

Longwave Infrared Thermal Imaging Camera



Security application cameras

384x288 resolution: CG300

640x480 resolution: CG600

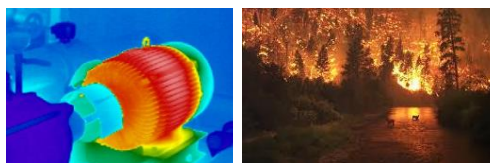
1024x768 resolution: CX1000



Radiometric (Thermography) application cameras

384x288 resolution: CG320

640x480 resolution: CG640



Thermal network cameras transmitting video data and temperature data

384x288 resolution: CG320-IP

640x480 resolution: CG640-IP

1024x768 resolution: CX1000-IP (transmits video data only)

Thermal cameras for automotive night vision

384x288 resolution thermal camera for automotive night vision



Others

Lenses (variety of lenses from 4.8-250mm), zoom lenses, 2FOV, Athermalized, Macro

Housing with Ge window

PT Drive



#810, Hanwha Biz Metro 1-cha, 242, Digital-ro, Guro-gu, Seoul, Korea (Zip: 08394)
Phone: 82-2-857-3888, Fax: 82-70-7614-3871 E-mail: sales@coxcamera.com www.coxcamera.com



Radiometric application thermal cameras

All CG series radiometric models are with latest version of thermal detectors from ULIS, which are, QVGA Gen2 detector and VGA Gen2 detector, respectively. Those detectors have better NETD than detectors for former CX series models, and just several times of NUC in a day is good enough because they are shutter-less compatible. Even though we do not execute NUC every 5 minutes or 1 minute, image quality is much better than former CX series models.

By increasing processing capacity, CG series cameras has more detailed features in alarm setting and ROI settings which were only available in thermal imaging analyzer.

CG series radiometric thermal cameras are fully controlled by thermal imaging analyzer on PC.

SDK for thermal imaging analyzer, working in Windows and developed in C++ language, is provided for customers who develop own version of thermal imaging analyzer.

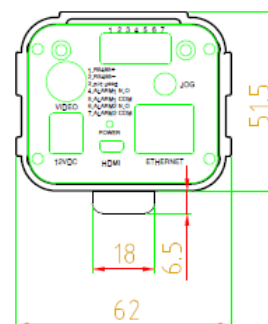
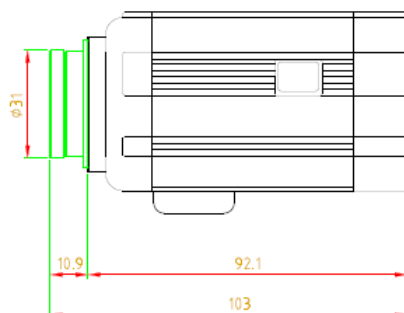
| Radiometric models | CG320 | CG640 |
|---------------------------------------|--|-----------------------|
| Resolution(sensor pixels) | 384x288 | 640x480 |
| Thermal sensitivity of sensor (NETD) | 40mK @ f1.0 30Hz 300K | 50mK @ f1.0 30Hz 300K |
| Spectral response | 8-14μm | 8-14μm |
| Measurement accuracy in lab condition | ±2°C or ±2% of reading (Accuracy is not guaranteed in measurement in the open air far apart from the object) | |
| Output | CVBS analogue video(BNC port) Temperature raw data from all pixels(Giga Ethernet) | |
| Temperature detection mode | | |
| Normal temperature detection | -20~120°C | -20~120°C |
| High temperature detection(Dual) | 0~650°C | 0~650°C |
| PC software included | Thermal imaging analyzer: Radiometric analysis PC software Camera controller: Access to camera via Ethernet for set-up Thermal report: help preparing report | |
| Lenses | From 4.8 to 250mm/Manual focus or motorized focus Zoom, 2 FOV, Athermalized, Macro-lens for PCB inspection | |
| Application | Medical/Fire Prevention/Preventive maintenance/PCB inspection/R & D/Process control/others | |



Specification of Thermography Cameras CG320 and CG640

| | CG320 | CG640 | Remark |
|----------------------------------|--|--|--|
| Resolution(pixels) | 384x288 | 640x480 | |
| Spectral response | 8-14μm | | Un-cooled LWIR micro-bolometer |
| Thermal Detector | Pixel Pitch | 17μm | |
| | Thermal Sensitivity (NETD) of sensor | <40mK @f1.0, 30Hz, 300K <50mK @f1.0, 30Hz, 300K | Shutter-less compatible |
| | Operating temperature (ambient temperature) | -10°C to 60°C (Installing thermal cameras inside housing with built-in fan and heater to keep inside temperature in a certain range, for example, 15 to 25°C, is recommended for use in out of operating temperature range for accuracy in measurement) | Accuracy of $\pm 2^{\circ}\text{C}$ or $\pm 2\%$ of reading: only when camera is in the range of ambient temperature and measurement is done in reasonable distance to the object. |
| Range of temperature measurement | CG320 & CG640: Normal temperature detection mode: -20 ~ 120°C High temperature detection mode: 0 ~ 650°C | | Thermal camera set at normal temperature detection mode has better accuracy in measurement |
| Control of focus/zoom | CG series cameras include circuit for controlling lens motors for focusing and zooming respectively. Thermal imaging analyzer for CG320 and CG640 has icons for focusing "+" / "-" and zooming "+" / "-". | | CG series model itself controls lens motor for focusing and zooming, and no extra control board is not necessary for control of lens motors. |
| System | Video Output | BNC connector(composite), HDMI | |
| | Temperature data output | via Ethernet port(Giga E) | |
| | Data refresh rate | 50Hz | 50Hz |
| | Video frame Rate | BNC connector(composite): NTSC 30Hz, PAL 25Hz HDMI: Selectable | |
| | Ethernet | Giga Ethernet(10/100/1000Mbps) | |
| Lens | 4.8mm to 250mm lenses, manual/motorized focus, zoom | | Athermalized/Macro lens available |
| PC Software | CG320/CG640: Thermal imaging analyzer Camera controller Thermal report | | Thermal imaging analyzer for CG320/CG640(1:1 connection): End of Sep., 2016 Thermal imaging analyzer for CG320/CG640(Multi-connection): end of Mar. 2017 |
| Weight of camera w/o lens | 290g | | 310g |

CG320 with 13.6m f1.0
manual lens

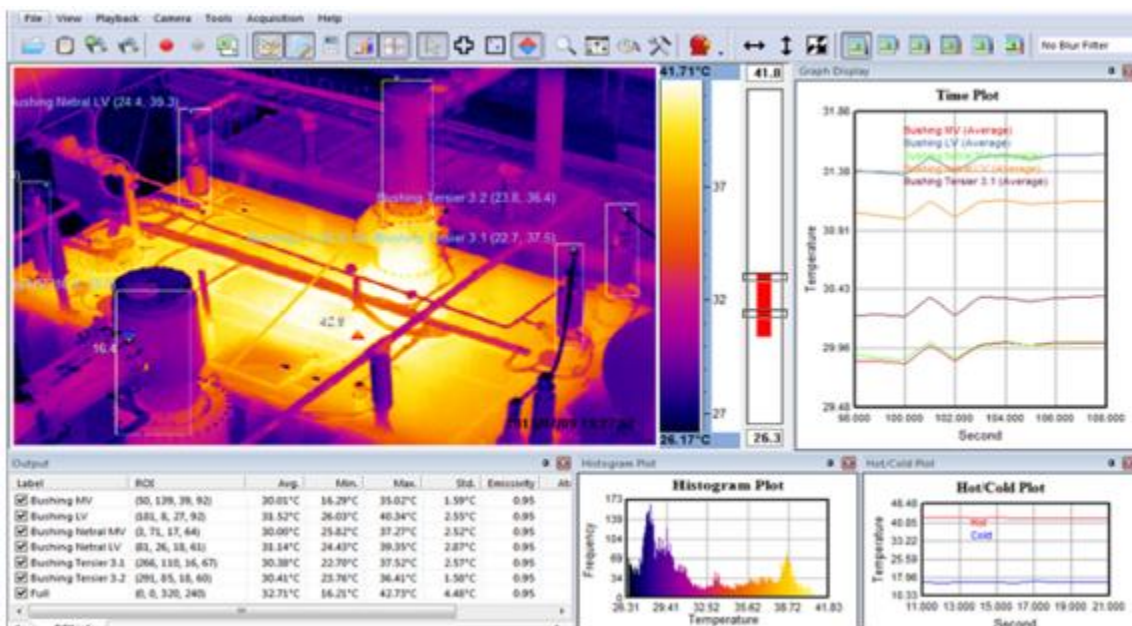


Size of camera case for 320 and CG640 is identical.

PC software for CG series radiometric cameras

CG320(384x288 resolution) and CG640(640x480 resolution) models have two different outputs, that is, CVBS analogue video data from BNC port and temperature raw data of each pixel from Ethernet port. All CG series thermography models are supplied with PC software for easy analysis with temperature raw data from thermal camera via Ethernet.

- **Thermal Imaging Analyzer**



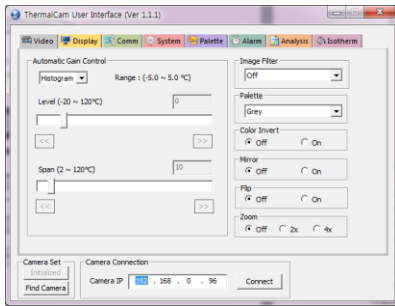
Thermal imaging analyzer on PC receives temperature raw data of all pixels via Ethernet from the camera connected to PC, and analyzes temperature data in various ways as user wants.

User can set ROI (Region of Interest) in different patterns to analyze just in ROI or to exclude specific area in the scene, and thermal imaging analyzer create alarm signal and play wave file or frame of image is glittering as set and two alarm relay-outs are available from the camera in addition to alarms on PC, when alarm conditions are met.

Multi-connection thermal imaging analyzer to which user can connect multi-cameras simultaneously shall be released early 2017.

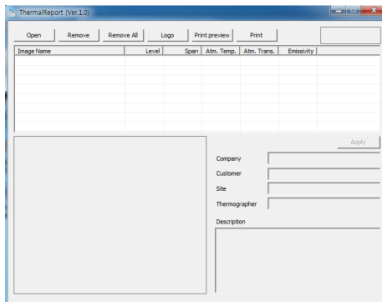
COX provides customers who develops own thermal imaging analyzer with SDK with sample program, working in Windows, prepared in C++ program language with technical support.

● Camera controller



With camera controller, user can access to the camera via Ethernet apart from the camera and change different settings.

● Thermal report



Using thermal report program, user can load radiometric jpeg file generated by thermal imaging analyzer, add description to each file, and make a thermal report easily.

COX provides users who want to develop own thermal imaging analyzer with SDK and sample program developed in C++ language.

FOV of COX thermal cameras

COX thermal cameras are supplied with different kinds of lenses to meet customers' requirements for the projects. Focal length from 4.8mm to 250mm is available, manual or motorized lens. Various continuous zoom lenses, 2FOV lenses, and athermalized lenses are also available. COX thermography cameras with macro-lenses to measure temperature of very small part, like pins of chip on PCB in SMT line are also available.

HFOV and VFOV for all COX cameras

| Focal length (mm) | CX300/CX320/CM300-PAL | | CX300/CX320/CM300-NTSC | | CG300/CG320/CG320-IP PAL/NTSC | | CX600/CX640/CX610/CM600-PAL/NTSC | | CG600/CG640/CG640-IP PAL/NTSC | | CG1000-PAL/NTSC | |
|----------------------|-----------------------|---------|------------------------|---------|-------------------------------|---------|----------------------------------|---------|-------------------------------|---------|--|---------|
| | HFOV(°) | VFOV(°) | HFOV(°) | VFOV(°) | HFOV(°) | VFOV(°) | HFOV(°) | VFOV(°) | HFOV(°) | VFOV(°) | HFOV(°) | VFOV(°) |
| 4.8 | 100.4 | 84.0 | 90.0 | 73.7 | 68.4 | 54.0 | 97.1 | 80.7 | 97.1 | 80.7 | Image with lenses whose focal length is under 35mm shows fairly big distortion on both side of image, and COX offers lenses from 35mm to 250mm for CX1000 model. | |
| 5 | | | | | 66.3 | 52.2 | | | | | | |
| 8 | 61.9 | 48.5 | 53.1 | 41.1 | 44.4 | 34.0 | 68.4 | 54.0 | 68.4 | 54.0 | | |
| 8.16 | | | | | 43.6 | 33.4 | | | | | | |
| 12 | 43.6 | 33.4 | 36.9 | 28.1 | 30.4 | 23.1 | 48.8 | 37.6 | 48.8 | 37.6 | | |
| 13.6 | | | | | 27.0 | 20.4 | | | | | | |
| 20 | | | | | 18.5 | 14.0 | | | | | | |
| 20 | 27.0 | 20.4 | 22.6 | 17.1 | 18.5 | 14.0 | 30.4 | 23.1 | 30.4 | 23.1 | | |
| 35 | 15.6 | 11.8 | 13.0 | 9.8 | 10.7 | 8.0 | 17.7 | 13.3 | 17.7 | 13.3 | 27.9 | 21.1 |
| 50 | 11.0 | 8.2 | 9.2 | 6.9 | 7.5 | 5.6 | 12.4 | 9.3 | 12.4 | 9.3 | 19.8 | 14.9 |
| 75 | 7.3 | 5.5 | 6.1 | 4.6 | 5.0 | 3.7 | 8.3 | 6.2 | 8.3 | 6.2 | 13.2 | 10.0 |
| 100 | 5.5 | 4.1 | 4.6 | 3.4 | 3.7 | 2.8 | 6.2 | 4.7 | 6.2 | 4.7 | 10.0 | 7.5 |
| 130 | 4.2 | 3.2 | 3.5 | 2.6 | 2.9 | 2.2 | 4.8 | 3.6 | 4.8 | 3.6 | 7.7 | 5.8 |
| 150 | 3.7 | 2.8 | 3.1 | 2.3 | 2.5 | 1.9 | 4.2 | 3.1 | 4.2 | 3.1 | 6.6 | 5.0 |
| 200 | 2.8 | 2.1 | 2.3 | 1.7 | 1.9 | 1.4 | 3.1 | 2.3 | 3.1 | 2.3 | 5.0 | 3.7 |
| 210 | 2.6 | 2.0 | 2.2 | 1.6 | 1.8 | 1.3 | 3.0 | 2.2 | 3.0 | 2.2 | 4.8 | 3.6 |
| 250 | 2.2 | 1.7 | 1.8 | 1.4 | 1.5 | 1.1 | 2.5 | 1.9 | 2.5 | 1.9 | 4.0 | 3.0 |

• 5mm, 8.16mm, 13.6mm, and 20mm lenses indicated in different color are designed just for CG300 and CG600, for projects which requires very small size of lens. Image quality of these lenses is not better than existing lenses of 4.8mm, 8mm, 12mm, and 20mm, because these lenses transmit less IR energy than current lenses.

• Lenses for CX1000 is a little bigger than other lenses for CG300/320/320-IP and CG600/640/640-IP.

Radiometric thermal network cameras

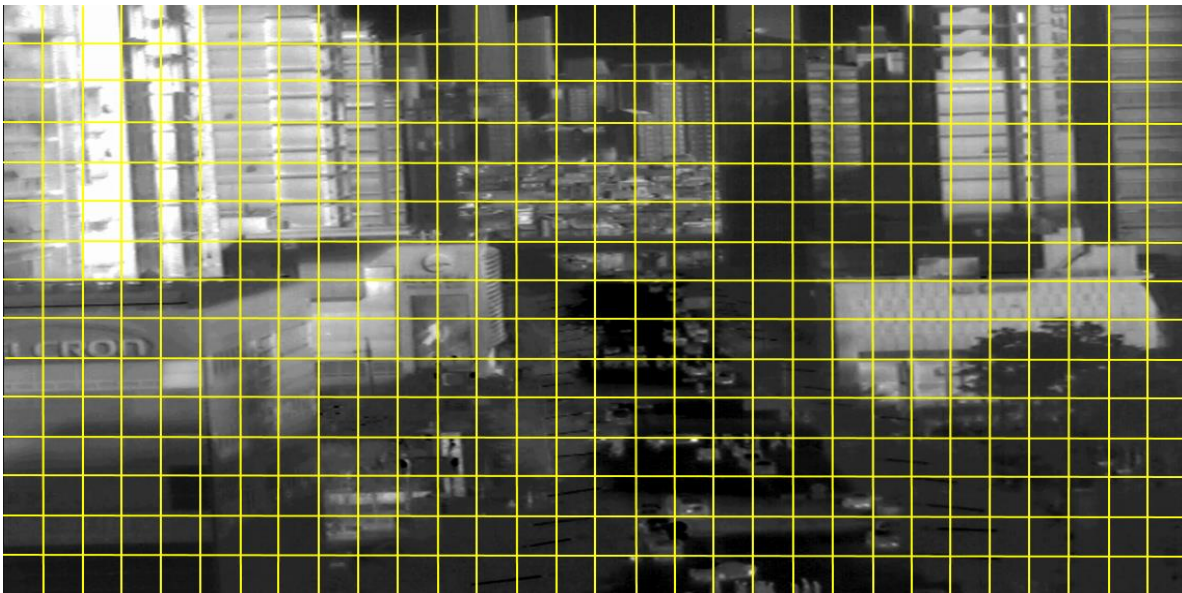
(Thermal network cameras of measuring temperature in 300 ROIs)

CG320-IP and CG640-IP are thermal network cameras transmitting video data and temperature data simultaneously. Core of these thermal network cameras is exactly same as CG320 or CG640, with normal temperature detection mode (measure up to 120°C) or high temperature detection mode (measure up to 650°C), respectively, and those thermal network cameras are new concept of thermal network camera and fundamentally different from other thermal network cameras already in the market.

CG320-IP and CG640-IP are very unique thermal network cameras transmitting compressed video data and temperature data of each section in the image including temperature alarm data simultaneously via IP network. User can set alarm temperature in each section which is 32 pixels x 32 pixels area in the image (20 sections x 15 sections in case of CG640-IP and it corresponds to 300 even size of ROIs) or in the group of sections in min., max., or average temperature. If temperature of any section or group of sections exceeds set temperature, corresponding camera sends alarm data in addition to compressed video data to alarm management software. Then alarm management software starts to record for set period of time (alarm recording) and pop up corresponding channel to show image in bigger size with detail data including section number and temperature in the section where measured temperature exceeded set temperature.

Setting max., min., or average temperature in each section or in group of section, is done in the temperature setting page in web viewer, while user see image as following picture.

After finishing temperature in each section or in group of section, then user transmit setting value to the corresponding camera, to make camera ready to issue temperature alarm when measured temperature in specific section or in group of section exceeds set value.



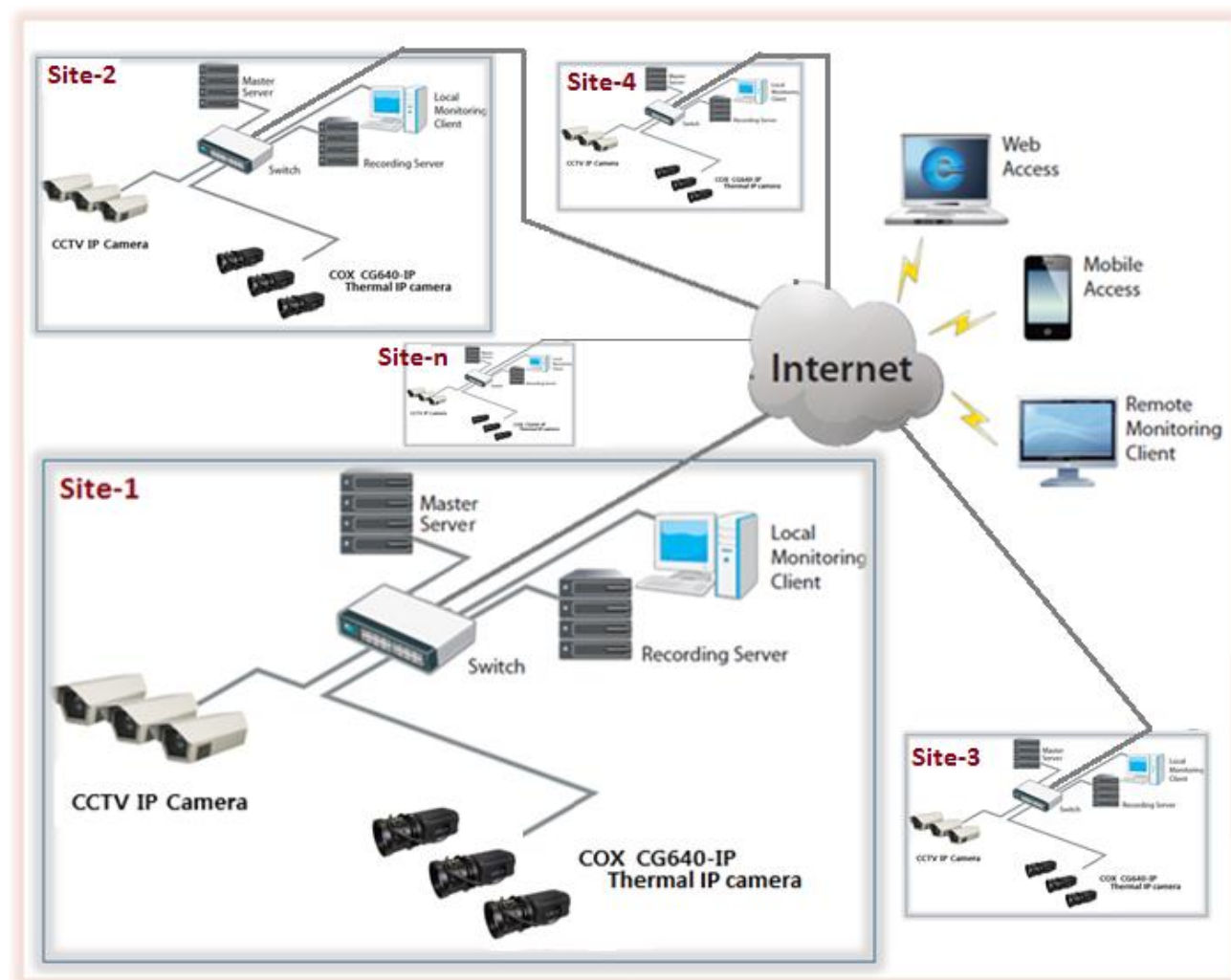
Section of 32 pixels x 32 pixels corresponds to

- 1) 300 ROIs (20 sections horizontally and 15 sections vertically) in case of 640x480 pixels thermal network camera, which is, CG640-IP
- 2) 108 ROIs (12 sections horizontally and 9 sections vertically) in case of 384x288 pixels thermal network camera, which is, CG320-IP

CG320-IP and CG640-IP thermal network cameras are very suitable for following application:

- 1) Fire prevention (detection) covering wide area(wild fire, waste management, sugar cane waste, other
- 2) Preventive maintenance in industrial plant
- 3) Intrusion detection (human, animal) in wide area
- 4) Fire and intrusion detection in yacht basin

Alarm management software has the same structure of VMS which is very popular in CCTV field. Alarm anagement software is based on VuRix which is developed by Innodep Inc. who is the biggest VMS company in Korea and competing with Genetec or Milestone in the world market.



As show in above configuraiton, user can mix CCTV network cameras and CG320-IP/CG640-IP thermal network cameras as many as required in the project, and VuRix VMS is in operation in many site with up to several thousands of network cameras.

COX suplies 16 channels and single site version of alarm management software free of charge for customers getting CG320-IP and CG640-IP thermal network cameras.

Alarm management software to which user can connect several tens or several hundreds of CCTV network cameras or COX thermal network cameras from muliti sites shall be charged to the minimum.

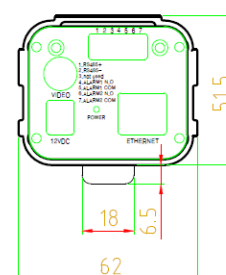
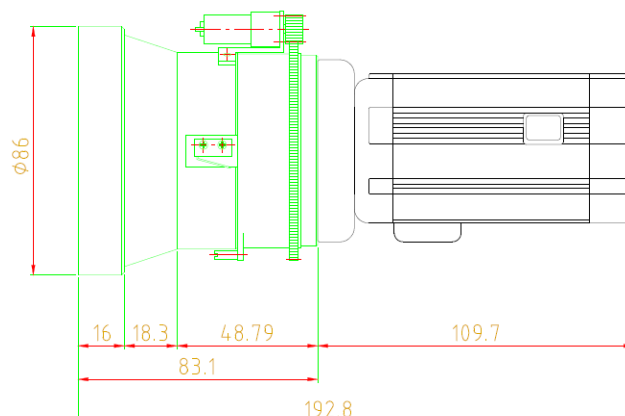
Specification of thermal network cameras CG320-IP and CG640-IP

| Radiometric thermal network camera | CG320-IP | CG640-IP |
|---------------------------------------|--|------------------------|
| Resolution(sensor pixels) | 384x288 | 640x480 |
| Thermal sensitivity (NETD) of sensor | <40mK @ f1.0 30Hz 300K | <50mK @ f1.0 30Hz 300K |
| Spectral response | 8-14μm | 8-14μm |
| Measurement accuracy in lab condition | ±2°C or ±2% of reading (Thermal camera with normal temperature detection mode has better accuracy than camera with high temp. mode) | |
| Output | Compressed video data, Simplified format of temperature data (min., max., or average temperature in each section or group of sections), Alarm signal | |
| Detection mode(thermal core) | | |
| Normal temperature detection | -20~120°C | -20~120°C |
| High temperature detection(Dual) | 0~650°C | 0~650°C |
| PC software included | Alarm management software as VMS in CCTV field (single site and up to 16 channels version is supplied free of charge and multi-site version and more than 16 channel version shall be charged min. level of cost) Windows version of SDK provided for customers who develop own software | |
| Lenses | From 4.8 to 250mm/Manual focus or motorized focus Zoom, 2 FOV, Athermalized | |
| Application | Fire prevention, Preventive maintenance, Intrusion detection (human, animal) and other general analysis application | |

ONVIF and POE supported



CG320-IP/CG640-IP
with
75mm f1.0
motorized lens



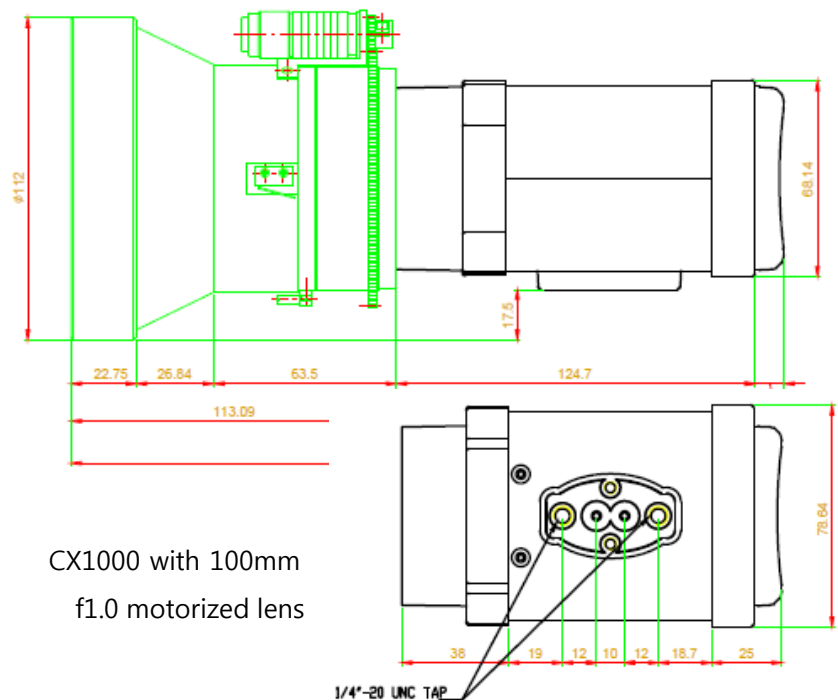
High resolution thermal camera

COX released CX1000 which is with XGA Gen2 thermal sensor, 1024 x 768 pixels 17µm pixels pitch. It is another latest version of thermal sensor from ULIS, in addition to QVGA Gen2 and VGA Gen2, and COX completed new thermal cameras products mix with Gen2 series thermal sensors from ULIS.

CX1000 is security application thermal camera which has the same interface as CG300 and CG600, and CX1000-IP is thermal network camera based on CX1000. CX1000-IP transmits video data only, and does not transmit temperature data or temperature alarm data as CG320-IP or CG640-IP thermal network cameras.

Both CX1000 and CX1000-IP are very suitable to observe wide area with very high image quality.

| High resolution thermal camera | CX1000 | CX1000-IP |
|--------------------------------------|--|----------------------------------|
| Resolution(sensor pixels) | XGA (1024 X 768) | |
| Thermal sensitivity (NETD) of sensor | <50mK @ f1.0 30Hz 300K | |
| Spectral response | 8-14µm | |
| Output | CVBS analogue video HDMI | Compressed video data (ONVIF) |
| Lenses | From 4.8 to 250mm/Manual focus or motorized focus Zoom, 2 FOV, Athermalized | |
| Application | Security (analogue camera) | Surveillance over IP network |



CX1000 with 100mm
f1.0 motorized lens

Camera case of CX1000 and CX1000-IP is identical

Security application thermal cameras

COX completed full line up of security application thermal cameras, which are, QVGA model, VGA model, and XGA models, all with Gen2 series of thermal sensor which are latest version of thermal sensor from ULIS, France.

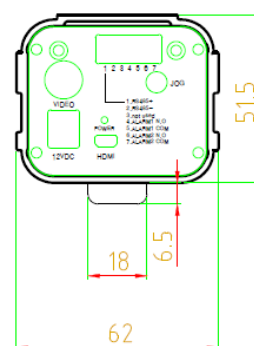
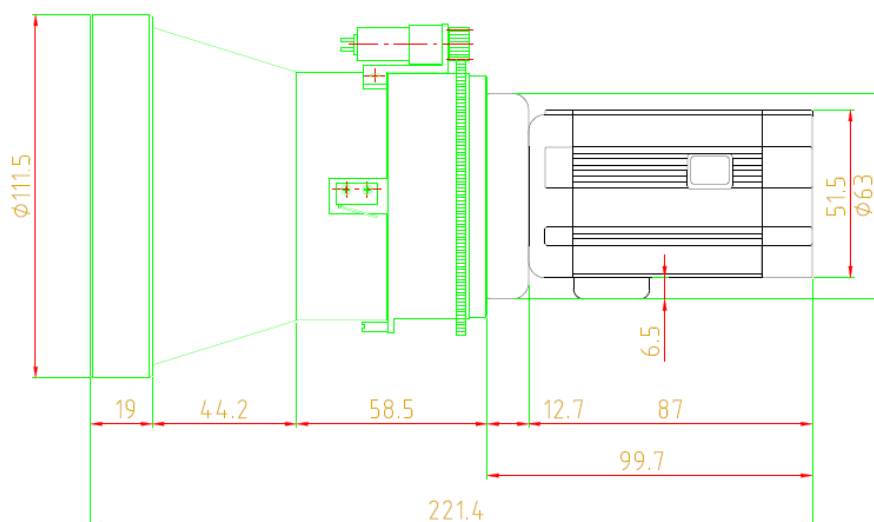
| Security models | CG300 | CG600 | CX1000 |
|---------------------------|---|---------|--|
| Resolution(sensor pixels) | 384x288 | 640x480 | 1024X768 |
| Output | CVBS analogue video(BNC port)/HDMI | | |
| Lenses | 4.8mm/8mm/12mm/20mm/35mm/50mm/75mm 100mm/110mm/120mm/130mm/150mm/200mm/250mm Manual/Motorized focus/Zoom/Athermalized lenses/2FOV | | |
| Control of focus and zoom | No separate lens motor control board required/Camera itself controls lens motor for focus and zoom | | Separate lens motor control board required |
| Application | Security and surveillance | | |



CG300 with 35mm manual lens

CG600 with 100mm motorized lens

CX1000 with 75mm manual lens



CG300/CG600 with 100mm f1.0 motorized lens

Specification of Security Cameras CG300, CG600, and CX1000

| | CG300 | CG600 | CX1000 |
|--|---|--|--------------------------|
| Resolution(sensor pixels) | 384x288 | 640x480 | 1024x768 |
| Pixel Pitch | 17μm | | |
| Detector Type | LWIR, Uncooled a-Si micro-bolometer | | |
| Thermal Sensitivity of Detector(NETD) | <40mK @f/1.0, 30Hz, 300K | <50mK @f/1.0, 30Hz, 300K | <50mK @f/1.0, 30Hz, 300K |
| Spectral Range | 8 - 14 μm (Long-wave IR) | | |
| Color Variation(Palette) | 10 colors(Grey,Iron, Rain_v1,2,3/Half_Grey/Yellow/MidGrey/Fire/BlueRed) | | |
| Image Setting | AGC, Level & Span, NUC, Mirror, Flip, Invert, Image Filter on Screen Menu | | |
| Digital zoom | 2x & 4x Digital Zoom | | |
| Focus | Manual, Motorized, Athermalized | | |
| Function | Hot/Cold tracker, Center indicator | | |
| System | TV Mode | NTSC/PAL Compatible | |
| | Protocol | COX own proprietary | |
| | OSD menu control | Pelco-D(RS485) | |
| | Video Output | Standard BNC Connector(Composite), HDMI | |
| | Frame Rate | BNC connector(composite): NTSC 30Hz, PAL 25Hz HDMI: 50Hz or 60Hz (selectable) | 50Hz |
| | Start-up | <2 Seconds | <2 Seconds |
| Modular Type | Available (For customers who want to integrate COX thermal cameras into own system, COX supplies cameras without camera cases with technical documents) | | |
| Optional | Outdoor housing w/ Germanium window (IP 66), Motorized, athermalized and optic zoom lens, module type available | | |
| Input Voltage | AC(110 to 220V) to DC(12V) adaptor | | |
| Operating Temperature | -20°C to 70°C (Housing with built-in fan and heater is recommended for use in the open air) | | |
| Storage Temperature | -40°C to 70°C | | |
| Weight of camera w/o lens | 280g | 300g | 540g |

Lenses for COX thermal cameras

COX supplies thermal cameras with variety of lens to meet customers' requirements for projects.

COX keeps a certain quantity of lenses from 8mm to 75mm in focal length on stock for quick delivery.

Lenses for COX thermal cameras

- Focal length from 4.8mm to 250mm
- Manual focus or motorized focus
- Continuous zoom lenses
- Athermalized lenses (focus remain unchanged in long use in frequent ambient temperature changes)
- Macro-lens for measuring very small parts under 1mm
- 2 FOV lenses
- Germanium window
- AR or DLC coating as per request



Thermal network cameras for security application

COX also supply thermal network cameras based on CG300, CG600, and CX1000 which are just for security application.

Differently from CG320-IP and CG640-IP, those thermal network cameras transmits compressed video data only, and do not transmit temperature data as CG320-IP and CG-640-IP.

Size of camera cases of CG300-IP and CG600-IP are exactly same as CG320-IP and CG640-IP.

Specification of thermal network cameras CG300-IP and CG600-IP

| Radiometric thermal network camera | CG300-IP | CG600-IP |
|--------------------------------------|--|------------------------|
| Resolution(sensor pixels) | 384x288 | 640x480 |
| Thermal sensitivity (NETD) of sensor | <40mK @ f1.0 30Hz 300K | <50mK @ f1.0 30Hz 300K |
| Spectral response | 8-14μm | |
| Output | Compressed video data, H.264, MPEG4, MJPG | |
| Lenses | From 4.8 to 250mm/Manual focus or motorized focus Zoom, 2 FOV, Athermalized | |
| Operation temperature(ambient) | -20~70°C (Housing with built-in fan and heater is recommended for use in the open air) | |
| Application | 24 hours surveillance | |

ONVIF and POE supported



COX thermal network cameras with variety of lens combination are very suitable for different projects which requires to transmit video data to control center far apart from the camera.

Cox supplied thermal network cameras with different housings with Ge window on PT drive for customers which will make execution of project much easier.

Thermal camera for automotive night vision

COX developed thermal cameras for automotive night vision application, just as FLIR Path Finder II, and started to supply to motors companies in cooperation with LG group company who developed tracking software detecting human or animal in the image on both sides of road in front of car in the dark. Processing algorithm of thermal camera for automotive night vision is prepared in such a way that tracking software detect human or animal which have a certain body temperature in very high probability.

Specification of COX automotive night vision system

| Thermal Imaging Performance | |
|------------------------------------|---|
| Sensor type | Uncooled micro bolometer developed specially for automobile application |
| Field of view | 19.4° x 14.6° |
| Spectral band | 8 – 14 μ m |
| Resolution | 384 x 288 pixels |
| Time to Image | < 10 sec. |
| Pixel pitch and NETD of sensor | 17 μ m, 40mK @ f1.0, 30Hz, 300K |
| Focal length and focus range | 18.8 mm f1.0 athermalized lens, 2.4 m to infinity |
| IP rating, lens protection | IP67, Ge window with built-in heater for defrosting |
| Outputs | |
| Video (from ECU) | CVBS analogue(NTSC/PAL), HDMI(480p, 576p, 720p, 1080i, 1080p selectable) |
| Connector type | BNC Connector for Video out 8-pin custom connector for power in, audio out |
| Frame Rate | PAL: 25 fps, NTSC: 30fps, HDMI(Selectable) |
| Power | |
| Power requirments | 12 VDC nominal (range 9V to 60V) |
| Enviromental | |
| Operating Temperature | -40°C to +85°C for camera -20°C to +70°C for ECU The operating temperature range of the Camera is -40°C to +85°C when operating in a closed compartment with heat sink to chassis. In a ventilated area, the heat sink between ECU and vehicle chassis may be removed, in which case the temperature range is -40°C to +70°C. |
| Storage Temperature | Ambient temperature, storage:-55°C to +95°C limited by the environmental temperature diurnal. |
| Impact protection/Water resistance | ES95400(Engineering specification of Hyundai Motors Company) |
| EMI/EMC | ES96200(Engineering specification of Hyundai Motors Company) |



Components of automotive night vision

- Thermal imager
- ECU and tracking software
- (Display unit)
- LVDS cable between camera and ECU
- Video cable (HDMI or Composite)
- Power cable (cigar jack)



Thermal camera for automotive night vision

- Thermal sensor 384 x 288 pixels, 17 μ m pixel pitch
- Athermalized lens 18.8mm f1.0
- HFOV 19.4°, VFOV 14.6° (Specially designed for automotive night vision)
- 2t, 32mm Ge window with DLC coating with built-in heater for defrosting
- IP67
- Size: 57mm (W) x 57mm (H) x 65.4mm (L)

Images by thermal camera for automotive night vision (without tracking software)

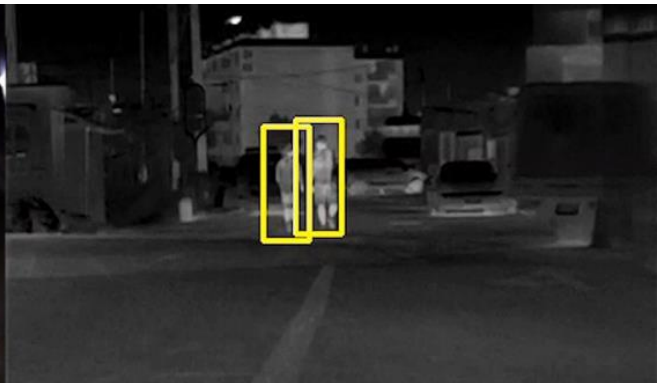


Low luminance camera (visible camera)



Only with eye identification with headlights on, driver cannot detect two men on the center line of road

Automotive night vision (with tracking software)



Tracking software of automotive night vision detects two men on the center line of road

We can apply thermal cameras for automotive night vision for other application. We are working on a special project installing those thermal cameras with wider view angle lens, FOV about 50°, on military vehicles in operation, for driving at relatively slow speed without turning on headlights in the dark.

Other products COX supplies in addition to thermal cameras

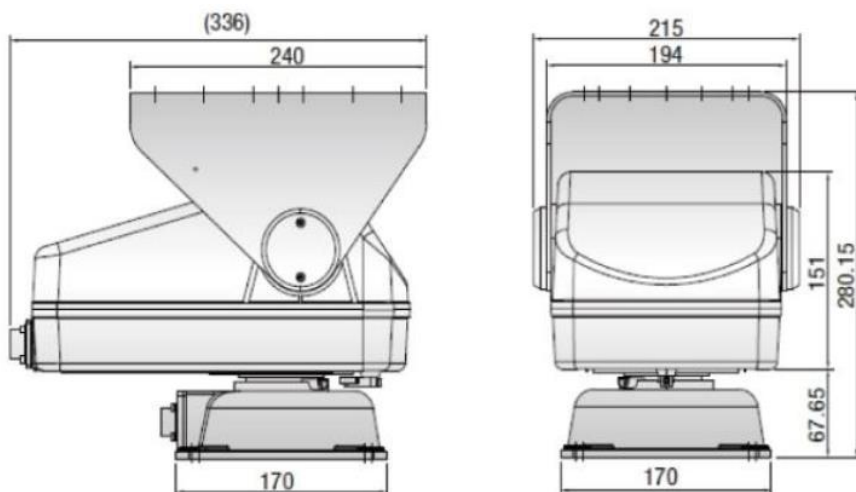
1. PT Drive

1) CVX-5000

PT drive supplied to Korean Military project from 2013.

Features:

- Max. Pan Speed : **60 ° /sec**
- Max. Tilt Speed : **25 ° /sec**
- Max. Preset Pan Speed : **60 ° /sec**
- Max. Preset Tilt Speed : **25 ° /sec**
- Min. Pan/Tilt Speed : **0.025 ° /sec**
- Preset Accuracy : **Max. ± 0.1 °**
- Pan Range : **360 ° Endless**
- Tilt Range : **-75 ° ~30 °**
- Wide operation temperature range : **-34 °C ~50 °C**
- Outdoor Pan/Tilt Driver
- Supports various protocols
- Supports RS-422/485 Communication
- Protocol : SAMSUNG-T, SAMSUNG-E, Pelco (D/P), Convex etc.
- Supports Max. 255 Presets



Specification of CVX-500 PT Drive

| | | |
|------------------------------|-----------|--|
| MODEL. CTH-10 | | |
| Materials | | Aluminium |
| IP Rating | | IP66 |
| Fan/Heater & Wiper | | Built-in Wiper / Fan / Heater |
| Color | | Ivory, Military |
| Weight | | 3.6kg |
| Exterior Dimension | | (W)195 X (H)146 X (D)530 |
| Usable area Dimension | | (W)154 X (H)112 X (D)296.5 |
| MODEL. CVX-5000 | | |
| Panning Range/Speed | | 0° ~ 360° (Endless), 0.025°/sec ~ 60°/sec |
| Tilt Range/Speed | | -75°(Opt.-90°) ~ 30°, 0.025°/sec ~ 25°/sec |
| Preset Accuracy/Repeat Angle | | Max. ±0.1° / Max. ±0.05° |
| Preset /Speed | | Max. 255 Point / Max. 60°/sec(Pan), Max. 25°/sec(Tilt) |
| Payload | | Max. 20kg (Depends on Housing) |
| Driving System | | Worm Gear Driven |
| Connector | | 4/15 Pin MS Connector |
| Fan/Heater | | Auto |
| Scan/Group | | 8 / 4 |
| Protocol | External | RS-485 / 422 (2400 ~ 19200 bps) Automatic, Convex, Samsung-T/E, Pelco-D/P, AD, Bosch, GE, Honeywell, Panasonic, Vicon |
| | IP Camera | RS-485 (2400 ~ 38400 bps) Pelco-D/P, Samsung-T |
| Operating Temperature | | -34°C ~ 50°C (-29.2°F ~ 122°F) |
| Operating Humidity | | Up to 90%RH (Non-condensing) |
| Storage Temperature | | -50°C ~ 80°C (-58°F ~ 176°F) |
| Fan/Heater | | Built-in Fan / Heater / Defrost Heater |
| IP Rating | | IP66 |
| Power source | | DC 48V ±10%, Max. 7A (Heater ON, PT Moving), 1.5A (Stand-by) |
| Power consumption | | 25W (Heater Off), Max 150W (Heater On) |
| Color | | Ivory, Military |
| Weight | | 10 kg |
| Dimensions (mm) | | 215(W) x 280(H) x 336(D) |
| Materials | | Aluminum die casting / High Grade Plastic |

2. Housing

COX supplies different kinds of housing for thermal cameras or combination of visible camera and thermal camera in one housing with Germanium window, required for specific projects.

1) CTH-10

Good design of housing manufactured by Aluminum di-casting mold.

Possible to install COX CG series models with lenses up to 75mm f1.0 focal length.

Features:

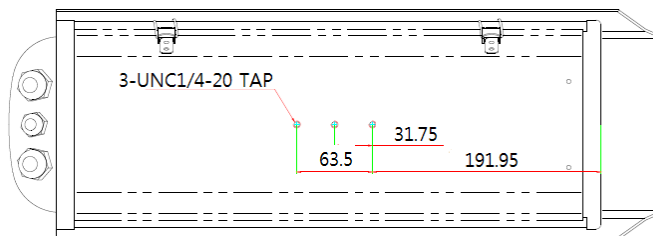
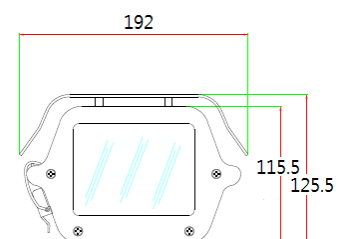
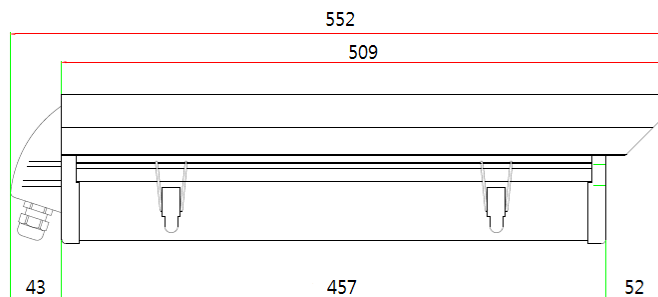
- Outdoor Housing
- Sun Shield attached
- Open structure of Top Cover for easy installation
- Aluminum Die-casting
- Built-in Wiper/Fan/Heater
- IP66, Salt resistance, Weather





2) CX2315

Low cost reliable housing with Ge window for COX thermal camera
Standard color: Ivory



Max. size of lens can be installed inside CX2315 housing in pair with COX thermal camera is 50mm f1.0 lens.

Specification of CX2315 housing

| Item | Specifications |
|---------------------|--|
| Model No. | CX2315 |
| USE | In/Outdoor, All-weather |
| Description | Infrared Camera Housing with Germanium window |
| Features | Built in blower/heater |
| Input Voltage | AC220V |
| Operating Condition | Temperature: -35℃~+49℃ Wind velocity: 80MPH Humidity: 100% |
| Thermostat | Heater 15℃ On 25℃ Off [Consumption Power: 60W] Blower 35℃ On 25℃ Off [Consumption Current: 0.12A] |
| Dimensions | 192(W) × 138(H) × 501(L)mm |
| Weight | 3.55KG |
| Material | Body: Aluminum FRONT, REAR: PC Front window: Germanium lens in core, Aluminum in surroundings |
| Accessory | 1/4-20UNF, SCREW-(1). SPRING WASHER-(1). PLAT WASHER-(1) |
| Encapsulation | Camera Housing IP 66 |
| Option | Front Heater(defroster): AC 24V 3W |

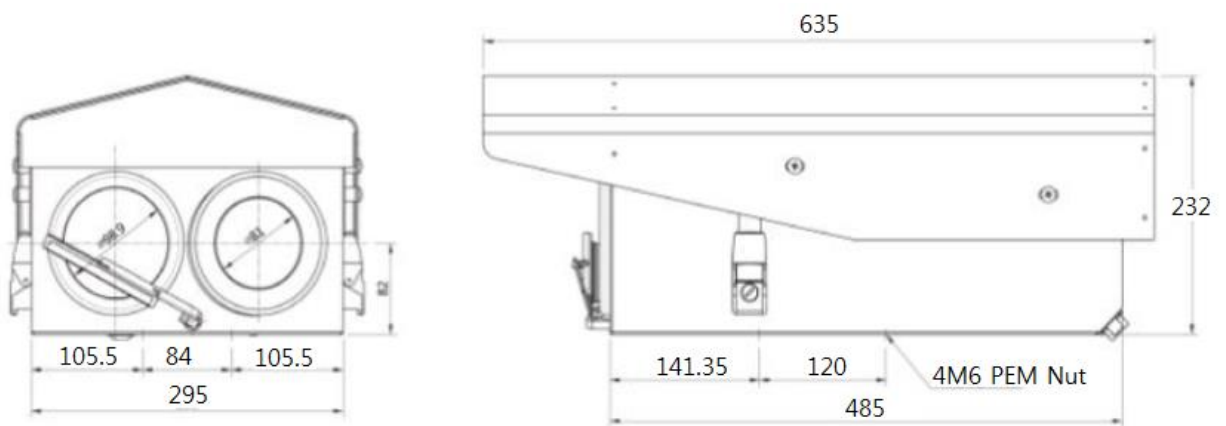
3) CTH-30

Housing for 2in1 camera (visible camera + thermal camera) on PT drive for observation.
Supplied to Korean Military project from 2013 for middle distance observation.

| | |
|-----------------------|-------------------------------|
| Model | CTH-30 |
| Materials | Aluminum Die-casting |
| Weight | Under 6.0kg(Only Housing) |
| Color | Ivory, Military |
| Rating | IP55 |
| Fan/Heater & Wiper | Built-in Wiper / Fan / Heater |
| Exterior Dimensions | (W) 295 x (L) 635 x (H) 232 |
| Usable area Dimension | (W) 290 x (L) 485 x (H) 232 |



- CTH-30 housing with IP66 is also available (modified for IP66 rating).
- Size of CTH-30 can be changed as per size of camera and lens inside.
- CTH-30 is manufactured not by mold but by sheet metal work and relatively easy to modify size and IP rating.



CVX-5000 PT Drive with CTH-30 housing

(2in1: Sony FCB-EV7520 camera and COX CG600-IP with 100mm f1.0 motorized lens)

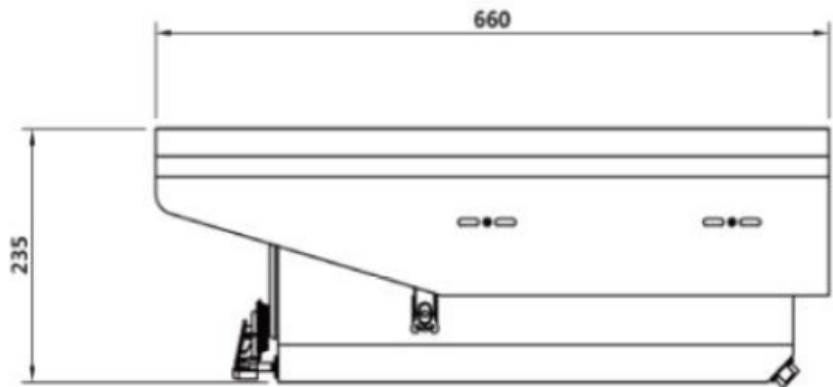
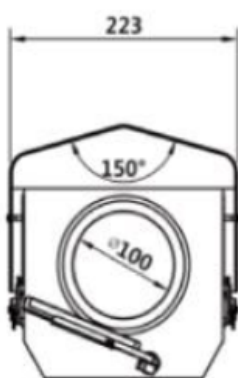
4) CTH-40

Housing for thermal camera or visible camera with Ge window.

| | |
|-----------------------|-------------------------------|
| Model | CTH-40 |
| Materials | Aluminum Die-casting |
| Weight | Under 5.0kg(Only Housing) |
| Color | Ivory, Military |
| Rating | IP55 |
| Fan/Heater & Wiper | Built-in Wiper / Fan / Heater |
| Exterior Dimensions | (W) 223 x (L) 660 x (H) 235 |
| Usable area Dimension | (W) 152 x (L) 261 x (H) 146 |



- CTH-40 housing with IP66 is also available(modified for IP66 rating).
- Size of CTH-40 can be changed as per size of camera and lens inside.
- CTH-40 is manufactured not by mold but by sheet metal work and relatively easy to modify size and IP rating.



3. Germanium window

COX supplies Ge window for housing with different thickness and diameter required in the projects.

- Thickness from 2mm to more than 10mm
- Diameter from 25mm to more than 200mm
- Coating: AR (Anti-reflection) coating
DLC (Diamond Like Carbon) coating



#810, Hanwha Biz Metro 1-cha, 242, Digital-ro, Guro-gu, Seoul, Korea (Zip: 08394)
Phone: 82-2-857-3888, Fax: 82-70-7614-3871 E-mail: sales@coxcamera.com www.coxcamera.com

