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1993 FORD Orion OEM Service and Repair Workshop Manual

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No	REPAIR the circuit.

CB6 CHECK THE INVERTER SYSTEM CONTROLLER (ISC) VPWR CIRCUITS FOR VOLTAGE

- Ignition OFF.
- Connect a 5A fused jumper between:

Positive Lead	Measurement / Action	Negative Lead
C1458A-K3		Ground

- Ignition ON.
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
C1458A-L2	V	Ground
C1458A-M2	V	Ground

Are the voltages greater than 10.5 volts?

Yes	GO to CB7

No	REPAIR the circuit.

CB7 CHECK THE INVERTER SYSTEM CONTROLLER (ISC) GROUND CIRCUITS FOR AN OPEN

- Ignition OFF.
- Measure and record:

- Communications network concern
- Motor Electronics Coolant Pump "B"

CC1 CARRY OUT A VEHICLE INSPECTION AND VERIFY THE SELF-TEST PROCEDURE

NOTE

If the self-test or communication concern occurred after a failed or aborted reprogram, the module may be blank. Attempt to reprogram the module again before continuing with this pinpoint test.

- Visually inspect the following for obvious signs of electrical damage:
  - harness wiring
  - electrical connections
- Verify the correct procedure was used to activate the self-test for the scan tool.
  REFER to: Electronic Engine Controls - System Operation and Component Description(303-14C Electronic Engine Controls - 3.5L EcoBoost (BM), Description and Operation).
  Recreating the Fault.

Was the correct self-test procedure used?

Yes	GO to CC2

No	REFER to: Electronic Engine Controls - System Operation and Component Description(303-14C Electronic Engine Controls - 3.5L EcoBoost (BM), Description and Operation). Recreating the Fault.

CC2 CARRY OUT THE NETWORK TEST

- Note: When using FDRS (Ford Diagnosis and Repair System) , the scan tool attempts to communicate with the PCM (powertrain control module) first. After establishing communication with the PCM (powertrain control module) , the scan tool then attempts to communicate with all modules on the vehicle. If an FDRS (Ford Diagnosis and Repair System) session cannot be established, FDRS (Ford Diagnosis and Repair System) may state no communication can be established with the PCM (powertrain control module) :
  - Choose No when the scan tool prompts whether or not to retry communication.
  - Enter a PCM (powertrain control module) part number, tear tag or calibration number to identify the vehicle and start a session. The PCM (powertrain control module) part number and 4-character tear tag are located on the PCM (powertrain control module) .

- Ignition ON.
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
C1458A-M1	V	Ground

Is the voltage greater than 10.5 volts?

Yes	GO to CC6

No	REPAIR the circuit.

CC6 CHECK THE INVERTER SYSTEM CONTROLLER (ISC) VPWR CIRCUITS FOR VOLTAGE

- Ignition OFF.
- Connect a 5A fused jumper between:

Positive Lead	Measurement / Action	Negative Lead
C1458A-K3		Ground

- Ignition ON.
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
C1458A-L2	V	Ground
C1458A-M2	V	Ground

Normal Operation and Fault Conditions

REFER to: Electric Powertrain Control - Component Location(303-14F Electric Powertrain Control - 3.5L V6 PowerBoost (CN), Description and Operation).

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
SOBDMC (secondary on-board diagnostic control module C) U069E:81	Lost Communication with Coolant Heater 'B': Invalid Serial Data Received	This DTC (diagnostic trouble code) sets when messages are missing from the Coolant Heater "A".
SOBDMC (secondary on-board diagnostic control module C) U069E:87	Lost Communication with Coolant Heater 'B': Missing Message	This DTC (diagnostic trouble code) sets when messages are missing from the Coolant Heater "A".

Possible Sources

- Communications network concern
- Inverter System Controller (ISC) software
- Coolant Heater "A"

CD1 CHECK FOR INVERTER SYSTEM CONTROLLER (ISC) DIAGNOSTIC TROUBLE CODES (DTCS)

- Using a diagnostic scan tool, carry out the Inverter System Controller (ISC) self-test.

Are any Inverter System Controller (ISC) diagnostic trouble codes (DTCs) present?

Yes	For DTC (diagnostic trouble code) U069E:81 GO to CD2 For DTC (diagnostic trouble code) U069E:87 GO to CD4 For all other Inverter System Controller (ISC) diagnostic trouble codes (DTCs), REFER to the DTC (diagnostic trouble code) chart in this section.

No	The system is operating correctly at this time. The DTC (diagnostic trouble code) may have been set due to high network traffic or an intermittent fault condition.

CD2 VERIFY THE INVERTER SYSTEM CONTROLLER (ISC) CALIBRATION LEVEL

- Verify the Inverter System Controller (ISC) is at the latest calibration level.

Is the Inverter System Controller (ISC) at the latest calibration level?

Yes	GO to CD3

	Recreating the Fault.

CD5 CARRY OUT THE NETWORK TEST

- Note: When using FDRS (Ford Diagnosis and Repair System) , the scan tool attempts to communicate with the PCM (powertrain control module) first. After establishing communication with the PCM (powertrain control module) , the scan tool then attempts to communicate with all modules on the vehicle. If an FDRS (Ford Diagnosis and Repair System) session cannot be established, FDRS (Ford Diagnosis and Repair System) may state no communication can be established with the PCM (powertrain control module) :
  - Choose No when the scan tool prompts whether or not to retry communication.
  - Enter a PCM (powertrain control module) part number, tear tag or calibration number to identify the vehicle and start a session. The PCM (powertrain control module) part number and 4-character tear tag are located on the PCM (powertrain control module) .
- Ignition ON.

Do all modules indicate pass?

Yes	GO to CD6

No	GO to CD7

CD6 CHECK FOR A COOLANT HEATER “A” CONCERN

- Using a diagnostic scan tool, carry out the Inverter System Controller (ISC) self-test.
- Check for any other Coolant Heater "A" related symptoms.

Is a concern present?

Yes	DIAGNOSE the Coolant Heater "A" concern. REFER to: Climate Control System - Vehicles With: Dual Automatic Temperature Control (DATC) (412-00 Climate Control System - General Information, Diagnosis and Testing).

No	The system is operating correctly at this time. The concern may have been caused by module connections. Address the root cause of any connector or pin issues.

C1458A-K3		Ground

- Ignition ON.
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
C1458A-L2	V	Ground
C1458A-M2	V	Ground

Are the voltages greater than 10.5 volts?

Yes	GO to CD10

No	REPAIR the circuit.

CD10 CHECK THE INVERTER SYSTEM CONTROLLER (ISC) GROUND CIRCUITS FOR AN OPEN

- Ignition OFF.
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
C1458A-L4	Ω	Ground
C1458A-M4	Ω	Ground

Are the resistances less than 5 ohms?

PAM (parking assist control module) U0293:00	Lost Communication With Hybrid/EV Powertrain Control Module 'A': No Sub Type Information	This DTC (diagnostic trouble code) sets when messages are missing from the Inverter System Controller (ISC).
BCM (body control module) U0293:00	Lost Communication With Hybrid/EV Powertrain Control Module 'A': No Sub Type Information	This DTC (diagnostic trouble code) sets when messages are missing from the Inverter System Controller (ISC).
BCMC (body control module C) U0293:00	Lost Communication With Hybrid/EV Powertrain Control Module 'A': No Sub Type Information	This DTC (diagnostic trouble code) sets when messages are missing from the Inverter System Controller (ISC).
DCDC (direct current/direct current converter control module) U0293:00	Lost Communication With Hybrid/EV Powertrain Control Module 'A': No Sub Type Information	This DTC (diagnostic trouble code) sets when messages are missing from the Inverter System Controller (ISC).
PCM (powertrain control module) U0293:00	Lost Communication With Hybrid/EV Powertrain Control Module 'A': No Sub Type Information	This DTC (diagnostic trouble code) sets when messages are missing from the Inverter System Controller (ISC).

Possible Sources

- Inverter System Controller (ISC)
- Wiring, terminals or connectors

CE1 CHECK FOR 12V BATTERY VOLTAGE AND SYSTEM VOLTAGE LOW DIAGNOSTIC TROUBLE CODES (DTCS)

character tear tag are located on the PCM (powertrain control module) .

- Ignition ON.

Is the Inverter System Controller (ISC) the only module offline?

Yes	GO to CE4

No	DIAGNOSE the network concern.

CE4 CHECK FOR AN INTERMITTENT CONCERN

NOTE

Do not use dielectric grease in the Inverter System Controller (ISC) connector.

- Using a diagnostic scan tool, refer to the snapshot data to determine when the fault occurs. Determine if the fault occurs during the following conditions:
  - During power-up
  - While driving
  - Temperature of vehicle
- Attempt to duplicate the concern.

Can the fault be duplicated?

Yes	GO to CE5

No	The system is operating correctly at this time. The DTC (diagnostic trouble code) may have been set due to high network traffic or an intermittent fault condition.

CE5 CHECK THE INVERTER SYSTEM CONTROLLER (ISC) VBATT CIRCUIT FOR VOLTAGE

NOTE

Do not use dielectric grease in the Inverter System Controller (ISC) connector.

- Ignition OFF.
- Disconnect Inverter System Controller (ISC) C1458A .

NOTE

Do not use dielectric grease in the Inverter System Controller (ISC) connector.

- Ignition OFF.
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
C1458A-L4	Ω	Ground
C1458A-M4	Ω	Ground

Are the resistances less than 5 ohms?

Yes	GO to CE8

No	REPAIR the open circuit. CLEAR the diagnostic trouble codes (DTCs) and REPEAT the self-test.

CE8 CHECK THE INVERTER SYSTEM CONTROLLER (ISC) PSR CONTROL WIRE

NOTE

Do not use dielectric grease in the Inverter System Controller (ISC) connector.

- Measure and record:

Positive Lead	Measurement / Action	Negative Lead