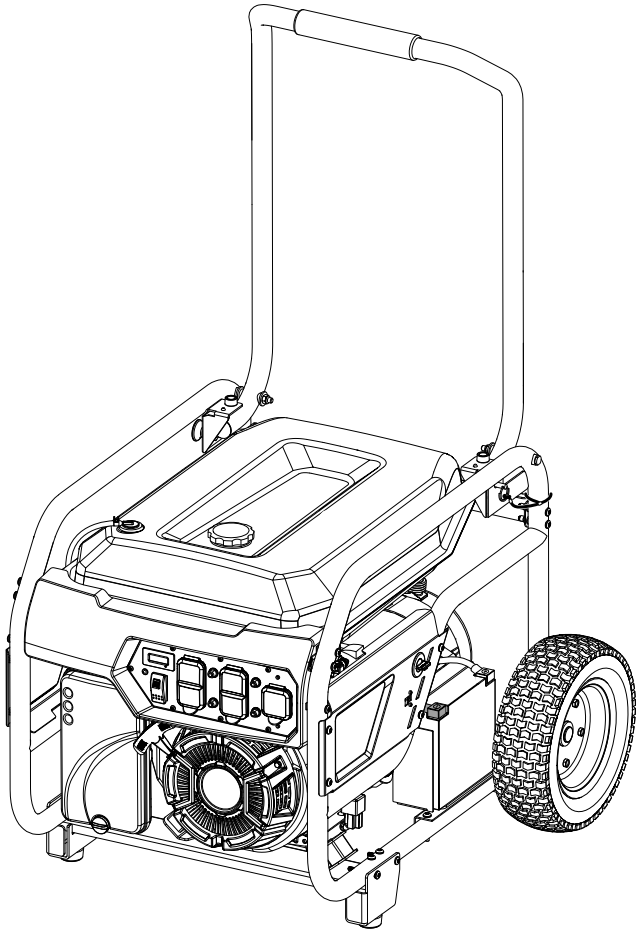
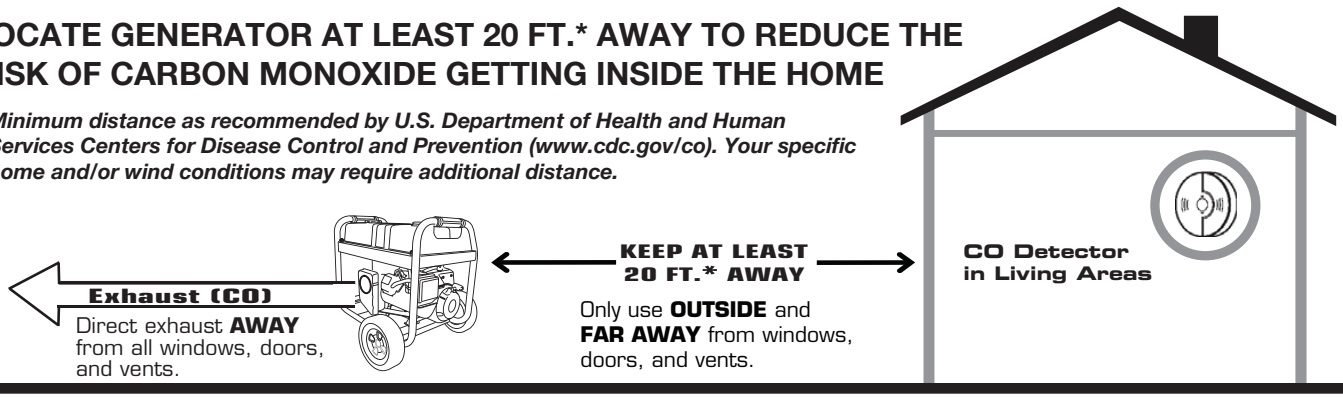
RY907000FI Electronic Fuel Injection (EFI) Diagnostics Service Manual



FOR RY907000FI
RYOBI 7,000 WATT GENERATOR

LOCATE GENERATOR AT LEAST 20 FT.* AWAY TO REDUCE THE RISK OF CARBON MONOXIDE GETTING INSIDE THE HOME

** Minimum distance as recommended by U.S. Department of Health and Human Services Centers for Disease Control and Prevention (www.cdc.gov/co). Your specific home and/or wind conditions may require additional distance.*



PRODUCT SPECIFICATIONS

ENGINE

Engine Type	420cc, EFI
Spark Plug	F6RTC or equivalent
Fuel Volume	6 gal.
Engine Lubricant Volume	32 oz.

**Rated output determined by PGMA Standard G300*

GENERATOR

Rated Voltage	120 V/240 V
Rated Amps	58.3 A/29.1 A
Rated Output*	7000 W
Starting Watts	8750 W
Rated Frequency	60 Hz

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IMPORTANT SAFETY INSTRUCTIONS

Use only recommended or equivalent replacement parts and accessories. Use of any other parts or failure to follow maintenance/service instructions may create a risk of shock or injury. Maintain the unit per maintenance instructions located in the generator's Operator's Manual. Inspect the unit before each use for loose fasteners, fuel leaks, etc. Replace damaged parts.

EFI COMPONENTS

Typical electronic fuel injection (EFI) system and related components include:

- Fuel Pump Module — Electronic pump and regulator to generate fuel pressure
- Fuel Filter — Particle and debris filtration of fuel system
- High Pressure Line — Connection from pump to fuel injector
- Ignition Coil — Transformer for high voltage spark generation
- Engine Start Switch — Commands engine to start
- Engine Starter Relay — Control of the engine starter
- Cranshaft Position Sensor — Rotational trigger for monitoring engine position
- Engine Temperature Sensor — Temperature operating point measurement
- Oxygen Sensor — Exhaust mixture monitoring device
- Wire Harness Assembly — System connection for electrical components
- EJT27 Throttle Body Assembly — Integrated engine control electronics and throttle body assembly
  - Dual Core Processor Electronic Control Unit (ECU)
  - Fuel Injector
  - Throttle Body/Intake Manifold
  - Temperature and Pressure Sensors
  - Malfunction Indicator Lamp (MIL)

FUEL RECOMMENDATIONS

Refer to the generator's Operator's Manual.

SYSTEM DESCRIPTION

The RYOBI™ EFI system is designed for optimal engine performance with improved fuel efficiency and lower emissions than a comparable carbureted machine. Fuel and spark functions are electronically controlled and engine operation continuously monitored during operation to maintain an ideal air/fuel ratio and best power. Electronic control is achieved through the use of a throttle body assembly, which combines electronics, sensors, and throttle body functionality into a single unit. The EFI system components connect to the throttle body assembly through the wire harness or high pressure line.

Fuel is routed from the tank to the fuel pump module. A directional fuel filter is positioned between the tank and the pump module to prevent damage or failure of the EFI components. The fuel pump module takes in fuel from the tank via gravity feeding and generates approximately 39 psi of fuel pressure to the high pressure line. This high pressure line then terminates at the fuel injector located on the throttle body assembly where it is electronically controlled.

Spark is generated by the inductive ignition coil. Charging and discharging is electronically controlled using energy from the battery to produce the spark. The ignition timing is dynamic during the operation of the engine and will vary based on operating conditions.

To allow electronic control of various functions, a crankshaft position sensor is used to monitor a pattern of teeth machined into the engine flywheel. These teeth are detected by the crankshaft position sensor and processed such that control based on angular engine events can be achieved. The pattern of teeth are all equally spaced with a single tooth removed to provide a reference point in the rotation.

Sensor data is essential to controlling the air/fuel mixture. Engine temperature is used for warm up and prevention of overheating. Precise control comes from the feedback of the oxygen sensor. This component provides rich or lean data used for managing the fuel injector. An integrated heater is used for fast transition from open loop to closed loop operation.

The central component of the system is the throttle body assembly, which is composed of an electronic control unit (ECU), fuel injector, temperature and pressure sensors, and mechanical throttle body. With connections to all other components of the system, the throttle body assembly enables precise control of the engine through software algorithms running on the ECU. Using a dual core micro-controller, these algorithms monitor the various sensors in the system and then control the fuel pump module, oxygen sensor heater, fuel injector, and ignition coil.

Integral to the throttle body assembly are multiple temperature and pressure sensors. These devices provide data necessary for consistent engine operation regardless of temperature and altitude. External sensors include engine temperature, crankshaft position, and oxygen sensors.

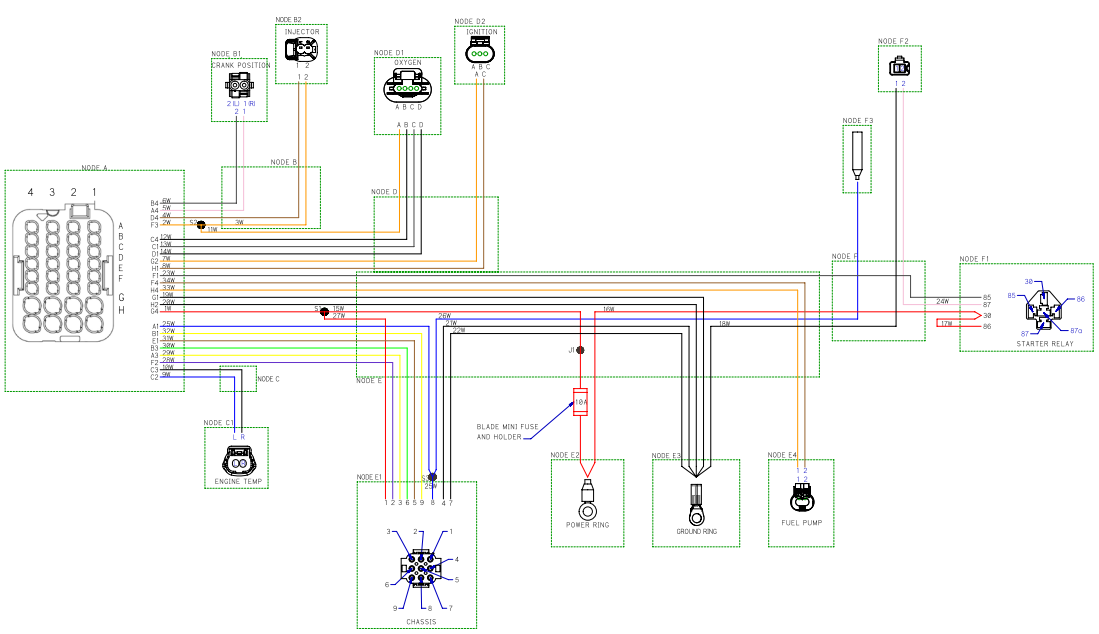
Operation of the engine begins with turning on the power switch. When turned on, a red MIL located on the throttle body ECU will turn on and off indicating power is on and the light is functional. A constant on of the light indicates a fault code is present and diagnostics are to be performed. With no active MIL, the engine can be started with the pull starter or the electric start. For electric start, the push button commands the engine to start through control by the EFI system. With electronic control of the starter relay, a controlled start is performed where the user is not required to hold the button during the cranking of the engine. A simple switch press creates a command to the EFI system that allows a consistent start of the engine. Start cycle will time out after 5 seconds if engine start is not detected. Once the engine is rotating, the EFI system will begin to control fuel and spark and result in the starting of the engine. A warming phase will occur once started. This warming of the engine is transparent to the operation and requires no special considerations such as a choke or other fuel enrichment controls found on a carbureted unit. After the warm up is completed, the EFI system will begin closed loop control of the air/fuel mixture using the oxygen sensor feedback. Closed loop operation may be briefly canceled during large engine transients such as when a large load is applied.

If any system faults are detected, the MIL will turn on indicating there is an issue with the system. These faults are stored in the ECU and can be retrieved using the EFI Diagnostic Kit. Depending on the fault, the engine may continue to run but have reduced performance and non-compliant emissions. Diagnostics and troubleshooting should be performed if the MIL is on. A qualified technician can access stored fault codes using a cable that plugs into the unit harness and a Windows-based computer. Contact RYOBI Customer Service for more detailed information.

RY907000FI WIRING DIAGRAMS

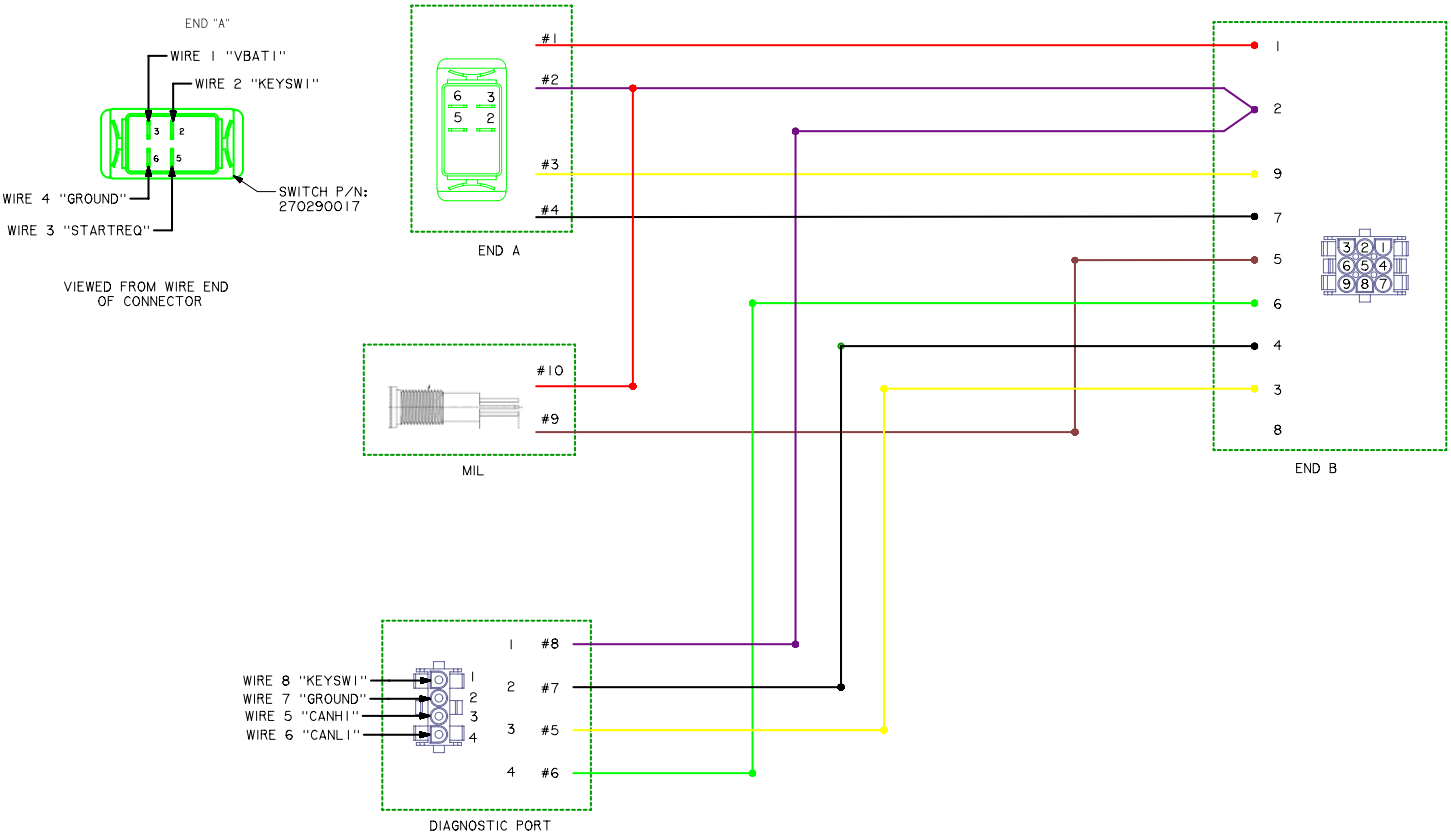
ENGINE FUEL INJECTION WIRING DIAGRAM

PIN	NAME	DESCRIPTION
A1	ENGSTPI	ENGINE STOP
A2	-	-
A3	CANHI	CAN
A4	CPS+	CRANK POSITION
B1	START REQUEST	START REQUEST
B2	-	-
B3	CANLI	CAN
B4	CPS-	CRANK POSITION
C1	O2INI+	OXYGEN SENSOR
C2	ETEMPI	ENGINE TEMPERATURE
C3	SGND	ENGINE TEMPERATURE
C4	O2HI-	OXYGEN SENSOR
D1	O2INI-	OXYGEN SENSOR
D2	-	-
D3	-	-
D4	INJ-	FUEL INJECTOR
E1	MIL1	MIL LIGHT
E2	-	-
E3	-	-
E4	-	-
F1	RELAY CONTROL	STARTER RELAY
F2	KEYSWI	KEY
F3	INJ+	FULE INJECTOR
F4	FPUMPI+	FUEL PUMP
G1	GND1	GROUND
G2	IGN+	IGNITION
G3	-	-
G4	VBAT1	POWER
H1	IGN-	IGNITION
H2	GND2	GROUND
H3	-	-
H4	FPUMPI-	FUEL PUMP



NO ES:
1. ALL CONNECTORS VIEWED FROM REAR WHERE HARNESS WIRES ENTER CONNECTOR
2. NOT TO SCALE
3. ● DENOTES SPLICE
4. SPLICE TO BE COVERED IN DUAL HST

CHASSIS WIRING HARNESS DIAGRAM



USING THE EFI DIAGNOSTIC KIT

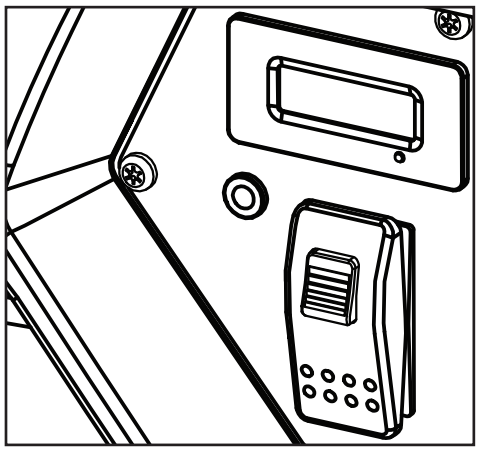
The RYOBI™ EFI Diagnostics Kit Includes:

- EFI Diagnostics Service Manual (Part number 995000285)
- USB Jump Drive with RYOBI™ EFI Software Program (Part number 903352003)
- Cable Assembly (for connecting computer to RYOBI™ EFI Generator) (Part number 290435055)

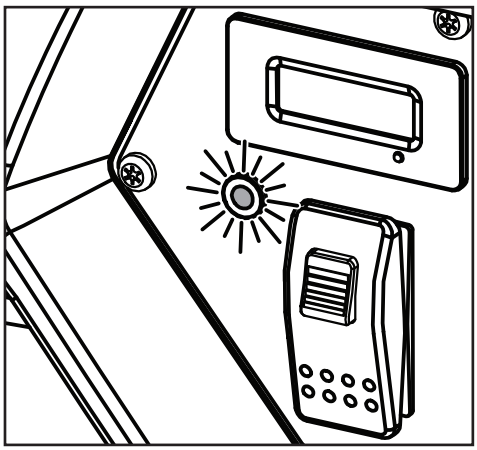
- Install the RYOBI™ EFI Service Diagnostics Software on your Windows-based computer using the USB drive supplied in the RYOBI™ EFI Diagnostics Kit.

- Determine if your MIL (Malfunction Indicator Lamp) is illuminated on the generator's front electrical panel.





NOT Illuminated



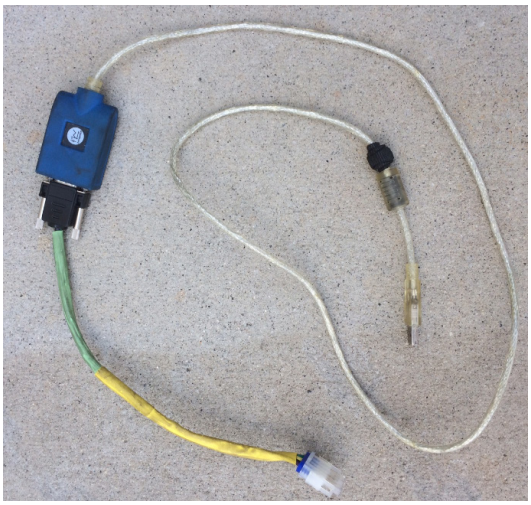
Illuminated

NOTE: If the MIL indicator is illuminated, further diagnostics of the unit are needed to determine the exact DTC (Diagnostic Trouble Code(s).

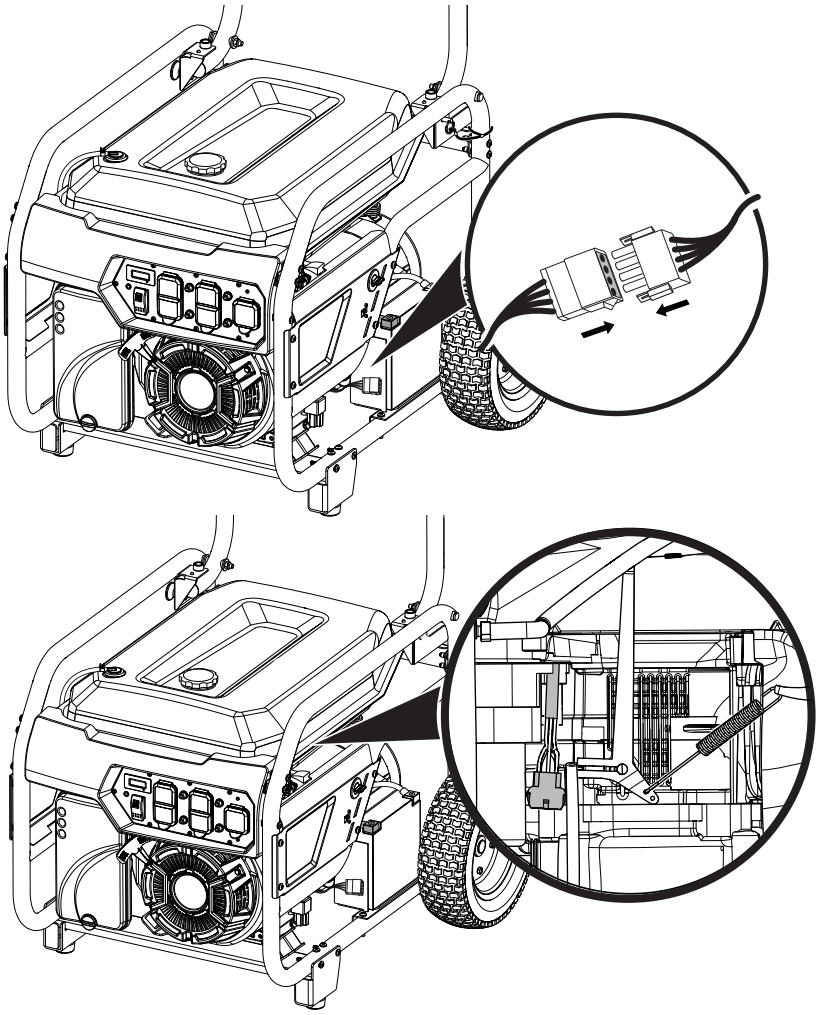
USING THE EFI DIAGNOSTIC KIT

For cases where the MIL indicator is illuminated:

- Locate the interface cable from the kit.



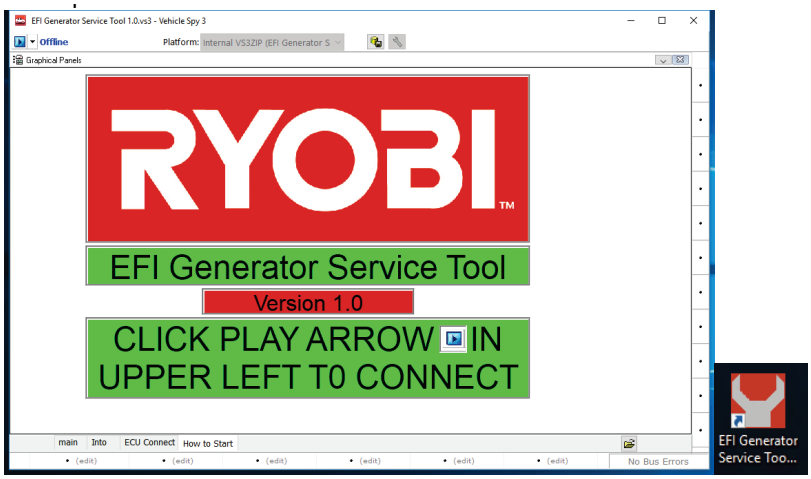
- Connect the interface cable's 4-pin connector to the 4-pin connector located on the generator's main wire harness. Plug the interface cable's USB plug into a USB port on your Windows-based computer.



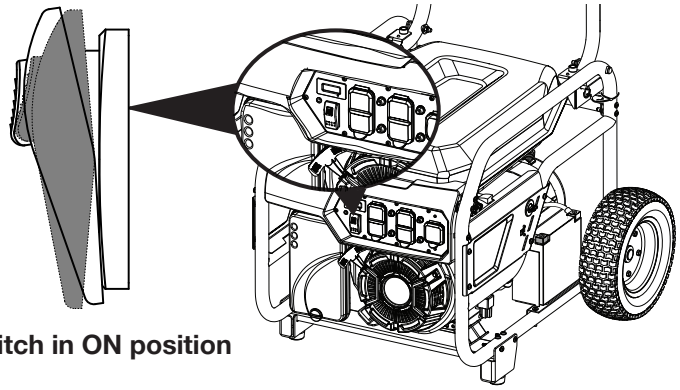
TOP View of 4-Pin Diagnostics Harness Connector for Reference

USING THE EFI DIAGNOSTIC KIT

- Open the RYOBI™ Diagnostics Software Program.

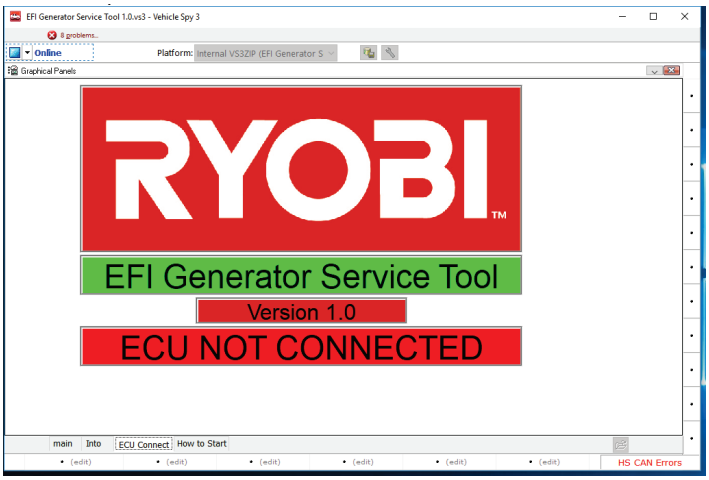


- Place your generator's engine switch in the **ON** or middle position.



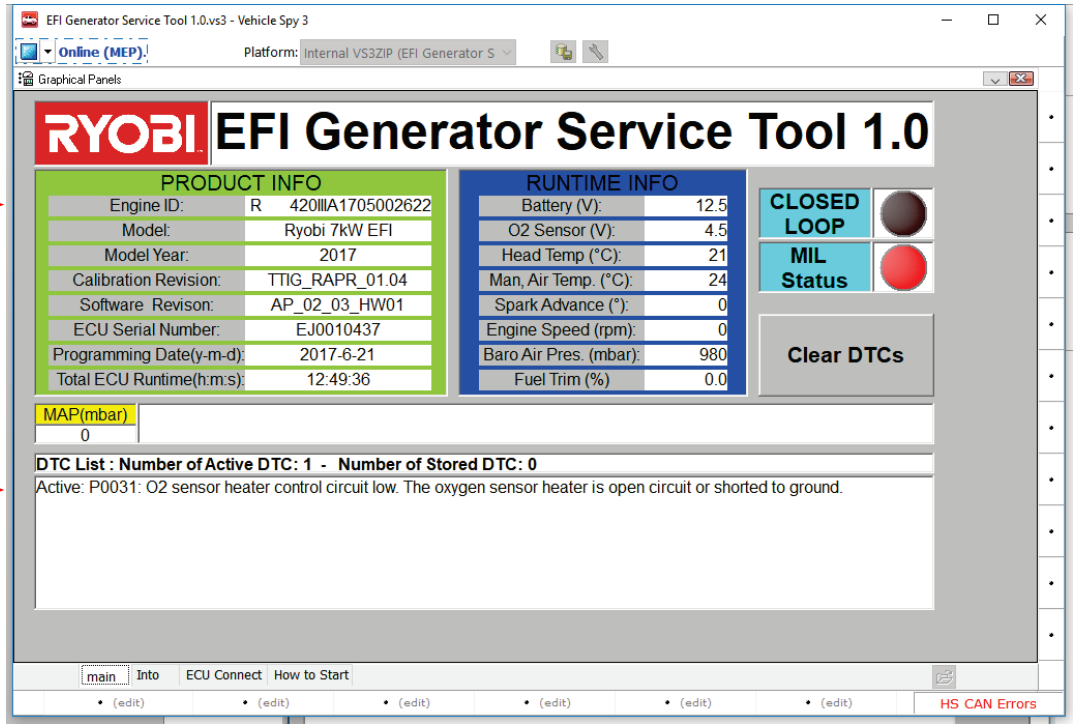
Switch in ON position

- If you receive this error message, the generator's engine switch is not in the **ON** position. Turn the engine switch ON and press the button to refresh.



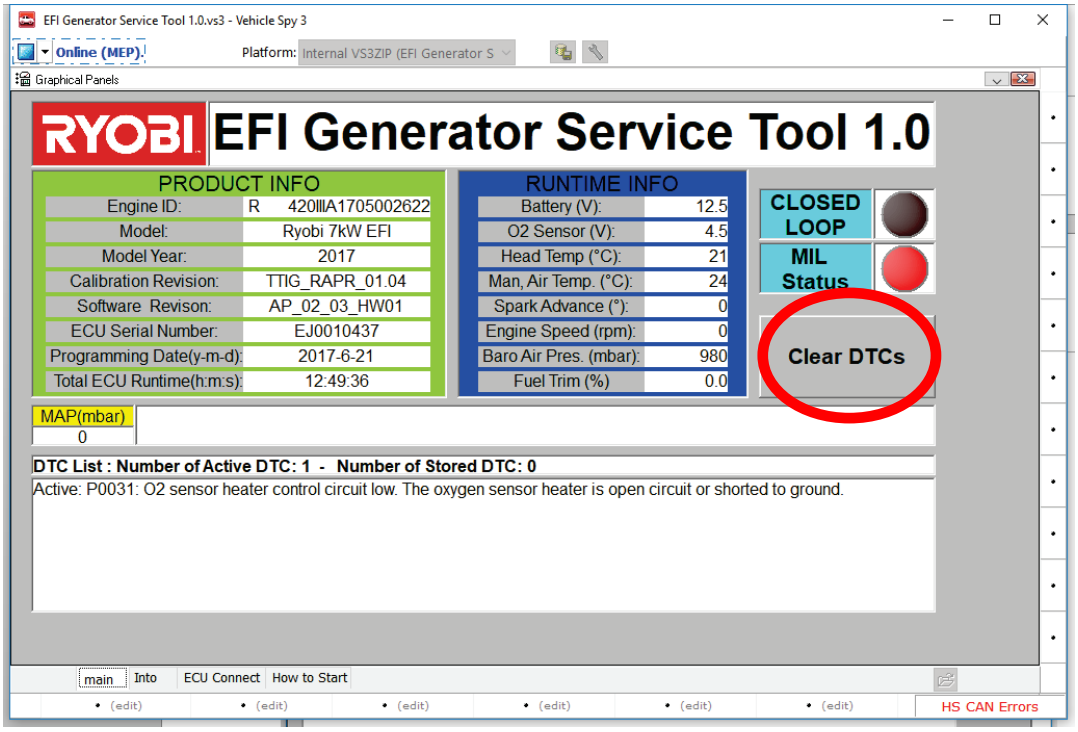
USING THE EFI DIAGNOSTIC KIT

- After finding the device, the software will show the engine serial number and the fault code(s).



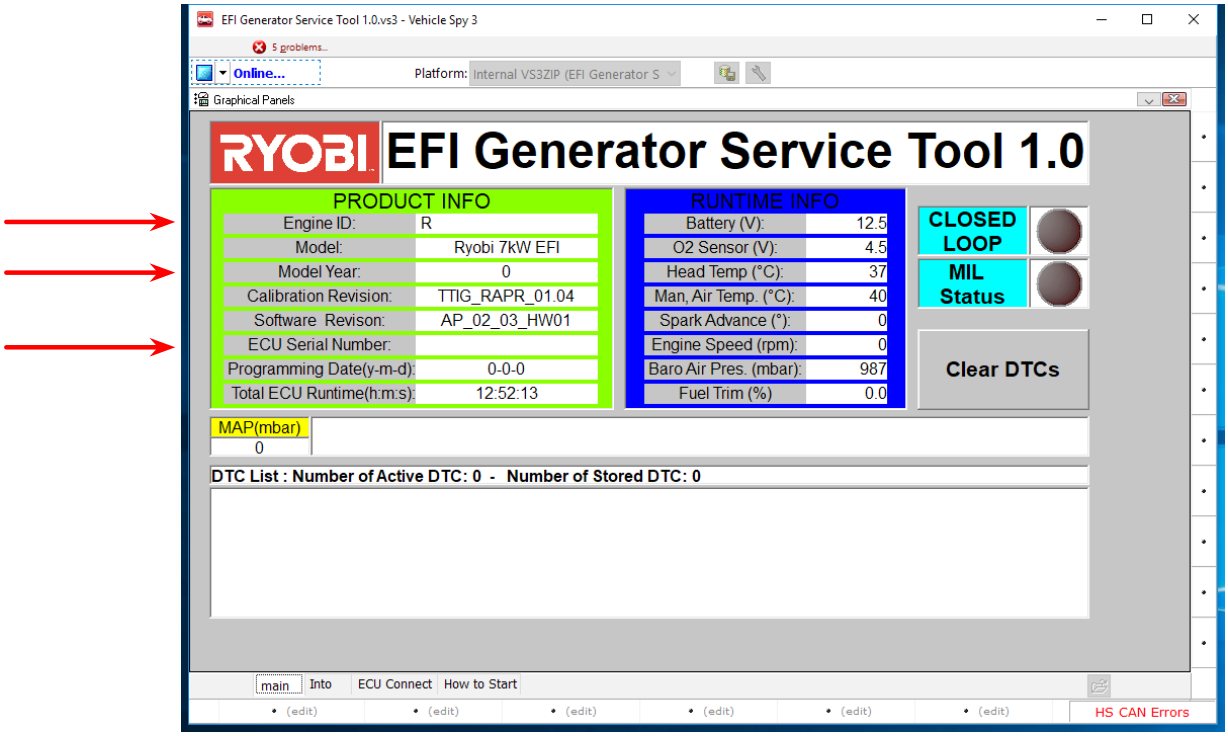
Once the fault or faults are noted, turn to the **DTC Troubleshooting Matrix** on page 12 for additional assistance in repairing the issue. An Active Fault Code will be labeled **Active**. A Non-Active Fault will be labeled **Stored**.

- After correcting the issue by either repairing or replacing components, the Fault will no longer be **Active**. It will change to **Stored**. You can clear all DTCs by pressing this button:

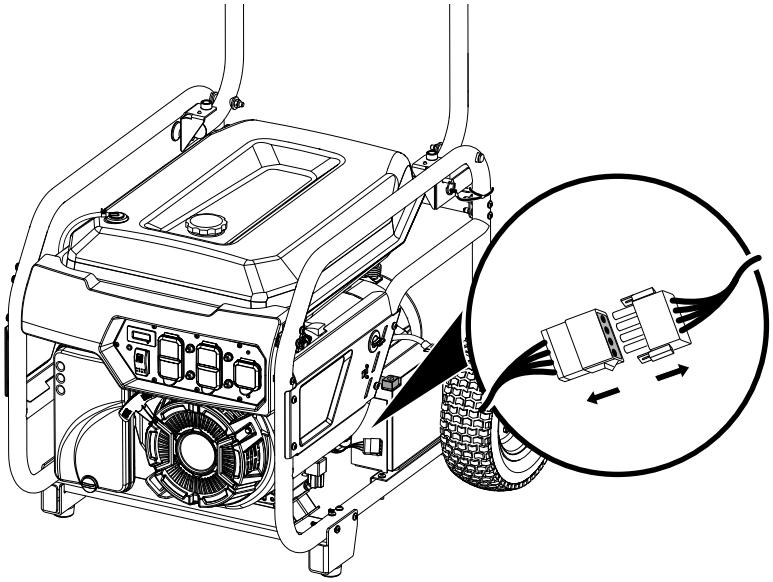


USING THE EFI DIAGNOSTIC KIT

- Once you place the generator's engine switch in the OFF position, your generator's identifying information will disappear.

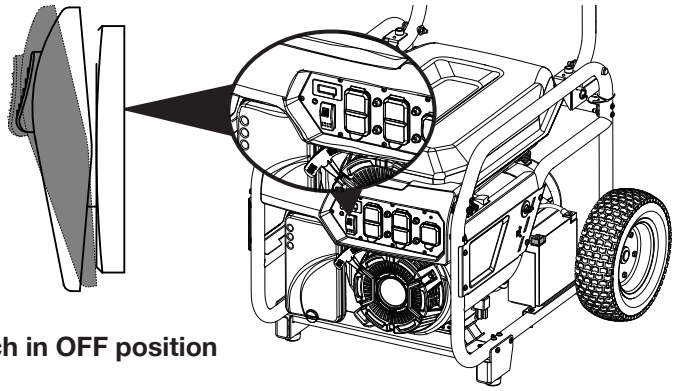


- Unplug the interface cable and reinstall the dust cover to the 4-pin connector on the main wire harness. The generator is now ready to be put back into service.



USING THE EFI DIAGNOSTIC KIT

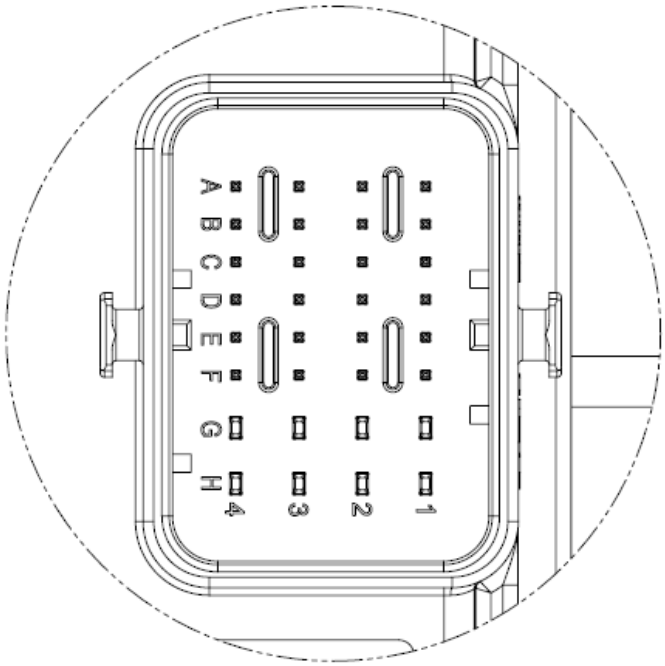
- Turn the generator's engine switch to the **OFF** position. This will ensure that the unit's battery is not drained inadvertently.



Switch in OFF position

RY907000FI ECU PIN OUT REFERENCE

PIN	NAME	DESCRIPTION
A1	ENGSTP1	ENGINE STOP
A2	-	-
A3	CANH1	CAN
A4	CPS+	CRANK POSITION
B1	START REQUEST	START REQUEST
B2	-	-
B3	CANL1	CAN
B4	CPS-	CRANK POSITION
C1	O2IN1+	OXYGEN SENSOR
C2	ETEMP1	ENGINE TEMPERATURE
C3	SGND	ENGINE TEMPERATURE
C4	O2H1-	OXYGEN SENSOR
D1	O2IN1-	OXYGEN SENSOR
D2	-	-
D3	-	-
D4	INJ-	FUEL INJECTOR
E1	MIL1	MIL LIGHT
E2	-	-
E3	-	-
E4	-	-
F1	RELAY CONTROL	STARTER RELAY
F2	KEYSW1	KEY
F3	INJ+	FULE INJECTOR
F4	FPUMP1+	FUEL PUMP
G1	GND1	GROUND
G2	IGN+	IGNITION
G3	-	-
G4	VBAT1	POWER
H1	IGN-	IGNITION
H2	GND2	GROUND
H3	-	-
H4	FPUMP1-	FUEL PUMP



DETAIL C
SCALE 3:1

DIAGNOSTIC TROUBLESHOOTING CODES (DTCS) MATRIX

Item	Fault Code	Condition	Cause	Actions
1	P0031	O2 Sensor Heater Control Circuit Low	Indicates an issue with the oxygen sensor heater control circuitry where the ECU has detected low voltage. The following conditions are examples of what may occur causing this fault: • Wiring to the oxygen sensor has become damaged and shorting to the chassis. • The connector for the oxygen sensor has been disconnected. • The oxygen sensor has electrically failed and is no longer operational.	• Check the electrical connector is positively fixed to the oxygen sensor. • Inspect wiring to the oxygen sensor and sensor body for damage. Repair and replace as necessary. • Verify continuity between Oxygen Sensor Connector Pin A and ECU Connector Pin F3. • Verify continuity between Oxygen Sensor Connector Pin B and ECU Connector Pin C4. • Clear DTCs. • Observe whether P0031 is still active. • If still active, further inspection and diagnostics will be required before returning generator to service. • If no longer active, return the generator to service.
2	P0032	O2 Sensor Heater Control Circuit High	Indicates an issue with the oxygen sensor circuitry where the ECU has detected high voltage. The following conditions are examples of what may occur causing this fault: • Wiring to the oxygen sensor has become damaged and shorting to a battery voltage source. • The oxygen sensor has electrically failed and is no longer operational.	• Check that the electrical connector is positively fixed to the oxygen sensor. • Inspect wiring to the oxygen sensor and sensor body for damage. Repair and replace as necessary. • Using a multimeter, measure resistance across pins A and B of the oxygen sensor. A resistance of 16-25 ohms is typical for a sensor that has been allowed to stabilize at room temperature. If the sensor is outside this range, the heater has been damaged and the sensor needs to be replaced. • Verify continuity between Oxygen Sensor Connector Pin A and ECU Connector Pin F3. • Verify continuity between Oxygen Sensor Connector Pin B and ECU Connector Pin C4. • Clear DTCs. • Observe whether P0032 is still active. • If still active, further inspection and diagnostics will be required before returning generator to service. • If no longer active, return the generator to service.
3	P0105	Intake Air Pressure Circuit	Indicates that the internal intake air pressure sensor has failed. When this DTC is active, the ECU will intentionally prevent its cylinder from running. This can occur in the following conditions, in order of decreasing likelihood: • The ECU has been physical tampered with. • The ECU has been tampered with using a third party calibration tool. • The intake air pressure sensor inside of the ECU has failed.	• Inspect the ECU for signs of physical tampering. Look for pry marks between the throttle body metal and the plastic cover of the ECU. Look for broken locking tabs on the plastic cover of the ECU. Look for small holes in the plastic cover of the ECU, including checking in the connector cavity. • Ensure the ECUs have a stable power supply from a healthy charged battery (12v+). • Use the manufacturer diagnostic software to reprogram the ECU with the latest service package. • Clear DTCs. • Observe whether P0105 is still active. • If P0105 is still active, the ECU is permanently damaged and the ECU must be replaced. Follow the ECU replacement procedure found later in this document. • If P0105 is no longer active, the ECU has been recovered and is safe to use moving forward. In this case, it is likely that the ECU was tampered with using a third party calibration tool.

DIAGNOSTIC TROUBLESHOOTING CODES (DTCS) MATRIX

Item	Fault Code	Condition	Cause	Actions
4	P0110	Intake Air Temperature Circuit	Indicates that the internal intake air temperature sensor has failed. The engine will be allowed to run with degraded performance in this situation. This can occur in the following conditions, in order of decreasing likelihood: • The ECU has been physical tampered with. • The ECU has been tampered with using a third party calibration tool. • The intake air temperature sensor inside of the ECU has failed.	• Inspect the ECU for signs of physical tampering. Look for pry marks between the throttle body metal and the plastic cover of the ECU. Look for broken locking tabs on the plastic cover of the ECU. Look for small holes in the plastic cover of the ECU, including checking in the connector cavity. • Ensure the ECUs have a stable power supply from a healthy charged battery (12V+). • Use the manufacturer diagnostic software to reprogram the ECU with the latest service package. • Clear DTCs. • Observe whether P0110 is still active. • If P0110 is still active, the ECU is permanently damaged and the ECU must be replaced. Follow the ECU replacement procedure found later in this document. • If P0110 is no longer active, the ECU has been recovered and is safe to use moving forward. In this case, it is likely that the ECU was tampered with using a third party calibration tool.
5	P0131	O2 Sensor Circuit Low Voltage	Indicates an issue with the oxygen sensor circuitry where the ECU has detected low voltage. The following conditions are examples of what may occur causing this fault: • Wiring to the oxygen sensor has become damaged and shorting to the chassis. • The connector for the oxygen sensor has been disconnected. • The oxygen sensor has electrically failed and is no longer operational. • Significant air leak path near oxygen sensor tip. • Oxygen Sensor has been contaminated through excessive oil consumption, or use of non-sensor safe chemicals (starting fluids, cleaners, etc.).	• Check that the electrical connector is positively fixed to the oxygen sensor. • Inspect wiring to the oxygen sensor and sensor body for damage. Repair and replace as necessary. • Verify continuity between Oxygen Sensor Connector Pin C and ECU Connector Pin C1. • Verify continuity between Oxygen Sensor Connector Pin D and ECU Connector Pin D1. • Clear DTCs. • Observe whether P0132 is still active. • If still active, further inspection and diagnostics will be required before returning generator to service. • Verify condition of exhaust manifold, and look for cracks, leaking exhaust gaskets, loose sensor connection to manifold. • Replace Oxygen Sensor if sensor tip appears to be contaminated, and previous diagnostic items have been verified. • Observe whether P0131 is still active. If no longer active, return the generator to service.

DIAGNOSTIC TROUBLESHOOTING CODES (DTCS) MATRIX

Item	Fault Code	Condition	Cause	Actions
6	P0132	O2 Sensor Circuit High Voltage	Indicates an issue with the oxygen sensor circuitry where the ECU has detected high voltage. The following conditions are examples of what may occur causing this fault: • Wiring to the oxygen sensor has become damaged and shorting to a battery voltage source. • The oxygen sensor has electrically failed and is no longer operational. • Long term excessively rich engine operation. • Oxygen Sensor has been contaminated through excessive oil consumption, or use of non-sensor safe chemicals (starting fluids, cleaners, etc.)	• Check that the electrical connector is positively fixed to the oxygen sensor. • Inspect wiring to the oxygen sensor and sensor body for damage. Repair and replace as necessary. • Verify continuity between Oxygen Sensor Connector Pin C and ECU Connector Pin C1. • Verify continuity between Oxygen Sensor Connector Pin D and ECU Connector Pin D1. • Clear DTCs. • Observe whether P0131 is still active. • Verify condition of exhaust manifold, and look for cracks, leaking exhaust gaskets, loose sensor connection to manifold. • Verify fuel pressure is within manufacturer specification. • Remove fuel injector with ignition on / engine off to verify injector is not stuck open. • Replace Oxygen Sensor if sensor tip appears to be contaminated, and previous diagnostic items have been verified. • If still active, further inspection and diagnostics will be required before returning generator to service. • If no longer active, return the generator to service. • Observe whether P0132 is still active. If no longer active, return the generator to service.
7	P0261	Fuel Injector Circuit Low	Indicates an issue with the fuel injector circuitry where the ECU has detected low voltage. The following conditions are examples of what may occur causing this fault: • Wiring to the fuel injector has become damaged and shorting to the chassis. • The electrical connector at the fuel injector has become disconnected or damaged. • The fuel injector has electrically failed and is no longer operational. • System Voltage low (<10V)	• Check the electrical connector is positively fixed to the fuel injector. • Inspect wiring to the fuel injector and the injector body for damage. Repair and replace as necessary. • Verify continuity between Fuel Injector Connector Pin 1 and ECU Connector Pin D4. • Verify continuity between Fuel Injector Connector Pin 2 and ECU Connector Pin F3. • Using a multimeter, check the resistance of the fuel injector. Nominal resistance is approximately 12 ohms. If open circuit, replace the fuel injector. • Clear DTCs. • Observe whether P0261 is still active. • If still active, further inspection and diagnostics will be required before returning generator to service. • If no longer active, return the generator to service.

DIAGNOSTIC TROUBLESHOOTING CODES (DTCS) MATRIX

Item	Fault Code	Condition	Cause	Actions
8	P0262	Fuel Injector Circuit High	Indicates an issue with the fuel injector circuitry where the ECU has detected high voltage. The following conditions are examples of what may occur causing this fault: • Wiring to the fuel injector has become damaged and shorting to a battery voltage source. • The fuel injector has electrically failed and is no longer operational.	• Check the electrical connector is positively fixed to the fuel injector. • Inspect wiring to the fuel injector and injector body for damage. Repair and replace as necessary. • Verify continuity between Fuel Injector Connector Pin 1 and ECU Connector Pin D4. • Verify continuity between Fuel Injector Connector Pin 2 and ECU Connector Pin F3. • Using a multimeter, check the resistance of the fuel injector. Nominal resistance is approximately 12 ohms. If shorted with resistance near zero ohms, replace the fuel injector. • Clear DTCs. • Observe whether P0262 is still active. • If still active, further inspection and diagnostics will be required before returning generator to service. • If no longer active, return the generator to service.
9	P0562	System Voltage Low	Indicates battery voltage in the generator EFI system is less than recommended for proper operation. This can occur due to the following conditions: • The generator's voltage regulator has been damaged. • The generator battery has been discharged or is faulty. • The generator is failing to charge the battery. • Battery charge low (<10V)	• Check wiring harness and ground connections. • Loose/corroded battery terminal connections. • Verify charging system operation. • Load test and if defective replace battery.
10	P0563	System Voltage High	Indicates battery voltage in the generator is above a safe threshold. This can occur due to the following conditions: • The generator's voltage regulator has been damaged. • The generator battery has been overcharged or is faulty.	• Verify charging system operation. • Load test and if defective replace battery.
11	P0602	ECU Programming Error	Indicates that the memory containing the ECU program has become corrupted. When this DTC is active, the ECU will intentionally prevent its cylinder from running. This can occur in the following conditions, in order of decreasing likelihood: • The ECU was tampered with using a third party calibration tool. • An unexpected error occurred while reprogramming the ECU, using the manufacturer diagnostic software. • An intermittent (nonpermanent) program memory failure occurred. • The program memory has become permanently damaged.	• Ensure the ECU has a stable power supply from a healthy charged battery. • Use the manufacturer diagnostic software to reprogram the ECU with the latest service package. • Clear DTCs. • Observe whether P0602 is still active. • If P0602 is still active, the ECU program memory is permanently damaged and the ECU must be replaced. • If P0602 is no longer active, the ECU has been recovered and is safe for future use.

DIAGNOSTIC TROUBLESHOOTING CODES (DTCS) MATRIX

Item	Fault Code	Condition	Cause	Actions
12	P0605	ECU Read Only Memory Error	Indicates that the calibration memory inside of the ECU is corrupt. When this DTC is active, the ECU will intentionally prevent its cylinder from running. This can occur in the following conditions, in order of decreasing likelihood: • The ECU was tampered with using a third party calibration tool. • An unexpected error occurred while reprogramming the ECU, using the manufacturer diagnostic software. • An intermittent (nonpermanent) calibration memory failure occurred. • The calibration memory has become permanently damaged.	• Ensure the ECUs have a stable power supply from a healthy charged battery. • Use the manufacturer diagnostic software to reprogram the ECU with the latest service package. • Clear DTCs. • Observe whether P0605 is still active. • If P0605 is still active, the ECU calibration memory is permanently damaged and the ECU must be replaced. Follow the ECU replacement procedure found later in this document. • If P0605 is no longer active, the ECU has been recovered and is safe to use moving forward.
13	P0606	ECU Processor	Indicates that a noncritical device inside of the ECU has failed. This can occur in the following conditions, in order of decreasing likelihood: • The ECU has been physically tampered with. • The ECU has been tampered with using a third party calibration tool. • The noncritical device inside of the ECU has failed.	• Inspect the ECU for signs of physical tampering. Look for pry marks between the throttle body metal and the plastic cover of the ECU. Look for broken locking tabs on the plastic cover of the ECU. Look for small holes in the plastic cover of the ECU, including checking in the connector cavity. Regardless of whether tampering is present or not, proceed with the following steps to attempt to repair the problem. • Ensure the ECUs have a stable power supply from a healthy charged battery. • Use the manufacturer diagnostic software to reprogram the ECU with the latest service package. • Clear DTCs. • Observe whether P0606 is still active. • If P0606 is still active, the ECU is permanently damaged and the ECU should be replaced. Follow the ECU replacement procedure found later in this document. • If P0606 is no longer active, the ECU has been recovered and is safe to use moving forward. In this case, it is likely that the ECU was tampered with using a third party calibration tool.
14	P0607	ECU Performance	Indicates that a critical device inside of the ECU has failed. When this DTC is active, the ECU will intentionally prevent its cylinder from running. This can occur in the following conditions, in order of decreasing likelihood: • The ECU has been physically tampered with. • The ECU has been tampered with using a third party calibration tool. • The critical device inside of the ECU has failed.	• Inspect the ECU for signs of physical tampering. Look for pry marks between the throttle body metal and the plastic cover of the ECU. Look for broken locking tabs on the plastic cover of the ECU. Look for small holes in the plastic cover of the ECU, including checking in the connector cavity. Regardless of whether tampering is present or not, proceed with the following steps to attempt to repair the problem: • Ensure the ECUs have a stable power supply from a healthy charged battery. • Use the manufacturer diagnostic software to reprogram the ECU with the latest service package. • Clear DTCs. • Observe whether P0607 is still active. • If P0607 is still active, the ECU is permanently damaged and the ECU must be replaced. • If P0607 is no longer active, the ECU has been recovered and is safe to use moving forward.

DIAGNOSTIC TROUBLESHOOTING CODES (DTCS) MATRIX

Item	Fault Code	Condition	Cause	Actions
15	P0628	Fuel Pump Control Circuit Low	Indicates an issue with the fuel pump circuitry where the ECU has detected low voltage. The following conditions are examples of what may occur causing this fault: • Wiring to the fuel pump has become damaged and shorting to the chassis, or creating an open circuit condition. • The electrical connector at the fuel pump has become disconnected or damaged. • The fuel pump has electrically failed and is no longer operational.	• Check the electrical connector is positively fixed to the fuel pump. • Inspect wiring to the fuel pump and pump body for damage. Repair and replace as necessary. • Verify continuity between Fuel Pump Connector Pin 1 and ECU Connector Pin H4. • Verify continuity between Fuel Pump Connector Pin 2 and ECU Connector Pin F4 . • Using a multimeter, check the resistance of the fuel pump. Nominal resistance is approximately 12 ohms. If open circuit, replace the fuel pump. • Clear DTCs using dealer tool. • Observe whether P0628 is still active. • If still active, further inspection and diagnostics will be required before returning generator to service. • If no longer active, return the generator to service.
16	P0629	Fuel Pump Control Circuit High	Indicates an issue with the fuel pump circuitry where the ECU has detected high voltage. The following conditions are examples of what may occur causing this fault: • Wiring to the fuel pump has become damaged and shorting to a battery voltage source. • The fuel pump has electrically failed and is no longer operational.	• Check the electrical connector is positively fixed to the fuel pump. • Inspect wiring to the fuel pump and the pump body for damage. Repair and replace as necessary. • Verify continuity between Fuel Pump Connector Pin 1 and ECU Connector Pin H4. • Verify continuity between Fuel Pump Connector Pin 2 and ECU Connector Pin F4. • Using a multimeter, check the resistance of the fuel pump. Nominal resistance is approximately 12 ohms. If shorted with resistance approximately zero ohms, replace the fuel pump. • Clear DTCs using Dealer tool. • Observe whether P0629 is still active. • If still active, further inspection and diagnostics will be required before returning generator to service. • If no longer active, return the generator to service.
17	P062F	ECU EEPROM Error	Indicates that the electrically erasable programmable read only memory (EEPROM) inside of the ECU has failed. This memory stores parameters such as the fuel trim parameters, so the information can be retained while the ECU is in PD mode. This DTC is considered non-critical, so the engine will be allowed to run with degraded performance. This can occur in the following conditions, in order of decreasing likelihood: • An intermittent (nonpermanent) EEPROM failure occurred. • The EEPROM has become permanently damaged.	• Ensure the ECUs have a stable power supply from a healthy charged battery. • Use the manufacturer diagnostic software to reprogram the ECU with the latest service package. • Clear DTCs. • Observe whether P062F is still active. • If P062F is still active, the ECU EEPROM is permanently damaged and the ECU should be replaced. Follow the ECU replacement procedure found later in this document. • If P062F is no longer active, the ECU has been recovered and is safe to use moving forward.

DIAGNOSTIC TROUBLESHOOTING CODES (DTCS) MATRIX

Item	Fault Code	Condition	Cause	Actions
18	P0650	Malfunction Indicator Lamp Control Circuit	Indicates a problem with the MIL circuit on the ECU. Under these conditions, the MIL will not illuminate due to a damaged connection to the lamp. To identify this issue, inspect the ECU for the MIL bulb check sequence by keying on and looking for the bulb to illuminate for 2.5 seconds. ECUs must be functional, as well as a charged battery to verify operation.	• Ensure the ECUs have a stable power supply from a healthy charged battery. • Use the manufacturer diagnostic software to reprogram the ECU with the latest service package. • Clear DTCs. • Observe whether P0650 is still active. • If P0650 is still active, the ECU is permanently damaged and the ECU should be replaced. Follow the ECU replacement procedure found later in this document. • If P0650 is no longer active, the ECU has been recovered and is safe to use moving forward.
19	P2226	Barometric Pressure Circuit	Indicates that the internal barometric air pressure sensor has failed. The engine will be allowed to run with degraded performance in this situation. This can occur in the following conditions, in order of decreasing likelihood: • The ECU has been physical tampered with. • The ECU has been tampered with using a third party calibration tool. • The barometric pressure sensor inside of the ECU has failed.	• Inspect the ECU for signs of physical tampering. Look for pry marks between the throttle body metal and the plastic cover of the ECU. Look for broken locking tabs on the plastic cover of the ECU. Look for small holes in the plastic cover of the ECU, including checking in the connector cavity. If tampering is present, no warranty should be honored for the ECU. Regardless of whether tampering is present or not, proceed with the following steps to attempt to repair the problem. • Ensure the ECUs have a stable power supply from a healthy charged battery. • Use the manufacturers diagnostic software to reprogram the ECU with the latest service package. • Clear DTCs. • Observe whether P2226 is still active. • If P2226 is still active, the ECU is permanently damaged and the ECU must be replaced. Follow the ECU replacement procedure found later in this document. • If P2226 is no longer active, the ECU has been recovered and is safe to use moving forward. In this case, it is likely that the ECU was tampered with using a third party calibration tool.
20	P2300	Ignition Coil Primary Control Circuit Low	Indicates a issue with the ignition coil circuitry where the ECU has detected low voltage. The following conditions are examples of what may occur causing this fault: • Wiring to the ignition coil has become damaged and shorting to the chassis. • The electrical connector at the ignition coil has become disconnected or damaged. • The ignition coil has electrically failed and is no longer operational.	• Check the electrical connector is positively fixed to the ignition coil. • Inspect wiring to the ignition coil and the coil body for damage. Repair and replace as necessary • Verify continuity between Ignition Coil Connector Pin A and ECU Connector Pin G2. • Verify continuity between Ignition Coil Connector Pin C and ECU Connector Pin H1. • Using a multimeter, check the resistance of the coil. Nominal resistance is approximately 1/2 ohm. If open circuit, replace the ignition coil. • Clear DTCs. • Observe whether P2300 is still active. • If still active, further inspection and diagnostics will be required before returning generator to service. • If no longer active, return the generator to service.

PARTS AND SERVICE

Prior to requesting service or purchasing replacement parts, please obtain your item, manufacturing, and serial numbers from the product data plate.

ITEM NO. _____

MANUFACTURING NO. _____

SERIAL NO._____

HOW TO OBTAIN REPLACEMENT PARTS: A replacement parts list is available online at **www.ryobitools.com**. Replacement parts can be purchased online or by calling 1-800-860-4050. Replacement parts can also be obtained at one of our service centers.

HOW TO LOCATE A SERVICE CENTER: Service centers can be located online at **www.ryobitools.com** or by calling 1-800-860-4050.

HOW TO OBTAIN CUSTOMER OR TECHNICAL SUPPORT: To obtain customer or technical support please contact us at 1-800-860-4050.

DANGER:

Carbon Monoxide. Using a generator indoors CAN KILL YOU IN MINUTES.

Generator exhaust contains high levels of carbon monoxide (CO), a poisonous gas you cannot see or smell. If you can smell the generator exhaust, you are breathing CO. But even if you cannot smell the exhaust, you could be breathing CO.

- Never use a generator inside homes, garages, crawlspaces, or other partly enclosed areas. Deadly levels of carbon monoxide can build up in these areas. Using a fan or opening windows and doors does NOT supply enough fresh air.
- ONLY use a generator outdoors and far away from open windows, doors, and vents. These openings can pull in generator exhaust.

Even when you use a generator correctly, CO may leak into the home. ALWAYS use a battery-powered or battery-backup CO alarm in the home.

If you start to feel sick, dizzy, or weak after the generator has been running, move to fresh air RIGHT AWAY. See a doctor. You could have carbon monoxide poisoning.

RY907000FI
Electronic Fuel Injection (EFI) Diagnostics Service Manual

FOR RY907000FI
RYOBI 7,000 WATT GENERATOR

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10-17-17 (REV:01)