**CSI 2010 Specification for:**

**FLIR FC-Series ID Thermal Fixed Camera**

**Notes to Specifier:**

1. **This CSI 2010-compliant specification is designed to allow the specifier to specify FLIR or similar products for any type of project. Specifier can easily customize this specification to his/her needs.**
2. **The specification is not proprietary to FLIR. Any suitable brand can be specified using this specification.**
3. **FLIR has placed Text Boxes such as this in bold to alert the specifier of important information. Delete all Text Boxes after editing.**
4. **FLIR has also placed edit prompts “[ ]” throughout the specification to prompt the specifier to add or modify information relative to the paragraph at hand. Delete all Edit Prompts “[ ]” after editing.**
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# PART 1 - GENERAL

# Summary

# This Specification is for a fixed thermal security camera with embedded video analytics (FC-Series ID) for installation into a fully operational Digital Video System. This Specification is part of a larger project which may be covered in one or more of the Specification Sections listed below.

# Section Contents and Related Specification References

# This Specification may be part of a larger Security System project. *[If so, utilize the appropriate specification sections below.]* Refer to the appropriate CSI 2010 Specification Sections as referenced below: *[Delete any sections not for coordination to this work.]*

# 000000 – Procurement and Contracting Requirements (Division 0)

# 010000 – General Requirements (Division 1)

# 020000 – Existing Conditions (Division 2)

# 080000 – Openings (Doors, Door Hardware and other Openings) (Division 8)

# 101400 – Signage (Division 10)

# 111200 – Parking Control Equipment (Division 11)

# 142000 – Elevators (Division 14)

# 250000 – Integrated Automation Systems (Division 25)

# 260000 – Electrical (Division 26)

# 270000 – Communications (Division 27)

# 271000 – Data Communications Network Equipment (including Firewalls, Routers, Codecs, Switches and Access Points)

# 272200 – Data Communications Hardware (including Servers, Storage, Workstations, Printers, etc.)

# 273000 – Voice Communications

# 280000 – General Security System Specification (Division 28)

# Section 280800 – Commissioning of Electronic Safety and Security

# Section 281000 – Electronic Access Control and Intrusion Detection

# Section 281600 – Intrusion Detection

# Section 281619 – Intrusion Detection Remote Devices and Sensors

# Section 282000 – Electronic Surveillance

# Section 282300 – Video Surveillance

# Section 282313 – Video Surveillance Control and Management Systems

# Section 282316 – Video Surveillance Monitoring and Supervisory Interfaces

# Section 282323 – Video Surveillance Systems Infrastructure

# Section 282329 – Video Surveillance Remote Devices and Sensors

# Drawings and Specifications:

# Drawings:

# *[Include this paragraph if Drawings were included.]* Drawings delivered with these Specifications show device locations, and may show conduits, details, device schedules and single-line or detailed schematics.

# *[Include this paragraph if Drawings were not included.]* Drawings are not included. See the descriptive narratives in Articles 1.5 and 1.7 below.

# Specifications: The Specifications describe the Scope of Work including:

# Section 1 – System Descriptions, all items to be delivered and installed and all services to be performed.

# Section 2 – Products, describes acceptable products.

# Section 3 – Execution, describes the standards and practices to be used by the installer for this work.

# Project Background and Site Conditions:

# *[Fill in Project Background and Site Conditions for this work here or delete this paragraph and include the paragraph below if this is part of a complete system.]*

# See Section 282313 – Video Surveillance Control and Management Systems

# Product Description:

# Provide a quantity of fixed thermal security cameras with embedded video analytics (FC-Series ID) as shown on the associated Purchase Order or Bill of Quantities.

# Submittals:

# *[Fill in Submittal Requirements for this work here or delete this paragraph and include the paragraph below if this is part of a complete system.]*

# See Section 013300 – Submittal Procedures

#  FC-Series ID Camera Quick Connect Guide

# FC-Series ID Installation Manual Delivery, Storage and Handling

# *[Fill in Submittal Requirements for this work here or delete this paragraph and include the paragraph below if this is part of a complete system.]*

# See Section 016000 – Product Requirements

# Quality Assurance:

# *[Fill in Submittal Requirements for this work here or delete this paragraph and include the paragraph below if this is part of a complete system.]*

# Manufacturer:

# Minimum 10 years’ experience in manufacture and design of IP Thermal Analytic Video Surveillance Systems.

# ISO 9001:2008 certification

# Installer:

# Minimum 5 years’ experience in installing IP Thermal Analytic Surveillance Systems.

# All camera installation, configuration and commissioning shall be performed by technicians fully authorized by manufacturer.

# Applicable Codes and Standards:

# *[Fill in Applicable Codes and Standards for this work here or delete this paragraph and include the paragraph below if this is part of a complete system.]*

# Thermal Camera

# Electromagnetic Compatibility: CE (EN55024:2010; EN50130-4:2011; EN50130-4; EN55032:2012; IEC 62599-2:2010: 2010); FCC 47 CFR Part 15, Subpart B, Class A, tested according to ANSI C63.4:2009 within CISPR 22:2008 Class A limits

# Environmental: IP66, IP67; IEC 60068-2-1:2007; IEC 60068-2-2:2007; IEC 60068-2-27:2008; ISTA-1A; MIL-STD-810G method 505.5, 507.5, 509.5, 514.6, and 521.3

# Material: RoHS Directive 2011/65/EU; WEEE 2012/19/EU

# ONVIF 2.3 Profile S

# Warranty:

# *[Fill in specific services for this work here or delete this paragraph and include the paragraph below if this is part of a complete system.]*

# Manufacturer’s warranty will cover three years for replacement or repair of defective equipment and a ten-year warranty for the thermal core.

# PART 2 - PRODUCTS

# Acceptable Manufacturer and Model:

# Acceptable Manufacturers: *[FLIR and/or name acceptable alternative manufacturers here, or indicate to submit all for review.]*

# Models: *[FLIR Thermal model FC-Series ID* *and/or name acceptable alternative models here, or indicate to submit all for review.]*

# General Product Description:

# A thermal video surveillance system consisting of a fixed thermal security camera with embedded video analytics (FC-Series ID).

# Detailed Product Description:

# Basic Description:

# The integrated system shall operate either as a stand-alone fixed thermal security camera with embedded video analytics or as part of an integrated network or DVR configuration. There shall be no need for additional hardware or software to perform the video analytics.

# Field software upgrades shall be distributable across the network.

# The camera shall provide both analog and digital video outputs.

# The integrated system shall include dry contact input and output.

# The integrated system shall not require illumination, Infrared Illuminators, active visible (Day TV) or image intensifiers to detect and identify images.

# The integrated system shall allow the user to view images, thermal patterns, and contrast despite smoke, low light, light fog, and haze.

# The integrated system shall be passive and not produce any energy or emit light in any bandwidth.

# The integrated system shall include athermalized optics that automatically adjust to ambient temperature changes, and therefore do not require re-adjustment and/or thermal refocusing.

# The integrated system shall not be susceptible to “image blooming” that results from brightly lit objects which appear as intense glows that may hide nearby detail and may blind the camera by flooding the scene with light.

# The integrated system shall utilize Flat-Field Correction (FFC) to compensate for temperature variations and eliminate the need for focal plane array temperature stabilization.

# The integrated system shall feature white-hot and black-hot operating modes. In the default white-hot mode, warmer images will be displayed in white or lighter shades than cooler or background areas. In the black-hot mode, warmer objects will be displayed as black or dark gray compared to cooler objects.

# The integrated system shall support a color palette of 14 colors to visualize differences in temperature.

# The integrated system shall include a web interface for remote control/configuration of the bundle without requiring the use of a VMS.

# The integrated system shall be compatible with 3rd party Network Video Management Software (NVMS), analog video displays or recording devices.

# The integrated system shall digitally encode images into a compressed IP video stream and send metadata and events over IP to a VMS.

# The integrated system shall embed analytic metadata in an encoded video stream to a Video Management System (VMS), and include detection overlays and on-screen display information on the encoded video.

# Setup and Configuration:

# Single-handedly install and setup one or more cameras for recording without requiring another person’s assistance.

# It shall be possible to configure the analytic capabilities via its web interface.

# It shall be possible to configure the thermal camera via its web interface.

# The integrated analytic capabilities shall provide a high probability of intelligent video detection while maintaining a low false alarm rate.

# The integrated system shall support the following function when the FC-Series ID camera is configured with the ioi PTZ Tracker (trk-101-P):

* + - * 1. Hand-off from the integrated system to a PTZ camera utilizing FLIR analytics.

# The camera shall enable the following additional functionality:

# Via the unit’s web interface, setup and configure the unit.

# Perform scheduled actions. The unit will perform actions on a specific date or time or on a recurring basis over a defined time period according to a predefined schedule.

# Perform automatic responses to a pre-defined triggering event during a defined monitoring period.

# Utilize the unit’s relay outputs to control external devices.

# Upon events, share snapshots and video clips via FTP, Network File Sharing, and Windows Share.

# SSH authentication

# Support for ONVIF 2.3 Profile S

# Support for IEEE 802.1x Authentication (certificate bit rate up to 4096 bps)

# The Thermal Camera shall include the following specifications:

# Basic Camera Specifications:

# Imager/Processor Specifications:

# Uncooled Vanadium Oxide Microbolometer Sensor (imager)

# Spectral band: 7.5 – 13.5 µm (LWIR)

# Sensitivity (NEDT): <50 mK when normalized to f/1.0 optics and room temperature

# Resolution:

# FC-3XX: 336x256 and 320x256 pixel array

# FC-6XX: 640x512 pixel array

# The camera is available in three sensor options: 8.3 fps, 25 fps, and 30 fps. The 8.3 fps models are easier to export. An export license is not required.

# The following models are available:

| **Model** | **Sensor** | **Pixel Pitch** | **HFOV°** | **VFOV°** | **Focal Length** | **f/** |
| --- | --- | --- | --- | --- | --- | --- |
| FC-344 | 320x256 | 34 (effective) | 44 | 36 | 13 | f/1.0 |
| FC-332 | 320x256 | 34 (effective) | 32 | 26 | 19 | f/1.0 |
| FC-324 | 336x256 | 17 | 24 | 18 | 13 | f/1.0 |
| FC-317 | 336x256 | 17 | 17 | 13 | 19 | f/1.0 |
| FC-309 | 336x256 | 17 | 9.2 | 7 | 35 | f/1.1 |
| FC-305 | 336x256 | 17 | 5.4 | 4.1 | 60 | f/1.25 |
| FC-304 | 336x256 | 17 | 4.3 | 3.3 | 75 | f/1.1 |
| FC-644 | 640x512 | 17 | 44 | 36 | 13 | f/1.0 |
| FC-632 | 640x512 | 17 | 32 | 26 | 19 | f/1.0 |
| FC-617 | 640x512 | 17 | 17 | 14 | 35 | f/1.1 |
| FC-610 | 640x512 | 17 | 10 | 8.2 | 60 | f/1.25 |
| FC-608 | 640x512 | 17 | 8.2 | 6.6 | 75 | f/1.1 |

# The following optimal detection distances are supported with Analytics:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Model** | **Sensor** | **Human [m]** | **Vehicle [m]** | **Human [feet]** | **Vehicle [feet]** |
| FC-344 | 320x256 | 66 | 88 | 218 | 290 |
| FC-332 | 320x256 | 91 | 121 | 299 | 397 |
| FC-324 | 336x256 | 131 | 174 | 430 | 571 |
| FC-317 | 336x256 | 181 | 240 | 594 | 788 |
| FC-309 | 336x256 | 391 | 521 | 1,284 | 1,708 |
| FC-305 | 336x256 | 572 | 762 | 1,879 | 2,499 |
| FC-304 | 336x256 | 711 | 945 | 2,332 | 3,102 |
| FC-644 | 640x512 | 133 | 177 | 437 | 580 |
| FC-632 | 640x512 | 182 | 242 | 598 | 793 |
| FC-617 | 640x512 | 362 | 480 | 1,188 | 1,576 |
| FC-610 | 640x512 | 572 | 762 | 1,879 | 2,499 |
| FC-608 | 640x512 | 711 | 945 | 2,332 | 3,102 |

The range predictions above are configured with the indicated lenses, assuming the following:

# Optimal performance

# Clear weather and thermal contrast

# Size of human object is 1.8m x 0.5m (5’9” x 1’8”)

# Size of vehicle object is 5.0m x 1.5m (16’5” x 4’11”)

# Pixel on target for detection under optimal conditions:

|  |  |
| --- | --- |
| **Human Target size** | **Optimal** **Detection Conditions** |
| 0.5 X 1.8m | 3 X 9.5m |

# Other assumptions apply

**NOTE:** Performance may vary according to weather conditions, thermal contrasts, and other environmental conditions. System integrator should design the site based on the specific conditions.

# The following optimal recognition/classification distances are supported with Analytics:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Model** | **Sensor** | **Human [m]** | **Vehicle [m]** | **Human [feet]** | **Vehicle [feet]** |
| FC-344 | 320x256 | 51 | 68 | 168 | 223 |
| FC-332 | 320x256 | 70 | 93 | 230 | 305 |
| FC-324 | 336x256 | 101 | 134 | 331 | 439 |
| FC-317 | 336x256 | 139 | 185 | 457 | 606 |
| FC-309 | 336x256 | 301 | 400 | 988 | 1,314 |
| FC-305 | 336x256 | 440 | 586 | 1,445 | 1,922 |
| FC-304 | 336x256 | 547 | 727 | 1,794 | 2,386 |
| FC-644 | 640x512 | 102 | 136 | 336 | 446 |
| FC-632 | 640x512 | 140 | 186 | 460 | 610 |
| FC-617 | 640x512 | 279 | 370 | 914 | 1,212 |
| FC-610 | 640x512 | 440 | 586 | 1,445 | 1,922 |
| FC-608 | 640x512 | 547 | 727 | 1,794 | 2,386 |

The range predictions above are configured with the indicated lenses, assuming the following:

# Optimal performance

# Clear weather and thermal contrast

# Size of human object is 1.8m x 0.5m (5’9” x 1’8”)

# Size of vehicle object is 5.0m x 1.5m (16’5” x 4’11”)

# Pixel on target for recognition/classification under optimal conditions:

|  |  |
| --- | --- |
| **Human Target size** | **Optimal Classification Conditions** |
| 0.5 X 1.8m | 4 X 13.5m |

# Other assumptions apply

**NOTE:** Performance may vary according to weather conditions, thermal contrasts, and other environmental conditions. System integrator should design the site based on the specific conditions.

# The following optimal human detection, recognition/classification, and identification distances are supported *without Analytics* (Johnson’s Criteria):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model** | **Sensor** | **Detection [m]** | **Recognition/ Classification [m]** | **Identification [m]** |
| FC-344 | 320x256 | 208 | 52 | 26 |
| FC-332 | 320x256 | 286 | 72 | 36 |
| FC-324 | 336x256 | 382 | 96 | 48 |
| FC-317 | 336x256 | 539 | 135 | 67 |
| FC-309 | 336x256 | 996 | 249 | 125 |
| FC-305 | 336x256 | 1698 | 425 | 212 |
| FC-304 | 336x256 | 2132 | 533 | 267 |
| FC-644 | 640x512 | 417 | 104 | 52 |
| FC-632 | 640x512 | 573 | 143 | 72 |
| FC-617 | 640x512 | 1079 | 270 | 135 |
| FC-610 | 640x512 | 1833 | 458 | 229 |
| FC-608 | 640x512 | 2236 | 559 | 280 |

The range predictions above are configured with the indicated lenses, assuming the following:

# Optimal performance

# Clear weather and thermal contrast

# Size of human object is 1.8m x 0.75m (5’9” x 29.5”)

# Other assumptions apply

**NOTE:** This table refers to human observation of the video and ***should not*** be used for analytic site design.

# Video Specifications

# Dynamic DDE

# Linear AGC

# Histogram AGC

# Sensitivity

# 14-bit WDR

# Image Polarity: White Hot/Black Hot

# Image Processing

# Pixel Pitch: 34μm (effective) or 17μm, depending on model selected

# Digital/Analog Video Outputs

# Digital:

# H.264 and MJPEG

# Resolution:

* 1. FC-3XX: 336x256 and 320x256 pixel array
	2. FC-6XX: 640x512 pixel array

# User-definable frame rate: 1-30 fps @ MJPEG; 1-30 fps @ H.264

# Two concurrent streams

# Bit Rate: H: 264: Restricted VBR and CBR (10kbps-4Mbps)

# Ethernet port: RJ45 10/100 Mbps

# Services and protocols: IPV4, HTTP, Bonjour, UPnP, DNS, NTP, RTCP, TCP, UDP, ICMP, IGMP, DHCP, ARP, SCP, FTP

# Video: RTP/RTSP Unicast/Multicast

# Alarms and commands: TCP/IP, HTTP

# IEEE 802.1x Authentication (certificate bit rate up to 4096 bps)

# Analog:

# NTSC/PAL (according to model number): dynamic NTSC/PAL settings, 1 BNC 75Ω

# Composite 1V p-p

# Electrical:

# Power Requirements: PoE (802.3af), PoE+ (802.3at), 12VDC, 24VAC

# Power Consumption:

# All units (except models 304, 305, 608, and 610 with heater) are <12.95 Watts.

# Models 304, 305, 608, and 610 (in all configurations) with heater are as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **POE (802.3af)** | **POE+ (802.3at)** | **12VDC** | **24VDC** | **24VAC (VA)** |
| **Heater off** | <5.5W | <5.5W | <5.5W | <5.5W | <8W |
| **Heater on (@ 100%)** | N/A | <25W | <25W | <25W | <32W |

# Mechanical:

# Dimensions:

# Without sunshield: 259 x 114 x 106 mm/10.2 x 4.5 x 4.2 in. (W x H x D)

# With sunshield: 282 x 129 x 115 mm/11.1 x 5.1 x 4.5 in. (W x H x D)

# Weight:

# Without sunshield:

|  |  |  |  |
| --- | --- | --- | --- |
| Lens | 13/19/35mm | 60mm | 75mm |
| Weight | 1.8kg (4 lbs.) | 2.0kg (4.5lbs.) | 2.2kg (4.75 lbs.) |

# With sunshield:

|  |  |  |  |
| --- | --- | --- | --- |
| Lens | 13/19/35mm | 60mm | 75mm |
| Weight | 2.2kg (4.75 lbs.) | 2.4kg (5.25lbs.) | 2.5kg (5.5 lbs.) |

# Enclosure: Tamper-resistant IP66 and IP67

# Control Inputs and Outputs (I/O):

# In: 1x Dry Contact

# Out: 1x Relay Out (rated load 0.025A@ 5VDC)

# Communication:

# 10/100 Mbps Ethernet

# Software:

# Integrated web server

# Bundled utility program (DNA-Discovery Network Assistant) to discover and configure IP, set device properties and user credentials, set the TV system (PAL/NTSC), upgrade the unit’s firmware, reset defaults, reboot the analytics firmware, and display camera properties.

* + 1. Video Analytics (with IOI TRK-101-P):
			1. Hand-off from the FC-Series ID camera to a PTZ camera utilizing FLIR analytics.

# Environmental:

# Operating temperature: Continuous Operation -50ºC to 70ºC (-58ºF to 158ºF), Cold Start -40°C to 70°C (-40°F to 158°F)

# Storage temperature: -50ºC to 85ºC

# Relative Humidity: 0-95%

# Icing, fogging, and frosting provisions: Anti-icing provided, Anti-fogging and Anti-frosting provided with 13mm,19mm and 35mm versions. Cold weather kit (optional) required for 60mm and 75mm versions.

# Humidity tolerance: per MIL-STD-810G method 507.5 procedure 2

# Salt fog tolerance: No damage caused exposure to salt fog per MIL-STD-810G, Section 509.4 (5 cycles).

# Protection for dust and water: System sealed to IP66 and IP67

# Vibration tolerance: per MIL-STD-810G “Transportation”

# Shock tolerance: per ISTA 1A

# Certifications:

# Electromagnetic Compatibility: CE (EN55024:2010; EN50130-4:2011; EN55032:2012; IEC 62599-2:2010); FCC 47 CFR Part 15, Subpart B, Class A, tested according to ANSI C63.4:2009 within CISPR 22:2008 Class A limits

# Environmental: IP66, IP67; IEC 60068-2-1:2007; IEC 60068-2-2:2007; IEC 60068-2-27:2008; ISTA-1A; MIL-STD-810G method 505.5, 507.5, 509.5, 514.6, and 521.3

# Material: RoHS Directive 2011/65/EU; WEEE 2012/19/EU

# The Thermal Camera shall include an embedded analytic engine according to the following technical specifications:

# Rule-Driven Video Analytics

# Embedded analytics:

# Region Entrance/Intrusion Detection

1. Human entrance to the scene or user-defined region in all or a specific direction
2. Vehicle entrance to the scene or user-defined region in all or a specific direction

# Crossover/Fence Trespassing: The analytic engine shall support the declaration of a real or virtual fence, such as entering into an exit way at an airport terminal secured boundary in order to detect motion of persons or objects across the threshold.

# Depth Setup: The camera supports automatic and manual depth configuration.

# Rules: Detected objects are classified according to whether human or vehicle, thus reducing false alarms due to movements of animals and other objects in the scene.

# The analytic engine shall allow for automatic responses following pre-defined events.

# Video analytics can be configured and operate when the camera is rotated, resulting in a larger effective detection area per camera.

# The camera supports automatic and manual masking of analytic detection areas.

# Analytic sensitivity can be easily configured in high, medium and low levels.

# Remote Site Monitoring and Management

# Built-in utility program that provides web-based configuration of analytics.

# Enables remote camera access from any PC with Chrome, IE, Mozilla, Safari over Windows and iOS.

# Transmits high quality live video and backup local recordings from sites with low-bandwidth.

# Local Storage via SD Card, maximum size 32GB for event recording only.

# Enables remote I/O control.

# Required System Elements to Complete a Workable System

# Digital Video Software or Video System See Section 282313 – Video Surveillance Control and Management Systems

# PART 3 - EXECUTION

# Examination:

# See Section 282313 – Video Surveillance Control and Management Systems

# Installation:

# See Section 282313 – Video Surveillance Control and Management Systems

# Preparation:

# See Section 282313 – Video Surveillance Control and Management Systems

# Quality Control:

# See Section 282313 – Video Surveillance Control and Management Systems

# Testing and Commissioning:

# See Section 282313 – Video Surveillance Control and Management Systems

# Handing Over:

# See Section 282313 – Video Surveillance Control and Management Systems

--- End of Specifications ---