

# Guardian Generation 3.1

## Hardware Installation Manual P1003100



This document covers only the hardware installation for Guardian Gen3. This product is for commercial use only and not for resale to UK consumers. The product is not intended to be a UK consumer connectable product within the meaning of the Product Security and Telecommunications Infrastructure Act 2022

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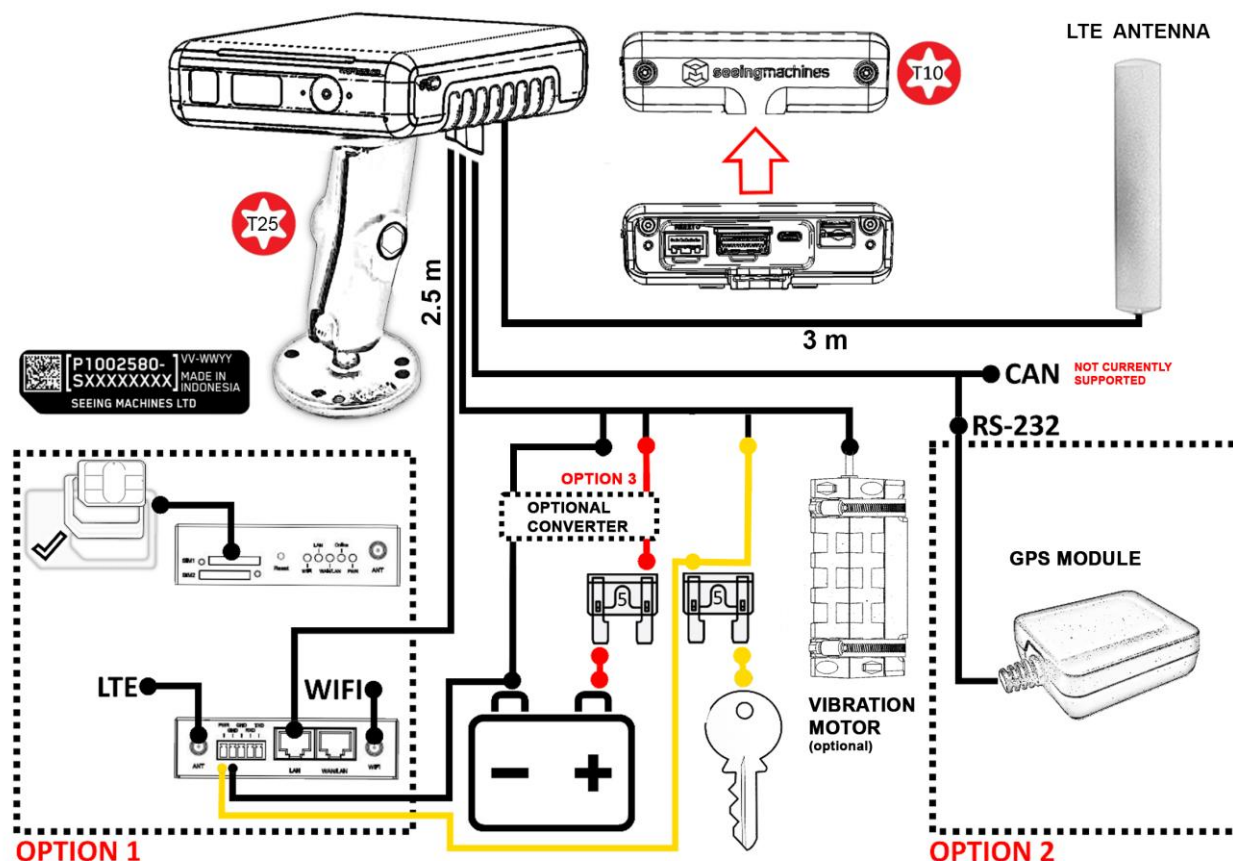
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## 1. System Overview

The following image provides an overview of the system structure. As indicated in the image, there are multiple options for connection. It should be noted that at present, there is no support for Bluetooth, Wi-Fi, CAN, external relay, telematics I/O or the Remote Button.

Note also, that the Guardian Gen 3 must unit have separate ignition and power connections. This is required to allow over the air updates when the ignition is switched off.



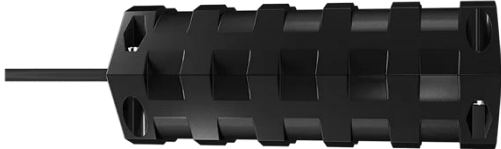
1. **Default** – Use internal Modem and GPS, 12V system
2. **Option 1** - Connect the Guardian Cellular Router for LTE and GPS, using a dedicated antenna for each.
3. **Option 2** - External Navisys GPS unit connected through RS-232. (This is an optional accessory).
4. **Option 3** – In the absence of a 12V power line in the vehicle, the High Voltage Power Adaptor must be installed. For detailed wiring diagrams refer to **section 9.4.1**

This document outlines the hardware-related steps necessary to install Guardian Generation 3 (Guardian) systems in the field and are intended to be completed alongside the steps in the *Software Installation Manual*.

## 2. Guardian (Gen3) Package

### 2.1. Standard Guardian (Gen3) Package Contents

| Description                                                                                                                                                                                                                                                                                                                                                              | Image                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p><b>Guardian unit</b></p> <p>Size: H34 x W110 x L128mm</p> <p>Peak Operating temp: -40 to 85 Celsius</p> <p>Power: 9 to 18V @36W max (Ignition 5mA max)</p> <p>Camera orientation: Portrait</p> <p>Dust and Water protection: IP50</p> <p>Refer to datasheet for more information</p>                                                                                  |    |
| <p><b>High Voltage Power Adaptor</b></p> <p>High Voltage Power adaptor required for 18 to 30V vehicles. Refer to the wiring diagram below in <a href="#">section 9.3.1</a></p>                                                                                                                                                                                           |   |
| <p><b>Guardian unit Back Plate</b></p> <p>(with captured screws)</p>                                                                                                                                                                                                                                                                                                     |  |
| <p><b>LTE Antenna</b></p>                                                                                                                                                                                                                                                                                                                                                |  |
| <p><b>Cable (Cable Harness)</b></p> <p>Red wire (male spade): Battery Power</p> <p>Yellow wire (thin male spade): Ignition Power</p> <p>Black wire (female spade): Ground</p> <p>Cables are labelled:</p> <p>RJ45 Ethernet Connector</p> <p>Vibration Motor Connector</p> <p>CAN connector (for future use)</p> <p>RS-232 Connector (optional GPS, and future comms)</p> |  |

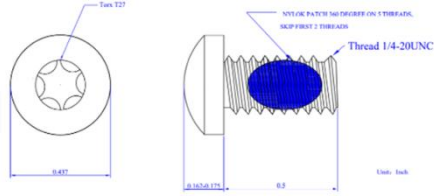
|                                                                                              |                                                                                      |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>Vibration Motor</b><br>(Optional accessory)                                               |    |
| <b>1 x Vibration plate</b>                                                                   |    |
| <b>2 x Hose Clamps</b><br>Clamps vibration motor to mounting plate / seat.                   |    |
| <b>2 x Tek screws</b>                                                                        |  |
| <b>2x 5-amp mini blade fuses</b>                                                             |  |
| <b>2x Fuse holders</b><br>(Note that an additional fuse holder is required for SDR installs) |  |

## 2.2. Standard Mount System (Optional)

When ordering a Guardian unit, you can choose to purchase only the Guardian unit or select a bundle that includes the mount. The following components are common to both mounting methods. (Options for the base are listed in the subsequent sections).

### 2.2.1. Guardian unit Interface Kit

|                                                       |                                                                                      |
|-------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>1x Ball Base with 1.5" 2-Hole Pattern - B Size</b> |  |
|-------------------------------------------------------|--------------------------------------------------------------------------------------|

|                                                                                                                            |                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <p><b>2x T27 Torx drive with patch lock</b></p> <p>½" long, thread ¼" x 20 TPI black</p> <p>(Note imperial not metric)</p> |  |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|

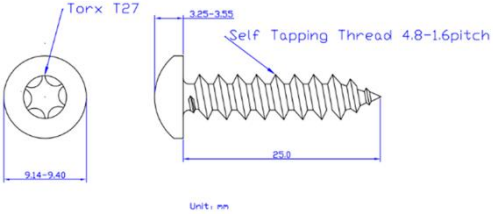
**2.2.2. Arm Kit**

|                                                                                                                                                                                                                                                                           |                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <p><b>1x Anti-Tamper Composite Double Socket Arm - B Size Medium</b></p> <p>(Modified) with Tamper proof bolt T25</p> <p>Seeing Machines provides a custom-made tamper proof version of the arm to prevent unauthorised repositioning of the unit after installation.</p> |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|

**2.3. Mount Base Options**

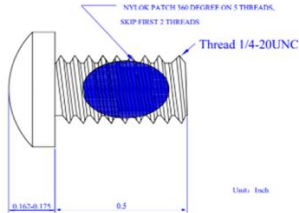
When ordering a Guardian bundle with a mount, you can select either the Hard Mount or Soft Mount base to be used with the mount.

**2.3.1. Screw Base Kit (Hard Mount)**

|                                                                                    |                                                                                      |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p><b>1x Round Plate with Ball - B Size</b></p>                                    |  |
| <p><b>4x Mounting screws for Base</b></p> <p>10G x 25mm T27 self-tapping black</p> |  |

**2.3.2. Adhesive Mount Base Kit (Soft Mount)**

|                                                                                         |                                                                                      |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p><b>Mounting Plate (Adhesive Soft Mount)</b></p> <p>(Replaces base of Hard Mount)</p> |  |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|

|                                                                                                 |                                                                                     |
|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Ball adapter</b>                                                                             |   |
| <b>Ball adapter bolt</b><br>1/2" long, thread 1/4" x 20 TPI black<br>(Note imperial not metric) |   |
| <b>Alcohol Wipes</b>                                                                            |  |

### 3. Installer Tooling

The tools below are specifically used to install Guardian Gen3. Other tools for general installations are not listed here.

|                                                                                                   |                                                                                       |
|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Flush cutters</b><br>For wiring and removing sharp edges on zip ties especially around airbags |  |
| <b>Multi-meter or test light</b><br>For identifying power connection                              |  |
| <b>Wire strippers</b><br>For power connection                                                     |  |

|                                                                                            |                                                                                      |
|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>Automotive crimpers</b><br>For crimping connectors                                      |    |
| <b>Torx T10 T25 and T27 bits with bit driver</b><br>For adjusting mounts and Guardian unit |    |
| <b>Trim tools</b>                                                                          |   |
| <b>Step drill</b><br>For allowing cables through tight dashboard panels                    |   |
| <b>Smartphone Apps</b><br>Spirit level and Protractor apps                                 |  |
| <b>Ethernet cable</b>                                                                      |  |

### 4. Installer Consumables

For most vehicles, the supplied Guardian unit components will be sufficient for installation, however if the vehicle needs longer power leads, they can be used in conjunction with the supplied Guardian unit components. Cable accessories like cable ties, splice and ring crimps may be needed, but are NOT supplied by Seeing Machines. The items in the table below can be sourced locally, however the items must comply to the specifications below.

**Note:** The extended cable should not exceed an additional 2.5 meters, making the total cable harness length 5 meters.

|                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Power: Battery wire</b><br>Colour: Red<br>Size: 16 AWG to suit provided connectors<br>Requirement: 16 AWG Hook up wire - Red. Reel, VW-1, -40 to 105C, PVC, Tinned strands                                                                                                                                                                                                                  |    |
| <b>Power: Ignition wire</b><br>Colour: Yellow<br>Automotive wire<br>Size: 16 AWG to suit provided connectors<br>Requirement: 16 AWG Hook up wire - Yellow. Reel, VW-1, -40 to 105C, PVC, Tinned strands                                                                                                                                                                                        |    |
| <b>Power: Ground wire</b><br>Colour: Black<br>Automotive wire<br>Size: 16 AWG to suit provided connectors<br>Requirement: 16 AWG, Hook up wire - Black. Reel, VW-1, -40 to 105C, PVC, Tinned strands                                                                                                                                                                                           |   |
| <b>Expandable Fabric Cable Wrap</b><br>Non-expanded Diameter: 13mm<br>Length: Up to 2.5m<br>Used to protect and group the cables in the cable harness.<br><br>Note: The Guardian Cable Harness has this wrap over the cable. In areas of cable coiling or areas where there is no rubbing or exposure to the cabin, the wrap from these sections can be removed and reused elsewhere if needed |  |
| <b>Zip/Cable Ties:</b><br>For cable formation, relief, and safe cabling                                                                                                                                                                                                                                                                                                                        |  |
| <b>Wire Joiner Terminal (Insulated)</b><br>(Blue 6.3mm)                                                                                                                                                                                                                                                                                                                                        |  |
| <b>Crimp Terminal</b><br>(Blue 6.3mm)<br>Ring 6mm                                                                                                                                                                                                                                                                                                                                              |  |
| <b>Crimp Terminal</b><br>(Blue 6.3mm)<br>Ring 10mm                                                                                                                                                                                                                                                                                                                                             |  |
| <b>Male spade (Insulated)</b><br>(Blue 6.3mm)                                                                                                                                                                                                                                                                                                                                                  |  |

|                                                 |                                                                                     |
|-------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Female spade (Insulated)</b><br>(Blue 6.3mm) |  |
| <b>Female spade (Insulated)</b><br>(Red 2.8mm)  |  |

## 5. Additional Installer References

For further reference to the below topics, see the appendix for further information.

- Installer safety and training
- OEM Mounting Practices
- Airbag safety
- Understanding Electromagnetic Interference (EMI)
- Documentation and Support

## 6. OEM Implementation

We highly recommend that OEM customers create their own custom mount for fast and consistent installation and performance. When mounting the Guardian unit inside the dashboard or alternative locations, the following specifications need to be considered:

- The Guardian unit must have at minimum 50mm of airflow space below the heatsink of the device (located on the base of unit).
- Airflow of greater than 1,000mm/s (3.6km/h) must be maintained during normal operation.
- Ensure the mount used can support 500 grams of weight, especially in off-road conditions.
- The system will only start-up when the ambient temperature is below 70 degrees Celsius.
- To maintain compatibility with future feature upgrades, refrain from placing metal materials above the Guardian unit.
- The imperial mounting threads for the Guardian unit are ¼ inch in diameter and 12mm deep to match the mounting system.

## 7. Mounting the Guardian Unit

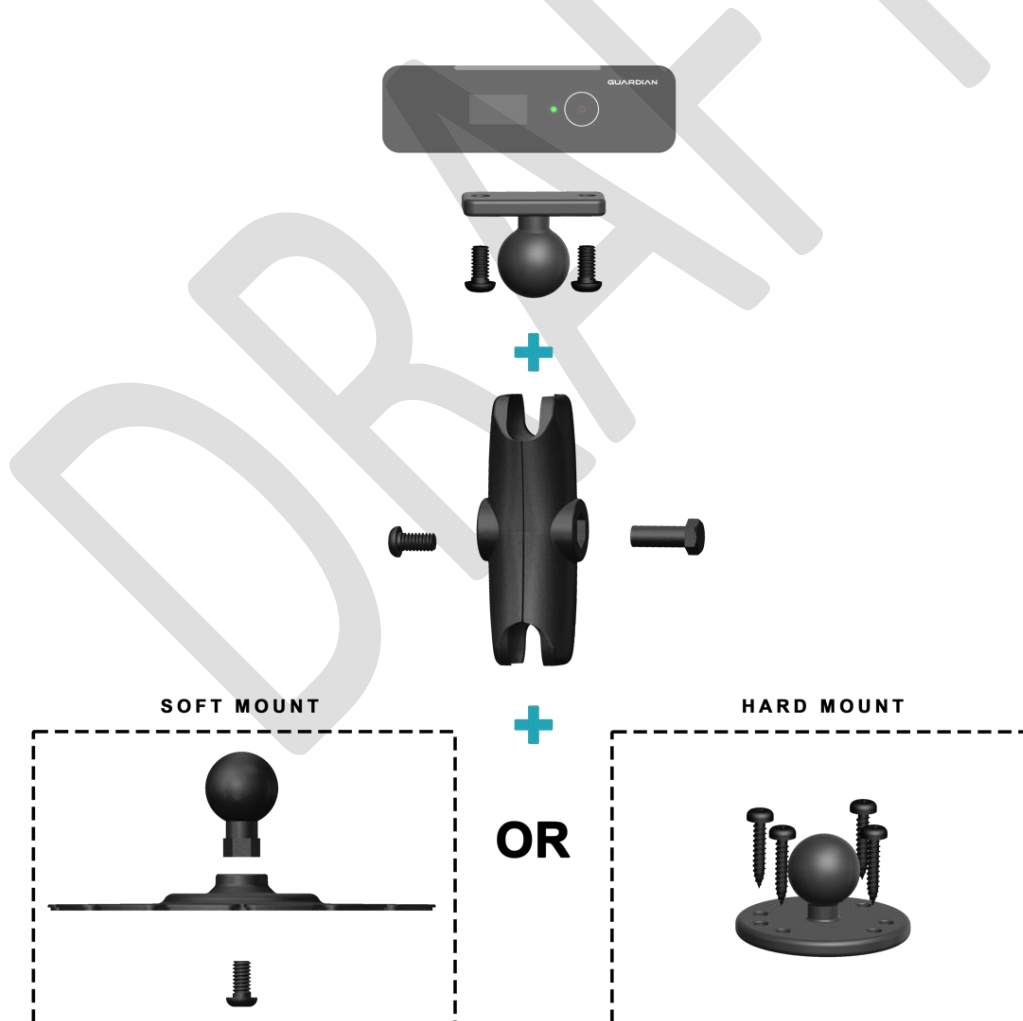
Seeing Machines has defined two simple mounting methods for installation of the Guardian unit based on customer requests:

1. **Hard Mount:** This method uses screws, drilling and cutting techniques to secure the Guardian unit safely and securely to the dashboard. Seeing Machines has defined the 'hard mount' as the preferred method for installation of the Guardian unit.
2. **Soft Mount:** This method uses tapes, magnets, cable ties, and Velcro to secure the device, avoiding the need for drilling or cutting. It's ideal for temporary installations or when customers prefer to avoid drilling or cutting. Customers should correct any movement or shifting. Seeing Machines recommends using the custom Guardian adhesive mount over other adhesive options.

**NOTE:** The mounting arm provides flexibility for the installer to allow for optimal installation, but it's important to account for the potential impact of vibration on the Guardian unit when choosing a method for securing the mounting arm.

**NOTE:** While our recommended mounting solution (the hard mount) has been thoroughly tested and proven effective, customers have the freedom to explore other mounting solutions and devise their own mounting setup. However, if an alternative configuration is chosen, it is the customer's responsibility to find a solution that meets their specific requirements and preferences. Customers should also consider the possibility of vibration, as this may lead to increased false positives in event detection within the system.

As visible in the image below, the interface attached to the Guardian unit and the arm are the same for both mounting methods. It is only the base that varies between mounting methods, as the Soft Mount (pictured on the left) **OR** the Hard Mount can be used for the base, connecting the mount to the dashboard of the vehicle. **Section 0 Guardian (Gen3) Package** provides images and details of the components in each mount type. For more information on these mounts, refer to the 'Guardian Gen3 Mounts Data Sheet'.



## 8. Positioning the Guardian unit

The Guardian Unit houses the driver facing camera, processing elements, IR illumination and more. Before installing the Guardian unit, it's important to consider the following positioning information.

### 8.1. Pitch, Yaw, Roll Definition

The Guardian unit should be positioned at an angle that ensures the driver's eyes and face can be accurately tracked. To achieve this, the following pitch and yaw settings must be followed.

**Note the field of view for pitch, yaw, and roll: Portrait (H) 53 degrees x (V) 88 degrees.**

#### Pitch Positioning (vertical angle):

Pitch positioning refers to the vertical angle of the Guardian unit, relative to the driver's eyeline.

The Guardian unit should be mounted on the dashboard **below the drivers eyeline**, with the optimal pitch setting around **- 5°**

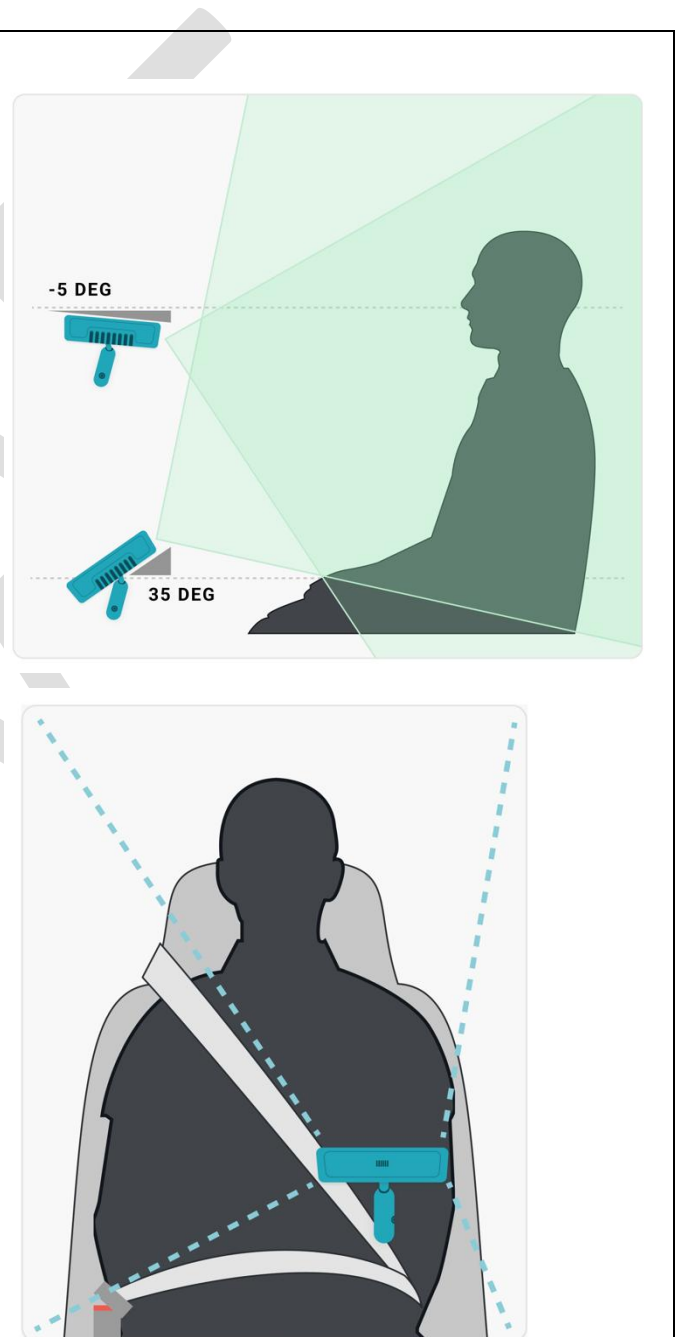
The minimum and maximum pitch values are **- 5° and <35°** as shown in the first image. This allows the camera in the Guardian unit to see the drivers head, torso and seat belt.

You can use a spirit level smartphone app to check the pitch by placing the smartphone on top of the Guardian unit. Assuming the vehicle is on level ground, this will allow you to determine the pitch of the Guardian unit.

As a general guideline, while viewing the camera's perspective during the software install wizard, ensure that the driver's seat fits within the camera's portrait view, as indicated in the second image.

The seat should be visible and centred both when pushed all the way forward and in its highest position, as well as when pushed back and in its lowest position. The drivers head, torso and seat belt must be visible in all seat positions.

Positioning will be confirmed as part of the software setup.



### Yaw Positioning (horizontal angle)

Yaw positioning refers to the horizontal angle at which the unit is positioned relative to the driver's line of sight when the driver is looking straight ahead.

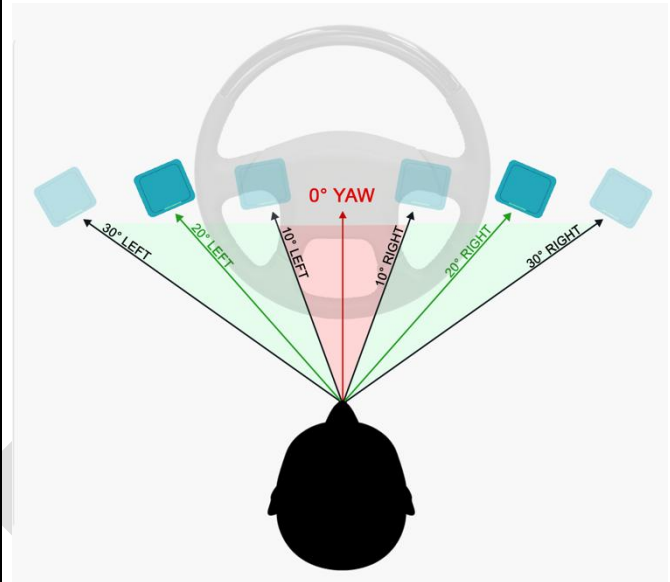
In the image, the red arrow directly in front of the driver's head, represents 0 ° yaw. You can use a protractor app on your smartphone, positioned under the driver's nose, to determine the yaw of the Guardian unit to the left or right of this point.

The yaw angle that ensures the driver's eyes and face can be accurately tracked is:

**Between 10 to 30 ° – either to the left or right of the driver.**

The Guardian unit can be mounted at an angle in the green area (left or right of the driver), but not in the red area (centre). As a rule of thumb, the ideal position is around 20 ° or at the edges of the steering wheel (represented by the green arrow). This ensures that the steering wheel does not block the vision of the camera in the Guardian unit.

Top-down view of normal driving position



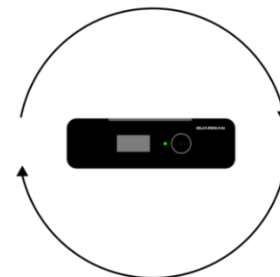
The unit must be mounted in a position where there are no obstructions between the Guardian unit and the driver's face. It's also important to ensure that the mounting position does not create a blind spot for the driver. This can be confirmed during installation by ensuring that the entire Guardian unit is clearly visible when the steering wheel is at its highest point (visual check only).

The distance from the driver's head to the Guardian unit should be within **0.4m to 1.0m** with an optimal distance of **0.8m**



### Roll Positioning (rotating clockwise or anticlockwise):

The Guardian unit needs to be horizontal. You can use a spirit level smartphone app to check the roll by placing the smartphone on top of the Guardian unit. Assuming the vehicle is on level ground, you'll be able to see the roll of the Guardian unit. This should be as level as possible, but can be within **-5° to 5°**



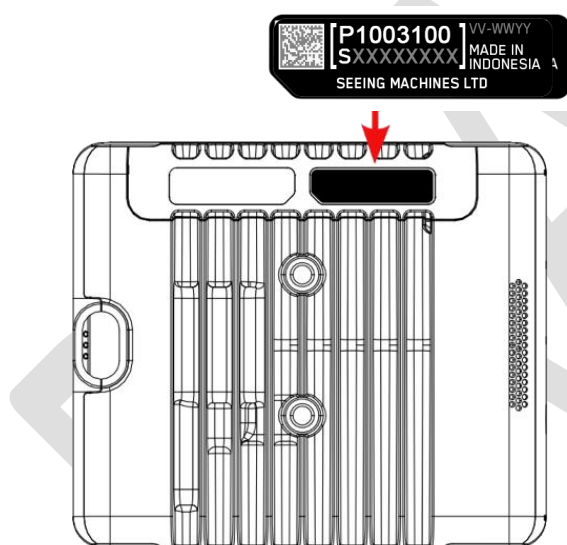
## 9. Installation of the Guardian unit

### 9.1. Advised Order of Installation

1. Install vibration motor, whilst routing the cable towards the fuse box. (This is important as the power connector is located close to the vibration motor connector).
2. Determine the mounting location for the Guardian unit on the dashboard.
  - a. Note: If the Guardian unit must be located next to an EMI source the optional external GPS may be required.
3. Secure the hard or soft mount to the dashboard (depending on which method has been selected).
4. Route the cable harness towards the fuse box (allow a little adjustment slack) and connect to vibration motor if present
5. Route the 4G/LTE antenna towards the Guardian unit.
6. If using the optional GPS unit, route the antenna cable towards the fuse box.
7. Install power connection for Guardian unit and the router
8. Route the ethernet connection on the cable harness at the fusebox for maintenance purposes.
9. Connect the power and data connections on the cable harness to the Guardian unit, and soft hold (strong enough to stay in place but not fully tightened in place) the mount for software calibration.
10. Connect the Ethernet cable to the Ethernet port on your laptop.

### 9.2. Preparation for installation

1. Record the serial number that is located on the underside of the Guardian unit. Make sure to record the full number.  
Eg. P1234567-S12345678



2. Determine the mounting location for the Guardian unit device on the dashboard and follow installation guidelines from the customer. Eg dedicated installation zone etc
3. Refer to **section 8 Positioning the Guardian unit** before installing the mounting solution.
4. Leave the plastic protection film on the main unit to avoid any scratches while positioning.
5. Identify where the fuse box is in the vehicle. The cable harnesses wiring should be terminated in the fuse box for easy access for maintenance and upgrades. Refer to section 0

6. **Installing the Vibration Motor** for more information.

DRAFT

### 9.3. LTE/4G Antenna

#### Connection:

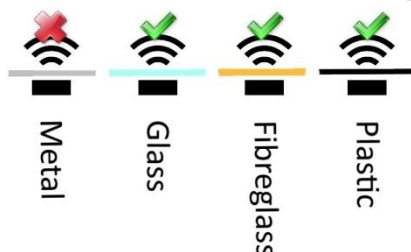
Connect the external LTE/4G antenna to the SMA connector on the base of the unit. Ensure this is tightened with a spanner to 30 Ncm (finger tight).



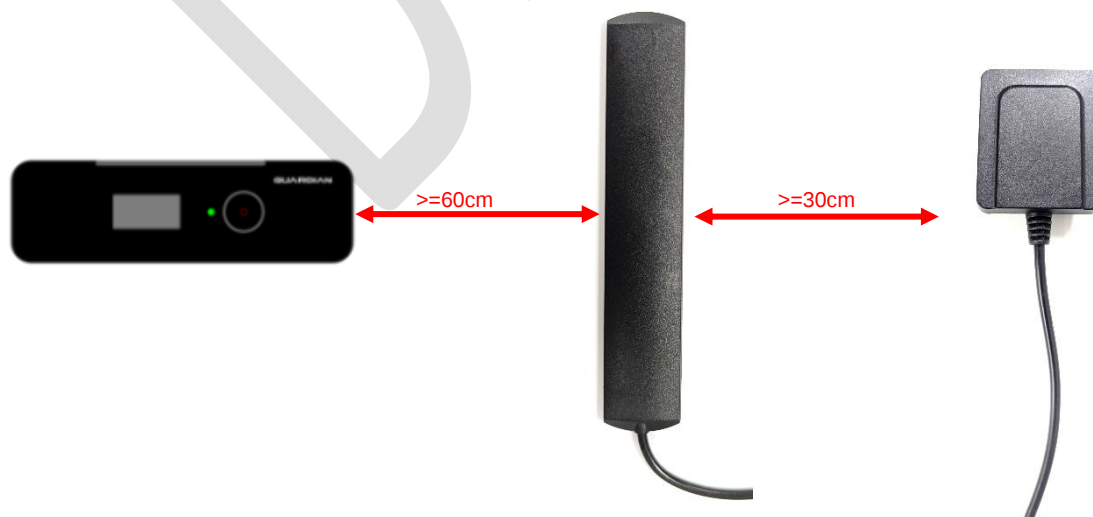
#### Antenna Mounting Considerations:

It is recommended that you mount the antenna as close to a window as possible. The shape of the antenna allows you to mount it close to the windscreen in a vehicle.

- The LTE/4G antenna must be mounted so that there is a clear line of sight to the horizon.
- The LTE/4G antenna can transmit through plastic, wood and fiberglass but not through metal.



If using the optional external GPS the LTE/4G antenna must be mounted at least 30 cm away and at least 60 cm away from the Guardian unit and any other antennas, including third-party GPS systems and communication antennas.



**Types of Mounting:**

The LTE/4G Antenna comes with adhesive tape for mounting. You must clean the area with the provided alcohol wipe and allow it dry for 1 minute before mounting. Ensure you firmly press down on the Antenna for 30 seconds. Make sure you do not have to move the antenna before you affix it. Relocating the antenna after will destroy the adhesive tape and you will not be able to re-attach it.

A 3<sup>rd</sup> party high gain antenna can be fitted if needed. Positioning of the High Gain antenna should be done following the guidelines of the chosen antenna.

**9.4. Routing the Cable (Cable Harness)**

The Guardian Cable Harness is made up of 3 individual cables. (Refer to **Section 1 – System Overview**)

- Power Connection and Vibration motor
- CAN and RS-232
- Ethernet

All cables should be routed towards the fuse box, even if unused, and should be hidden in that area for other technicians to find for maintenance or upgrades (allow some adjustment slack). Tucking cables next to the fuse box is advised, to leave the fuses accessible.

- Route the LTE antenna cable towards the Gen3 unit weaving the cable into the cable wrap for a clean look
- If installing the Vibration Motor, refer to **section 0**

- Installing the Vibration Motor

### 9.4.1. Power Cable

- Mount the power cable in a manner that directs it towards the fuse box.
- It is advised to use the spade connectors discussed below for the power connection. The power connection can be extended if needed up to a total length of 5m. Attach the fuse holders as close to the fuse box as possible to prevent electrical shock or fires in case the power cables are shorted due to wear and tear.
- Based on the specific needs of the vehicle, create one of the below configurations, leaving out the fuses:

#### Wiring Configurations

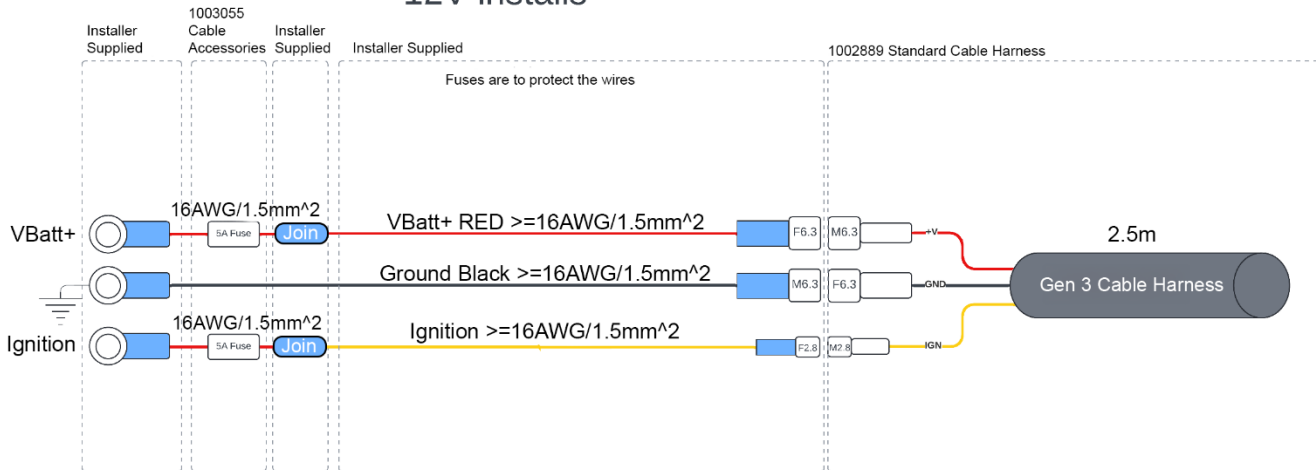
|                                                                                                                                                                                                                                                                             |             |                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------|
| <b>Configuration 1 – Direct power connection:</b><br>(for ring terminal connection example)<br><br>Ring terminal > fuse holder > spade connector > cable harness.<br><br>(It's also possible to consider other methods like soldering)                                      | Red wire    |    |
|                                                                                                                                                                                                                                                                             | Yellow wire |    |
|                                                                                                                                                                                                                                                                             | Black wire  |    |
| <b>Configuration 2 – Extended power connection:</b><br>(for ring terminal connection example)<br><br>Ring terminal > fuse holder > terminal joiner > extension wire > spade connector > cable harness.<br><br>(It's also possible to consider other methods like soldering) | Red Wire    |  |
|                                                                                                                                                                                                                                                                             | Yellow Wire |  |
|                                                                                                                                                                                                                                                                             | Black wire  |  |

#### High Voltage Power

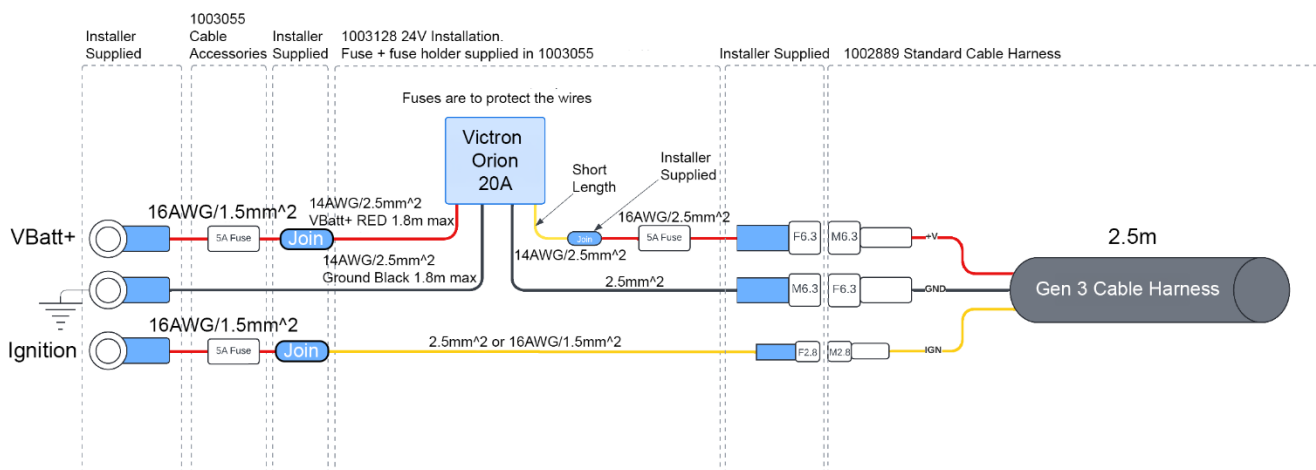
|                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------------------|
| If the vehicle you are installing the Guardian unit into does not have a 12V power line, you will need to install the High Voltage Power Adaptor on the power wire (red wire) of the Guardian unit, directly after the fuse. However, this is not necessary if the 24V vehicle has a 12V converter rail providing constant power (Not ignition controlled).<br><br>Note: the ignition wire can be installed as normal on either 12V or 24V | Red wire |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------------------|

The following wiring diagrams indicate the wiring options for 12V and 24V installs:

### 12V installs



### 24V installs



#### 4. At the fuse box:

- Find the "Battery" power source which is always 12/24V irrespective of whether the ignition is turned on or off.
- Find the "Ignition" power source which only has 12/24V when the ignition is turned on.
- Find the "Ground" source which is part of the vehicle chassis. Try to find an existing chassis connection, as making your own is not advised.
- Isolate the vehicle and connect the configuration cable to the power source:
  - Red wire configuration cable to Battery terminal
  - Yellow wire configuration cable to Ignition terminal
  - Black wire configuration cable to Ground Terminal
- Route the Cable Harness to the spade terminals and connect.
- Insert the 5-amp fuses into the fuse holders.
- The vehicle can now be un-isolated.

### 9.5. External GPS (Optional)

The following are optional extras, and can be plugged into cable extensions RS232 connector:

- Ensure the directional GPS antenna is mounted on the dashboard with an unobstructed view of the sky, facing the receiver upwards. For optimal performance, place the antenna as close to a window as possible, avoiding placement under the dashboard. Note that the antenna can receive data through plastic, glass, and fiberglass, but not metal. Additionally, maintain a distance of at least 30cm between the GPS antenna and other devices, including antennas. If signal performance is poor, this distance can be increased.
- The image indicates which surface should be facing towards the sky. (The serial number is located on the base). Adhesive tape can securely fasten the GPS to the surface. Before applying the tape, ensure the surface is clean.



### 9.6. Ethernet

- This will need to be accessible to maintenance technicians and will be used to setup the system in **phase 3**.
- The ethernet cable should be installed to sit in the fuse box area, with the ability to easily input an ethernet cable for maintenance connection to a laptop.
- By standardising the ethernet cable to be in the fuse box area, technicians can expect the cable to be in the same area each time

For more information on the Cable Harness, refer to the 'Cable Harness Data Sheet'.

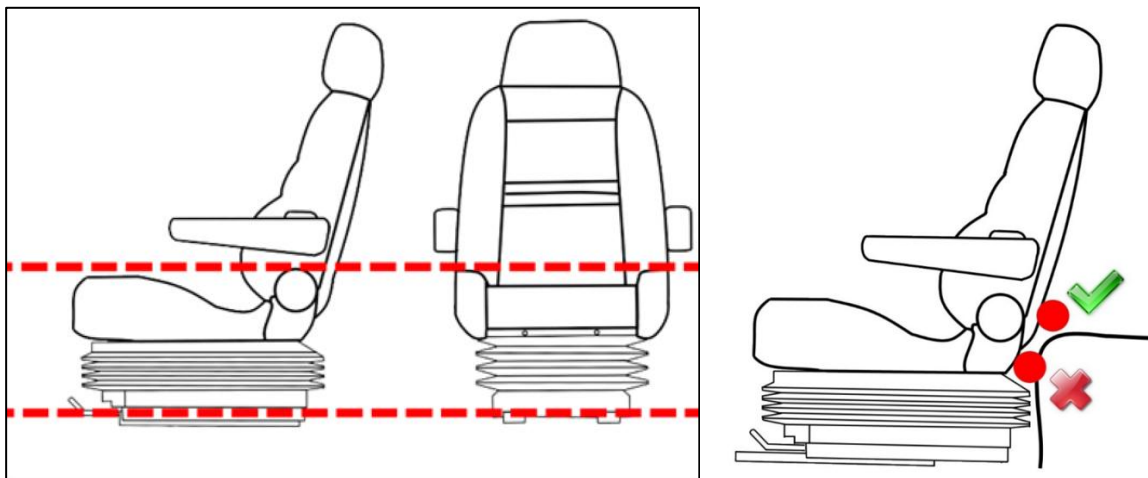
### 9.7. Installing the Vibration Motor (Optional)

Note that the Vibration Motor is an optional component that may not have been purchased by the customer.

#### 9.7.1. Selecting the Mounting Location

The Vibration Motor must be mounted on the driver's seat. It must be located above the adjustment rails and within the red dotted lines as per the image. **Do not** drill the vibration motor to the seat or frame. This may damage the structural integrity of the seat. The Motor is to be mounted using the supplied clamps or bracket.

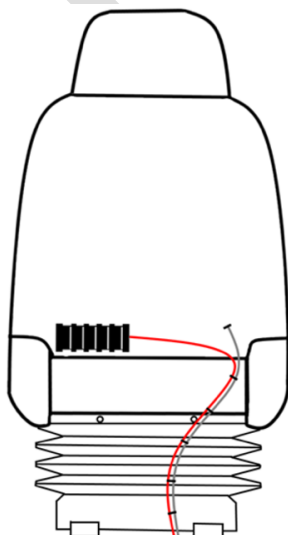
**Note:** We recommend that you do not mount the Vibration Motor under the sliding adjustment rails as the vibration cannot be easily felt by the driver.



The placement of the Vibration Motor must not interfere with the seat belt, or seat adjustment functions. It should also not be mounted in such a way that it interferes with the driver's comfort and safety.

**Note:** If the Vibration Motor can only be mounted outside of the red dotted line in the image above, you must seek approval from the site representative.

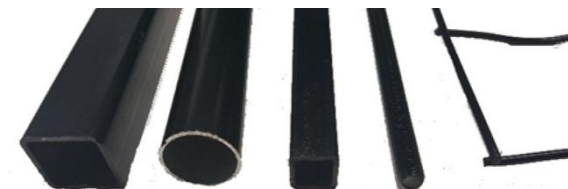
It's also important to ensure that the motor is mounted in such a way that prevents cable damage during normal vehicle operation. The seat should move freely in all directions, and the cabling must have sufficient slack to accommodate this movement. It is recommended you follow existing cabling if available.



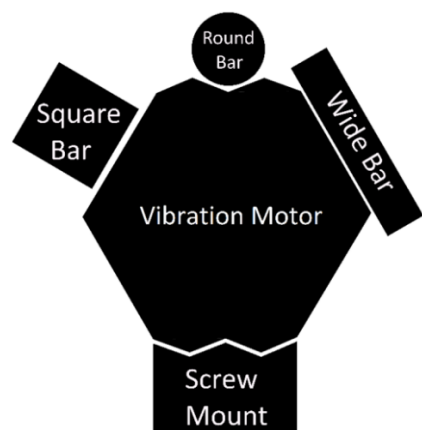
### 9.7.2. Mounting Methods

#### Mounting the Vibration Motor on a bar

Locate a flat, rounded or square bar like one of the following:



The Vibration Motor has been designed to allow it to mount to different shapes. As per the image, you can see that there is a 'V' shape edge and a flat edge to provide you with flexible mounting options.



The hose clamps must be used to mount the Vibration Motor to an appropriate (strong) bar on the seat. Do not mount the Vibration motor to any flexible bars. You can use the 2 hose clamps in any of the 5 slots on the vibration motor (as per the image).



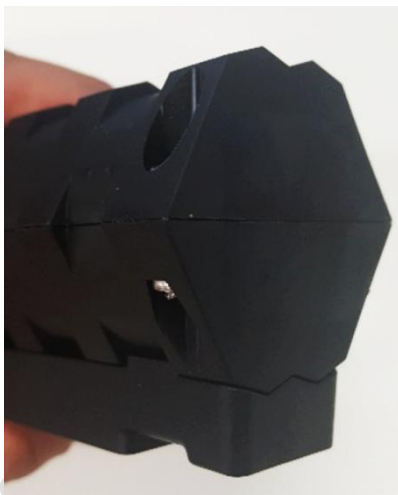
### Mounting the Vibration Motor to the Vibration Motor plate

Mounting to the bar is the preferred option; however, there is a plate that allows you to screw into a surface if required. You will need to screw 2 x Tek screws into an appropriate location, noting the recommendations in s. **9.4.1 Selecting the Mounting Location**.

**Do not drill** into the seat or the frame as this may damage the structural integrity of the seat or interfere with air bladders or other electrics within the seat. Refer to the sections below for guidance on attaching the vibration motor with hose clamps.



When the Screw Mount has been fixed into position, you can fix the Vibration Motor to mount using the provided hose clamps. You will need to rotate the Vibration Motor so that the bar mount position sits on the screw mount (as per the first image below). Use the 2 hose clamps on the outer slots to secure the vibration motor to the mount.



### **9.7.3. Adjusting the mounts**

Using an 8mm socket and your impact driver to tighten the hose clamps (this is the easiest and fastest way to mount). The hose clamps can then be rotated to the final position prior to tightening them.

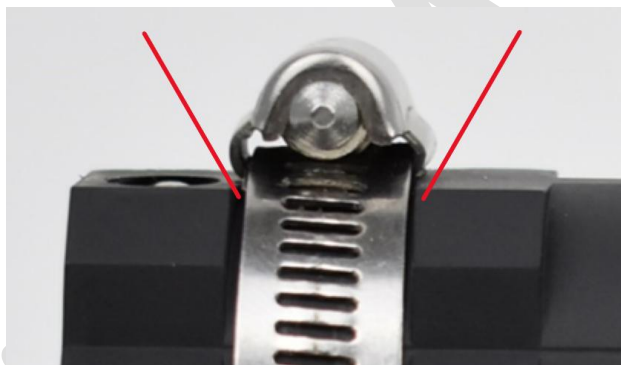


Secure any excess hose clamp with the provided zip ties. Note that it's not advised to cut the excess on the hose clamps as it will leave very sharp edges.



#### Important Points to Note

The hose clamps must fall into the slots on the Vibration Motor so that the motor cannot slide out. Ensure that the hose clamps are tightened so the motor cannot move or slide around during normal vehicle operation.



#### 9.7.4. Cabling for the Vibration Motor

Connect the vibration motor cable plug cable to the cable on the cable harness marked 'vibration motor'.



#### Note:

- To minimize the risk of damage, avoid placing this connection in the footwell whenever possible.
- Before disconnecting any cables attached to the cable harness, press the locking mechanism at the cable end.
- Attach the remaining portion of Expandable Fabric Cable Wrap on moving parts of the vibration motor cable.

### 9.8. Attaching the Guardian Mounting Option to the Dashboard

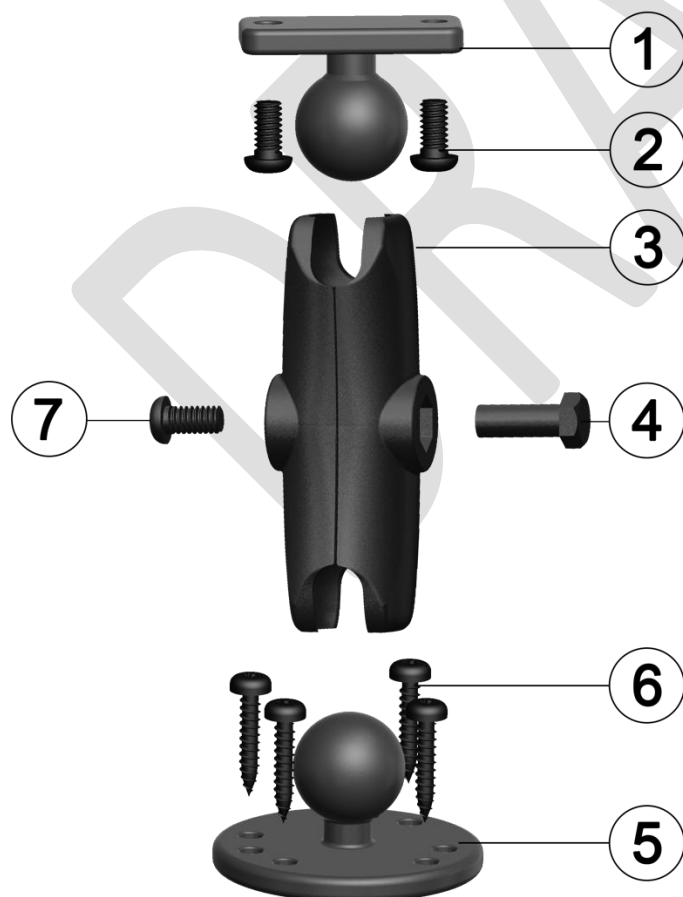
- Once you have determined the mounting location for the Guardian unit on the dashboard, assemble the Mount pieces (see images and table below) and tighten the tamper proof bolt enough for the mount to hold itself, but still allow for adjustment.
- The mount should be installed so that the base is not between panels and is on a reasonably flat part of the Dashboard. It should NOT be placed on an easy to remove part of the dashboard, as it may not be secure during normal use.
- Refer to section **7 Mounting the Guardian Unit** for more information on the Guardian Mounting options, including the hard mount and the soft mount.

### 9.9. Hard Mount Installation

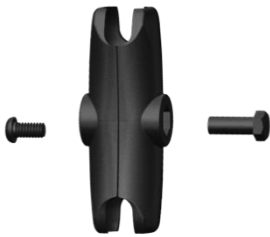
#### 9.9.1. Initial Considerations

- The Hard Mount must be screwed or bolted onto the dashboard, preferably by bolting rather than screwing on thin plastic surfaces (bolts not provided).
- If using bolts, you must use split washers or nyloc nuts to bolt the plate on the dash. This will ensure that vibration of the vehicle does not unscrew the nut.
- Alternatively, the self-tapping screw can be used.
- The type of screws or bolts required depends on the material that the dashboard is made from.

#### 9.9.2. Hard Mount Kit Components



**HARD MOUNT KIT 1003122 (Part Number)**

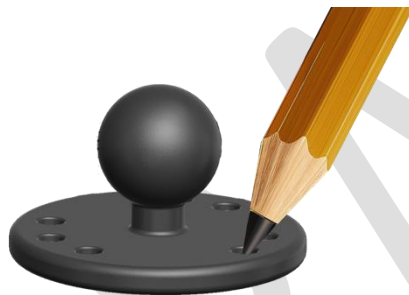
|                                                                                       |                |
|---------------------------------------------------------------------------------------|----------------|
|  | <b>1002985</b> |
|   | <b>1002984</b> |
|  | <b>1003046</b> |

| Kit Part Number 1003122 |             |                                                                                                    |     |
|-------------------------|-------------|----------------------------------------------------------------------------------------------------|-----|
| Item No.                | Part Number | Description                                                                                        | Qty |
| 1                       | 1002985     | Ball Base with 1.5" 2-Hole Pattern - B Size (Guardian Mount Interface)                             | 1   |
| 2                       | 1002810     | #10-24 T25 Torx pan head black stainless Machine screw                                             | 2   |
| 3                       | 1002984     | Anti-tamper Medium B size composite arm (The Arm)                                                  | 1   |
| 4                       | 1003213     | #10-24 Black stainless steel Barrel nut                                                            | 1   |
| 5                       | 1003046     | Round Plate with Ball - B Size (The Base)                                                          | 1   |
| 6                       | 1003121     | SS 304, black finish, 25mm long, self-tapping, ST4.8x1.6 thread diameter, pan head, Torx T27 drive | 4   |
| 7                       | 1003259     | #10-24 T25 Torx pan head black stainless Machine screw                                             | 1   |

### 9.9.3. Installation process

For the installation process below, refer to the image and table above to identify the correct elements.

- Once the ideal location for the Guardian unit is determined, detach the 'Base' from the 'Arm'.
- Use the 'Base' as a template to mark four holes for the screws on the dashboard.



- Pre-drill these holes using a 3mm drill bit for metal or fiberglass dashboards.



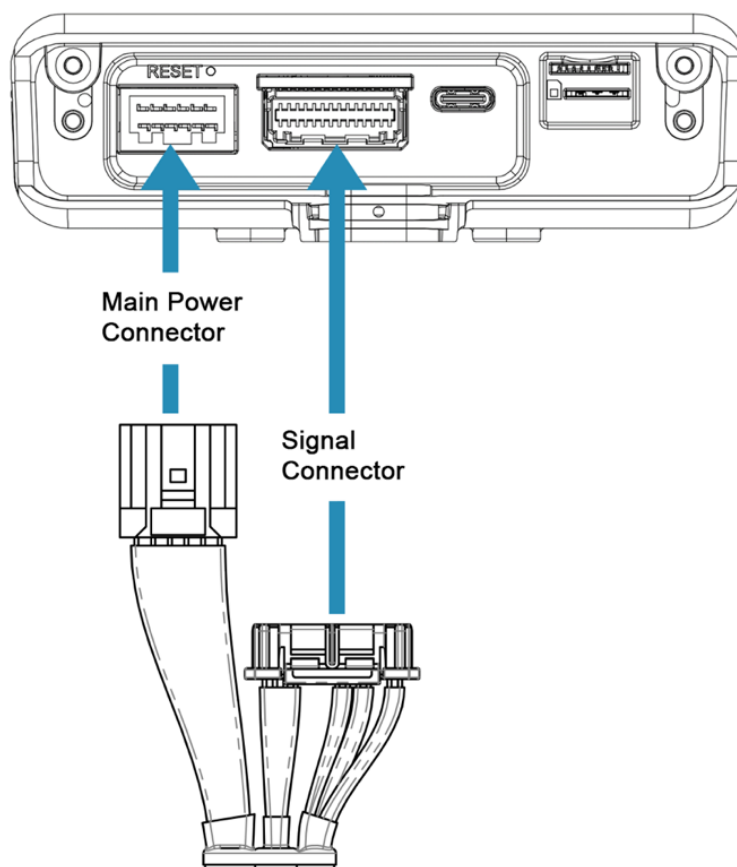
- Position the 'Base' in place and carefully screw in the self-tapping screws (Part 1003121), ensuring not to over tighten them, especially on thinner dashboard materials.



5. Bring the device end of the cable onto the dashboard (the end with two connectors).
6. Use a T10 screwdriver to remove the screws on the rear of the Guardian unit and remove the rear cover.

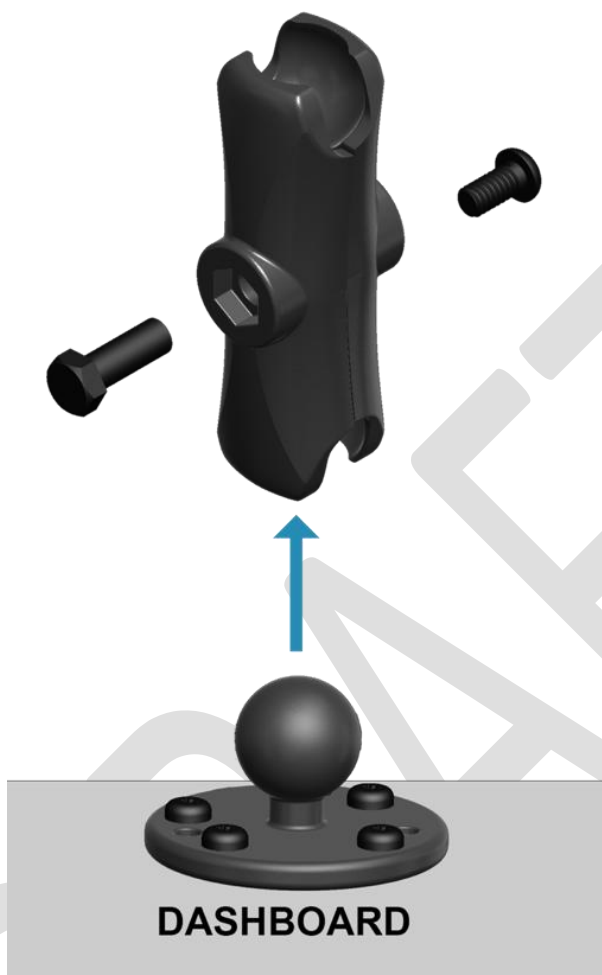


7. Connect the 2 connectors on the device side of the connector to the rear of the unit and slot the cable relief in the moulded receptacle.



8. Re-attach the rear cover of the Guardian unit in place with a T10 screwdriver taking care not to over tighten the screws

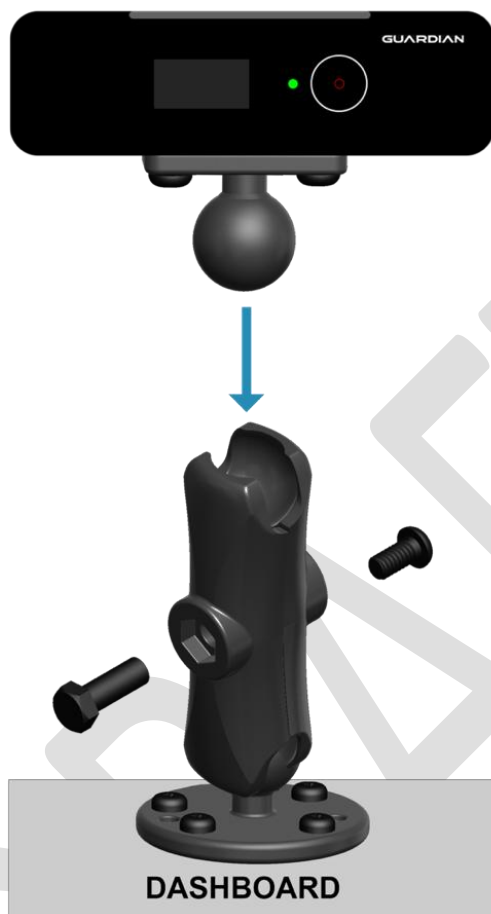
9. Turn the tightening screw counterclockwise on the side of the 'Arm' to release the sockets at the top and bottom of the 'Arm'. Then, position one end of the 'Arm' on the ball of the 'Base', so that the arm sits vertically and tighten the mount arm adjustment screw until the two halves of the arm meet.



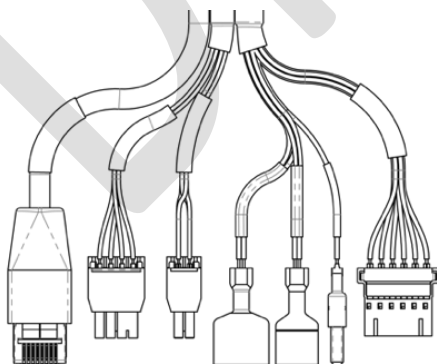
10. Use 2 of the supplied screws (Part 1003213) to attach the 'Guardian Mount Interface' to the underside of the Guardian unit.



11. Position the 'Guardian Mount Interface' in the socket at the top of the 'Arm'. Then tighten the screw (Part 1003213) and the bolt on the composite arm until the two halves of the arm meet and clamp to the rubber balls tightly. This will secure the two ball-joints to the arm so that the Guardian unit stays in place, until the software calibration confirms its final position.



12. Bring the other end of the cable (the end with seven connectors) on to the Dashboard.



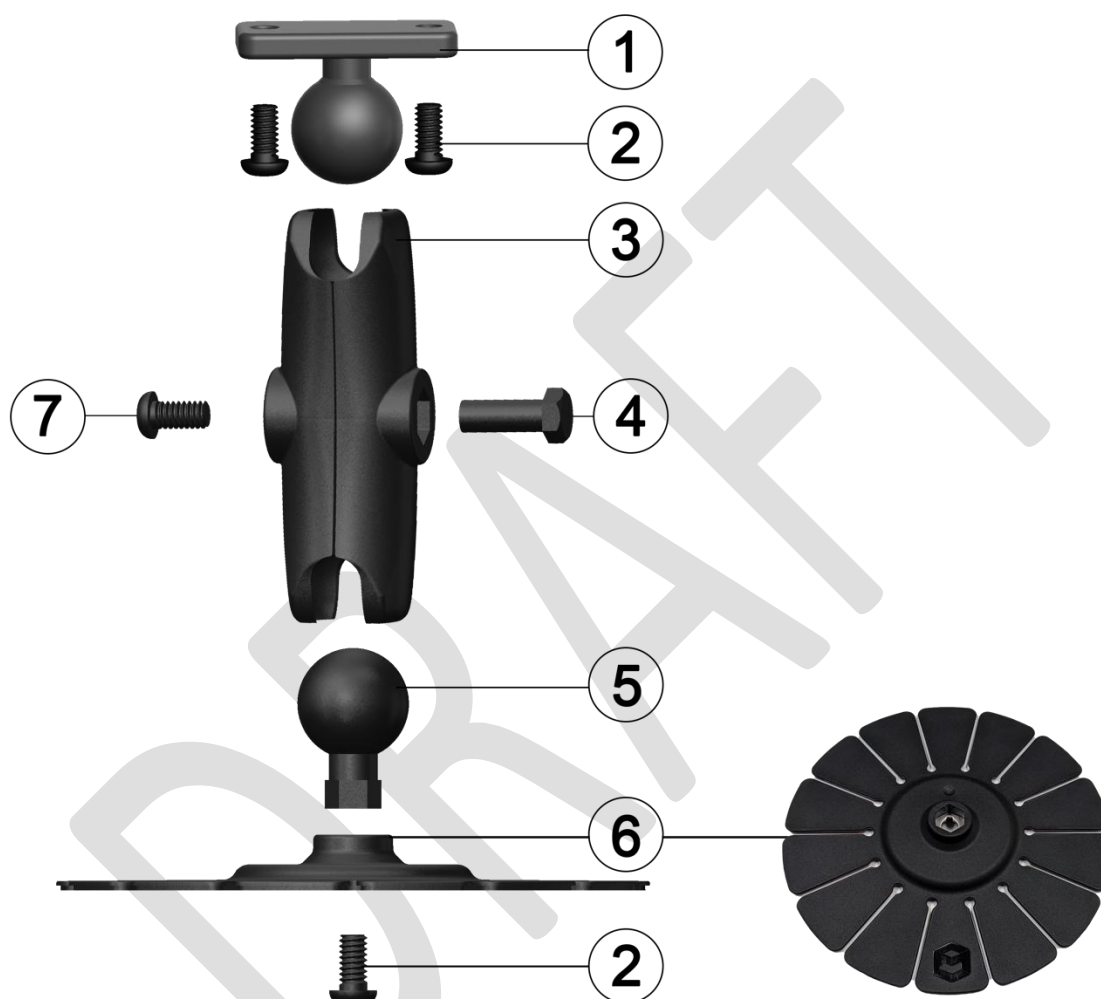
13. The cable is slim and can fit between removable panels in the vehicle. However, in some cases, you may need to trim the panel edges slightly for a better fit, rather than applying excessive pressure on the cable. Alternatively, you can also make a hole if needed with a step drill.

### 9.10. Soft Mount Installation

#### 9.10.1. Initial Considerations

- Warm up the cabin and the adhesive mount to a temperature of at least 10 degrees Celsius before applying the adhesive base.

#### 9.10.2. Soft Mount Kit Components



| Item No. | Part Number | Description                                                            | Qty |
|----------|-------------|------------------------------------------------------------------------|-----|
| 1        | 1003123     | Ball Base with 1.5" 2-Hole Pattern - B Size (Guardian Mount Interface) | 1   |
| 2        | 1002810     | 1/4"x20 T27 Torx pan head black stainless machine screw                | 3   |
| 3        | 1002984     | Anti-tamper Medium B size composite arm (The Arm)                      | 1   |
| 4        | 1003213     | 1/4"-20TPI Barrel nut                                                  | 1   |
| 5        | 1002811     | Ball Adapter with 1/4" x 20 Threaded Hole and Hex Post - B Size        | 1   |
| 6        | 1002803     | Adhesive Dash Mount Assembly                                           | 1   |
| 7        | 1003259     | #10-24 T25 Torx pan head black stainless Machine screw                 | 1   |

### 9.10.3. Installation process

**Note: You will only have one attempt to stick the adhesive mount down, it cannot be repositioned.**

1. Connect the 'Ball Adapter' to the top of the 'Adhesive Base' by screwing the 1/4"x20 T27 Torx pan head black stainless machine screw to the bottom of the Adhesive Base.

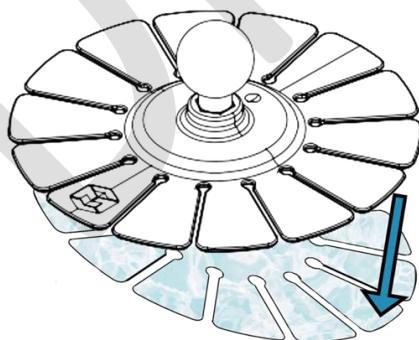


2. Examine the dashboard to find a suitable location for installation of the Adhesive Base that is mostly flat. Ensure the chosen area is predominantly flat to guarantee proper adhesion between the base and the dashboard.
3. When installing the soft mount in humid environments, primer can be used. Refer to the 3M recommendations for VHB tape. 3M™ Tape Primer 94 is an adhesion promoter for use in conjunction with 3M™ VHB™ Tape for use on many plastic, rubber, painted and bare metal substrates.

[https://www.3m.com.au/3M/en\\_AU/p/d/b40065491/](https://www.3m.com.au/3M/en_AU/p/d/b40065491/)

[https://www.3m.com.au/3M/en\\_AU/vhb-tapes-au/](https://www.3m.com.au/3M/en_AU/vhb-tapes-au/)

4. Heat the cabin and the mount to a minimum of 10 degrees Celsius before affixing the 'Adhesive Base' to the dashboard.
5. Remove the protective film from the back of the 'Adhesive Base' and immediately affix it to the dashboard surface. Press and massage the **area** for about 30 seconds to remove air bubbles and air pockets.

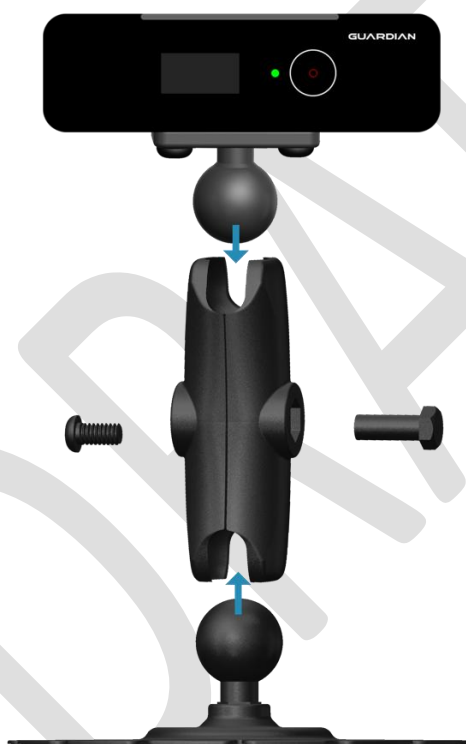


6. 3M recommends the adhesive curing time to be 72 hours at room temperature without load on the adhesive. In our testing this was not required, but if problems occur with adhesion, additional curing time may be necessary.

7. Use the supplied screws to attach the 'Guardian Mount Interface' to the underside of the Guardian unit.



8. Position the 'Guardian Mount Interface' in the socket at the top of the 'Arm', and the 'Adhesive Base' in the socket at the base of the 'Arm'.



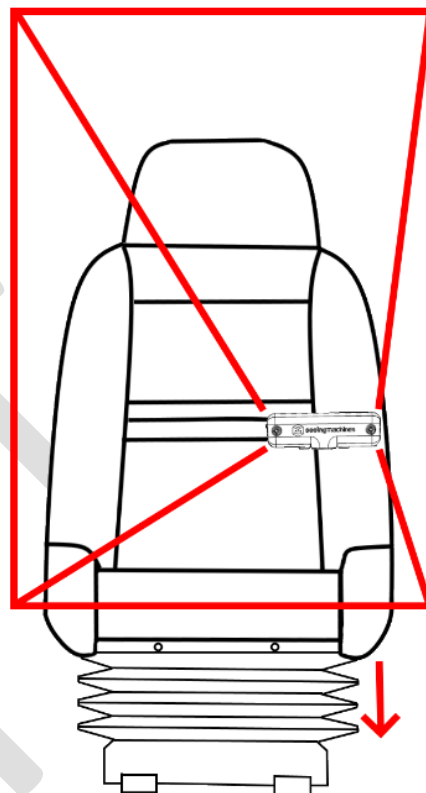
9. Tighten the torx pan head black stainless Machine screw on the composite arm until the two halves of the arm meet and clamp to the rubber balls tightly. This will secure the two ball-joints to the arm so that the Guardian unit stays in place, until the software calibration confirms its final position.

### 9.11. Adjusting the Mount

- The ball-head of the mount solution provides infinite options for positioning the Guardian unit, but adjustment is made via a single bolt.
- It should be noted that the mount can be tightened enough to hold the Guardian unit in place, for fine adjustments in the software configuration stage.
- Set the pitch, yaw and roll of the Guardian unit simultaneously, then use a T27 Torx driver to tighten the single locking bolt to secure the Guardian unit. This will ensure the Guardian unit is secure and won't move during normal vehicle operation.
- Adjust the field of view so that the driver is positioned inside the red square as shown in the image, to ensure that the camera can see the driver.

Field of View: Portrait  
(H) 53 degrees x (V) 88 degrees

- The orientation of the camera is portrait, so it is important that the camera's yaw position is directly looking at the driver when the seat is in its central position.
- The field of view needs to see the drivers full head, and full torso, at the seats lowest position, with the seat all the way forwards on the rails.
- The drivers full head needs to be seen at the seats highest position.
- For fine adjustments it's better to use the installation wizard in the software setup instructions.



## 10. Maintenance Menu

Press the Maintenance button to access the maintenance menu. This menu can help diagnose issues by providing a quick assessment and overview of the system's overall health, status of main components, system identifiers and network details. For more information refer to the 'Guardian Gen3 Maintenance Menu Guide'.



For additional maintenance procedures for servicing an already installed Guardian unit, see our knowledgebase for quick and easy steps to determine if a system is healthy or not.

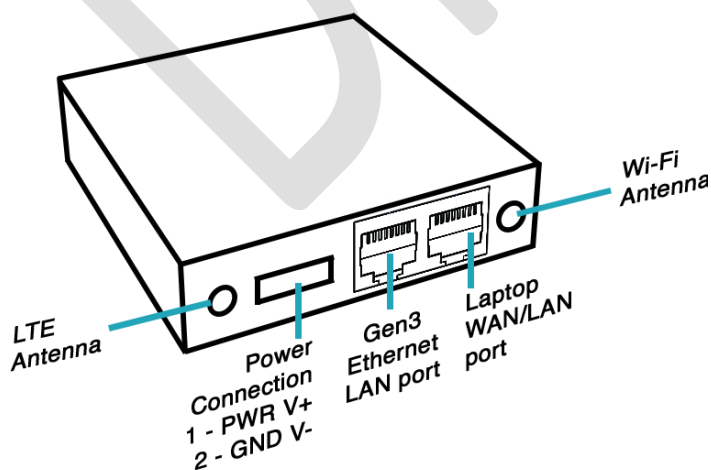
## 11. 'Manual Self-Test' feature

Press and hold the maintenance button for one second while the vehicle is stationary to perform a self-test. This function will perform a system check to determine any system functionality issues and display information on the screen.

## 12. External GPS/LTE Router Installation (Optional)

The image below indicates the way to connect the laptop to the Guardian Cellular Router. The laptop can connect to the router via the LAN port. Section 1 – System Overview shows the system wiring to connect the router. The SIM is a Mini size card and is inserted into SIM1 on the back side of the router

Note: the LED indicators can be useful to see if the Router is online (online LED is on) or offline (online LED off)



### 12.1. Connecting the laptop to the router via the LAN port

Use an Ethernet cable to provide a connection from the Ethernet port on the laptop to the WAN port on the router. The other LAN port is used to connect the Guardian unit to the router.

The Guardian Cellular Router is pre-configured to work with the Guardian unit, if you have problems getting internet on the router, 24/7 Support can help you

## 13. Final Values Recorded

These values should be recorded to use for insurance, proof of install, and to register with 24/7 Support when the software has been completed

| Item of focus                                    | Photo / Recorded Info                                                                                                                                                                                |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product code and Serial Number                   | P1234567-S12345678                                                                                                                                                                                   |
| Router Serial number (Optional)                  | SN: FI1234567890                                                                                                                                                                                     |
| SIM card number                                  | (18 to 22 digit number)                                                                                                                                                                              |
| Vehicle ID                                       | (Fleet ID / Registration / VIN)                                                                                                                                                                      |
| Company Name                                     | (of the vehicle, not the install location)                                                                                                                                                           |
| Installation Photos                              | <ul style="list-style-type: none"><li>• Guardian unit installed</li><li>• Router installed (Optional)</li><li>• Power and Fuses</li><li>• Antenna placements</li><li>• Any previous damage</li></ul> |
| Video Adjusted to final position (Software Step) |                                                                                                                                                                                                      |

## 14. Support for other routers (customer supplied)

In some cases, customers may supply their own router. Refer to the 'Software Installation Guide' for more information on setting up other routers.

## 15. Software Setup

Now that the installation of the Guardian unit hardware has been completed, the software will need to be setup through a laptop.

Refer to the 'Guardian Generation 3 Software Installation Guide' for software setup instructions.

## 16. Appendix

### 16.1. Installer Safety and Training

Safety must be considered prior to installing the Guardian unit. You must comply with the client's site safety policies, processes, arrangements, and requirements in place at the site where you will install or maintain the System. If such policies do not exist, it is a requirement to follow the SAFE WORK practices detailed below. For additional Safety related information, contact the local Occupational Health & Safety authority in your country.

**SAFE WORK means:**

**LOOK** for the hazards that may be present during the job.

**ASSESS** the hazards and associated risk involved with the job.

**MANAGE** the hazards involved with the job with controls.

**EVALUATE** the effectiveness of the controls.

When conducting your Safe Work Analysis or a Job Hazard Analysis (JHA), you must plan for how you will manage the risks and hazards you have identified using the "Hierarchy of Controls", where Elimination is the most effective control measure and Personal Protective Equipment (PPE) is the least effective control measure:

**Elimination** Completely eliminate or remove the hazard from the job.

**Substitution** Change the task or tool to one with lower risks.

**Engineering** Isolation from the hazard (e.g. machine guards)

**Administration** Training, policies, and procedures

**PPE** Use of protective equipment such as gloves, safety glasses

## 16.2. Airbag Safety

- Prior to installing the system, you must be familiar with the location of, and deployment direction of any fitted airbags.
- You must not install any components in a way that would interfere with the operation or deployment of airbags.
- To ensure that you do not place cables in a way that interferes with airbag operation, Seeing Machines recommends running cables alongside OEM cables.
- You should also use Flush Cutters when cutting excess zip ties off, as this helps to reduce damage to other components from sharp plastic edges.

## 16.3. Understanding Electromagnetic Interference (EMI)

- Electromagnetic interference may impact the performance of Guardian. Cables should be installed away from high-power radiation sources, such as UHF and 4G/5G antennas. The greater the distance between the cable and the source of radiation/noise, the less likely it is that the product will be affected by EMI.
- Installers should be aware of any radiation sources and their locations prior to commencing the installation.

## 16.4. Documentation and Support

Documents to refer to the knowledge base

# 17. Compliance information

Where required, compliance marks can be viewed on the OLED screen of the Guardian Unit (3 presses of the maintenance button).

## 17.1. Warning Statement

**CAUTION:** Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

## 17.2. FCC Interference statement

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### 17.3. ISED Interference statement

CAN ICES-003(B) / NMB-003(B)

#### Innovation, Science and Economic Development Canada (ISED) Notices

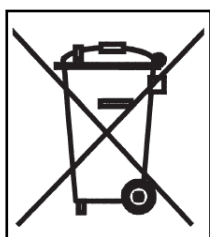
This device complies with Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable

## 18. Waste and Pollution

Do **not** treat this item as general waste. It should be recycled as electronic waste.



## 19. About This Document

### 19.1. Revision History

| Version | Date     | Description     |
|---------|----------|-----------------|
| 0.1     | 20/12/24 | Initial version |
|         |          |                 |
|         |          |                 |
|         |          |                 |
|         |          |                 |
|         |          |                 |
|         |          |                 |