CVC501-G HVAC & Fast Idle CAN Vehicle Controller
CVC502 HVAC Control without Fast Idle
2020 Ford F250-F550 (6.7L Diesel Engine)

Contact InterMotive for additional vehicle applications

System Overview

The CVC501-G/CVC502 are designed to activate the OEM air conditioning system based on aftermarket equipment requests (typically rear auxiliary A/C systems), even when the front A/C is turned off. This allows the rear A/C on ambulances and transit buses to operate even if the front A/C is off. The CVC501-G/CVC502 monitors two "Rear A/C Request" inputs: one active low (ground) and one active high (12V). When the engine is running, and either of these inputs are active, the CVC501-G/CVC502 will activate the OEM A/C system to provide air conditioning for the rear. The OEM A/C system monitors pressures and temperatures as originally designed.

Whenever the rear A/C system asserts the A/C request signal, the CVC501-G/CVC502 will engage the OEM clutch/compressor. As defaulted from the factory*, the CVC501-G/CVC502 will cycle the clutch/compressor on/off based on both the front evaporator temperature and rear freeze switch (if used). This prevents freezing of the front evaporator. In climates where front evaporator freezing is not an issue, this default setting can be modified such that clutch cycling is only based on the rear system requirements. This will provide maximum cooling for the rear system.

The OEM Ford system has conditions & safety overrides which may shut the clutch/compressor off (pressure, outside air temp too cold, etc.). When the rear A/C is off, the front A/C system works as intended from the factory.

The CVC501-G/CVC502 also monitors an active high (12V) "Front A/C Off Request" input. This can be used to prevent rear evaporator freeze up. If this input activates with the engine running and the front A/C on, the CVC501-G/CVC502 will deactivate the OEM A/C compressor clutch. This input must be grounded in order for the OEM A/C system to turn on. Leaving it floating or applying 12V causes the CVC501-G/CVC502 to request the front A/C off. If a rear evaporator freeze switch is not used, this wire must be permanently grounded.

The CVC501-G/CVC502 also provides an auxiliary fan control output which may be used if desired to control fans on a supplementary condenser system.

Fast Idle—The CVC501-G also provides an engine Fast Idle capability with an external request input. Fast-Idle is useful to protect the vehicle battery from becoming discharged, and is also helpful to increase the A/C system's output. When the external Fast Idle input is activated and all safety conditions are met, CVC501-G will increase engine idle speed to 1200 RPM. The Battery Charge Protect feature will automatically increase idle speed and maintain Fast Idle whenever the charging system voltage falls below 12.7V. After the battery voltage increases above 13.5V for one minute, or the safety conditions are no longer met, idle speed will return to normal. In all cases, the Park Brake must be set for any Fast Idle to occur. The external Fast Idle input can be wired to the Park Brake switch, which will cause the system to Fast Idle whenever Park Brake is set.

Review Ford SVE Bulletin Q-195 and ensure final system wiring complies with all of Ford's requirements.

* Firmware version 4.03 (August 2015) and later defaults the system to monitor front evaporator temperature and cycle the compressor as needed to prevent front evaporator freeze up. This can be disabled with a special procedure outlined in these instructions.

Installation Instructions

Disconnect vehicle battery before proceeding with installation.

WARNING
Disconnect the battery to prevent setting a check engine light.

IMPORTANT—READ BEFORE INSTALLATION

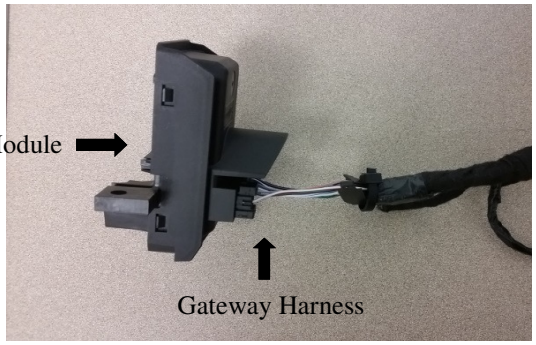
It is the installer's responsibility to route and secure all wiring harnesses where they cannot be damaged by sharp objects, mechanical moving parts and high heat sources. Failure to do so could result in damage to the system or vehicle and create possible safety concerns for the operator and passengers. Avoid placing the module where it could encounter strong magnetic fields from high current cabling connected to motors, solenoids, etc. Avoid radio frequency energy from antennas or inverters next to the module. Avoid high voltage spikes in vehicle wiring by always using diode clamped relays and solenoids when installing upfitter circuits.

CVC501-G/CVC502 Module

Remove the lower dash panel below the steering column area and find a suitable location to mount the module. Locate the module in an area away from any high heat sources (engine heat, heater ducts, etc.). Do not actually mount the module until all wire harnesses are routed and secure. Leave enough 'take out harness' to allow dropping the module down for observation of the diagnostic LEDs. The last step of the installation is to mount the module.

CVC501-G/CVC502

1. Locate the vehicles Gateway Module. It will be mounted below the lower left dash panel.
2. Remove the harness behind the Gateway module by pressing the locking tab and pulling outward.
3. Plug the Female side of the Intermotive Gateway Harness into the back of the Gateway module. Ensure the connection is fully seated and secured by the locking tab.
4. Plug the Male side of the Intermotive Data Link Harness into the Gateway harness.
5. Secure the CVC Gateway harness so that it does not hang below the lower dash panel.

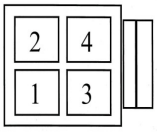


Rear A/C Request Input(s)

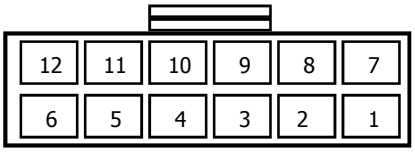
Note: The following connections must be made using solder and heat shrink.

1. Determine the type of signal for the Rear A/C System Request (active high-12V or active low-Ground).
2. If signal is active low: Connect the 4-pin connector pin #3 Gray wire to the Rear A/C system's active low request wire.
3. If signal is active high: Attach the 12-Pin connector Pin #1 Blue wire to the Rear A/C system's active high request.

Only one of these inputs will be used. The unused input can be left unconnected.

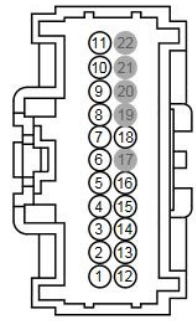


Back of connector



Back of Connector

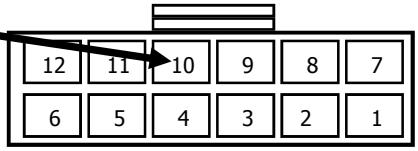
Fast Idle



The Ford Super Duty can no longer Fast Idle over the CAN network.
Beginning in 2020, the following connections must be made:

1. Locate the Customer Access 22-pin harness located behind the passenger kick panel.
2. The mating 22-pin pigtail is included with the vehicle and will be located in the vehicle's glovebox.
3. Using solder and heat shrink, connect the following wires together:

- White wire from the Intermotive harness (840-00058) to the White/Brown wire of the OEM 22-pin pigtail.
- Yellow wire from the Intermotive harness (840-00058) to the Yellow/Green wire of the OEM 22-pin pigtail.
- Green wire from the Intermotive harness (840-00058) to the Green wire of the OEM 22-pin pigtail.
- Plug the terminal on the end of the Yellow wire into pin-10 of the Intermotive 12-pin connector.



Back of Connector

Front A/C Off Request Input

Used to prevent the rear A/C evaporator from freezing

1. For applications which control this CVC501-G/CVC502 input, remove the eyelet from the 4 Pin connector Pin-1 White wire and connect to the rear A/C system evaporator freeze switch. This provides a ground until the evaporator temperature approaches freezing. This input must be grounded in order for the OEM A/C system to turn on. Leaving it floating or applying a +12V causes the CVC501-G/CVC502 to turn off the front A/C clutch/compressor.
2. For applications not requiring this input, the installer must permanently ground this input using the eyelet on the end of the wire.

Aux Fan output (optional)

Capable of sourcing 12V @ 1/2amp, this signal is intended to drive a relay coil to power fans on an auxiliary condenser. This signal goes active (12V) when the front clutch/compressor turns on and will shut off 30 seconds after the front clutch/compressor shuts off. It also activates when either rear request input is active. Normal clutch/compressor cycling will not shut this signal off and it does not matter which A/C system (front or rear) is causing the clutch/compressor to be on. This signal stays on regardless of the "Front Off Request" signal.

Connect the 12-pin connector pin #8 Orange wire to the relay coil which controls the auxiliary condenser fan(s). Ground the other side of the relay coil.

Fast Idle (CVC501-G only)

Grounding the 12 pin connector Pin #5 Green wire will increase the engine RPM to 1200 when the Park Brake precondition and other safety conditions are met.

Charge Protect is a feature that maintains battery voltage by increasing engine RPM's when necessary, boosting the alternator output. This feature will initialize Fast Idle whenever the charging system voltage falls below 12.7V. The voltage must be above 13.5V for one minute before Fast Idle is shut off.

Safety conditions that must be met to engage or maintain Fast Idle operation

Parking Brake must be set
Vehicle NOT moving
Service Brake NOT pressed
Vehicle Transmission Range in Park
RPM inside of safe operating range.
Transmission Fluid Temperature below 250° F
Engine Coolant Temperature below 230° F

CVC501-G/CVC502 Module

Ensure all harnesses are properly connected and routed, and are not hanging below the dash area. Mount the CVC501-G/CVC502 module as described on page 2 and secure using screws or double sided tape.

Reconnect the vehicle battery

VIN Capture

Every time the module is powered up (first install, battery or fuse change, etc.) it will automatically acquire the vehicle VIN. If for some reason it does not recognize the chassis, engine, or model year, the LED's will 'VIN scroll'. Contact Intermotive if you experience this. (Early firmware versions, prior to v4.0, use a special procedure to acquire VIN—contact factory).

Post Installation Check List

Start the engine

Rear A/C Test

1. Set Front (OEM) A/C off.
2. Confirm the OEM A/C clutch engages with rear A/C on.
3. Confirm the OEM A/C clutch disengages with rear A/C off.

Front A/C Test (If Front A/C Off Request Input used—rear evaporator freeze switch)

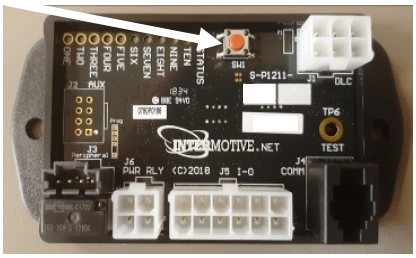
1. Turn on both Front and Rear A/C systems.
2. Confirm both the Front and Rear A/C systems are on.
3. Request Front AC off from the Rear A/C system and confirm the OEM A/C clutch turns off.

Fast Idle Function (CVC501-G only)

1. Ensure Fast Idle safety conditions met (see previous page).
2. Activate the Fast Idle input wire & confirm Fast Idle engaged.
3. De-activate Fast Idle input & confirm Fast Idle disengages.

Diagnostic LEDs can be enabled by momentarily pressing the Red "Test" button on the module. The on-board LED's will illuminate as described below. Exit this mode by momentarily pressing the Red "Test" button again or cycling the key.

STATUS: 2 Digit Diagnostic Code
LED10: Controlling front A/C clutch
LED9: Fast Idle Engaged
LED8: Aux fan output active
LED7: Front AC Request Off input true (J6 p1)
LED6: Fast Idle Request is true (J5 p5)
LED5: Front evap being monitored/cycles clutch
LED4: Active high Rear A/C Request is true (J5 p1)
LED3: Active low Rear A/C Request is true (J6 p3)
LED2: Internal use
LED1: Internal use

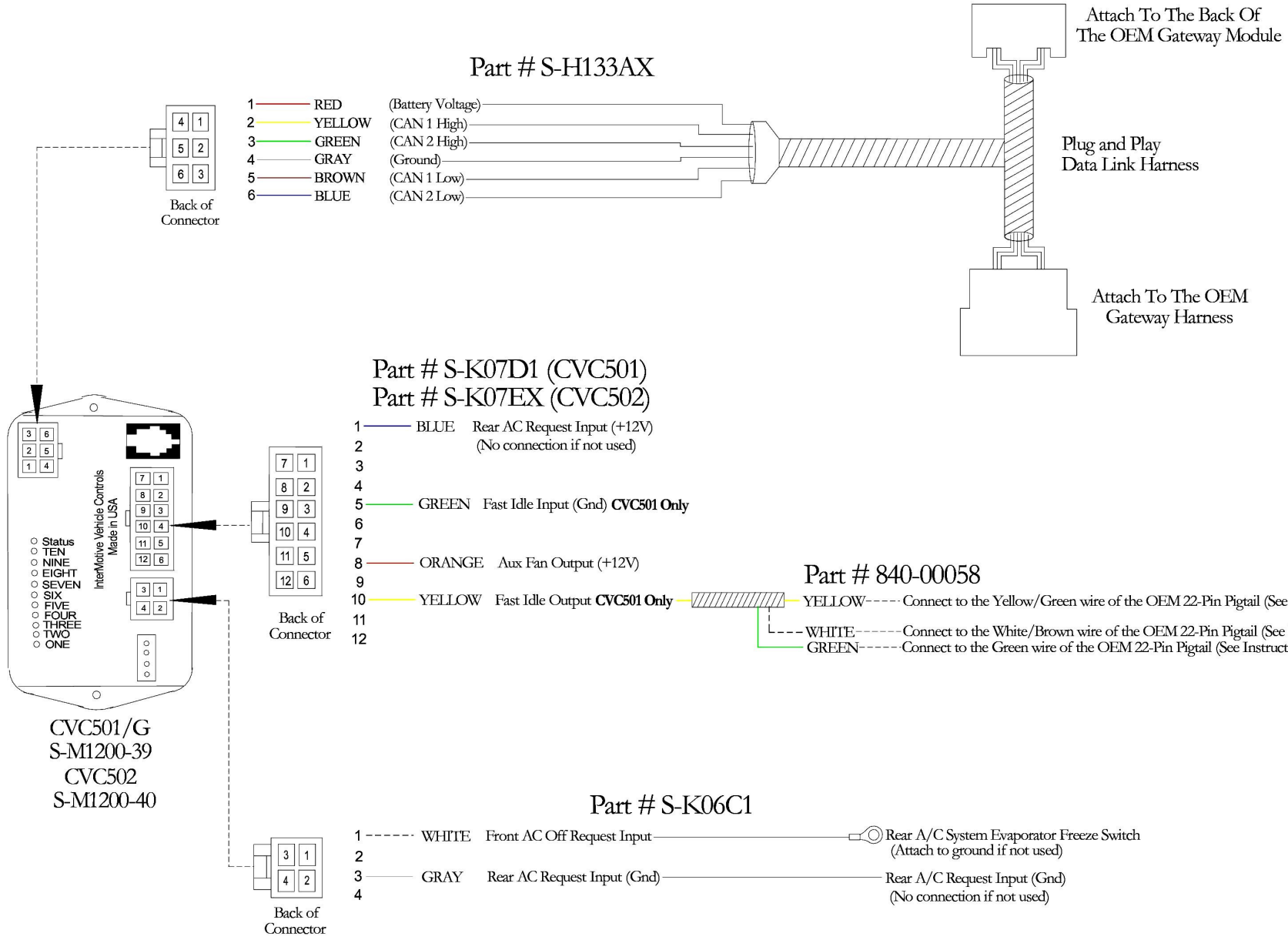


Disabling Front Evaporator Monitoring— From the factory, the CVC501-G/502 monitors the front OEM evaporator, and will cycle the A/C compressor clutch off/on to prevent freezing. This can be disabled as follows.

1. Start the engine.
2. Place transmission in neutral.
3. Apply and hold the Service Brake.
4. Cycle the Park Brake on/off 4 times in 5 seconds.
5. Upon success the on-board LEDs will all flash in unison. At this point, a key cycle causes the new setting to take effect and be stored in permanent memory. Repeating this procedure will re-enable front evaporator monitoring. Mode, (above) LED5 indicates the status of this option.

If the CVC501-G/CVC502-A fails any step in the Post Installation review the installation instructions and check all connections.

Reinstall the lower dash panel



Submit product registration at www.intermotive.net

If the CVC501-G/CVC502 fails any step in the Post Installation Check List, review the installation instructions and check all connections.
If necessary, call InterMotive Technical Support at (530) 823-1048.