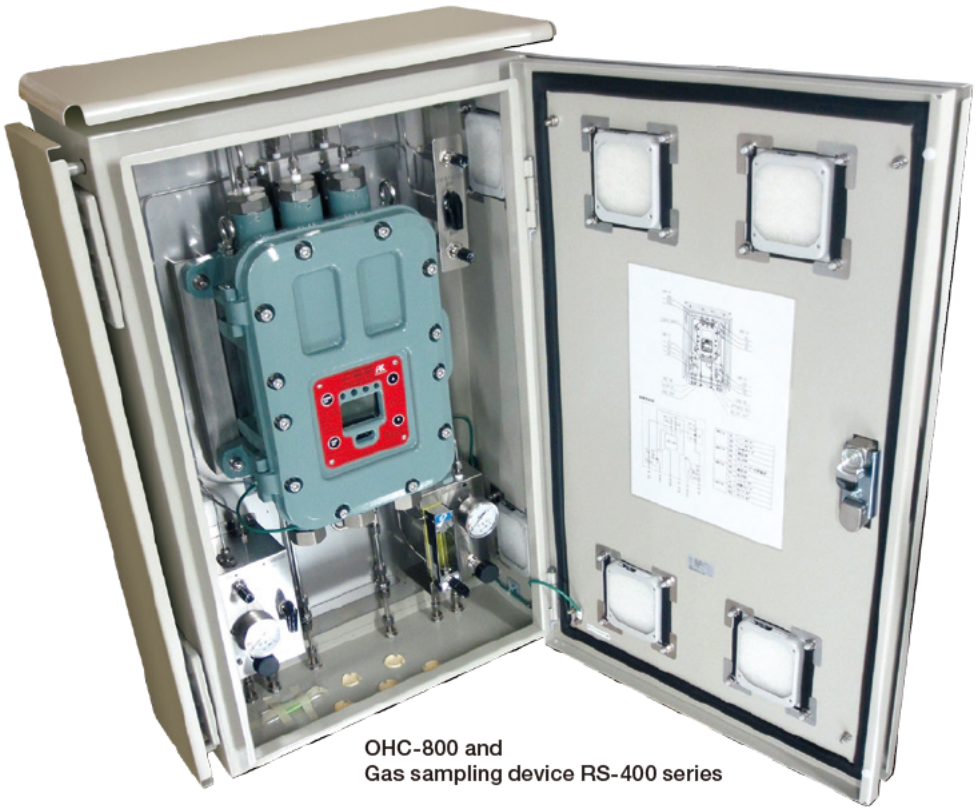
RIKEN KEIKI

# Explosion-Proof Calorimeter

Calorific value | Specific gravity | Wobbe Index | Methane number

## Model OHC-800



OHC-800 and
Gas sampling device RS-400 series

### "Opt-Sonic calculation" is applied by using Optical sensor and Sonic sensor

"Opt-Sonic calculation" is based on the calculation combining 2 measuring results obtained by the 2 sensors. This can minimize the interference effects on the reading caused by interference gases, and enable the high-accuracy and reliable measurement.

* Opt-Sonic is a term coined by RIKEN KEIKI to describe Optical and Sonic sensors

### Easy to switch the display among "Calorific value", "Density" and "WOBBE index"

Displayed unit is easily switched by pressing the button. Laborious calculation is not needed.

### Fulfilling self-diagnosis function and running cost

Self-diagnosis function including fault diagnostic prevents the calorimeter from being incapable of measuring the gas.
Few consumables are needed and this saves running cost.

### Body structure that can be installed into all types of location

Structure is robust with Explosion-Proof (Exd IIB+H2 T4) and high ingress protection level (IP66/IP67)
Both 100VAC~240VAC and 24VDC power supply can be supplied.

RIKEN KEIKI Co., Ltd.

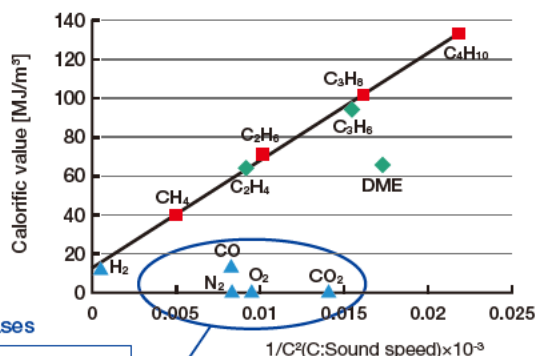
# Features

- Unique measuring principle “Opt-Sonic calculation” is applied.
  This can minimize the interference effects caused by interferencegases, anda high-accuracy measuring result can be obtained.
- Fast response time T90 reaction within 5 seconds.
- High repeatability +/-0.02MJ/m³
- Wide operation temperature -20~+60 degree C
- Explosion-Proof structure even for Hydrogen II2G Ex db IIB+$H_2$ T4 Gb <ATEX / IECEx>
- High ingress protection level IP66 / IP67
- Remarkable temperature characteristic
  Below 0.10MJ/m³ fluctuation for the temperature change in a day (< 20 degree C)
- Easy to switch the display among “Calorific value”, “Density” and “WOBBE index” just by the button operation.

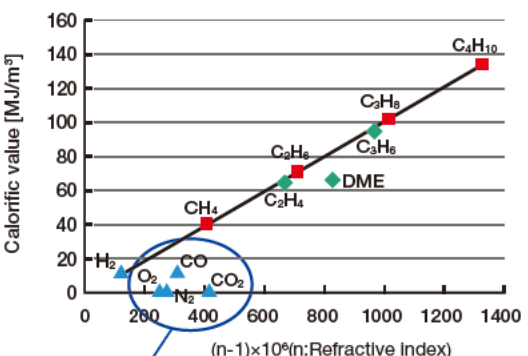
## “Opt-Sonic calculation” is applied by using Optical sensor and Sonic sensor. The interference effects on the reading caused by interference gases such as $N_2$, $O_2$, $CO_2$ etc. can be minimized.

### [What is “Opt-Sonic calculation” ?]

Optical sensor and Sonic sensor are individually used for a calorimeter, but both sensors have the interference effects on the reading caused by interference gases such as $N_2$, $O_2$, $CO_2$ etc.




Relationship between calorific value and sound speed (Sonic sensor)



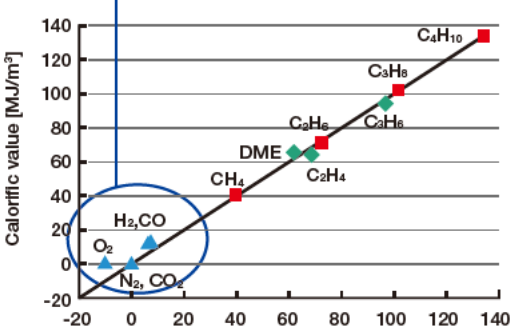

Relationship between calorific value and refractive index (Optical sensor)

**Interference gases**

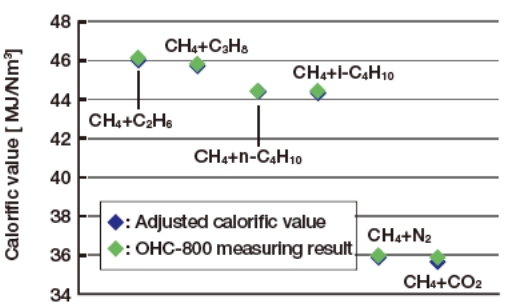
Gases that have no or low calorific values, but influence on the Optical and Sonic sensors.

“Opt-Sonic calculation” using measuring results of the Optical sensor and Sonic sensor can minimize the interference effects caused by interference gases, and realize a high-accuracy measurement.

**Minimized the interference effects caused by interference gases**




Relationship between calorific value and results of “Opt-Sonic calculation”




Evaluation result by Chemicals Evaluation and Research Institute, Japan (CERI)

## Specification

| | |
|---|---|
| Model | OHC-800 |
| Measuring principle | Opt-Sonic calculation through measurement of refractive index and sound speed |
| Measuring gas | $CH_4$ basis Paraffinic Hydrocarbon gases as represented by Natural Gas*1 |
| Measuring targets | Calorific value (Density / WOBBE index selectable) |
| Measuring range*2 | Calorific value: 25.00~50.00 $MJ/m^3$ (Gross, 0 degree C, 101.325kPa converted)<br>Density: 0.500~1.500 (Specific gravity converted) |
| Measuring method | Constant-flow-rate gas introduction using external sampling devices |
| Display | Full-dot LCD (with backlight), 3 color LED lamp |
| External Output | 4-20 mA DC (isolated, source current type) maximum load resistance of 300 Ω / RS-485 communication |
| FAILURE alarm | Low flow, Sensor unit abnormality, Low light amount |
| FAILURE alarm display | Lamp (red) / Content indication on LCD |
| FAILURE alarm contact*3 | No-voltage contact 1a or 1b De-energize (Energize when alarming) or Energize (De-energize when alarming)<br>Contact capacity of 2 A, 30 VDC (resistance load) |
| Self-diagnostic function | FUNCTION CHECK (warm-up or maintenance mode), MAINTENANCE REQUIRED, OUT OF SPECIFICATION |
| Self-diagnostic display | FUNCTION CHECK, OUT OF SPECIFICATION: Lamp (orange) / Content indication on LCD<br>MAINTENANCE REQUIRED: Lamp (green) / Content indication on LCD |
| Self-diagnostic contact | FUNCTION CHECK, OUT OF SPECIFICATION: No-voltage contact 1a or 1b De-energize (Energize when alarming) or Energize (De-energize when alarming) Contact capacity of 2 A, 30 VDC (resistance load)<br>MAINTENANCE REQUIRED: SSR contact, contact capacity of 20 W, 240 VAC (resistance load) |
| Power supply | 100 - 240 VAC ±10%, 50/60 Hz, max. 18 VA or 24 VDC ±10%, max.<br>5 W (The setting can be changed to either the AC or DC) |
| Ingress Protection level | Equivalent to IP66 and IP67 |
| Operation temperature | ATEX / IECEx: -20~+60 degree C (no sudden changes) / Japan Ex: -20~+57 degree C (no sudden changes) |
| Operation humidity | 95%RH or less (no condensing) |
| Outer dimensions / Weight | Approx. 286 (W) x 453 (H) x 150 (D) mm / Approx. 23 kg |
| Explosion-Proof structure | Flame-proof enclosures (Explosion-proof class: II2G Ex db IIB+$H_2$ T4 Gb <ATEX / IECEx> / Exd IIB+$H_2$ T4 <Japan Ex> |

*1 Total concentration of interference gases such as $N_2$, $O_2$, $CO_2$, CO etc. contained in a target gas is estimated as less than 20%
*2 Contact RIKEN KEIKI for the other measuring ranges
*3 Contact setting is adjustable

OHC-800 is designed to have it incorporated in the specific sampling device RS-400 series. The model of sampling device is selected in accordance with the location where the calori-meter is installed and gas sampling point pressure condition etc.

### Sampling device model

**RS-400-** □ □ □ □



**Enclosure**
0: No enclosure
1: Enclosure for outdoor (SUS) with shading plate
2: Enclosure for indoor (SPCC) with window

**Use of pressure reducing valve for measuring gas**
0: Pressure reducing valve not used
1: Pressure reducing valve used

**Bypass flow rate of measuring gas**
0: Not bypassed
1: 0.5 - 5 L/min
2: 1 - 10 L/min
3: 2 - 20 L/min
* "0: Not bypassed" is applied for the case without pressure reducing valve.

**Pressure gauge unit**
1: MPa
2: MPa/PSI double units
* "1: MPa" is selected for the use in Japan because of the Measurement Act.

# Application

## Electric power energy
(Power generation plant, cogeneration power plant)

Calorific value adjustment, Gas turbine control



## Gas energy
(LNG terminal etc.)

Calorific value adjustment when Town gas is supplied



## Gas engine for ship
(LNG ship etc.)

Methane number measuring for a high efficient engine control



## Biogas
(Biogas plant, general factory)

Calorific value measurement of biogas after removing $CO_2$ contained in the gas



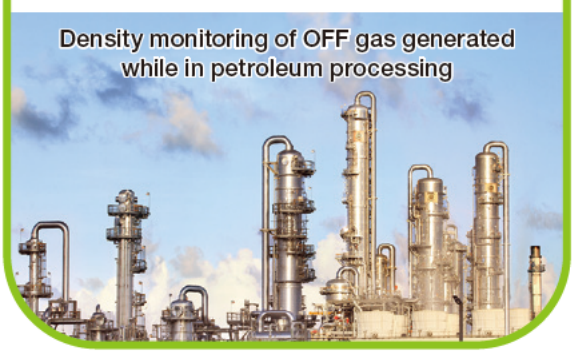
## Iron steel
(Coke-oven etc.)

Monitoring of $CO_2$ and CO contained coke-oven gas



## Refinery
(Refinery plant, petro chemical plant)

Density monitoring of OFF gas generated while in petroleum processing



- The applications above are just examples. Contact RIKEN KEIKI for the other measuring targets and measuring ranges.


**RIKEN KEIKI Co., Ltd.**

2-7-6 Azusawa, Itabashi-ku, Tokyo 174-8744, Japan
Phone : +81-3-3966-1113
Telefax : +81-3-3558-9110
E-mail : intdept@rikenkeiki.co.jp
Web : https://www.rikenkeiki.co.jp/english



※The contents described in this catalog are subject to change without notice according to the performance improvement.


★Distributed by:


Printed in Japan PC3E-0410-200800 Ⓢ