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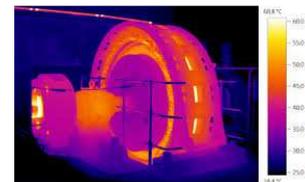
TSO

Thermal camera for video surveillance applications
series 300-600-300IP-600IP

Radiometric (thermographic) thermal camera
series 320-640-320IP-640IP

Thermal cameras provide an ideal solution, as compared to visible-light cameras, for detecting people and objects in low light or bad weather conditions. They create images based on the heat emitted by any object, vehicle or people. Thermal imaging is not affected by light conditions such as shadows, back lighting, darkness and even camouflaged objects, providing images that allows the operators to detect and act during suspicious activities, 24 hours per day and 7 days per week.

Global Proof offers to the market a wide range of professional products both for the *video surveillance* sector and for the *radiometric* one, where it is necessary to measure temperatures (thermography).

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The **TSO** series thermal cameras can be divided into 2 main categories:

- VIDEO SURVEILLANCE
- RADIOMETRIC (thermographic)

Each category has respectively 2 *analog* models and 2 *IP* models

Application	Model	Resolution	Format
VIDEO SURVEILLANCE	TSO300	384x288	Analog
	TSO600	640x480	Analog
	TSO300IP	384x288	IP
	TSO600IP	640x480	IP
RADIOMETRIC (thermographic)	TSO320	384x288	Analog
	TSO640	640x480	Analog
	TSO320IP	384x288	IP
	TSO640IP	640x480	IP

TSO thermal cameras are supplied with 50mm lens with different FOV.

The following table shows the FOV of our thermal cameras for video surveillance and of the radiometric ones, with the 50mm lenses.

lens	TSO300/300IP TSO320/320IP		TSO600/600IP TSO640/640IP	
Focal Length	HFOV (°)	VFOV (°)	HFOV (°)	VFOV (°)
50mm	7,5°	5,6°	12,4°	9,3°

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Video surveillance models	TSO300	TSO600
Resolution (sensor pixels)	384x288	640x480
Output	CVBS analog video (BNC)/HDMI	
Optical lens	50mm Manual or motorized focus/Manual or motorized zoom	
Focus and zoom control	No need of PCB drivers for adjusting focus and zoom, the thermal camera will adjust them autonomously	
Applications	Security and surveillance	

Radiometric models	TSO320-320IP	TSO640-640IP
Resolution (pixels)	384x288	640x480
Spectral response	8-14µm	
Output	Compressed video data (H.264 / MPEG4 / MJPEG) and temperature alarm data (including the position of the ROI, the position of the spot inside the ROI and the temperature of the spot).	
Optical lens	50mm Manual or motorized focus/Manual or motorized zoom	
Measurement accuracy in lab condition	± 2 ° C o ± 2% of reading (The thermal camera with normal temperature detection mode is more accurate than that with high temperature detection mode)	
Detection mode (Thermal core)	**Medical**: +20°C ~ +50°C **Normal**: -20°C ~ +120°C **High temperature**: 0 ~ +500°C	
Thermal sensitivity (NETD) of the sensor	<40mK @f1.0, 30Hz, 300K	<50mK @f1.0, 30Hz, 300K

All the radiometric models of the TSO series features the latest versions of the thermal image sensors, that are: *QVGA Gen2* and *VGA Gen2*. These sensors have an excellent *NETD* value (amount of infrared radiation required to produce an output signal equal to the systems own noise).

By increasing the performance, the TSO cameras provides more detailed features as regards alert settings and ROI (regions of interest) settings that were previously available only in the thermal sensor

The TSO thermal cameras are completely managed by the thermal imaging analyzer on PC. Users who want to develop their own thermal imaging analyzer or include their thermal cameras into their own software will be provided with a Windows SDK, C++ code.

Radiometric IP thermal cameras
(IP thermal cameras that detect the temperature of up to 10 ROI)

TSO320-IP and TSO640-IP thermal cameras are particularly indicated for the following applications:

- Fire prevention (detection) in large areas: wildfire, waste management, biomass storage areas, etc.
- Preventive maintenance in industrial plants
- Intrusion detection (people, animals) in large areas
- Fire/intrusion detection in port basins

TSO320-IP e TSO640-IP are thermal IP cameras that trasmit video data and temperature alarm data simultaneously. These thermal network cameras have the same thermal core as TSO320 or TSO640 and have the following measurement ranges: _medical_ detection mode (from +20°C to +50°C), _normal_ detection mode (up to +120°C) and _high temperature_ detection mode (up +500°C).

The models TSO320-IP and TSO640-IP are unique among thermal cameras: they transmit compressed video data and temperature alarm data that includes, as well: ROI position data, the position data of the spots that have generated a temperature alarm signal inside the ROI and the max. / min. / average temperature of each ROI, all simultaneously through IP network.

On the web browser of TSO320-IP and TSO640-IP cameras the user can set: up to 10 rectangular ROIs, the alarm temperature for each ROI (min. , max or average temperature) and isothermal color.

If the temperature of any spot inside the ROI exceeds or drops below the set up alarm threshold, the thermal camera transmits the temperature alarm data, together with the compressed video, to the VMS that is connected to the thermal camera.

The alarm data includes: ROI position data, isotherm video (where all the spots that have generated the alarm are expressed with the preset color) and temperature data of each ROI (max. / min. / average temperature).

In addition to the alarm data and the relevant activities to the VMS of the PC, the relating camera generates an alarm to the relais.

The web browser of TSO320-IP or TSO640-IP displays the picture in this way:

After setting the ROI area, the temperature of each ROI and the isothermal color, the setting values are transmitted to the relevant camera.

The size and the number of ROIs can be set up on the web browser of TSO320-IP or TSO640-IP:

1) The maximum number of rectangular ROIs is 10.
2) Each ROI does not have maximum size limitations.

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Model	TSO300, TSO600
Video	
Sensor	LWIR a-Si Uncooled Microbolometer 17µm
Resolution (pixels)	384x288, 640x480
Thermal sensitivity of the sensor (NETD)	<50mK @ f1.0 30Hz 300K
Spectral response	8-14 µm
Video output	PAL CVBS 1.0v Pk-Pk, 75Ω/HDMI
Optical lenses	
Focus	From 4,8mm to 300mm, fixed focus or autofocus lens, according to the needs
Focus & Zoom control	Motorized focus and motorized zoom, by selecting "Focus +/-" or "Zoom In/out"
Operations	
Camera characters	On/Off 20 characters, 5 lines
Integrated motion detection	On/Off (3 rectangular areas)
Frame rate	25/50Hz
Brightness	Manual setting: 0~100
Gain	Manual setting: 0~100
Auto NUC (non-uniformity correction)	Off/Auto/Time/ Time+Auto
Digital zoom	2x / 4x
Color variations (palette)	GREY, IRON, RAIN_V1, RAINBOW, HALF GREY, YELLOW, MIDGREY, FIRE, BLUE RED (tot.:9 colors)
Heat threshold	0~100
Image sharpening	On/Off (edge sharpness only)
Digital noise filter (DNS)	SSNR (2D), Noise filter (On/off)
Image rotation	Flip: On/Off, Mirror: On/Off
Intelligent video analytics	Motion detection
Alarm events	Motion detection
Temperature alarm events	Not available
OSD control	Pelco D Protocol, RS-485
Function	Tracker: Hot-cold, center indicator
Max. User Access	Max 10 users access (TBD)

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Environmental		
Operating temperature	From -40°C to +60°C	
Storage temperature/humidity	From -20°C to +70°C	
Electrical		
Power supply	12V±0.3Vdc	
Consumption	30W Max.	
Mechanical		
Color/Material	Light grey RAL 7035/Aluminium	
Dimensions	165mm W x 122mm H x 470mm D	
Weight (without optical lens)	3,3Kg	3,4Kg

Model	TSO300-IP, TSO600-IP	TSO320, TSO640 TSO320-IP, TSO640-IP
Video		
Sensor	FPA Uncooled Microbolometer, Pixel size 17µm	
Resolution (pixels)	384x288, 640x480	384x288, 640x480
Thermal sensitivity of the sensor (NETD)	<50mK @ f1.0 30Hz 300K	
Spectral response	8-14 µm	
Video output	CVBS 1.0v Pk-Pk, 75Ω	
Optical lenses		
Focus	From 4,8mm to 300mm fixed focus or autofocus lens, according to the needs	
Focus & Zoom control	Motorized focus and motorized zoom, by selecting "Focus +/-" or "Zoom In/out"	
Operations		
Camera characters	On/Off 20 characters, 5 lines	
Integrated motion detection	On/Off (3 rectangular areas)	
Frame rate	25/50Hz	
Brightness	Manual setting: 0~100	
Gain	Manual setting: 0~100	
Auto NUC (non-uniformity correction)	Off/Auto/Time/ Time+Auto	
Digital zoom	1x / 2x / 3x / 4x	
Color variations (palette)	RED HOT/IRON/ RAINBOW/AMBER/BLACK HOT/WHITE HOT (tot.:11 colors)	
Heat threshold	0~100	
Image sharpening	On/Off (edge sharpness only)	
Digital noise filter (DNS)	SSNR (2D), Noise filter (On/off)	
Image rotation	Flip: On/Off, Mirror: On/Off	
Intelligent video analytics	Motion detection	
Alarm events	Motion detection	Temperature alarm / Motion detection
Temperature alarm events	Not available	Up to 10 regions of interest (ROI), temperature setting for each region: max, min or medium
Network		
Ethernet	RJ-45 (10/100Base-T)	
Video Compression Format	H.264 (MPEG4 part 10/AVC): Main/Baseline/High Motion JPEG	

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Resolution (pixels)	720x576, 640x480, 384x288, 720x480, 320x240
Frame Rate	(H.264) max 30fps in all resolutions, (MJPEG) max 15fps @640x480
Smart Codec	Manual Mode (area based: 4ea,TBD)
Video Quality adjustments	H.264: Compression level, Management of Target Bitrate level, MJPEG: quality adjustments
Bitrate control modes	CBR o VBR, Motion JPEG: VBR (Bitrate range 128K~1M)
Streaming	Multiple Streaming (upto 3 profiles), Max. Profiles:4, Fixed profiles (default):2
IP	IPv4, IPv6
Protocols	TCP/IP, UDP/IP, RTP(UDP),RTP(TCP), RTCP, RTSP, NTP, http, HTTPS, SSL, HDCP, PPPoE, FTP, ICMP, IGMP, ARP, DNS, DDNS, SMTP
Security	IP Address Filtering User Access Log HTTPS(SSL) Login Authentication, Digest Login Authentication, 802.1x Authentication
Streaming methods	Unicast/Multicast
Max. User Access	Max 10 users access (TBD)
Application Programming Interface	OnVif Profile S Ver 2.4
Webpage Language	English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish, Dutch, Portuguese, Turkish, Polish, Czech, Hungarian, Greek.
Web Viewer	Supported OS: Windows XP/VISTA/7/8/8.1/10 Supported Browser: Microsoft Intenet Explorer (Ver. 9~11)
Central management Software	SSM ver 1.0
Environmental	
Operating temperature	From -40°C to +70°C
Storage temperature/humidity	From -20°C to +70°C
Electrical	
Power supply	12V±0.3VCC, PoE (IEEE802.3at Class3)
Consumption	Max.30W
Mechanical	
Color/Material	Light grey RAL 7035/Aluminium
Dimensions	165mm W x 122mm H x 470mm D

Weight (without optical lens)	3,3Kg	3,4Kg

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