# Application

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

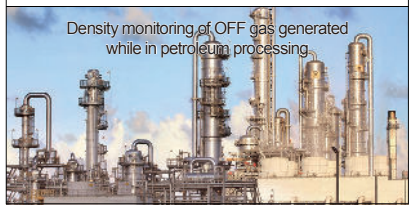

### Gas energy
(LNG terminal etc.)


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


### Biogas
(Biogas plant, general factory)


### Iron steel
(Coke-oven etc.)


### Refinery
(Refinery plant, petro chemical plant)




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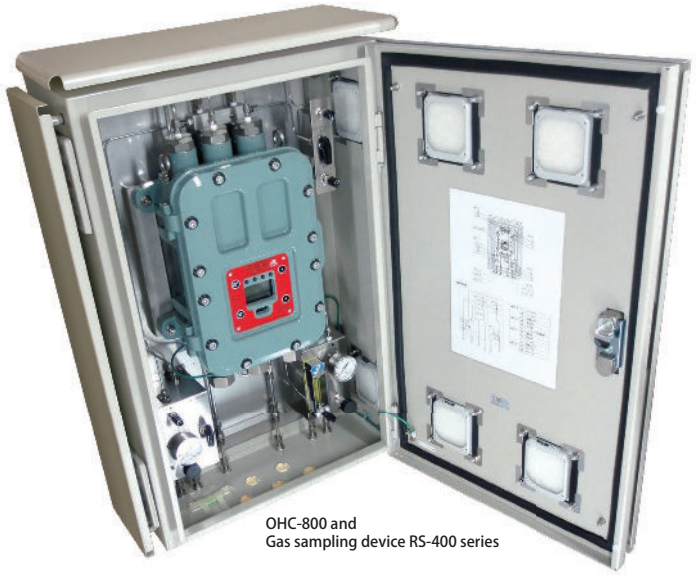
RIKEN KEIKI

# 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.**

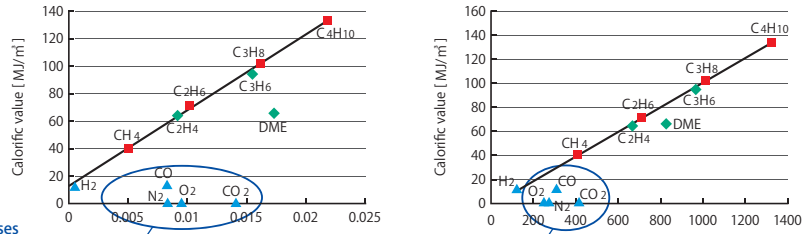
# Features

- Unique measuring principle "Opt-Sonic calculation" is applied.
  This can minimize the interference effects caused by interferencegases, and a high-accuracy measuring result can be obtained.
- Fast response time T90 reaction within 5 seconds.
- High repeatability +/- 0.02MJ/㎥
- Wide operation temperature -20 ~ +57 degree C
- Explosion-Proof structure even for Hydrogen Exd IIB+H2 T4
- High ingress protection level IP66 / IP67
- Remarkable temperature characteristic
  Below 0.10MJ/㎥ 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.




Interference gases

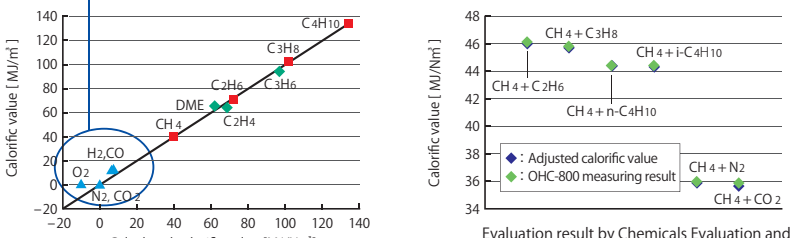
Gases that have no or low calorific values, but influence on the Optical and Sonic sensors.

Relationship between calorific value and sound speed (Sonic sensor)

Relationship between calorific value and refractive index (Optical sensor)

"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/㎥ (Gross, 0 degree C, 101.325kPa converted)<br>Density : 0.500～1.500 MJ/㎥ (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 | -20～+57 degree C(TIIS)/-20～+60 degree C(ATEX/IECEx) |
| 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: Exd Ⅱ B+$H_2$ T4 <TIIS>/ Ⅱ 2GExd Ⅱ B+$H_2$T4 <ATEX/IECEx>) |

*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 calorimeter 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.