



**8.0, 9.1, and 10.3 L Industrial Engines  
Owner's Manual and Maintenance Log  
Export/Site-Certified Engines**

**2026**



## 8.0, 9.1, & 10.3 L Owner's Manual

### **Service Parts**

To ensure that your engine continues to run reliably and efficiently for as long as possible, use only genuine Industrial Irrigation parts.

For genuine Industrial Irrigation service parts for your engine, or for technical assistance in servicing your engine, call:

Industrial Irrigation 800-289-6478

### **Maintenance Providers**

Maintenance and repair services may be performed by you or any qualified engine service provider that you choose. However, your engine warranty does not cover damage or failure caused by improper maintenance or repairs.

### **Owners Manual & Maintenance Log Storage & Use**

Store this Owner's Manual and Maintenance Log in a safe, visible place by your engine. The maintenance log must be updated whenever your engine is serviced.

### **Disclaimer**

All information and specifications in this manual are based on the latest data available at the time of the publication. Industrial Irrigation reserves the right to make changes or improvements at any time without notice.



## 8.0, 9.1, & 10.3 L Owner's Manual

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### U.S. EPA Legal Requirements – Site-Certified Engines

This manual pertains to engines that are for export use (outside the USA) or for domestic Site-Certified applications when used as a stationary or constant-speed mobile engine. It is illegal to operate this engine in a variable-speed (foot pedal speed control) application.

In order to comply with EPA Site-Certification regulations for these engines the U.S. EPA requires you to do the following:

1. Operate and maintain your engine as specified in this Owner's Manual. In addition, you are required by law to keep detailed maintenance records.
2. If you do not operate and maintain your engine as specified in this Owner's Manual, your engine will be considered a non-certified engine.

In this case, you must:

- Keep a maintenance plan and records of conducted maintenance.
- To the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions.
- Conduct an initial performance test within 1 year of engine startup to demonstrate compliance. Contact your regional EPA office for instructions on how to conduct an initial performance test.

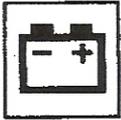
Per section 113 of the U.S. Clean Air Act, failure to abide by these legal requirements can result in fines up to \$52,058 per day.

A maintenance plan and log are provided at the back of this manual for you to record your engine maintenance. Update the log each time you service your engine.

Engines for Export Use (outside the USA) need not comply with the above guidelines for emissions testing.

## SAFETY SYMBOLS

This section identifies the ISO 8999 symbols that may be used in this manual.



Battery



Electrical hazards



Engine coolant fill level



Engine coolant temperature



Engine oil fill level



Engine oil pressure



Hot surface warning



Warning



Read the handbook



No Smoking or Flame

## **SAFETY PRECAUTIONS - STARTING**



### **WARNING**

**Starting an engine incorrectly may cause injury to the operator and/or cause damage to the engine. Engine operators must be instructed in the correct procedures before attempting to start any engine.**

### **Before Starting**

- Inspect the engine, intake, exhaust, cooling system, and drivetrain to verify that the engine is fully assembled and not in the process of being serviced.
- Ensure the engine is free to turn without obstruction.
- Check that all safety guards are in their correct position and secure.
- Check that the coolant level in the radiator overflow bottle is between "Add" and "Full".
- Check that the oil level on the dipstick is between "Add" and "Full".
- Check that the fuel supply is connected, shut-off valves are open, and there are no leaks.
- If an LPG fuel system is being used, verify that there is fuel in the cylinder/tank.
- If a natural gas fuel system is being used, verify that the correct fuel supply pressure is being supplied to the engine.
- Check that the battery is connected and charged.
- When possible, disengage any driven equipment while starting.

**SAFETY PRECAUTIONS - ELECTRICAL**

**The battery produces flammable and explosive hydrogen gas. The battery electrolyte contains poisonous and corrosive sulfuric acid. The precautions listed below must be followed to ensure operator safety.**

- Do not smoke or allow any flame near the battery.
- With the engine stopped and the ignition switch in the OFF position, disconnect the negative battery cable from the battery before working on the engine.
- Be careful not to short circuit battery positive to ground with tools when working on the engine.
- Avoid getting battery electrolyte in your eyes or on your skin or clothes. If electrolyte gets in your eyes, flush with clean water immediately and get medical help. If electrolyte gets on your skin, wash immediately with soap and water and get medical help if you feel pain or burning. Remove and wash any clothing that is exposed to electrolyte.
- Never remove any electrical cables while the battery is connected in the circuit.
- Be careful to not short-circuit or cross battery positive and negative.
- Never 'flash' any connection to check the current flow.
- The ECU Wiring Harness, battery, and alternator must be disconnected before commencing any electric welding when a pole strap is directly or indirectly connected to the engine.
- When charging the battery, only do a slow charge (5 A or less), and ensure there is good ventilation.

## **FUELS**



**Natural gas and LPG are combustible gases, and can be explosive if leaked and contained in a confined area. Keep cigarettes and all other flame sources away from these areas.**

**If you can hear a fuel leak, shut off the fuel supply at the source immediately and fix the leak or have it serviced. Check the entire fuel supply line from the cylinder/tank to the engine for leaks with a soapy water bubble mixture anytime a cylinder/tank is changed or the fuel supply line is worked on. Fuel leaks should also be checked as part of the regular engine maintenance.**

Depending on your engine and fuel system configuration, your engine is designed to run on natural gas, liquid LPG, or vapor LPG. The fuel requirements for each are discussed below. See the "[SPECIFICATIONS](#)" section for the required fuel supply pressures for each fuel.

### **Natural Gas**

Your engine is certified to run on "pipeline-quality" and most grades of non-pipeline quality natural gas. Specifically, your engine is certified to run on natural gas that has at least 45% methane content by volume AND an energy content of 700 – 1800 BTU per SCF.

### **LPG**

In order to maintain emissions compliance and the engine warranty, use commercial-grade HD-10 or better LPG.

Liquid LPG is drawn off of the bottom side of a LPG tank or cylinder and is a liquid until it has passed through the regulator/vaporizer, at which point it is vaporized to a gas. If you connect vapor LPG to a liquid LPG fuel system, you may starve the engine for fuel, causing it to produce low power and excessive emissions.

IIS does not recommend running your Reliable Horsepower engine utilizing a vapor LPG system. Please contact IIS to discuss your specific application requirements prior to running your engine on a vapor LPG system.



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### STARTING, RUNNING, & STOPPING THE ENGINE

Observe the safety precautions listed in "[SAFETY PRECAUTIONS - STARTING](#)" before starting the engine.

#### Starting the engine

- Turn the key switch to the ON position and verify that the MIL is illuminated. If not determine why the lamp is not working.
- Turn the key switch to the START position and hold until the engine has started.
- Release the key promptly after the engine starts to avoid grinding the starter.
- Do not crank the engine for more than 15 seconds at a time.
- Allow at least 30 seconds between cranking attempts.
- If the engine does not start after 3 starting attempts, review the "Before Starting" checklist.
- 

#### Running the engine

- Do not race or fully load the engine during the first 3 minutes of operation.
- Verify that the "CHECK ENGINE" light is off while the engine is running. If it is on, refer to the [DIAGNOSTICS](#) section.
- Verify that there are no fuel, coolant, or oil leaks while the engine is running. If there are leaks, stop the engine and fix them or have the engine serviced.
- Listen to the engine. If you hear an abnormal noise while the engine is running, turn it off and correct the problem or have the engine serviced.
- No adjustments are necessary to the fuel or ignition systems.
- Your engine is certified to operate under load with set speeds between 1200 and 3000 rpm.

#### Stopping the engine

- If the engine has been running under load and is hot, run the engine at no load for 3 minutes to allow the engine to cool before stopping the engine.
- Stop the engine by turning the key switch to the OFF position. The engine may run-on for 1-5 seconds while the fuel is depleted from the carburetor and the air/fuel mixture is depleted from the intake manifold.



### ENGINE MAINTENANCE

You should properly maintain your engine for the following reasons.

- You are legally required to maintain your engine and keep maintenance records to ensure emissions compliance. See "[U.S. EPA Legal Requirements](#)" at the front of this manual.
- Your engine warranty will be void if the engine is not properly maintained.
- Keeping your engine properly maintained will ensure the best engine life, power, and fuel economy.

#### **Scheduled Maintenance**

A schedule of the required engine maintenance tasks is listed on the following page. The scheduled maintenance should be performed when the engine reaches the specified operating hours or the specified months have elapsed, whichever comes first.

#### **Daily Maintenance**

In addition to the scheduled maintenance, daily checks are required to keep your engine running properly. These checks are listed in the "[SAFETY PRECAUTIONS - STARTING](#)" and "[STARTING, RUNNING, & STOPPING THE ENGINE](#)" sections.

#### **Maintenance Log**

Keep a record of your engine's scheduled maintenance in the Maintenance Log at the back of this manual.



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**Spare Page**



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## INDUSTRIAL IRRIGATION 8.0, 9.1, & 10.3 L

The following table lists the periodic maintenance required to ensure

<b>MAINTENANCE</b>								
Periodic maintenance should be performed after specified intervals have elapsed in months or hours, whichever comes first.	Months	1	4	8	13	17	21	25
	Hours	100	250	500	750	1000	1250	1500
<b>ENGINE</b>								
Air filter	(A)			I		R		I
Alternator/Fan/Water Pump Belt		I	I	I	I	I	I	I
Battery		I	I	I	I	I	I	I
Engine coolant		I	I	I	I	R	I	I
Radiator outside	(A)	C	C	C	C	C	C	C
Engine oil	(A)	R	R	R	R	R	R	R
Oil Filter	(A)	R	R	R	R	R	R	R
Spark Plugs (Platinum tipped)						I		
Spark Plug Wires						I		
Pre-Catalyst and Post-Catalyst Oxygen Sensors								
PCV system				I		I		I
<b>FUEL SYSTEM</b>								
Check fuel hoses and fittings for gas leakage	(B)	I	I	I	I	I	I	I
Fuel Filter						R		
LPG Primary Vaporizer/Regulator						I/D		
Fuel Lock-off valve(s)						I		
<b>Notes:</b>	A) Under heavy duty operating condition, more frequent maintenance might be necessary.							
	B) At time of LPG cylinder replacement, inspect tank connections for leakage with soapy water.							
<b>Abbreviations:</b>	I = Inspection							
	R= Replace							
	A= Adjust							
	C= Clean							
	D= Drain							
	T= Retighten							





## **AIR FILTER**

**Part Number: Depending on engine configuration.**

**MAA55PA2806**

**Or**

**INA55FA1226**

### **Inspection**

1. Remove air filter element from enclosure.
2. Tap filter to knock off loose dirt.
3. Visually check filter.
4. If filter is clean, reinstall old filter.  
If filter is dirty, replace with a new filter.

## **ALTERNATOR-FAN-WATER PUMP BELT**

### **Inspection**

Check the belt for visible cracks, missing chunks, and fraying. Small cracks on the inside of the belt are OK. Replace the belt if cracks are visible on the outside of the belt, chunks are missing from the inside of the belt, or the belt is frayed.

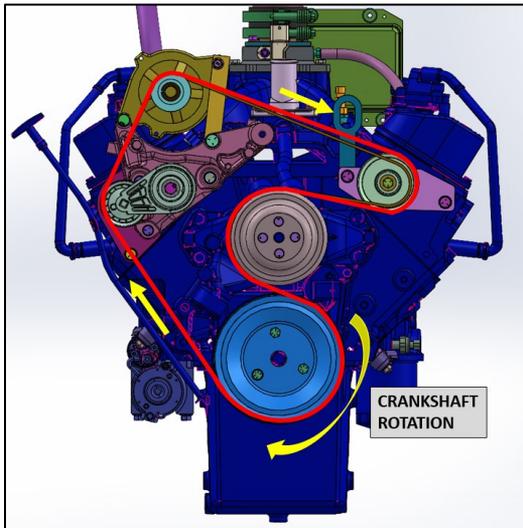
### **Belt Tension**

The belt should displace about 1/2" when 20 lbs of force is applied to the midpoint of the belt. If the deflection is greater than 1/2", increase the belt tension. If less than 1/2", reduce the belt tension.

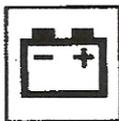
### **Belt Replacement**

1. Release all tension from the old belt.
2. Remove the old belt.
3. Install the new belt.
4. Apply tension to the belt as specified in "Belt Tension".
5. Recheck tension after 25-50 hours of operation.

### **Belt Routing**



## BATTERY



The battery produces flammable and explosive hydrogen gas. The battery electrolyte contains poisonous and corrosive sulfuric acid. Review the safety precautions in "[SAFETY PRECAUTIONS - ELECTRICAL](#)" before working on the battery.

Battery Specifications	
Nominal Voltage:	12 V
Cranking Amps:	800
Cold Cranking Amps:	640
Battery voltage during alternator charging:	13.5 -15.0 V
Fully charged battery with key off @ 20 C (68 F):	12.5 -13.0 V
Half charged battery with key off @ 20 C (68 F):	12.0 - 12.5 V
Discharged battery with key off @ 20 C (68 F):	less than 12.0 V

### Battery electrolyte inspection

1. Check electrolyte level.
2. If low, top off with distilled water. Do not overfill.

### Battery corrosion inspection

1. Check battery posts and clamps for corrosion.
2. If corroded, remove negative cable first, then positive.
3. Clean both posts and both clamps with a small wire brush.
4. Reconnect cables, positive cable first.

### **If the engine is cranking slowly or not at all:**

1. Remove the battery negative lead from the battery.
2. Remove the positive lead from the battery.
3. Clean the battery posts and cables with a small wire brush.
4. Replace leads, positive lead first.

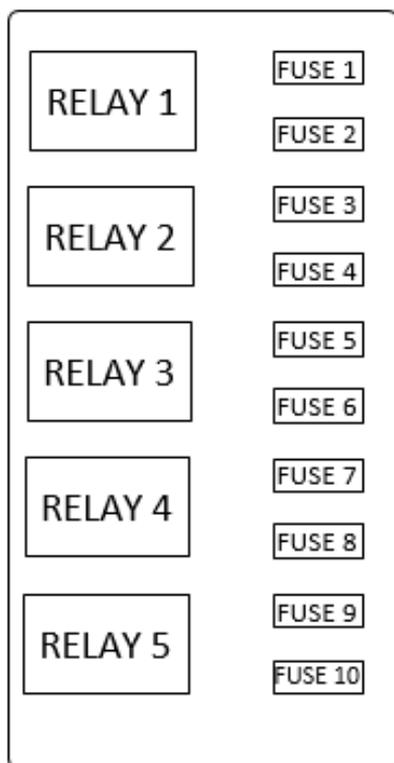
### **If the engine is still cranking slowly or not at all:**

1. Remove the battery negative leads.
2. Recharge the battery in a well-ventilated area.
3. Reinstall the battery.

### **If the engine is still cranking slowly or not at all:**

Replace the battery.

## FUSES



### Relay

1	Ignition
2	Main Power
3	Auto Start
4	Starter
5	Spare

### Fuse

1	Ignition
2	Main Power
3	Auto Start
4	Starter
5	ECU Panel
6	Control Panel
7	Spare
8	Keyswitch Power
9	Spare
10	Spare



### ENGINE OIL AND FILTER REPLACEMENT



<b>Filter:</b>	<b>GSA556438384</b>
<b>Oil Grade:</b>	SAE 10W-30 for 100 Hour break-in period <b>SAE 15W-40</b> for Continuous Duty in all applications where operating temperatures are above 30 F. SAE 10W-30 for Continuous Duty in applications where operating temperatures are below 30 F. <b>-NOTE-</b> Use of lighter weight oil in continuous duty applications, especially in temperatures above 30 F can potentially increase oil consumption.
<b>Ash Content:</b>	.9% or Less
<b>API Certification:</b>	SN
<b>Oil Pan Capacity:</b>	12 quarts (Up to 1 additional quart is required for oil filter) *

**\* Engine Models requiring an Oil Cooler will need additional capacity. (See [Oil Cooler Below](#))**

#### **DRAIN THE ENGINE OIL**

1. Remove the oil filler cap.
2. Remove the oil drain plug and drain the oil into a container.

#### **REPLACE THE OIL FILTER**

1. Remove the oil filter.
2. Check and clean the oil filter installation surface.
3. Check that the part number of the new oil filter is correct.
4. Apply clean engine oil to the gasket of the new oil filter and screw on until finger tight.
5. Tighten it an additional  $\frac{3}{4}$  turn.



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### **REFILL WITH ENGINE OIL**

1. Clean and install the oil drain plug.
2. Fill with fresh engine oil. Do not overfill.
3. Install the oil filler cap.
4. Start engine and check for oil leaks.
5. Recheck the engine oil level.

### **OIL COOLER**

Certain applications will require an oil cooler. Recommended oil temperature range is 190-240°F. An approved oil cooler is available through Industrial Irrigation; please call for pricing and information specific to your application. When filling engine with oil cooler, begin with 12 quarts in the engine and then adjust level as needed after running. Cooler hoses and other factors will cause oil capacity to vary.

**Dispose of your used oil at your local oil recycling center.**

## ENGINE COOLANT, RADIATOR, AND COOLING SYSTEM



**To avoid being scalded or burned, never remove the radiator cap unless the engine is off and coolant has fully cooled. The coolant in the radiator is pressurized when hot and may boil over when the radiator cap is loosened.**

When using antifreeze coolant, mix the antifreeze coolant with water, observing instructions attached to antifreeze container. Use only antifreeze approved for aluminum components in a 50/50 mixture ratio.

### **Clean radiator outside**

Clean outside of radiator with dry compressed air.

### **Inspect cooling system, hoses and connections**

Check hoses and fittings for loose connections or for any sign of oil deterioration or soft spots in the hoses. Retighten connections or replace hoses if needed.

Check coolant level. If low, top off coolant with a premixed 50/50 mixture of antifreeze and water.

### **Engine Coolant Replacement**

1. Open overflow bottle cap.
2. Drain old coolant.
3. Flush system with fresh, clean water.
4. Slowly refill system with premixed 50/50 antifreeze/water mixture.
5. Idle engine with radiator cap off to allow air to escape.
6. Top off coolant in overflow bottle if needed.
7. Stop engine.
8. Replace radiator cap and close overflow bottle cap.



## SPARK PLUGS & WIRES

Ignition System Part Specifications	
Ignition Coils	OEA0518151018
Spark plug part number & gap for models IIBGI80804xxx, IIBGI80914xxx, & IIBGI81034xxx	GSA5519313641 (taper seat) Delco Platinum 41-817  .035 in (0.89 mm)
Spark plug part number & gap for models IIBGI80806xxx, IIBGI80916xxx, & IIBGI81036xxx	AVA557090 (gasket seat) NGK BKR5EGP  0.035 in (0.89 mm)
Spark plug wires	OEA0518151075

### Spark plug inspection

1. Remove one plug from each bank.
2. Inspect plugs for fouling and erosion.
3. Clean or replace plugs if needed.

### Ignition wires inspection

1. Visually check ignition wires.
  - Look for spark arcing while the engine is running.
  - Check for cracks in the wire insulation.
2. If arcing and/or cracked insulation is evident, replace the entire set of ignition wires.

### Distributor Cap and Rotor – (If so equipped)

1. Replace cap and rotor at the time of spark plug wire replacement.



## **POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM**

**Part Number: RMA55L263**

### **Inspection**

1. Remove the PCV valve from the engine.
2. Shake the valve. You should hear the valve rattle, indicating that the cartridge is moving freely.
3. If the valve does not rattle, clean it with carburetor cleaner.
4. If the valve still does not rattle, replace the valve.

## CHECKING FOR GAS LEAKS



**Natural gas and LPG are combustible gases, and can be explosive if leaked and contained in a confined area. Keep cigarettes and all other flame sources away from these areas.**

### Inspection

1. If you can hear a fuel leak, shut off the fuel supply at the source immediately and fix the leak or have it serviced.
2. If there are no audible leaks, spray the fuel line up to the lock-off valve with a soapy water mixture. A stream of bubbles indicates leak sources.
3. Tighten fittings and clamps as needed to eliminate slow leaks.
4. Start the engine.
5. Check the fuel supply line from the lock-off valve to the engine with a soapy water mixture.
6. If any fuel line components (hoses, pipe, fittings, etc.) need to be replaced, first bleed the fuel out of the line by shutting off the gas supply at the source with the engine running at idle. Wait for the engine to stop before disassembling the fuel line.

## **NATURAL GAS & LPG FUEL FILTERS**



Fuel filters are recommended to protect both your fuel system and engine.

**Liquid LPG Fuel Filter:**                    **AFC, Inc. Model 455**

**RAW Natural Gas Filter:**                **Oxion, Inc. Model M150**

**Pipeline Natural Gas &  
Vapor LP Fuel Filter:**                    **Maxitrol Model GF60-1-88**

### **Filter Replacement**

1. Shut off the fuel supply at the source with the engine running at idle.
2. Wait for the engine to stop.
3. Remove the old fuel filter.
4. Install the new fuel filter per the filter manufacturer's instructions.
5. Check for leaks. See "[Checking for Gas Leaks](#)".



### LPG REGULATOR/VAPORIZER

Commercial grade LPG often contains heavy hydrocarbons, compressor oil and other contaminants. Over time, the oil and contaminants will settle to the bottom of the LPG cylinders/tanks. Liquid LPG fuel systems, which draw from the bottom side of the cylinder/tank, are prone to having these contaminants build up in the regulator/vaporizer. The oil and contaminants can degrade the operation of the regulator/vaporizer, and when severe, can degrade the performance of the engine.

#### Inspection/Drain Procedure

1. With the engine idling, shut off the fuel supply at its source.
2. Wait for the engine to stop running.
3. If a drain valve is in the fuel line downstream of the regulator/vaporizer, open the valve and drain any oil in the line into a container.

If there is no drain valve in the line, remove the regulator/vaporizer from the fuel system. Tilt the regulator/vaporizer so the outlet is down. Drain any oil into a container.

Drain any accumulated liquids from the fuel hose and fuel trim valve.

4. Close the drain valve or reinstall the fuel system components.
5. Check the fuel system for leaks. See "[Checking for Gas Leaks](#)".



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### NATURAL GAS & LPG FUEL LOCK-OFF VALVES

Liquid LPG Lock-Off Valve P/N: **KEA5513111011**

Natural Gas & Vapor LPG Lock-Off Valve P/N: **ASA558215B60**

The fuel lock-off valve is located between the NG regulator and fuel supply or LPG regulator/vaporizer and the fuel cylinder/tank. The Engine Control Module (ECM) opens the fuel lock-off when the engine is cranked and turns it off when the key switch is turned off or the ECM shuts down the engine for low oil pressure or engine overheat.

The lock-off can sometimes "gum up" due to LPG deposits in the lock-off. The procedure below will verify if the lock-off is opening and closing correctly.

#### Inspection

1. Turn off the engine.
2. Disconnect the fuel lock-off positive and negative wires from the wiring harness.
3. Apply 12 VDC across the lock-off.
4. You should hear the valve open immediately when 12 V is applied and hear the valve close immediately when 12 V is removed. This indicates that the valve is moving freely.

If you cannot hear the valve open and close, replace the valve.



## DIAGNOSTICS

### How to manage/retrieve/clear fault codes

*Diagnostic fault codes can be read through your equipment's electronic display control panel. Please refer to that manual for instructions on how to retrieve and clear codes.*

Fault codes will only be displayed on electronic engines equipped with an ECM.

Mechanical engines will only have a mechanical control panel with individual safety gauges and will not display fault codes for any potential shutdown events.



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### DTC List

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51	07	TPSSensor Conflict	549
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102	03	PTP Voltage High	371
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102	21	PTP Data Drift Low	374
105	00	MAT Higher Than Expected	233
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### DTC List (continued)

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190	00	Engine OverSpeed	429
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629	11	SRAM Memory Fault	623
629	31	Flash Memory Fault	622
632	05	Natural Gas Fuel LockOff Short Open Fault	251
632	07	Low Fuel Pressure (software v43.07 and newer)	476
632	12	FuelShutOffStuckOpen	475
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### DTC List (continued)

SPN	FMI	Description	SFC
636	07	Crank Sensor Loss Fault	422
636	11	Crank Sensor Other Fault	425
637	02	CAM Sensor Phase Fault	424
637	05	Cam Phaser Drive Relay Open or short Gnd	427
637	07	CAM Sensor Loss Fault	421
637	11	CAM Sensor Other Fault	426
639	11	CAN Line Circuit/Bus Error Passive	561
639	14	CAN Tx_Rx Warning	562
725	05	HEI-EST Bypass Open / Short Fault	883
731	05	Knock Sensor Open Circuit	781
731	06	Knock Sensor short Circuit	782
855	03	UEGO Heater Short to battery fault	452
855	04	UEGO Heater Short to gnd fault	451
855	05	UEGO Htr Open Fault	463
855	07	UEGO Heater Temperature Control	139
855	16	UEGO Heater Temperature LTE	136
855	18	UEGO Heater Temperature HTE	137
970	01	External Shutdown Fault	571
977	05	Fan 1 Short Open Fault	244
1131	00	PTT Higher Than Expected	378
1131	03	PTT Voltage High	376
1131	04	PTT Voltage Low	377
1188	05	Waste Gate Valve Open or Short Grnd	691
1204	00	Engine Over Load Fault	821
1213	05	MIL Open / Short Fault	253
1247	00	Engine Over Power Fault	822
1257	06	Spark 8 Max Current	882
1268	05	Spark 1 Open Primary	842



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### DTC List (continued)

SPN	FMI	Description	SFC
1268	06	Spark 1 Max Current	841
1269	05	Spark 2 Open Primary	845
1269	06	Spark 2 Max Current	844
1270	05	Spark 3 Open Primary	848
1270	06	Spark 3 Max Current	847
1271	05	Spark 4 Open Primary	852
1271	06	Spark 4 Max Current	851
1272	05	Spark 5 Open Primary	855
1272	06	Spark 5 Max Current	854
1273	05	Spark 6 Open Primary	858
1273	06	Spark 6 Max Current	857
1274	05	Spark 7 Open Primary	879
1274	06	Spark 7 Max Current	878
1275	05	Spark 8 Open Primary	881
1322	14	Severe Cylinder Misfire	761
1322	31	Single/Multiple Cylinder Misfire	759
1323	31	Cylinder 1 Misfire	751
1324	31	Cylinder 2 Misfire	752
1325	31	Cylinder 3 Misfire	753
1326	31	Cylinder 4 Misfire	754
1327	31	Cylinder 5 Misfire	755
1328	31	Cylinder 6 Misfire	756
1329	31	Cylinder 7 Misfire	757
1330	31	Cylinder 8 Misfire	758
1352	31	High Engine Knock Level Cylinder 1	771
1353	31	High Engine Knock Level Cylinder 2	772
1354	31	High Engine Knock Level Cylinder 3	773
1355	31	High Engine Knock Level Cylinder 4	774



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### DTC List (continued)

SPN	FMI	Description	SFC
1356	31	High Engine Knock Level Cylinder 5	775
1357	31	High Engine Knock Level Cylinder 6	776
1358	31	High Engine Knock Level Cylinder 7	778
1359	31	High Engine Knock Level Cylinder 8	779
1391	03	delta Pressure - Voltage High	473
1391	04	delta Pressure - Voltage Low	474
1391	16	deltaP Higher Than Expected	477
1391	18	deltaP Lower Than Expected	478
1391	20	deltaP Zero Offset Fault	479
1442	03	L Series Trim Position Voltage High	633
1442	04	L Series Trim Position Voltage Low	634
1442	05	L Series Trim Valve Drive fault	635
1442	12	L Series Trim Valve Status	636
1442	16	Trim Position adapt high fault	632
1442	18	Trim Position adapt low fault	631
1557	05	Fan 2 Short Open fault	245
1639	07	Fan Speed Close Loop Control	434
1639	08	Fan Speed Unexpected Noise	433
1675	05	Starter Control Relay Fault	653
1675	11	Auto Crank attempt failed	652
1675	12	Auto Crank attempts exceeded	651
1692	00	Overboost	694
1692	16	Boost pressure Higher than Expected	692
1692	18	Boost pressure Lower than Expected	693
1695	16	Adaptive Learn Correction on Hi Limit	471
1695	18	Adaptive Learn Correction on Lo Limit	472
2452	03	Load Sensor Voltage High	126
2452	04	Load Sensor Voltage Low	125



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### DTC List (continued)

SPN	FMI	Description	SFC
2791	05	EGR Valve Open or Short Grnd	512
2980	03	Fuel Pressure Voltage High	885
2980	04	Fuel Pressure Voltage Low	886
2980	07	Low Fuel Pressure (software before v43.07)	481
3056	00	UEGO IP Fault (bank 1)	443
3056	02	UEGO Air Cal Sensor Failed Fault (bank 1)	414
3056	03	UEGO SNS Short to BATT Fault (bank 1)	455
3056	04	UEGO SNS Short to GND Fault (bank 1)	454
3056	05	UEGO SNS Open Fault (bank 1)	453
3056	14	UEGO2 VM Fault (bank 1)	412
3056	15	UEGO Air Cal at Upper Limit (bank 1)	416
3056	16	UEGO O2 Failed on Rich Side (bank 1)	466
3056	17	UEGO Air Cal at Lower Limit (bank 1)	415
3056	18	UEGO O2 Failed on Lean Side (bank 1)	465
3057	00	UEGO IP Fault (bank 2)	443
3057	02	UEGO Air Cal Sensor Failed Fault (bank 2)	414
3057	03	UEGO SNS Short to BATT Fault (bank 2)	455
3057	04	UEGO SNS Short to GND Fault (bank 2)	454
3057	05	UEGO SNS Open Fault (bank 2)	453
3057	15	UEGO Air Cal at Upper Limit (bank 2)	416
3057	16	UEGO O2 Failed on Rich Side (bank 2)	466
3057	17	UEGO Air Cal at Lower Limit (bank 2)	415
3057	18	UEGO O2 Failed on Lean Side (bank 2)	465
3217	03	PreCat O2 input high	225
3217	04	PreCat O2 input Low	226
3217	05	PreCcat O2 Heater Short Open Fault	183
3217	08	PreCat O2 inactive fault	184
3217	15	PreCat O2 Failed on Rich Side	189



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### DTC List (continued)

SPN	FMI	Description	SFC
3217	17	PreCat O2 Failed on Lean Side	197
3227	03	Postcat O2 Voltage High	181
3227	04	PostCat O2 Voltage Low	182
3227	05	PostCat O2 Heater Short Open Fault	187
3227	15	PostCat O2 Failed on Rich Side	185
3227	17	PostCat O2 Failed on Lean Side	186
3464	02	Throttle Spring Test Fault	554
3464	05	Throttle Valve H bridge Fault	552
3464	06	Throttle Valve Open Fault	553
3464	07	Throttle Valve Stuck	555
3509	03	XDRP (+5V) Voltage HTE	161
3509	04	XDRP (+5V) Voltage LTE	162
3607	05	Major alarm hardware Fault	255
3673	00	TPS2 Higher than Expected	547
3673	01	TPS2 Lower than Expected	548
3673	03	TPS2 Voltage High	545
3673	04	TPS2 Voltage low	546
3938	03	Synchronizer input high	812
3938	04	Synchronizer input low	813
5078	05	Minor alarm hardware Fault	256
516098	05	Knock 2 Sensor Open Circuit	783
516098	06	Knock 2 Sensor short Circuit	784
516131	05	Propane Gas Fuel LockOff Short Open Fault	252
520555	03	UEGO INRC Short to Batt Fault	458
520555	04	UEGO INRC Short to GND Fault	457
520555	05	UEGO INRC Open Fault	456
520556	03	UEGO SR Short to BATT Fault	462
520556	04	UEGO SR Short to GND Fault	461



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### DTC List (continued)

SPN	FMI	Description	SFC
520556	05	UEGO SR Open Fault	459
520700	09	TSC1 Message Time Out Fault	662
520707	11	CAN Line Circuit/Bus Error Passive	563
520707	14	CAN Tx_Rx Warning	564
520708	09	OHECS Message Time Out Fault	565
520709	09	GTACP Message Time Out Fault	566
520710	09	GC2 Message Time Out Fault	567
520711	09	EBC1 Message Time Out Fault	568
520712	09	ACS Message Time Out Fault	569
520713	09	Inter ECU Comms Message	663
520713	09	Time Out Fault for	663
520713	09	Master/Slave System Only	663
520714	09	CCVS Message Time Out Fault	661



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### SPECIFICATIONS

<b>Component</b>	<b>Part Number or Specification</b>
Air Filter:	<b>MAA55PA2806, INA55FA1226</b>
Alternator-Fan-Water Pump belt:	<b>GYA554060739</b>
Battery:	<b>12 V, 800 Cranking Amps, 640 Cold Cranking Amps</b>
Oil:	<b>See page 17 for oil specifications and capacity.</b>
Oil Filter:	<b>GSA556438384</b>
Spark Plugs For Model Numbers IIBGI80804xxx IIBGI80914xxx IIBGI81034xxx	<b>GSA5519313641 (taper seat) Delco Platinum 41-817</b>
Spark Plugs For Model Numbers IIBGI80806xxx IIBGI80916xxx IIBGI81036xxx	<b>AVA557090 (gasket seat) NGK BKR5EGP</b>
Spark Plug Gap:	<b>.035 in (0.89 mm)</b>
Spark Plug wires:	<b>OEA0518151075</b>
PCV valve:	<b>RMA55L263</b>
Fuel Filter(s):	<b>See Page 23</b>
Liquid LPG Lock-Off:	<b>KEA5513111011</b>
Natural Gas & Vapor LPG Lock-Off:	<b>ASA558215B60</b>
Knock Sensor	<b>12623730</b>
Exhaust Gas Temperature (EGT) Sensor	<b>GSA5512643246</b>



## **Engine Identification**

**Engine part number** \_\_\_\_\_

**Engine serial number** \_\_\_\_\_

**Engine application** \_\_\_\_\_

**Purchased from** \_\_\_\_\_

**In-service date** \_\_\_\_\_

**Engine hours at delivery** \_\_\_\_\_



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# Engine Warranty

### **Warranty Provisions**

IIS, Inc. warrants that this engine was designed and built for continuous duty service and that the engine is free of defects in materials and workmanship.

### **Base Warranty Period**

The engine's base warranty period is 2500 hours or 3 years, whichever comes first.

The engine's operating hours are determined based on the hour meter within the engine ECM that was supplied with your engine, or for engines without an ECM the hours will be determined by the hour meter on the tachometer. The warranty period begins when your engine is placed into service.

### **Engine Dress Components**

Dress components for your complete engine package each carry their own warranty policy and are addressed on a case-by-case basis. Please call IIS to discuss any possible dress component warranty issues.

### **Owner Obligations**

This warranty is valid only if you operate and maintain your engine as specified in this Owner's Manual. In particular, you must maintain your engine as specified in the Maintenance Schedule and record your maintenance in the Maintenance Log.

If you have any questions regarding your warranty rights or responsibilities, contact IIS at 800-289-6478.



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### MAINTENANCE LOG

**Service Interval:** 100 Hour Break-In Period

- Inspect Alternator-Fan-Water Pump belt, Tensioner and Idlers
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 250 Hours or 4 Months

- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 500 Hours or 8 Months

- Inspect air filter
- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage
- Inspect PCV system

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 750 Hours or 13 Months

- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 1000 Hours or 17 Months

- Replace air filter
- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Replace engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Replace spark plugs & inspect spark plug wires
- Inspect PCV system
- Inspect fuel lines, hoses, and fittings for gas leakage
- Replace fuel filter
- Inspect and drain LPG regulator/vaporizer
- Inspect fuel lock-off valve

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 1250 Hours or 21 Months

- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 1500 Hours or 25 Months

- Inspect air filter
- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage
- Inspect PCV system

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 1750 Hours or 29 Months

- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 2000 Hours or 34 Months

- Replace air filter
- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Replace engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Replace spark plugs & inspect spark plug wires
- Inspect PCV system
- Inspect fuel lines, hoses, and fittings for gas leakage
- Replace fuel filter
- Inspect and drain LPG regulator/vaporizer
- Inspect fuel lock-off valve

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 2250 Hours or 38 Months

- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 2500 Hours or 42 Months

- Inspect air filter
- Replace Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage
- Inspect PCV system

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 2750 Hours or 46 Months

- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 3000 Hours or 50 Months

- Replace air filter
- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Replace engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Replace spark plugs & inspect spark plug wires
- Inspect PCV system
- Inspect fuel lines, hoses, and fittings for gas leakage
- Replace fuel filter
- Inspect and drain LPG regulator/vaporizer
- Inspect fuel lock-off valve

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 3250 Hours or 55 Months

- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 3500 Hours or 59 Months

- Inspect air filter
- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage
- Inspect PCV system

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 3750 Hours or 63 Months

- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 4000 Hours or 67 Months

- Replace air filter
- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Replace engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Replace spark plugs & inspect spark plug wires
- Inspect PCV system
- Inspect fuel lines, hoses, and fittings for gas leakage
- Replace fuel filter
- Inspect and drain LPG regulator/vaporizer
- Inspect fuel lock-off valve

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 4250 Hours or 71 Months

- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 4500 Hours or 76 Months

- Inspect air filter
- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage
- Inspect PCV system

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 4750 Hours or 80 Months

- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Inspect engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Inspect fuel lines, hoses, and fittings for gas leakage

**Date:**

**Engine Hours:**

**Mechanic:**



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### MAINTENANCE LOG

**Service Interval:** 5000 Hours or 84 Months

- Replace air filter
- Inspect Alternator-Fan-Water Pump belt
- Inspect battery
- Replace engine coolant
- Clean radiator outside
- Replace engine oil and filter
- Replace spark plugs & spark plug wires
- Replace pre-catalyst and post-catalyst oxygen sensors
- Inspect PCV system
- Inspect fuel lines, hoses, and fittings for gas leakage
- Replace fuel filter
- Inspect and drain LPG regulator/vaporizer
- Inspect fuel lock-off valve

**Date:**

**Engine Hours:**

**Mechanic:**



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### Notes