

Uncooled MWIR camera MIR640DB

This is an uncooled mid-infrared camera equipped with a sensitivity wavelength of 3 to 5 μm developed uniquely. This model has higher sensitivity in the mid-infrared region than our previous products and is available at a lower price.

<Features>

- Area pixel : 640×480 pixel
- Pixel pitch : 17 μm
- Sensitivity wavelength : 3~5 μm
- Framerate : 30fps

<Applications>

- Through flame in-furnace monitoring
- Incinerator internal condition monitoring
- High temperature measurement
- Glass melting furnace temperature measurement



Visible image of in-furnace

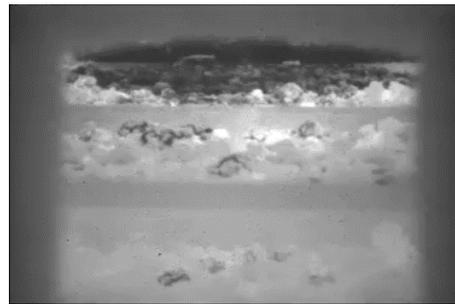


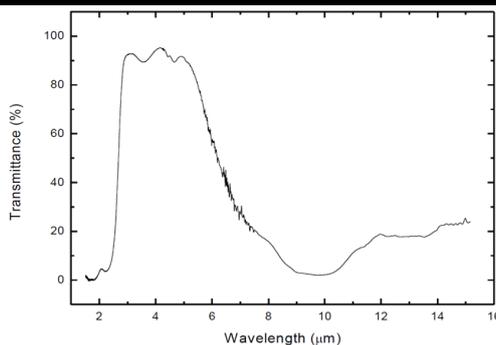
Image with through flame camera, same as left



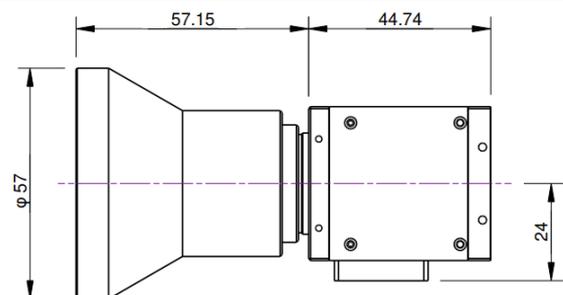
Camera overview (With f=14mm lens)

Specification

Item	Specification
Detector	Uncooled micro bolometer
Area pixel number	640 × 480 pixel
Pixel pitch	17 μm /pixel
Sensitivity wavelength	3 ~ 5 μm
Frame rate / Digital output	Maximum 30fps • 14bit
Image output interface	CameraLink/USB2.0/Ethernet/NTSC/GigE Vision (Equivalent to VIM-Gen2 series)
Power	DC5V (USB bus power supply (*1) and GigE Vision is available to supply from PoE)
Operating temperature	-10 ~ +50°C (No due condensation)
Housing	Installable with water-cooled heat resistant housing
External trigger function	Asynchronous trigger photography available (Trigger input via CameraLink CC1)
Lens mount	M25 × 0.5 pitch or M34 × 0.5 pitch
Camera dimensions	W38mm × H38mm × D44.74mm (Without lens)



Sensitivity wavelength chart



Overview (With f=7.5mm lens)

Features of MIR640DB

The temperature of low-emissivity objects can be measured with high accuracy!

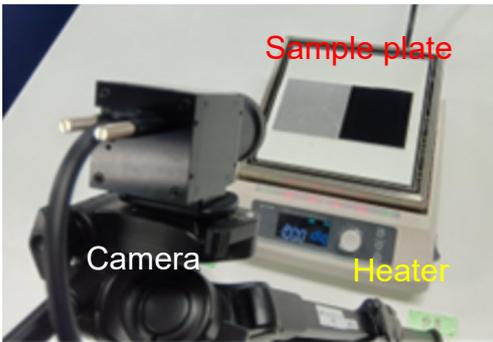
MWIR (3-5 μm band) is less affected by reflected light at room temperature than LWIR (8-14 μm band), so it is possible to measure the temperature of low-emissivity objects such as metals with a glossy surface with high accuracy. The results of verifying the effect using metals with different emissivities are shown below.

<Experimental method>

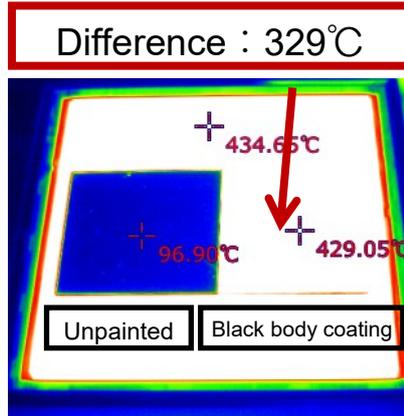
An aluminum piece with one side painted black is heated to 100 $^{\circ}\text{C}$ on a hot plate and photographed with a far-infrared camera and a mid-infrared camera. The temperatures of the unpainted aluminum surface and the black-coated surface are measured from the infrared images obtained by each camera.

(The emissivity ϵ of each camera is set so that the temperature of the unpainted aluminum surface is 100 $^{\circ}\text{C}$.)

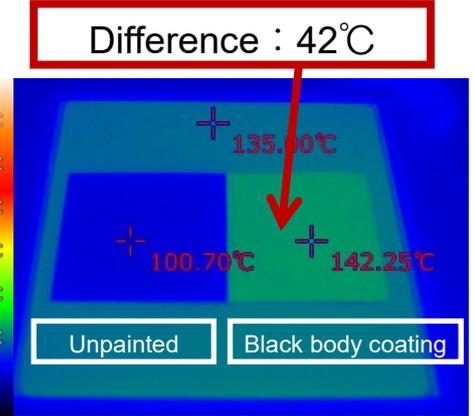
<Images>



Measurement environment



LWIR camera image ($\epsilon=0.09$)



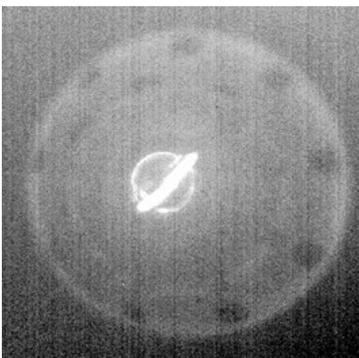
MWIR camera image ($\epsilon=0.45$)

The difference between the actual temperature of the black-painted surface and the camera output temperature is as large as 329 $^{\circ}\text{C}$ in the far-infrared image, but is suppressed to 42 $^{\circ}\text{C}$ in the mid-infrared image. In addition, the emissivity is also higher at 0.35 for mid-infrared compared to 0.09 for far-infrared, enabling highly accurate temperature measurement with little fluctuation.

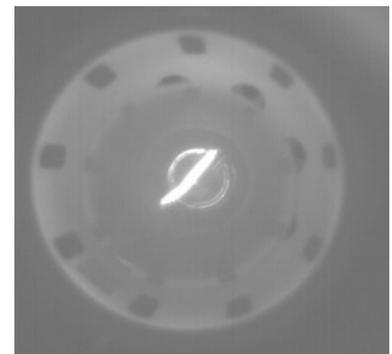
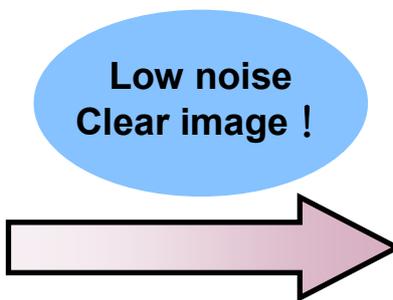
High sensitivity ! (Possible to get clear MWIR image)

Uncooled MWIR detector which developed us has three times the sensor sensitivity of our previous products. Taking advantage of this feature, it is possible to obtain clearer mid-infrared images than with previous devices.

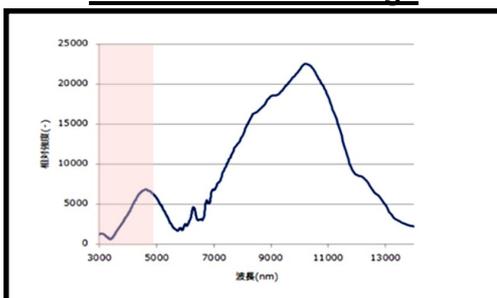
<Incandescent bulb>



Previous camera image

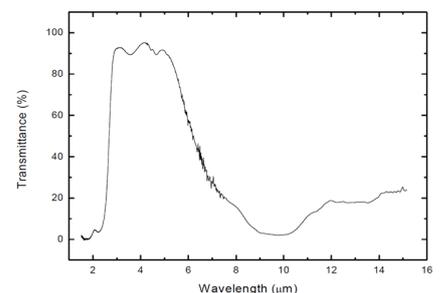


MIR640DB image



Previous camera sensitivity

3 times higher
sensitivity at 3-
5 μm !



MIR640DB sensitivity

Application of MIR640DB

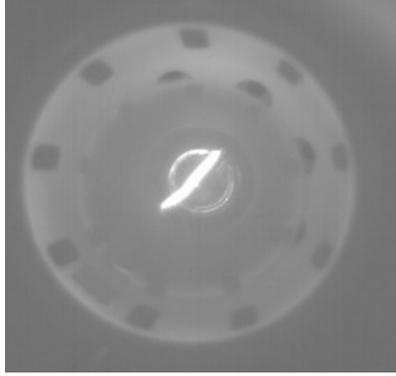
Conventionally, cooled cameras have been used to capture images in the mid-infrared region of 3 to 5 μm , but their applications have been limited due to their large size and high cost. Our uncooled mid-infrared camera MIR640DB uses an uncooled bolometer sensor developed in-house, and is small, low-cost, and does not require replacement of the cooler, making it suitable for a wide range of applications.

< Incandescent bulb >

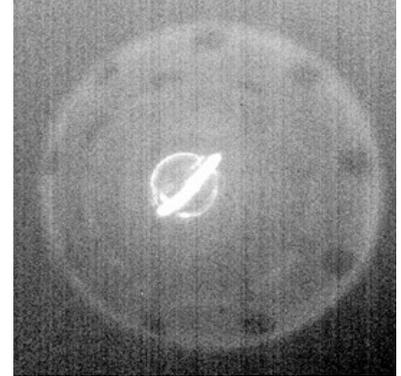
Since light bulb glass transmits far-infrared rays of 3 to 4 μm , a mid-infrared camera can capture the high-temperature filament when the light bulb is lit through the glass. The MIR640DB can capture clearer images with less noise than previous models.



Visible image



MIR640DB image



Recent camera image

< Image of inside the incinerator >

Furnace walls and garbage debris can be seen through the flames

Flames inside furnaces such as those in waste incineration plants mainly contain CO₂ resonance radiation (wavelengths around 4.4 μm). By combining this with an optical filter that filters out this radiation, it is possible to visualize the condition inside the furnace through the flames. The MIR640DB has higher sensitivity than previous models, making it possible to obtain clearer images of the inside of the furnace.



Visible image



MIR640DB image (with filter)



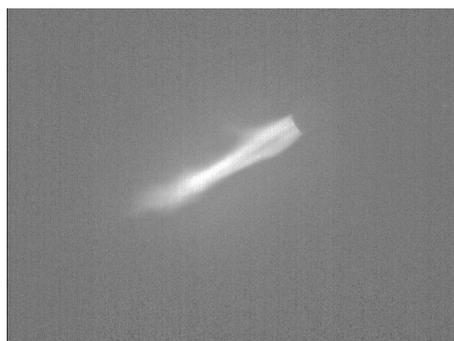
Recent camera image

< Burner flame detection image: Only the flame is visible >

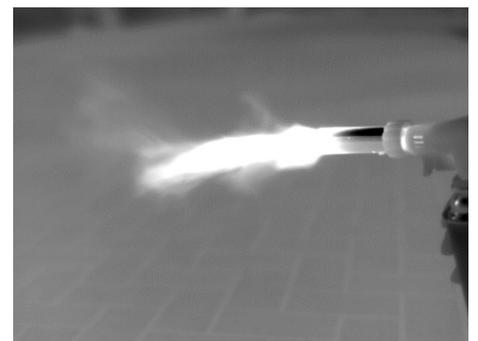
By using an optical filter that transmits only the emission wavelengths of flames, it is possible to exclude high temperature areas such as the burner tube and visualize only the flames.



Visible image



MIR640DB image



FIR camera image