

RI: Reductant Temperature Sensor

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 temperature sensor
- reductant pump assembly
- harness circuits: RDT and SIGRTN
- reductant dosage control module (5H298)
- PCM (12A650)

REDUCTANT TEMPERATURE SENSOR EXPECTED VALUES

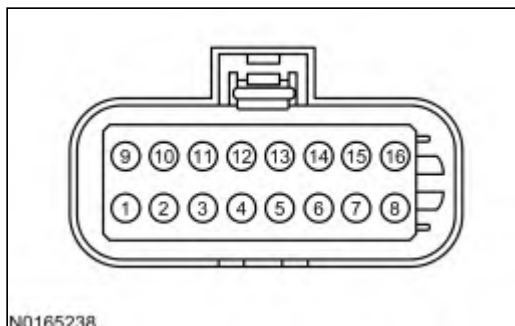
Temperature (°C)	Temperature (°F)	Resistance (K Ohms, Transit)	Resistance (K Ohms, All Others)
-40	-40	336	45
-30	-22	177	26
-20	-4	97	16
-10	14	55	9.4
0	32	32	5.9
10	50	20	3.8
20	68	12	2.5
30	86	8	1.7
40	104	5.3	1.2
50	122	3.6	0.84
60	140	2.5	0.60
70	158	1.8	0.44
80	176	1.2	0.32

Reductant Heater and Sender Assembly Connector

N0073230

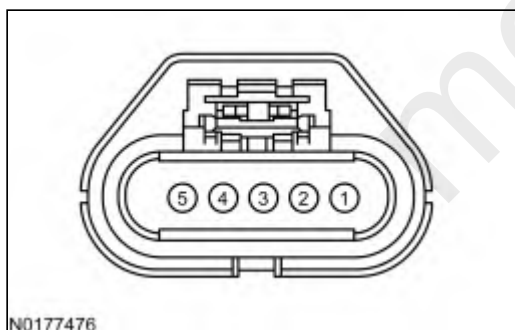
Pin	Circuit
5	SIGRTN (Signal Return)
3	RDT (Reductant Temperature)

Reductant Pump Assembly Connector



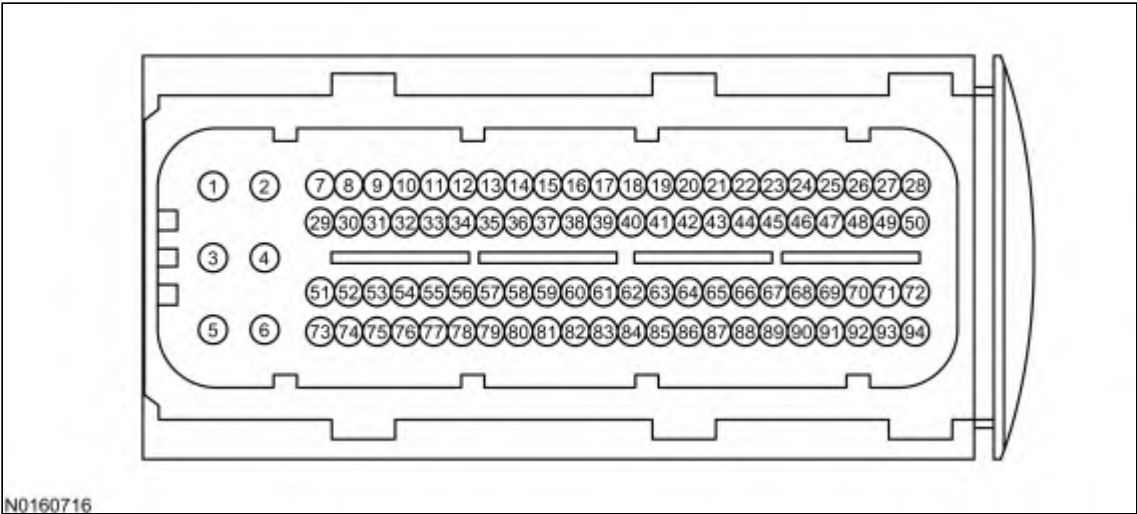
Pin	Circuit
3	SIGRTN (Signal Return)
2	SIGRTN (Signal Return)
1	RDT (Reductant Temperature)

Reductant Quality Module Connector



Pin	Circuit
4	SIGRTN (Signal Return)
5	REDQUALVL (Reductant Quality Value)

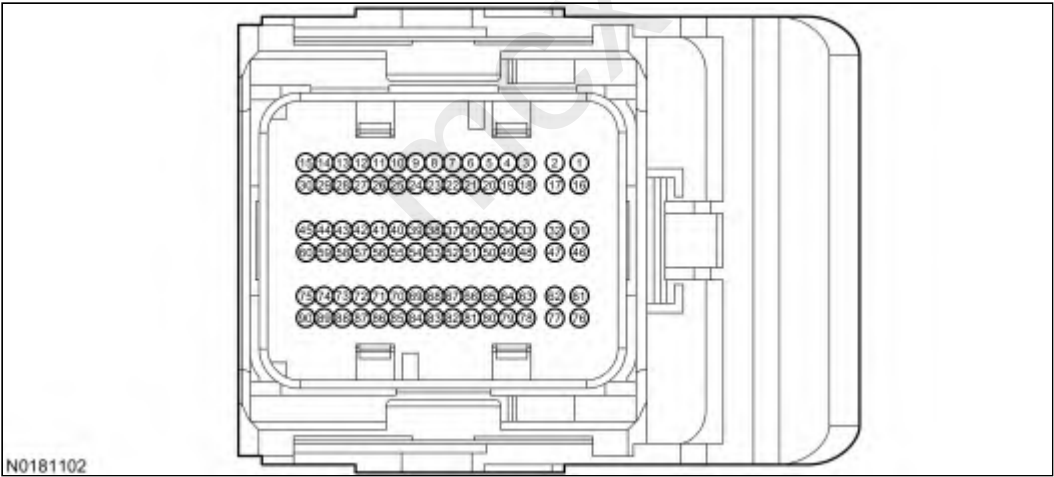
Reductant Dosage Control Module Connector



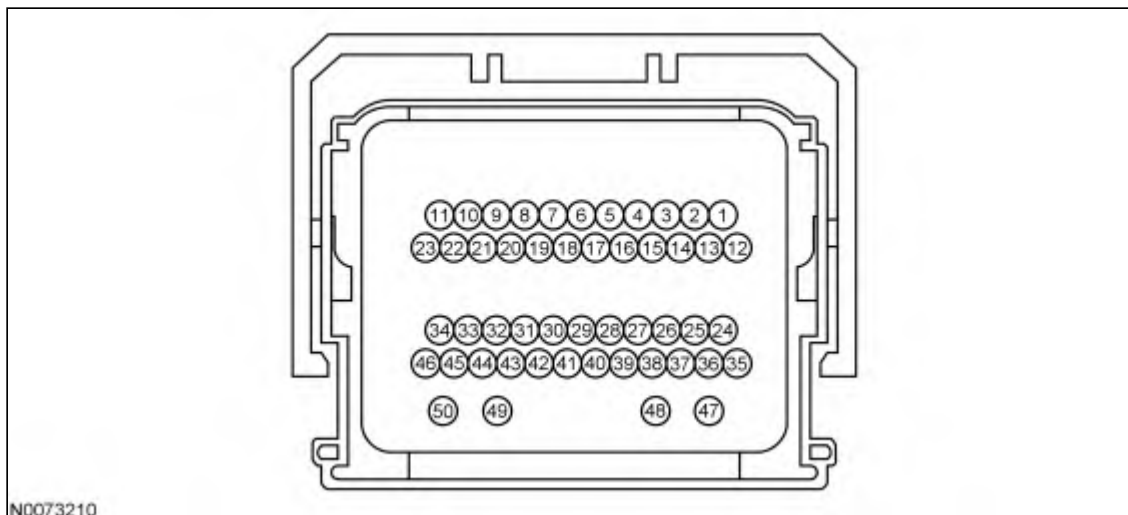
Vehicle	Connector	Pin	Circuit
Transit	A	90 56	SIGRTN RDT
Transit Connect	A	63 62	SIGRTN REDQUALVL

Powertrain Control Module-T (PCM-T) Connector

A



B



Vehicle	Connector	Pin	Circuit
F-Series Super Duty	A	70 69	SIGRTN RDT
All other vehicles	B	43 38	SIGRTN RDT

RI1 PRELIMINARY DIAGNOSIS

Are DTCs P2043, P2044, P2045, P20AD, P205B, P205C, P205D, or P205E present?

Yes	For DTCs P2043 or P205B, GO to RI2 . For all others, GO to RI3 .
No	Unable to duplicate the condition. CHECK for a loose connection, and damaged or corroded terminals. WIGGLE the harness attempting to recreate the concern. REPAIR as necessary. RETURN to Section 3, Symptom Charts for further direction.

RI2 CHECK THE REDUCTANT TEMPERATURE SENSOR OPERATION

- Verify the engine temperature is at ambient room temperature before continuing with this test. A soak period of 6 hours may be required.
- Ignition ON, engine OFF.
- For Transit and Transit Connect,
- Access the DCU and monitor the REDUCT_TNK_T (TEMP) PID.
- For all others,
- Access the PCM and monitor the REDUCT_TNK_T (TEMP) PID.

Is the PID temperature within 40°C (72°F) of ambient temperature?

Yes	Unable to duplicate the condition. CHECK for a loose connection, and damaged or corroded terminals. WIGGLE the harness attempting to recreate the concern. REPAIR as necessary. REFER to Section 3, No Diagnostic Trouble Codes (DTCs) Present Symptom Chart Index , if a driveability concern exists.
No	For Transit and Transit Connect, 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 all others, INSTALL a new Reductant Pump assembly. REFER to the Workshop Manual Section 303-08, Engine Emission Control.

Clear the PCM DTCs. REPEAT the self-test.

RI3 CHECK THE REDUCTANT TEMPERATURE SENSOR CIRCUITS FOR AN OPEN

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

(+) Reductant Quality Module Connector, Harness Side	(-) Reductant Dosage Control Module Connector, Harness Side
REDQUALVL - Pin 5	REDQUALVL
SIGRTN - Pin 4	SIGRTN

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

(+) Reductant Heater and Sender Assembly Connector, Harness Side	(-) Reductant Dosage Control Module Connector, Harness Side
RDT - Pin 3	RDT
SIGRTN - Pin 5	SIGRTN

- For all others,
- Reductant Pump Assembly connector disconnected.
- PCM-T connector disconnected.
- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Harness Side	(-) PCM-T Connector, Harness Side
RDT - Pin 1	RDT
SIGRTN - Pin 2	SIGRTN

Are the resistances less than 5 ohms?

Yes	GO to RI4 .
No	For DTC P205E, REPAIR the open circuit. CARRY OUT the Selective Catalytic Reduction (SCR) System Procedure. REFER to Section 2, Drive Cycles . Clear the RDCM and PCM DTCs. REPEAT the self-test. For all others, REPAIR the open circuit. Clear the RDCM and PCM DTCs. REPEAT the self-test.

RI4 CHECK THE REDUCTANT TEMPERATURE SENSOR CIRCUITS FOR A SHORT TO GROUND

- For Transit Connect,
- Measure the resistance between:

(+) Reductant Quality Module Connector, Harness Side	(-)
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(+) Reductant Quality Module Connector, Harness Side	(-)
REDQUALVL - Pin 5	Ground
SIGRTN - Pin 4	Ground

- For Transit,
- Measure the resistance between:

(+) Reductant Heater and Sender Assembly Connector, Harness Side	(-)
RDT - Pin 3	Ground
SIGRTN - Pin 5	Ground

- For all others,
- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Harness Side	(-)
RDT - Pin 1	Ground
SIGRTN - Pin 3	Ground

Are the resistances greater than 10K ohms?

Yes	GO to RI5 .
No	REPAIR the short circuit. Clear the RDCM and PCM DTCs. REPEAT the self-test.

RI5 CHECK THE REDUCTANT TEMPERATURE SENSOR CIRCUITS FOR A SHORT TO VOLTAGE

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

(+) Reductant Quality Module Connector, Harness Side	(-)
REDQUALVL - Pin 5	Ground
SIGRTN - Pin 4	Ground

- For Transit,
- Measure the voltage between:

(+) Reductant Heater and Sender Assembly Connector, Harness Side	(-)
RDT - Pin 3	Ground
SIGRTN - Pin 5	Ground

- For all others,
- Measure the voltage between:

(+) Reductant Pump Assembly Connector, Harness Side	(-)
RDT - Pin 1	Ground
SIGRTN - Pin 3	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the RDCM and PCM DTCs. REPEAT the self-test.
No	GO to RI6 .

RI6 CHECK THE RESISTANCE OF THE REDUCTANT TEMPERATURE SENSOR

Note: Refer to the chart at the beginning of this test for the resistance specifications.

- For Transit Connect,
- Measure the resistance between:

(+) Reductant Quality Module Connector, Component Side	(-) Reductant Quality Module Connector, Component Side
REDQUALVL - Pin 5	SIGRTN - Pin 4

- For Transit,
- Measure the resistance between:

(+) Reductant Heater and Sender Assembly Connector, Component Side	(-) Reductant Heater and Sender Assembly Connector, Component Side
RDT - Pin 3	SIGRTN - Pin 5

- For all others,
- Measure the resistance between:

(+) Reductant Pump Assembly Connector, Component Side	(-) Reductant Pump Assembly Connector, Component Side
RDT - Pin 1	SIGRTN - Pin 3

Is the resistance within specification?

Yes	For Transit and Transit Connect, GO to RI7 . For all others, GO to RI8 .
No	For DTC P205E, INSTALL a new component in question. REFER to the Workshop Manual Section 303-08, Engine Emission Control. CARRY OUT the Selective Catalytic Reduction (SCR) System Procedure. REFER to Section 2, Drive Cycles . 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 DTC. REPEAT the self-test. For all others, INSTALL a new component in question. REFER to the Workshop Manual Section 303-08, Engine Emission Control. Clear the RDCM and PCM DTCs. REPEAT the self-test.

RI7 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.

RI8 CHECK FOR CORRECT PCM OPERATION

- Disconnect all the PCM connectors.
- Visually inspect for:
 - pushed out pins
 - corrosion
- Connect all the PCM connectors and make sure they seat correctly.
- Carry out the PCM self-test.
- Verify the concern is still present.

Is the concern still present?

Yes	INSTALL a new PCM. REFER to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM) .
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.