

VOLVO PENTA GENSET ENGINE

TAD1345GE

441 kW (600 hp) at 1500 rpm, 449 kW (611 hp) at 1800 rpm, acc. ISO 3046

The TAD1345GE is a powerful, reliable and economical Generating Set Diesel Engine built on the dependable Volvo in-line six concept.

Durability & low noise

Designed for easy, fast and economical installation. Field tested to ensure highest standard of durability and long life. 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 & noise emission

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

The TAD1345GE is EU Stage 2 emission certified. An electronically controlled viscous fan drive is available giving substantially lower noise and fuel consumption.

Easy service & maintenance

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

Technical description

Engine and block

- Cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners
- Piston cooling for low piston temperature and reduced ring temperature
- Tapered connecting rods for increased piston lifetime
- Crankshaft induction hardened bearing surfaces and fillets with seven bearings for moderate load on main and high-end bearings
- Case hardened and Nitrocarburized transmission gears for heavy duty operation
- Keystone top compression rings for long service life
- Viscous type crankshaft vibration dampers to withstand single bearing alternator torsional vibrations
- Replaceable valve guides and valve seats
- Over head camshaft and four valves per cylinder



Features

- High power density
- Highly efficient cooling system
- Dual Speed 1500 / 1800 rpm
- EMS 2
- EU Stage 2 emission certified
- Wide range of optional equipment including visco fan.

Lubrication system

- Full flow oil cooler
- Full flow disposable spin-on oil filter, for extra high filtration
- The lubricating oil level can be measured during operation
- Gear type lubricating oil pump, gear driven by the transmission

Fuel system

- Electronic high pressure unit injectors
- Fuel prefilter with water separator and water-in-fuel indicator / alarm
- Gear driven low-pressure fuel pump
- Fine fuel filter with manual feed pump and fuel pressure switch

Cooling system

- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop
- Belt driven coolant pump with high degree of efficiency
- Electronically controlled viscous fan drive provides lower noise and fuel consumption (optional).

Turbo charger

- Efficient and reliable turbo charger
- Electronically controlled Waste-gate
- Extra oil filter for the turbo charger

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.
- Possibility to perform a start battery test according to the NCPA requirements via CAN bus signals.
- The instruments and controls connect to the engine via the CAN SAE J1939 interface, either through the Control Interface Unit (CIU) or the Digital Control Unit (DCU). The CIU converts the digital CAN bus signal to an analog 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, oil temp, boost pressure, boost temp, coolant temp, fuel temp, water in fuel, fuel pressure and two speed sensors.

**VOLVO
PENTA**

TAD1345GE

Technical Data

General

Engine designation	TAD1345GE	
No. of cylinders and configuration.....	in-line 6	
Method of operation	4-stroke	
Bore, mm (in.).....	131 (5.16)	
Stroke, mm (in.).....	158 (6.22)	
Displacement, l (in ³).....	12.78 (780)	
Compression ratio.....	18.1:1	
Wet weight, engine only, kg (lb).....	1325 (2921)	
Wet weight with Gen Pac, kg (lb).....	1790 (3946)	

Performance	1500 rpm	1800 rpm
with fan, kW (hp) at:		
Prime Power	388 (528)	392 (533)
Standby Power	431 (586)	431 (586)

Lubrication system	1500 rpm	1800 rpm
Oil consumption, liter/h (US gal/h) at:		
Prime Power	0.04 (0.011)	0.05 (0.013)
Standby Power	0.04 (0.011)	0.05 (0.013)
Oil system capacity incl filters, liter	36	

Fuel system	1500 rpm	1800 rpm
Specific fuel consumption at:		
Prime Power, g/kWh (lb/hph)		
25 %	217 (0.352)	229 (0.371)
50 %	199 (0.323)	205 (0.332)
75 %	197 (0.319)	200 (0.324)
100 %	196 (0.318)	201 (0.326)
Standby Power, g/kWh (lb/hph)		
25 %	211 (0.342)	225 (0.365)
50 %	198 (0.321)	204 (0.331)
75 %	197 (0.319)	201 (0.326)
100 %	196 (0.318)	202 (0.327)

Intake and exhaust system	1500 rpm	1800 rpm
Air consumption, m ³ /min (cfm) at:		
Prime Power	26.8 (946)	33.0 (1165)
Standby Power	27.6 (975)	33.0 (1165)
Max allowable air intake restriction, kPa (PSI)	5 (0.7)	
Exhaust gas temperature after turbine, °C (°F) at:		
Prime Power	475 (887)	440 (824)
Standby Power	570 (1058)	490 (914)
Max allowable back-pressure in exhaust line, kPa (PSI)	10 (1.5)	
Exhaust gas flow, m ³ /min (cfm) at:		
Prime power	56.8 (2006)	77.0 (2719)
Standby Power	58.3 (2059)	82.0 (2896)

Cooling system	1500 rpm	1800 rpm
Fan power consumption, std ratio, kW (hp) 10 (14)		18 (24)

Cooling system	1500 rpm	1800 rpm
AOT at max cooling air flow, °C (°F):		
Prime Power	60 (140)	63 (145)
Standby Power	56 (133)	60 (140)
Max cooling air flow, m ³ /s (cfs)	6.7 (237)	8.2 (290)

Standard equipment

	Engine	Gen Pac
Engine		
Automatic belt tensioner	•	•
Lift eyelets	•	•
Flywheel		
Flywheel housing with conn. acc. to SAE 1	•	•
Flywheel for 14" flex. plate and flexible coupling	•	•
Engine suspension		
Fixed front suspension	•	•
Lubrication system		
Oil dipstick	•	•
Full-flow oil filter of spin-on type	•	•
By-pass oil filter of spin-on type	•	•
Oil cooler, side mounted	•	•
Low noise oil sump	•	•
Fuel system		
Fuel filters of disposable type	•	•
Electronic unit injectors	•	•
Pre-filter with water separator	•	•
Intake and exhaust system		
Air filter with replaceable paper insert	•	•
Air restriction indicator	•	•
Air cooled exhaust manifold	•	•
Connecting flange for exhaust pipe	•	•
Exhaust flange	•	•
Turbo charger, low right side	•	•
Cooling system		
Radiator incl intercooler	-	•
Coolant pump	•	•
Fan hub	•	•
Pusher fan	-	•
Fan guard	-	•
Belt guard	-	•
Control system		
Engine Management System (EMS) with CAN-bus interface SAE J1939	•	•
Alternator		
Alternator 80 A	•	•
Starting system		
Starter motor	•	•
Connection facility for extra starter motor	•	•
Instruments and senders		
Temp.- and oil pressure for automatic stop/alarm	•	•
Other equipment		
Expandable base frame	-	•
Engine Packing		
Plastic wrapping	•	•

1) must be ordered, see order specification

2) Available later

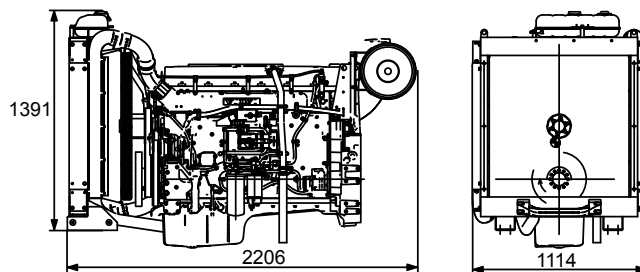
- optional equipment or not applicable

• included in standard specification

For our wide range of optional equipment, please see Order specification.

Dimensions TAD1345GE

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% at 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/EEC. The engine also complies with TA-luft -50% exhaust emission regulations.

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 governing purpose is available for this rating.

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

VOLVO PENTA

AB Volvo Penta

SE-405 08 Göteborg, Sweden
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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	12,78 779,7	
Firing order		1-5-3-6-2-4	
Bore	mm in	131 5,16	
Stroke	mm in	158 6,22	
Compression ratio		18,1:1	
Wet weight	Engine only	kg lb	1325 2921
	Engine incl. cooling system, air filtration system, and frame	kg lb	1790 3946

Performance

		rpm	1500	1800
Prime Power	without fan	kW hp	398 541	410 558
	with fan	kW hp	388 528	392 533
Standby Power	without fan	kW hp	441 600	449 611
	with fan	kW hp	431 586	431 586
Torque at:	Prime Power	Nm lbft	2534 1869	2175 1604
	Standby Power	Nm lbft	2807 2071	2382 1757
Mean piston speed		m/s ft/sec	7,9 26,0	9,5 31,2
Effective mean pressure at:	Prime Power	MPa psi	2,5 361	2,1 310
Effective mean pressure at:	Standby Power	MPa psi	2,8 400	2,3 340
Max combustion pressure at:	Prime Power	MPa psi	17,8 2582	17,2 2495
Max combustion pressure at:	Standby Power	MPa psi	19,3 2799	18,1 2625
Total mass moment of inertia, J (mR ²)		kgm ² lbft ²	3,43 81,4	
Friction Power		kW hp	30 40,8	44 59,84

Derating see Technical Diagrams

Engine noise emission

Test Standards: ISO 3744-1981 (E) sound power

Tolerance ± 0.75 dB(A)

		rpm	1500	1800
Measured sound power Lw	No load	dB(A)	114,8	117,8
	Prime Power	dB(A)	116,9	119,6
	Standby Power	dB(A)	117,2	119,8
Calculated sound pressure Lp at 1 m	No load	dB(A)	97,8	100,8
	Prime Power	dB(A)	99,9	102,5
	Standby Power	dB(A)	100,2	102,8

Unsilenced exhaust noise

Data calculated as sound pressure Lp.

Assumed microphone distance 1 m

	rpm	1500	1800
Prime Power	dB(A)	115	118
Standby Power	dB(A)	115	119

Test conditions for load acceptance data

Warm engine.	Generator	Model	Type of AVR
	Stamford	HCI544C	SX440

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	1,7	1,5	1,3	1,7	20-100	24,5	30,8	4,0	4,5
0-40	3,3	3,6	1,7	1,6	40-100	7,3	9,3	2,0	2,8
0-60	9,9	14,7	1,8	2,8	60-100	2,5	2,6	1,7	1,9
0-80	24,3	30,4	3,6	3,6	80-100	1,1	1,1	1,9	1,9
0-98	36,1	47,9	3,9	4,6					
0-55	7,0		2,7		55-100	3,1		1,7	
0-60	10,0		2,2		59-100	2,6		1,7	
0-50		7,0		2,8	50-100		4,2		1,9
0-54		10,0		2,2	54-100		3,5		1,9
100-0	5,5	6,5	2,1	2,1					

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	1,0	1,1	1,7	1,8	20-100	6,5	8,4	1,9	3,4
0-40	2,2	2,4	2,2	2,0	40-100	3,0	3,7	2,0	1,7
0-60	4,1	4,2	2,2	1,6	60-100	1,9	2,2	2,5	2,3
0-80	8,7	9,3	3,2	2,6	80-100	0,9	0,9	1,9	2,0
0-78	6,5		2,1		78-100	0,9		2,2	
0-88	10,0		2,9		88-100	0,7		1,3	
0-71		6,4		1,4	71-100		1,5		2,1
0-80		10,0		3,0	80-100		1,0		1,8
100-0	3,7	4,0	2,1	2,1					

Cold start performance

		°C	rpm	1500	1800
Time from start to stay within 0.5% of no load speed at ambient temperature:	20	s	4,8	4,6	
	5	s	5,7	5,2	
	-15*	s	6,6	6,0	

* With manifold heater 4 kW engaged, lubrication oil 15W/40 and block heater.

Block heater type	Make	Power kW	Engaged hours	Cooling water temp engine block
	Volvo	2	12	10°C 50°F

Lubrication system

		rpm	1500	1800
Lubricating oil consumption	Prime Power	litre/h US gal/h	0,04 0,011	0,05 0,013
	Standby Power	litre/h US gal/h	0,04 0,011	0,05 0,013
Oil system capacity including filters		litre US gal	36 9,5	
Oil sump capacity:	max	litre US gal	30 7,9	
	min	litre US gal	19 5,0	
Oil change intervals/specifications:	VSD3	h	600	
	VSD2	h	400	
		h	200	
Engine angularity limits:	front up	°	11	
	front down	°	11	
	side tilt	°	11	
Oil pressure at rated speed		kPa psi	370 - 520 54 - 75	
Lubrication oil temperature in oil sump:	max	°C	130	
		°F	266	
Oil filter micron size		µ	40	

* See also general section in the sales guide

Fuel system

		rpm	1500	1800
Prime Power Specific fuel consumption at:	25%	g/kWh lb/hph	217 0,352	229 0,371
	50%	g/kWh lb/hph	199 0,323	205 0,332
	75%	g/kWh lb/hph	197 0,319	200 0,324
	100%	g/kWh lb/hph	196 0,318	201 0,326
Standby Power Specific fuel consumption at:	25%	g/kWh lb/hph	211 0,342	225 0,365
	50%	g/kWh lb/hph	198 0,321	204 0,331
	75%	g/kWh lb/hph	197 0,319	201 0,326
	100%	g/kWh lb/hph	196 0,318	202 0,327

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Fuel system	rpm 1500 1800		
Fuel to conform to	ASTM-D975-No1 and 2D JIS KK 2204, EN 590		
System supply flow at:	litre/h US gal/h	125,0 33,0	127,0 33,6
Fuel supply line max restriction (Measured at fuel inlet connection)	kPa psi	30,0 4,4	30,0 4,4
Fuel supply line max pressure, engine stopped	kPa psi	20,0 2,9	20,0 2,9
System return flow	litre/h US gal/h	18,0 4,8	18,0 4,8
Fuel return line max restriction (Measured at fuel return connection)	kPa psi	20,0 2,9	20,0 2,9
Maximum allowable inlet fuel temp (Measured at fuel inlet connection)	°C °F	50 122	50 122
Prefilter / Water separator micron size	µ	10	
Fuel filter micron size	µ	5	
Governor type/make, standard	Volvo / EMS 2.2		
Injection pump type/make	Delphi E3		

Intake and exhaust system		rpm 1500 1800		
Air consumption at: (+25°C and 100kPa)	Prime Power	m ³ /min cfm	26,8 946	33 1165
	Standby Power	m ³ /min cfm	27,6 975	33 1165
Max allowable air intake restriction including piping		kPa psi	5 0,7	5 0,7
Air filter restriction clean Volvo Penta filter		kPa psi		
Heat rejection to exhaust at:	Prime Power	kW BTU/min	268 15241	280 15923
	Standby Power	kW BTU/min	303 17231	324 18426
Exhaust gas temperature after turbine at:	Prime Power	°C °F	475 887	440 824
	Standby Power	°C °F	570 1058	490 914
Max allowable back pressure in exhaust line	Prime Power	kPa psi	9 1,3	9 1,3
	Standby Power	kPa psi	10 1,5	10 1,5
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	Prime Power	m ³ /min cfm	56,8 2006	77,0 2719
	Standby Power	m ³ /min cfm	58,3 2059	82,0 2896

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03**Cooling system**

			rpm	1500	1800
Heat rejection radiation from engine at:	Prime Power	kW	15	22	
		BTU/min	853	1251	
	Standby Power	kW	17	23	
		BTU/min	967	1308	
Heat rejection to coolant at:	Prime Power	kW	145	165	
		BTU/min	8246	9383	
	Standby Power	kW	160	180	
		BTU/min	9099	10236	
Coolant	Volvo Penta coolant "ready mix" or Volvo Penta coolant mixed with clean fresh water 40 / 60				
Radiator cooling system type	Closed circuit				
Standard radiator core area	m ²		0,8		
	foot ²		8,61		
Fan diameter	mm		890		
	in		35,04		
Fan power consumption - LOW fan ratio	kW		6	11	
	hp		8	15	
Fan power consumption - STD fan ratio	kW		10	18	
	hp		14	24	
Fan drive ratio - LOW	0,84 : 1				
Fan drive ratio - STD	0,99 : 1				
Coolant capacity,	engine	litre	20		
		US gal	5,28		
	std radiator and hoses	litre	24		
		US gal	6,34		
Coolant pump	drive/ratio		Belt / 1,43 :1		
Coolant flow with standard system	l/s		5	5,5	
	US gal/s		1,32	1,45	
Minimum coolant flow	l/s		5,0	5,5	
	US gal/s		1,32	1,45	
Maximum outer circuit restriction, including piping	kPa		39	47	
	psi		5,7	6,8	
Thermostat	start to open	°C	82		
		°F	180		
	fully open	°C	92		
		°F	198		
Maximum static pressure head (expansion tank height + pressure cap setting)	kPa		100		
	psi		14,5		
Minimum static pressure head (expansion tank height + pressure cap setting)	kPa		70		
	psi		10,2		
Standard pressure cap setting	kPa		70		
	psi		10,2		
Maximum top tank temperature	°C		107		
	°F		225		
Draw down capacity. The difference between min coolant level in the expansion tank and the lowest level where the engine's coolant system still are functioning	litre		1,8		
	US gal		0,48		

Charge air cooler system

		rpm		1500	1800
Heat rejection to charge air cooler	Prime Power	kW	78	94	
		BTU/min	4436	5346	
	Standby Power	kW	82	92	
		BTU/min	4663	5232	
Charge air mass flow	Prime Power	kg/s	0,53	0,62	
	Standby Power	kg/s	0,53	0,63	
Charge air inlet temp. (Charge air temp after turbo compressor)	Prime Power	°C	195	199	
		°F	383	390	
	Standby Power	°C	204	199	
		°F	399	390	
Charge air outlet temp. (Charge air temp after intercooler)	Prime Power	°C	44	44	
		°F	111	111	
	Standby Power	°C	45	45	
		°F	113	113	
Maximum pressure drop over charge air cooler incl. piping		kPa	8		
		psi	1,16		
Charge air pressure (After charge air cooler)		kPa	225		
		psi	32,63		
Standard charge air cooler core area		m ²	0,89		
		foot ²	9,58		

Cooling performance

Cooling air flow and external restriction at different radiator air temperatures based on 107°C TTT and 40% coolant. Valid at 1 atm. (radiator and cooling fan, see optional equipment)

Engine speed rpm	Air on temp °C	PRIME POWER		STANDBY POWER	
		Air flow m ³ /s	External restriction Pa	Air flow m ³ /s	External restriction Pa
1500 (STD 0,99)	50			5,8	261
	52			6,1	180
	54	5,7	290	6,4	82
	56	6,1	180	6,7	0
	58	6,4	82		
	60	6,7	0		
1800 (STD 0,99)	55			7,0	455
	58			7,6	215
	60	7,3	340	8,2	0
	61	7,6	225		
	63	8,2	0		

Note! External restrictions are calculated for values >0 Pa

Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronus / Droop	Isochronus
Governor droop	0-8 %	0,0
Governor response	Adjustable PID-constants (VODIA)	Standard
Dual speed	YES	1500 or 1800
Idle speed	600-1200	900
Fine speed adjustment	± 120	0
Stop function	Energized to Run / Stop	Energized to Stop
Preheating function	On / Off	On
Lamp test	On / Off	On

Engine sensor and switch settings

Parameter	Unit	Alarm level		Engine protection		
		Setting range	Default setting	Level	Action. Default/Alternative	
Oil temp	°C	120 - 130	125	Setting +5	Shut down.	
Oil pressure	Low idle	kPa	-	190,0	-30,0	Shut down.
	1500 rpm	kPa	-	250,0	-30,0	Shut down.
	1800 rpm	kPa	-	300,0	-30,0	Shut down.
Oil level		-	Min level	-	-	
Piston cooling pressure >1000 rpm	kPa	-	150	150,0	Shut down.	
Coolant temp	°C	95 - 103	102	Setting +5	Shut down.	
Coolant level		See cooling system	On	Low level		
Fuel feed pressure	Low idle	kPa	-	100	-	-
	>1400 rpm		-	200	-	-
Water in fuel		-	High level	-	-	
Crank case pressure	kPa	-	Increased pressure	Increased pressure	Shut down.	
Air filter pressure droop	kPa	-	5	-	-	
	0,0		Alarm level		Engine protection	
Altitude, above sea	m	-	-	-	Automatic derating, see section derating	
Charge air temp	°C	-	80	85	Shut down.	
Charge air pressure *	1500 rpm	kPa	-	360	370	Shut down.
	1800 rpm	kPa	-	350	360	Shut down.
Engine speed	rpm	100 - 120% of rated speed	120% of rated speed	Alarm level	Shut down.	
* P abs at sea level						

Engine protection can be disabled. For consequences please see VP International Limited Warranty Policy

Electrical system

Voltage and type	24V / insulated from earth	
Alternator:	make/output	A Bosch 80 A
	tacho output	Hz/alt. Rev 6
	drive ratio	5,3:1
Starter motor	make	Melco
	type	105P70
	kW	7,0
Number of teeth on:	flywheel	153
	starter motor	12
Max wiring resistance main circuit	mΩ	2

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Cranking current at +20°C	A	180	
Crank engine speed at 20°C	rpm	155	
Starter motor battery capacity:	max	Ah/A	2x225
	min at +5°C	Ah/A	-
Inlet manifold heater (at 20 V)	kW	4,0	
Power relay for the manifold heater	A	1	

Power take off

in 5 0

Front end in line with crank shaft max:	Nm lbft	-		
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	160 118		
Speed ratio direction of rotation viewed from flywheel side	0,91:1/clockwise			
Timing gear at servo pump PTO max:	Nm lbft	100 74		
Speed ratio direction of rotation viewed from flywheel side				
Max allowed bending moment in flywheel housing	Nm	15000		
	lbft	11063		
Max. rear main bearing load	N	4000		
	lbf	899,2		