TGES

LaserMethane SMART

Laser flammable gas detector

LM2B03E-SBA (Bluetooth enabled)
LM2B03E-SNA (Bluetooth less)

Operating Instructions

Be sure to read this manual before using this product.

DISTRIBUTED BY:

HEATH CONSULTANTS

Your Safety...Our Commitment

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Tokyo Gas Engineering Solutions Corporation

Congratulations on your purchase of the Laser Methane Gas Detector. This product is a hand-held gas detector capable of remote detection of methane and methane containing gases (e.g. natural gas).
Please read this manual to ensure it is used correctly.
This product is intrinsically safe explosion-proof “ic” certified equipment. It is certified for explosion-proof designated area “zone 2” and must not be used in “zone 0” or “zone 1”.

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1. Introduction

1.1 Check your package

Remove the detection unit and included accessories from the packaging and ensure that the following items are included. If any of these items are missing or damaged, please contact us as soon as possible as indicated on page 60 of this document.

Main Unit

Main Unit : 1unit

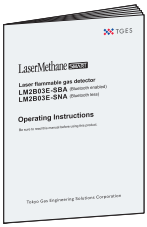
(Battery case and a micro SD card already installed)

Standard accessories

Carrying case: 1 piece

Strap: 1 piece

Instruction manual: 1 copy



About the trademark

The Bluetooth logo is a trademark or registered trademark of BluetoothSIG, Inc. and is used by Tokyo Gas Engineering Solutions Co., Ltd. under license.
The ™ mark and ® mark are not specified in this instruction manual.

2. Safety Precautions

Before using the product, please read this section carefully to use the product correctly.

- Within this manual and on the product labels, it is shown how to use the product safely, and prevent harm to the user and others. Please follow the pictures as indicated for proper safe use.
- To clearly indicate the level of danger and potential for damage, the warnings due to incorrect handling are classified into three categories: “Danger”, “Warning” and “Caution”. Each of these defines important safety information and must be observed by the user. The symbols and their meanings are as follows:

Degree of danger/damage and its indication

DANGER	Indicates an imminently hazardous situation which, if not avoided, could result in death or serious injury to the user.
WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to the user.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor injury to the user or other persons, or physical damage only.

Symbols used on the product or in the instructions

	Indicates a prohibited activity. The prohibition is indicated in or near the circle.
	Indicates a mandatory action to be followed. In or near the circles, you will find the information that you must follow.
	Indicates a warning or reminder. This is indicated in or near the triangle.
	This mark indicates that the part is recyclable.

DANGER

Do not use the product in an abnormal state , for example, if the product is producing smoke, or a strange odour. If the product is used in this abnormal state, there is a risk of fire or electric shock.

Do not use the product if the exterior (housing) is damaged. Failure to do so may result in fire or electric shock.

Do not use the product if water or foreign matter gets inside. Use of the product in this condition may result in fire or electric shock.

[If any of the above occurs, please take the following steps immediately:]

- Turn off the power to the unit.
- Remove the battery from the unit.
- Contact us through the options provided on page 60 of this manual.

This product is approved for zone “2”. Use in any other zone may result in death or serious injury to the user or an accident.
However, the measuring and guiding light is “op is T3 Ga” obtained as standard, so that the laser beam can be directed into zones “0” and “1”.

Do not attempt to replace batteries in areas where explosive gases may be present.

Improper handling of the batteries may result in fire, electric shock or explosion. The following points should be observed

- The following batteries can be used:
  Designated battery:manufacturer “Panasonic”
  Rechargeable battery: AA nickel-hydrogen batteries
  “eneloop” series : BK-3HCD, BK-3MCC
  “EVOLTA” series : BK-3MLE, BK-3LLB
- Charge the secondary battery with a special charger designated by the manufacturer.

DANGER

- Do not break the battery case or heat the battery.
- Do not throw batteries into a fire.
- Do not remove the battery case in a hot environment (for example, in a car under the blazing sun).
- Do not expose the battery and battery case to water, oil, or other liquids. Do not use in humid areas.
- Do not use the machine if the battery is leaking.
- When you do not use the machine for a long period of time, remove the battery from the machine.

WARNING

Do not disassemble this product. Disassembly is strictly forbidden in order to maintain the safety level of explosion-proof equipment. This equipment should not be serviced by the user.
Disassembly or repair by the user may result in electric shock, burns or injury. For internal inspection, adjustment or repair, please contact your local service representative.
For information on the explosion protection of this product, please refer to page 14.

Do not look into the light emitted from the product or point it at anyone while the power is on. Exposure to radiation may result in injury. Please observe the following.

- Do not shine the guide laser beam directly into your eyes or the eyes of others. Please try to avoid pointing the laser beam at eye level.
- Do not reflect the guide laser beam from a mirror or other highly reflective material.
- Never look into the light from the product.
- Do not allow children to handle it.

For more information about the laser beam, see page 18.

CAUTION

This product has been tested and certified as intrinsically safe or explosion-proof. Please note that strict limits apply to the assembly, maintenance and repair of this equipment. Failure to comply with these restrictions may result in dangerous operation of the equipment.

Do not subject this product or the battery case to strong shocks or vibrations. Doing so may cause damage to the product.

Do not press the touch screen display forcibly or subject it to strong shocks. Doing so may result in damage.

Do not use in areas of high heat as this may lead to ignition. Please note the following points

- Do not cover with tablecloths.
- Do not use in places where air circulation is poor, such as in boxes.
- When recharging batteries, use the method specified by the battery manufacturer.

Do not hold the detector lamp close to your eyes for long periods of time. Doing so may cause blindness and result in an accident.

Do not use batteries that have been over-discharged.
If the unit is stored with batteries installed for more than two months, the batteries will over-discharge and become unusable.
Replace the batteries with a new ones.

Be careful of static electricity.
This product may malfunction due to static electricity. If this happens, please restart the product.

CAUTION

Always use the strap when using this product.
Use the strap to prevent damage, malfunction or injury from the product being dropped.

Gas measurements should be carried out at a short distance away from electrical appliances and industrial equipment that generate electrical noise.
There is a possibility that the gas will not be measured correctly.

Do not use in areas where corrosive gases may be present (e.g. hot springs) or where there is a high salt content (e.g. salt water beaches).
Doing so may result in the product lifespan being shortened.

When storing this product, please note the following:

- Do not store the product in extremely high temperatures, such as in a car, or in a cold place where it is directly exposed to very outside air.
- Do not store the product in a place where it is likely to be subjected to strong vibrations.

When transporting the unit, please pay attention to the following points

- If the product is transported by car or other means, it must be protected from direct vibration and shock.
- If the product is shipped for repair, please place a shock absorber in the delivery box.

CAUTION

Do not point the product in the direction of strong light such as sunlight.
Prolonged exposure to strong light may cause internal damage to the device.

Do not remove the security seal from the device.
Removing the security seal will void the product warranty. Please refer to pages 12 and 13 for the location of the security seal.

3. Terms of use

■ About the Bluetooth communication function

The LM2B03E-SBA incorporates Bluetooth functionality. Please note the following when using this product:

Do not use this product or your smartphone in a metal case.
The measurement data from the product is sent to your smartphone via the Bluetooth communication function, and the smartphone sends the received data to the cloud server.
If either or both of the product and the smartphone are used in a metal case, this may cause problems such as failure to transmit data, loss of communication or a shortened communication range.

For more information on the use of dedicated smartphone applications and cloud servers, please contact your retailer.

Keep this product and your smartphone away from devices equipped with wireless LAN.
If you use the Bluetooth function of this product near a device equipped with a wireless LAN (IEEE802.11b/g), the communication speed of the wireless LAN may be reduced. In addition, the communication speed between this product and a smartphone may decrease or communication may be cut off.

If the product is used in the presence of medical electronic equipment, care should be taken to ensure that it does not affect the medical electronic equipment Bluetooth.
Radio waves in the 2.4GHz band used for the communication may affect medical electronic equipments.

Tokyo Gas Engineering Solutions Corporation will not bear the responsibility of measurement data or information.

■ Radio interference

This product complies with the CE marking according to the EU directive and is intended for use in an industrial environment.

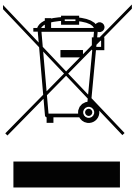
However if this product is used near a radio or television receiver, interference may occur. In addition, if the product is used near electrical or industrial products that generate strong magnetic fields or electrical noise, the gas may not be detected correctly.

■ Precautions for the use of this product

- When handling this product, please be careful of static electricity. Please use this product in an environment with sufficient anti-static measures.

■ Remarks about proper unit disposal.

This product complies with the Council Directive 2012/19 / EU (“WEEE Directive”) of the European Union and the pictogram shown on the right is displayed on the unit.

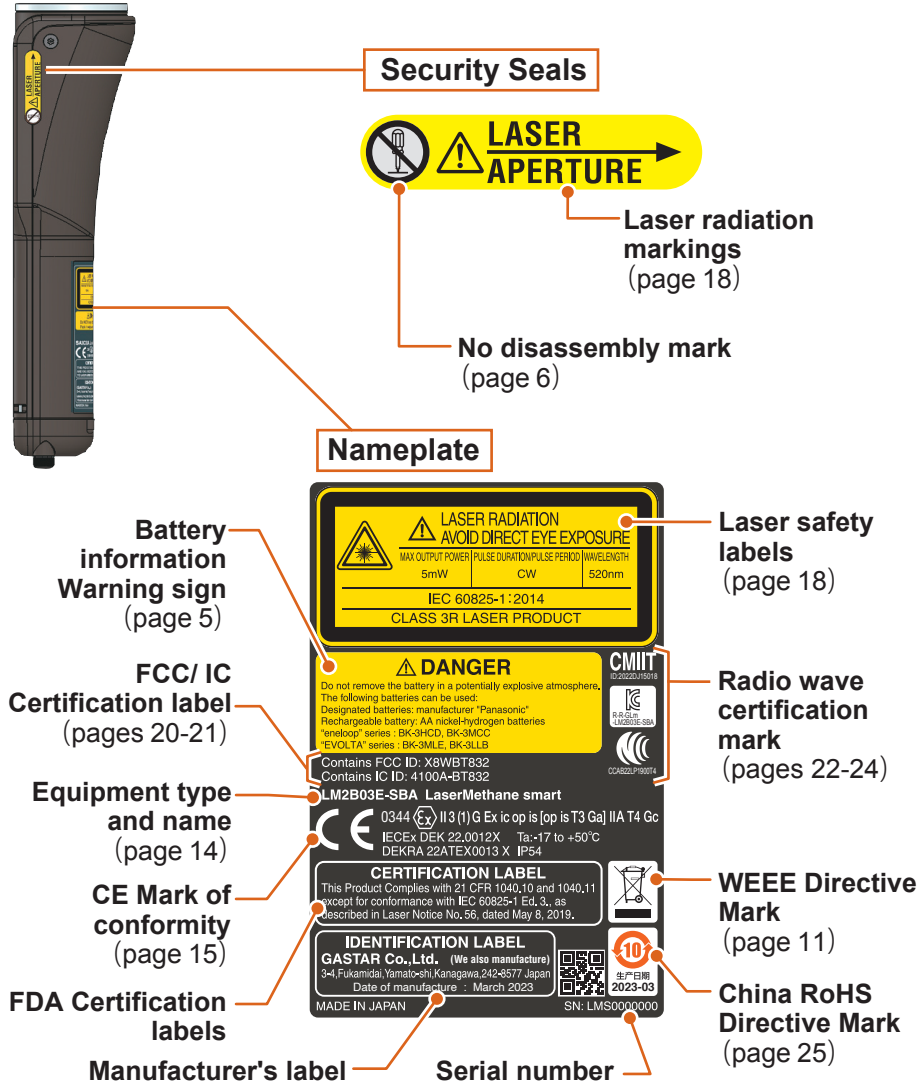


For products placed on the EU market after 13 August 2005, please contact Tokyo Gas Engineering Solutions Corporation at the end of the product’s useful life to arrange disposal in accordance with the original contract and local legislation.

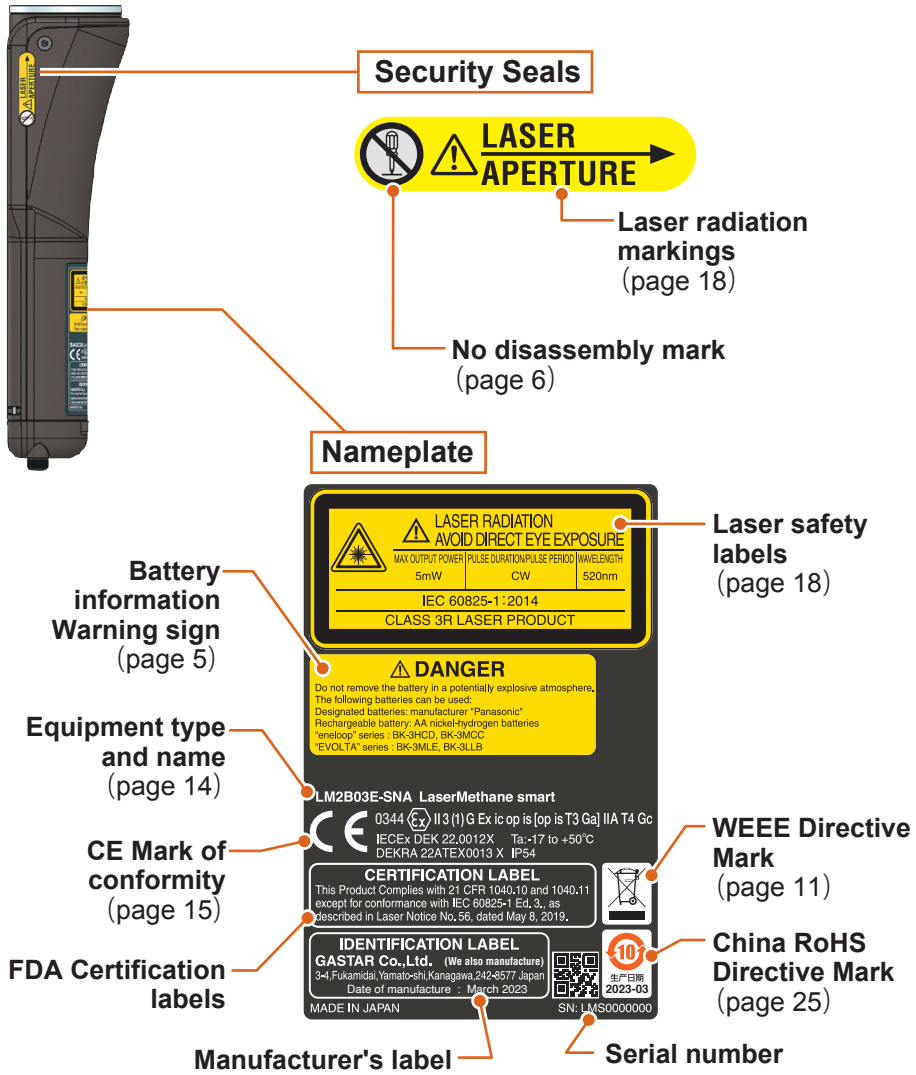
4. Certifications and Standards

4.1 Position of the nameplate and caution label

Model : LM2B03E-SBA



Model : LM2B03E-SNA



4.2 Certification

■ About explosion protection

IECEx Intrinsically safe explosion-proof
ATEX Intrinsically safe explosion-proof

Note 1) Intrinsically safe explosion-proof type

- ATEX Intrinsically safe explosion-proof type : Type “ i ”
- Certification number IECEx: IECEx DEK 22.0012X
  ATEX: DEKRA 22ATEX0013 X
- Products : LM2B03E-SBA LaserMethane smart
  LM2B03E-SNA LaserMethane smart
- Manufacturer : GASTAR Co., Ltd.
- Address : 3-4, Fukamidai, Yamato-shi, Kanagawa, 242-8577 Japan
- Applicable standards : IECEx : IEC 60079-0:2017 IEC 60079-11:2011 IEC 60079-28:2015
  ATEX : EN IEC 60079-0 : 2018 EN 60079-11:2012 EN 60079-28:2015
- Type of protection and marking code
  CE 0344 Ex II 3 (1) G Ex ic op is [op is T3 Ga] IIA T4 Gc
- Group : II
- Categories : 3G
- Ambient temperature : −17 to +50 °C
- Applicable detection hazard location : Methane and methane containing gases zones 2

Note 2) Repair

- Disassembly or modification of this product by the customer is prohibited. Any disassembly or modification of the product is not warranted as intrinsically safe by IECEx and ATEX.

WARNING

Use of explosion-proof equipment

For repair of this product, please contact your dealer or our contact person.

This product has been certified as an intrinsically safe explosion-proof type as described above. Repair or modification of the intrinsically safe equipment by the customer may result in damage to the intrinsically safe or explosion-proof construction.

■ CE Indication of conformity

The manufacturer, GASTAR Co.,Ltd., in accordance with Regulation (EC) No 2019/1020, has marked the following products with the CE conformity mark to indicate that they comply with the EMC, ATEX, RE and RoHS directives of the European Union (EU).

■ Display of CE

1. Product model

Model : LM2B03E-SBA LaserMethane smart
: LM2B03E-SNA LaserMethane smart
Accessories : LM2B91E Straps
LM2B92E Battery case
LM2B93E Carrying case

2. Applicable directives

EMC : Directives 2014/30/EU
ATEX : Directives 2014/34/EU
RE : Directives 2014/53/EU
RoHS : Directives 2011/65/EU

3. Standards to be applied

EMC
Emissions : EN61326-1:2021
Immunity : EN61326-1:2021

	Criteria *
IEC61000-4-2 (ESD)	B
IEC61000-4-3 (EMF)	A
IEC61000-4-8 (RPFMF)	A

*** : Performance criteria**

A : The product shall continue to operate as intended during and after testing. If the product is used as intended, any reduction in performance or loss of function cannot be less than the performance level specified in the operating instructions. When immunity tests with continuous electromagnetic phenomena are applied, the performance level may be replaced by an acceptable reduction in performance which is recovered without user intervention. An acceptable reduction in performance is only permitted within a performance level if this information is clearly provided to the user via documentation such as the product's operating instructions. Changes to the operating state or loss of data are not permitted.

B : The product shall continue to operate as intended after testing. If the product is used as intended, any degradation in performance or loss of function cannot be less than the performance level specified in the operating instructions. During testing, the performance level of the equipment may be replaced by an acceptable reduction in performance if such a reduction in performance is detailed in the EMC test plan. An acceptable reduction in performance is only permitted within the performance level if this information is clearly provided to the user via the product's instruction manual or other documentation. Unintentional changes to the operating state are permitted if self-healing is possible. The loss of stored data is not permitted.

C : Loss of function is permitted if the function is self-recoverable or can be recovered by operation of the control. The recovery procedure is described in the operating instructions.

4. Certifications and Standards

ATEX :	**EN IEC 60079-0 : 2018**
	EN 60079-11 : 2012
	EN 60079-28 : 2015
IECEx :	**IEC 60079-0 : 2017**
	IEC 60079-11 : 2011
	IEC 60079-28 : 2015
RE :	**EN 62368-1 : 2014+A11 : 2017**
	EN 62479 : 2010
	EN 301 489-1 V2.2.3
	EN 301 489-17 V3.2.4
	EN 300 328 V2.2.2
RoHS :	**EN IEC 63000: 2018 (Category 9)**

4.3 Applicable Standards

■ Laser beam safety

The measurement laser beam emitted by this product is classified as class 1 according to IEC 60825-1 specification.
The guide laser beam is classified as class 3R according to IEC 60825-1 specification. The guide laser beam is dangerous to the eyes and should not be observed directly or aimed at other persons. Energizing the guide laser beam can also be seen on the display as “ LASER ”.
The Class is indicated on the label on the back of the product (see “ Specification of the laser beam” on page 19).

Class 1 and 3R indicate the degree of danger with respect to the laser beam, as defined in IEC 60825-1 as follows:

Class 1 : Laser products that are safe to use for long periods of direct observation in the beam, even when using telescopic optics. Observation in the beam can still cause visual effects such as blindness, especially in dark surroundings.

Class 3R : Although the level of radiant power exceeds the MPE for direct in beam observation conditions, the AEL is 5 times stronger than the Class 2 AEL (for visible lasers) or 5 times more powerful than the Class 1 AEL (for invisible lasers) and therefore the risk of failure is relatively low for these laser products. Because of the relatively low risk, the requirements for manufacturers and the control criteria in the national regulations for users are less stringent than for Class 3B. Laser products of class 3R are not regarded as intrinsically safe, but the risk is reduced.

■ Specification of the laser beam

1. Laser Safety Classifications Based on IEC 60825-1:2014	2. Incorporated laser Specification
■Measurement light beam radiation (Class 1 Laser) ●Maximum output power : 10mW or less ●Pulse width : CW ●Wavelength : 1653nm ●Beam extension in collimated beam : 8.5mrad or less	■Measurement light beam radiation ●Pulse width : CW ●Wavelength : 1653nm ●Beam extension in collimated beam : 8.5mrad or less ●Embedded laser output level : 10mW or less
■Guide light beam radiation (Class 3R Laser) ●Maximum output power : 5mW or less ●Pulse width : CW ●Wavelength : 520nm ●Beam extension in collimated beam : 1.5mrad or less	■Guide light beam radiation ●Pulse width : CW ●Wavelength : 520nm ●Beam extension in collimated beam : 1.5mrad or less ●Embedded laser output level : 5mW or less

CAUTION The use of controls or adjustments or the performance of procedures other than those specified here may result in dangerous exposure to laser radiation.

■ Compliance with Radio Law (Applicable for LM2B03E-SBA only)

This product is equipped with a Bluetooth module.
As the Bluetooth module transmits and receives radio waves, it must be certified according to the radio law of the country in which the product is used.

■ Radio Law certification (Applicable for LM2B03E-SBA only)

This product has been certified according to the Radio Law of the following Countries:
Europe, Japan, USA, Canada, People's Republic of China, Republic of Korea, Taiwan.
If you require certification for use in other countries, please contact your dealer or our sales representative.

Please check the page 12 name plate for the Radio Law certification mark.

■ RE Directive (Applicable for LM2B03E-SBA only)

In order to export radio equipment (including radio modules) to Europe, the product must comply with the Radio Equipment Directive (RE Directive 2014/53/EU).
The product has been certified as compliant with the directive in the CE declaration and can therefore be sold in Europe.

■ FCC Regulations (Applicable for LM2B03E-SBA only)

This product has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. There is no guarantee, however, that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna.
- Increase the distance separating the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult your dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.
This product must not be co-located or operated together with any other antenna or transmitter.

■ RF exposure compliance (Applicable for LM2B03E-SBA only)

This product complies with the FCC radiation exposure limits established for uncontrolled environments and meets the FCC radio frequency (RF) exposure guidelines in Supplement C of OET65. The RF energy of this product is so low that it is considered compliant without a maximum permissible exposure (MPE) rating. However, it is advisable to operate the device itself at a distance of at least 20 cm from the human body (excluding hands, wrists, feet and ankles).

■ IC regulations (Applicable for LM2B03E-SBA only)

The device (Bluetooth module) complies with Industry Canada's licence-exempt RSS standard.
The following two conditions apply to its operation

(1) This device may not cause interference.
(2) This device must accept any interference received, including interference that may cause undesired operation of the device.

The device must accept any interference that may cause undesired operation of the device.

Cet équipement est conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contrôlé et respecte les règles d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'IC.
Cet équipement émet une énergie RF très faible qui est considérée conforme sans évaluation de l'exposition maximale autorisée. Cependant, cet équipement doit être installé et utilisé en gardant une distance de 20 cm ou plus entre le dispositif rayonnant et le corps (à l'exception des extrémités : mains, poignets, pieds et chevilles).

■ CMIIT Registration Information (Applicable for LM2B03E-SBA only)

The following are the provisions of the “Measures for the Management of Electronic Information Products” of the People’s Republic of China.
They are applicable only in the People’s Republic of China.

- Conformity ID; CMIIT ID: 2022DJ15018
- Product name: LaserMethane smart
- Model name: LM2B03E-SBA
- Brand Name; TGES
- Manufacturer’s name; see end of book
- Country of origin; see end of page

■ Product Description（产品说明）

1. ■ 使用频率：2.4 - 2.4835 GHz
   ■ 等效全向辐射功率 (EIRP)：
   天线增益＜ 10dBi 时：≤ 100 mW 或≤ 20 dBm ①
   天线增益≥ 10dBi 时：≤ 500 mW 或≤ 27 dBm ②
   ■ 最大功率谱密度：
   天线增益＜ 10dBi 时：≤ 20 dBm / MHz(EIRP) ①
   天线增益≥ 10dBi 时：≤ 27 dBm / MHz(EIRP) ②
   ■ 载频容限：20 ppm
   ■ 带外发射功率（在 2.4-2.4835GHz 頻段以外）
   ≤ -80 dBm / Hz (EIRP)
   ■ 杂散发射（辐射）功率（对应载波 ±2.5 倍信道带宽以外）：
   ≤ -36 dBm / 100 kHz (30 - 1000 MHz)
   ≤ -33 dBm / 100 kHz (2.4 - 2.4835 GHz)
   ≤ -40 dBm / 1 MHz (3.4 - 3.53 GHz)
   ≤ -40 dBm / 1 MHz (5.725 - 5.85 GHz)
   ≤ -30 dBm / 1 MHz（其它 1 - 12.75 GHz)
2. 不得擅自更改发射频率、加大发射功率（包括额外加装射频功率放大器），不得擅自外接天线或改用其它发射天线；
3. 使用时不得对各种合法的无线电通信业务产生有害干扰；一旦发现有干扰现象时，应立即停止使用，并采取措施消除干扰后方可继续使用；
4. 必须忍受各种无线电业务的干扰或工业、科学及医疗应用设备的辐射干扰；
5. 不得在飞机和机场附近使用。

■ KC registration information (Applicable for LM2B03E-SBA only)

The provisions of the “Korean Radio Law / EMC Regulations” of the Republic of Korea are shown below.
These apply only in the Republic of Korea.

■ KC 등록정보

본 제품은 다음과 같이 등록되어 있습니다 .

□ 등록 번호 : R-R-GLm-LM2B03E-SBA
□ 신청자명 : 주식회사 가스터
□ 제품 이름 : LaserMethane smart
□ 모델명 : LM2B03E-SBA LaserMethane smart
□ 제조 연월 : 본체 라벨에 기재
□ 제조자명 : 주식회사 가스터
□ 제조국 : 일본

사용자 안내문

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서
가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다 .

■ NCC registration information (Applicable for LM2B03E-SBA only)

GASTAR Co., Ltd. In order to show that the following products comply with the frame of NCC in Taiwan, the following products are marked with NCC according to the rules.

CCAB22LP1900T4

■ Product name ; LaserMethane smart
■ Model name ; LM2B03E-SBA
■ Brand name ; TGES
■ Manufacturer ; See the end of the book
■ Country of origin ; See end of book

■ **Warning text display**（警告文字顯示）

『取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。
低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。
前述合法通信，指依電信管理法規定作業之無線電通信。
低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。』

■ **Warning statement about NCC:**（警告使用者）

警告使用者：
此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。

■ The provisions of the “Law for Restricting the Use of Hazardous Substances in Electrical and Electronic Products” of the People’s Republic of China are as follows.
This is only applicable in the People’s Republic of China.

关于符合中华人民共和国《电器电子产品有害物质使用限制控制法》规定的声明

产品中有毒、危险物质或元素的名称和含量

部件名称	有毒和危险物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (CD)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷线路板 (PCA)	×	○	×	×	○	○
机壳、支架 (Chassis)	○	○	×	×	○	○
LCD	×	×	×	×	○	○
其他(电缆、风扇、连接器等) (Appended goods)	×	○	×	×	○	○

○表示该有毒有害物质在该部分所有均质材料中的含量均低于 GB/T26572 规定的限制要求。

× 表示该零件至少一种均质材料中有毒有害物质的含量超过 GB/T26572 规定的限制要求。

《电子电气产品有害物质限用标识要求》SJ/T 11364-2014

环保使用期限

该标志基于“电子电气产品有害物质限制使用标签要求”。 自生产之日起，产品中所含有害物质的泄漏或突然波动不会对环境污染、人身和财产造成重大影响。

5. Overview and principles

5.1 Overview

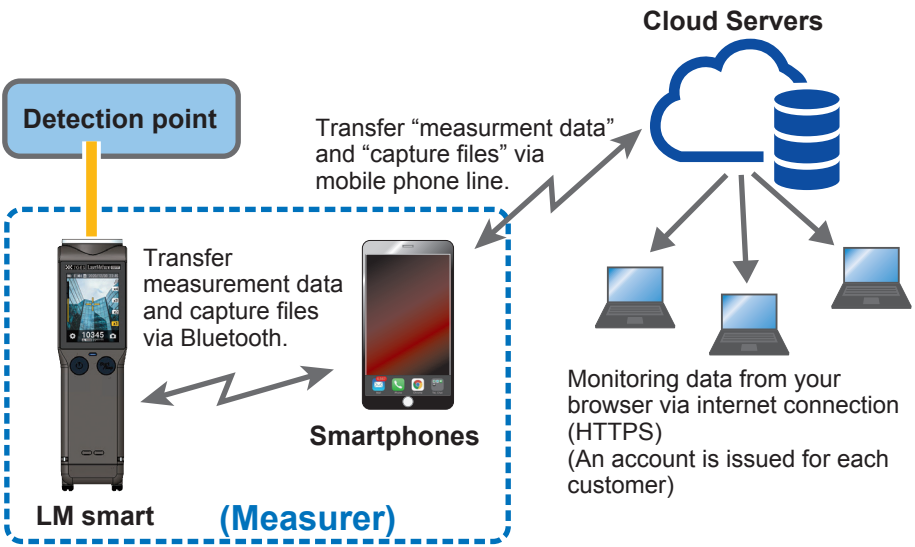
This handheld gas detector is designed for remote detection of methane and methane containing gases (e.g. natural gas). By pointing the detector in the desired direction, methane within a distance of approximately 30 metres is instantly detected.

The measuring laser beam is accompanied by a green guide laser beam, which enables the measuring point to be visually identified.
The total amount of methane detected is shown in real time on the display.

Using the Bluetooth function (Applicable for LM2B03E-SBA only)

Using the product's Bluetooth function and a dedicated smartphone app, measurement data and image files taken with the camera can be captured via the smartphone and transferred to a cloud server. At that time, location information from the smartphone is added to the file name of the measurement data and the capture data.

Note: For more information on the use of special applications for smartphones and cloud servers, please contact your retailer.

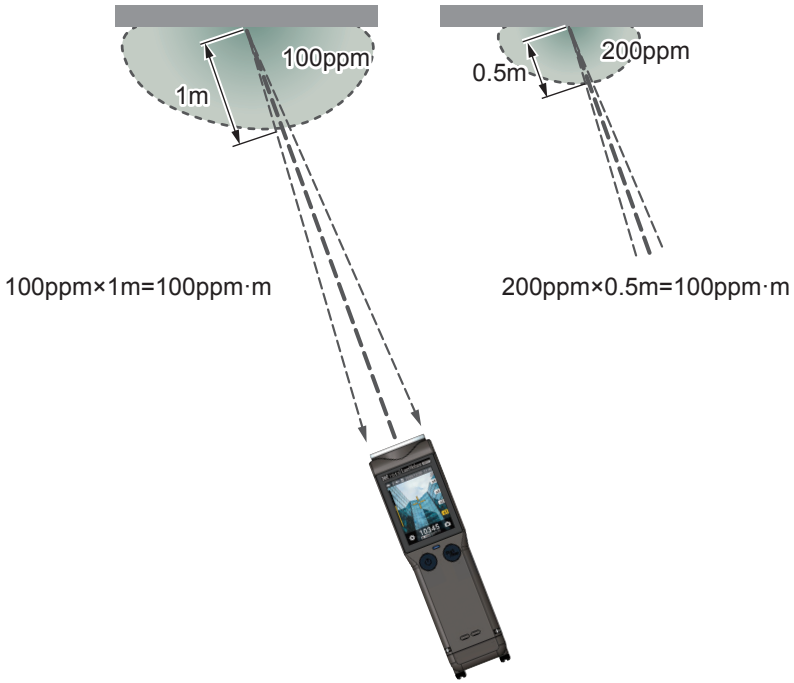


5.2 Principle

The product detects methane based on near-infrared absorption spectroscopy using a semiconductor laser.

A laser beam is emitted towards a detection point (gas pipe, ceiling, wall, floor, ground, etc.). The laser beam is scattered when it hits the detection point. A part of the scattered light is detected by the receiver of the product, and the total amount of methane between the product and the detection point is measured.

The total amount of methane measured is expressed as the methane concentration (ppm) multiplied by the thickness (m), i.e. the methane column density (ppm-m).

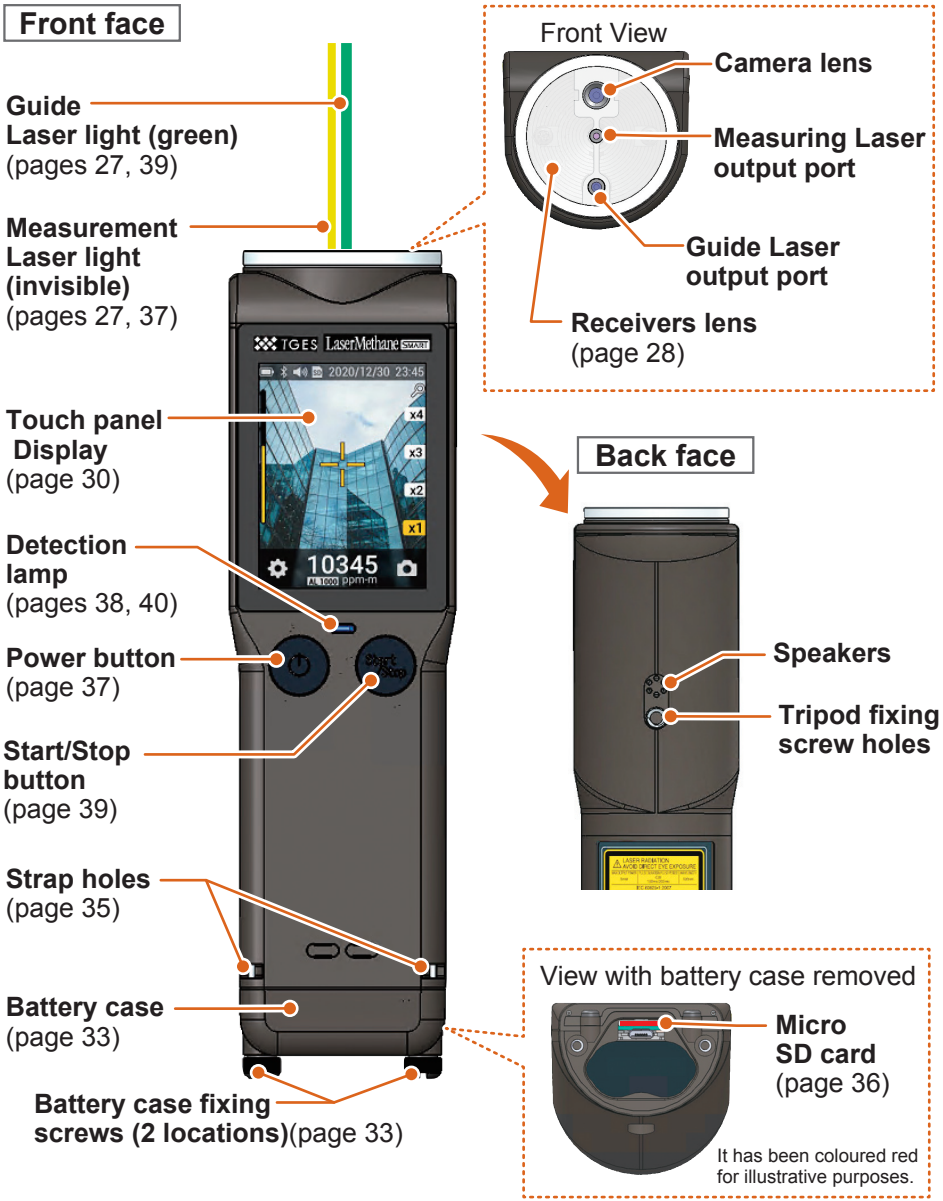


Both detect the same methane column density.

In principle, this product cannot detect gases other than methane (butane, propane, etc.). It is also not possible to detect gases beyond the reach of the measuring laser, for example behind walls or underground.

6. Names of the parts

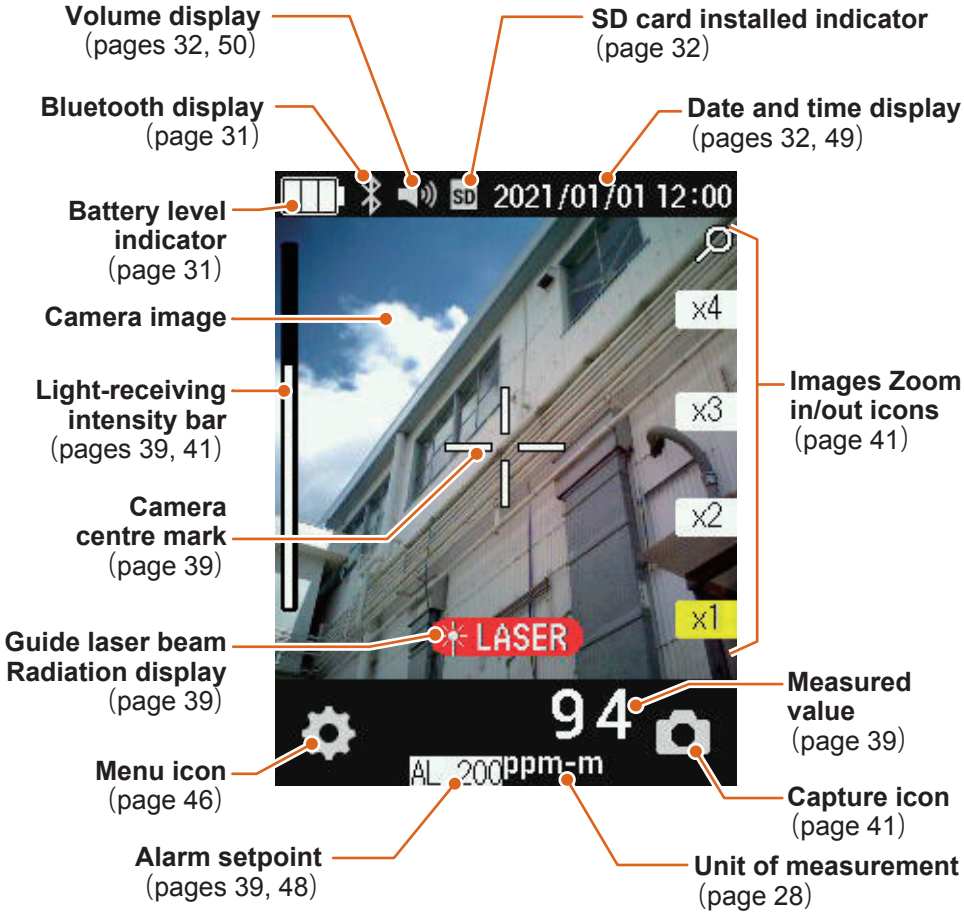
6.1 Main Unit



6.2 Touch Panel Display

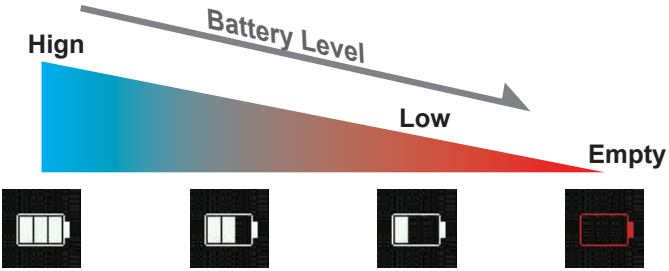
The initial page shown below will appear when power-on.

Note: The figures are examples for illustrative purposes only. Not all displays will appear at the same time. For other indications, please refer to the section regarding “8. Operations”.



Battery level indicator

When the battery is low, the product will stop working. We recommend that you replace the batteries as soon as possible.



NOTE: During measurement, if the battery power becomes low, a warning alarm will sound. In this case, the measurement is stopped and the measurement standby screen is forcibly displayed. You cannot perform any operations other than zooming in and out of the image and turning off the power.
NOTE: If the product is powered on with “no- battery condition,” the measurement standby screen will be displayed instead of the startup screen, and the warning instead of the startup screen.

Bluetooth display

(Applicable for LM2B03E-SBA only)

This icon indicates that the product is a model with Bluetooth function (it will be displayed even if the product is not connected to a smartphone). For more information on using the Bluetooth function, see page 45.

Volume display

Displays the volume of the operating sound and alarm.
For information on how to change the volume, see the section about “Sound” on page 50.

SD card installed indicator

The product is equipped with a micro SD card (16 GB). This is where measurement data and captured files will be stored.
You can also remove the micro SD card and view the measurement data and captured files on your PC.
Please note that the Micro SD card is installed in a narrow space and should be handled with care.
For instructions on how to remove and insert the micro SD card, see the section on “7.4 Removing and inserting a micro SD card” on page 36.
NOTE: Tokyo Gas Engineering Solutions Corporations shall not be liable for any loss of data or damage caused by malfunction of the micro SD card.
NOTE: If the product is damaged due to a damaged micro SD card, it will be repaired for a fee. Please contact your dealer or our sales office.

Date and time display

Displays today’s date and time.
Please refer to the section on ‘Time & Date’ on page 49 for settings.
NOTE: This product has a built-in battery for back-up, but if the current time is not set for a long period of time, the time may is not. If this happens, please reset the time.
NOTE: The backup battery cannot be replaced by the customer. Please consult your dealer or our contact person for advice.

7. Preparation before use

7.1 Preparing batteries for use

This product is not supplied with batteries.
Please prepare 4 AA batteries before using this product.
The following batteries can be used:

Designated battery:manufacturer "Panasonic"
Rechargeable battery: AA nickel-hydrogen batteries
"eneloop" series : BK-3HCD, BK-3MCC
"EVOLTA" series : BK-3MLE, BK-3LLB

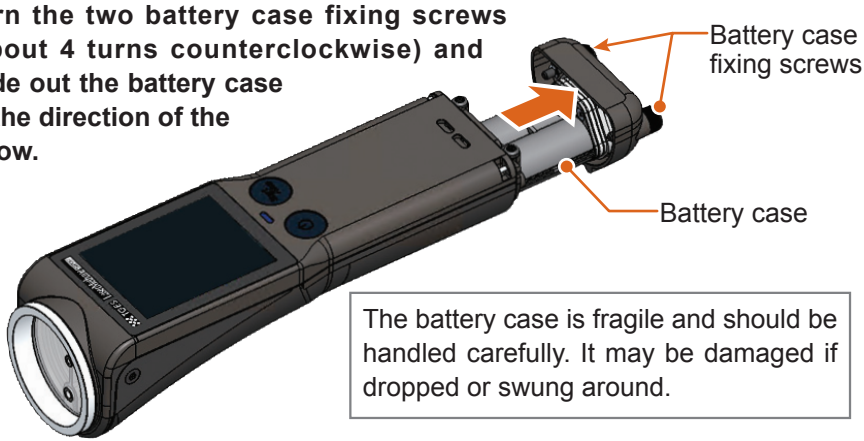
NOTE: The one with the longest drive time is "eneloop pro BK-3HCD".

DANGER **Use only the same type and make of batteries. Using different types, different manufacturers, or mixing old and new batteries may cause accidents or damage.**
Use batteries in accordance with the specified precautions of the battery manufacturer.

CAUTION **When using this product, start it up within an ambient temperature range of -5 to +40°C.**
When using this product near the highest or lowest temperature in the operating temperature range, wear gloves as handling with bare hands may result in 'burns' or 'frostbite'.

7.2 Battery installation

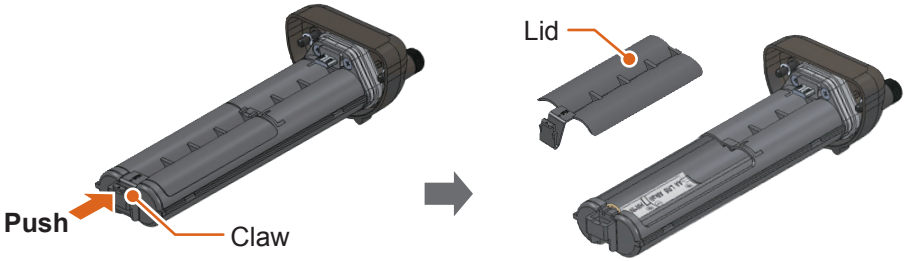
1 Turn the two battery case fixing screws (about 4 turns counterclockwise) and slide out the battery case in the direction of the arrow.



The battery case is fragile and should be handled carefully. It may be damaged if dropped or swung around.

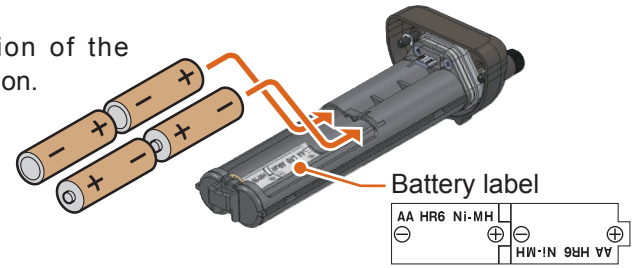
❷ Detach the battery case lid.

Press the claw in the direction of the arrow to release the lid.



❸ Insert four batteries.

Check the orientation of the batteries before insertion.



❹ Attach the lid and return it to the main unit.

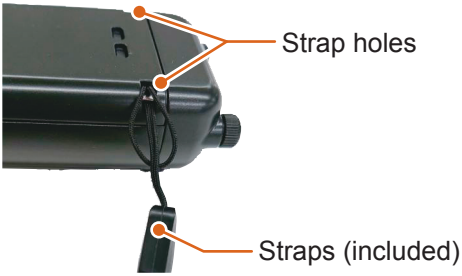
The lid can be fitted by inserting the protruding part into the battery case as shown in the diagram and pressing the claw part from above. After inserting the battery case into the body, tighten the two screws completely.

⚠ CAUTION **The packing attached to the battery case is an important component to ensure waterproof performance. If it is damaged or detached, please replace it.**

❺ **Tighten the two battery case fixing screws firmly in their original positions.**
Securely fasten the battery case to the main unit so that there is no contact between the battery case and the main unit.

7.3 Attachment of straps

Attach the strap to the product as shown in the diagram below.



There are two strap holes. Choose the one that is most convenient for you.

CAUTION **To prevent damage from drops, always carry the product by the strap in your hand.**

CAUTION

Specific conditions of uses

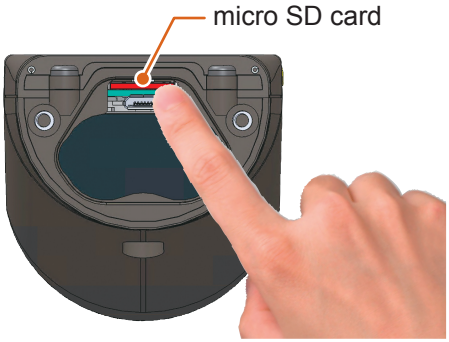
This device is equipped with a shock-sensitive LCD screen and a Fresnel lens. If the device is dropped or hit strongly, it will be damaged by the impact and cannot be used safely, so please take extra care when carrying it around.

7.4 Removing and inserting a micro SD card

The micro SD card can be inserted in the upper part of the battery case compartment.
When removing and inserting the micro SD card, turn off the power before removing the battery case.

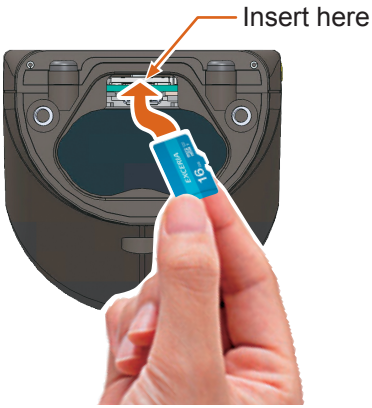
Removing the micro SD card

Press the micro SD card once and it will pop out a little, remove it carefully.



Inserting a micro SD card

Push the SD card until you hear a click sound.
Make sure the orientation of the SD card. Metallic contacts of the SD card are not seen when inserting.



To replace the microSD card Select microSDHC 16 GB.
For other micro SD cards, please check at your own risk.

CAUTION **Please handle the micro SD card with care.**

8. Operations

8.1 Start-up and Shutdown

Turn the power on

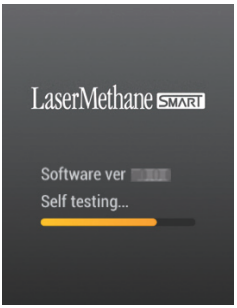
1. **Press and hold the Power button for approximately 2 seconds.**
   The device will start with a “beep” sound.

WARNING **When the power is switched on, a measuring Laser beam (invisible light) is emitted. Do not look into the receiver or point it at anyone.**

▶ **The start-up screen appears for a few seconds, followed by the self-test screen for a few seconds.**

- The start-up time may be longer depending on the temperature.
- “Self-test” is a self-diagnostic test to ensure correct measurement.

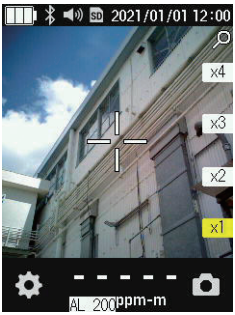
[Startup screen]



[Self-test screen]

NOTE: If the self-test fails, an error message will appear. See ‘SELFTEST FAILURE’ on page 54.

▶ **When measurement preparation is complete, the screen shown on the right appears indicating the measurement standby mode.**



[Standby screen]

The standby screen turns off after approx. 1 minute. Tap anywhere on the display, or press the Start/Stop or Power button, and the standby screen will appear.

▶ **While waiting for a measurement, the detection lamp flashes.**

Turn off the power

❶ **Press and hold the power button for approximately 2 seconds.**
The main unit will power off.

8.2 Measurement

You have to insert a SD card to record measurements.
It can be checked with the SD card installed indicator. Refer to page 36 for micro SD card insertion.

❶ **Press the Start/Stop button and point the guide Laser beam at the object to be measured.**
A beeping sound is audible and the measurement of the gas concentration will begin.

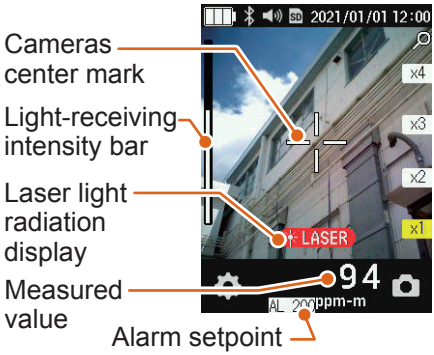
> ⚠ **WARNING** **The guided Laser beam is emitted as soon as the measurement starts. For safety reasons, please do not look into the front light receiving area.**

▶ **During measurement, measured values are shown on the display screen.**

- If the measured value is shown in white, the measurement is accurate.
- Adjust the orientation of the product so that the camera center mark is at the center of the object to be measured.
- During the measurement waiting period, the measured value is displayed as "-----".

NOTE: The unit of measurement is "ppm-m".

> The figure shows an example in Normal Mode.
> When the measurement mode is LDAM Mode, the display is partially different. See 'Mode Selection' on page 51.



> ⚠ **WARNING** **When LASER is lit on the display, green laser light is emitted. Do not point or look into the laser light.**

▶ If you detect methane gas...

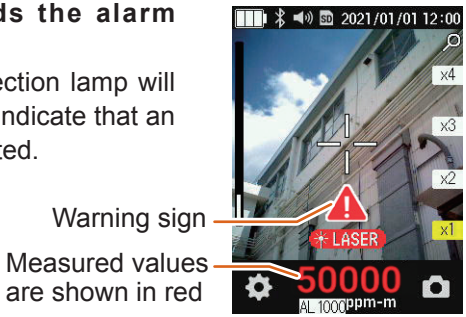
- The measured value will increase.
  The measured value depends on the amount of methane gas and the distance to the measuring position. When there is a methane leak, the reading will rise sharply.

▶ If the measured value exceeds the alarm setpoint...

- The alarm will sound begin beeping and the flashing duration of the detection lamp will shorten. Refer to ‘Alert Value’ on page 48 for the alarm setting value.

▶ If the measured value exceeds the alarm setpoint by a factor of 5...

- The alarm will beep and the detection lamp will change from flashing to fully lit to indicate that an abnormal reading has been detected.
  The measured value is shown in red.



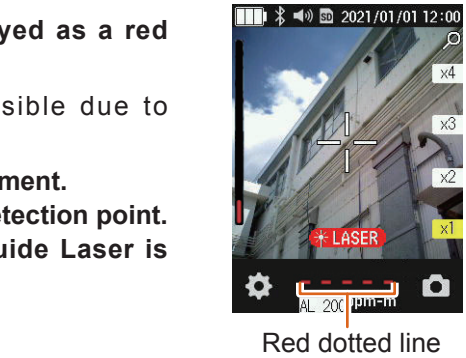
▶ If the measured value is displayed as a red dotted line - - - - -...

Measurement is no longer possible due to insufficient light reception.

Try a different method of measurement.

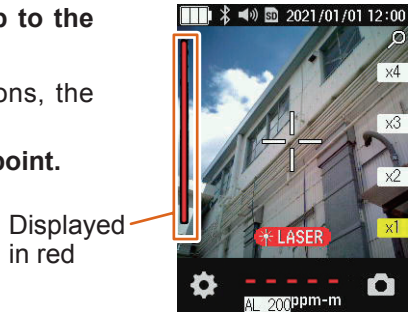
(1) Shorten the distance to the detection point.

(2) Look for areas where the guide Laser is reflected and facing the front.



When the light intensity bar is red up to the upper limit...

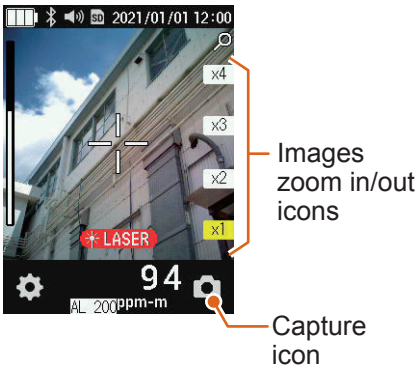
Due to sunlight or strong laser reflections, the measurement is no longer possible.
Shorten the distance to the detection point.



❷ **Capture the screen** if necessary.

(1) Tap the image zoom in/out icons to select the magnification.
x4 is the maximum magnification ratio.

(2) Tap the capture icon.



> If the measurement mode is LDAM Mode, you can choose to save or discard the capture file.
> See 'Mode Selection' on page 51.

❸ **To end the measurement, press the Start/Stop button again.**

The measurement is completed, and the measurement standby screen is displayed.

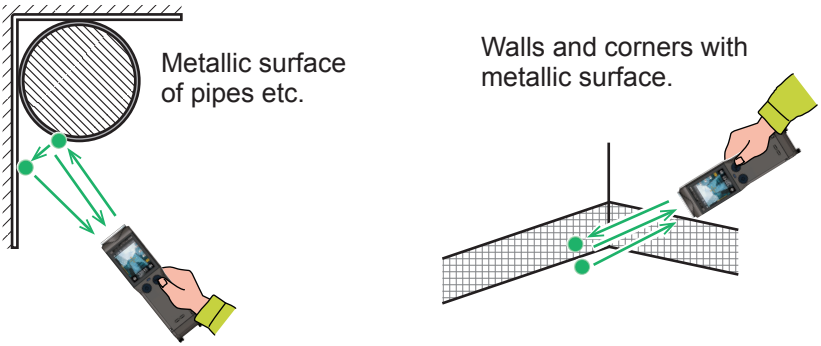
> ⚠ **CAUTION** **Always switch off this product when not in use.**

Two guide laser beams are visible?

When measuring on or near shiny reflective objects such as metal, it is possible to see two guide laser beams, as shown in Figure-A. In this case, a high measurement value may be displayed regardless of the presence of methane. In such a case, please measure at the point where the guide laser beam appears to be one, as shown in Figure-B.

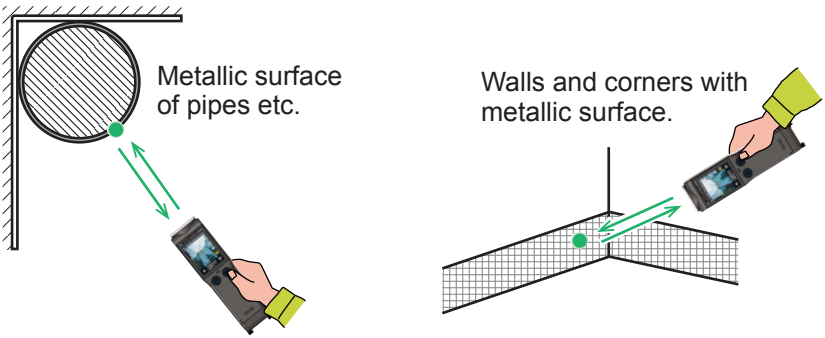
[Figure-A: Possible display of high readings]

If two guide laser beams are visible, it is possible that the measured value wrong.



[Figure-B: The case of the correct measurement value]

Make sure you see only one laser point for proper measurements.



NOTE: If the object is a PE tube with a thickness more than 10mm, it may not be possible to make a correct measurement because the measuring light penetrates the PE tube.

About measured and captured data:

- During measurement, the measured value is updated every 0.5 seconds.
- During measurement, the data is stored in the memory in every 3 minutes. The last data before terminating the measurement will be less than 3 minutes.
- The measurement data and the capture file are stored in the micro SD card together with the information of the measurement (or capture) date and time.
  If the device is connected to a smartphone, device location obtained from the smartphone will be added to the memory file.

20210928140351_LMS2109002_+25.470167_+118.469034.txt

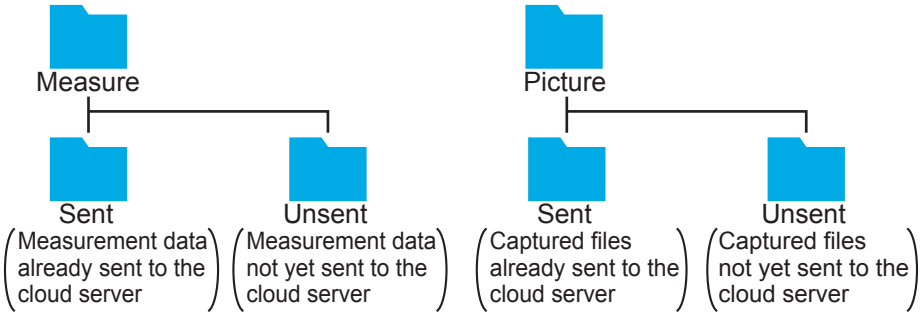
Date and time	**Serial number of this product**	**Location information (Latitude _ Longitude)**
Example of 28 September 2021 14:03:51		

- The built-in Micro SD card can store approximately 2,035 days of measurement data (approximately 13.7 kB for 3 minutes) alone, and approximately 65,000 times of capture files (approximately 21.2 kB per file) alone.
- When the capacity of the Micro SD card is used up, the product will delete the old measurement data and capture files stored in the SD card, and overwrite them with new data and files.

8.3 Viewing data on a micro SD card on your computer

You can remove the micro SD card from the product and view the measurement data (.txt) and capture files (.jpg) on your computer.
For details on how to remove the micro SD card, see “7.4 Removing and inserting a micro SD card” on page 36.

About the folder structure in the micro SD card



Viewing measurement data

The measurement data is in CSV format. It can be viewed in Excel or other programs.

When you run out of space on your SD card...
This product deletes the measurement data and capture files stored in the SD card in order of oldest to newest, and overwrites them with new data and files.
For the approximate amount of data that can be stored, please refer to “About measured and captured data:” on page 43.

8.4 Transferring data to a cloud server

(Applicable for LM2B03E-SBA only)

As soon as this product is started, Bluetooth will be in transmitting status. When the connection with the smartphone is established, it starts to send and receive the following data.

Location information:	Transfers the location information obtained by the GPS function of the smartphone to the device.
Measurement data etc. :	Transfers the data measured with this product, screen capture files, etc. to your smartphone.

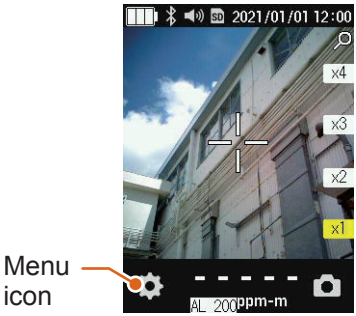
NOTE: For information on how to operate the application for smartphones and transfer data to the cloud server, please contact your retailer.

Special application for smart phones
Application softwares for iPhone and Android are available.
Please contact your dealer for information on obtaining and using the application.

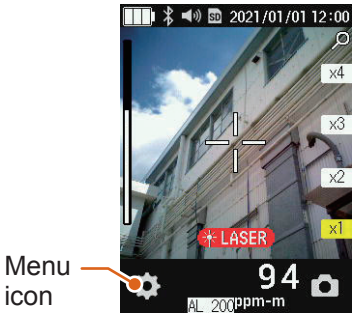
8.5 Changing settings

On menu screen

❶ **Tap the menu icon on the standby or in-measurement screen.**
The [Menu screen-1] will appear.



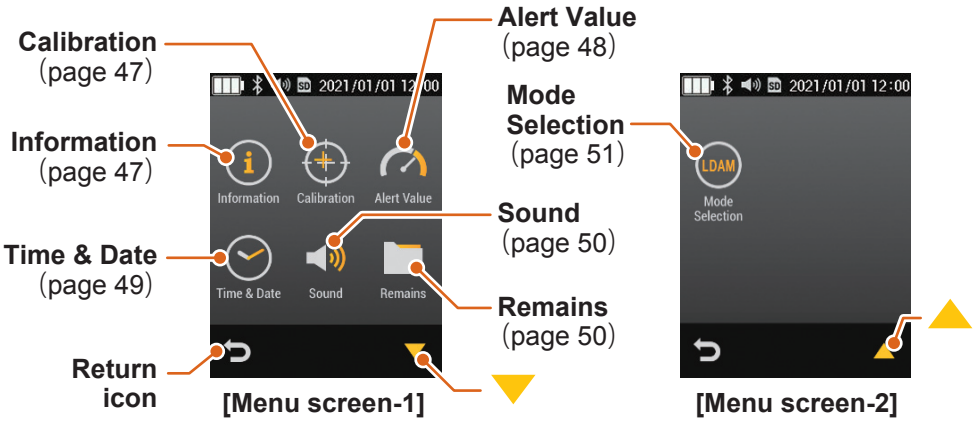
[Standby screen]



[Screen during measurement]

❷ **Tap ▼ or ▲ to switch between menu screen-1 or screen-2.**

❸ **Tap the icon you wish to change or confirm.**



[Menu screen-1] [Menu screen-2]

❹ **Check and change the settings if necessary (see pages 47 to 52).**

❺ **Tap the return icon to return to the standby screen.**

Check and change your settings

1 Tap the respective icon.

Information

Information about the "Product Serial No." and "Software Version" is displayed.
The information is displayed sequentially by ▼.
Tap the return icon to return to [Menu Screen-1].

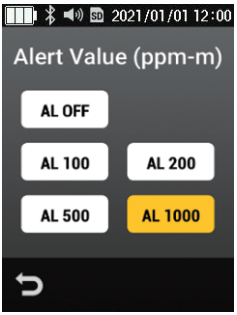
Calibration

Tapping ▶ Start button will start the calibration. Calibration will take between 2 to 3 minutes. During calibration, calibration progress will be shown on the bar indicator.
When the calibration is completed, the display returns to the measurement standby screen.

[Standby screen]

> **Calibration should be carried out regularly to ensure consistent performance.**
> **Calibration should also be carried out if errors become frequent or if the instrument has not been used for a long period of time.**

Alert Value



Set the methane column density to alarm when measuring.
Please select OFF, 100, 200, 500, or 1000 (ppm-m).
Tap the return icon to return to [Menu Screen-1].

For example, if AL100 is selected, an alarm beeping will be audible intermittently when the measured value is 100ppm-m or more, and the detection lamp will light up.
When a reading of 500ppm-m (5 times the set value) or more is detected, the alarm sounds with a continuous beep and the detection lamp will light up.

If AL OFF is selected, the alarm will not sound (the detection lamp also does not light up).

NOTE: The factory default setting is 100ppm-m.
NOTE: The alarm setting point can be checked on the standby screen.

For methane column density, see page 28.

Time & Date

Enter the current date and time.
You will first be prompted to enter the date (Date).

(1) Set Year, Month and Day by tapping ▼ or ▲ respectively.

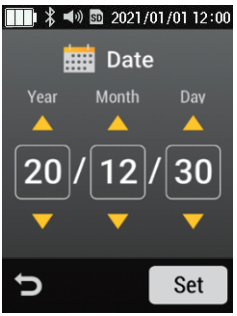
(2) Tap the Set button to confirm the value and display the time entry screen (Time).
NOTE: If you do not tap Set at this point and tap the return icon, the date will be cancelled and you will be returned to [Menu Screen-1].

(3) Hour, Min and Sec are set by tapping the ▼ or ▲ button respectively.

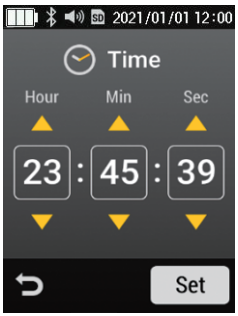
(4) Tap Set to confirm the value and return to [Menu Screen -1].
NOTE: If you do not tap Set at this point and tap the return icon, the time entry will be cancelled and you will be returned to the Date screen.

NOTE: When entering the year, month, date or time, long-tap ▼ or ▲ to change the number in succession.

NOTE: Please tap Set on both the Date and Time screens. If you return with the return icon, you will not have changed either the date or the time.

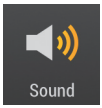


[Date input screen]

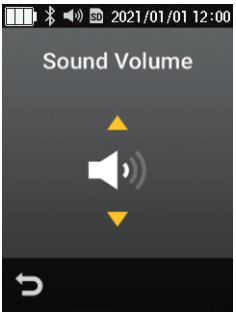


[Time input screen]

NOTE: The factory default setting is ‘unsuitable’. Re-set it at the time of the location where it will be used.



Sound



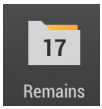
To change sound volume.
Tap ▼ or ▲ to select OFF, Small, Medium or Large.

OFF	Small	Medium	Large

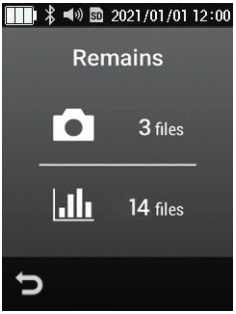
Check the volume with the sound produced when changing the setting.
Tap the return icon to return to [Menu Screen-1].

NOTE: The factory default setting is “Medium”.

NOTE: The volume indicator at the top of the screen shows the current volume setting.



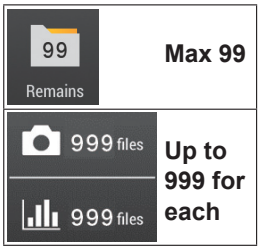
Remains



You can check how many capture files and measurement data have not yet been transferred to your smartphone.
The right figure is an example of 3 capture files and 14 measurement data points that have not yet been transferred. Tap the return icon to return to [Menu Screen-1].

NOTE: The number displayed on the menu screen icon is the total number of untransferred capture files and untransferred measurement data.

NOTE: The limits on the number of data that can be displayed on the screen are shown on the right. If the number of data exceeds the limit, it will not be displayed.



NOTE: For information on the amount of data that can be stored on a micro SD card, see page 43.

NOTE: For information on transfering data from your smartphone to the cloud server, please refer to the instructions for using the cloud service.

Mode Selection

(Applicable for LM2B03E-SBA only)

Switches the measurement mode.
Select either LDAM Mode or Normal Mode.

LDAM Mode: For LDAM-compliant information management.

Normal Mode: If LDAM management is not required.

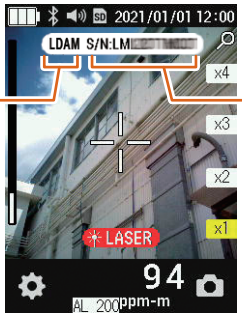
Tap the return icon to return to the menu screen.

NOTE: The factory default setting is "Normal Mode".

The above figure shows the case when Normal Mode is selected.

When LDAM Mode is selected

The LDAM mode indicator and the serial number of the product are displayed on the standby and in-measurement screens.



LDAM Mode dispaly

Serial number of this product

If you capture a photo during a measurement by tapping the camera icon, the measurement will be aborted and the screen will change to the preview screen.
You can then choose to save or discard the image.

SAVE

DISCARD

Indicates that this is a preview screen.

What is LDAM?

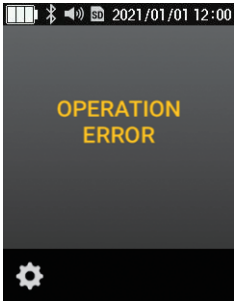
LDAM is an acronym for Leak Detection And Maintenance and is the collective name for the functions of the entire system of leak detection and data recording.
LDAM requires that a series of inspection records of critical inspection points and information about the equipment used for the inspection must be maintained.
The product has an ‘LDAM mode’ specification to meet this requirement. The product's ‘LDAM mode’ is designed to extract, record and verify only the data recorded for the LDAM.

When LDAM Mode is selected

During the measurement, the product serial number is shown on the product display. On the cloud service side, there is a menu where only files captured for LDAM can be extracted and displayed.

9. Error Message

9.1 Explanation of error messages and how to deal with them



OPERATION ERROR

Instrument operation error. Displayed when the instrument is not ready for measurment.

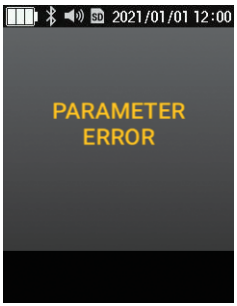
(1) Press and hold the power button for about 2 seconds to turn the power OFF.

(2) Press and hold the power button for about 2 seconds to turn the power ON.

If the error message is displayed again, please perform calibration.

For calibration, follow the instructions in “Calibration” on page 47.

If the OPERATION ERROR is displayed repeatedly, seek repair.



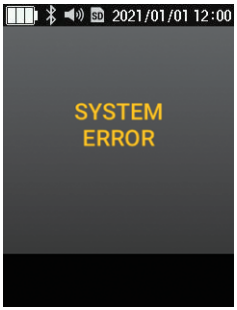
PARAMETER ERROR

Displayed when there is an error in the operating parameters.

(1) Press and hold the power button for about 2 seconds to turn the power off.

(2) Press and hold the power button for about 2 seconds to turn the power ON.

If the PARAMETER ERROR message is displayed repeatedly, call for service.



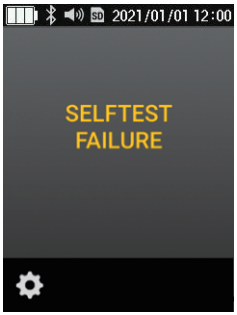
SYSTEM ERROR

This message is displayed when there is a malfunction in the control unit.

(1) Press and hold the power button for about 2 seconds to turn the power off.

(2) Press and hold the power button for about 2 seconds to turn the power ON.

If the SYSTEM ERROR is displayed again, please ask for repair.



SELFTEST FAILURE

Appears when the self-test fails on power-up (the instrument does not meet the specified measurement performance).

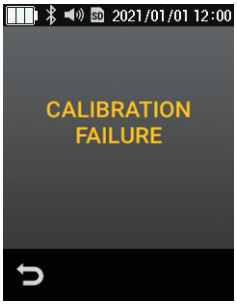
(1) Press and hold the power button for about 2 seconds to turn the power OFF.

(2) Press and hold the power button for about 2 seconds to turn the power ON.

If the error message is displayed again, please perform calibration.

For calibration, follow the instructions in “Calibration” on page 47.

If the SELFTEST FAILURE is displayed repeatedly, seek repair.



CALIBRATION FAILURE

This is displayed when the calibration has not been carried out correctly.

(1) Calibration is carried out again.

If the CALIBRATION FAILURE message is displayed repeatedly, call for repair.

10. Troubleshooting

10.1 Symptoms and remedies

Symptoms	How to deal with	Reference page
Pressing the power button does not start the machine	Did you press and hold (approx. 2 seconds) unt you hear a “beep”?	page 37
	Is there enough battery power? Replace the battery with a fully charged or new ones.	page 31
Measurement sound “beep...” is not audible	Do you have the volume turned off in the “Sound” setting?	page 50
Alarm not sounding	Have you increased the value of the ‘Alert Value’ setting?	page 48
	Do you have the volume turned off in the “Sound” setting?	page 50
Sound is audible even though Sound is turned off	If there is no battery power remaining, you will hear a sound when you press a button or other object that cannot be operated.	page 31
The date and time display is off, even after resetting the settings.	The backup battery is low.	Request a repair

If the symptoms persist, or if you are unsure, discontinue use and contact your dealer or retailer for advice.

11. Maintenance

11.1 Routine maintenance

If the product becomes dirty, wipe it clean with a soft, dry cloth.

If the light-receiving part of the product, the measuring laser beam output port, the guide laser beam output port or the camera lens become dirty, wipe them gently with a soft, dry cloth so as not to damage their surfaces.

Do not use kitchen detergent, polishing powder, thinner, benzene or ethanol.
Do not scrub with a brush.
The surface gloss, printing and writing will be lost or scratched. If the receiver or laser output port becomes dirty or scratched, accurate measurement may not be possible.

11.2 Calibration

To ensure correct measurement results, calibration should be carried out regularly (once a month or so). Any malfunctions or failures due to lack of calibration will be subject to repair even if the product is still under warranty.

See page 47 for calibration instructions.

12. Specifications

12.1 Main Unit

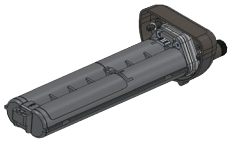
Item	Specifications
Target gas	Methane (CH4) Methane containing gases (e.g. natural gas)
Unit	ppm·m
Detection limits	1 ~ 50,000ppm·m
Detection accuracy	± 10% (Note)
Detection response time	0.1 second
Sensing distance	0.5m ~ 30m
Power supply	Designated battery: manufacturer “Panasonic” Rechargeable battery: AA nickel-hydrogen batteries “eneloop” series : BK-3HCD, BK-3MCC “EVOLTA” series : BK-3MLE, BK-3LLB
Continuous operating time	Full operation (@ 25°C): approx. 2.5 hours Battery: Panasonic eneloop BK-3MCC used Note: The more times the battery is charged, the shorter the operating time will be.
Laser safety	IEC60825-1:2014 Guide laser beam Output wavelength:520nm Output level: 5mW (Class 3R) Below Measuring laser beam Output wavelength: 1653nm Output level: 10mW (Class1) Below Note: Do not look directry into the laser beam.

(Note) Detection accuracy of 100ppm-m and 1,000ppm-m in dedicated measurement systems

Item	Specifications
External communication method	Bluetooth Ver.5.0 (Bluetooth Low Energy Only)
Applicable standards	EU Directive [EMC] EN61326-1: 2021 EU Directive [ATEX] EN IEC 60079-0: 2018 EN 60079-11: 2012 EN 60079-28: 2015 EU Directive [IECE x] IEC 60079-0: 2017 IEC 60079-11: 2011 IEC 60079-28: 2015 EU Directive [RE] EN 62368-1: 2014+A11: 2017 EN 62479: 2010 EN 301 489-1 V2.2.3 EN 301 489-17 V3.2.4 EN 300 328 V2.2.2 EU Directive [RoHS] EN IEC 63000: 2018 (Category 9)
Intrinsic safety	Ex II 3 (1) G Ex ic op is [op is T3 Ga] IIA T4 Gc
Environmental conditions	Operating temperature range: –17 to +50 °C Operating humidity range: 30 ~ 90% (No condensation)
Protection class	Dust and drip proof construction (IP54 equivalent)
Storage temperature / humidity range	–20 to +60 °C, 90% Below
Dimensions and weight	Dimensions: 55mm (W) × 200mm (D) × 53mm (H) Weight: 500g Below (with 4 eneloop batteries installed)

13. Ordering information

13.1 Standard accessories

Productname	Type	Shape
Carrying case	LM2B93E	
Straps	LM2B91E	
Battery case	LM2B92E	

To place an order, please contact the dealer from whom you purchased the product or your contact person.

14. Warranty and Contact Information

14.1 Warranty information

Tokyo Gas Engineering Solutions Corporation provides a 12-month warranty from the date of purchase, providing free repair of defects caused by faulty workmanship. However, this warranty does not apply in the following cases

- Failure due to use not in accordance with the instructions in the manual
- Damage caused by improper operation, use, unauthorised alteration, dismantling or repair.
- The fault is caused by frequent use, clearly beyond normal use.
- Failure caused by improper or inadequate maintenance by the customer
- Unavoidable disability caused by fire, flood, earthquake or other natural disaster, or by war or riot.
- Failures caused by connections other than to specified products, components or consumables.
- Faults caused by a power supply other than that specified, the place of use, etc.

Tokyo Gas Engineering Solutions Corporation shall not be liable for any damage to the customer or loss of business caused by unforeseen circumstances resulting from defects in this product.

14.2 Contact us

If you have any questions or concerns about this product, or if you think it is faulty, please contact us at the address below.

Tokyo Gas Engineering Solutions Corporation

Shiodome Shiba-Rikyu Building,
1-2-3, Kaigan, Minato-ku, Tokyo 105-0022, Japan
TEL : +81-3-6452-8460
FAX : +81-3-6452-8392
URL : https://www.tokyogas-es.co.jp/en/index.html

LaserMethane SMART

No.SG21-LM9001-1201x02(1/1)

EU DECLARATION of CONFORMITY (DoC)

This declaration of conformity is issued under the sole responsibility of the manufacturer:

Name: GASTAR Co., Ltd.

Address: 3-4, Fukamidai, Yamato-shi, Kanagawa, 242-8577 Japan

We declare that the DoC is issued under our sole responsibility and belongs to the following product:

Object of the declaration:

Product Name LaserMethane smart

Model Name LM2B03E-SBA

LM2B03E-SNA(Not subject to RE)

LM2B03N-SBA(Not subject to ATEX)

LM2B03N-SNA(Not subject to RE and ATEX)

The object of the declaration described above is in conformity with the relevant Union harmonization legislation:

(RE) Directive (2014/53/EU)Radio Equipment

(EMC) Directive (2014/30/EU)Electromagnetic Compatibility

(ATEX) Directive (2014/34/EU)Equipment and protective systems for potentially explosive atmospheres

(RoHS) Directive (2011/65/EU) Restriction of Hazardous Substances in Electrical and Electronic Equipment

The following harmonized standards and technical specifications have been applied:

Health & Safety (Article 3.1(a)):	EN 62479:2010	EN 62368-1:2014+A11:2017
EMC (Article 3.1(b)):	EN IEC 61326-1:2021 ETSI EN 301 489-17 V3.2.4	ETSI EN 301 489-1 V2.2.3
Radio Spectrum (Article 3.2):	ETSI EN 300 328 V2.2.2	
ATEX	EN IEC 60079-1:2018 EN 60079-28:2015	EN 60079-11:2012
RoHS	EN IEC 63000:2018(Categories 9)	

Signed for and on behalf of:

Kanagawa Japan	20 September 2022	T. Sato
Place of Issue:	Date of Issue:	Tetsuya Sato Head of Business Development Department

European Union importer information.

■ **PERGAM ITALIA SRL**
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e-mail: info@pergamitaly.eu

Sales Company

Tokyo Gas Engineering Solutions Corporation

Shiodome Shiba-Rikyu Building,
1-2-3, Kaigan, Minato-ku, Tokyo 105-0022, Japan
URL: https://www.tokyogas-es.co.jp/en/index.html

Manufacturing Company

GASTAR Co.,Ltd.

3-4, Fukamidai,Yamato-shi, Kanagawa, 242-8577 Japan
URL: http://www.gastar.co.jp/

LM2B03E-SBA•LM2B03E-SNA
LaserMethane smart
Operating Instructions
20 March 2023 (First edition)

KGL02-0912(00)

5910909000

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Printed in Japan