



TCAM2500 VISUAL PLUS THERMAL MONITORING SYSTEM

FEATURES

- Dual visual plus thermal monitoring in a single camera
- Engineered for operation in Electric Power substations
- Automated temperature monitoring of critical assets
- Monitor multiple temperature points /assets
- Notification through SCADA or email
- Storage of temperature readings in system database

KEY BENEFITS

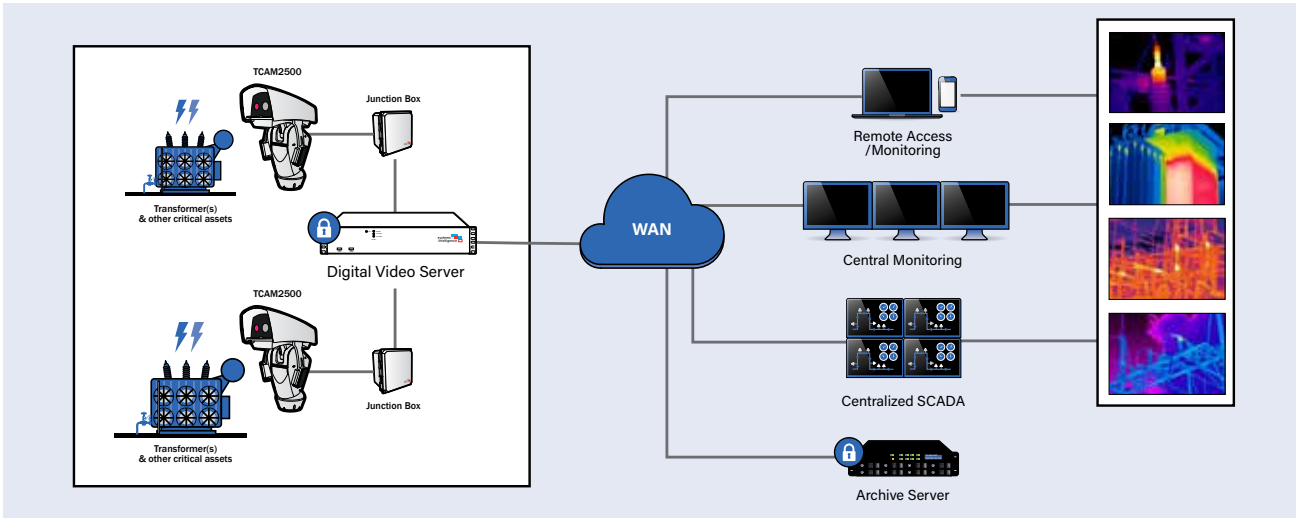
- Thermal temperature readings with visual confirmation
- Reliable operation in harsh environments with high levels of EMI, ESD, voltage surges and interrupts
- More reliable continuous temperature readings under all system load conditions
- Reduced downtime due to unplanned outages by detection of potential problems before failures occur
- Reduced monitoring requirements for operations personnel
- Temperature trending analysis allows input into condition based maintenance program

The risk of outages is increasing on the electric power grid due to its aging infrastructure and lack of automation systems that monitor the condition of critical equipment at substations and along the grid. Transformer fluid leaks or insulation breakdown cause overheating that is a warning of potential failures, but many utilities don't have automated thermal detection systems that can help reveal these problems.

Continuous thermal monitoring systems are able to anticipate, detect, and respond rapidly to problems, thereby reducing the chance of failures, outages and lost productivity. Detection of temperature increases in substation equipment with thermal monitoring cameras allows preventative maintenance operations before an unplanned outage occurs due to asset failure.

The Systems With Intelligence thermal monitoring solution includes a substation hardened digital video server (DVS) that digitally records video from multiple cameras and incorporates a suite of sophisticated video and thermal analytic algorithms for detection of anomalies. The DVS includes software tools for video monitoring and analysis, features flexible networking capabilities and provides automated alarm and event notification.

SUBSTATION MONITORING ARCHITECTURE



APPLICATIONS

The Systems With Intelligence thermal monitoring solution can be used to monitor and analyze the thermal signatures of the following substation components. Abnormal thermal signatures are precursors to potential equipment failures.

- Power transformers (oil levels, radiators and pump operation)
- Load tap changers
- Insulator bushings
- Standoff insulators
- Lightning arrestors
- Circuit breakers
- Mechanical disconnects
- Control cabinets
- Batteries

SPECIFICATIONS	
IMAGING PERFORMANCE	
Field of View, focal length	FV01/FS01 = 24° x 18°, 19mm FV02/FS02 = 48° x 37°, 9mm FV03/FS03 = 34° x 26°, 13mm FV04/FS04 = 18° x 14°, 25mm FV05/FS05 = 13° x 10°, 35mm FV06/FS06 = 63° x 50°, 7.5mm
Resolution	324 x 256 pixels
Detector Type	Uncooled VOx Microbolometer
Pixel Pitch	25µm
Scene Range (High Gain)	-25 °C to 135 °C
Scene Range (Low Gain)	-40 °C to 550 °C
Time to Image	<4.0secs
Video Compression	H.264
NETWORK	
Interface	Pan/Tilt Housing: 10/100TX, RJ45 Fixed Housing: 100FX, SC or 10/100TX, RJ45
Security	Password Protected
Protocols	IPv4/v6, DHCP, HTTP, UDP, RTP/RTSP, UPnP, NTP, ICMP
Software Interface	Web Server

THERMAL	
Spectral band	7.5 to 13.5 µm
Sensitivity	0.1 °C
Frame rate	FV0x = 30Hz, FS0x = 7.5Hz
ENVIRONMENTAL WITH PAN/TILT HOUSING	
Operating Temperature Range	-40° to 85° C
Encapsulation	IP66 (IEC 60529)
Wind Resistance	Operational: up to 160km/h Stationary: up to 210 km/h
Resistance to Salty Fog	EN50130-5, EN60068-2-52
Certifications	CE: EN60950-1, EN6095-22, EN61000-6-4, EN55022 Class A, EN50130-4
* The specification for this product may change without prior notice for product improvement.	

SPECIFICATIONS: DAY/NIGHT CAMERA

VIDEO	
Imaging Device	1/2.8" 2.38M CMOS
Total / Effective Pixels	1952(H) x 1116(V), 2.18M / 1944(H) x 1104(V), 2.14M
Scanning System	Progressive
Min. Illumination	Color : 0.3Lux (1/30sec, F1.6, 50IRE), B/W : 0.03Lux (1/30sec, F1.6, 50IRE)
S / N Ratio	50dB
LENS	
Focal Length (Zoom Ratio)	4.44 ~ 142.6mm (Optical 32x)
Max. Aperture Ratio	F1.6(Wide) / F4.4(Tele)
Angular Field of View	H : 62.8° (Wide) ~ 2.23° (Tele) / V : 36.80° (Wide) ~ 1.26° (Tele)
Min. Object Distance	1.5m (4.92ft)
1.5m (4.92ft)	Auto / Manual / One push
Lens / Mount Type	DC auto iris / Board-in type

SPECIFICATIONS: HOUSING

GENERAL	
Built in aluminium and ABS	
Epoxy polyester powder painting, RAL9002 colour	
Top mount (OTT)	
Transmission through toothed belt	
Slip-ring	
Electronic limit switches	
Plug installation thanks to connector and easy replacement on-site	
Zero backlash	
MECHANICAL	
Cable glands: 3xM16	
Horizontal rotation: continuous	
Vertical rotation: from +45° up to -20°	
Horizontal speed (variable): from 0.02°/s up to 20°/s through toothed belt	
Tilt speed (variable): from 0.02°/s up to 20°/s	
COMMUNICATIONS	
Ethernet connection: IEEE 802.3 100Base-Tx	
PROTOCOLS	
Pelco-D	

OPERATIONAL

Camera Title	Off / On (Displayed up to 45 characters)
Day & Night	Auto (ICR) / Color / B/W / External Schedule
Backlight Compensation	Off / BLC
Wide Dynamic Range	120dB
Digital Image Stabilization	Off / On
Defog	Off / Auto / Manual
Motion Detection	Off / On (4ea 4 points polygonal zones)
Privacy Masking	Off / On (32 zones with 2 points of rectangle)
Gain Control	Off / Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor Mercury
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec)
Digital Zoom	Digital Zoom

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ENVIRONMENT

Indoor/Outdoor
Operating temperature (with heater): -40°C (-40°F)/+85°C (185°F)
Surge immunity: up to 2kV line to line, up to 4kV line to earth (Class 4)

CERTIFICATIONS

Electrical safety: EN60950-1
Photobiological safety of lamps and lamp systems (LED illuminators): EN62471
Electromagnetic compatibility: , EN55022 (Class A), FCC Part 15 (Class A)
Immunity: EN50130-4
Outdoor installation: EN60950-22
IP protection degree: EN60529 (IP66)
Resistant to salty fog: EN50130-5, EN60068-2-52

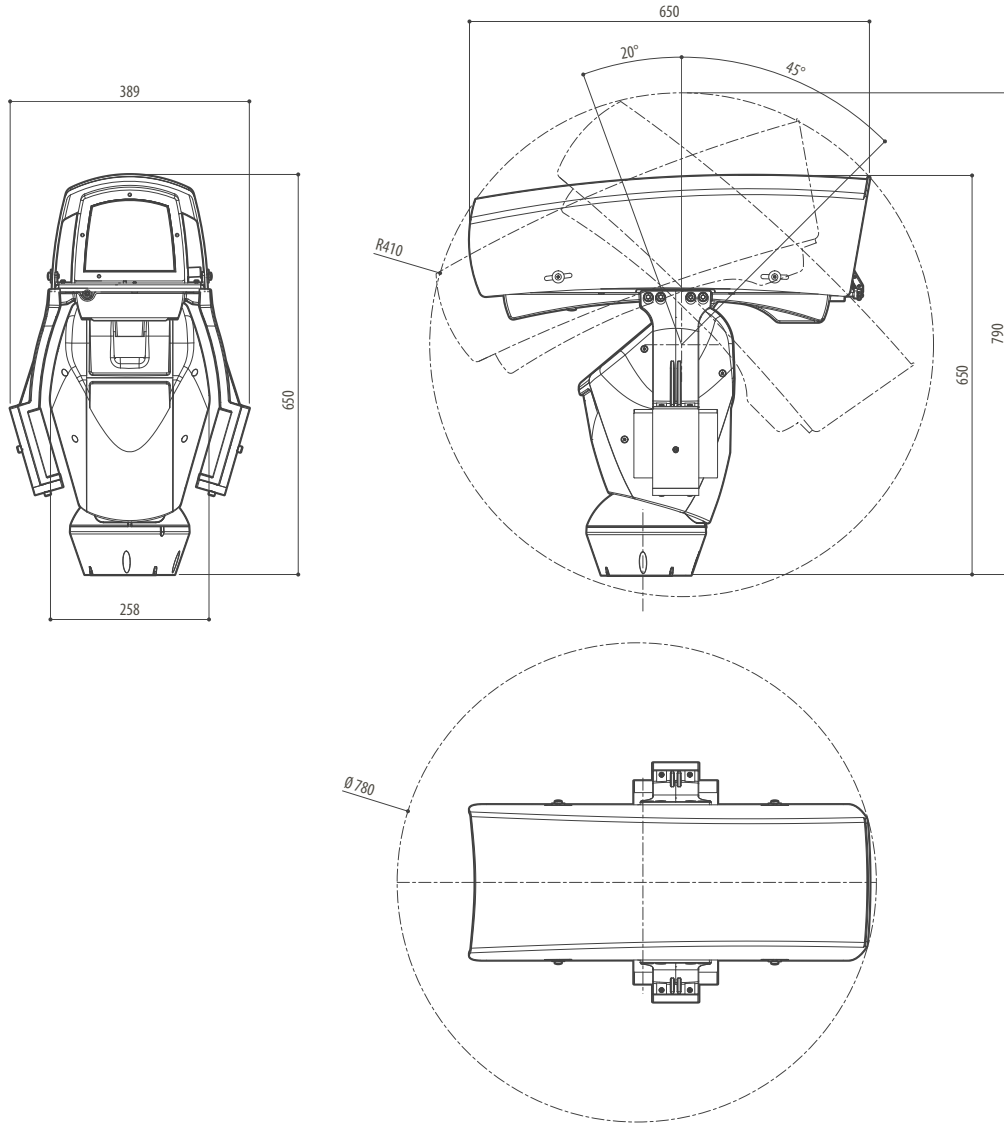
EAC certification

ELECTRICAL

24VAC, 50/60Hz, 100W

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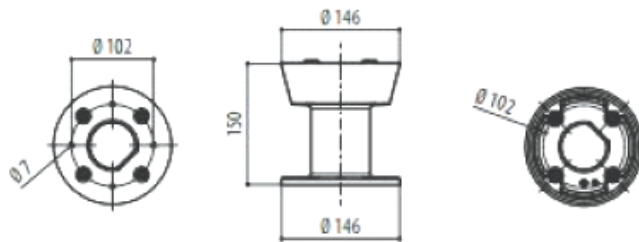
PAN/TILT HOUSING DIMENSIONS Unit: mm



MOUNTING OPTIONS Unit: mm

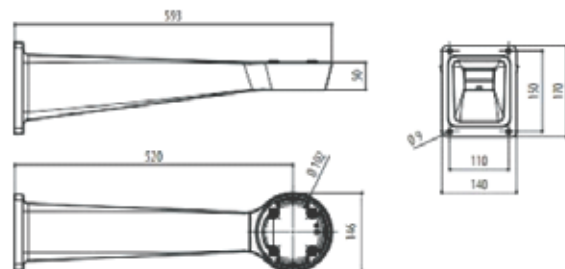
Parapet Bracket, Option A04

- Made of die-cast aluminum
- Epoxypolyester power painting
- Internal cable management
- Unit Weight: 1.6kg (3.5lb)



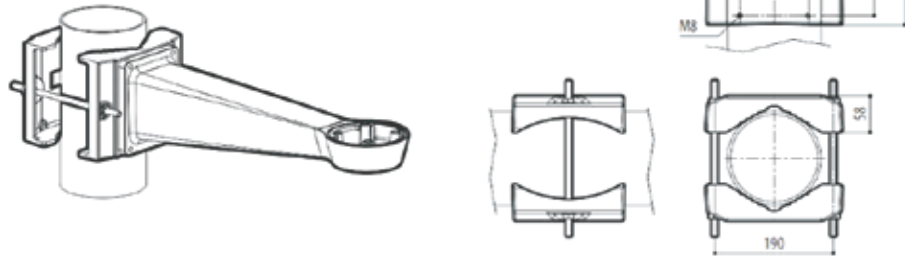
Wall Mount Bracket, Option A08

- Made of die-cast aluminum
- Epoxypolyester power painting
- Wall bracket with internal cable channel
- Unit Weight: 3.1kg (6.6lb)



Pole Mount Bracket with Arm, Option A13

- Pole Installation
- Pole Diameter: 80- 150mm (3.14 - 5.9in)



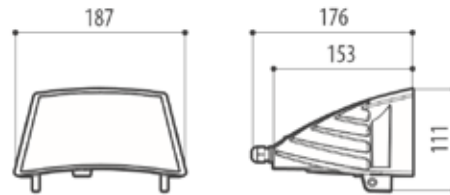
Accessories

Illuminator

- Adjustable built-in twilight sensor for automatic activation and deactivation
- Die-cast aluminium body
- Unit weight: 1.5kg (3.3lb)

Illuminator Power Supply - PS-120IRLED

- 120VAC IRLED Illuminator Power Supply
- Required with PT04 Housing



CONFIGURATION



BASE UNIT	Description
TCAM2500	Thermal Camera System with combined Day/Night and Thermal
HOUSING	
PT03	Pan Tilt Housing - 24VAC
PT04	Pan Tilt Housing - 120VAC
FIELD OF VIEW	
FV01/FS01	24° Field of View (30Hz/7.5Hz)
FV02/FS02	48° Field of View (30Hz/7.5Hz)
FV03/FS03	34° Field of View (30Hz/7.5Hz)
FV04/FS04	18° Field of View (30Hz/7.5Hz)
FV05/FS05	13° Field of View (30Hz/7.5Hz)
FV06/FS06	63° Field of View (30Hz/7.5Hz)
DAY/NIGHT CAMERA	
FZ01	2 Megapixel Full HD 32x Network Zoom Camera
BRACKETS	
A04	Parapet Bracket for Pan/Tilt Housing
A08	Wall Mount Bracket for Pan/Tilt Housing
A13	Pole Mount Bracket for Pan/Tilt Housing
AXX	No Mounting Accessory provided
ILLUMINATORS	
IR108	10 degree, 850nm, LED Illuminator
IR308	30 degree, 850nm, LED Illuminator
IR608	60 degree, 850nm, LED Illuminator

NOTE: If illuminators are used with PT04 housing power supply PS-120IRLED is required.



Systems With Intelligence Inc.
6889 Rexwood Road, Unit #9
Mississauga, Ontario, CANADA
L4V 1R2

Tel: +1-289-562-0126
Fax: +1-289-562-0152

General Inquiries:

info@SystemsWithIntelligence.com

Sales Inquiries:

sales@SystemsWithIntelligence.com

Product Support:

support@SystemsWithIntelligence.com

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