

STANDARD ACCESSORIES

BARRING DEVICE – Manual.

CRANKCASE PRESSURE RELIEF DOORS – Flame arresting, 1.5 in.² relief area per cubic ft. of crankcase volume.

CRANKCASE VENT CONNECTION – Single 3" (76.2 mm) round pipe.

NOTE: Refer to ATGL Application Guidelines for proper system design.

GOVERNOR – Woodward UG Actuator, mounted, with 701A speed control, not mounted.

LIFTING EYES

PAINT – Oilfield orange primer.

WAUKESHA CUSTOM ENGINE CONTROL™ DETONATION SENSING MODULE (DSM™) – Includes individual cylinder sensors, Detonation Sensing Module, and filter. Device is compatible with Waukesha CEC Ignition Module only. Sensors are mounted and wired to DSM Filter. Detonation Sensing Module and filter are mounted. 24V DC power is required. The DSM meets Canadian Standards Association Class 1, Group D, Division 2, hazardous location requirements.

WAUKESHA CUSTOM ENGINE CONTROL AIR FUEL MODULE (AFM™) – Electronic air fuel ratio control. Includes air fuel module, main fuel gas regulator actuator, intake manifold pressure transducer, exhaust O₂ sensor assembly, junction box, and wiring harness. Air Fuel Module is shipped loose for customer installation. Wiring harness allows connection of all engine mounted components to junction box. The module must be mounted off engine. 24V DC power is required. The AFM meets Canadian Standards Association Class 1, Group D, Division 2, hazardous location requirements.

MAJOR COMPONENTS

CAMSHAFT – Consists of individual segments, one per cylinder, bolted together.

CONNECTING RODS – Low alloy, forged, fully machined.

CRANKCASE – Single piece, stress relieved, gray iron casting. Main bearing caps are retained with vertical studs and lateral tie bolts.

CRANKSHAFT – Low alloy, forged, fully machined, counterweighted with seven main bearing journals. The crankshaft is flanged for full power transmission from each end. Bearings are heavy duty, replaceable, precision aluminum type.

CYLINDER HEAD – Twelve interchangeable, bore-cooled with two hard faced intake and two hard faced exhaust valves per head. Includes stainless steel intake and exhaust valve seats and prechamber fuel control valves.

CYLINDER LINER – Removable wet type with intermediate jacket water guide.

ENGINE MONITORING DEVICES – Thermocouples, K-type, for jacket water temperature, intake manifold temperature, lube oil temperature, individual cylinder exhaust temperatures and pre and post turbocharger temperatures are wired to a common junction box. Pressure taps piped to a common bulkhead for intake manifold pressure, lube oil pressure, prechamber fuel pressure, main chamber fuel pressure and jacket water pressure.

ENGINE PROTECTION DEVICES – Engine emergency shutdown/starter lockout palm button (2) mounted, one wired on either side of the engine.

FLYWHEEL – With 291 tooth ring gear. Machined for direct connected, single bearing generator shaft. Mounted. Flywheel guard not included.

INTERCOOLER – Air-to-water, for 90° F (32° C) or option 130° F (54° C) inlet water.

PISTON – Single piece, aluminum alloy with integrally cast cooling passages. Four piston rings with the top two compression rings housed in a Ni-resist ring carrier. 9:1 compression ratio.

TURBOCHARGER – Two, water cooled center housing, exhaust driven, with Turbocharger Control Module (TCMII™), electronic controlled wastegate and air bypass. 24V DC required.

VIBRATION DAMPER – Enclosed, viscous type.

SYSTEMS

AIR INLET AND EXHAUST SYSTEMS

Air Inlet Connection – Two 14" (356 mm) round.

Exhaust Manifold – Water cooled.

Exhaust Outlet – Two 11.75" B.C. (298.4 mm) horizontal outlet flanges.

FUEL SYSTEM – Carburetor with precombustion circuit. Single fuel inlet connection, mounted main and prechamber gas supply regulators. Shipped loose 24V DC pilot operated main fuel valve. Mounted 24V DC pilot operated prechamber fuel valve. Includes adjustable speed switch for control of solenoid valve during start cycle.

IGNITION SYSTEM – Crankshaft fired Waukesha Custom Engine Control Ignition Module with flange mounted coils. Ignition system meets Canadian Standards Association Class 1, Group D, Division 2 hazardous location requirements. Includes fuses for protection against reverse polarity. 24V DC power required.

LUBRICATION SYSTEM – Gear driven, externally mounted gear type pump with pressure regulator and bypass circuit. Discharge side has flange for connection to remote oil cooler. Includes shell and tube type lube oil cooler, not mounted, sized for connection in series with intercooler. Includes full flow, 45 gallon (170 litre) capacity oil filter. Not mounted. Includes 175° F (79° C) lube oil temperature control valve. Not mounted. Includes full flow filter strainer, mounted. Requires single customer lube oil inlet connection.

STARTING SYSTEM – One turbine type pneumatic starter with 24V DC starting valve and strainer. Requires 150 psig (10.3 bar) air/gas supply.

WATER CIRCULATION SYSTEM

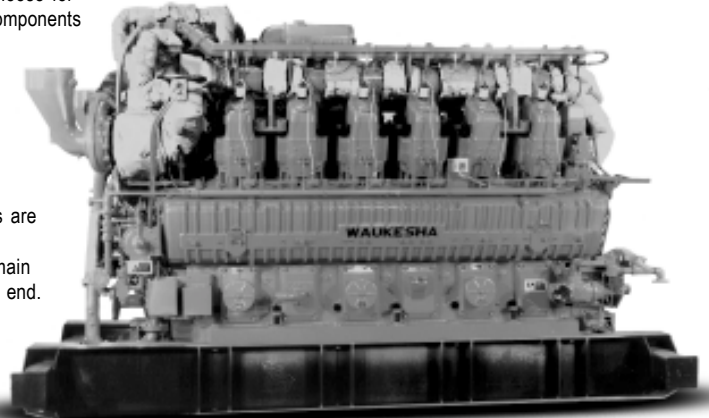
Auxiliary Circuit – Includes gear driven water pump with discharge piped to intercooler. Suction side has single flange for customer connection. Requires single customer outlet connection. Includes 90° F (32° C) auxiliary water temperature control valve, not mounted.

Engine Jacket – Includes gear driven water pump with discharge to engine inlet. Suction side has single flange for customer connection. Requires single customer outlet connection. Includes 180° F (82° C) jacket water temperature control valve, not mounted.

Waukesha
ATGL

12V-AT27GL

ATGL™ Gas Engine Series
Constant Speed



Model 12V-AT27GL Lean Combustion,
Twelve Cylinder, Four-Cycle Gas Engine

SPECIFICATIONS

Cylinders V-12	Lube Oil Capacity 252 gal. (955 L)
Piston Displacement 13048 cu. in. (214 L)	Starting System 150 psi (10.3 bar)
Bore & Stroke 10.83" x 11.81" (275 x 300 mm)	Rating 900 - 1000 rpm 2970 - 3295 bhp (2216 - 2458 kWb)
Compression Ratio 9:1	
Jacket Water System Capacity 97 gal. (368 L)	

Waukesha Engine
ISO 9001
CERTIFIED

SPECIFICATIONS: 12V-AT27GL SERIES - CONSTANT SPEED ENGINES

Basic Model Specifications:

Type	4-cycle, 4-valve, lean burn, prechamber
Aspiration	Turbocharged - Intercooled
Number of cylinders	V-12
Bore x stroke	10.827 in. x 11.811 in. (275 x 300 mm)
Displacement	13048 cu. in. (214 litres)
Compression ratio	9.0:1
Piston speed - @ 1000 rpm	1969 ft./min. (10.0 m/sec.)
Low idle	650-750 rpm

Bearings - Main:

Number	7
Diameter x width	8.858 x 4.094 in. (225 x 104 mm)
Projected area/bearing	36.27 in. ² (23400 mm ²)

Bearing - Crankpin:

Diameter x width	7.677 x 3.071 in. (195 x 78 mm)
Projected area/bearing	23.58 in. ² (15210 mm ²)

Lube Oil System:

Sump capacity including filters & coolers	252 gal. (955 litres)
Strainer screen	74 micron
Main filter efficiency	15 micron @ 90% efficiency
Normal lube oil pressure	55-65 psi (378-447 kPa)
Lube oil system pipe flange	4.0 in. ANSI (102 mm)
Pre-lube:	
· Duration	5 min. before start or 5 min. each hour not running
· Pressure	25 psi (172 kPa)**
· Flow	30 gpm (114 l/min.)
Post-lube (after hot shutdown)	5 min.

Crankcase Breather System:

Volume, maximum flow	90 scfm (42.5 l/sec)
Suction vacuum - H ₂ O	2 in. (51 mm)

Cooling System:

Jacket capacity, engine only	97.2 gal. (368 litres)
Auxiliary water capacity	20.0 gal. (75.7 litres)
Maximum inlet head water pump - H ₂ O	50 ft. (15.2 m)
Minimum inlet head water pump - H ₂ O	14.1 ft. (4.3 m)
Normal jacket water temperature out of engine	180° F (82° C)
Auxiliary water pipe flange	6.0 in. ANSI (152 mm)
Jacket water pipe flange	6.0 in. ANSI (152 mm)

Fuel System:

Natural gas pressure range at regulator	45 - 60 psi (310 - 414 kPa)
Natural gas inlet, pipe flange	2 in. ANSI (50.8 mm)

Air Induction System (Ducting, Filter & Silencer):

Maximum permissible restriction - H ₂ O	15.0 in. (381 mm)
Compressor inlet pipe diameter	14 (356 mm)
Required filtering efficiency (coarse dust per SAE726-C)	99.7%

Exhaust System (Turbine Outlet):

Maximum permissible backpressure - H ₂ O	12.0 in. (305 mm)
Turbine outlet pipe flange	8 in. ANSI (203 mm)

Starting System:

Regulated starting air/gas pressure	150 psi (1034 kPa)**
Air inlet flange	1.5 in. ANSI (38.1 mm)
Air outlet flange	4.0 in. (102 mm) O.D. Tube or 3.5 in. (89 mm) NPT Pipe

Miscellaneous:

Recommended spacing between engines	114 in. (2900 mm)*
Recommended distance to wall	78 in. (2000 mm)*
Recommended overhead clearance	92 in. (2340 mm)*
Engine dry weight without flywheel	46,000 lb. (20,866 kg)
Shipping skid	3,440 lb. (1,560 kg)
Flywheel	1,767 lb. (802 kg)
Heaviest engine part, top overhaul: cylinder head	450 lb. (204 kg)

*From centerline of crankshaft

**Pressure is based on 50° F (10° C) lube oil temperature.

NOTE: All pipe diameters are typical.

TECHNICAL DATA: 12V-AT27GL SERIES - CONSTANT SPEED ENGINES

Continuous Duty Power Ratings - BHP (kWb)	1000 rpm	900 rpm
90° F (32° C) Intercooler Water Temperature	3295 (2458)	2970 (2216)

System Flows GPM (l/min)	1000 rpm	900 rpm
Jacket Water	480 (1817)	430 (1628)
Auxiliary Circuit Pump**	650 (2460)	585 (2214)
Lube Oil	145 (548)	145 (548)
Prelube Pump	30 (113)	30 (113)

Standard Temperatures	°F (°C)
Lube Oil - Out	195 (91)
Charge Air Cooler Water - In	90 (32)
Jacket Water - Out	180 (82)

PERFORMANCE: 12V-AT27GL SERIES - CONSTANT SPEED ENGINES

		Intercooler Water Temperature		130°F (54°C)		90°F (32°C)	
		1000 rpm	900 rpm	1000 rpm	900 rpm		
Low NO _x Settings ^x	Power	3130	2820	3295	2970		
	BSFC (Btu/bhp-hr)	6645	6480	6565	6425		
	NO _x (grams/bhp-hr)	0.7	0.5	0.5	0.5		
	CO (grams/bhp-hr)	2.2	2.2	2.0	1.9		
	NMHC (grams/bhp-hr)	1.0	1.0	0.8	0.8		
Low Fuel Consumption Settings	BSFC (Btu/bhp-hr)	6430	6340	6420	6280		
	NO _x (grams/bhp-hr)	1.1	0.7	0.7	0.7		
	CO (grams/bhp-hr)	1.8	1.9	1.7	1.7		
	NMHC (grams/bhp-hr)	0.7	0.8	0.7	0.7		

NOTES:

- 1) Performance ratings are based on ISO 3046/1-1995 with mechanical efficiency of 90% and T_{cr} limited to ± 10° F.
- 2) Fuel consumptions based on ISO 3046/1-1995 with a +5% tolerance for commercial quality natural gas having a 900 Btu/ft³ saturated low heat value.
- 3) Data based on standard conditions of 77° F (25° C) ambient temperature, 29.53 inches Hg (100kPa) barometric pressure, 30% relative humidity (0.3 inches Hg /1 kPa water vapor pressure).
- 4) Data will vary due to variations in site conditions. For conditions and/or fuels other than standard, consult the Waukesha Engine Division Sales Engineering Department.

**Charge air cooler and lube oil cooler plumbed in series.

WAUKESHA ATGL SERIES LEAN COMBUSTION GAS ENGINE

CYLINDER HEADS

In each of the individual bore-cooled cylinder heads jacket water is directed around the centrally located prechamber, the four valve guides and valve seats. This means lower overall temperatures and provides reduced deformation of the cylinder head flame plates. This feature results in extended spark plug, valve, valve guide and valve seat life.

CYLINDER LINERS AND WATER GUIDE ASSEMBLIES

An intermediate jacket water guide separates the gray iron cylinder liners from the crankcase deck. This allows a high volume of coolant to flow around the combustion chamber and also reduces liner bore distortion due to preloading of the cylinder head studs. These features mean lower piston ring temperatures and longer ring life.

PISTONS

One piece aluminum alloy pistons. The top two rings are housed within a Ni-Resist insert, cast into the piston, which provides piston ring groove wear resistance.

Lubrication oil for cooling is supplied under pressure to a cooling coil cast into the piston crown. This feature provides for lower piston and piston ring operating temperatures. This design means longer piston and piston ring operating life.

CRANKCASE

The crankcase is a single piece gray iron casting which is stress relieved before final machining. The main bearing caps are retained with vertical studs and lateral tie bolts. These features assure structural rigidity and lower stress levels. This means a durable crankcase assembly and long main bearing life.

CRANKSHAFT AND CONNECTING RODS

Underslung crankshaft and connecting rods are fully machined from low alloy, high tensile strength forged steel. The crankshaft also features flanged construction on each end. This allows full power transmission from either the front or rear end of the engine for greater application flexibility.

Connecting rods have a high angle diagonal split at the rod cap. This permits the largest possible bearing diameter, for low unit loading, while allowing removal of the piston and rod assembly from the top of the engine. These features add up to high strength, application flexibility and long bearing life.

INTERCOOLER, CARBURETOR AND INTAKE MANIFOLD

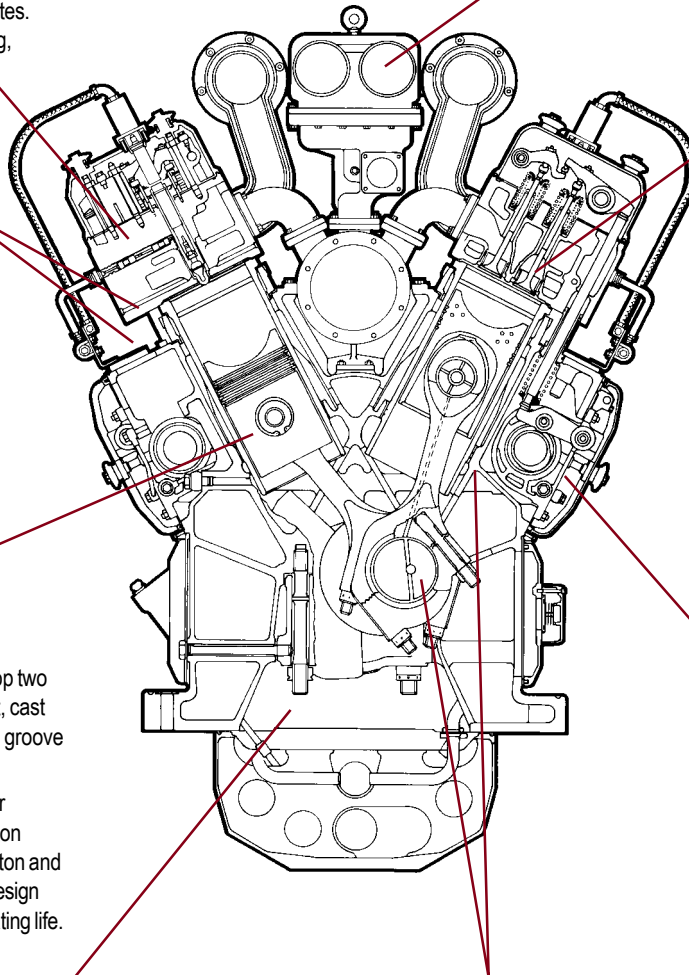
A single intercooler, carburetor and intake manifold provide for a constant air/fuel ratio and uniform air/fuel distribution to each cylinder. This means improved fuel efficiency, lower exhaust emissions and simplified operation and maintenance.

VALVES AND VALVE TRAIN

The intake and exhaust valves (two each per cylinder) are made of a high silicon alloy material. The valve stems are chrome plated, have chrome plated stems. The valve heads are Stellite® coated and the valve seats are hardened stainless steel. These features provide for high strength and wear resistance. The hardened valve guides and valve seats are water cooled to minimize high temperature distortion and corrosion. These features mean long valve, seat and guide life.

CAMSHAFT

The camshaft consists of individual cylinder segments bolted together. This feature allows for simplified removal and replacement if necessary. The camshaft lobe design minimizes valve overlap which reduces gas flow between the intake and exhaust ports. This assures fuel efficiency and low exhaust emissions.



WAUKESHA ENGINE DIVISION
DRESSER EQUIPMENT GROUP, INC.
1000 West St. Paul Avenue
Waukesha, WI 53188-4999
Phone: (262) 547-3311 Fax: (262) 549-2795
<http://www.waukeshaengine.com>

Bulletin 7084 1100

WAUKESHA ENGINE DIVISION
A DIVISION OF DRESSER INDUSTRIAL PRODUCTS, B.V.
Farmsumerweg 43, Postbus 330
9900 AH Appingedam, The Netherlands
Phone: (31) 596-652269 Fax: (31) 596-624217

Consult your local Waukesha Distributor for system application assistance. The manufacturer reserves the right to change or modify without notice, the design or equipment specifications as herein set forth without incurring any obligation either with respect to equipment previously sold or in the process of construction except where otherwise specifically guaranteed by the manufacturer.