September 2012

Americas
Bosch Security Systems, Inc.
130 Perinton Parkway
Fairport, New York, 14450,
USA
Phone: + 1 800 289 0096
Fax: +1 585 223 9180
security.sales@us.bosch.com
www.boschsecurity.us

Europe, Middle East, Africa
Bosch Security Systems B.V.
P.O. Box 80002
5600 JB Eindhoven, The Netherlands
Phone: + 31 40 2577 284
Fax: +31 40 2577 330
emea.securitysystems@bosch.com
www.boschsecurity.com

Asia-Pacific
Robert Bosch (SEA) Pte Ltd
11 Bishan Street 21
Singapore 573943
Phone: +65 6258 5511
Fax: +65 6258 4671
apr.securitysystems@bosch.com
www.boschsecurity.com

Product Guide Specification

Specifier Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) 3-Part Format, based on *MasterFormat 2004* and *The Project Resource Manual—CSI Manual of Practice. The Manufacturer is responsible for technical accuracy.*

The section must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the project and local building code. Words and sentences within brackets [ ] are choices to include or exclude a particular item or statement. Coordinate this section with other specification sections and the Drawings. Delete all "Specifier Notes" after editing this section.

SECTION 28 23 29
VIDEO SURVEILLANCE REMOTE DEVICES AND SENSORS
BOSCH MIC SERIES 612 THERMAL CAMERA

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes
1. Video Surveillance Remote Devices

B. Related Sections
1. Section [28 23 13 – Video Surveillance Control and Management Systems].
2. Section [28 23 16 – Video Surveillance Monitoring and Supervisory Interfaces].
3. Section [28 23 19 – Digital Video Recorders and Analog Recording Devices].
4. Section [28 23 23 – Video Surveillance Systems Infrastructure].

**********Specifier's note: Include those standards referenced elsewhere in this SECTION.

1.2 REFERENCES

A. European Norm
   1. EN50130-4:2011 Alarm Systems - Electromagnetic Compatibility - Product Family Standard: Immunity Requirements For Components Of Fire, Intruder And Social Alarm Systems.
   2. EN55022:2010 European limits and methods of measurement of radio disturbance characteristics of information technology equipment
   3. EN50121-4:2006 Railway applications. Electromagnetic compatibility. Emission and immunity of the signaling and telecommunications apparatus
   4. EN61000-4-2, 4-3, 4-4, 4-5, 4-6, 4-8, 4-11 Electromagnetic compatibility (EMC). Testing and measurement techniques. Electrical fast transient/burst immunity test.
   5. Complies with CE and EN Electromagnetic Compatibility regulations and Product Safety standards.

B. Federal Communications Commission (FCC) (www.fcc.gov)
   1. FCC CFR 47 part 15 class A – Telecommunications – Radio Frequency Devices – Digital Device Emission.

C. Industry Canada (ICES)
   1. Complies with ICES-003 - Digital Apparatus

D. International Electrotechnical Commission (IEC)
   1. IEC 60950-1 & 22 Information Technology Equipment – Safety.

E. International Organization for Standardization (ISO)
   1. 9001 – Quality System.

F. Underwriters Laboratories, Inc. (UL) (www.ul.com)
   1. Complies with UL standards.

1.3 SYSTEM DESCRIPTION

A. Video Surveillance Remote Devices
   1. Dome Dual Thermal/Optical CCD

B. Performance Requirements
   1. The thermal PTZ camera shall be a precision mechanical Pan-Tilt-Zoom type.
   2. The thermal PTZ camera shall include a 36x optical day/night CCD camera module and a [35 mm] [50 mm] un-cooled thermal imager for comprehensive Detection-, Classification-, Recognition- and Identification-level imaging performance.
   3. The thermal PTZ camera shall be IP68 / NEMA 6P certified for performance in extreme environments.
   4. The thermal PTZ camera shall incorporate an uncooled vanadium oxide microbolometer thermal imager for effective long-range detection-level imaging capabilities.

5. The thermal PTZ camera shall incorporate precision zoom optics with a day-night mechanical filter technology for outstanding identification-level imaging performance in either visible light or under active infrared illumination.
6. The thermal PTZ camera shall feature the standard Bosch AutoDome controller interface and be compatible with various industry-standard communications protocol including Bosch Bilinx and OSRD, Pelco P/D protocols.
7. [The 320 TVL thermal PTZ camera shall offer a High Temp Thermal Meter and a Low Temp Thermal Meter in order to trigger an alarm on the on-screen display.]
8. The thermal PTZ camera shall be capable of connecting to a MIC-IP-PS power supply box that supports simultaneous video and control functionality using both IP and Bilinx analog (PAL or NTSC) signals.
9. The thermal PTZ camera shall be suitable for surface-, ceiling- and corner-mounted applications.

1.4 SUBMITTALS

A. Submit under provisions of Section [01 33 00.]

B. Product Data:
   1. Manufacturer's data, user and installation manuals for all equipment and software programs including computer equipment and other equipment required for complete video management system.

C. Shop Drawings; include
   1. System device locations on architectural floor plans.
   2. Full Schematic of system, including wiring information for all devices.

D. Closeout Submittals
   1. User manual.
   2. Parts list.
   3. System device locations on architectural floor plans.
   4. Wiring and connection diagram.
   5. Maintenance requirements.

1.5 QUALITY ASSURANCE

A. Manufacturer:
   1. Minimum of [10] years experience in manufacture and design Video Surveillance Devices.
   2. Manufacturer's quality system: Registered to ISO 9001 Quality Standard.

B. Video Surveillance System
   1. Listed by UL, EN, and the FCC specifically for the required loads. Provide evidence of compliance upon request.

C. Installer:
   1. Minimum of [5] years experience installing Video Surveillance System.

1.6 DELIVERY, STORAGE AND HANDLING

A. Comply with requirements of Section 01 60 00.

B. Deliver materials in manufacture’s original, unopened, undamaged containers; and unharmed original identification labels.

C. Protect store materials from environmental and temperature conditions following manufacturer’s instructions.

D. Handle and operate products and systems according to manufacturer’s instructions.

E. Bosch provides off-the-shelf availability for our top selling products and same-day or 24-hour shipping.

1.7 WARRANTY

A. Provide manufacturer’s warranty covering 3 years for replacement and repair of defective equipment.

1.8 MAINTENANCE

A. Make ordering of new equipment for expansions, replacements, and spare parts available to dealers and end users.

B. Provide factory direct technical support from 8:00 a.m. to 8:00 p.m. via phone and e-mail.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:
[Bosch Security Systems, Inc.
130 Perinton Parkway
Fairport, New York, 1450, USA
Phone: + 1 800 289 0096
Fax: + 1 585 223 9180
security.sales@us.bosch.com
www.boschsecurity.us]

[Bosch Security Systems B.V.
P.O. Box 80002
5600 JB Eindhoven, The Netherlands
Phone: + 31 40 2577 284
Fax: +31 40 2577 330
emea.securitysystems@bosch.com
www.boschsecurity.com]

[Robert Bosch (SEA) Pte Ltd
11 Bishan Street 21
Singapore 573943
Phone: +65 6258 5511
Fax: +65 6258 4671
apr.securitysystems@bosch.com
www.boschsecurity.com]

B. Substitutions: [Not permitted.] [Under provisions of Division 1.]
1. [All proposed substitutions must be approved by the Architect or Engineer professional.]
2. [Proposed substitutions must provide a line-by-line compliance documentation.]

**********Specifier's note: Select Camera System Series based on project requirement.

2.2 BOSCH MIC SERIES 612 THERMAL CAMERA

A. General Characteristics:
   1. The thermal PTZ camera shall be a best-fit camera for a variety of security applications.
   2. The thermal PTZ camera shall offer two video outputs:
      a. One (1) video output shall transmit optical video
      b. One (1) video output shall be user-switchable and transmit either the optical video or the thermal video.
   3. The thermal PTZ camera shall be capable of connecting to a MIC-IP-PS power supply box that supports simultaneous video and control functionality using both IP and Bilinx analog (PAL or NTSC) signals.
   4. The thermal PTZ camera shall be certified to IP68/NEMA 6P and be encased in a rugged, vandal-resistant, weather-resistant cast solid aluminum housing.
   5. The thermal PTZ camera shall be coated with a protective layer of Alodine 5200.
   6. The thermal PTZ camera shall be capable of operating submerged in up to 1 m (3.3 ft) of water for a maximum duration of 24 hours. (The PTZ camera is not rated to be installed permanently under water).
   7. The thermal PTZ camera shall offer brushless motor technology with full 360° continuous rotation pan and 180° tilt angle.
   8. The PTZ camera shall have an integrated long life silicone wiper.

B. Optical Imaging
   1. The thermal PTZ camera shall consist of an integrated high-resolution Exview HAD CCD camera using a 1/4-inch imager.
   2. The thermal PTZ camera shall offer a 36x (3.4 – 122.4 mm, F1.6 to F4.5) auto-iris, auto-focus optical zoom lens.
   3. The thermal PTZ camera shall be designed to perform over a wide range of environmental and lighting conditions with a horizontal resolution of 550 TVL (NTSC/PAL) typical and sensitivity down to 0.0052 lux.
   4. The thermal PTZ camera shall offer wide dynamic range for clear images in extreme high-contrast environments.
   5. The thermal PTZ camera shall offer SensUp control to increase sensitivity by more than 50 times.
   6. The thermal PTZ camera shall offer a feature that restores image color when shooting images illuminated by a sodium vapor lamp.
   7. The thermal PTZ camera shall feature a Night mode to enhance night viewing by increasing the IR sensitivity. An internal IR filter will switch from color to monochrome mode automatically by sensing the illumination level. An internal through-the-lens IR detector will enhance the monochrome mode stability by preventing the camera from reverting to color mode when IR illumination is dominant.
   8. The thermal PTZ camera shall offer Back Light Compensation (BLC) to selectively amplify an area of interest in the image to compensate for large contrast differences when only a portion of the image is brightly lit.
   9. The thermal PTZ camera shall offer Automatic White Balance.
   10. The thermal PTZ camera shall offer Automatic Gain Control (AGC) with a range of –3 dB to 28 dB in 2 dB steps.

11. The thermal PTZ camera shall offer an AutoScaling feature that reduce the pan/tilt speed as the camera zooms in on an object, so that the relative speed on the screen remains constant.
12. The thermal PTZ camera shall offer an AutoPivot feature to automatically rotate and flip the camera as it tilts through the vertical position to maintain the correct orientation of the image.

C. Thermal Imaging
1. The thermal PTZ camera shall incorporate a Focal Plane Array (FPA) un-cooled Vanadium Oxide microbolometer core with:
   a. [7.5/8.3 Hz (NTSC/PAL)]
   b. [25/30 Hz (NTSC/PAL) – U.S. export license required]
2. [The 320 TVL thermal PTZ camera shall have a 35 mm (F1.2) thermal imaging lens.]
3. [The 640 TVL thermal PTZ camera shall have a 50 mm (F1.2) thermal imaging lens.]
4. [The 320 TVL thermal PTZ camera shall offer 320 x 240 NTSC or 320 x 256 PAL effective picture elements.]
5. [The 640 TVL thermal PTZ camera shall offer 640 x 280 NTSC or 640 x 512 PAL effective picture elements.]
6. The thermal PTZ camera shall have enhanced viewing options including spectral heat variance and hot and cold spot highlights.
7. [The 320 TVL thermal camera shall provide for effective thermal imaging at 800 m (2625 ft) for human detection and 2250 m (7382 ft) for object detection.]
8. [The 640 TVL thermal camera shall provide for effective thermal imaging at 1500 m (4921 ft) for human detection and 3900 m (12,795 ft) for object detection.]
9. The thermal PTZ camera shall offer <50mk f/1.0 thermal sensitivity (NEDT).
10. The thermal PTZ camera shall have a spectral response of 7.5 to 13.5 µm.
11. [The 320 TVL thermal PTZ camera shall have a field of view of 13° x 10°.]
12. [The 640 TVL thermal PTZ camera shall have a field of view of 12.4° x 9.9°.]
13. The thermal PTZ camera shall offer a selection of user-selectable thermal color options.
14. [The 320 TVL thermal PTZ camera shall offer a thermal temperature threshold feature.]
15. [The 320 TVL thermal PTZ camera thermal temperature threshold shall offer a High Temp Thermal Meter and a Low Temp Thermal Meter in order to trigger an alarm on the on-screen display.]
16. [The 320 TVL thermal PTZ camera thermal temperature threshold shall offer a temperature range of -40 °C to +150 °C, in 1 degree increments.]
17. [The 320 TVL thermal PTZ camera shall allow setting multiple high and low temperature inputs, a high threshold only, or a low threshold only.]
18. The thermal PTZ camera shall offer a selection of user-selectable AGC modes.
19. [The 320 TVL thermal PTZ camera shall offer a user-selectable on-screen temperature display.]

D. Operation
1. The thermal PTZ camera shall offer full 360° continuous rotation pan and 180° tilt control.
2. The thermal PTZ camera shall provide image stabilization for the optical output using a dedicated digital signal processor (DSP) to minimize camera shake on both the horizontal and vertical axes (±10% pixel displacement for frequencies up to `0 Hz) while maintaining a clear image as the zoom range increases. The image stabilization algorithms do not reduce camera sensitivity.
3. The thermal PTZ camera shall offer pan speeds from 0.2° to 72° per second (variable) and tilt speeds from 0.2° to 90° per second (variable).
4. The thermal PTZ camera shall offer a tilt range of -58° to +90°.
5. The thermal PTZ camera shall offer a pre-position speed of 120° per second.
6. The thermal PTZ camera shall be accurate to within ±0.30° (typical) of pre-position settings.
7. The thermal PTZ camera shall have an audible noise of <66 dB.
8. The thermal PTZ camera shall offer 99 pre-positions with 20-character titles.
9. The thermal PTZ camera shall offer 16 independent sectors with 20 character-titles.
10. The thermal PTZ camera shall offer the following guard tours:
    a. Two (2) recorded tours, with a total duration of 15 minutes.
    b. One preset tour shall consist of up to 99 scenes, consecutively.
    c. One present tour shall be capable of storing 99 pre-positions with a configurable dwell time and be customizable as to the order and frequency of the pre-positions visited.
11. The thermal PTZ camera shall offer 24 individual privacy masks.
12. The thermal PTZ camera shall be capable of displaying eight (8) privacy masks in the same scene.
13. The thermal PTZ camera shall be capable of defining the privacy masks using three (3), four (4) or five (5) anchor points to form different shapes to best fit the area to be masked. Mask selections will be black, white or blurred.
14. The thermal PTZ camera shall possess on-screen display menus that allow camera set-up via a remote keyboard.

E. Communications
1. The thermal PTZ camera shall support a variety of data transmission methods, including Bilinx (over coax), Bosch Biphase (with optional converter), and RS485.
2. The thermal PTZ camera shall natively support the Bosch (OSRD, Bilinx), Pelco P/ D (Bosch Biphase protocol converter, sold separately.).
3. The PTZ camera shall support remote control, configuration, and firmware updates over the coax cable.
4. The thermal PTZ camera shall provide one (1) tamper input. (Eight (8) additional inputs possible with optional alarm card.)
5. The thermal PTZ camera shall offer two (2) relay outputs and washer relay output only with optional alarm card.
6. The thermal PTZ camera shall offer a tamper switch (ground connection).
7. The thermal PTZ camera shall be compatible with Bosch Allegiant series switcher/controller, Divar digital video recorders, and Bosch IP encoders/decoders.
8. The thermal PTZ camera shall be compatible with a PC-based application that allows PTZ control, camera configuration, and firmware updates.

9. The thermal PTZ camera shall offer embedded menus in English, Czech, Dutch, French, German, Italian, Polish, Portuguese, Russian, and Spanish.

F. [Hybrid Operation
   1. The thermal PTZ camera shall be capable of connecting to a MIC-IP-PS power supply box that supports simultaneous video and control functionality using both IP and Bilinx analog (PAL or NTSC) signals.
   2. The MIC-IP-PS power supply box shall allow integration with the Bosch Video Client BVC) and with the Bosch Video Management System (BVMS).
   3. The MIC-IP-PS power supply box shall allow full camera control and configuration capabilities over the network.
   4. The MIC-IP-PS power supply box shall be capable of capturing and storing images using H.264 compression.
   5. The MIC-IP-PS power supply box shall deliver the following simultaneous streams:
      a. Two (2) individually configurable H.264 streams at 4CIF/D1 resolution.
      b. One (1) H.264 I-frame only stream.
      c. One (1) M-JPEG stream at 4CIF/D1 resolution.
   6. The MIC-IP-PS power supply box shall deliver DVD-quality video, at rates up to 30 images per second, via TCP/IP over Cat5/Cat6 UTP cable.
   7. The MIC-IP-PS power supply box shall support iSCSI devices to allow the network-enabled camera to stream video directly to an iSCSI RAID array.
   8. The MIC-IP-PS power supply box shall conform to the ONVIF standard and to the NTCIP protocol.
   9. [The MIC-IP-PS power supply shall offer embedded Intelligent Video Analysis (IVA) that eliminates dedicated PCs and associated software maintenance.
      a. The MIC-IP-PS power supply shall be capable of processing and analyzing video from the camera itself, with no extra hardware required.
      b. The MIC-IP-PS power supply shall be capable of detecting and sending alarms for abnormal events.
      c. The MIC-IP-PS power supply shall be configurable to analyze up to 10 different scenes for one or more of the following events: Line Crossing, Loitering, Idle Object, Removed Object, Conditional Change, Trajectory Tracking, and Filters.
      d. The MIC-IP-PS power supply shall allow users to set up to 10 separate profiles and switch profiles based on a day/night or holiday schedules.
      e. The MIC-IP-PS power supply shall support scene tours that automatically reposition the camera to each scene for a specified duration.
      f. The MIC-IP-PS power supply shall incorporate an Alarm Rule Engine, enabling abnormal events that IVA detects to prompt the camera to take one or more actions such as:
         1) Trigger a relay connected to an alarm siren and/or strobe
         2) Trigger a visual alert to be displayed on the operator's screen
         3) Go to a specified scene (preset position)
   10. The MIC-IP-PS power supply shall:
      a. offer 120 VAC, 230 VAC and 24 VAC models
      b. supplied in an rugged aluminum enclosure rated to IP67 ingress protection.
      c. offer an SD card slot for local recording.
      d. offer an optional fiber optic media converter kit.
   11. The MIC-IP-PS power supply box shall allow camera firmware updates via IP connection.

G. Mounting
   1. The thermal PTZ camera shall allow operation while mounted in an upright or inverted position.
   2. The thermal PTZ camera shall offer wall, corner, or pole mounting options.

H. Environmental
   1. The thermal PTZ camera shall be rated to IP68, NEMA 6P ingress protection.
   2. The thermal PTZ camera shall be capable of withstanding a sustained wind load of 240 km/h (150 mph).
      a. Camera: 517 N (116 lbf)
      b. Wall Mount: 130 N (29 lbf)
   3. The thermal PTZ camera shall offer an Effective Protected Area (EPA) for the following components:
      a. Camera: 0.192 m^2 (2.06 ft^2)
      b. Wall Mount: 0.0483 m^2 (0.52 ft^2)
   4. The thermal PTZ camera shall conform to the IEC60068-2-6, Test Fc: Vibration (operational), 10 m/s^2 (1.0 g).
   5. The thermal PTZ camera shall conform to the IEC60068-2-27, Test Ea: Shock, 30 g.
   6. The thermal PTZ camera shall operate within a temperature range of –40°C to +60°C (–40°F to +140°F).
   7. The thermal PTZ camera shall possess a cold start-up temperature of –40°C (–40°F) (requires 30-minute warm-up prior to PTZ operations).

I. Construction
   1. The thermal PTZ camera housing shall be constructed of machined aluminum with anti-corrosion pretreatment.
   2. The thermal PTZ camera housing shall be available in the following colors:
      a. [Black (RAL9005)]
      b. [White (RAL9010)]
      c. [Grey (RAL9006)]
   3. The thermal PTZ camera housing shall offer an Alodine 5200 surface treatment with a powder coat, sand finish.
   4. The thermal PTZ camera housing shall offer these viewing windows:
      a. Optical: tempered flat glass viewing window.
      b. Thermal: germanium covering
   5. The thermal PTZ camera housing shall offer a long-life silicone window wiper.
   6. The thermal PTZ camera shall come with a heater installed.
   7. [The thermal PTZ camera shall offer an optional washer kit.]
   8. [The thermal PTZ camera shall offer an optional sunshield.]

J. The thermal PTZ camera shall conform to the following specifications:
   1. 36x Day/Night Camera:
      a. Imager: ¼ in.-type Exview HAD CCD (progressive scan)
      b. Resolution / Effective Picture Elements:
         1) PAL: Approx. 440,000; 752(H) x 582(V)
         2) NTSC: Approx. 380,000; 768(H) x 494(V)
      c. Lens: 36x Zoom (3.4 to 122.4 mm), F1.6 to F4.5
      d. Horizontal Resolution: 550 TVL (NTSC, PAL) typical
      e. Digital Zoom: 12x

f. Zoom Movement Speed: 4.0 seconds (optical Wide to optical Tele) and 6.2 seconds (optical Wide to digital Tele)
g. Focus: Automatic with manual override
h. Iris: Automatic with manual override
i. Field of View: 1.7° to 57.8°
j. Video Output: 1.0 Vp-p, 75 Ohm
k. Gain Control: Auto/Manual/Max (–3 dB to –28 dB, 2 dB steps)
l. Aperture Correction: Horizontal and vertical
m. Digital Zoom: 12x
n. Horizontal Resolution: 550 TVL(NTSC, PAL) typical
o. Sensitivity:
    1) Day Mode, SensUp Off
        a) 30 IRE: 0.66 lux
        b) 50 IRE: 1.4 lux
    2) Day Mode, SensUP On
        a) 30 IRE: 0.04 lux
        b) 50 IRE: 0.1 lux
    3) Night Mode, SensUp Off:
        a) 30 IRE: 0.104 lux
        b) 50 IRE: 0.209 lux
    4) Night Mode, SensUp On:
        a) 30 IRE: 0.0052 lux
        b) 50 IRE: 0.0103 lux
p. Filter: Automatic IT cut filter
q. Electronic Shutter Speed: 1/1 to 1/10,000 sec., 22 steps
r. Signal-to-Noise Ratio (SNR): >50 dB
s. White Balance: 2000 K to 10,000 K

2. 320 TVL Thermal Camera Module:
    a. Supports alarm features based on reading from thermal camera's temperature spot meter
    b. Imager: Focal Plane Array (FPA), un-cooled Vanadium Oxide microbolometer
        1) 7.5 Hz NTSC, 8.3 Hz PAL
        2) 30 HZ NTSC, 25 Hz PAL; U.S. export license required
    c. Resolution / Effective Picture Elements:
        1) PAL: 320 x 256
        2) NTSC: 320 x 240
    d. Lens: 35 mm (F1.2)
    e. Field of View: 13° x 10°
    f. Spectral Response: 7.5 to 13.5 µm
    g. Thermal Sensitivity (NEDT): < 50 mk f/1.0
    h. Digital Zoom: 2x, 4x
    i. Focus: Factory-set at infinite focus

j. Performance Range:
   1) Human 1.8 x 0.5 m (5.9 x 1.6 ft)
      a) Detection: 800 m (2625 ft)
      b) Recognition: 200 m (656 ft)
      c) Identification: 105 m (344 ft)
   2) Object 2.3 x 2.3 m (7.5 x 7.5 ft)
      a) Detection: 2250 m (7382 ft)
      b) Recognition: 590 m (1936 ft)
      c) Identification: 290 m (951 ft)

k. User-selectable Thermal Color Options:
   1) White Hot (default mode)
   2) Black Hot
   3) IceFire
   4) Glowbow
   5) Ironbow 1
   6) Ironbow 2
   7) Rainbow
   8) Fusion
   9) Sepia
   10) Color 1
   11) Color 2
   12) RedHot
   13) GreenHot
   14) Rain

l. User-selectable AGC Modes:
   1) Outdoor (default mode)
   2) Indoor
   3) Low Contrast

3. 640 TVL Thermal Camera Module:
   a. Imager: Focal Plane Array (FAP), un-cooled Vanadium Oxide microbolometer
      1) 7.5 Hz NTSC, 8.3 Hz PAL
      2) 30 HZ NTSC, 25 Hz PAL; U.S. export license required
   b. Resolution / Effective Picture Elements:
      1) PAL: 640 x 512
      2) NTSC: 640 x 480
   c. Lens: 50 mm (F1.2)
   d. Field of View: 12.4° x 9.9°
   e. Spectral Response: 7.5 to 13.5 µm
   f. Thermal Sensitivity (NEDT): < 50 mk f/1.0
   g. Digital Zoom: 2x, 4x
   h. Focus: Factory-set at infinite focus

i. Performance Range:
    1) Human 1.8 x 0.5 m (5.9 x 1.6 ft)
        a) Detection: 1500 m (4921 ft)
        b) Recognition: 380 m (1247 ft)
        c) Identification: 190 m (623 ft)
    2) Object 2.3 x 2.3 m (7.5 x 7.5 ft)
        a) Detection: 3900 m (12,795 ft)
        b) Recognition: 1060 m (3478 ft)
        c) Identification: 540 m (1772 ft)

j. User-selectable Thermal Color Options:
    1) White Hot (default mode)
    2) Black Hot
    3) IceFire
    4) Glowbow
    5) Ironbow 1
    6) Ironbow 2
    7) Rainbow
    8) Fusion
    9) Sepia
    10) Color 1
    11) Color 2
    12) RedHot
    13) GreenHot
    14) Rain

k. User-selectable AGC Modes:
    1) Outdoor (default mode)
    2) Indoor
    3) Low Contrast

4. Mechanical:
    a. Drive Unit: Brushless, integral pan/tilt motor drive
    b. Pan Range: 360° continuous rotation
    c. Tilt Angle: 180°
    d. Tilt Range: -58° to +90°
    e. Variable Speed:
        1) Pan: 0.2°/s-72°/s
        2) Tilt: 0.2°/s-90°/s
    f. Pre-position Speed: 120°/s
    g. Preset Accuracy: ±0.30° typical
    h. Proportional Pan/Tilt to Zoom: Yes
    i. Audible Noise: <66 dB
5. Electrical
    a. Input Voltage: 18 VAC, ±10%, 50/60 Hz
    b. Power Consumption:
        1) Camera: 36 VA
        2) With Heater: 54 VA
    c. Input Current:
        1) Camera: 2 A
        2) Heater: 1 A

6. Miscellaneous
   a. Sectors/Titling: 16 independent sectors with 20-character titles
   b. Privacy Masking: 24 individually configurable
   c. Pre-positions: 99 with 20-character titles
   d. Guard Tours:
      1) Two (2) recorded tours, total duration 15 minutes
      2) One (1) preset tour consisting of 99 scenes, consecutively
      3) One (1) preset tour with up to 99 customized scenes
   e. Camera Setup/Control: RS-485, Bilinx (coax); also Bosch Biphase with converter (sold separately)
   f. Communications Protocol: Bosch (OSRD, Bilinx), Pelco P/ D (Bosch Biphase protocol converter, sold separately.)
   g. [Washer Drive: Optional with MIC-WKT kit]
   h. Supported Languages: English, Czech, Dutch, French, German, Italian, Polish, Portuguese, Russian, and Spanish
7. User Connections
   a. Power (Camera): Via composite cable
   b. Control Data:
      1) RS-485 (twisted pair; Simplex, half and full duplex operation via composite cable).
      2) Biphase ±
   c. Video: Dual coaxial via composite cable
   d. Alarm Inputs: One (1) tamper input (eight (8) additional inputs possible with optional alarm card)
   e. Relay Outputs: Two (2) relay outputs and washer relay output only with optional alarm card
   f. Alarm Communication: Tamper switch (ground connection)
   g. Software: CTFID software allows direct connection to a USB-equipped PC via the MIC Series PSU over a full duplex to provide access to all camera functions and useful diagnostic tools.
8. Environmental
   a. Ingress Protection Rating/Standard: IP68/NEMA 6P
   b. Operating Temperature (with heater): –40°C to +60°C (–40°F to +140°F)
   c. Cold Start-up Temperature: –40°C (–40°F) (Requires 30-minute warm-up prior to PTZ operations.)
   d. Storage Temperature: –40°C to +70°C (–40°F to +158°F)
   e. Humidity: 0-100%
   f. Wind Load (estimated):
      1) Sustained: 240 km/h (150 mph)
      2) Camera: 517 N (116 lbf)
      3) Wall Mount: 130 N (29 lbf)
      4) Effective Protected Area (EPA):
         a) Camera: 0.192 m^2 (2.06 ft^2)
         b) Wall Mount: 0.0483 m^2 (0.52 ft^2)
   g. Vibration: IEC60068-2-6, Test Fc: Vibration (operational), 10 m/s^2 (1.0 g).
   h. Shock: IEC60068-2-27, Test Ea: Shock, 30 g.

9. Construction:
    a. Dimensions (W x H x D): 267 x 452 x 201 mm (10.5 x 17.8 x 7.9 in.)
    b. Weight: 10.66 kg (23.50 lb) including 4 in. pitch circle diameter PCD base
    c. Viewing Window:
        1) Optical: Tempered flat glass
        2) Thermal: Germanium covering
    d. Construction Material: Machined aluminum
    e. Standard Colors:
        1) [Black (RAL9005)]
        2) [White (RAL9010)]
        3) [Gray (RAL9006) – available only in specific regions]
    f. Standard Finish: Alodine 5200 surface treatment with powder coat paint, sand finish
    g. Window Wiper: Standard, long-life silicone wiper
    h. Heater: Standard
    i. Sunshield: Optional, sold separately

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine areas to receive devices and notify adverse conditions affecting installation or subsequent operation.

B. Do not begin installation until unacceptable conditions are corrected.

3.2 PREPARATION

A. Protect devices from damage during construction.

3.3 INSTALLATION

A. Install devices in accordance with manufacturer's instruction at locations indicated on the floor drawings plans.

B. Perform installation with qualified service personnel.

C. Install devices in accordance with the National Electrical Code or applicable local codes.

D. Ensure selected location is secure and offers protection from accidental damage.

E. Location must provide reasonable temperature and humidity conditions, free from sources of electrical and electromagnetic interference.

3.4 FIELD QUALITY CONTROL

A. Test snugness of mounting screws of all installed equipment.

B. Test proper operation of all video system devices.

C. Determine and report all problems to the manufacturer's customer service department.

3.5 ADJUSTING

A. Make proper adjustment to video system devices for correct operation in accordance with manufacturer's instructions.

B. Make any adjustment of camera settings to comply with specific customer's need.

3.6 DEMOSTRATION

A. Demonstrate at final inspection that video management system and devices functions properly.

END OF SECTION