



AutoVu™ SharpZ3 Installation Guide 13.6

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You can send your comments, corrections, and suggestions about this guide to documentation@genetec.com.

About this guide

This guide provides you with a complete source of information about how to install and configure an AutoVu™ SharpZ3 system.

You can customize your AutoVu™ SharpZ3 system to fit several different deployment types (for example, parking enforcement or law enforcement).

Depending on the type of installation you require, you might not need to perform all of the steps listed in this document. For hardware installation information related to your AutoVu deployment type, follow the steps in the appropriate installation overview. If you are not sure of which installation overview to use, contact your AutoVu representative.

WARNING: Only AutoVu™-certified personnel should set up and install AutoVu systems. Read all of the procedures in this guide before installing an AutoVu system. Failure to follow the supplied instructions or information might result in loss of data or damage to hardware and will void the warranty.

Notes and notices

The following notes and notices might appear in this guide:

- **Tip:** Suggests how to apply the information in a topic or step.
- **Note:** Explains a special case or expands on an important point.
- **Important:** Points out critical information concerning a topic or step.
- **Caution:** Indicates that an action or step can cause loss of data, security problems, or performance issues.
- **Warning:** Indicates that an action or step can result in physical harm, or cause damage to hardware.

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Getting started

This section includes the following topics:

- ["About Security Center AutoVu"](#) on page 2
- ["About AutoVu mobile ALPR"](#) on page 3
- ["Specifications for the SharpZ3 "](#) on page 5
- ["Storage requirement for ALPR images"](#) on page 8

About Security Center AutoVu

The AutoVu™ automatic license plate recognition (ALPR) system automates license plate reading and identification, making it easier for law enforcement and for municipal and commercial organizations to locate vehicles of interest and enforce parking restrictions. Designed for both fixed and mobile installations, the AutoVu™ system is ideal for a variety of applications and entities, including law enforcement, municipal, and commercial organizations.

Depending on the Sharp hardware you install, you can use AutoVu in a fixed configuration such as on a pole in a parking lot, or in a mobile configuration such as on a patrol vehicle.

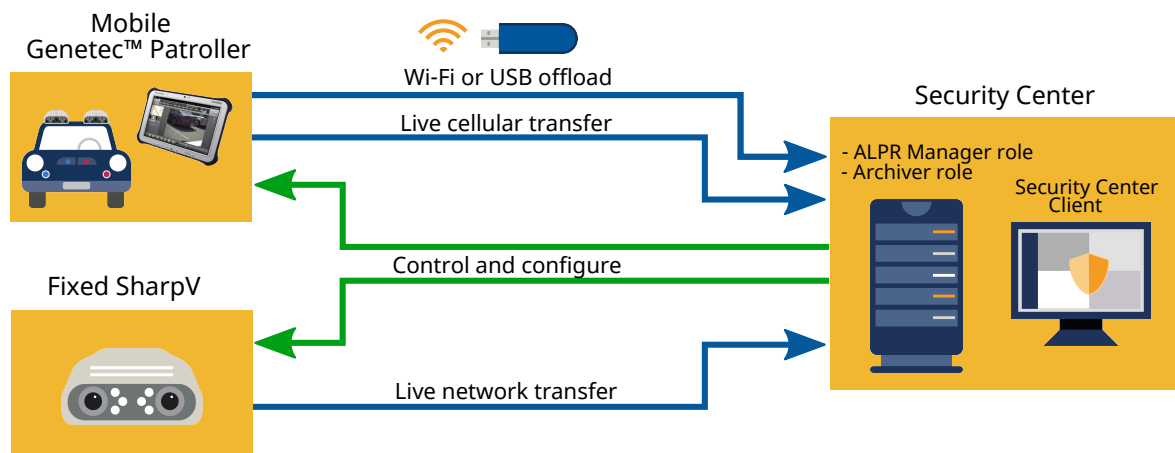
You can use AutoVu for the following:

- Scofflaw and wanted vehicle identification
- City-wide surveillance
- Parking enforcement
- Parking permit control
- Vehicle inventory
- Security
- Access control

AutoVu system architecture

In an AutoVu system, Sharp cameras send license plate images to Genetec Patroller™ or Security Center to be matched against lists of vehicles of interest (hotlists) and vehicles with permits (permit lists). Alternatively, you can send read data for processing in the cloud or using FTP or HTTP.

The following diagram shows how a typical AutoVu system works:



Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



About AutoVu mobile ALPR

Mobile AutoVu™ ALPR solutions use Genetec™ hardware and software installed in a patrol vehicle to capture license plate reads and analytics on the vehicle associated with each read.

All AutoVu hardware and software installed on a vehicle function in conjunction with the on-board Genetec Patroller™ software to collect ALPR data, process license plates through enforcement rules, and if required, transfer the collected data to the Security Center server for storage and later data mining operations.

The ALPR data collected from each vehicle can be transferred to the back office through a cellular data connection, a local Wi-Fi connection, or through a manual transfer via USB. After the data is transferred to Security Center, operators can generate reports to investigate vehicle infractions. This allows operators to search for specific plates and the locations they were spotted, or pull statistical data on the number of hits in a specific geographical region. The strong auditing capabilities of the system paired with its data mining capabilities make this a powerful force multiplier to add evidence to investigations.

SharpZ3 ALPR cameras

Depending on the hardware installed, a SharpZ3 system can support two or four SharpZ3 camera units. Each SharpZ3 camera unit includes three cameras: one color camera to capture a context image of the ALPR read, and two infrared ALPR cameras to capture the license plate. SharpZ3 camera units also have their own built-in illumination to ensure plates are well lit during the capture process at any time of day.



The SharpZ3 camera units are connected to the SharpZ3 base unit which is usually installed in the trunk of the patrol vehicle. Depending on the requirements of the system, a two- or four-camera ALPR module can be installed in the base unit, and up to three expansion modules can be installed, which add additional features to the system such as navigation tracking and additional auxiliary cameras. The ALPR data that is retrieved contains the plate number, a time stamp of the moment of capture, the GPS location of the plate read, a color image of the moment of capture, and an infrared image of the license plate itself.

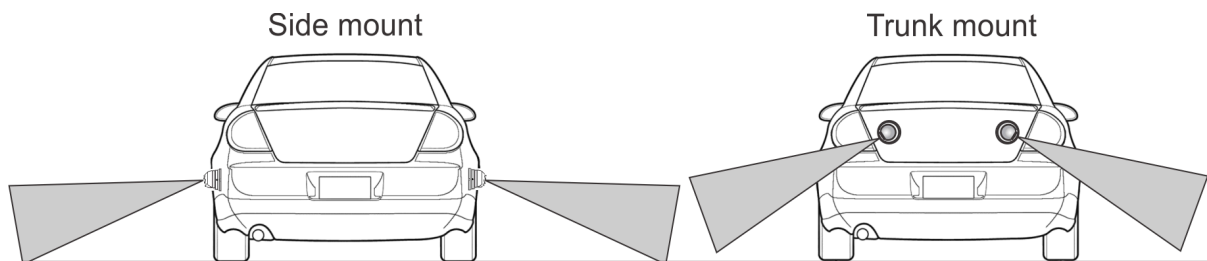
Patroller software and in-vehicle computer

Patroller is the software application installed on the in-vehicle computer. Patroller connects to Security Center to retrieve enforcement rules and upload captured license plate data. Genetec Inc. currently offers the Panasonic FZ-G1 ruggedized tablet as the in-vehicle computer.



Optional wheel-imaging

For time-limited parking enforcement, wheel-imaging cameras can be installed to virtually chalk the wheels of parked vehicles to establish whether they have moved. This replaces manual chalking, where a parking enforcement officer physically marks a tire of a parked vehicle with chalk.



Specifications for the SharpZ3

Refer to the technical, mechanical, and environmental specifications when planning and deploying a SharpZ3 system.

SharpZ3 camera specifications

Specification	Details
ALPR camera sensors	1456(H) x 1088(V) progressive scan @30fps, monochrome, global shutter
ALPR capture range	Up to 19-meter (63-foot) range with retro-reflective license plates
ALPR camera lens options	8 mm, 12 mm, 16 mm, 25 mm
Context camera sensor	<ul style="list-style-type: none"> 1456(H) x 1088(V) progressive scan @30 fps Color B&W night mode with 940nm illuminator Global shutter JPEG still images and MJPEG video streaming
Context camera lens	Based on ALPR lens configuration: 4 mm, 6 mm, 8 mm, 12 mm
Illuminator	<ul style="list-style-type: none"> Pulsed LED illuminator (740 nm, 850 nm, 940 nm, 590 nm)
Water-resistance sealing	IEC 60529 IPx6, IPx7 IEC 60529 IP6x
Dimensions	4.2 cm (h) x 13 cm (w) x 9 cm (d) (1.65 x 5.12 x 3.56 in.)
Weight	0.54 kg (1.2 lbs)
Color	Available in black/white

SharpZ3 base unit specifications

Specification	Details
I/O	Base unit: 2x 10/100/1000 Base-T Ethernet ports (RJ45) 4x digital inputs (triggers), 0–32 V dc, opto-coupled 4x dry-contact outputs (relays): 2x 0.25A solid state relays, 2x 8A electromechanical relays 1x regulated 12 V AUX output power, 200 ma
Mounting options	Horizontal and vertical
Dimensions	9.1 cm (h) x 21.8 cm (w) x 23.6 cm (d) (3.6 x 8.6 x 9.3 in.) Excludes cabling, cable racks, and mounting brackets.

Specification	Details
Weight	Base unit: 2.0 kg (4.4 lbs) ALPR module: 2-ports: 1.9 kg (4.1 lbs) ALPR module: 4-ports: 2.0 kg (4.4 lbs)
Processors	Intel Atom Processor E3950 Intel Myriad X VPU (machine-learning co-processor)
Power	12/24 V dc nominal (9 to 32 V dc) Optional modules: 2x ALPR base unit module: Typical power consumption: 56 W 4x ALPR base unit module: Typical power consumption: 110 W

SharpZ3 system certification (camera and base unit)

Specification	Details
Vibration	IEC 60068-2-64
Shock resistance	IEC 60068-2-27
Electromagnetic immunity and emissions	FCC part 15 Sub-part B ICES-003 Issue 4 CISPR32 / EN55032 CISPR24 / EN55024 CISPR25 / EN55025 EN 50498
CE marking	EMC Directive 2014/30/EU; Automotive EMC Directive 2004/104/EC; RoHS Directive 2011/65/EU
Temperature	Camera unit operating: -40°C to 55°C (-40°F to 131°F) Base unit operating: <ul style="list-style-type: none"> Four-camera ALPR module (no cooler pack): -40°C to 60°C (-40°F to 140°F) Four-camera ALPR module (with cooler pack): -40°C to 65°C (-40°F to 149°F) Two-camera ALPR module (all cases): -40°C to 65°C (-40°F to 149°F) Storage: -40°C to 85°C (-40°F to 185°F) Certifications: IEC 60068-2-1 Category Ad and Ae IEC 60068-2-2 Category Be IEC 60068-2-14 Category Na Includes hi-temp auto-shutoff protection

Part numbers

AU-Z3-W-12F12F-850

A
B
C
D
E

Component	Signification
A	SharpZ3 prefix
B	Color: W (white) or B (black)
C	Primary ALPR lens: <ul style="list-style-type: none">• Focal length: 8 mm, 12 mm, 16 mm, 25 mm
D	Secondary ALPR lens: <ul style="list-style-type: none">• Filter: F: Monochrome sensor with filter M: Monochrome sensor without filter C: Color sensor with filter
E	LED <ul style="list-style-type: none">• Illumination: 590 nm, 740 nm, 850 nm, 940 nm

Storage requirement for ALPR images

The images associated with the reads and hits are stored on disk in G64 files by an Archiver. You can estimate the disk space required to store these images if you know the average number of reads and hits processed by the ALPR Manager per day.

For every license plate read or hit processed by the ALPR Manager, the Archiver stores a set of four images:

- One context camera image (in either high resolution or low resolution)
- One ALPR camera image (cropped to show only the license plate)
- One context camera thumbnail image
- One ALPR camera thumbnail image

The size of the image set depends on the model of the Sharp camera and whether the context camera is configured to take images in high resolution or low resolution.

Use the following formula to estimate the disk space you need for the desired image retention periods.

$$\text{Disk space} = (\text{ReadsPD} \times \text{ImageSize} \times \text{ReadIRP}) + (\text{HitsPD} \times \text{ImageSize} \times \text{HitIRP})$$

where:

- **ReadsPD:** Average number of reads per day.
- **ImageSize:** Estimated image size per read (depends on the Sharp model and configuration).
- **ReadIRP:** Read image retention period (see ALPR Manager's **Properties** tab).
- **HitsPD:** Average number of hits per day.
- **HitIRP:** Hit image retention period (see ALPR Manager's **Properties** tab).

If your patrol vehicles are equipped with wheel imaging cameras, double the number of hits per day in your formula (there is typically one wheel image per hit).

The following table gives you the rough estimates of the image size per read based on the Sharp model and configuration.

Type of image	Sharp VGA or XGA	SharpV	SharpZ3
High-resolution configuration			
Context camera image	~50 KB	~120 KB	~160 KB
ALPR camera image (cropped)	~3 KB	~3 KB	~2 KB
Context camera thumbnail image	~3 KB	~3 KB	~2 KB
ALPR camera thumbnail image	~1 KB	~1 KB	~1 KB
Total image size per read:	~57 KB	~127 KB	~165 KB
Low-resolution configuration			
Context camera image	~18 KB	-	-
ALPR camera image (cropped)	~3 KB	~3 KB	-
Context camera thumbnail image	~3 KB	~3 KB	-

Type of image	Sharp VGA or XGA	SharpV	SharpZ3
ALPR camera thumbnail image	~1 KB	~1 KB	-
Total image size per read:	~25 KB	-	-

Installation overviews

This section includes the following topics:

- ["About the installation overviews"](#) on page 11
- ["Law enforcement installation overview"](#) on page 12
- ["University parking enforcement installation overview"](#) on page 13
- ["City parking enforcement installation overview"](#) on page 14
- ["Overtime parking enforcement installation overview"](#) on page 16
- ["MLPI enforcement installation overview"](#) on page 17

About the installation overviews

You can customize your AutoVu™ SharpZ3 system to fit several different deployment types (for example, parking enforcement or law enforcement).

Depending on the type of installation you require, you might not need to perform all of the steps listed in this document. For hardware installation information related to your AutoVu deployment type, follow the steps in the appropriate installation overview. If you are not sure of which installation overview to use, contact your AutoVu representative.

Law enforcement installation overview

There are many tasks involved in installing a SharpZ3 system for law enforcement. Use this overview as a reference to guide you through the process.

These are the tasks to perform while on site. If you can't complete the tasks on this checklist, contact your AutoVu representative.

Step	Task	Description	Where to find more information
1	Install the SharpZ3 base unit in the vehicle.	You can mount the base unit anywhere inside the vehicle that is safe, secure, and has good airflow.	<ul style="list-style-type: none"> • Base unit installation on page 36
2	Install the SharpZ3 cameras on the vehicle.	Depending on the hardware ordered, systems can support either two or four SharpZ3 cameras.	<ul style="list-style-type: none"> • About camera mounting on page 50
3	Install and configure the in-vehicle computer.	The in-vehicle computer must be powered through the base unit's auxiliary 8A Max relay.	<ul style="list-style-type: none"> • ToughPad computer installation on page 109
4	Align the SharpZ3 cameras.	You must align your SharpZ3 cameras using the AutoVu Installation Kit so they can read plates accurately.	<ul style="list-style-type: none"> • Camera alignment on page 76
5	Complete the installation.	At the end of the installation you should test the system to ensure that the hardware is functional, and perform a read report to test performance.	<ul style="list-style-type: none"> • Completing the SharpZ3 installation on page 123

University parking enforcement installation overview

There are many tasks involved in installing a SharpZ3 system for university parking enforcement. Use this overview as a reference to guide you through the process.

On site tasks

These are the tasks to perform while on site. If you can't complete the tasks on this checklist, contact your AutoVu representative.

Step	Task	Description	Where to find more information
1	Install expansion modules.	Depending on the deployment type you might need to install one or more expansion modules in the SharpZ3 base unit.	<ul style="list-style-type: none"> • About SharpZ3 expansion modules on page 29
2	Install the SharpZ3 base unit in the vehicle.	You can mount the base unit anywhere inside the vehicle that is safe, secure, and has good airflow.	<ul style="list-style-type: none"> • Base unit installation on page 36
3	Install peripheral hardware.	In addition to the SharpZ3 base unit and cameras, you must install hardware that is associated with vehicle odometry or with SharpZ3 expansion modules.	<ul style="list-style-type: none"> • Navigation hardware options • Installing the SharpZ3 satellite navigation hardware • Install the GlobalSat GPS driver • Installing the odometry sensor • Installing the cellular antenna • Installing the car camera switch
4	Install the SharpZ3 cameras on the vehicle.	Depending on the hardware ordered, systems can support either two or four SharpZ3 cameras.	<ul style="list-style-type: none"> • About camera mounting on page 50
5	Align the SharpZ3 cameras.	You must align your SharpZ3 cameras using the AutoVu Installation Kit so they can read plates accurately.	<ul style="list-style-type: none"> • Camera alignment on page 76
6	Install and configure the in-vehicle computer.	The in-vehicle computer must be powered through the base unit's auxiliary 8A Max relay.	<ul style="list-style-type: none"> • ToughPad computer installation on page 109
7	Complete the installation.	At the end of the installation you should test the system to ensure that the hardware is functional, and perform a read report to test performance.	<ul style="list-style-type: none"> • Completing the SharpZ3 installation on page 123

City parking enforcement installation overview

There are many tasks involved in installing a SharpZ3 system for city parking enforcement. Use this overview as a reference to guide you through the process.

On site tasks

These are the tasks to perform while on site. If you can't complete the tasks on this checklist, contact your AutoVu representative.

Step	Task	Description	Where to find more information
1	Install expansion modules.	Depending on the deployment type you might need to install one or more expansion modules in the SharpZ3 base unit.	<ul style="list-style-type: none"> About SharpZ3 expansion modules on page 29
2	Install the SharpZ3 base unit in the vehicle.	You can mount the base unit anywhere inside the vehicle that is safe, secure, and has good airflow.	<ul style="list-style-type: none"> Base unit installation on page 36
3	Install peripheral hardware.	In addition to the SharpZ3 base unit and cameras, you must install hardware that is associated with vehicle odometry or with SharpZ3 expansion modules.	<ul style="list-style-type: none"> Navigation hardware options <ul style="list-style-type: none"> Installing the SharpZ3 satellite navigation hardware Install the GlobalSat GPS driver Installing the odometry sensor Installing the cellular antenna Installing the car camera switch
4	Install the SharpZ3 cameras on the vehicle.	Depending on the hardware ordered, systems can support either two or four SharpZ3 cameras.	<ul style="list-style-type: none"> About camera mounting on page 50
5	Align the SharpZ3 cameras.	You must align your SharpZ3 cameras using the AutoVu Installation Kit so they can read plates accurately.	<ul style="list-style-type: none"> Camera alignment on page 76
6	(Optional) Install wheel-imaging cameras on the vehicle.	If the system includes the AUX PoE expansion module, you can install wheel-imaging cameras to perform virtual tire-chalking.	<ul style="list-style-type: none"> About installing wheel-imaging cameras in a SharpZ3 system on page 92
7	(Optional) Install AutoVu auxiliary context cameras on the vehicle.	To mount an AutoVu™ auxiliary PoE camera beside a SharpZ3 camera, you can install a SharpZ3 auxiliary camera bracket on the SharpZ3 hardmount.	<ul style="list-style-type: none"> About using AutoVu auxiliary PoE cameras for additional context images on page 100

Step	Task	Description	Where to find more information
8	Install and configure the in-vehicle computer.	The in-vehicle computer must be powered through the base unit's auxiliary <i>8A Max</i> relay.	<ul style="list-style-type: none">• ToughPad computer installation on page 109
9	Complete the installation.	At the end of the installation you should test the system to ensure that the hardware is functional, and perform a read report to test performance.	<ul style="list-style-type: none">• Completing the SharpZ3 installation on page 123

Overtime parking enforcement installation overview

There are many tasks involved in installing a SharpZ3 system for overtime parking enforcement. Use this overview as a reference to guide you through the process.

On site tasks

These are the tasks to perform while on site. If you can't complete the tasks on this checklist, contact your AutoVu representative.

Step	Task	Description	Where to find more information
1	Install expansion modules.	Depending on the deployment type you might need to install one or more expansion modules in the SharpZ3 base unit.	<ul style="list-style-type: none"> About SharpZ3 expansion modules on page 29
2	Install the SharpZ3 base unit in the vehicle.	You can mount the base unit anywhere inside the vehicle that is safe, secure, and has good airflow.	<ul style="list-style-type: none"> Base unit installation on page 36
3	Install peripheral hardware.	In addition to the SharpZ3 base unit and cameras, you must install hardware that is associated with vehicle odometry or with SharpZ3 expansion modules.	<ul style="list-style-type: none"> Navigation hardware options Installing the SharpZ3 satellite navigation hardware Install the GlobalSat GPS driver Installing the odometry sensor Installing the cellular antenna Installing the car camera switch
4	Install the SharpZ3 cameras on the vehicle.	Depending on the hardware ordered, systems can support either two or four SharpZ3 cameras.	<ul style="list-style-type: none"> About camera mounting on page 50
5	Align the SharpZ3 cameras.	You must align your SharpZ3 cameras using the AutoVu Installation Kit so they can read plates accurately.	<ul style="list-style-type: none"> Camera alignment on page 76
6	Install wheel-imaging cameras on the vehicle.	If the system includes the AUX PoE expansion module, you can install wheel-imaging cameras to perform virtual tire-chalking.	<ul style="list-style-type: none"> About installing wheel-imaging cameras in a SharpZ3 system on page 92
7	Install and configure the in-vehicle computer.	The in-vehicle computer must be powered through the base unit's auxiliary 8A Max relay.	<ul style="list-style-type: none"> ToughPad computer installation on page 109
8	Complete the installation.	At the end of the installation you should test the system to ensure that the hardware is functional, and perform a read report to test performance.	<ul style="list-style-type: none"> Completing the SharpZ3 installation on page 123

MLPI enforcement installation overview

There are many tasks involved in installing a SharpZ3 system for Mobile License Plate Inventory (MLPI). Use this overview as a reference to guide you through the process.

On site tasks

These are the tasks to perform while on site. If you can't complete the tasks on this checklist, contact your AutoVu representative.

Step	Task	Description	Where to find more information
1	Install expansion modules.	Depending on the deployment type you might need to install one or more expansion modules in the SharpZ3 base unit.	<ul style="list-style-type: none"> • About SharpZ3 expansion modules on page 29
2	Install the SharpZ3 base unit in the vehicle.	You can mount the base unit anywhere inside the vehicle that is safe, secure, and has good airflow.	<ul style="list-style-type: none"> • Base unit installation on page 36
3	Install peripheral hardware.	In addition to the SharpZ3 base unit and cameras, you must install hardware that is associated with vehicle odometry or with SharpZ3 expansion modules.	<ul style="list-style-type: none"> • Navigation hardware options • Installing the SharpZ3 satellite navigation hardware • Install the GlobalSat GPS driver • Installing the odometry sensor • Installing the cellular antenna • Installing the car camera switch
4	Install the SharpZ3 cameras on the vehicle.	Depending on the hardware ordered, systems can support either two or four SharpZ3 cameras.	<ul style="list-style-type: none"> • About camera mounting on page 50
5	Align the SharpZ3 cameras.	You must align your SharpZ3 cameras using the AutoVu Installation Kit so they can read plates accurately.	<ul style="list-style-type: none"> • Camera alignment on page 76
6	Install and configure the in-vehicle computer.	The in-vehicle computer must be powered through the base unit's auxiliary 8A Max relay.	<ul style="list-style-type: none"> • ToughPad computer installation on page 109
7	Complete the installation.	At the end of the installation you should test the system to ensure that the hardware is functional, and perform a read report to test performance.	<ul style="list-style-type: none"> • Completing the SharpZ3 installation on page 123

About SharpZ3 hardware installation

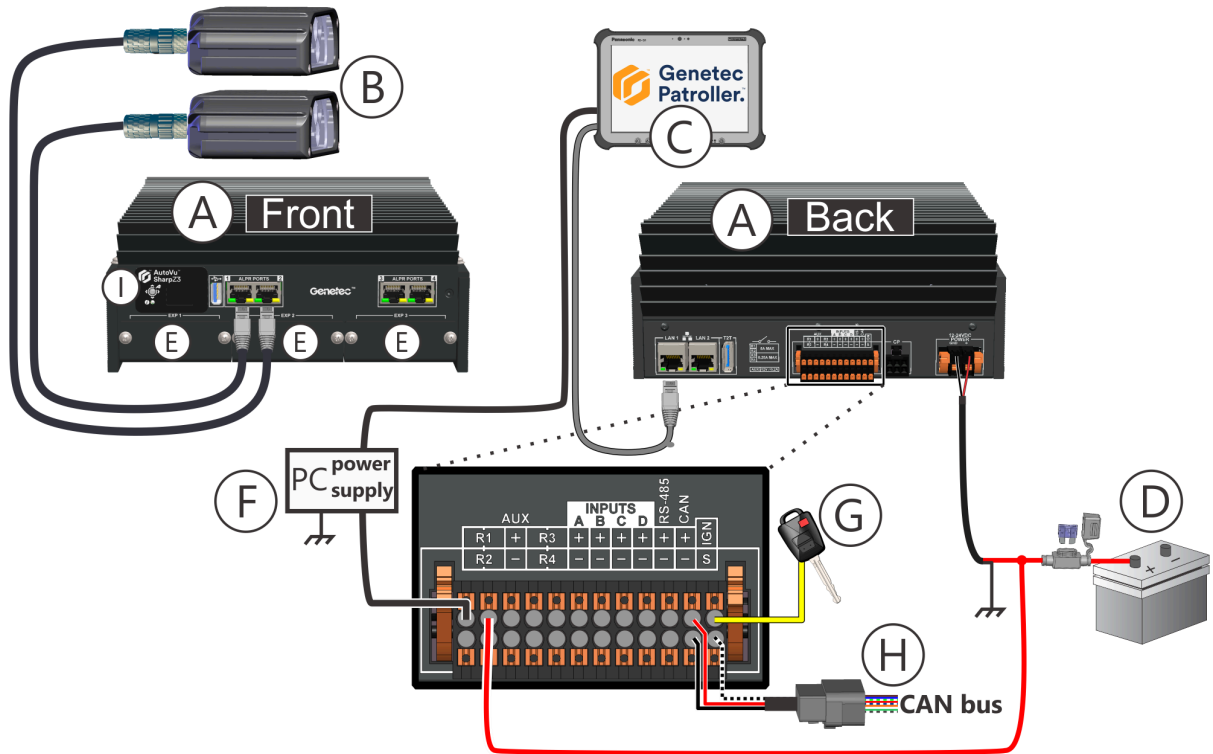
This section includes the following topics:

- ["Hardware components for a SharpZ3 installation"](#) on page 19
- ["Required tools and parts for a SharpZ3 installation"](#) on page 21
- ["About the AutoVu Installation Kit"](#) on page 23
- ["SharpZ3 cabling recommendations"](#) on page 24
- ["Wire ferrules for SharpZ3 installations"](#) on page 25

Hardware components for a SharpZ3 installation

An AutoVu™ SharpZ3 system is installed on law enforcement or parking patrol vehicles. The system typically includes a SharpZ3 base unit, SharpZ3 ALPR cameras, and peripheral devices.

Before installing a SharpZ3 system, familiarize yourself with the hardware components of the system:



Component	What you should know
A Base unit	The base unit is the main processing component of the SharpZ3 system and is generally installed in the trunk of the patrol vehicle. For more information, see Base unit installation on page 36.
B SharpZ3 cameras	SharpZ3 cameras can be installed on the patrol vehicle using a hardmount or a magnetic mount (magmount). Hardware is also available for mounting the cameras on the vehicle's lightbar. For more information, see About camera mounting on page 50.
C In-vehicle computer	The in-vehicle computer displays license plate reads and hits to the driver of the vehicle using Genetec Patroller™ software. SharpZ3 systems generally include a Panasonic ToughPad. For more information, see ToughPad computer installation on page 109.
D Power cable with inline fuse	The base unit is connected to vehicle's battery with a fuse installed as close to the battery as possible. For more information, see Connecting power to the base unit on page 42.
E Expansion slots	To add capabilities to the system, you can install up to three expansion modules in the SharpZ3 base unit. For more information, see About SharpZ3 expansion modules on page 29.

	Component	What you should know
F	In-vehicle computer power supply	Power is supplied to the Panasonic ToughPad using the base unit's 8A relay. For more information, see About powering the in-vehicle computer on page 121.
G	Vehicle ignition	To power the SharpZ3 system, you must connect the base unit to the vehicle's power and ignition signal. When properly connected, the system is supplied with the vehicle's 12 VDC power when the ignition is on. For more information, see Connecting the ignition signal on page 40.
H	CAN bus	Future use.
I	Base unit control interface	Future use.

Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Required tools and parts for a SharpZ3 installation

Before installing SharpZ3 hardware, make sure that you have the tools and parts required to successfully complete the installation process.

Tools

There are a number of additional required tools and parts that are not included with the AutoVu™ installation kit.

- **AutoVu Installation Kit:** Includes several tools that are recommended for AutoVu installations.
For more information, see [About the AutoVu Installation Kit](#) on page 23.
- **Electric or battery powered drill and drill bits:** Required when running cables through the vehicle roof or body panels.
For more information, see [Drilling a camera cable hole](#) on page 66.
- **Multimeter:** Required for measuring electrical current in the OEM fuse box.
For more information, see [Connecting the ignition signal](#) on page 40.
- **Digital level:** Used for measuring the camera tilt.
- **Depth-controlled cable jacket stripper:** Recommended for stripping the cable jacket to avoid damage to the internal conductors. The Cyclops stripping tool is included with the AutoVu Installation Kit.
For more information, see [Terminating the SharpZ3 camera cable](#) on page 68.
- **Wire stripper:** Required for stripping wire insulation.
For more information, see [Terminating the SharpZ3 camera cable](#) on page 68.
- **RJ45 crimp tool:** Use a professional quality tool for proper crimping. The EZ-RJPRO® HD Crimp Tool is included with the AutoVu Installation Kit.
For more information, see [Terminating the SharpZ3 camera cable](#) on page 68.
- **Panel removal tool:** Use the correct panel removal tools to ensure that the vehicle panels are not damaged during the installation.
NOTE: You might also need a Philips, Torx, or flat blade screwdriver.
For more information, see [Preparing the vehicle for a hardmounted camera installation](#) on page 52.
- **2.5 mm flat-tip screwdriver:** Used for pushing in tension clamps and securing screws.
For more information, see [Connecting power to the base unit](#) on page 42.
- **Hex key wrenches:** Required when mounting the cameras on the patrol vehicle.
For more information, see [Installing the hardmount on the vehicle for SharpZ3 cameras](#) on page 54.
- **Torque wrench:** Required to ensure connections are not over-tightened or under-tightened.
For more information, see [Custom SharpZ3 camera mounting](#) on page 64.
- **Wire ferrule crimping tool:** Ferrules are included for all wire connections and are recommended, but not mandatory. A crimping tool is included with the AutoVu Installation Kit.
- **Phillips screwdriver:** Required when installing hardware such as expansion modules, and wire racks.
- **Adjustable wrench:** Required when mounting the base unit in the patrol vehicle.
- **Center punch:** Used to mark drilling locations.
For more information, see [Preparing the vehicle for a hardmounted camera installation](#) on page 52.
- **Hole saw or stepping drill bit:** For cable penetrations, you can use a stepping drill bit or you can use a fine-toothed hole saw designed for vehicle body panels which is depth-regulated and includes a pilot drill bit.
For more information, see [Drilling a camera cable hole](#) on page 66.
- **Grease pencil:** Used to mark support locations on the roof of the vehicle.

- **Roll of tape:** Used for marking a center line on the vehicle. Use tape that will not damage the vehicle.
- **Digital angle finder:** Used to measure the horizontal angle of SharpZ3 cameras.
- **Laser distance tool or measuring tape:** Used to measure the distance from the SharpZ3 camera unit to the target license plate.

Parts

- **Wires (stranded):**
 - **Base unit 12V power:** 14 AWG (red) and 14 AWG (black)
 - **I/O connector:** 22 to 18 AWG
 - **Ignition signal:** 22 to 18 AWG (yellow)
 - **Navigation expansion module:**
 - **Reverse signal (REV):** 24 to 18 AWG
 - **Chassis ground (CGND):** 18 AWG (black)
 - **VSS (ODO +/-):** 24 to 20 AWG shielded, twisted pair
 - **Odometry sensor (ODO +/-):** 22 to 20 AWG jumper wire
- **20A ATO/ATC in-line fuse:** Required at the source of the vehicle's 12-24V system tapping point.
- **0.5A fuse:** In-line or in the OEM fuse box using a tap fuse adapter.
- **Ring terminal:** A ring terminal with incorporated internal locking teeth is required at the chassis grounding screw location.
- **Heat-shrink tubing:** Required for the protection of soldered wire connections.
- **Convolute wire loom:** Required to protect cables from potential damage from heat or abrasion.
- **Cable glands:** Required when sealing wire holes drilled in the vehicle's roof.
NOTE: Cable glands are required for all cable penetrations. Ensure that you have the appropriate glands in installing a cellular antenna or satellite navigation antenna.
- **Butyl tape and isopropyl alcohol:** Required for sealing any cable penetrations that do not use a cable gland.
- **Base unit mounting screws:** Use appropriate screws to attach the bracket to the vehicle: ¼"-20 or M6. The screws must be long enough to secure the hardware, but short enough not to damage any vehicle components under the mounting location.

AutoVu auxiliary PoE cameras

The following tools are required if you are installing AutoVu auxiliary PoE cameras on the patrol vehicle:

- **Hex key wrench:** 3mm hex key
- **Socket wrenches:** 7mm and 1/4" socket wrenches
- **Phillips screwdriver:** Phillips #1 screwdriver

About the AutoVu Installation Kit

The AutoVu™ Installation Kit contains several tools used in AutoVu installations. The kit is recommended when deploying SharpV and SharpZ3 camera units.



The following tools are included in the AutoVu Installation Kit:

- **EZ-RJPRO™ HD Crimp Tool:** The SharpZ3 camera cable is pre-terminated with an RJ45 connector. If you shorten the camera cable, you must use the EZ-RJPRO™ HD Crimp Tool and the provided replacement RJ45 connector. For more information, see [Terminating the SharpZ3 camera cable](#) on page 68.

NOTE: The tool can also be used in SharpV installations to crimp standard RJ45 connectors.

- **Ferrule crimper:** A ferrule crimper is required when making connections to the SharpZ3 base unit. For more information, see [Wire ferrules for SharpZ3 installations](#) on page 25.

The tool can also be used in SharpV installations if you are using ferrules for the I/O cable connection.

- **Target license plate:** You must use the target license plate when you align the SharpZ3 cameras. For more information, see the *SharpZ3 Installation Guide*. You can also use the plate to generate license plate reads to test the system.

In SharpV installations, the target license plate is used when setting the zoom and focus.

IMPORTANT: Apply the target license plate sticker to a flat, dry backing such as cardboard or plastic. Apply the sticker in temperatures above 18° C (65° F).

- **Cable tester:** If you shorten and terminate the SharpZ3 camera cable.

For more information, see [Terminating the SharpZ3 camera cable](#) on page 68.

- **M12 x-code to RJ45 converter:** The M12 x-code to RJ45 converter is used when testing SharpZ3 camera cables.

For more information, see [Terminating the SharpZ3 camera cable](#) on page 68.

- **iX to RJ45 converter:** The iX to RJ45 converter is used to test cables for devices connected to the SharpZ3 PoE expansion module such as AutoVu PoE cameras.

For more information, see [Installing a wheel-imaging camera](#) on page 94.

SharpZ3 cabling recommendations

When installing the cabling of a SharpZ3 system, follow these practices to avoid damage to the cables or to the vehicle.

WARNING: Failure to follow the supplied instructions or information might result in loss of data or damage to hardware and will void the warranty.

Recommendations

- Route and secure cables so they are clear of the vehicle's moving parts, especially the steering wheel, shift lever, parking brake, sliding seat tracks, doors, or any of the vehicle's controls.
- Secure all wiring with cable clamps or electrical tape so that no bare wiring is exposed.
- Cables connected to the computer docking station must allow enough slack so that the user can adjust the computer without pulling the cables.
- Route power wires from the battery through the vehicle firewall, preferably routed through existing wire channels under the door sills.
- Protect cables from abrasion by sharp edges.
- Use rubber cable glands or rubber grommets to prevent damage to wires that pass through the vehicle body or firewall. Seal the holes to prevent water from entering the vehicle.
- Wrap excess camera cable using a cable tie in the middle to form an "8". This prevents damage to the cable and prevents possible interference caused by a coiled cable.



Things to avoid

- Do not install this product or route any cables in air bag deployment areas. Equipment mounted in the air bag deployment area can damage or reduce the effectiveness of the air bag, or become projectiles that could cause serious personal injury or death. Refer to the vehicle's owner manual for the air bag deployment area. The user and installer assume full responsibility for determining proper mounting location, based on providing ultimate safety to all passengers inside the vehicle.
- Do not route wires where they might be exposed to temperatures above 85°C (185°F), such as near the engine manifold. If the insulation heats up, wires may become damaged, resulting in a short circuit, malfunction, or permanent damage to the product.
- When securing hardware with screws, do not allow the screws to come into contact with any electrical lead.
- Do not route wires through areas that are particularly susceptible to vibration. Vibration can damage wires or insulation, resulting in a short circuit or other damage to the vehicle.

Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



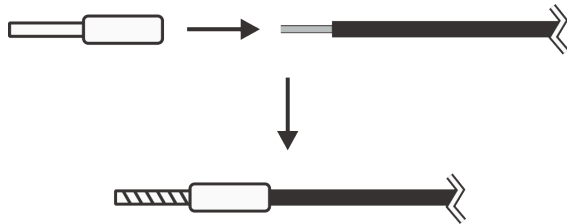
Wire ferrules for SharpZ3 installations

For a more secure connection when making wire connections to the SharpZ3 base unit, use the ferrule crimping tool that is included with the AutoVu Installation Kit to crimp the appropriate ferrule to the end of each stripped wire.

IMPORTANT: Use the ferrules provided with the SharpZ3 hardware. The SharpZ3 requires longer ferrules than those used with SharpX systems.

The following table shows the appropriate ferrules for each wire gauge:

Wire AWG	Ferrule color
14	Blue
18	Red
20	Grey
22	White
24	Violet



Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Module installation

This section includes the following topics:

- ["Installing the ALPR module"](#) on page 27
- ["About SharpZ3 expansion modules"](#) on page 29
- ["Installing expansion modules"](#) on page 30
- ["Navigation expansion module connections"](#) on page 32
- ["Aux PoE expansion module connections"](#) on page 34

Installing the ALPR module

To connect SharpZ3 cameras to the base unit, you must install an ALPR module. ALPR modules are available for two-camera or four-camera systems.

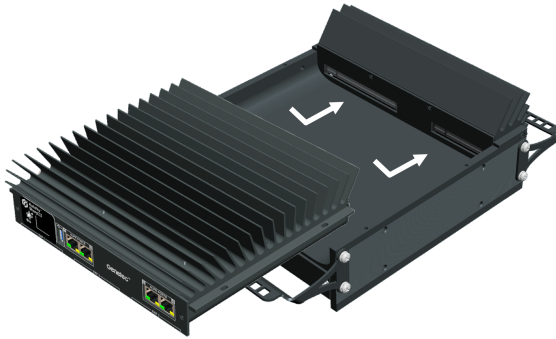
Before you begin

To complete these steps, you need the following:

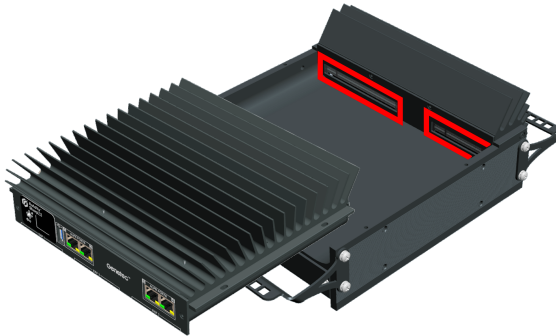
- Phillips #1 screwdriver

To install the ALPR module:

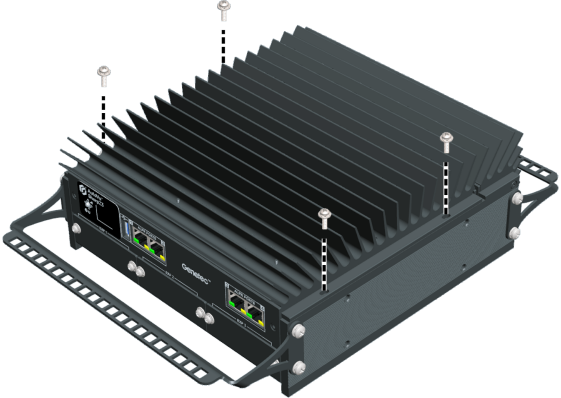
- 1 Place the ALPR module on the base unit and slide it into place.



- 2 Firmly press the module to ensure that the connection at the back of the module is solid.



3 Secure the ALPR module using the provided Phillips screws.



Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



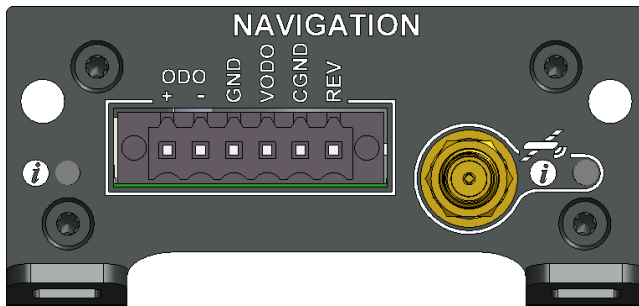
About SharpZ3 expansion modules

To add functionality to the SharpZ3 system, you can install up to three expansion modules in the base unit.

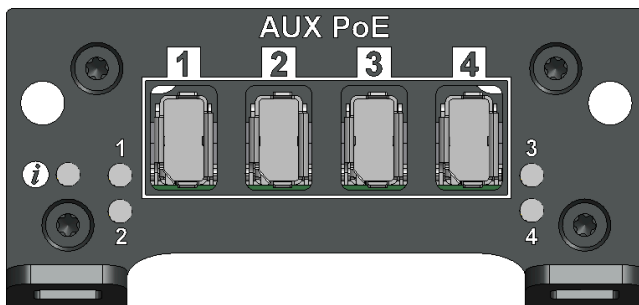
Expansion modules give the system the flexibility to be configured for the requirements of different applications. For example, you can configure your parking enforcement and law enforcement patrol vehicles with different camera configurations or add precise positioning to the system.

The following SharpZ3 expansion modules are available:

- **Navigation expansion module:** Adds precise positioning to the SharpZ3 system.



- **AUX PoE expansion module:** Connect wheel-imaging cameras or other PoE devices in the vehicle.



Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Related Topics

[Aux PoE expansion module connections](#) on page 34

[Navigation expansion module connections](#) on page 32

Installing expansion modules

The SharpZ3 expansion modules add additional capabilities to the SharpZ3 system. You can install up to three expansion modules in the SharpZ3 base unit.

Before you begin

To complete these steps, you need the following:

- Phillips #1 screwdriver

What you should know

- The base unit has three expansion slots. Each slot is covered by an expansion slot protector until a module is installed.
- It is easier to install the expansion modules before the base unit is mounted in the patrol vehicle.

To install an expansion module:

- 1 Remove the protector from an available expansion module slot:
 - a) Remove the two Phillips screws.
 - b) Slide out the protector.



- 2 Install the expansion module:
 - a) Slide the module into the slot.
 - b) Firmly press the module to ensure that the connection at the back of the module is solid.
 - c) Secure the module in the slot using the two screws that you removed from the slot protector.

TIP: While tightening the screws, gently lift up the module. This aligns the tops of the modules and provides slightly more space under the base unit.



Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Related Topics

[Navigation expansion module connections](#) on page 32

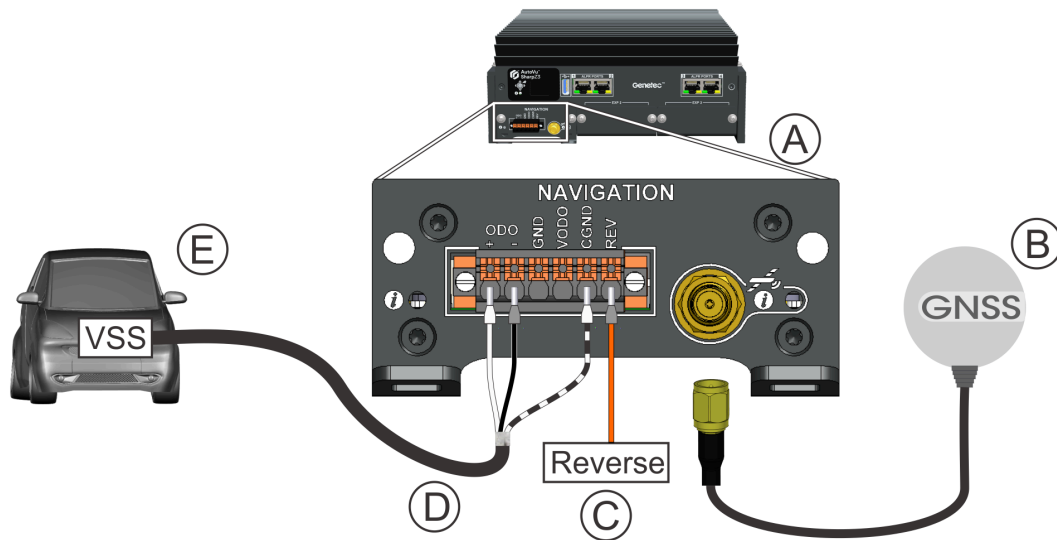
[Aux PoE expansion module connections](#) on page 34

Navigation expansion module connections

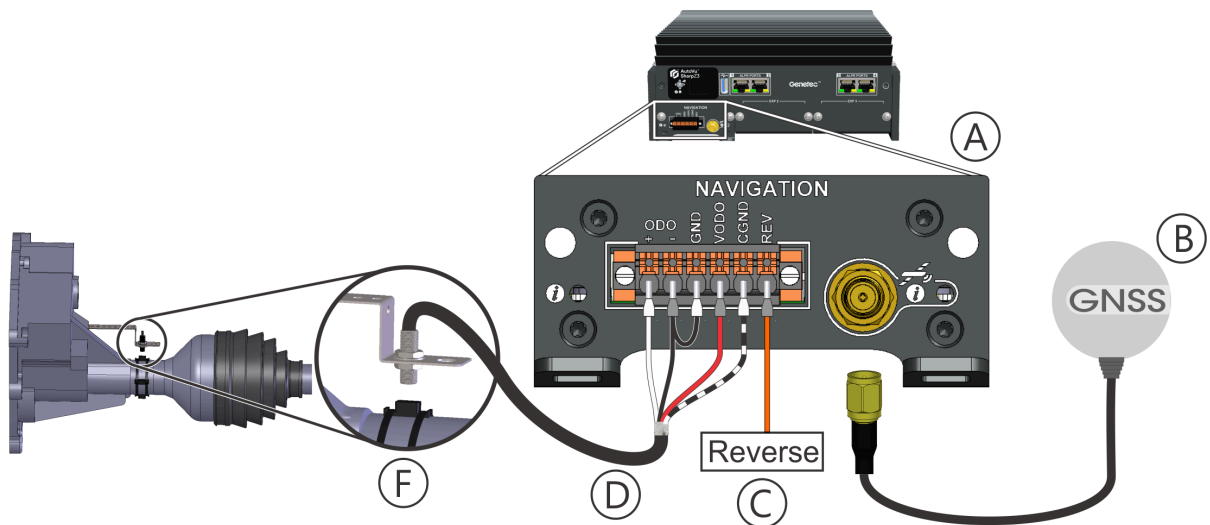
With the navigation expansion module, the SharpZ3 system can add precise location information to license plate reads and can ensure that the patrol vehicle is accurately displayed on maps in Genetec Patroller™.

To provide the wheel tick information required for precise positioning, you can connect the base unit to the vehicle's VSS signal, or you can install the odometry sensor.

VSS connections



Odometry sensor connections



Component	Description
A	Navigation expansion module The navigation expansion module adds precise positioning to the SharpZ3 system.

	Component	Description
B	Satellite navigation antenna	The GNSS satellite navigation antenna is connected to the base unit and works with the odometry inputs to provide precise georeferencing for the vehicles associated with the plate reads. For more information on which satellite navigation hardware to install, see Satellite navigation hardware options on page 83. NOTE: Connecting the satellite navigation antenna to the navigation expansion module provides more accurate location information than connecting an antenna to the in-vehicle computer.
C	Reverse signal	The SharpZ3 system is usually connected to the vehicle's reverse signal by tapping the reverse lights.
D	VSS or odometry sensor cable connection	Connect the hardware to the base unit as shown in the diagram. NOTE: The wire that connects to the CGND pin is the drain wire from the sensor cable.
E	VSS signal	You can tap the VSS signal from the vehicle's power-train control module (PCM). For more information, see the vehicle's electrical schematics documentation. NOTE: Some newer vehicles and electric vehicles do not include a VSS or OSS.
F	Odometry sensor	If the VSS signal from the vehicle is unavailable, you can install an odometry sensor. In general, a VSS provides more ticks per wheel rotation, resulting in more accurate odometry. For more information on the odometry sensor, see Installing the odometry sensor on page 86.

Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



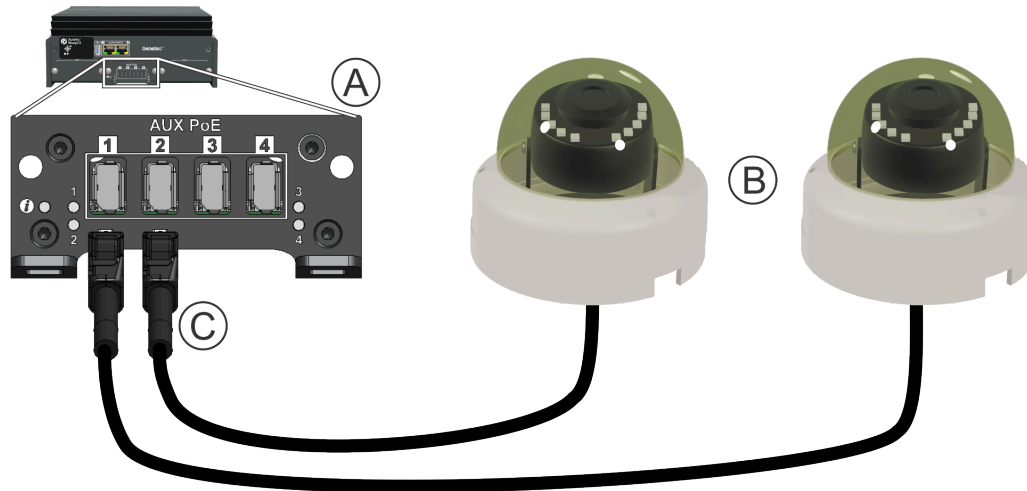
Related Topics

[Installing the odometry sensor](#) on page 86

Aux PoE expansion module connections

The Aux PoE expansion module provides four Power over Ethernet (PoE) ports to the SharpZ3 base unit. The module provides power for wheel-imaging cameras, additional context cameras, or other PoE devices in the patrol vehicle.

Connections for PoE devices



	Component	Description
A	Aux PoE expansion module	The Aux PoE expansion module lets you add up to four PoE devices to the system.
B	PoE devices	You can associate each SharpZ3 camera with its own PoE camera, or you can associate the same PoE camera with multiple SharpZ3 cameras.
C	IX industrial connector	The four Aux PoE expansion module ports are compatible with ix industrial connectors.

Base unit installation

This section includes the following topics:

- ["Base unit installation"](#) on page 36
- ["Best practices for mounting the base unit"](#) on page 37
- ["Connecting the ignition signal"](#) on page 40
- ["Connecting power to the base unit "](#) on page 42
- ["Power management in a SharpZ3 system"](#) on page 44
- ["Installing the base unit cooler pack "](#) on page 45
- ["About the base unit cable racks"](#) on page 47

Base unit installation

The base unit is the processing component of the SharpZ3 system and is typically installed in the trunk of the patrol vehicle. The best mounting location depends on the type of vehicle and the location of any other hardware installed in the vehicle.

You can mount the base unit anywhere inside the vehicle that is safe, secure, and has good airflow. When planning an installation, you must decide the best location and orientation for the base unit. Vertical and horizontal mounting brackets are included with the base unit kit.

The following example shows base units mounted vertically and horizontally:



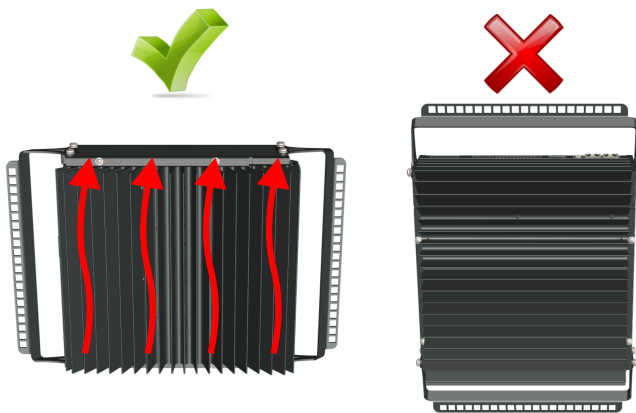
Best practices for mounting the base unit

When you mount a base unit in a patrol vehicle, you must consider space restrictions, protection of the unit from impact, and other factors. You must also have the correct mounting hardware for installations on carpet, metal, or plywood.

Consider the following best practices when planning the base unit installation.

General recommendations

- **WARNING:** The the heat dissipation fins on the ALPR module might have sharp edges. Take care when installing the hardware. Ensure that the base unit is not installed within reach of passengers in the vehicle.
- Install the base unit in an area with adequate ventilation around the heat dissipation fins.
- Install the base unit in an area protected from water or dust infiltration.
- If you mount the base unit vertically, orient the heat dissipation fins vertically.



- Make sure that there is nothing vital (for example, break lines or the fuel tank) that could be damaged when screwing the mounting bracket to the vehicle.
- Select an appropriate mounting surface. In this example, the back of the seat is reinforced with fabric-covered plywood.



- Use appropriate screws to attach the bracket to the vehicle: ¼"-20 or M6. The screws must be long enough to secure the hardware, but short enough not to damage any vehicle components under the mounting location.

- Cable racks are included for the front and back of the base unit. To protect the cable connections from damage, install the cable racks and secure all cables with cable ties.

Hardware orientation

- To ensure adequate heat dissipation, do not mount the base unit upside down.

Horizontal mount

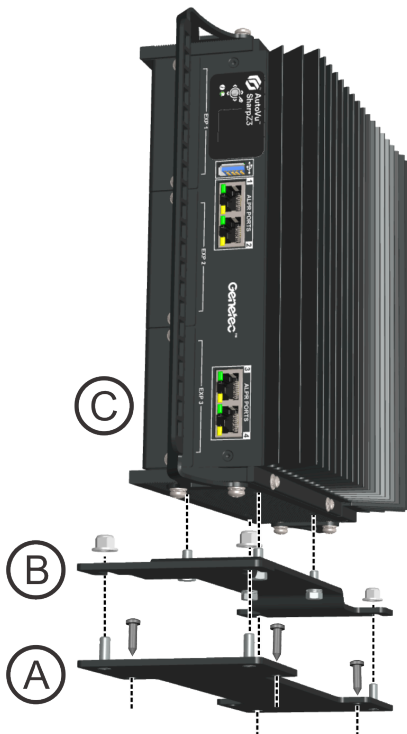
- The horizontal mounting brackets are generally installed with the mounting flanges pointing outward. If required, you can install the brackets with the flanges pointing inward. If you are installing the bracket this way, keep in mind that you must install the brackets in the vehicle before mounting the base unit. This is because the mounting holes are not accessible after the base unit is connected to the brackets.



- To install the brackets with the flanges pointing inward, use the paper template that is provided with the hardware to accurately mark the positions of the mounting holes.

Vertical mount

- When selecting an installation location, leave enough space to easily access the mounting screws with a wrench.
- Install the vertical bracket before connecting the base unit.
- To mount the base unit vertically, install the bracket base (A) in the vehicle using ¼"-20 or M6 screws. Connect the vertical mounting bracket (B) to the base unit (C), then mount the assembly to base bracket using the provided locknuts.



Example

Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.



Related Topics

[About the base unit cable racks](#) on page 47

Connecting the ignition signal

To power the base unit, you must connect it to the vehicle's power and ignition signal. When properly connected, the base unit is supplied with the vehicle's 12 VDC power when the ignition is on.

What you should know

You can obtain the ignition signal from the fuse box using a fuse tap adapter. Using this adapter, you can tap into the fused circuit and give a fused connection to the base unit.

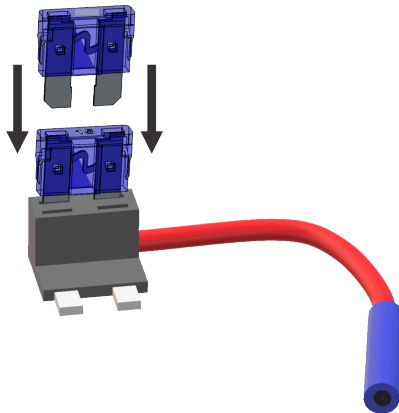
WARNING: Simply shutting off the main power to the base unit can corrupt the base unit and make the system inoperable. To turn on and turn off the base unit safely, the system requires an ignition signal.

IMPORTANT: These instructions do not replace your vehicle's owner manual. If you are unsure about your vehicle's electrical wiring, see your owner's manual before continuing.

To connect the vehicle's ignition signal to the base unit:

- 1 Use a multimeter to identify the ignition signal from the fuse box:
It should be a circuit that supplies 12V when the key is switched to the RUN position, and is off when the key is in the OFF position.
 - a) With the key in the OFF position, use either a circuit tester or a volt meter to identify the fuses that are 10A or less and that do not have power.

WARNING: Do not tap fuses that are related to the automatic braking system (ABS) or the airbags.
 - b) Turn the key to the RUN position and identify which of those fuses now have power.
 - c) When you have identified a suitable fuse, cycle the power to ensure that the power is on when the key is in the RUN position and off when the key is in the OFF position.
- 2 Install the tap fuse adapter:
 - a) Remove the ignition signal fuse from the fuse box.
 - b) Insert the fuse into the fuse tap adapter.
 - c) Install a 0.5A fuse in the added circuit holder.
 - d) Install the fuse tap adapter into the fuse box.



- 3 Connect the wire from the base unit's IGN pole to the fuse tap adapter.

IMPORTANT: For a more secure connection, crimp a ferrule to the tip of each stripped wire. Use the [appropriate ferrule for the wire gauge](#).

NOTE: The IGN pole draws negligible current. It is simply used to sense the ignition signal.
- 4 Label the connections for future service.

Example

Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.



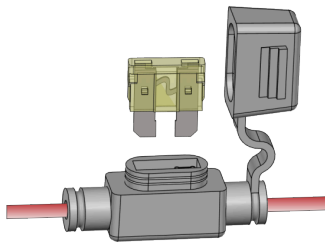
Connecting power to the base unit

To power the base unit, you must connect it to the vehicle's power. The base unit requires a constant power source of 12 VDC protected with a 20A fuse.

Before you begin

To complete these steps, you need the following:

- **Stranded copper wires:** AWG (red) and 14 AWG (black) for 12V power on the base unit.
- **Heat-shrink tubing:** Required for the protection of soldered wire connections.
- **Ring terminal:** A ring terminal with incorporated internal locking teeth is required at the chassis grounding screw location.
- **20A ATO/ATC in-line fuse:** Required at the source of the vehicle's 12-24V system tapping point.



- **Convolute wire loom:** Required to protect cables from potential damage from heat or abrasion.

IMPORTANT:

- These instructions do not replace your vehicle's owner manual. If you are unsure about your vehicle's electrical wiring, see your owner's manual before continuing.
- Solder your connections and protect them with heat shrink tubing.

What you should know

You can use the base unit to switch power for auxiliary devices, such as [power for the tablet computer](#) or a modem.

WARNING: Simply shutting off the main power to the base unit can corrupt the base unit and make the system inoperable. To turn on and turn off the base unit safely, the system requires an [ignition signal](#).

To connect the base unit to the vehicle's 12V power source:

- 1 Connect a wire from the base unit's positive (+) terminal, through the 20A in-line fuse, to the vehicle's 12V power source (permanent +12V).

NOTE:

- Install the fuse at the source of your vehicle's 12V system tapping point. The base unit is already protected internally by an electronic circuit breaker.
 - If you connect the primary power lead from the battery, it must be fused within 2 inches of the battery.
- 2 Label the primary wire at the fuse to help identify the circuit for future service.
 - 3 Run the wire to the base unit location.

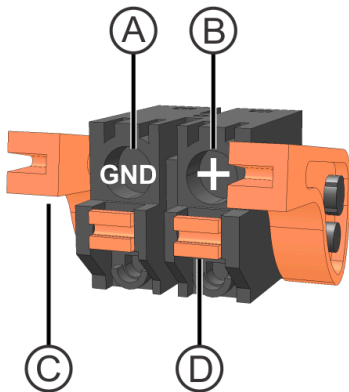
IMPORTANT: Protect the wire with a convolute wire loom and secure the loom from potential heat damage or abrasion.

- 4 Connect the wire from your base unit's GND pole to your vehicle's chassis for grounding.

NOTE:

- Ensure that the ground connection is clean and secure and that there is no paint impeding the connection.
- Do not make the chassis ground connections at a weld point.
- A ring terminal with incorporated internal locking teeth is required at the chassis grounding screw location. For a reliable connection, select ring terminals that are compatible with the size of the stud, screw, or bolt that will be used to attach them to the vehicle.

- 5 Ensure that the power connector is securely installed in the base unit with the connector clamps engaged.



Component	
A	Negative/return/GND. Use 14 AWG (black)
B	Permanent 12V (+). Use 14 AWG (red)
C	Connector clamp
D	Wire tension clamps

- 6 Strip 10 mm ($\frac{3}{8}$ in) of insulation from the stranded copper wires.

IMPORTANT: For a more secure connection, crimp a ferrule to the tip of each stripped wire. Use the [appropriate ferrule for the wire gauge](#).

WARNING: Do not lengthen any power or signal wires. If the wire you are installing is too short, replace with a new longer wire. Splices are a point of possible failure which can cause the system to malfunction.

- 7 Insert the red wire into the positive (+) connector pole.
8 Insert the black wire into the ground (GND) connector pole.

Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Power management in a SharpZ3 system

The SharpZ3 system includes an auto shutdown feature to protect the vehicle battery and a cranking event protection feature which prevents a reboot due to a voltage dip caused by engine startup.

Auto shutdown

If the vehicle engine is off and the SharpZ3 system is running solely on vehicle battery power, the system shuts down after a 60 second delay (configurable) if battery voltage falls below 10.3 V at the base unit power connector. Note that there is an approximate 0.5 V to 0.7 V drop between the battery and the base unit power connector. For more information, see the SharpZ3 Administrator Guide

After auto shutdown, the SharpZ3 system restarts when it detects a voltage greater than 11.7 V. When the vehicle engine is running again, the voltage typically increases to >12.6 V, which allows the SharpZ3 system to power up again.

NOTE: You can configure the startup voltage (default 11.7 V) in the Sharp Portal.

Cranking event protection

Many law enforcement vehicles include external timers that maintain power to the equipment such as radios even when the engine is off. If the SharpZ3 system is being powered with an external timer, and the engine is then turned on, the resulting dip in voltage does not cause the SharpZ3 system to restart. The system can withstand a temporary voltage dip down to 7 V.

Installing the base unit cooler pack

If you install a SharpZ3 system with a four-camera ALPR module in extreme environments where the ambient temperature in the patrol vehicle trunk exceeds the unit's maximum temperature rating, you must install the SharpZ3 cooler pack on the base unit.

What you should know

- When installing the base unit, leave at least 5cm (2 in) of space above the unit to ensure proper air circulation.
- To confirm if the base unit fan is required for your installation, contact your AutoVu™ representative.
- You can mount the cooler pack on either side of the base unit.



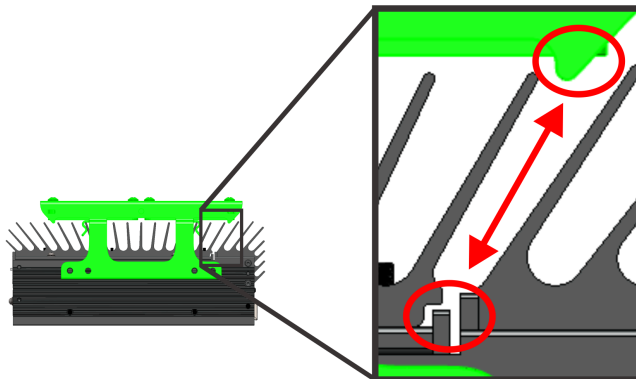
SharpZ3 base unit maximum temperature rating:

Configuration	ALPR module	Maximum ambient air temperature
Without cooler pack	Two-camera ALPR module	65°C (149°F)
	Four-camera ALPR module	60°C (140°F)
With cooler pack	Two-camera ALPR module	Cooler pack not required
	Four-camera ALPR module	65°C (149°F)

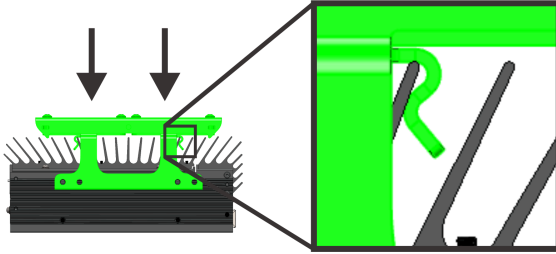
To install the SharpZ3 cooler pack on the base unit:

- 1 Align the cooler pack clips with the correct heat sink fins.

TIP: The point on the cooler pack body should align with the gap between the base unit body and the ALPR module.



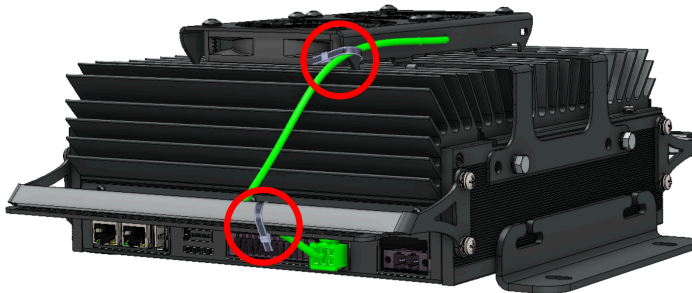
- 2 Press down to clip the cooler pack into place.



- 3 Secure the bracket using the provided hex head screws and washers.



- 4 Connect the cooler pack cable to the **CP** plug on the back of the base unit.
- 5 Secure the cable to the cooler pack frame and to the wire rack using cable ties.



Example

Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.

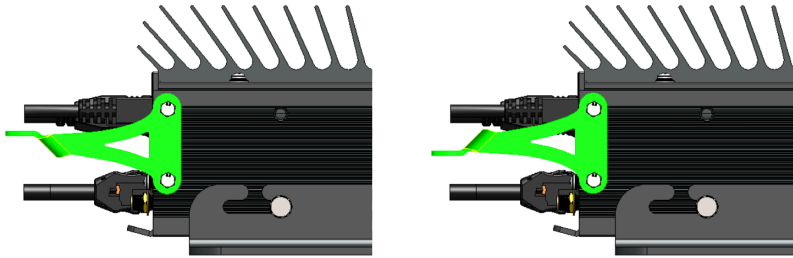


About the base unit cable racks

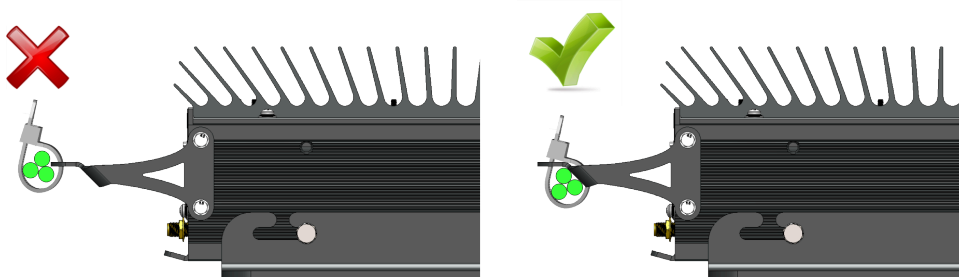
To protect the SharpZ3 cable connections from damage, cable racks are included with the base unit.

Note the following when installing the base unit in the patrol vehicle:

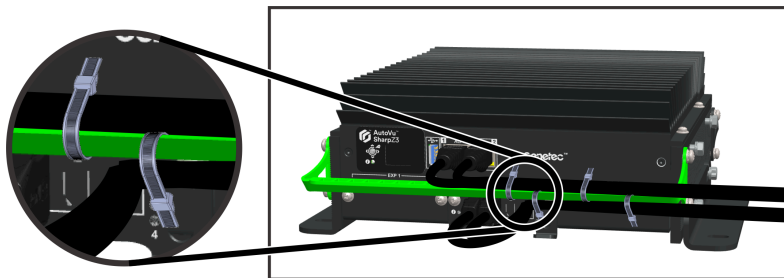
- If you remove the cable racks during the base unit installation, you must reattach them before you finish the installation.
- Cable racks are included for the front and back of the base unit.
- The cable racks are not symmetrical. In tight installation locations, you can flip the cable racks to provide a better fit.



- To protect cables from impact and abrasion, do not attach cables to the edge of the cable rack. Instead, loop cable ties through the inside of the cable rack.



- For a cleaner installation, secure camera cables to the top of the cable rack and secure expansion module cables to the bottom of the cable rack.



Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Related Topics

[Best practices for mounting the base unit on page 37](#)

Camera installation

This section includes the following topics:

- ["About camera mounting"](#) on page 50
- ["Hardmount camera installation"](#) on page 52
- ["Installing the SharpZ3 camera using the magmount"](#) on page 58
- ["Lightbar camera installation"](#) on page 60
- ["Custom SharpZ3 camera mounting"](#) on page 64
- ["Drilling a camera cable hole"](#) on page 66
- ["Camera cable connection"](#) on page 68
- ["Sealing cable holes in the patrol vehicle "](#) on page 75
- ["Camera alignment"](#) on page 76

About camera mounting

SharpZ3 camera units are mounted on a patrol vehicle as a part of a SharpZ3 ALPR system. Each camera unit contains two LPR cameras, one context camera, and infrared illuminators.

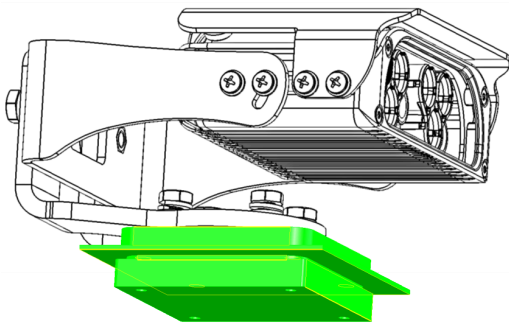
SharpZ3 camera units can be attached to the roof of the patrol vehicle using the Genetec™ universal mounting bracket and pan/tilt mount in conjunction with either the Genetec hardmount or magmount.

IMPORTANT:

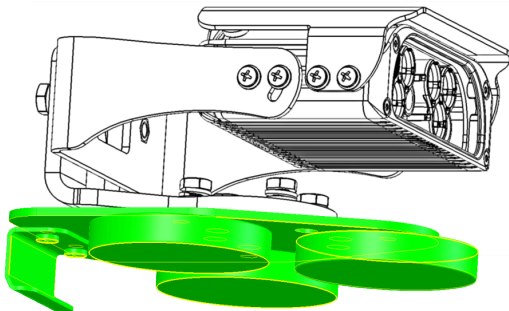
- You must install the cameras in the correct locations on the vehicle. For more information, see [SharpZ3 camera installation configurations](#) on page 76.
- The warranty is void if you open or drill holes in the AutoVu equipment, if you add decals and other adhesive materials, or if you paint SharpZ3 cameras.
- To prevent damage to the cameras and cables, do not bring the patrol vehicle through a contact car wash that uses brushes to scrub the vehicle. Use only non-contact car washes that use water jets.

The following image shows the SharpZ3 mounting configurations:

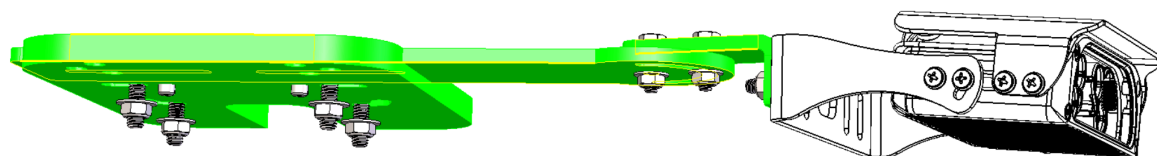
Hardmount:



Magmount:



Lightbar:



Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Hardmount camera installation

For permanent installations, SharpZ3 cameras can be attached to the roof of the vehicle using the SharpZ3 universal mounting bracket and pan/tilt mount in conjunction with the Genetec™ hardmount.

Preparing the vehicle for a hardmounted camera installation

Before installing SharpZ3 camera units on the roof of the patrol vehicle, you must perform some pre-installation steps to prepare the vehicle.

What you should know

- The hardmount bracket can be installed on surfaces up to 2.5 mm (0.1 in) thick. Installing on a thicker surface can damage the threaded base block.
- To complete these steps, you need the following:
 - **Panel removal tool:** Use the correct panel removal tools to ensure that the vehicle panels are not damaged during the installation.
NOTE: You might also need a Philips, Torx, or flat blade screwdriver.
For more information, see [Preparing the vehicle for a hardmounted camera installation](#) on page 52.
 - **Grease pencil:** Used to mark support locations on the roof of the vehicle.
 - **Center punch:** Used to mark drilling locations.
For more information, see [Preparing the vehicle for a hardmounted camera installation](#) on page 52.
 - **Electric or battery powered drill and drill bits:** Required when running cables through the vehicle roof or body panels.
For more information, see [Drilling a camera cable hole](#) on page 66.
 - **Thread-locking fluid:** Apply thread-locking fluid to the SharpZ3 camera hardmount screws to prevent loosening.
For more information, see [Preparing the vehicle for a hardmounted camera installation](#) on page 52.
- The camera mounting base has four parts: the threaded base block, two rubber gaskets, and the upper mounting block. The upper and lower mounting blocks are installed above and below the roof with the rubber gasket in between to prevent water leaks and reduce vibration.

IMPORTANT:

- Before drilling holes in any part of the vehicle body always check for hidden electrical wires or fuel lines.
- Cameras are usually mounted near the tops of the “A pillars” or on the top corners of the windshield. However, you must be careful to avoid drilling through any support bracing that supports the roof.
- Ensure that the roof is stable enough not to vibrate when the camera is installed. If the roof is not stable, install support brackets.
- To seal camera cable holes drilled into the roof of the vehicle, use weatherproof cable glands or weatherproof, non-corrosive sealant such as butyl tape.

WARNING: Do not run more than one cable through a cable gland.

To prepare the vehicle for a hardmounted camera installation:

- 1 Disconnect the negative (typically black) cable from the vehicle's battery. This is important for your safety and to prevent accidental deployment of the airbags.

- Lower the vehicle headliner to gain access to the underside of the roof. Depending on the vehicle, you might also need to remove trim panels, sun visors, handles, and door gaskets to access the mounting location.

NOTE:

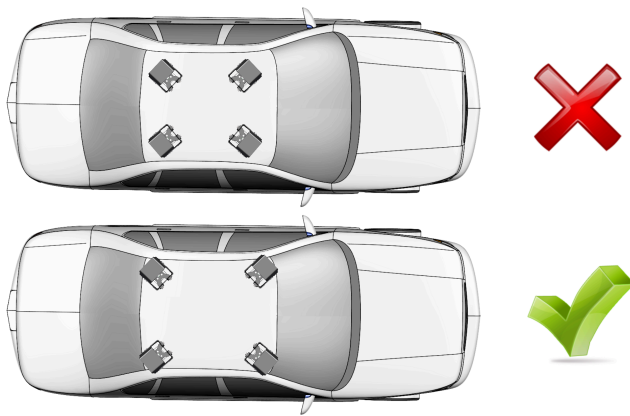
- You do not need to completely remove the headliner, but you must gain access to the underside of the mounting location and to the area and locations where you will route the camera cables.

- Identify any supports, braces, airbags, or wiring that might interfere with hardware installation and mark their locations on the top of the vehicle roof.

As it is difficult to know what is directly under the mounting location, we suggest using the "tapping method" to identify obstructions. With one hand on the roof, and your other hand on the under-side of the roof, tap the roof and feel for a solid tap on the under-side. Using this method, you will be able to find any obstructions and mark their location on the roof using a grease pencil.

- Place the upper mounting blocks on the vehicle roof where you intend to install the cameras.

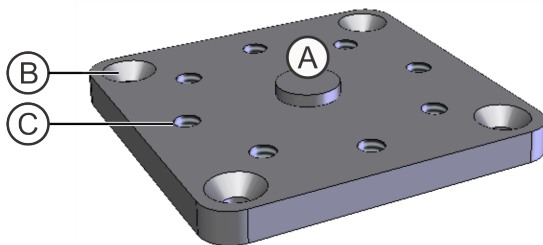
NOTE: To reduce the chance of the vehicle roof being visible in the license plate images, select locations that are as close as possible to the corners of the roof.



- Measure approximately 15 cm (6 in) back from the corner of the upper mounting block and make a mark for the camera cable hole. Use the tapping method to verify that there are no roof supports that will interfere with the location.

- Using a center punch, mark the mounting holes (B) in the upper mounting block (A).

WARNING: Do not drill the holes (C) that secure the camera to the mount.



- Drill the mounting holes (B) using a 3.18 mm ($\frac{1}{8}$ in) drill bit.

NOTE: Although the final hole size is 6.35 mm ($\frac{1}{4}$ in), it is recommended that you drill with a smaller drill bit – for example a $\frac{1}{8}$ in. bit first. Drilling with a smaller bit allows you to make sure that the placement of the lower block is not impacted by the roof bracing. If you must adjust the mounting position, the small hole can be easily sealed.

- Using the drill bit as a guide, put the threaded base block in place and verify the location is not impacted by the roof bracing.

- If the mounting block location is not obstructed, switch to the 6.35 mm ($\frac{1}{4}$ in) drill bit and re-drill all the holes for the mounting block.

- Deburr the holes to remove any metal shards or remnants.

After you finish

Install the Genetec™ hardmount on the vehicle.

Installing the hardmount on the vehicle for SharpZ3 cameras

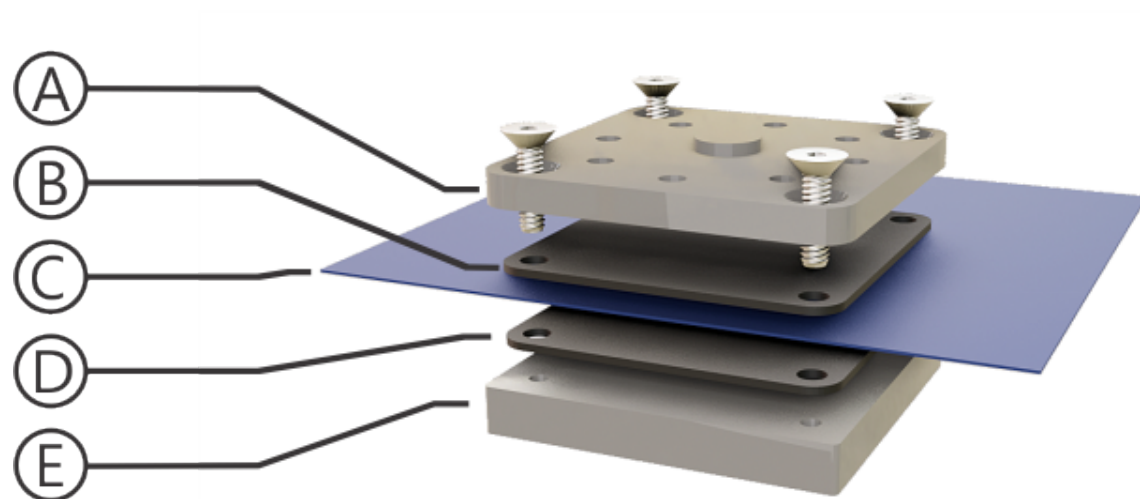
To permanently install SharpZ3 cameras on the patrol vehicle, you can use the hardmount: a base for the pan/tilt mount.

Before you begin

Prepare your vehicle for a hardmount installation.

What you should know

The hardmount includes the following components:



Component	
A	Upper mounting block
B	Upper rubber gasket
C	Vehicle roof
D	Lower rubber gasket
E	Threaded base block

- To complete these steps, you need the following:
 - Roll of tape
 - Hex key wrenches

- The camera mounting base has four parts:
 - Threaded base block
 - Two rubber gaskets
 - Upper mounting block

The upper and lower mounting blocks are installed above and below the roof with the rubber gasket in between to prevent water leaks and reduce vibration.

To install the hardmount on the vehicle:

- 1 Place one of the rubber mounting gaskets on the threaded base block and hold the assembly underneath the mounting location.
TIP: After you align the gasket and base block, hold them in together using tape.
- 2 On the roof of the vehicle, align the second gasket on the mounting location, and then align the upper mounting block.
TIP: Use a hex key wrench to help align the screw holes.
- 3 Apply thread-locking fluid to the four flat-head socket-cap screws and insert them into the mounting holes. Tighten the screws using a diagonal pattern.

Attaching the SharpZ3 pan/tilt/roll bracket to the hardmount

After you attach the hardmount to your vehicle, you can attach the camera using the pan/tilt/roll bracket.

Before you begin

[Install the SharpZ3 hardmount on the vehicle.](#)

What you should know

- To attach the camera, you need the following tools:
 - Socket wrench
 - Phillips screwdriver
- The camera mounting base has four parts:
 - Threaded base block
 - Two rubber gaskets
 - Upper mounting block

The upper and lower mounting blocks are installed above and below the roof with the rubber gasket in between to prevent water leaks and reduce vibration.

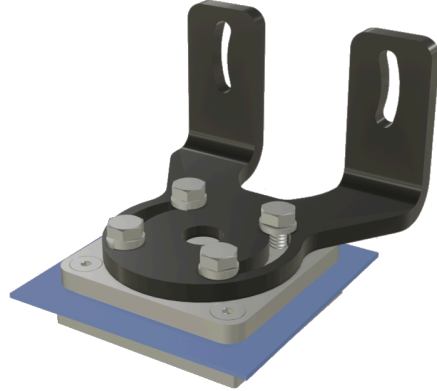
To attach the camera using the pan/tilt/roll bracket:

- 1 Assemble the pan/roll bracket hardware using the included documentation.

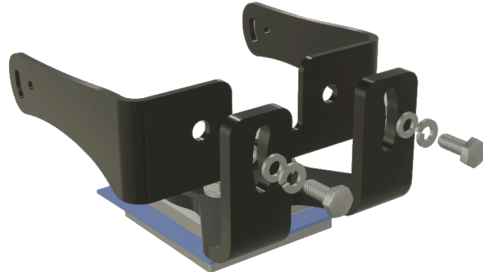
- 2 Attach the pan/roll bracket to the hardmount using four hex-head cap screws, flat washers, and split washers as shown in the included documentation.

NOTE:

- Set the alignment for the bracket to allow the bracket to pivot from forward to 90 degrees to the side.
- Do not over-tighten because you still need to aim the camera later.



- 3 Slide the camera onto the tilt bracket, with the bracket's open notch to the top. Leave about a 2.5 cm (1 in) gap between the back of the bracket and the camera.
- 4 Attach the camera to the bracket using the Phillips pan head screws, serrated washers, and flat washers.
- 5 Attach the assembled camera and tilt bracket to the pan/roll bracket using hex-head cap screws, flat washers, and split washers.



Attaching the SharpZ3 camera to the pan/tilt/roll bracket

After the hardmount is assembled, you can attach the SharpZ3 using the supplied hardware.

Before you begin

[Install the SharpZ3 hardmount on the vehicle.](#)

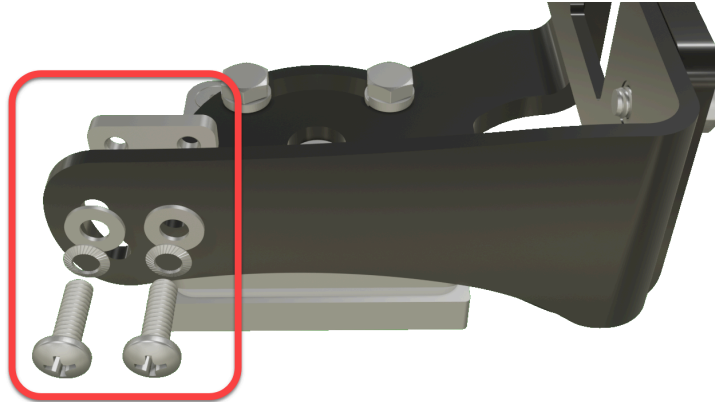
What you should know

- To attach the camera, you need the following tools:
 - Phillips screwdriver

To attach the SharpZ3 camera to the pan/tilt/roll bracket:

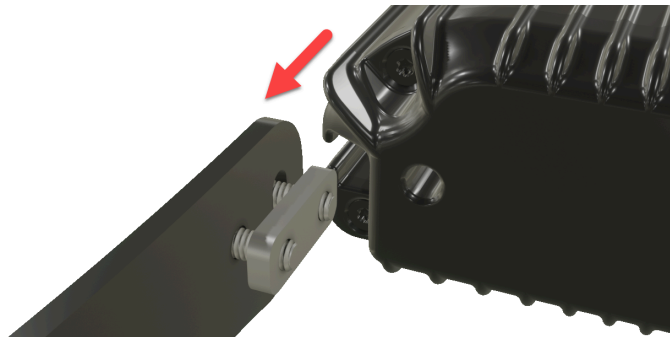
- 1 Connect the two t-slot retaining strips to the bracket using the supplied flat washers, serrated washers, and Phillips pan-head screws.

IMPORTANT: The flat washer must be installed against the bracket.



- 2 Slide the SharpZ3 camera onto the t-slot retaining strips and tighten the screws with a Phillips screwdriver.

NOTE: Do not fully tighten the screws. You will need to readjust the angle during the final camera alignment.



Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Installing the SharpZ3 camera using the magmount

If you need to frequently move or remove the cameras from the patrol vehicle roof, you can install the cameras using the universal mounting bracket and pan/tilt mount with a magnetic base.

Before you begin

Read [About camera mounting](#) on page 50.

What you should know

WARNING: Do not remove the silicone boots covering the magnets. Genetec Inc. is not responsible for scratches to the vehicle's paint caused by contact with bare magnets.

NOTE:

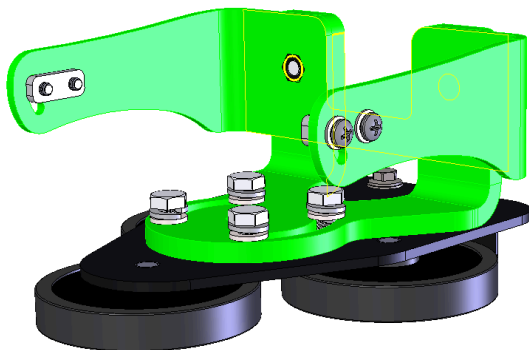
- The magmount uses extremely strong magnets and is difficult to remove from the vehicle roof. To adjust the camera's position after it is attached, you can loosen the bolts rather than attempt to move the entire mount.
- The holding power of the magnetic mounting system depends on surface finish, surface flatness, and thickness of the steel mounting surface. Keep the mounting surface and magnets clean, dry, and free of foreign particles that would prevent full surface contact.

To complete these steps, you need the following:

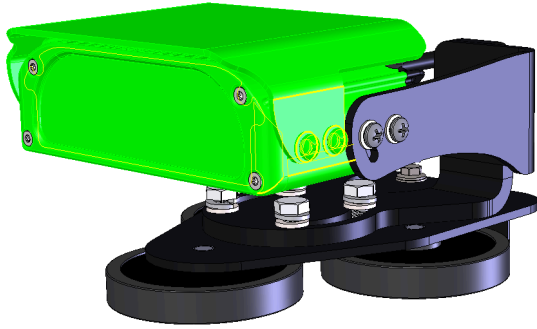
- Socket wrench
- Phillips screwdriver

To install the camera using the magmount:

- 1 Assemble the magmount base using the instructions included with the magmount kit.
TIP: Properly positioned the camera before tightening the bolts.
- 2 Attach the pan/tilt/roll bracket to the magmount base using four hex bolts.

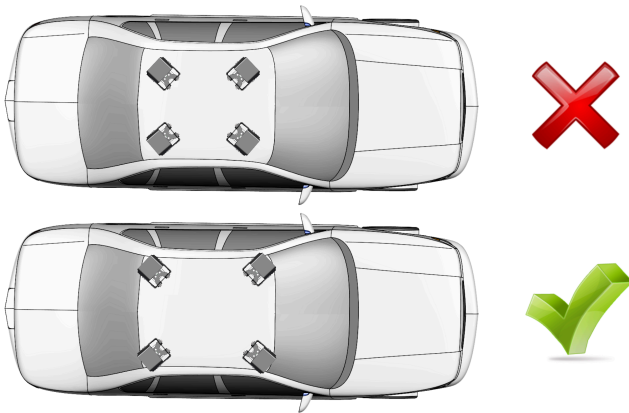


- 3 Attach the camera to the pan/tilt/roll bracket.



- 4 Verify that the roof of your vehicle is clean, dry, and free of debris, and then place the mounted camera in the desired position on the patrol vehicle.

NOTE: To reduce the chance of the vehicle roof being visible in the license plate images, select locations that are as close as possible to the corners of the roof.



- 5 Install the grooved end of the universal window seal to your vehicle's passenger window. You can cut the seal as needed to fit your window.

Lightbar camera installation

SharpZ3 cameras can be attached to the patrol vehicle's lightbar using the SharpZ3 lightbar bracket.

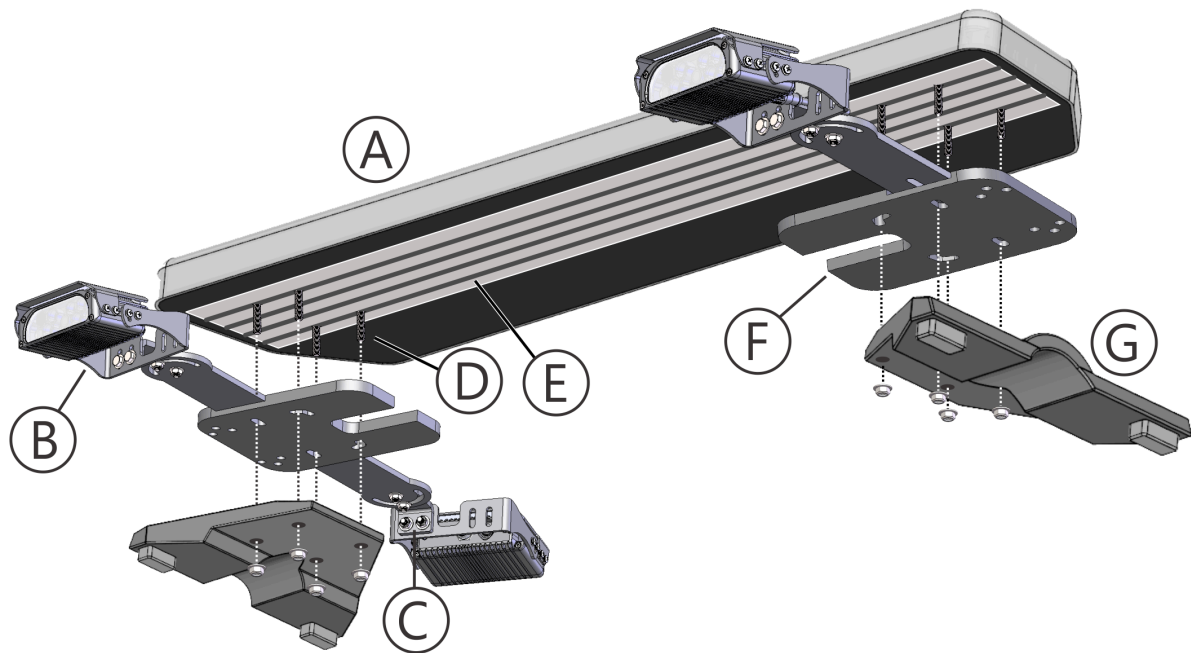
The SharpZ3 lightbar mounting bracket is compatible with lightbars from manufacturers such as Whelen, Code 3, and SoundOff Signal. For a list of the latest supported models, contact your AutoVu™ representative.

About the lightbar bracket

Using Genetec™ lightbar brackets, you can mount up to four SharpZ3 cameras on the patrol vehicle.

Lightbar mounting bracket overview

Before installing the lightbar bracket on the patrol vehicle's lightbar, familiarize yourself with components:



Component	Description
A	Patrol vehicle lightbar To verify that your lightbar is compatible with the lightbar bracket, contact your AutoVu™ Sales representative.
B	Tilt bracket Provides vertical tilt adjustment and some roll adjustment.
C	Pan bracket Provides horizontal pan adjustment. You can connect the pan bracket to the left or right side of the tilt bracket.
D	Mounting bolts Use the mounting bolts included with the hardware.
E	Slide bars Compatible lightbars include slotted slide bars so that you can adjust the position of the mounting bolts.

	Component	Description
F	Spacer plate	The spacer plate must be rotated according to which side of the vehicle it is being installed on as shown in the diagram. NOTE: For some lightbar models, the spacer plate is unnecessary. For information on the hardware required for your lightbar, refer to the documentation included with the lightbar camera bracket.
G	Mounting base	The lightbar mounting bracket is installed between the lightbar and the mounting base.

Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Installing the SharpZ3 camera on a lightbar

If the patrol vehicle includes one of the supported lightbars, you can install SharpZ3 cameras using the lightbar mounting bracket.

What you should know

- The SharpZ3 lightbar mounting bracket is compatible with several lightbars from Whelen®, Code3, and SoundOff Signal®. To verify that your lightbar is compatible, contact your AutoVu™ Sales representative.
- When installing the spacer plate, the orientation of the plate depends on which side of the vehicle you are installing the cameras on.
- You can attach the pan bracket to either the left or right side of the tilt bracket. You can change the mounting position for a better fit at the end of the installation.

To complete these steps, you need the following:

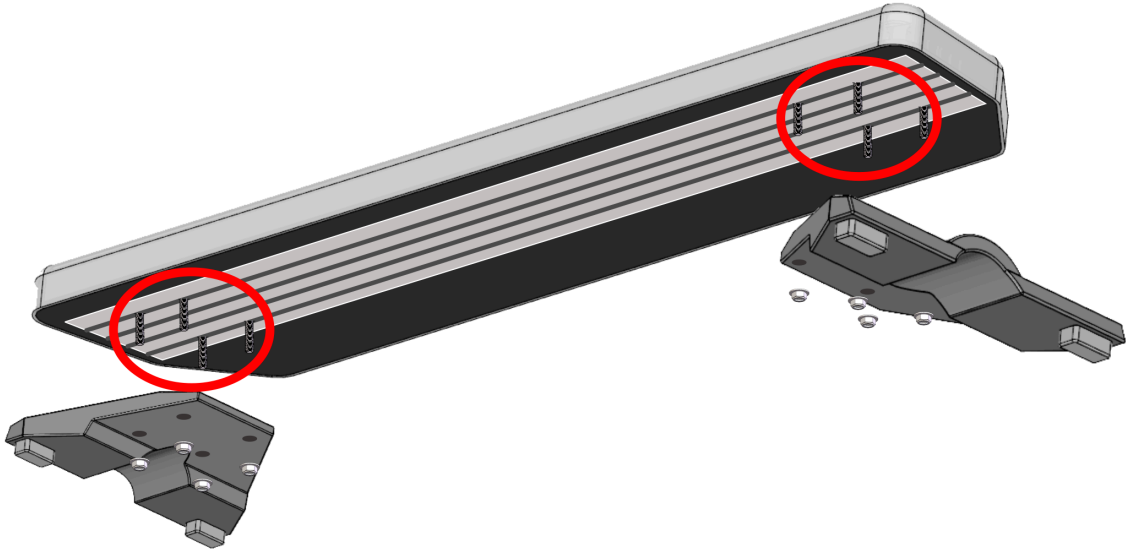
- Socket wrench
- Phillips screwdriver

NOTE: The instructions and graphics in this section are for example only. Additional steps might be required depending on the type of lightbar installed on the vehicle.

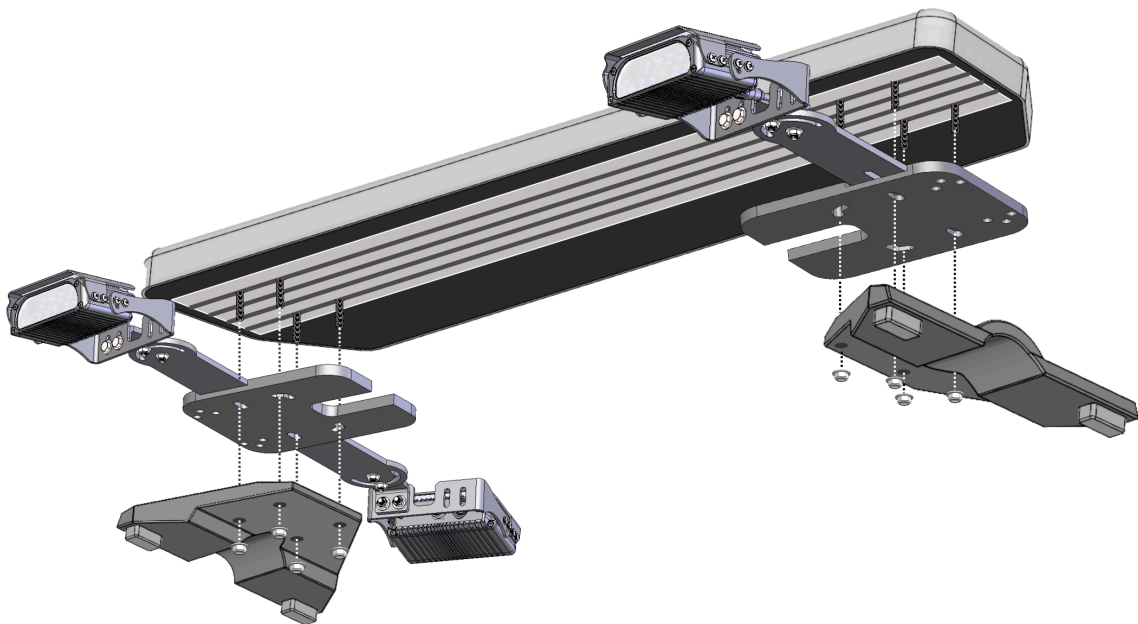
To install SharpZ3 cameras on a lightbar:

- 1 Assemble the lightbar mounting bracket using the instructions included with the hardware.
TIP: Do not tighten the bolts until after you have properly positioned the cameras.
- 2 Separate the lightbar from its mounting base.

- 3 Remove the mounting bolts from the slide bars.

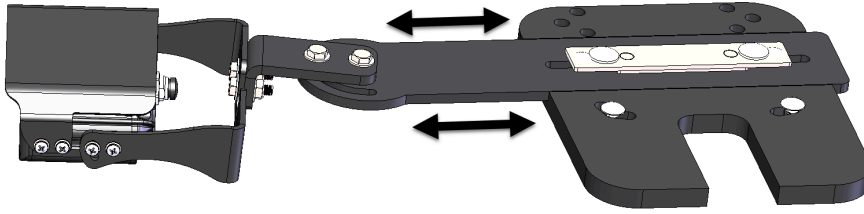


- 4 Install the new carriage bolts in the slide bars.
- Align the AutoVu lightbar bracket under the lightbar and find the slide bar slots that match the bracket mounting holes.
 - Install the four carriage bolts in the appropriate slide bar slots.
- NOTE:** 1/4" and 5/16" carriage bolts are included with the lightbar mounting bracket. Select the bolts that are appropriate for the mounting holes in the lightbar base.
- 5 Install the AutoVu lightbar bracket between the lightbar and the lightbar base and fasten the assembly using the appropriate washers and locknuts as shown in the documentation included with the hardware.



- 6 Install the assembled lightbar on the patrol vehicle.

- 7 Adjust the position of the mounting bracket by sliding it to the front or back, then tighten the fastening bracket.



Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



After you finish

- [Align the cameras](#) so that license plates of passing vehicles are within the camera's field of view.
- Tighten the remaining fasteners on the lightbar mounting bracket.

Custom SharpZ3 camera mounting

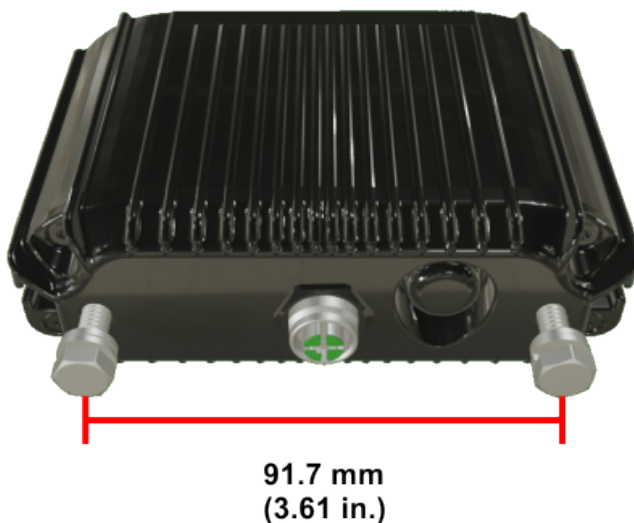
If you cannot mount the SharpZ3 camera using the available mounting hardware, you can create a custom solution using one of the camera mounting points.

What you should know

- The custom mount you design must be safe, rigid, and all fasteners must provide vibration resistance.
- SharpZ3 fasteners are made of stainless steel. The hardware you use must meet or exceed the quality of the original SharpZ3 hardware.
- SharpZ3 cameras must be mounted at a specific angle for proper ALPR. When designing a custom mount for a SharpZ3 camera, you must consider the required camera angle, or ensure that the camera angle is adjustable after mounting.

Threaded mounting holes

The SharpZ3 camera includes two threaded mounting holes on the back of the camera body. You can mount the camera to a surface using two bolts and fasteners.



IMPORTANT: To avoid damage to the camera body, do not exceed 4 Nm (3 lbf-ft) of torque when tightening the mounting bolts.

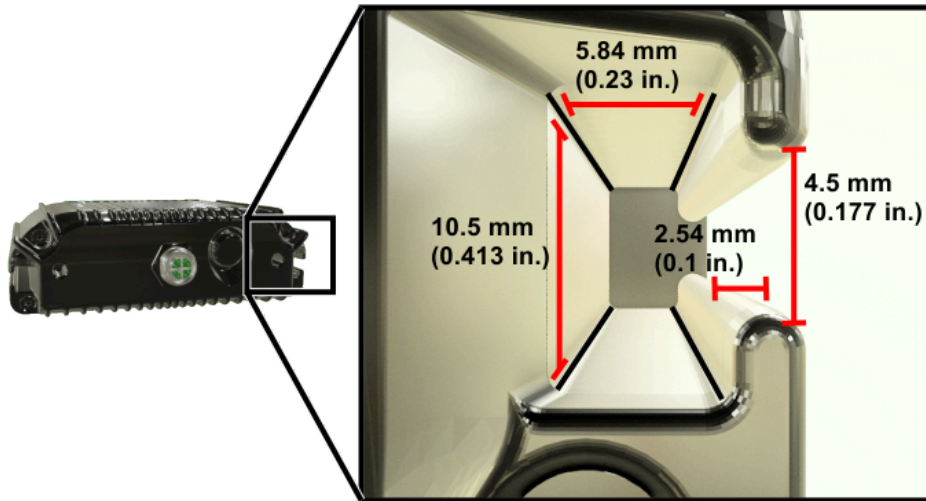
Component	Description
Hole spacing	91.7 mm (3.61in.)
Hole depth	Between 6.35 mm (0.25 in) and 9.53 mm (0.375 in)
Thread	¼-20 UNC

T-slot mounting

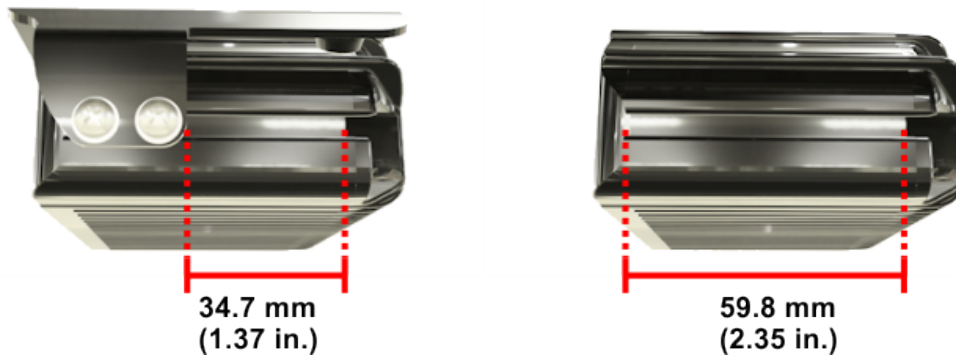
You can mount the SharpZ3 camera using the two T-slots on the camera body.

IMPORTANT: Use both T-slots. Mounting the SharpZ3 by only one T-slot will damage the camera body.

T-slot inner dimensions:



T-slot usable length with and without sun shield:



Related Topics

[Hardmount camera installation](#) on page 52

[Installing the SharpZ3 camera using the magmount](#) on page 58

[Lightbar camera installation](#) on page 60

[Camera alignment](#) on page 76

Drilling a camera cable hole

For installations with cameras that are hardmounted or attached to the patrol vehicle lightbar, you must drill a cable hole in the roof of the vehicle for each camera.

Before you begin

- Install the camera using the [hardmount bracket](#) or [lightbar bracket](#).
NOTE: If you are installing cameras using [magmounts](#), you do not need to drill holes in the vehicle roof.
- For hardmount installations, [prepare the vehicle for camera installation](#).

What you should know

- The SharpZ3 camera cable is pre-terminated with an RJ45 connector. If you shorten the camera cable, you must use the provided replacement RJ45 connector. For more information, see [Terminating the SharpZ3 camera cable](#) on page 68.
- This procedure includes the use of cable glands. Alternatively, you can use butyl tape to seal the cable hole. If you use butyl tape, a 1.9 cm (0.75 in) hole can accommodate one camera cable, and a 2.5 cm (1 in) hole can accommodate two camera cables. If you use this method, install a rubber grommet to protect the cable and account for the grommet when calculating the hole size.
- Follow the cable management guidelines for SharpZ3. For more information, see [SharpZ3 cabling recommendations](#) on page 24.

To complete these steps, you need the following:

- **Electric or battery powered drill and drill bits:** Required when running cables through the vehicle roof or body panels.
 For more information, see [Drilling a camera cable hole](#) on page 66.
- **Hole saw or stepping drill bit:** For cable penetrations, you can use a stepping drill bit or you can use a fine-toothed hole saw designed for vehicle body panels which is depth-regulated and includes a pilot drill bit.
 For more information, see [Drilling a camera cable hole](#) on page 66.
- **Grease pencil:** Used to mark support locations on the roof of the vehicle.
- **Center punch:** Used to mark drilling locations.
 For more information, see [Preparing the vehicle for a hardmounted camera installation](#) on page 52.
- **Cable glands:** Required when sealing wire holes drilled in the vehicle's roof.
NOTE: Cable glands are required for all cable penetrations. Ensure that you have the appropriate glands in installing a cellular antenna or satellite navigation antenna.
- **Butyl tape and isopropyl alcohol:** Required for sealing any cable penetrations that do not use a cable gland.

To drill camera cable holes in the vehicle:

- 1 Choose an appropriate cable gland for the 0.6 cm (0.25 in) camera cable and the 1.9 cm (0.75 in) hole required for the RJ45 connector.
WARNING: Do not run more than one cable through a cable gland.
- 2 Place the cable gland on the section of the vehicle roof where you intend to pass the cable. Use a pencil to trace the outline of the cable gland.
IMPORTANT: The hole should be slightly smaller than the outline of the cable gland so that the cable gland collar can grip the vehicle's roof.
- 3 Check that both sides of the roof are clear of anything that could be damaged, and then drill the hole.
- 4 Deburr the holes to remove any metal shards or remnants.
- 5 Install the cable gland in the camera cable hole.

- 6 Pass the camera cable through the cable gland.

Leave approximately 20 cm (8 in) of cable to allow the connection to the camera. A simple distance check is to lay the cable across the hardmount plate. To ensure that you have a proper loop for connecting to the camera, the tip of the connector should reach to the far side of the plate.

Example

Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.



Camera cable connection

To connect a SharpZ3 camera, you must terminate the camera cable with an RJ45 connector and connect the M12 x-code connector to the camera.

SharpZ3 camera cables have been engineered by Genetec Inc. for guaranteed performance and compliance at various levels (signal integrity, EMI, flexibility, sealing, environmental).

SharpZ3 camera cables use an RJ45 connector, but they do not carry standard Ethernet protocol. They carry a proprietary protocol operating at a higher frequency.

IMPORTANT:

- Do not try to make your own SharpZ3 camera cable. Doing so can result in intermittent or permanent camera connection problems.
- You can shorten the provided SharpZ3 camera cable, but do not attempt to extend it.
- Do not use a coupling mechanism to connect the SharpZ3 camera cable to another cable.

NOTE:

- An EZ-RJPRO™ HD crimp tool is included with the AutoVu Installation Kit.
- New RJ45 connectors are included with every SharpZ3 system.

Terminating the SharpZ3 camera cable

The SharpZ3 camera cable is pre-terminated with an RJ45 connector. If you want to shorten the camera cable, or if you want to drill a smaller cable hole, you can cut the cable and terminate it using the provided replacement RJ45 connector.

Before you begin

- [Install the cameras](#) on the patrol vehicle.
- [Drill the camera cable holes](#).
- [Run that camera cables](#) to the base unit location.
- Cut the camera cables to the correct length.

What you should know

- The SharpZ3 camera uses a standard Cat6a Ethernet cable.
- An EZ-RJPRO™ HD crimp tool is included with the AutoVu Installation Kit.
- Replacement RJ45 connectors are included with every SharpZ3 system.

To complete these steps, you need the following:

- **Depth-controlled cable jacket stripper:** Recommended for stripping the cable jacket to avoid damage to the internal conductors. The Cyclops stripping tool is included with the AutoVu Installation Kit.

For more information, see [Terminating the SharpZ3 camera cable](#) on page 68.

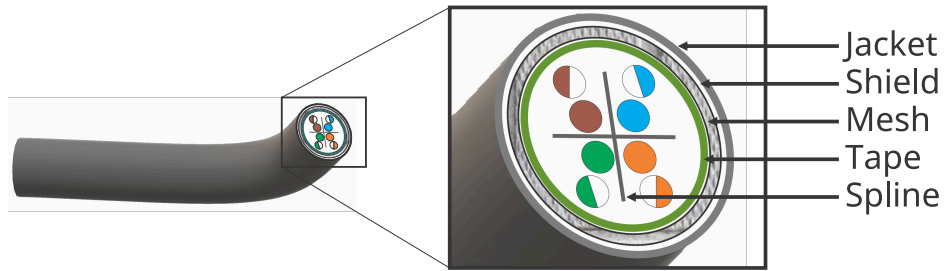
- **Wire stripper:** Required for stripping wire insulation.

For more information, see [Terminating the SharpZ3 camera cable](#) on page 68.

- **RJ45 crimp tool:** Use a professional quality tool for proper crimping. The EZ-RJPRO® HD Crimp Tool is included with the AutoVu Installation Kit.

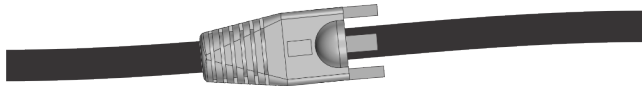
For more information, see [Terminating the SharpZ3 camera cable](#) on page 68.

The SharpZ3 camera cable is a Cat6a network cable with a plastic spline separating four twisted pairs.

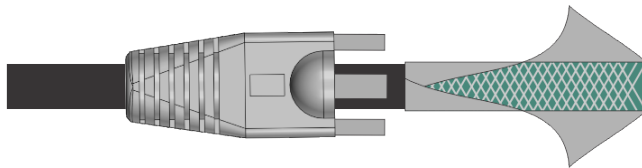


To terminate the camera cable:

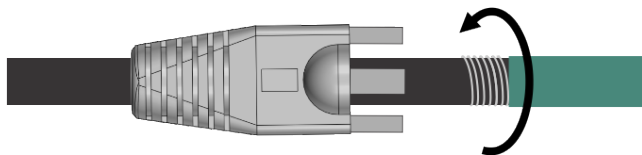
- 1 Slide the strain relief boot over the unstripped camera cable.
You can do this after you strip the cable, but it is easier to do it first.



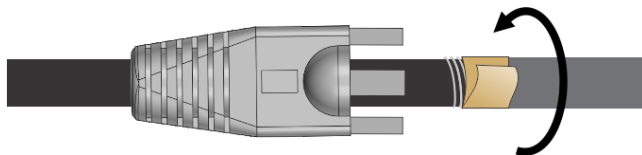
- 2 Using the cable jacket stripper, strip approximately 5 cm (2 in) from the cable jacket.
- 3 Remove the metal shield tape.
IMPORTANT: Do not remove the wire mesh.



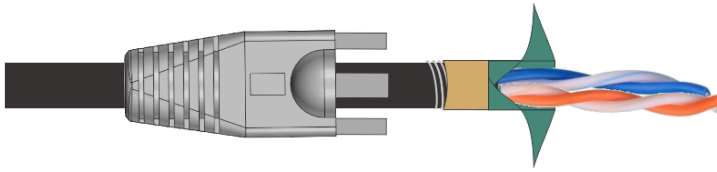
- 4 Separate the strands of the wire mesh and cut off all but two strands.
- 5 Wrap the strands around the cable jacket.
TIP: To keep the cable diameter as small as possible, do not overlap the wires.



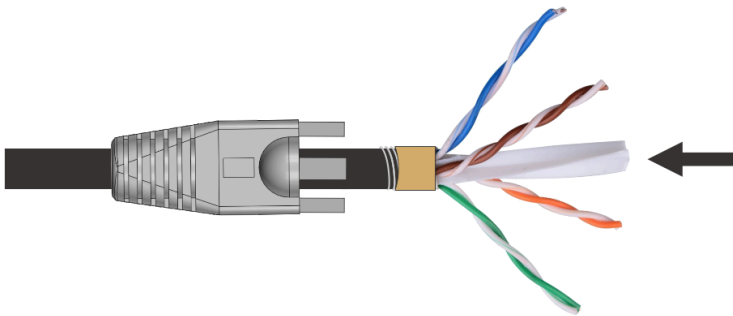
- 6 Wrap the provided copper tape around the strands.



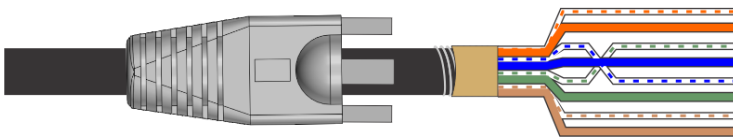
7 Remove the plastic tape.



8 Cut off the plastic spline.

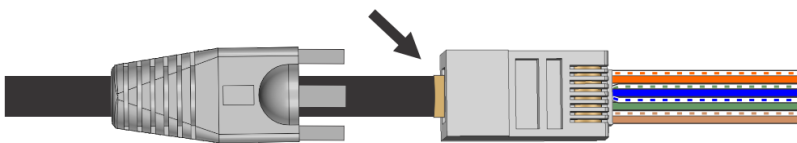


9 Arrange the conductors according to the EIA-T568B standard. For more information, see [Conductor arrangements for SharpZ3 cameras](#) on page 71.



10 Insert the wires into the EZ-RJPRO® HD connector.

11 Slide the connector over the copper tape.



12 Confirm the wire order still matches the EIA-T568B standard.

13 Twist the wires so that they can easily pass through the crimp tool.

TIP: If required, pull the wires so that the RJ45 connector slides farther over the copper tape.

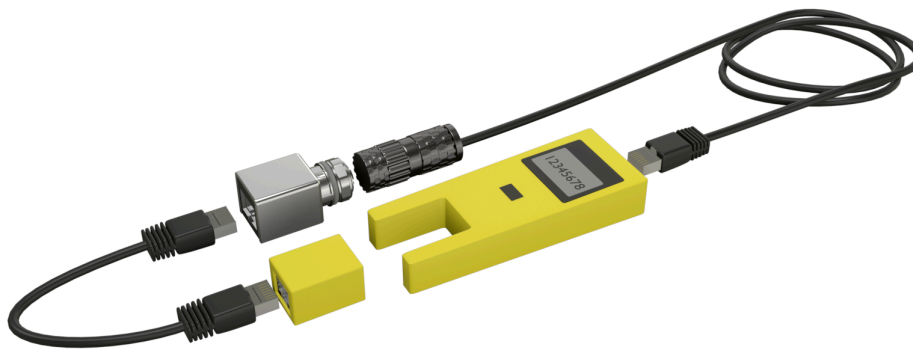
14 Slide the strain relief boot into place and insert the plastic prongs into the RJ45 connector.



15 Crimp the connector using the EZ-RJPRO® HD crimp tool.



16 Test the Rj45 connection using the cable tester and M12 x-code to RJ45 converter, and patch cable included with the AutoVu Installation Kit. Test the connection according to the instructions included with the cable tester. For more information, see [About the AutoVu Installation Kit](#) on page 23.



Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.

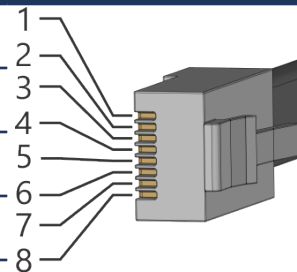


Conductor arrangements for SharpZ3 cameras

The following table lists the conductor arrangements for SharpZ3 cameras

You must terminate the SharpZ3 camera cables according to the EIA-T568B conductor arrangement.

Pin #	EIA-T568B
1	White/Orange
2	Orange
3	White/Green
4	Blue
5	White/Blue



Pin #	EIA-T568B
6	Green
7	White/Brown
8	Brown

Connecting the camera cable

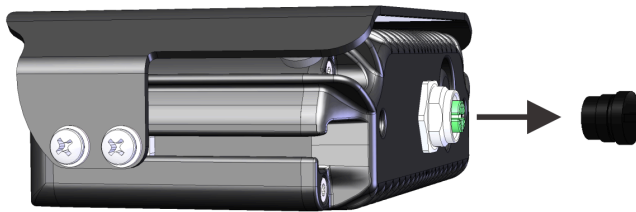
After the SharpZ3 camera is installed on the patrol vehicle, you can connect the camera cable.

What you should know

- The camera cable uses an M12 X-coded connector.
- No tools are required when connecting the camera cable.

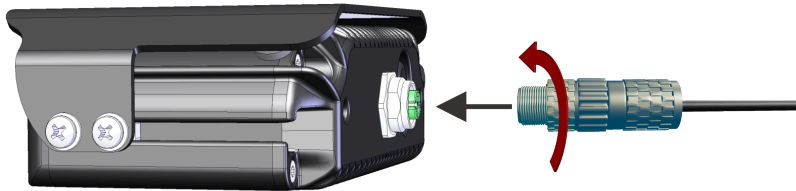
To connect the camera cable to the SharpZ3 camera:

- 1 Remove the plastic protector cap from the camera.
- 2 Apply a small amount of dielectric compound (included) on the cable connector threads.
IMPORTANT: Do not let the dielectric compound come in contact with the inside of the cable connector.



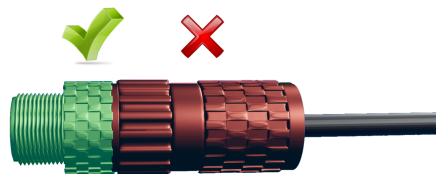
- 3 Align the notch on the cable connector with the notch on the camera port.

- Connect the cable to the camera and tighten by hand until you feel resistance, then tighten an additional $\frac{1}{4}$ turn by hand.
As you turn the connector clockwise, jiggle the connector up and down to make sure that the cable connection is tight enough.



WARNING:

- Do not overtighten the connector.
- Only tighten the front of the connector. Tightening the back of the connector will break the camera.



Example

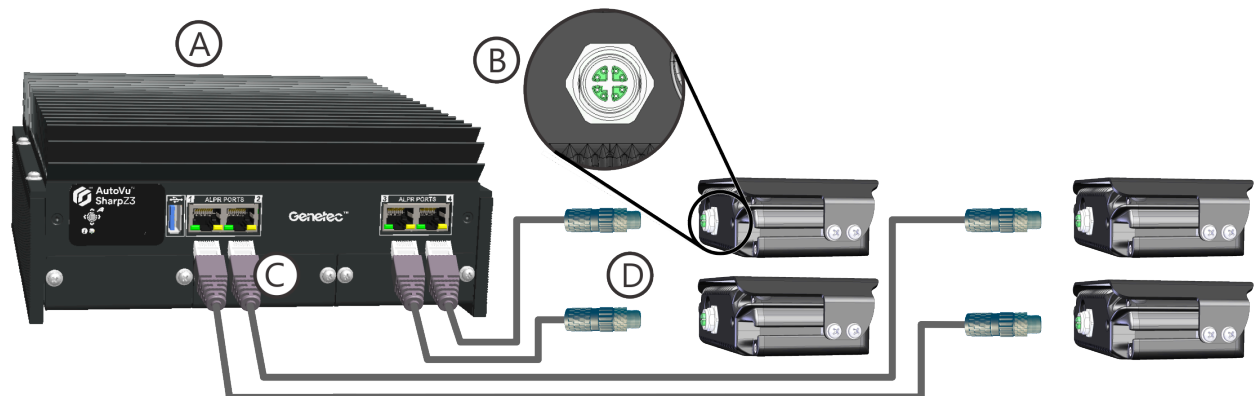
Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Base unit camera connections

Depending on configuration of your SharpZ3 system, you can connect up to four SharpZ3 cameras to the base unit.

The following image shows a SharpZ3 system with a four-camera ALPR module:



	Component	Description
A	SharpZ3 base unit	Responsible for ALPR processing.
B	Camera connector	Remove the protective cap before connecting the camera cable.
C	ALPR camera ports	The SharpZ3 Cat6a camera cable connects to the ALPR module with an RJ45 connector.
D	Camera cable	The SharpZ3 Cat6a camera cable connects to the SharpZ3 camera with an M12 X-coded connector.

Sealing cable holes in the patrol vehicle

To ensure a watertight installation, you must seal all cable holes drilled in the body of the vehicle.

What you should know

- The following steps are not required if you are using cable glands to seal the cable holes.
- If you run more than one cable through a cable hole, seal the hole using a rubber grommet and butyl tape, not a cable gland.

To seal the cable holes:

- 1 Install a rubber grommet in the cable hole to prevent damage to wires that pass through the vehicle body.
- 2 Clean the area around the cable hole using isopropyl alcohol or rubbing alcohol.
- 3 When the area is dry, use about a 8 cm (3 in) section of butyl tape to wrap the cable and the area around the base of the cable gland.
- 4 Press the butyl tape into place to ensure a tight seal.

Camera alignment

To maximize the number of license plate reads generated by the SharpZ3 system, you must install the camera units in specific locations on the patrol vehicle. You must then align the camera units based on the correct installation configuration.

SharpZ3 camera installation configurations

The number and configuration of the SharpZ3 cameras installed on a patrol vehicle depends on whether the SharpZ3 system will be reading license plates for parking enforcement, law enforcement, or for vehicle repossession.

The following table lists the camera locations for the most common SharpZ3 installation configurations. If these scenarios do not apply to your installation, contact your AutoVu representative.

Configuration	Maximum speed	Cameras	Driver Front	Passenger Front	Driver Rear	Passenger Rear
Parking commercial kits						
University, City, Overtime	40 km/h (25 mph)	2	12 mm	8 mm		
Central (EU) 2x2	40 km/h (25 mph)	2	12 mm	8 mm		
Central (EU) 4x4	40 km/h (25 mph)	4	12 mm	8 mm	12 mm	8 mm
Law enforcement ¹						
City vehicle		3	16 mm	12 mm	16 mm	
City vehicle		2		12 mm	25 mm	
City vehicle (rear plates ²)		2	16 mm	12 mm		
Highway vehicle		3	16 mm	12 mm	25 mm	
Highway vehicle		2		12 mm	25 mm	
Highway vehicle (rear plates ²)		2	25 mm	12 mm		
Highway (shoulder ³)		2	25 mm	12 mm		
Vehicle repossession ¹						
Repo vehicle	70 km/h (45 mph)	4	12 mm	8 mm	16 mm	25 mm

NOTE: The recommended camera configurations are based on the following assumptions:

- License plate characters are between 25 and 60 pixels high in the images acquired by the ALPR camera.
- License plates are mounted on vehicles between 0.3 m and 0.9 m (1 to 3 feet) from the ground.

- Horizontal distance from the camera to the license plate:
 - **Parking lots:** 2.0 m (6.5 ft) to 3.2 m (10.5 ft)
 - **Street patrol (2 lanes):** 2.1 m (7.0 ft) to 5.2 m (17 ft)

¹ These are recommended configurations and are not sold as kits.

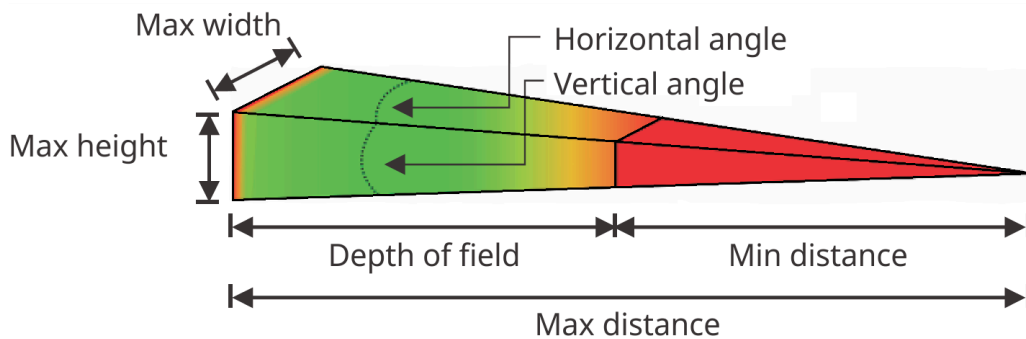
² For regions where a license plate is not required on the front of the vehicle.

³ For patrol vehicles that park on the shoulder or breakdown lane and must read license plates across multiple lanes.

SharpZ3 camera field of view specifications

SharpZ3 units are available with several different focal length options for the ALPR camera. Each camera option is capable of reading license plates at different distances.

NOTE: The distance at which the SharpZ3 ALPR camera can capture license plate reads might vary depending on lighting conditions.



Lens type	Horizontal angle	Vertical angle	Minimum width	Minimum height	Minimum distance	Maximum distance	Depth of field
8 mm	34.9°	26.4°	4.4 m (14.4 ft)	3.3 m (10.8 ft)	2.6 m (8.5 ft)	7.0 m (23.0 ft)	4.4 m (14.4 ft)
12 mm	23.6°	17.8°	4.4 m (14.4 ft)	3.3 m (10.8 ft)	3.9 m (12.8 ft)	10.6 m (34.8 ft)	6.7 m (22 ft)
16 mm	17.8°	13.4°	4.4 m (14.4 ft)	3.3 m (10.8 ft)	5.2 m (17.1 ft)	14.1 m (46.3 ft)	8.9 m (29.2 ft)
25 mm	11.5°	8.6°	4.4 m (14.4 ft)	3.3 m (10.8 ft)	8.1m (26.6 ft)	22.0 m (72.2 ft)	13.9 m (45.6 ft)

Aligning the SharpZ3 cameras

Each SharpZ3 camera unit installed on a patrol vehicle must be aligned according to its position on the vehicle and the ALPR camera lens focal length.

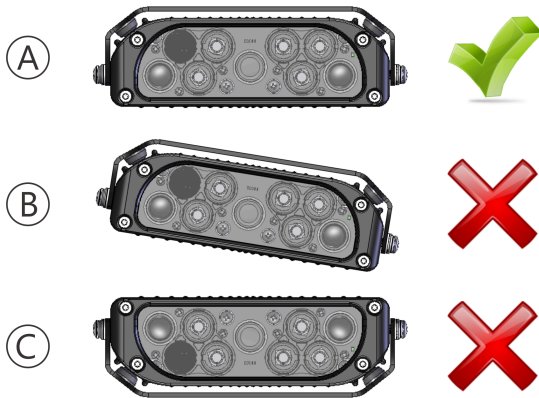
What you should know

To align SharpZ3 camera units, you need the following tools:

- **10 mm hex key wrench:** Used to adjust the SharpZ3 camera unit pan.
 - **Phillips #1 screwdriver:** Used to adjust the SharpZ3 camera unit tilt.
 - **Digital angle finder:** Used to measure the horizontal angle of SharpZ3 cameras.
 - **Laser distance tool or measuring tape:** Used to measure the distance from the SharpZ3 camera unit to the target license plate.
 - **Grease pencil:** Used to mark support locations on the roof of the vehicle.
 - **Roll of tape:** Used for marking a center line on the vehicle. Use tape that will not damage the vehicle.
 - **Target license plate:** Used for generating plate reads and for aligning SharpZ3 cameras. A target license plate is included with the [AutoVu Installation Kit](#). The target must be suspended at a height of 0.9 m (3 ft) from the ground.
- TIP:** Attach the target to the box used to ship the SharpZ3 system.
- NOTE:** If the target is not available, you can mark a spot on a cardboard box at the height of 0.9 m (3 ft).

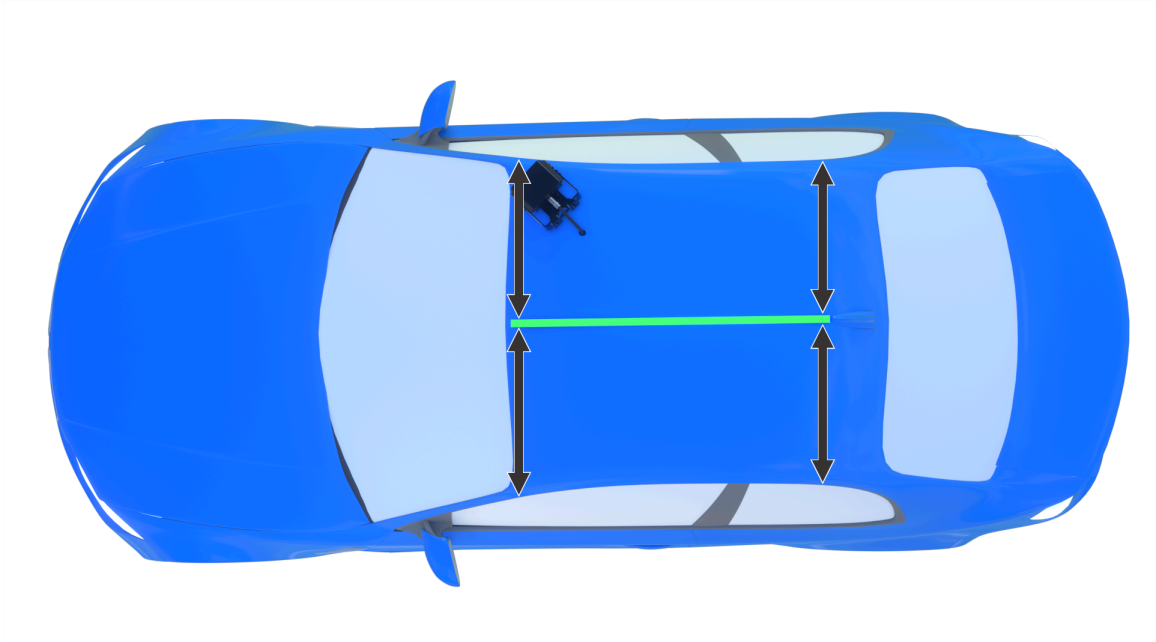
To align SharpZ3 cameras:

- 1 With the SharpZ3 cameras installed and connected to the base unit, park the patrol vehicle on a level surface. Leave enough space around the vehicle to install the target license plate at the required distances from the cameras.
- 2 Adjust the camera bracket roll so that the camera is parallel to the ground.

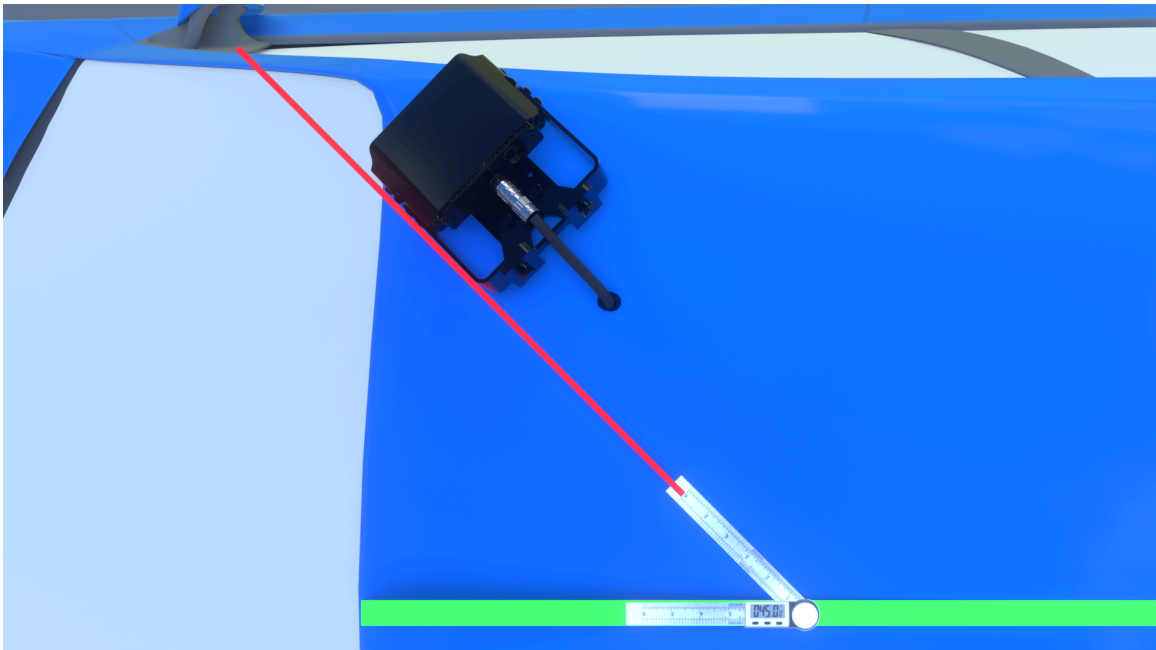


A	Level to ground
B	Not level to ground (body roll)
C	Upside down

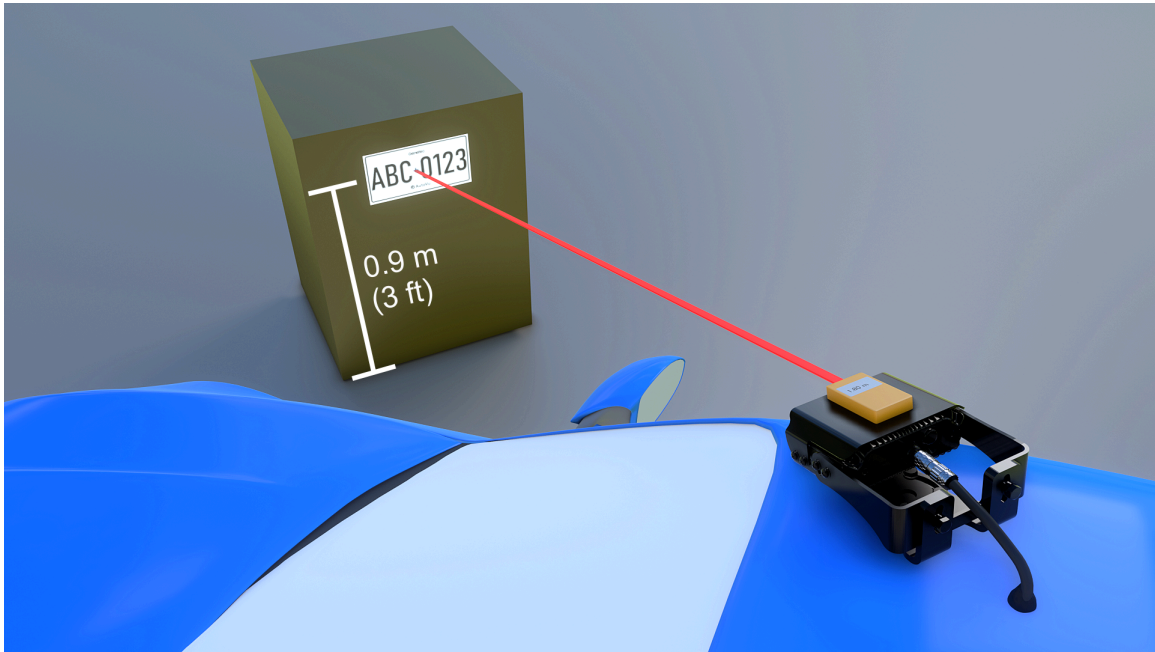
- 3 To find the mid-line of the vehicle roof, measure and mark the center point on the front and back of the roof with a grease pencil, then use tape to mark the mid-line.



- 4 Place your digital angle finder on the mid-line and set it to the pan angle for the camera according to the following table.
- 5 Extend the line using a straight line or string and set the pan angle of the SharpZ3 camera unit.



- 6 Using a laser distance tool or tape measure, find the correct target distance based on the camera focal length and enforcement scenario in the following table, then place the target at the correct distance from the camera unit.



Camera lens	Pan angle	Target distance (small) ¹	Target distance (medium) ¹	Target distance (large) ¹
University parking: Up to 40 km/h (25 mph); includes 90° parking				
8 mm	45° ²	1.80 m (5.89 ft)	2.00 m (6.57 ft)	2.20 m (7.21 ft)
12 mm	41°	2.59 m (8.36 ft)	2.85 m (9.35 ft)	3.15 m (10.33 ft)
Law enforcement: City				
8 mm	45° ²	1.85 m (5.90 ft)	2.05 m (6.73 ft)	2.25 m (7.37 ft)
12 mm	37°	2.75 m (9.02 ft)	3.11 m (10.20 ft)	3.44 m (10.66 ft)
Law enforcement: Highway				
12 mm	30°	2.79 m (9.16 ft) ³	3.16 m (10.37 ft) ³	3.52 m (11.55 ft) ³
16 mm	24°	3.89 m (12.78 ft)	4.44 m (14.57 ft)	4.89 m (16.05 ft)
25 mm	15°	6.01 m (19.70 ft)	6.88 m (22.56 ft)	7.80m (26.60 ft)
Vehicle repossession: Up to 70 km/h (45 mph)				
8 mm	45°	1.85 m (5.90 ft)	2.05 m (6.73 ft)	2.25 m (7.37 ft)
12 mm	37°	2.75 m (9.02 ft)	3.11 m (10.20 ft)	3.44 m (10.66 ft)

Camera lens	Pan angle	Target distance (small) ¹	Target distance (medium) ¹	Target distance (large) ¹
16 mm	25°	3.85 m (12.63 ft)	4.39 m (14.42 ft)	4.84 m (15.88 ft)
25 mm	16°	5.90 m (19.35 ft)	6.76 m (22.18 ft)	7.55 m (24.78 ft)

¹ Vehicle height:

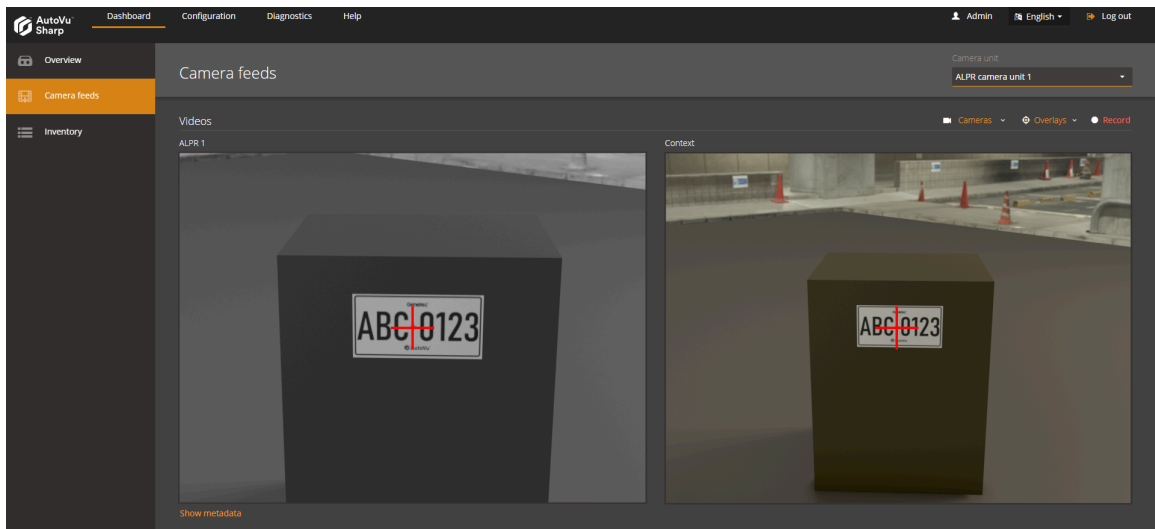
- **Small vehicle:** 1.5 m (4.9 ft)
- **Medium vehicle:** 1.6 m (5.3 ft)
- **Large vehicle:** 1.7 m (5.6 ft)

² A pan of 45° using the 8 mm camera lens is the optimal configuration for parallel parking.

³ A 12 mm camera in this configuration can only read plates in the closest lane.

To align the SharpZ3 camera unit in the Sharp Portal:

- 1 In the Sharp Portal, navigate to the **Dashboard > Camera feeds page**.
- 2 Select the camera unit from the **Camera unit** menu.
- 3 From the **Overlays** menu, select **Crosshairs**.
Crosshairs are displayed on the video feed.
- 4 Adjust the SharpZ3 camera unit vertical tilt until the crosshairs in the camera feed meet the crosshairs on the center of the target license plate.



After you finish

Repeat the alignment steps for the remaining SharpZ3 camera units.

Peripheral hardware installation

This section includes the following topics:

- ["About SharpZ3 navigation hardware"](#) on page 83
- ["About installing wheel-imaging cameras in a SharpZ3 system"](#) on page 92
- ["About using AutoVu auxiliary PoE cameras for additional context images"](#) on page 100
- ["About the AutoVu car camera switch"](#) on page 106

About SharpZ3 navigation hardware

If it is important to know the precise location of the patrol vehicle, permit hits, and hotlist hits, the SharpZ3 base unit must include the Navigation option module.

The navigation expansion module provides additional navigation information. This information can be used with any type of AutoVu™ mobile deployment, but it is required for patrol vehicles running Genetec Patroller™ in *City Parking Enforcement with Wheel Imaging* mode.

The module is also mandatory for installations that include wheel-imaging cameras.

How precise positioning is obtained

The navigation expansion module is connected to a satellite receiver that obtains satellite positioning information. The system also receives odometry information from the vehicle VSS or odometry sensor. This provides greater reliability than satellite positioning alone. For example, if you drive through a long tunnel, the satellite signal will be lost, but the odometry information lets the AutoVu system continue to track changes in the speed and direction of the vehicle.

The base unit is also connected to the vehicle's reverse signal (usually by tapping the reverse lights), and to the in-vehicle computer.

NOTE: To obtain precise positioning, you must calibrate the AutoVu navigation system in Patroller.

Satellite navigation hardware options

The satellite navigation hardware that must be installed on the patrol vehicle depends on whether the system includes the navigation expansion module and wheel-imaging cameras.

Satellite navigation hardware

Installation type	Required satellite navigation hardware	Connector type	Connection location	Required drivers
Base unit with the navigation expansion module	Tallysman TW2412 GPS/GLONASS Antenna	SMA	Navigation expansion module GNSS port	None
Base unit without the navigation expansion module (GPS only)	GlobalSat BU-353 USB GPS Receiver ¹	USB	In-vehicle computer USB port	Install drivers on in-vehicle computer.

¹ For information on installing the GPS driver on the Patroller computer, see the *Genetec Patroller Administrator Guide*.

Installing the SharpZ3 satellite navigation hardware

To provide satellite coordinates for plate reads, you must install a satellite navigation antenna on the patrol vehicle.

What you should know

- If the patrol vehicle uses wheel-imaging cameras, the base unit you install must include the SharpZ3 navigation expansion module so that the system can track the location of the vehicles associated with captured plate reads.
- For patrol vehicles that lack wheel-imaging cameras and a GPS source, you can install the GlobalSat BU-353N or BU-353S4 USB GPS antenna.

To complete these steps, you need the following:

- **Electric or battery powered drill and drill bits:** Required when running cables through the vehicle roof or body panels.

For more information, see [Drilling a camera cable hole](#) on page 66.

The following procedure applies to all supported receivers and antennas and the general term "satellite hardware" is used.

To install the satellite hardware:

- 1 Install the satellite hardware on the vehicle's roof:
 - a) Ensure that the vehicle's roof is clean, dry, and free of debris.
 - b) Place the magnetized side of the satellite hardware on the vehicle's roof, and consider the following:
 - The satellite hardware requires an unobstructed view of the sky. This includes any objects near the hardware such as a light bar that might block the signal coming from satellites near the horizon.
 - You must install the satellite hardware at least 30 cm (12 in) from any other antenna.
 - For best performance, install the satellite hardware at least 100 cm (40 in) from the SharpZ3 cameras.
 - c) Create a cable penetration in the vehicle's roof and pass the satellite hardware cable through the hole using an appropriate cable gland.
 - For more information on drilling cable holes, see [Drilling the camera cable holes](#).
 - For more information on sealing the cable penetration, see [Sealing the camera holes](#).
- 2 Run the cable to the connection location.
 - If you are installing a Tallysman TW2412 GPS/GLONASS antenna, run the cable to the base unit.
 - If you are installing a GlobalSat BU-353 USB GPS receiver, run the cable to the in-vehicle computer.

IMPORTANT: Avoid bending the antenna cable sharply. Try to make all bends with a smooth radius.
- 3 Connect the satellite hardware to the SharpZ3 system.
 - If you are installing a Tallysman TW2412 GPS/GLONASS antenna, connects to the SMA connector on the navigation expansion module. For more information, see [Navigation expansion module connections](#) on page 32.
 - If you are installing a GlobalSat BU-353 USB GPS receiver, connects to the in-vehicle computer's USB port.

Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.

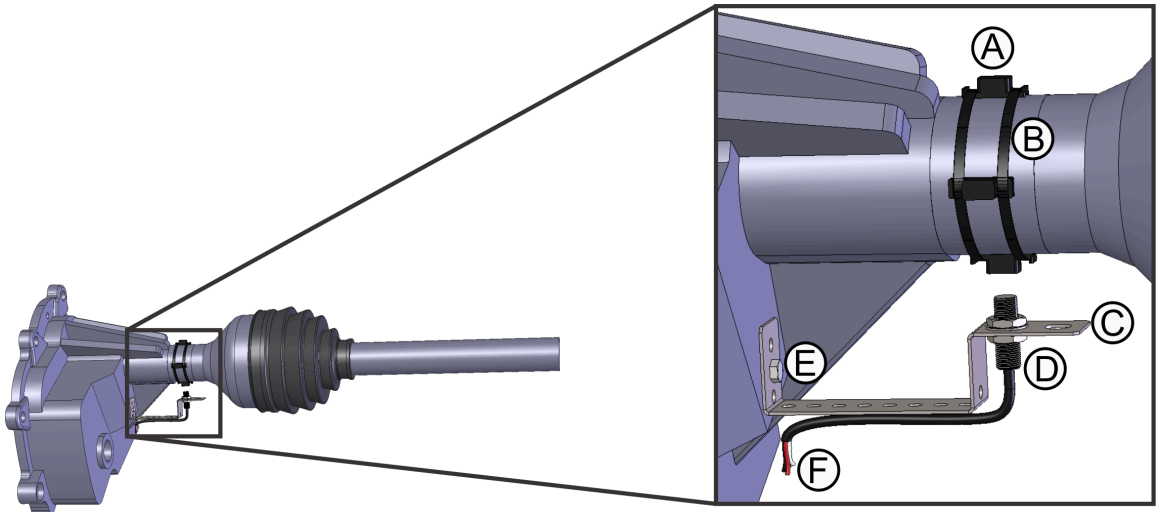


About the odometry sensor

To track and display a patrol vehicle's position accurately on a map, you can provide an odometry signal to the SharpZ3 system by installing an odometry sensor on the drive shaft of the vehicle.

Consider the following when planning your odometry sensor installation:

- If your patrol vehicle has a Vehicle Speed Sensor (VSS) or Output Speed Sensor (OSS), it is recommended to tap into that sensor instead of installing an odometry sensor.
NOTE: Some newer vehicles and electric vehicles do not include a VSS or OSS.
- You can install the odometry sensor on front-wheel drive or rear-wheel drive vehicles.
- An odometry sensor installation includes the following hardware components:



	Component
A	Magnets
B	Cable ties
C	Mounting bracket NOTE: The bracket in the image has been customized to fit the specific installation.
D	Odometry sensor
E	Bolt from the engine block or transmission case (or use self-tapping screws)
F	Odometry sensor cable

Installing the odometry sensor

The odometry sensor is installed near the vehicle drivetrain and detects magnets attached to a rotating shaft.

What you should know

- To complete these steps, you need the following:
 - Jack stands or vehicle ramps
 - Electric drill
 - Stepping drill bit
 - Roll of tape
 - Cable ties
 - Strip of paper
 - Pencil
 - Wrenches
 - Flat blade screwdriver
 - Sandpaper
 - Epoxy (included)

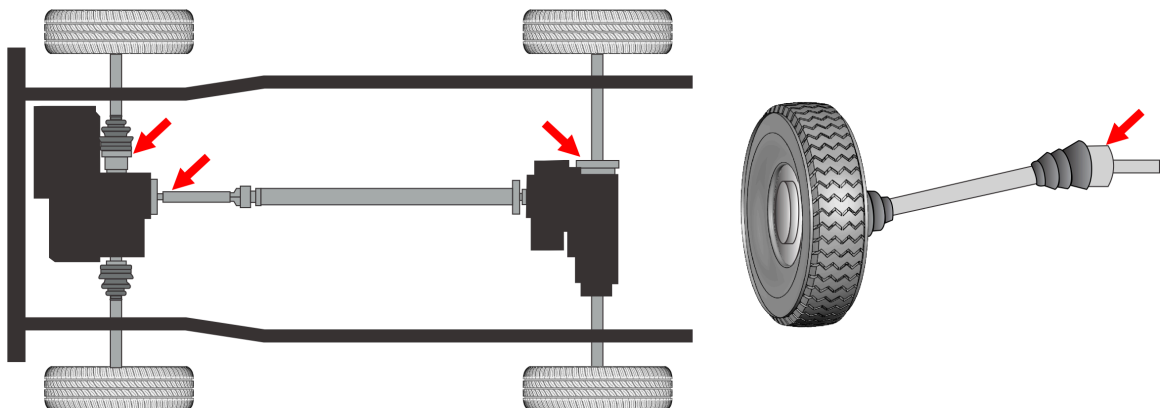
To install the odometry sensor:

- 1 Raise and support the vehicle so that you can work on the drivetrain.

CAUTION:

- Never get under any vehicle that is only supported by jacks. Use jack stands or ramps.
 - Do not use concrete blocks to support the vehicle.
 - Always chock the wheels of the vehicle and set the parking brake.
- 2 Choose a mounting location for the odometry sensor.
 - The sensor must be no farther than 1.9 cm ($\frac{3}{4}$ in) from the magnets.
 - The mounting bracket must be installed on a surface that is immobile relative to the magnets. This means that the distance between the sensor and the magnets must be consistent, even when driving on rough surfaces. The magnets will damage the odometry sensor if they come into contact during vehicle operation.
 - To minimize the lateral movement of the sensor, install it as close as possible to the output of the transmission or differential.

The following drivetrain locations are recommended:

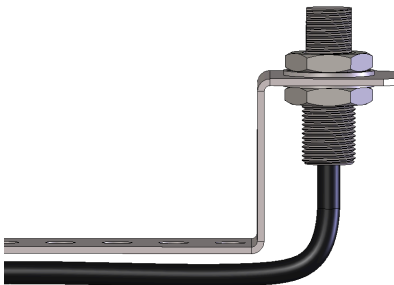


3 Mount the sensor bracket:

- Self-tapping screws are provided to attach the bracket to a surface under the vehicle. However, it is recommended that you use appropriate bolts, nuts and lock washers to secure the bracket. If possible, use an existing bolt from the transmission case or differential case.

WARNING: Drilling through the floor pan to mount the bracket is not recommended because the motion of the floor does not match the motion of the drive shaft. If you must drill through the floor pan, ensure that you do not damage fuel or electrical lines that might be embedded in the floor pan.

- If you are mounting the bracket to a crossmember, drill 0.5 cm (3/16 in) holes and attach the bracket with 0.6 cm (1/4 in) tapping screws.
 - If you use a transmission bolt, drill the bracket as required to widen the hole.
 - If only one mounting bolt is available, bend the bracket over an edge to prevent it from spinning.
 - The installation examples used in this procedure show the odometry sensor mounted below the drive shaft, but note that the sensor can be oriented in any direction relative to the drive shaft.
- 4 Remove the protective rubber cap from the sensor, and then attach the sensor to the sensor bracket as close to the end of the bracket as possible.
Install a lock washer and a nut on each side of the bracket. Hand-tighten the nuts. The connection will be fully tightened at the end of the installation.



- 5 Bend the bracket as needed to aim the sensor at a point on the middle of the drive shaft.

TIP: To reduce vibration, bend the bracket so that it is as short as possible.

- 6 Determine the number of magnets to use.

Shaft circumference can vary depending on the vehicle type and selected drivetrain location. Use the following guidelines to determine the number of magnets to use.

Minimum shaft circumference	Number of magnets
5.1 cm (2 in)	2
7.6 cm (3 in)	3
10.2 cm (4 in)	4
12.7 cm (5 in)	5
15.2 cm (6 in) or larger	6

If the shaft cross-section is not circular, for example, hexagonal or other shape, place the magnets as required so that they are evenly-spaced. The distance between the magnets and the sensor can vary but must not exceed 1.4 cm (0.75 in). If you need assistance, contact your AutoVu™ representative.

7 Prepare the magnet mounting location:

- a) Use the included sandpaper to remove surface rust from the expected magnet locations around the shaft.

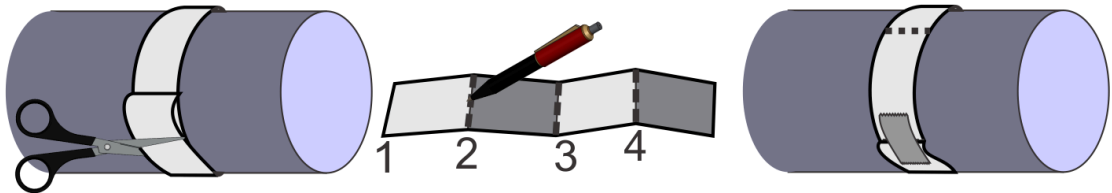
If the magnet locations are already clean and rust-free, use sandpaper to roughen the surface to ensure that the epoxy adheres.

- b) Use the included alcohol wipe to clean the magnet mounting locations.

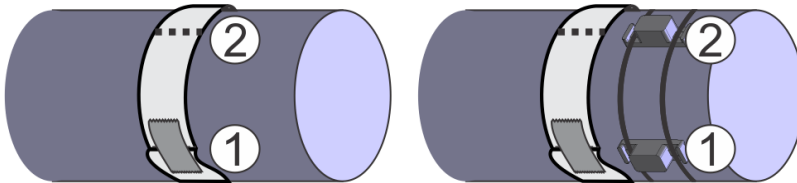
8 Identify the magnet mounting points:

NOTE: In the following example, four magnets are installed. Adjust the instructions to account for the number of magnets you are installing.

- a) Wrap a strip of paper around the shaft.
- b) Mark the circumference of the shaft and cut the paper to match.
- c) Fold the paper in half twice, dividing it into four equal sections. Make the creases more visible using a marker. The creases will show the mounting location for the magnets.
- d) Wrap the strip of paper around the shaft and use a piece of tape to hold the paper in place.



9 Secure the magnets to the shaft:



- a) Position the strip of paper so that the magnets will be installed beside the paper, directly in line with the sensor.

- b) Prepare the epoxy according to the instructions on the package.

IMPORTANT: The supplied epoxy hardens in 5 - 10 minutes. Read through the rest of the steps and prepare your work before securing the magnets.

- c) Apply epoxy to the back of the magnets and position the magnets beside the mounting locations marked on the strip of paper.

- d) Secure the magnets using two cable ties, making sure that the tie straps sit between the notches on the sides of the magnets.

To tighten the cable ties, place the blade of a screwdriver against the cable tie lock, and use pliers to pull on the strap end.

- e) Cut off any excess strap and ensure that the cable tie locks do not contact the sensor when the shaft rotates.

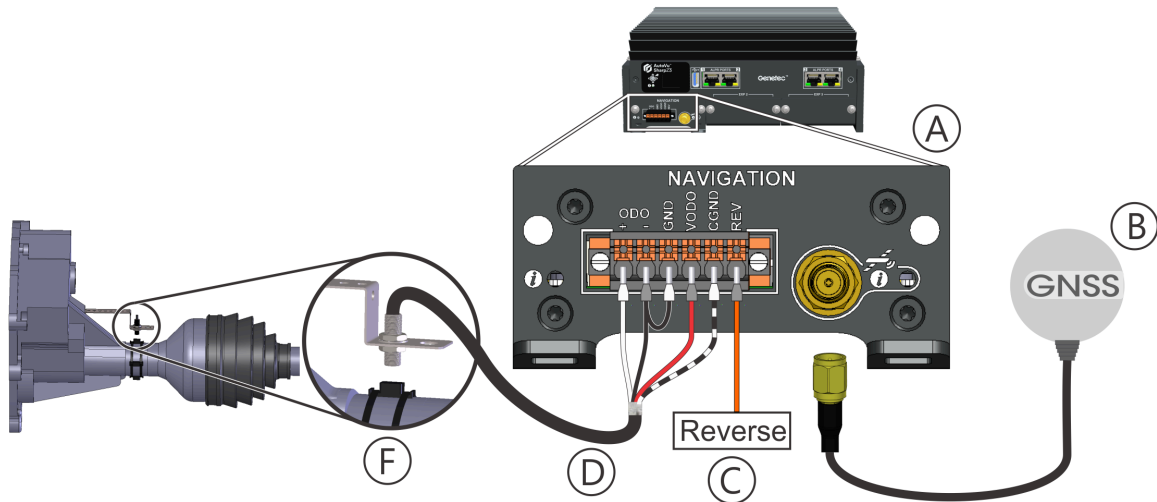
- f) Verify that the magnets did not shift during tightening.

10 Adjust the sensor in the bracket:

- a) Make sure that the gap between the sensor and the magnets is no greater than 1.9 cm ($\frac{3}{4}$ in). Reposition the sensor to align with the magnets, if needed.

- b) When the sensor is in its final position on the mounting bracket, tighten the sensor mounting nuts to 31 Nm (23 ft-lbf).

- 11 Check for an existing hole in the floor pan that is suitable for passing the sensor cable to the base unit. If you cannot find an appropriate hole in the floor pan, drill a hole and install a cable gland to protect the cable.
- WARNING:** Fuel lines and electrical cables are sometimes embedded in a vehicle's floor pan. Do not drill through the floor pan unless you are sure there are no hidden obstacles.
- 12 Run the cable to the base unit using a wire loom to protect the wires.
- WARNING:** Make sure that wires are routed away from exhaust pipes, shift rods, or any other hot or moving parts.
- 13 Connect the odometry sensor cable to the base unit as shown:



Component	Description	
A	Navigation expansion module	The navigation expansion module adds precise positioning to the SharpZ3 system.
B	Satellite navigation antenna	The GNSS satellite navigation antenna is connected to the base unit and works with the odometry inputs to provide precise georeferencing for the vehicles associated with the plate reads. For more information on which satellite navigation hardware to install, see Satellite navigation hardware options on page 83.
C	Reverse signal	The SharpZ3 system is usually connected to the vehicle's reverse signal by tapping the reverse lights.
D	Odometry sensor cable connection	Connect the hardware to the base unit as shown in the diagram.
E	Odometry sensor	The odometry sensor provides wheel rotation information to the AutoVu system if a VSS signal is not available.

Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Installing the cellular antenna

If the SharpZ3 system uses a cellular connection to transmit plate reads and to update hotlists and permits, you must install a cellular antenna on the patrol vehicle.

Before you begin

- Install the base unit in the patrol vehicle.
- Lower the vehicle's headliner to gain access to the underside of the mounting location.

What you should know

- You can install the cellular antenna on the vehicle roof or trunk.

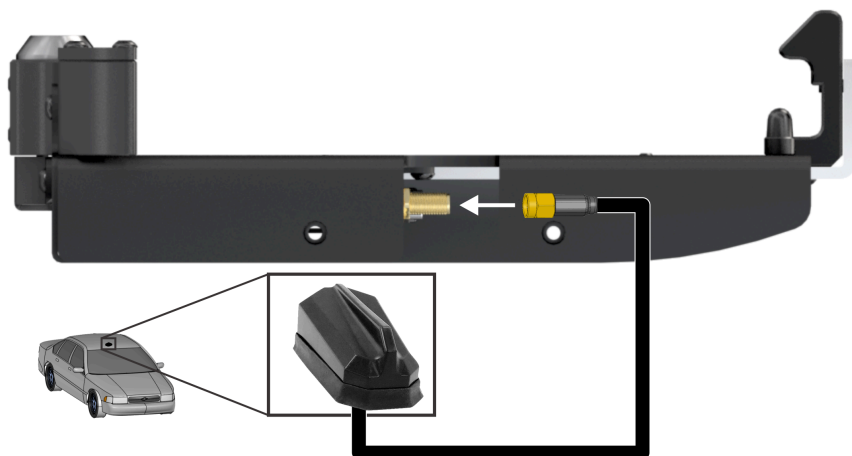
To complete these steps, you need the following:

- **Hole saw or stepping drill bit:** For cable penetrations, you can use a stepping drill bit or you can use a fine-toothed hole saw designed for vehicle body panels which is depth-regulated and includes a pilot drill bit.

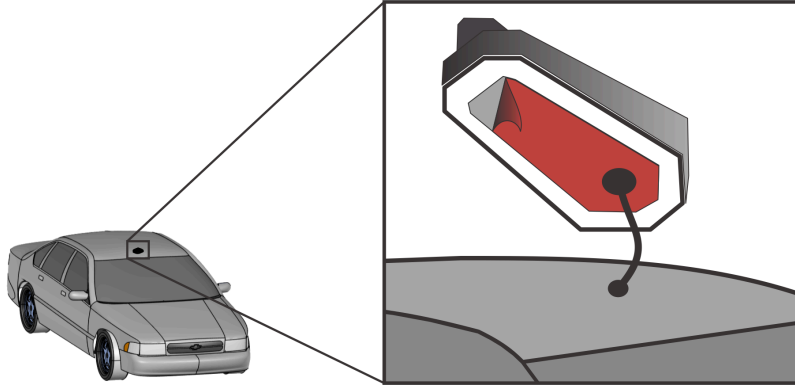
For more information, see [Drilling a camera cable hole](#) on page 66.

To install the cellular antenna on the vehicle:

- 1 Place a cable gland on the location of the vehicle roof where you intend to pass the cable and use a grease pencil or other marker to trace the outline of the cable gland.
The cable gland should have an outer diameter of 1.9 cm ($\frac{3}{4}$ in) and an inner diameter .95 cm ($\frac{3}{8}$ in).
IMPORTANT: The hole should be slightly smaller than the outline of the cable gland so that the cable gland collar can grip the vehicle's roof.
- 2 Verify that both sides of the roof are clear of anything that could be damaged, and then drill the cable hole.
- 3 Deburr the holes to remove any metal shards or remnants.
- 4 Install the cable gland in the cable hole.
- 5 Pass the cable through the cable gland and run the cable to the ToughPad dock.
- 6 Connect the antenna cable to the SMA connector on the ToughPad dock.



- 7 Peel off the adhesive liner from the back of the antenna.



- 8 Align the antenna as desired and place the antenna on the vehicle. Apply pressure to ensure surface contact.

About installing wheel-imaging cameras in a SharpZ3 system

The AutoVu™ wheel-imaging camera enhances mobile automatic license plate recognition (ALPR) systems by attaching a photo of the vehicle's wheel to each license plate read and hit. When comparing wheel images from the patrol vehicle's first pass and second pass, you can use the wheel's valve stem (or other reference point) to see whether the wheel has moved even a short distance.

Combined with the AutoVu digital tire chalking feature, the wheel-imaging camera provides an additional layer of violation validation, reducing ticket challenges and enhancing time-limited parking enforcement efficiency.

To accurately record wheel images, the SharpZ3 system must include the Navigation expansion module. This allows the system to interface into the vehicle's odometry signal to know how far the patrol vehicle has traveled.

Camera specifications

- Max. 2 MP (1920x1080) @ 30fps resolution
- Built-in 4 mm megapixel fixed lens
- Built-in IR illumination
- IP66/IP67/IK10 rated protection

Required tools and parts

The following tools and parts are required for wheel-imaging camera installation:

- T10 Torx key wrench (included)
- 7 mm wrench or socket wrench
- 3 mm Hex key wrench
- Center punch
- Drill
 - 4.8 mm (3/16 in) drill bit
 - 22.2 mm (7/8 in) hole saw or stepping drill bit
- Cable ties for securing cable
- Additional grommets

Example

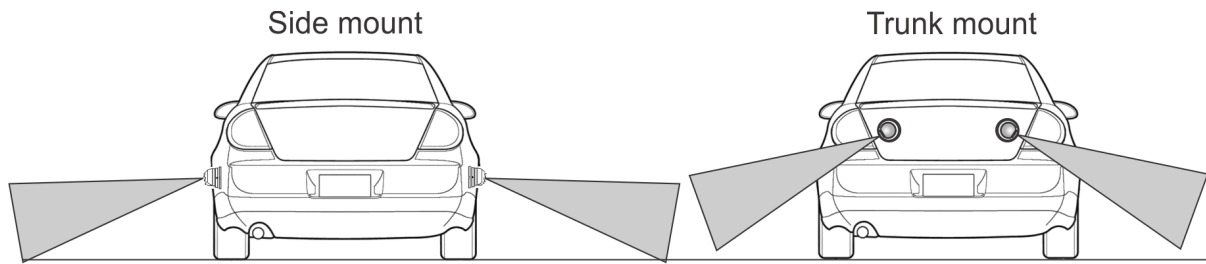
Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Wheel-imaging camera location

Wheel-imaging cameras are either side-mounted on the rear quarter panel or trunk-mounted.

NOTE: If you are installing two wheel-imaging cameras, ensure that they are mounted symmetrically on both sides of the vehicle.



The best choice of installation location generally depends on the vehicle make and model. When selecting a location, it is important to consider ease of installation, aesthetics, and the long-term survivability of the camera. Use the following information when deciding the best installation location.

Side mount

- This is the preferred location because the wheel-imaging cameras will be closer to the parked vehicle's wheels and they will appear larger in the image.
- You will need to attach the camera to the vehicle using the provided bolts. Ensure that you can access the back of the vehicle panel (usually done by removing the tail light assembly or trunk liner).
- To avoid road grime and rocks kicked up by the tires, select a location that is at or above the top of the wheel well.
- Ensure that the cameras can be mounted symmetrically. Note the location of the vehicle's fuel port and the range of motion of any sliding doors.

Trunk mount

- Mounting may be easier because you do not need to access the side panel through the tail light assembly or trunk liner.
- Repeated opening and closing of the trunk puts stress on the camera cables.
- This installation type may not be suitable for vehicles with swinging rear doors.
- To avoid damage in a collision, cameras should not extend past the vehicle bumper. Do not install cameras on the vehicle bumper.

Drilling the mounting and cabling holes for your wheel-imaging camera

When you have selected the location for the wheel-imaging cameras, drill holes for mounting the camera and for passing the camera cable.

What you should know

- Three 4.8 mm (3/16 in) holes are required for mounting the camera.
- One 22.2 mm (7/8 in) hole is required to pass the camera cable and install the camera cable grommet.

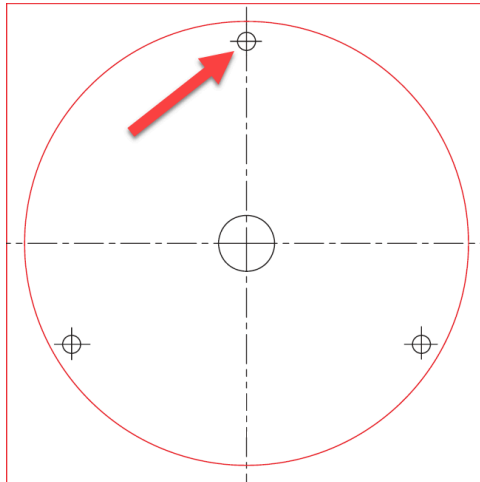
To drill the mounting holes:

- 1 Access the back of the panel you are mounting the camera on.
 - For side-mount installations, ensure that you can access the inside of the vehicle panel. Ensure that nothing will be damaged when you drill the mounting holes. You may also need to remove the liners from inside the trunk and drill an additional 22.2 mm (7/8 in) hole in the liner to pass the camera cable.
 - For trunk-mount installations, remove any liners inside the trunk lid. Ensure that nothing will be damaged when you drill the mounting holes.

2 Mark the mounting holes and cable hole.

- a) A paper template is included with the camera hardware. Tape the template to the installation location on the vehicle.

IMPORTANT: Make sure one of the mounting holes is at the top.



- b) Verify that there are no obstacles, wires, or braces that will prevent the installation of the camera.
c) Using a center punch, mark the three mounting holes and cable penetration.

3 Drill the mounting holes using a 4.8 mm (3/16 in) drill bit.

4 Drill the 22.2 mm (7/8 in) cable penetration.

For cable penetrations, you can use a stepping drill bit or you can use a fine-toothed hole saw designed for vehicle body panels which is depth-regulated and includes a pilot drill bit.

Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Installing a wheel-imaging camera

After you have drilled the mounting holes, you can mount the wheel-imaging camera using the supplied hardware.

To install the wheel-imaging camera:

- 1 Run the cut end of the 10-meter iX PoE cable from the base unit to the outside of the vehicle, through the camera cable hole.

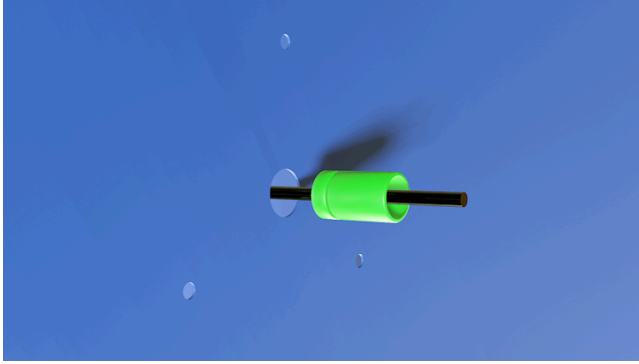
NOTE: If you drill any additional holes to pass the cable, install grommets to protect the cable.

- 2 Cut the excess cable.

NOTE:

- Before making the cut, make sure that the iX connector can still reach its port on the Aux PoE expansion module.
- Leave enough cable so that you can comfortably create the RJ45 connection in later steps.

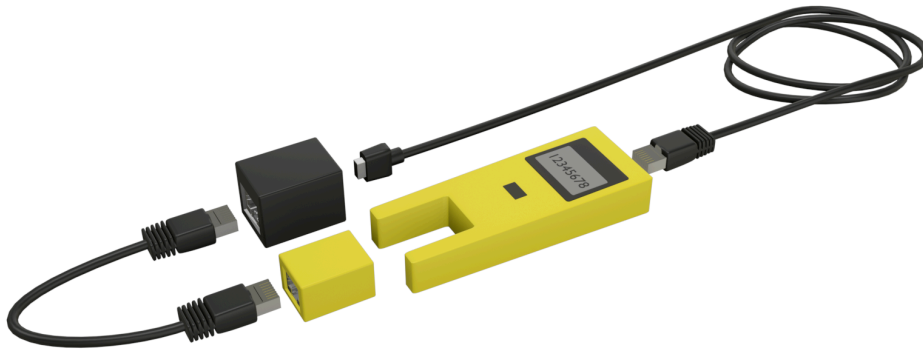
- Slide the cable connector gland onto the end of the cable.



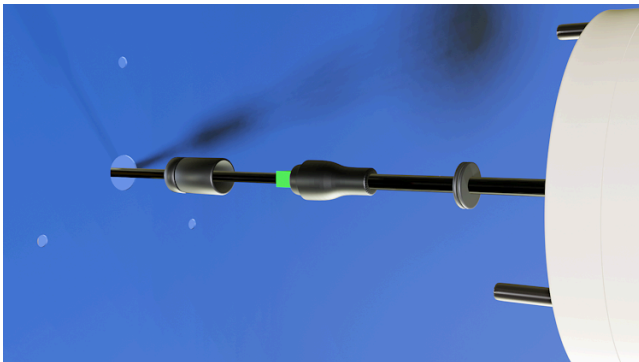
- Terminate the camera cable. Arrange the conductors according to the EIA-T568B standard. For more information, see [Conductor arrangements for SharpZ3 cameras](#) on page 71.



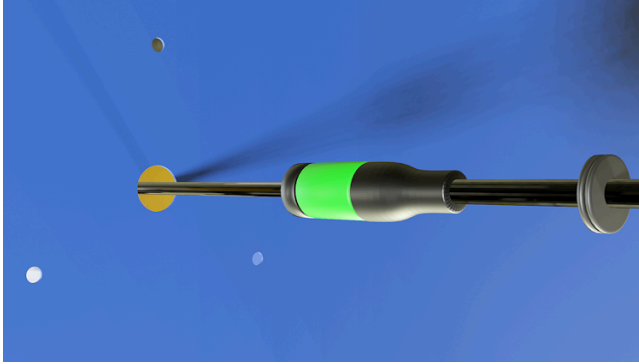
- Test the RJ45 connection using the cable tester, iX to RJ45 converter, and patch cable included with the AutoVu Installation Kit. Test the connection according to the instructions included with the cable tester. For more information, see [About the AutoVu Installation Kit](#) on page 23.



- Connect the RJ45 plug to the camera connector.
IMPORTANT: Ensure that the tab on the RJ45 plug locks into place.

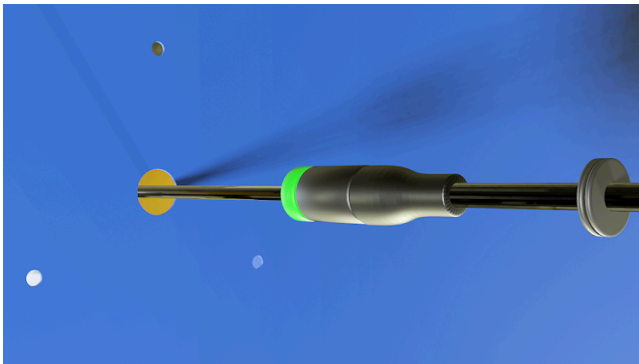


- 7 Slide the cable connector gland over the RJ45 plug and rotate the front of the connector gland $\frac{1}{2}$ turn.
WARNING: Do not tighten the constrictor ring at the back of the cable connector gland yet. You must first tighten the front of the cable connector gland highlighted in this image.

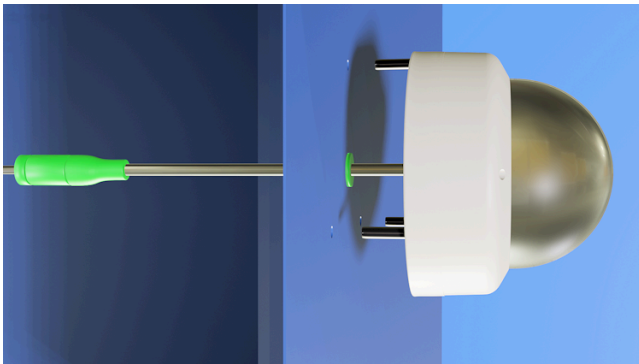


- 8 To create a waterproof connection, hand-tighten the constrictor ring at the end of the cable connector gland.

WARNING: Do not try to connect or disconnect the cable while the constrictor ring is tightened.

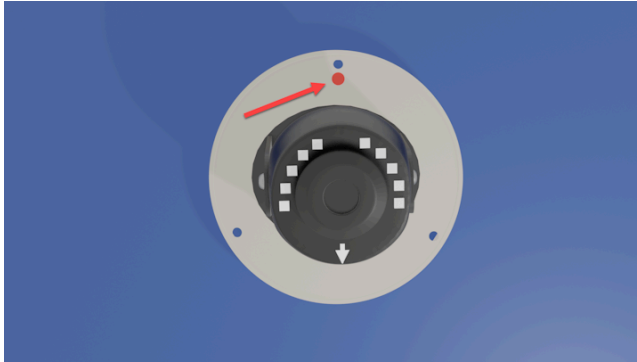


- 9 Push the cable connector through the hole and install the grommet.
TIP: To reduce vibration noise, secure the connector with tie wraps.

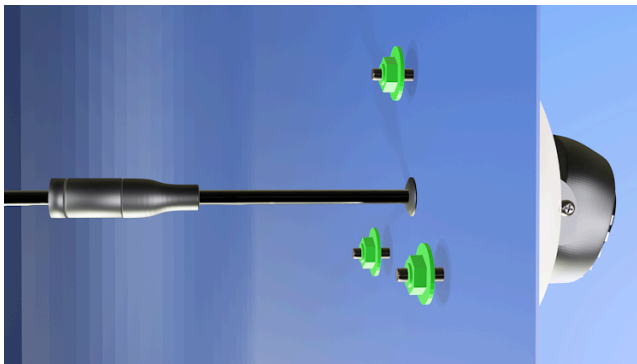


- 10 Remove the three Torx-head screws from the camera body using the provided key wrench.
11 Separate the camera dome from the camera base.
NOTE: The camera dome is connected to the camera base by a securing strap. You can let the dome hang freely while you install the camera base.

- 12 Insert the provided mounting bolts through the camera base and through the vehicle body panel. To ensure proper water drainage, install the base with the red on the top.

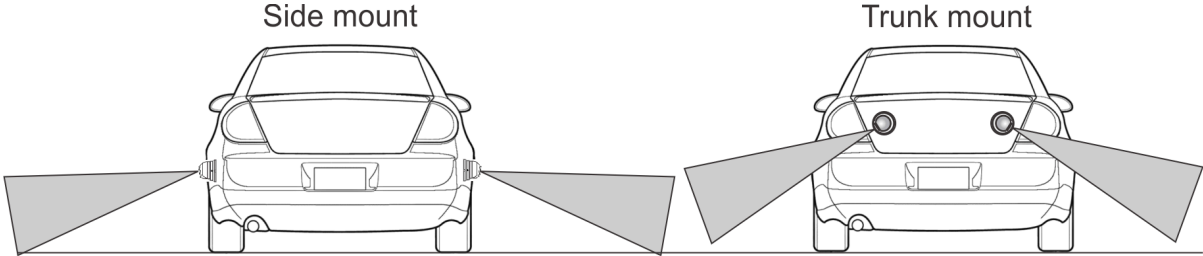


- 13 Attach the camera using the provided nuts and washers.



- 14 Connect the wheel imaging camera cable to the Aux PoE expansion module. For more information, see [Aux PoE expansion module connections](#) on page 34.
- 15 Log on to the Sharp Portal.
- 16 Associate the wheel-imaging camera with a SharpZ3 camera. For more information, see [Associating wheel-imaging cameras with SharpZ3 camera units](#).
- 17 Open the *Camera feeds* page, and monitor the feed from the wheel-imaging camera.

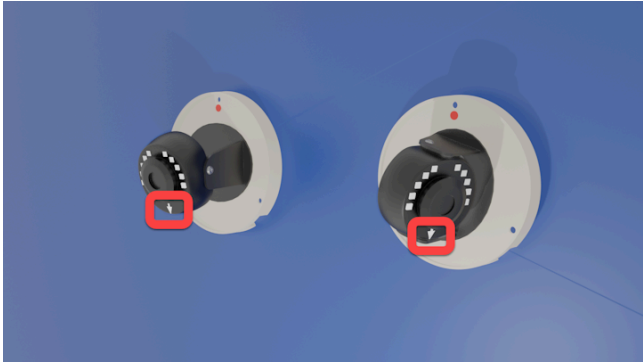
18 Aim the camera for a side mount or trunk mount installation.



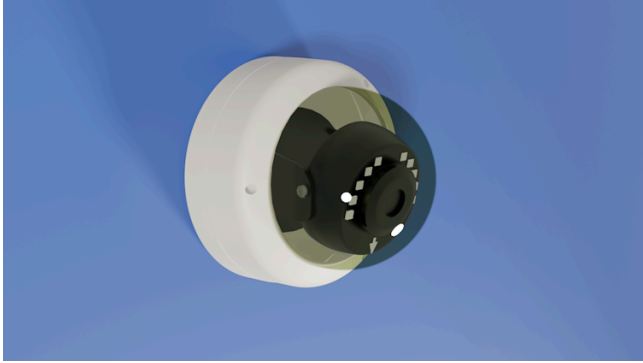
You can adjust three axes of rotation.



Make sure that the arrow is pointing down.

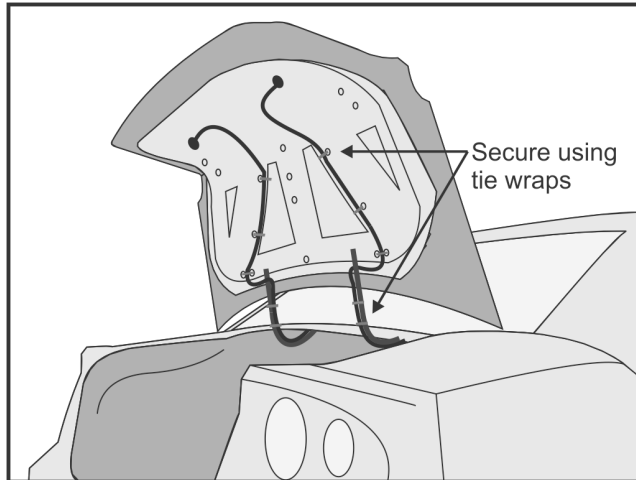


19 Attach the dome to the camera body and secure it using the three Torx-head screws.



20 Complete the installation.

- Replace all tail light assemblies and trunk liners that were removed for the installation.
- Secure the cable using cable ties.



Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



About using AutoVu auxiliary PoE cameras for additional context images

For a more detailed view of the area surrounding a license plate read location, you can install AutoVu™ auxiliary PoE cameras on the parking enforcement patrol vehicle.

To mount an AutoVu™ auxiliary PoE camera beside a SharpZ3 camera, you can install a SharpZ3 auxiliary camera bracket on the SharpZ3 hardmount.

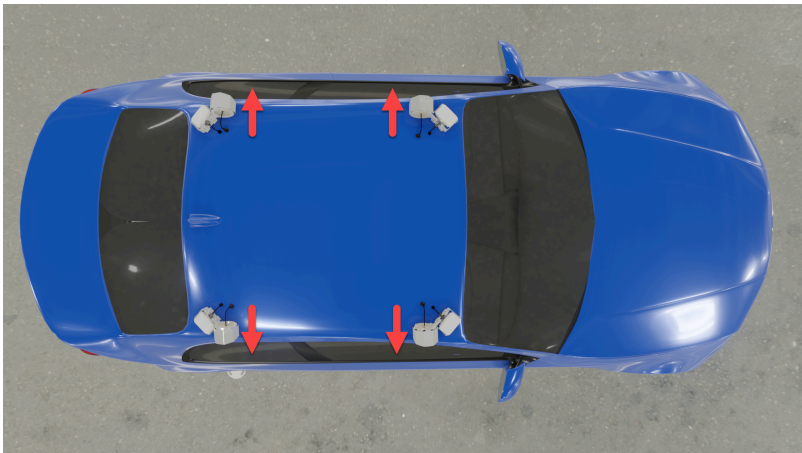


AutoVu™ auxiliary PoE camera specifications

- Maximum 2 MP (1920x1080) @ 30fps resolution
- Built-in 6 mm (back) or 2.4 mm (front) fixed lens
- Built-in IR illumination
- IP66/IP67/IK10 rated protection

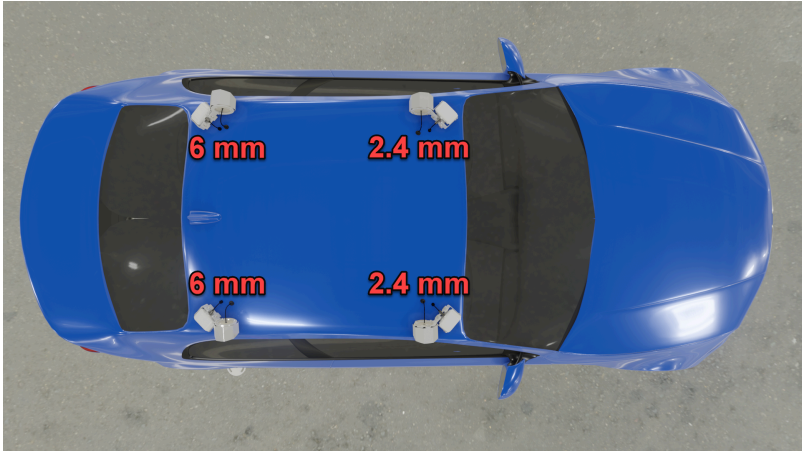
Matching brackets to vehicle locations

Brackets are available for installing the auxiliary camera to the left or to the right of the SharpZ3 camera. Match the brackets with their vehicle locations and ensure that the auxiliary cameras are perpendicular to the direction of travel.



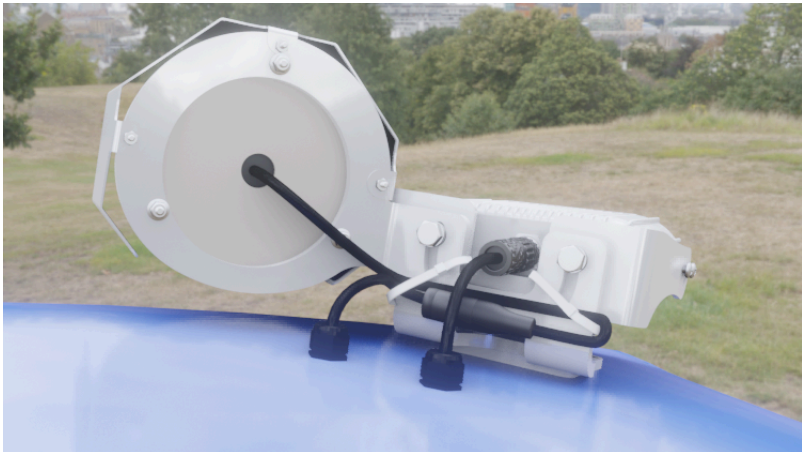
Matching auxiliary cameras to vehicle locations

Auxiliary cameras are available with focal lengths of 2.4 mm for the front and 6 mm for the back. Match the auxiliary camera focal lengths with their vehicle locations.



Auxiliary camera cable management

The auxiliary camera cable passes through a 0.6 cm (0.25 in) hole in the vehicle roof and is sealed using a cable gland. Secure the cable and connector to the bracket or to a light bar using cable ties.



Installing a SharpZ3 auxiliary camera bracket and AutoVu auxiliary PoE camera

To install an AutoVu™ auxiliary PoE camera, you must attach it to a SharpZ3 auxiliary camera bracket.

Before you begin

- [Prepare the vehicle for a hardmounted camera installation.](#)
- [Install the hardmount on the vehicle.](#)

What you should know

You need the following tools:

- **Hex key wrench:** 3mm hex key
- **Socket wrenches:** 7mm and 1/4" socket wrenches
- **Phillips screwdriver:** Phillips #1 screwdriver

To install the bracket and camera:

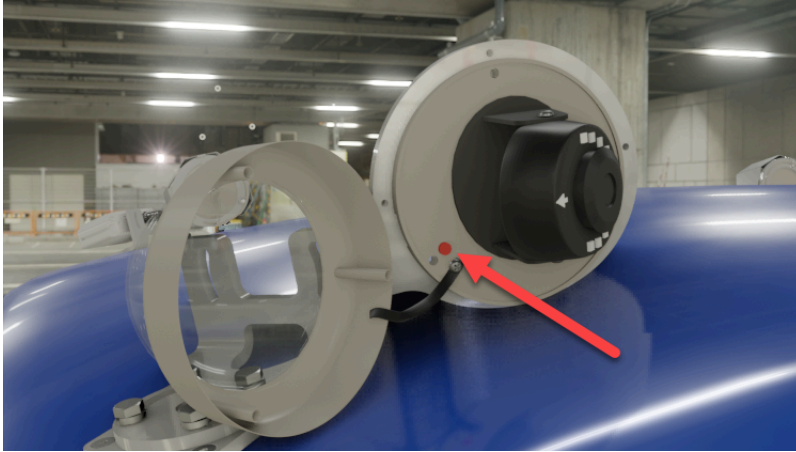
- 1 Attach the bracket to the hardmount using four hex-head cap screws, flat washers, and split washers.



- 2 Remove the camera dome.
 - a) Remove the three Torx-head screws from the camera body using the provided Torx key wrench.
 - b) Separate the camera dome from the camera base.

NOTE: The camera dome is connected to the camera base by a securing strap. You can let the dome hang freely while you install the camera base.

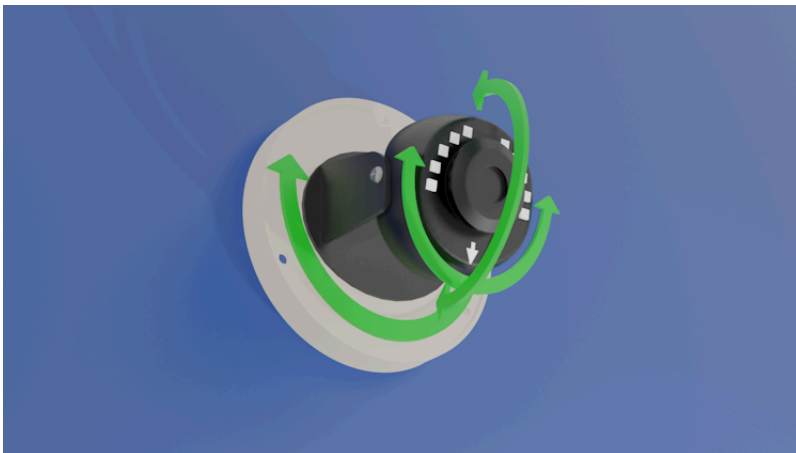
- 3 Rotate the camera so that the red dot is on the bottom-left.



- 4 Insert the provided mounting bolts through the camera base and through the auxiliary camera bracket.
- 5 Attach the camera using the provided lock nuts.
- 6 Rotate the camera so that the white arrow is pointing down.



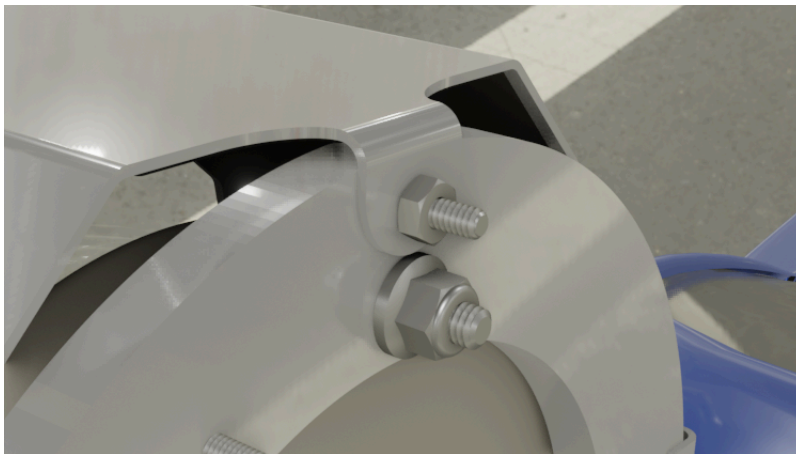
TIP: You can adjust three axes of rotation.



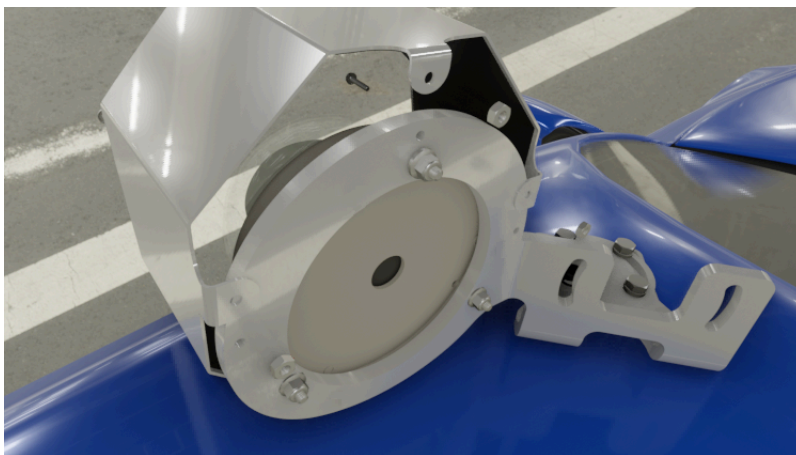
- 7 Aim the auxiliary cameras according to their positions on the vehicle.
 - a) Aim front cameras perpendicular to the direction of travel, and slightly down.
 - b) Aim rear cameras in the same direction as the rear SharpZ3 cameras.



- 8 Attach the dome to the camera body and secure it using the three Torx-head screws.
- 9 Attach the rain guard to the auxiliary bracket using the provided nuts.
NOTE: The rain guard tabs must be installed behind the bracket as shown.



TIP: Slide the rain guard down from above the camera.



After you finish

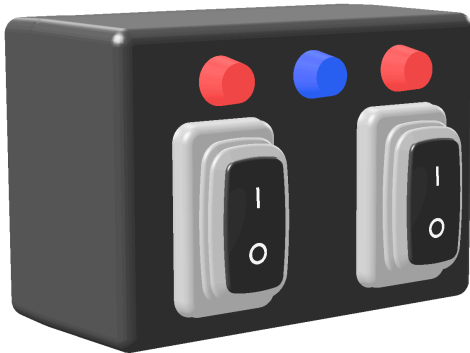
1. Drill the 22.2 mm (7/8 in) hole to accommodate the camera cable connector. For more information, see [Drilling a camera cable hole](#) on page 66.
2. Terminate the camera cable according to the EIA-T568B standard. For more information, see [Installing a wheel-imaging camera](#) on page 94.
NOTE: The installation procedure is the same for wheel-imaging cameras except for the cable grommet, which is not present on auxiliary cameras.
3. Connect the wheel-imaging camera cable to the Aux PoE expansion module. For more information, see [Aux PoE expansion module connections](#) on page 34.
4. Log on to the Sharp Portal.
5. Associate each AutoVu Auxiliary PoE camera with a SharpZ3 camera. For more information, see [Associating wheel-imaging cameras with SharpZ3 camera units](#).

About the AutoVu car camera switch

The AutoVu™ car camera switch is an optional hardware switch module that is installed in a patrol vehicle. The car switch provides manual controls to enable right-side or left-side SharpZ3 cameras.

When the AutoVu car camera switch is installed in a patrol vehicle, it removes the need for the operator to control the cameras using the Genetec Patroller™ control buttons. This reduces the distraction associated with using electronic devices while driving.

The device features toggle switches for the right and left cameras as well as LED lights to inform the driver of the current camera activation (red) and to show system power (blue).



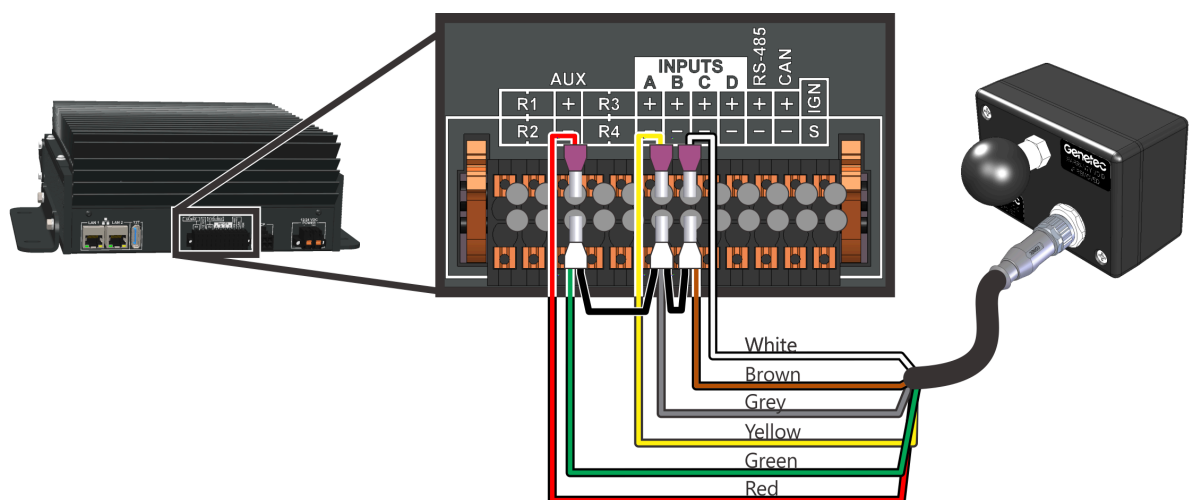
AutoVu car camera switch wiring

To control SharpZ3 camera selection using the AutoVu™ car camera switch, you must connect the switch to the inputs of the base unit.

Important information

- The blue and pink wires of the cable are not used in a car camera switch installation. Trim these wires so that they do not interfere with the installation.
- Two 24 AWG jumper wires (shown in black) are required, but are not provided with the kit.

Connect the wires to the base unit as shown in the following wiring diagram:



Mounting the AutoVu car camera switch

To control SharpZ3 camera selection using the AutoVu™ car camera switch, you must mount the switch in an accessible location in the patrol vehicle.

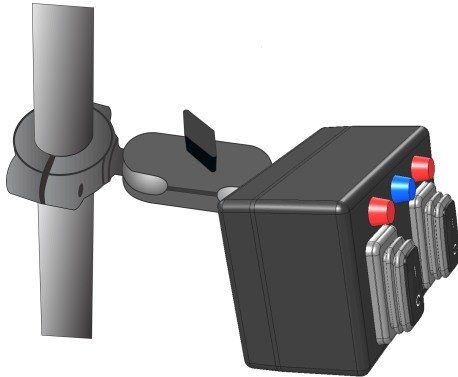
To mount the AutoVu car camera switch:

- 1 Decide on a mounting location.

NOTE:

- The switch can be installed anywhere in the patrol vehicle that is safely within reach of the driver. For vehicles that include an in-vehicle computer, the mounting arm usually provides a convenient mounting location.
 - If the supplied mounting accessories are not appropriate for your selected mounting location, you can use any components from RAM® Mounts that are compatible with the 1-inch mounting ball on the car switch.
- 2 Run the car switch cable from the mounting location to the base unit.

NOTE: The pigtail end of the cable is connected to the base unit and the cable connector connects to the car switch.
 - 3 Assemble the supplied mounting accessories according to the instructions included with the hardware.



In-vehicle computer installation

This section includes the following topics:

- ["ToughPad computer installation"](#) on page 109
- ["Installing the ToughPad base mount"](#) on page 110
- ["Assembling the tele-pole and lower swing arm"](#) on page 111
- ["Assembling the tilt-pivot head"](#) on page 113
- ["Attaching the tablet mount to the tilt-pivot head"](#) on page 117
- ["Attaching the ToughPad dock and keyboard tray to the tablet mount"](#) on page 119
- ["About powering the in-vehicle computer"](#) on page 121

ToughPad computer installation

To view license plate reads inside the patrol vehicle, you must install an in-vehicle computer. SharpZ3 systems generally include a Panasonic ToughPad.

The tablet computer's power supply comes with cigarette wiring cabling which should be hardwired to the base unit's auxiliary 8A Max relay. This should be sufficient for one computer connection. The power supply is already fused; no additional fuse is required.

Installing the ToughPad base mount

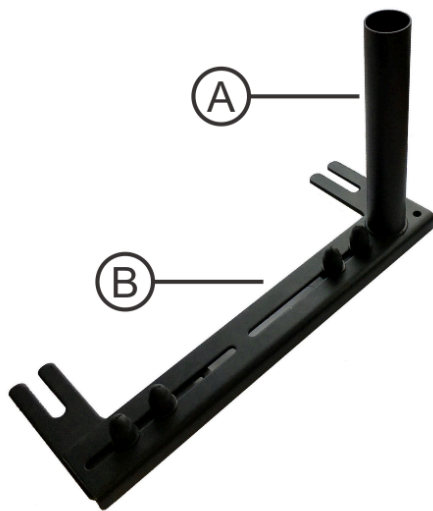
Depending on the type of vehicle the ToughPad mount is being installed in, you might need to install a universal base mount, or a base mount that is designed for the vehicle.

What you should know

Use these steps to install the following hardware:

- **Base mount:** RAM-VB-109-3U (Genetec part number: AU-H-RAMSWING)
NOTE: For this example, we are using the universal base mount.
- **Lower pole:** RAM-VP-TBF12U (Genetec part number: AU-H-RAMPOLEBOT12)
NOTE: The lower pole is always shipped with the ToughPad mount hardware, however, the lower pole is only required if you are installing the universal base mount. If you are using a custom base mount, a lower pole is fused to the base mount.

Refer to the following diagram when installing the seat base:



	Component
A	Lower pole
B	Universal base mount

To install the ToughPad base mount:

- 1 Assemble and install the base mount using the manufacturer's instructions.
- 2 If the base mount you are installing includes a separate lower pole (A), attach it to the base mount using the manufacturer's instructions.

Assembling the tele-pole and lower swing arm

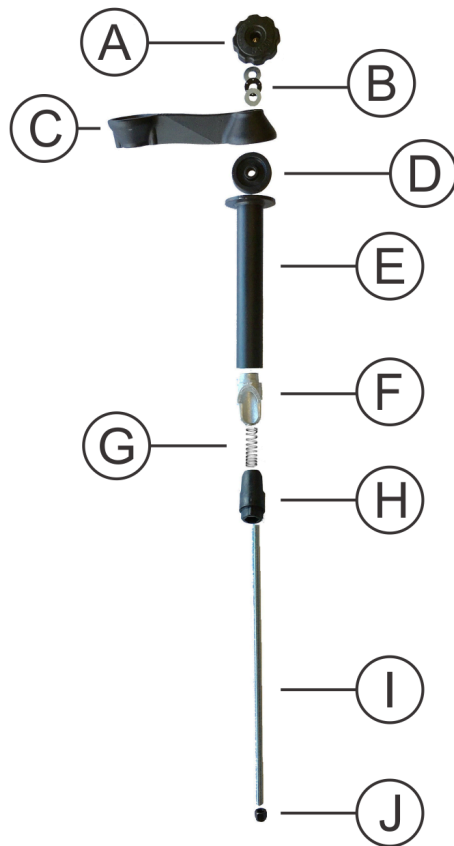
The tele-pole is connected to the lower swing arm and is installed on the base mount.

What you should know

Use these steps to install the following hardware:

- **Tele-pole:** RAM-VP-TTM12U (Genetec part number: AU-H-RAMPOLETOP12)
- **Swing arm:** RAM-VB-109-3U (Genetec part number: AU-H-RAMSWING)

Refer to the following diagram when assembling the tele-pole:



	Component
A	Plastic knob
B	Thrust washer assembly: <ul style="list-style-type: none"> • 2 x flat washers • Ball bearing washers
C	Swing arm
D	Nylon washer
E	Upper tube

	Component
F	Aluminum wedge
G	Spring
H	Plastic wedge
I	Threaded rod
J	Hex lock nut

NOTE: The hardware provided with the swing arm is not required. This includes an additional knob (A), thrust washer assembly (B), and nylon washer (D).

To assemble the tele-pole:

- 1 Screw the lock nut (J) onto the threaded rod (I) using a wrench. The rod should protrude through the nut by about 0.6 cm (1/4").

TIP: For a better grip, you can use pliers to hold the center of the bolt.

- 2 Slide the plastic wedge (H) onto the rod. The flat part of the wedge should touch the lock nut.
- 3 Slide the spring (G) onto the rod.
- 4 Invert the metal wedge (F) and slide it onto the rod. The angled side of the two wedges should touch.
- 5 Slide the upper tube (E) onto the rod. The flared side of the tube should point away from the wedges.
- 6 Slide a nylon washer (D) onto the rod.
- 7 Slide the lower swing arm (C) onto the rod as shown in the diagram.

NOTE: The manufacturer's name "RAM" must be facing upward.

- 8 Create a thrust washer assembly (B) using a ball bearing washer between two flat washers.



- 9 Slide the thrust washer assembly onto the rod.
- 10 Screw the plastic knob (A) onto the top of the rod. Do not tighten the knob.
- 11 Slide the tele-pole assembly into the lower pole which is attached to the base mount.
- 12 Tighten the plastic knob to secure tele-pole to the base mount.

Assembling the tilt-pivot head

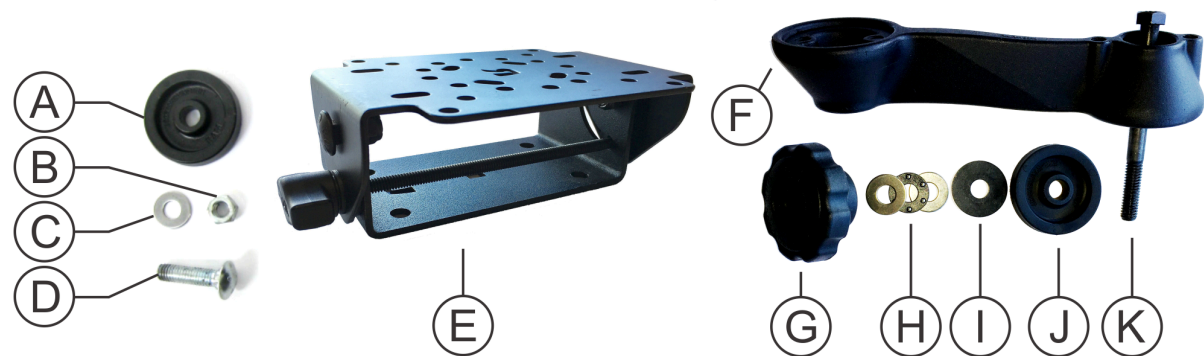
After the tele-pole is assembled, you can attach the tilt-pivot head and upper swing arm.

What you should know

Use these steps to install the following hardware:

- **Tilt-pivot head:** RAM-VB-TNT90-1 (Genetec part number: AU-H-RAMTNT90)
- **Swing arm:** RAM-VB-109-3U (Genetec part number: AU-H-RAMSWING)

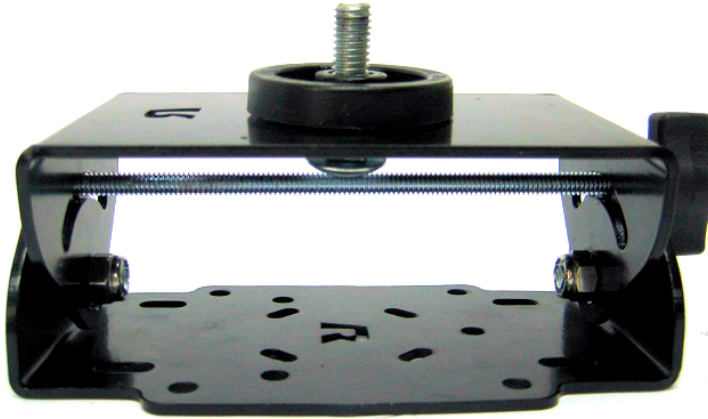
Refer to the following diagram when assembling the tilt-pivot head:



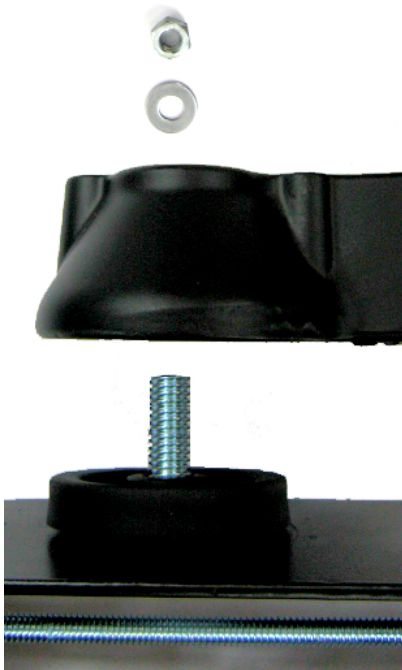
	Component
A	Nylon washer
B	Lock nut
C	Flat washer
D	Carriage bolt
E	Tilt-pivot head assembly
F	Swing arm
G	Plastic knob
H	Thrust washer assembly: <ul style="list-style-type: none"> • 2 x flat washers • Ball bearing washers
I	1 ¼" flat washer
J	Nylon washer
K	Hex bolt

To assemble the tilt-pivot head:

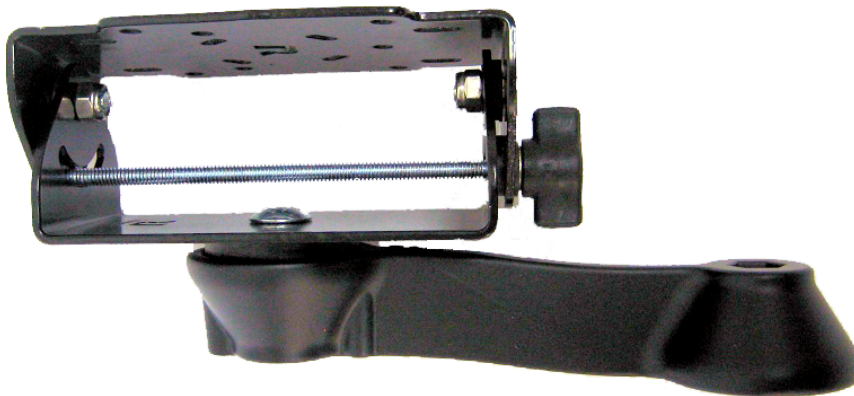
- 1 Rotate the tilt-pivot assembly (E) enough to place the carriage bolt (D) through the square opening from the bottom.
- 2 Slide the nylon washer (A) onto the carriage bolt with the flat side of the washer touching the tilt-pivot assembly.



- 3 Place the swing arm (F) over the carriage bolt and attach it using the flat washer (C) and lock nut (B).
NOTE: The manufacturer's name "RAM" must be facing downward. When you invert the finished assembly, "RAM" will be facing upward.

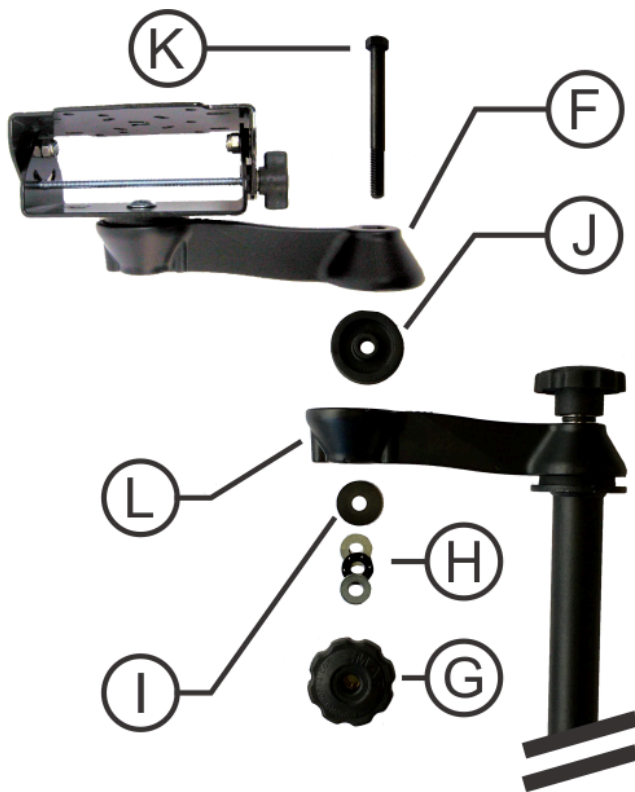


The assembled tilt-pivot head should look like this:



Connect the tilt-pivot head to the tele-pole:

Refer to the following diagram when mounting the tilt-pivot head onto the tele-pole:



- 4 Sandwich the nylon washer (J) between the upper swing arm (F) and the lower swing arm (L).
- 5 Insert the hex bolt (K) downward, connecting the upper and lower swing arms.
- 6 Slide the 1 1/4" flat washer (I) onto the hex bolt.
- 7 Create a thrust washer assembly (H) using a ball bearing washer between two flat washers and slide the assembly onto the hex bolt.



- 8 Screw the plastic knob (G) onto the hex bolt to secure the swing arm assembly.

Attaching the tablet mount to the tilt-pivot head

After the tilt-pivot head is attached to the tele-pole, you can attach the tablet mount to the tilt-pivot head.

Before you begin

Ensure that you have all of the required hardware:

- Tablet mount
- Tilt-pivot head
- 4 x $\frac{3}{4}$ " flat head screws
- 4 x serrated flange nuts

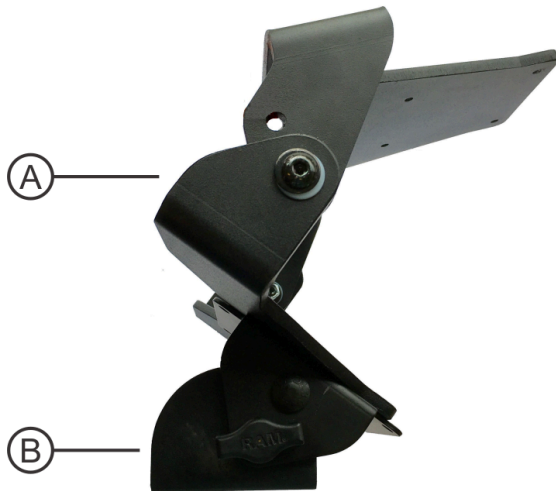
What you should know

You must connect the tablet mount to the tilt-pivot head as shown before connecting the keyboard tray to the tablet mount.

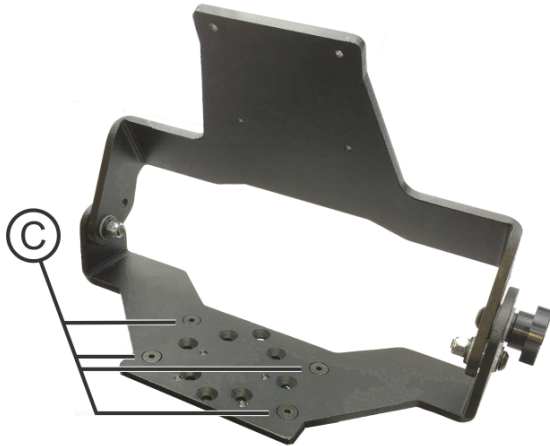
To attach the tablet mount to the tilt-pivot head:

- 1 The tablet mount (A) and the tilt-pivot head should both be able to tilt towards the user. Orient the tablet mount and the tilt-pivot head as shown.

NOTE: The adjustment knob on the tilt-pivot head might be on either side depending on how it was assembled by the manufacturer.



- 2 Connect the tablet mount (B) to the tilt-pivot head using the four $\frac{3}{4}$ " flat head screws and serrated flange nuts in the mounting holes (C) shown in the following image.



Attaching the ToughPad dock and keyboard tray to the tablet mount

After the table mount is attached to the tilt-pivot head, you can attach the ToughPad dock and keyboard tray to the tablet mount.

What you should know

Use these steps to install the following hardware:

- **ToughPad dock:** AS7.P001.100 (Genetec part number: AU-H-PANADKSTG1)
- **Keyboard tray:** AS7.C100.002 (Genetec part number: AU-H-PANAKEYTRAY)
- 4 x $\frac{3}{8}$ " flat head screws

To attach the ToughPad dock and keyboard tray to the keyboard mount:

- 1 Connect the mounting bracket (A) to the tablet mount (B) as shown using the screws that are pre-fastened to the tablet mount.

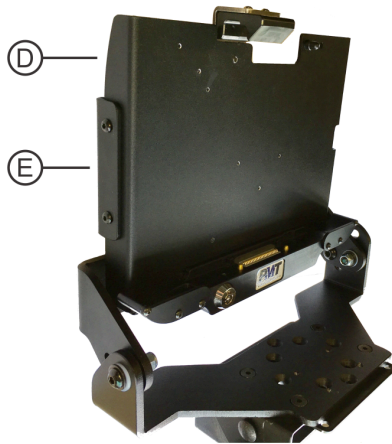


- 2 On the back of the ToughPad dock, set the *EXT/INT ANT* switch (C) to *INT*.

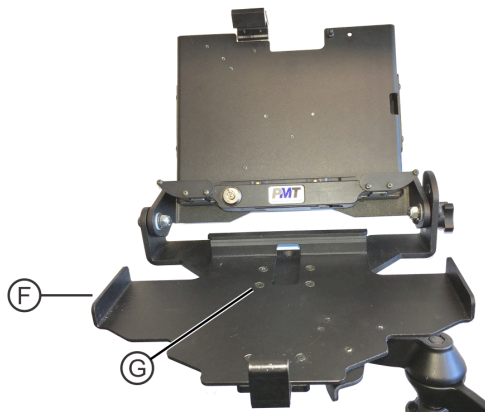
IMPORTANT: Do not use the *EXT* setting. Doing so disables the system's networking capability and the system does not function.



- 3 Attach the ToughPad dock (D) to the mounting bracket (E) as shown using the screws that are pre-fastened to the mounting bracket.



- 4 Attach the keyboard tray (F) to the tablet mount as shown using the four $\frac{3}{8}$ " flat-head screws (G) that are shipped with the keyboard tray.



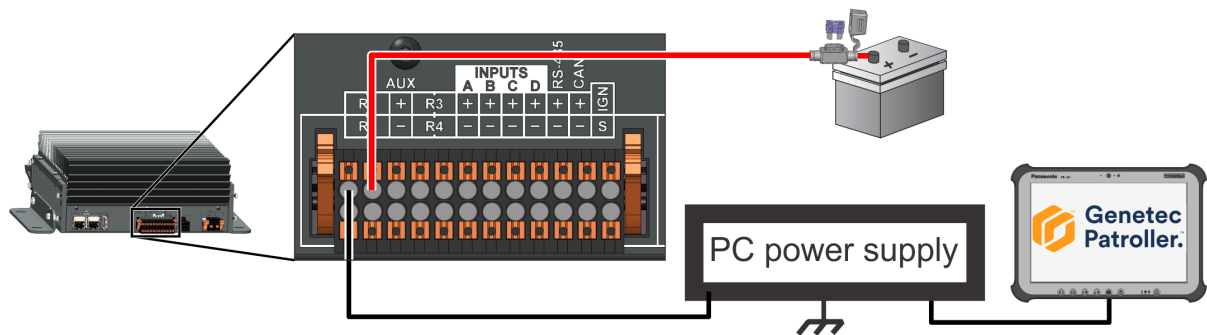
About powering the in-vehicle computer

You must use the 8A MAX relay on the base unit to control the power to the in-vehicle computer. This way, the computer receives power only when the ignition is on.

You must power the in-vehicle computer through the base unit auxiliary 8A MAX relay. This way, the tablet computer and the base unit both react to the vehicle ignition signal, after a configurable delay. The tablet then runs on its own battery for a duration configurable in Windows.

To supply power to the in-vehicle computer, cut off the cigarette lighter adapter from the PC power supply and extend the cable to the SharpZ3 base unit location.

The following diagram shows a typical installation in which power for the in-vehicle computer is controlled by the base unit relay:



Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Completing the installation

This section includes the following topics:

- ["Completing the SharpZ3 installation"](#) on page 123

Completing the SharpZ3 installation

Before you replace the body liners and other paneling in the vehicle, ensure that the installation does not affect the vehicle's operation or mandated safety functions or circuits.

To complete the installation:

- 1 Test the system to ensure that the hardware is functional and the wiring is correct and solid.
- 2 Test network communication.
- 3 Test the following vehicle functions:
 - GPS signal
 - Odometry
 - Reverse signal
 - Ignition

After you finish

When the AutoVu™ installation is finished, include the following information in the field report that is submitted to Genetec Inc.:

- Power connection locations
- Signal connection locations, for example, ignition, odometer, and GPS.
- Diagram the how the wires are routed in the vehicle
- IP addresses of all installed equipment
- Serial number and part numbers of all installed equipment
- Point of contact information for the customer:
 - Name
 - Title
 - Phone number and/or email
- A read report to evaluate the performance.

Glossary

ALPR camera

An Automatic License Plate Recognition (ALPR) camera is a camera connected to an ALPR unit that produces high resolution close-up images of license plates.

ALPR context

An ALPR context is an ALPR optimization that improves license plate recognition performance for license plates from a specific region (for example, New York) or from a group of regions (for example, Northeast states).

ALPR Manager

The ALPR Manager role manages and controls the patrol vehicle software (Genetec Patroller™), Sharp cameras, and parking zones. The ALPR Manager stores the ALPR data (reads, hits, timestamps, GPS coordinates, and so on) collected by the devices.

ALPR rule

ALPR rule is a method used by Security Center and AutoVu™ for processing a license plate read. An ALPR rule can be a hit rule or a parking facility.

ALPR unit

An ALPR unit is a device that captures license plate numbers. An ALPR unit typically includes a context camera and at least one ALPR camera.

automatic license plate recognition

Automatic license plate recognition (ALPR) is an image processing technology used to read license plate numbers. ALPR converts license plate numbers cropped from camera images into a database searchable format.

AutoVu MLC™

AutoVu MLC™ (Machine Learning Core) replaces traditional rule-based ALPR technology with machine learning-based algorithms in the detection of license plates and the filtering of misreads and false positives. It is a proprietary technology of Genetec Inc. used in AutoVu™ Sharp hardware for license plate recognition.

AutoVu™

The AutoVu™ automatic license plate recognition (ALPR) system automates license plate reading and identification, making it easier for law enforcement and for municipal and commercial organizations to locate vehicles of interest and enforce parking restrictions. Designed for both fixed and mobile installations, the AutoVu™ system is ideal for a variety of applications and entities, including law enforcement, municipal, and commercial organizations.

auxiliary PoE camera

For a more detailed view of the area surrounding a license plate read location, you can install AutoVu™ auxiliary PoE cameras on the parking enforcement patrol vehicle.

capture rate

The capture rate measures the speed at which a license plate recognition system can take a photo of a passing vehicle and detect the license plate in the image.

certificate

Designates one of the following: (1) *digital certificate*; (2) *SDK certificate*.

Config Tool

Config Tool is the Security Center administrative application used to manage all Security Center users and to configure all Security Center entities such as areas, cameras, doors, schedules, cardholders, patrol vehicles, ALPR units, and hardware devices.

context camera

A context camera is a camera connected to an ALPR unit that produces a wider angle color image of the vehicle whose license plate was read by the ALPR camera.

contract permit parking

Contract permit parking is a parking scenario where only drivers with monthly permits can park in the parking zone. A whitelist is used to grant permit holders access to the parking zone.

covert hit

A covert hit is a read (captured license plate) that is matched to a covert hotlist. Covert hits are not displayed on the Genetec Patroller™ screen, but can be displayed in Security Desk by a user with proper privileges.

covert hotlist

Covert hotlists allow you to ensure the discretion of an ongoing investigation or special operation. When a hit is identified, only the authorized officer at the Security Center station is notified, while the officer in the patrol vehicle is not alerted. This enables enforcement officials to assign multiple objectives to the vehicle and back-end systems, while not interrupting the priorities of officers on duty.

custom field

A custom field is a user-defined property that is associated with an entity type and is used to store additional information that is useful to your organization.

Daily usage per patroller entity

Daily usage per patroller entity is a type of investigation task that reports on the daily usage statistics of a selected patrol vehicle (operating time, longest stop, total number of stops, longest shutdown, and so on) for a given date range.

discovery port

A discovery port is a port used by certain Security Center roles (Access Manager, Archiver, ALPR Manager) to find the units they are responsible for on the LAN. No two discovery ports can be the same on one system.

district

A district is a type of parking regulation characterizing an overtime rule. A district is a geographical area within a city. A vehicle is in violation if it is seen within the boundaries of the district over a specified period of time.

enforce

To enforce is to take action following a confirmed hit. For example, a parking officer can enforce a scofflaw violation (unpaid parking tickets) by placing a wheel boot on the vehicle.

entity

Entities are the basic building blocks of Security Center. Everything that requires configuration is represented by an entity. An entity can represent a physical device, such as a camera or a door, or an abstract concept, such as an alarm, a schedule, a user, a role, a plugin, or an add-on.

event-to-action

An event-to-action links an action to an event. For example, you can configure Security Center to trigger an alarm when a door is forced open.

false positive read

False positive plate reads can occur when a license plate recognition system mistakes other objects in an image for license plates. For example, lettering on a vehicle or street signs can sometimes create false positive plate reads.

federated entity

A federated entity is any entity that is imported from an independent system through one of the Federation™ roles.

federated system

A federated system is a independent system (Omnicast™ or Security Center) that is unified under your local Security Center via a Federation™ role, so that the local users can view and control its entities, as if they belong to the local system.

Federation™

The Federation™ feature joins multiple, independent Genetec™ IP security systems into a single virtual system. With this feature, users on the central Security Center system can view and control entities that belong to remote systems.

Fuzzy matching

Environmental factors such as dirt or snow can partially obstruct license plate characters and increase the likelihood of partial plate reads occurring. In addition, similarly shaped letters and numbers, like “2” and “Z” or, “8”, “B”, and “0”, can also reduce plate read accuracy. Fuzzy matching lets AutoVu™ compare reads not only to exact matches in hotlists, but also to potential or probable matches.

Genetec Patroller™

Genetec Patroller™ is the software application installed on an in-vehicle computer that analyzes license plate reads from AutoVu™ Sharp camera units. The application can be installed to operate in different modes to suit your specific enforcement needs and can be configured to notify the vehicle operator if immediate action is required.

geocoding

Geocoding is the process of finding associated geographic coordinates (latitude and longitude) from a street address.

Geographic Information System

Geographic Information System (GIS) is a system that captures spatial geographical data. Map Manager can connect to third-party vendors that provide GIS services in order to bring maps and all types of geographically referenced data to Security Center.

georeferencing

Georeferencing is the process of using an object’s geographic coordinates (latitude and longitude) to determine its position on a map.

ghost patroller entity

A ghost patroller entity is automatically created by the ALPR Manager when the AutoVu™ license includes the XML Import module. In Security Center, all ALPR data must be associated to a Genetec Patroller™ entity or an ALPR unit corresponding to a fixed Sharp camera. When you import ALPR data from an external source via a specific ALPR Manager using the XML Import module, the system uses the ghost entity to represent the ALPR data source. You can formulate queries using the ghost entity as you would with a normal entity.

Hardware inventory

Hardware inventory is a type of maintenance task that reports on the characteristics (unit model, firmware version, IP address, time zone, and so on) of access control, video, intrusion detection, and ALPR units in your system.

hash function

In cryptography, a hash function uses a mathematical algorithm to take input data and return a fixed-size alphanumeric string. A hash function is designed to be a one-way function, that is, a function which is infeasible to revert.

hit

A hit is a license plate read that matches a hit rule, such as a hotlist, overtime rule, permit, or permit restriction. A Genetec Patroller™ user can choose to reject or accept a hit. An accepted hit can subsequently be enforced.

hit rule

Hit rule is a type of ALPR rule used to identify vehicles of interest (called "hits") using license plate reads. The hit rules include the following types: hotlist, overtime rule, permit, and permit restriction.

Hits

Hits is a type of investigation task that reports on hits reported within a selected time range and geographic area.

hot action

A hot action is an action mapped to a PC keyboard function key (Ctrl+F1 through Ctrl+F12) in Security Desk for quick access.

hotlist

A hotlist is a list of wanted vehicles, where each vehicle is identified by a license plate number, the issuing state, and the reason why the vehicle is wanted (stolen, wanted felon, Amber alert, VIP, and so on). Optional vehicle information might include the model, the color, and the vehicle identification number (VIN).

Hotlist and permit editor

Hotlist and permit editor is a type of operation task used to edit an existing hotlist or permit list. A new list cannot be created with this task, but after an existing list has been added to Security Center, users can edit, add, or delete items from the list, and the original text file is updated with the changes.

I/O linking

I/O (input/output) linking is controlling an output relay based on the combined state (normal, active, or trouble) of a group of monitored inputs. A standard application is to sound a buzzer (through an output relay) when any window on the ground floor of a building is shattered (assuming that each window is monitored by a "glass break" sensor connected to an input).

illuminator

An illuminator is a light in the Sharp unit that illuminates the plate, thereby improving the accuracy of the images produced by the ALPR camera.

Inventory report

Inventory report is a type of investigation task that allows you to view a specific inventory (vehicle location, vehicle length of stay, and so on) or compare two inventories of a selected parking facility (vehicles added, vehicles removed, and so on).

IPv4

IPv4 is the first generation Internet protocol using a 32-bit address space.

IPv6

IPv6 is a 128-bit Internet protocol that uses eight groups of four hexadecimal digits for address space.

Kashef Third-Party Matcher

The AutoVu™ - Kashef Third Party Matcher plugin forwards license plate reads to the Kashef API and triggers alarms based on the vehicle legal status returned from Kashef.

Law Enforcement

Law Enforcement is a Genetec Patroller™ software installation that is configured for law enforcement: the matching of license plate reads against lists of wanted license plates (hotlists). The use of maps is optional.

license key

A license key is the software key used to unlock the Security Center software. The license key is specifically generated for each computer where the Directory role is installed. To obtain your license key, you need the *System ID* (which identifies your system) and the *Validation key* (which identifies your computer).

license plate inventory

A license plate inventory is a list of license plate numbers of vehicles found in a parking facility within a given time period, showing where each vehicle is parked (sector and row).

license plate read

A license plate read is a license plate number captured from a video image using ALPR technology.

live hit

A live hit is a hit matched by the Genetec Patroller™ and immediately sent to the Security Center over a wireless network.

live read

A live read is a license plate captured by the patrol vehicle and immediately sent to Security Center over a wireless network.

load balancing

Load balancing is the distribution of workload across multiple computers.

logical ID

Logical ID is a unique ID assigned to each entity in the system for ease of reference. Logical IDs are only unique within a particular entity type.

Logons per Patroller

Logons is a type of investigation task that reports on the logon records of a selected patrol vehicle.

long term

Long term is a type of parking regulation characterizing an overtime rule. The *long term* regulation uses the same principle as the *same position* regulation, but the parking period starts on one calendar date and ends on another calendar date. No more than one overtime rule can use the long term regulation in the entire system.

main server

The main server is the only server in a Security Center system hosting the Directory role. All other servers on the system must connect to the main server to be part of the same system. In a high availability configuration where multiple servers host the Directory role, it is the only server that can write to the Directory database.

manual capture

Manual capture is when license plate information is entered into the system by the user and not by the ALPR.

map link

A map link is a map object that brings you to another map with a single click.

map mode

Map mode is a Security Desk canvas operating mode that replaces tiles and controls with a geographical map showing all active, georeferenced events in your system. Switching to Map mode is a feature that comes with AutoVu™, Genetec Mission Control™, or Record fusion, and requires a license for one of these major features.

map object

Map objects are graphical representations on your maps of Security Center entities or geographical features, such as cities, highways, rivers, and so on. With map objects, you can interact with your system without leaving your map.

map view

A map view is a defined section of a map.

Mobile Data Computer

Mobile Data Computer is a tablet computer or ruggedized laptop used in patrol vehicles to run the Genetec Patroller™ application. The MDC is typically equipped with a touch-screen with a minimum resolution of 800 x 600 pixels and wireless networking capability.

Mobile License Plate Inventory

Mobile License Plate Inventory (MLPI) is the Genetec Patroller™ software installation that is configured for collecting license plates and other vehicle information for creating and maintaining a license plate inventory for a large parking area or parking garage.

Monitoring

The *Monitoring* task is a type of operation task that you can use to monitor and respond to real-time events that relate to selected entities. Using the *Monitoring* task, you can also monitor and respond to alarms.

network address translation

Network address translation is the process of modifying network address information in datagram (IP) packet headers while in transit across a traffic routing device, for the purpose of remapping one IP address space into another.

new wanted

A new wanted is a manually entered hotlist item in Genetec Patroller™. When you are looking for a plate that does not appear in the hotlists loaded in the Genetec Patroller™, you can enter the plate in order to raise a hit if the plate is captured.

OCR equivalence

OCR equivalence is the interpretation of OCR (Optical Character Recognition) equivalent characters performed during license plate recognition. OCR equivalent characters are visually similar, depending on the plate's font. For example, the letter "O" and the number "0", or the number "5" and the letter "S". There are several pre-defined OCR equivalent characters for different languages.

odometry sensor

To track and display a patrol vehicle's position accurately on a map, you can provide an odometry signal to the SharpZ3 system by installing an odometry sensor on the drive shaft of the vehicle.

output behavior

An output behavior is a type of entity that defines a custom output signal format, such as a pulse with a delay and duration.

overtime rule

An overtime rule is a type of entity that defines a parking time limit and the maximum number of violations enforceable within a single day. Overtime rules are used in city and university parking enforcement. For university parking, an overtime rule also defines the parking area where these restrictions apply.

parking facility

A parking facility is a type of entity that defines a large parking area as a number of sectors and rows for the purpose of inventory tracking.

parking lot

A parking lot is a polygon that defines the location and shape of a parking area on a map. By defining the number of parking spaces inside the parking lot, Security Center can calculate its percentage of occupancy during a given time period.

parking zone

The parking zones that you define in Security Center represent off-street parking lots where the entrances and exits are monitored by Sharp cameras.

Patroller Config Tool

Genetec Patroller™ Config Tool is the Genetec Patroller™ administrative application used to configure Patroller-specific settings, such as adding Sharp cameras to the in-vehicle LAN, enabling features such as

Manual Capture or New Wanted, and specifying that a username and password are needed to log on to Genetec Patroller™.

patroller entity

A patroller entity in Security Center represents a patrol vehicle equipped with an in-vehicle computer running Genetec Patroller™ software.

Patroller tracking

Patroller tracking is a type of investigation task that allows you to replay the route followed by a patrol vehicle on a given date on a map, or view the current location of patrol vehicles on a map.

patrol vehicle

A patrol vehicle monitors parking lots and city streets for parking violations or wanted vehicles. A patrol vehicle includes one or more Sharp automatic license plate recognition (ALPR) cameras and an in-vehicle computer running Genetec Patroller™ software.

permit

A permit is a type of entity that defines a single parking permit holder list. Each permit holder is characterized by a category (permit zone), a license plate number, a license issuing state, and optionally, a permit validity range (effective date and expiry date). Permits are used in both city and university parking enforcement.

permit hit

A permit hit is a hit that is generated when a read (license plate number) does not match any entry in a permit or when it matches an invalid permit.

permit restriction

A permit restriction is a type of entity that applies time restrictions to a series of parking permits for a given parking area. Permit restrictions can be used by patrol vehicles configured for University Parking Enforcement and for systems that use the AutoVu™ Free-Flow feature.

Plate link

When a patrol vehicle that is registered with Plate link enters a parking zone, it downloads all recent plate reads and hits from other patrol vehicles that are registered with the same account. This data sharing ensures that the system catches parking violations that would otherwise be missed.

Plate Reader

Plate Reader is the software component of the Sharp unit that processes the images captured by the ALPR camera to produce license plate reads, and associates each license plate read with a context image captured by the context camera. The Plate Reader also handles the communications with the Genetec Patroller™ and the ALPR Manager. If an external wheel imaging camera is connected to the Sharp unit, the Plate Reader also captures wheel images from this camera.

plugin

A plugin (in lowercase) is a software component that adds a specific feature to an existing program. Depending on the context, plugin can refer either to the software component itself or to the software package used to install the software component.

plugin role

A plugin role adds optional features to Security Center. A plugin role is created by using the *Plugin* role template. By default, it is represented by an orange puzzle piece in the *Roles* view of the *System* task. Before you can create a plugin role, the software package specific to that role must be installed on your system.

Post-Payment

The AutoVu™ Post-Payment plugin validates the parking session against the parking lot rules and the payment provider database, and then sends an evidence package to ticketing system if an infraction is detected.

primary server

Primary server is the default server chosen to perform a specific function (or role) in the system. To increase the system's fault-tolerance, the primary server can be protected by a secondary server on standby. When the primary server becomes unavailable, the secondary server automatically takes over.

private IP address

A private IP address is an IP address chosen from a range of addresses that are only valid for use on a LAN. The ranges for a private IP address are: 10.0.0.0 to 10.255.255.255, 172.16.0.0 to 172.16.255.255, and 192.168.0.0 to 192.168.255.255. Routers on the Internet are normally configured to discard any traffic using private IP addresses.

private task

A private task is a saved task that is only visible to the user who created it.

privilege

Privileges define what users can do, such as arming zones, blocking cameras, and unlocking doors, over the part of the system they have access rights to.

read rate

The read rate measures the speed at which a license plate recognition system can correctly detect and read all of the characters in an image of a license plate.

Reads

Reads is a type of investigation task that reports on license plate reads performed within a selected time range and geographic area.

Reads/hits per day

Reads/hits per day is a type of investigation task that reports on license plate reads performed within a selected time range and geographic area.

Reads/hits per zone

Reads/hits per zone is a type of investigation task that reports on the number of reads and hits per parking area for a selected date range.

reverse geocoding

Reverse geocoding is an AutoVu™ feature that translates a pair of latitude and longitude into a readable street address.

role

A role is a software component that performs a specific job within Security Center. To execute a role, you must assign one or more servers to host it.

salt (cryptography)

In cryptography, a salt is data that is used as an additional input to the information you want to encrypt or protect with a hash function, so that the original information is nearly impossible to guess, even when the attacker knows what algorithm is being used.

same position

Same position is a type of parking regulation characterizing an overtime rule. A vehicle is in violation if it is seen parked at the exact same spot over a specified period of time. Genetec Patroller™ must be equipped with GPS capability in order to enforce this type of regulation.

schedule

A schedule is a type of entity that defines a set of time constraints that can be applied to a multitude of situations in the system. Each time constraint is defined by a date coverage (daily, weekly, ordinal, or specific) and a time coverage (all day, fixed range, daytime, and nighttime).

scheduled task

A scheduled task is a type of entity that defines an action that executes automatically on a specific date and time, or according to a recurring schedule.

Security Center

Security Center is a truly unified platform that blends IP video surveillance, access control, license plate recognition, intrusion detection, and communications within one intuitive and modular solution. By taking advantage of a unified approach to security, your organization becomes more efficient, makes better decisions, and responds to situations and threats with greater confidence.

Security Center Federation™

The Security Center Federation™ role connects a remote, independent Security Center system to your local Security Center. That way, the remote system's entities and events can be used in your local system.

Security Desk

Security Desk is the unified user interface of Security Center. It provides consistent operator flow across all of the Security Center main systems, Omnicast™, Synergis™, and AutoVu™. The unique task-based design of Security Desk lets operators efficiently control and monitor multiple security and public safety applications.

server

A server is a type of entity that represents a server machine on which the Genetec™ Server service is installed.

Server Admin

Server Admin is the web application running on every server machine in Security Center that allows you to configure the settings of Genetec Server. Server Admin also allows you to configure the Directory role on the main server.

SharpOS

SharpOS is the software component of a Sharp unit. SharpOS is responsible for everything related to plate capture, collection, processing, and analytics. For example, a SharpOS update can include new ALPR contexts, new firmware, Sharp Portal updates, and updates to the Sharp's Windows services (Plate Reader, HAL, and so on).

Sharp Portal

Sharp Portal is a web-based administration tool used to configure Sharp cameras for AutoVu™ systems. From a web browser, you log on to a specific IP address (or the Sharp name in certain cases) that corresponds to the Sharp you want to configure. When you log on, you can configure options such as selecting the ALPR context (for example, Alabama, Oregon, Quebec), selecting the read strategy (for example, fast moving or slow moving vehicles), viewing the Sharp's live video feed, and more.

Sharp unit

The Sharp unit is a proprietary ALPR unit of Genetec Inc. that integrates license plate capturing and processing components, as well as digital video processing functions, inside a ruggedized casing.

SharpZ3

SharpZ3 is a proprietary mobile ALPR system designed by Genetec Inc. that integrates license plate cameras and a base unit that is responsible for ALPR processing as well as communication with the Genetec Patroller™ software running on the in-vehicle computer.

SharpZ3 ALPR module

ALPR modules are available for the SharpZ3 base unit which can support either two or four SharpZ3 cameras.

SharpZ3 auxiliary camera bracket

To mount an AutoVu™ auxiliary PoE camera beside a SharpZ3 camera, you can install a SharpZ3 auxiliary camera bracket on the SharpZ3 hardmount.

SharpZ3 base unit

The SharpZ3 base unit is the processing component of the SharpZ3 system. The base unit includes the ALPR module and up to three expansion modules that are used to add features to the system such as precise navigation, PoE ports for wheel imaging cameras, and so on.

SharpZ3 camera unit

SharpZ3 camera units are mounted on a patrol vehicle as a part of a SharpZ3 ALPR system. Each camera unit contains two LPR cameras, one context camera, and infrared illuminators.

SharpZ3 expansion module

Up to three expansion modules can be added to the SharpZ3 base unit. The modules add additional functionality to the base system. For example, you can add modules for precise navigation, PoE ports for wheel imaging cameras, and so on.

stereoscopy

SharpZ3 camera units contain two ALPR camera lenses. When SharpOS analyzes the images together, it can distinguish depth in the field of view and can therefore estimate vehicle position and orientation.

task

A task is the central concept on which the entire Security Center user interface is built. Each task corresponds to one aspect of your work as a security professional. For example, use a monitoring task to monitor system events in real-time, use an investigation task to discover suspicious activity patterns, or use an administration task to configure your system. All tasks can be customized and multiple tasks can be carried out simultaneously.

taskbar

A taskbar is a user interface element of the Security Center client application window, composed of the Home tab and the active task list. The taskbar can be configured to appear on any edge of the application window.

tile

A tile is an individual window within the canvas, used to display a single entity. The entity displayed is typically the video from a camera, a map, or anything of a graphical nature. The look and feel of the tile depends on the displayed entity.

timeline

A timeline is a graphic illustration of a video sequence, showing where in time, motion, and bookmarks are found. Thumbnails can also be added to the timeline to help the user select the segment of interest.

transient parking

Transient parking is a parking scenario where the driver must purchase parking time as soon as the vehicle enters the parking lot.

unit

A unit is a hardware device that communicates over an IP network that can be directly controlled by a Security Center role. We distinguish four types of units in Security Center:

- Access control units, managed by the Access Manager role
- Video units, managed by the Archiver role
- ALPR units, managed by the ALPR Manager role
- Intrusion detection units, managed by the Intrusion Manager role

University Parking Enforcement

University Parking Enforcement is a Genetec Patroller™ software installation that is configured for university parking enforcement: the enforcement of scheduled parking permits or overtime restrictions. The use of maps is mandatory. Hotlist functionality is also included.

unreconciled read

A unreconciled read is a MLPI license plate read that has not been committed to an inventory.

user

A user is a type of entity that identifies a person who uses Security Center applications and defines the rights and privileges that person has on the system. Users can be created manually or imported from an Active Directory.

user group

A user group is a type of entity that defines a group of users who share common properties and privileges. By becoming member of a group, a user automatically inherits all the properties of the group. A user can be a member of multiple user groups. User groups can also be nested.

validation key

A validation key is a serial number uniquely identifying a computer that must be provided to obtain the license key.

vehicle identification number

A vehicle identification number (VIN) is an identification number that a manufacturer assigns to vehicles. This is usually visible from outside the vehicle as a small plate on the dashboard. A VIN can be included as additional information with license plate entries in a hotlist or permit list, to further validate a hit and ensure that it is the correct vehicle.

wheel imaging

Wheel imaging is a virtual tire-chalking technology that takes images of the wheels of vehicles to prove whether they have moved between two license plate reads.

whitelist

A whitelist is a hotlist that is created for the purpose of granting a group of license plates access to a parking lot. A whitelist can be compared to an access rule where the secured area is the parking lot. Instead of listing the cardholders, the whitelist applies to license plate credentials.

widget

A widget is a component of the graphical user interface (GUI) with which the user interacts.

Zone occupancy

Zone occupancy is a type of investigation task that reports on the number of vehicles parked in a selected parking area, and the percentage of occupancy.

Where to find product information

You can find our product documentation in the following locations:

- **Genetec™ TechDoc Hub:** The latest documentation is available on the TechDoc Hub. To access the TechDoc Hub, log on to [Genetec Portal](#) and click [TechDoc Hub](#). Can't find what you're looking for? Contact documentation@genetec.com.
- **Installation package:** The Installation Guide and Release Notes are available in the Documentation folder of the installation package. These documents also have a direct download link to the latest version of the document.
- **Help:** Security Center client and web-based applications include help, which explains how the product works and provide instructions on how to use the product features. To access the help, click **Help**, press F1, or tap the ? (question mark) in the different client applications.

Technical support

Genetec™ Technical Assistance Center (GTAC) is committed to providing its worldwide clientele with the best technical support services available. As a customer of Genetec Inc., you have access to TechDoc Hub, where you can find information and search for answers to your product questions.

- **Genetec TechDoc Hub:** Find articles, manuals, and videos that answer your questions or help you solve technical issues.

Before contacting GTAC or opening a support case, it is recommended to search TechDoc Hub for potential fixes, workarounds, or known issues.

To access the TechDoc Hub, log on to [Genetec Portal](#) and click [TechDoc Hub](#). Can't find what you're looking for? Contact documentation@genetec.com.

- **Genetec Technical Assistance Center (GTAC):** Contacting GTAC is described in the Genetec Lifecycle Management (GLM) documents: [Genetec Assurance Description](#) and [Genetec Advantage Description](#).

Additional resources

If you require additional resources other than the Genetec Technical Assistance Center, the following is available to you:

- **Forum:** The Forum is an easy-to-use message board that allows clients and employees of Genetec Inc. to communicate with each other and discuss many topics, ranging from technical questions to technology tips. You can log on or sign up at <https://gtapforum.genetec.com>.
- **Technical training:** In a professional classroom environment or from the convenience of your own office, our qualified trainers can guide you through system design, installation, operation, and troubleshooting. Technical training services are offered for all products and for customers with a varied level of technical experience, and can be customized to meet your specific needs and objectives. For more information, go to <http://www.genetec.com/support/training/training-calendar>.

Licensing

- For license activations or resets, please contact GTAC at <https://gtap.genetec.com>.
- For issues with license content or part numbers, or concerns about an order, please contact Genetec Customer Service at customerservice@genetec.com, or call 1-866-684-8006 (option #3).
- If you require a demo license or have questions regarding pricing, please contact Genetec Sales at sales@genetec.com, or call 1-866-684-8006 (option #2).

Hardware product issues and defects

Please contact GTAC at <https://gtap.genetec.com> to address any issue regarding Genetec appliances or any hardware purchased through Genetec Inc.