

FLIR Systems, Inc.

FC-Series Traffic Camera

Architect & Engineering Specifications

This document is controlled to FLIR Technology Level 1. The information contained in this document pertains to a dual-use product controlled for export by the Export Administration Regulations (EAR). FLIR trade secrets contained herein are subject to disclosure restrictions as a matter of law. Diversion contrary to US law is prohibited. US Department of Commerce authorization is not required prior to export or transfer to foreign persons or parties unless otherwise prohibited.



Document Number: FC-3XX
Version: 100
Issue Date: May 2012

FLIR Systems, Inc.
Commercial Systems
70 Castilian Drive
Goleta, CA 93117
1-877-773-3547
<http://www.cvs.flir.com/traffic/>

FC-Series Traffic Camera

PART 1 - NOT USED

PART 2 - PRODUCTS

2.01 Thermal Traffic Camera

A. Functional Description

1. The Thermal Traffic Camera shall not depend on any visible or invisible (infrared) illumination or image intensifier to “see” i.e. produce images. The Thermal Traffic Camera shall be totally passive and not produce any energy or emit light in any bandwidth. The Thermal Traffic Camera shall allow the user to clearly identify images in the total absence of light.
2. The Thermal Traffic Camera shall allow the user to see through smoke and light fog and to view the thermal patterns and contrast in the scene.
3. The Thermal Traffic Camera shall utilize a Vanadium Oxide (VOx) uncooled microbolometer responding in the LWIR (Long Wave Infrared) spectral range of 7.5 – 13.5 μm , which is beyond what is visible to the human eye.
4. The Thermal Traffic Camera shall be based on Vanadium Oxide (VOx) microbolometer detector technology, and shall not be susceptible to permanent damage after imaging the sun. This is in contrast to some systems based on amorphous silicon detector technology, which can be permanently damaged when viewing the sun or even reflections of the sun.
5. The Thermal Traffic Camera shall not utilize shutters to prevent damage from the sun, but rather the Thermal Traffic Camera shall provide uninterrupted video which shall be required for traffic and ITS installations.
6. The Thermal Traffic Camera shall not utilize dynamic apertures to protect the image sensor because these mechanisms reduce sensitivity for an extended period of time, thus reducing the Thermal Traffic Camera performance, which shall not be acceptable for traffic installations.
7. The Thermal Traffic Camera shall provide athermal optics that automatically adjust to background thermal changes, and therefore do not require re-adjustment and/or thermal refocusing.
8. The Thermal Traffic Camera shall not be susceptible to “image blooming” caused by bright lights as are image intensifiers and visible spectrum cameras.

FC-Series Traffic Camera

9. The camera shall be factory configured with the following fixed anti-reflection coated Germanium lenses with the Field of View (FOV) and resolutions as indicated:

Device	Lens	Resolution (pixels)	FOV
FC-334T	13 mm	320 x 240	34° H x 28° V
FC-324T	19 mm	320 x 240	28° H x 18° V
FC-348T	9 mm	320 x 240	48° H x 37° V

10. The Noise Equivalent Temperature Difference (NETD) is the measure of the smallest object temperature that can be detected by the thermal image sensor relative to the system noise. The measurement is usually quantified as a mK value. This is the most common Figure of Merit of a thermal imaging system and a true measurement of the thermal camera's sensitivity. The Thermal Traffic Camera image sensor shall provide a NETD of < 75mk, <50mK f/1.0 or lower.
11. The Thermal Traffic Camera shall include Auto Digital Detail Enhancement (Auto DDE) which is an advanced non-linear image processing algorithm. The Auto DDE function is fully automatic and requires no input or adjustment from the user. The Auto DDE shall enhance the image detail to match the total dynamic range of the original image allowing details to be visible to the user even in scenes with low or high thermal contrast. Auto DDE will increase the probability of detection of low contrast images. These settings shall be optimized for performance with Traffic Video Detection.
12. The Thermal Traffic Camera shall utilize Non-Uniformity Correction (NUC) which is a set of compensation factors for each pixel. NUC shall enable the following features and benefits:
- Eliminate the need for FPA (Focal Plane Array) temperature stabilization.
 - Allow for near instantaneous camera turn-on.
 - Reduced system complexity and power consumption.
 - Allow for a wider operating temperature range.
13. The Thermal Traffic Camera shall include Automatic Gain Control (AGC) circuitry to compensate for scene variations, improve image quality by avoiding saturation and distortion, and to balance signal levels prior to display to maximize image quality.
14. The Thermal Traffic Camera shall feature both White-Hot and Black-Hot operating modes. In the White-Hot (default) mode warmer objects will be displayed in white or lighter shades than cooler or background areas. In the Black-Hot mode warmer images will be displayed as black or dark gray as compared to cooler background objects.

FC-Series Traffic Camera

15. The Thermal Traffic Camera shall provide standard NTSC or PAL analog composite video output (factory configured) to allow it to function as a direct replacement for daylight camera and to connect directly to industry standard video detection software cards, and recording devices. The analog video signal shall be available via BOTH a BNC video output connector and a connector free terminal block. The video outputs shall be surge protected.
16. The Thermal Traffic Camera shall be furnished in an IP-66 rated outdoor enclosure with sunshield and mounting base. The mounting base shall be provided with 1/4x20 holes for mounting to a pedestal or wall mount. All cable connections shall be made inside of the enclosure. The enclosure shall be provided with liquid-tight sealed cable gland fittings for the video and power cables.
17. The camera enclosure shall include grounding and surge protection. A separate Earth ground connection shall be made inside the enclosure to a designated grounding lug. The Earth ground conductor may be run as part of the power cable bundle.
18. The Thermal Traffic Camera shall operate on surge protected 110/220 VAC.
19. The Thermal Traffic Camera shall include a 10-year warranty on the thermal detector.
20. The Thermal Traffic Camera shall have been installed and tested by the said agency.
21. The Thermal Traffic Camera shall be a FLIR FC Series Traffic Camera. Acceptable Models: FC-324T, FC-334T, FC-348T.

FC-Series Traffic Camera

B. Technical Description

1. The Thermal Traffic Camera shall meet the following minimum requirements:

Sensor Type	Long-life VOx Uncooled Microbolometer w/10-year warranty
Spectral Response	7.5 to 13.5µm
Sensitivity (Thermal Camera sensor)	< 75mk, <50mK f/1.0
Pixel Pitch	25 microns
Video Output	Dual NTSC or PAL (BNC and Connector Free)
Serial Control Interface	RS-232 or RS-422
User Interface	Via Windows-based application program (Windows-based GUI)
Input Voltage	90-240VAC Single Phase 50-60hz
Power Consumption	90-240VAC: 1.7W w/110VAC 90-240VAC: 18W peak w/Heaters
Operating Temperature Range	-50°C to 75°C (Continuous Operation) -40°C to 75°C (Cold Start)
Storage Temperature Range	-55°C to 85°C
NEMA TS 2	Environmental testing for FC Series was conducted by IAW w/Section 2.1 of MEMA TS 2-2003 and either meets or exceeds those requirements in the following categories: Operating Voltage, Operating Frequency, Ambient Temperature, Humidity, Vibration and Shock
Enclosure Rating	IP-66
Weight	4.2 lb w/sun shield
Dimensions	10.8" x 5.4" x 4.4" (w/sun shield)

The Thermal Traffic Camera shall be a FLIR FC-Series Traffic Camera. Model FC-334T, FC-348T, or FC-324T.