Spectrum-analysis type infrared Flame Detector

(It is not a flickering type)

IFD-2300Series

IFD-0300Series

features

low consumption current .

explosion proof structure.

no moving part.

extremely strong structure.

good performance and leasonable price.

can be used in the place with reflection of solar optical blink..

can be used in the place with an ultraviolet ray.

Applications

LNG, LPG, oil tank yard, quay, transformer, boiler, turbine facility, and other.

a large open space like atrium.

a paint factory.

Switching source of Monitoring TV.

Sensor in conjunction with fire control equipment.

KGK

KOKUSAI GIJUTSU KAIHATSU Co. LTD

Detecting fires without fail and promptly

The next generation flame detector

If it is possible to detect fire breaking at early stage, we can minimize the damage by prompt extinction. For fire detection, we need to detect specific phenomenon to fires like heat, smoke and light (flame). But if it takes time to detect those phenomenons or responds to other high-temperature objects like heat and light, it can not be useful. Especially as for oil or gas fires, it is very important detect flame surely and promptly for successful extinction at early stage to avoid expansion of fires.

This flame detector is based on unprecedented theory and technology,being able to detect fires without fail and very quickly (within 2 seconds after fire breaking). Also it can be used in places where flame detection has always been very difficult. For example, outside, the place with rapid temperature change, or the place where there are reflection of solar light or generation of ultraviolet radiation like arc, which may cause misdetection. In the case this flame detector is subjected to direct sun light, please use sun cover.

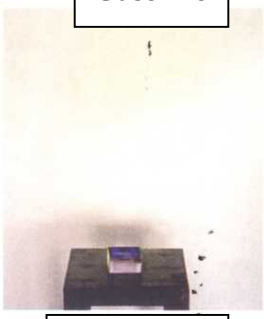
Outside test

Inside test

N-Heptane

Gasoline

Toluene



Methanol

Flame detection by infrared radiation

All substances in the environment, whether living or not, are emitting infrared ray. When carbon hydrate is burning, there would be a very wide range of emission of wavelength. In that case, besides infrared ray, there would be secondary emission which is generally called 'resonance radiation'. This is caused by carbon hydrate in combustion gas and causes a specific spectral pattern in infrared region, which drastically change its strength of radiation near 4.4μm(μ：1/ 1000mm) in wavelength.

On the other hand, so-called gray-collared emissions have its peak at 2μm reaching its maximum moderately. Wavelength distribution graph is a mountain with gentle slope. This gray collared radiation is light emission from object. Other than fires, high temperature object and sun light also do contain this wavelength of 2μm significantly.

As for dispersion of these high- temperature objects, each temperature has each peak. For instance, it is 1.4μm at 1800℃, 4.4μm at 400℃, and 7.8μm at 100℃. Fig.1 shows spectral characteristic of various objects. The amount of emission is relative figure.

This flame detector adopted new fire-detect method utilizing each feature of infrared ray of flame and other objects.

In case of flame wavelength, it is having its peak value at 4.4μm with extremely low value at its left and right area. This is completely different from the cases the object is without flame. Using this difference of the cases with fire and without fire, this detector does distinguish whether there is flame or not without fail.

Principle to distinguish fire and high-temperature objects.

1. flame
   Fig2:(a+b+c)/(W1+W2+W3)<b/W2
2. High temperature object of 100℃
   Fig3:(a+b+c)/(W1+W2+W3) b/W2
3. High temperature object of 1800℃
   Fig4: :(a+b+c)/(W1+W2+W3) b/W2

By calculating infra red radiation emitted from natural/artificial objects in the method as outlined above, we can detect flame wavelength and make fire signal

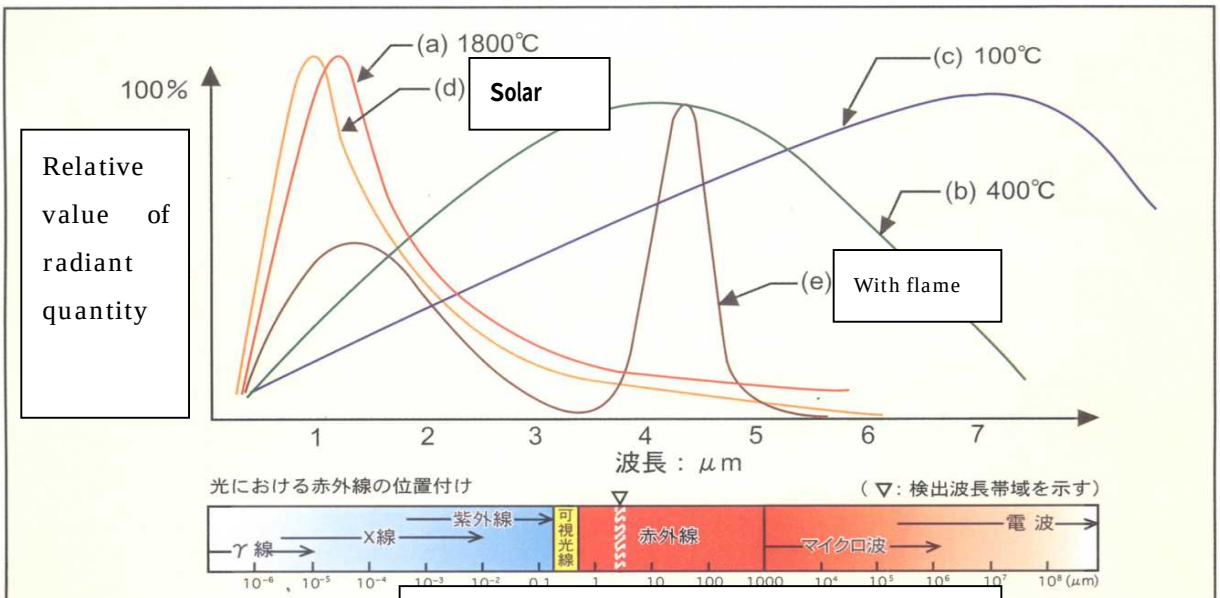


Fig.1 dispersioncharacteristic of emission

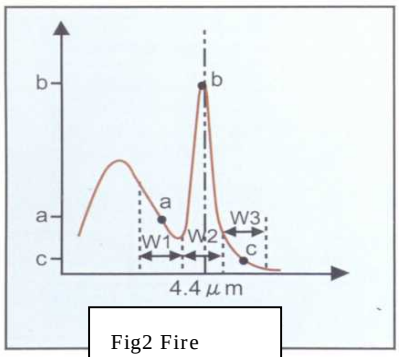


Fig2 Fire

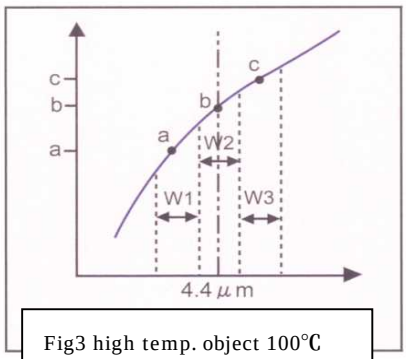


Fig3 high temp. object 100℃

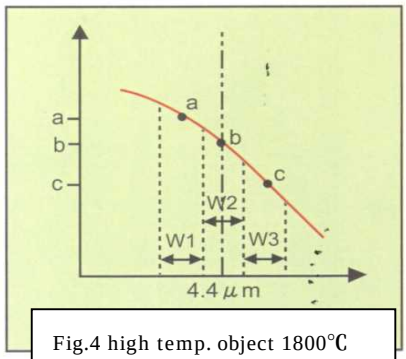
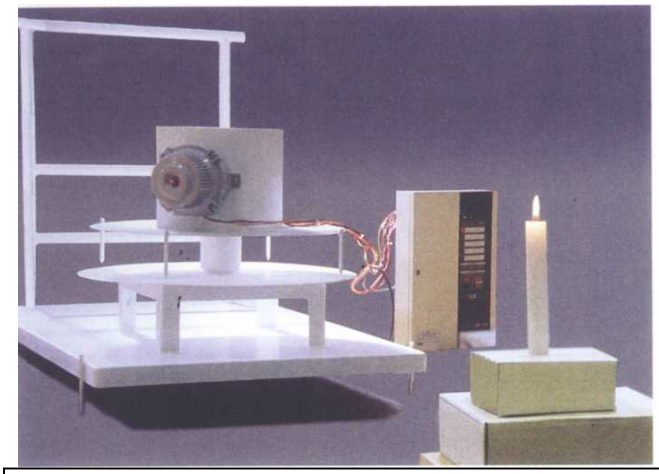
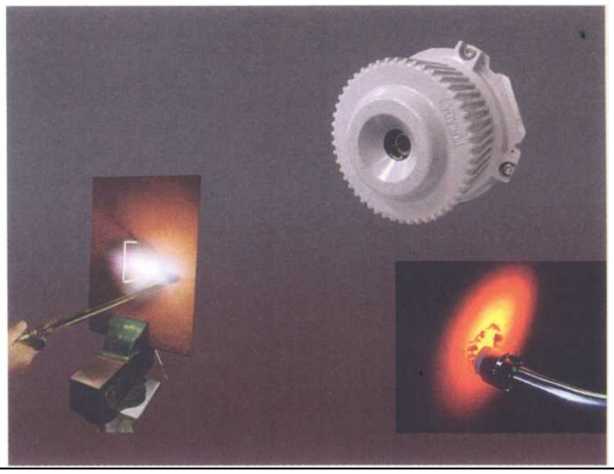
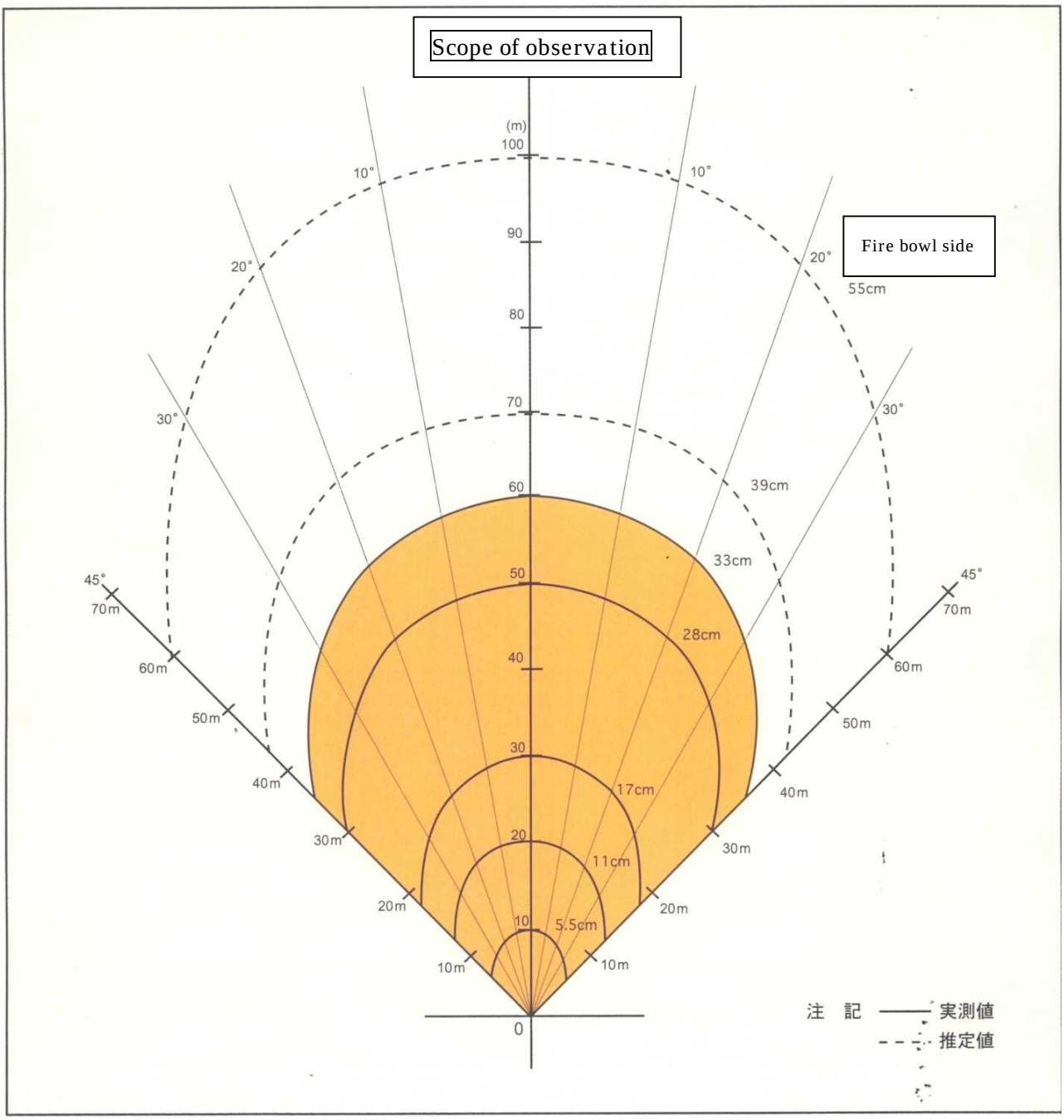


Fig.4 high temp. object 1800℃





<detect range check using candle (angle 45 °)>	<miss operation test using high temperature object>



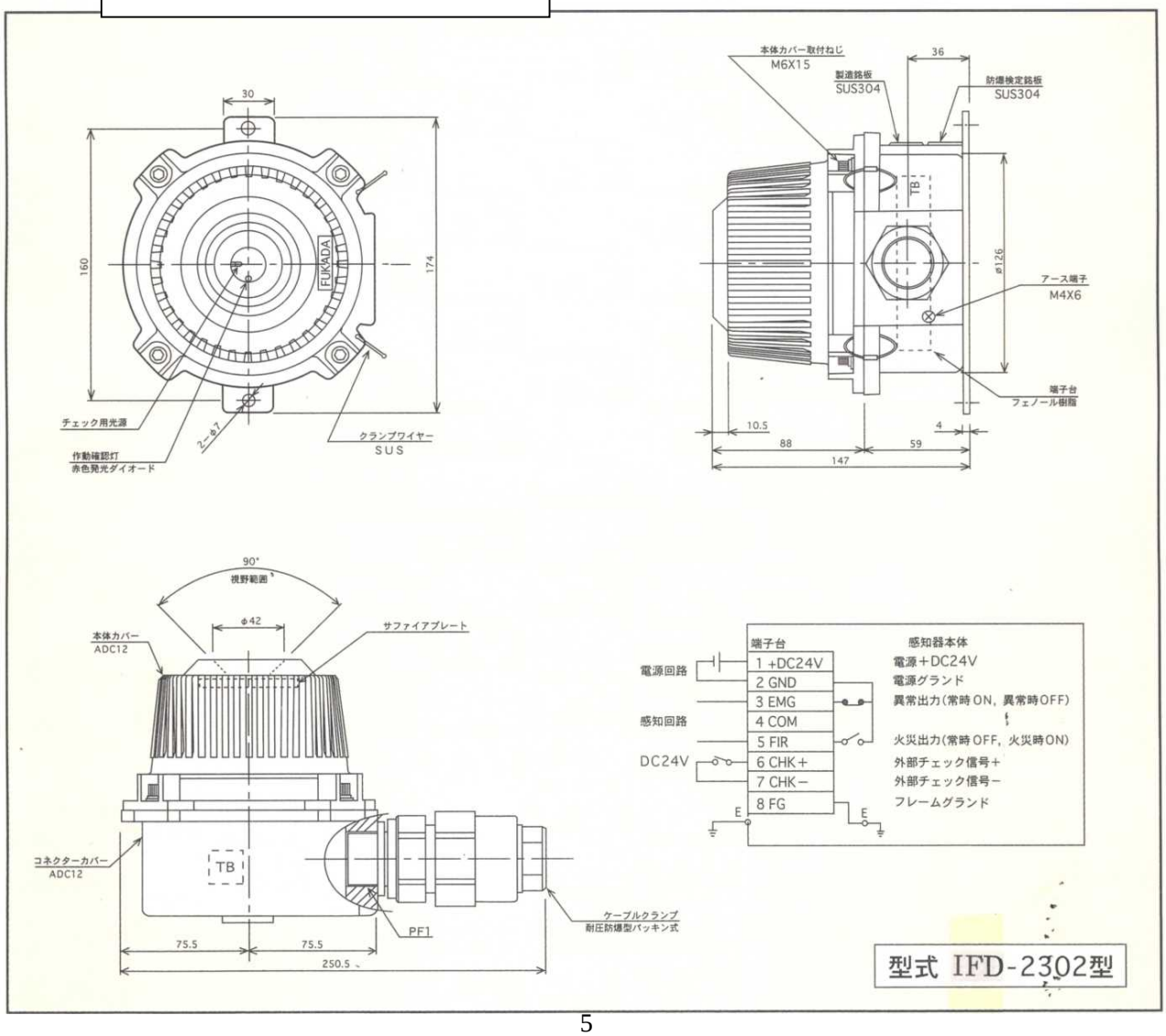
<Detection test – LNG>

Major use

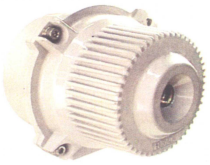
Fire detection and alarm - LNG, LPG, oil tank yard, quay, transformer, boiler, turbine facility, and other hazardous materials.
Early fire detection and alarm – a large open space like atrium.
Early fire detection and alarm - a paint factory
Switching source of Monitoring TV
Sensor in conjunction with fire control equipment

Characteristics

Long detection range…60m or more in the case of fire bowl(n-Heptane) of 33cm on each side.
Waveband transmit well through smoke and dirt on window
Explosion-proof construction…can be set at any place
Extremely low possibilities of misdetection －not detect direct/reflect sun light or lighting
Short detection time
Checking circuit, operation check lamp and self-checking function are built-in



Specification

			
type	IFD-2302	IFD-2312	IFD-0300S2
structure	Pressure and explosion proof structure for both inside and outside usage(Exd II BT6), pressure proof packing with protector tube socket		
approved number	c13375		c14640
detect distance	60m front of a fire bowl (n heptane, 33cm each side)		
detect time	aprox.5 seconds(aprox.5minutes needed to be warmed up after powered on)		
output signal	Relay (no-voltage contact) output		
observation angle	90 ° (full corn shape)		
insulating esistance ・ pressure resistance (without thunder resistance element)	10MΩor more (DC500V Megger), AC1000V sine wave, 1 min		
power source	DC24V±20%, under 30mA	AC100V +30V, −15V, 5VA	
operating temperature limit	-20°C～+60°C		
operating humidity limit	35%～95% RH		
weight	aprox.2.5kg		aprox.8kg
Time to check up	functional test: per 6 months, decompose and check : per decade		

※ Possibility to detect spark from arc welding

※ As for sun cover and unit base, please purchase separately.