RH: Reductant Heater

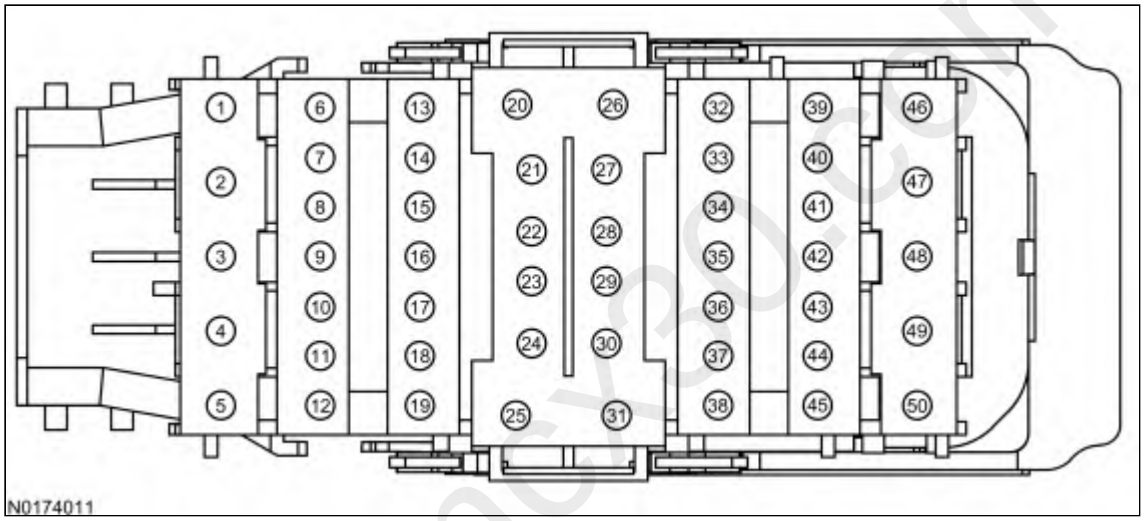
Note: *Regeneration may occur during normal operation. During regeneration, diagnostic procedures may display biased values. If a regeneration occurs during diagnostic procedures, allow the process to complete before continuing diagnostics.*

This pinpoint test is intended to diagnose the following:

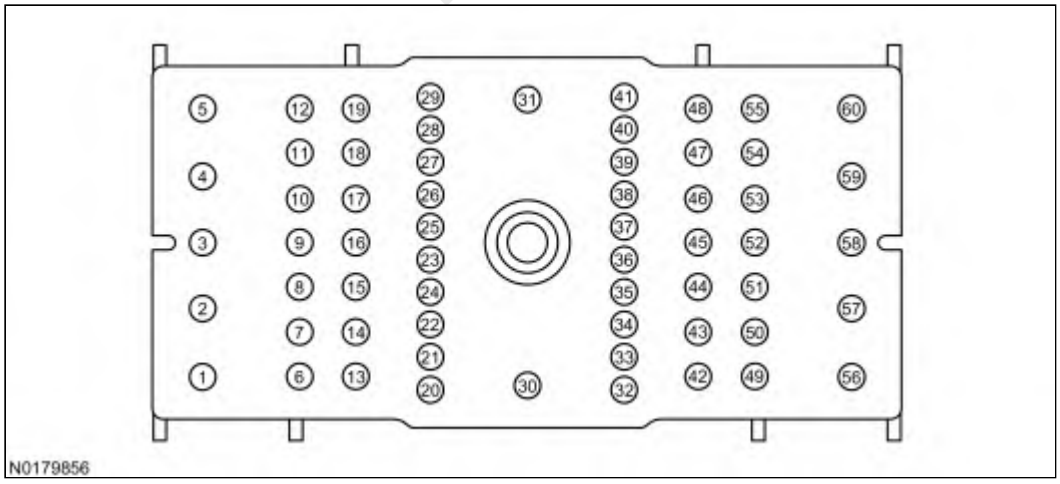
- reductant heaters
- harness circuits: GND, RDHTRC1, RDHTRC2, RDHTRC3 and RDHTRPWR
- glow plug control module (GPCM)
- reductant dosage control module (5H298)

Battery Junction Box-B (BJB-B) Connector

A



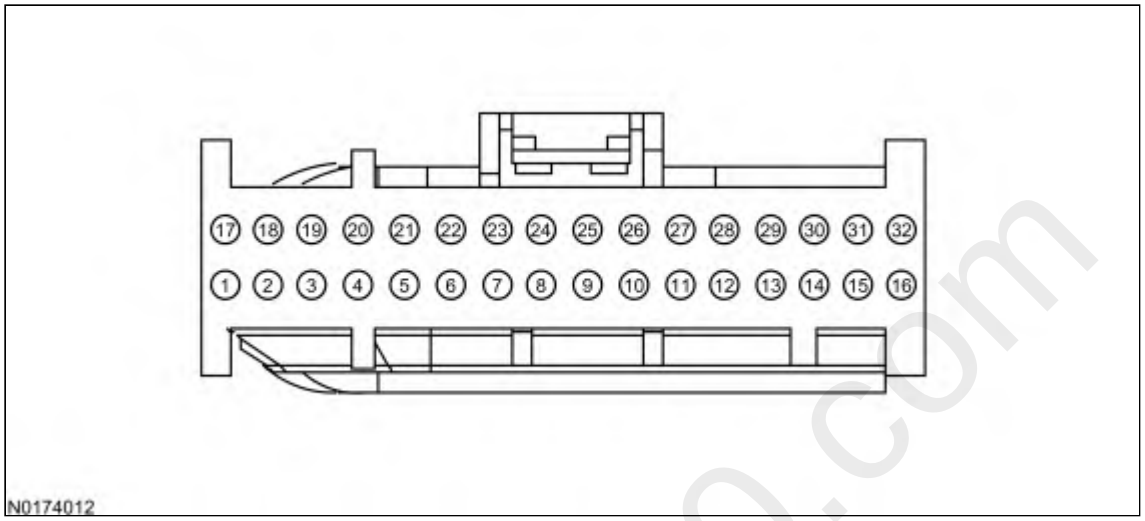
B



Vehicle	Connector	Pin	Circuit

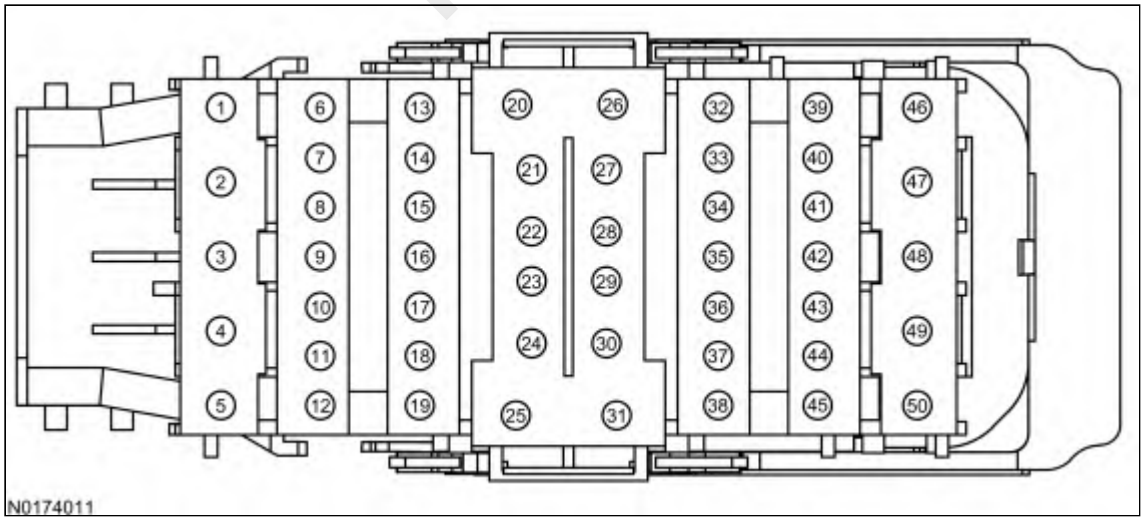
Vehicle	Connector	Pin	Circuit
F-150	A	42	GND
F-Series Super Duty	B	48 40 39	RDHTRPWR RDHTRCTRL GND

Battery Junction Box-C (BJB-C) Connector



Pin	Circuit
28	RDHTRCTRL (Reductant Heater Control)

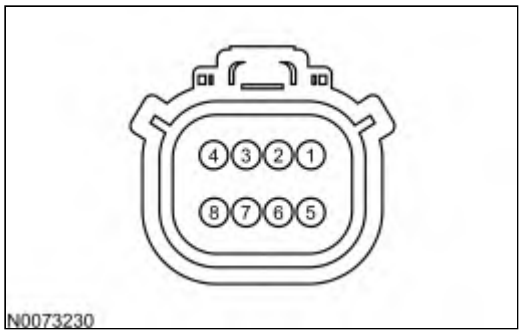
Battery Junction Box-D (BJB-D) Connector



Pin	Circuit

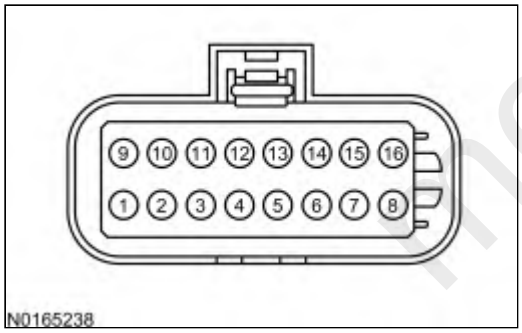
Pin	Circuit
50	RDHTRPWR (Reductant Heater Power)

Reductant Heater and Sender Assembly Connector



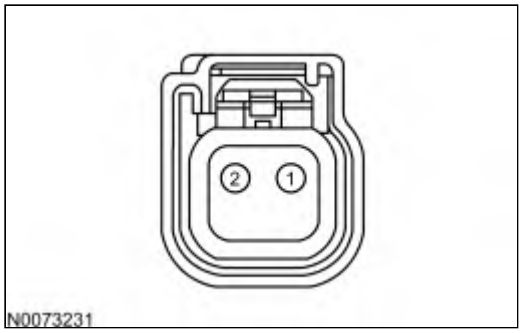
Pin	Circuit
2	GND (Ground)
1	RDHTRC1 (Reductant Heater Control 1)

Reductant Pump Assembly Connector



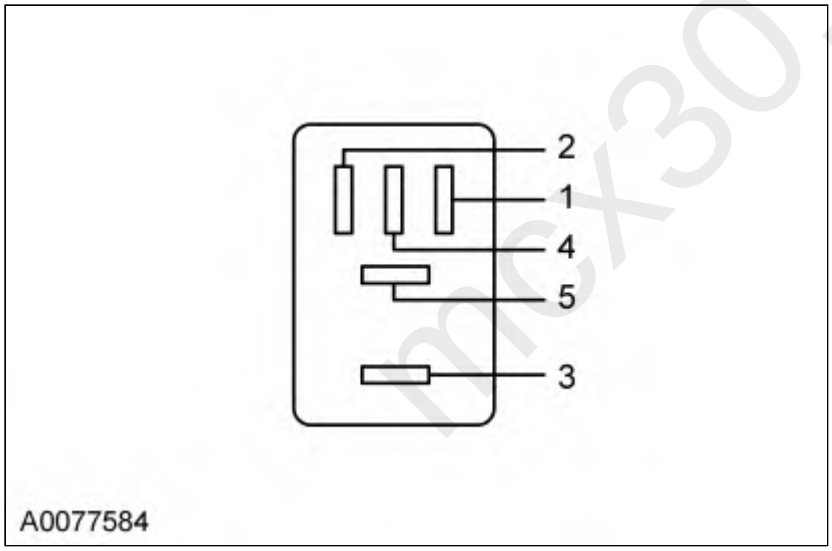
Pin	Circuit
15	GND (Ground)
11	GND (Ground)
9	RDHTRC1 (Reductant Heater Control 1)

Reductant Pressure Line Heater Assembly Connector



Vehicle	Connector	Pin	Circuit
Transit	A	2 1	RDHTRC3 GND
Transit Connect	A	1 2	GND RDHTRC2
All other vehicles	A	2 1	GND RDHTRC2

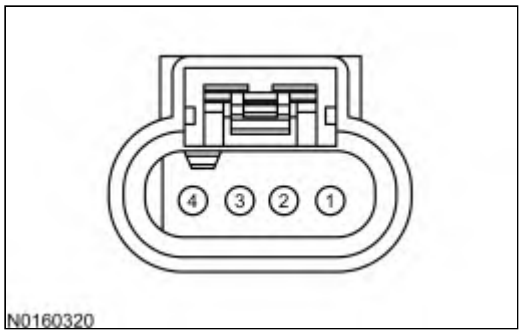
Reductant Heater Relay Connector



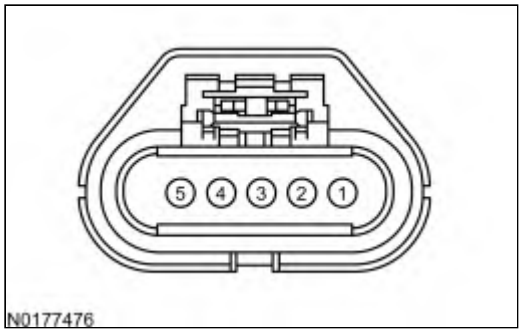
Pin	Circuit
1	RDHTRCTRL (Reductant Heater Control)
5	RDHTRPWR (Reductant Heater Power)
2	GND (Ground)
3	B+ (Battery Positive Voltage)

Reductant Quality Module Connector

A

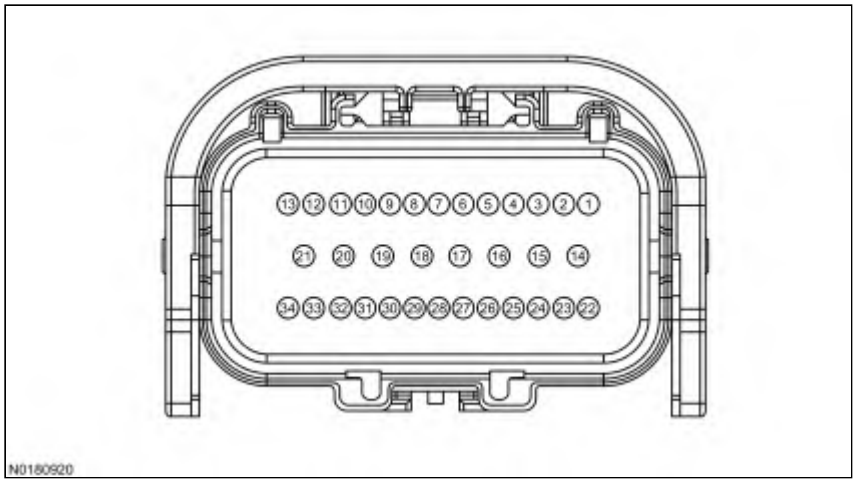


B



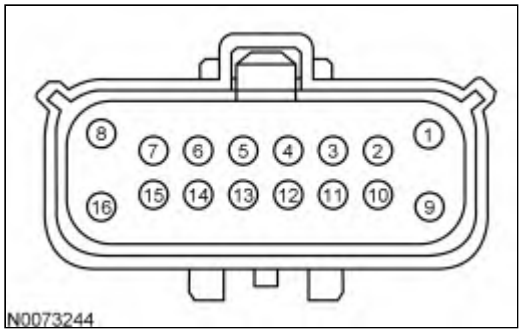
Vehicle	Connector	Pin	Circuit
F-650 / F-750, F-150, F-Series Super Duty	A	1	GND
Transit, Transit Connect	B	2 1	GND RDHTRC1

Glow Plug Control Module-B (GPCM-B) Connector



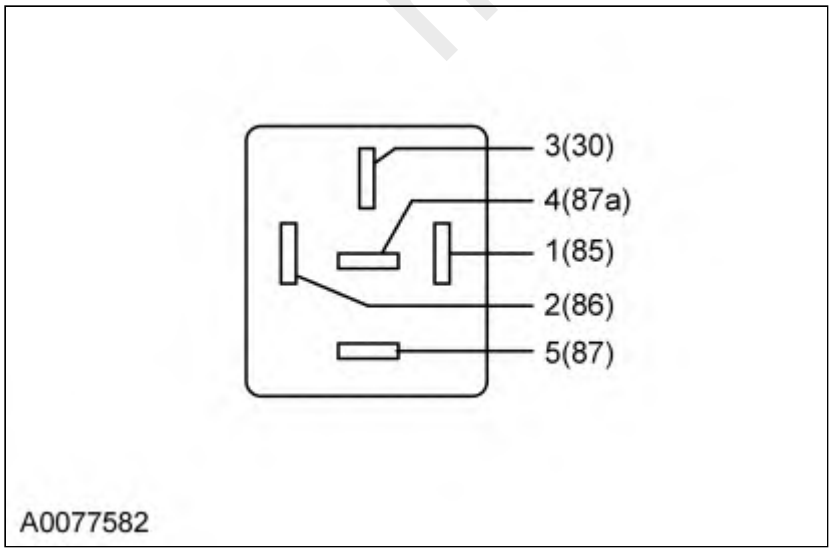
Pin	Circuit
22	RDHTRC2 (Reductant Heater Control 2)
1	RDHTRC1 (Reductant Heater Control 1)
14	RDHTRPWR (Reductant Heater Power)
28	RDHTRCTRL (Reductant Heater Control)

Glow Plug Control Module-C (GPCM-C) Connector



Pin	Circuit
13	RDHTRC2 (Reductant Heater Control 2)
15	RDHTRC1 (Reductant Heater Control 1)
2	RDHTRCTRL (Reductant Heater Control)
16	RDHTRPWR (Reductant Heater Power)

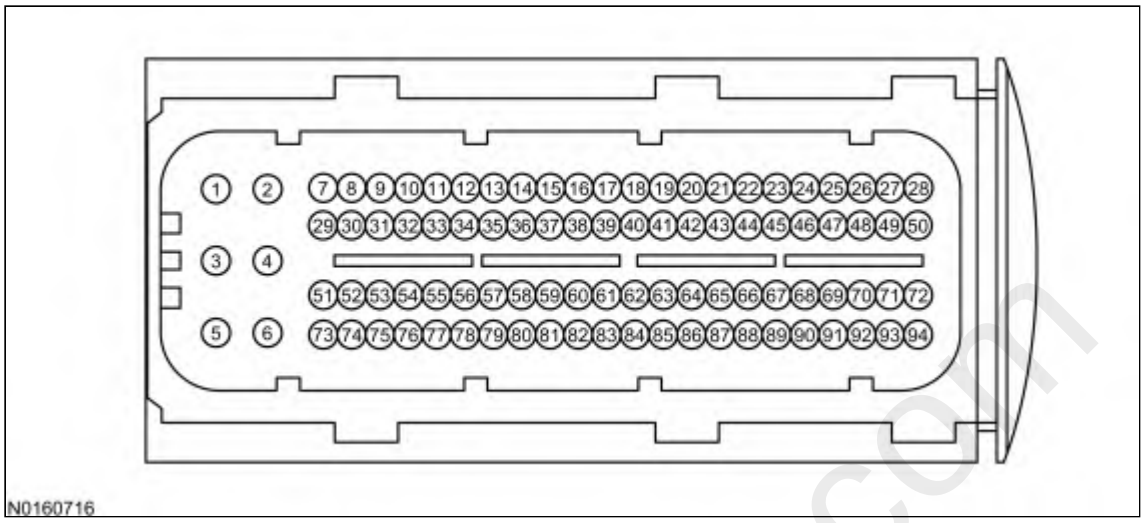
Reductant Dosage Control Module Relay Connector



Pin	Circuit

Pin	Circuit
5	VPWR (Vehicle Power)
1, 3	B+ (Battery Positive Voltage)

Reductant Dosage Control Module Connector



Vehicle	Connector	Pin	Circuit
Transit Connect	A	6	RDHTRC2
		2	RDHTRC1
		1, 3, 5	VPWR
		89	RDCMRC
Transit	A	6	RDHTRC2
		2	RDHTRC1
		4	PWRGND
		1, 3, 5	VPWR
		89	RDCMRC

RH1 PRELIMINARY DIAGNOSIS
Are DTCs P209F, P20B9, P20BA, P20BB, P20BC, P20BD, P20BE, P20BF, P20C0, P20C1, P20C2, P20C3, P20C4, P214F, P21C2, P21C3, P21C4, P21C7, P21DD, P221C or P221D present?

Yes	For F-150 and F-Series Super Duty, GO to RH26. For F-650 / F-750 with DTCs P20BD, P20BF, P20BE, P20C0, P221C or P221D, GO to RH16. For F-650 / F-750 with DTCs P209F, P20B9, P20BA, P20BB, P20BC, P214F or P21DD, GO to RH12. For Transit and Transit Connect, GO to RH8. For all others, GO to RH2.
No	RETURN to Section 3, Symptom Charts for further direction.

RH2 CHECK THE REDUCTANT HEATER RELAY

- Carry out the reductant heater relay component test. Refer to the Wiring Diagrams Cell 149 Component Testing.

Is a concern present?

Yes	INSTALL a new Reductant Heater relay. Clear the GPCM and PCM DTCs. REPEAT the self-test.
No	GO to RH3.

RH3 CHECK THE REDUCTANT HEATER RELAY B+ CIRCUIT

- Reductant Heater Relay connector disconnected.
- Measure the voltage between:

(+) Reductant Heater Relay Connector, Harness Side	(-)
B+ - Pin 3	Ground

Is the voltage greater than 10.5 V?

Yes	GO to RH4.
No	REPAIR the open circuit. Clear the GPCM and PCM DTCs. REPEAT the self-test.

RH4 CHECK THE REDUCTANT HEATER RELAY GND CIRCUIT

- Measure the resistance between:

(+) Reductant Heater Relay Connector, Harness Side	(-)
GND - Pin 2	Ground

Is the resistance less than 5 ohms?

Yes	GO to RH5.
No	REPAIR the open circuit. Clear the GPCM and PCM DTCs. REPEAT the self-test.

RH5 CHECK THE REDUCTANT HEATER RELAY CIRCUITS FOR AN OPEN

- GPCM-C connector disconnected.
- Measure the resistance between:

(+) Reductant Heater Relay Connector, Harness Side	(-) GPCM-C Connector, Harness Side
RDHTRPWR - Pin 5	RDHTRPWR - Pin 16
RDHTRCTRL - Pin 1	RDHTRCTRL - Pin 2

Are the resistances less than 5 ohms?

Yes	GO to RH6.
No	REPAIR the open circuit. Clear the GPCM and PCM DTCs. REPEAT the self-test.

RH6 CHECK THE REDUCTANT HEATER RELAY CIRCUITS FOR A SHORT TO GROUND

- Measure the resistance between:

(+) GPCM-C Connector, Harness Side	(-)
RDHTRPWR - Pin 16	Ground
RDHTRCTRL - Pin 2	Ground

Are the resistances greater than 10K ohms?

Yes	GO to RH7.
No	REPAIR the short circuit. Clear the GPCM and PCM DTCs. REPEAT the self-test.

RH7 CHECK THE REDUCTANT HEATER RELAY CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- Measure the voltage between:

(+) GPCM-C Connector, Harness Side	(-)
RDHTRPWR - Pin 16	Ground
RDHTRCTRL - Pin 2	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the GPCM and PCM DTCs. REPEAT the self-test.
No	GO to RH38.

RH8 CHECK THE REDUCTANT DOSAGE CONTROL MODULE FOR VOLTAGE

- Ignition OFF.
- Reductant Dosage Control Module connector disconnected.
- Connect a 5 amp fused jumper wire between the following:

Point A Reductant Dosage Control Module Connector, Harness Side	Point B
RDCMRC	Ground

- Ignition ON, engine OFF.
- Measure the voltage between:

(+) Reductant Dosage Control Module Connector, Harness Side	(-)

(+) Reductant Dosage Control Module Connector, Harness Side	(-)
VPWR	Ground

Is the voltage greater than 10.5 V?

Yes	For Transit with DTCs P20BD, P20BE, P20BF, P20C0, P221C or P221D. GO to RH16. For Transit with DTCs P20C1, P20C2, P20C3 or P20C4. GO to RH21. For Transit Connect with DTCs P20BD, P20BE, P20BF or P20C0, GO to RH16. For all others, GO to RH12.
No	GO to RH9.

RH9 CHECK THE VOLTAGE TO THE REDUCTANT DOSAGE CONTROL MODULE RELAY

- Ignition OFF.
- Reductant Dosage Control Module Relay connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) Reductant Dosage Control Module Relay Connector, Harness Side	(-)
B+ - Pin 1, 3	Ground

Is the voltage greater than 10.5 V?

Yes	GO to RH10.
No	REPAIR the open circuit. Clear the RDCM and PCM DTCs. REPEAT the self-test.

RH10 CHECK THE REDUCTANT DOSAGE CONTROL MODULE RELAY

- Carry out the reductant dosage control module relay component test. Refer to the Wiring Diagrams Cell 149, Component Testing.

Is a concern present?

Yes	INSTALL a new Reductant Dosage Control Module relay. Clear the RDCM and PCM DTCs. REPEAT the self-test.
No	GO to RH11.

RH11 CHECK THE REDUCTANT DOSAGE CONTROL MODULE CIRCUITS FOR AN OPEN

- Ignition OFF.
- Measure the resistance between:

(+) Reductant Dosage Control Module Relay Connector, Harness Side	(-) Reductant Dosage Control Module Connector, Harness Side
VPWR - Pin 5	VPWR

- Measure the resistance between:

(+) Reductant Dosage Control Module Connector, Harness Side	(-)
PWRGND	Ground

Is the resistance less than 5 ohms?

Yes	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.
No	REPAIR the open circuit. Clear the RDCM and PCM DTCs. REPEAT the self-test.

RH12 CHECK THE REDUCTANT TANK HEATER CIRCUITS FOR AN OPEN

- Ignition OFF.
- For Transit Connect,
- Reductant Dosage Control Module connector disconnected.
- Reductant Quality Module connector disconnected.
- Measure the resistance between:

(+) Reductant Quality Module Connector, Harness Side	(-) Reductant Dosage Control Module Connector, Harness Side
RDHTRC1	RDHTRC1

- Measure the resistance between:

(+) Reductant Quality Module Connector, Harness Side	(-)
GND	Ground

- For Transit,
- Reductant Dosage Control Module connector disconnected.
- Reductant Heater and Sender Assembly connector disconnected.
- Measure the resistance between:

(+) Reductant Heater and Sender Assembly Connector, Harness Side	(-) Reductant Dosage Control Module Connector, Harness Side
RDHTRC1 - Pin 1	RDHTRC1

- Measure the resistance between:

(+) Reductant Heater and Sender Assembly Connector, Harness Side	(-)
GND - Pin 2	Ground

- For all others,
- GPCM-C connector disconnected.

- Reductant Pump Assembly connector disconnected.
- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Harness Side	(-) GPCM-C Connector, Harness Side
RDHTRC1 - Pin 9	RDHTRC1 - Pin 15

- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Harness Side	(-)
GND - Pin 11	Ground

Are the resistances less than 5 ohms?

Yes	GO to RH13.
No	REPAIR the open circuit. For Transit and Transit Connect, clear the RDCM and PCM DTCs. REPEAT the self-test. For all others, clear the GPCM and PCM DTCs. REPEAT the self-test.

RH13 CHECK THE RDHTRC1 CIRCUIT FOR A SHORT TO GROUND

- For Transit Connect,
- Measure the resistance between:

(+) Reductant Quality Module Connector, Harness Side	(-)
RDHTRC1	Ground

- For Transit,
- Measure the resistance between:

(+) Reductant Heater and Sender Assembly Connector, Harness Side	(-)
RDHTRC1 - Pin 1	Ground

- For all others,
- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Harness Side	(-)
RDHTRC1 - Pin 9	Ground

Is the resistance greater than 10K ohms?

Yes	GO to RH14.
No	REPAIR the short circuit. For Transit and Transit Connect, clear the RDCM and PCM DTCs. REPEAT the self-test.

	For all others, clear the GPCM and PCM DTCs. REPEAT the self-test.

RH14 CHECK THE REDUCTANT TANK HEATER CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- For Transit Connect,
- Measure the voltage between:

(+) Reductant Quality Module Connector, Harness Side	(-)
RDHTRC1	Ground
GND	Ground

- For Transit,
- Measure the voltage between:

(+) Reductant Heater and Sender Assembly Connector, Harness Side	(-)
RDHTRC1 - Pin 1	Ground
GND - Pin 2	Ground

- For all others,
- Measure the voltage between:

(+) Reductant Pump Assembly Connector, Harness Side	(-)
RDHTRC1 - Pin 9	Ground
GND - Pin 11	Ground

Is any voltage present?

Yes	REPAIR the short circuit. For Transit and Transit Connect, clear the RDCM and PCM DTCs. REPEAT the self-test. For all others, clear the GPCM and PCM DTCs. REPEAT the self-test.
No	GO to RH15.

RH15 CHECK THE REDUCTANT TANK HEATER RESISTANCE

- Ignition OFF.
- For Transit Connect,
- Measure the resistance between:

(+) Reductant Quality Module Connector, Component Side	(-) Reductant Quality Module Connector, Component Side
RDHTRC1	GND

- For Transit,
- Measure the resistance between:

(+) Reductant Heater and Sender Assembly Connector, Component Side	(-) Reductant Heater and Sender Assembly Connector, Component Side
RDHTRC1 - Pin 1	GND - Pin 2

- For all others,
- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Component Side	(-) Reductant Pump Assembly Connector, Component Side
RDHTRC1 - Pin 9	GND - Pin 11

Is the resistance between 1 - 2.5 ohms (Transit and Transit Connect) or 1.33 - 1.66 ohms (all others)?

Yes	For Transit and Transit Connect, GO to RH25. For all others, GO to RH38.
No	For Transit, INSTALL a new Reductant Heater and Sender assembly. REFER to the Workshop Manual Section 303-08, Engine Emission Control. Clear the RDCM and PCM DTCs. REPEAT the self-test. For Transit Connect, INSTALL a new Reductant Quality module. REFER to Workshop Manual Section 303-08, Engine Emission Control. Clear the RDCM and PCM DTCs. REPEAT the self-test. For all others, INSTALL a new Reductant Pump assembly. REFER to the Workshop Manual Section 303-08, Engine Emission Control. Clear the GPCM and PCM DTCs. REPEAT the self-test.

RH16 CHECK THE REDUCTANT PRESSURE LINE HEATER ASSEMBLY AND REDUCTANT PUMP ASSEMBLY CIRCUITS FOR AN OPEN

- Ignition OFF.
- For Transit Connect,
- Reductant Dosage Control Module connector disconnected.
- Reductant Pressure Line Heater Assembly connector disconnected.
- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-) Reductant Dosage Control Module Connector, Harness Side
RDHTRC2	RDHTRC2

- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-)
GND	Ground

- For Transit,
- Reductant Dosage Control Module connector disconnected.
- Reductant Pump Assembly connector disconnected.
- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Harness Side	(-) Reductant Dosage Control Module Connector, Harness Side
RDHTRC2	RDHTRC2

- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Harness Side	(-)
GND - Pin 11	Ground

- For all others,
- GPCM-C connector disconnected.
- Reductant Pressure Line Heater Assembly connector disconnected.
- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-) GPCM-C Connector, Harness Side
RDHTRC2	RDHTRC2 - Pin 13

- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-)
GND	Ground

Are the resistances less than 5 ohms?

Yes	GO to RH17.
No	REPAIR the open circuit. For Transit and Transit Connect, clear the RDCM and PCM DTCs. REPEAT the self-test. For all others, clear the GPCM and PCM DTCs. REPEAT the self-test.

RH17 CHECK THE RDHTRC2 CIRCUIT FOR A SHORT TO GROUND

- For Transit,
- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Harness Side	(-)
RDHTRC2	Ground

- For all others,
- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-)
RDHTRC2	Ground

Is the resistance greater than 10K ohms?

Yes	GO to RH18.
No	REPAIR the short circuit. For Transit and Transit Connect, clear the RDCM and PCM DTCs. REPEAT the self-test. For all others, clear the GPCM and PCM DTCs. REPEAT the self-test.

RH18 CHECK THE REDUCTANT PRESSURE LINE HEATER ASSEMBLY AND REDUCTANT PUMP ASSEMBLY CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- For Transit,
- Measure the voltage between:

(+) Reductant Pump Assembly Connector, Harness Side	(-)
RDHTRC2	Ground
GND - Pin 11	Ground

- For all others,
- Measure the voltage between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-)
RDHTRC2	Ground
GND	Ground

Is any voltage present?

Yes	REPAIR the short circuit. For Transit and Transit Connect, clear the RDCM and PCM DTCs. REPEAT the self-test. For all others, clear the GPCM and PCM DTCs. REPEAT the self-test.
No	For Transit, GO to RH20. For all others, GO to RH19.

RH19 CHECK THE REDUCTANT PRESSURE LINE HEATER RESISTANCE

- Ignition OFF.
- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Component Side	(-) Reductant Pressure Line Heater Assembly Connector, Component Side
RDHTRC2	GND

Is the resistance between 3 - 5 ohms?

Yes	For Transit Connect, GO to RH25. For all others, GO to RH38.
No	INSTALL a new Reductant Pressure Line Heater assembly. REFER to the Workshop Manual Section 303-08, Engine Emission Control. Clear the GPCM and PCM DTCs. REPEAT the self-test.

RH20 CHECK THE REDUCTANT PUMP ASSEMBLY HEATER RESISTANCE

- Ignition OFF.
- Reductant Pump Assembly connector disconnected.
- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Component Side	(-) Reductant Pump Assembly Connector, Component Side
RDHTRC2	GND - Pin 15

Is the resistance between 2.5 - 6 ohms?

Yes	GO to RH25.
No	INSTALL a new Reductant Pump assembly. REFER to the Workshop Manual Section 303-08, Engine Emission Control. Clear the RDCM and PCM DTCs. REPEAT the self-test.

RH21 CHECK THE REDUCTANT PRESSURE LINE HEATER CIRCUITS FOR AN OPEN

- Reductant Dosage Control Module connector disconnected.
- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-) Reductant Dosage Control Module Connector, Harness Side
RDHTRC3	RDHTRC3

- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-)
GND	Ground

Are the resistances less than 5 ohms?

Yes	GO to RH22.
No	REPAIR the open circuit. Clear the RDCM and PCM DTCs. REPEAT the self-test.

RH22 CHECK THE RDHTRC3 CIRCUIT FOR A SHORT TO GROUND

- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-)

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-)
RDHTRC3	Ground

Is the resistance greater than 10K ohms?

Yes	GO to RH23.
No	REPAIR the short circuit. Clear the RDCM and PCM DTCs. REPEAT the self-test.

RH23 CHECK THE REDUCTANT PRESSURE LINE HEATER ASSEMBLY CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- Measure the voltage between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-)
RDHTRC3	Ground
GND	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the RDCM and PCM DTCs. REPEAT the self-test.
No	GO to RH24.

RH24 CHECK THE REDUCTANT PRESSURE LINE HEATER RESISTANCE

- Ignition OFF.
- Reductant Pressure Line Heater Assembly connector disconnected.
- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Component Side	(-) Reductant Pressure Line Heater Assembly Connector, Component Side
RDHTRC3	GND

Is the resistance between 3 - 5 ohms?

Yes	GO to RH25.
No	INSTALL a new Reductant Pressure Line Heater assembly. REFER to the Workshop Manual Section 303-08, Engine Emission Control. Clear the RDCM and PCM DTCs. REPEAT the self-test.

RH25 CHECK FOR CORRECT REDUCTANT DOSAGE CONTROL MODULE OPERATION

- Reductant Dosage Control Module connector disconnected.
- Visually inspect for:
  - pushed out pins
  - corrosion
- Connect the reductant dosage control module connector and make sure it seats correctly.
- Carry out the DCU self-test.
- Verify the concern is still present.

Is the concern still present?

Yes	INSTALL a new Reductant Dosage Control module. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls.
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

RH26 F-150 AND F-SERIES SUPER DUTY DIAGNOSIS
Are DTCs P209F, P20B9, P20BA, P20BB, P20BC, P20BD, P20BE, P20BF, P20C0, P20C1, P20C2, P20C3, P20C4, P214F, P21C2, P21C3, P21C4, P21C7, P21DD, P221C or P221D present?

Yes	For DTCs P20BD, P20BF, P20BE, P20C0, P221C or P221D, GO to RH34. For DTCs P209F, P20B9, P20BA, P20BB, P20BC, P214F or P21DD, GO to RH30. For all others, GO to RH27.
No	RETURN to Section 3, Symptom Charts for further direction.

RH27 CHECK THE BJB CIRCUITS FOR AN OPEN

- Ignition OFF.
- For F-150,
- BJB-B connector disconnected.
- BJB-C connector disconnected.
- BJB-D connector disconnected.
- GPCM-C connector disconnected.
- Measure the resistance between:

(+) BJB-B Connector, Harness Side	(-)
GND	Ground

- Measure the resistance between:

(+) BJB-C Connector, Harness Side	(-) GPCM-C Connector, Harness Side
RDHTRCTRL - Pin 28	RDHTRCTRL - Pin 2

- Measure the resistance between:

(+) BJB-D Connector, Harness Side	(-) GPCM-C Connector, Harness Side
RDHTRPWR - Pin 50	RDHTRPWR - Pin 16

- For all others,
- BJB-B connector disconnected.
- GPCM-B connector disconnected.
- Measure the resistance between:

(+) BJB-B Connector, Harness Side	(-)
GND	Ground

- Measure the resistance between:

(+) BJB-B Connector, Harness Side	(-) GPCM-B Connector, Harness Side
RDHTRCTRL	RDHTRCTRL - Pin 28
RDHTRPWR	RDHTRPWR - Pin 14

Are the resistances less than 5 ohms?

Yes	GO to RH28.
No	REPAIR the open circuit. Clear the GPCM and PCM DTCs. REPEAT the self-test.

RH28 CHECK THE REDUCTANT HEATER RELAY CIRCUITS FOR A SHORT TO GND

- For F-150,
- Measure the resistance between:

(+) GPCM-C Connector, Harness Side	(-)
RDHTRPWR - Pin 16	Ground
RDHTRCTRL - Pin 2	Ground

- For all others,
- Measure the resistance between:

(+) GPCM-B Connector, Harness Side	(-)
RDHTRPWR - Pin 14	Ground
RDHTRCTRL - Pin 28	Ground

Are the resistances greater than 10K ohms?

Yes	GO to RH29.
No	REPAIR the short circuit. Clear the GPCM and PCM DTCs. REPEAT the self-test.

RH29 CHECK THE REDUCTANT HEATER CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- For F-150,
- Measure the voltage between:

(+) GPCM-C Connector, Harness Side	(-)
RDHTRPWR - Pin 16	Ground
RDHTRCTRL - Pin 2	Ground

- For all others,
- Measure the voltage between:

(+) GPCM-B Connector, Harness Side	(-)
RDHTRPWR - Pin 14	Ground
RDHTRCTRL - Pin 28	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the GPCM and PCM DTCs. REPEAT the self-test.
No	GO to RH38.

RH30 CHECK THE RDHTRC1 CIRCUITS FOR AN OPEN

- Ignition OFF.
- For F-150,
- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Harness Side	(-) GPCM-C Connector, Harness Side
RDHTRC1 - Pin 9	RDHTRC1 - Pin 15

- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Harness Side	(-)
GND - Pin 11	Ground

- For all others,
- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Harness Side	(-) GPCM-B Connector, Harness Side
RDHTRC1 - Pin 9	RDHTRC1 - Pin 1

- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Harness Side	(-)
GND - Pin 11	Ground

Are the resistances less than 5 ohms?

Yes	GO to RH31.

No	REPAIR the open circuit. Clear the GPCM and PCM DTCs. REPEAT the self-test.

RH31 CHECK THE REDUCTANT TANK HEATER CIRCUITS FOR A SHORT TO GROUND

- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Harness Side	(-)
RDHTRC1 - Pin 9	Ground

Is the resistance greater than 10K ohms?

Yes	GO to RH32.
No	REPAIR the short circuit. Clear the GPCM and PCM DTCs. REPEAT the self-test.

RH32 CHECK THE RDHTRC1 CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- Measure the voltage between:

(+) Reductant Pump Assembly Connector, Harness Side	(-)
RDHTRC1 - Pin 9	Ground
GND - Pin 11	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the GPCM and PCM DTCs. REPEAT the self-test.
No	GO to RH33.

RH33 CHECK THE RDHTRC1 RESISTANCE

- Ignition OFF.
- Reductant Pump Assembly connector disconnected.
- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Component Side	(-) Reductant Pump Assembly Connector, Component Side
RDHTRC1 - Pin 9	GND - Pin 11

Is the resistance between 1.33 - 1.66 ohms?

Yes	GO to RH38.
No	INSTALL a new Reductant Pump assembly. REFER to the Workshop Manual Section 303-08, Engine Emission Control. Clear the GPCM and PCM DTCs. REPEAT the self-test.

RH34 CHECK THE RDHTRC2 AND REDUCTANT PUMP ASSEMBLY CIRCUITS FOR AN OPEN

- Ignition OFF.

- For F-150,
- GPCM-C connector disconnected.
- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-) GPCM-C Connector, Harness Side
RDHTRC2	RDHTRC2 - Pin 13

- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-)
GND	Ground

- For all others,
- GPCM-B connector disconnected.
- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-) GPCM-B Connector, Harness Side
RDHTRC2	RDHTRC2 - Pin 22

- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-)
GND	Ground

Are the resistances less than 5 ohms?

Yes	GO to RH35.
No	REPAIR the open circuit. Clear the GPCM and PCM DTCs. REPEAT the self-test.

RH35 CHECK THE REDUCTANT PRESSURE LINE HEATER ASSEMBLY CIRCUIT FOR A SHORT TO GROUND

- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-)
RDHTRC2	Ground

Is the resistance greater than 10K ohms?

Yes	GO to RH36.
No	REPAIR the short circuit. Clear the GPCM and PCM DTCs. REPEAT the self-test.

RH36 CHECK THE RDHTRC2 AND REDUCTANT PUMP ASSEMBLY CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- Measure the voltage between:

(+) Reductant Pressure Line Heater Assembly Connector, Harness Side	(-)
RDHTRC2	Ground
GND	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the GPCM and PCM DTCs. REPEAT the self-test.
No	GO to RH37.

RH37 CHECK THE RDHTRC2 RESISTANCE

- Ignition OFF.
- Reductant Pressure Line Heater Assembly connector disconnected.
- Measure the resistance between:

(+) Reductant Pressure Line Heater Assembly Connector, Component Side	(-) Reductant Pressure Line Heater Assembly Connector, Component Side
RDHTRC2	GND

Is the resistance between 3 - 5 ohms?

Yes	GO to RH38.
No	INSTALL a new Reductant Pressure Line Heater assembly. REFER to the Workshop Manual Section 303-08, Engine Emission Control. Clear the GPCM and PCM DTCs. REPEAT the self-test.

RH38 CHECK FOR CORRECT GPCM OPERATION

Note: *Not all vehicles have all components listed.*

- For F-Series Super Duty,
- Disconnect all the GPCM connectors.
- Visually inspect for:
  - pushed out pins
  - corrosion
- Connect all the GPCM connectors and make sure they seat correctly.
- BJB-B connector connected.
- BJB-C connector connected.
- Ignition ON, engine OFF.
- Clear the PCM DTCs.
- Carry out the PCM KOEO self-test.
- Verify the concern is still present.
- For all others,
- Disconnect all the GPCM connectors.
- Visually inspect for:
  - pushed out pins
  - corrosion
- Connect all the GPCM connectors and make sure they seat correctly.
- BJB-B connector connected.

- BJB-C connector connected.
- BJB-D connector connected.
- Ignition ON, engine OFF.
- Clear the PCM DTCs.
- Carry out the KOER Glow Plug Monitor Self-Test using the scan tool.
- Carry out the PCM KOEO self-test.
- Verify the concern is still present.

Is the concern still present?

Yes	INSTALL a new GPCM. Refer to the Workshop Manual Section 303-07, Glow Plug System. Clear the PCM DTCs. REPEAT the self-test.
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.