

For a complete wiring diagram, refer to **SYSTEM WIRING DIAGRAMS** article .

LEFT HAND DRIVE LAYOUT

This drawing is a composite depicting all available options. Some components may not be present on vehicle. For more detailed information refer to the wiring information.

2917008406

Courtesy of CHRYSLER GROUP, LLC

DIAGNOSIS AND TESTING > NO CRANK (BCM EQUIPPED) > THEORY OF OPERATION

This vehicle may come equipped with one of two types of ignitions, the IGNM (IGNition Node Module) or a KIN (Keyless IGNition Node). The KIN uses a Keyless Go Start/Stop push button for cycling the ignition on/off. The IGNM does not use a Keyless Go Start/Stop push button, instead providing a visible slot for the FOB/K to fit into for cycling the ignition on/off.

When the operator presses the Start/Stop Button on a KIN or cycles the FOBIK in a IGNM type ignition, the FOBIK is validated wirelessly by the RF Hub (Radio Frequency Hub Module). If the FOBIK is recognized as belonging to the vehicle and is inside the vehicle, the system allows the ignition state of the vehicle to be changed by the operator between the LOCK, ACCESSORY, RUN, and START ignition states.

LED Operation

The LEDs in the IGNM and Start/Stop Button provide visual indication of the ignition system and button use to aid the driver. The Logic for LED control is implemented in the IGNM and RF HUB. The IGNM and Start/Stop Button contain four LEDs:

- OFF Indication
- ACC Indication (Accessory)
- ON Indication (On or Run)
- Ignition Switch Indicator (button backlight)

The LEDs indicate the vehicle ignition position and are driven by the CAN bus signals related to the ignition position. The Center LED (Ignition Switch Indicator) will blink if there is a related concern.

The RF HUB will log a DTC indicating an incorrect Ignition status value is present; in this state the ignition status is unknown. This will continue until the correct signal is received by the RF Hub.

EVIC Operation

The Keyless Go feature requires the vehicle to be equipped with an EVIC display for prompts and status information. The display messages are:

- Service Keyless System
- FOB Not Detected
- FOB Left Vehicle
- Not in Park
- Push Brake Pedal and Push Button to Start
- Push Clutch Pedal and Push Button to Start
- Vehicle not in Park Warning

BCM/RF Hub Module Interaction

There are a few things that must take place before the starter relay can apply voltage to the starter. Below are some key points to check when diagnosing a no crank condition.

The BCM requires two signals from the RF HUB to verify the ignition is in the run or start position. The voltage on the F20 circuit is one of these signals. It can be monitored in both the RF HUB and BCM data display screens as the Ignition Run/Start under the "Sensor" value. The run or start position voltage on this circuit should be at or close to battery voltage.

Simultaneously the RF HUB busses the Ignition Run/Start status to the BCM. The BCM monitors the bussed input information as the secondary verification on the Ignition Run/Start status. The bussed messages can be monitored with the scan tool in both the RF HUB and BCM data display screens.

The F20 circuit voltage and the bussed ignition run/start status message received by the BCM must agree to enable starting. Once the vehicle is started, the loss of only one ignition signal will not cause the vehicle to cycle off as long as the other feed still indicates a "run status".

The RF HUB also requires an input from the Gated park switch (hardwired) and the OK to start CAN Bus message from the TCM (Crank Enable).

Diagnostic Aids



NOTE:

The No Crank Diagnostic serves as an aid in diagnosing the concern and is intended to be used as a general guide, since each no crank condition can be unique.

The No Crank Diagnostic Test assumes all of the following to be true:

- Communication to all configured modules in the vehicle is possible with the scan tool.
- The condition is currently present.
- The TCM, PCM, RF HUB, and BCM are at the latest calibration (part number) levels.
- There are no active DTCs.
- There are no applicable Recalls.
- There are no applicable TSBs.
- There are no PCM inhibits (i.e. RPM, Trans Range, Clutch).
- The FOBs complete function and operation is correct.
- All battery cables and connections are clean and tight.
- There are no open fuses.
- The battery is fully charged and can pass a load test from the GR8 tester.
- The engine rotates freely.
- Any aftermarket equipment/wiring that has been installed is operating correctly.

Starter Relay Operation

In a no crank condition the Starter Relay can be missing power at pin 85, feed at pin 30, controlled ground at pin 86 or output at pin 87. Further explanation of how a relay operates is listed below:

- Pin 85 receives power from the BCM once the parameters for the Ignition Switch position and status, and all inhibit monitors (i.e. clutch switch, RPM, etc.) are satisfied.
- Pin 30 is a constant B+ feed.
- Pin 86 is a controlled ground by a module (i.e. PCM or BCM). Once power is sent from the BCM to the pin 85 of the relay it passes through a coil and leaves the relay through pin 86 to the control module.

- Pin 87 is an output circuit to the Starter solenoid. Once the circuit on pin 86 is grounded by the control module, the coil winding in the relay magnetically pulls the internal switch closed. When the internal switch is closed the power at pin 30 is sent to pin 87 of the relay.

DIAGNOSIS AND TESTING > NO CRANK (BCM EQUIPPED) > DIAGNOSTIC TEST

1. STARTER RELAY CHECK

1. When attempting to start the vehicle, listen and if needed feel for a click at the starter relay in the PDC.



NOTE:

Some starter relays are internal to a module and may not be accessible, making it more difficult to hear, or feel the clicking response. It is possible for a poor ground or the Trans Range Sensor position to be lost causing the starter to click once.

Did you hear an audible click at the relay or starter?

Yes

1. Go To Step 9

No

1. Go To Step 2

2. STARTER RELAY INPUT CHECK

1. Use a 12 volt test light/DVOM to check for power at pin 85 of the starter relay.

Is there Power/12 volts at pin 85?

Yes

1. Go To Step 8

No

1. Go To Step 3

3. RF HUB OPERATION

1. Using the scan tool, confirm the ignition switch status changes in the RF HUB under the data display screen for the "Sensor" values.

Does the ignition switch status on the data screen match the physical position of the KIN/IGNM?

Yes

1. Go To Step 5

No

1. Go To Step 4

4. REMOTE START ANTENNA



NOTE:

If the vehicle is not equipped with Remote Start, proceed to the next test step.

1. Cycle the ignition off.
2. Disconnect the Remote Start Antenna from the RF HUB.
3. Using one FOB/IK and sitting in the driver's seat, attempt to start the vehicle.

Did the vehicle start?

Yes

1. Replace the Remote Start Antenna in accordance with the Service Information.
2. Perform the BODY VERIFICATION TEST. Refer to BODY VERIFICATION TEST

No

1. Go To Step 5

5. BCM IGNITION STATUS

1. Using the scan tool, confirm the ignition switch status changes in the BCM under the data display screen for the "Bussed Input" and "Sensor" values.



NOTE:

The change of status in the BCM for the "Sensor" value validates the voltage activity (with very low amperage) of the F20 circuit.

In the BCM, do both values for the ignition switch status match; and do they match those in the RF HUB?

Yes

1. Go To Step 6

No

1. If the status of the Ignition Switch position is not changing under the "Sensor" value, check the F20 circuit at the BCM for battery voltage with a DVOM (not a test light).

2. If there is Battery voltage **at the BCM on the F20 circuit** verify all power, ground and bus circuits are OK for the BCM. If no problem found replace the BCM in accordance with Service Information. (Refer to MODULE, BODY CONTROL).
3. If there is **NO** Battery voltage **at the BCM** on the F20 circuit, then check for voltage on the F20 circuit at the RF HUB.
4. If there is Battery voltage **coming out of the RF HUB on the F20 circuit** , check the F20 circuit between the RF HUB and BCM for a short, open condition or high resistance.
5. If there is **NO** Battery voltage **coming out of the RF HUB on the F20 circuit** verify all power, ground & communication circuits, & connections to the RF HUB prior to replacing. (Refer to MODULE, RADIO FREQUENCY (RF HUB)).
6. In the data screen, if the status of the Ignition Switch was not changing under the "Bussed Input" value, further diagnosis is needed between the RF HUB, (bus circuits, connections) and the BCM.

6. PCM IGNITION, TRANS RANGE/CLUTCH SWITCH STATUS VERIFICATION

1. Using the scan tool confirm there are no inhibits that have been triggered in the PCM (i.e. Ignition Switch, Trans Range or Clutch Switch) and any switch inputs (filtered states) relating to the starting system function and operate correctly under the data display screen.

Does the PCM show any inhibits (**not DTCs**) for starting (**not remote starting**)?

Yes

1. Correct the inhibit reason listed.
2. If no problem can be found, then verify all power, ground and bus circuits to the PCM and replace the PCM in accordance with the Service Information. (Refer to MODULE, POWERTRAIN CONTROL).

No

1. Go To Step 7

7. BCM TO STARTER RELAY POWER INPUT CHECK

1. At this time if all the correct inputs for the ignition switch status are correct in the RF HUB, BCM and PCM, verify both power feeds are present (pin 30 and 85) to the Starter Relay while in the crank position.

Are both power feeds present at the relay when the ignition is in the crank position?

Yes

1. Go To Step 8

No

1. If, there is no power to pin 30 or 85, no DTCs, TSBs, Recalls, or Inhibits replace the BCM in accordance with Service Information. (Refer to MODULE,

BODY CONTROL).

8. STARTER RELAY CONTROL CIRCUIT CHECK

1. Using a test light/DVOM determine if the Starter Control circuit at pin 86 of the relay is missing ground (at the relay if equipped with a removable relay or wiring to the internal relay) when the ignition is in the crank position.

Was the Starter Control circuit for pin 86 being grounded when the ignition was in the crank position?

Yes

1. Go To Step 10

No

1. Verify the Starter Relay Control circuit from pin 86, has no shorts, opens or high resistance on the wiring going from the Starter Relay in the BCM (or PDC) to the PCM.
2. Verify the cables do not have excessive resistance by performing a voltage drop on the battery cables.

9. STARTER RELAY OUTPUT CIRCUIT CHECK



NOTE:

At this point in the test, when the key is in the crank position power has been verified at Pin 30 & 85, along with the control circuit being grounded for pin 86.

1. Remove the Starter Relay Output circuit connector from the Starter solenoid.
2. Using a test light/DVOM and ignition in the crank position check for power at pin 87 (If equipped with a removable relay or wiring to the internal relay) of the relay and at the connection to the starter.

Was there power at pin 87 for the output circuit?

Yes

1. Go To Step 10

No

1. If power is missing to pin 30 of the starter relay the BCM is suspect. Verify all power, ground, communication circuits and connections to the BCM before replacing in accordance with service information.
2. If power is missing at pin 87 of the starter relay and the relay is replaceable, change out the relay and recheck the concern. If a known good relay causes no change, check the Starter Output circuit from pin 87 of the relay to the starter for an open, short, excessive resistance, or poor connections to the solenoid or starter.

3. Verify and Inspect the Starter to ensure it is free of corrosion, oil, and there is no damage, or binding conditions.
4. Verify that all wiring, cables and connections are clean and tight.

10. STARTER RELAY OUTPUT CIRCUIT LOAD TEST

1. Load test the Starter Relay output circuit going from the BCM to the Starter.

Does the starter relay output circuit pass the load test?

Yes

1. Verify that all connections are clean, tight and there is no damage to starter when fully inspected. If no problem found then replace the Starter in accordance with Service Information. (Refer to STARTER).

No

1. Adjust the shift cable in accordance with the Service Information. Perform the POWERTRAIN VERIFICATION TEST. Refer to the appropriate TESTING & DIAGNOSTICS article in ENGINE PERFORMANCE.

DIAGNOSIS AND TESTING > REMOTE START INOPERATIVE (BCM - RF HUB EQUIPPED)

For a complete wiring diagram, **refer to SYSTEM WIRING DIAGRAMS article** .

DIAGNOSIS AND TESTING > REMOTE START INOPERATIVE (BCM - RF HUB EQUIPPED) > THEORY OF OPERATION

The customer may notice that the signal range of the Remote Keyless Entry (RKE) system is reduced. This condition may be due to the RKE antenna where the RKE key fob may need to be closer than 3 meters (10 feet) before the functions available on the key fob will operate. The diagnostic test is provided as a diagnostic aid for the dealer technician.

It is necessary to confirm the correct sales code(s) are present in the Standard and Optional Equipment sections of DealerCONNECT to determine if a factory or a Mopar® Accessory Remote Start kit was installed. If the vehicle has a Mopar® Accessory Remote Start kit, verify that at least 20 minutes has elapsed since the sales codes were added to DealerCONNECT. Once it has been confirmed that the proper sales codes have been added and the allotted time has passed, verify the vehicle has been configured properly using the scan tool. Also, make sure that the system shows as enabled in the BCM and that the temporary remote start override is set to disabled.

For any further assistance on diagnosing the installed Mopar® Accessory kit contact the Mopar® Accessories group at 800-84-MOPAR (66787).

DIAGNOSIS AND TESTING > REMOTE START INOPERATIVE (BCM - RF HUB

EQUIPPED) > DIAGNOSTIC TEST

1. REMOTE START FUNCTION

 NOTE:

In some cases the vehicle will start then stall, indicating a fuel level concern (less than a quarter of a tank). Before proceeding verify there is enough fuel in the tank for the vehicle to start and run.

1. Attempt to start the vehicle with the FOBIK.

Does the vehicle start when using the FOBIK?

Yes

1. At this time the Remote Start is functioning properly.
2. Using the scan tool, check for any related Starting, Communication, or Ignition related DTCs that may inhibit the Remote Starting feature. Check the BCM for any previous Remote Start Inhibits and mileage that were stored. Inhibits may be found under the system tests or miscellaneous functions tab.

No

1. Go To Step 2

2. REMOTE START VISUAL CHECK

1. While pressing the remote start button on the FOBIK, observe the exterior lights and the horn operation.

Does the horn sound and the exterior parking lights flash?

Yes

1. Go To Step 3

No

1. Go To Step 4

3. CHECKING BCM INHIBITS

 NOTE:

Since the horn sounds and the parking lights flash, this verifies the BCM is receiving the CAN BUS message from the RF HUB. It also verifies the RF signal for Remote Start from the FOBIK to the RF HUB is operating correctly.

1. Using the scan tool, check the Remote Start inhibits of the BCM or any ACTIVE DTCs listed in all modules.



NOTE:

Inhibits may be found under the system tests or miscellaneous functions tab. The fuel level may not be a listed inhibit.

Are there any Remote Start inhibits or any ACTIVE DTCs listed in the entire vehicle?

Yes

1. For any inhibits for a complete list of Remote Start inhibits. Refer to DIAGNOSIS AND TESTING .
2. For any ACTIVE DTCs, perform the appropriate diagnostic procedure in DTC INDEX .

No

1. Check for any related TSBs prior to replacing the BCM. If no related TSBs are found, then replace the BCM in accordance with the Service Information. (Refer to MODULE, BODY CONTROL).

4. RKE FUNCTION SHORT RANGE

1. While standing next to the Driver door and using the FOB/K, attempt to lock and unlock the doors.

Does the RKE function properly?

Yes

1. Go To Step 5

No

1. Go To Step 7

5. RKE FUNCTION MID RANGE

1. While standing 20 feet from the vehicle and using the FOB/K, attempt to lock and unlock the doors.

Does the RKE function properly at 20 feet?

Yes

1. Go To Step 6

No

1. Go To Step 7

6. RKE FUNCTION LONG RANGE

1. While standing 100 feet from the vehicle and using the FOB/K, attempt to lock and unlock the doors.

Does the RKE function properly at 100 feet?

Yes

1. Go To Step 9

No

1. Go To Step 7

7. FOBIK SIGNAL STRENGTH

1. Use the RF Tester 9001 to check the signal strength of the FOBIK.

Does the FOBIK pass?

Yes

1. Go To Step 10

No

1. Go To Step 8

8. CHECKING THE FOBIK

1. Replace the battery in the FOBIK with a known good battery and recheck the signal from the FOBIK with the RF Tester 9001.

Does the FOBIK pass?

Yes

1. Go To Step 9

No

1. Check for any related TSBs prior to replacing the FOBIK. If no related TSBs are found, then replace the FOBIK in accordance with the Service Information.

9. CHECKING FOR ACTIVE DTCs

 **NOTE:**

The RKE portion of the FOBIK is operational, this verifies that the RF HUB is capable of receiving signals and communicating to operate the locks.

1. Use the scan tool to check for ACTIVE DTCs.

Did the scan tool show any ACTIVE DTCs in the entire vehicle?

Yes

1. Diagnose the DTCs in accordance with the Service Information before proceeding with the Remote Start Inoperative concern.

No

1. Go To Step 10

10. CHECKING THE RF HUB



NOTE:

Even though the RKE function of the system may work with no concern, the BCM is either not receiving a message or is receiving a corrupt message from the RF HUB for remote start operation.

1. While sitting in the driver seat and using the scan tool, monitor the RF HUB on the data display screen for changes when the Remote Start button of the FOB/K is pressed.

Did the status change when the Remote Start button of the FOB/K was pressed?

Yes

1. Go To Step 11

No

1. Go To Step 12

11. CHECKING BCM INHIBITS



NOTE:

The parking lights flash and the horn are inoperative when using the FOB/K, this indicates a faulty BCM or "Inhibit" that may be preventing the start request from occurring.

1. Use the scan tool to check for any Remote Start inhibits listed in the BCM. This may be found under the system tests or miscellaneous functions tab.

Were there any Remote Start inhibits listed in the BCM?

Yes

1. Perform the REMOTE START SYSTEM Diagnosing and Testing. Refer to DIAGNOSIS AND TESTING .

No

1. If this has had a Mopar® Accessory kit installed verify the correct Sales Code for Remote Start has been added to Dealer Connect and a Restore Vehicle Configuration has been performed.
2. Confirm the system is enabled; and the temporary Remote Start override is set to disabled in the BCM and contact the Mopar® Accessories group (800-84-

Mopar) for further details before proceeding.

3. If this has a factory installed Remote Start, check for any related TSBs prior to replacing the BCM. If no related TSBs are found, then replace the BCM in accordance with the Service Information.

12. CHECKING THE REMOTE START ANTENNA

1. Cycle the ignition off
2. Disconnect the Remote Start antenna from the RF Hub.
3. Using one FOB/K and sitting in the driver's seat, attempt to start the vehicle.

Did the vehicle start?

Yes

1. Replace the Remote Start Antenna in accordance with the Service Information.
2. Perform the BODY VERIFICATION TEST. Refer to BODY VERIFICATION TEST .

No

1. Verify all power, ground, communication circuits, & connections to the RF HUB prior to replacing. (Refer to MODULE, RADIO FREQUENCY (RF HUB)).