JOHN DEERE POWERTECH™ 9.0L ENGINE

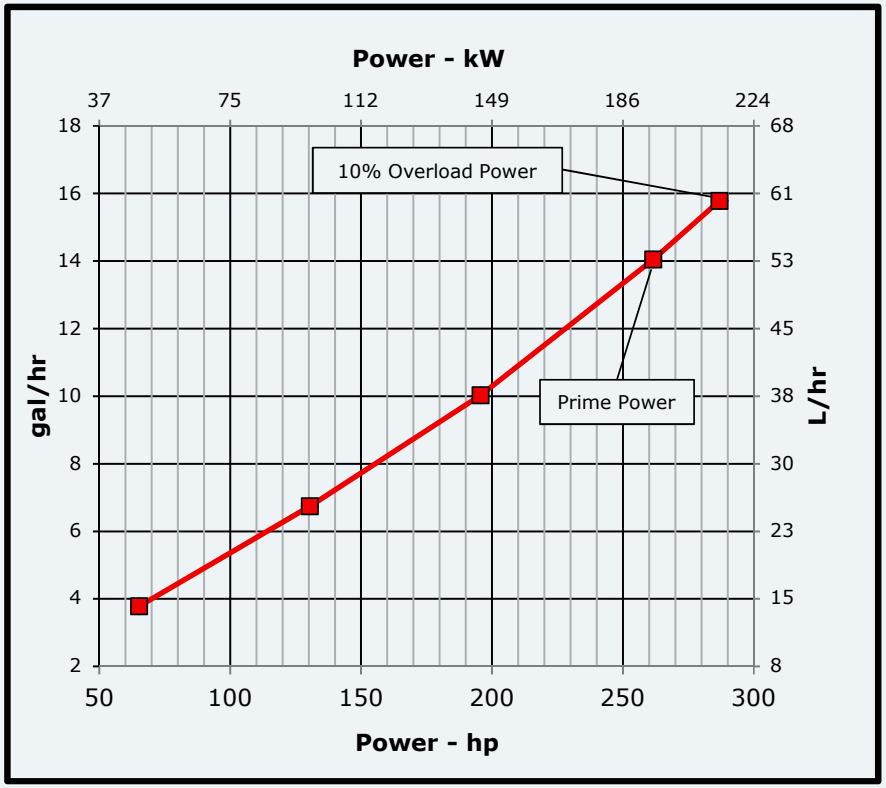
> MODEL: 6090AFM85

NOGVA

ENGINE PERFORMANCE CURVE

Rating: **50 Hz - 261hp (195kW) @ 1500 RPM**
Application: **Marine**

Generator Efficiency (%)	Power Factor	Calculated Gen-Set Rating kWe	kVA	Prime Power hp (kW)	10% Overload Power hp (kW)
88-92	0.8	171-179	214-224	261 (195)	287 (214)



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:
• IMO Tier II Compliant (MARPOL Annex VI)	
Ref: Engine Emission Label	9-Jun-20

Performance Curve: 6090AFM85_F

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

MODEL: 6090AFM85

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**	220	kW	12522	BTU/min
Max. Pressure Drop Across Keel Cooler	40	kPa	6	psi
Coolant Flow	268	L/min	70.8	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	220	BTU/min
Engine Radiated Heat	13	kW	759	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

Performance Curve: 6090AFM85_F

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

MODEL: 6090AFM85

Fuel System

ECU Description		L14		
Fuel Injection Pump		Denso HP4		
Governor Type		Electronic		
Volumetric Fuel Consumption, Prime	53.1	L/hr	14.0	gal/hr
Mass Fuel Consumption, Prime	45.2	kg/hr	100	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 1500 RPM**	250	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	299	L/min	79	gal/min
Max. Suction Lift	3	m	9.8	ft
Max. Outlet Pressure	140	kPa	20	psi
Max. Inlet Restriction	30	kPa	4	psi

* With clean filters

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

*** With 1932 option

Air Intake System

Engine Air Flow	17.0	m^3/min	600	ft^3/min
Intake Manifold Pressure	206	kPa	29.8	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	0.105	m^2	162	in^2

Performance Data

Prime Power	195	kW	261	hp
10% Overload Power	214	kW	287	hp
Rated Speed		1500	RPM	
Low Idle Speed		1000	RPM	
Prime Torque	1239	Nm	913	lb-ft
BMEP, Prime	1729	kPa	251	psi
Rated Pferdestärke, Prime (metric hp)		265	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	16.9	kW	22.6	hp

Exhaust System

Exhaust Flow	40	m^3/min	1409	ft^3/min
Exhaust Flow @ gas STP	16.3	m^3/min	574	ft^3/min
Exhaust Temperature	453	°C	847.4	°F
Max. Allowable Exhaust Restriction+	7.5	kPa	60	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	101.6	mm	4.0	in
Min. Exhaust Pipe Diameter, Wet	114.3	mm	127.0	in

+ Exhaust system restriction should be limited to 7.5 kPa. When an exhaust aftertreatment system is installed, the maximum design restriction is 15 kPa. Restriction over 7.5 kPa will result in diminished performance. Restriction over 15 kPa may cause engine damage

Performance Curve: 6090AFM85_F

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

MODEL: 6090AFM85

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%	49	65	310	228	14.3	3.8	250
50%	97	130	619	457	25.5	6.7	223
75%	146	196	929	685	38.0	10.0	221
100%	195	261	1238	913	53.1	14.0	232
110%	214	287	1362	1004	59.7	15.8	237

Performance Curve: 6090AFM85_F

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

> nogva.no NOGVA