Omnitracs SR4 Western Star Installation Guide

This VSA covers models manufactured between 1997-2022



Manufactured by Daimler Trucks of North America

Cable Guide



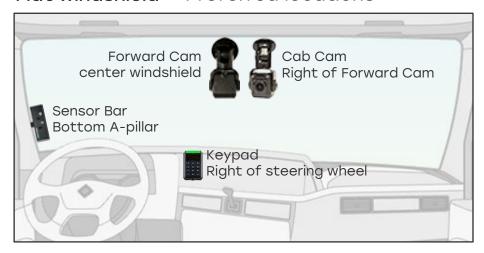
Western Star 4900 (Split Windshield)

Year Range	SR4 Harness Description	SR4 SKU	Cable Type
1997-2003	J-1708, 6 Pin White Flange	104-0009-0011-01	J-1708, 6-pin, (White) Flange
2004-2012	J1708 & J1939 9-Pin Type 1 Black Flange	104-0009-0018-00	J-1939, 9-pin Type 1, (Black) Flange
2013-2016	2-Pin Type B Deutsch Black inside	104-0009-0008-00	J-1939, 2-pin Type B, Deutsch (Black Inside)
2017-2022	Splice Pack Green/yellow metal tip leads	104-0009-0014-00	J-1939, Splice Pack

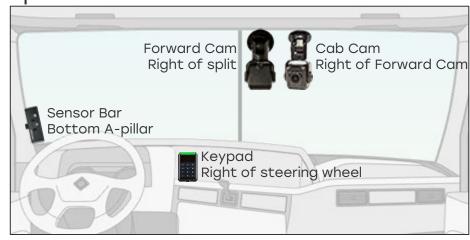
Note: Any combination of these mounting locations are approved

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

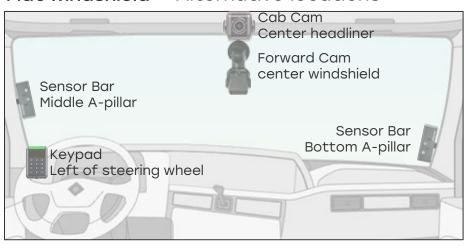
Flat windshield - Preferred locations



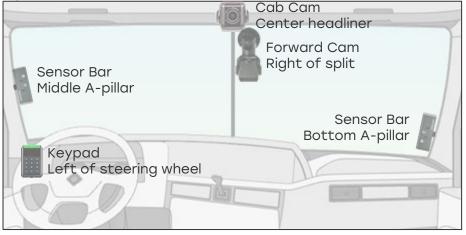
Split windshield - Preferred locations



Flat windshield - Alternative locations



Split windshield - Alternative locations

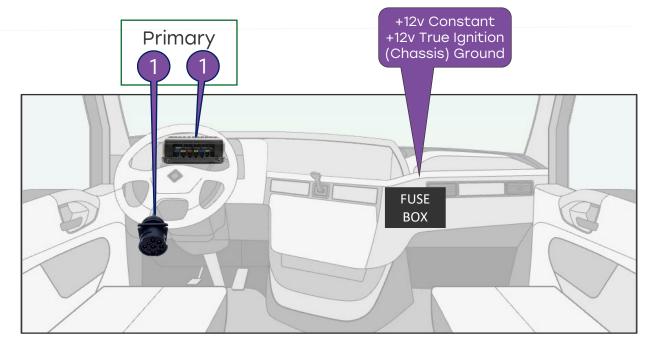


Western Star 4900 2004-2012 DLC and wiring instructions



2004-2012 Approved controller, ECU, and wiring locations

Component	Primary location	
Controller	Driver-side Behind the instrument panel	
ECU Port	Driver-side J1708 & J1939 9-Pin Type 1, Black Flange (104-0009-0018-00)	
Wiring Constant, True Ignition, & Ground	Center dash right of split Fuse Box	



2004-2012 Constant power, true ignition, and ground wiring connections

Fuse box Location	Wiring Locations
Center Dash	Constant Power Connect Add-A-Fuse to 12 Volt constant source in fuse box. (Meter with Digital Multimeter) True Ignition Connect Add-A-Fuse to 12 Volt ignition source in fuse box. (Meter with Digital Multimeter) Ground #10 ring terminal to chassis Note: Use the fuse box wiring diagram to identify slot locations

See the WIRING CONNECTION INSTRUCTIONS slide for details

2004-2012 9-PIN type 1 Flange Data Link Connector (DLC)

Component	Notes
9-Pin Type I Flange (Black)	N/A

		Description
SR4 Part#	104-0009-0018-00	J1708 & J1939, 9 Pin Type 1, Flange black
Connector Color	Black	(<u>Black</u>) color indicates J1939, 250kb network speed
Network	J1939 & J1708	Vehicle Bus Communication Network - (Passive)
Baud Rate	250kb	 Supports (250kb) low speed protocol (250kb) Best Connection for 3rd Party Devices
Connection Type	9-PinType 1, Flange	Square mounting tab located near the connectors base with slots for mounting screws.



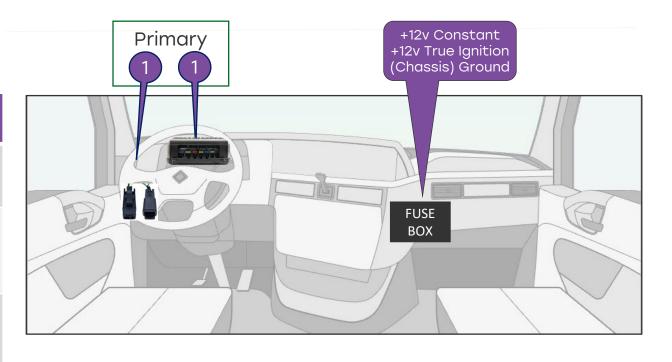


Western Star 2013-2016 Controller, DLC, and wiring



2013-2016 Approved controller, ECU, and wiring locations

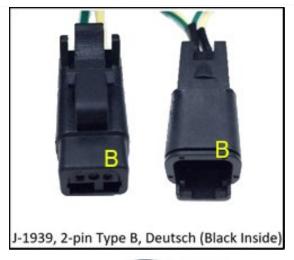
	(1)
Component	Primary location
Controller	Driver-side Behind the instrument panel
ECU Port	Driver-side 2-pin Type B Deutsch Black inside (104-0009-0008-00)
Wiring Constant, True Ignition, & Ground	Center dash right of split Fuse Box



2013-2016 2-Pin Type B Deutsch Data Link Connection (DLC) locations

Component	Notes
2-Pin Type B Deutsch (black inside)	N/A

		Description	
SR4 Part #	104-0009-0008-00	J-1939, 2 Pin Type B Deutsch (black inside)	
Connector Color	Black	(<u>Black</u>) internal color indicates Type B Connector	
Network	J1939	Vehicle Bus Communication Network - (Passive)	
Baud Rate	250kb, 500kb	 Supports (250kb) Low speed and (500kb) High speed (250kb) Best Connection for 3rd Party Devices 	
Connection Type:	2-Pin, Type B	 Deutsch connection, (<u>B</u>) pin slot is green wire, (+) J1939 Notified by tab on (<u>B</u>) pin slot of male connector 	





2013-2016 Constant power, true ignition, and ground wiring connections

Fuse box Location	Wiring Locations
Center Dash Cincipal Control	Constant Power Connect Add-A-Fuse to 12 Volt constant source in fuse box. (Meter with Digital Multimeter) True Ignition Connect Add-A-Fuse to 12 Volt ignition source in fuse box. (Meter with Digital Multimeter) Ground #10 ring terminal to chassis Note: Use the fuse box wiring diagram to identify slot locations
	identify slot locations

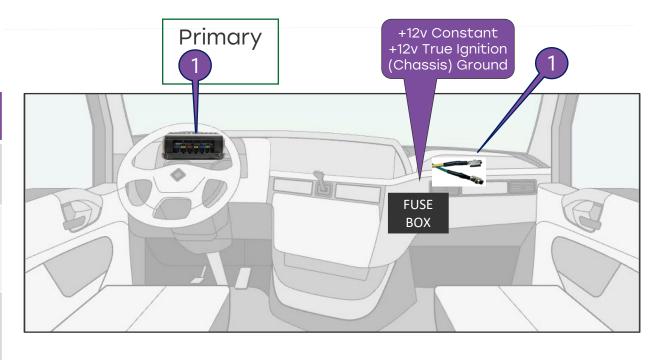
See the WIRING CONNECTION INSTRUCTIONS slide for details

Western Star 2017-2022 DLC and wiring instructions



2017-2022 Approved controller, ECU, and wiring locations

Component	Primary location	
Controller	Driver-side Behind the instrument panel	
ECU Port	Passenger side J-1939, Splice Pack green/yellow metal tip leads (104-0009-0014-00)	
Wiring Constant, True Ignition, & Ground	Center dash right of split Fuse Box	



2017-2022 Constant power, true ignition, and ground wiring connections

Fuse box Location	Wiring Locations
Center Dash	Constant Power Connect Add-A-Fuse to 12 Volt constant source in fuse box. (Meter with Digital Multimeter) True Ignition Connect Add-A-Fuse to 12 Volt ignition source in fuse box. (Meter with Digital Multimeter) Ground #10 ring terminal to chassis Note: Use the fuse box wiring diagram to identify slot locations

See the WIRING CONNECTION INSTRUCTIONS slide for details

2017-2022

Splice Pack Data Link Connection (DLC) to the vehicle

Connection location/instructions

Connector type: J-1939, Splice Pack

Behind dash

(green/yellow metal tip leads)

Part # 104-0009-0014-00

Details

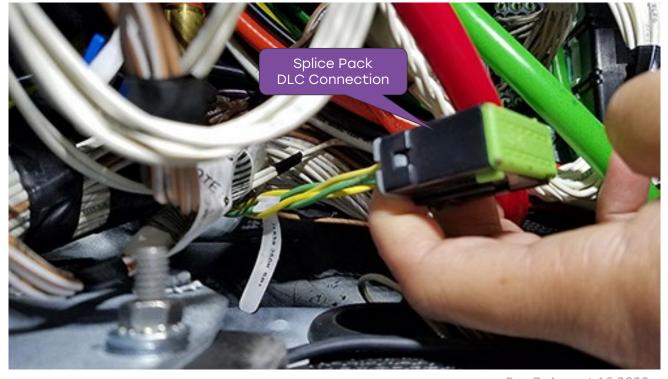
- 1. Remove the splice pack cover
- 2. Then remove the bottom
- 3. Insert the wiring harness terminal connectors into the back of the splice pack
 - ✓ Green on the green side
 - ✓ Yellow on the yellow side
 - ✓ Make sure each connector clicks into place
- 4. Replace the cover











2017-2022 Splice Pack Data Link Connection (DLC)

Component	Notes
Splice Pack (green/yellow metal tip leads)	N/A

		Description	
SR4 Part #	104-0009-0014-00	J-1939, Splice Pack (green/yellow metal tip leads) Vehicle Bus Communication Network - (Active)	
Network	J1939		
Baud Rate	250kb	 Supports (250k) Low speed Active Protocol (250k) Best Connection for 3rd Party Devices 	
Connection Type	nnection Type Terminal leads (Green/Yellow) crimped female terminal leads		

IMPORTANT: Vehicles using the Splice Pack cable will require a setpoint change. ECU protocol = 0





360 Cameras



Western Star Approved 360 Camera VSA

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.



Approved ADAS Forward-facing Camera location

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



Western Star Driver Feedback Device location

Mounting Location

Mounted on the right-hand side of the steering wheel

To the top of the dash.

Run the cable to the controller.

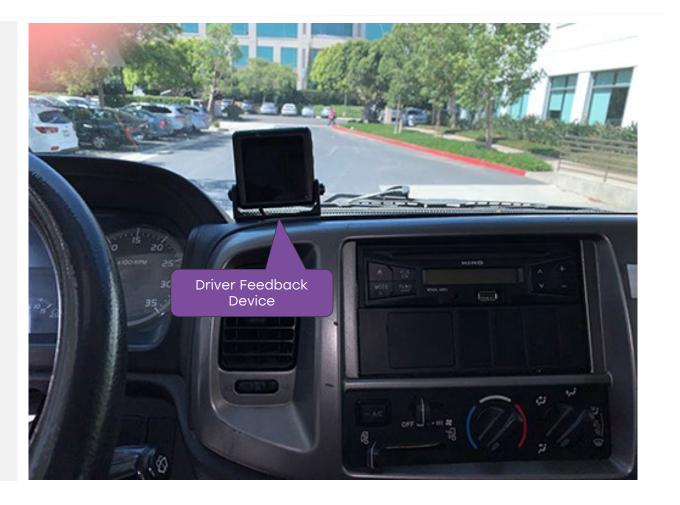
Plug the driver feedback cable into the port DRIVER FB

Secure the device by cleaning the area with an 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 a clean cloth. Do not use shop rags that 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

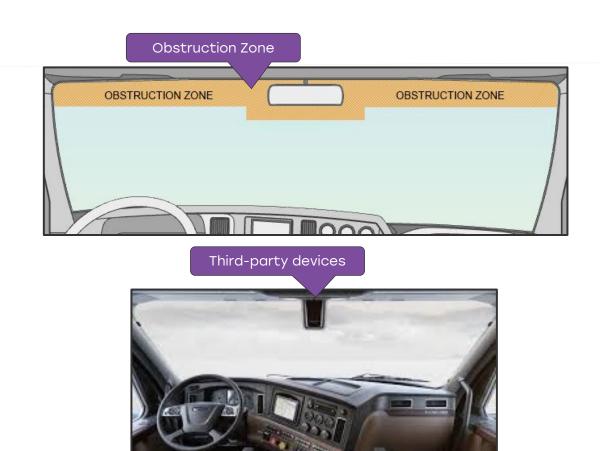


Camera Mounting Considerations

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 driver's face, hands on the steering wheel, shoulder, and seat or lap belt. When blocked by a 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.



Forward and Cab-facing Camera Installation Instructions

Forward-facing Camera Installation Instructions



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

Details

- 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 lintfree clean cloth. Do not use shop rags that contain grease even when clean.
- 3. Press firmly on the 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 airbag functionality

Cab-facing Camera Installation Instructions



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

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 that 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 the 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 airbag functionality
- 7. Ensure the cable doesn't get pinched

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, <u>DOES NOT BLOCK</u> the cameras Infrared (IR) sensors











Forward-facing Camera - Field of View Adjustment

Use the proprietary M4 security wrench

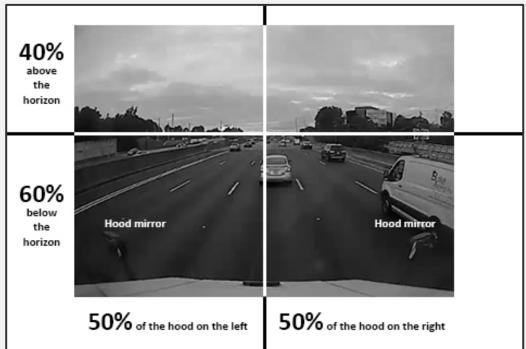
- Loosen the camera bracket screws located on the Forward-facing camera mounting bracket shaft
- 2. Adjust the camera angle by rotating and/or tilting the camera slightly down to capture the view of the horizon to see an unobstructed view of the road and traffic signals/signs in front of the vehicle
 - 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.



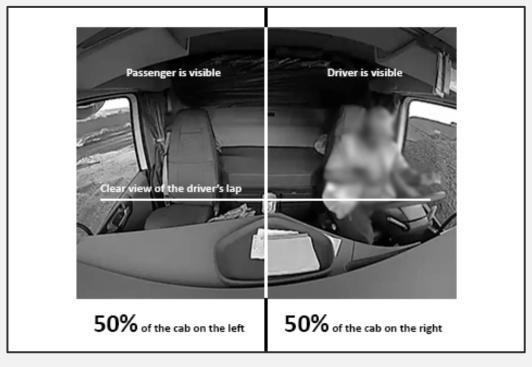
Acceptable Camera Views

Forward-facing camera view



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.

Sensor Bar and Keypad Installation Details

Sensor Bar Installation Details

- I. Driver-side
 I. driver. Sor 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

company contensume the cable does not prevent the copyright of an airbag functional export controlled information functionality of an airbag



- 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

Cable Routing

Service Loops

Before connecting cables to the controller, coil excess wiring in an 8" loop and secure it 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





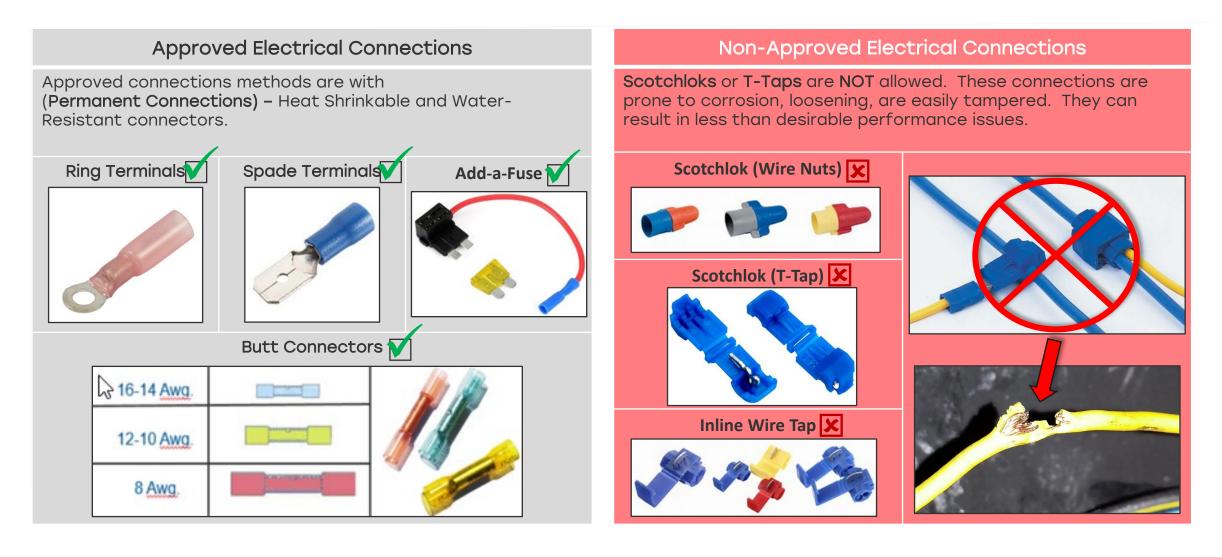




Controller: Wiring and Component Connectic



Approved and Non-Approved Electrical Connection Methods



Verifying Wiring Connecting

+12v (Uninterrupted) Constant Power		+12v True-Ignition	(Chassis) Ground
(Red Wire)		(Orange Wire)	(Black Wire)
How to locate Constant Uninterrupted Power with a Digital Multi-meter:		How to locate True Ignition with a Digital Multi-meter:	Verifying Chassis Ground
	 Test for constant 12 volts (in all key positions) With the ignition ON, vehicle running, Ignition OFF, and while cranking. Verify constant battery voltage remains constant and does not drop below 10vDC 	 With the vehicle off your meter will show "0" volts. With the key in the Run position your meter will show approx. 11 ~ 14 volts. While the vehicle starter is cranking, your meter will show approx. 10 ~11 volts. 	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
	AZI CON CONTRACTOR AND CONTRACTOR AN	4. With the engine running your meter will show approx. 12 ~ 14 volts.	Ground Wire

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

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.

(<u>+MPC</u>) 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.

(<u>LVD</u>) 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, not a Negative Ground MPC/LVD.

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

DLC connector and Power

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

Analog Power (optional, not part of the installation)

Connect the 360 power connector to the ANALOG PWR port

360 Analog 4-port power cable included in Analog First Camera Kit

The Keypad

Connect the Keypad connector to the **KEYPAD** port

The Sensor Bar

Connect the Sensor Bar connector to the blue SENSOR BAR port

The Wabco Camera (optional, not part of this installation)

Connect the Wabco camera connector to the blue WABCO CAM port

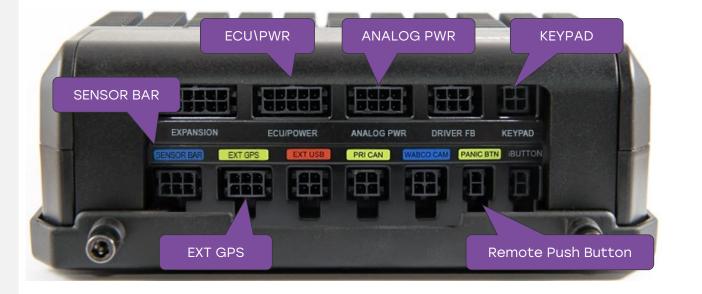
External GPS (optional, not part of this installation)

Connect the GPS Puck connector to the yellow EXT GPS port

The Remote Push Button (optional, not part of this installation)

Connect the Remote Push Button to the yellow PANIC BTN port

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

Connection instructions

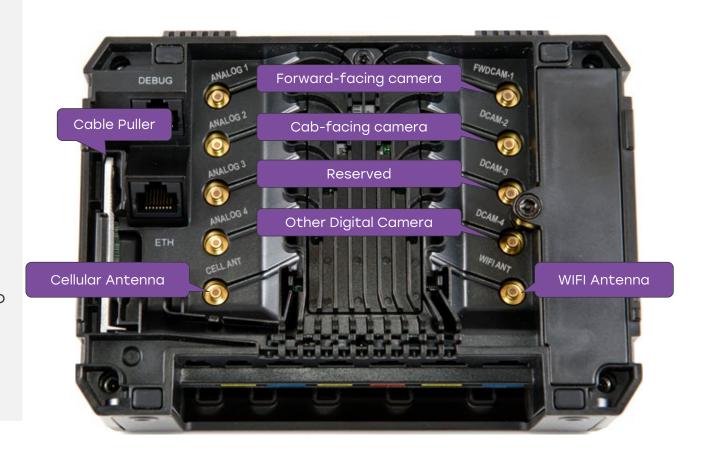
- Forward-facing Camera (FWDCAM-1 port)
- Cab-facing Camera (DCAM-2 port)
- Reserved (DCAM-3 port)
- Other Digital Camera (DCAM-4 port) (optional, not installed on this vehicle)
- Cellular Antenna (CELL ANT port)
- WIFI Antenna (WIFI ANT port)

Details

Connect all cables to their ports and route through the strain relief channel. Use a 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



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
 - ✓ <u>ON green</u>, awake and running with constant power
 - ✓ <u>BLINKING green</u>, awake and running ONLY on the controllers internal battery. <u>Action: Rewire to</u> obtain constant power.



Diagnostic Mode and Self QA



Preparing Diagnostic Mode and checking cellular connectivity

- 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).
- Verify the system has a cellular connection by observing a solid blue gear LED on the Sensor Bar.







Run Diagnostic Mode using the Keypad or Driver Feedback Device

Press the green button on the keypad or driver feedback device five times in 10 seconds to initiate Diagnostic Mode

When the diagnostic mode is complete, it will display all Zeros (00000).

Press the green button one time to create a manual event.

Note: The SR4 Controller will reboot after the test is complete.



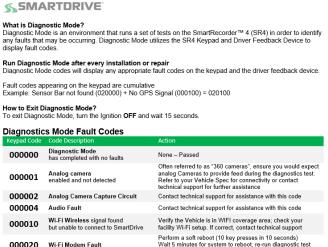
When the test identifies an SR4 system fault, a code will display on the keypad or the driver feedback device. Fault codes are cumulative

Example:
Sensor Bar not found (020,000)
Ignition Off (010,000)
The error codes are added together. 030,000 will display.

When the keypad displays a fault code, use the <u>SR4 Installation Checklist and Diagnostic</u> <u>Mode/Fault Code Guide</u> to assist you in resolving the problem. This document is available from your SmartDrive Project Manager or online on the Response Center help page.

If you can't resolve a fault code, contact **Technical Support**. Toll-free number **(866) 933-9930 Option 1**



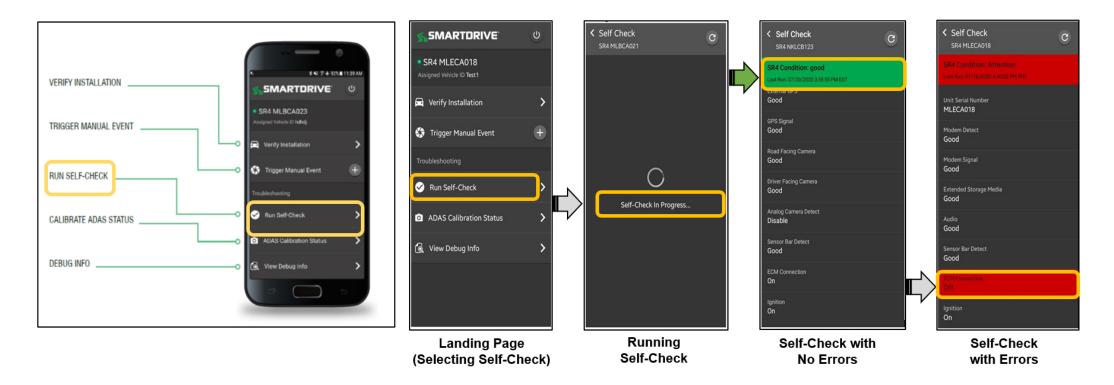


Rev 7, August 16 2022

Run Self-check (Diagnostic Mode) using the SmartDrive Technician App

Perform self-service installation QA via a mobile device

- The Android App is available in the Google Play Store.
- Run Self-Check.
- When the SR4 Condition is green, you are done.
- When the SR4 Condition is red, the problem area is shown in red. Resolve that problem area and run Self-Check again.



Approved Exceptions



Vehicle Specification Assessment (VSA) & Exception Management

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

Document all Approved Exceptions

