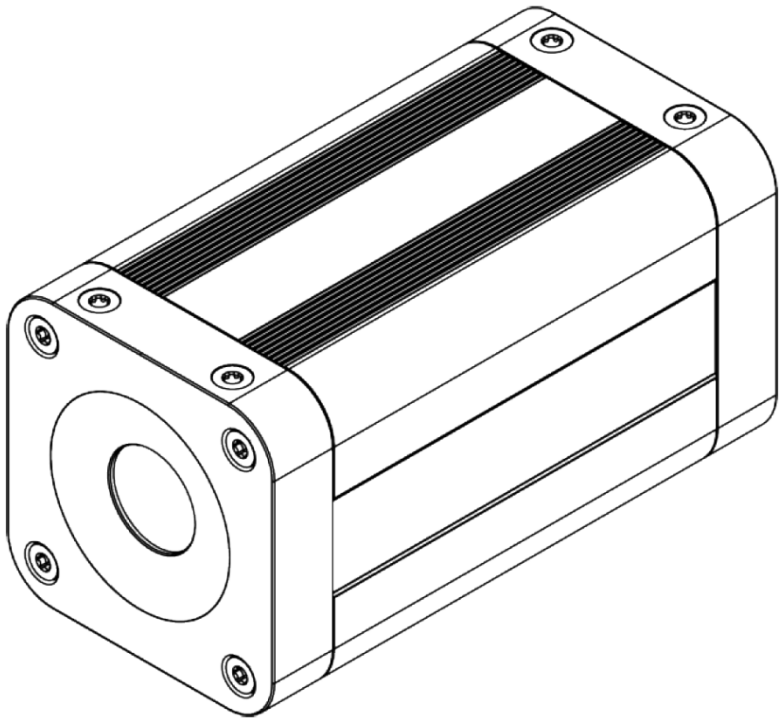
Guardian Series

G300 User Manual

GQ-4ACX, GQ-9ACX, GQ-4AC, GQ-9AC



IMPORTANT SAFETY INFORMATION
READ ENTIRE MANUAL BEFORE USE

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1. General Information

1.1 Welcome

Thank you for choosing Seek Thermal. The Seek Guardian Series cameras are efficient and effective tools to monitor scenes and objects for changes in temperature. Please visit the following website and navigate to Guardian Series to download the complete User Manual:

https://support.thermal.com/hc/en-us

1.2 Copyrights

1.3 Disclaimer

The information provided in this manual is for general informational purposes only. While every effort has been made to ensure the accuracy and completeness of the content, Seek Thermal makes no representations or warranties of any kind, express or implied, about the accuracy, reliability, suitability, or availability of the information contained herein.

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Specifications are subject to change without notice. Models and accessories are subject to regional market considerations. Export License procedures may apply. Products described herein may be subject to US Export Regulations; see section 1.6.

Seek Thermal shall not be liable for any loss or damage, including but not limited to direct, indirect, incidental, consequential, or any other damage arising from the use of or reliance on this manual or the products described within. Users are advised to exercise their own judgment and discretion by using the information provided and seek professional advice as needed.

1.4 Product Registration

Register your Guardian Series product today to receive the latest product news and access additional benefits. Registration must be completed within 60 days of purchase. The camera serial number will need to be located; this may be found:

1. On the bottom plate of the camera
2. Logging in to the camera web browser interface and navigating to *Settings* > *About*

To register your product, please visit:

https://www.thermal.com/register.html

1.5 Warranty

Seek Thermal provides a warranty for this device, guaranteeing it to be free from defects in material and workmanship during normal use and service for a duration of two years from the date of purchase. Please note that this warranty is exclusively available to the original purchaser. This warranty does not cover any product that has been subjected to misuse, neglect, accidents, or abnormal operating conditions. Should a product covered by this warranty fail, Seek Thermal will either repair or, at its discretion, replace the device when returned by the purchaser, with prepaid shipping, to Seek Thermal within the specified warranty period. Seek Thermal will undertake the repair or replacement at no cost, including return shipping, provided that Seek Thermal's examination confirms a defect in the product. However, if the failure resulted from misuse, neglect, accident, or abnormal conditions of operation or storage, reasonable repair costs will be billed. In such cases, an estimate will be provided upon request before any work commences.

1.6 Export Control

These products may be subject to US Export Regulations under ECCN 6A003 and may require an export license for specific destinations.

2. Safety Information

2.1 General notes

Read and understand the safety instructions and user manual before using this product. Doing so will avoid fire, explosions, electric shock, or other hazards that may result in damage to property or injury. Keep all safety information and instructions for future reference. This product may only be used following these instructions. Any use other than those described in this manual is considered non-intended use. This will also invalidate the warranty. Seek Thermal is not liable for material damage or personal injury caused by incorrect handling or non-compliance with the safety instructions.

2.2 Intended use

This device uses thermal imaging technology to observe temperature changes. The camera is designed for continuous operation. The device and its components are designed to operate within the documented technical specifications; these must be adhered to achieve the desired results. Do not use the camera at ambient temperatures above 60°C. Be wary of high-temperature environments with significant radiant heat sources. The thermal infrared sensor is a sensitive electronic component and must be protected from radiant heat.

2.3 Reasonably foreseeable misuse

This device should not be used for medical diagnosis or any unauthorized or unintended use. Such misuse may compromise safety and the camera's functionality. It is essential to use the device in accordance with the guidelines provided by the camera manufacturer.

2.4 Statement Regarding FCC / IC Compliance

Applicability: This Class A digital apparatus complies with FFC and CAN ICES-3 (A)/NMB-3(A).

This device complies with Part 15 of the FCC Rules / Innovation, Science and Economic Development Canada’s license-exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

L’émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d’Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L’exploitation est autorisée aux deux conditions suivantes : (1) L’appareil ne doit pas produire de brouillage; (2) L’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.

Note: Modifications or changes to this product may void the FCC authorization to operate this equipment.

2.5 Explanation of graphical symbols

The CE and UKCA marking on the product are the manufacturers' declarations that the product complies with the essential requirements of the relevant European and UK health, safety, and environmental protection legislation. See Declaration of Conformity.

The WEEE mark indicates that this device must not be treated as unsorted municipal waste and should be collected separately in accordance with national or regional guidelines.

2.6 Explanation of safety warnings

WARNING

Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

CAUTION

Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates information considered important, but not hazard related.

2.7 Safety Instructions

WARNING

Please review all safety information before operating the product. Ensure you read and follow all instructions carefully.

WARNING

Do not modify the product in any way; use it only as specified.

WARNING

Discontinue use if the product is not operating correctly or is abnormally warm. Do not use the product if it has been altered or damaged.

WARNING

Refrain from inserting metal objects into the connector.

WARNING

Use appropriately shielded M12 POE cable.

WARNING

The thermal imager must only be used by authorized personnel familiar with and trained on the uses, proper operation, features, and full functionality of the thermal imager. This includes understanding thermal images and how they are interpreted.

CAUTION

Do not use the camera in ambient temperatures outside the operating temperatures laid forth in the product specifications. High temperatures can cause camera damage and may result in interruption of operation. If this happens, allow the Imager to stabilize (either cool down or warm up) before you continue with its operation.

NOTICE

Exercise caution to avoid applying excessive force while cleaning the infrared lens, as this may result in damage to the lens itself or its anti-reflective coating. Please refer to the Maintenance and Cleaning section of User Manual for detailed cleaning instructions, section 10.1.

NOTICE

Encapsulation rating is effective only when connector openings on the camera are properly sealed with their respective covers or caps or M12 cable.

NOTICE

For best results, it is recommended to allow approximately 15 minutes once the camera has been started before taking a measurement.

3. Introduction

The Seek G300 thermal imaging camera features a compact yet robust design, offering an effective thermal monitoring solution to enhance safety, productivity, and quality. Equipped with Power over Ethernet (PoE), the G300 enables convenient connectivity and power supply through a single Ethernet cable, simplifying setup and eliminating the need for separate power sources. It is engineered to withstand demanding industrial environments and boasts IP67 protection and an extended ambient temperature range of up to 60°C.

The Seek G300 cameras excel in early fire detection, condition monitoring and process control, providing precise thermal imaging solutions for diverse industrial needs. Additionally, the camera facilitates data transfer to a simple web interface or internet-based applications through its RESTful API protocol, delivering real-time insights for informed decision-making in industrial settings.

3.1 Key features and benefits

- 320 x 240 thermal resolution with Mixed Gain technology and SV image optimization
- -20°C to 550°C (-4°F to 932°F) measurement range
- > 25 Hz sensor frame rate
- Robust housing, IP67 rated encapsulation
- Fixed focus for ease of use
- No additional Software required, simple camera configuration via built in web browser
- On-board analytics with alarms including spot temperatures and areas of interest
- Single Power over Ethernet (PoE) connector for communication and power
- 2 lens options available

3.2 Available models

Model	Lens	Field of View	Frame Rate
GQ-4ACX	4.0 mm	56° x 42°	> 25 Hz
GQ-9ACX	9.1 mm	24° x 18°	> 25 Hz
GQ-4AC	4.0 mm	56° x 42°	< 9 Hz
GQ-9AC	9.1 mm	24° x 18°	< 9 Hz

3.3 Accessories

Part number	Product name
GK-AAA	G-Series Accessory Kit. Contents: • PoE Injector • Region plugs (US, EU, UK) • Cable, M12 to RJ45 • Cable, Ethernet

3.4 Scope of Delivery

Standard delivery includes the following:

- Guardian Series G300 Camera
- Printed version of Safety Information and QuickStart Guide

4. Technical Specifications

Technical Specifications - G300		
Sensor Resolution	320 x 240	
Microbolometer	Uncooled Vanadium Oxide	
Pixel Pitch	12 µm	
Spectral Response	7.8 - 14 µm	
Sensor Frame Rate	> 25 Hz or < 9 Hz	
Object Measurement Range	-20°C to 550°C (-4°F to 932°F)	
Object Imaging Range	-20°C to 550°C (-4°F to 932°F)	
Accuracy[1]	The greater of ±5°C (±9°F) or 5% between 5°C to 100°C scene temperatures Typical performance ±10% between 100°C and 550°C scene temperatures	
Sensor Sensitivity	< 35 mK @ 25°C w/ SV1 Image Optimization	
Power	Power Over Ethernet, PoE IEEE 802.3af class 0	
Power Consumption	3.5 W typical	
Connector Type	M12 X-coded	
Optics		
Focal Length	**4.0 mm**	**9.1 mm**
Spatial Resolution (IFOV, center)	3.00 mrad	1.32 mrad
Field of View (H x V)	56° x 42°	24° x 18°
Focus	Fixed	
Lens Protective Window Material	Silicon	
Measurement Analysis		
Temperature Spots	10 measurement spots	
Areas of Interest (AOI)	5 boxes (with min/max/average temperature measurements)	
Exclusion Zones	3 masks (blank out/ignore pixels)	
Alarms		
Alarm functions	Above/Below threshold temperature	
Alarm output	RESTful API, store image, store video, store alarm log	
Interfaces		
Configuration	Web interface, browser based	
Ethernet Protocols	DHCP, HTTP, IEEE 1588, RESTful API	
Image Streaming	RTSP	

[1] At ambient temperature 25°C (77°F) with calibration geometry

Environmental	
Encapsulation	IP 67
Operating Temperature Range	-10°C to 60°C (14°F to 140°F)
Storage Temperature Range	-40°C to 80°C (-40°F to 176°F)
EMC	EN 61000-6-2:2005/AC:2005 (Immunity) EN 61000-6-4:2007/A1:2011 (Emission) FCC CFR 47 Part 15 Subpart B Class A (Emission)
Vibration Resistance	IEC 60068-2-6 (0.15mm amplitude 10–58Hz, 2g accel. at 58–500Hz sinusoidal)
Shock Resistance	IEC 60068-2-27 (25 G)
Corrosion Resistance	IEC 60068-2-11 (salt mist)
Physical Data	
Camera Size (L x W x H)	105 x 50 x 50 mm (4.13 x 1.97 x 1.97 in.) incl. connector
Camera Weight	340 grams (0.75 lbs.)
Housing Material	Aluminum
Mounting (base)	4x M4 mounting 1x 1/4-20" UNC

4.1 Camera Parts

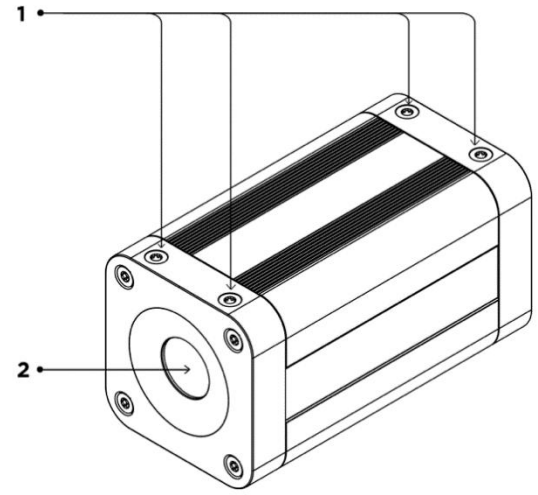


Figure 1 - Front View

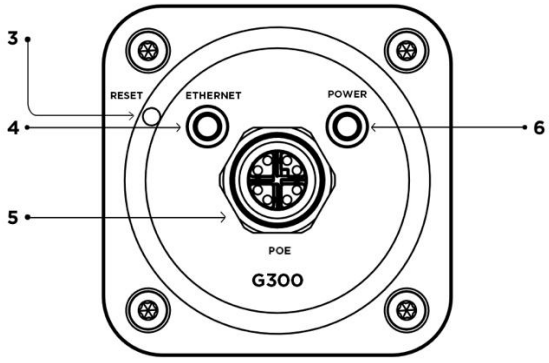


Figure 2 - Rear View

Front View

1. Accessory mounting holes
2. Infrared Sensor

Rear View

3. Reset button
4. Ethernet LED (green)
5. Ethernet PoE M12 connector, x-coded
6. Power Led (blue)

4.2 Camera Drawings

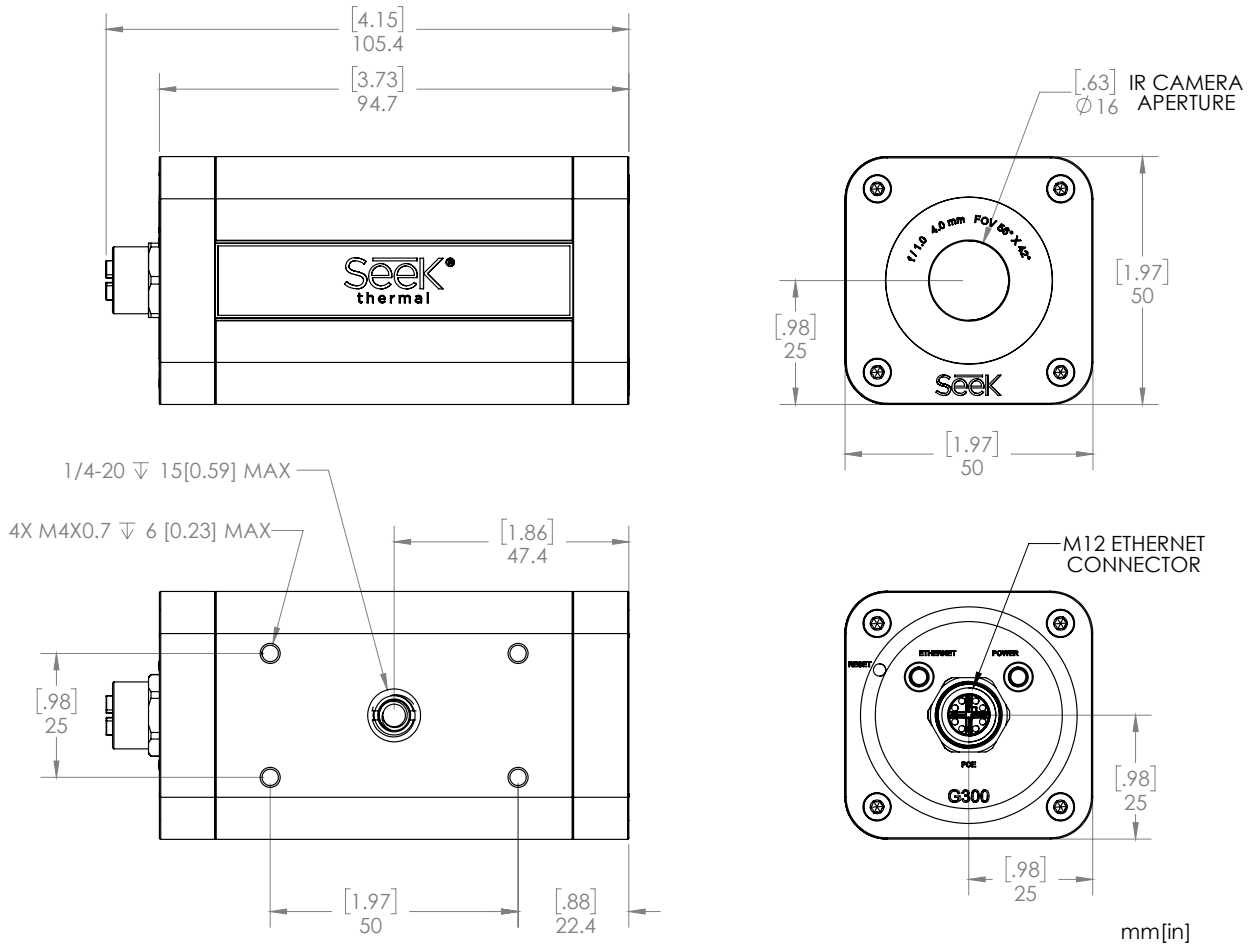


Figure 3 - Camera Mechanical Drawings

5. Thermography Basics

Thermal infrared cameras provide a non-invasive, efficient, and proactive approach to surface temperature-related measurement. However, it is essential to understand the underlying principles to help appreciate the limitations.

A thermal infrared camera transforms infrared radiation into a visible image by capturing the intensity of the infrared energy. High-transmittance optics focus the infrared energy onto an infrared detector. The detector subsequently converts this infrared energy into an electronic signal. This signal is processed to generate a thermographic image that allows real-time viewing. The resulting thermographic image represents multiple pixel temperature measurements.

The intensity of the infrared energy is influenced by:

- **Temperature:** The primary factor influencing infrared energy intensity is temperature variation. Objects emit infrared radiation based on their temperature, so temperature differences between objects or within an object can lead to variations in the intensity of emitted infrared energy.
- **Object material properties (emissivity):** Different materials have different emissivity properties, affecting how the infrared energy is emitted or reflected. Materials with higher emissivity emit more infrared radiation compared to those with lower emissivity. See *Table 2 - Table of Typical Emissivity Values.*
- **Surface structure:** Surface conditions, such as roughness or moisture content, can impact the emission or absorption of infrared energy, altering the intensity detected by a thermal camera.
- **Environmental Factors:** Environmental conditions such as ambient temperature, humidity levels, and atmospheric conditions (fog, dust, smoke) can influence the intensity of emitted or detected infrared energy.

5.1 Field of View

The Field of View (FOV) defines the area captured by the camera lens, including its height and width (expressed as angles). The larger the angle, the larger the FOV. The Instantaneous Field of View (IFOV) refers to the angular size of a single pixel's field of view. Changes in distance affect the FOV captured by the thermal camera. *Figure 4 - G300 FOV Projection Diagram* illustrates how distance impacts the FOV projection. Note that the area a single pixel "sees" will increase with increased distance.

The G300 offers two lens options to suit various application requirements:

GQ-4ACX – 4.0mm with 56° x 42° FOV

GQ-9ACX – 9.1mm with 24° x 18° FOV

The wide-angle 4.0 mm lens is ideal for seeing more objects closer, and the 9.1mm lens is designed for seeing fewer objects at a greater distance. Spot size represents the area a group of pixels covers at a given distance. With a 4.0 mm G300, a 10x10 pixel spot at 1 meter will cover a 30.54 mm pixel area, while at 5 meters, that same 10x10 pixel spot will cover a 152.72 mm area. Therefore, a 30.54 mm sized object can be measured accurately from 1 meter, and a 152.72 mm sized object can be accurately measured from 5 meters. Measuring an object smaller than the 10x10 spot size may result in lower accuracy of measurements.

To maintain measurement accuracy, Seek Thermal recommends a minimum of 10x10 "pixels on target," or the number of pixels the target object covers in the image. Larger objects can be measured at higher distances, whereas smaller objects must be closer to the camera for accurate measurement. Please refer to *Table 1 - FOV for G300* to help determine which G300 model best suits your application and to ensure that your target object fills a 10x10 spot size at your required distance.

Understanding and compensating for the effects of distance on thermal measurements is essential for accurate temperature assessment and proper interpretation of thermal images. Understanding the camera's specifications regarding distance capabilities is crucial for obtaining reliable temperature readings at varying distances.

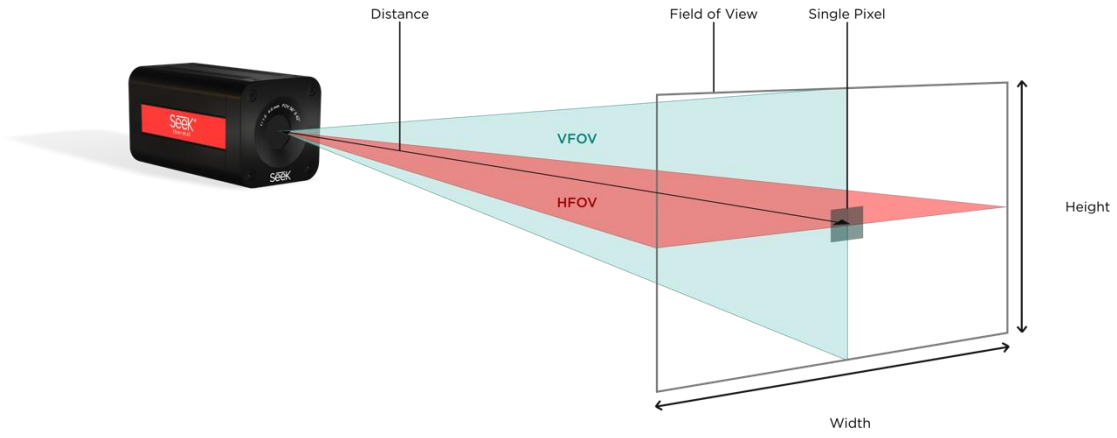


Figure 4 - G300 FOV Projection Diagram

6. Camera Set-Up Considerations

6.1 Location Placement

Camera placement is critical to ensure optimal performance. Ensure no obstructions or limitations exist in the camera's optical path. Any high-intensity heat sources in the field of view may cause the sensor to produce erroneous readings.

6.2 Minimum Focus Distance

GQ-4ACX – 0.2 m (8 in.)

GQ-9ACX – 1 m (40 in.)

6.3 Ambient Temperature

The mounting location must consider environmental conditions. The Camera CPU temperature may be monitored by looking at the internal camera temperature sensor reading.

Notice: Do not let the internal camera temperature reach >75 °C (167°F).

6.4 Atmospheric Transmission

It is essential to maintain the cleanliness of the camera lens. If the lens is dirty, infrared energy will be blocked, and the camera will not measure accurately. Please see section 10.1 *Care and Maintenance* for more information.

6.5 Encapsulation

The G300 camera meets the encapsulation standard IP67. Please note that effectiveness requires an appropriate IP67 M12 cable. To maintain the IP67 protection class, regularly inspect all seals on waterproof connectors and end caps.

Installation

6.6 Mechanical Installation

The camera may be mounted via four M4 mounting holes or the 1/4-20” UNC tripod mount located on the bottom face of the camera housing. See section 4.2 *Camera Drawings* for details.

Notice: The torque for the M4 screw must not exceed 1.28Nm (0.94ft-lb). Max thread engagement must not exceed 6mm.

6.7 Powering the camera

The camera uses PoE (Power over Ethernet). This allows a single cable to deliver both data connection and electric power to the camera. Computer ethernet ports are not PoE capable. A PoE injector is required. See the figure below for a sample connection to a computer.

Notice: PoE injector, M12 cable and ethernet cable are not included in standard scope of delivery (section 3.4 *Scope of Delivery*). These instructions assume the user has access to required cables and accessories.

Notice: The camera is powered directly by using Power over Ethernet (PoE), IEEE 802.3af (36-56 V DC).

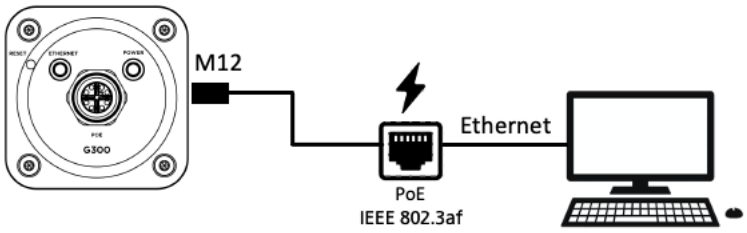


Figure 5 - Example camera set-up

7. Camera Operation and Connection

7.1 Initial Set-up

Follow the instructions below to set up your camera for the first time. To discover the camera on the network, please download the **Seek IP Utility Tool.** This tool may be used to discover the camera over a network while the camera is in DHCP mode (default mode). Please visit **https://support.thermal.com** and navigate to *Seek IP Utility Tool* to download the latest version.

The Seek IP Utility Tool scans for cameras automatically. Cameras on the network may be further identified by the MAC address or serial number printed on the bottom of the camera.

You will need to access the Seek Live View web interface to configure the camera and set up temperature regions and alarms. Follow the basic steps below:

Step 1. Connect the M12 PoE cable to the rear of the camera. Turn it clockwise to secure the connection. Make sure to tighten it firmly, but avoid over-tightening, as this could damage the connectors.
Step 2. Connect the other end of the cable (RJ45) to the PoE injector port. Alternatively, a PoE switch may be used. (Do not use a crossover cable between the camera and the PoE injector).
Step 3. Check that the camera has power. A blue LED on the rear of the camera should indicate power.

Notice: Some network connections require a direct connection to a computer. We recommend that the initial camera setup be completed by directly connecting the camera to a computer.

Step 4. Connect the ethernet cable from the ethernet injector directly to a Windows computer or laptop.
Step 5. Open Seek IP Utility Tool. The G300 camera should be discoverable in the application window. Either manually type the camera's IP address into a browser or double -click on the camera in the Seek IP Utility Tool.
Step 6. Log in to the camera. Default username and password are:

Username: **admin**
Password: **admin**

You may now use the Seek Live View web interface to set up temperature regions and alarms.

8. Seek Live View Web Interface

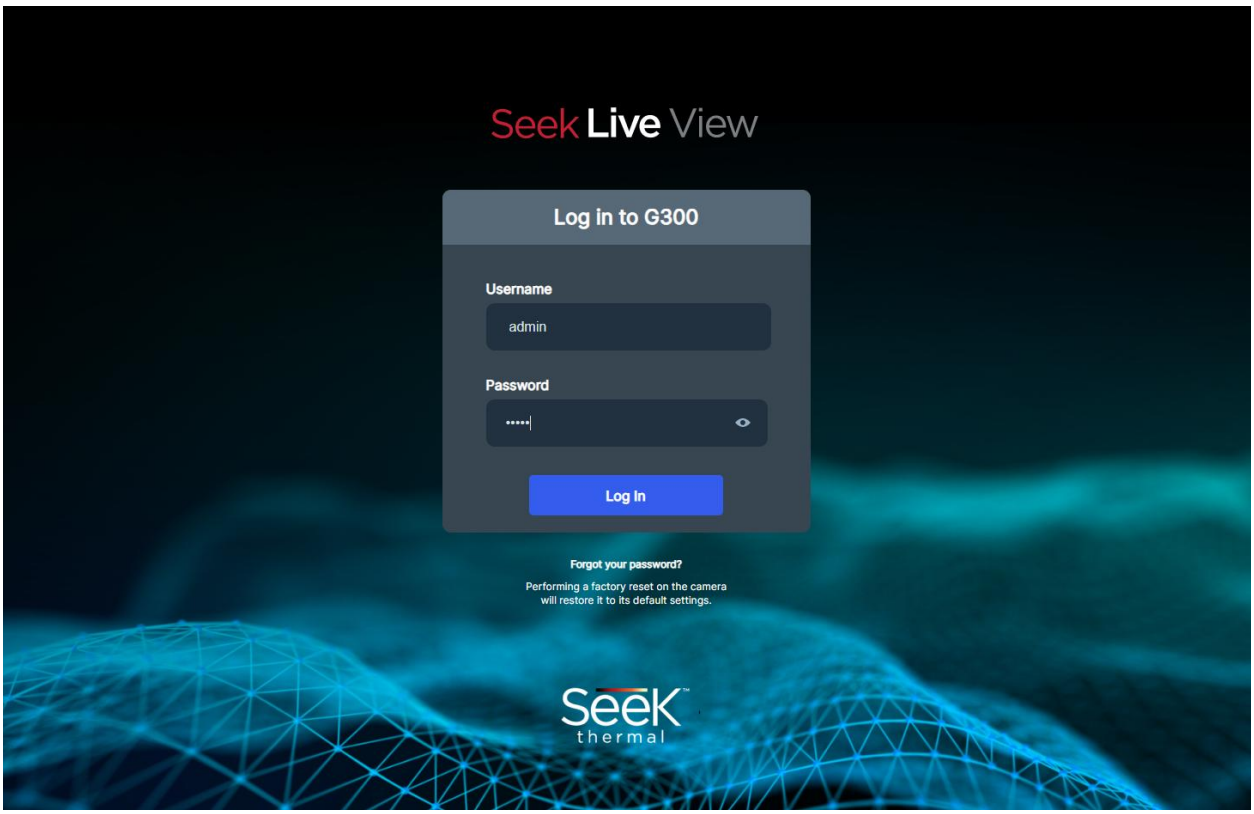
8.1 Browser Compatibility

The Seek Live View web interface supports Google Chrome and Microsoft Edge; other browsers might vary in compatibility and support.

8.2 Login page

After typing in the camera's IP address into a web browser or double-clicking on the camera in the Seek IP Utility software, the login page for the camera will appear. The default login for the camera is username and password are:

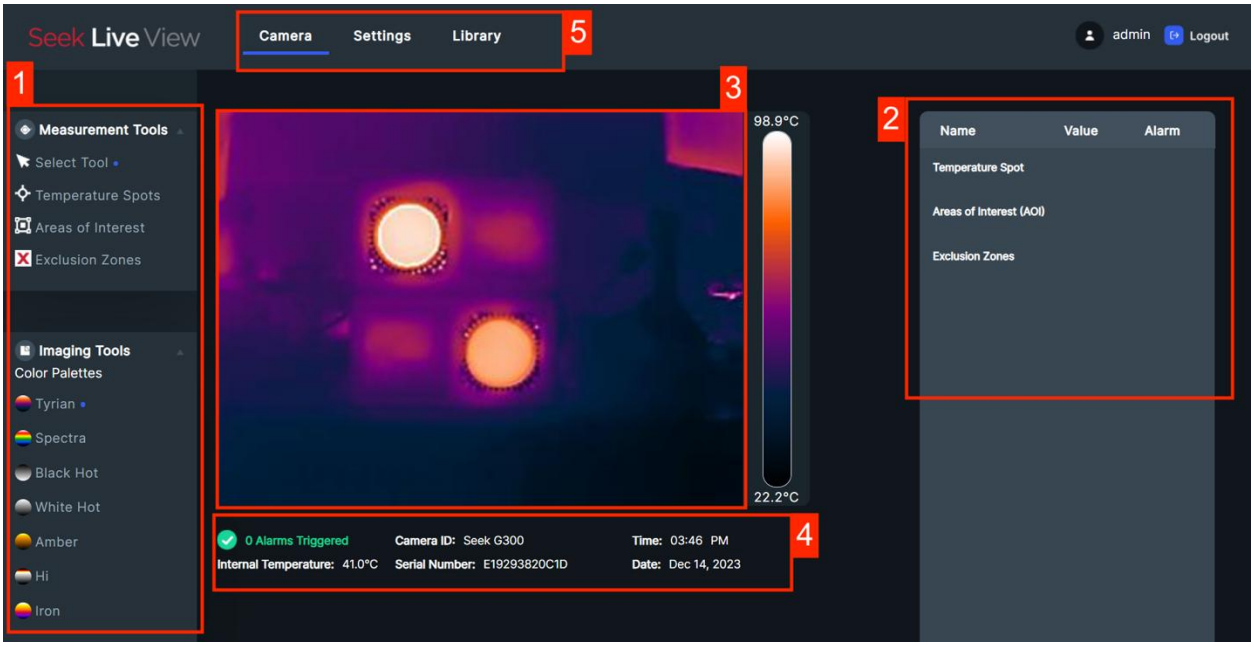
Username: **admin**
Password: **admin**



8.3 Camera Page

The Camera page is opened after the user has successfully logged into the camera. This is the default page after logging in to the camera. The Camera page summarizes all relevant information in one easy-to-use location.

Notice: The actual layout and size may look different depending on the resolution of your computer's display.



1. **Toolbar**
   The toolbar contains the following functionality:
   - *Measurement Tools*
   - *Imaging Tools*
   - *Exclusion Zones*

2. **Measurement and Alarm panel**
   Measurement tools are populated in this panel. Alarms can also be managed here.

3. **Camera image**
   The live camera image visually represents what the camera is targeting.

4. **Important camera information**
   Information regarding the camera temperature, serial number, camera ID, date, and time is presented here.

5. **Tabs**
   Use this panel to navigate to the *Camera* page, the *Settings* page, and the *library* page

8.3.1 Measurement Tools

A Temperature Spot and/or Area of Interest box may be used to measure temperature. Multiple Temperature Spots and Areas of Interest can be used to capture measurements. Temperature values are displayed in the Measurement & Alarm panel.

8.3.1.1 Temperature Spots

Temperature Spots display the temperature reading of the object targeted in the thermal image. Up to 10 spots may be created at the same time. To create a Temperature Spot measurement:

1. In Measurement Tools, select Temperature Spot
2. Place the spot on the thermal image
3. The spot measurement value will appear in the Measurement & Alarm panel on the right of the screen under *Temperature Spot*
4. All spots have a flag located next to the spot. This is the ID number. This ID number corresponds to the ID number located next to the Spot name in the Measurement & Alarm panel
5. Spots may be moved by clicking on the spot reticle and moving the mouse into the desired position
6. To give a custom name to the spot, click the ••• , located next to the Spot name. A popup window will appear. Enter a new name for the spot. Click *Save*
7. See section 8.3.4 for how to set an alarm
8. To delete the spot, click the ••• , located next to the Spot name. A popup window will appear. Click *Delete* to remove the spot

8.3.1.2 Areas of Interest (AOI)

AOI's display the minimum (*min*), maximum (*max*) and average (*avg*) temperature reading of the object targeted in thermal image. An alarm may be set for any *min*, *max* or *avg* measurement value. Up to 5 AOIs may be created at the same time. To create an AOI measurement:

1. In Measurement Tools, select *Areas of Interest*
2. Place the AOI box on the thermal image
3. The AOI measurement values for *min*, *max,* and *avg* will appear in the Measurement & Alarm panel on the right of screen under *Areas of Interest*
4. All AOIs have a flag located next to the box. This is the ID number. This ID number corresponds to the ID number located next to the AOI name in the Measurement & Alarm panel
5. AOI's may be resized by clicking and dragging any corner of the rectangular box

   Notice: Only rectangular shapes may be drawn

6. AOIs may also be moved by clicking inside the AOI box region and moving the mouse into the desired position
7. To give a custom name to the AOI, click the ••• located next to the AOI name. A popup window will appear. Enter a new name for the AOI. Click *Save*
8. See section 8.3.4 for how to set an alarm
9. To delete the AOI, click the ••• located next to the AOI name. A popup window will appear. Click *Delete* to remove the AOI

8.3.2 Advanced Settings

To edit the emissivity value for an individual Spot or AOI, click the ••• located next to the Spot name. A popup window will appear. Enter the Advanced Settings drop-down menu by clicking on *Advanced Settings*. An emissivity value between 0.1 and 1 can be entered. The default emissivity is 0.97.

Notice: Use caution with these advanced settings; incorrect emissivity values can drastically affect the temperature measurement. Please refer to section 5 for full details on emissivity.

8.3.2.1 Exclusion Zones

Exclusion Zones (or masks) ignore specific regions of the thermal image. For example, if an AOI is used to monitor a scene and there is a hot object in the scene, and that hot object is well-known or safe, then this object may be excluded from the AOI measurement with the use of this tool.

Notice: If the exclusion zone is placed over a temperature spot or covers an entire AOI, the measurement value for that corresponding measurement will show a blank value in the Measurement & Alarm Panel.

Up to 3 Exclusion Zones may be created at the same time. To create an Exclusion Zone:

1. In Measurement Tools, select *Exclusion Zones*
2. Place the Exclusion Zone on the thermal image
3. The default name *Mask* will appear in the Measurement & Alarm panel on the right of screen under *Exclusion Zones*
4. All Exclusion Zones have a flag located next to the box. This is the ID number. This ID number corresponds to the ID number located next to the Exclusion Zone name in the Measurement & Alarm panel
5. Exclusion Zones may be resized by clicking and dragging any corner of the rectangular box

   Notice: Only rectangular shapes may be drawn

6. Exclusion Zones may be moved by clicking inside the Exclusion Zone box region and moving the mouse into the desired position
7. To give a custom name to the Exclusion Zone, click the ••• located next to the Exclusion Zone name. A popup window will appear. Enter a new name for the Exclusion Zone. Click *Save*
8. To delete the Exclusion Zone, click the ••• located next to the name. A popup window will appear. Click *Delete* to remove the Exclusion Zone

8.3.3 Imaging Tools

A user can select between 7 unique color palettes. The color palette visualizes temperature variation, allowing easier identification and understanding of temperature differences across an image. Users should test different color palettes to find the best one for their application.

8.3.4 Setting Temperature alarms

Each measurement value can have an alarm associated with it. Users can create temperature-based alarms tailored to their specific monitoring requirements. To set an alarm for temperature measurements (whether for Temperature Spots or Areas of Interest):

1. Identify which measurement value you wish to set an alarm for
2. Click the next to the desired measurement value. This will open a configuration window
3. Within this window, users can specify the *Trigger* and *Action* parameters for the alarm

   Triggers:
   i. *Above:* The alarm activates if the measured temperature goes above the specified *threshold Temperature*
   ii. *Below:* The alarm activates if the measured temperature drops below the specified *Threshold Temperature*
   iii. *Threshold Temperature*: Determines the temperature level that triggers the alarm
   iv. *Threshold time*: The time the temperature needs to exceed the threshold for the alarm to activate
   v. *Hysteresis:* Helps prevent rapid toggling of the alarm in cases of marginal temperature fluctuations. Hysteresis defines the range where temperature fluctuation will not affect the trigger. For example, with a 2.0°C hysteresis and a threshold set at 25.0°C, if the temperature exceeds 25.0°C, the trigger activates and remains active until the temperature falls below 23.0°C. Conversely, if the threshold is set below 25.0°C, the trigger activates if the temperature drops below 25.0°C and stays active until the temperature rises above 27.0°C

   Actions:
   i. *None*: Records a log entry without media capture. This is selected as default
   ii. *Save Video*: Records a 5-second video clip starting from 5 seconds before the alarm is triggered and ending 5 seconds after
   iii. *Save Image*: Captures and saves a JPEG image
   iv. *Save Image and Video*: Saves both an image and a video, starting 5 seconds before and ending 5 seconds after the alarm is triggered

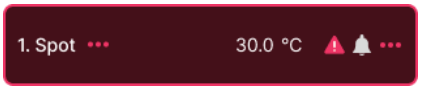
Notice: A log entry is automatically recorded, with the default action set to *None.*

4. Click *Save* to activate the alarm. The icon will indicate that an alarm is now active
5. To edit an alarm, click the next to the icon. The configuration window will appear
6. To remove an alarm, click the icon. This will turn the alarm off and return the alarm to the state. Alternatively, enter the configuration window once again and click *Delete Alarm*

8.3.4.1 Active alarms

An alarm is triggered when the measured temperature meets the conditions set in section 8.3.4. The indications that an alarm is active are:

1. A red box will highlight the alarming measurement value, as shown below, and a warning sign will appear next to the temperature value:



2. The number of active alarms will be shown in the important camera information section as shown:

3. The ID flag on the Temperature Spot or AOI associated with the active alarm will turn red

Notice: Alarms will remain active until the temperature falls above or below the threshold temperature

8.4 Settings page

Within Settings, the user can make changes to the network settings, upload new firmware, change camera name, change camera units, and set the camera time.

8.4.1 General Settings

Under the General Settings, users can view or modify settings such as temperature units, upload camera firmware, view camera serial number and firmware versions.

8.4.1.1 Temperature Units

Switch between Celsius (C) and Fahrenheit (F) for temperature display based on personal preference. The default temperature unit is Fahrenheit.

8.4.1.2 Firmware and Camera Serial Number

Displays current camera firmware version and camera serial number.

8.4.1.3 Restart Camera

To Initiate a camera reboot for system refresh or troubleshooting purposes follow these steps:

1. Navigate to *Restart Camera* under General Settings
2. Click the *Restart Camera* button
3. A pop-up window will appear, click *Restart*
4. The camera will restart, allow 30s for a full restart

8.4.1.4 Factory Reset

Factory reset restores the camera to default settings, clearing libraries, measurements, and returning settings to their initial configuration. This includes resetting the camera to default DHCP network mode, changing the password back to the default admin, and resetting the camera name. Follow these steps to execute a Factory Reset:

1. Navigate to *Factory Reset Camera* under General Settings
2. Click the *Reset Camera To Factory Settings* button
3. A pop-up window will appear, click *Restart*
4. The camera will restart, allow 30s for a full factory reset

8.4.1.5 Firmware Update

To update the camera firmware, follow these steps:

1. Download Firmware File: Download the firmware file required for the update. Ensure the file is named in the format THERMAL.STL
2. Access Firmware Update window: Navigate to the "Update Camera Firmware" section within the General Settings and click “Update Camera Firmware”. A pop-up window will appear
3. Upload Firmware File: Drag and drop the downloaded firmware file (THERMAL.STL format) into this window as prompted
4. Confirmation and Restart: Upon successful file upload, the camera will restart. Allow the camera to restart, which will display the login screen. Wait for approximately 30 seconds to ensure the system fully reboots. Then, log back into the camera using your credentials

8.4.2 User Management

Users can modify the camera identification name and password within User Management.

8.4.2.1 Camera ID

Change the Camera ID displayed on the camera page for identification purposes.

8.4.2.2 Change Camera Password

The password may be changed from the default password. The current camera password must be known so that the camera password can be changed. The password must meet the criteria below:

- Be at least 8, but less than 32 characters long
- Case-sensitive

If you forget your password, you may reset it by pressing the reset button for 4 seconds. See section 9.1.

8.4.3 Network Settings

Use the Network Settings page to configure the camera. By default, the camera is in DHCP mode. A Static IP address may be set.

Notice: Modifying network settings may alter the camera's IP address. Ensure the IP address is noted before applying to avoid potential connectivity issues. If unreachable, use the Seek IP Utility tool or reset the camera to default DHCP mode, see section 9.1.

8.4.4 Regional Settings

Configure the Camera time zone and choose between manual (*Set Time Manually)* or *Network Time Protocol (NTP)* mode.

Notice: NTP mode is only available if an NTP server is accessible with an active internet connection. Be sure to enter the correct NTP address. If the device does not have an active internet connection, select *Set Time Manually*.

8.4.5 E-Mail Settings

Enable or disable Email Alerts on Alarm events.

8.4.5.1 E-Mail Settings

From Address, enter the email address and password or passkey associated with the email provider’s email account that will be sending the emails.

To Address, enter in the email addresses of the recipients that are to receive the email alerts.

Include or exclude jpeg attachments of alarm events when available.

8.4.5.2 Server Settings

Fill in the appropriate email server settings for email account provider sending the email alerts including SMTP Server address, SMTP TLS Port, Username and Password.

Notice: Most Email Servers Require 2-Step Authentication. To learn more details on how to set up 2-Step Authentication and generate application email passwords please visit the Seek Thermal G300 FAQ page on support.thermal.com.

8.4.6 Access

Enable or disable RTSP streaming and generate an authentication token for REST API use.

8.4.6.1 RTSP Stream

Select RTSP Stream On or Off. The RTSP stream is set to Off by default.

To access the live video stream from your camera, use the following URL format:

- rtsp://<CAMERA_IP>:8554/stream

Notice: Replace <CAMERA_IP> with the actual IP address of the camera and ensure that the camera is connected to the network.

8.4.6.2 Authentication Token

An Authentication Token is a secure, persistent key that provides authorized access to the REST API functionality without expiration, ensuring continuous secure access to the API. Click *Generate Token* to create an authentication token.

Notice: The G300 uses REST APIs, which any user can access directly. To learn more about the REST APIs and Swagger tool built into the camera itself, download the G300 REST API and INTEGRATION GUIDEs from the support website: *https://support.thermal.com*

8.5 Library page

The Library Page lets users view alarm log entries and download images or videos. Log details include Alarm ID name, Alarm Trigger Type, Threshold Temperature, and Date and Time stamps, providing users with a detailed overview of recorded alarm events for easy reference and analysis.

Images are in JPEG format.

Videos are saved as MP4 files in H.264 format and recorded 5 seconds before and 5 seconds after the alarm event in one video.

8.5.1 How to download an image

To download an image:

- Click the image icon associated with the desired alarm log

8.5.2 How to download a video

To download a video:

- Click the video icon associated with the desired alarm log

8.5.3 Erase Log Entries

To delete alarm log entries:

1. Select log entries by selecting the entry on the right side of the page. Multiple entries can be deleted by selecting the check box on the top of the page
2. Scroll down and choose *Erase Selected Entries* at the bottom of the page
3. For multiple logs, select all desired entries and click *Erase Selected Entries*

Notice: The camera can store a maximum of 500 log entries. Logs follow a first-in, first-out deletion principle

9. Reset Button and LED Functionality

9.1 Reset Button

Reset button is accessed on the rear of the housing, see Figure 2 - Rear View.

Reset button hold time	LED Response	Action
< 1 second	Power (blue) and ethernet (green) light turn off	Main camera application is restarted.
> 4 seconds	Flashing blue and green LED	Main camera application is restarted. The camera's IP settings reset to the factory defaults (DHCP mode). Username and Password are set to default.

9.2 LED

LED	LED Response	Action
Power LED	Steady blue	Normal operation
Ethernet LED	Steady green flash	Normal operation, indicating active network connection.

10. Maintenance, Troubleshooting & Support

10.1 Care and Maintenance

The Seek G300 thermal imager requires little maintenance. For best care, please follow the guidelines below:

- When not in use, the thermal imager should be stored at an average room temperature of 23˚C (73˚F) and kept clear from potential physical damage. Store with the M12 plug on the connector.
- Use a soft cloth with warm water only and a mild detergent to clean the camera housing. Do not use solvents to clean the camera.

Notice: Do not allow any liquids or debris to enter the M12 connector, and make sure the M12 connector plug is attached when handling the device around dirty or contaminated environments

To clean the window:

- Remove loose particles from the lens using a soft brush or lens tissue.
- Use a commercial lens cleaning solution with more than 30% isopropyl alcohol and a soft cloth.

Notice: Gently use the cloth on the lens, as the lens has a delicate anti-reflective coating.

Notice: Do not use ammonia or any cleaners containing ammonia to clean the window as it could cause permanent damage to the surface.

10.2 Troubleshooting

If you are experiencing problems with your product, please refer to this checklist. If the problem persists, please contact Seek Thermal Customer Service or your local distributor.

Issue:	**Solution:**
Camera Not Powering On	• Check the POE connection and verify if the power source is functioning. • Ensure the Ethernet cable is properly connected and delivering power. If the issue persists, try using a different Ethernet port or cable
Connectivity Problems	• Check network settings and ensure proper configuration. • Verify that the Ethernet cable is securely connected and that the network switch or router is operational. • Troubleshoot network issues by testing with another device or using a different port.
Accuracy is out of spec	• Ensure there are no other obstructions or radiative interference affecting the thermal sensor. • Make sure the lens is clean. • Ensure the number of pixels on target follow guidelines. • Ensure the correct emissivity values are set.
Camera overheats	Ensure the camera is installed in a well-ventilated area and not exposed to direct sunlight or extreme temperatures outside of spec

10.3 Customer Support

For any questions or issues with the use of this product, do not hesitate to contact our customer support group at

www.thermal.com/support

The Quality Management System under which this product was developed and manufactured has complied with the ISO 9001 Standard. Seek Thermal Incorporated reserves the right to make changes and improvements to any of the products without prior notice.

Appendix A: Field of View – G300

Lens	Distance		HFOV		VFOV		Spot side length (3x3)		Spot side length (10x10)	
	m	ft	m	ft	m	ft	mm	in	mm	in
4 mm 56 (H) x 42 (V)	0.50	1.60	0.53	1.70	0.38	1.23	4.58	0.18	15.27	0.59
	1.00	3.30	1.06	3.51	0.77	2.53	9.16	0.36	30.54	1.21
	2.00	6.90	2.13	7.34	1.54	5.30	18.33	0.76	61.09	2.53
	3.00	9.80	3.19	10.42	2.30	7.52	27.49	1.08	91.63	3.59
	5.00	16.40	5.32	17.44	3.84	12.59	45.81	1.80	152.72	6.01
	10.00	32.80	10.63	34.88	7.68	25.18	91.63	3.61	305.43	12.02
9.1 mm 24 (H) x 18 (V)	0.50	1.60	0.21	0.68	0.16	0.51	1.96	0.08	6.54	0.25
	1.00	3.30	0.43	1.40	0.32	1.05	3.93	0.16	13.09	0.52
	2.00	6.90	0.85	2.93	0.63	2.19	7.85	0.33	26.18	1.08
	3.00	9.80	1.28	4.17	0.95	3.10	11.78	0.46	39.27	1.54
	5.00	16.40	2.13	6.97	1.58	5.20	19.63	0.77	65.45	2.58
	10.00	32.80	4.25	13.94	3.17	10.39	39.27	1.55	130.90	5.15

Table 1 - FOV for G300

Appendix B: Table of Emissivity Values

Material	Emissivity Value
Aluminum	0.05 - 0.2
Brass	0.3 - 0.35
Concrete	0.92 - 0.96
Dry Soil	0.85 – 0.95
Paper	0.9 - 0.96
Plastics (varies)	0.8 - 0.95
Rubber	0.9 - 0.95
Stainless Steel	0.3 - 0.6
Wood	0.9 – 0.96

Table 2 - Table of Typical Emissivity Values

Notice: Emissivity values can vary depending on factors such as surface finish, temperature, and specific types or forms of materials. These values are approximate and can serve as a general reference for common materials. Adjustments might be necessary based on specific conditions and applications.