

www.sdtron.co.kr

SunDoo

Human & Technology





Contents

About us

- 01 Introduction
- 02 History
- 03 Customer

Business Field

- 01 Research & Development
- 02 Sales
- 03 Training
- 04 Customer Support

***We are an industry leader
in the forefront of gas safety.***

We are committed to the production of gas safety instruments for the purpose of protecting people and property through dedicated research and development of gas detection and monitoring equipment. The company operates under the guiding philosophy of “Warm Ice” under which, the instruments themselves are cold, but are infused with value-added warmth of the human care present in our employees as they work toward the goal of gas-safety through the use of our equipment.



Introduction



Sundoo Electronics Co. Ltd is a company that has demonstrated technology leadership in the gas safety field through extensive research and development. Its impressive track record of producing high-quality reliable instruments has made its instruments has created high demand for its products in the markets of natural gas and electricity. Its dedication toward developing new products for gas safety through collaboration and joint research and development with KGS as well as other companies internationally has contributed to the safety and prosperity of energy industries in Korea and abroad.

The flagship instruments manufactured by Sundoo Electronics Co. Ltd -- the Digital Manometer, Laser Methane Leak Detector, Vehicle Mounted Gas Leak Detector have made Sundoo a major contributor toward the technological independence of Korea and has decreased its need for the importing of instruments from foreign sources.

In addition, Sundoo has become a major overseas supplier of high-precision measuring instruments to KOGAS, KGS, Utility Companies, Power Plants, Construction Companies.

Sundoo fulfills a promise to customers to satisfy and maintain a wide set of needs through top-quality products through its continuing research and development as well as its position as a global-oriented trustworthy digital leader in the 21st-century gas safety industry.

History

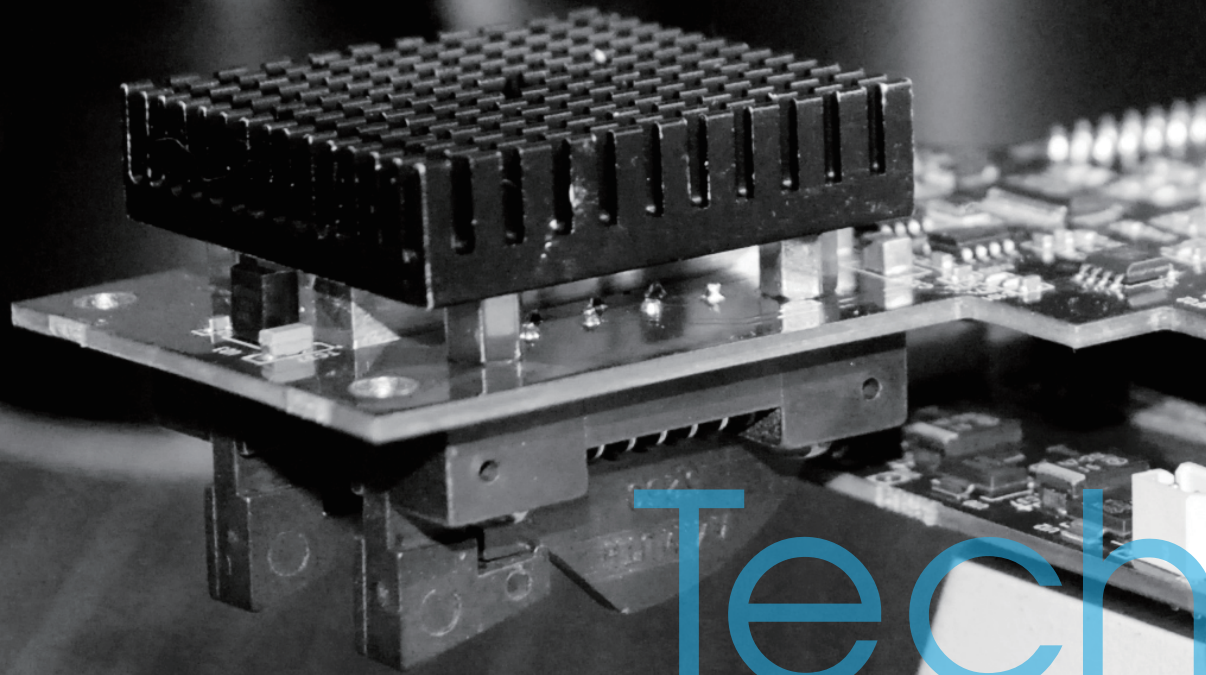


- 1997 Sundoo Electronics Co, Ltd. founded.
- 2005 Established R&D CENTER
- 2006 Certified as Venture Enterprise by the Korean Government And Inno-Biz Enterprise
Awarded Prize of Prestigious CEO in Business Innovation
Awarded Prize of Prestigious Manager of Medium Industry
- 2007 Certified ISO 9001 And ISO 14001
Awarded Prize of Prestigious Venture Enterprise by Minister of knowledge Economy
Awarded Prize of Promotion of Foreign Trade by Minister of knowledge Economy
Certified as Promising Export Firm by the small & midium Business Administration
- 2009 Awarded Prize of Technolgy Promotion by Minister of knowledge Economy
Awarded Prize of Technolgy Development by Minister of S&M Business Administration
Certified as Next Generation Export Firm
- 2011 Certified as small hidden champion by Ministry of Employment and Labor
- 2014 Awarded Prize of the development of the electric industry
- 2015 from the Small and Medium Business Administration.
- 2016 **Presidential Excellent Capital Goods Award.**
Development of safety equipment awarded by the Minister of National Security
Awarded Prize of Commendation from the Minister of Industry and Commerce
Awarded Prize of Industry and Energy by the Minister of Commerce
- 2017 Awarded Prize of Technology Promotion by the Minister of Future Creation Science
- 2018 KRISS Home Doctor Program Certification

Customer

Research & Development

- 01 CP-Monitor & Digital Manometer
- 02 Laser Gas Leaked Detector
- 03 Vehicle Mounted Gas Detector



Tech
Safet

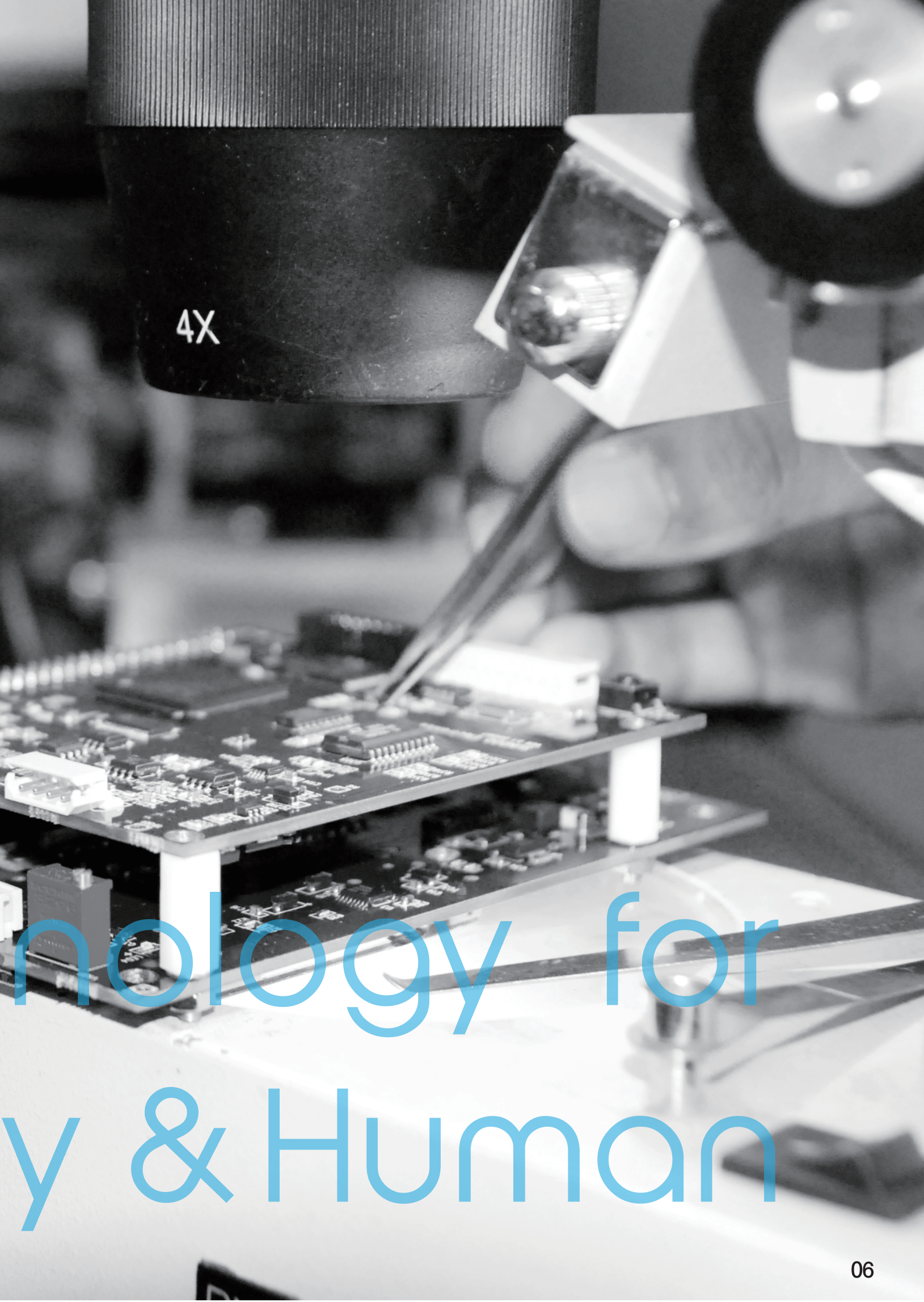
Buisness Field

Research & Development

Sales

Training

Customer Support



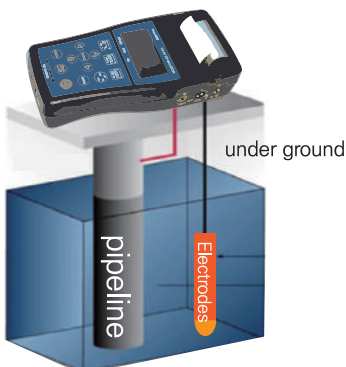
nology for
y & Human

SD-21 (CP-Monitor)

The Cathodic Protection Monitor is the first product Sundoo has ever developed and localized in Korea. This instrument is used for measuring electric field potential for the purpose of corrosion prevention on buried pipelines. SD-21 shows an outstanding performance track record over other competitors and has set the high-water mark for accuracy and reduction of distorted readings. The superiority of SD 21 has been well established by its ability to measure voltage, current, earth resistance, and frequency concurrently. The device does exceptionally well in the granite environment of Korea which requires input impedance 100 MΩ, which sets it apart from its competitors.



* How to work



* 8 certificates (CP-Monitor & Digital Manometer)



SDM-2 (Digital Manometer)

SDM-2 is an instrument that is intended to measure gas pressure and a gas tightness test for gas pipelines. It has proven to be an invaluable tool for KGS, Utility Companies, and construction companies. The instrument significantly saves time for users (SDM-2 just takes 4 minutes while Pressure Chart Recorder takes 30 minutes). It also can measure a wide range of pressure with three sensors low, medium, and high pressure. The internal printer provides a “hard copy” of the results is needed.

SDM-2

- Airtightness test
- Check for leak of gas
- Pressure test of LNG/LPG



SDM-L
Mini Digital Manometer



CP-Monitor

CP-Monitor & Manometer

Digital Manometer



(Early Model: SD-17)



(Model: SD-21)



(Model: SD-88)



(Model: SDM-2)



(Early Model: SD-55)

Laser Methane Leak Detector



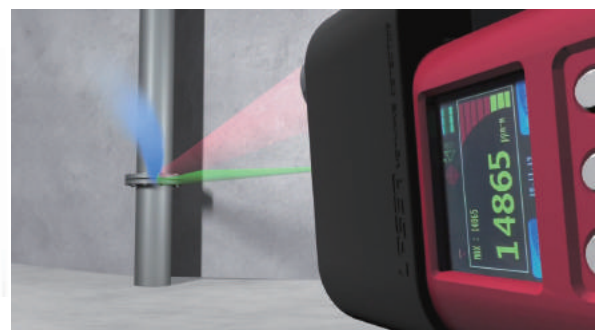
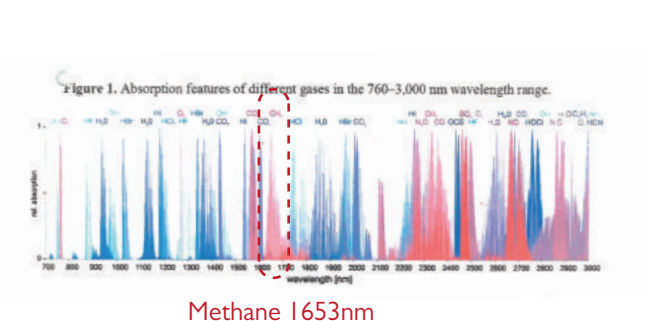
FDL-7



Pi-Note by Esders

Through joint research and development, Sundoo and KGS developed FDL-7, a Laser Methane Leak Detector. FDL-7 uses the TDLAS (Tunable diode laser absorption spectroscopy) technique for measuring the concentration of methane. This technology benefits operators by allowing inspection of inaccessible areas remotely, safely, and efficiently.

·TDLAS(Tunable diode laser absorption spectroscopy)



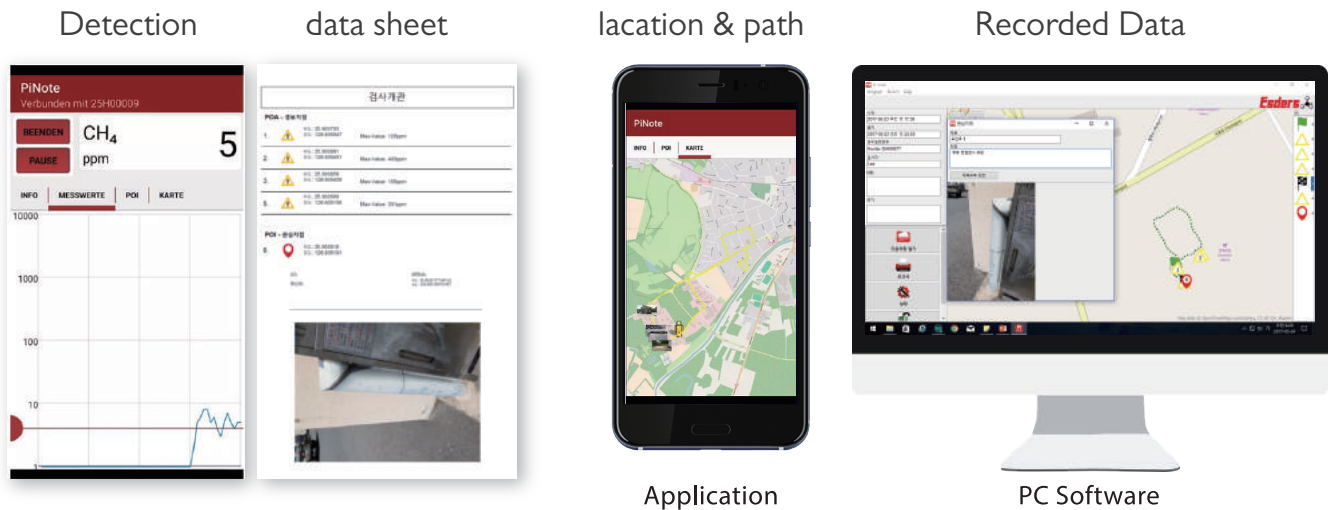
Detecting the intrinsic wavelength of methane molecules using a laser

 Environment



 PI-Note Application

FDL-7 synchronizes the Android App, “PI-NOTE,” to log the data which includes surveyed area, suspicious leakage spots with pictures. This information can be received through email and managed easily on a PC.



 We are developing various types of laser detectors



(On Sale)

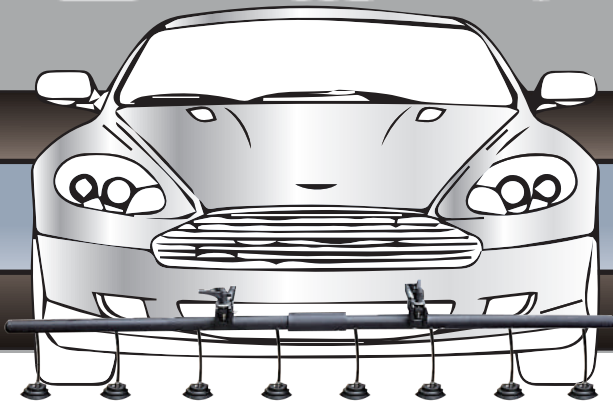
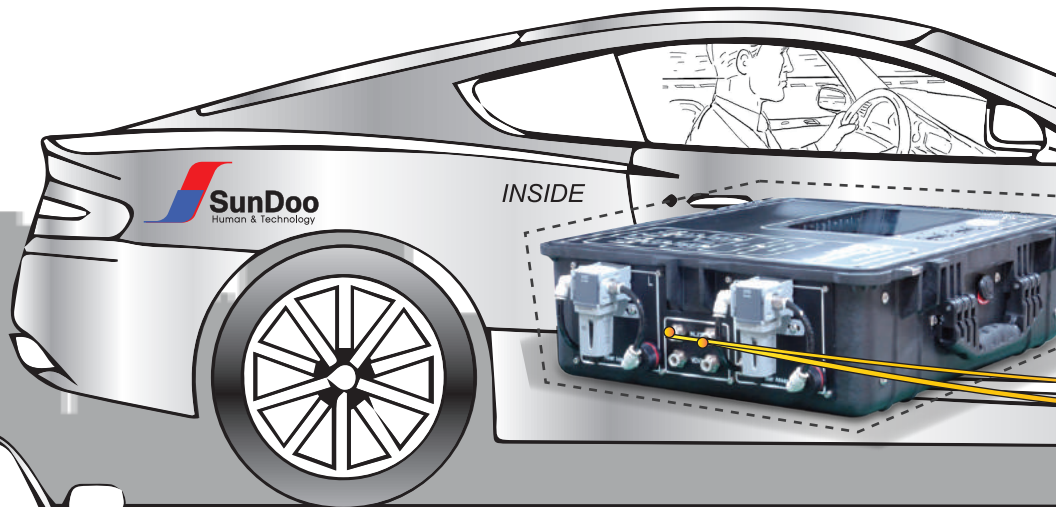
(Developing)

(Developing)

(On Sale)

(On Sale)

TRACER LASER



Timeline of Vehicle

FID (flame ionization detector)

IR (Infrared Controlled Interference Polarization Spectrometer)

TD

1990~

2004

• Tracer G7

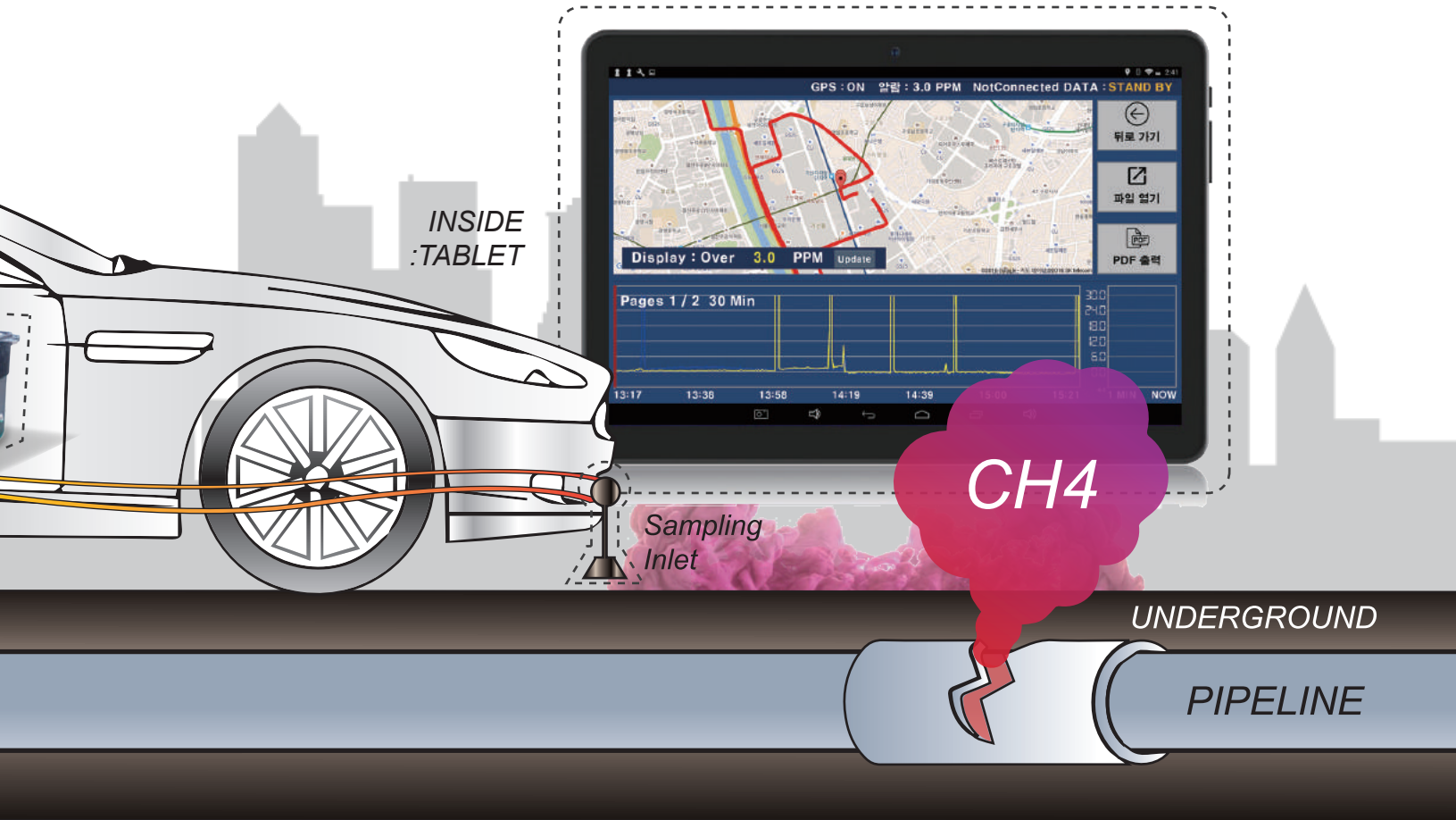
2010

• Tracer IR

2013

• Tracer IR(Ver.2)





Mounted Gas Detectors by Sundoo

LAS (Tunable diode laser absorption spectroscopy)		TCD (Thermal Conductivity Detector)
2016	2016	2019
<ul style="list-style-type: none"> Tracer Roof 	<ul style="list-style-type: none"> Tracer Laser 	<ul style="list-style-type: none"> Tracer-Hunter (LPG)

1. GAS LEAK DETECTOR

More information can be found in the catalog.

Vehicle-mounted

Remote Laser Methane Leak Detector

(1) Tracer Laser



(1) FDL-7



(2) FDL-7 (NH3)



(3) RMLD



(1) SD



2. GAS Analyzer

Gas Technology

(1) OLLI



(2) SIGI Ex



(3) HUNTER



(4) Goliath



(5) GasCam



3. Underground Pipe Detector

CP-Monitor

Buried Pipeline Coating Survey Instrument

Pipe Locator

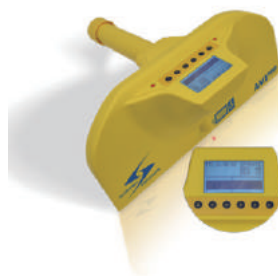
(1) SD-21



(2) DCVG MAXIMUS



(1) AML-PRO



(2) Quantum Imager



Digital Manometer



Portable gas leak detector



Ethane Tester



Methane Analyzer



Locator



Water Leak Detector



Metal Detector



Providing Operational Training

We offer opportunities for our customer's various training programs. This will help customers to maintain safety and reduced operational cost.



Operational Training

We are committed to supporting customers by providing helpful and practical training. In order to help customers, the training program includes basic knowledge of the technology, applications, operation of the instrument. If necessary, we provide a field demonstration to maximize the customers' productivity such as efficiency, maintenance, and safety.

KGS Employee Support Training Program

Sundoo regularly supports managers and inspectors of KGS to utilize our products in "Inspection Instruments Field Training."



After Sales Service

We guarantee customers' satisfaction by providing a competent after sales service of our products including maintenance. Repair of foreign instruments requires higher cost and delays associated with the overseas shipment. But local technicians and support staff make it possible to lessen cost and time for Korean businesses.



Instrument Calibration Service

Sundoo has served customers for over 20 years. We are seriously committed to providing the best performance of the instruments that we provide our customers. Our calibration service covers over 20 different gases.

: Methane

More than five different concentrations of methane (ppm).

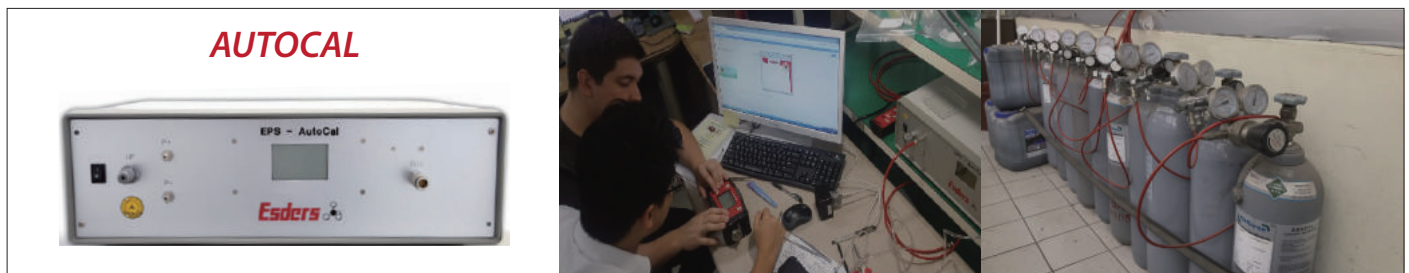
More than three different concentrations of methane (LEL%).

More than three different concentrations of methane (VOL%).

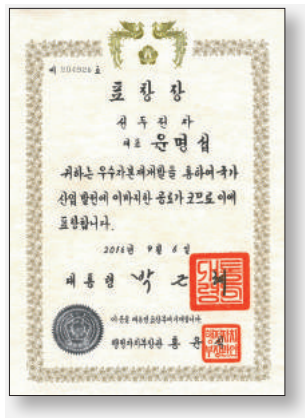
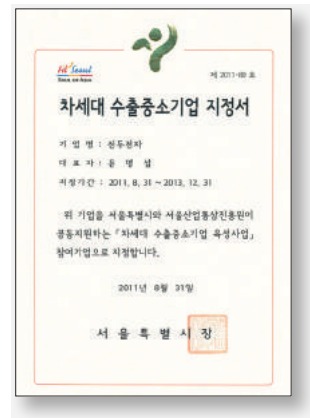
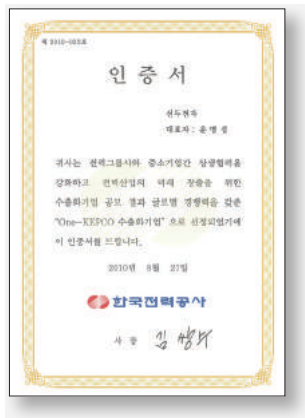
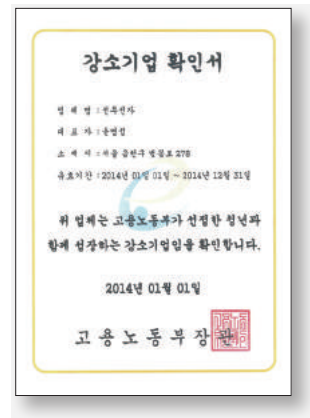
: Other Gases

O₂, CO, CO₂, H₂S, C₂H₆, C₄H₁₀, other mixtures of Gas.

Autocal Calibration System



Autocal, made in Germany by Esder offers an unparalleled precise calibration service that detects and monitors six gases simultaneously and automatically controls the flow rate.



memo



Sundoo Electronics Co. Ltd,

Office 1004, SJ Techno Ville, 278 Botkkot-ro, Geumcheon-gu, Seoul, Korea

Tel. +82 (0)2-3397-3297 **Fax.** +82 (0)2-3397-3292

E-mail. sundoo97@sdtron.co.kr

www.sdtron.co.kr

FDL-7

Laser Methane Detector

Developed & manufactured by Sundoo and KOGAS

System Description



The **Laser Methane Leak Detector FDL-7** can remote and efficiently detect methane leaks up to 30 meters away

Portable, lightweight and rugged unit

Extremely portable, rugged and easy to operate

Sensitive to methane only

System Description



Stable operation utilizing integrated temperature stabilization of the laser diode

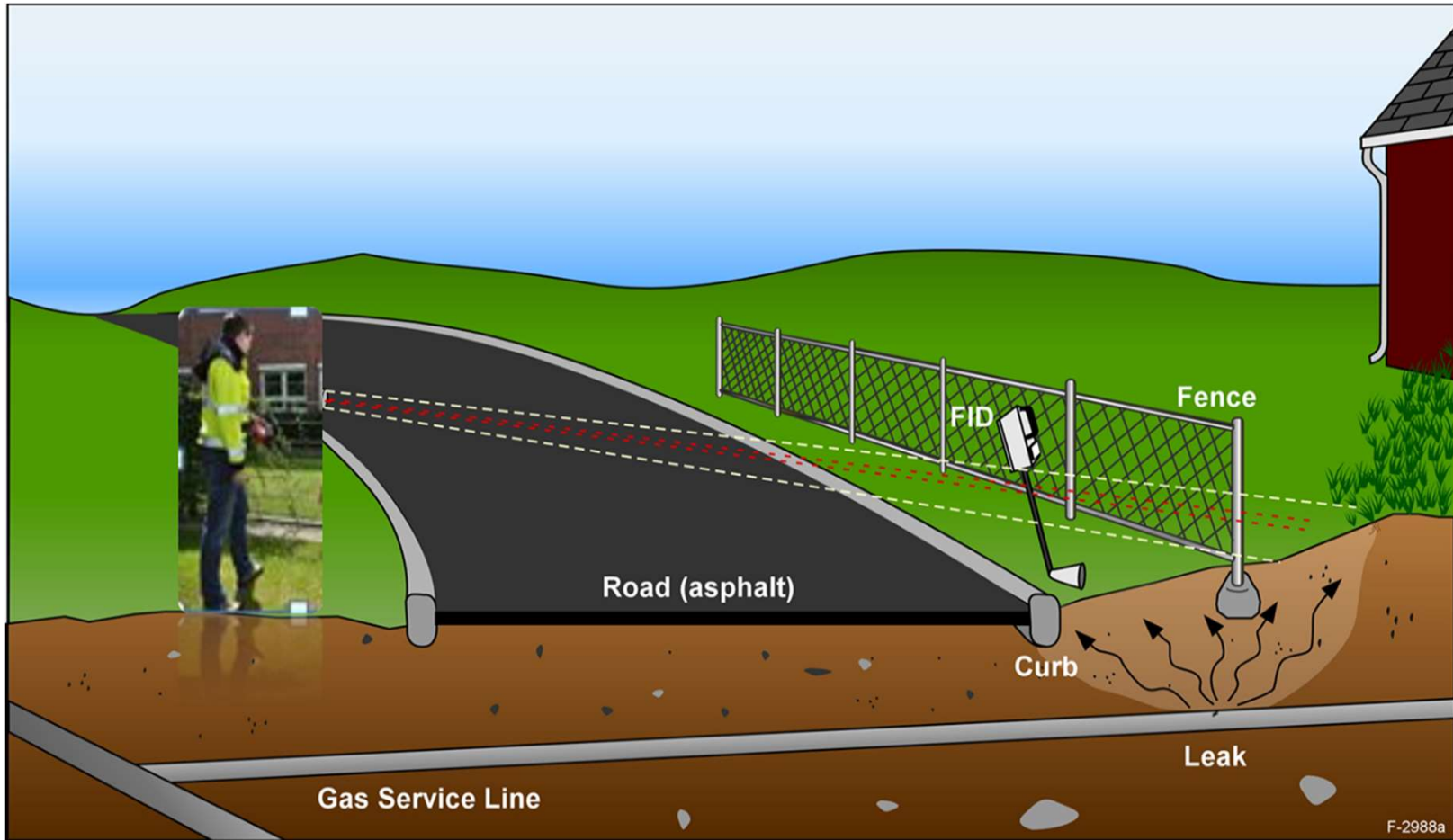
Touch screen and intuitive menu structure

Green fluorescent laser tracking point for easy leak detection

User-defined alarm threshold

Intergrated GPS and Bluetooth functionality

FDL - 7 Concept



Do not need to be in gas plume!

Three Conditions Needed To Detect A Leak

- Need a sufficient plume to detect a leak
- The IR beam must pass through the plume
- Need a background target to reflect beam

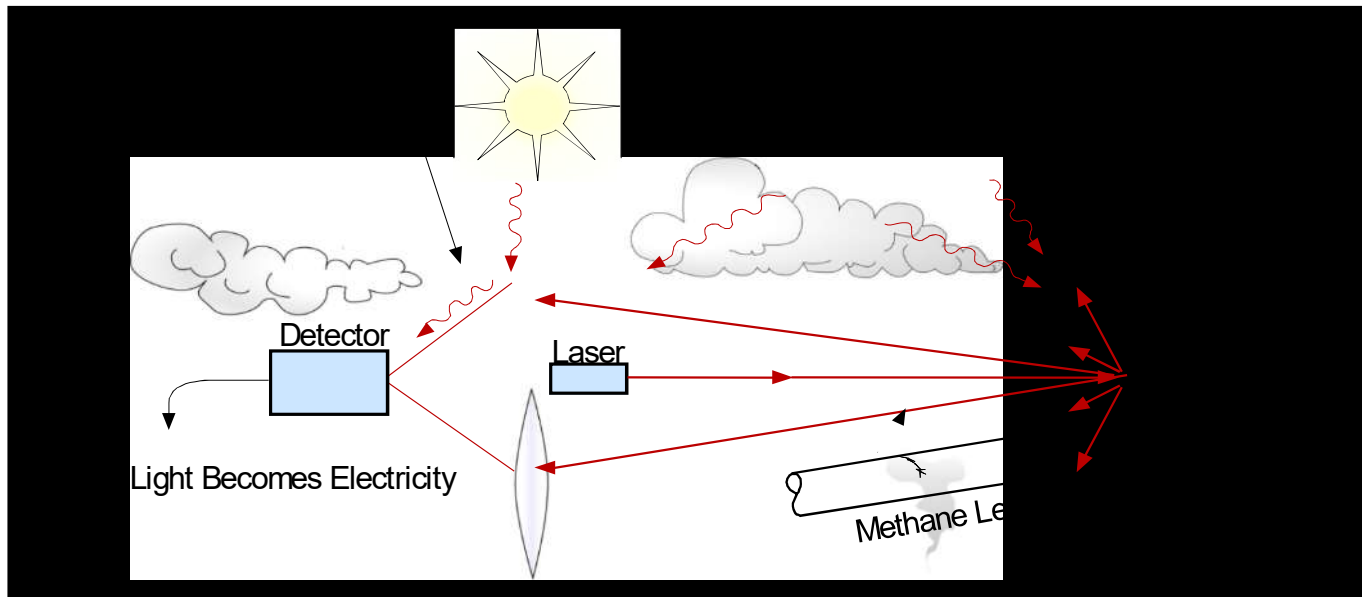


Working principle

- Tunable Diode Laser Absorption Spectroscopy (TDLAS)
 - Every gas absorbs specific wavelengths (frequencies) of light
 - The FDL - 7 laser beam emits a specific wavelength which is absorbed by methane
 - The amount of laser light absorbed is proportional to the total amount of gas in the path of the laser beam
 - Concentration is then expressed as parts-per-million-metered, or "ppm-m". Concentration times plume width.

Working principle

- Laser light beam is remotely projected on to a target (e.g., grass, wall, etc.)
- A fraction of the beam is scattered from the target surface and returned to the source
- Returned light is collected and focused onto a detector
- The presence of methane is encoded within the returned light
- Methane readings are displayed in ppm-m



Instrument Design

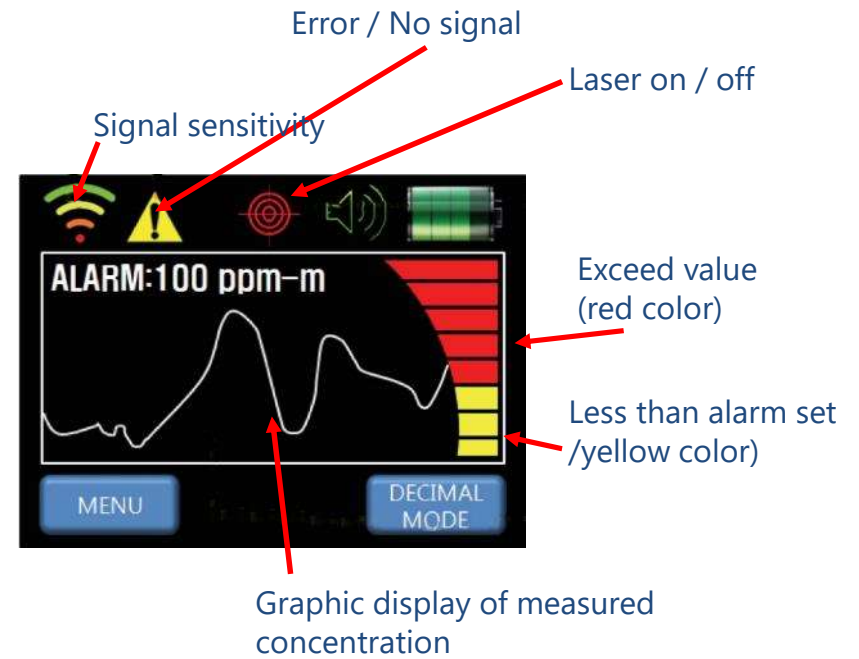
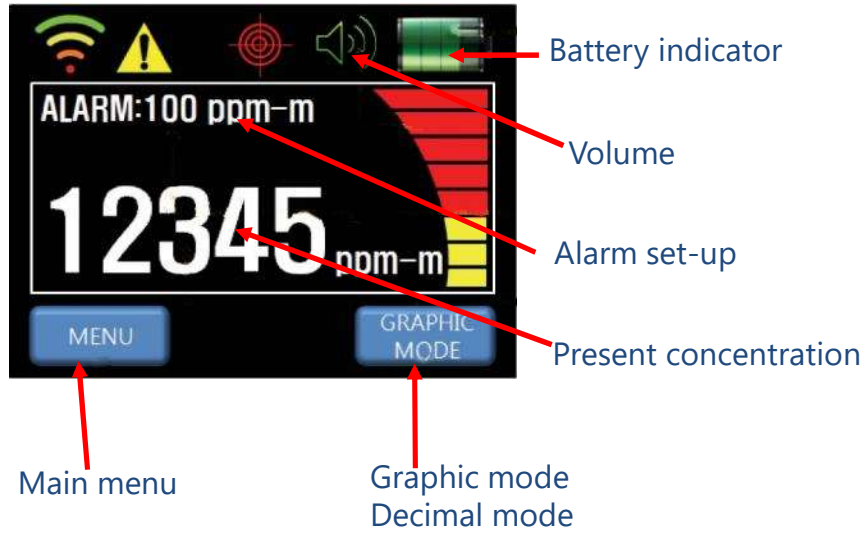


How to use it

- GRAPHIC/ESC
- Display - LCD
 - touch screen
- MENU/ENTER
- Power ON/OFF
- Laser ON/OFF



Features



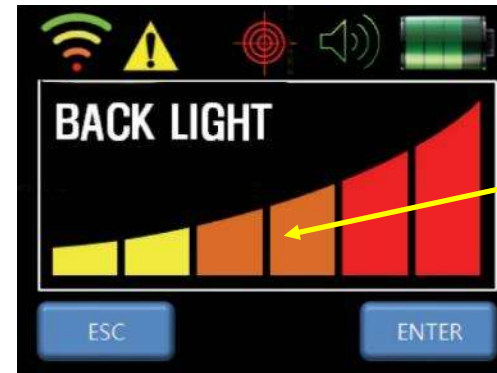
Features



Buttons for select and set the volume, alarm, backlight, off-set, language and information

Cancel or escape

Select, set or enter



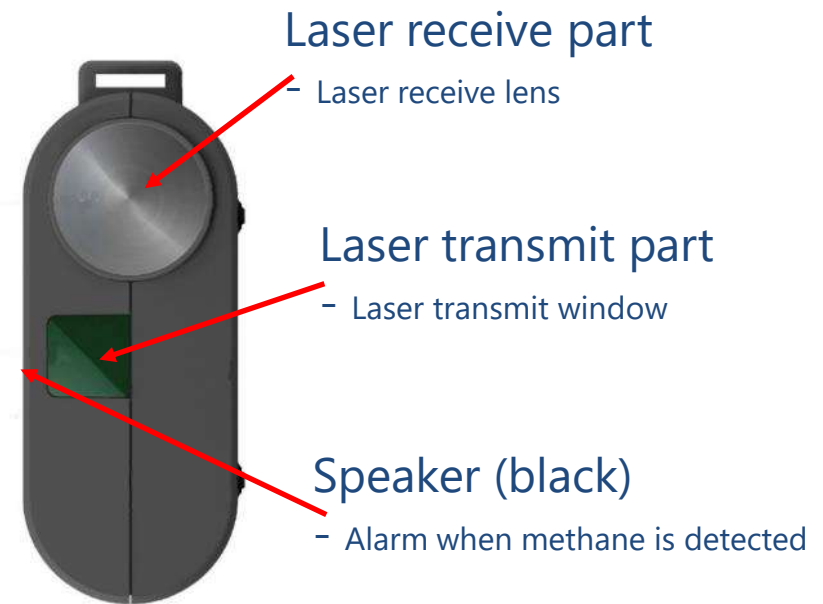
Selectable BAR graph

Move to left (the other side of the move to right)



Increase button (the other side of the Decrease button)

Features



Laser Safety

- **Infra-red Detector Laser**
 - Class I
 - Always on when instrument is on. This laser is invisible.
- **Green Spotter Laser**
 - Class IIIa
 - Under the control of the operator
 - Same rating as pointer lasers commonly sold in stores and used for business presentations
 - Safe when handled properly

Applications



- Plant and Industrial Inspections
- Pipe suspended under a bridge
- Hard to access place or dangerous places
- Detect a leaking point through the window
- Street survey
- Pipeline survey

Applications

Reduce Survey challenges:



- Pipes going on walls or ceilings.
- Over or through fences / no access
- Enclosed Regulator stations

Applications

Compressor Stations:

- Quicker and more efficient inspection of multiple exposed piping in a stations yard.



Greater scanning ability to cover a wide area



Benefits



Reduce survey challenges:

- ▶ Dogs
- ▶ Landscaping
- ▶ Uncooperative Customers
- ▶ Natural Disasters – Earth-Quakes, Hurricanes, Floods

Benefits






More efficient
survey of pipelines
on bridges and
overpasses

Benefits

- Wider area of search due to sweeping of the beam
- Significant advantage to detect leaks away from the pipe
- Scanning technique verses probing technique
- Rapid warm-up

Comparison Table vs LMm, RMLD I/S

Items	FDL-7	LMm	RMLD
			
Detection method	Tunable diode laser absorption spectroscopy	Tunable diode laser absorption spectroscopy	Tunable diode laser absorption spectroscopy
Dimension (WxDxH)	215 × 155 × 65 mm	179× 70 × 42 mm	Transeiver : 213×150mm, 103∅ Controller : 210×150×255 mm
Detection range	1 ~ 50,000 ppm-m	1 ~ 50,000 ppm-m	0 ~ 99,999 ppm-m
Detection response time	0.2 sec	0.1 sec	0.2 sec
Detection distance	0.5 ~ 30 m	0.5 ~ 30 m	0.5 ~ 30 m
Continuous operating time	8 hours	4 hours	6-8 hours
Size of receiver lens	50∅ Circle	40* 30 mm Square	100∅ Circle
Weight	1.3 kg	0.6kg	6.4kg

Comparison Table vs LMm, RMLD I/S

Items	FDL-7	LMm	RMLD
Temperature compensation (TEC Circuit)	Yes/ stable	No/ unstable	Yes/ stable
Guide Laser	Green laser	Red laser (not visible >20m distance)	Green laser
Display	Color LCD (Touch Pad)	Color LCD	Black & White LCD
LCD Size	57.6 × 43.2 mm	41 × 31 mm	78 × 44 mm
Warming up time	10 Seconds	30-60 Seconds	Not listed
Operating temperature range	-17°C to +50°C	-17°C to +50°C	-17°C to +50°C
ATEX	II2G Ex ib IIA T3	II2G Ex ib op-pr/is IIA T1	UL 913 (Class I,II and III)
Warranty	2 years	1 year	1 year

Comparison Table vs LMm,LMm-G - 1

Items	FDL-7	LMm	LMm-G
			
Guide Laser	Green laser	Red laser (not visible > 20m)	Green laser
Certificate	CE(ATEX) CE(EMC) by the end of March)	CE(ATEX & EMC)	CE(R & TTE)
Best Application	Hazardous Areas Outdoors under strong sunshine	Hazardous Areas	Outdoors under strong sunshine
Continuous operating time	8 hours	6 hours	4.5 hours
Operating temperature range	-17°C to +50°C	-17°C to +50°C	-10°C to +50°C
Weight	1.3 kg	0.6kg	0.6kg

Comparison Table vs LMm,LMm-G - 2

Items	FDL-7	LMm	LMm-G
Temperature compensation (TEC Circuit)	Yes/ stable	No/ unstable	No/ unstable
Display	Color LCD (Touch Pad)	Color LCD	Color LCD
LCD Size	57.6 × 43.2 mm	41 × 31 mm	41 × 31 mm
Data communication and App on Smartphone	Available in July 2016	None	Yes
Warming up time	10 Seconds	5 Minutes	5 Minutes
Warranty	2 years	1 year	1 year
Control of International System	ISO9001 & ISO14001	ISO9001	ISO9001

Reference of international clients

Country	End User
Korea	KOGAS
Korea	The Presidential Residence
Korea	POSCO
Korea	SK & SK Hynics
Korea	SAMSUNG
Korea	AMORE
China	n.a.
Germany	n.a.
Italy	n.a.
Spain	n.a.
.	

FDL-7 specification

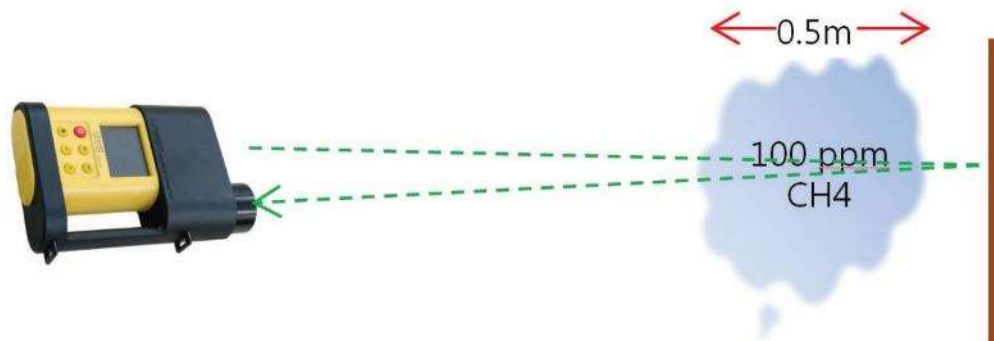
Technical Specifications

Measurement method	Tunable diode laser absorption spectroscopic (TDLAS)
Measurement range	0 ~ 50.000 ppm x m
Sensitivity	10 ppm x at distance 0 ~10 m 20 ppm x m at distance 10 ~30 m
Response time	within 0.2 sec
Detection distance	0.5 ~30 m / longer than 30 at depends on background
Beam size	25 ~30 cm at 30 m distance
Alarm	Variable depending on concentration
Safety	Detection laser: Class I Point laser (green): Class Iia
Display	2.8 inch color CD (touch screen)
Operating temperature	- 17 to + 50° C
Humidity	5 to 90% RH
Weight	1.36 kg

FDL-7 specification

Technical Specifications

Dimension	233 x 155 x 66 mm
Power supply	Rechargeable Li-ion battery
Battery life	Up to 8 hrs
Intrinsically safe / ATEX	II 2G Ex ib IIA T3
Calibration gas	Methane (CH ₄)
Protection class	IP 54
Connectivity	USB, earphone, DC jack, GPS, Bluetooth
Scope of delivery	Earphone, carrying strap, hard case, charger, manual
Warranty	24 months



$100 \text{ ppm} \times 0.5 \text{ m} = 50 \text{ ppm} \times \text{m}$
The measured value of the FDL-7 is the product of the methane density between the detector and the trageting point as well as the path length through the gas cloud.

FDL - 7 Parts

Carrying Strap



Charger



Complete Kit