SmartDrive™ SR4 Nissan Frontier Installation Guide

This VSA covers models manufactured between 1998-2020

Manufactured by Nissan

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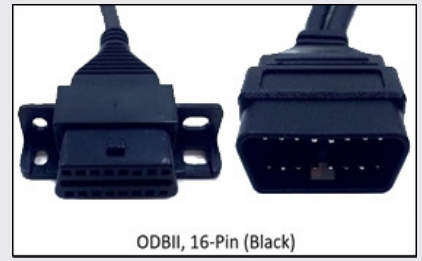
Nissan Frontier
Cable Guide

Rev 2, December 11, 2019

2019 Nissan Frontier
(Flat Windshield)

Year Range	SR4 Harness Description	SR4 SKU	Cable Type
Optional	**Universal 3-Wire** (No Data Link Connector DLC) Use when DLC connector is used by a third party device or cable run is too far for OBDII	104-0009-0001-00	N/A
1998-2020	**Driver-side** ODBII 16-pin black	104-0009-0013-00	

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1998–2020 Controller, DLC, and wiring

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Approved camera mounting (flat windshield), sensor bar, and keypad locations

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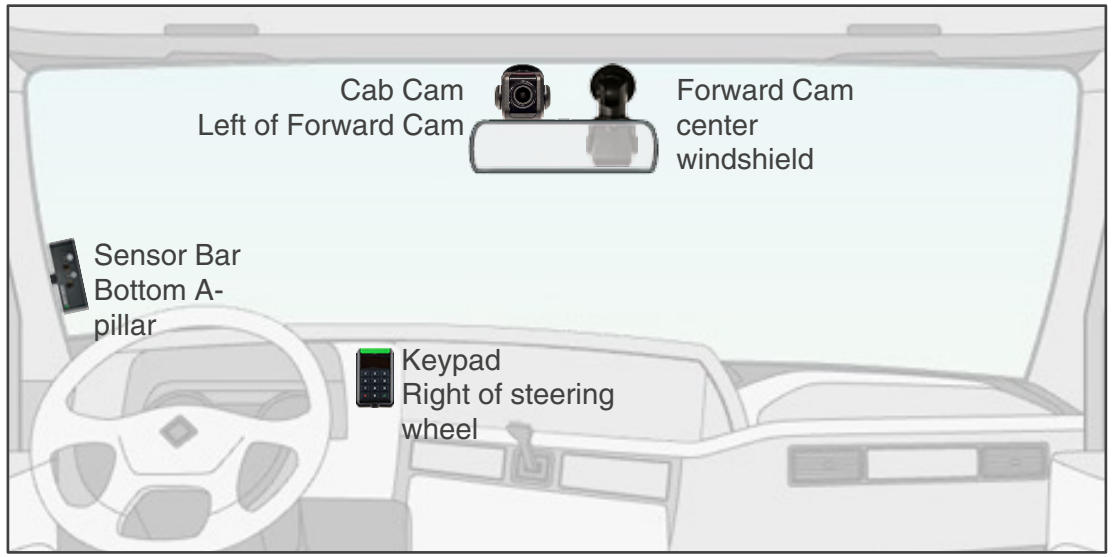
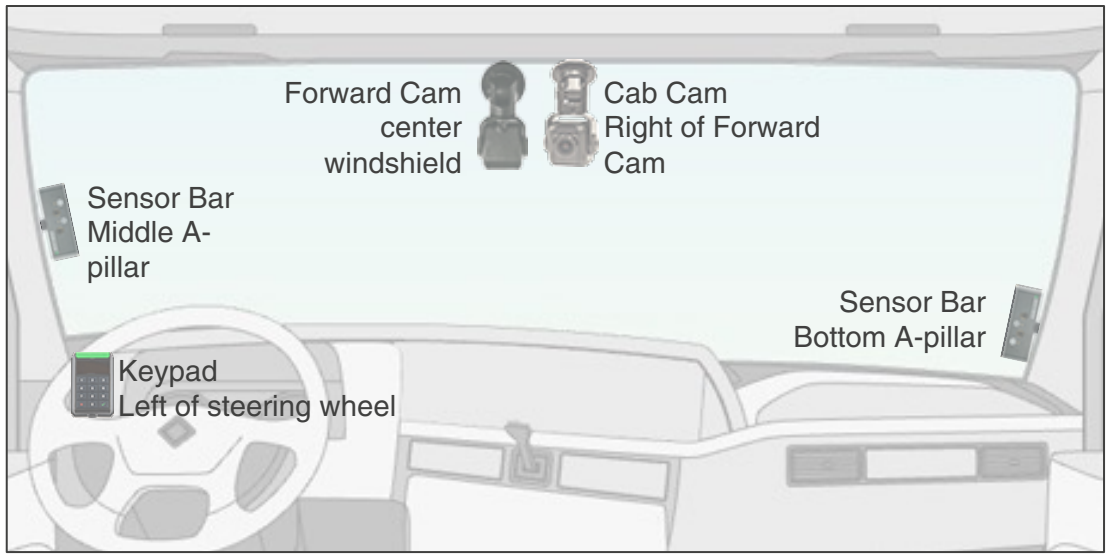
Note: Any combination of these mounting locations are approved

Flat windshield - Preferred locations



Flat windshield - Alternative locations



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Approved ADAS Forward-facing Camera location

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Mounting Location

Mount the ADAS shroud 1" from the top and center of the windshield

The camera cannot interfere with a driver's line of sight of the road, traffic signals, or road signs.

Details

1. Before removing the adhesive backing, check to make sure the camera fits properly
2. Using an alcohol pad clean the windshield and wipe dry with a lint-free clean cloth
3. **Critical: Use a pocket level to ensure that the bottom of the camera is mounted level looking from left to right.**
4. Press firmly on camera bracket for 10 seconds to ensure adhesion
5. Run camera cable under the headliner towards the driver side
6. Remove the A-pillar cover and run the camera cable down to the controller. Ensure the cable doesn't get pinched.

This camera requires calibration. Details are available in the ADAS installation and Calibration guide

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Driver Feedback Device location

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Mounting Location

Mounted on the right hand side of the steering wheel to the top of the dash.

Run the cable to the controller.

Plug the driver feedback cable into the port DRIVER FB

Secure the device by cleaning the area with alcohol pad and secure with adhesive

Details

1. The sensor bar must be visible to the driver.
2. Clean the windshield with an alcohol pad and wipe dry with clean cloth. Do not use shop rags which have grease even when clean.
3. Press firmly on the baseplate for 10 seconds to ensure it adheres properly to the dash
4. Secure with 2 self-tapping screws
5. Run wires to the controller

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1998-2020 Approved controller, ECU, and wiring locations

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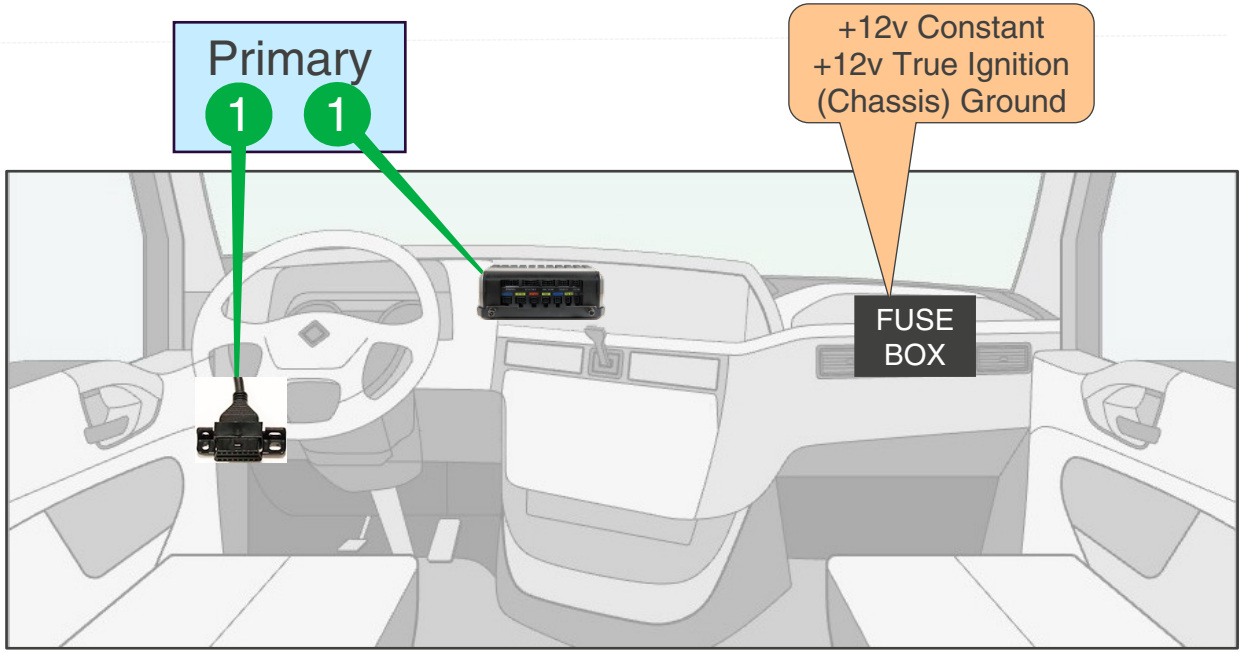
Component	1 Primary location
Controller	**Driver-side** Right of steering wheel, inside dash
ECU Port	**Driver-side** OBDII, 16 Pin, (black) (104-0009-0013-00)
Wiring Constant Power	**Passenger Side** Behind the glove box
Wiring True Ignition	**Passenger Side** Behind the glove box
Wiring Ground	**Passenger Side** To chassis near the fuse box



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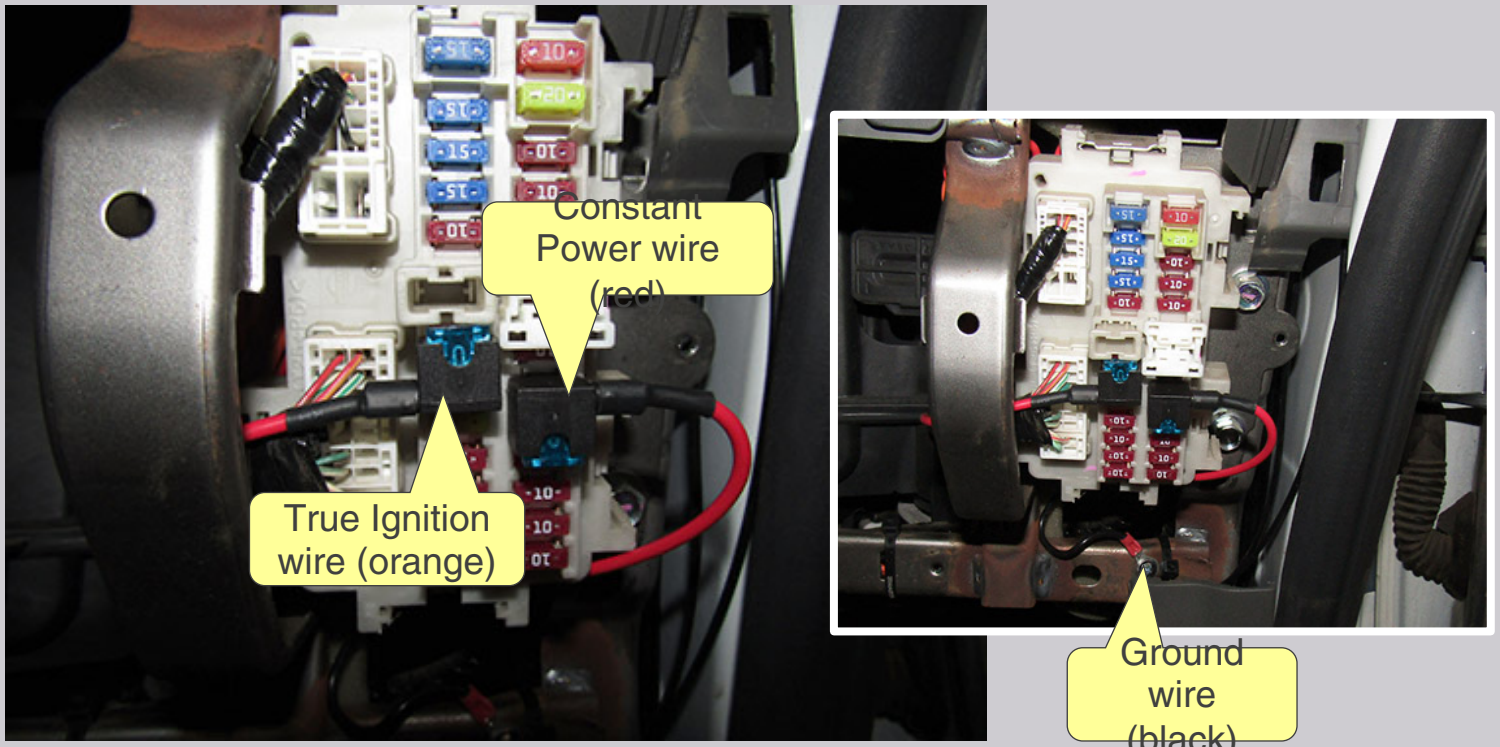
1996-2020 Constant power, true ignition, and ground wiring connections

Fuse box Location	Wiring Locations
Passenger-side Fuse Box behind glove box	**True Ignition** Add-a-fuse to **slot L5** **Constant Power** Add-a-fuse to **slot R7** **Ground** #10 ring terminal to chassis under fuse box



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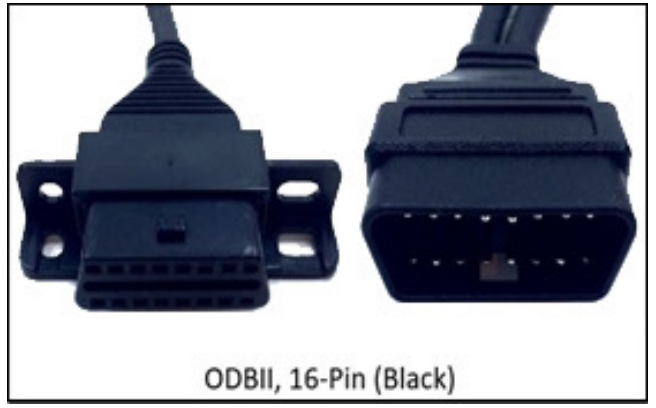
1996-2020 16-Pin OBDII Data Link Connection (DLC) locations

Component	Notes
16 Pin, OBDII (black)	N/A

		Description
SR4 Part #	104-0009-0013-00	J-1939, 16-Pin OBDII (black)
Connector Color	Black	(Black) color indicates integration with Light-Duty vehicles
Network	CAN	Vehicle Bus Communication Network – (Active)
Baud Rate	11-Bit CAN, 250kb, 500kb	• 11 Bit CAN, (250kb) Low speed and (500kb) High speed • (CAN, 500kb) Best Connection for 3rd Party Devices
Connection Type:	16-Pin, OBDII	(Black) 16-pin J1962 connection with trapezoid shape



ODBII, 16-Pin (Black)

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OPTIONAL Universal 3-wire (no Data Link Connector)

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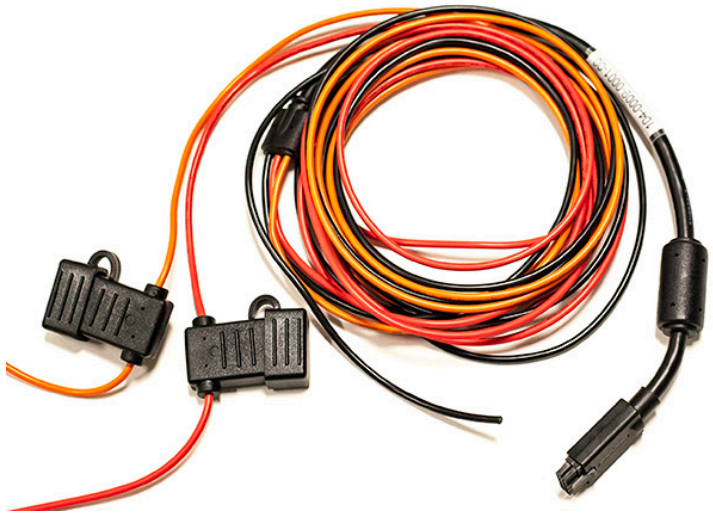
Component	Notes
Universal 3-wire (No DLC connector)	Optional Use when a third party device is using the DLC connection or when the DLC connection is to far to make an ODBII connection

		Description
SR4 Part#	104-0009-0001-00	Universal 3-Wire (no DLC)
Connector Color	N/A	Red, Orange, and Black power leads (Only)
Network	N/A	N/A
Baud Rate	N/A	N/A
Connection Type	N/A	N/A



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360 Camera Side-mirror Installation

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Approved 360 Camera VSA

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The following 360 Convoy VSAs describe the installation process.

- SR4-360 VSA_Side Mirror
- SR4-360 VSA_Rear view
- SR4-360 VSA_Entry Exit Door
- SR4-360 VSA_Inside Interior
- SR4-360 VSA_Monitor M7104
- SR4-360 VSA_5 Camera

Please contact your Project Manager for a copy of these documents.

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Best Practices: Cameras, Sensor Bar, & Keypad

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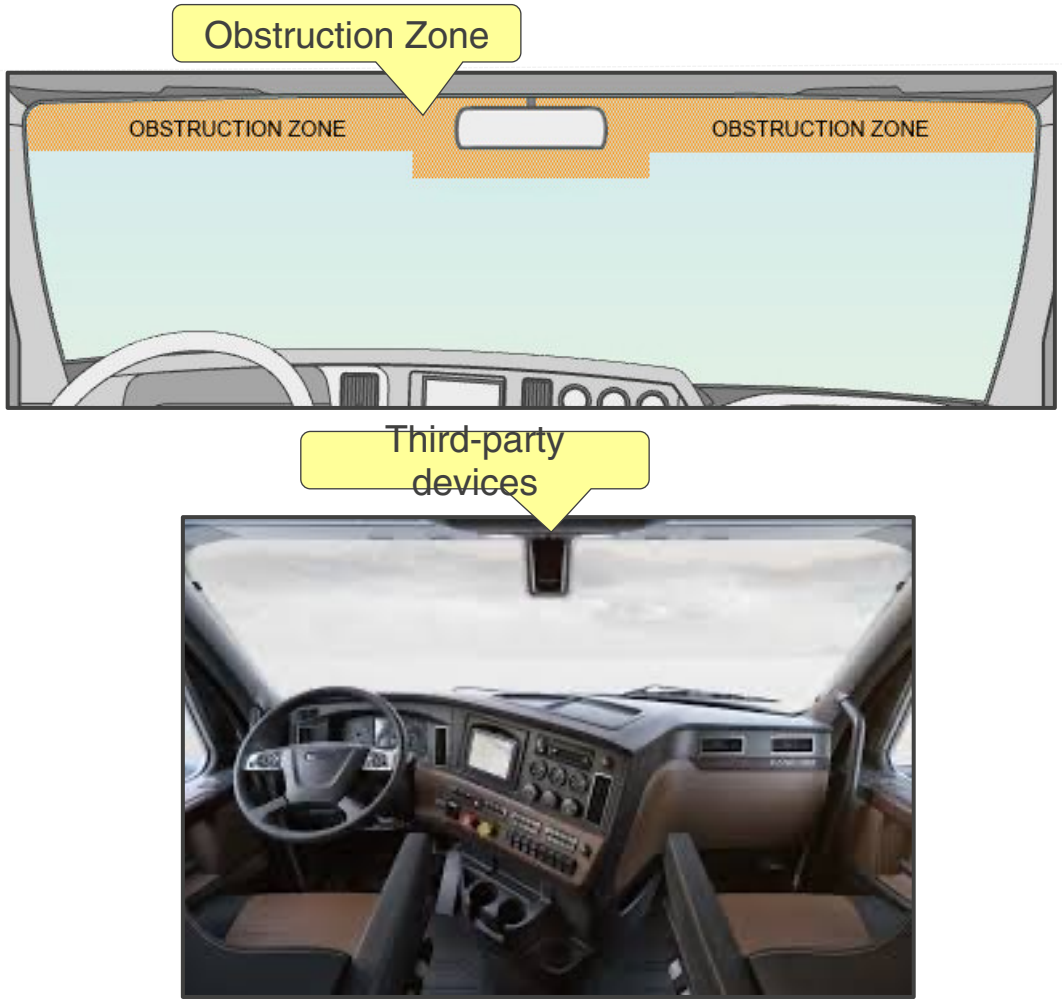
Best Practice: Camera Mounting Considerations

During an install, you may find obstructions such as sun visors and third party devices that make it impossible to mount in a SmartDrive approved location. The following describes our recommended adjustments in these situations.

Sun Visors are set in the down position and fully extended during the install process to verify the Cab-facing camera has a clear view of the drivers face, hands on the steering wheel, shoulder, and seat or lap belt. When blocked by visor, mount the Cab-facing camera using the secondary location where the desired view is attainable.

When third party devices are located at the top center of the windshield, mount the forward-facing camera on the right side of the device.



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Best Practice: Forward and Cab-facing Camera Installation Instructions

Forward-facing Camera Installation Instructions

Mount the camera within 6" from the top of the windshield. Camera cannot interfere with a driver's line of sight to the road, traffic signals, or road signs

Details

1. Before removing the adhesive backing, check to make sure the camera fits properly. **Use a pocket level to ensure the bottom of the camera is mounted level looking from left to right.**
2. Using an alcohol pad clean the windshield and wipe dry with a lint-free clean cloth. Do not use shop rags which contain grease even when clean.
3. Press firmly on camera bracket for 10 seconds to ensure adhesion
4. Use ¼ loom to protect the cable and to keep it from coming loose from the headliner
5. Run the camera cable down to the controller.
6. Cables must not block air bag functionality

Cab-facing Camera Installation Instructions

Camera lens must have a complete view of the driver when the visors are in the down and fully extended position. Use a headliner location when the fully extended visor covers the camera lens.

Details

1. Mount the Cab-facing camera on a flat hard surface Using an alcohol pad clean the windshield and wipe dry with a clean cloth. Do not use shop rags which contain grease even when clean.
2. **Mount the camera where the sun visor does not block the lens** (windshield or headliner)
   - Headliner: Secure with 2-3 self-tapping screws
3. Press firmly on camera bracket for 10 seconds to ensure adhesion
4. Use ¼ loom to protect the cable and to keep it from coming loose from the headliner
5. Run the camera cable to the controller
6. Cables must not block air bag functionality
7. Ensure the cable doesn't get pinched

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Best Practice: Cab-facing Camera Installation Instructions regarding Infrared Light

Cab-facing Camera Headliner Mount
The cab-facing camera has two infrared (IR) sensors that improve image quality when the cab is dark. IR flare occurs when the camera bracket partially blocks the cab-facing camera creating a bright flare in the image. (See image 1)

Proper Headliner Mounting Options

The camera face must extend beyond the bracket to prevent obstruction

Vertical Mount
Mount the camera vertically to the headliner and position the bracket to hang toward the road. Rotate the camera level with the road and tilted down slightly toward the driver. There should be a visual air gap between the camera and bracket (see all the way through). (See image 2)

Horizontal Mount
Mount the camera horizontally to the headliner and tilt the bracket forward parallel with the headliner. Rotate the camera level with the road and tilt it down toward the driver. There should be a visual air gap between the camera and bracket (see all the way through).
(See image 3)

Make sure the cab-facing camera bracket, or vehicle's headliner, DOES NOT BLOCK the cameras Infrared (IR) sensors

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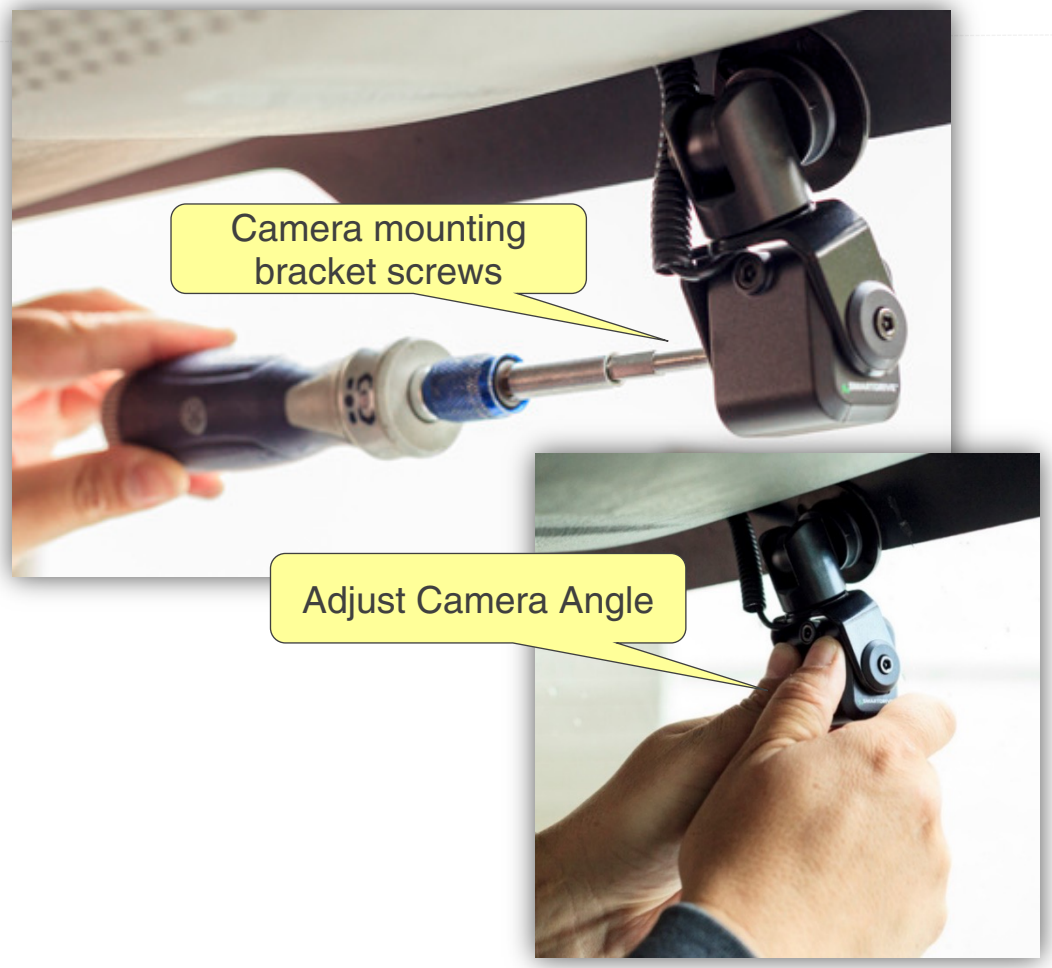
Best Practice: Forward-facing Camera – Field of View Adjustment

Use the proprietary M4 security wrench

1. Loosen the camera bracket screws located on the Forward-facing camera mounting bracket shaft
2. Adjust the camera angle by rotating and/or tilting the camera slightly down to capture the view of the horizon to see an unobstructed view of the road and traffic signals/signs in front of the vehicle
    - **Note:** It is not required to remove the camera from the mounting bracket to complete this adjustment
3. Tighten camera bracket screws when the proper camera angle placement is achieved

Note: These are stock images which are not specific to this vehicle.



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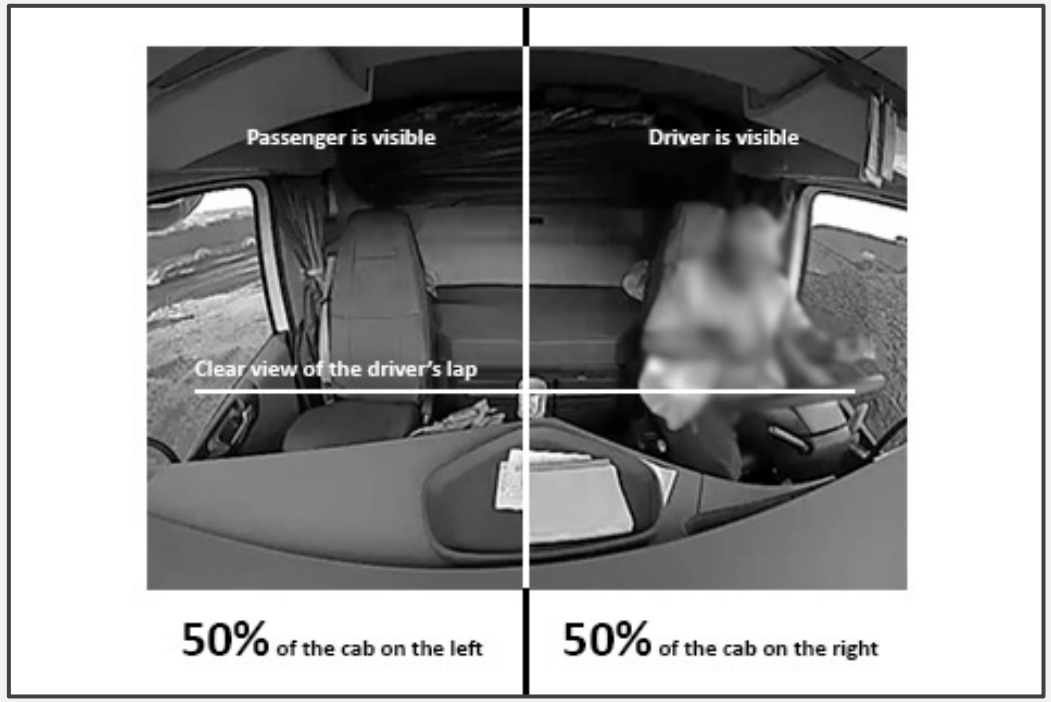
Best Practice: Acceptable Camera Views

Forward-facing camera view

The field of view shows a small portion of the hood while maintaining view of horizon to see road and traffic signals/signs.

Cab-facing camera view



The camera placement is ideal if the field of view provides an unobstructed view of the driver's head / eyes, lap, hands, seatbelt, and an adequate view of the steering wheel (i.e., a visual approximation of at least 75% of the wheel visible within the frame.

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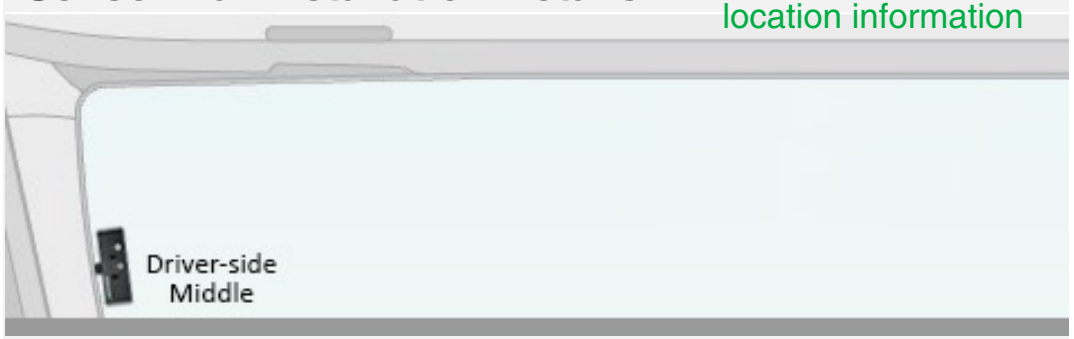
Best Practice: Sensor Bar and Keypad Installation Details

Sensor Bar Installation Details

See Sensor Bar slide for location information



1. The sensor bar must be visible to the driver. Do not mount where a visor in the down position or fully extended can block the drivers view of the sensor bar.
2. Clean the windshield with an alcohol pad and wipe dry with clean cloth. Do not use shop rags which have grease even when clean.
3. Remove the baseplate from the sensor bar.
   - *DO NOT lose the screws*
4. Press firmly on the baseplate for 10 seconds to ensure it adheres properly to the windshield
5. Install the sensor bar and secure screws until tight
6. Run sensor bar wires to the controller
7. Ensure the cable does not prevent the functionality of an airbag

Keypad Installation Details

See Keypad slide for location information

1. Mount keypad bracket and secure the bracket with 2 self-tapping screws
2. Run the length of the keypad cable behind the dashboard to the controller location.
3. If needed, drill a ¾ inch hole in the dash and insert a ¾ inch snap bushing into the hole to protect the cable from sharp surfaces
4. Inspect the backside of the box & verify that the screws don't protrude and cause damage
5. Insert keypad into mount

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Best Practice: Cable Routing

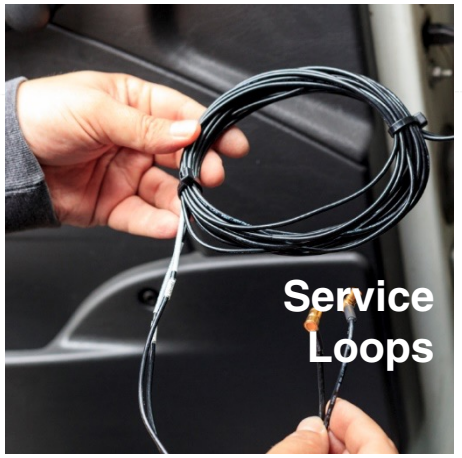
Service Loops
Before connection cables to the controller, coil excess wiring in an 8” loop and secure with zip ties

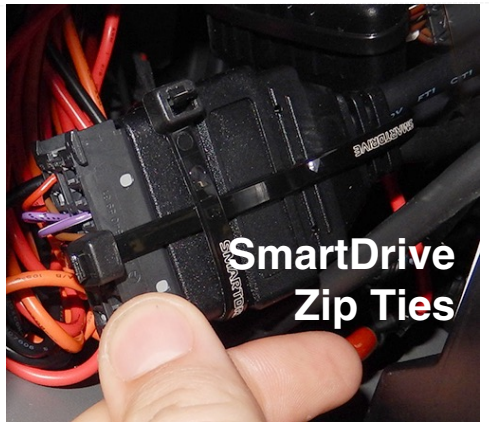
Zip Ties
Use zip ties a needs to secure wiring

Controller SMB Connectors
Press down on each SMB Coaxial connector to ensure a good connection

Molex Connectors
Push and lightly pull each Molex connector to ensure that the snap-in clip is secure

OBDII Connectors
Use SmartDrive banded zip ties around the connectors to prevent them from coming loose and to identify tampering





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Controller: Wiring and Component Connections

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Approved and Non-Approved Electrical Connection Methods

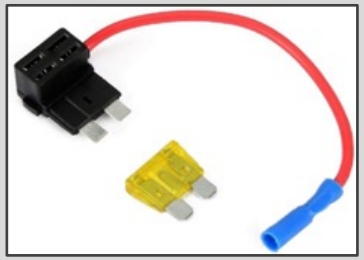
Approved Electrical Connections

Approved connections methods are with (**Permanent Connections) –** Heat Shrinkable and Water Resistant connectors.

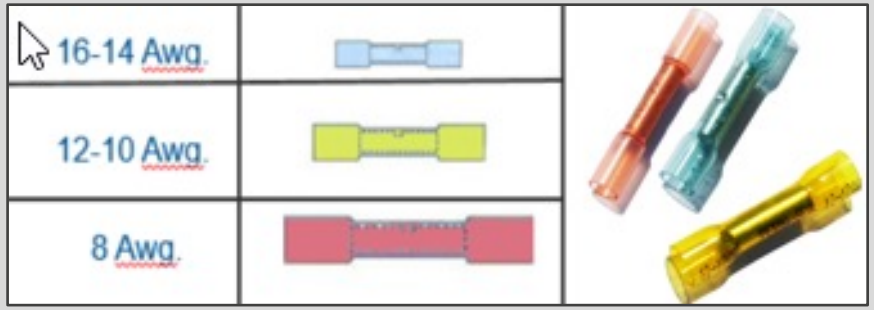
Ring Terminals ✓

Spade Terminals ✓

Add-a-Fuse ✓



Butt Connectors ✓



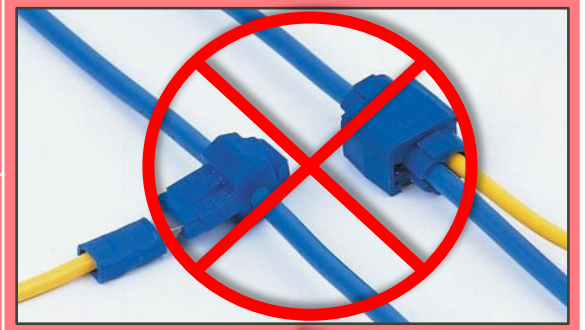
Non-Approved Electrical Connections

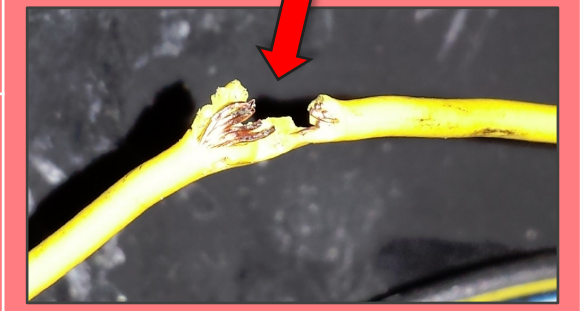
Scotchloks or **T-Taps** are **NOT** allowed. These connections are prone to corrosion, loosening, are easily tampered. They can result in less than desirable performance issues.

Scotchlok (Wire Nuts) ✗

Scotchlok (T-Tap) ✗

Inline Wire Tap ✗





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Verifying Wiring Connecting

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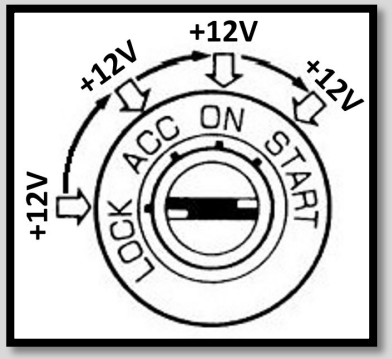
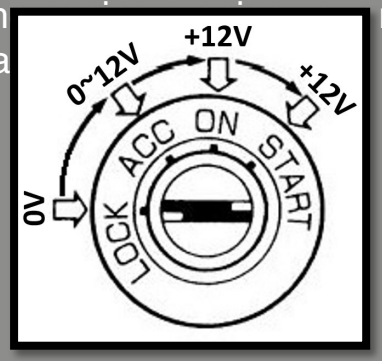
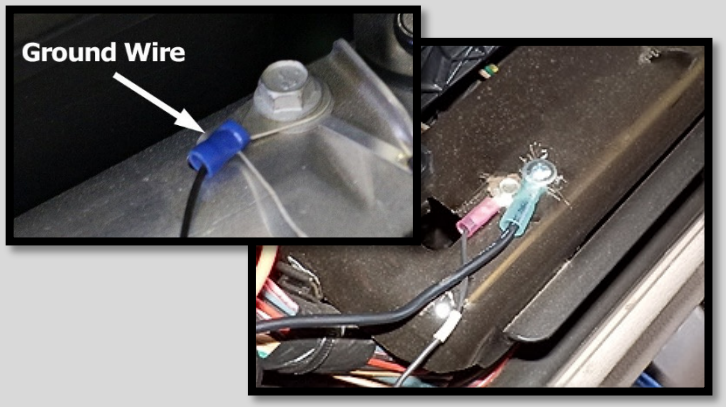
+12v (Uninterrupted) Constant Power	+12v True-Ignition	(Chassis) Ground
(Red Wire) **How to locate Constant Uninterrupted Power with a Digital Multi-meter:** 1. Test for constant 12 volts (in all key positions) 2. With the ignition ON, vehicle running, Ignition OFF, and while cranking. 3. Verify constant battery voltage remains constant and does not drop below 10vDC 	**(Orange Wire)** **How to locate True Ignition with a Digital Multi-meter:** 1. With the vehicle off your meter will show "0" volts. 2. With the key in the Run position your meter will show approx. 11 ~ 14 volts. 3. While the vehicle starter is cranking, your meter will show approx. 10 ~11 volts. 4. With th meter will show a 	**(Black Wire)** **Verifying Chassis Ground** Connect a #10 ring terminal to the black ground wire. When making a connection in the engine compartment, use a #10 water resistant, heat shrinkable ring terminal. Scrape surface near the vehicles fuse box and use ¼ inch self-tapping screw to connect the ground wire 

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Master Power Cutoff (MPC) and Low Voltage Disconnect (LVD)

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Negative Ground
Master Power Cut-off Switch (-MPC)

NEVER connect to:

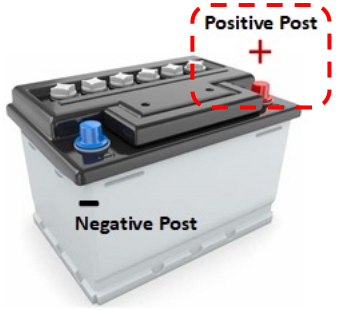
(-) Negative Ground (MPC)!

Positive Master Power Cut-off Switch (+MPC) and LVD

ONLY connect to:

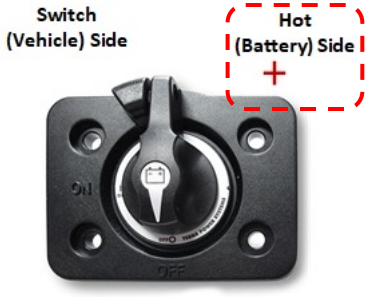
- Positive Post of Vehicle Battery.
- Hot/Battery side of (+MPC) Switch.
- Hot/Battery side of (LVD).

Vehicle Battery



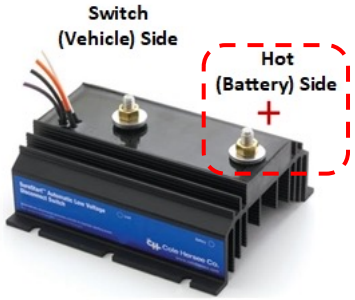
Connect the SmartRecorders **Red** Constant Power wire to the **Positive Post** of the Vehicles Battery.

(+MPC)
Positive Master Power Cut-off Switch



Connect the SmartRecorders **Red** Constant Power wire to the **Hot/Battery** side of the Master Power Cut-off switch.

(LVD)
Low Voltage Disconnect



Connect the SmartRecorders **Red** Constant Power wire to the **Hot/Battery** of side the Low Voltage Disconnect.

The SmartDrive SR4 system is designed to function only with a Positive MPC/LVD, <u>not a Negative Ground MPC/LVD</u>.

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Controller Connection Ports: DLC/Power, Analog Power, Keypad, Sensor Bar, GPS, Wabco Camera, GPS, Remote Push Button

Expansion Port

Plug the expansion cable to the EXPANSION port

ECU/Controller connection and Power

Plug the main power and ECU connector to the ECU/PWR port

Analog Power

Plug the Analog Camera Power connector to the Analog PWR port

Driver Feedback

Plug the driver feedback cable into the port DRIVER FB

The Keypad

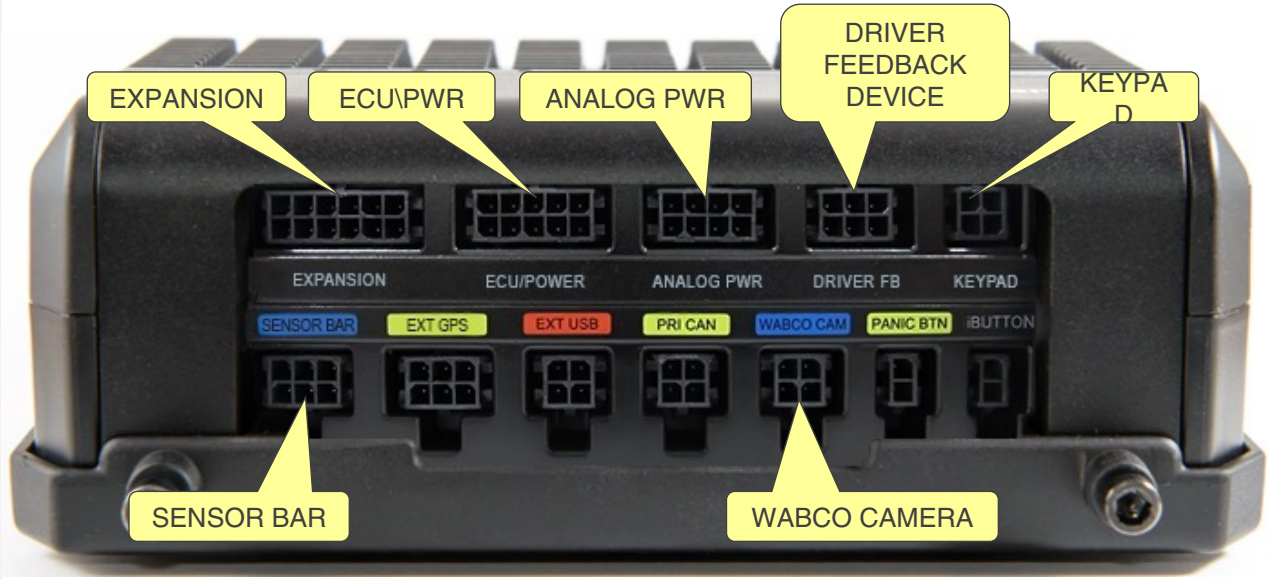
Connect the Keypad connector to the KEYPAD port

The Sensor Bar

Connect the Sensor Bar connector to the blue SENSOR BAR port

Wabco Camera

Plug the Wabco camera connector to the WABCO CAM port



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Controller Connections: Forward and Cab-facing cameras and Sensor Bar (Cellular and WIFI)

Connection instructions

1. Forward-facing Camera (FWDCAM-1 port)
2. Cab-facing Camera (DCAM-2 port)
3. Reserved (DCAM-3 port)
4. Other Digital Camera (DCAM-4 port) (not available)
5. Cellular Antenna (CELL ANT port)
6. WIFI Antenna (WIFI ANT port)

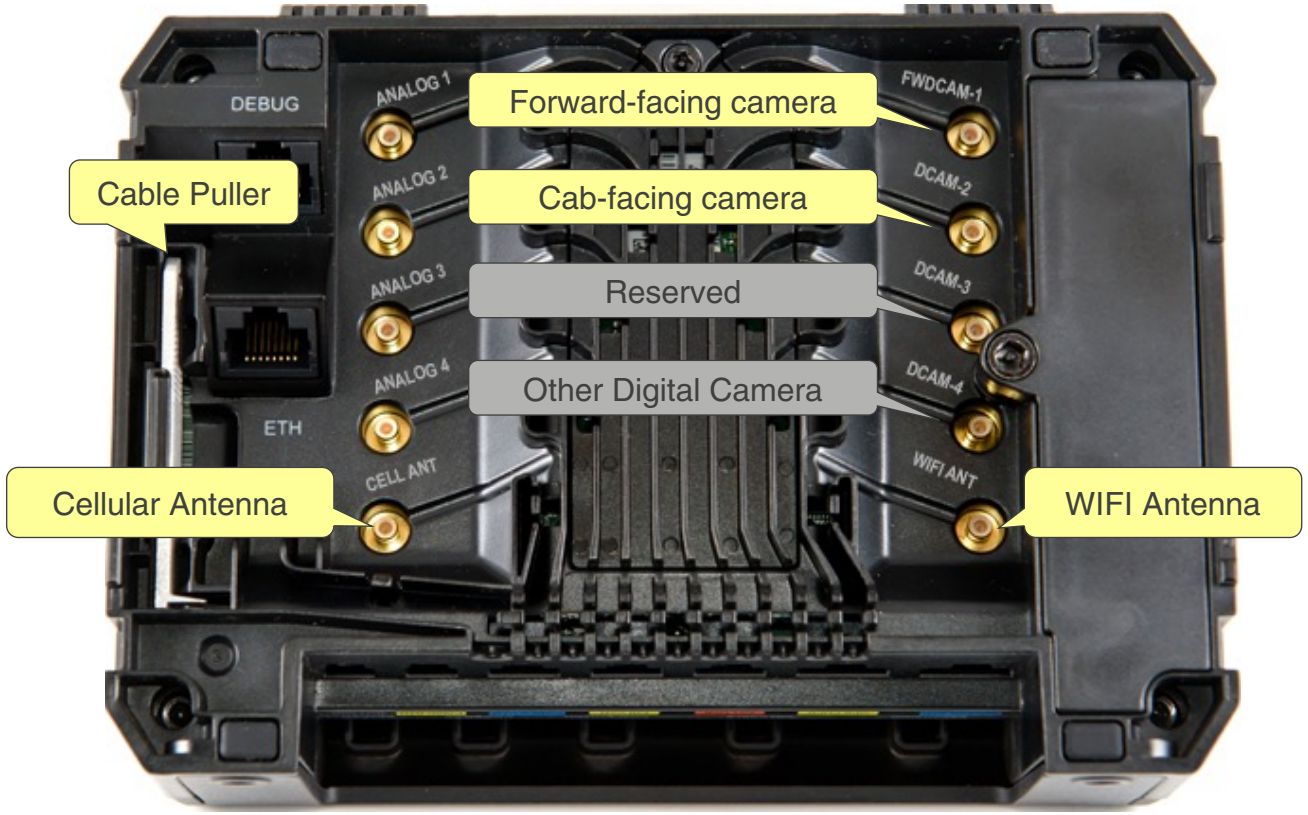
Details

Connect all cables to their ports and route through the strain relief channel. Use mounting tray for securing the Controller

Please take extra care when routing and tying up the camera cables as kinks or tight cable ties may create video failure

Depress the SMB coaxial connector until it clicks (locks) in place then route the cable in the strain relief channel

Should you need to remove a cable, use the cable puller



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Controller Connections: Analog cameras

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Connection instructions

- Analog 1: 360 camera mounted on the passenger-side
- Analog 2: 360 camera mounted on the driver-side
- Analog 3: Any other analog camera (backup, rear view, etc.)
- Analog 4: Not available

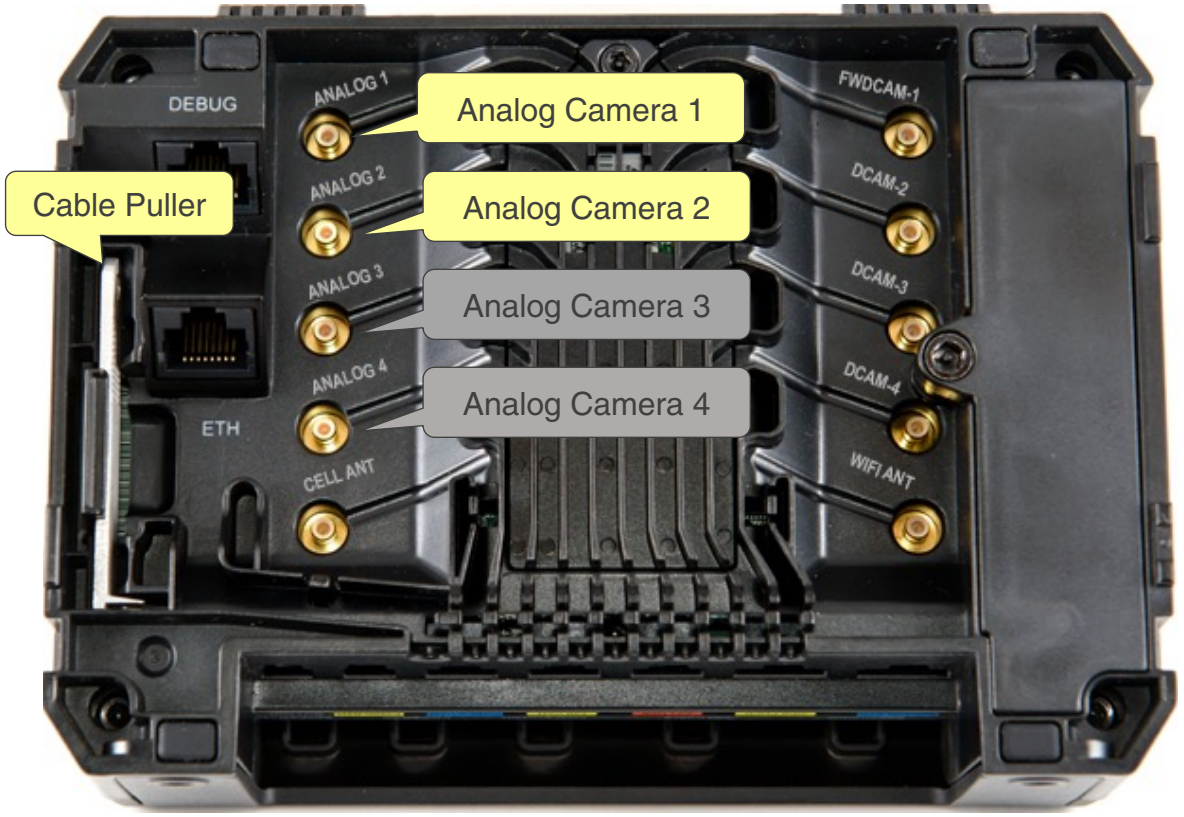
Details

Connect all cables to their ports and route through the strain relief channel. Use mounting tray for securing the Controller

Please take extra care when routing and tying up the camera cables as kinks or tight cable ties may create video failure

Depress the SMB coaxial connector until it clicks (locks) in place then route the cable in the strain relief channel

Should you need to remove a cable, use the cable removal tool



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System Verification

Once the Controller is powered up, use the 3 LEDs on the top of the Controller to verify proper operation

- ✓ **Power LED**
  - ✓ Solid **red** when control is receiving external power
  - ✓ OFF when not powered
- ✓ **Ignition LED**
  - ✓ Solid **orange** when ignition is on
  - ✓ OFF when ignition is off
- ✓ **System LED**
  - ✓ OFF when the controller is shut down
  - ✓ ON **green**, awake and running with constant power
  - ✓ **BLINKING green, awake and running ONLY on the controllers internal battery. Action: Rewire to obtain constant power.**

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Diagnostic Mode and QA Verification

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Preparing Diagnostic Mode and checking cellular connectivity

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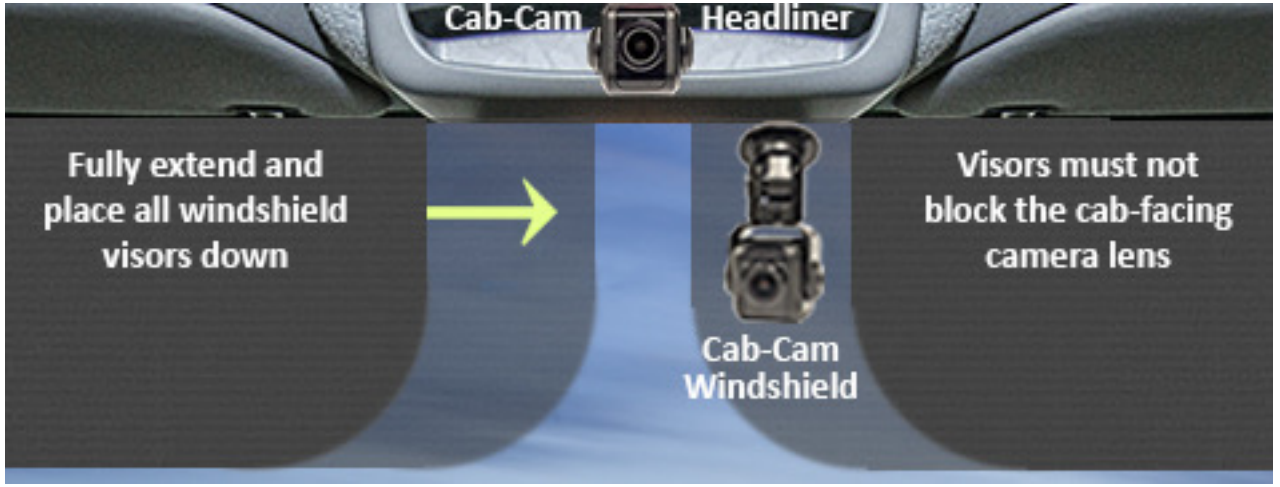
1. **Move the vehicle outside** to obtain cellular connectivity
2. **Start/Crank the vehicle and let it run for 30-60 seconds** before triggering an event to ensure ECU data is being gathered.
3. **Turn the windshield wipers on** to ensure the Road-Facing camera is in the windshield wiper path.
4. **Fully extend and place all windshield visors down** to ensure the Cab-Facing camera has a clear view of the driver (no obstructions).
5. **Verify the syster**

ction by observing a solid blue gear
6. **Press the green button on the keypad (1x)** to trigger a manual event. After several seconds, verify the event is offloading by observing a blinking blue gear LED.
7. **Wait 10-15 minutes for the video to fully offload** - the Sensor Bar target

green. During this time, gather all ins elow and perform vehicle cleanup.



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SR4 Installation Checklist and Diagnostic Guide

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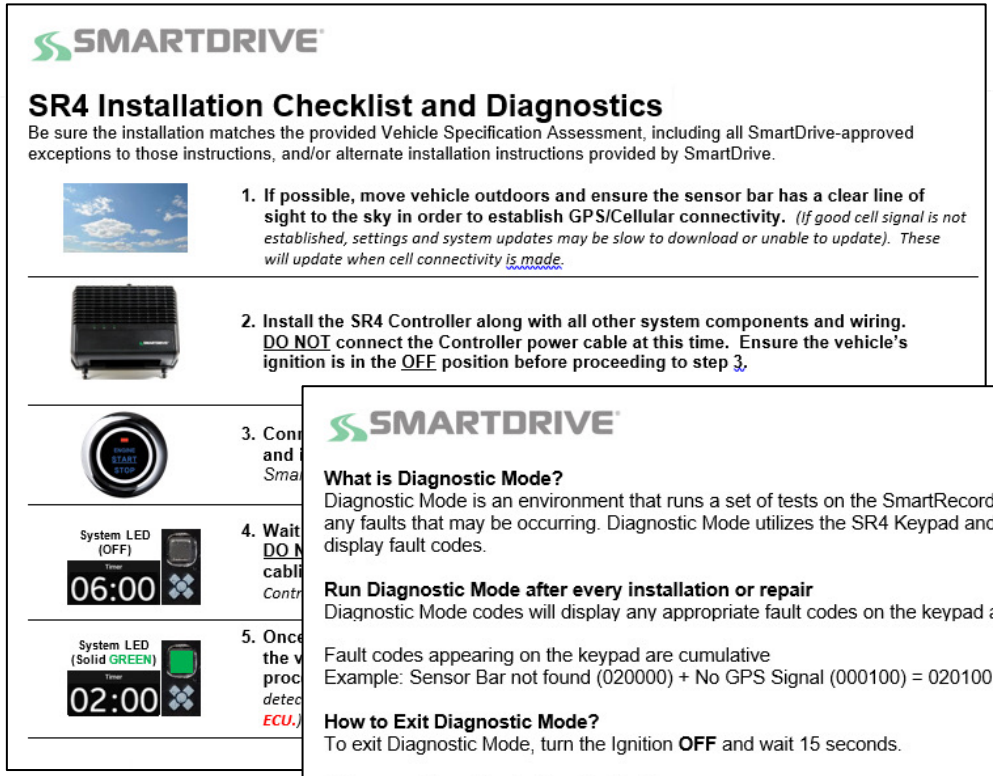
The SR4 Installation checklist and Diagnostic Mode/Fault Code Guide provides key step-by-step installation information and instructions for running Diagnostic Mode. Included is a complete list of fault codes with helpful actions to assist you in resolving the problem.

This document is available from your SmartDrive Project Manager or online in the Response Center help page

Should you have problems resolving a fault code on your own, the guide contains SmartDrive Technical Support contact information. Our Technical Support team can provide you with additional troubleshooting steps to help you resolve the problem.

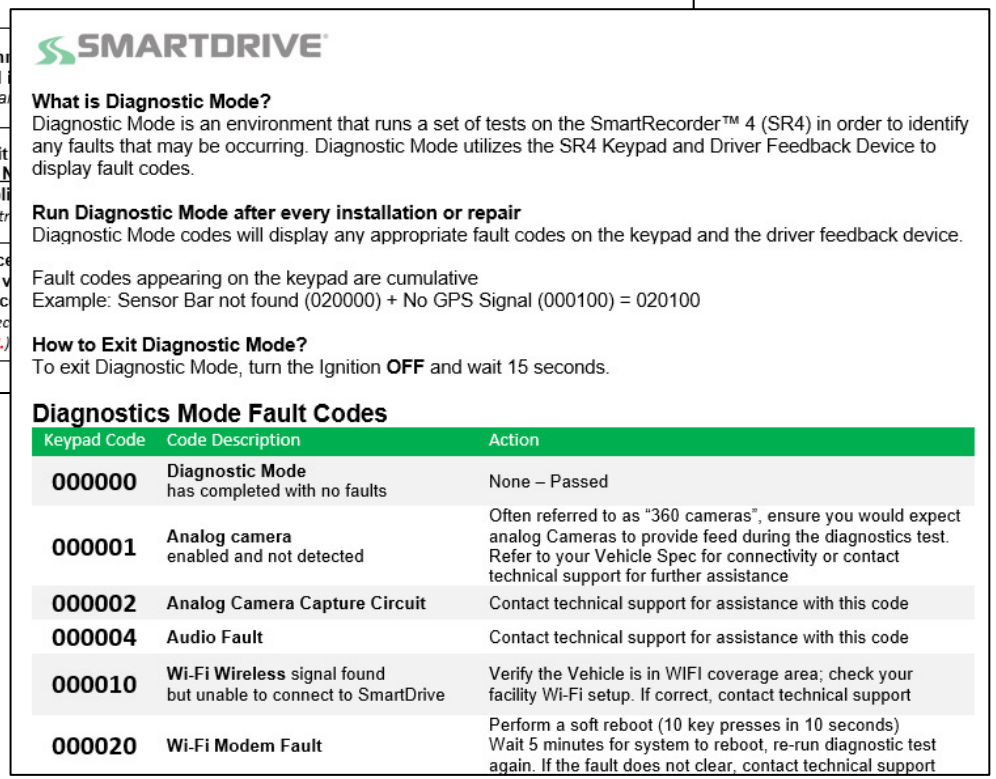


SMARTDRIVE

SR4 Installation Checklist and Diagnostics

Be sure the installation matches the provided Vehicle Specification Assessment, including all SmartDrive-approved exceptions to those instructions, and/or alternate installation instructions provided by SmartDrive.

1. **If possible, move vehicle outdoors and ensure the sensor bar has a clear line of sight to the sky in order to establish GPS/Cellular connectivity.** *(If good cell signal is not established, settings and system updates may be slow to download or unable to update). These will update when cell connectivity is made.*
2. **Install the SR4 Controller along with all other system components and wiring. DO NOT connect the Controller power cable at this time. Ensure the vehicle's ignition is in the OFF position before proceeding to step 3.**
3. **Conn and** *Sma*
4. **Wait DO N cabli** *Contr*
5. **Once the v proc** *detec ECU.)*



SMARTDRIVE

What is Diagnostic Mode?
Diagnostic Mode is an environment that runs a set of tests on the SmartRecorder™ 4 (SR4) in order to identify any faults that may be occurring. Diagnostic Mode utilizes the SR4 Keypad and Driver Feedback Device to display fault codes.

Run Diagnostic Mode after every installation or repair
Diagnostic Mode codes will display any appropriate fault codes on the keypad and the driver feedback device.

Fault codes appearing on the keypad are cumulative
Example: Sensor Bar not found (020000) + No GPS Signal (000100) = 020100

How to Exit Diagnostic Mode?
To exit Diagnostic Mode, turn the Ignition **OFF** and wait 15 seconds.

Diagnostics Mode Fault Codes

Keypad Code	Code Description	Action
000000	**Diagnostic Mode** has completed with no faults	None – Passed
000001	**Analog camera** enabled and not detected	Often referred to as "360 cameras", ensure you would expect analog Cameras to provide feed during the diagnostics test. Refer to your Vehicle Spec for connectivity or contact technical support for further assistance
000002	**Analog Camera Capture Circuit**	Contact technical support for assistance with this code
000004	**Audio Fault**	Contact technical support for assistance with this code
000010	**Wi-Fi Wireless** signal found but unable to connect to SmartDrive	Verify the Vehicle is in WIFI coverage area; check your facility Wi-Fi setup. If correct, contact technical support
000020	**Wi-Fi Modem Fault**	Perform a soft reboot (10 key presses in 10 seconds) Wait 5 minutes for system to reboot, re-run diagnostic test again. If the fault does not clear, contact technical support

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Creating a diagnostic mode manual event

- **Start the vehicle** and let it run
- **Run the windshield wipers during the test**
- **Place the driver visor down and fully extend the visors**
- **Move the steering wheel in the down (in use) position** exactly as it would be placed when driving the vehicle
- **Press the green button on the keypad 5 times in 10 seconds** to initiate diagnostic mode

Diagnostic Mode

The SR4 Controller will reboot after the test is complete.

If the test finds any problems, it will display the fault code on the keypad. Fault codes appearing on the keypad are cumulative (i.e. no Sensor Bar not found (020000) + Ignition Off (010000) = 030000).

Refer to the next slide to understand the fault code and follow the instructions to resolve the problem.

After correcting all fault codes, rerun the Diagnostic mode until th keypad displays all Zeros (000000). You need to have all zeros befo calling Tech Support for QA verification.

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Create a manual event

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Before calling SmartDrive Technical Support, create a manual event and ensure it has recorded and offloaded using the below LED Sensor Bar Observations.

- ✓ SYSTEM BOOT - Installer will observe the controller has completed booting (**all 3 LED's on the controller are solid red, orange, and green**)
- ✓ SYSTEM READY – The SmartRecorder System is ready to record when the **sensor bar light LED 1 is solid Green** and **LED 2 is solid BLUE** (good cell)

- ✓ EVENT TRIGGERED - Create a manual event by pressing the green button on the Keypad – **LED 1 Blinks Blue** while the event is recording
- ✓ EVENTS STORED - Once the event has completed recording **LED 1 turns Solid Blue** indicating there is an event stored and awaiting offload
- ✓ CONECTING - When the SR Connects to the SmartDrive network **LED 2 turns Solid Blue** indicating a connection has been made
- ✓ OFFLOAD - When the SR begins to offload **LED 2 Blinks Blue** indicating that the SR is currently offloading
- ✓ OFFLOAD COMPLETE - **LED 1 will return Solid Green**

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Complete Post Installation Verification Check with SmartDrive Technical Support:

- ✓ *After a manual event has been created, the event MAY take up to 10 minutes to be visible to our QA Specialists in the event player*
- ✓ *Please wait 10 minutes BEFORE calling Technical Support to allow time for the event to offload*
- ✓ *Then call Technical Support to do a QA checkout*

Technical Support Call In:

Call Toll free number **(866) 933-9930 Option 1**

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Approved Exceptions

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Vehicle Specification Assessment (VSA) & Exception Management

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VSA - MASTER INSTALL SPECIFICATION

The VSA is the approved hardware installation and wiring spec for this vehicle make-model and year ranges

Specific details are defined within – **check the model year you are installing on** as it specifies:

- ✓ Appropriate SmartDrive wiring harness to use
- ✓ Location and instructions for the approved Data Link Connector (DLC)
- ✓ Approved locations and install details for cameras, controller, keypad, and sensor bar
- ✓ The source and approved method to obtain uninterrupted constant power, true ignition, and chassis ground
- ✓ How to connect cables to the controller
- ✓ How to test, troubleshoot, and diagnose
- ✓ How to call into Technical Support for final QA validation

CAUTION: EXCEPTION MANAGEMENT

- ❑ **Contact** your SmartDrive Project and Account Manager if anything within this document cannot be followed
- ❑ Toll free number **(866) 933-9930 Option 1** or their direct phone number
- ❑ **All exceptions** must be documented and approved by SmartDrive and Customer before proceeding with installations

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Document all Approved Exceptions

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N/A	Approved by

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