



2.4L and 3.4 L Industrial Engines

Owner's Manual and Maintenance Log

EPA Certified Engines

2026



2.4 and 3.4 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.



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U.S. EPA Legal Requirements

This engine has been certified by the U.S. Environmental Protection Agency (EPA) as a stationary and constant-speed mobile engine. It is illegal to operate this engine in a variable-speed (foot pedal speed control) application.

To ensure emissions compliance, the U.S. EPA requires you to do one of the following two options:

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:

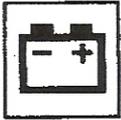
- Keep a maintenance plan and records of conducted maintenance.
- To the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions.
- Conduct an initial performance test within 1 year of engine startup to demonstrate compliance.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

SAFETY SYMBOLS

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



Battery



Electrical hazards



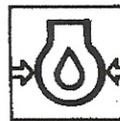
Engine coolant fill level



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" 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 950 – 1100 BTU per SCF. In addition, the natural gas must be provided by a supplier through a pipeline.

If your natural gas supply does not these specifications, your engine is considered to be being operated as a non-certified engine. See "U.S. EPA Legal Requirements".

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 1000 and 2500 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.



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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 2.4 AND 3.4 L

The following table lists the periodic maintenance required to ensure

MAINTENANCE

Periodic maintenance should be performed after specified intervals have elapsed in months or hours, whichever comes first.	Months Hours	1 100	4 250	8 500	13 750	17 1000	21 1250	25 1500
ENGINE								
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	I	R	I	R	I	R
Oil Filter	(A)	R		R		R		R
Spark Plugs						I		
Pre-Catalyst and Post-Catalyst Oxygen Sensors								
PCV system				I		I		I
Exhaust System - Inspect for cracks/leaks						I		
FUEL SYSTEM								
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		
Notes:	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.							
Abbreviations:	I = Inspection							
	R= Replace							
	A= Adjust							
	C= Clean							
	D= Drain							
	T= Retighten							



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ENGINE AND FUEL SYSTEM MAINTENANCE SCHEDULE

that your engine, fuel system and catalyst work properly and stay in good condition.

INTERVAL

29	34	38	42	46	50	55	59	63	67	71	76	80	84
1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250	4500	4750	5000

MAINTENANCE

	R		I		R		I		R		I		R
I	I	I	R	I	I	I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	R	I	I	I	R	I	I	I	R	I	I	I	R
C	C	C	C	C	C	C	C	C	C	C	C	C	C
I	R	I	R	I	R	I	R	I	R	I	R	I	R
	R		R		R		R		R		R		R
	R				I				R				I
													R
	I		I		I		I		I		I		I
	I		I		I		I		I		I		I

MAINTENANCE

I	I	I	I	I	I	I	I	I	I	I	I	I	I
	R				R				R				R
	I/D				I/D				I/D				I/D
	I				I				I				I



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AIR FILTER

Housing Part Number: HDA55G065433

Element Part Number: HDA05P822768

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.

Pressure Drop

The air pressure drop across the air filter must not exceed:

clean filter: 5 inH₂O

dirty filter: 15 inH₂O



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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

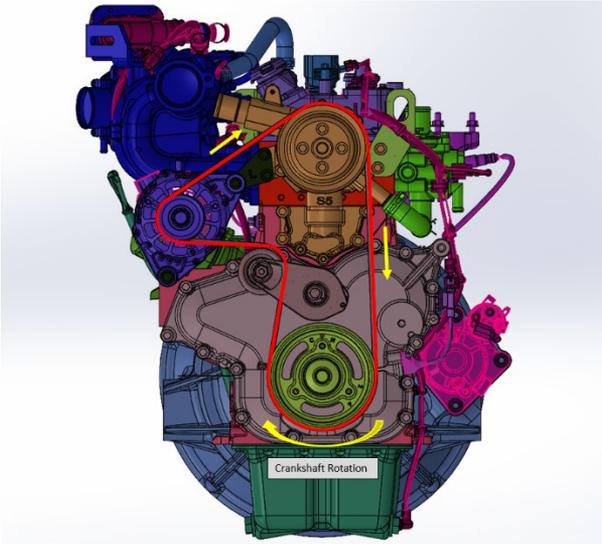
The belt should displace about 1/2" when 20 lbs of force is applied to the midpoint of the belt. If the deflection is greater than 1/2", increase the belt tension. If less than 1/2", reduce the belt tension.

Belt Replacement

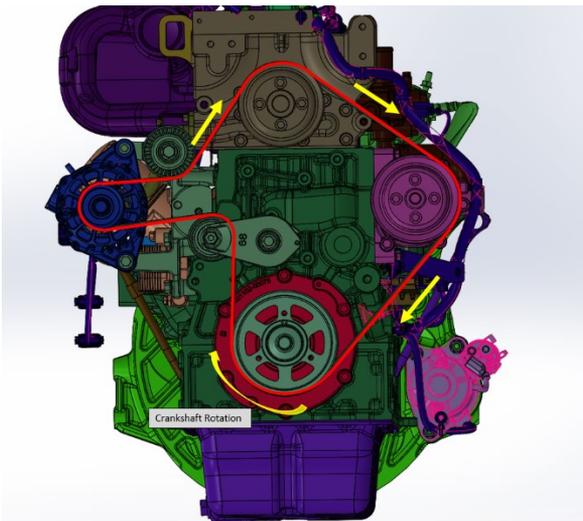
1. Release all tension from the old belt.
2. Remove the old belt.
3. Install the new belt.
4. Apply tension to the belt as specified in "Belt Tension".
5. Recheck tension after 25-50 hours of operation.

Belt Routing

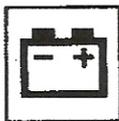
2.4L:



3.4L:



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:	925
Cold Cranking Amps:	750
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.

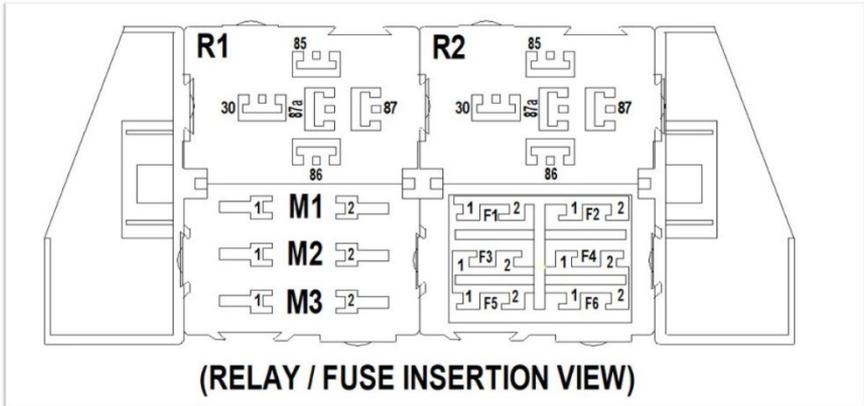
If the engine is still cranking slowly or not at all:

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



Relays

R1	Starter
R2	Main Power

Fuses

M1	Empty
M2	Empty
M3	Empty
F1	5a - Vswitch
F2	20a - ECM
F3	20a - Starter
F4	20a - Ignition
F5	5a - DEPR
F6	20a - Control Panel

ENGINE OIL AND FILTER REPLACEMENT



Filter:	400508-00109
Oil Grade:	Factory oil for 100 Hour break-in period SAE 15W-40 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. -NOTE- Use of lighter weight oil in continuous duty applications, especially in temperatures above 30 F can potentially increase oil consumption.
Oil Class:	ACEA A3/B4
API Certification:	SN
Oil Pan Capacity:	Minimum: 6.0L Maximum: 12.6L

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.

REFILL WITH ENGINE OIL

1. Clean and install the oil drain plug.
2. Fill with fresh engine oil. Do not overfill.



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3. Install the oil filler cap.
4. Start engine and check for oil leaks.
5. Recheck the engine oil level.

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.



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SPARK PLUGS, IGNITION COILS

Ignition System Part Specifications	
Ignition Coil	300715-00154C
Spark plugs part number	NGK ILZKAR7P5D
Spark plug gap	0.020 in (0.508 mm)

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.



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POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

Hose Assembly Part Number: 420108-02697

Inspection

1. Check hose for leaks/cracks.
2. Valve canister is not a replaceable part.
3. If service is required then replace cylinder head cover P/N: 150106-00294 that includes the breather housing.

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: As recommended by LPG fuel supplier

RAW Natural Gas Filter: Oxion, Inc. Model M150

**Pipeline Natural Gas &
Vapor LP Fuel Filter:** Maxitrol Model GF60-1-88
Or
Honeywell American Meter 1" In-Line

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: IMA55E1785501A

Natural Gas & Vapor LPG Lock-Off Valve P/N: ASA058215G30

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.



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Notes



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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.



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DTC List

Fault Descriptions - 2.4L & 3.4L	SPN	FMI	DTC
CL air/fuel ratio control at limit - too rich	0	1	16B
CL air/fuel ratio control at limit - too lean	0	1	16C
TPS1 high voltage	51	3	120
TPS1 low voltage	51	4	120
TPS1 higher than TPS2	51	0	220
TPS1 lower than TPS2	51	1	120
Unable to reach higher TPS	51	7	2112
Unable to reach lower TPS	51	7	2111
Oil pressure low stage 1 (sender or SENT)	100	18	520
Oil pressure low stage 2 (sender or SENT)	100	1	524
Oil pressure high voltage (switch or sender)	100	3	520
Oil pressure low voltage (switch or sender)	100	4	520
IAT high voltage	105	3	110
IAT low voltage	105	4	110
IAT higher than expected 1	105	15	110
IAT higher than expected 2	105	0	127
MAP high pressure	106	16	105
MAP low voltage	106	4	105
BP high pressure	108	0	2226
BP low pressure	108	1	2226
ECT / CHT high voltage	110	3	115
ECT / CHT low voltage	110	4	115
ECT higher than expected 1	110	15	115
ECT higher than expected 2	110	0	217
Voltage high	168	15	560
Voltage low	168	17	560
RPM higher than expected	515	31	1113
Fuel rev limit	515	16	1111
Spark rev limit	515	0	1112
Flash checksum invalid	628	13	607
COP failure	629	31	607
RTI 1 loss	629	31	1612
RTI 2 loss	629	31	1613
RTI 3 loss	629	31	1614
A/D loss	629	31	1615



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DTC List – Continued

Fault Descriptions - 2.4L & 3.4L	SPN	FMI	DTC
Invalid interrupt	629	31	1616
RAM failure	630	12	607
Fuel run-out longer than expected	632	31	1089
Lockoff open	632	4	5
Lockoff short to power	632	3	5
Crank loss	636	4	335
Crank sync noise	636	2	335
Never crank synced at start	636	8	16
CAN1 Tx failure	639	12	1626
CAN1 Rx failure	639	12	1627
Cam1 loss (intake)	723	4	340
Cam sync noise	723	2	340
Knock sensor open	731	4	325
Knock excessive signal	731	2	325
Knock retard at limit	731	0	1325
5VE1 high voltage	1079	3	641
5VE1 low voltage	1079	4	641
5VE2 high voltage	1080	3	651
5VE2 low voltage	1080	4	651
CAN2 Tx failure	1231	12	1646
CAN2 Rx failure	1231	12	1648
Primary Loop Open or Low-Side Short to Ground - 1	1268	5	351
Primary Coil Shorted - 1	1268	6	351
Primary Loop Open or Low-Side Short to Ground - 2	1269	5	2303
Primary Coil Shorted - 2	1269	6	2304
Primary Loop Open or Low-Side Short to Ground - 3	1270	5	2306
Primary Coil Shorted - 3	1270	6	2307
Primary Loop Open or Low-Side Short to Ground - 4	1271	5	2309
Primary Coil Shorted - 4	1271	6	2310
Start relay control ground short	1321	4	615
Start relay coil short to power	1321	3	615
Relay coil open	1485	5	685
Relay coil short to power	1485	3	685
Hardware ID Failure	1634	2	1674
Calibration Configuration Error	1634	13	1673



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DTC List – Continued

Fault Descriptions - 2.4L & 3.4L	SPN	FMI	DTC
EGO1 open / lazy	3217	5	130
Pre-catalyst O2 sensor out of range	3221	31	116C
EGOH1 open / ground short	3222	4	30
EGOH1 short to power	3222	3	30
EGO2 open / lazy	3227	5	150
EGOH2 open / ground short	3232	4	50
EGOH2 short to power	3232	3	50
MAP higher than expected	3563	15	1068
TPS2 high voltage	3673	3	220
TPS2 low voltage	3673	4	220
CL high LPG	4236	0	1151
CL low LPG	4236	1	1152
CL high NG	4236	0	1153
CL low NG	4236	1	1154
AL high LPG	4237	0	1161
AL low LPG	4237	1	1162
AL high NG	4237	0	1163
AL low NG	4237	1	1164
DBW drive current high	5419	6	120E
Knock sensor2 excessive signal	6651	2	331
Knock sensor2 open	6651	4	332
FT gaseous fuel high	7722	3	185
FT gaseous fuel low	7722	4	185
FT gaseous fuel extremely low	7722	1	1016
Post-catalyst delta-phi at min limit	520180	11	1141
Post-catalyst delta-phi at max limit	520181	11	1142
EPR / CFV regulation pressure higher than expected	520260	0	1171
EPR / CFV regulation pressure lower than expected	520260	1	1172
EPR / CFV comm lost	520260	31	1173
EPR / CFV internal actuator fault detection	520260	12	1176
EPR / CFV external Vrelay intermittent or internal circuitry fault detection	520260	12	1177
Intake backfire detected	520390	31	1330



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SPECIFICATIONS

Component	Part Number or Specification
Air Filter:	Housing: HDA55G065433 Element: HDA05P822768
Alternator-Fan-Water Pump belt:	130205-01461
Battery:	12V, 925 Cranking Amps, 750 Cold Cranking Amps
Oil:	See page 17 for oil specifications and capacity.
Oil Filter:	400508-00109
Ignition Coil:	300715-00154C
Spark Plugs:	NGK ILZKAR7P5D
Spark Plug Gap:	0.020 in (0.508 mm)
PCV Hose Assembly:	420108-02697
Liquid LPG Lock-Off:	IMA55E1785501A
Natural Gas & Vapor LPG Lock-Off:	ASA058215G30
Knock Sensor	301308-00973



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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, built, and equipped so that it fully complies with the applicable emissions standards of U.S. EPA 40 CFR 60 and 1048 at the time of sale from IIS Inc., and that the engine is free of defects in materials and workmanship that may keep it from meeting the emissions standards.

Base Warranty Period

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

Emissions-Related Warranty Period

Your engine's emissions-related warranty period is 2500 operating hours or 3 years, whichever comes first. The warranty period on the catalyst is 3500 operating hours or 5 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. The warranty period begins when your engine is placed into service.

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.



Engine Warranty

Component Lists

Components covered until first scheduled maintenance interval

- Spark plugs

Components Covered under the 2500 hour/3 year Warranty

- CAM sensor
- CRANK sensor
- Electronic Pressure Regulator (DEPR)
- Engine Control Module (ECM)
- Engine Coolant Temperature (ECT) sensor
- Electronic throttle
- Exhaust manifold
- Ignition Coil over Plugs
- Intake manifold
- Knock sensor
- Manifold Absolute Pressure / Intake Air Temp (TMAP) sensor
- Positive Crankcase Ventilation (PCV) valve
- Pre-catalyst oxygen sensor
- Post-catalyst oxygen sensor

Components Covered under the 3500 hour/5 year Warranty

- Catalyst

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
- 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
- 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
- Inspect spark plugs
- 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
- Inspect exhaust system for leaks/cracks

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
- 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
- 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 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
- Inspect exhaust system for leaks/cracks

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
- 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
- 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 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
- Inspect exhaust system for leaks/cracks

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
- 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
- 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 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
- Inspect exhaust system for leaks/cracks

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
- 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
- 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
- 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
- Inspect exhaust system for leaks/cracks
- Replace Pre and Post Catalyst Oxygen Sensors

Date:

Engine Hours:

Mechanic:



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Notes



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Notes



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