

RVision, Inc.

Mini-HP™

Setup and Operations Manual



ITAR AND EAR – EXPORT REGULATION COMPLIANCE

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Our warranty is limited to the repair or replacement of RVision product. RVision reserves the right to decide if a repair or replacement is warranted.

RVision does not authorize any party to assume for it any other obligation or liability.

RVision warrants that each of the component parts of the system will not malfunction, destruct or fail to operate for a period of one (1) year when operated as described in RVision documentation and instructions packaged with the product.

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TECHNICAL SUPPORT AND SALES

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Sales telephone: (619) 233-1403
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WARNING:

The system enclosure is pressurized with nitrogen to keep the camera lens free of condensation. Any attempt to remove the cover will void the warranty and might cause system damage. Refer to system specifications in this manual for data concerning environmental limits of operation.



CAUTION:

Please read this manual to avoid improper installation. Careless operation of any RVision pan/tilt device can result in injury or system damage. The Mini-HP™ requires an input voltage of 12-30 volts direct current (VDC). Applying power out of this range may damage the unit. Replace the lens cap when not in use.

Overview

The RVision Mini-HP™ numeric pan/tilt positioner is a small-sized high precision, low noise surveillance system.

The Mini-HP™ is ruggedized to withstand, and continue to remain operational in, a broad range of environmental conditions including high and low temperatures, high-vibration, potential impact shock, high humidity, atmospheric dust, and maritime locations. The Mini-HP™ is particularly suited to installation environments that require a system that is light-weight, requires low-power supply, and is easy to setup. Product specifications for the Mini-HP™ are located later in this manual.

The Mini-HP™ system can be configured with the following components. Additional information for these configurations can be obtained by contacting sales at RVision.

- The RVision Quick-Connect™ allows rapid mounting and electrical connection of the pan/tilt camera. The Quick-Connect™ can be attached to several types of platforms as discussed later within this manual.
- The RVision BigFoot™ connector is designed to allow rapid mounting and removal of the Mini-HP™ from the attachment platform. The BigFoot can be attached to several types of platforms as discussed later within this manual.
- Color and video outputs are available simultaneously or optionally a video switch may be installed in the pan/tilt for single-display systems
- The RVision LOOK™ Controller for control of the Mini-HP™ and image display.
- A variety of video compression, stabilization and video tracking modules

Camera Specifications

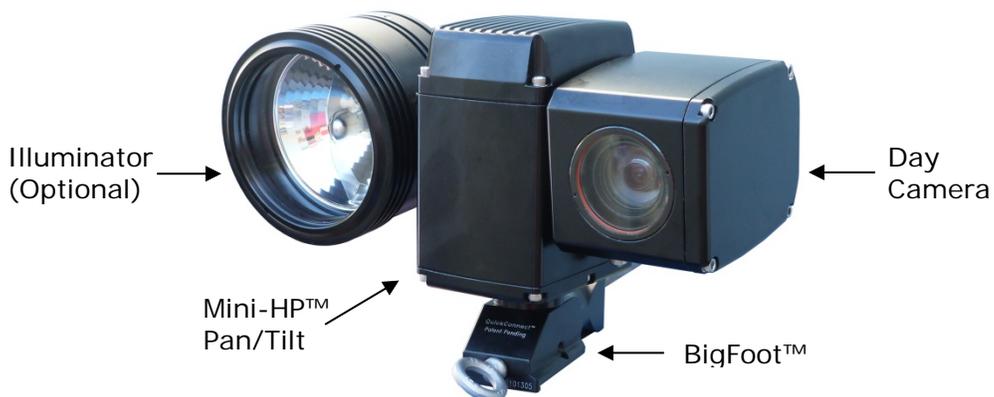


Figure 1: Mini-HP PTZ and payloads

Item	Specification
Pan Range	Continuous
Tilt Range	180°
Pan/Tilt Speed	180°/s
Pan/Tilt Resolution	0.007°
Weight	6.1 - 7.9 lbs.*
Housing Material	6061-T6 Machined Aluminum
Operating Temperature	-40°C to +70°C
Mounting	Bigfoot™/QuickConnect™
Control Interface	RS232/RS422; SW Switch
Command Protocol	RVision, Pelco-D
Video Format	NTSC / PAL
Zoom - Color	36x Optical, 12x Digital
HFOV - Color	57.8° - 1.7°
Resolution - Color	550TVL, 380K NTSC, 440K Pal
Sensitivity - Color	0.1 lux 1/4s NTSC, 1/3s PAL
Sensitivity - NIR	0.01 lux 1/4s NTSC, 1/3s PAL
Illuminator Option	NIR or White Light, 35/50W

* Overall system weight depends on payload configuration.

Mechanical Dimensions

Before mounting the Mini-HP™ make certain there is adequate unobstructed space for the device to operate in the chosen location. Figure 3 contains the vertical rotational clearance value for mounting the Mini-HP™. Figure 4 contains the horizontal rotational clearance value. The following dimensions are for **Mini-HP™ with illuminator**:

NOTE: Values are in inches.

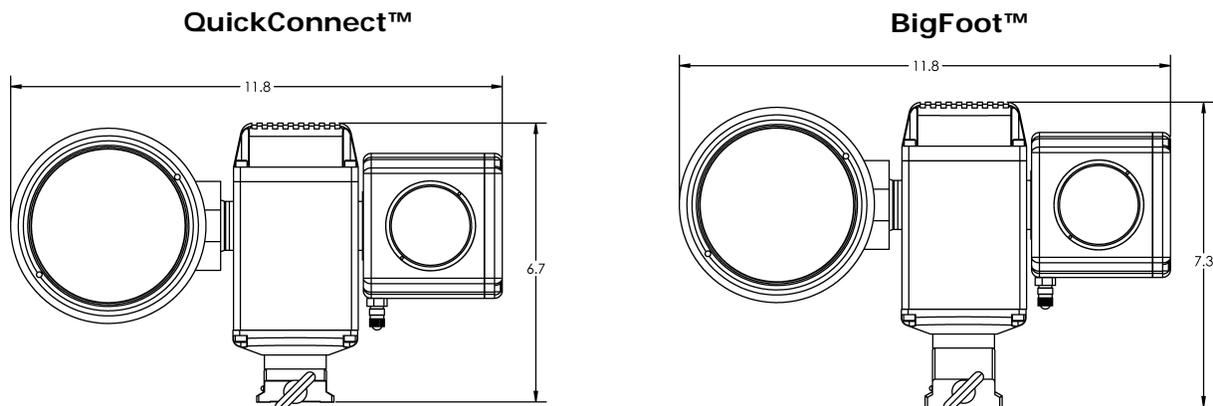


Figure 2: Front Face Dimensions

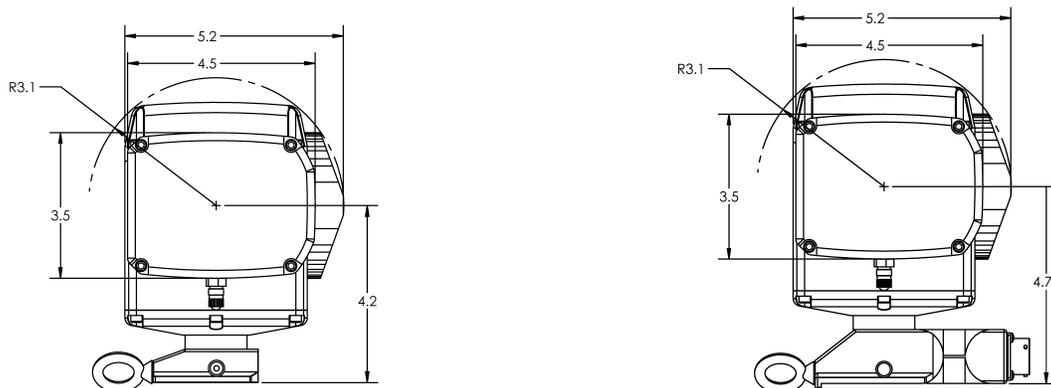


Figure 3: Vertical rotational clearance

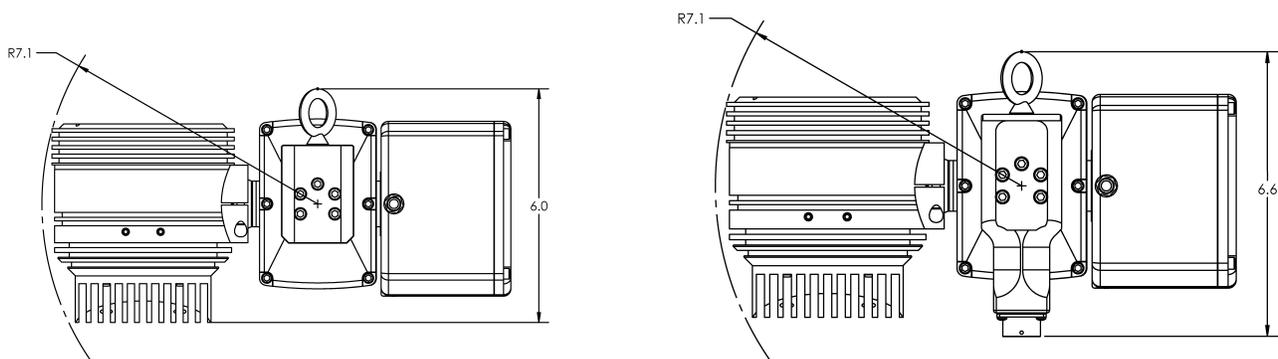
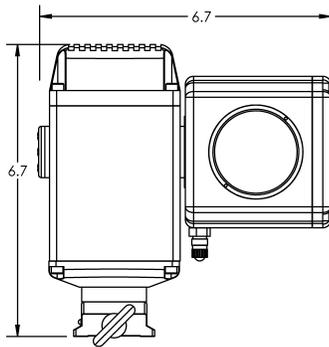


Figure 4: Horizontal rotational clearance

The following dimensions are for the standard **Mini-HP™** without illuminator:

NOTE: Values are in inches.

QuickConnect™



BigFoot™

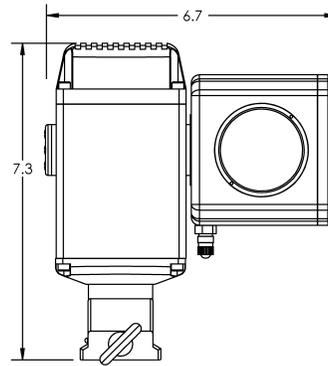


Figure 5: Front Face Dimensions

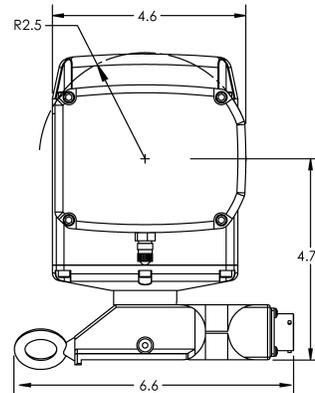
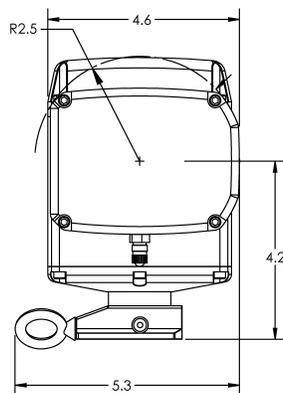


Figure 6: Vertical rotational clearance

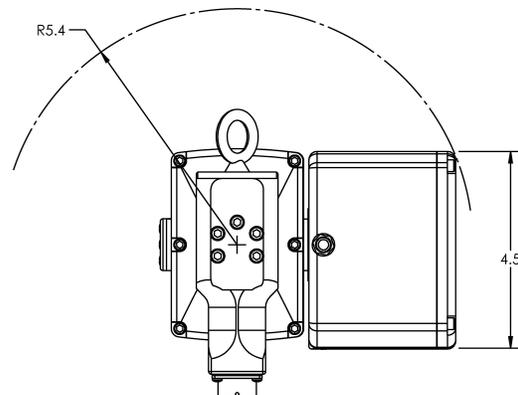
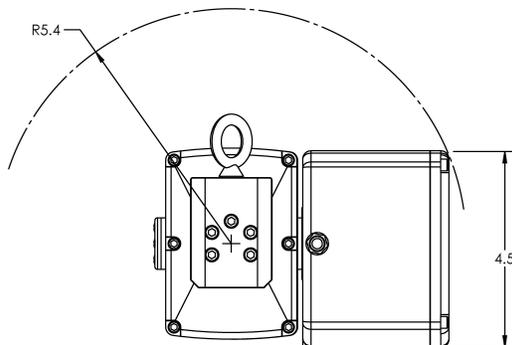


Figure 7: Horizontal rotational clearance

Power Requirements

This section contains power supply information for the Mini-HP™ system.



WARNING

Make certain that before and during system setup the power plug is detached from the power source, otherwise the system may be damaged, the persons setting up the system injured, or both.

- Correct polarity to the system must be observed, or damage may result.
- The Mini-HP™ system requires 12 to 30 VDC current under load, 24VDC nominal is preferred to reduce incidence of installation voltage sag issues.
- Cable length and the wire voltage drop calculation should be performed prior to power supply and cabling implementation. The largest practical power conductor should be installed within the shortest distance between source and the Mini-HP™ to minimize voltage drop.
- Circuit protection including fuses or breakers should be considered.
- A power supply with minimal peak-to-peak ripple is suggested to minimize power supply noise in the system.

NOTE: The current requirement will vary depending on payload. For this configuration, a 24V 10A supply should be sufficient (RV P/N 200137). Note that not all supplies perform similarly under transient load, test the power supply with the complete camera system in the lab before performing field installation.

Connecting the System: Look 6.5™

The Mini-HP™ may be used with a LOOK 6.5™ controller, connected as shown.

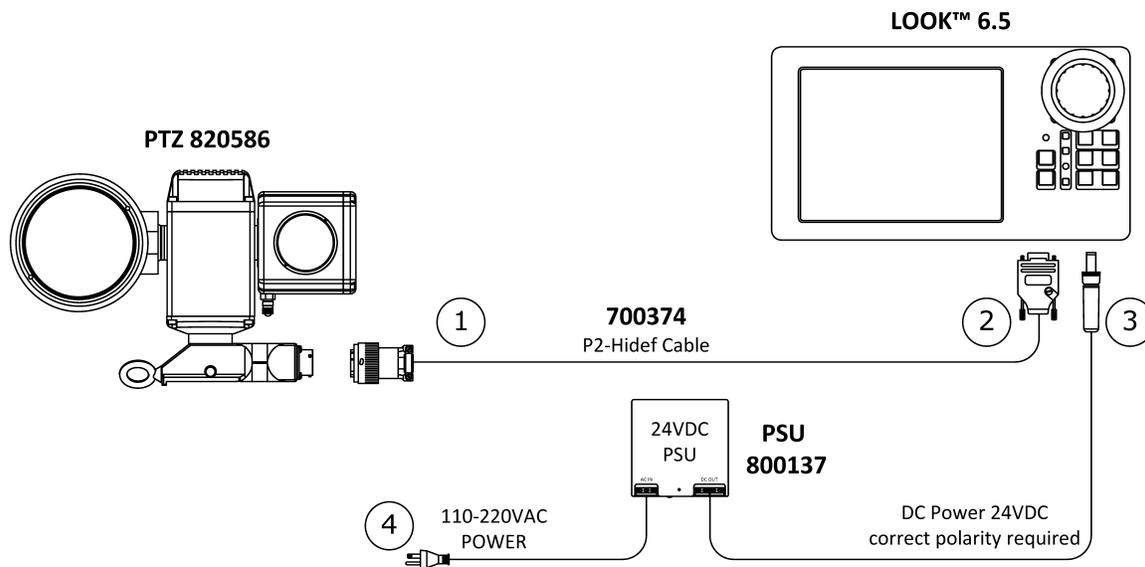


Figure 8: Wiring layout for /Mini-HP™ to LOOK™

Reference Number	Connection
①	700374 cable P2 connector connects to bigfoot of Mini-HP™
②	700374 cable Hidef connector to LOOK™ Controller.
③	Power plug of 24 VDC Power Supply Unit to LOOK™ Controller.
④	Power supply plug of Power Supply Unit to AC power source.

Connecting the System: Laptop/Encoder

The Mini-HP™ may also be used with a laptop or other serial controller, connected as shown.

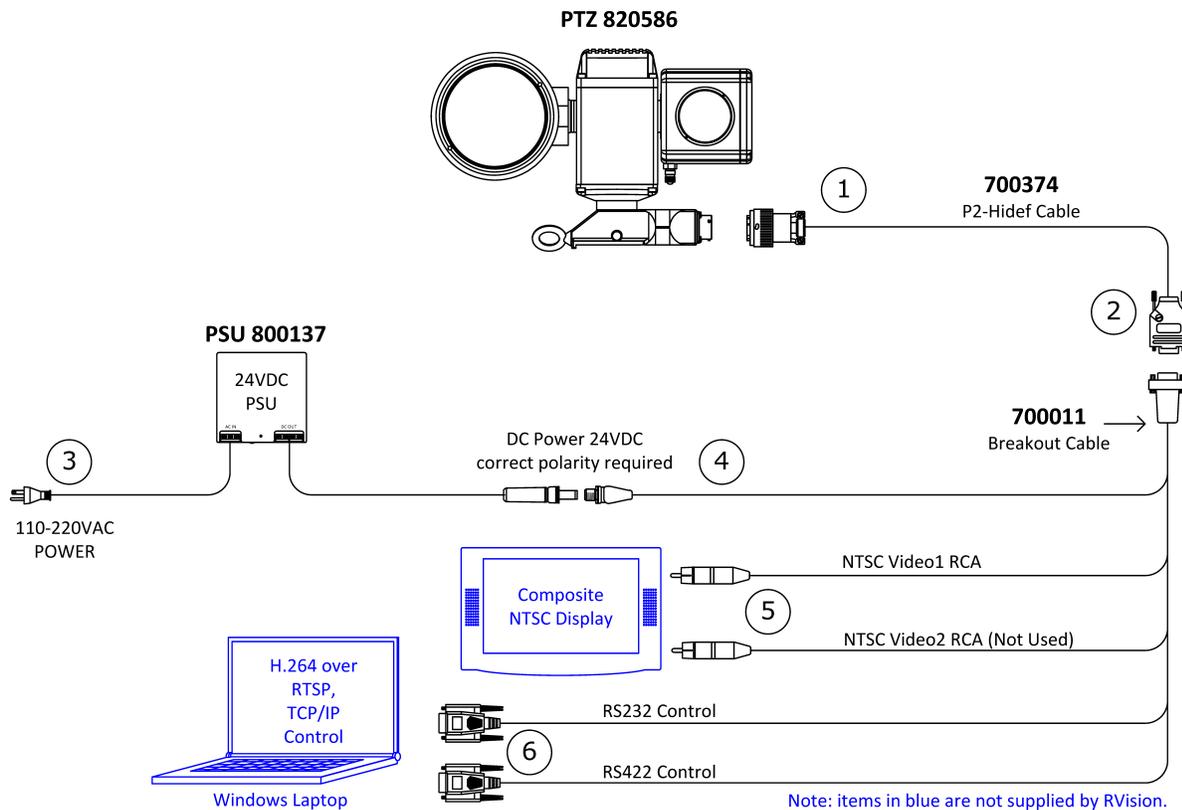


Figure 9: Block wiring layout for Mini-HP™ to Laptop

Reference Number	Connection
①	700374 cable P2 connector connects to the bigfoot of the Mini-HP™ camera
②	Hidef connector of 700374 cable connects to 700011 break-out cable
③	Power supply plug of Power Supply Unit to AC power source.
④	Power plug of 24 VDC Power Supply Unit to power plug of 700011 break-out cable
⑤	NTSC/PAL RCA Video Outputs
⑥	RS232/RS422 control (can be reconfigured)

Testing the System

Once the cables have been connected as shown in Figure 5 or 6 and a power-good check has been performed, prepare to apply power and turn on the Mini-HP™. This is best accomplished on a benchtop prior to field installation.

Calibration of the Mini-HP™

The Mini-HP™ automatically calibrates during power on. The Mini-HP™ will slowly pan and tilt in the closest direction towards the encoder initialization position. After the encoders are located, the Mini-HP™ will pan and tilt to the home position. Once the Mini-HP™ has reached home position, power-on calibration is complete and the system is ready for commands. Note that below 0°C, heaters in the system will prevent movement for several minutes while the system warms to prevent system damage.

Video Sources

- Verify that the video source is operational.
- Confirm that the color video is present. The color camera video should be visible in several seconds after startup.

System Control

Establish control of the system using PSEE or a LOOK controller. Refer to the LOOK or PSEE section of this manual for specific instructions in the use of these components. Test zoom and focus controls of the camera, then pan/tilt control.

Troubleshooting

If trouble is encountered with these basic tests, recheck the system for any setup issues.

- In the case that pan/tilt calibration does not occur, look inside the lens of the color camera as the system is powered: the color camera lens should move on startup. If there is lens movement but no pan/tilt calibration, recheck voltage under load conditions at the cable end near the camera (24V 10A suggested) and adjust power supply voltage, current or conductor size as appropriate. Check cable pins and sockets are clean and intact. NOTE: If ambient temperatures are below 0°C, The camera heaters must warm up the camera for several minutes before calibration will occur.
- If video noise is encountered, check power supply with oscilloscope for excessive voltage ripple. Also consider mounting the PTZ on an electrically isolated mount, as vehicles or even buildings may have electrical noise present that may couple into the camera or power supply. Video balance filters attached to termination ends of video cables may also be considered.
- For serial control issues, check that TX/RX lines are properly oriented. RS422 4-wire interfaces must be converted to RS232 before plugging into a computer. With LOOK controllers, see the LOOK 6.5™ section of this manual and try using the "Discover" function to locate the camera settings. Contact techsupport@rvisionusa.com for assistance.

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BigFoot™ & QuickConnect™

Quick-Connect™ Shoe Mounting

The Quick-Connect™ (QC) slides into a mounting Shoe for quick mechanical retention and electrical connection of the camera. A quick-release button allows for easy removal of the camera from the mount. Locking screw allows for more secure attachment of the camera. The Shoe may be mounted with four screws passed through the Shoe to a mounting surface below, or attached to a standard tripod thread.

Quick-Connect™ is available only on the 2G-HP SEE™, m3G-HP™, and Dual-HP family of RVision cameras.

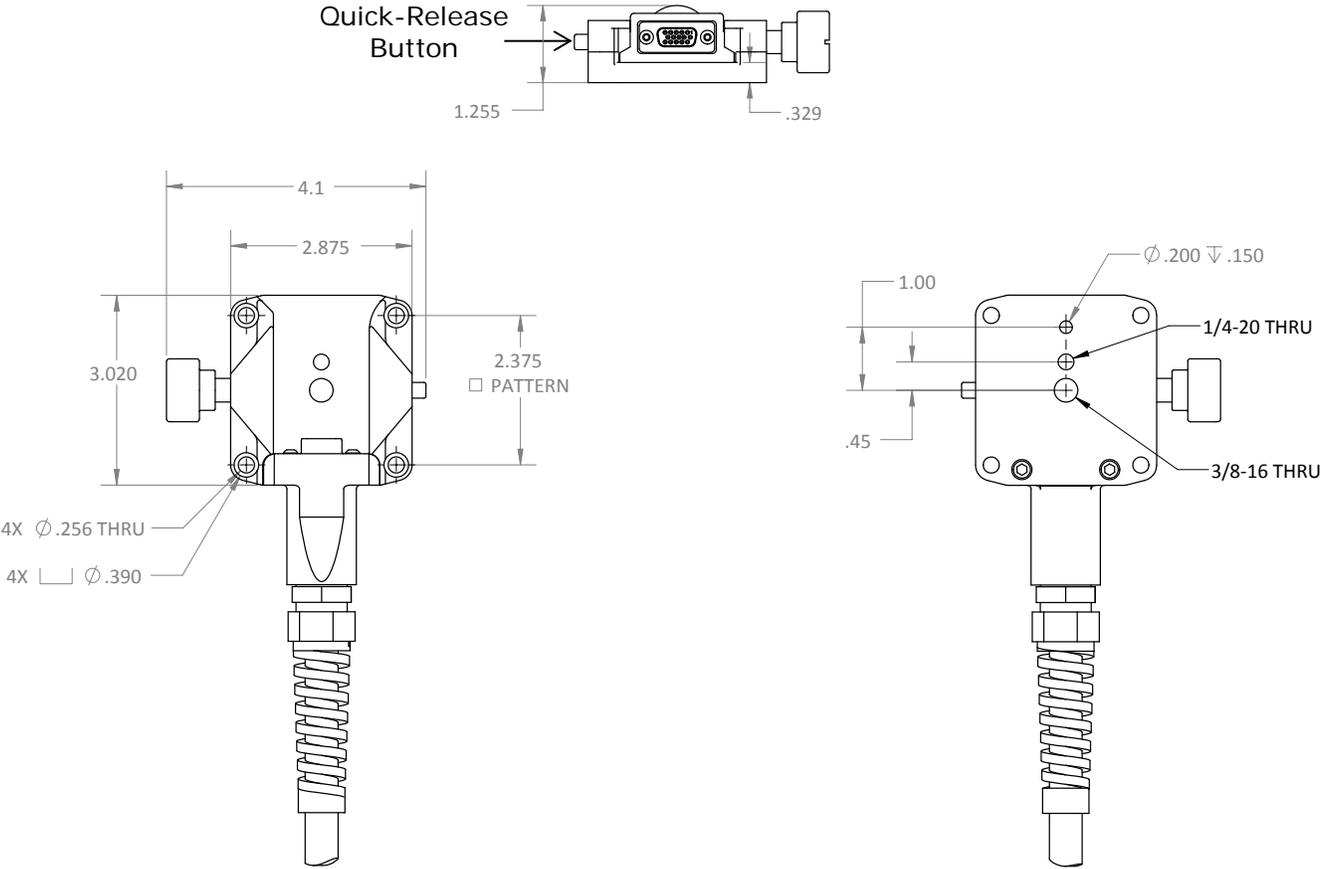


Figure 1: QuickConnect™ Cable Dimensions

Bigfoot™ Shoe Mounting

The Bigfoot™ slides into a mounting Shoe for quick mechanical retention of the camera. A quick-release button allows for easy removal of the camera from the mount. Locking screw allows for more secure attachment of the camera. The Shoe may be mounted with four screws passed through the Shoe to a mounting surface below, or attached to a standard tripod thread.

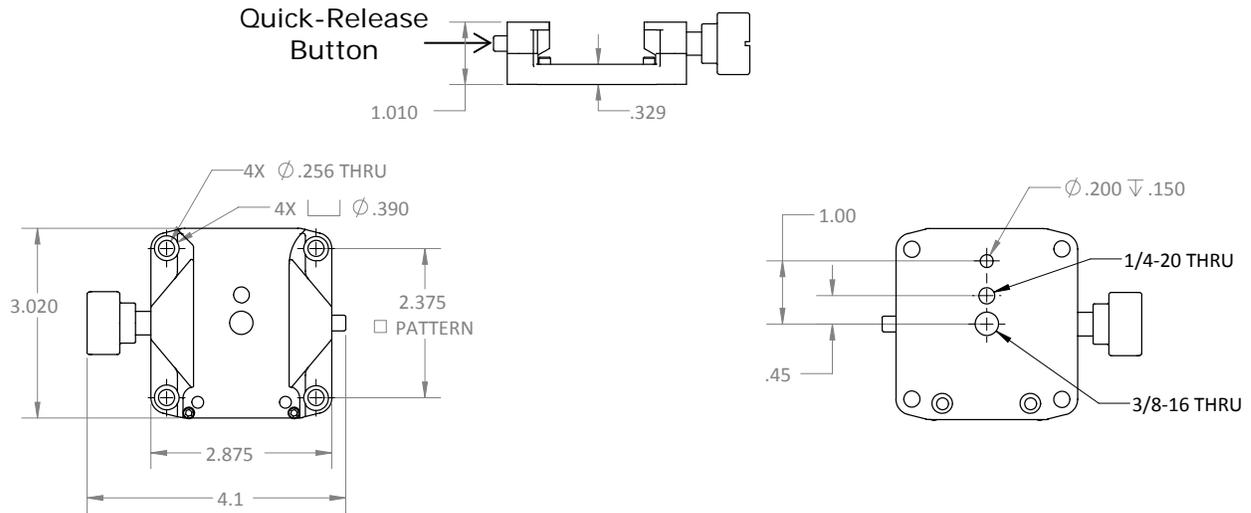
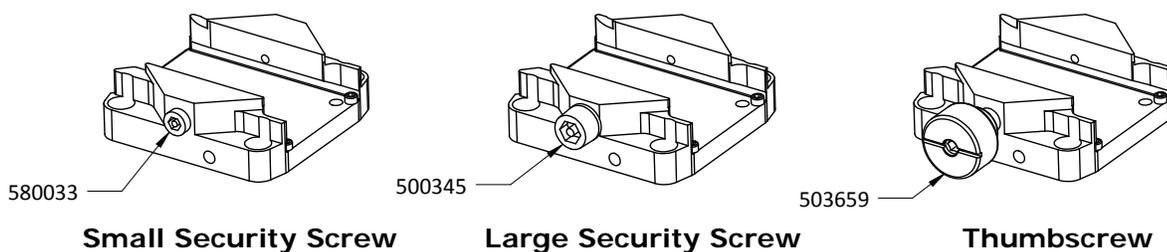


Figure 2: BigFoot™ Mount Dimensions

Locking Screw Options

A variety of locking knobs are available for additional security of mounting. These locking knobs are compatible with both Bigfoot™ & QuickConnect™ products.



- Small Security Hex Lock-Screw (580003): Basic tamper resistance in normal outdoor environments. Uses 3/16" Tamper Hex Tool (RV P/N 480001).
- Large Security Hex Lock-Screw (500345): Basic tamper resistance in harsh outdoor environments; use at oceanside or if large amounts of debris buildup are expected (preferred for Bigfoot™ installations). Uses 5/16" Tamper Hex Tool (RV P/N 480007).
- Thumbscrew (503659): Thumbscrew for quick, tool-free attachment and removal of the PTZ. Integrated standard hex screw if more tightening torque is required. Option to use flat screwdriver or 3/16" Tamper Hex Tool (RV P/N 480001).

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LOOK 6.5™ Controller

Controller Introduction

The LOOK 6.5™ controller governs the operation of the pan/tilt assemblies and cameras. Use the controller to:

- View camera image
- Aim the camera at objects of interest
- Focus the camera
- Preset automated movements and zooms using the preset buttons

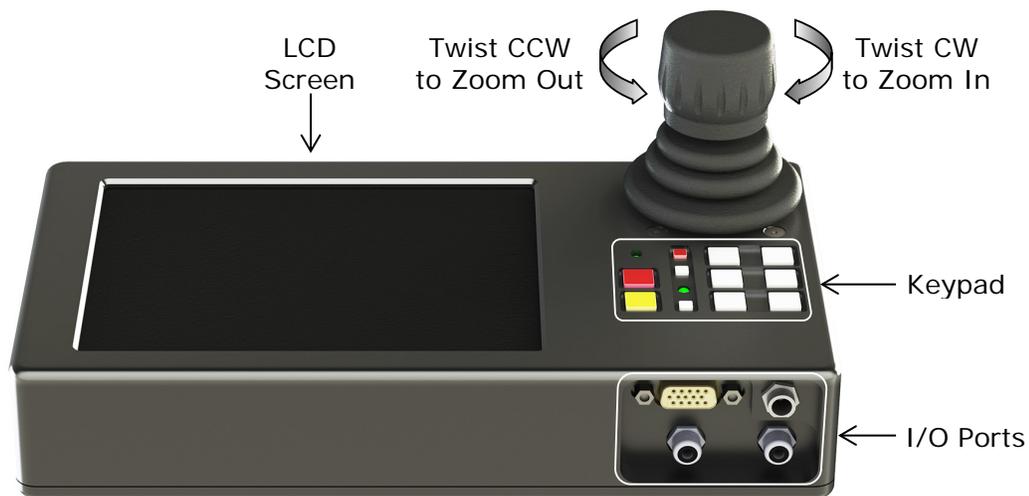


Figure 1: The LOOK 6.5™ Controller

The LOOK 6.5™ has the following main features:

- A screen for viewing the images from the camera and for displaying system messages
- A joystick for pan/tilt motion control and the zoom camera's control
- Keypad for entering commands
- Input/output ports for connecting a camera, power and video/audio outputs
- LOOK 6.5™ Controls

System Dimensions

All dimensions shown in inches.

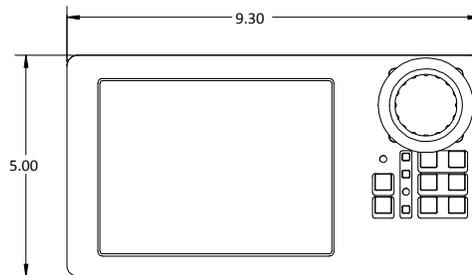


Figure 2: Front Face

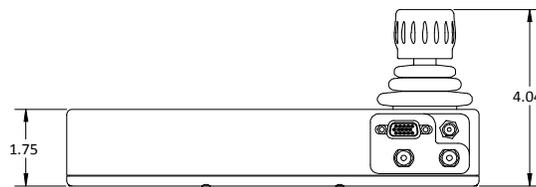


Figure 3: Connector Side View

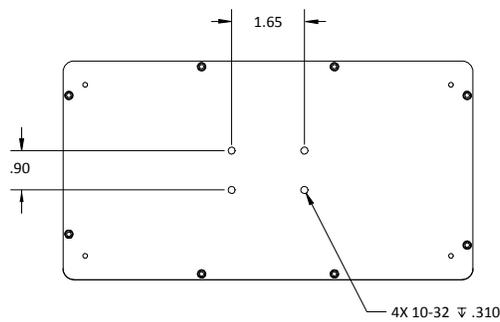


Figure 4: Back Mounting Area

Connect the Cables

This section describes the connections on the LOOK 6.5™. Video 1 and 2 connectors provide output to optional DVR and audio

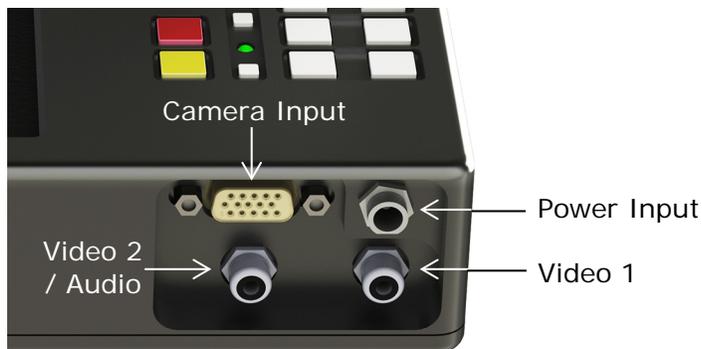


Figure 5: The LOOK 6.5™ Controller Connectors

LOOK 6.5™ Dual Mode connectors and their functions

Connectors	Function
Camera Input	Connector for the camera
Power	Connector for power source (DC only). Connect only once camera is connected.
Video 1 (optional)	Connector for video 1 output (color)
Video 2 / Audio (optional)	Connector for video 2 output (thermal)

Note: Video 1 and 2 connectors provide output to optional TV/DVR and audio devices

System Operation

The LOOK 6.5™ provides an LCD screen, Joystick, and keypad for basic and advanced operation. While many advanced functions are provided in the following tables, many users will find joystick controls and a few keys sufficient for normal operation. For advanced users, a multitude of customized settings are available to integrate into a variety of uses.

LCD Screen

The display screen shows the video image from the camera and status messages from the LOOK 6.5™ controller, such as version identification and the status of cameras connected to the LOOK 6.5™. Possible messages and their meaning include:

Display	Description
687105	Version of firmware
Joystick failure	Joystick calibration error

Joystick

The joystick provides pan/tilt, and camera zoom control. The actions on the joystick and the functions enabled by the action are as follows:

Joystick Action	Function
Move left	Pans left
Move right	Pans right
Move up	Tilts up
Move down	Tilts down
Move up and right	Pan and tilt up and to the right
Move up and left	Pan and tilt up and to the left
Move down and right	Pan and tilt down to the right
Move down and left	Pan and tilt down to the left
Turn clockwise	Camera zooms in
Turn counterclockwise	Camera zooms out

Keypad

The Keypad provides single-touch access to a variety of extended functions, and also allows chording of keys (2nd+key) to access secondary functions. The keypad is also used to control an advanced OSD menu system detailed later in this document.

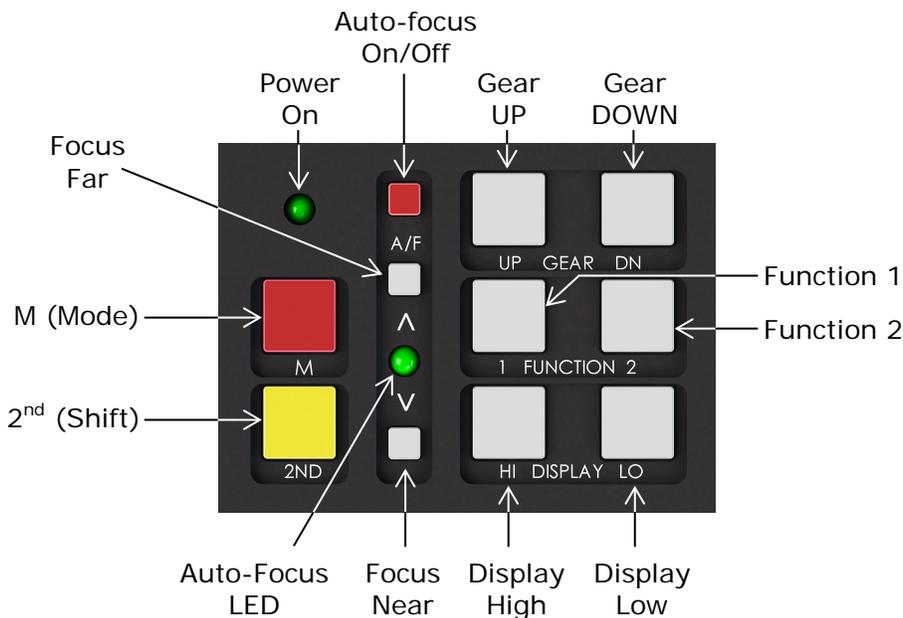


Figure 6: LOOK 6.5™ Controller Keypad

Basic Functions	Key(s)	Comment
Toggle the autofocus on and off	Press Autofocus (A/F)	Light beneath autofocus (A/F) is on when A/F is on and off when autofocus is off
Toggle near infra-red (NIR) low light mode (black and white)	Press M (mode)	Color cameras are normally auto-NIR. For thermals, toggles up to 14 false-color palettes.
Autofocus indication	The green LED (below A/F) will be lit when autofocus is on	Color camera only
Focus Far	Upper small white button	Press the upper white button to focus far. Disable the A/F before use for color camera
Focus Near	Lower small white button	Press the lower white button to focus near. Disable the A/F before use for color camera
Toggle the color camera's image stabilization feature.	Hold the 2ND key, then press HI button	When in Color Mode
Calibrate/reset	Hold the 2ND key and press the A/F button	Moves camera back to home
Gear Up/Down	Adjust speed speed level (three speeds available)	Three speeds available

Extended Function	Key(s)	Comment
Slower Shutter	With auto focus on, press Focus Far button	Toggles on and off
Switch between color and thermal video on LCD	Hold 2nd key and press M	---
Toggle color/NIR mode video in Sony camera display	Press M	When LOOK 6.5™ is connected to a color camera
Toggle thermal white/black hot (or up to 14 palettes)	Press M	When LOOK 6.5™ is connected to a thermal camera
Backlights toggles on and off	Auto focus on and in color mode. Press Focus/ Near button	When LOOK 6.5™ is connected to a color camera
Slower shutter toggles on and off	Auto focus on and in color mode. Press Focus Far button	When LOOK 6.5™ is connected to a color camera
IR LED toggle on/off	Hold 2nd key and press LO	When LOOK 6.5™ is connected to an IR laser/camera
Green LED toggle on/off	Hold 2nd key and press DN	When LOOK 6.5™ is connected to a green laser/camera
Laser Range Finder	Display HI	Measures distance to target with LRF (if equipped)
Clear Laser Range Finder	Display LO	Clears LRF Reading

Presets

Preset positions can be programmed inside the Look 6.5™. Preset tour cycles the pan/tilt/zoom presets 0 and 1. Tour will continue to execute until the process is stopped manually with joystick movement.

Preset Function	Key(s)	Comment
Set Preset 0	Hold the 2nd key and press FUNCTION 1	Stores the current PTZ position as preset 0.
Got to Preset 0	Press FUNCTION 1	---
Set Preset 1	Hold 2nd key and press FUNCTION 2	Stores the current PTZ position as preset 1.
Go to Preset 1	Press Function 2	---
Initiate Tour - five second intervals between each preset is the default	Simultaneously press Function 1 and Function 2	Power LED toggles off and on once when pressing UP/DN to increase/decrease time interval
Stop Tour mode	Move joystick, pan, tilt or zoom	---
Increase/decrease time interval between presets	Press UP/DN key to increase/decrease time interval between presets	---

To set presets 0 or 1 quickly:

- Point and focus on the target you want to preset.
- Press and hold 2nd and Function 1 or 2nd and Function 2.

If more presets are needed, you can set a range from preset 0 to any number you choose (when legacy mode is off). For example, preset 0 through preset 10 or preset 0 through preset 99. To set presets 0 through 99:

- Press and hold *Function 1* or *Function 2* for three seconds. The presets OSD displays the current preset number.
- Each click on *Display HI* or *Display LO* moves to the next preset number.
- 2nd + Function 1 or 2 to set preset.
- M button to recall preset button.

Press and hold *HI* or *LO* to scroll through the preset positions.

- Press and hold 2nd and either *Function 1* or *Function 2* to set the number displayed as the last number in the tour.
- Press and hold *Function 1* or *Function 2* for 3 seconds to clear the preset OSD display.

Preset Touring

Touring mode automatically moves the camera through the preset positions you have defined.

There are two ways to use touring mode:

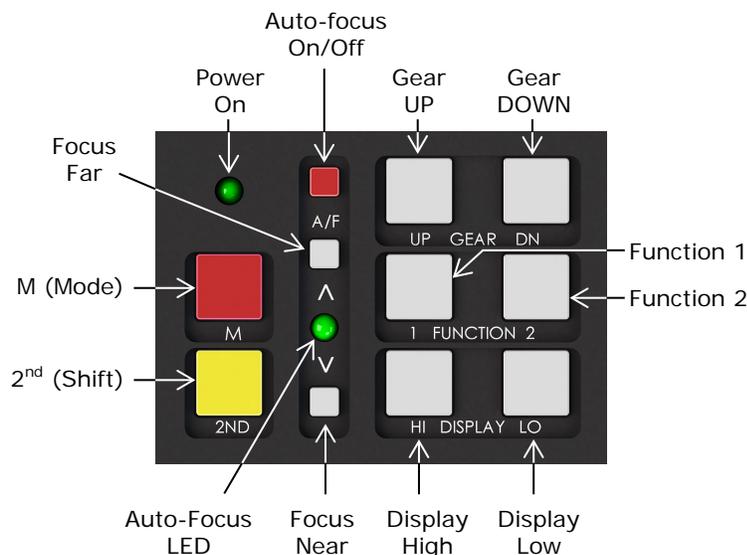
- Tour between presets 0 and 1 without displaying the presets menu by pressing the *Function 1* and *Function 2* keys at the same time.
- Tour between presets 0 and any number you select up to 99 *(when legacy mod is off). To do this:
 - Press *F1* or *F2* for more than three seconds. The preset number is displayed.
 - Set the last preset number in the tour by pressing *HI* to increase the last preset number and *LO* to decrease the last preset number until the desired number is displayed.
- Press *F1* and *F2* to start tour.
- To adjust the time interval at which the camera moves between preset positions in touring mode use the *Gear UP* key to increase the interval and *Gear DN* key to decrease the interval.
- To stop a tour. Move the joystick in any direction to end the tour.

OSD Menu System

For advanced features or system-level configuration, the LOOK OSD (On-Screen Display) Menu system may be accessed by the end user. Press and Hold 'Gear Up' and 'Gear Dn' for several seconds until the OSD menu appears.

```

----- Main Menu -----
1)LOOK Type
2)Communications
3)Camera Functions
4)Az/EI Position
5)Display Control
6)Device IDs
7)Auto-Iris(On/Off)
8)Discover
9)Legacy Mode(On/Off)
10)Current Configuration
11)Exit
  
```



- Menu selector can be moved up and down by pressing 'Gear Up' or 'Gear Dn'.
- Once the desire item is highlighted, press 'M' button (large red) to select the item.
- If the item connects to a submenu, the submenu screen will be shown.
- In order to exit the OSD system, move the selector and pick 'Main Menu' and 'Exit', depending on your position within the menu system. These items are repeated in multiple submenus and will not be mentioned further in the following sections.
- Caution- OSD menu system provides a rich control interface to the system, contact RVision support before use if you have questions on proper use. Test the OSD system on an isolated camera in a lab environment first to learn the system.
- OSD menu screen trees and explanation of available items appear in the following section.

LOOK Type (LOOK Menu)

Selects video switch configuration of control system.

```

----- Main Menu -----
1)LOOK Type
2)Communications
3)Camera Functions
4)Az/EI Position
5)Display Control
6)Device IDs
7)Auto-Iris(On/Off)
8)Discover
9)Legacy Mode(On/Off)
10)Current Configuration
11)Exit

```

```

--- LOOK Menu ---
1)Single LOOK
2)Dual LOOK w/o Switch
3)Dual LOOK w Switch C
4)Dual LOOK w Switch D
5)Main Menu

```

Single LOOK

Single LOOK mode is dedicated to the color camera. No video switch required.

Dual LOOK W/O Switch

Dual LOOK W/O Switch mode is used when operating a color and thermal (heat mapping to color) camera. The video switches used are not in the LOOK 6.5™ Controller. The video switches used are in the color and thermal cameras pan tilts.

Dual LOOK W Switch C

Dual LOOK W Switch C mode is used when operating a carbide camera. The video switch used is in the LOOK 6.5™ Controller. The video switch used is not in the carbide camera pan tilt.

Dual LOOK W Switch D

Dual LOOK W Switch D mode is used when operating an m3G type camera. The video switch used is in the LOOK 6.5™ Controller. The video switch used is not in the camera pan tilt.

NOTE: When used with a dual head camera, the video switch changes the images displayed on the display screen between color and thermal. Do not use dual mode when operating a single head camera: The mode for the missing camera displays as a blank screen. The RCA video outputs are not affected in either version.

Communications (Comm Menu)

Sets LOOK 6.5™ communication parameters in order to match camera.

```

----- Main Menu -----
1)LOOK Type
2)Communications
3)Camera Functions
4)Az/EI Position
5)Display Control
6)Device IDs
7)Auto-Iris(On/Off)
8)Discover
9)Legacy Mode(On/Off)
10)Current Configuration
11)Exit

```

```

--- Comm Menu ---
1)LOOK Baud Rate
2)Port-2 Baud Rate
3)Link Type
4)Main Menu

```

LOOK Baud Rate

Refers to the number of signal or symbol changes that occur per second in the LOOK 6.5™ Controller. (bps is bits per second). The LOOK 6.5™ controller has two serial ports with Port 1 being the default port connected to the PTZ, and port 2 used in daisy chained control systems.

2400/4800/9600/57600bps

Sets the baud rate for Port 1, used for general camera control

Port-2 Baud Rate

Sets the baud rate for Port 2, used for advance pass-through features.

2400/4800/9600/57600bps

Sets the baud rate for Port 2, for use with advanced pass-through features.

Link Type

Allows the user to select between RS-232 or RS-422/485 connections.

RS-232

Cable allows the user to use a single connection. RS-232 allows for one transmitter and one receiver on a line.

RS-422/485

Cable allows the use of a multi-drop connection. RS-422/485 allows for one transmitter and up to 10 receivers on two lines.

Camera Functions (Camera Menu)

Controls various advanced camera serial functions

```

----- Main Menu -----
1)LOOK Type
2)Communications
3)Camera Functions
4)Az/EI Position
5)Display Control
6)Device IDs
7)Auto-Iris(On/Off)
8)Discover
9)Legacy Mode(On/Off)
10)Current Configuration
11)Exit

```

```

----- Camera Menu -----
1)Get Cam Ver:
2)Get Cam S/N:
3)Set Camera: RS-232
4)Set Camera: RS-422/485
5)Set Camera: Baud 2400
6)Set Camera: Baud 4800
7)Set Camera: Baud 9600
8)Set Camera: Baud 57600
9)Toggle(Upright/Inverted)
10)Set Home Position
11)Main Menu

```

Get Camera Ver:

Allows the user to see the software version of the camera/s in use.

Get Camera S/N:

Allows the user to see the serial number/s of the camera/s in use.

Set Camera: RS-232

Set the camera to RS-232 link type

Set Camera: RS-422/485

Set the camera to RS-422/485 link type.

Set Camera Baud: <2400,4800,9600,57600>

Set the camera to 2400/4800/9600/57600bps.

Toggle (Upright/Inverted)

Inverts the camera image and pan/tilt controls. Normally used for ceiling-mount applications.

Set Home Position

Sets homing position of camera on power-up to currently selected position.

Az/EI Position (Az/EI Menu)

Az/EI enables the presentation of the PTZ's azimuth and elevation information on the LOOK screen.

```

----- Main Menu -----
1)LOOK Type
2)Communications
3)Camera Functions
4)Az/EI Position
5)Display Control
6)Device IDs
7)Auto-Iris(On/Off)
8)Discover
9)Legacy Mode(On/Off)
10)Current Configuration
11)Exit

```

```

--- Az/EI Menu ---
1)Off
2)Upper Left
3)Upper Right
4)Lower Left
5)Main Menu

```

Off

No Az/EI information is displayed.

Upper Left

The Az/EI is displayed in the upper left.

Upper Right

The Az/EI is displayed in the upper right.

Lower Left

The Az/EI is displayed in the lower left.

Display Control (Display Menu)

Display Menu adjusts the characteristics of the LCD to modify the on-screen image.

```

----- Main Menu -----
1)LOOK Type
2)Communications
3)Camera Functions
4)Az/EI Position
5)Display Control
6)Device IDs
7)Auto-Iris(On/Off)
8)Discover
9)Legacy Mode(On/Off)
10)Current Configuration
11)Exit

```

```

--- Display Menu ---
1)Brightness 16
2)Contrast 16
3)Color 16
4)Hue 16
5)Dimmer 16
6)Sharpness 16
7)Reset to Default
8)Main Menu

```

Brightness

Adjust lightness of image

Contrast

Adjust light/dark contrast to boost pale images

Color

Adjusts intensity of display color

Hue

Tint color balance

Dimmer

Adjust backlight brightness. Boost for outdoor use, uses more power and will warm device.

Sharpness

Adjust level of detail sharpening filtering in display

Reset to Default

Resets the display controller to the default settings

Device IDs (Device IDs Menu)

Allows for configuration of ID of attached cameras. Use special care when multiple cameras are attached to the system to avoid confusion.

```

----- Main Menu -----
1)LOOK Type
2)Communications
3)Camera Functions
4)Az/EI Position
5)Display Control
6)Device IDs
7)Auto-Iris(On/Off)
8)Discover
9)Legacy Mode(On/Off)
10)Current Configuration
11)Exit

```

```

--- Device IDs Menu ---
1)Device ID:    01
2)New ID:      01
3)Set This Camera w New ID
4)Set All Cameras w New ID
5)Main Menu

```

Device ID:

Allows the user to set a device identity from 1-99.

New ID:

Allows the user to set a new device identity.

Set This Camera w New ID

Sets a camera to the new id entered for assembly code cameras.

Set All Cameras w New ID

Sets all cameras to the new id entered.

Auto-Iris (Auto Iris Menu)

The auto-iris function switched from auto to manual iris control and allows manual adjustment to the camera iris.

```
----- Main Menu -----  
1)LOOK Type  
2)Communications  
3)Camera Functions  
4)Az/EI Position  
5)Display Control  
6)Device IDs  
7)Auto-Iris (On/Off)  
8)Discover  
9)Legacy Mode (On/Off)  
10)Current Configuration  
11)Exit
```

```
--- Auto Iris Menu ---  
1)Auto-Iris On  
2)Auto-Iris Off  
3)Main Menu
```

Auto-Iris On

Turns on the auto-iris function on the camera. The auto iris opens and closes the lens iris as the light changes and prevents the camera from being damaged by very bright sunlight. Auto irises are motorized, allowing them to automatically adjust the iris opening to the changing light throughout the day. It is better suited to record in outdoor locations where the changes between sunlight and nighttime can be automatically adjusted for.

Auto-Iris Off

Turns the auto-iris function of the camera off.

Discover (Discover Menu)

Discovery allows the controller to locate an attached camera if parameters are unknown by cycling through all possible baud rates, link types, and camera IDs based upon that Auto parameter being turned On. When off, the displayed setting is used. Note that with all the Auto parameters on, the Discovery process can take several minutes.

```

----- Main Menu -----
1)LOOK Type
2)Communications
3)Camera Functions
4)Az/EI Position
5)Display Control
6)Device IDs
7)Auto-Iris(On/Off)
8)Discover
9)Legacy Mode(On/Off)
10)Current Configuration
11)Exit

```

```

--- Discover Menu ---
1)Auto Baud: On 2400
2)Auto Link: Off RS-232
3)Auto CamID: Off 01
4)Discover: Started
5)Main Menu

```

Auto Baud:

On/Off If on, directs the LOOK™ to try each of the baud rates (2400/4800/9600/57600 bps) to Discover the PTZ camera. If off, the LOOK™ will use the displayed baud rate during the Discovery process.

Auto Link:

On/Off If on, directs the LOOK™ to try each link type (RS-232/RS-422) to Discover the PTZ camera. If off, the LOOK™ will use the displayed link type during the Discovery process.

Auto CamID:

On/Off If on, directs the LOOK™ to try each camera ID (01...99) to Discover the PTZ camera. If off, the LOOK™ will use the displayed ID during the Discovery process.

Discover:

Started/Stopped/Found Select Start to initiate the Discovery process and the Started will be displayed. Press Stop to stop the Discovery process as it will continue indefinitely until the PTZ camera is found. Note that there are circumstances when a camera may not be Discovered. The LOOK™ will display Found if the Discovery process establishes communications with the PTZ camera, and the displayed values for baud, link type, and camera ID will display the PTZ camera's configuration.

Once a PTZ camera has been discovered, the LOOK™ can be used to pan/tilt/zoom the cameras as described above, or be reconfigured. In addition, the LOOK™ will store the Discovered camera's configuration in its non-volatile memory.

Legacy Mode (Function Menu)

The LOOK 6.5™ has many advanced functions beyond the LOOK 6.0™, including 100-preset support and azimuth/elevation display. In order to accommodate some of these features, some legacy functionality and button mappings were changed in the LOOK 6.5™. For installations with many existing LOOK 6.0™ devices, it may be desirable to enable legacy functionality when installing new controllers to avoid confusion and retraining. With Legacy Mode ON, software functionality of the LOOK 6.5™ is modified to match the LOOK 6.0™. This configuration is reversible by opening the OSD menu and turning legacy mode OFF to restore full LOOK 6.5™ functionality.

```

----- Main Menu -----
1)LOOK Type
2)Communications
3)Camera Functions
4)Az/EI Position
5)Display Control
6)Device IDs
7)Auto-Iris(On/Off)
8)Discover
9)Legacy Mode(On/Off)
10)Current Configuration
11)Exit

```

```

--- Function Menu ---
1)Legacy Mode On
2)Legacy Mode Off
3)Main Menu

```

Legacy Mode On:

Enable Legacy mode, uses LOOK 6.0™ features.

Legacy Mode Off:

Disable Legacy mode, uses LOOK 6.5™ features.

NOTE: When Legacy mode is enabled, advanced preset and tour functionality is disabled and single-button access to two presets is enabled.

Current Configuration

Shows currently set options currently set on the controller.

```

----- Main Menu -----
1)LOOK Type
2)Communications
3)Camera Functions
4)Az/EI Position
5)Display Control
6)Device IDs
7)Auto-Iris(On/Off)
8)Discover
9)Legacy Mode(On/Off)
10)Current Configuration
11)Exit

```

```

Current Configuration
* LOOK: Dual w Switch D
* Protocol: Visca
* Link: RS-232
* Baud: 2400
* Port-2 Baud: 9600
* Legacy: Off
* Device ID: 01
* Az/EI: Lower Left
* Auto-Iris: On
Main Menu

```

LOOK:

Shows the current operational mode Single, Dual W/O Switch, Dual W Switch C, or Dual W Switch D.

Protocol:

Shows the current camera control protocol used with PTZ cameras.

Link:

Current link type selected.

Baud:

Shows the Port 1 baud rate settings: 2400, 4800, 9600 or 57600 bps.

Port 2 Baud:

Shows the Port 2 baud rate settings: 2400, 4800, 9600 or 57600 bps.

Device ID:

Shows the current device ID setting from 01- 99.

Az/EI:

Shows the current Az/EI info display position (or off).

Auto-Iris:

Shows the auto/manual iris status.

RVision, Inc.

pSEE™ Control Software

Installing pSEE™ Software

pSEE™ is not currently available on the Web and can only be downloaded by submitting a request via e-mail. To obtain the pSEE™ URL, send an e-mail to RVision at the following address.

techsupport@rvisionusa.com

NOTE: If the computer running pSEE™ is networked, the network administrator may be required to install pSEE™. Contact your network administrator for any additional instructions.

To install pSEE™ perform the following steps.

Enter the URL sent by RVision Web browser address bar and press Enter. Click to allow your browser to download the file if prompted.

NOTE: pSEE is downloaded as a zipped file. Firewalls may have issues with applications, speak with your IT department if you are unable to receive the file through your system.

- Open the zip file pSEE.zip.
- Drag the file pSEE.exe application onto the Desktop and launch it.



Figure 1: pSEE™ application icon

Using pSEE™ Software

The pSEE™ graphical user interface (GUI) consists of eight tabbed pages that contain functions controlling the payloads attached to the PTZ.

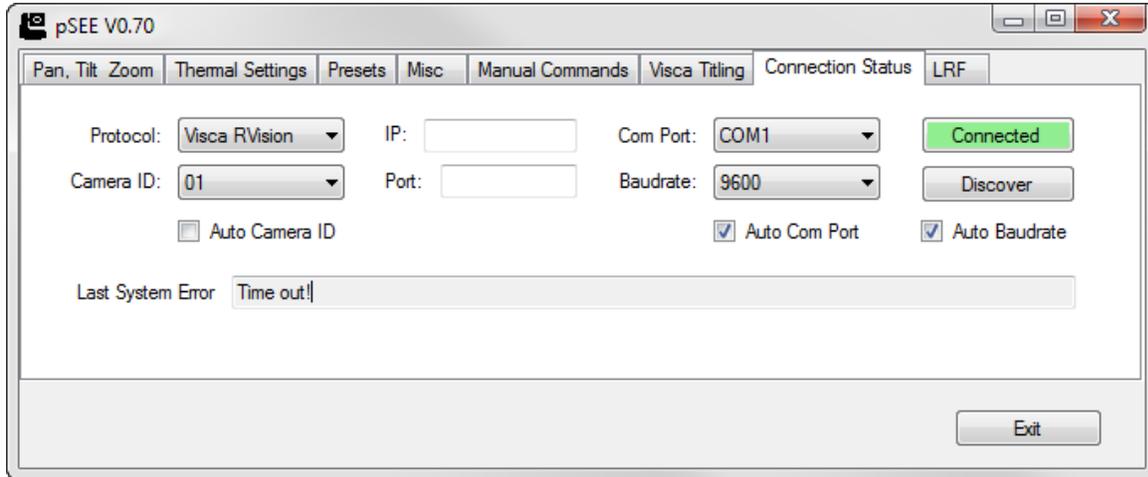


Figure 2: pSEE™ Software Window

The Tabs within PSEE are as follows:

Tab	Function
Connection Status	Communication setup between computer and the attached PTZ camera.
Pan, Tilt, Zoom	Controls the pan and tilt function of the PTZ camera. Controls the color or thermal camera zoom and focus (if equipped). This tab also controls other optional system attributes.
Thermal Settings	Controls polarity, focus, zoom and calibration (if equipped)
Presets	Configurable presets for pan, tilt and zoom functionality. Presets are enabled with single button execution.
Misc (Miscellaneous)	Checks system functions and enables other system attributes.
Manual Commands	Sends any command in the API to the PTZ camera.
Visca Titling	Allows entry of on-screen text. Only for Sony color camera.
LRF	Laser Rangefinder Readings (if equipped)

Connection Status Tab

Upon launching the application, the Connection Status tab is displayed. Select the camera parameters (if known) or click “Discover” to autodetect the camera first (see table below). Click “Connect” to establish control the camera. Clicking “Exit” at any time will exit the application.

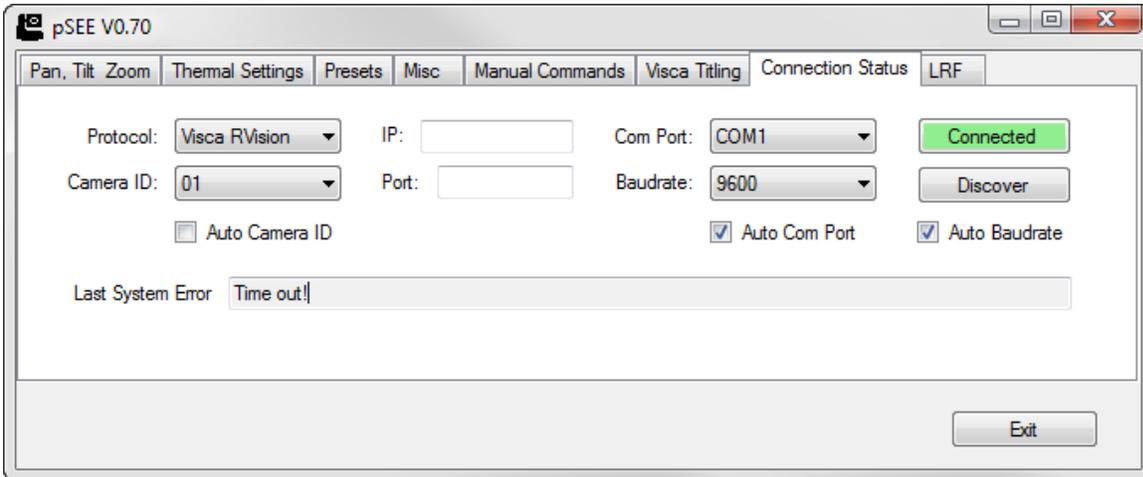


Figure 3: Connection Status Tab

Connection status tab functions are as follows:

User Interface	Description
Protocol	Visca R/Vision only supported.
Camera ID	ID number of connected camera.
Auto camera ID	Autodetect camera ID (when “Discover” is clicked)
IP	IP address of camera (if attached to IP encoder)
IP Port	IP port of camera (if attached to IP encoder)
Com Port	Serial com port of PC attached to camera
Baud Rate	Serial baud rate of attached camera
Auto Com Port	Autodetect com port (when “Discover” is clicked)
Connect (or Connected)	Attempt to Connect/Disconnect from camera.
Discover ^a	Attempt to find attached serial camera by testing camera ID, port, and baud rate (as checked).
Auto Baud Rate	Autodetect camera baud rate (when “Discover” is clicked)

a. If the camera is factory set to RS422, it must be adapted to RS232 before connecting. pSEE™ will still sense the camera is “RS232” because of the adapter.

Pan, Tilt, Zoom Tab

The Pan, Tilt, Zoom tab controls the horizontal and vertical position of the pan/tilt and the zoom function of the camera.

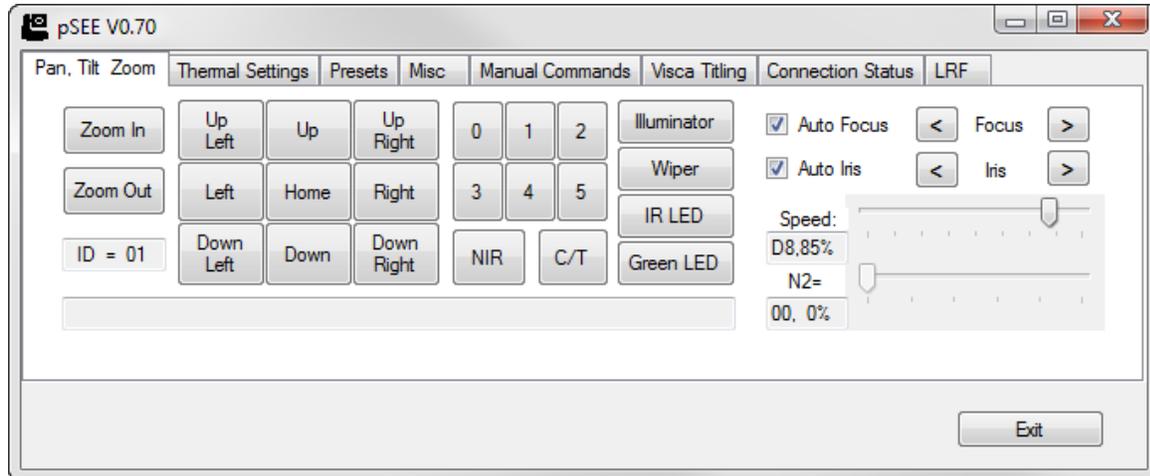


Figure 4: Pan, Tilt, Zoom tab

Pan/Tilt tab functions are as follows:

Function	Description
Pan/Tilt Control	
Up Left	Move left and up.
Left	Move left.
Up Left	Move left and up.
Left	Move left.
Down Left	Move left and down.
Up	Move up.
Home ^a	Move camera back to its preset home position
Down	Move down.
Up Right	Move up and right.
Right	Move right.
Down Right	Move right and down.
0,1,2,3,4,5	Go to one of six presets. See Presets Tab.
Speed	Slider bar to adjust camera movement speed.

Camera Control	
NOTE: This section applies only to the Sony color camera.	
Auto Focus	Enables the automatic mode of object focus when checked. Unchecking the "Auto Focus" enables the "Focus" slider for manual operation.
Auto Iris	Toggles Auto iris and allows for manual iris control with slider.
Focus	Manual focus adjustment for the color CCTV camera. Must uncheck Auto-focus to be used.
Zoom In	Narrow field of view.
Zoom Out	Wide field of view.
Miscellaneous	
C/T	Switch between thermal and color video. Only for video switch units.
Illuminator	Toggle lamp power (if equipped).
Wiper	Toggle wiper (if equipped).
N2=	Displays the amount of Nitrogen left in the camera. Slider cannot be moved. Only for Sony color camera.
IR LED	Toggles LED or Laser illuminator (if equipped). Control key must be held down while activating.
Green LED	Toggles LED or Laser illuminator (if equipped). Control key must be held down while activating.

a. The default home position is set so that the camera is pointed towards the eye-bolt and optically level to the horizon. The specific home Az/EI varies based upon the type of PTZ camera. The home position can be modified by the user. Contact RVision support for assistance in modifying this position.

Thermal Settings Tab

The Thermal Settings tab contains functions to control a thermal camera core and lens, if present.

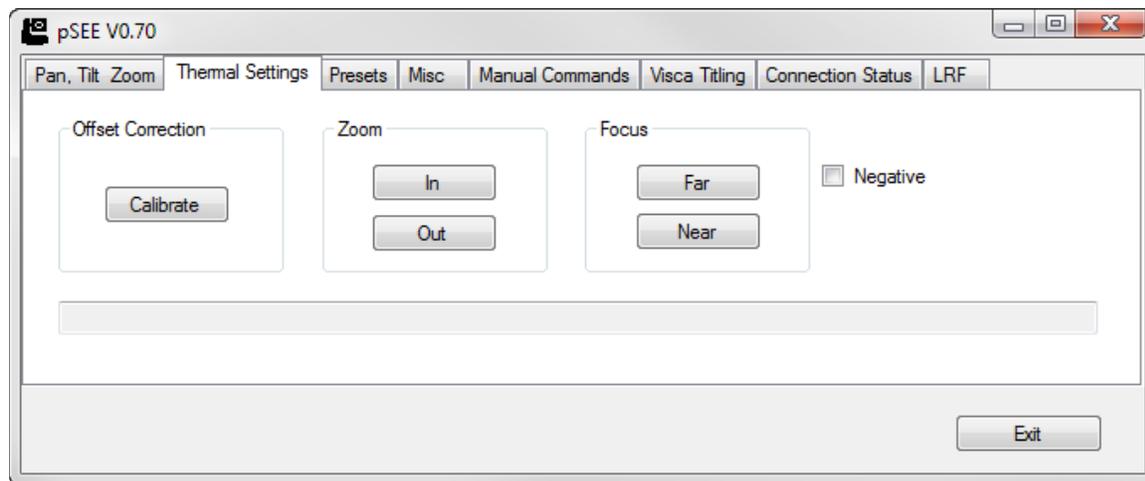


Figure 5: Thermal Settings tab

Misc tab functions are as follows:

Function	Description
Calibrate	Cycles the shutter in the camera to perform non-uniformity correction (NUC) to clear accumulated image artifacts. Imagery will freeze briefly while NUC calibration is performed.
Zoom In	Zoom in to enlarge thermal imagery on-screen ^a .
Zoom Out	Zoom out to reduce thermal imagery on-screen ^a .
Focus Near	Adjusts thermal focus to be nearer to the camera ^b .
Focus Far	Adjusts thermal focus to be farther from to the camera ^b .
Negative	Toggles between white hot/black hot palettes

a. If an optical-zoom lens is not present, digital zoom may be performed, either in steps (1/2/4/8x) or continuous fashion, depending on the system configuration.

b. Thermal focus only available on some camera models. Fixed-lens cameras focus is set from minimum practical distance to infinity and does not require further adjustment.

Presets Tab

The Presets tab controls the configuration of up to 100 preset pan and tilt functions.

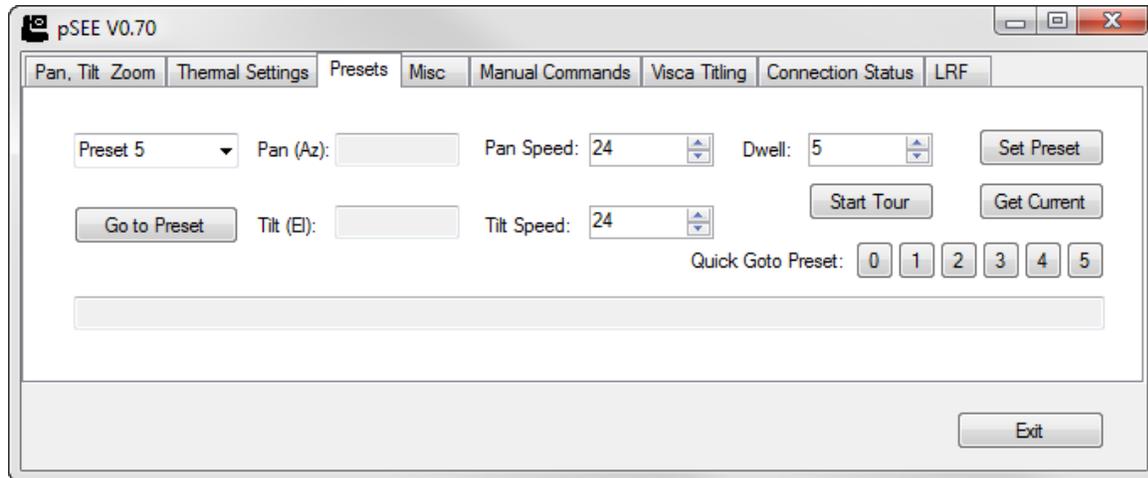


Figure 6: Presets tab

Preset tab functions are as follows:

Function	Description
Preset <i>n</i>	Pull-down menu allows single selection of 100 presets. When a tour is started, the preset shown in this drop-down menu will be the last in the tour before looping back to the beginning.
Get Current	Detects the current position of the camera.
Pan	Horizontal camera position to store.
Tilt	Vertical position to store.
Pan Speed	Speed of horizontal movement. (1-24)
Tilt Speed	Speed of vertical movement. (1-24)
Dwell	Dwell time is the amount of time the PTZ remains at the preset and includes travel time. For example, if it takes 1 second to travel to the preset, and the dwell time is set to three, then the PTZ remains at that position for two seconds.
Goto Preset	Execute one of 100 preset commands.
Set Preset	Save the position displayed.
Tour Mode	Enable the continued loop of preset commands.

Storing a Preset

1. Move the camera to the desired position.
2. Select desired preset from the pull-down menu located in the upper left corner of the Presets tab.
3. Click Get Current.
4. Enter the desired pan and tilt speed (1-24).
5. If the preset is to be used in a tour, check "Last preset in tour" if it will be the final preset in the tour.
6. If used as part of a tour, enter the dwell time in seconds.
7. Click Set Preset.

NOTE: Many camera settings such as color camera zoom will be stored as part of the preset.

Misc (Miscellaneous) Tab

The Misc (Miscellaneous) tab contains several general camera functions.

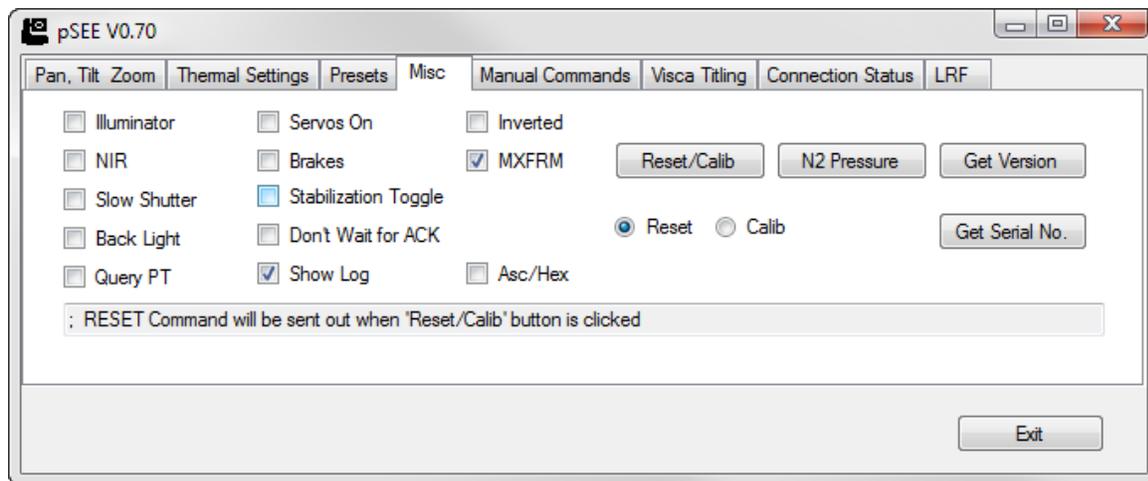


Figure 7: Misc tab

Misc tab functions are as follows:

Function	Description
Illuminator	Toggle lamp power (if equipped)
NIR toggle ^{a,b}	Toggle the color cameras near infrared mode on and off. Sony color camera only.
Slow shutter ^{b,c}	Increase camera sensitivity for slow-moving or fixed subjects in very low light. Sony color camera only.
Backlight	Check when light source is behind subject. Sony color camera only.
Query PT	Continuously queries pan/tilt to update pan/tilt position in Pan/Tilt/Zoom tab.
Servos On	Not supported. Leave off.
Brakes	Not supported. Leave on.
Stabilization Toggle	Turn video image stability off or on. Corrects low frequency vibration. Sony color camera only.
Don't wait for ACK	Check to continue next command without waiting for software or device ACKnowledgement. Necessary on one-way links or slow COM connections.

Misc tab functions (Continued)

Function	Description
Show Log	Check to display sent commands and device acknowledgements in a separate "log window".
Inverted	Flips camera video and motion to inverted mounting of pan/tilt.
MXFRM	MXFRM mode- for use with XFRM camera systems only.
Asc/Hex	Choose character mode for logfile window.
Reset/Calib (Button)	Either send a soft-reset or calibrate command to the PTZ (depends on radio buttons below)
Reset (Radio Button)	Pick Reset function for Reset/Calib button
Calib (Radio Button)	Pick Calibrate function for Reset/Calib button
N2 Pressure	Check N2 Pressure; results will appear below.
Get Version	Display Camera firmware version. Results will appear below.
Get Serial No.	Display Camera serial number. Results will appear below.

- a. Auto-NIR enabled at the factory. Sony color camera only.
- b. Contact RVision support for camera API to modify the default setting
- c. Auto-slow shutter enabled at the factory. Sony color camera only.

Manual Commands Tab

The Manual Commands tab is used to enter and transmit up to three hexadecimal format commands, for example, commands to change the communications, baud rate and camera ID.

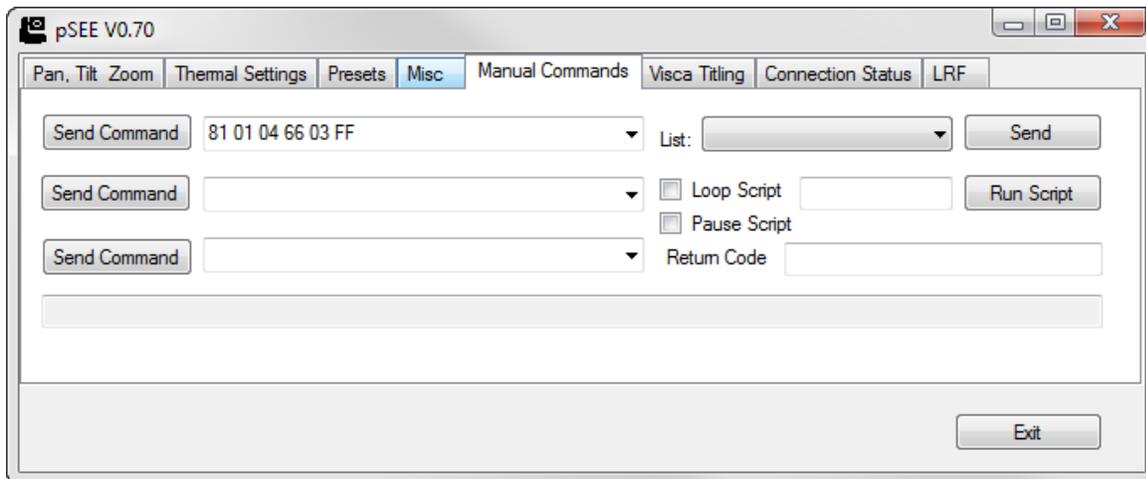


Figure 8: Manual Commands tab

Manual Commands tab functions are as follows:

Function	Description
Send Command	Transmit displayed command string to the Carbide-16™.
List	Select from one of multiple pre-formatted commands.
Send	Send selected command from the list.
Run Script	Runs selected script.
Pause Script	Pauses Running script.
Loop Script	Repeatedly run selected script.
Return Code	Display device acknowledgement or system response to last command sent.

NOTE: Use Show Log in Misc tab to display a running log file of commands sent and camera acknowledgments.

Titling Tab

The Titling tab contains functions for inserting text into the video image. Applies to Sony color camera only.

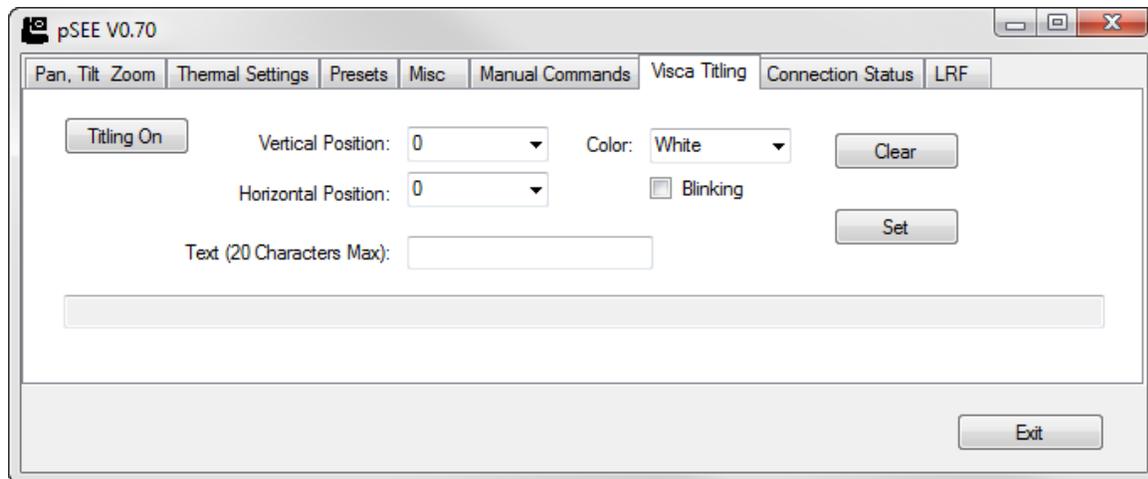


Figure 9: Titling Tab

Titling tab functions are as follows:

Function	Description
Titling On	Enables title mode. The text must be set for the title to be displayed.
Vertical Position	Increase value to move title down.
Horizontal Position	Increase value to move title right.
Text	Twenty characters maximum, alphanumeric, and uppercase only.
Color	Color of title text white, yellow, violet, red, cyan, green or blue.
Blinking	Turn blink mode on or off.
Clear	Clears text.
Set	Sends text into image title position. "Titling on" must be set to display the text.

LRF Tab

The LRF tab contains functions for controlling the LRF, if installed in the camera. The LRF (Laser Rangefinder) uses a laser pulse to test the distance to a target. Consult the manual section specific to your product to determine proper laser safety procedures. LRFs have differing resolution and range depending on model, and performance may be affected by inclement weather, object clutter, or reflectivity of the target.

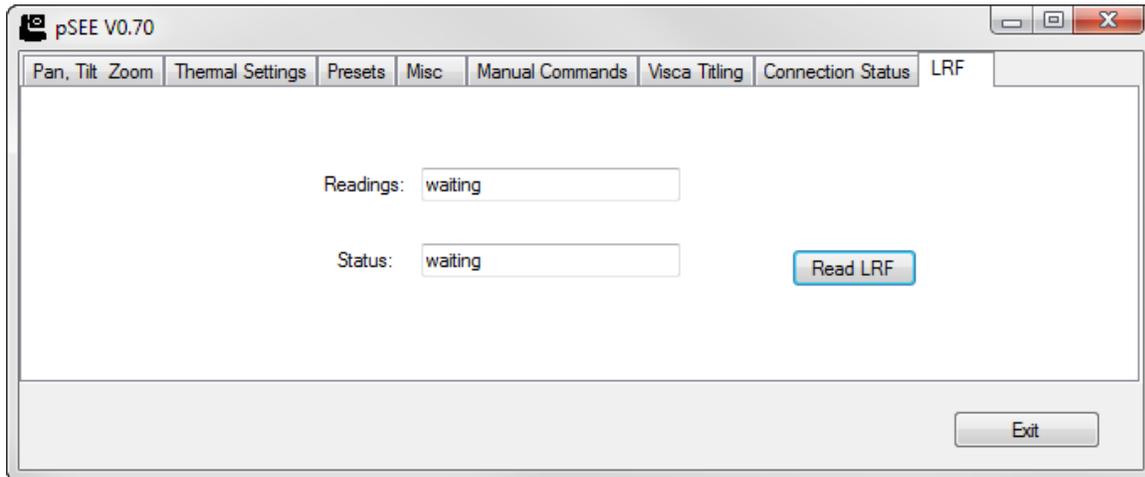


Figure 10: LRF Tab

LRF (Laser-Rangefinder) tab functions are as follows:

Function	Description
Readings	Displays range to target, measured in meters.
Status	Displays status of LRF, such as readiness to range or error states
Read LRF	Press button to range target. LRFs have a maximum repeated repetition rate, see product specs for more information. .

Changing Camera Configurations

Cameras shipped from RVision are set to RS232, 9600 bps, ID1, unless a different configuration is requested at time of purchase. Most RVision cameras can be reconfigured after purchase using the pSEE™ application. These common configuration steps are illustrated below.

Changing the Baud Rate

To change the baud rate, go to the Manual Commands tab and select the baud rate from the List pull down menu. Click 'Send' to set the baud rate.

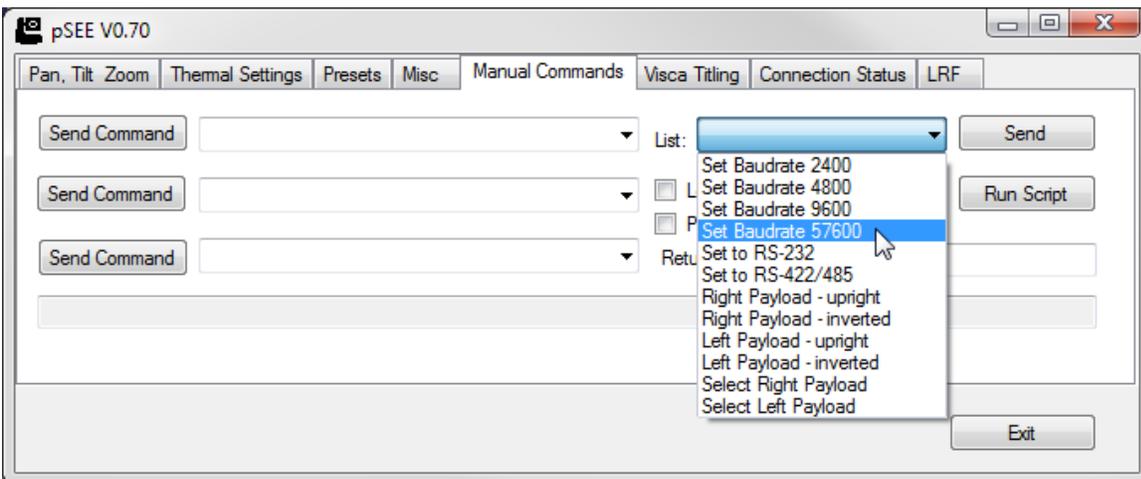


Figure 11: Changing Baud Rate

Once the baud rate is set, exit pSEE™ and reset power to the camera.

The new baud rate can be verified by restarting pSEE™. The new baud rate should be displayed when the camera is auto-detected using the 'Discover' button.

Changing the Camera ID

The camera ID can be changed to suit an installation with multiple cameras on a single RS485 communication bus. By setting each camera to a unique camera ID, each camera can be controlled independently from a suitable controller. The camera ID is changed through a command entered manually in the Manual Commands tab.

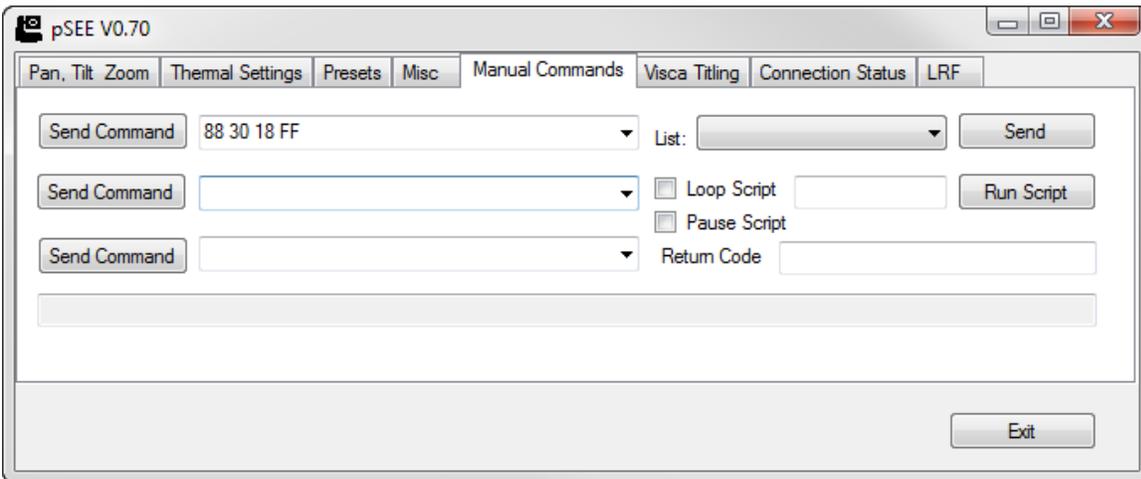


Figure 12: Changing the Camera ID

NOTE: Additional configuration may be required in third-party controllers and matrix switchers to accommodate this change. In order to avoid confusion, it is advised to connect each camera on its own directly to a computer to set camera IDs. Once this is complete, place the cameras into a larger installation.

To change the camera's ID (factory default is set to 1) use the Send Command field in the Manual Commands tab enter the following command:

88 30 AB FF

Where AB is the hexadecimal camera address.

As an example, to set the camera ID to 24 the AB parameter is hexadecimal 18.

88 30 18 FF

NOTE: Camera ID 08 is reserved for the system. ID 0 is not used.

Contact RVision support at techsupport@rvisionusa.com to request Camera API which lists the supported commands.

Set RS-232 or RS-422/485

When the camera is set to RS232, communications to a computer with a serial port is possible with the use of a breakout cable. Third-party systems may use RS232 or may require switching to RS422/485. If RS485 is required, pSEE can set this format with a simple drop-down menu.

NOTE: Computers that have a serial port normally use RS232. When the camera is set for RS422/485, this serial connection must be adapted back to RS232 to communicate with the computer. A 4-wire full-duplex RS422/485 to RS232 adapter (Telebyte TB253P or similar, RVision P/N: 200310 & 700510) with the proper end-wiring will adapt this connection.

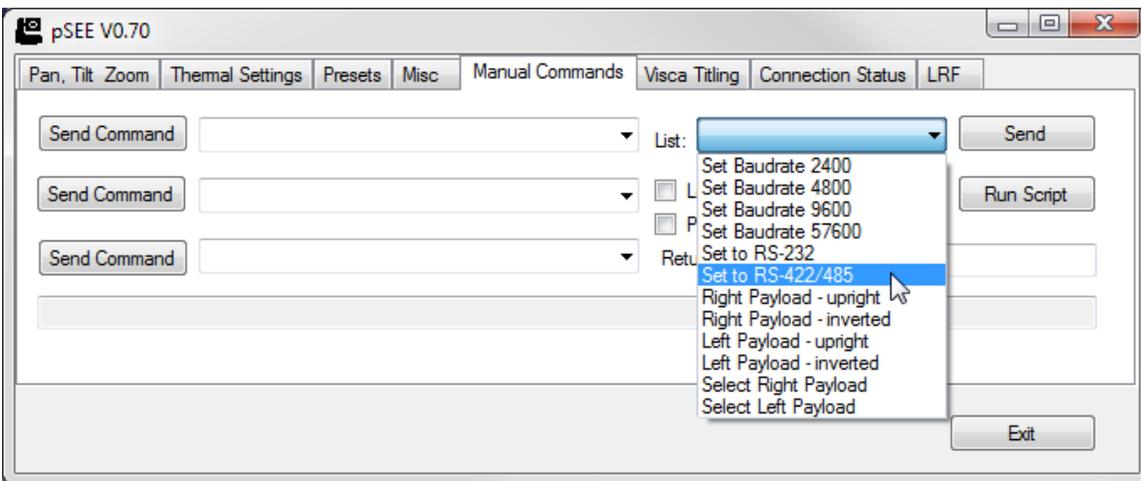


Figure 13: Set RS-232 or RS-422/485

Hook up the proper cabling and establish a connection to the camera. In the 'Manual Commands' tab, select the dropdown to set to RS-232 or RS-422/485 and click 'Send'.

To test the new setting, turn off the camera and exit pSEE™. Change the serial cabling between RS232 and RS422/485 with adapter as required. Turn on the camera power and restart pSEE™. Click Discover to locate the camera.

If pSEE™ cannot locate the camera, double-check connections and adapter wiring. Contact RVision for assistance.

RVision, Inc.

Care & Cleaning

General Care



CAUTION

The thermal camera is an expensive and sensitive instrument. Observe the following in handling and using the thermal camera.

- Do not subject the camera to any physical impact.
- Do not drop the camera.
- Do not aim the camera toward the sun. Solar radiation may cause damage to the camera's sensor.
- Do not scratch or abrade the lens.
- Do not submerge the lens in any type of liquid.
- Do not exceed the camera's operating temperature range.
- The camera will not transmit an image under water, or through glass or any material with a shiny surface. Such materials reflect thermal radiation.
- The camera is sensitive to strong electromagnetic radiation. Do not position the camera near a radio-frequency source, or any other type of source of strong electromagnetic radiation.

Cleaning RVision Products

This appendix contains instructions for cleaning RVision products.

**WARNING**

Do not open system enclosures. All servicing of sealed system components should be performed by RVision or the appropriate component manufacturer. Opening system enclosures may lead to invalidation of the product warranty.

**CAUTION**

Do not use a dry cloth to clean the camera window or germanium lens. A dry cloth will scratch and damage the window and lens or the coating on the window and lens.

Camera Window and Thermal Lens

- If the lens or camera window must be cleaned, use 75% isopropyl alcohol and lens tissue.
- Clean the lens with light wiping motions.
- Use a fresh section of tissue with each swipe across the lens so that once removed from the lens, dirt is not dragged back over the surface of the lens.

Exterior Surfaces

**WARNING**

Do not use compressed air to clean the exterior surface as damage may result to the window and lenses, and push sand or particulate matter into the seals.

To remove dirt and smudges, a mild house-hold cleaner such as 409 may be used. For removing fingerprints, use a soft cloth soaked in 75% Isopropyl alcohol. Do not use any industrial-grade solvents as damage to the exterior paint, optics, or O-rings may result. Only 75% IPA should be used on optical window or lens surfaces.

Foot and Shoe Connector

- Before engaging the high-def connector, verify that the pins and sockets of the male and female connectors are free from sand and other foreign material.
- Blow dust particles from the connector with clean, dry compressed air. This inspection will help prevent electrical shorting and damage to the connectors.
- Before engaging the foot in the shoe, apply a liberal amount of dielectric grease (RV P/N 380085) to the pins and sockets of the high-def connectors.
- Regularly apply a light amount of dielectric grease to the tapered areas of the foot and shoe.

MIL SPEC Connector

- Verify that the pins and sockets areas free from sand and any other foreign material. Blow with compressed air as needed.
- Apply a liberal amount of dielectric grease (RV P/N 380085) to the pins and sockets of the mil-spec connectors.
- Connect the connectors. Verify that the twist lock ring engages properly with the three lock pins. Do not use tools to tighten.

RVision, Inc.

Nitrogen Purging

Nitrogen Introduction

The camera is back-filled with dry Nitrogen (N₂) after air is evacuated to prevent condensation of water within the optics that could reduce visibility or damage the electronic and optical parts within the camera enclosure. N₂ should be checked periodically (3 month intervals are recommended) and can be re-purged at the customer site by following these directions. The installed system permits remote monitoring of N₂ levels. The N₂ should be refilled once N₂ counts drop to 25% above empty level.

**WARNING**

Improper pressure levels can or damaged parts of the camera system or refilling system have the potential to eject glass and other fragments from the system. The following procedure must be strictly adhered to order to prevent injury or death. Pressure level in the camera must not exceed 5.5psi.

Inspect the System

Disconnect camera power and remove the PTZ from its mount. Inspect the enclosure and glass window at the front of the camera enclosure. If the glass is intact, proceed to the next step.

**CAUTION**

Make certain that there are no cracks in the glass. If cracks are detected, do not proceed with the N₂ filling procedure. Store the system in a protected area and contact RVision for further assistance.

Use a Phillips screwdriver to remove the bleed screw on the camera enclosure. Inspect the O-ring of the seal screw for damage or debris, clean or replace seal-screw O-ring if required (Contact RVision for replacements). Apply a small amount of O-ring lube on seal and set aside in clean area. Also clean the bleed screw counter bore area.

Assemble N2 Filling Station

To properly fill N2 of the system, an appropriate filling station must be assembled. A filling station consists of the following items.

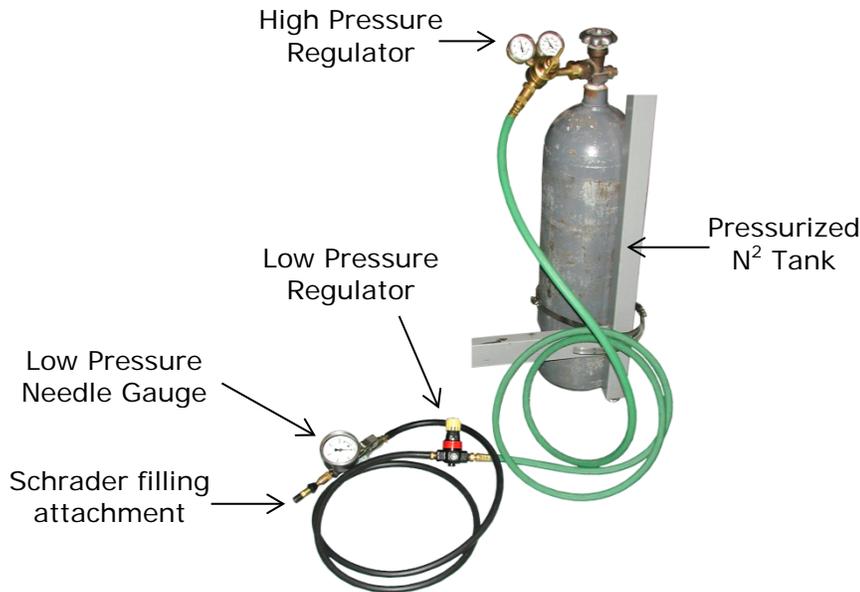


Figure 1: Example of an N2 Filling Station

1. Dry N2 pressurized tank- Available at many industrial supply stores. Strap to a fixed post.
2. High Pressure regulator- Gross pressure regulation, feed-in to low-pressure regulator
3. Low-Pressure regulator- Precision regulation to low levels (not to exceed 5.5PSI to the camera)
4. Low-Pressure needle gauge- Precise measurement of pressure output of N² low-pressure output
5. Schrader filling attachment- Filling hose and Schrader attachment to fill camera enclosure
6. Medium-size Phillips screwdriver: Used to remove purge screw on camera
7. Computer System- Windows 7 or later with PSEE and serial port
8. Camera Connection Cables and test stand w/power supply
9. TV Monitor

Purge the Camera enclosure with N2

Point the camera window away from yourself and make sure others stand clear while refilling the camera. Bleed screw should be removed before executing these steps.

1. If camera enclosure window is foggy, allow time for moisture to dissipate (with bleed screw removed) before proceeding.
2. Check N2 Pressure of filling station is set to 5psi.
WARNING: Camera pressure levels must not exceed 5.5psi or injury may result. PSEE readings of N2 Pressure from the camera enclosure are in 'counts', not psi. Use the needle gauge to accomplish 5psi N2 filling of the camera housing.
3. Remove Schrader valve cap from camera housing.

4. Plug filling hose into camera Schrader valve and begin filling enclosure with bleed screw removed and purge for 30 seconds.
5. Cover bleed hole in enclosure with a finger, observe pressure in enclosure rises to 5psi.
6. Remove finger from bleed hole and repeat purge and release process about five times.
7. Tighten bleed screw while continuing to fill enclosure to 5psi.
8. Replace Schrader valve cap on camera housing.

Verify Proper N² Levels

1. Load camera into QuickConnect™ test stand and power-up camera.
2. After camera has finished self-calibration dance, open pSEE™ software.
3. Connect to camera and verify pan/tilt is functional and clear video is present.
4. Click on "Misc" tab.
5. Click "N2 Pressure" button.
6. N2 Pressure
7. N2 pressure "Now" reading should now be approximately equal to the "Full" pressure (set at the factory). The "Now" pressure should not exceed 180 counts.
8. Press pin lightly within Schrader valve to relieve any excess pressure and Click "N2 Pressure" button to re-check pressure.

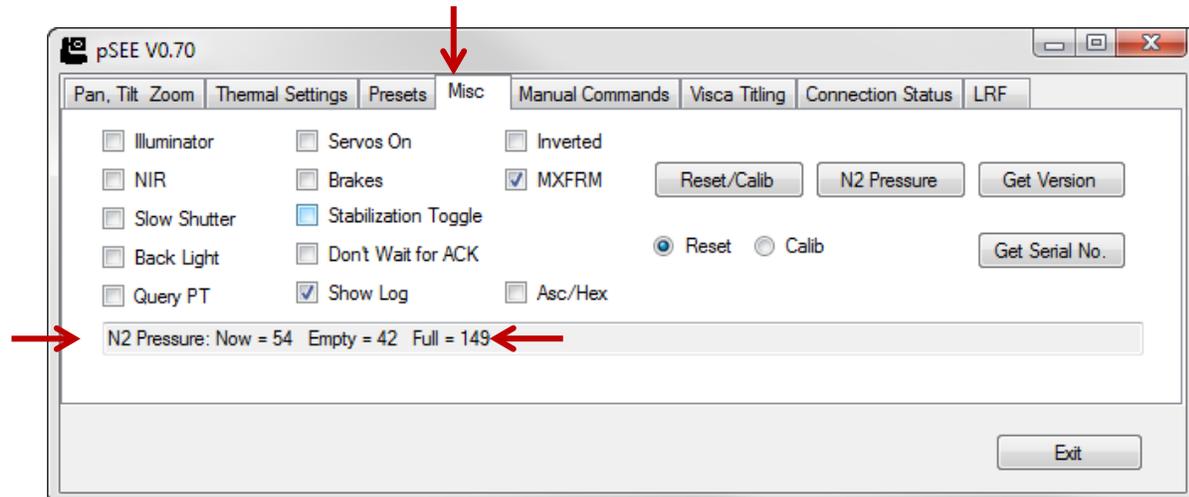


Figure 2: PSEE with MISC tab and N² Values.

Check for Leaks

The Camera may be checked for leaks by setting it aside for a period of several days and rechecking N2 levels. As gas pressure depends on temperature, ambient temperature should be similar when re-checking pressure levels. A reduction of 2 counts of N2 after this period is acceptable.

If it is desired to reinstall the camera immediately, inspection of the enclosure seals with a soap solution may be performed.

1. Mix a solution of 75% water / 25% dish soap.
2. Use a q-tip to apply solution to enclosure seals and around bleed screw and base of Schrader valve.
3. Apply solution to borders of camera window.
4. If bubbles appear and grow, there may be a leak. Set camera aside and retest with PSEE™ at a later date.
5. If no leaks are found, clean camera as outlined in manual and return the system into service

Periodic Maintenance

The camera requires the presence of dry N² to prevent ingress of contaminants into the camera enclosure and eliminate camera video problems due to condensation on the inside of the window.

1. The camera N2 levels should be checked every three months.
2. N2 should be refilled if levels ever drop within 25% of factory empty levels.
3. If the camera exhibits leaks that exhaust N2 levels quickly, contact RVision for support.