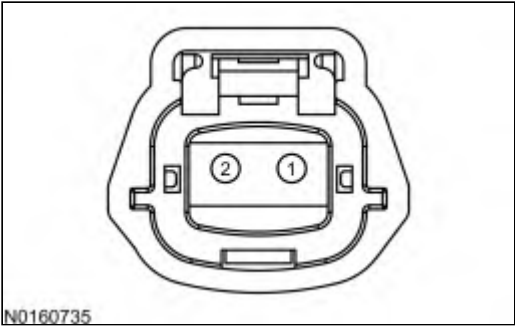


HU: Intake Air Systems

This pinpoint test is intended to diagnose the following:

- air cleaner assembly (including air cleaner element) (9600)
- air inlet tube (9F843)
- clean air tube hose and resonator (9R504) and (9F593)
- intake manifold runner control bank 1 (IMRC1) solenoid (9J559)
- intake manifold runner control bank 2 (IMRC2) solenoid (9J559)
- intake manifold runner control bank 1 (IMRC1) sensor (9P471)
- intake manifold runner control bank 2 (IMRC2) sensor (9P471)
- throttle body assembly (9E926)
- harness circuits: IMRC, IMRC1, IMRC1A, IMRC2, IMRC2A, SIGRTN, VPWR and VREF
- PCM (12A650)

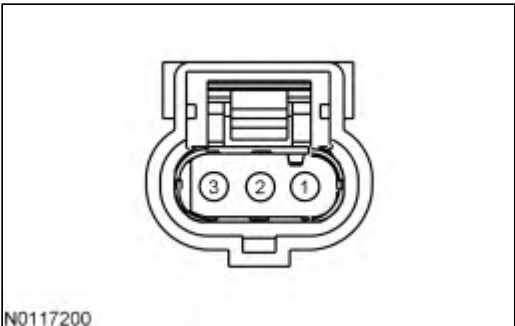
Intake Manifold Runner Control Bank 1 (IMRC1) Solenoid Connector



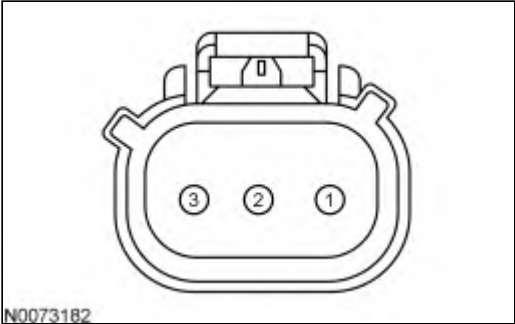
Pin	Circuit
1	VPWR (Vehicle Power)
2	IMRC1A (Intake Manifold Runner Control Bank 1 Actuator)

Intake Manifold Runner Control Bank 1 (IMRC1) Sensor Connector

A

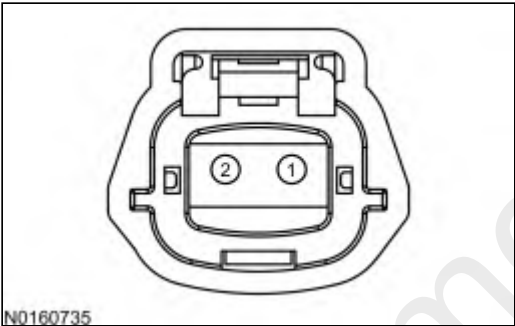


B



Vehicle	Connector	Pin	Circuit
F-150	A	2 1 3	IMRC1 SIGRTN VREF
F-Series Super Duty, Mustang	B	1 3 2	IMRC1 SIGRTN VREF

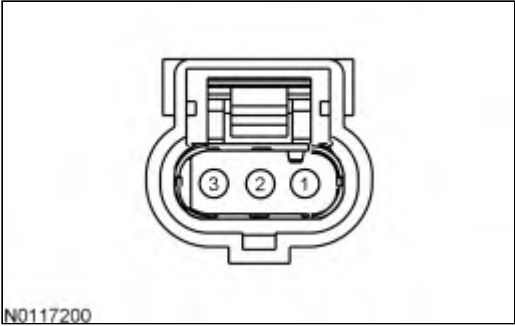
Intake Manifold Runner Control Bank 2 (IMRC2) Solenoid Connector



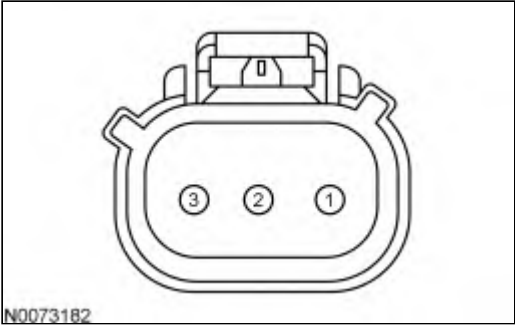
Pin	Circuit
1	VPWR (Vehicle Power)
2	IMRC2A (Intake Manifold Runner Control Bank 2 Actuator)

Intake Manifold Runner Control Bank 2 (IMRC2) Sensor Connector

A



B



Vehicle	Connector	Pin	Circuit
F-150	A	2 1 3	IMRC2 SIGRTN VREF
F-Series Super Duty, Mustang	B	1 3 2	IMRC2 SIGRTN VREF

Powertrain Control Module (PCM) Connector

For PCM connector views or reference values, refer to Section 6, Reference Values.

Vehicle	Connector	Pin	Circuit
Mustang 5.0L	306 PIN	E27 E7 E15 E15	IMRC2 IMRC1 IMRC2A IMRC1A
Mustang 5.2L	198 PIN	E44 E45 E59 E60	IMRC2 IMRC1 IMRC2A IMRC1A

Vehicle	Connector	Pin	Circuit
All other vehicles	306 PIN	E27 E7 E15	IMRC2 IMRC1 IMRC1A

HU1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)

Are DTCs P0505, P0506, P2004, P2005, P2006, P2007, P2008, P2011, P2014, P2015, P2016, P2017, P2019, P2020, P2021 or P2022 present?

Yes	For DTCs P0505 or P0506, GO to HU2 . For all others, GO to HU6 .
No	GO to HU2 .

HU2 CHECK THE BASE IDLE SPEED

Note: The vehicle must be at operating temperature and at idle for a minimum of 1 minute.

- Ignition ON, engine running.
- Determine if the idle speed is incorrect. Refer to the Section 6 Typical Reference Value Charts, if necessary.
- Access the PCM and monitor the RPM (RPM) PID.

Is vehicle idle speed correct?

Yes	GO to HU4 .
No	GO to HU3 .

HU3 CHECK FOR VACUUM LEAKS

- Listen for vacuum leaks.
- Inspect the entire intake air system from the mass airflow (MAF) sensor to the intake manifold for leaks such as:
 - cracked or punctured intake air tube.
 - loose connections on the intake air tube at the air cleaner housing or throttle body
 - EGR valve gasket leak to intake manifold
 - intake manifold assembly or gasket
 - EGR valve diaphragm or control solenoid
 - vacuum supply connectors and hose

Are any leaks present?

Yes	REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.
No	GO to HU4 .

HU4 CHECK THE INTAKE AIR SYSTEM FOR LEAKS, OBSTRUCTIONS AND DAMAGE

- Ignition OFF.
- Remove the air cleaner element. Check the air cleaner for restrictions.
- Check for restrictions between the air inlet and the throttle body.

Are any concerns present?

Yes	REMOVE the restriction. INSTALL a new air cleaner element. REFER to the Workshop Manual Section 303-12, Intake Air Distribution and Filtering. Clear the PCM DTCs. REPEAT the self-test.

No	REINSTALL the air cleaner element. GO to HU5 .
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HU5 CHECK THE POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

Note: A high idle may indicate a vacuum leak.

- Check for any PCV system leaks.

Is a concern present?

Yes	REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.
No	For Aviator, Corsair, Escape/Kuga, Explorer, F-650 / F-750, F-Series Super Duty, Flex, Fusion, MKZ, Motorhome / Stripped Chassis / Step Van, Mustang, Navigator, Ranger 2.3L, Transit, Transit Connect 2.0L, and Transit Connect 2.5L, GO to HU15 . For all others, Unable to duplicate or identify the concern at this time. RETURN to Section 3, Symptom Charts for further direction.

HU6 VISUAL INSPECTION FOR DISCONNECTED IMRC LINKAGE

- Inspect the IMRC for any disconnected or damaged linkages.
- Inspect the IMRC solenoid and vacuum lines for correct connection, damage, vacuum leaks or restrictions.
- Disconnect the IMRC linkage.
- Inspect the linkage for restrictions. Spring tension in one direction is normal.
- Rotate the IMRC plate to fully open and to fully closed, contacting both limits.
- Check for restrictions during rotation.

Is a concern present?

Yes	REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.
No	GO to HU7 .

HU7 CHECK THE FUNCTIONALITY OF THE IMRC

 **WARNING:** Keep fingers clear of the mechanism. Failure to follow these instructions may result in personal injury.

Note: On vacuum operated systems the engine must run for 20 seconds to restore vacuum between state commands.

- Connect the IMRC linkage.

- Ignition ON, engine running.
- Access the PCM and monitor the IMRC1M (VOLT) and IMRC2M (VOLT) PIDs.
- Access the PCM and control the IMRC (MODE) PID.
- Command the IMRC PID to ON and then to OFF.

Do the IMRC1M and IMRC2M PIDs indicate full travel of the IMRC plates?

Yes	The concern is an intermittent. GO to Pinpoint Test Z .
No	For DTCs P2008 or P2011, GO to HU8 . For all others, GO to HU11 .

HU8 CHECK IMRC SOLENOID COIL FOR AN OPEN

- Ignition OFF.
- For DTC P2008,
- IMRC1 Solenoid connector disconnected.
- Measure the resistance between:

(+) IMRC1 Solenoid Connector, Component Side	(-) IMRC1 Solenoid Connector, Component Side
IMRC1A - Pin 2	VPWR - Pin 1

- For all others,
- IMRC2 Solenoid connector disconnected.
- Measure the resistance between:

(+) IMRC2 Solenoid Connector, Component Side	(-) IMRC2 Solenoid Connector, Component Side
IMRC2A - Pin 2	VPWR - Pin 1

Is the resistance between 22 - 26 ohms?

Yes	GO to HU9 .
No	INSTALL a new IMRC solenoid. REFER to the Workshop Manual Section 303-01, Engine. Clear the PCM DTCs. REPEAT the self-test.

HU9 CHECK THE VPWR CIRCUIT FOR AN OPEN

- Ignition OFF.
- For DTC P2008,
- IMRC1 Solenoid connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) IMRC1 Solenoid Connector, Harness Side	(-)
VPWR - Pin 1	Ground

- For all others,
- IMRC2 Solenoid connector disconnected.
- Ignition ON, engine OFF.

- Measure the voltage between:

(+) IMRC2 Solenoid Connector, Harness Side	(-)
VPWR - Pin 1	Ground

Is the voltage greater than 10.5 V?

Yes	GO to HU10 .
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

HU10 CHECK THE IMRC CIRCUIT FOR AN OPEN

- Ignition OFF.
- PCM connector disconnected.
- For DTC P2008,
- Measure the resistance between:

(+) IMRC1 Solenoid Connector, Harness Side	(-) PCM Connector, Harness Side
IMRC1A - Pin 2	IMRC1A

- For all others,
- Measure the resistance between:

(+) IMRC2 Solenoid Connector, Harness Side	(-) PCM Connector, Harness Side
IMRC2A - Pin 2	IMRC2A

Is the resistance less than 5 ohms?

Yes	INSTALL a new IMRC solenoid. REFER to the Workshop Manual Section 303-01, Engine.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

HU11 CHECK THE VREF CIRCUIT FOR AN OPEN

- Ignition OFF.
- For DTCs P2004, P2006, P2014, P2015, P2016, or P2017,
- IMRC1 Sensor connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) IMRC1 Sensor Connector, Harness Side	(-) IMRC1 Sensor Connector, Harness Side
VREF	SIGRTN

- For all others,
- IMRC2 Sensor connector disconnected.
- Ignition ON, engine OFF.

- Measure the voltage between:

(+) IMRC2 Sensor Connector, Harness Side	(-) IMRC2 Sensor Connector, Harness Side
VREF	SIGRTN

Is the voltage between 4.5 - 5.5 V?

Yes	GO to HU12 .
No	GO to Pinpoint Test C .

HU12 CHECK THE IMRCM CIRCUIT FOR AN OPEN

- Ignition OFF.
- PCM connector disconnected.
- For DTCs P2004, P2006, P2014, P2015, P2016, or P2017,
- Measure the resistance between:

(+) IMRC1 Sensor Connector, Harness Side	(-) PCM Connector, Harness Side
IMRC1	IMRC1

- For all others,
- Measure the resistance between:

(+) IMRC2 Sensor Connector, Harness Side	(-) PCM Connector, Harness Side
IMRC2	IMRC2

Is the resistance less than 5 ohms?

Yes	GO to HU13 .
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

HU13 CHECK FOR A SHORT TO GROUND

- For DTCs P2004, P2006, P2014, P2015, P2016, or P2017,
- Measure the resistance between:

(+) IMRC1 Sensor Connector, Harness Side	(-)
IMRC1	Ground

- For all others,
- Measure the resistance between:

(+) IMRC2 Sensor Connector, Harness Side	(-)
IMRC2	Ground

Is the resistance greater than 10K ohms?

Yes	GO to HU14 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

HU14 CHECK THE IMRC1 OR IMRC2 CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- For DTCs P2004, P2006, P2014, P2015, P2016, or P2017,
- Measure the voltage between:

(+) IMRC1 Sensor Connector, Harness Side	(-)
VREF	Ground

- For all others,
- Measure the voltage between:

(+) IMRC2 Sensor Connector, Harness Side	(-)
VREF	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	INSTALL a new IMRC1 or IMRC2 sensor. REFER to the Workshop Manual Section 303-01, Engine. Clear the PCM DTCs. REPEAT the self-test.

HU15 PRELIMINARY DIAGNOSIS FOR IDLE AIR CONCERNS

- Ignition ON, engine OFF.

Are any DTCs present other than P0505 or P0506?

Yes	DISREGARD the current diagnostic trouble code (DTC) at this time. DIAGNOSE the next DTC. GO to Section 4, Diagnostic Trouble Code (DTC) Charts and Descriptions .
No	GO to HU16 .

HU16 MONITOR THE INTAKE AIR SYSTEM RELATED PIDS

Note: Verify the vehicle has reached the normal engine coolant operating temperature of 77°C (170°F). Allow the engine to idle an additional 5 minutes.

Note: All PIDs may not be available on all vehicles.

- Access the PCM and monitor the ECT (TEMP) and ECT1 (TEMP) PIDs.
- Access the PCM and monitor the ETC_TRIM (ANGL) PID.
- Access the PCM and monitor the IACTRIM (NUM) and IACKAM2 (NUM) PIDs.
- Mathematically add and record the value of the IACTRIM PID to the IACKAM2 PID value, for the total IAC value at idle.

Is the ETC_TRIM PID angle equal to 3.5 degrees or is the total IAC value greater than 0.5 lb/min?

Yes	INSTALL a new throttle body assembly. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. Clear the PCM DTCs. REPEAT the self-test.
No	RETURN to Section 3, Symptom Charts for further direction.

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