VOLVO PENTA INDUSTRIAL DIESEL

TAD734GE

250kW (340 hp) at 1500 rpm, 263 kW (357 hp) at 1800 rpm, acc. to ISO 3046

The TAD734GE is a powerful, reliable and economical Generating Set Diesel Engine built on the dependable in-line six design.

Durability & low noise

Designed for easiest, fastest and most economical installation. Well-balanced to produce smooth and vibration-free operation with low noise level.

To maintain a controlled working temperature in cylinders and combustion chambers, the engine is equipped with piston cooling. The engine is also fitted with replaceable cylinder liners and valve seats/guides to ensure maximum durability and service life of the engine.

Low exhaust emission

The state of the art, high-tech injection and charging system with low internal losses contributes to excellent combustion and low fuel consumption.

The TAD734GE complies with EU Stage 2 exhaust emission regulations.

Easy service & maintenance

Easily accessible service and maintenance points contribute to the ease of service of the engine.

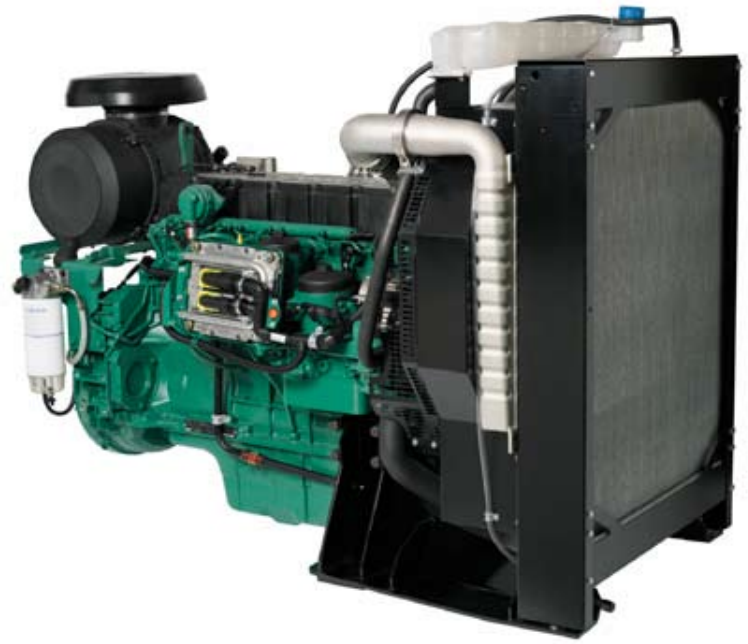
Technical description

Engine and block

- Optimized cast iron cylinder block with optimum distribution of forces
- Piston cooling for low piston temperature and reduced ring temperature
- Drop forged steel connecting rods
- Crankshaft hardened bearing surfaces and fillets for moderate load on main and big-end bearings
- Keystone top compression rings for long service life
- Replaceable valve guides and valve seats
- Three PTO positions at flywheel end
- Lift eyelets
- Flywheel housing with connection acc. to SAE 2
- Flywheel for flexplate
- Fixed integrated radiator front engine suspension
- Transport brackets, rear

Lubrication system

- Full flow cartrigde insert filter
- Rotary displacement oil pump driven by the crankshaft
- Deep front oil sump
- Oil filler on top
- Oil dipstick, short in front
- Integrated full flow oil cooler, side-mounted



Features

- Electronic governing, EMS2
- CAN bus communication
- Compact design for the power class
- High power to weight ratio
- Emission compliant
- Noise optimized engine design
- Dual speed

Fuel system

- Common rail
- Gear driven fuel feed pump
- Six hole fuel injection nozzles
- Electronic governor
- Fuel prefilter with water separator
- Fine fuel filter of cartridge insert type

Intake and exhaust system

- Connection flange for exhaust line
- Waste gate turbo charger, centre low with exhaust flange
- Two-stage air filter, with cyclon
- Heater flange in charge air inlet (with relay)

Cooling system

- Belt driven, maintenance-free coolant pump with high degree of efficiency
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block
- Reliable thermostat with minimum pressure drop
- Pusher fan

Electrical system

- Engine Management System 2 (EMS 2), an electronically controlled processing system which optimizes engine performance. It also includes advanced facilities for diagnostics and fault tracing
- The instruments and controls connect to the engine via the CAN SAE J1939 interface, either through the Control Interface Unit (CIU) or the Display Control Unit (DCU). The CIU converts the digital CAN bus signal to an anolog signal, making it possible to connect a variety of instruments. The DCU is a control panel with display, engine control, monitoring, alarm, parameter setting and diagnostic functions. The DCU also presents error codes in clear text.
- Sensors for oil pressure, boost pressure, boost temp, exhaust temp, coolant temp, water in fuel, fuel pressure and two speed sensors.

TAD734GE

Technical Data

General

Engine designation	TAD734GE
No. of cylinders and configuration	in-line 6
Method of operation	4-stroke
Bore, mm (in.)	108 (4.25)
Stroke, mm (in.)	130 (5.12)
Displacement, l (in³)	7.15 (436.0)
Compression ratio	17:1
Dry weight, excl. cooling system, kg (lb)	764 (1684)
Wet weight, excl. cooling system, kg (lb)	788 (1737)

Performance	**1500 rpm**	**1800 rpm**
with fan, kW (hp) at:		
Prime Power	213 (290)	216 (294)
Max Standby Power	238 (324)	243 (330)

Lubrication system	**1500 rpm**	**1800 rpm**
Oil consumption, liter/h (US gal/h) at:		
Prime Power	0.03 (0.008)	0.03 (0.008)
Max Standby Power	0.03 (0.008)	0.03 (0.008)
Oil system capacity incl filters, liter	29	

Fuel system	**1500 rpm**	**1800 rpm**
Specific fuel consumption at:		
Prime Power, g/kWh (lb/hph)		
25 %	244 (0.396)	257 (0.417)
50 %	233 (0.378)	237 (0.384)
75 %	217 (0.352)	222 (0.360)
100 %	204 (0.331)	205 (0.332)
Max Standby Power, g/kWh (lb/hph)		
25 %	247 (0.400)	259 (0.420)
50 %	235 (0.381)	239 (0.387)
75 %	217 (0.352)	225 (0.365)
100 %	205 (0.332)	207 (0.336)

Intake and exhaust system	**1500 rpm**	**1800 rpm**
Air consumption at 27°C, m³/min (cfm):		
Prime Power	16.1 (569)	18.3 (646)
Max Standby Power	16.3 (576)	18.9 (667)
Max allowable air intake restriction, kPa (In wc)	3.0 (12.0)	3.0 (12.0)
Heat rejection to exhaust, kW (BTU/min) at:		
Prime Power	160 (9099)	174 (9895)
Max Standby Power	177 (10066)	189 (10748)
Exhaust gas temperature after turbine, °C (°F) at:		
Prime Power	495 (923)	475 (887)
Max Standby Power	550 (1022)	510 (950)
Max allowable back-pressure in exhaust line, kPa (In wc)	10 (40.2)	10 (40.2)
Exhaust gas flow, m³/min (cfm) at:		
Prime power	33.0 (1165)	36.7 (1296)
Max Standby Power	33.4 (1180)	37.9 (1338)

Cooling system	**1500 rpm**	**1800 rpm**
Heat rejection radiation from engine, kW (BTU/min)		
Prime Power	24 (1365)	25 (1422)
Max Standby Power	26 (1479)	28 (1592)
Heat rejection to coolant kW (BTU/min)		
Prime Power	117 (6654)	124 (7052)
Max Standby Power	128 (7279)	137 (7791)
Fan power consumption, kW (hp)	11.6 (16)	20.0 (27)

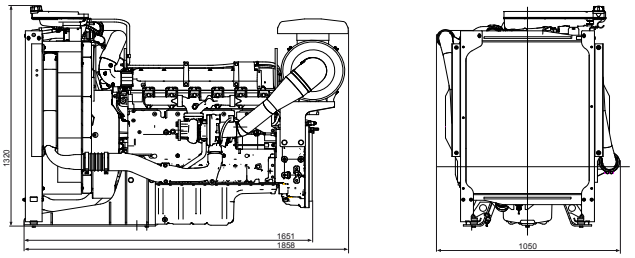
Standard equipment

Engine	
Automatic belt tensioner	•
Lift eyelets	•
Flywheel	
Flywheel housing with conn. acc. to SAE 2	•
Flywheel 10" and 11.5" disc	•
Vibration damper	•
Engine suspension	
Fixed integrated radiator front engine suspension	•
Lubrication system	
Oil dipstick	•
Full-flow oil filter of cartridge type	•
Oil cooler, side mounted	•
Fuel system	
Common rail	•
Fuel filters of cartridge type	•
Pre-filter with water separator	•
Intake and exhaust system	
Two-stage air filter with cyclon	•
Connecting flange for exhaust pipe	•
Turbo charger, low left side	•
Cooling system	
Tropical radiator incl intercooler	•
Belt driven coolant pump	•
Fan hub	•
Pusher fan	•
Fan guard	•
Belt guard	•
Control system	
Engine Management System (EMS) with CAN-bus interface SAE J1939 and stand alone interface	•
Alternator	
Alternator 100A / 24 V	•
Starting system	
Starter motor, 5.0kW, 24 V	•
Instruments and senders	
Temp.- and oil pressure for automatic stop/alarm	•
Engine Packing	
Plastic wrapping	•

[1] must be ordered, se order specification
– optional equipment or not applicable
• included in standard specification

Dimensions TAD734GE

Not for installation



Note! Not all models, standard equipment and accessories are available in all countries.
All specifications are subject to change without notice.
The engine illustrated may not be entirely identical to production standard engines.

Power Standards
The engine performance corresponds to ISO 3046, BS 5514 and DIN 6271. The technical data applies to an engine without cooling fan and operating on a fuel with calorific value of 42.7 MJ /kg (18360 BTU/lb) and a density of 0.84 kg/liter (7.01 lb/US gal), also where this involves a deviation from the standards. Power output guaranteed within 0 to +2% att rated ambient conditions at delivery. Ratings are based on ISO 8528.
Engine speed governing in accordance with ISO 3046/IV, class A1 and ISO 8528-5 class G3

Exhaust emissions
The engine complies with EU stage 2 emission legislation according to the Non Road Directive EU 97/68/EC.

Rating Guidelines
PRIME POWER rating corresponds to ISO Standard Power for continuous operation. It is applicable for supplying electrical power at variable load for an unlimited number of hours instead of commercially purchased power. A10 % overload capability for govering purpose is available for this rating.
MAXIMUM STANDBY POWER rating corresponds to ISO Standard Fuel Stop Power. It is applicable for supplying standby electrical power at variable load in areas with well established electrical networks in the event of normal utility power failure. No overload capability is available for this rating. 1 hp = 1 kW x 1.36

Information
For more technical data and information, please look in the Generating Set Engines Sales Guide.

LOTUS® POWER GENERATOR SETS

VOLVO PENTA

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General

In-line four stroke diesel engine with direct injection. Rotation direction, anti-clockwise viewed towards flywheel. Turbocharged

Number of cylinders			6
Displacement, total		litre in^3	7.15 436.0
Firing order			1-5-3-6-2-4
Bore		mm in	108 4.25
Stroke		mm in	130 5.12
Compression ratio			17
Dry weight	Engine only, excluding cooling system	kg lb	764 1684
	Including cooling system	kg lb	954 2103
Wet weight	Engine only, excluding cooling system	kg lb	788 1737
	GenPac	kg lb	1021 2251

Performance		**r/min**	**1500**	**1800**
Standby Power	without fan	kW hp	250 340	263 357
	with fan	kW hp	238 324	243 330
Prime Power	without fan	kW hp	225 306	236 321
	with fan	kW hp	213 290	216 294
Torque at:	Standby Power	Nm lbft	1592 1174	1393 1027
	Prime Power	Nm lbft	1432 1056	1252 923
Mean piston speed		m/s ft/sec	6.5 21.4	7.8 25.7
Effective mean pressure at:	Standby Power	MPa psi	2.8 406	2.4 355
Effective mean pressure at:	Prime Power	MPa psi	2.5 365	2.2 319
Max combustion pressure at:	Standby Power	MPa psi	19.6 2843	19.7 2857
Max combustion pressure at:	Prime Power	MPa psi		
Total mass moment of inertia, J (mR^2)		kgm^2 $lbft^2$	2.60 61.7	
Degree of irregularity at:	Standby Power			
	Prime Power			
Friction Power		kW hp	17 22.576	23 31.552

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Engine noise emission

Test Standards: ISO 3744-1981 (E) sound power (without fan, intake and exhaust noise)

Tolerance ± 0.75 dB(A)

		r/min	1500	1800
Measured sound power Lw	No load	dB(A)	87	89.5
	Standby Power	dB(A)	93.5	94.5
		dB(A)		
Calculated sound pressure Lp at 1 m	No load	dB(A)	99	104.5
	Standby Power	dB(A)	108.5	109.5
		dB(A)		

Unsilenced exhaust noise

Data calculated as sound pressure Lp.

Assumed microphone distance 1 m

	r/min	1500	1800
Standby Power	dB(A)	116.7	118.2
	dB(A)		

Test conditions for load acceptance data

Warm engine.	**Generator**	**Model**	**Type of AVR**
	mecc alte spa	ECO 38-2L/4	

Load acceptance performance can vary due to actual alternator inertia, voltage regulator, type of load and local ambient conditions.

Single step load performance at 1500 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load	Speed diff (%)		Recovery time (s)	
	Prime	Standby	Prime	Standby	(%)	Prime	Standby	Prime	Standby
0-20	2.3	2.6	1.5	1.4	30-100	8.3	-	2.0	-
0-40	4.2	4.7	1.5	1.5	40-100	6.3	6.2	1.5	3.3
0-50	5.1	6.9	1.5	1.7	50-100	4.7	5.3	1.5	3.0
0-60	7.8	10.0	2.0	2.1	60-100	4.0	4.5	1.0	2.5
0-70	11.9	16.9	2.5	3.1	70-100	3.3	3.5	0.5	2.0
0-80	17.7	21.7	3.5	3.6					
0-90	20.7	-	4.0	-					
100-0	7.7	8.3	2.0	2.0					

Single step load performance at 1800 rpm

Load (%)	Speed diff %		Recovery time (s)		Remaining load	Speed diff (%)		Recovery time (s)	
	Prime	Standby	Prime	Standby	(%)	Prime	Standby	Prime	Standby
0-20	1.7	1.8	1.0	1.0	20-100	8.0	8.7	3.1	3.5
0-40	2.8	2.9	1.5	1.3	40-100	4.1	5.2	2.3	3.0
0-50	3.9	4.1	1.4	1.6	60-100	2.9	2.9	1.3	2.0
0-60	4.5	5.3	1.4	1.6	80-100	2.3	2.3	1.0	1.8
0-70	6.3	7.7	1.7	2.0	90-100	0.9	1.0	1.0	1.0
0-80	7.7	9.2	2.0	2.0					
0-90	9.9	13.3	2.3	2.4					
100-0	5.8	6.5	2.0	2.0	0-100	12.1	16.0	2.3	3.9

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Cold start performance			r/min	1500	1800
Time from start to no load speed at ambient temperature:	°C	20	s	6.6	7.6
		5	s	7.0	8.4
		-15*	s	10.5	12.0
Time from start to stay within 0.5% of no load speed at ambient temperature:	°C	20	s	6.0	7.0
		5	s	6.2	7.7
		-15*	s	9.6	11.5

* With manifold heater kW engaged, lubrication oil 15W/40 and block heater.

Usage of manifold heater:	Time preheating, minutes	Time post heating, minutes

Block heater type	Make	Power kW	Engaged hours	Cooling water temp engine block

Lubrication system			r/min	1500	1800
Lubricating oil consumption	Standby Power		litre/h US gal/h	0.03 0.008	0.03 0.008
	Prime Power		litre/h US gal/h		
Oil system capacity including filters			litre US gal	29 7.7	
Oil sump capacity:		max	litre US gal	24 6.3	
		min	litre US gal	20 5.3	
Oil change intervals/specifications:			h	500	
			h		
			h		
Engine angularity limits:		front up	°	10	
		front down	°	10	
		side tilt	°	10	
Oil pressure at rated speed			kPa psi	420 - 450 61 - 65	
Oil pressure shut down switch setting			kPa psi	100 15	
Lubrication oil temperature in oil sump:		max	°C °F	130 266	
Oil filter micron size			µ	17.000	

* See also general section in the Sales Support Tool

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Fuel system		r/min	1500	1800
Specific fuel consumption at:	25%	g/kWh lb/hph	247 0.400	259 0.420
	50%	g/kWh lb/hph	235 0.381	239 0.387
	75%	g/kWh lb/hph	217 0.352	225 0.365
	100%	g/kWh lb/hph	205 0.332	207 0.336
Prime Power Specific fuel consumption at:	25%	g/kWh lb/hph	244 0.396	257 0.417
	50%	g/kWh lb/hph	233 0.378	237 0.384
	75%	g/kWh lb/hph	217 0.352	222 0.360
	100%	g/kWh lb/hph	204 0.331	205 0.332

Fuel system	r/min	1500	1800
Fuel to conform to	EN 590 / 2-D (US)		
System supply flow at:	litre/h US gal/h	164.0 43.3	197.0 52.0
Fuel supply line max restriction (rel.)	kPa psi	35.0 5.1	35.0 5.1
Fuel supply line max pressure, engine stopped	kPa psi	35.0 5.1	35.0 5.1
System return flow	litre/h US gal/h	102.6 27.1	132.0 34.9
Fuel return line max restriction (rel.)	kPa psi	50.0 7.3	50.0 7.3
Maximum allowable inlet fuel temp	°C °F	70 158	70 158
Prefilter / Water separator micron size	µ	10.000	
Fuel filter micron size	µ	5.000	
Governor type/make, standard	EMS II		
Injection pump type/make	EMS II		
Injection timing std.	°B.T.D.C	5	9
Injection timing	°B.T.D.C		

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Intake and exhaust system			r/min	1500	1800
Air consumption at:	Standby Power		m^3/min cfm	16.3 576	18.9 667
	Prime Power		m^3/min cfm	16.1 569	18.3 646
Max allowable air intake restriction including piping			kPa in wc	3 12.0	3 12.0
Air filter type				?	
Air filter cleaning efficiency			%	?	
Heat rejection to exhaust at:		Standby Power	kW BTU/min	177 10066	189 10748
		Prime Power	kW BTU/min	160 9099	174 9895
Exhaust gas temperature after turbine at:		Standby Power	°C °F	550 1022	510 950
		Prime Power	°C °F	495 923	475 887
Max allowable back pressure in exhaust line			kPa In wc	10.0 40.2	10.0 40.2
Exhaust gas flow at:		Standby Power	m^3/min cfm	33.4 1180	37.9 1338
			m^3/min cfm	33.0 1165	36.7 1296

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Cooling system		r/min	1500	1800
Heat rejection radiation from engine at:	Standby Power	kW BTU/min	26 1479	28 1592
	Prime Power	kW BTU/min	24 1365	25 1422
Heat rejection to coolant at:	Standby Power	kW BTU/min	128 7279	137 7791
	Prime Power	kW BTU/min	117 6654	124 7052
Coolant				
Radiator cooling system type		Closed circuit		
Standard radiator core area		m² foot²	0.65 7.00	
Fan diameter		mm in	870 34.25	
Fan power consumption		kW hp	11.6 16	20 27
Fan drive ratio			1	
Coolant capacity,	engine	litre US gal	8 2.11	
	std radiator with hoses	litre US gal	24 6.34	
Coolant pump		drive/ratio	2.56	
Coolant flow with standard system		l/s US gal/s	4.08 1.08	4.91 1.30
Minimum coolant flow		l/s US gal/s	3.6 0.95	4.4 1.16
Maximum outer circuit restriction, including piping		kPa in wc	33 132	45 181
Thermostat	start to open	°C °F	83 181	
	fully open	°C °F	103 217	
Maximum static pressure head (expansion tank height + pressure cap setting)		kPa in wc	85 341	
Minimum static pressure head (expansion tank height + pressure cap setting)		kPa in wc	75 301	
Standard pressure cap setting		kPa in wc	75 301	
Maximum top tank temperature		°C °F	103 217	
Draw down capacity				

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Charge air cooler system		r/min	1500	1800
Heat rejection to charge air cooler	Standby Power	kW BTU/min	48 2730	55.3 3145
	Prime Power	kW BTU/min	46.9 2667	55.1 3133
	Continuous Satndby Power	kW BTU/min	44.8 2548	53.4 3037
Charge air mass flow	Standby Power	kg/s	0.3	0.35
	Prime Power	kg/s	0.29	0.34
	Continuous Satndby Power	kg/s	0.29	0.34
Charge air inlet temp. (Charge air temp after turbo compressor)	Standby Power	°C °F	207 405	205 401
	Prime Power	°C °F	198 388	199 390
Charge air outlet temp. (Charge air temp after intercooler)	Standby Power	°C °F	43 109	42 107
	Prime Power	°C °F	40 103	40 104
Maximum pressure droop over charge air cooler incl. piping		kPa psi	15 2.18	
Charge air pressure 1500rpm (After charge air cooler)		kPa psi	250 36.26	
Charge air pressure 1800rpm (After charge air cooler)		kPa psi	240 34.81	
Standard charge air cooler core area		m² foot²	0.512 5.51	

Cooling performance

Cooling air flow and external restriction at different radiator air temperatures based on 103°C TTT and 50% antifreeze (radiator and cooling fan, see optional equipment) and sea level.

Engine speed rpm	Air on temp °C	PRIME POWER		STANDBY POWER	
		Air flow kg/s	External restriction Pa	Air flow kg/s	External restriction Pa
1500	52	3.8	410	3.9	350
	57	4.0	310	4.6	170
	61			5.2	0
	62	4.8	90		
	64	5.2	0		
1800	57	4.4	500	5.0	500
	62	5.1	460	5.6	230
	65	5.7	230	6.5	0
	68	6.5	0		

Note! Calculated values >0 Pa

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Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronous/droop switchable	Isochronous
Governor droop	1rpm/10Nm - 1rpm/127Nm	1rpm/25Nm
Governor response	NA	NA
Idle speed	550-800 rpm	600 rpm
Stop function	Energized to run / stop	Energized to stop
Preheating on ignition	ON/OFF*	OFF*
Lamp test	ON/OFF	ON

* Option

Engine protections

Parameter	"Yellow lamp"	"Red lamp"	Derate 0 % to engine protection map	Derate 100% to engine protection map	Forced idle after 5sec	Forced shut down after 15sec]
Coolant temperature	104°C	106°C	106°C	113°C	>113°C	>113°C
Oil temperature	128°C	130°C	130°C	135°C		
High boost temp	75°C	80°C	80°C	85°C	>85°C	>85°C
Parameter	"Yellow lamp"	"Red lamp"	Derate 50 % to engine protection map		Forced idle after 5sec	Forced shut down after 15sec]
High boost pressure	380kpa	390kpa	390kpa		>395kpa	>395kpa
Parameter	"Yellow	"Red lamp"	Derate 70		Forced idle after	Forced shut
Low oil pressure	Limit	80kpa < limit	80kpa < limit		85kpa < limit	85kpa < limit

* Off means no shut down, alarm only

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Electrical system		r/min	1500	1800
Voltage and type		24V / insulated from earth		
Alternator:	make/output	Amp	100	
	tacho output	Hz/alt. Rev		
	drive ratio		3	
Starter motor		make	Melco	
		type	M008T62471	
		kW	5.0	
Number of teeth on:	flywheel		129	
	starter motor		10	
Inrush current at +20°C		Amp	1750	
Cranking current at +20°C		Amp	400	
Crank engine speed at 20°C		rpm	200	
Starter motor battery capacity:	max	Ah	135	
	min at +5°C	Ah		
Inlet manifold heater (at 20 V)		kW		
Power relay for the manifold heater		Amp	2	

Power take off		r/min	1500	1800
Front end in line with crank shaft max:		Nm lbft	1200 885	
Front end belt pulley load. Direction of load viewed from flywheel side:	max left	kW hp		
	max down	kW hp		
	max right	kW hp		
Timing gear at compressor PTO max:		Nm lbft	187 138	
Speed ratio direction of rotation viewed from flywheel side		1,116 ccw		
Timing gear at servo pump PTO max:		Nm lbft		
Speed ratio direction of rotation viewed from flywheel side				
Timing gear at hydraulic pump PTO max:		Nm lbft		
Speed ratio direction of rotation viewed from flywheel side				
Max allowed bending moment in flywheel housing		Nm lbft	1100 811	
Max. rear main bearing load		N lbf	5000 1124.0	