# Advanced Thermo **TVS-500EX**

| | TVS-500EX |
|---|---|
| Measurement range | -40〜500℃:Standard<br>〜2000℃ (with optional high temperature filter) |
| Temperature resolution | Better than 0.05℃ with Averaging |
| Accuracy | ±2℃ or ±2% ※1 |
| Frame time | 1/60 seconds |
| Detector | Uncooled FPA, 320(H) x 240(V) VOx microbolometer |
| Wavelength | 8〜14μm |
| FOV | 19.4°(H)x14.6°(V) (with standard 22mm lens) |
| Spatial resolution | 1.07mrad |
| Measurement distance | 30cm〜 ∞ |
| Effective pixels | 320(H)x240(V) |
| Display | 3.5" semi-transmissive color LCD monitor, Inverted display |
| Visible camera | 640x480 |
| Functions — Multi point temperature display | 5 points |
| Multi point emissivity correction | 5 points (Back Calculation) |
| Mixing Image Display | Mixing of thermal image and visible image display with sequential ration change. |
| Max/min temperature position tracking | Yes |
| Auto temperature tracking | AS (auto sense), AP (auto point), PPM mode, R&D mode, Medical mode |
| Digital zoom | x2, x4 (scroll display, area designation possible) |
| Freeze | On/Off |
| Isotherm function | Yes |
| Grid display | Yes |
| Alarm function | Displayed by setting the temperature (single/continuous) |
| Alarm function — Signal output | Yes |
| Alarm function — Image recording | Interval recording with alarm as a trigger |
| Color palette | Rainbow/hot iron/iron bar/white black/black white/contrast |
| Image improvement function | Averaging process |
| Other functions | Emissivity correction, day and time display, battery volume, memo, last memory |
| CF Card — Data storage | 300/64MB. Up to 512MB.<br>Realtime memory (option) 400 frames (standard), 1600 frames (reduced size) ※2 |
| CF Card — Mode | CF format, delete, create directory, file name input, one shot recording, interval recording, one shot playback, gallery display, file name display |
| CF Card — File format | IRI, BMP (thermal image)/JPG (visible image)/BMP (mixing image)/LOG Simultaneous recording of thermal image, visible image, and mixing image. |
| CF Card — Interval recording | 3S〜23H59m59s (1/60s〜 when using optional realtime memory) |
| Temperature unit | ℃/ ℉/K |
| Video output | NTSC or PAL |
| PC interface | RS-232C, USB, IEEE1394(option) ※2 |
| Power | Battery (Li-ion), AC adapter, Long life battery (option) |
| Power consumption | 14W |
| Battery run time | Approx 2H, approx 4H (when using optional long life battery) |
| Operational temperature/humidity | -10〜50℃/RH80% or less (no condensation) |
| Dimensions | 140(H)x140(W)x226(D)mm including protrusions |
| Weight | 1.9Kg (without battery) |
| Environmental protection | IP54 |
| Shock | 30G JISC0041/IEC60068-2-27 |
| Vibration | 3G JISC0040/IEC60068-2-6 |

※1 Accuracy applies from -20 to 300℃
※2 USB, IEEE and realtime memory are exclusive to each other

## ■ Measurement distance and FOV (with standard 22mm lens)



TVS-500EX

7.6cm  25.7cm  2.57m  25.7m  34.2m
10.2cm  34.2cm  3.42m  34.2m

0.32mm
1.07mm
1.07cm  10.7cm

Measurement distance
0  0.3m  1m  10m  100m

☐ Total FOV
☐ FOV of a pixel
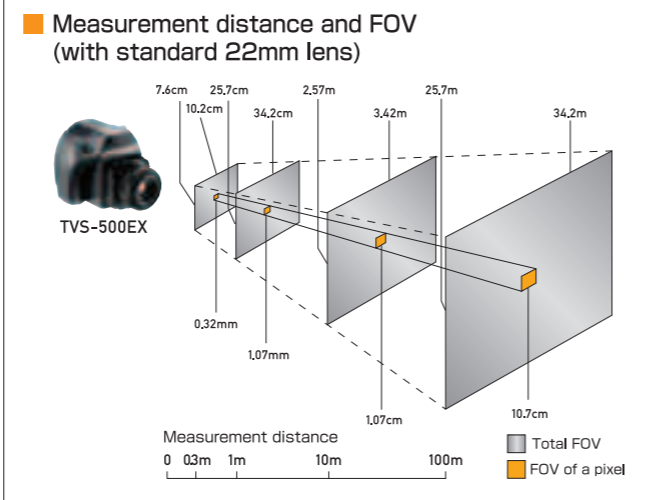
## ■ Operational environment for the USB link software "Advanced Package"

● **OS compatibility**
  OS: Microsoft Windows 2000 SP-4, Microsoft Windows XP SP-2
● **PC specifications**
・ PC-AT compatible
・ The above OS shall be preinstalled and USB2.0 interface shall be equipped as standard.
・ Pentium M/1.7GHz or better (Pentium 4/2.6GHz or better is recommended)
・ RAM: 512MB or more (1GB or more is recommended)
・ HDD: A blank space of approximately 1GB or more is required in the HDD. When recording thermal image at 60Fps and visible image simultaneously, 7200rpm or faster 3.5FDD will be required.
・ Displayed color: 16 bit color (65536 colors) or more
・ Resolution: XGA (1024x768) or better

※This software is dedicated for TVS-500EX, and it cannot be used with other TVS series products. And this software is always sold with the hardware and not sold alone.
※If the USB interface of TVS-500EX is changed to IEEE1394 interface, this software cannot be used.

## ■ Standard configuration

● TVS-500
  (with 22mm standard lens) 1ea
● AC adapter
● Battery pack
● Battery charger

● CF card
● Card adapter
● Neck strap
● RS-232C cable
● Operation manual

● Pointer & Light
● USB cable
● CD for application software installation

## ⚠ Precautions for use of this product.

●Please make sure to read the instruction manual carefully before use so that the equipment can be used Safely. ●Do not leave equipment in a place where there is water, moisture, steam, smoke, etc. It may cause fire, electric shock or failure of the equipment ●This company shall not be liable for any incidental damages (loss of business profit, change or loss of data, etc.) caused by the use or non-availability of this product. ●This company shall not be liable for any damages caused by malfunctions due to connection with other equipment or with equipment containing software developed by others. ●This company shall not be liable for any damages caused by using the product in a way other than those explained in the operation manual. ●The specifications and functions described in this brochure may be changed without notice for improvement. ●Company names and product names appearing in this brochures are trade names and trademarks of those companies. ●Windows is a trademark of Microsoft Corporation of the USA registered in the USA and other countries.

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## Advanced Thermo **TVS-500EX** NEW



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# NIPPON AVIONICS CO.,LTD.

# A new stage of infrared thermography now begins

## Advanced Thermo **TVS-500EX**

Advanced thermo, TVS-500EX, is an infrared thermography using new Japanese sensor and realizing clearer and higher quality image than before.

It is truly an advanced thermography which offers convenient and various functions, and easy operation. In addition, TVS-500EX meets the environmental requirements (compliance to RoHS directive).

# Top level performance in its category

### 0.05℃ temperature resolution 1.07mrad spatial resolution

It is equipped with a new Japanese IR sensor realizing ultra high sensitivity and high quality image, and it measures even a micro temperature difference with accuracy.

※Full mixing display
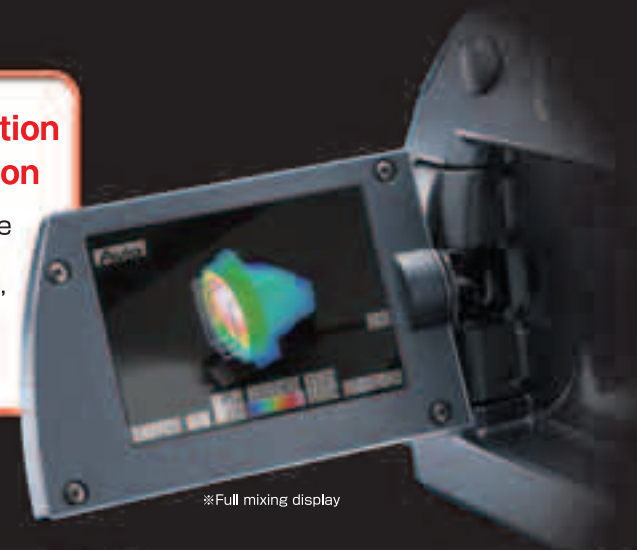
### Built-in USB link application software

Application software boots up by simple connection to PC.

### Thermal image and visible image can be displayed completely simultaneously.

Our unique transmissive mixing enables to see the background of the thermal image.

**The world's first system unique to Avio (patent pending)**

### User friendly design with easy operation

Easy operation is realised with the palm grip of excellent hold feeling and user friendly operation panel.

### Various options to meet different applications

Realtime memory and optional lenses etc are available to satisfy different applications.

※As of February 1st, 2007

# Supporting "visualization" of "heat" from measurement, analysis to report

Avio unique world's first system (patent pending)

## Built-in USB link application software called "Advanced Package"
※As of February 1st, 2007

Advanced Package is designed for USB interface, which is equipped on PC as standard, and it realizes realtime measurement of thermal image and visible image from TVS-500EX. It is also useful in various aspects of measurement such as recording or editing of measured temperature information and images.

**NIKON SYSTEMS INC.**
Advanced Package incorporates an advanced image processing software of Nikon Systems Inc.

### The software boots up by simply connecting the USB cable.



Connected with a PC via USB cable.



The application software boots up automatically.



Start measurement.

### Various functions are useful in many fields including research and development.

TVS-500EX

USB link

## Realtime display and recording at 1/60 seconds.

High speed display and recording are available with maximum 1/60 seconds for thermal images and maximum 1/20 seconds for visible images.
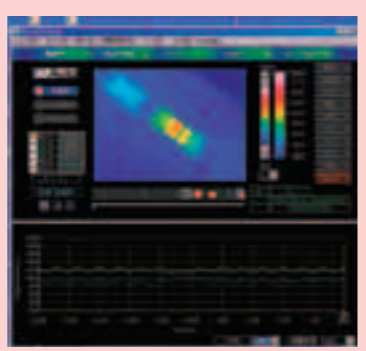
Point temperature trend display ▶

**Major functions**

- Multi point temperature display and trend graph display (maximum 5 points)
- Mixing display of thermal image and visible image
- Interval recording of images
- Changing of displayed temperature range, displayed color and temperature unit
- One shot recording
- CSV file output of point temperature

## Sorting and editing of recorded images

Sorting and editing of recorded realtime images can also be made easily.
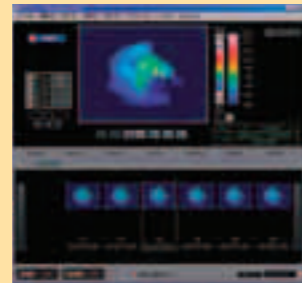
Editing of recorded realtime image can be made.

Image sorting and linking with the analytical software can be made easily.

**Major functions**

(Image editing software)
- Conversion of realtime image to a regular thermal image file (selective, totally)
- Point temperature checking and conversion of realtime image file (AVI, WMV)

(File searching software)
- Thumb nail display of recorded thermal images and visible images
- Linking with the optional analytical software, and a function to control image files by date
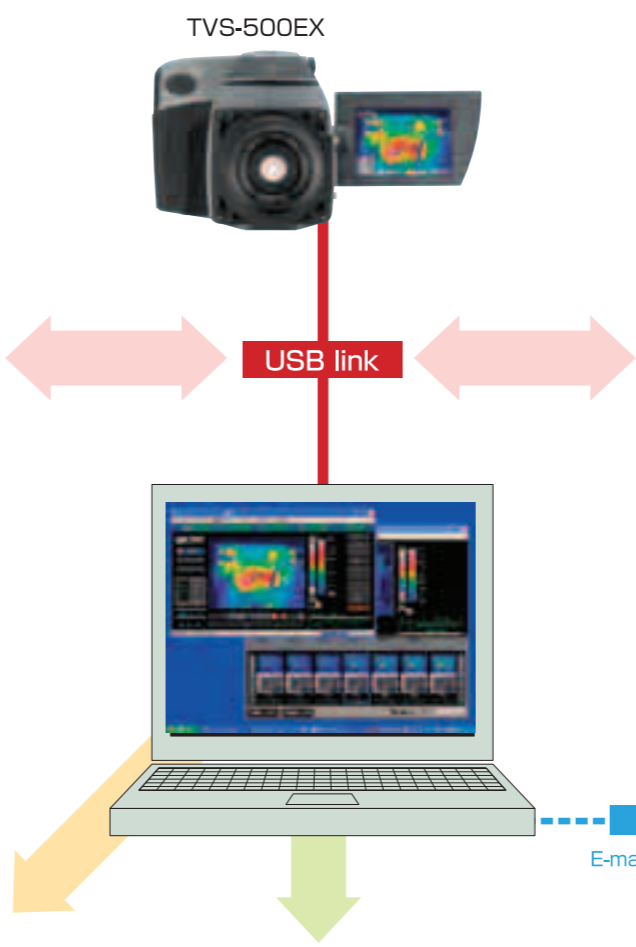
## Setting and control by a PC
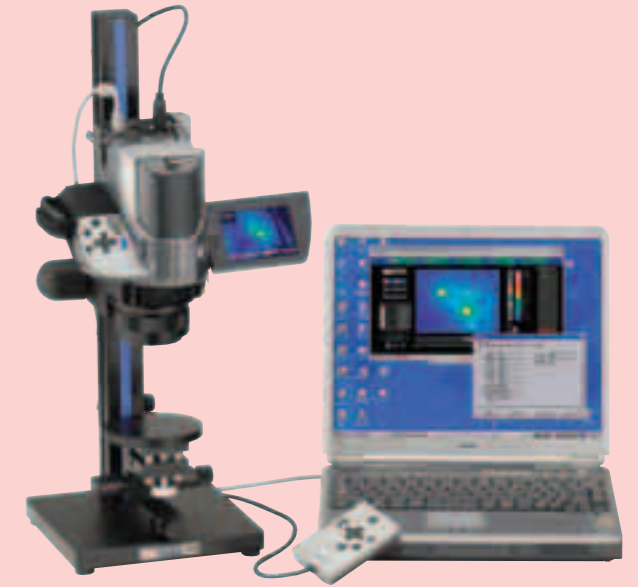
Setting of parameters, such as emissivity, or controlling of the camera itself can be made from a PC. If combined with a remote control unit (option), work efficiency with optional lenses will be substantially improved.

Internet
E-mail delivery of alarm
Mobile

## Alarm function

E-mail with thermal image attached can be delivered, and image before alarm can be recorded.

## Analysis is easy using the optional analytical software.

Thermal image analysis software
(Multi functional software covering from image display to analysis and report writing.)

File control
Profile and histogram
Report writing
Trend function
Subtraction
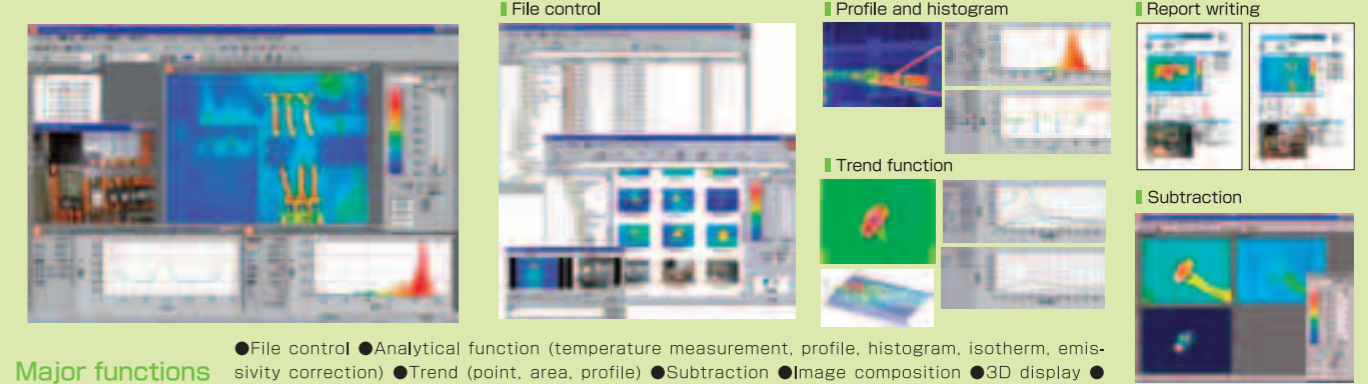
**Major functions**
- File control ● Analytical function (temperature measurement, profile, histogram, isotherm, emissivity correction) ● Trend (point, area, profile) ● Subtraction ● Image composition ● 3D display ● Report output ● Various filters ● Data conversion

Depending on the performance of the PC used, above functions may be affected. Please see the last page of this brochure for the details of the software operational environment.

# Variety of functions on the main unit

Thermal image and visible image can be displayed completely simultaneously

## Our unique transmissive mixing function where background of the thermal image can also be seen. (Patent pending)

**Our unique method enables overlapping thermal image and visible image.**
The background of the thermal image can be displayed in transmission.
By changing ratio of overlapped thermal image and visible image and easy adjustment of position, TVS-500EX can identify location and understand situation of object easily.

Visible image + Thermal image → Mixing image
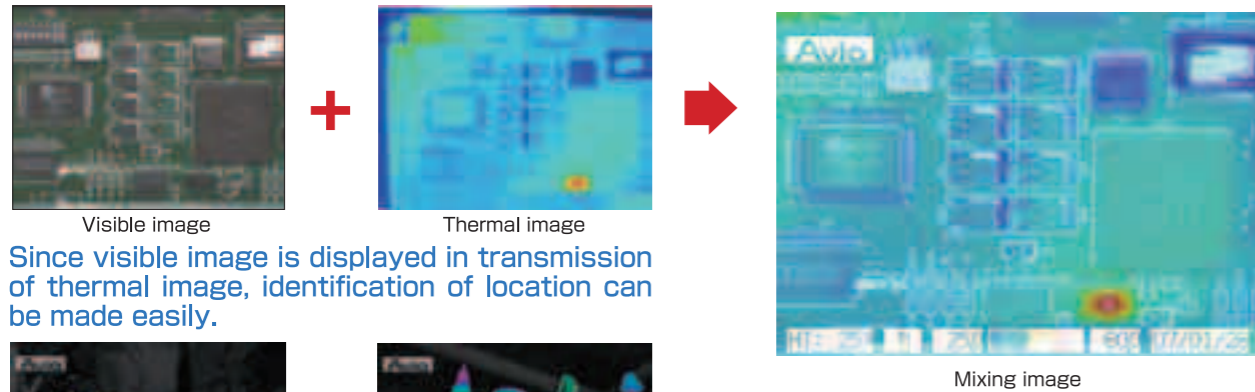
**Since visible image is displayed in transmission of thermal image, identification of location can be made easily.**

Electronic equipment

Boiler

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Standard functions on the main unit

## In addition, many useful functions for measurement are available as standard.

### Multi point temperature display/multi point emissivity correction
Point temperature can be displayed for up to 5 points, and emissivity of each point can be corrected.
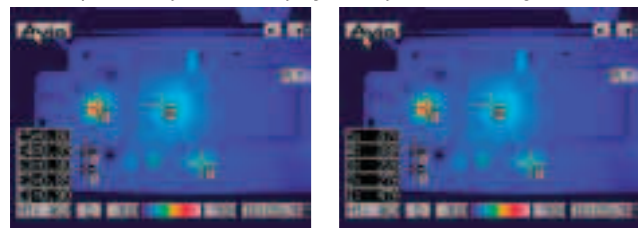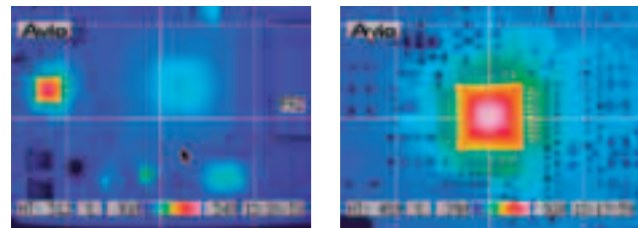
### Grid display
Grids are displayed in 100 pixel spacing. (with standard 22mm lens)
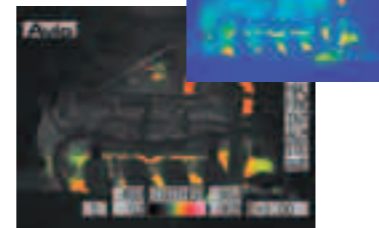Display with the close-up lens (63µm).
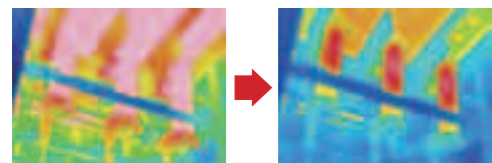
### Auto function
Temperature range suitable for the object can be set in one action.
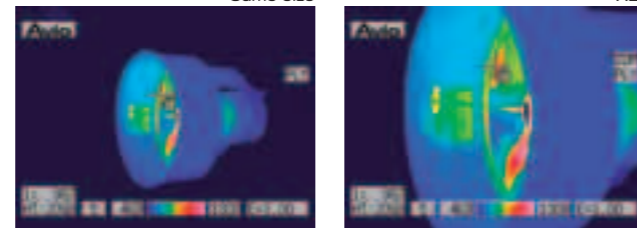
### Maximum (minimum) temperature tracking
Maximum (minimum) temperature within the screen can be tracked. (area designation and alarm output are possible)
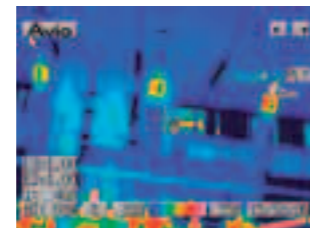
### Zoom function
Same size / X2
Thermal image can be zoomed (X2, X4). The screen can be scrolled during zoom display.

### Isotherm
Thermal image
Within the temperature displayed range, the section with a certain temperature range can be highlighted in a different pseudo color.

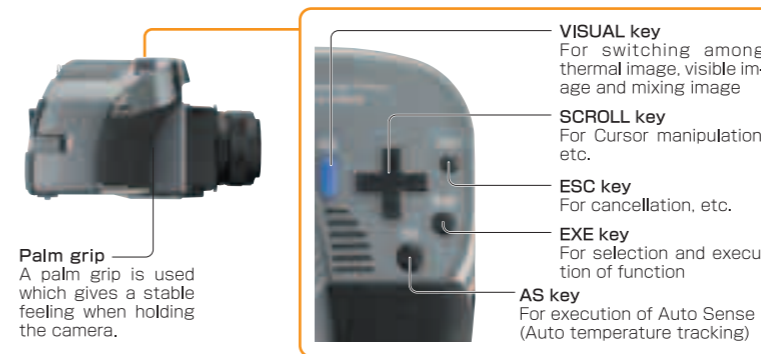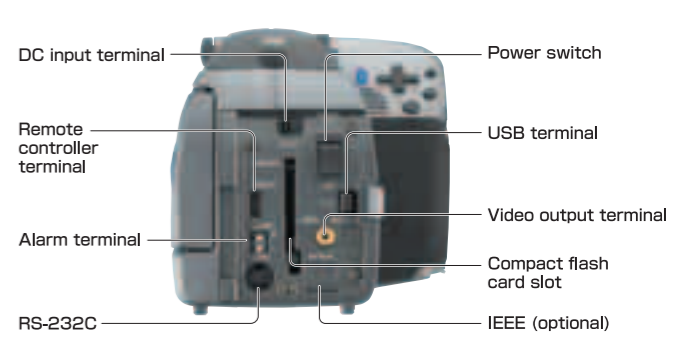### Pointer & Light(laser pointer & LED illuminator), convenient for measurement, is attached as a standard accessory.

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## Operability is pursued thoroughly.

**Palm grip**
A palm grip is used which gives a stable feeling when holding the camera.

**VISUAL key**
For switching among thermal image, visible image and mixing image

**SCROLL key**
For Cursor manipulation, etc.

**ESC key**
For cancellation, etc.

**EXE key**
For selection and execution of function

**AS key**
For execution of Auto Sense (Auto temperature tracking)

## Variety of interfaces

DC input terminal
Remote controller terminal
Alarm terminal
RS-232C

Power switch
USB terminal
Video output terminal
Compact flash card slot
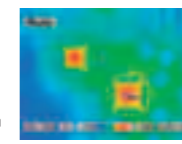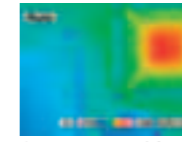IEEE (optional)

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## OPTIONS

### Close-up lens (63µm) TVC-2100UB
Measured temperature range : 0~300℃
Measurement distance: 56mm
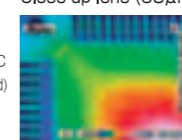FOV: 20mm(H)x15mm(V)
Size: φ66x20.5mm
Weight: 90g

Standard lens
Close-up lens (63µm)

### Microscopic lens (18.5µm) TVM-7025U
Measured temperature range : 30~300℃
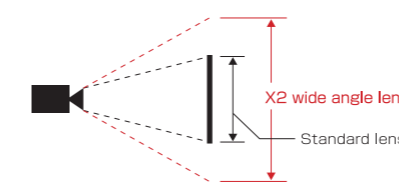Measurement distance: 33mm (fixed)
FOV: 5.9mm(H)x4.4mm(V)
Size: φ66x155mm

Microscopic lens (18.5µm)

### X2 telescopic lens TVL-2044B
Measured temperature range : -20~500℃
Measurement distance : 1200mm or longer
FOV: 10˚(H)x7˚(V)
Size: φ84x32.7mm
Weight: 170g
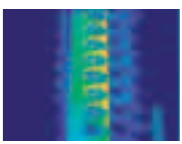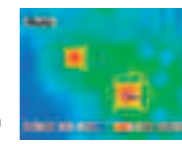
Standard lens
X2 telescopic lens

### X3 telescopic lens TVL-2066B
Measured temperature range : -20~500℃
Measurement distance : 2500mm or longer
FOV: 6.4˚(H)x4.9˚(V)
Size: φ126x78.5mm
Weight: 550g

X3 telescopic lens

### X2 wide angle lens TVL-2011B
Measured temperature range : -20~500℃
Measurement distance: 150mm or longer
FOV: 39˚(H)x29˚(V)
Size: φ58x32mm
Weight: 110g

X2 wide angle lens
Standard lens

### Exclusive remote controller
The remote controller can be used in direct connection to the camera. (1.5m long cable)

### Long life battery case
The battery case can be used in direct connection to DC input terminal.
(Two spare battery packs, sold separately, are required for use.)
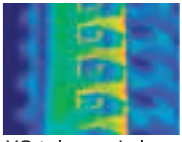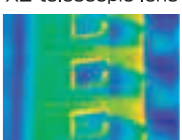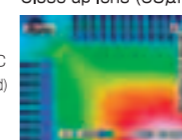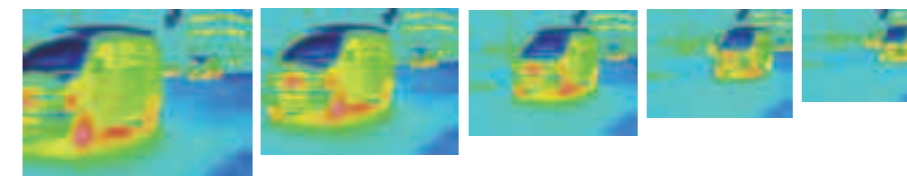Approx 4 hours continuous operation.

### Other options
- Filter for high temperature measurement (for 900℃, 2000℃)
- IEEE1394 image transfer kit (for desk top PC, for laptop PC)
  This is a kit to transfer image via IEEE1394. When it is used, it replaces with the USB interface.
- Carrying case
- Battery pack (for spare)
- Battery charger (for spare)

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## Realtime memory (Option)

## Up to 1600 frames of thermal images can be recorded into the memory inside the camera at the maximum speed 1/60 seconds

### Specifications

| Number of recorded frames | Maximum 400 frames (full size recording) Maximum 1600 frames (reduced size) |
|---|---|
| Frame time | 60fps, 30fps, 20fps, 10fps, 5fps, 2fps, 1fps, 2s |
| Recording mode | Continuous, alarm, one shot |

※When realtime memory is used, it replaces with the USB interface.