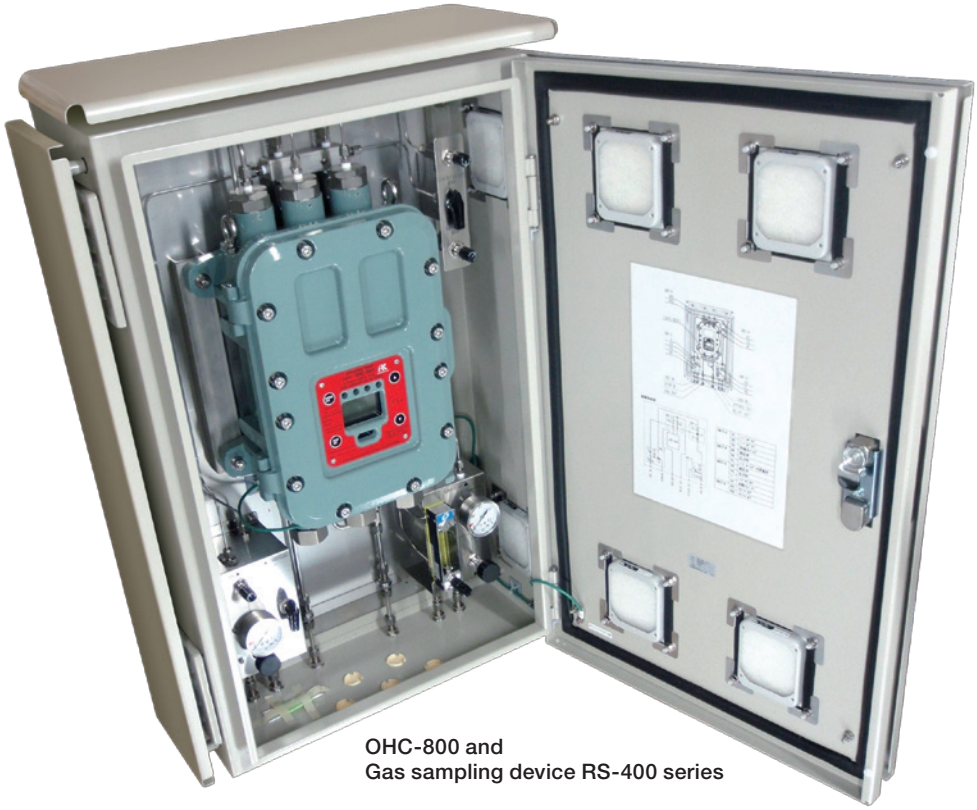
RIKEN KEIKI

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.

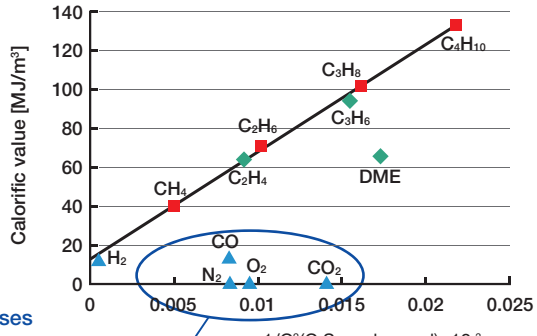
Features

- 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/m^3
- Wide operation temperature -20~+60 degree C
- Explosion-Proof structure even for Hydrogen II 2 G Ex db IIB+H_2 T4 Gb <ATEX>
  Ex db IIB+H_2 T4 Gb <IECEx>
- High ingress protection level IP66 / IP67
- Remarkable temperature characteristic
  Below 0.10MJ/m^3 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.

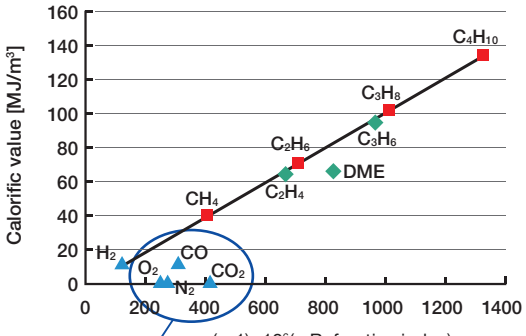
“Opt-Sonic calculation” is applied by using Optical sensor and Sonic sensor. The interference effects on the reading caused by interference gases such as N_2, O_2, CO_2 etc. can be minimized.

[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)



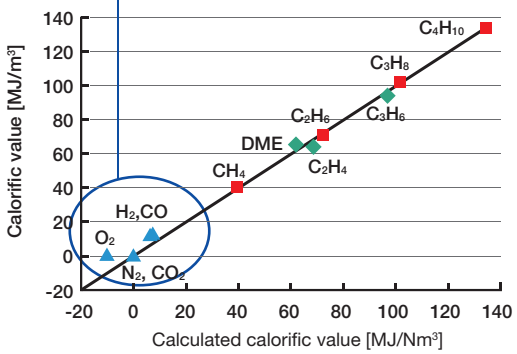
Relationship between calorific value and refractive index (Optical sensor)

Interference gases

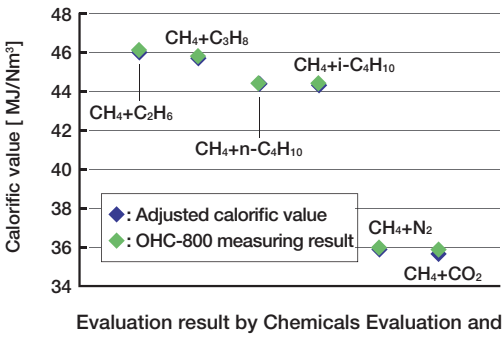
Gases that have no or low calorific values, but influence on the Optical and Sonic sensors.

“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) 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) 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 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) 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. 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	ATEX: II 2 G Ex db IIB+H_2 T4 Gb / IECEx: Ex db IIB+H_2 T4 Gb / Japan Ex: Ex d IIB+H_2 T4

*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.

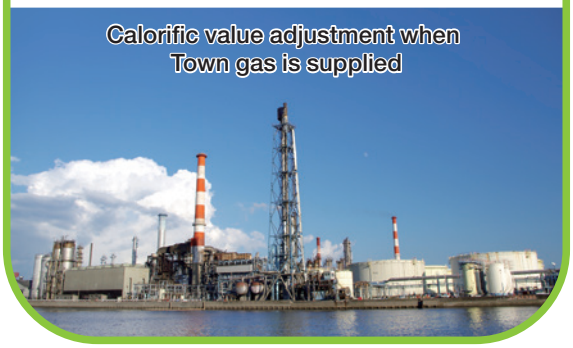
Application

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)

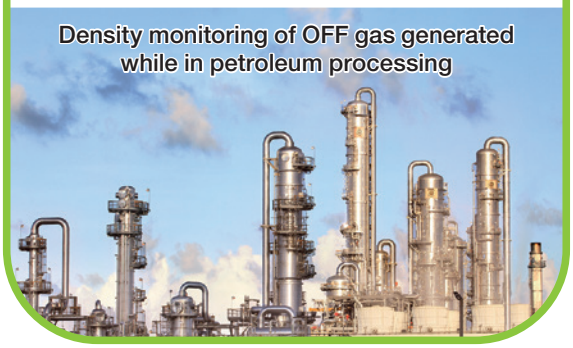
Calorific value measurement of biogas after removing CO_2 contained in the gas

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

★ Distributed by:

PC3E-0411-260500 Ⓢ