Infrared camera

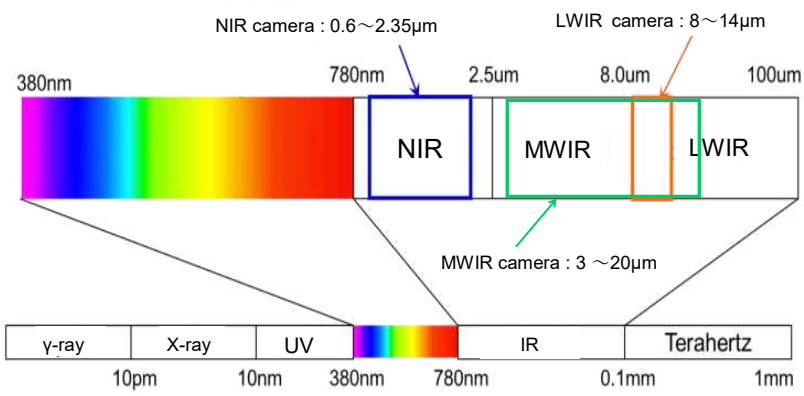
Selection Catalog

Vision Sensing

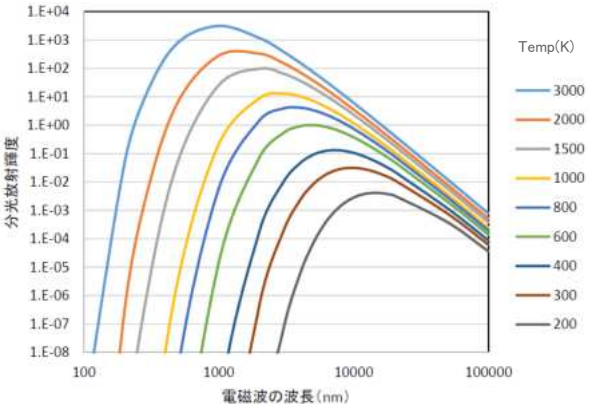
Vision Sensing Co., Ltd.

Features of Uncooled far infrared camera

Infrared rays mean the electromagnetic wave of the wavelength from 780nm passed out of sight to 100μm. By the wavelength, it is divided into near infrared rays, middle infrared rays and far infrared rays. This invisible light is emitted from a surface of all objects with thermal energy, and the emission spectrum changes by its temperature (Planck's radiation law). Using those characteristics, the temperature is able to be measured contactless by the energy emitted from materials.

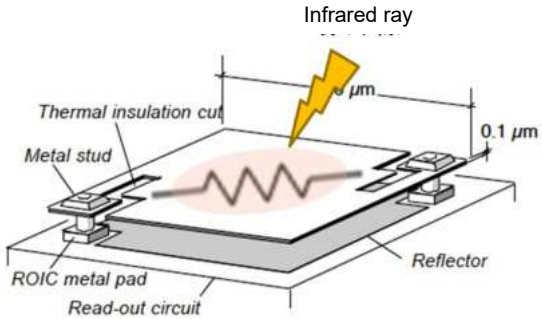


Infrared wavelength domain

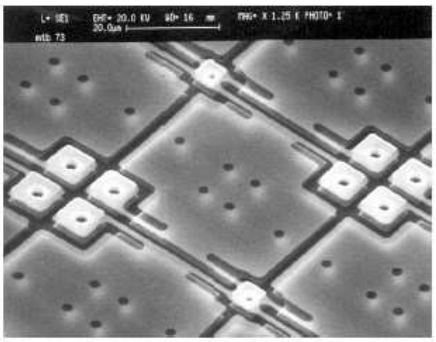


Planck's radiation law graph

Infrared cameras are mainly used with the quantum type detector utilizing the photoelectric effect and the bolometer type detector measuring changes of electrical resistance value. The quantum type detector cameras are high sensitivity, but require cooling devices to suppress the dark current. The bolometer type cameras work in a room temperature and easy for a size reduction. Our far infrared cameras are equipped with an uncooled bolometer array detector using amorphous silicon in a light receiving side.

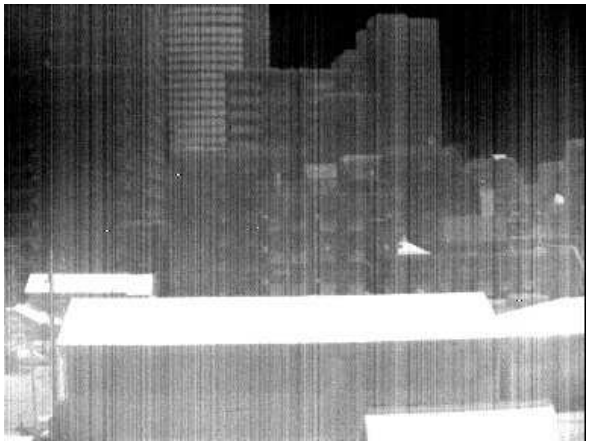


Structure of the Bolometer element

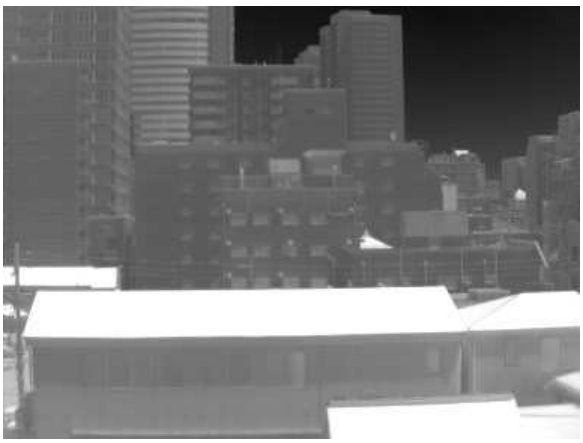


The element surface (Amorphous silicon)

The bolometer array detector is produced with MEMS technique, but the sensitivity unevenness appears in each detector and pixel due to the processing inhomogeneity. Furthermore the infrared detector incidents the infrared ray from the temperature of lens body tube, camera housing and detector itself, besides the infrared ray of shooting objects transmitted through the lens. Except the infrared ray from shooting objects, it changes by the influence of an ambient temperature and affects a bad influence upon the image.



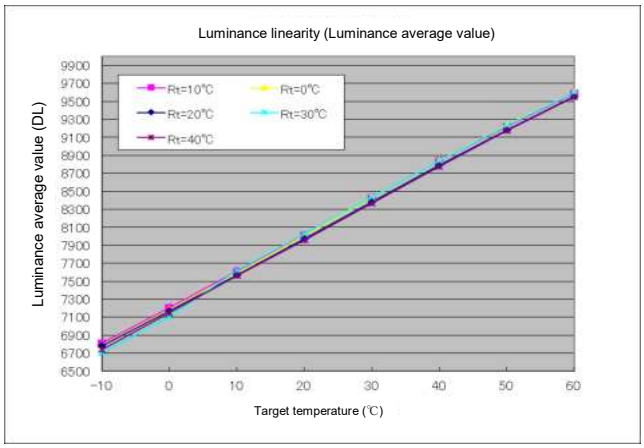
Output image before the correction



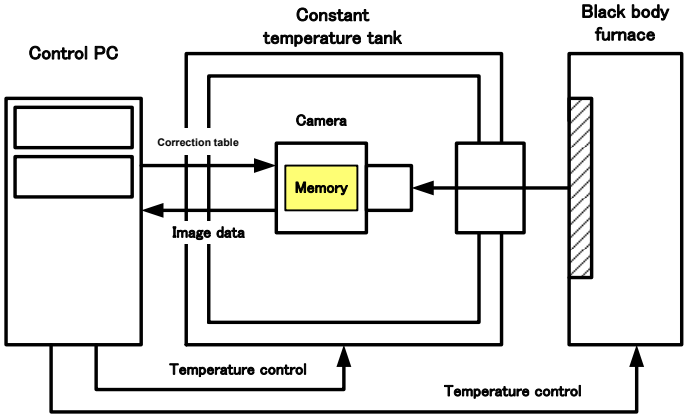
Output image after the correction

Shutter-less temperature correction technology

As technique to correct the sensitivity unevenness of each pixels and the influence of an ambient temperature changes, general infrared cameras are equipped with correction functions using a shutter. The image output breaks off during operating a shutter, continuous photography and temperature measurement are not possible. Our cameras make correction tables with the target photography and an ambient temperature in advance, and write to the memory stored inside (We call this as "Calibration"). The photography image is output with changing the correction table automatically according to an ambient temperature. We call this correction technique as "Shutter-less correction".



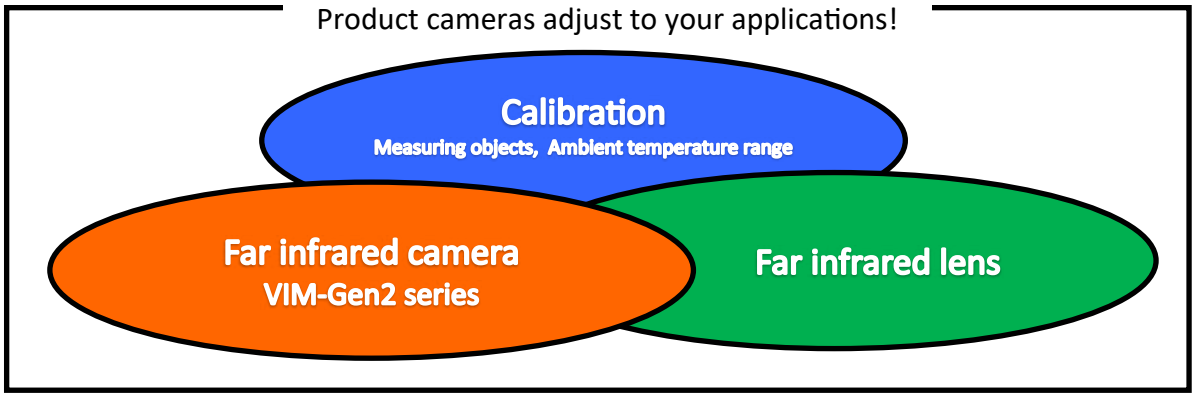
Input/output characteristics in an ambient temperature changes

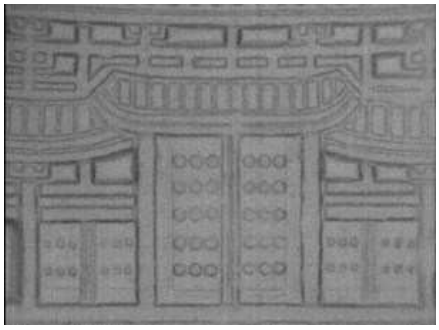


Calibration equipment components

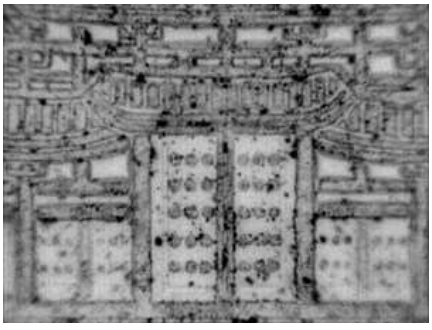
Suggest the most suitable system for your application!

We provide uncooled infrared cameras with various line-up of VIM series and wide range of lenses, and satisfy the customers demands. Calibration is carried out by the necessary temperature range, so it is possible to manufacture original far infrared cameras which fit to customers required temperature range and resolution.



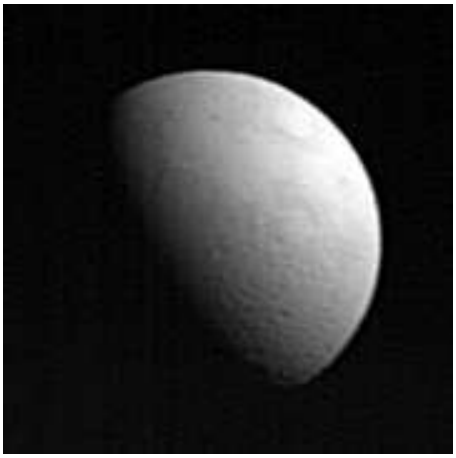


Room temperature



Cooling time

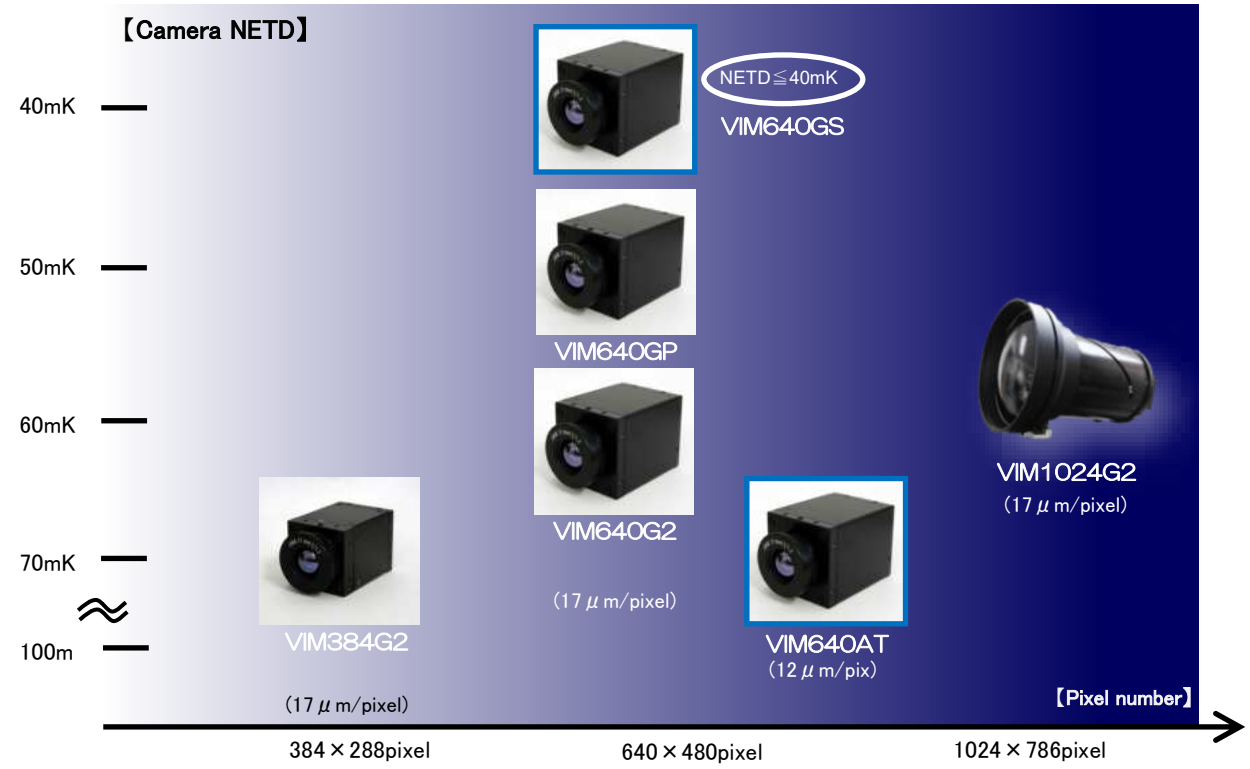
Dirt on 10 yen coin (x4 microscope lens)



Moon surface far infrared image (f=225mm telephoto lens)

Far infrared camera line-up

Various model selection from high pixel high-end devices to low pixel compact type with adapting to customers applications.



Camera specification comparison

（The numerical value in the parenthesis mentioned above shows pixel pitch.）

Items	Specifications		
Model	VIM384G2	VIM640G2 / GP / GS	VIM1024G2
Area pixel number	384×288	640×480	1024×768
Pixel pitch	17μm/pixel		
Diagonal length of detector light receiving section	8.16mm	13.6mm	21.76mm
Camera NETD (*1)	< 70mK	< 60mK(G2)/50mK(GP)/40mK(GS)	< 60mK
Maximum frame rate (*2)	30fps		
Digital output	14bit		
Correction processing	Shutter-less correction or Internal shutter correction		
Shutter correction (Internal)	Available in option		Standard installation
Image output interface	CameraLink/USB/Ethernet/NTSC/GigE/Modbus (Select at the order)		GigE or HDSDI (Select at the order)
Control interface	Same as above （NTSC：RS-232C/422control）		Same as above （HDSDI：RS232control）
Power supply voltage	DC 5V ±0.5V（Dedicated AC adopter attachment/USB bus power supply (*3)）		DC 12V ±1V
Consumption current	0.4A		1.0A
Thermal measurement range	Standard：-20 ～ +120℃ Option：50 ～ 500℃ is available (Other temperature range is consulted)		
Operating / Storage temperature	-10～+50℃（No due condensation）/ -25～+60℃（No due condensation）		
Fixing camera	1/4 inch screw adapter attachment		

(*1) It is the value with lens F/1.0 at the target temperature 300K. Camera total NETD changes depending on lens usage.
(*2) It is a maximum rate with operating in an area effective pixel number. It is possible to raise a frame rate by partial scan movement.
(*3) Regards to VIM640 series, if it connect to USB2.0, please use at an ambient temperature under 40°C. If the temperature exceeds 40°C, please use USB3.0.

Selection Guide

VIM-Gen2 series suit to customers applications, cameras are supplied as custom made with combinations by selecting ①Camera body ②Lens ③Interface and ④Calibration condition.
Please select from rich variations.

STEP-1：Select the pixel number

Select the camera with appropriate pixel numbers (384/640/1024) from the optical resolution and the field of view, in accordance with choosing the lens.

VIM-384G2

VIM-640G2

STEP-2：Select the lens

Select the lens with the focal length which is suitable for selected pixel number from the optical resolution, the field of view and the objective distance. Please refer the lens table list.

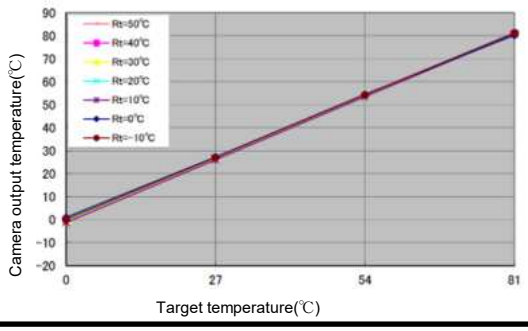
STEP-3：Select the interface

Select the image output interface witch fits to your demands. (In case of the module, the substrate is appeared on the rear part.)

Model number suffix
MO：Module
CL：CameraLink
US：USB
EN：Ethernet
NT：NTSC
PS：GigE Vision

STEP-4：Select the calibration condition

Select the request range of target temperature and ambient temperature. Shutter-less table is able to save up to maximum 2 conditions corresponding to the temperature range and the lens, and able to operate by switching in each conditions.



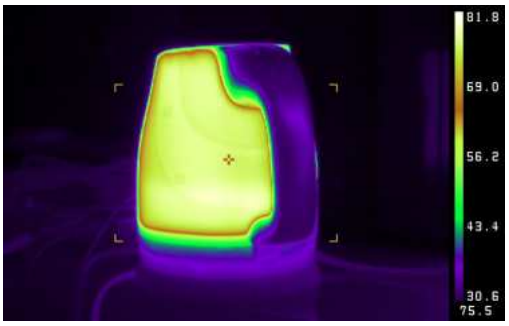
Also supporting the calibration for a high temperature photography equipped with the optical filter.

VIM series camera specifications

Supplying 2 types of image size QVGA and VGA. 4 kinds of interface are prepared so as to support various needs. Regarding to the temperature correction, there are models equipped with an additional shutter correction function (Available in option), in addition to the conventional shutter-less correction mode, and it is selectable by applications.

Day time street and people

Night time road overhead view



Electric pot

Camera specifications

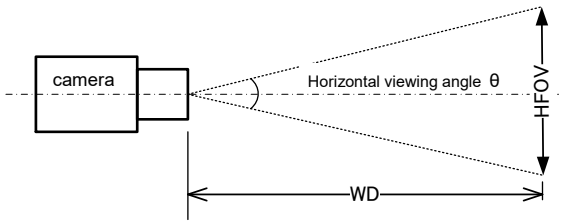
Items	Specifications	
Model (＊1)	VIM-384G2	VIM-640G2/GP/GS
Detector	LYNRED　PICO384Gen2	LYNRED　PICO640Gen2
Area pixel number	384×288	640×480
Diagonal length of detector light receiving section	8.16mm	13.6mm
Pixel pitch	17μm/pixel	
Sensitivity wavelength	8～14μm	
NETD (＊2)	＜70mK	＜60mK(G2)/50mK(GP)/40mK(GS)
Digital output	14bit	
Maximum frame rate	30fps	
Correction processing	Shutter-less correction or Internal shutter correction	
Photography (Thermal measurement range)	Standard：-20 ～ +120℃ Option：50 ～ 500 ℃ is available (Other temperature range is consulted)	
Lens	Various lenses are attachable	
Image output interface	①Camera-link : Base config. 1Tap, Connector/MDR, CC1 supports external trigger, Serial communication control	
	②USB2.0 : Output image : UVC, Control : UVC or USB serial (Original command control)	
	③Ethernet : 100Base-TX, Image : UDP communication (Original format), Control : Telnet, Connector : RJ45	
	④Analog video : NTSC or PAL　BNC connector	
	⑤Gig E Vision : 1000 Base-TX, Connector : RJ45	
External trigger mode	CameraLink, External trigger with USB or External IO input photography (Frame synchronizing / Asynchronous trigger photography) (*3)	
Partial scan	Available in option	
Power	DC +5V (USB bus power supply (*4))	
Operating / Storage temperature	-10~+50℃(No due condensation) / -25~+60℃(No due condensation)	
Dimensions	W33xH33xD52mm (With lens f=13mm)	W38xH38xD72mm (With lens f=17mm)
Weight	83g (Camera body only)	118g (Camera body only)

＊1）This is a basic model. It is formed by an interface, with/without an internal shutter or each interface specification details.
＊2）It is the value with lens F/1.0 at the target temperature 300K. Camera total NETD changes depending on lens usage.
＊3）External asynchronous trigger photography only corresponds to CameraLink output..
＊4） Regards to VIM640 series, if it connect to USB2.0, please use at an ambient temperature under 40°C. If the temperature exceeds 40°C, please use USB3.0.

Lens and Viewing angle of VIM series

Horizontal viewing angle combined with representative chalcogenide lens is shown in table below.
Preparing other lenses as germanium, microscope, ultra wide angle and telephoto etc., and please feel free to contact us.

View calculation



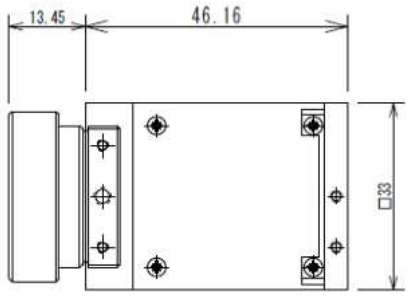
Calculate Horizontal field of view HFOV with next formula from working distance WD and below listed Horizontal viewing angle.

HFOV＝WD×tan(θ/2)×2
Vertical field of view＝HFOV×0.75

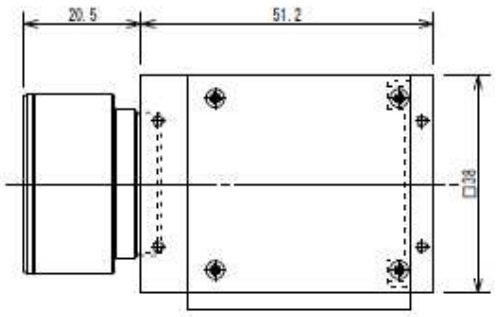
Lens specifications

Model	Specifications	Horizontal viewing angle (degree)		Mount
		VIM384G2	VIM640G2	
CAL-Q037	f=3.7mm F/1.3	89.6 (*1)	— (*2)	M12 (*3)
CAL-Q062	f=6.2mm F/1.0	63	—	M25
CAL-Q068	f=6.8mm F/1.4	56.3 (*1)	—	M25
CAL-V075	f=7.5mm F/1.2	51.1	90.8	M25
CAL-V085	f=8.5mm F/1.2	43.5	73.2	M25
CAL-V089	f=8.9mm F/1.4	41.5	69	M25
CAL-Q100	f=10mm F/1.2	36.6	—	M25
CAL-Q130	f=13mm F/1.0	28.7	—	M25
CAL-V140	f=14mm F/1.2	25.7	42.1	M25
CAL-Q190	f=19mm F/1.2	19.4	—	M25
CAL-V190	f=19mm F/1.0	19.6	32.3	M25
CAL-V250	f=25mm F/1.2	14.8	24.2	M25
CAL-V350	f=35mm F/1.1	10.5	17.0	M25
CAL-V500	f=50mm F/1.0	7.47	12.3	M34
CAL-V600	f=60mm F/1.25	6.2	10.3	M34
CAL-V750	f=75mm F/1.1	4.9	8.2	M34
CAL-V1000	f=100mm F/1.5	3.7	6.2	M34

＊1）The corners get dark.
＊2）“—” means inadequate in use due to the lack of image circle.
＊3）If the mount is different, it is required to exchange the lens including the lens mount.



VIM-384G2-USL+CAL-Q130



VIM-640G2U-USL+CAL-V190

Interface for VIM series

4 kinds of interface are prepared, every specifications are equipped with original functions. Please select according to your application.

CameraLink output type：For image processing and In-line high speed inspection!

- Output：Base Configuration 1Tap, Clock frequency 20 MHz
- Support external trigger photography operation via CC1
- Command controllable with serial communications via Camera-link
- Full frame high speed image is capturable
- Corresponding to each makers' grabber of Dalsa/Matrox/Linx etc.
- Ideal for high speed image processing such as In-line inspection!

USB output type：Supporting UVC connected to PC directly, Thermal camera like WEB!

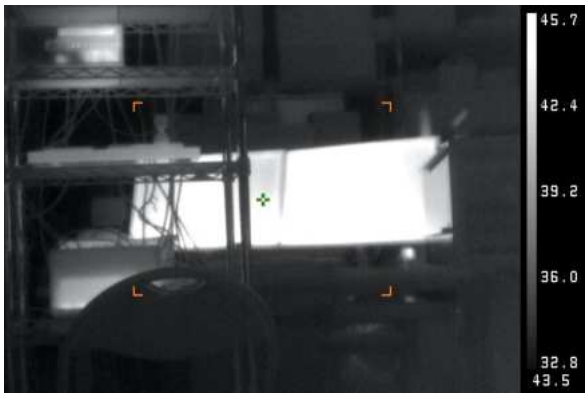
- Output：USB2.0
- Support UVC2.0（USB Video Class）（Operation is confirmed by Amcap）
- Operatable by Linux and Android*, not only Windows
  *Operatable with application for WEB camera with smartphone or tablet which correspond s USB On The Go.
- Maximum frame rate 30 fps
- Camera control：UVC or original command control
- Ideal for camera system of facility thermal monitoring and remote monitoring!

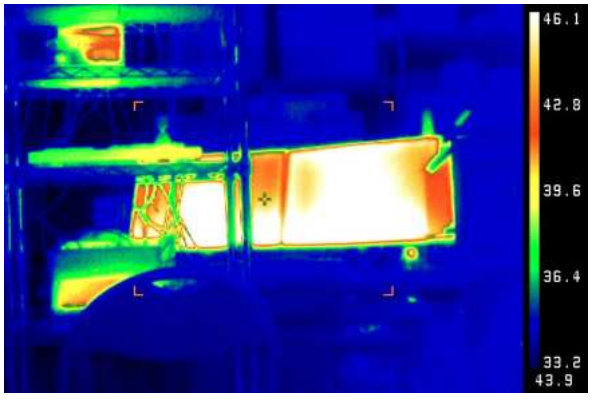
Ethernet output type：For thermal monitoring and remote monitoring system！

- Output：100BaseTX UDP communication（original format）
- Maximum frame rate 30fps（In case of VIM-384G2）
- Command controllable by Telnet (TCP/IP)
- Built-in alarm monitoring function, contact output and mail transmission is enable at abnormal occurrence.
- Sample program source for receiving is attached
- Ideal for camera system of facility thermal monitoring and remote monitoring!

NTSC output type：Night surveillance and monitoring applications！

- Output：NTSC interlace output（720×480 dot-by-dot display）
- Frame rate 30fps
- Enable to show color bar and specified point temperature in a display
- Capable to fetch the specified point temperature information by serial communications
- Command controllable by RS-232C/422 serial communications
- Ideal for monitoring applications such as night monitoring camera！





USB output UVC mode display（Left ：monochrome　Right ：Rainbow color display）

XGA far Infrared camera VIM-PICO1024

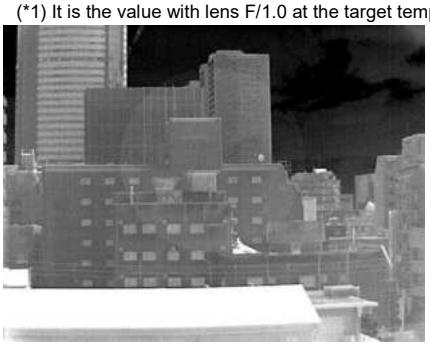
High– definition model with the best pixel number for consumer cameras
Effective for wide area night surveillance!

- Area pixel number：1024 x 768 pixel
- Sensitivity：60mK (*1)
- Digital output：14bit
- Pixel pitch：17μm
- Frame rate：Standard 30fps（Maximum 50fps）

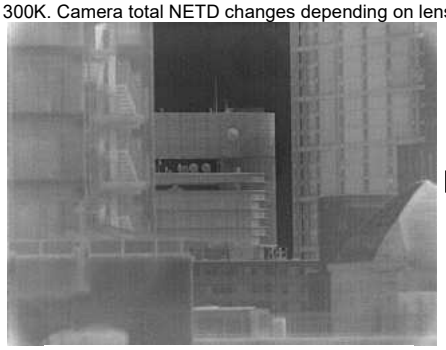
Zoom lens is available! ＜at using OPH-40330Z＞
- f = 400mm Zoom lens
- Lens F value：1.5

＜Horizontal viewing angle in use＞
- Wide angle：25.5°
- Telephoto：3.33°（Optical zoom use）
- Telephoto：0.42°（Digital zoom use）

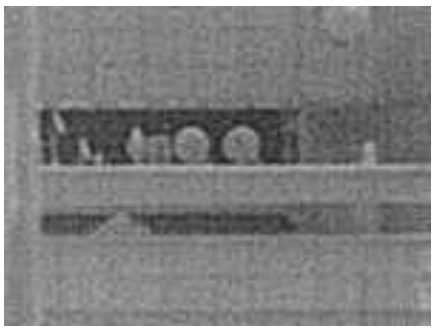
(*1) It is the value with lens F/1.0 at the target temperature 300K. Camera total NETD changes depending on lens usage.



Zoom with Wide angle lens



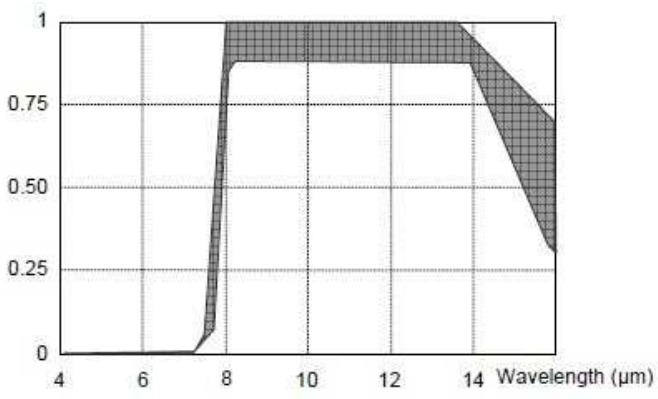
Zoom with Optics 7.5times！



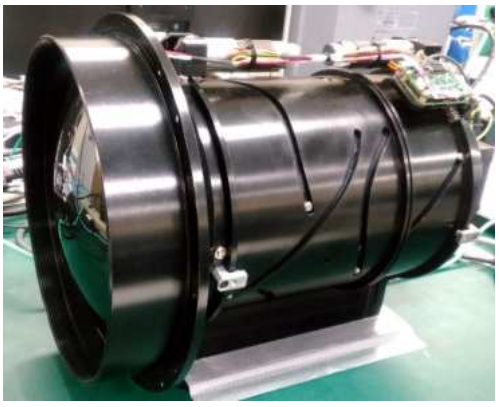
Optics x Digital 60 times！

Camera specifications

Items	Specifications
Sensitivity wavelength	8~14μm（refer the worst data in below chart）
Image output interface	HD-SDI output or GigE Vision
Control interface	RS-232C（via Camera-link）
Power	DC １２V ±１V
Operating temperature	-10~+50℃ (No due condensation)
Storage temperature	-25~+60℃ (No due condensation)
External trigger mode	External trigger input installed (Frame synchronization trigger photography)
Thermal control function	Non (TEC-less)
Correction processing	Shutter-less correction (Corresponding to internal/external shutter correction)
Dynamic range	Cut out bit number and offset is settable optionally, Auto-off set function
Lens mount	Corresponding to various lens maker
Camera body dimensions	W80mm × H80mm × D60mm (Body only)



Sensitivity wavelength



Camera body appearance photo (with OPH-40300Z)

Far infrared ray lens

We'll suggest the most suitable model from the abundant lens group which corresponds to your purpose, such us the wide angle, the telephoto, the zoom and the microscope and so on.

Model	Focal length F-value optical material Image circleφ	Appearance
JAN-T018	f=18mm F/1.0 Ge φ21mm	
JAN-T025	f=25mm F/1.0 Ge φ21mm	
JAN-T050	f=50mm F/1.0 Ge φ21mm	
OPH-V026W	f=2.6mm F/1.4 Ge φ13.6mm	
OPH-X042W	f=4.2mm F/1.4 Ge φ21mm	
OPH-V100D (Electric focus)	f=100mm F/1.0 Ge φ22mm	
OPH-V150D (Electric focus)	f=150mm F/1.0 Ge φ22mm	
OPH-15100Z (Electric zoom)	f=15～100mm F/1.4 Ge φ22mm	
OPH-25150Z (Electric zoom)	f=25～150mm F/1.4 Ge φ22mm	
OPH-25225Z (Electric zoom)	f=25～225mm F/1.4 Ge φ22mm	
OPH-40300Z (Electric zoom)	f=40～300mm F/1.5 Ge φ22mm	

Model	Focal length F-value optical material Image circleφ	Appearance
CAL-Q068	f=6.8mm F/1.4 GASIR φ6.8mm	
CAL-Q081	f=8.1mm F/1.1 GASIR φ8.2mm	
CAL-Q130	f=13mm F/1.0 GASIR φ8.2mm	
CAL-Q190	f=18.8mm F/1.2 GASIR φ12mm	
CAL-V350	f=35mm F/1.2 GASIR φ12mm	
CAL-V600	f=60mm F/1.2 GASIR φ20mm	
CAL-V750	f=75mm F/1.13 GASIR φ15.4mm	
CAL-V1000	f=100mm F/1.5 GASIR φ20mm	
CAL-V190	f=19mm F/1.0 GASIR Φ14mm	
ZSL-550AR	f=18.8mm F/0.96 ZnS φ10mm	
ZSL-612AR	f=18.8mm F/0.96 ZnS φ10mm	
ZSL-608AR	f=35mm F/1.08 ZnS φ13.6mm	

- Please select larger image circle than the diagonal length of detector light receiving section from the camera model at choosing lenses.
- Calibration is also carried out with assembling customers requested lens to the camera.

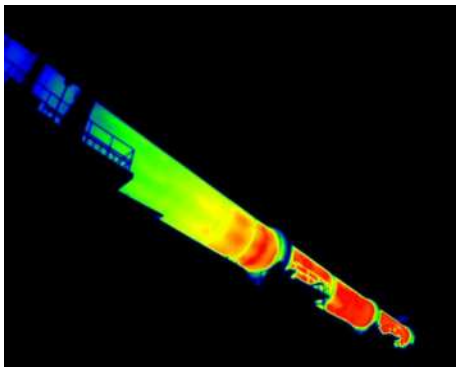
GigE Vision supported camera VIM640G2-PSL

High speed full frame rate transferable interface model via Ethernet

〈Features〉
- Area pixel number：640×480 pixel
- Pixel pitch ：17μm
- Frame rate：30fps
- Output : GigE Vision (PoE available)

＜Applications＞
- Night surveillance system
- Inline thermal measurement
- Plant ignition monitoring
- Railway failure monitoring

Shinkansen (traveling)



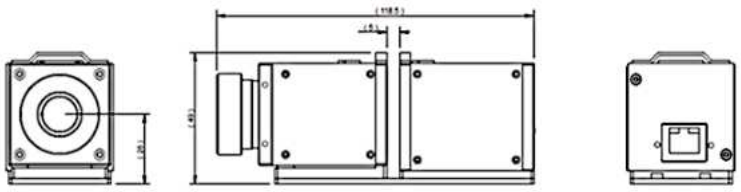
Plant ignition monitoring

Camera appearance
(Assemble with lens f=7.5mm F/1.2)

Camera specifications

Items	Specifications
Area pixel number / Pixel pitch	640 x 480 pixel • 17μm/pixel
Frame rate	30 fps
Thermal measurement range	Standard：-20 ～ +120℃ Option：50 ～ 500℃ is available (Other temperature range is consulted)
Absolute temperature accuracy	Larger one from ±2℃ or ±2%
Sensitivity wavelength	8 ～ 14μm
Image output interface	Gig E Vision 2.0 (conforms GenICam)
Control Interface	Command control via Gig E Vision Pleora SDK
External DIO	Input (External synchronizing trigger)
Lens	Corresponding to various lenses
Correction processing	Shutter-less correction
Software	Provide with ShutterLess Viewer (Image display, record and area determination function etc.)
Power	① PoE supply (Class2) ② DC12V(AC adapter)
Operating temperature	-10 ~ +50℃ (No due condensation)
Storage temperature	-25 ~ +60℃ (No due condensation)
Dimensions / Weight	W38mm × H49mm × D119mm, under 400g

External drawing



VIM640AT with pixel pitch 12μm detector

Shutter-less far infrared camera equipped with ATTO640 of LYNRED

＜Features＞
- Area pixel number : 640×480 pixel
- Pixel pitch：12μm
- NETD：70mK less (*1)
- Output：Same as VIM series

＜Applications＞
- Night monitoring system, Railway failure thermal measurement, fire monitoring system

＜Features＞
- Approx 1.4 times of telephoto image is captured compared with conventional 17μm element assembling with same optics

Image of element pitch 17μm camera

Image of ATTO 640 detector

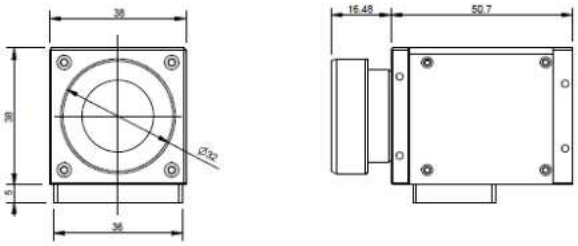
ATTO640 detector appearance

Camera specifications

Items	Specifications
Area pixel number / Pixel pitch	640 × 480 pixel • 12μm/ pixel
Camera NETD(*1)	70mK
Frame rate	30 fps
Thermal measurement range	Standard：-20 ～ + 120℃ Option：50 ～ 500℃ is available (Other temperature range is consulted)
Absolute temperature accuracy	Larger one from ±2℃ or ±2%
Sensitivity wavelength	8 ～ 14μm
Image output interface	USB / Ethernet / CameraLink
Control interface	Same as above
External DIO	Input (External synchronizing trigger)
Lens	Corresponding to various lenses
Correction processing	Shutter-less correction
Software	Provide with ShutterLess Viewer (Image display, record and area determination function etc.)
Operating / Storage temperature	10~+50℃ (No due condensation) / -25~+60℃ (No due condensation)
Dimensions / Weight	W38mm × H38mm × D72mm, under 200g

*1) It is the value with lens F/1.0 at the target temperature 300K. Camera total NETD changes depending on lens usage.

External drawing



Space camera development

Development results

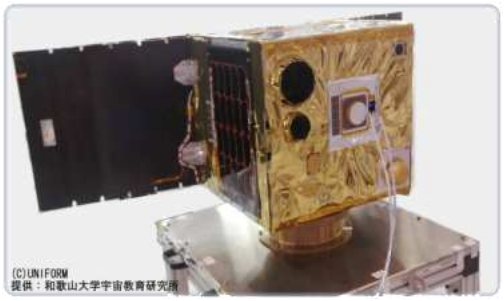
Mounted on the satellite UNIFORM-1 launched in 2014！

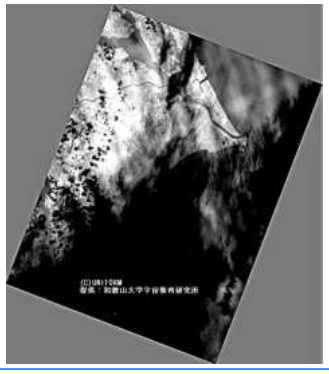
Succeed to obtain the far infrared image of ground surface from the space.
Based on this achievement, we provide the customized development of the infrared camera which is able to operate stably in the space environment. We support in every phases, such as design, manufacture and various tests.

- Lynred 640G2 VGA detector is mounted
- Corresponding to shutter operation in the space (Vacuum calibration technique)
- Lens：f=100mm F/1.5
- Pass the radiation test（20krad）
- Pass the vibration test of QT level
- Low cost with using electric devices of industrial class

Camera appearance

UNIFORM-1 appearance





Loaded on the robot arm of the international space station (ISS)
Japanese Experiment Module “Kibo” ！

Kibo Pressurized Module exterior (Forward side)

Camera appearance

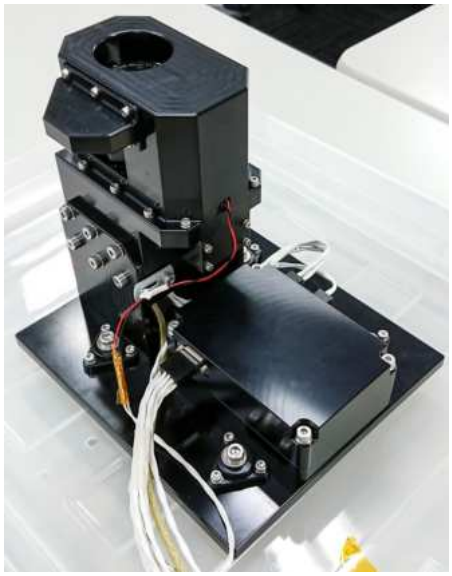
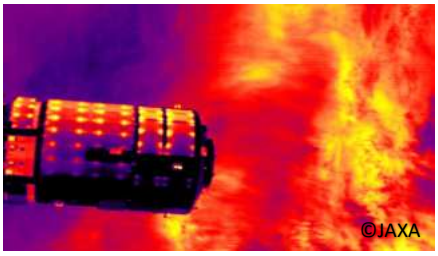
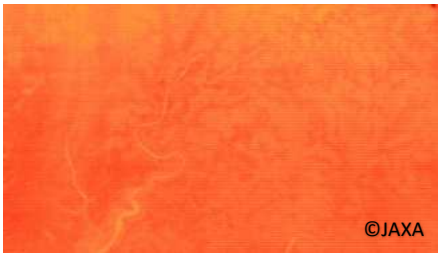


Image captured in May 2020

H-II Transfer Vehicle “KOUNOTORI 9” Approaching to ISS



River on the earth



Through flame middle infrared camera WIR384/640G2

Uncooled middle infrared camera is based on our far infrared camera VIM series with a built-in detector extending the sensitivity wavelength to 3-5μm (In-house developed products).

It is able to photograph inside through the flame in combination with a band pass filter which transmitted only around 3.9μm.

Ideal for monitoring applications of high temperature objects, such as internal parts of combustion furnace, glass melting furnace and rotary kiln.

＜Features＞

- Area pixel number：384×288
  or 640×480 pixel
- Sensitivity wavelength：3~13μm
- Maximum frame rate：30fps

＜Applications＞

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

Camera appearance

Visible image of in-furnace

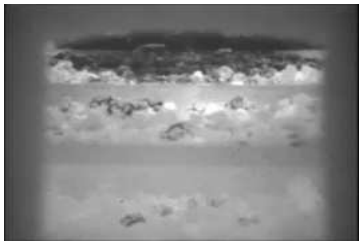
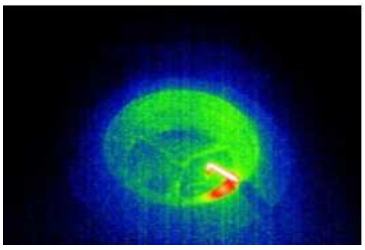


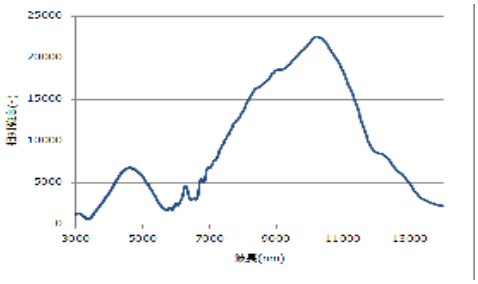
Image with through flame camera, same as left



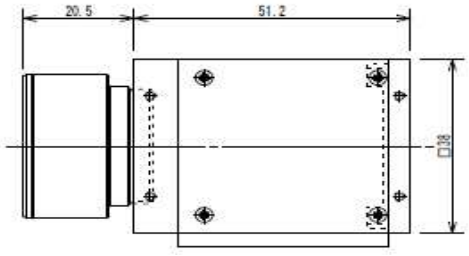
Ignited Cooktop image

Camera Specifications

Items	Specifications
Detector	Amorphous silicon type uncooled micro bolometer
Area pixel number	384 × 288 or 640 × 480 pixel
Pixel pitch	17μm/pixel
Sensitivity wavelength	3 ～ 13μm (band pass filter 3.9μm is attached at photographing through flame)
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℃ (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	VIM-384：W33mm × H33mm × D45mm (without lens) VIM-640：W38mm × H38mm × D51.2mm (without lens)



Sensitivity wavelength



External drawing (WIR640G2)

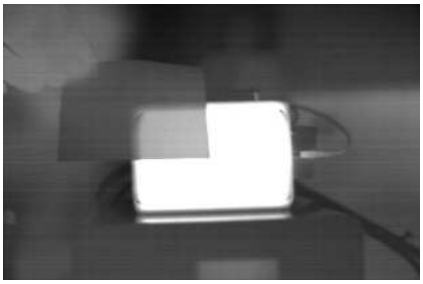
(*1) Regards to VIM640 series, if it connect to USB2.0, please use at an ambient temperature under 40°C. If the temperature exceeds 40°C, please use USB3.0.

Wideband infrared camera WIR640VO

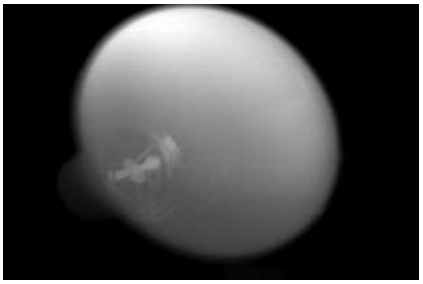
High sensitivity wideband uncooled infrared area camera equipped with Vox detector.
There are 2 bands of sensitivity wavelength with 3～4μm and 7～20μm, built-in band pass filter and acquiring the spectral image of middle infrared region are possible.
Ideal for resin material identification and thermal measurement through glass in the middle infrared region.

＜Features＞
- Area pixel number : 640x480 pixel
- Pixel pitch：17μm
- Sensitivity wavelength：3～20μm
- Maximum frame rate : 30fps

<Applications>
- Resin material identification
- Thermal measurement through glass
- Gas detection
- High temperature measurement



Resin transparent image

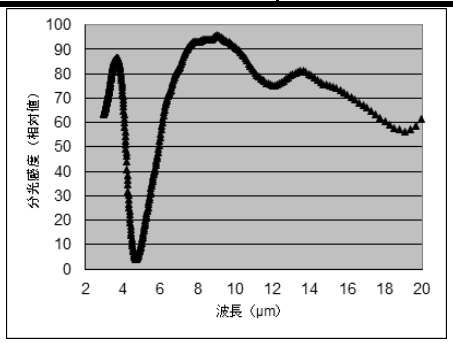


Filament through the incandescent bulb glass

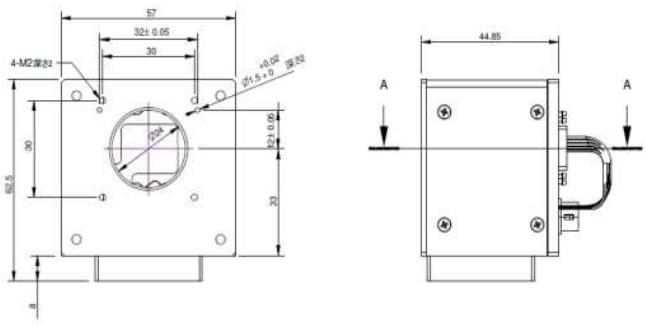
Camera appearance

Camera specifications

Items	仕　　様
Detector	Vox（Vanadium oxide）type uncooled micro bolometer
Area pixel number	640 × 480 pixel
Pixel pitch	17μm/pixel（Light receiving section：10.88mm×8.16mm）
Sensitivity wavelength	3 ～ 20μm
Frame rate / Digital output	Maximum 30fps / 16bit
Image output interface	CameraLink Base Configuration × 1　Connector：MDR
Control interface	USB (Dedicated application)
Power	DC 12V
Operating temperature	0 ～ +50℃（No due condensation）
Thermal control function	Non
External trigger mode	Asynchronous trigger photography available（Trigger input via CameraLink CC1）
Lens mount	M25 × 0.5 pitch
Camera dimensions	W57mm × H62.5mm × D45mm（without lens）



Sensitivity Wavelength



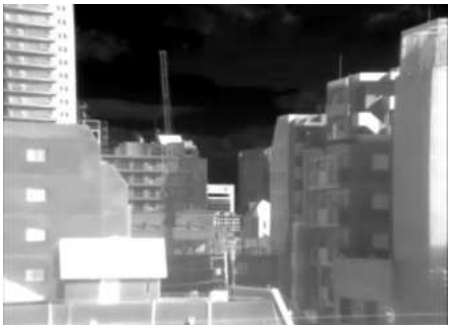
External drawing

VGA cooled middle infrared camera MIR640PL

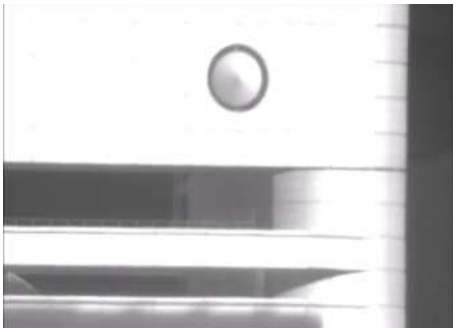
High sensitivity middle area camera equipped with cooled InSb detector.
Clear image of Low NETD is capturable and ideal for long range surveillance at night.
GigE Vision output is added and portability is improved.

＜Features＞
- Area pixel number：640×512 pixel
- Pixel pitch：15μm
- Sensitivity wavelength：1.5～5.4μm
- Maximum frame rate：30fps

＜Applications＞
- Night long range surveillance
- Gus detection
- High sensitivity thermal measurement
- Tracking system seeker



TV station with f=35mm



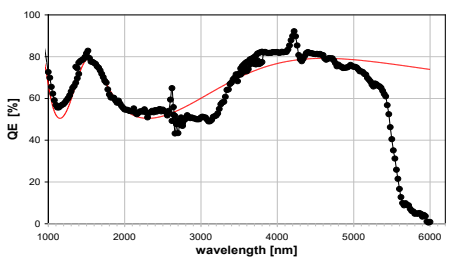
Zoom with f=690mm same as left

Camera appearance with f=35-690mm

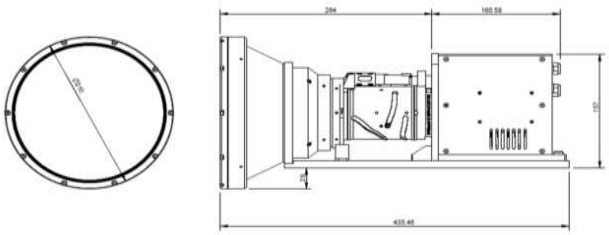
Camera specifications

Items	Specifications
Detector	InS Array detector（Quantum type Cold shield：F/4）
Area pixel number	640 × 512 pixel
Pixel pitch	15μm/pixel（Light receiving section ：9.6mm×7.68mm）
Sensitivity wavelength	1.5 ～ 5.4 μm（Filter is selectable）
Frame rate / Digital output	30fps / 13bit
Detector NETD	20mK less
Cooling system	Stirling cooler（K508N　MTTF＞17,000 hours）＊1）
Image output interface	SDI or GigE Vision output（Gigabit Ethernet）
Control interface	Serial communications or virtual serial command control via eBUS SDK Pleora
Power	DC 12V
Operating temperature	-30 ～ +50℃（No due condensation）
Storage temperature	-30 ～ +50℃（No due condensation）
Lens	Corresponding to various lenses
External trigger function	Frame synchronizing / Asynchronous trigger photography is available
Dimensions	W210mm × H210mm × D436mm（with lens）

＊1)　MTTF is average outage time and an operational life is not guaranteed. We recommend the maintenance for replacing every 2years.



Sensitivity wavelength



External drawing

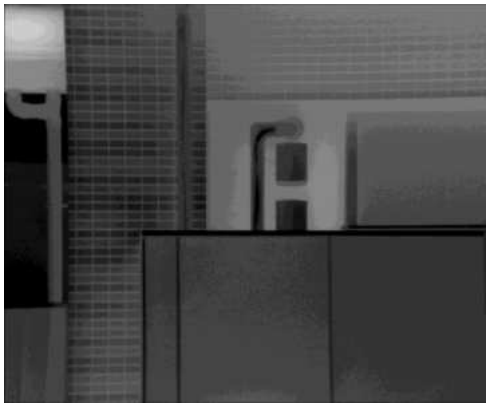
SXGA cooled middle infrared camera MIR1280BB

High sensitivity middle infrared area camera with cooled XBn detector. High-definition image of SXGA format and ideal for night long range surveillance in combination with telephoto lenses.

＜Features＞
- Area pixel number：1280×1024 pixel
- Pixel pitch：10μm
- Sensitivity wavelength：3.6～4.15μm
- Maximum frame rate：30fps

＜Applications＞
- High resolution night surveillance
- Gus detection
- High sensitivity thermal measurement
- Tracking system seeker

TV station with f=72mm



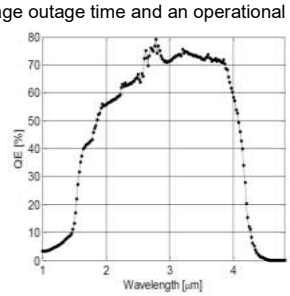
Zoom with f=900mm same as left

Camera appearance with f=72-900mm

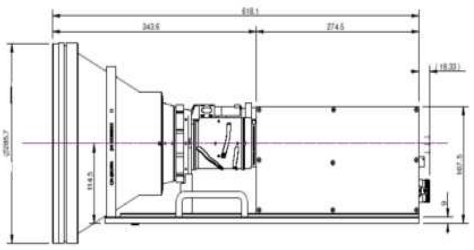
Camera Specifications

Items	Specifications
Detector	XBn array detector（Quantum type Cold shield：F/4）
Area pixel number	1280 × 1024 pixel
Pixel pitch	10μm/pixel（Light receiving section ：12.8mm×10.24mm）
Sensitivity wavelength	3.6 ～ 4.15μm
Frame rate / Digital output	30fps / 12bit
Detector NETD	25mK less
Cooling system	Stirling cooler （K508N MTTF＞17,000 hours) ＊1）
Image output interface	HD-SDI
Control interface	Serial communications via Ethernet
Power	DC 24V
Operating temperature	-20 ～ +65℃（No due condensation)
Storage temperature	-30 ～ +60℃（No due condensation)
Lens	Corresponding to various lenses
Dimensions	W286mm × H286mm × D618mm（with lens)

＊1) MTTF is average outage time and an operational life is not guaranteed. We recommend the maintenance for replacing every 2years.



Sensitivity wavelength



External drawing

VGA cooled far infrared camera LIR640PL

High sensitivity far infrared area camera with cooled T2SL detector. Clear image of low NETD is capturable, appropriate for night long range surveillance and high-definition thermal measurement. Portability is improved by selecting USB3 Vision for output.

＜Features＞
- Area pixel number：640×512 pixel
- Pixel pitch：15μm
- Sensitivity wavelength：7.8～9.3μm
- Maximum frame rate：30fps

＜Applications＞
- High resolution night surveillance
- High-definition thermal camera
- Gus detection

Building at night with f=25mm

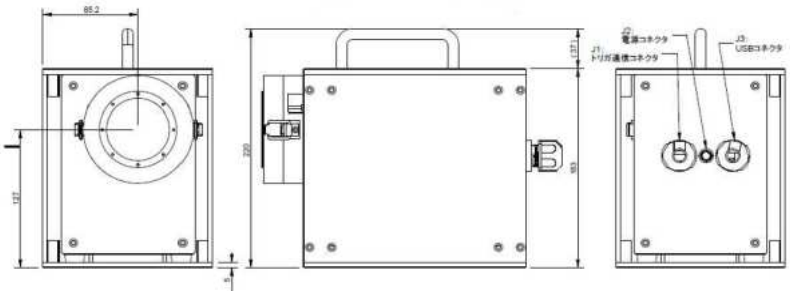
Camera appearance

Camera specifications

Items	Specifications
Detector	T2SL array detector （Quantum type Cold shield：F/2.7）
Area pixel number	640 × 512 pixel
Pixel pitch	15μm/pixel（Light receiving section：9.6mm×7.68mm）
Sensitivity wavelength	7.8 ～ 9.3 μm
Frame rate / Digital output	30fps / 13bit
Detector NETD	15mK less
Cooling system	Stirling cooler （K548N　MTTF＞13,200 hours） *1）
Image output interface	USB3 Vision output
Control interface	Virtual serial command control via eBUS SDK Pleora
Power	DC 24V
Operating temperature	-15 ～ +50℃ （No due condensation）
Storage temperature	-40 ～ +70℃ （No due condensation）
Lens	Corresponding to various lenses
Eternal trigger function	Frame synchronizing / Asynchronous trigger photography is available
Dimensions	W152mm × H220mm × D270mm

*1)　MTTF is average outage time and an operational life is not guaranteed. We recommend the maintenance for replacing periodically.

External drawing



Applicable lens

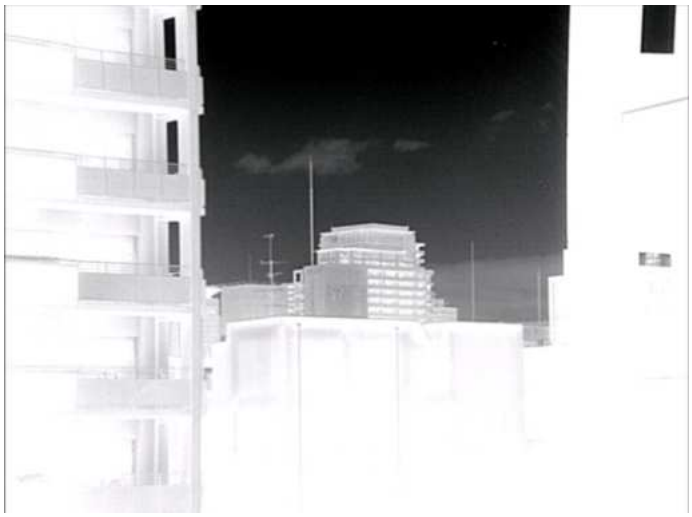
Lineup of telephoto zoom lenses which is suitable for mid-infrared cameras is shown in below.
In addition, lineup of fixed-focus lenses and other lenses is provided.
Please feel free to contact us for further information.

Model	Focal length	Horizontal viewing angle（degree）		Lens appearance
		WFOV	NFOV	
OPH-19200Z	19－200mm	29．7	2.8	
OPH-15300Z	15－300mm	35．1	1.8	
OPH－21420Z	21－420mm	25．1	1.3	
OPH－35690Z	35－690mm	15．2	0.8	
OPH－72900Z	72－900mm	7.3	0.6	

Sample image (MIR640PL)

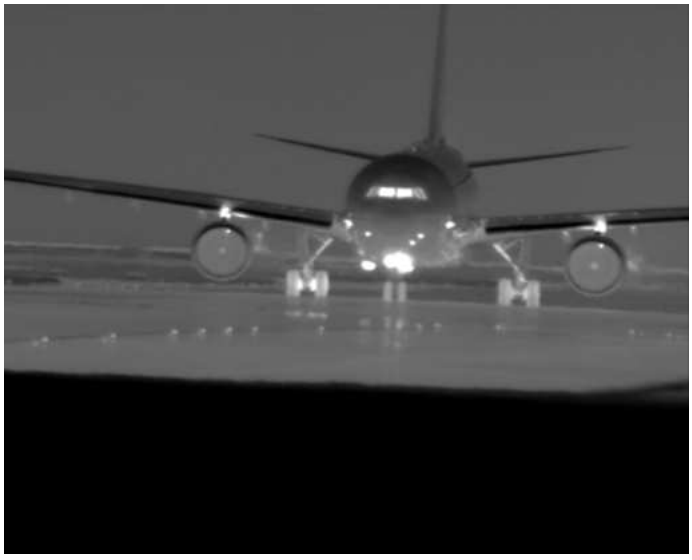
Haneda airport from Odaiba Akatsuki Futo Park
(f=300mm)

Kasai Rinkai Park from Odaiba Akatsuki Futo Park
(f=300mm)

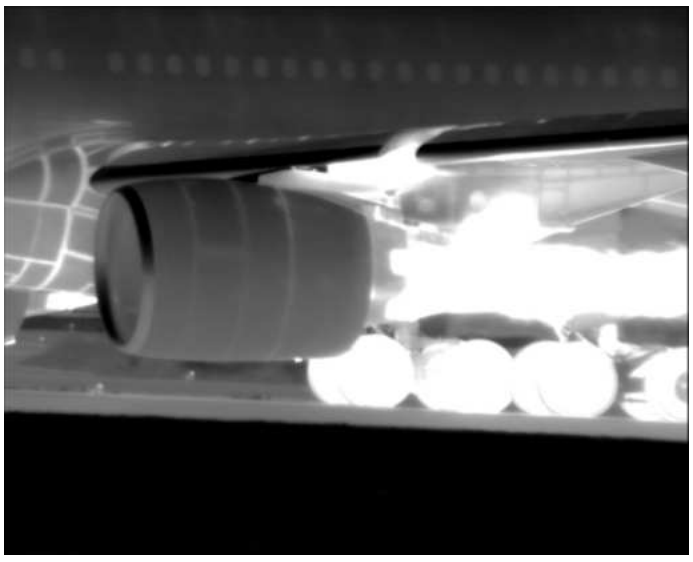


200m forward Emblem of building, Wide (f=35mm)

Same as left, Telephoto (f=690mm)



Airplane after landing



Around engine of airplane

InGaAs near infrared camera　NIR640SN

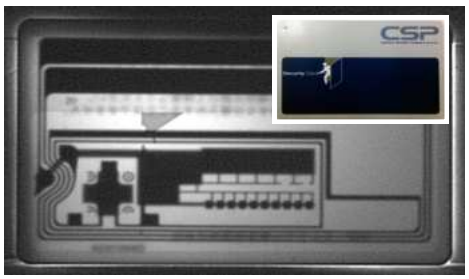
- Temperature control function (TEC) is built-in a detector and stable near infrared images are capturable.
- Ideal for acquiring spectacle images with assembling a filter by using high sensitive characteristics.
- While it is high sensitivity, achieved lower price than conventional models.

＜Features＞
- Area pixel number：640×512 pixel
- Pixel pitch：15μm
- Sensitivity wavelength：0.9～1.7μm
- Maximum frame rate：98fps

＜Applications＞
- Moisture detecting
- Dissimilar material identification
（Pharmaceutical products etc.）
- Silicon wafer transmission detecting
- High temperature measurement
(Over 200℃)

Camera appearance

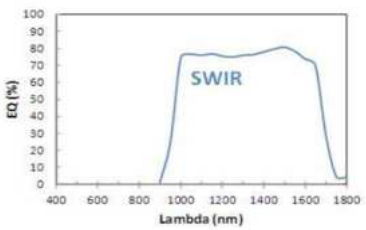
Indoor person



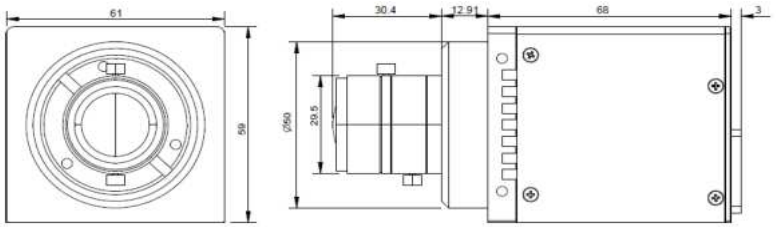
Transmission image of IC card

Camera specifications

Items	Specifications
Detector	InGaAs array detector
Area pixel number	640 × 512 pixel
Pixel pitch	15μm/pixel（Light receiving section：9.6mm×7.68mm）
Sensitivity wavelength	0.9 ～ 1.7μm
Full Well Capacity	43Ke– (High sensitivity)/120Ke–(Middle sensitivity)/1.44Me-(Low sensitivity)
Black current	30fA Noise with ROIC <30e-(High sensitivity)
Frame rate / Digital output	1 ～ 98 frame / 16bit
Exposure time	Variable in 1μm ～ 900ms（Maximum limit depends on specified value of flame rate）
Optical filter	Diameter 25.4mm filter attachable（Insert between lens-detector）
Image output interface	CameraLink Base Configuration × 1TAP　Connector：SDR
Control interface	RS-232C（via CameraLink）
Power / Consumption current	Voltage：DC 12V ± 1V　/ Consumption current：Maximum 9W
Operating / Storage temperature	-10~+50℃ (No due condensation) / -25~+60℃ (No due condensation)
Thermal control function	With TEC built –in detector
External trigger function	Frame synchronization / Asynchronous trigger photography available
Lens mount	Standard：C mount or M42 mount combined use
Dimensions	W61mm × H59mm × D81mm（Without lens）



Sensitivity wavelength

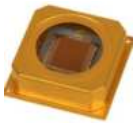


External drawing

Near infrared area camera NIR640LN

Low noise InGaAs detector is equipped • Gated Imaging is possible!

- Area camera with InGaAs element FPA has the sensitivity range from visible to near infrared
- Stable near infrared images are capturable by operating TEC built in a detector
- High sensitive features enable a high-speed frame photography up to maximum 200 fps
- Gated Imaging mode is possible
- Available for laser ranging and laser tracking



Gated Imaging amplifier

＜Features＞
- Area pixel number：640×512 pixel
- Pixel pitch：15μm
- Sensitivity wavelength：0.9～1.7μm
- Maximum frame rate：200fps
- Gated Imaging mode is possible

＜Applications＞
- Moisture detecting
- Dissimilar material identification
（Pharmaceutical products etc.）
- Night surveillance under the low light
- High temperature measurement (Over 200℃)
- Laser ranging, laser tracking

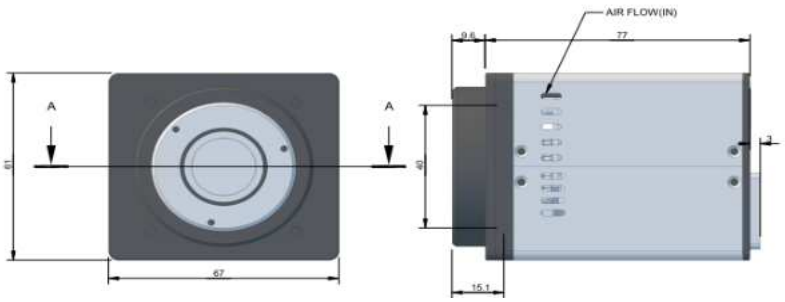
Assemble with f=50mm lens

Camera specifications

Items	Specifications
Detector	InGaAs array detector
Area pixel number	640 × 512 pixel
Pixel pitch	15μm / pixel（Light receiving section：9.6mm × 7.68mm）
Sensitivity wavelength	0.9 ～ 1.7μm
Digital output	12bit
Dark current	2fA less (@283K)
Maximum frame rate	200fps
Exposure time	0.6μs ～ Maximum limit depends on specified value of flame rate
Optical filter	Diameter 25.4mm filter attachable (Insert between lens – detector)
Image output interface	CameraLink Base Configuration × 2TAP（12bit） Connector：SDR
Control interface	RS-232C（via CameraLink）
Power / Power consumption	Voltage：DC12V / Power consumption：Maximum 15W
Operating temperature	-10 ～ +40℃ (No due condensation)
Storage temperature	-25 ～ +60℃ (No due condensation)
Thermal control function	With TEC built in detector
External trigger function	Frame synchronization / Asynchronous trigger photography available
Lens mount	Standard：C mount or M42 mount combined use
Dimensions	W67mm × H61mm × D90mm (Without lens)

Actual photography image

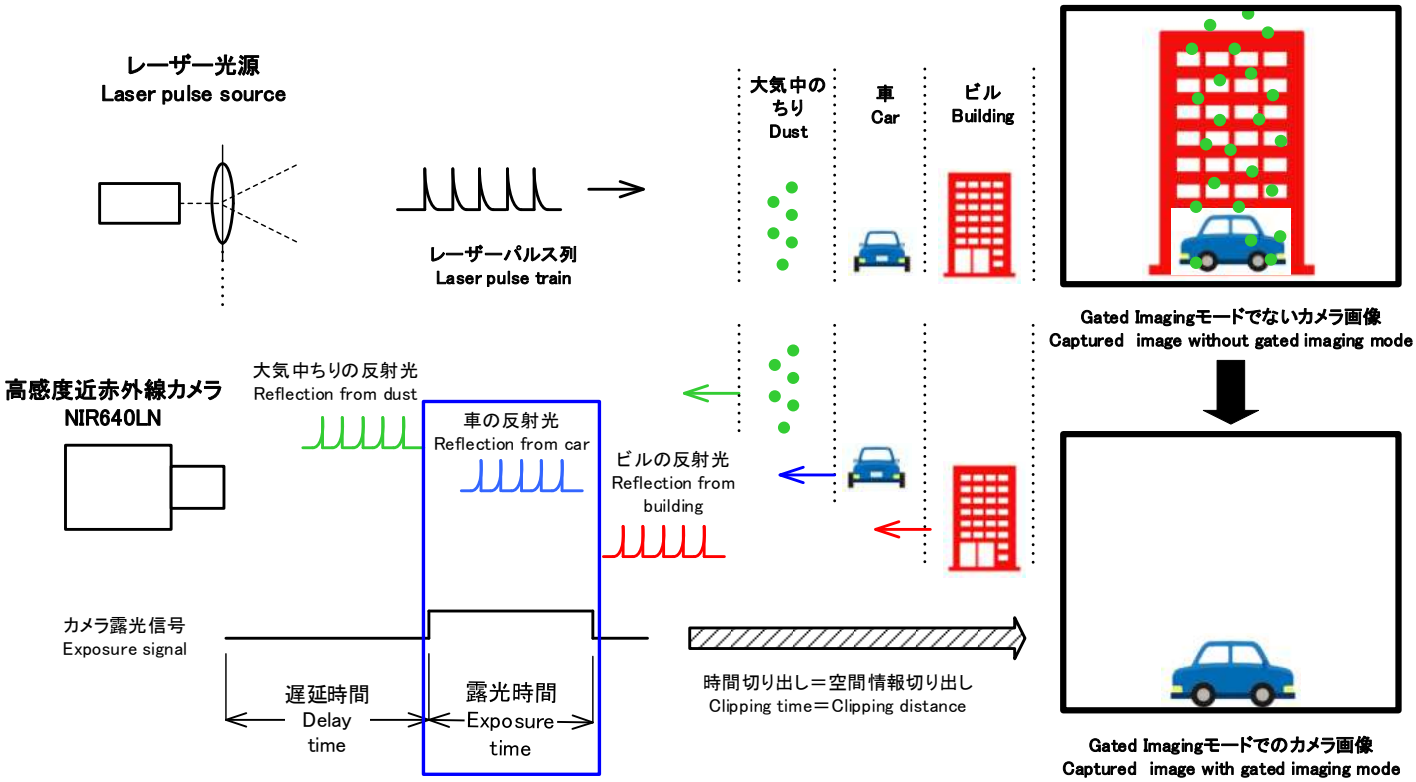
External drawing



Gated imaging mode on SWIR camera

The Gated Imaging system uses a method to clip image information within a specific distance range, eliminating the effects of dust and water vapor in the air in front of the target, and enables to acquire only the target image and measure the distance to the target. Our near-infrared camera "NIR640LN" achieves high-speed operation with the shortest **exposure time of 1 µs** compared to the 10 µs of conventional models, and the highly accurate Gated Imaging system can be constructed by synchronizing nanosecond order laser pulse light sources.

＜*Principal of Gated Imaging method*＞



- An optical pulse train of nanosecond order is output from a laser light source.
- A train of light pulses reflects off the surface of each object and returns to the camera.
  At this time, in proportion to the distance to the object surface, the arrival time of the reflected pulse train becomes longer.
- By controlling the camera exposure delay time and exposure time according to this arrival time, only the image information of a specific distance range is extracted.
  (Above illustration shows a sample only the car is extracted from a dust in the air or a building in a back.)

＜*Image sample*＞

Normal mode image (Mixed all object)

Gated imaging mode image (Clipped tree only)

This content describes application examples of our cameras, and does not guarantee the operation and performance of systems such as laser ranging.

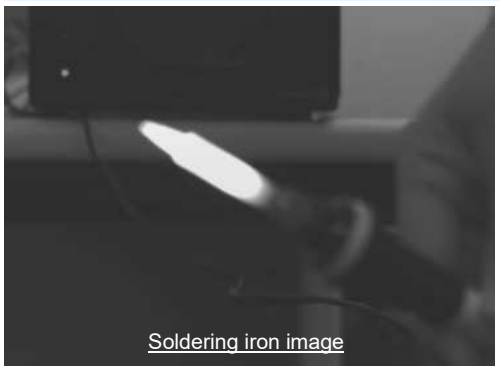
InGaAs near infrared camera NIR640CD

- Area camera with InGaAs element FPA and the sensitivity region from visible to NIR
- Stable near infrared images are capturable by operating TEC built in a detector
- High sensitive features enable a high-speed frame photography up to maximum 200 fps
- An optical filter is able to build in and ideal for acquiring spectral images

＜Features＞
- Area pixel number：640×512 pixel
- Pixel pitch：15μm
- Sensitivity wavelength：0.6～1.7μm
- Maximum frame rate：200fps

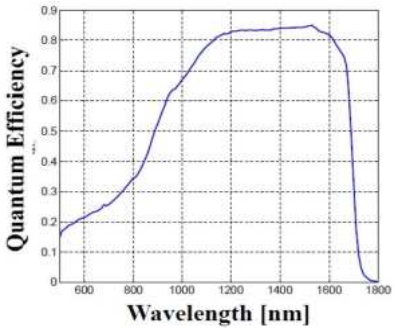
＜Applications＞
- Moisture detecting
- Dissimilar material identification
（Pharmaceutical products etc.）
- Night surveillance under the low light
- High temperature measurement (Over 200℃)

Kerosene and water



Soldering iron image

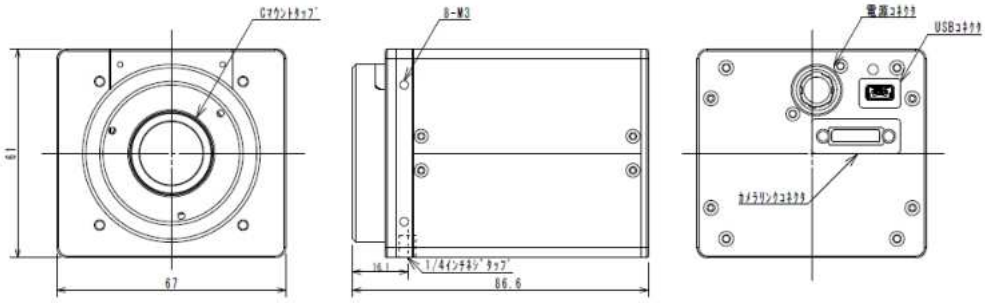
Assemble with f=50mm lens



Camera specifications

Items	Specifications
Detector	InGaAs array detector
Area pixel number	640 × 512 pixel
Pixel pitch	15μm / pixel（Light receiving section：9.6mm×7.68mm）
Sensitivity wavelength	0.6 ～ 1.7μm
Frame rate ／ Digital output	Maximum 200 fps / 12 bit
Exposure time	Variable in 1μm ～ 90ms（Configurable in 1μs step）
Optical filter	Diameter 25.4mm filter attachable (Insert between lens – detector)
Image output interface	CameraLink Base Configuration × 2TAP Connector：SDR
Control interface	RS-232C（via CameraLink）
Power	Power：DC 12V ± 1V
Operating / Storage temperature	-10~+50℃ (No due condensation) / -25~+60℃ (No due condensation)
Thermal control function	TEC installation by Peltier cooler built in a detector (recommend 0℃)
External trigger function	Frame synchronization / Asynchronous trigger photography available
Lens mount	Standard：C mount or M42 mount combined use
Dimensions	W67mm × H61mm × D86.6mm (Without lens)

External drawing



FT-IR spectrum measurement service

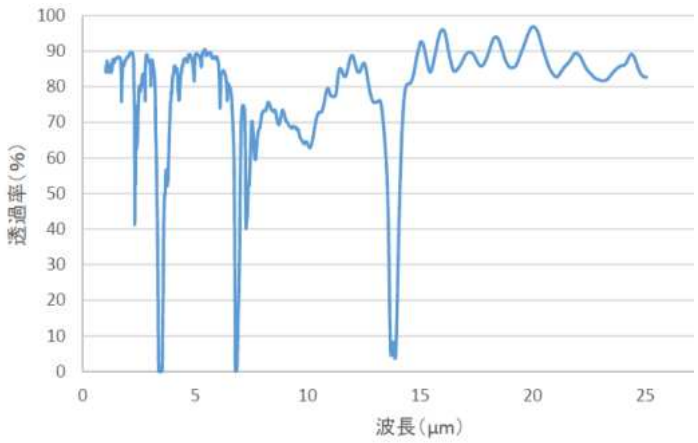
Measuring absorption and transmission spectrum of materials！

Service to inspect in advance by using near, middle and far infrared ray, regards to materials which is difficult to be detected the defect judgment by visible image.
We analyze and suggest the method of defect detection at low cost under difficulty to experiment by purchasing expensive infrared cameras, filters or lights.

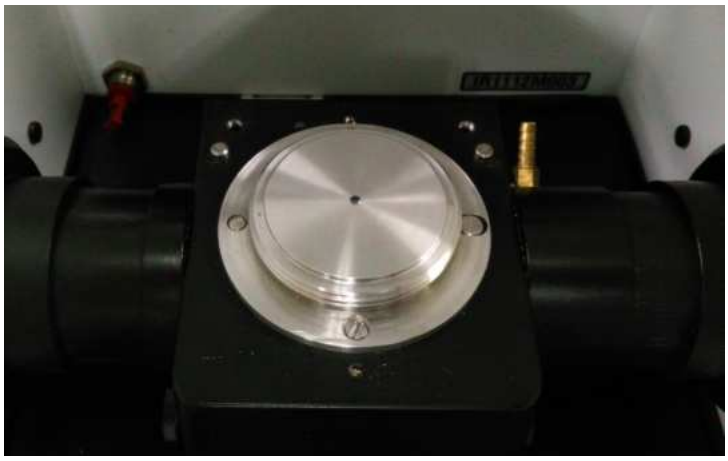
FTIR infrared spectrum analyzing device

＜Measurement method＞
- Transmission measurement
  Reflection measurement
  ATR reflection measurement

＜Wavelength range measured
by FTIR infrared spectrum analyzing device＞
- 2.5～25μm（near ～far infrared）
- 240～2600nm（visible～near infrared）



Measurement sample of resin film



ATR reflection measurement diamond stage

＜FT-IR spectrum evaluation service (Charged)＞
1. Prepare a sample.
2. Carry out FT-IR spectroscopy of a sample.
3. Select a filter + infrared camera.
4. Acquire sample images with a filter built-in camera and verify if it is effective.
5. Submit a report.
   (If there is no filter on our hand, the cost for the filter will be charged separately.)

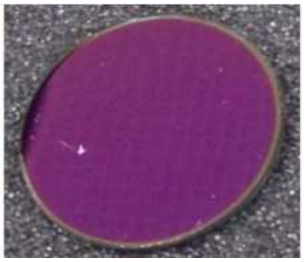
＜Regarding to Results＞
Measurement results of raw data is submitted by Excel file.
Based on the measurement results, we also propose cameras, filters, and lighting devices to detect the target object.
If there any trouble in detecting invisible objects by a visible light, please feel free to contact us!

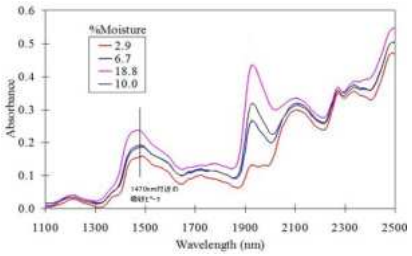
Near infrared camera applications examples

In the wavelength range of near infrared cameras, the light absorption and the transmission characteristics appear remarkably depending on the difference of materials. Those characteristics are used in the difficult fields for visible cameras, such as moisture detection and inspection over silicon wafers etc.

Applications of near infrared camera with bandpass filter

Applications of near infrared camera are extended by extracting the certain wavelength range with using bandpass filter.
For example, the water has absorption bands near 1.4μm and 1.9μm. Shooting image seems dark by extracting with using a bandpass filter of a specified band.
Colorless moisture can not see with visible cameras and it is effective to detect in near infrared cameras.





【Filter】λ0　1450nm　λ1/2　32.0nm

Image sample1：Water in a cup

Visible image　Near infrared image　Near infrared image (with a filter)

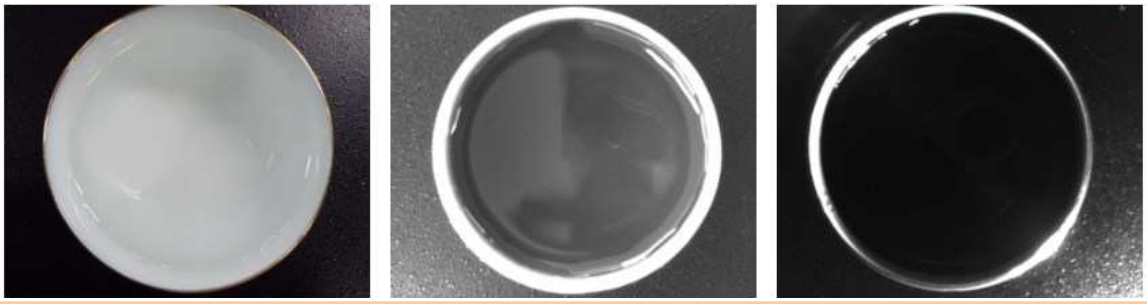
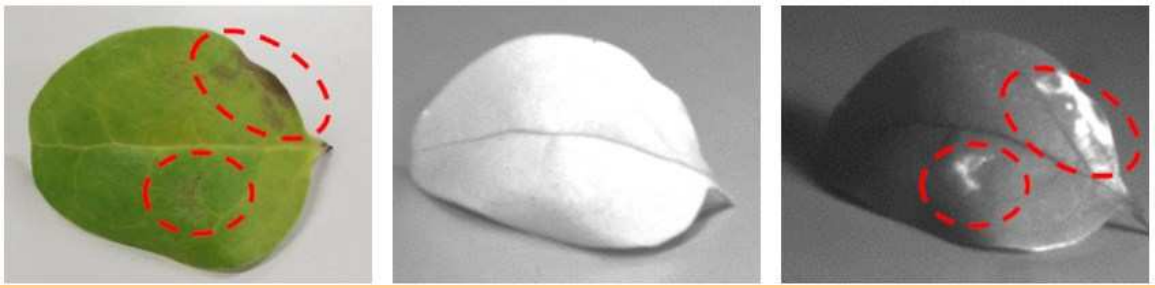


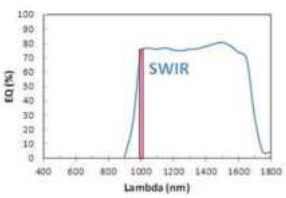
Image sample 2：Fallen leaf

Visible image　Near infrared image　Near infrared image (with a filter)



Vascular detection

Visible image　Near infrared image　Visible image　Near infrared image



【Filter】
λ0　1000.0
λ1/2　21.0nm

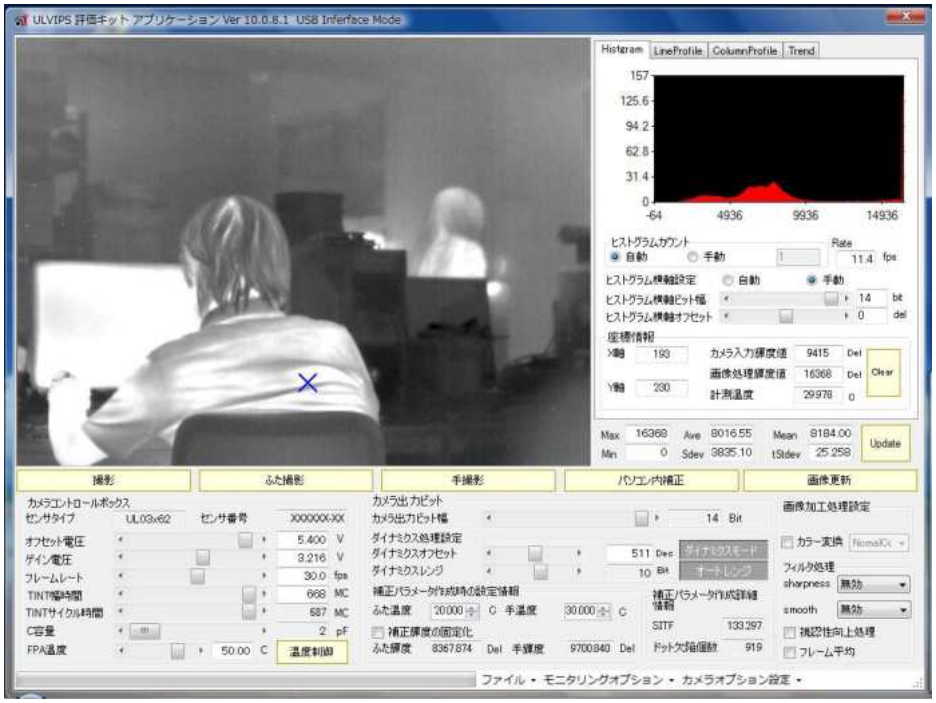
Possible to capture the vascular image more precisely by extracting the wavelength range of hemoglobin (600~1000nm) in the blood.

All image samples are captured by NIR640SN

Application Software

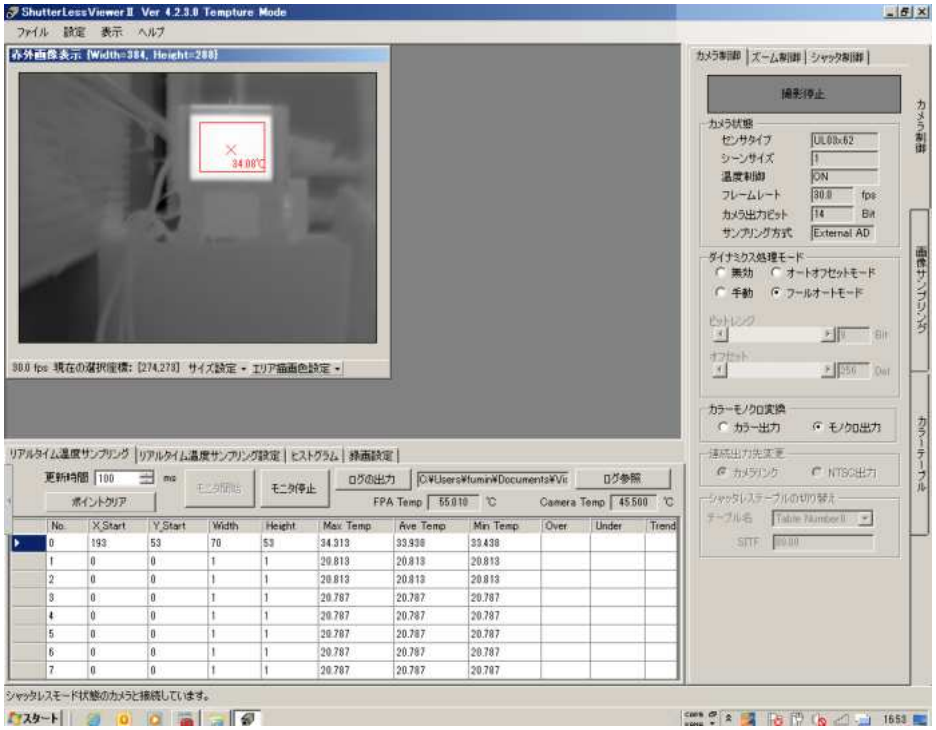
We prepare "Camera evaluation software" as an environment that customers can change the detector parameter and make the simple correction table by own. Customers can search the temperature range required for defect detecting, evaluate the field of view and the sensitivity of monitoring camera, and compose the most suitable far infrared camera.
The application of "ShutterLess Viewer II" is provided with our camera after calibration for free. ShutterLess Viewer II displays an image and a temperature as a thermography camera, and has a function to save the data.
In addition, the temperature judgement function within specified area is implemented, it is possible to build a simple temperature inspection system easily.
We will support the customized function to be required besides standard software.

Camera evaluation software



<Main functions>
- Setting the detector parameter
(Gain / offset voltage, TINT, C capacity)
- Temperature correction table between two points
- Dynamics mode setting
(Dynamics range / offset setting / auto-off set)
- Various statistics processing
(Maximum / minimum / average / standard deviation)
- Detector dot defect correction processing
(Defect pixel automatic detection)
- Photography image sampling preservation function (Preservation space / time designation, RAW/BMP/CSV form support)
- Animation preservation function (AVI form)
- Camera inside temperature indication
- Partial scan Setting (option)
- FPA temperature control setting
(with only some models)
- Image interface: USB connection

Shutter-less viewer



<Main function>
- Dynamics mode setting
(Dynamics range / offset setting / auto-off set)
- Color bar indication
(Color table reshuffling, upper and lower limit temperature set)
- Digital zoom function (x1, x2, x4, x8)
- Temperature monitoring function
(8 domains add up maximum / minimum / average)
- Temperature judgement function
(Alarm output)
- Photography image sampling preservation function (preservation space / time designation, RAW/BMP/CSV form support)
- Animation preservation function (AVI form)
- The monitoring data log output (CSV form)
- Image interface: USB connection,
Ethernet connection,
Cameral-link connection
(DALSA grabber or Pleora)
- Alarm email transmission function

<Company profile>

- Establishment ： December 16, 2008
- Capital ： JPY 3,300 million
- Executive Officers： Chief Executive Officer Yasuo Mito
- Business： Development, design and manufacture of various cameras include far infrared cameras
  Development, design and production of image processing system
  Development and design of image recognition algorithm

Osaka head office

Building appearance

7 minutes walk from Minami-morimachi and Osaka Temmangu station

Tokyo branch office

Building appearance

7 minutes walk from JR Gotanda,
5 minutes walk from Tokyu Osakihirokoji

Vision Sensing Co., Ltd.

＜Osaka head office＞
〒530-0036
Yoriki-machi park building 5F, 1-5 Yoriki-machi, Kita-ku, Osaka, Japan
TEL：+81-6-4800-0151　FAX：+81-6-4800-0152
URL：https://www.vision-sensing.jp
＜Tokyo branch office＞
〒141-0031
DK gotanda building 4F, 7-13-5 Nishi-gotanda, Shinagawa-ku, Tokyo, Japan

We may change specifications mentioned without a notice. Thank you for your understanding.