

## INTERFEROMETER TYPE CALORIMETER

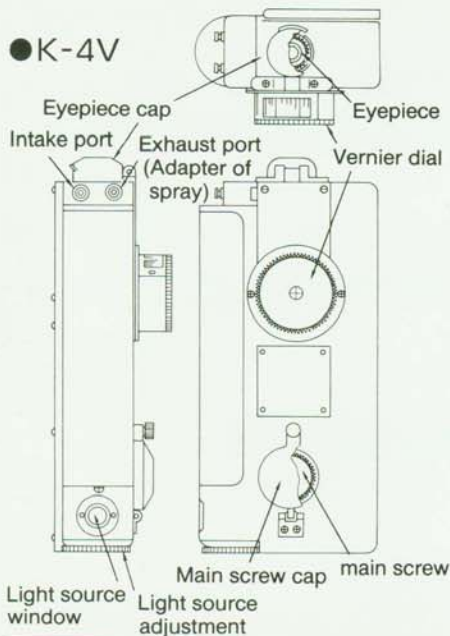
# GAS-CALORIMETER

**K-4, K-4S, K-4V, K-4VS**

- Butane-gas-calorimeter
- Propane-gas-calorimeter
- Methane-gas-calorimeter

### OUTLINE

These portable calorimeters are part of the LITTLE GAS INDICATORS range. They utilize light interference to measure the calorie of butane, propane or methane instantaneously. These models are mainly used to control the calorie of gases in gas manufacture, large-scale gas consuming facilities, laboratories, etc.

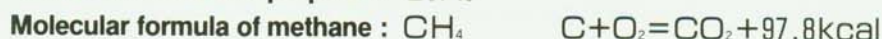
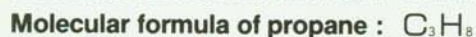
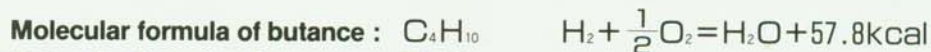


### FEATURES

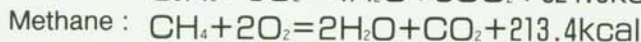
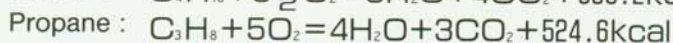
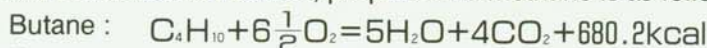
- Since these models are interferometer types, they can be used to measure the calorie of gases both accurately and quickly.
- The eyepiece cap is also used as the power switch for ease of operation.
- Illumination of the light source can be confirmed through the light source window.
- The entire meter is totally protected against moisture.
- Model K-4V features a vernier which can be read down to 20 kcal.
- The measured calorie of mixtures of propane and butane can be easily corrected by adjustment of the mixing ratio.
- The power source is made up of two dry batteries of SUM2 size, and the entire meter is compact and lightweight.

### PRINCIPLE OF OPERATION

Butane, propane and methane gases are composed of hydrogen molecules  $H_2$  and carbon molecules  $C$ , and are expressed by the following molecular formulae. The optimum combustion of hydrogen and carbon molecules is also expressed by the following formulae.



That is, the calorie of 1 mol. each of butane, propane and methane is as follows.



If 1 mol. of liquid is vaporized, it expands to 22.4 liters, thus the calorie of 1 % of 1 m<sup>3</sup> of gas (1,000 liters) is given by the following formula and used as the design standard for interferometers.

$$\frac{273}{293} \times 10 \times \frac{\text{calorie of 1 mol}}{22.4} = kcal/m^3$$

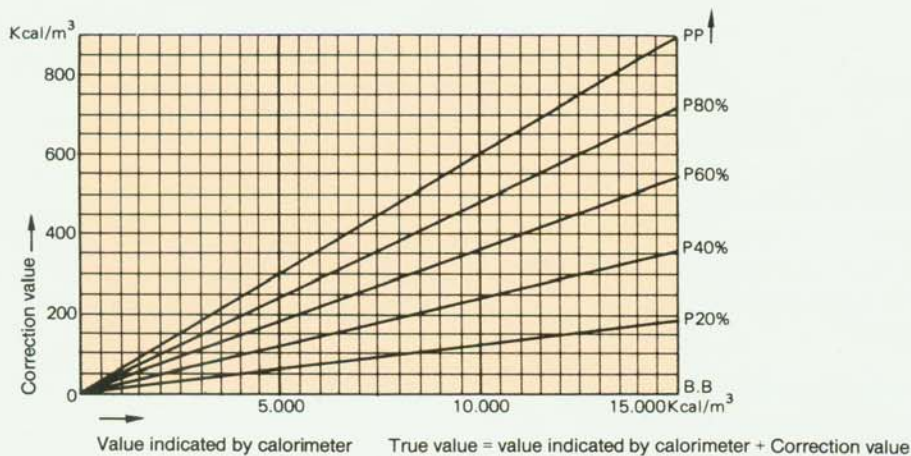
# TOKA GAS-CALORIMETER


Gas to be measured	Model name	Measuring range (kcal)	Min. division in visual field (kcal)	Min. division of vernier (kcal)
Butane	K-4	0 ~ 15,000	1,000	—
	K-4S	0 ~ 20,000, 30,000	1/20 of max. division	—
	K-4V	0 ~ 20,000, 30,000	1,000	20
	K-4VS	0 ~ 20,000, 0 ~ 30,000	1/20 of max. division	20
Propane	K-4	0 ~ 15,000	1,000	—
	K-4S	0 ~ 20,000, 30,000	1/20 of max. division	—
	K-4V	0 ~ 20,000, 30,000	1,000	20
	K-4VS	0 ~ 20,000, 30,000	1/20 of max. division	20
Methane	K-4S	0 ~ 10,000	1,000	—
	K-4VS	0 ~ 10,000	1,000	20

## SPECIFICATIONS

Models	K-4, K-4S	K-4V, K-4VS
Dimensions	74 x 155 x 30 M/M	74 x 155 x 30 M/M
Weight	Body :750 gr, Body and case :1,030 gr	Body :780 gr, Body and case 1,060 gr
Features	Standard type. Movement of interference fringe is read by scale through eyepiece.	Position of interference fringe on scale in visual field is measured to a further degree of accuracy by means of vernier.
Indicated accuracy	2% of full scale	
Ambient temperature	- 10°C ~ + 50°C	
Temperature compensation	$1 \pm \frac{\Delta t}{273}$ (based on 20°C) Difference between ambient temperature and 20°C is set as $\Delta t$ , and read value is multiplied by above correction factor.	

## CORRECTION TABLE FOR MIXTURE OF PROPANE AND BUTANE



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