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2020 Ford Police Interceptor Utility Service and Repair Manual

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Global Customer Symptom Code Chart

Customer Symptom	Action
Start/Run/Move > Starting > Cranks Will Not Start > Always	GO to Pinpoint Test A
Start/Run/Move > Starting > Hard Start/Long Crank > Always	GO to Pinpoint Test A
Start/Run/Move > Starting > Auto Start/Stop > Inoperative	GO to Pinpoint Test AA

Pinpoint Tests

PINPOINT TEST A : NO START

WARNING

Do not smoke, carry lighted tobacco or have an open flame of any type when working on or near any fuel-related component. Highly flammable mixtures may be present and may be ignited. Failure to follow these instructions may result in serious personal injury.

Normal Operation and Fault Conditions

Refer to the DTC (diagnostic trouble code) Fault Trigger Conditions.

Possible Sources

- Spark (as related to electronic engine control)
- PCM (powertrain control module) (12A650)

Pinpoint Test Steps available in the on-line Workshop Manual.

PINPOINT TEST AA : AUTO START STOP

Normal Operation and Fault Conditions

Refer to the DTC (diagnostic trouble code) Fault Trigger Conditions.

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
PCM (powertrain	Internal Control Module Start-Stop Performance:	Sets when an error occurs in the PCM (powertrain control module) . This DTC (diagnostic trouble code) may be accompanied by other Diagnostic Trouble Codes (DTCs).

Powertrain Control Module (PCM) Input and Output Controls

303-14E Electronic Engine Controls - 3.5L V6 PowerBoost (CN)	***2022 F-150***
Diagnosis and Testing	***Procedure revision date: 03/11/2022***

Powertrain Control Module (PCM) Input and Output Controls

Diagnostic Trouble Code (DTC) Chart

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: Diagnostic Methods

(100-00 General Information, Description and Operation).

Diagnostic Trouble Code Chart

Module	DTC (diagnostic trouble code)	Description	Action
PCM (powertrain control module)	P0219:00	Engine Overspeed Condition: No Sub Type Information	GO to Pinpoint Test Z
PCM (powertrain control module)	P0297:00	Vehicle Overspeed Condition: No Sub Type Information	GO to Pinpoint Test Z
PCM (powertrain control module)	P0685:00	ECM/PCM Power Relay Control Circuit/Open: No Sub Type Information	GO to Pinpoint Test B
PCM (powertrain control module)	P068A:00	ECM/PCM Power Relay De-Energized - Too Early: No Sub Type Information	GO to Pinpoint Test B

Start/Run/Move > Starting > No Crank > Intermittent	GO to Pinpoint Test Z
Start/Run/Move > Starting > Slow Crank/Battery > Intermittent	GO to Pinpoint Test Z
Start/Run/Move > Starting > Hard Start/Long Crank > Always	GO to Pinpoint Test C
Start/Run/Move > Starting > Hard Start/Long Crank > Intermittent	GO to Pinpoint Test Z
Start/Run/Move > Starting > Auto Start/Stop > Inoperative	GO to Pinpoint Test Z
Start/Run/Move > Running > Engine Won't Shut Off > Always	GO to Pinpoint Test B
Start/Run/Move > Moving > Upshift Quality > Intermittent	GO to Pinpoint Test Z
Start/Run/Move > Moving > Downshift Quality > Intermittent	GO to Pinpoint Test Z
Driving Performance > Runs Rough > All Running Modes > Intermittent	GO to Pinpoint Test Z
Driving Performance > Idle Quality > Rolling > Intermittent	GO to Pinpoint Test Z
Driving Performance > Stalls/Quits > At Idle > Intermittent	GO to Pinpoint Test Z
Driving Performance > Backfires > At Idle > Intermittent	GO to Pinpoint Test Z
Driving Performance > Backfires > Acceleration > Intermittent	GO to Pinpoint Test Z
Driving Performance > Backfires > Deceleration > Intermittent	GO to Pinpoint Test Z
Driving Performance > Lack/Loss of Power > Acceleration > Intermittent	GO to Pinpoint Test Z

PCM (powertrain control module) P068A:00	ECM/PCM Power Relay De-Energized - Too Early: No Sub Type Information	Sets when the non volatile random access memory write did not complete successfully after the ignition key was turned OFF, prior to PCM (powertrain control module) shutdown. This DTC (diagnostic trouble code) also sets when the PCM (powertrain control module) power relay is de-energized too early.
PCM (powertrain control module) P06B8:00	Internal Control Module Non-Volatile Random Access Memory (NVRAM) Error: No Sub Type Information	Sets when the PCM (powertrain control module) detects a concern with the ability of the PCM (powertrain control module) to correctly store permanent Diagnostic Trouble Codes (DTCs). Check for other Diagnostic Trouble Codes (DTCs) and diagnose those first. Check for aftermarket performance products. Check for an electrical or charging system concern. If an updated calibration is available, update the calibration to the latest level. If an updated calibration is not available, clear the Diagnostic Trouble Codes (DTCs) and repeat the self-test. If this DTC (diagnostic trouble code) is retrieved after a PCM (powertrain control module) reprogramming, turn the ignition OFF and allow the PCM (powertrain control module) to complete a normal power down sequence.

Possible Sources

- PCM (powertrain control module) power circuitry concern
- PCM (powertrain control module) power relay (12A646)
- PCM (powertrain control module) (12A650)

Pinpoint Test Steps available in the on-line Workshop Manual.

PINPOINT TEST C : REFERENCE VOLTAGE (VREF)

Refer to Wiring Diagrams Cell 024for schematic and connector information.
Normal Operation and Fault Conditions Refer to the DTC (diagnostic trouble code) Fault Trigger Conditions. **DTC Fault Trigger Conditions**

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
PCM (powertrain control module) P06A6:00	Sensor Reference Voltage 'A' Circuit Range/Performance: No Sub Type Information	Sets when the PCM (powertrain control module) detects the VREF circuit is not within a calibrated voltage range. All other Diagnostic Trouble Codes (DTCs) should be diagnosed first.

PINPOINT TEST QB : KEEP ALIVE POWER (KAPWR)

Refer to Wiring Diagrams Cell 025for schematic and connector information.
Normal Operation and Fault Conditions Refer to the DTC (diagnostic trouble code) Fault Trigger Conditions. **DTC Fault Trigger Conditions**

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
PCM (powertrain control module) P2610:00	ECM/PCM Engine Off Timer Performance: No Sub Type Information	Sets when the PCM (powertrain control module) detects the difference between the engine off time and the central processing unit (CPU) time exceeds a calibrated limit for a calibrated amount of time. This DTC (diagnostic trouble code) may set with other Diagnostic Trouble Codes (DTCs). Check for all other Diagnostic Trouble Codes (DTCs) and diagnose those first. If DTC (diagnostic trouble code) P2610 sets after a module programming, disregard this DTC (diagnostic trouble code) . Clear the Diagnostic Trouble Codes (DTCs) and repeat the PCM (powertrain control module) self-test.

Possible Sources

- Battery terminal condition
- PCM (powertrain control module) circuitry concern
- PCM (powertrain control module)

Pinpoint Test Steps available in the on-line Workshop Manual.

PINPOINT TEST Z : INTERMITTENT

Normal Operation and Fault Conditions
This pinpoint test is intended to diagnose and isolate intermittent concerns for all EEC (electronic engine control) subsystems. Parameter identifiers (PIDs) corresponding to a circuit can be used to aid in identifying the intermittent cause. Some circuits do not have an associated PID (parameter identification) or the PID (parameter identification) may not be available and must be measured using a digital multimeter.
Refer to the DTC (diagnostic trouble code) Fault Trigger Conditions.
DTC Fault Trigger Conditions

Variable Camshaft Timing (VCT) System

303-14E Electronic Engine Controls - 3.5L V6 PowerBoost (CN)	***2022 F-150***
Diagnosis and Testing	***Procedure revision date: 10/30/2020***

Variable Camshaft Timing (VCT) System

Diagnostic Trouble Code (DTC) Chart

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: Diagnostic Methods

(100-00 General Information, Description and Operation).

Diagnostic Trouble Code Chart

Module	DTC (diagnostic trouble code)	Description	Action
PCM (powertrain control module)	P0010:00	A Camshaft Position Actuator A Control Circuit/Open Bank 1: No Sub Type Information	GO to Pinpoint Test HK
PCM (powertrain control module)	P0011:00	A Camshaft Position Timing - Over-Advanced (Bank 1): No Sub Type Information	GO to Pinpoint Test HK
PCM (powertrain control module)	P0012:00	A Camshaft Position Timing - Over-Retarded (Bank 1): No Sub Type Information	GO to Pinpoint Test HK
PCM (powertrain control module)	P0013:00	B Camshaft Position Actuator A Control Circuit/Open Bank 1: No Sub Type Information	GO to Pinpoint Test HK

PCM (powertrain control module)	P0025:00	B Camshaft Position Timing - Over-Retarded (Bank 2): No Sub Type Information	GO to Pinpoint Test HK
PCM (powertrain control module)	P0340:00	Camshaft Position Sensor A Circuit (Bank 1 Or Single Sensor): No Sub Type Information	GO to Pinpoint Test DR
PCM (powertrain control module)	P0344:00	Camshaft Position Sensor A Circuit Intermittent (Bank 1 Or Single Sensor): No Sub Type Information	GO to Pinpoint Test DR
PCM (powertrain control module)	P0345:00	Camshaft Position Sensor A Circuit (Bank 2): No Sub Type Information	GO to Pinpoint Test DR
PCM (powertrain control module)	P0349:00	Camshaft Position Sensor A Circuit Intermittent (Bank 2): No Sub Type Information	GO to Pinpoint Test DR
PCM (powertrain control module)	P0365:00	Camshaft Position Sensor B Circuit (Bank 1): No Sub Type Information	GO to Pinpoint Test DR
PCM (powertrain control module)	P0369:00	Camshaft Position Sensor B Circuit Intermittent (Bank 1): No Sub Type Information	GO to Pinpoint Test DR
PCM (powertrain control module)	P0390:00	Camshaft Position Sensor B Circuit (Bank 2): No Sub Type Information	GO to Pinpoint Test DR
PCM (powertrain control module)	P0394:00	Camshaft Position Sensor B Circuit Intermittent (Bank 2): No Sub Type Information	GO to Pinpoint Test DR
PCM (powertrain control module)	P052A:00	Cold Start Intake A Camshaft Position Timing Over-Advanced (Bank 1): No Sub Type Information	GO to Pinpoint Test HK
PCM (powertrain control module)	P052B:00	Cold Start Intake A Camshaft Position Timing Over-Retarded (Bank 1): No Sub Type Information	GO to Pinpoint Test HK

Driving Performance > Runs Rough > Deceleration > Always	GO to Pinpoint Test HK
Driving Performance > Runs Rough > All Running Modes > Always	GO to Pinpoint Test HK
Driving Performance > Idle Quality > Rolling > Always	GO to Pinpoint Test HK
Driving Performance > Idle Quality > Slow > Always	GO to Pinpoint Test HK
Driving Performance > Idle Quality > Slow Return > Always	GO to Pinpoint Test HK
Driving Performance > Idle Quality > Rough > Always	GO to Pinpoint Test HK
Driving Performance > Idle Quality > Rough > Always	GO to Pinpoint Test HK
Driving Performance > Stalls/Quits > At Idle > Always	GO to Pinpoint Test HK
Driving Performance > Lack/Loss of Power > Acceleration > Always	GO to Pinpoint Test DR
Driving Performance > Lack/Loss of Power > Acceleration > Always	GO to Pinpoint Test HK
Driving Performance > Lack/Loss of Power > Cruise/ Steady Speed > Always	GO to Pinpoint Test DR
Driving Performance > Lack/Loss of Power > Cruise/ Steady Speed > Always	GO to Pinpoint Test HK
Driving Performance > Poor Fuel Economy > City Driving > Loaded	GO to Pinpoint Test HK
Driving Performance > Poor Fuel Economy > Highway Driving > Loaded	GO to Pinpoint Test HK
Driving Performance > Poor Fuel Economy > Combined > Loaded	GO to Pinpoint Test DR
Driving Performance > Poor Fuel Economy > Combined > Loaded	GO to Pinpoint Test HK
Driving Performance > Hesitates/Stumble > Cruise/ Steady Speed > Always	GO to Pinpoint Test HK
Driving Performance > Hesitates/Stumble > Cruise/ Steady Speed > Always	GO to Pinpoint Test HK
Driving Performance > Engine Surge > At Idle > Always	GO to Pinpoint Test HK
Driving Performance > Engine Surge > Acceleration > Always	GO to Pinpoint Test HK
Driving Performance > Engine Surge > Cruise/ Steady Speed > Always	GO to Pinpoint Test HK

module) P0345:00		intermittent impact on the CMP (camshaft position) signal. Diagnose any base engine concerns related to the engine oil pressure or engine timing. Refer to the appropriate 303-00 section, Engine System, Oil Pressure Test, to check the engine oil pressure. Refer to the appropriate 303-01 section, Engine, to check the engine timing and VCT (variable camshaft timing) phasers.
PCM (powertrain control module) P0349:00	Camshaft Position Sensor 'A' Circuit Intermittent (Bank 2): No Sub Type Information	Sets when the PCM (powertrain control module) detects the CMP (camshaft position) bank 2, sensor 1, circuit signal is intermittent. Harness routing, harness alterations, incorrect shielding, or electrical interference from other systems may have an intermittent impact on the CMP (camshaft position) signal. Diagnose any base engine concerns related to the engine oil pressure or engine timing. Refer to the appropriate 303-00 section, Engine System, Oil Pressure Test, to check the engine oil pressure. Refer to the appropriate 303-01 section, Engine, to check the engine timing and VCT (variable camshaft timing) phasers.
PCM (powertrain control module) P0365:00	Camshaft Position Sensor 'B' Circuit (Bank 1): No Sub Type Information	Sets when the PCM (powertrain control module) detects the CMP (camshaft position) bank 1, sensor 2 circuit signal cannot be detected. Harness routing, harness alterations, incorrect shielding, or electrical interference from other systems may have an intermittent impact on the CMP (camshaft position) sensor signal. Diagnose any base engine concerns related to the engine oil pressure or engine timing. Refer to the appropriate 303-00 section, Engine System, Oil Pressure Test, to check the engine oil pressure. Refer to the appropriate 303-01 section, Engine, to check the engine timing and VCT (variable camshaft timing) phasers.
PCM (powertrain control module) P0369:00	Camshaft Position Sensor 'B' Circuit Intermittent (Bank 1): No Sub Type Information	Sets when the PCM (powertrain control module) detects the CMP (camshaft position) bank 1, sensor 2 circuit signal is intermittent. Harness routing, harness alterations, incorrect shielding, or electrical interference from other systems may have an intermittent impact on the CMP (camshaft position) sensor signal. Diagnose any base engine concerns related to the engine oil pressure or engine timing. Refer to the appropriate 303-00 section, Engine System, Oil Pressure Test, to check the engine oil pressure. Refer to the appropriate 303-01 section, Engine, to check the engine timing and VCT (variable camshaft timing) phasers.