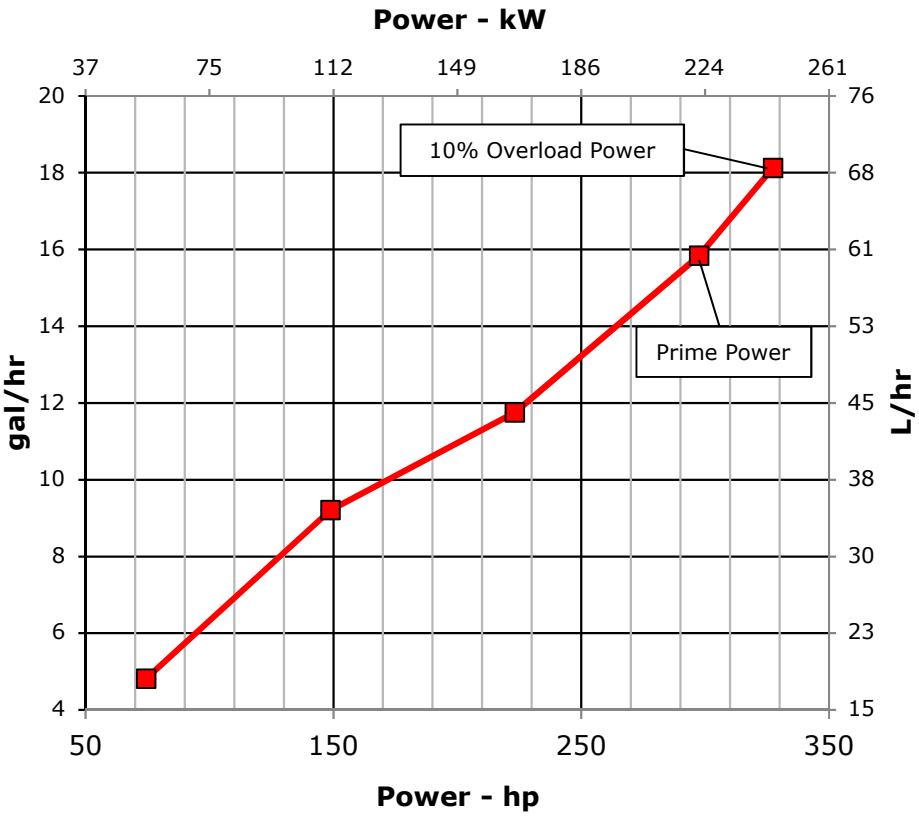
ENGINE PERFORMANCE CURVE

Rating: **60 Hz - 298hp (222kW) @ 1800 RPM**
Application: **Marine**

PowerTech™ 9.0L Engine
Model: 6090AFM85

Generator Efficiency (%)	Power Factor	Calculated Gen-Set Rating		Prime Power	10% Overload Power
		kWe	kVA	hp (kW)	hp (kW)
88-92	0.8	195-204	244-255	298 (222)	327 (244)



REFERENCE CONDITIONS

Air Intake Restriction.....12 in.H_2O (3 kPa)
Exhaust Back Pressure..... 30 in.H_2O (7.5 kPa)

Rated speed and power
Gross power guaranteed within ±5% at ISO 8665/SAE J1228 and ISO 3046/SAE J1995
Test conditions:
77 °F (25 °C) air inlet temperature
29.31 in.Hg (99 kPa) barometric pressure
104 °F (40 °C) fuel inlet temperature
0.853 fuel specific gravity @ 60 °F (15.5 °C)

Ambient air temperature is defined to be the temperature of ambient air close to operating vessel that is not influenced in any manner by operating characteristics of the vessel (free field temp).

Conversion factors: Power: kW = hp x 0.746
Fuel: 1 gal = 7.1 lb, 1 L = 0.85 kg
Torque: N·m = lb-ft x 1.356

All values from currently available data. Subject to manufacturing and measurement variations and to change without notice.
Actual performance is subject to application and operation conditions outside of John Deere control.

All pressures shown in gauge pressure

Notes:
Marine Generator: The Marine generator engine rating is the power available under normal varying electrical load factors for an unlimited number of hours per year in commercial applications. This rating incorporates a 10% overload capability, and conforms to ISO 8528 prime power. Average load over a 24-hour period shall not exceed 67% of the prime rating, of which no more than 2 hours are between 100% and 110% of the prime rating.

Constant speed engines are not certified for constant speed propulsion applications (i.e. variable pitch proppeller, hybrid porpulsion system).

Possible applications: This rating is used for applications that require constant speed operation in power generation or auxiliary applications such as generators and hydraulic pumps.

Designed/Calibrated to meet:	Certified by:
• EPA Marine Tier 3 Constant Speed Auxiliary (40 CFR 1042) • IMO Tier II Compliant (MARPOL Annex VI)	Keith D. Ochsner
Ref: Engine Emission Label	9-Jun-20

Performance Curve: 6090AFM85_E

All values at rated speed, power, and standard conditions, per SAE J1995 unless otherwise noted.

Engine Installation Criteria

General Data

Model	6090AFM85			
Number of Cylinders	6			
Bore	118	mm	4.65	in
Stroke	136	mm	5.35	in
Displacement	9	L	549	in^3
Compression Ratio	16.3:1			
Valves per Cylinder, Intake/Exhaust	2/2			
Combustion System	Direct injection			
Firing Order	1-5-3-6-2-4			
Engine Type	In line, 4 Cycle			
Aspiration	Turbocharged and Aftercooled			
Aftercooling System	Engine coolant			
Engine Crankcase Vent System	Closed			

Cooling System*

Engine Coolant Heat Rejection**	245	kW	13945	BTU/min
Max. Pressure Drop Across Keel Cooler	40	kPa	6	psi
Coolant Flow	334	L/min	88.2	gal/min
Min. Coolant Pump Inlet Pressure	30.3	kPa	4.4	psi
Thermostat Start to Open	71	°C	160	°F
Thermostat Fully Open	83	°C	182	°F
Engine Coolant Capacity, HE	42	L	11.1	gal
Engine Coolant Capacity, KC	40	L	10.6	gal
Min. Coolant Fill Rate	12	L/min	3.2	gal/min
Min. Pressure Cap	110.3	kPa	16	psi
Max. External Coolant Restriction	40	kPa	5.8	psi
Normal Operation Max Top Tank Temperature	100	°C	212	°F
≤ 5% of Total Operating Time Top Tank Temperature	100-110	°C	212-230	°F
Absolute Max Top Tank Temperature	110	°C	230	°F
Recommended Fuel Cooler	4	kW	212	BTU/min
Engine Radiated Heat	15	kW	856	BTU/min

* The cooling system should be capable of typical at ambient up to the maximum conditions in which the vessel will operate.

Typical operation is defined as the average load sustainable in the vessel over 10 min.

** Reference 32 °C Sea Water Temperature

Physical Data

Length to rear face of block	1297	mm	51.1	in
Length to rear face of flywheel housing (SAE #2)	1415	mm	55.7	in
Length maximum	1685	mm	66.3	in
Width maximum	1027	mm	40.4	in
Height, crank centerline to top	664	mm	26.1	in
Height, crank centerline to bottom	319	mm	12.6	in
Weight, with oil, no coolant (includes engine, flywheel housing, flywheel, and electronics)	1055	kg	2325	lb
Center of Gravity Location, X-axis From Rear Face of Block	408	mm	16.1	in
Center of Gravity Location, Y-axis Right of Crankshaft	38	mm	1.5	in
Center of Gravity Location, Z-axis Above Crankshaft	200	mm	7.87	in
Max. Allowable Static Bending Moment At Rear Face of Flywheel Housing (for installations up to 5-G)	814	Nm	600	lb-ft
Thrust Bearing Load Limit, Forward Continuous	8.6	kN	1933	lbf
Thrust Bearing Load Limit, Forward Intermittent	13	kN	2923	lbf
Thrust Bearing Load Limit, Rearward Continuous	4	kN	899	lbf
Thrust Bearing Load Limit, Rearward Intermittent	6	kN	1349	lbf

Electrical System

Min. Recommended Battery Capacity, 12V @32 °F (0 °C)	1100	amps		
Min. Recommended Battery Capacity, 24V @32 °F (0 °C)	750	amps		
Starter Rolling Current, 12V @32 °F (0 °C)	920	amps		
Starter Rolling Current, 24V @32 °F (0 °C)	600	amps		
Min. Voltage at ECU during Cranking, 12V	6	volts		
Min. Voltage at ECU during Cranking, 24V	10	volts		
Max. Allowable Start Circuit Resistance, 12V	0.0012	ohms		
Max. Allowable Start Circuit Resistance, 24V	0.002	ohms		
Electrical Component Maximum Temperature Limit	125	°C	257	°F
Maximum ECU Temperature	105	°C	221	°F

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Engine Installation Criteria

Fuel System

ECU Description			L14	
Fuel Injection Pump			Denso HP4	
Governor Type			Electronic	
Volumetric Fuel Consumption, Prime	59.9	L/hr	15.8	gal/hr
Mass Fuel Consumption, Prime	50.9	kg/hr	112	lb/hr
Total Fuel Volumetric Flow	240	L/hr	63.4	gal/hr
Total Fuel Mass Flow	204	kg/hr	450	lb/hr
Max. Fuel Inlet Restriction*	20	kPa	80	in.H2O
Max. Fuel Inlet Pressure	20	kPa	80	in.H2O
Max Fuel Return Pressure	20	kPa	80	in.H2O
Normal Operation Fuel Temperature	40	°C	104	°F
Max. Fuel Inlet Temperature	100	°C	212	°F
Min. Recommended Fuel Line Inside Diameter	8.34	mm	0.33	in
Min. Recommended Fuel Line Size			6	(-) AN
Primary Fuel Filter			10	mic
Secondary Fuel Filter			2	mic

Lubrication System

Oil Pressure at 1800 RPM**	280	kPa	41	psi
Max. Crankcase Pressure	2	kPa	8	in.H_2O
Maximum Installed Angle, Front Down			0	deg
Maximum Installed Angle, Front Up			12	deg
Engine Angularity Limits Any Direction, Continuous***			20	deg
Engine Angularity Limits Any Direction, Intermittent***			30	deg

Seawater Pump System

Seawater Pump Flow	352	L/min	93	gal/min
Max. Suction Lift	3	m	9.8	ft
Max. Outlet Pressure	140	kPa	20	psi
Max. Inlet Restriction	30	kPa	4	psi

Air Intake System

Engine Air Flow	19.6	m^3/min	692	ft^3/min
Intake Manifold Pressure	196	kPa	28.4	psi
Manifold Air Temperature	89	°C	192	°F
Maximum Manifold Air Temperature	130	°C	266	°F
Max. Allowable Temperature Rise, Ambient Air to Engine Inlet	17	°C	30	°F
Max. Air Intake Restriction, Clean Air Cleaner	3	kPa	12	in.H_2O
Max. Air Intake Restriction, Dirty Air Cleaner	6.25	kPa	25	in.H_2O
Min. Ventilation Area	0.121	m^2	187	in^2

Performance Data

Prime Power	222	kW	297	hp
10% Overload Power	244	kW	327	hp
Rated Speed		1800	RPM	
Low Idle Speed		1000	RPM	
Prime Torque	1177	Nm	868	lb-ft
BMEP, Prime	1643	kPa	238	psi
Rated Pferdestärke, Prime (metric hp)		302	ps	
Front Drive Capacity, Intermittent	955	Nm	704	lb-ft
Front Drive Capacity, Continuous	955	Nm	704	lb-ft
Software and Label Convertible to 50 Hz?		NO		
Friction Power @ Rated Speed	24	kW	32.2	hp

Exhaust System

Exhaust Flow	49	m^3/min	1713	ft^3/min
Exhaust Flow @ gas STP	18.91	m^3/min	668	ft^3/min
Exhaust Temperature	493	°C	919.4	°F
Max. Allowable Exhaust Restriction	7.5	kPa	30	in.H_2O
Max. Shear on Turbocharger Exhaust Outlet	11	kg	24.3	lb
Max. Bending Moment on Turbocharger Exhaust Outlet	7	Nm	15.4	lb-ft
Min. Exhaust Pipe Diameter, Dry	114.3	mm	4.5	in
Min. Exhaust Pipe Diameter, Wet	127.0	mm	5.0	in

* With clean filters

** With John Deere Plus-50 II™ 15w-40, not applicable with break in oil.

*** With 1932 option

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Engine Performance Data Table

Engine Power	Crank Power		Crank Torque		Fuel Consumption		BSFC
	kW	hp	Nm	lb-ft	L/hr	gal/hr	g/kW-hr
25%	55	74	294	217	18.2	4.8	279
50%	111	149	589	434	34.8	9.2	267
75%	166	223	883	651	44.5	11.7	227
100%	222	298	1177	868	59.9	15.8	230
110%	244	327	1295	955	68.6	18.1	239

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