

CSI 2010 Specification for: FLIR FH-Series ID Dual-Spectrum Cameras

Notes to Specifier:

- 1. This CSI 2010-compliant specification is designed to allow the specifier to specify Teledyne 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 Teledyne FLIR. Any suitable brand can be specified using this specification.**
- 3. Teledyne FLIR has placed Text Boxes such as this in bold to alert the specifier of important information. Delete all Text Boxes after editing.**
- 4. Teledyne 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

1.1. Summary

- A. This Specification is for a fixed dual-spectrum security camera with embedded video analytics (FH-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.

1.2. Section Contents and Related Specification References

- A. 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.]***
1. 000000 – Procurement and Contracting Requirements (Division 0)
 2. 010000 – General Requirements (Division 1)
 3. 020000 – Existing Conditions (Division 2)
 4. 080000 – Openings (Doors, Door Hardware and other Openings) (Division 8)
 5. 101400 – Signage (Division 10)
 6. 111200 – Parking Control Equipment (Division 11)
 7. 142000 – Elevators (Division 14)
 8. 250000 – Integrated Automation Systems (Division 25)
 9. 260000 – Electrical (Division 26)
 10. 270000 – Communications (Division 27)
 - a. 271000 – Data Communications Network Equipment (including Firewalls, Routers, Codecs, Switches and Access Points)
 - b. 272200 – Data Communications Hardware (including Servers, Storage, Workstations, Printers, etc.)
 - c. 273000 – Voice Communications
 11. 280000 – General Security System Specification (Division 28)
 - a. Section 280800 – Commissioning of Electronic Safety and Security
 - b. Section 281000 – Electronic Access Control and Intrusion Detection
 - c. Section 281600 – Intrusion Detection
 - d. Section 281619 – Intrusion Detection Remote Devices and Sensors
 - e. Section 282000 – Electronic Surveillance

- f. Section 282300 – Video Surveillance
- g. Section 282313 – Video Surveillance Control and Management Systems
- h. Section 282316 – Video Surveillance Monitoring and Supervisory Interfaces
- i. Section 282323 – Video Surveillance Systems Infrastructure
- j. Section 282329 – Video Surveillance Remote Devices and Sensors

1.3. Drawings and Specifications:

A. Drawings:

- 1. ***[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.
- 2. ***[Include this paragraph if Drawings were not included.]*** Drawings are not included. See the descriptive narratives in Articles 1.5 and 1.7 below.

B. Specifications: The Specifications describe the Scope of Work including:

- 1. Section 1 – System Descriptions, all items to be delivered and installed and all services to be performed.
- 2. Section 2 – Products, describes acceptable products.
- 3. Section 3 – Execution, describes the standards and practices to be used by the installer for this work.

1.4. Project Background and Site Conditions:

- A. ***[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.]***
- B. See Section 282313 – Video Surveillance Control and Management Systems

1.5. Product Description:

- A. Provide a quantity of fixed dual-spectrum security cameras with embedded video analytics (FH-Series ID) as shown on the associated Purchase Order or Bill of Quantities.

1.6. Submittals:

- A. ***[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.]***
- B. See Section 013300 – Submittal Procedures
- C. *FH-Series Camera Quick Install Guide*
- D. *FH-Series Camera Installation and User Guide*

1.7. Delivery, Storage and Handling

- A. ***[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.]***
- B. See Section 016000 – Product Requirements

1.8. Quality Assurance:

- A. ***[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.]***
- B. Manufacturer:
 - 1. Minimum 10 years' experience in manufacturing and designing IP Thermal Video Surveillance Systems.
 - 2. ISO 9001:2008 certification
- C. Installer:
 - 1. Minimum 5 years' experience in installing IP Thermal Video Surveillance Systems.
 - 2. All camera installation, configuration and commissioning shall be performed by technicians fully authorized by manufacturer.

1.9. Applicable Codes and Standards:

- A. ***[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.]***
- B. Environmental:
 - 1. IP Rating (Dust & Water Ingress): IP66 & IP67
 - 2. Corrosion: MIL-STD 810G, 1000 hr salt spray
 - 3. Shock: IEC 60068-2-27
 - 4. Vibe: IEC 60068-2-64
 - 5. Vandalism: IK10 (except windows)
 - 6. Surge Immunity on AC Power Lines and on Signal Lines: EN 50130- 4
 - 7. Surge / Lightning Protection: TVS 6000 V Lightning protection, surge protection, voltage transient protection
- C. Electromagnetic Compatibility: CE; FCC Part 15, Subpart B, Class A
- D. Enclosure: NEMA 4X
- E. Material: RoHS; WEEE
- F. Safety: IEC 62368

G. ONVIF Profiles S, G, & T

1.10. Warranty:

- A. ***[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.]***
- B. Manufacturer's standard warranty will cover three years for components and ten years for the thermal sensor.

PART 2 - PRODUCTS

2.1. Acceptable Manufacturer and Model:

- A. Acceptable Manufacturers: ***[Teledyne FLIR and/or name acceptable alternative manufacturers here, or indicate to submit all for review.]***
- B. Models: ***[FLIR dual-spectrum model FH-Series ID and/or name acceptable alternative models here, or indicate to submit all for review.]***

2.2. General Product Description:

- A. A dual-spectrum video surveillance system consisting of a fixed dual-spectrum security camera with embedded video analytics (FH-Series ID).

2.3. Detailed Product Description:

A. Basic Description:

1. The camera shall operate either as a standalone, fixed dual-spectrum security camera 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.
2. The camera shall consist of (1) a thermal sensor with multiple lens options of various fixed fields of view and (2) a 4K visible light sensor with multiple auto-focus lens options of various levels of optical zoom and fields of view corresponding to the thermal sensor lens.
3. The camera shall include onboard video analytics that incorporates, provides, and supports:
 - a. Deep neural network (DNN) based Artificial Intelligence
 - b. Intrusion and loitering detection
 - c. Human and vehicle classification for detected objects
 - d. Separate configuration for the visible video and for the thermal video
 - e. High probability of intelligent video detection while reduced nuisance alarm rate and false alarm rate
 - f. Geotracking of detected targets in GPS coordinates
 - g. Pairing with compatible FLIR Security PTZ cameras
 - h. Hand-off to ioi PTZ Tracker
4. The thermal sensor lens shall be coated with anti-reflection germanium.
5. The camera shall digitally encode images into compressed video and stream it over IP via its Ethernet cable connection. For example, to video management systems (VMSs).
6. The camera shall provide four independent IP network video streams: two streams for thermal video and two streams for visible video.

7. The camera shall provide analog video outputs.
8. Field software upgrades shall be distributable across the network.
9. Video from the thermal sensor shall allow the user to view images, thermal patterns, and contrast despite smoke, low light, light fog, and haze.
10. The camera imagers shall be passive and not produce any energy or emit light in any bandwidth.
11. The thermal sensor shall include athermalized optics that automatically adjust to ambient temperature changes, and therefore do not require re-adjustment and/or thermal refocusing.
12. The thermal sensor shall not be susceptible to “image blooming” that results from brightly lit objects that appear as intense glows that might hide nearby detail and might blind the camera by flooding the scene with light.
13. The thermal sensor shall utilize automatic flat-field correction (FFC) to compensate for temperature variations and eliminate the need for focal plane array (FPA) temperature stabilization.
14. The video from the thermal sensor shall feature the following colorization modes: WhiteHot, BlackHot, Rainbow, Rainbow-Invert, Contrast, Contrast-Invert, IronBow2, IronBow2-Invert, Arctic, Arctic-Invert, IceFire, and IceFire-Invert. For example, in the default WhiteHot mode, warmer objects and areas appear in white or lighter shades of gray than cooler objects and areas. In BlackHot mode, warmer objects and areas appear as black or dark gray compared to cooler objects and areas.
15. The camera shall include a browser-based interface for remote operation and configuration without requiring the use of a VMS.
16. The camera shall be compatible with 3rd party Network Video Management Software (NVMS), digital video displays, and recording devices.
17. The camera shall support overlaying on-screen display information onto the encoded video.
18. Setup and Configuration:
 - a. Single-handedly install and set up one or more cameras without requiring another person’s assistance.
 - b. It shall be possible to configure the camera’s sensors via its browser-based interface.
 - c. It shall be possible to configure the camera’s analytic capabilities via its browser-based interface.
19. The camera shall include two dry contacts for alarm input and two relay contacts for output. These contacts shall be configurable as normally open or normally closed
20. The camera shall include onboard heaters and fans for defogging, de-icing, and temperature control. The camera shall support automatic and manual heater and fan control via the browser-based interface.

B. The camera shall support the following additional functionalities:

1. 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.
2. Perform automatic responses to a pre-defined triggering event during a defined monitoring period. For example, sending notification emails.
3. Utilize the unit's relay outputs to control external devices, including one dedicated to supporting external infrared (IR) LED illumination.
4. Provide onboard 24VAC power for up to two supported third-party external IR LED illuminators.
5. Provide onboard storage (SoE) for video and snapshots.
6. Nexus CGI digest authentication.
7. Strong password enforcement.
8. IEEE 802.1X authentication (EAP-TLS) support.
9. Firewall with options to individually block or allow RTSP, UPnP, Nexus Discovery, Nexus SDK, TRK, ICMP, and SNMP services and their default ports.
10. TLS control and HTTPS redirect support.

2.4. The camera shall meet the following specifications:

A. Basic Camera Specifications:

The following models are available:

Model	Thermal FOV (H x W)	Thermal Focal Length	F/#
FH-669 ID	69° × 56°	9 mm	F1.4
FH-644 ID	44° × 36°	13 mm	F1.0
FH-625 ID	25° × 18°	25 mm	F1.1
FH-617 ID	17° × 14°	35 mm	F1.1
FH-612 ID	12° × 10°	50 mm	F1.2
FH-610 ID	10° × 8.2°	60 mm	F1.2
FH-608 ID	8.6° × 6.6°	75 mm	F1.1
FH-606 ID	6.2° × 4.9°	100mm	F1.6

1. **Thermal Imager / Processor** Specifications:

- a. Uncooled Vanadium Oxide Microbolometer Sensor (imager)
- b. Spectral Range: 7.5 to 13.5 μm
- c. Pixel Pitch: 17 μm

- d. Sensitivity (NEdT): <25mK @ 25°C (77°F) F1.0
- e. Array Format: 640x512
- f. Each model is available in two sensor options: 8.3 fps and user-switchable 25 or 30 fps. The 8.3 fps models are easier to export. An export license is not required.
- g. Optimal video analytics (VA) classification distances are based on the VA configuration DNN AI or Fusion AI with High or Ultra Motion Sensitivity;
 - **Fusion AI** detects Upright and Discreet human intrusions at short, medium to long range distances. Upright human intrusions denote vertical movements such as standing, walking, running. Discreet human intrusions denote movements such as crawling, rolling or camouflaged actions. Fusion AI is not recommended for heavy traffic scenes or scenes with dynamic vehicle activity.
 - **DNN AI** detects Upright non-discreet human intrusions. Upright human intrusions denote vertical movements such as standing, walking, running.
 - **Vehicle detection** is limited to cars, vans, trucks and trailers up to 15m size

VA classification distances represent the maximum distance to accurately classify intrusions in Day and Night on the Thermal spectrum measured under the following controlled conditions and site setup policy, in order to achieve >95-99% detection accuracy rate (DAR). Appropriate animal filter (object size) filter settings and masking levels 2 or 3 should be applied to achieve <5% nuisance alarm rate (NAR) and false alarm rate (FAR):

- ❖ Camera is installed on a stable fixed pole at a height of 20 ft ~ 6 meters
- ❖ Mounting orientation (tilt) is at horizon level close to top of the scene
- ❖ Georeference setting for VA Calibration is setup correctly and the calibration verified at closest and farthest of area or FOV such that detection human boxes correctly represent the typical height of a human at different distances
- ❖ The Region of Interest within the FOV of the camera has a clear line of sight, flat ground surface terrain with no tall grass or sloping surfaces.
- ❖ Detection region starts at 5 meters from the fence line or boundary from where the intrusion can start
- ❖ Static scenery/ objects such as walls, fences, trees and tree branches, that can occlude target detection is masked using Masking Level 2 or 3.
- ❖ Vehicle classification is reliable at distances up to 200m when using Fusion AI configuration.

Model	DNN AI	Fusion AI High	Fusion AI Ultra	Fusion AI High	Fusion AI Ultra	DNN AI
	Upright Human (m)	Upright Human (m)	Upright Human (m)	Discreet Human (m)	Discreet Human (m)	Vehicle (m)
FH-669 ID	60	90	100	50	60	50
FH-644 ID	100	150	170	70	85	60
FH-625 ID	180	230	260	120	140	100
FH-617 ID	250	310	350	150	170	150
FH-612 ID	350	410	450	200	240	200
FH-610 ID	450	520	600	250	300	250
FH-608 ID	500	570	650	300	350	300
FH-606 ID	580	650	730	380	430	380

- h. Optimal *human* detection, recognition, and identification distances **without VA** (Johnson's Criteria):

Model	Detection		Recognition		Identification	
	[m]	[ft]	[m]	[ft]	[m]	[ft]
FH-669 ID	266	872.7	66	216.5	33	108.3
FH-644 ID	417	1368.2	104	341.2	52	170.6
FH-625 ID	734	2408.1	183	600.4	92	301.9
FH-617 ID	1079	3540.2	270	885.9	135	442.9
FH-612 ID	1528	5013.4	382	1253.3	191	626.7
FH-610 ID	1833	6014.1	458	1502.7	229	751.3
FH-608 ID	2236	7336.0	559	1834.0	279	915.4
FH-606 ID	2941	9648.8	735	2411.388	368	1207.3

- i. Optimal *vehicle* detection, recognition, and identification distances **without VA** (Johnson's Criteria):

Model	Detection		Recognition		Identification	
	[m]	[ft]	[m]	[ft]	[m]	[ft]
FH-669 ID	815	2674.0	204	669.3	102	334.7
FH-644 ID	1278	4193.1	319	1046.6	160	525.0
FH-625 ID	2249	7379.0	562	1843.9	281	922.0
FH-617 ID	3307	10850.3	827	2713.4	413	1355.1
FH-612 ID	4686	15374.8	1171	3842.1	586	1922.7
FH-610 ID	5623	18449.1	1406	4613.1	703	2306.5
FH-608 ID	6857	22496.7	1714	5623.4	857	2811.7
FH-606 ID	9020	29592.8	2255	7398.2	1127	3697.5

The distances above reflect cameras configured with the indicated lenses, and assume:

- i. Optimal performance
- ii. Clear weather and thermal contrast
- iii. Human critical dimension is 0.75m (29.5")
- iv. Vehicle critical dimension is 2.3m (7.5')
- v. Pixels for detection under optimal conditions: 1.5
- vi. Pixels for recognition under optimal conditions: 6
- vii. Pixels for identification under optimal conditions: 12
- viii. Other assumptions apply

j. Dynamic Detail Enhancement (DDE)

k. Automatic Gain Control (AGC)

2. **Visible Light Imager** Specifications:

a. Sensor Resolution: 4K 2160p (3840×2160)

b. Sensitivity:

i. Color: 0.25 Lux (F1.6, AGC On, 30 FPS)

ii. B/W: 0.10 Lux (F1.6, AGC On, 30 FPS)

c. Optical characteristics for each model:

Model	Default FOV	Focal Length	F/#
FH-669 ID	98° × 55°	3.6-10mm	F1.5-2.8
FH-644 ID	63° × 35°	3.6-10mm	F1.5-2.8
FH-625 ID	36° × 20°	9-22mm	F1.4-1.7
FH-617 ID	24° × 14°	13-55 mm	F1.6-2.2
FH-612 ID	17°×10°	13-55 mm	F1.6-2.2
FH-610 ID	14° × 8°	13-55 mm	F1.6-2.2
FH-608 ID	11°× 6°	13-55 mm	F1.6-2.2
FH-606 ID	8°× 4.5°	13-55 mm	F1.6-2.2

d. Optimal video analytics (VA) classification distances measured at Optimal Daylight conditions: based on the VA configuration DNN AI or Fusion AI with High or Ultra Motion Sensitivity

- **Fusion AI** detects Upright and Discreet human intrusions at short, medium to long range distances. Upright human intrusions denote vertical movements such as standing, walking, running. Discreet human intrusions denote movements such as crawling, rolling, camouflaged actions. Fusion AI is not recommended for heavy traffic scenes or scenes with dynamic vehicle activity.
- **DNN AI** detects Upright non-discreet human intrusions. Upright human intrusions denote vertical movements such as standing, walking, running.
- **Vehicle detection** is limited to cars, vans, trucks and trailers up to 15m size

VA classification distances represent the maximum distance to classify in optimal Daylight for the Visible spectrum measured under the following controlled conditions and site setup policy, in order to achieve >95-99% detection accuracy rate (DAR). Appropriate animal filter (object size) filter settings and masking levels 2 or 3 should be applied to achieve <5% nuisance alarm rate (NAR) and false alarm rate (FAR):

- ❖ Camera is installed on a stable fixed pole at a height of 20 ft ~ 6 meters
- ❖ Mounting orientation (tilt) is at horizon level close to top of the scene
- ❖ Georeference setting for VA Calibration is setup correctly and the calibration verified at closest and farthest of area or FOV such that detection human boxes correctly represent the typical height of a human at different distances
- ❖ The Region of Interest within the FOV of the camera has a clear line of sight, flat ground surface terrain with no tall grass or sloping surfaces
- ❖ Detection region starts at 5 meters from the fence line or boundary from where the intrusion can start
- ❖ Static scenery/ objects such as walls, fences, trees and tree branches, that can occlude target detection is masked using Level 2 or 3 Masking
- ❖ Vehicle detection limited to cars, vans, trucks and trailers up to 15m size
- ❖ Vehicle classification is reliable at distances up to 200m when using Fusion AI configuration.

Model	DNN AI	Fusion AI High	Fusion AI Ultra	Fusion AI High	Fusion AI Ultra	DNN AI
	Upright Human (m)	Upright Human (m)	Upright Human (m)	Discreet Human (m)	Discreet Human (m)	Vehicle (m)
FH-669 ID	60	70	80	40	50	100
FH-644 ID	90	110	120	60	70	120
FH-625 ID	170	190	210	110	130	180
FH-617 ID	240	270	300	150	170	250
FH-612 ID	350	380	420	200	230	300
FH-610 ID	400	450	480	250	280	350
FH-608 ID	450	500	530	280	310	400
FH-606 ID	530	580	610	320	350	480

- e. White Balance: Auto / ATW / One Push / Manual
 - f. Noise Reduction:
 - i. ColorNR Off / On (3 levels)
 - ii. 2DNR (0-100)
 - iii. 3DNR (0-100)
 - g. Night Mode:
 - i. Color (day)
 - ii. B/W (night)
 - iii. Auto, with separate night-to-day and day-to-night thresholds, and adjustable switch time (Slow, Normal or Fast)
 - h. Wide Dynamic Range:
 - i. Digital Wide Dynamic Range (dWDR): Off / On (3 levels)
 - ii. True (Shutter) Wide Dynamic Range: Off / On
 - i. Exposure Modes: Full Auto / Manual / Shutter Priority / Flickerless / Manual
 - j. Backlight Compensation Off / On (6 options)
3. Video:
- a. The camera shall provide user-configurable H.265 / H.264 / M-JPEG video compression simultaneously on up to four digital streams.
 - b. Resolution shall be scalable on each stream, which can be set to unicast or multicast.
 - i. Primary streams:
 - Thermal: VGA (640 × 512)
 - Visible: 4K (3840 × 2160) (only available with H.265 / H.264 compression), 1080p (1920 × 1080), 720p (1280 × 720) & VGA (640 × 480)
 - ii. Secondary streams:
 - Thermal: VGA (640 × 512)
 - Visible: 1080p (1920 × 1080), 720p (1280 × 720) & VGA (640 × 480)
 - c. User-Definable Frame Rate: 5-30 fps
 - d. User-Definable Bit Rate for H.265 / H.264: Restricted VBR and CBR (100kbps-12Mbps)
4. Audio:

- a. Line-level analog audio input
 - b. Analog-to-digital conversion
 - c. G.711 audio compression
 - d. Digital audio output
5. Digital Input / Output (I / O):
- a. Input: two (2) dry alarm contacts
 - b. Output: two (2) relay contacts 1A max at 24VAC / 30VDC
 - c. Each input and output individually user-configurable between normally open and normally closed via the camera's browser-based interface
 - d. One output dedicated to supporting third-party external infrared (IR) LED illumination
6. Network:
- a. Ethernet: RJ45 100/1000 Mbps
 - b. Supported Services and Protocols: IPV4, HTTP, HTTPS, UPnP, DNS, NTP, RTSP, TCP, UDP, ICMP, IGMP, DHCP, ARP, SNMP
 - c. Cybersecurity:
 - i. IEEE 802.1X
 - ii. TLS / HTTPS
 - iii. User authentication
 - iv. Access control via firewall
 - v. User credentials with policy enforcement
 - vi. Digest authentication
 - vii. IP address filtering
- B. Electrical:
- 1. Input Voltage: PoE 802.3bt; 12 VDC ($\pm 10\%$); 24 VDC ($\pm 10\%$); 24 VAC ($\pm 10\%$)
 - 2. Power Consumption
 - a. Nominal: 15W
 - b. 12 VDC with heaters enabled: 48W
 - c. All other input voltages with heaters enabled: 70W

C. Connections and Interfaces:

1. Network: RJ45
2. Power Input:
 - a. 12 VDC: Through dedicated terminal block
 - b. 24 VDC / VAC: Through dedicated terminal block
 - c. PoE: Through RJ45 connection
3. Power Output:
 - a. 24 VAC x 2 (maximum 4.2A total): Through dedicated terminal blocks
3. microSD Card Slot: Up to 512GB on a Class 10 microSD/microSDHC/microSDXC card (minimum 8GB)
4. Audio In / Out: Through terminal block
5. Alarm In / Alarm Out: Through terminal block

D. Physical and Mechanical:

1. Dimensions, with sunshield: 233 x 124 x 313 mm / 9.2 x 4.9 x 12.3 in. (W x H x D)
2. Unit Weight: 11.3 lbs / 5.1 kg

E. Software:

1. Integrated web server
2. Discovery Network Assistant (DNA) tool to discover and configure the camera's IP addressing and DNS server settings; set device properties and user credentials; set the TV system (PAL/NTSC); upgrade the camera's firmware; reset defaults; reboot the analytics firmware; and display camera properties.

F. Environmental:

1. IP Rating (Dust & Water Ingress): IP66, IP67
2. Enclosure: NEMA 4X
3. Operating Temperature Range:
 - a. -40°C to 70°C (PoE 70W class 8 or 24V AC / DC)
 - b. -20°C to 70°C (PoE 50W class 6 or 12 VDC)
4. Storage Temperature Range: -55°C to 85°C
5. Corrosion: MIL-STD 810G, 1000hr salt spray
6. Humidity: 0-95% relative

7. Shock: IEC 60068-2-27
8. Vibration: IEC 60068-2-64
9. Vandalism: IK10 (except windows)
10. Surge Immunity on AC Power Lines: EN 50130-4
11. Surge Immunity on Signal Lines: EN 50130-4
12. Surge / Lightning Protection: TVS 6000V lightning protection, surge protection, voltage transient protection

G. Other Certifications:

1. USA: FCC Part 15 (subpart B, class A)
2. International: CE Marked, EN 50130-4, RoHS, NEMA 4X, WEEE, IEC 62368

H. Optional Accessories:

1. 421-0086-00: Illuminator mount bracket for FH-Series cameras
2. 421-0087-00: Wall mount adapter for FH-Series cameras
3. 500-1116-00: Large pole adapter assembly for pole diameter \varnothing 150-230 mm (6-9")
4. 500-1119-00: Corner mount assembly
5. 500-1120-00: Pedestal mount assembly
6. 500-1121-00: Small pole adapter assembly for pole diameter \varnothing 65-110 mm (2.6-4.3")

2.5. Required System Elements to Complete a Workable System

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

PART 3 - EXECUTION

1.1. Examination:

A. See Section 282313 – Video Surveillance Control and Management Systems

1.2. Installation:

A. See Section 282313 – Video Surveillance Control and Management Systems

1.3. Preparation:

A. See Section 282313 – Video Surveillance Control and Management Systems

1.4. Quality Control:

A. See Section 282313 – Video Surveillance Control and Management Systems

1.5. Testing and Commissioning:

A. See Section 282313 – Video Surveillance Control and Management Systems

1.6. Handing Over:

A. See Section 282313 – Video Surveillance Control and Management Systems

--- End of Specifications ---