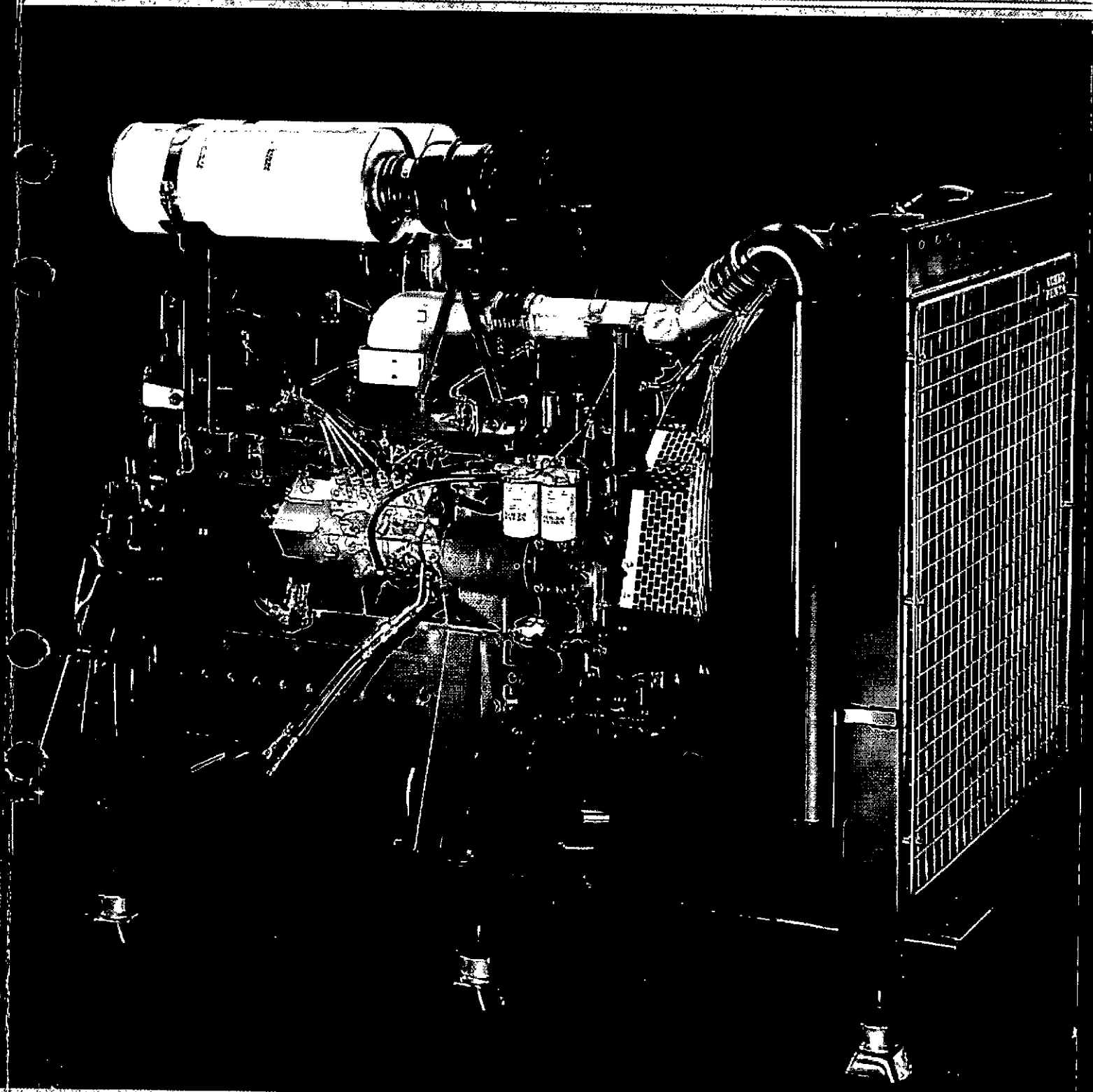
1997/98

Generating Set Engines



Main news in the 1997/98 edition of the generating engine sales handbook

The general section has been updated with new emission standards and importer list.

New and discontinued engine models

Certified genset engines for USA EPA/CARB will soon be available. These engines produce some 10% less exhaust emissions compared with TA-luft approved engines. The certificate is required for mobile gensets (moved within 12 months) in the USA from 1 January 1996. All engines are in production, EPA/CARB certificates will be available August 1997.

TAD 1030 GE**
same power as TAD 1030 G
TAD 1231 GE
325kVA PRP/50Hz, 304 kWe Stby/60Hz
TAD 1232 GE*
375kVA PRP/50Hz, 354 kWe Stby/60Hz
TAD 1630 GE**
459kVA PRP/50Hz, 446 kWe Stby/60Hz
TAD 1631 GE**
same power as TAD 1631 G

*) TAD 1230 will be discontinued at the end of 1997
**) "G" engine have been discontinued as the new "GE" engines are in production.

Note that the fan drive ratio on the TAD 1630 GE has been increased from 1:1 to 1,12 compared to TAD 1630 G.

New technical data

- continuous standby power is incorporated (performance section)
- individual engine injection timing setting is incorporated (fuel system section)
- technical data for TWD 1630 G has been revised

New optional equipment

- special settings for TA-luft emission standard compliance for TWD 710 G and TWD 1210 G.
- dual starter motor flywheel housing for 6 and 7 litre engines.
- new fuel pre-filter/water separator. It is strongly recommended for markets with poor fuel quality and high fuel water content.
- exhaust elbows (first part of the flexible exhaust pipe).
- heat guards for the exhaust manifold and turbine housing.
- re-introduction of the flexible coupling CFD 275 for TWD 1630 G.
- new instruction books for most European languages
- standard equipment for GenPac is marked with • in the optional equipment section.
- Engine suspension on TWD 1630 G and TAD 1630 GE is now optional equipment. (It was previously included in engine order no.).

A new GAC speed control designated ESD 5500 has been in production since December 1996 and the old ESD 5131 has been discontinued. The new speed control incorporates a start-up smoke limiter which ramps up the fuel without excessive smoke during start-up. When nominal speed has been reached, this function is disconnected to facilitate good load acceptance.

Please help us in our ambition to further develop this Sales Handbook into a more powerful sales tool.
If you find incorrect information, or if you have any comments about this publication, please don't hesitate to send us your comments.

Please send to:

AB Volvo Penta
42200 Market Communication
S-405 08 Göteborg, Sweden

Fax: +46 31 51 23 22

In order to recieve a follow-up of this Sales Handbook, please subscribe to the Volvo Penta Industry Black Binder.

Contact person:

Leifh-Gunnar Claeson
Volvo Publication Store,
Penta Division
Dept 7920, ARU-2
S-405 08 Göteborg, Sweden

Phone: +46 31 765 82 05
Fax: +46 31 54 75 93

If more Sales Handbooks are required, they can be ordered from our Publication Store.

Contact person:

Frank Jensen
Volvo Publication Store,
Penta Division
Dept 7913, ARU
S-405 08 Göteborg, Sweden

Phone: +46 31 765 84 48
Fax: +46 31 66 29 00

Visit the Volvo Penta Official Homepage on Internet: **www.penta.volvo.se**

AB Volvo Penta quality management system meets the international **ISO 9001** standard (EN ISO 9001: 1994) and is certified by Lloyd's Register Quality Assurance. Approval certificate no 937890.

Engines

Specific technical descriptions,
installation drawings,
technical data, diagrams,
order specifications with references
to optional equipment descriptions

97-05 AdEra Dokument AB, Växjö

Volvo Penta Generating Set Engine Ratings 1997/98
1500 rpm, 50 Hz

÷ 0.8

Engine model	Prime power			Continuous Standby power			Maximum Standby power			Efficiency	Emissions
	kWm	kWe	kVA	kWm	kWe	kVA	kWm	kWe	kVA	%	
TD 610 G	100	90	113	100	90	113	110	99	124	90	
TWD 610 G	114	103	130	133	120	150	146	131	164	90	
TD 710 G	142	128	160	142	128	160	156	140	175	90	
TWD 710 G	152	138	173	163	148	185	179	163	204	91	1
TAD 730 G	176	162	202	181	167	208	199	183	229	92	1
TD 1010 G	176	162	202	180	166	207	198	182	228	92	
TWD 1010 G	198	182	228	201	185	231	221	203	254	92	
TAD 1030 GE	224	206	258	241	222	277	265	244	305	92	1,2
TD 1210 G	217	200	250	239	220	275	261	240	300	92	
TWD 1210 G	262	241	301	262	241	301	288	265	331	92	1
TWD 1211 G	282	260	325	282	260	325	308	283	354	92	
TAD 1231 GE	282	260	325	282	260	325	308	283	354	92	1,2
TAD 1232 GE	323	300	375	323	300	375	356	331	414	93	1,2
TWD 1630 G	350	326	407	353	329	410	388	361	451	93	1
TAD 1630 GE	395	367	459	395	367	459	435	404	506	93	1,2
TAD 1631 GE	430	404	505	430	404	505	473	445	556	94	1,2

1) Complies with TA-luft emission regulation. TWD 710 G and TWD 1210 G require special rating adjustment.
2) EPA/CARB emission certified.

1800 rpm, 60 Hz

Engine model	Prime power			Continuous Standby power			Maximum Standby power			Efficiency	Emissions
	kWm	kWe	kVA	kWm	kWe	kVA	kWm	kWe	kVA	%	
TD 610 G	101	91	114	101	91	114	111	100	125	90	
TWD 610 G	126	113	142	126	114	142	139	125	156	90	
TD 710 G	139	125	156	152	137	171	167	150	188	90	
TWD 710 G	165	150	188	178	162	202	195	177	222	91	
TAD 730 G	192	177	221	205	189	236	226	208	260	92	
TD 1010 G	192	177	221	203	187	233	223	205	256	92	
TWD 1010 G	220	202	253	227	209	261	250	230	288	92	
TAD 1030 GE	233	214	268	255	235	293	280	258	322	92	2
TD 1210 G	245	225	282	250	230	288	275	253	316	92	
TWD 1210 G	272	250	313	275	253	316	302	278	348	92	
TWD 1211 G	300	276	345	300	276	345	330	304	380	92	
TAD 1231 GE	300	276	345	300	276	345	330	304	380	92	2
TAD 1232 GE	341	317	396	349	325	406	381	354	443	93	2
TWD 1630 G	376	350	438	391	364	455	430	400	500	93	
TAD 1630 GE	430	404	505	430	404	505	474	446	557	94	2
TAD 1631 GE	484	455	569	484	455	569	537	505	631	94	2

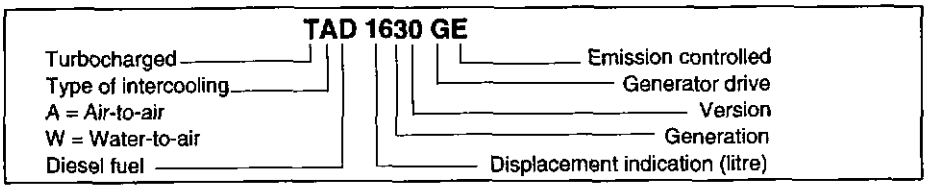
2) EPA/CARB emission certified.

kWm=kilowatt mechanical, net with fan
kWe=kilowatt electrical

kVA=kiloVoltAmper calculations based on a 0.8 power factor
Efficiency=generator output calculated with typical generator efficiency

General

Engine Designation



Engine Power Standards

Engine power ratings are based on operations at ISO 3046 power standards. The standard is identical to BS 5514, DIN 6271 and in general, SAE J 1349. Engine performance data has been adjusted to the standard reference condition.

Engine Power Ratings

Gen set engines have different power ratings depending on the type of service in which the engine will be employed. The aim being to limit the maximum power output in order to achieve the required service life of the engine.
Ratings are based on ISO 8528.

Power Standards
Engine performance corresponds to ISO 3046, BS 5514, DIN 6271 and in general SAE J 1349. The technical data applies to an engine without cooling fan and operating on a fuel with a calorific value of 42.7 MJ/kg (18360 BTU/lb) and a density of 0.84 kg/litre (7.01 lb/US gal, 8.42 lb/Imp gal) as well as where this also involves a deviation from the standards.
Power output is guaranteed within 0 to +2% at rated ambient conditions on delivery. Engine speed governing in accordance with ISO 3046/IV, class A1 and ISO8528 G2 (G3 with electronic speed governor)

Reference conditions:

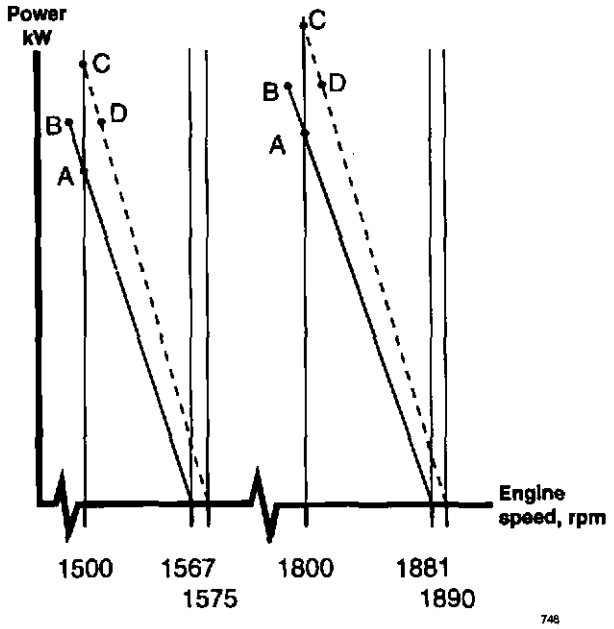
Total barometric pressure:	100 kPa
Air temperature:	25°C
Relative humidity:	30%
Fuel temperature	40°C

Rating Guidelines

Prime Power: ratings corresponding to ISO Standard Power for continuous operation. This relates to the supplying of electrical power at variable load for an unlimited number of hours as opposed to commercially purchased power. A 10% overload capability is available with this rating.

Continuous Standby Power: ratings corresponding to ISO Power. This relates to the supplying of standby electrical power at variable loads for an unlimited number of hours in the event of normal utility power failure. A 10% overload capability is available with this rating.

Maximum Standby Power: ratings corresponding to ISO Fuel Stop Power. This relates to the supplying of 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 with this rating.



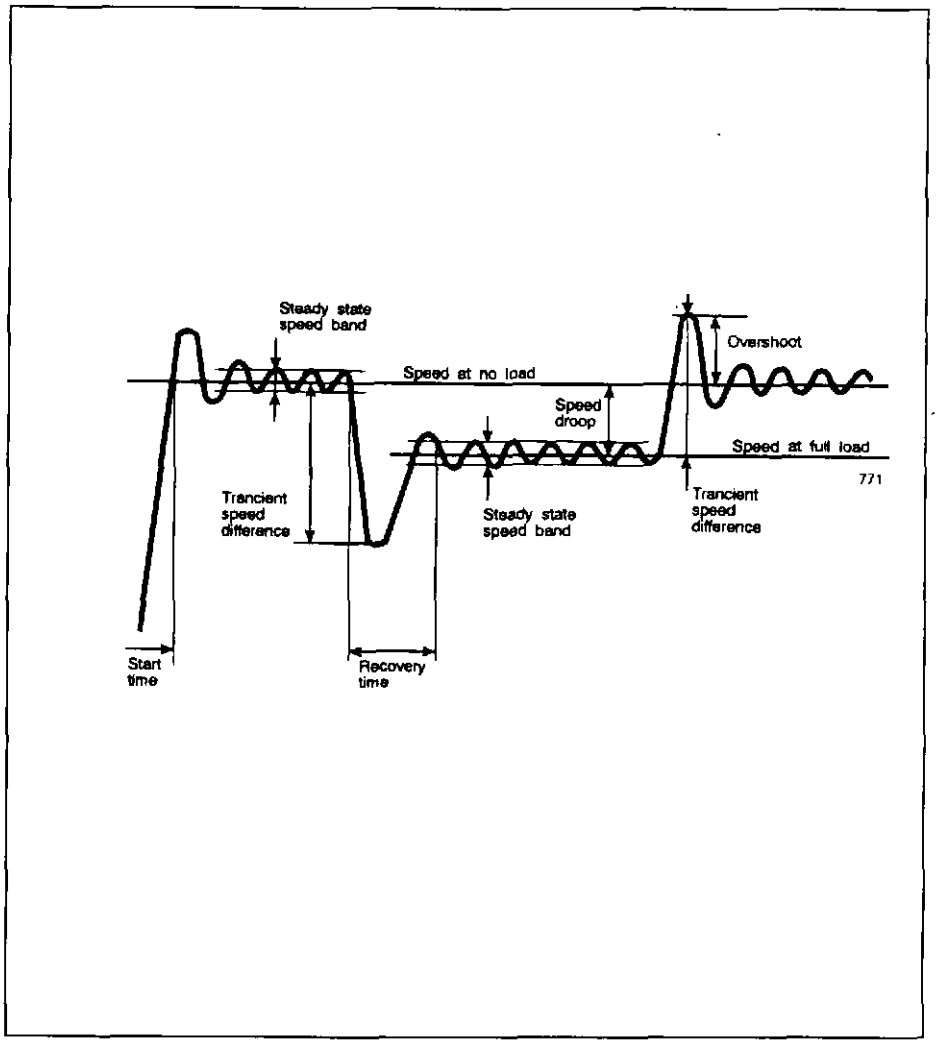
A = Prime Power (with 10% overload available)
B = 110% of Prime Power (Fuel Stop Power)
C = Maximum Standby Power with no overload (Fuel Stop Power)
D = Continuous Standby Power (with 10% overload available)

Load acceptance characteristics

Gen set engines must have a sufficient capacity to be able to recover frequency after an abrupt load application. The frequency dip response primarily depends on the turbine inertia of the turbo-charger and on the fuel system. The terminology used to define load acceptance characteristics can be seen in the diagram.

Volvo Penta load acceptance data has been collated using generators equipped with a relatively unsophisticated automatic voltage regulator (AVR). With modern AVR technology such as that employed by the Leroy Somer R 448 and Stamford MX 341, it is possible to improve load acceptance by reducing voltage at low frequencies.

Another method of improving load acceptance is to use the GAC Load Anticipation Module, LAM 100, which senses electrical load changes prior to engine speed changes.



Torsional vibration

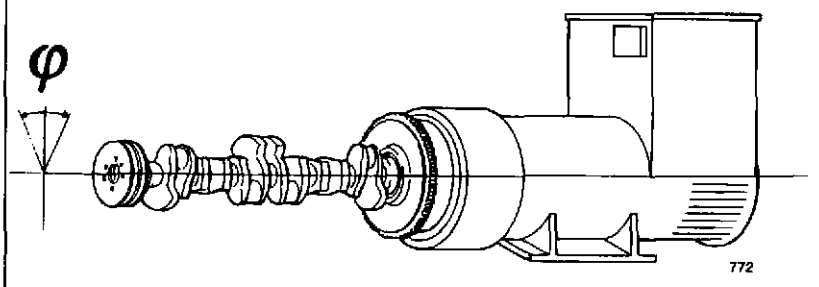
Torsional vibration occurs as a result of forces on the crankshaft caused by the piston and connecting rod during the power stroke. These forces tend to deflect the crankshaft and also tend to displace the shaft at an angle.

The object of Torsional Vibration Calculations (TVC) is to locate the critical speed points and to ensure that these critical speeds are outside the operating range of the engine (within +10% to –5% of the constant speed).

Disregarding the torsional compatibility of the engine and the equipment driven by the engine may fracture the crankshaft and flywheel bolts and may lead to overheating of the vibration damper.

Approved combinations with engines coupled to single bearing generators are listed in the "technical information" file in the Industrial Sales Handbook. If the required combination is not listed, please contact Volvo Penta.

If two-bearing generators are specified, torsional vibration analyses are carried out by the manufacturer of the coupling. Volvo Penta will supply engine input data on request.



Sound

Decibel dB

Sound is the oscillation of air pressures transmitted at a speed of 340 metres per second. The number of oscillations per unit of time, determines the frequency of the sound (Hz).

The human ear is capable of detecting sounds in a frequency range of 20–20,000 Hz and a range of pressure oscillations from $2x10^{-5}$ – 10^{2} Pa. The lowest pressure is the auditory threshold, whilst the highest is known as the threshold of pain. By using logaritmic scales an easily manageable scale of unit values for sound pressure can be obtained. This unit is known as a decibel (db).

dB(A) scale

Sound measurements weighted to the human ear are refered to as the "A" scale. Because it reflects the real impact on the human ear, the dB(A) scale is normally used to express measured sound.

Sound and distance

The sound pressure will fall linearly with distance from a source provided it is in (free) field conditions which do not account for surrounding machines, floors and walls. Doubling distance from source decreases sound 6 dB, halving distance from source increases sound by 6 dB.

Addition of sound levels

dB is logarithmic and can not be added like a proper unit.

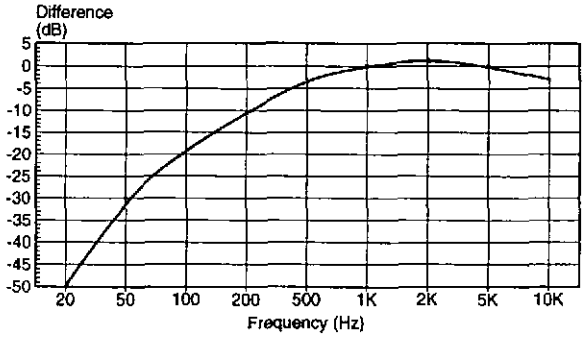
Adding e.g. 74 dB and 80 dB will result in a total sound of 81 dB.

Adding e.g. 4x80 dB will result in a total sound of 86 dB.

Noise

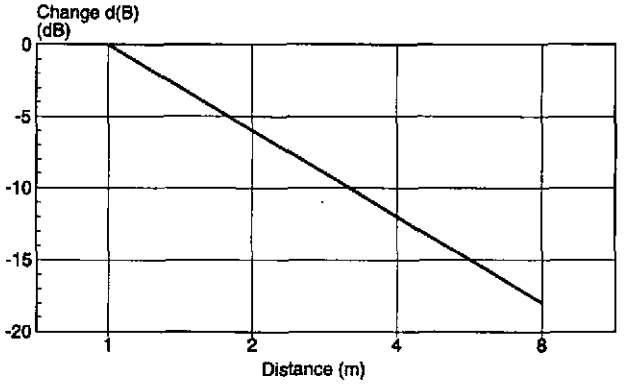
Noise is defines as unwanted sound. Exposure to excessive noise can cause permanent hearing damage.

Frequency response for the ASA weighting characteristics of A-scale



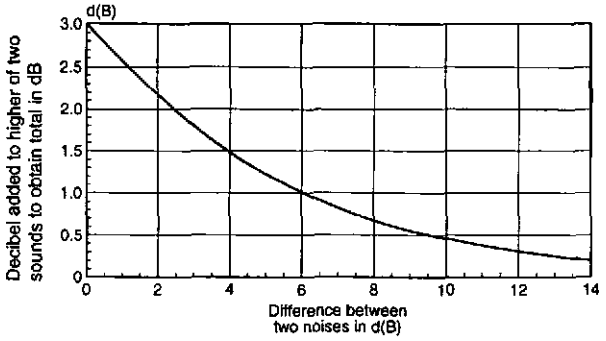
6A

The effect of distance on sound



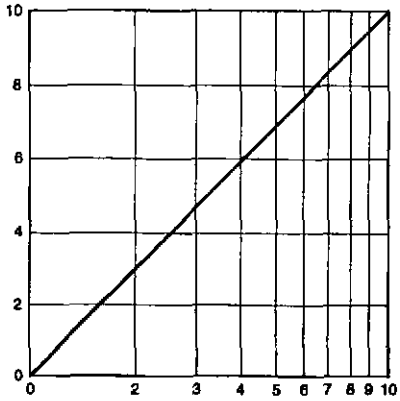
TT304

Addition of unequal sound



6C

Addition of equal sound



Sound measurement

Engine sound levels are measured in a semi-anechoic chamber, i.e., a room with sound insulated walls and a hard, sound-reflecting floor. Sound levels are measured in accordance with the ISO 3744-1981 international standard, using 10 microphones arranged in a hemispherical pattern at a radius of 3m. Exhaust, intake and cooling fan noise are **not** *recorded.*

The sound levels are measured in *decibels -dB- through a frequency* range of 31.5 to 16000 Hz. The sound levels are measured with an A-filter to simulate the response of the human ear - measured as dBA.

Two different readings are used to express sound levels:

Lw = sound power level is independent of microphone positions and acoustic *environment* and used in all Volvo Penta sound level data.

Lp = sound pressure level varies *with microphone distance and* acoustic environment.

To estimate Lp at 1 meter microphone distance from the engine outer surface with a known Lw:

Lp 1 m = Lw – 12 (dBA)

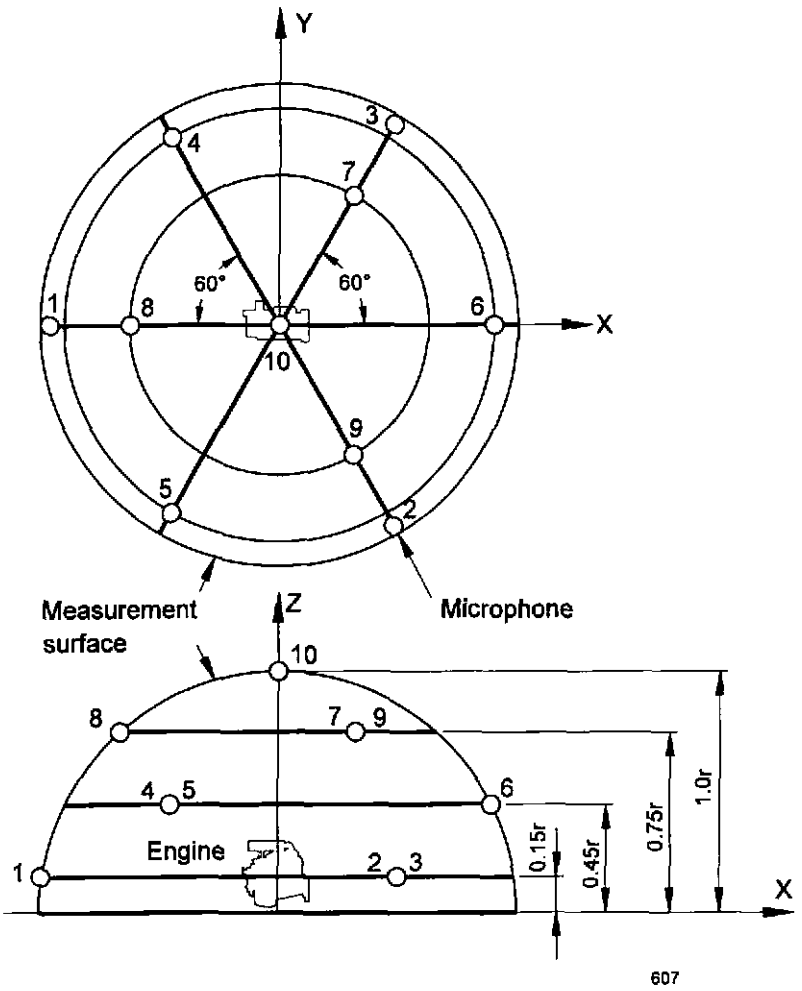
Lw and Lp are stated in each engine technical data section.

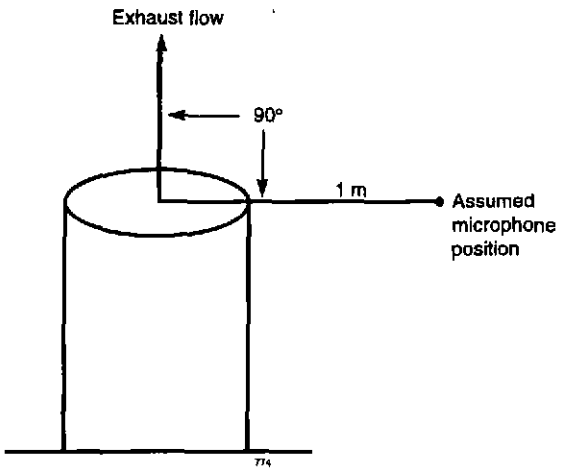
Unsilenced exhaust sound

Noise is defined as unwanted sound. *Exposure to excessive noise can* cause permanent hearing damage. The unsilenced exhaust sound is calculated as sound pressure level Lp. The calculation is based on an assumed microphone position 90° to the exhaust flow, at a distance of 1 metre.
To estimate measured unsilenced exhaust sound pressure level use **calculated value + 9 dB(A).**

Calculated values are stated in each engine technical data section.

The sound power level is measured with 10 microphones placed in a hemisphere





Cooling capability

The function of the cooling system is to dissipate the engine heat to the ambient air without the coolant boiling.

The radiator ambient air capability is dependent on:

Coolant temperature shut down switch setting
The real coolant boiling point depends on the system pressure and the type of coolant used. In practice, the coolant temperature shut down switch normally limits the maximum permissible coolant temperature.

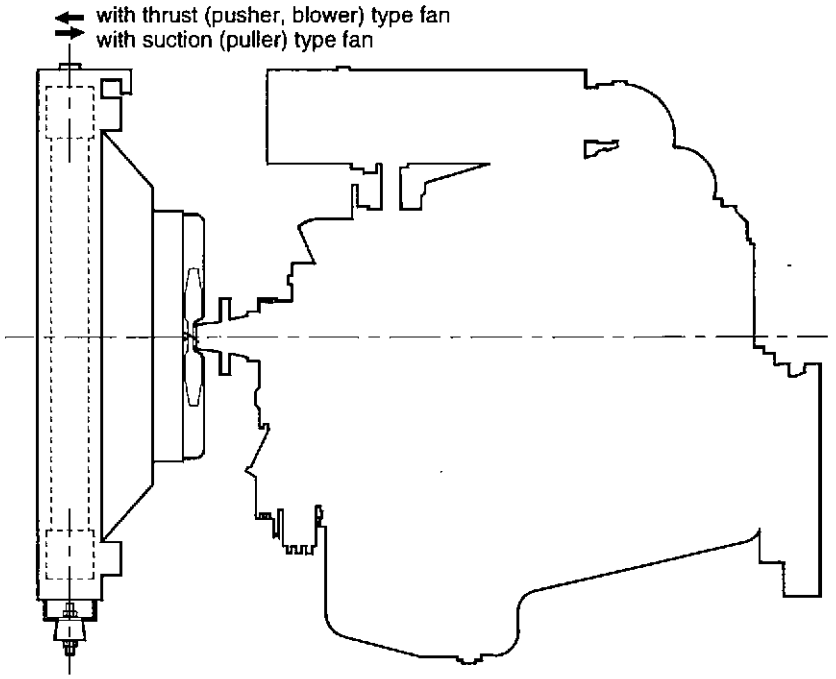
Type of coolant
The radiator ambient air capability is improved by 4°C when the coolant is changed from 50% glycol to fresh water with inhibitor.

Air on temperature
The air on temperature (into radiator) depends on the ambient air temperature and any additional heat from engine, generator, air blast oil cooler, etc.
A gen set equipped with a thrust cooling fan will normally have an air on temperature 5 to 7°C above the ambient air temperature.

Altitude
Altitude affects the boiling point of the coolant and cooling fan air flow. Radiators with a 70 kPa pressure cap setting have a good overheating margin up to 4000 m above sea level. Radiator ambient air capability is reduced by 2.5°C per 500 m increase in elevation.

External restrictions
If the cooling air flow is restricted by ducts, louvres, etc., this will result in reduced radiator ambient air capability, see engine technical data.

Air flow directions:



The individual Volvo Penta engine cooling performance data found in engine technical data is based on the following conditions:

Top tank temperature	103°C
Coolant	50% glycol/50% water
System pressure	70 kPa
Altitude	150 m above sea level

Variations factors from Volvo Penta base cooling performance conditions:

* When a coolant temp of 97°C is permitted (97°C coolant temp shut down switch) the radiator ambient air capability is decreased by	–6°C
* When 25% instead of 50% antifreeze is used the radiator ambient air capability is increased by	+2°C
* When fresh water with inhibitor is used, instead of 50% antifreeze the radiator ambient air capability is increased by	+4°C
* When operating at higher altitudes than 150 m the radiator ambient air capability is decreased by (per 500 m)	–2.5°C

Coolant freezing temperature:

Fresh water	0°C
25% glycol	–13°C
50% glycol	–34°C

Exhaust gas emissions

The composition of exhaust gasses
During the combustion process of a diesel engine, chemical energy is converted into mechanical energy at high temperatures and under very high pressure. For the most part, exhaust gasses consist of the same elements found in the air - nitrogen, carbon dioxide, water and oxygen. Only <0.1% of these components can be defined as exhaust-gas emissions.

NO_x **Nitrous oxides** are formed by a reaction between the N and O in the air at high temperatures.

HC **Hydrocarbons** are elements of unburned fuel which have formed as a result of a low combustion temperature and/or a poor fuel/air mixture. They give diesel exhaust its characteristic smell.

CO ***Carbon monoxide*** *is formed at the intermediate combustion* stage as a result of air deficiency, which results in incomplete oxidization from CO to CO_2.

PM **Particulate matter** consists of a core of carbon (<10 µm) and comes from the fuel and the lubricating oil. This is primarily a result of poor fuel/air mixture. Poisonous hydrocarbons condense on the surface of the particles.

SO_2 **Sulphur dioxide** is formed by a reaction between the sulphur in the fuel and the oxygen in the air. It is directly related to the amount of sulphur in the fuel and is not the subject of existing or proposed control legislature.

The effects of exhaust gases on health and the environment
Diesel engines add to the pollution which has an adverse effect on health and the environment. The biggest environmental problem is acidification, which weakens plants, trees, etc.

- **Acidification**
  Diesel engines primarily emit NO_x, which with water, forms nitric acid. In addition, sulphur dioxide forms sulphuric acid with water. These are both strong acids which affect the leaves of plants and attack their root systems, reducing the plants' capacity to absorb water and minerals.

- **Oxidants**
  Oxidants such as ozone, O_3, are formed as a result of the sensitive balance in the atmosphere being disrupted by too much HC and NO_x. This affects the photosynthesis/respiration of trees, restricting their growth.

- **Photochemical smog**
  Photochemical smog is formed in highly populated urban areas when HC and NO_x are exposed to sunlight. The smog contains a great deal of pollutants and obtains its brownish colour from NO_2. Nitrous oxides and hydro-carbons in the smog affect the respiratory system and increase sensitivity to infection, particularly to disorders of the air passages.

- **Particulate matter**
  Particulates in the air is also the result of emissions of diesel exhaust gasses. The particles are small cores of carbon (<10 µm) upon which hydrocarbons can condense and which can transport mutagenic and carcinogenic hydro-carbons into the lungs.

- **Greenhouse effect**
  Today, the greenhouse effect represents one of the most widespread environmental threats of all.There is a fear for connection between global warming and the increase in the carbon dioxide content of the atmosphere, contributed to by the combustion of all fossil fuels.

Test procedure
Exhaust emissions can be measured under steady state full load conditions, steady state multi mode cycle or transient cycle. For on road vehicles in the European Community (EC) a steady state 13 mode cycle is used based on the cycle in ECE Regulation 49. The engine is run att different loads and speeds and the emissions are measured and corrected with a weight factor in each mode.

For engines inteded for off road applications emission measurements are based on the ISO 8178-4 test cycles. In this a limited number of modes from the ECE R49 13 mode cylce is used with different weight factors depending on the application. Constant speed generating set engines are tested according to ISO 8178 D2 test cycle.

The test cycle is set to reflect the "average" working cycle of generating sets. The test comprises a series of five steps, each gauged at a specific load which must be maintained for a given period. In addition, every measured value is given a weighting prior to the final total of emissions being determined.

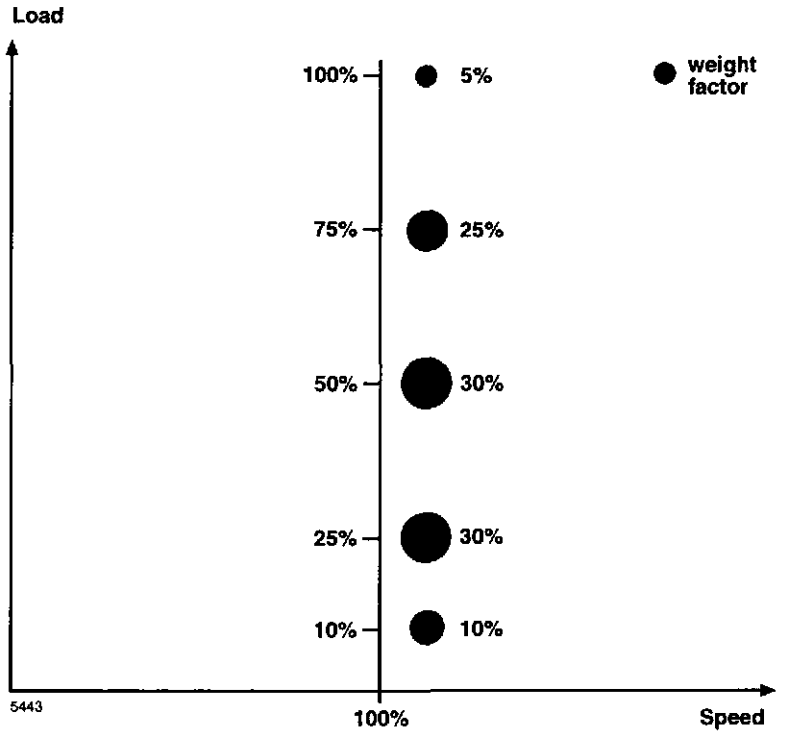
Exhaust gas emission limits
Exhaust limits and implementation dates are set by national laws and regulations based on defined test cycles and procedures.

Emission limits and implementation dates have been set by EPA (US Environmental Protection Agency) and CARB (Californian Air Resources Board) for mobile generating sets as well as mobile machinery. For the moment exhaust emissions are legislated by the European Union only for mobile machinery such as construction and materials handling equipment.

Exhaust smoke limits
There are limits for the smoke generated at steady state by not during acceleration off load.

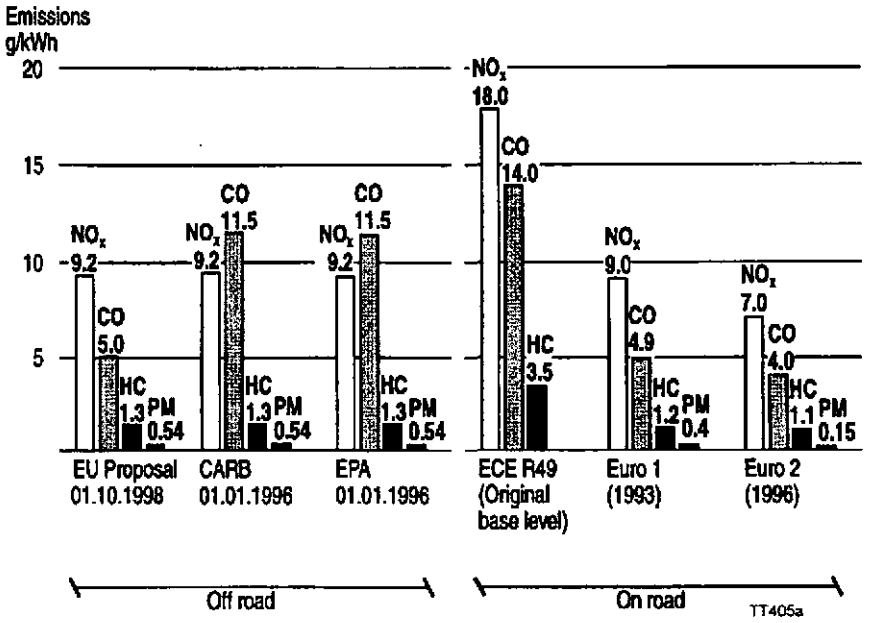
Certified engines
Engines denoted "GE" are certified to EPA and CARB regulations, see also rating selection at page 2 in this book. To recieve certified engines order also certified engine rating specified for each individual engine.

ISO 8178 D2 test cycle with weight factors



5 mode test cycle for constant speed generating set engines

Exhaust emission regulation within Volvo Penta engine range 130–560 kW



TA-Luft Exhaust Emission Regulation

In the absence of a stationary power emission regulation in Europe, the German power plant emission standard TA-Luft (Techniche Anleitung zur reinhalt der Luft) is used as a national regulation in Europe. Test procedures and conditions are not clearly defined. Emissions are measured at steady state operation at max. 5% exhaust oxygen (O_2) content. This standard is applied in Germany, Austria, Luxemburg, Switzerland and the Netherlands and is gaining acceptance in other European countries.

Approved engines

Volvo Penta has measured Gen Set engine exhaust emissions in cooperation with the German TüV, in accordance with TA-Luft emission standards. All Volvo Penta TAD engines and many of the TWD engines satisfy the TA-Luft regulation limits, according to the measurements made by TüV, see also rating selection on page 2 in this book.

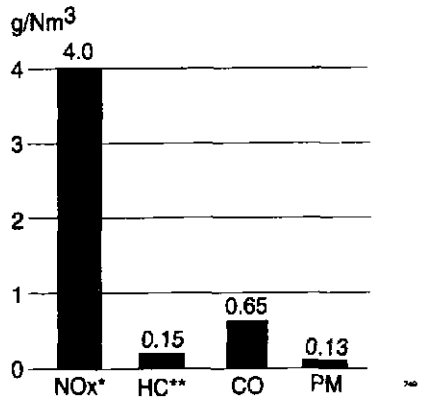
TA-luft emission regulation

TA Luft

(Technische Anleitung zur Reinhaltung der Luft, Germany 1986).

Emission regulation for stationary engines

- Applies to installations with greater than 1 MW total fuel energy input (approximately >400 kW engine output)
- Engine(s) to be tested at site at rated output or at maximum available load.
- Emission limits for stationary diesel engines < 3 MW thermal power at 5% oxygen content in the exhaust gas (diagram)



* Does not apply to emergency standby generator sets

** *Does not apply when HC mass flow is less than 3 kg/h*

Engine calculation formulas:

To find:	Calculate
Power	$\frac{2\pi \times T \times N}{1000}$ (*kW*)
Torque	$\frac{P}{2\pi \times N} \times 1000$ (*Nm*)
Mean effective pressure (PME)	$\frac{2P}{V \times N}$ (*MPa*)
Torque rise	$\frac{Tp - Tr}{Tr} \times 100$ (%)
Speed droop	$\frac{No - Nr}{Nr} \times 100$ (%)
Thermal efficiency	$\frac{\frac{100.000}{Hs}}{SFC} \times 100 = \frac{8432*}{SFC}$ (%)

* with calorific value=42.7 Mj/kg=11.86 kW/kg

P = Power (kW)
T = Torque (Nm)
V = Displacement (litre)
Tp = Peak torque
Tr = Torque at rated speed
N = Engine speed $\frac{rpm}{60}$ (*rps*)
No = No load high idle speed
Nr = Full load rated speed
Hs = Thermal (Calorific) value (kW/kg)
SFC= Specific fuel consumption (g/kWh)

Electrical formulas:

Three phase alternating current

0.8 Efficiency

To find:	Calculate
kWe	$kWm \times EFF$
kWe	$\frac{U \times I \times 1.73 \times PF}{1000} = kVA \times PF$
kVA	$\frac{U \times I \times 1.73}{1000} = \frac{kWe}{PF}$
kVAR	$\frac{U \times I \times 1.73 \times \sqrt{1-(PF)^2}}{1000}$
Amps	$\frac{kWe \times 1000}{U \times 1.73 \times PF}$
Amps	$\frac{kVA \times 1000}{U \times 1.73}$
Frequency	$\frac{Rpm \times Poles}{2 \times 60}$
Rpm	$\frac{2 \times 60 \times Frequency}{Poles}$

kWm Mechanical power
kWe Electrical power
PF Power factor
EFF Generator efficiency
I Current (A)
U Voltage (V)
kVA Real power
KVAR Reactive power
Amp Line current
Rpm Revolutions per minute

Conversion factors

Metric to U.S. or IMP. conversion factors:

	To convert From	To	Multiply by
Length	mm	inch	0.03937
	cm	inch	0.3937
	m	foot	3.2808
Area	mm^2	sq.in.	0.00155
	m^2	sq. ft.	10.76
Volume	cm^3	cu. in.	0.06102
	litre, dm^3	cu. ft.	0.03531
	litre, dm^3	cu. in.	61.023
	litre, dm^3	imp. gallon	0.220
	litre, dm^3	U.S. gallon	0.2642
	m^3	cu. ft.	35.315
Force	N	lbf	0.2248
Weight	kg	lb.	2.205
Power	kW	hp (metric)	1.36
	kW	bhp	1.341
	kW	BTU/min	56.87
Torque	Nm	lbf ft	0.738
Pressure	MPa	psi	145.038
	Pa	mm H_20	0.102
	Pa	in H_20	0.004
	KPa	in H_20	4.0
	mH_20	in H_20	39.37
Energy Work	kJ/kWh	BTU/hph	0.697
	kJ/kg	BTU/lb	0.430
	MJ/kg	BTU/lb	430
	kJ/kg	kcal/kg	0.239
Fuel Consump.	g/kWh	g/hph	0.7355
	g/kWh	lb/hph	0.00162
Inertia	kgm^2	$lbft^2$	23.734
Flow	l/s	cu.ft./min.	2.1189
Speed	m/s	ft.per/min.	196.85
Temp.	°F=9/5×°C+32		

U.S. or IMP. to metric conversion factors:

To convert From	To	Multiply by
inch	mm	25.40
inch	cm	2.540
foot	m	0.3048
sq. in.	mm^2	645.2
sq. ft.	m^2	0.093
cu. in.	cm^3	16.388
cu. ft.	litre, dm^3	28.320
cu. in.	litre, dm^3	0.01639
imp. gallon	litre, dm^3	4.545
U.S. gallon	litre, dm^3	3.785
cu.ft.	m^3	0.0283
lbf	N	4.448
lb.	kg	0.454
hp (metric)	kW	0.735
bhp	kW	0.7457
BTU/min	kW	0.0176
lbf ft	Nm	1.356
psi	MPa	0.0069
mm H_20	Pa	9.807
in H_20	Pa	249.098
in H_20	KPa	0.24908
in H_20	mH_20	0.0254
BTU/hph	kJ/kWh	1.435
BTU/lb	kJ/kg	2.326
BTU/lb	MJ/kg	0.00233
kcal/kg	kJ/kg	4.184
g/hph	g/kWh	1.36
lb/hph	g/kWh	616.78
$lbft^2$	kgm^2	0.042
cu.ft./min.	l/s	0.47194
ft.per min.	m/s	0.00508
°C=5/9×(°F–32)		

Prefixes, multiplying factors and abbreviations:

Prefix	Factors	Symbol
kilo –	x1000	k
mega –	x1,000,000	M
milli –	÷1000	m
micro –	÷1,000,000	µ

Importers directory

Angola
Auto-Sueco (Angola) SARL
Av. 4 de Fevereiro, 95 -3° AP 34
C.P. 1273 LUANDA
Phone: ++244-2-331778
Fax: ++244-2-339698

Argentina
Palmero S.A.
Peru 467
(1067) Buenos Aires
Phone: ++54-1-3432551
Fax: ++54-1-3343698

Australia
Eastern Engine Pty Ltd
70 Banya St.
P.O. Box 78
Bulimba, 4171 QUEENSLAND
Phone: ++61-7-8991622
Fax: ++61-7-8991045

Bahrain
International Agencies Co. Ltd.
Marine and Technical Services Division
131 Al Khalifa Ave.
P.O. Box 584
MANAMA 301
Phone: ++973-72 86 91, 72 71 14
Fax: ++973-72 84 12, 72 75 09

Bangladesh
Swedish Motors Limited
Ibrahim Chamber (3rd flr), 95
Motijheel Commercial area,
DHAKA-1000
Phone: ++880-2-955 3113
Fax: ++880-2-956 5119

Belgium
Volvo Penta France S.A.
La Capitole
55, avenue des Champs Pierreux
92 757 NANTERRE
Phone: ++33-1-55 17 55 17
Fax: ++33-1-55 17 52 62

Benin
Techvaart Engineerings
13, Creek Road
Apapa, Lagos, Nigeria
Phone: ++234 1 5453033
Fax: ++234 1 5875957

Bolivia
Corporación Automotriz Boliviana S.A.
Ave. 6 de Agosto 2860
Casilia 4812, San Jorge
La Paz
Phone: ++591-2 433209, 432184
Fax: ++591-2 433166

Botswana
Swedish Motor Corporation Ltd
P O Box 41259
Lot 14400
Garborone West
Phone: ++267-323117
Fax: ++267-319988

Brazil
Volvo Penta do Brasil Ltda.
Avenida das Americas 13443
Rio de Janeiro -RJ
22790 - 700
Phone: ++55-21 4379544
Fax: ++55-21 4376479

Bulgaria
Volvo Penta Central Europe GmbH
Redderkoppel 5. P.O. Box 9013
D-24151, KIEL, GERMANY
Phone: ++49-431- 39940
Fax: ++49-431 396774

Canada
Volvo Penta of the Americas
1300 Volvo Penta Drive
CHESAPEAKE, VA 23320-9860
Phone: ++1-757-4362800
Fax: ++1-757-4365158

Canary Islands
Volvo Penta Espana, S.A.
Paseo de la Castellana 130
Madrid 28046
Phone: ++34-1 5666100
Fax: ++34-1 5666200

Chile
Ditec S.A.
Casilla 14085
AV. Los Condes 12916
SANTIAGO
Phone: ++56-22151000
Fax: ++56-22172926

China
Volvo Penta Asia (Pte) Ltd
Representative Office Shanghai
Lot No 14, Jin Qiau Processing Zone
Pudong, SHANGHAI
P.R. CHINA 201206
Phone: ++86-21 58345123
Fax: ++86 21 58340119

Colombia
Chaneme Mavecolsa S.A.
Avenida Las Americas No. 52-91
A.A. No, 39057, BOGOTA
Phone: ++57-2 611057
Fax: ++57-2 697871

Congo
Demimpex Congo
Demimpex Zaire
Av. Bokoro 14
Kinshasa - Gombe
Zaire
Phone: ++243 88 46553

Cuba
Volvo Penta Habana
Edifico Someillan Piso 28
Calle O Esq 17, Vedado
Habana
Phone: ++53-7-333359, 333166
Fax: ++53-7-333981

Cyprus
PAS Mediterranen Shipping Ltd
223 St Andrew Street
P.O. Box 210
LIMASSOL
Phone: +357 5 364755
Fax: +357 5 364995

Czech Republic
Volvo Penta Central Europe GmbH
Redderkoppel 5. P.O. Box 9013.
D24151 KIEL, GERMANY
Phone: ++49-431 39940
Fax: ++49-431 396774

Denmark
Johs Thornam A/S
Kalvebod Brygge 20
1560 KØBENHAVN
Phone: ++45-33 140782
Fax: ++45-33 325202

Egypt
Orascom "Onsi Sawiris & Co"
160, 26 th July Street
Agouza, CAIRO
Phone: ++20-2 3026930
Fax: ++20-2 3440201

Estonia
Volvo Penta Norden AB
Olarsbäcken 8
PB 30 02201 ESPO
FINLAND
Phone: ++358-9-452891
Fax: ++358-9-422034

Faroe Islands
P/F Bátatænastan
Grim Kambandsgöta 4
PO Box 101, 110 Torshavn
Phone: ++298-11735
Fax: ++298-13835

Finland
Volvo Penta Norden AB
Olarsbäcken 8
PB 30 02201 ESPO
FINLAND
Phone: ++358-9-452891
Fax: ++358-9-422034

France
Volvo Penta France S.A.
La Capitole
55, avenue des Champs Pierreux
92 757 NANTERRE
Phone: ++33-1-55 17 55 17
Fax: ++33-1-55 17 52 62

Gabon
Societe Africaine Colombiane & Cie
B.P. 683 LIBERVILLE
Phone: ++241-722764
Fax: ++241-760651

Germany
Volvo Penta Central Europe GmbH
Redderkoppel 5. P.O. Box 9013.
D24151 KIEL, GERMANY
Phone: ++49-431 39940
Fax: ++49-431 396774

Ghana
Multi-Tech Services Ltd
PO Box 9228
K.I.A. Accra
Phone: ++233-21 224678, 229335
Fax: ++233-21 220369, 225810

Great Britain
Volvo Penta UK Ltd
Otterspool Way
Watford WD2 8 HW
Phone: ++44-1923 228544
Fax: ++44-1923 818556

Greece
Saracakis Brothers S.A.
71 Athinon Ave.
101 72 ATHENS
Phone: +30-1-3465320, 3467011
Fax: +30-1-3467329

Guadelope
G.M.D.
Lot 8, Portes de la Marina
F-97110 Point à Pitre
Phone: ++590-909403
Fax: ++590-909623

Hong Kong
Volvo Hong Kong Ltd. (Volvo Penta Div.)
10 flr. Scomber Building
1, Yip Fat St., Wong Chuk Hang
Hong Kong
Phone: ++852-28702481
Fax: ++852-28702699

Hungary
Volvo Penta Central Europe GmbH
Redderkoppel 5. P.O. Box 9013.
D-24151 KIEL, GERMANY
Phone: ++49-431 39940
Fax: ++49-431 396774

Iceland
Brimborg HF
Faxafeni 8
108 REYKJAVIK
Phone: ++354-1 685870
Fax: ++354-1 813762

India
Volvo Penta Private Limited,
Volvo Penta Division
"Embassy Square"
201, 2nd Floor
No. 148, Infantry Road
Bangalore - 560 001
Phone: ++91-80-2282910
Fax: ++91-80-2254740

Indonesia
PT Tira Austenite
Paulogadung Industrial Estate
Jin Pulo Ayang Kav.R1.
Jakarta Timur 13930
Phone: ++62-21 4602594
Fax: ++62-21 4602593

Israel
Mayer's Cars & Trucks Co. Ltd
6. Chaim Shapira ST.
RISHON LETZYON 75704
Phone: ++972-3-963 8020
Fax: ++972-3-963 8416

Italy
Volvo Penta Italy SPA
Via Copernico 20
20090 Trezzano SUL Naviglio
Milano
Phone: ++39-2 484301
Fax: ++39-2- 48401848

Ireland
Volvo Penta UK Limited
Otterspool Way
Watford WD 2 8 HW
Phone: ++44-1923 228544
Fax: ++44-1923 818556

Japan
Volvo Penta Japan Corporation
CS Tower 6F
1-11-30 Akasaka
Minato-Ku, Tokyo 107
Phone: ++81-3 5562 7843
Fax: ++81-3 5562 7870

Jemen
Elaghil Trading Co Ltd
P.O. Box 66
Sana's
Phone: ++967 2207471
Fax: ++967 2207596

Jordan
Mithkal Shawkat & Sami Asfour Co
P.O. Box 26 AMMAN 11118
Phone: ++962-6 651989/655635
Fax: ++962-6 649636

Jamaica
Deryck A. Gibson Ltd.
P.O. Box 11
KINGSTON 5
Phone: ++1-809-9262250
Fax: ++1-809 9267061

Kenya
Hyundai Heavy Equipment & Volvo Penta
P.O. Box 76562
Go Down No. 2
Plot 15081/15
Embakasi Road
Nairobi
Phone: ++254 2 569163
Fax: ++254 2 713360

South Korea
Tanam Electric Co. Ltd
4f. Wooochang Bldg
157-2, Samsung-Dong
Kangnam-Ku, Seoul
Phone: ++82-2 5013663
Fax: ++82-2 34529479

Kuwait
Issam Al-Gharabally Est.
PO Box 20912
13070 SAFAT
Phone: ++965-4844768, 4847154
Fax: ++965-4849688

Lebanon
Michel Sadaka & Co
P.O. Box 116 and 315
Cable Sadaco - Zahle
Phone: ++961-8 806837
Fax: ++961-8 800031

Latvia
Volvo Penta Norden AB
Olarsbäcken 8
PB 30 02201 ESPO
FINLAND
Phone: ++358-9-452891
Fax: ++358-9-422034

Lithuania
Volvo Penta Norden AB
Olarsbäcken 8
PB 30 02201 ESPO
FINLAND
Phone: ++358-9-452891
Fax: ++358-9-422034

Luxemburg
Volvo Penta France S.A.
La Capitole
55, avenue des Champs Pierreux
92 757 NANTERRE
Phone: ++33-1-55 17 55 17
Fax: ++33-1-55 17 52 62

Malaysia
Federal Auto Industrial Sdn Bhd.
15/6 Jalan Bicu
PO Box 7007
40700 Shah Alam, Selangor
Phone: ++60-3-5503300
Fax: ++60-3-5590592

Martinique
Manufactures Réunies
37, Rue Jacques Cazotte
97200 Fort De France
Phone: ++596-713528, 701729
Fax: ++596-635217

Mexico
Volmar SA de CV
Arabella No 93
Col. Miguel Hidalgo
Del: Tlahuac
CP. 13200 Mexico City D.F.
Phone: ++52-5 8450078
Fax: ++52-5 8408456

Maldives
ALBA International Pvt Ltd
25 Boduthakurufaanu Magu
Male 20-25
Phone: ++960 32245, 515173
Fax: ++9960 323523

Namibia
Swedish Motor Corporation Ltd
P.O. Box 5081, Auspannplatz
Cnr Lazarett & Patterson Street
Windhoek
Phone: ++264 61 249341
Fax: ++264 61 249346

Netherlands
Nebim Handelmaatschappij B.V.
Nijverheidsweg 1
Postbus 195
3640 AD MIJDRECHT
Phone: ++31-297 280111
Fax: ++31-297 287364

New Zealand
Volpower New Zealand Ltd.
73 C Greenmount Drive, East Tamaki
P.O. Box 58-744, Greenmount,
AUCKLAND
Phone: ++64-9 2744305
Fax: ++64-9 2744306

Nigeria
Deckcrown Ltd
Allenby House
1a Temple Road
London NW2 6PJ, Great Britain
Phone: ++44-181-4509920
Fax: ++44-191-2081800

Norway
Volvo Penta Norden AB
Postboks 534
1411 Kolbotn
Phone: ++47-66818500
Fax: ++47-66818420

Oman
Muscat Overseas Industrial & Marine Equipment Trading Co. Ltd
P.O. Box 1288, Muttrah
Postal Code 114
Sultanate of Oman
Phone: ++968-794404, 794406
Fax: ++968-794407

Pakistan
Volvo Pakistan Limited
49/c, Ghaus-ul-Azam Road
(Old Jail Road) P.O. Box 676
Lahore 54000
Phone: ++92-42-7587140
Fax: ++92-42 7580027

Peru
Volvo Peru S.A.
Carretera Central KM.6.5-ATE
PO Box 815 LIMA 100
Phone: ++51-14 943500/944808
Fax: ++51-14 942062

Philippines
Nordic Industries, INC
3rd fl One Marian Center Bldg.
106 Esteban St Legaspi Village
Makati, Metro Manila
Phone: ++63-2 8943624/8943634
Fax: ++63-2 8154110

Poland
Volvo Penta Central Europe GmbH
Redderkoppel 5, P.O. Box 9013
D-24151 KIEL, GERMANY
Phone: ++49-431 39940
Fax: ++49-431 396774

Portugal
Auto-Sueco, Lda
E.N.10 São João Da Talha
Apartado 25
2686 Sacavém
Phone: ++351-1 9552041
Fax: ++351-1 9556669

Quatar
Al Badi Trading & Contracting Co. Ltd.
P.O. Box 3915, DOHA
Phone: ++974-320715, 412723
Fax: ++974-442888

Romania
Volvo Penta Central Europe GmbH
Redderkoppel 5, P.O. Box 9013
D-24151 KIEL, GERMANY
Phone: ++49-431 39940
Fax: ++49-431 396774

Russia
AIA. Ltd.
Office 401-406
34 Verkhnaya Ul, PO Box 12
125040 MOSCOW
Phone: ++7-503 9563285
Fax: ++7-502- 2211567

Saudi Arabia
Alkhorayef Commercial Company
Agricultural Division
P.O. Box 305 RIYADH
Phone: ++966-1 4955452
Fax: ++966-1 4950261

Singapore
Volvo Penta Asia (Pte) Ltd.
1 Temasek Avenue
22-01 Millenia Tower
Singapore 039192
Phone: ++65-2213111
Fax: ++65-3397925

Slovakia
Volvo Penta Central Europe GmbH
Redderkoppel 5, P.O. Box 9013
D-24151 KIEL, GERMANY
Phone: ++49-431 39940
Fax: ++49-431 396774

Slovenia
Balato
Tovarniska 5
5270 AJDOVSCINA
Phone: ++386 65 63457
Fax: ++386 65 63469

South Africa
Swedish Truck Distributors
PO Box 1590
Germiston 1400
Phone: ++27-11 820 09 20
Fax: ++27-11 873 9845

Spain
Volvo Penta Espana , S.A.
Paseo de la Castellana 130
MADRID 28046
Phone: ++34-1 5666100
Fax: ++34-1 5666200

Sri Lanka
Hayleys Engineering Limited
25, Foster Lane
Colombo 10
Phone: ++94-1 669087
Fax: ++94-1 691679, 699299

Surinam
H. Bromet
Dominestraat 34
PARAMARIBO
Phone: ++597-473512
Fax: ++597-472473

Sweden
Volvo Penta Norden AB
Box 216
421 23 Västra Frölunda
Phone: ++46-31 686400
Fax: ++46-31 682736

Switzerland
Volvo Penta Central Europe GmbH
Redderkoppel 5, P.O. Box 9013
D-24151 KIEL, GERMANY
Phone: ++49-431 39940
Fax: ++49-431 396774

Volvo Penta Central Europe GmbH
Niederlassung Schweiz
3250 LYSS
Phone: ++41-32 3878260
Fax: ++41-32 3878271

Tahiti
E.S.I.
Bp 1662
PAPEETE
Phone: ++689-410784
Fax: ++689-410821

Taiwan
Jou International Co Ltd.
4F-8, 186 Nanking E Rd. Sec 4
TAIPEI 10 570
Phone: ++886-2-5776271
Fax: ++886-2-5794545

Thailand
Vor Supaporn Machinery Co Ltd
292/3-4 Nanglingee Road
Yannawa
BANGKOK 10120
Phone: ++66-2-6780023
Fax: ++66-2-2853389

Trinidad
L.P. Marine + Industrial Supplies Ltd
178, Western, Main Road,
P.T. CUMANA
Phone: ++1-809 6323441
Fax: ++1-809 6323441

Turkey
ERK Mühendislik, Sanai ve Ticaret Ltd
Abidei Hürriyet Cad Palazoglu Sok.
No 4 Sisli ISTANBUL
Phone: ++ 90-212 2321363
Fax: ++90-212 2316404

Uganda
Swedish Truck Distributors
P.O. Box 6968
Blacklines House
Plot 258A Ntinda
Ginja Road, Kampala
Phone: ++256 41 255267
Fax: ++256 41 255288

United Arab Emirates
Mohammed Bin Mooasaood & Sons
Engineering Product Division
P.O. Box 322,
ABU DHABI
Phone: ++971-2 722622, 720291
Fax: ++971-2 765211

USA
Volvo Penta of the Americas
1300 Volvo Penta Drive
CHESAPEAKE, VA 23320-9860
Phone: ++1-757-4362800
Fax: ++1-757-4365158

Vietnam
Dumarest Hong Kong Ltd
Vietnam Office
93 Ly Tu Trong St. Distr. 1
Ho Chi Minh, Vietnam
Phone: ++84-8 8292918
Fax: ++84-8 8293163

Zaire
Demimpex Zaire
Av. Bokoro 14
Kinshasa-Gombe
Phone: ++243-88 46553

Zimbabwe
Swedish Motor Corporation Ltd
P.O. Box ST 625
77 Dagerhamn Road
Southerton, Harare
Phone: ++263-4 669910
Fax: ++263-4 669598

Catalogue disposition

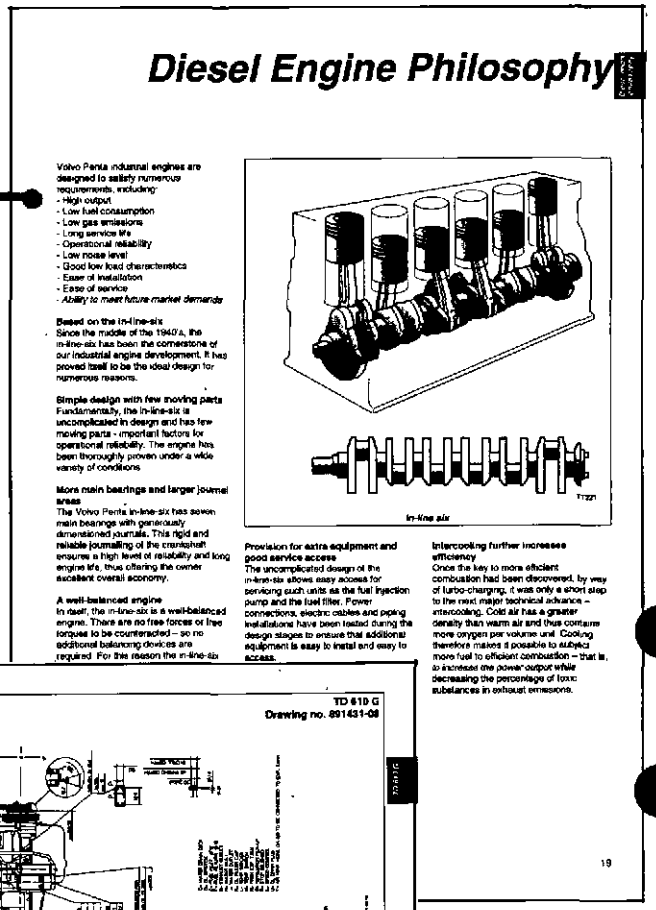
Common engine information is collected in the Diesel Engine Philosophy section.

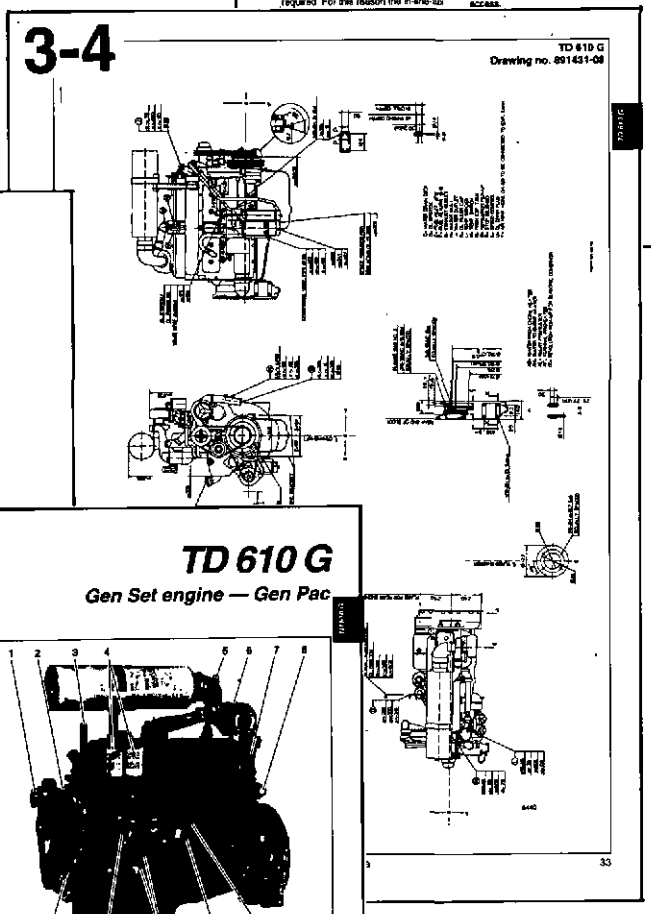
The subsequent section shows the layout of one engine section, containing information relating to one specific engine. The first four pages form the introduction to the engine section.

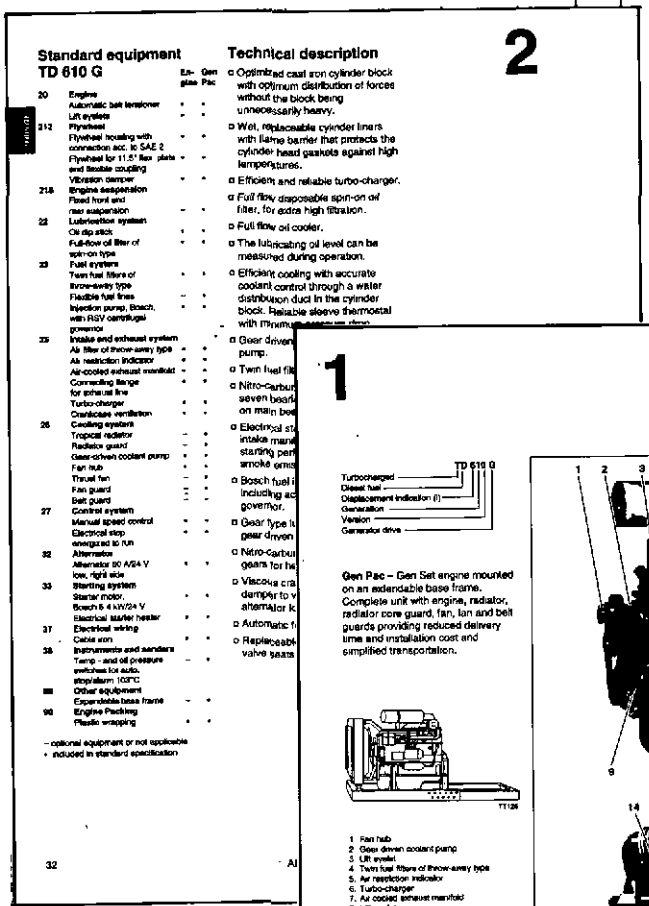
Page 1
Identification page with brief reasoning/arguments and main engine components.

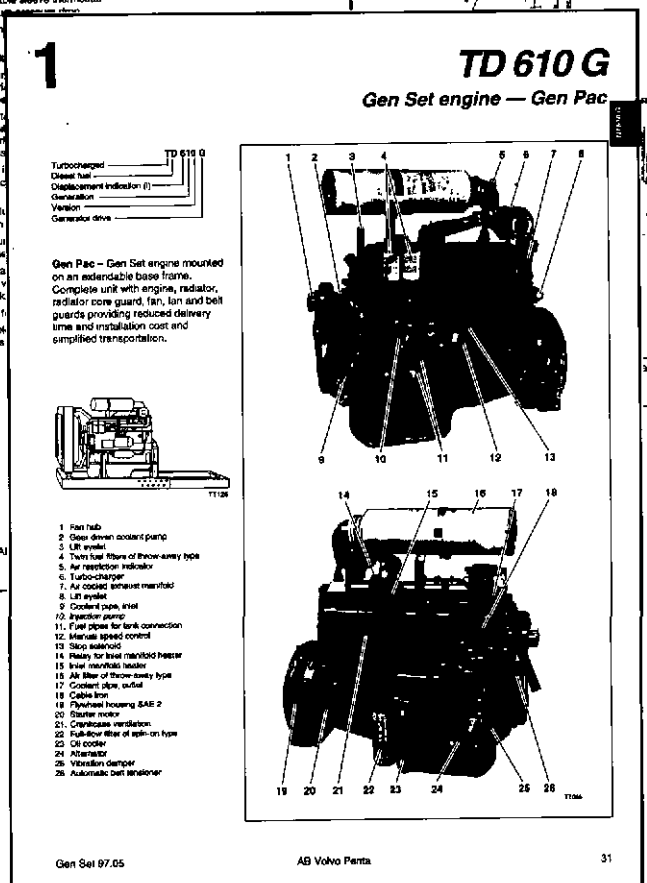
Page 2
Summary of standard equipment, plus brief technical description.

Page 3-4
Installation drawings.



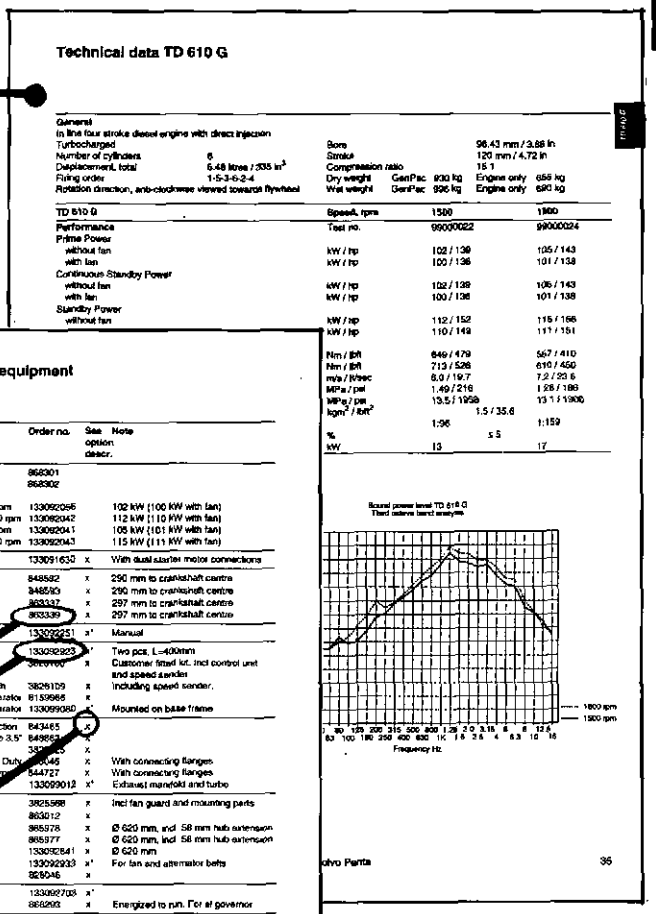






Technical data

All necessary technical data, for each of the different engine systems.



Technical data TD 610 G

General
In line four stroke diesel engine with direct injection
Turbocharged
Number of cylinders 6
Displacement, total 6.48 litres / 395 in³
Firing order 1-5-3-6-2-4
Rotation direction, anti-clockwise viewed towards flywheel

Bore 98.43 mm / 3.88 in
Stroke 120 mm / 4.72 in
Compression ratio 16:1
Dry weight GenPac 930 kg Engine only 655 kg
Wet weight GenPac 936 kg Engine only 680 kg

TD 610 G	Speed, rpm	1500	1800
Performance	Test no.	99000022	99000024
Prime Power			
without fan	kW / hp	102 / 139	105 / 143
with fan	kW / hp	100 / 136	101 / 138
Continuous Standby Power			
without fan	kW / hp	102 / 139	105 / 143
with fan	kW / hp	100 / 136	101 / 138
Standby Power			
without fan	kW / hp	112 / 152	115 / 156
	kW / hp	110 / 149	111 / 151
	Nm / lbft	649 / 479	557 / 410
	Nm / lbft	713 / 526	610 / 450
	m/s / ft/sec	8.0 / 19.7	7.2 / 23.6
	MPa / psi	1.49 / 216	1.28 / 186
	MPa / psi	13.5 / 1958	13.1 / 1900
	kgm² / lbft²	1.5 / 35.6	
		1:96	1:159
	%	≤ 5	
	kW	13	17

Sound power level TD 610 G
Third octave band analysis

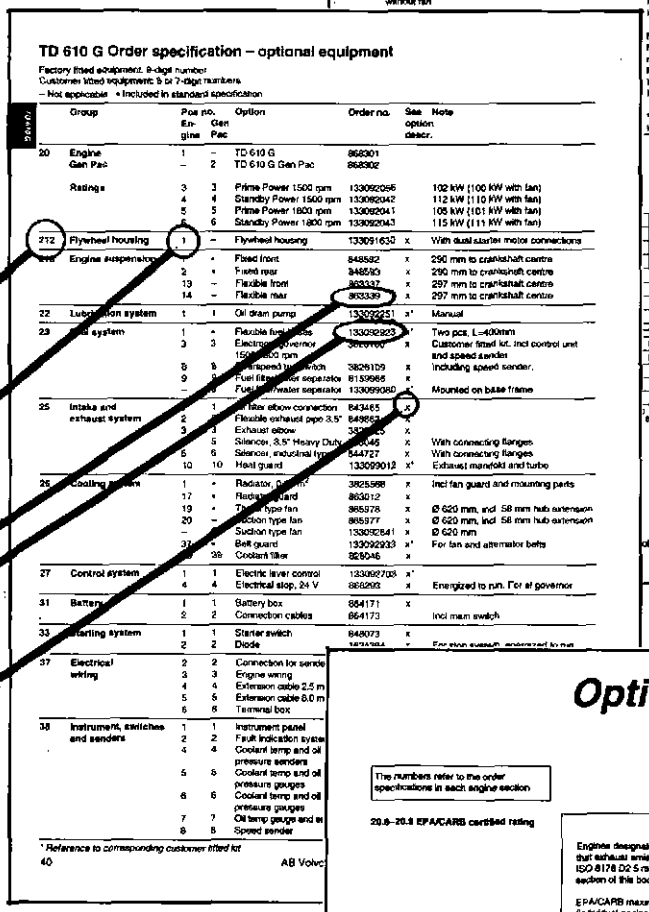
Volvo Penta 35

Order specification

The order specification is the main document and contains all available optional equipment. Each item of equipment is identified by a position number, made up of a function group number from the Volvo standard function group register and a sequential serial number for each function group.

The order number for customer-fitted equipment is made up of 6 or 7 digits and 9 digits for factory-fitted equipment.

An X in the "See option descr." column indicates that more information can be found in the Optional Equipment section at the end of the engine section. Simply locate the same position number as on the order specification.



TD 610 G Order specification – optional equipment

Factory fitted equipment, 9-digit number
Customer fitted equipment, 6 or 7-digit numbers
– Not applicable • Included in standard specification

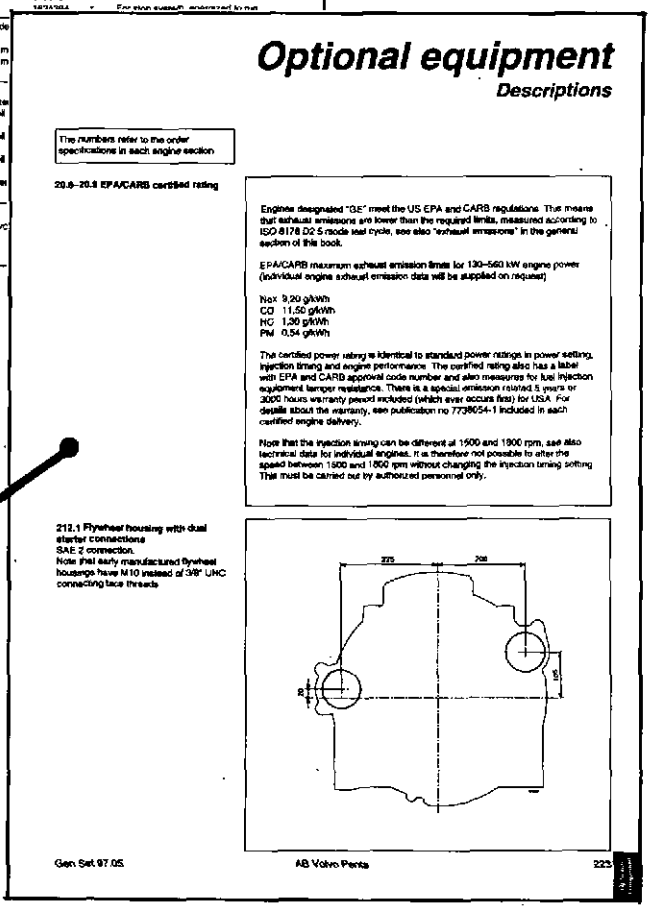
	Group	Pos no. Engine	Pos no. Gen Pac	Option	Order no.	See option descr.	Note
20	Engine	1	–	TD 610 G	868301		
	Gen Pac	–	2	TD 610 G Gen Pac	868302		
	Ratings	3	3	Prime Power 1500 rpm	133092056		102 kW (100 kW with fan)
		4	4	Standby Power 1500 rpm	133092042		112 kW (110 kW with fan)
		5	5	Prime Power 1800 rpm	133092041		105 kW (101 kW with fan)
		6	6	Standby Power 1800 rpm	133092043		115 kW (111 kW with fan)
212	Flywheel housing	1	–	Flywheel housing	133091630	x	With dual starter motor connections
213	Engine suspension	•	•	Fixed front	848582	x	290 mm to crankshaft centre
		2	•	Fixed rear	848580	x	290 mm to crankshaft centre
		13	–	Flexible front	863337	x	297 mm to crankshaft centre
		14	–	Flexible rear	863339	x	297 mm to crankshaft centre
22	Lubrication system	1	1	Oil drain pump	133092251	x*	Manual
23	Fuel system	1	•	Flexible fuel hoses	133092923	x*	Two pcs, L=400mm
		3	3	Electronic governor 1500/1800 rpm	3824060	x	Customer fitted kit, incl control unit and speed sender
		8	8	Overspeed protection switch	3826109	x	Including speed sender.
		9	9	Fuel filter/water separator	8159966	x	
		–	–	Fuel filter/water separator	133099080	x	Mounted on base frame
25	Intake and exhaust system	1	1	Filter elbow connection	843465	x	
		2	2	Flexible exhaust pipe 3.5"	849864	x	
		3	3	Exhaust elbow	3824060	x	
		5	5	Silencer, 3.5" Heavy Duty	840045	x	With connecting flanges
		6	6	Silencer, industrial type	844727	x	With connecting flanges
		10	10	Heat guard	133099012	x*	Exhaust manifold and turbo
26	Cooling system	1	•	Radiator, complete	3825568	x	Incl fan guard and mounting parts
		17	•	Radiator guard	863012	x	
		19	•	Thermo type fan	865978	x	Ø 620 mm, incl 58 mm hub extension
		20	–	Suction type fan	865977	x	Ø 620 mm, incl 58 mm hub extension
		–	•	Suction type fan	133092641	x	Ø 620 mm
		37	•	Belt guard	133092933	x*	For fan and alternator belts
		38	38	Coolant filler	829046	x	
27	Control system	1	1	Electric lever control	133092708	x*	
		4	4	Electrical stop, 24 V	885268	x	Energized to run. For st governor
31	Battery	1	1	Battery box	864171	x	
		2	2	Connection cables	864173		Incl main switch
33	Starting system	1	1	Starter switch	848073	x	
		2	2	Diode	3824064	x	For stop overrun, engine not to run
37	Electrical wiring	2	2	Connection for sender			
		3	3	Engine wiring			
		4	4	Extension cable 2.5 m			
		5	5	Extension cable 8.0 m			
		6	6	Terminal box			
38	Instrument, switches and senders	1	1	Instrument panel			
		2	2	Fault indication syste			
		4	4	Coolant temp and oil pressure senders			
		5	5	Coolant temp and oil pressure gauges			
		6	6	Coolant temp and oil pressure gauges			
		7	7	Oil temp gauge and s			
		8	8	Speed sender			

* Reference to corresponding customer fitted kit

40 AB Volvo

Optional equipment

This section contains descriptions of specific equipment, e.g. dimensions, material, functional descriptions, etc. Each item of equipment is identified by the same position number as on the order specification.



Optional equipment
Descriptions

The numbers refer to the order specifications in each engine section

20.8–20.9 EPA/CARB certified rating

Engines designated "GE" meet the US EPA and CARB regulations. That means that exhaust emissions are lower than the required limits, measured according to ISO 8178 D2 5 mode test cycle, see also "exhaust emissions" in the general section of this book.

EPA/CARB maximum exhaust emission limits for 130–560 kW engine power (individual engine exhaust emission data will be supplied on request)

Nox 9,20 g/kWh
CO 11,50 g/kWh
HC 1,30 g/kWh
PM 0,54 g/kWh

The certified power rating is identical to standard power ratings in power setting, injection timing and engine performance. The certified rating also has a label with EPA and CARB approval code number and also measures for fuel injection equipment tamper resistance. There is a special emission related 5 years or 3000 hours warranty period included (which ever occurs first) for USA. For details about the warranty, see publication no 7738654-1 included in each certified engine delivery.

Note that the injection timing can be different at 1500 and 1800 rpm, see also technical data for individual engines. It is therefore not possible to alter the speed between 1500 and 1800 rpm without changing the injection timing setting. That must be carried out by authorized personnel only.

212.1 Flywheel housing with dual starter connections
SAE 2 connection.
Note that early manufactured flywheel housings have M10 instead of 3/8" UNC connecting face threads

Gen Set 97.05 AB Volvo Penta 223

Notes

Diesel Engine Philosophy

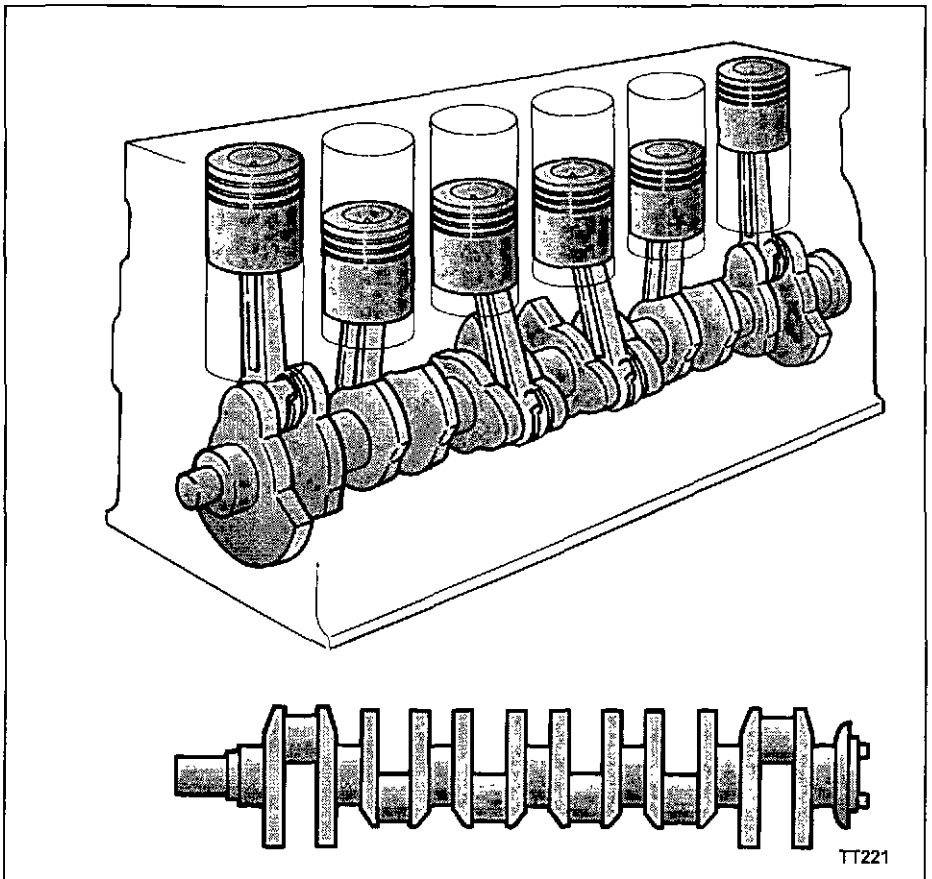
Volvo Penta industrial engines are designed to satisfy numerous requirements, including:
- High output
- Low fuel consumption
- Low gas emissions
- Long service life
- Operational reliability
- Low noise level
- Good low load characteristics
- Ease of installation
- Ease of service
- Ability to meet future market demands

Based on the in-line-six
Since the middle of the 1940's, the in-line-six has been the cornerstone of our industrial engine development. It has proved itself to be the ideal design for numerous reasons.

Simple design with few moving parts
Fundamentally, the in-line-six is uncomplicated in design and has few moving parts - important factors for operational reliability. The engine has been thoroughly proven under a wide variety of conditions.

More main bearings and larger journal areas
The Volvo Penta in-line-six has seven main bearings with generously dimensioned journals. This rigid and reliable journalling of the crankshaft ensures a high level of reliability and long engine life, thus offering the owner excellent overall economy.

A well-balanced engine
In itself, the in-line-six is a well-balanced engine. There are no free forces or free torques to be counteracted – so no additional balancing devices are required. For this reason the in-line-six engine design is more suitable for quiet, vibration-free operation than a four cylinder engine, V8 or V10.



In-line six

Provision for extra equipment and good service access
The uncomplicated design of the in-line-six allows easy access for servicing such units as the fuel injection pump and the fuel filter. Power connections, electric cables and piping installations have been tested during the design stages to ensure that additional equipment is easy to instal and easy to access.

Ideal for turbo-charging
The quantity of fuel that can be fed to a diesel engine is directly proportional to the amount of oxygen available at the moment of combustion. That is why Volvo, as one of the first manufacturers in the world, invested in turbo-charging of high speed diesel engines as early as 1954.

Intercooling further increases efficiency
Once the key to more efficient combustion had been discovered, by way of turbo-charging, it was only a short step to the next major technical advance – intercooling. Cold air has a greater density than warm air and thus contains more oxygen per volume unit. Cooling therefore makes it possible to subject more fuel to efficient combustion – that is, to increase the power output while decreasing the percentage of toxic substances in exhaust emissions.

Engine block

The Volvo Penta engine block has been designed with the help of advanced CAD/CAM technology and finite element analysis.

The engine block has been dimensioned using these methods and has been designed to absorb the forces exerted by very high levels of turbo-charging. The engine block therefore has further potential for the development of higher output power in the future.

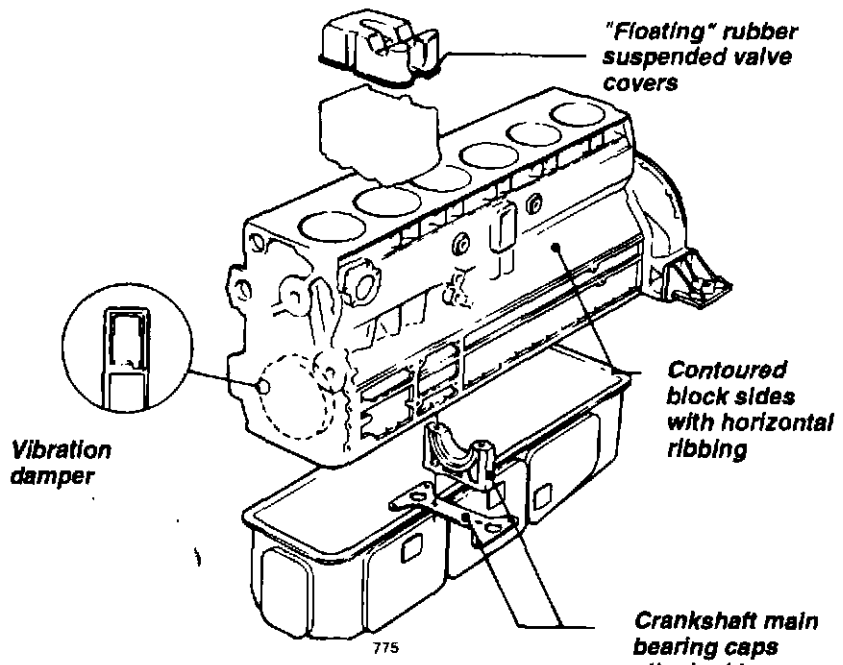
To reduce vibration and thereby, noise levels, the following measures have been taken:

1. The engine block has contoured sides and horizontal strengthening.

2. Stiffening plates, (16 l) also known as foot plates, arranged between the main bearing caps and the cylinder block.

3, Floating rubber suspended valve covers for noise suppression.

4. Fluid damping of the torsional vibration of the crankshaft.



16- litre engine block

Cylinder head and seals

To withstand continuous operation at high pressure and to achieve a high power output from a given engine, whilst maintaining reliability and service life, it is of the utmost importance that the seals between the engine block and the cylinder head are effective and reliable.

1. The 6 and 7 litre engines have two separate cylinder heads with 20 bolts per cylinder head, evenly spaced around the cylinders.

2. The 10, 12 and 16 litre engines have separate cylinder heads with six evenly spaced bolts.

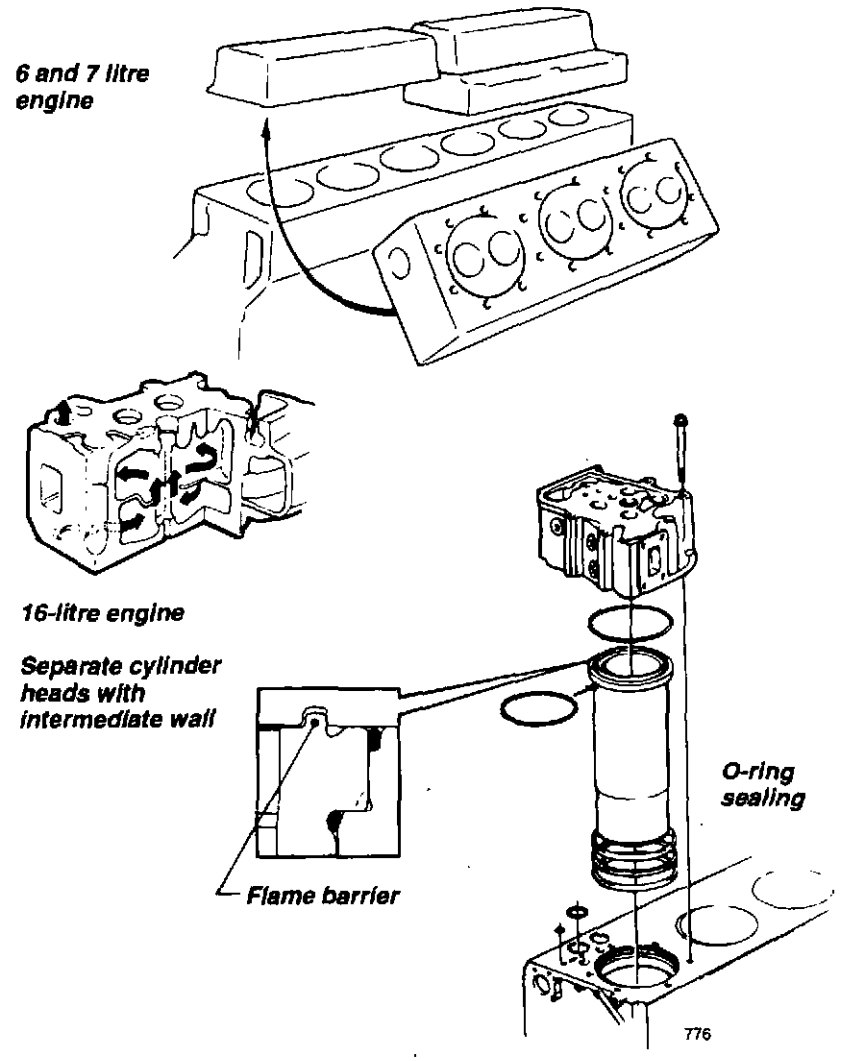
3. Flame barriers surrounding each cylinder liner for seal protection.

4. Highly flexible, long cylinder bolts, precision torque tightened.

16-litre engine details:

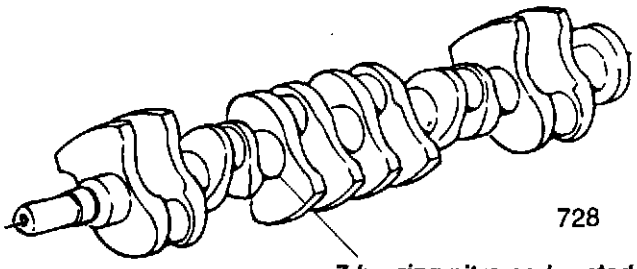
5. No gaskets between cylinder heads and cylinder block – the cylinder heads seat directly on the engine block, a simple and effective solution for low maintenance costs.

6. O-ring seals around all coolant and oil channels. Each cylinder has two upper and three lower sealing rings.



Crankshaft
Volvo crankshafts are manufactured from nitrocarburized, micro-alloy steel. The shafts are finely polished with a maximum tolerance of 0.002 mm to the main bearing journals.

The crankshafts are substantially dimensioned to withstand the forces exerted by the high level of turbo-charging.

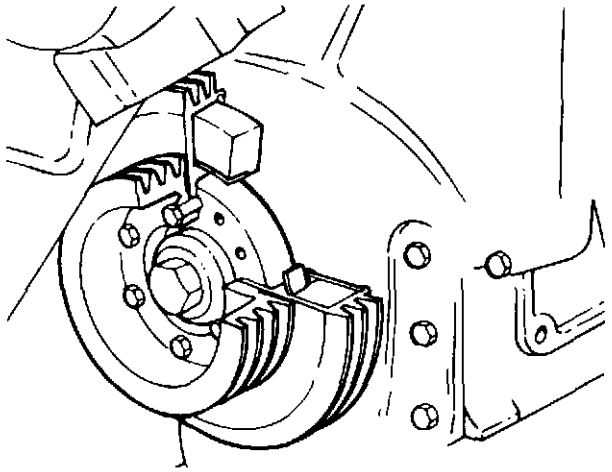


7-bearing nitro-carburated crankshaft

Vibration damper
The vibration damper is mounted on the front of the crankshaft and prevents amplification of the natural frequencies which could occur if the frequency of the engine's pistons power pulses should coincide with the natural frequency of the crankshaft.

The damper is extremely effective over a wide range of speeds.

The vibration damper is a hermetically sealed housing containing a vibration mass of steel with a bushed centre bearing. The housing is filled with a viscous silicon fluid.



Connecting rods
The connecting rods are made of drop-forged, toughened special steel with an "I"-profile. The big-end shells are split diagonally which makes it possible to fit and remove the bearing shells through the cylinder bores.

The side forces acting on the bearing shells' mating surfaces are absorbed by the axial saw-tooth design on the faces of the joint.

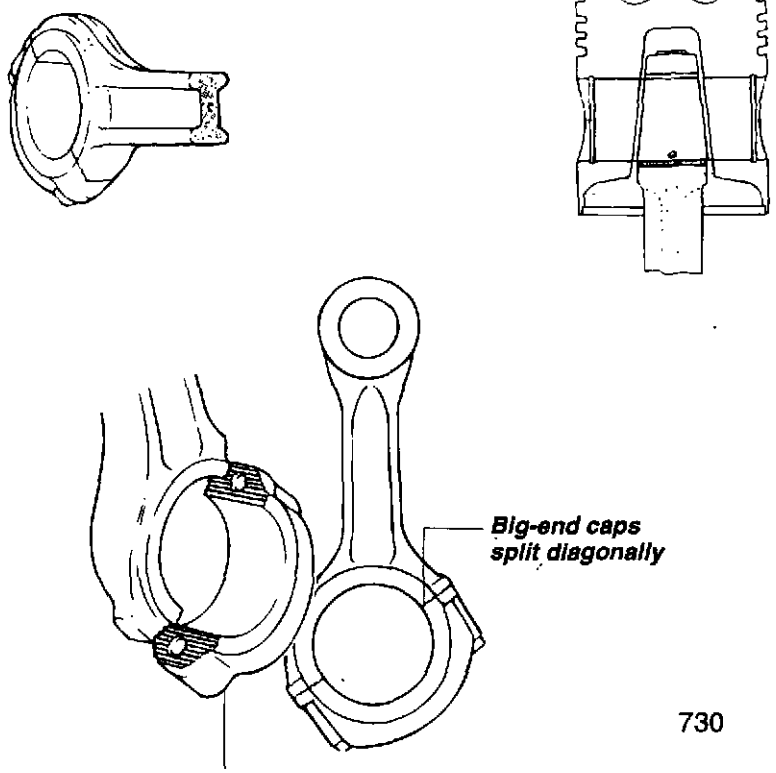
The small ends of the connecting rods have a trapezoidal shaped bearing - the lower section is wider than the upper section - to be able to better absorb the forces exerted during compression and combustion. The risk of piston fracture is thereby reduced.

The 6 litre-engine has an oval gudgeon pin hole with chamfered edges - a different solution for the same tensile strength problem. The chamfered edges of the gudgeon pin holes allows for deformation of the gudgeon pin at high pressure.

The 16-litre engine has both trapezoidal shaped end bearings and chamfered edges, which reduces the risk of piston fracture to a minimum.

"I"-profile connecting rod

Trapezoidal shaped bearing



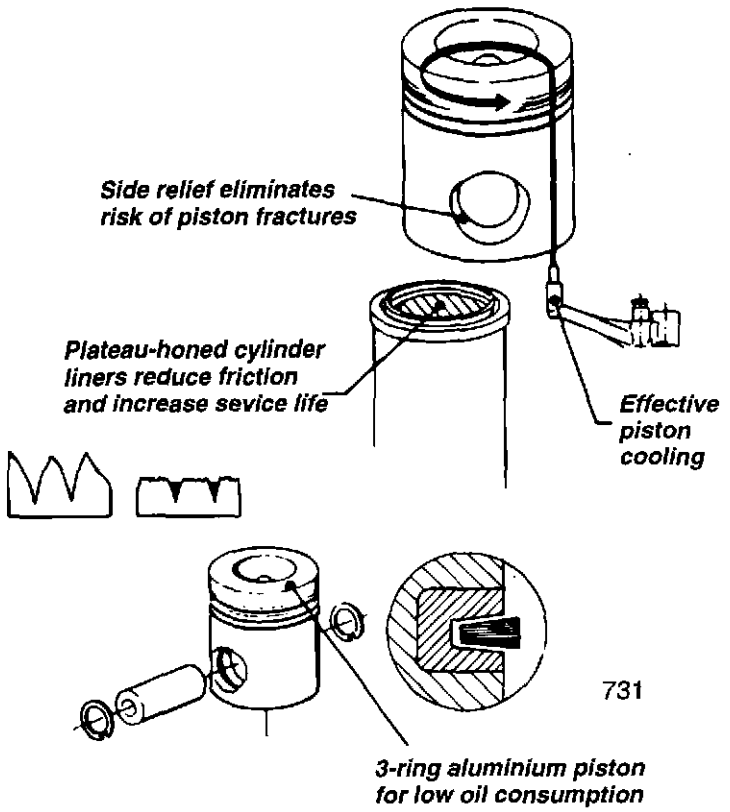
Pistons

The pistons are made of graphite coated aluminium. The graphite layer gives the skirt better oil absorbtion and adhesion properties, which in turn means reduced wear on the cylinder liners and pistons and a consequent reduced risk of piston seizure. The 16 litre engine has two oil rings and one compression ring on each piston. The rings are located low down on the piston to reduce friction losses at lower working temperature.

All compression rings are molybdenum-coated and the top ring groove has a cast-iron ring carrier which increases the operational reliability even further.

All engines have (and the 6 and 10 litre engines are prepared for) piston cooling. Cooling is achieved by injecting oil via a nozzle located below the cylinder liner. The oil then splashes the lower section of the piston. Some models are supplied with an internal piston channel.

The piston liners are plateau-honed, which gives lower oil consumption, lower friction and increased durability.



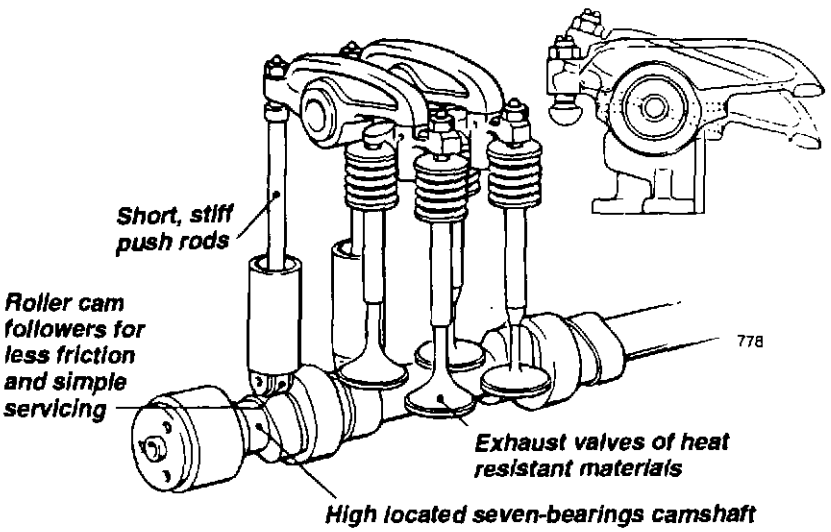
Valve system and camshaft

The exhaust valve is subject to great stresses with temperatures of +800°C and pressure of 150 bars. The valves are therefore manufactured from Nimonic, the trade name for a group of alloys with extremely high tensile strength at high temperatures. These alloys were originally developed for use in jet engines.

Both inlet and exhaust valves have chromed valve stems with hardened tips and replaceable wear caps. Valve seats and valve guides are replaceable.

The camshaft is substantially dimensioned and is supported in seven bearing journals in order to withstand the forces exerted when the valves open. The camshaft is made from specially hardened steel with extra tensile strength. This, together with the special design of the cams provides a smoother valve operation which is less wearing on the other constituent parts of the valve assembly.

The 16-litre engine has four valves per cylinder – two inlet and two outlet valves – to ensure an efficient flow of gasses. This is of major importance to the total performance and efficiency of the engine.



High positioned camshaft and short, stiff push rods, contribute to the intrinsic strength of the assembly. The design provides a relatively rigid valve assembly with stiff valve springs, thereby making the valve system very stable and robust.

Roller cam followers reduce friction and wear on both the cam followers and the camshaft.

Fuel system
Volvo Penta uses an injection pump with a separate pump element for each cylinder. The pump is located on a central console to reduce fuel pressure pipe length. This also increases the precision of the injection process.

The governor is of the mechanical type and reacts quickly to changes in engine speed. At the same time the system must be so stable that no speed variations (hunting) occur at the required level. For gen set applications, the speed variation is quantified as a maximum 0.25% of the engine speed.

The governor adjusts the fuel quantity by means of a control rod which turns the obliquely cut plungers in the injection pump until the correct injection volume is achieved. The control rod position is affected partly by the engine speed control and partly by a system of centrifugal weights in the governor.

Electronic speed governor
System description:
A magnetic speed sensor measures the engine speed and sends a proportional frequency signal to the speed control unit.

The electronic speed control unit compares the existing engine speed with the required speed and sends corrective signals to the electrical actuator.

The electronic actuator is connected to the injection pump fuel rod. It controls the volume of fuel and thus maintains any required engine speed very accurately, independent of engine load.

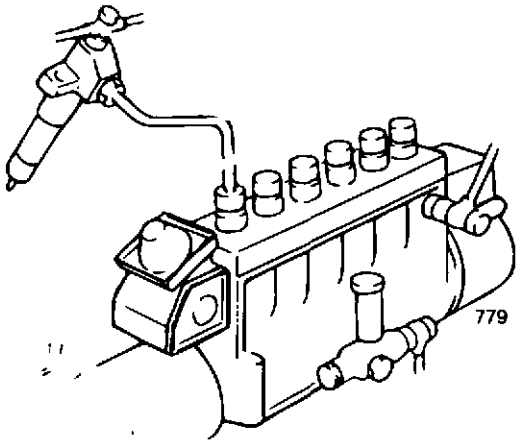
Electronic governor advantages:
The speed droop is adjustable. When paralleling with other engines, it is very simple to adjust the governor speed droop.

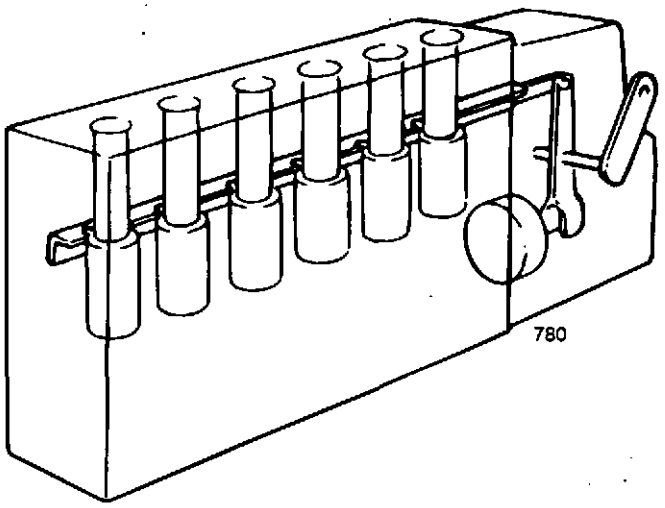
It is possible to operate at isochronous speed (0% droop) even in parallel with other electrical governors.

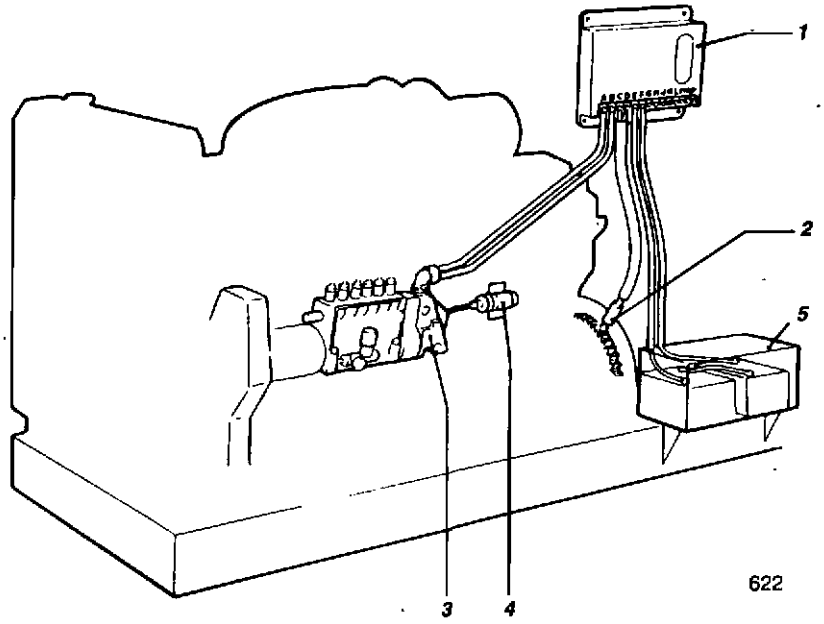
Accessories
Accessories are available such as automatic synchronizers, load sharing modules, power ramp control (used when paralleling with the mains), remote speed control, load anticipation modules etc.

Interface modules are available to facilitate the use of GAC load sharing modules and auto synchronizers with other manufacturer's speed controls such as the Cummins EFC system, Barber Coolman and Woodward.

Accessories are not sold by Volvo Penta. Contact the GAC (Governor America Corporation) local representative.







The system incorporates:
1. Control unit
2. Engine speed sender
3. Electromagnetic actuator
4. Stop solenoid
5. Batteries

Turbo-charger
The turbo-charger is driven by the exhaust gases from the engine. In this way the turbo utilizes otherwise wasted energy and increases total efficiency. The advantages of turbo-charging can be summarized as follows:
• Higher output power
Increased oxygen supply means that more fuel can be burnt per work cycle
• Better fuel economy
Increased oxygen supply means that the fuel can be burnt more completely
• Cleaner exhaust gases
Thanks to a better supply of oxygen and more complete combustion
• Lower noise level
The turbo-charger cuts off the high frequency inlet air noise. As more power is taken out of the same engine volume, the sound emitting surfaces are smaller.
• Longer service life
A larger volume of air in the cylinders reduces the thermal stresses in the engine.

Intercooler
With intercooling, the air that has been compressed and heated by the turbo is cooled in an intercooler.

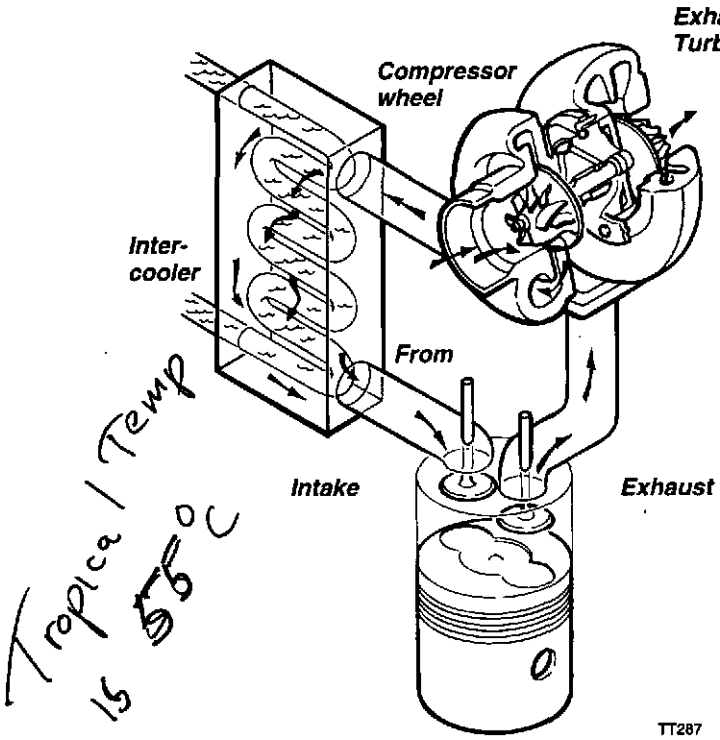
The intercooler increases the oxygen supply during combustion thereby allowing the injected fuel to be burnt more efficiently whilst reducing fuel consumption as well as the level of exhaust emission.

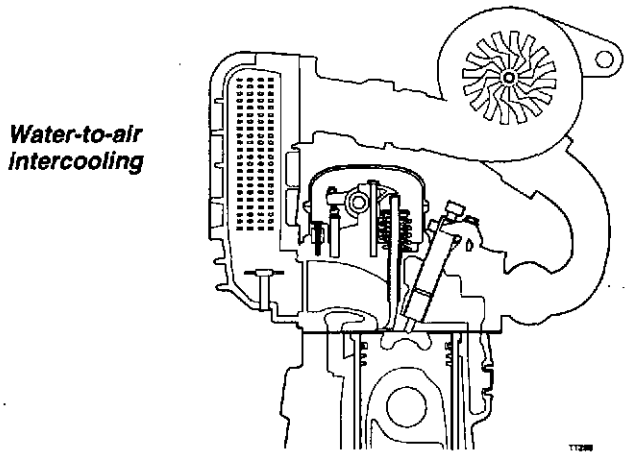
Intercooling also reduces the thermal stresses on the engine, increasing durability and reducing oil consumption.

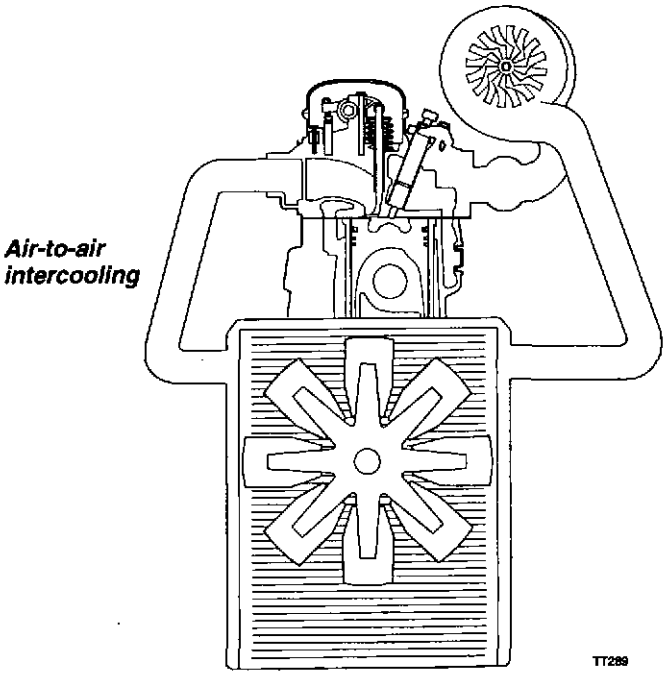
Water-to-air intercooling (TWD):
Coolant circulates from the water pump through the engine mounted intercooler and the radiator before returning to the water pump. Compressed air from the turbocharger is cooled from over 150°C to approximately 90°C prior to entering the engine.

Air-to-air intercooling (TAD):
The air-to-air intercooler is mounted between the radiator and the engine and makes use of the air flow from the engine's cooling fan. This reduces the *charge air temperature to 50°C before it is* fed into the cylinders, thus promoting highly efficient combustion.

This feature combined with a high compression ratio and delayed, rapid injection under high pressure give the TAD engines excellent cold starting characteristics and low exhaust gas emissions. It also results in reduced fuel consumption and an extended service life.







Design of inlet port and combustion chambers

The cylinder inlet ports are carefully designed to achieve effective combustion by optimizing air rotation, with an acceptable pressure drop, when the air enters the cylinders.

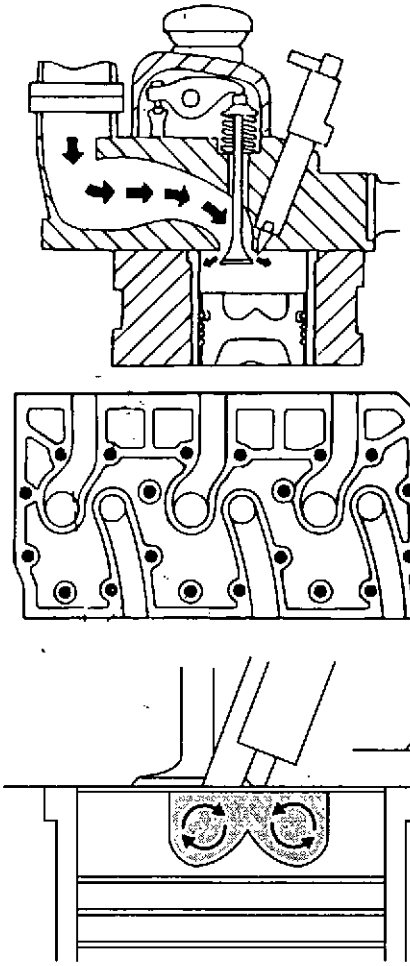
On the 6 and 7 litre engines, the inlet and exhaust ports are symmetrically located on each cylinder.

The design of the combustion chamber increases the turbulence of the inlet air. Each air particle therefore has a spiral motion around the raised centre of the combustion chamber. The injector is centrally located in this spiral.

This process is very sensitive as the mixture of fuel and air in the different phases of combustion can vary at different points within the combustion chamber.

The first droplets of fuel injected into the combustion chamber use the oxygen that is immediately available. The rotation ensures that the subsequent droplets reach other areas of the combustion chambers where oxygen is available.

Volvo Penta has consistently built its engines based on the principle that combustion should take place in stages in the combustion chamber. The fuel is burnt in the air whilst injected into the combustion chamber.



Centrally located injector

61–71 inlet and exhaust ports, symmetrically located

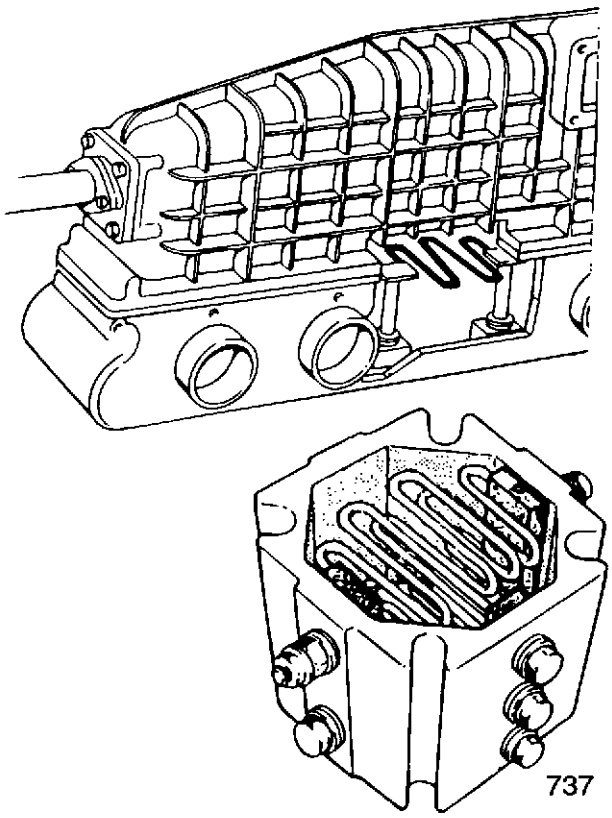
Combustion chamber turbulence

736

Pre-heater element

To accommodate a high degree of turbo-charging without having a high peak pressure, Volvo Penta strives to keep the compression ratio as low as possible while maintaining good starting characteristics. A lower compression ratio means of course a slight temperature increase in the boost air when starting cold or idling, when the turbo cannot assist in increasing the temperature of the air .

To facilitate easy starting and reduce exhaust smoke, all Volvo Penta engines have a 24 volt air pre-heater fitted in the air inlet manifold.



Preheater element in intercooler

Preheater element in inlet duct (no inter-cooler)

737

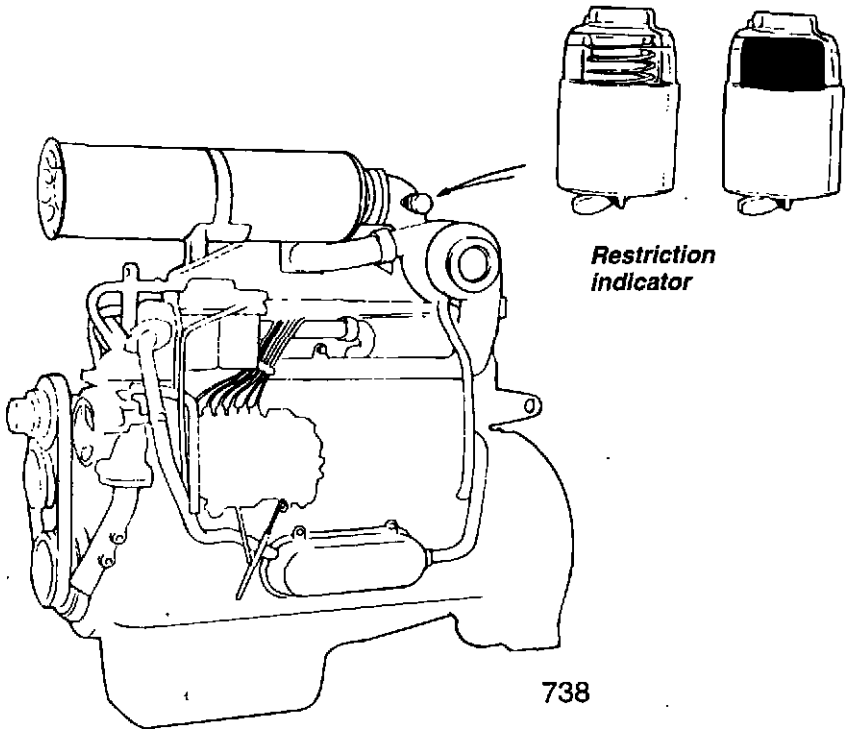
Restriction indicator

The pressure drop in the inlet system must not be excessive if the engine is to work with the correct air/fuel mixture.

A dirty filter results in a high pressure drop, leading to combustion with insufficient air. This results in power losses, higher combustion and exhaust temperatures, increased exhaust gas emissions and greater thermal stresses.

To avoid this, all Volvo Penta engines are equipped, as standard, with a restriction indicator in which a window displaying a red field shows when the pressure drop is too high, (500 mm WC) i.e., the filter is clogged and needs replacing.

The restriction indicator also avoids the air filter having to be replaced unnecessarily. This reduces maintenance costs. As the filter's cleaning efficiency increases with the amount of blockage, there is no need to replace the filter until the maximum permissible pressure has been reached, as shown on the indicator.

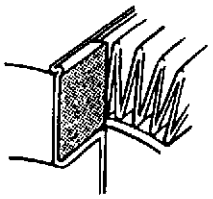


Restriction indicator

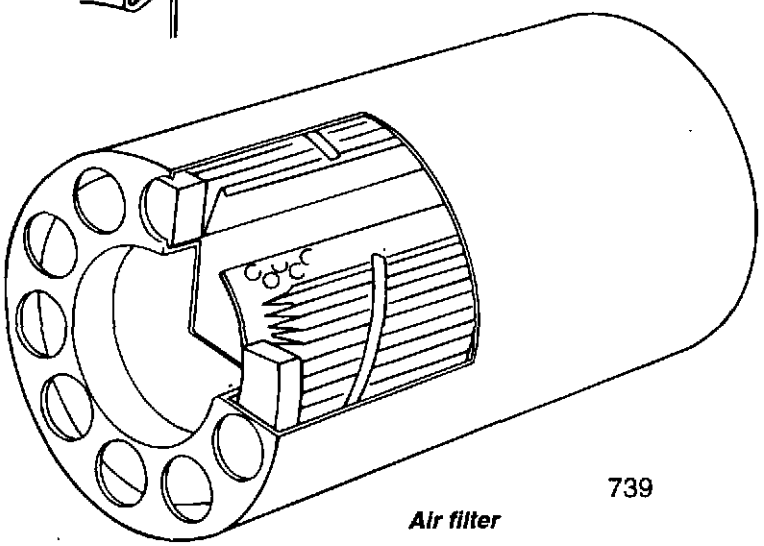
738

Air filters

Volvo Penta air filters are medium grained, high quality, single stage cartridge paper filters with the greatest possible paper area. The seal between the paper and the metal end-cover does not allow any particles, harmful to the engine, to pass through.



Seal



739

Air filter

Cooling system

Rigorous demands are made of the cooling system. A diesel engine releases the fuel's energy by converting it into heat. Of the total heat generated, under maximum favourable conditions, 43–44% can be utilized for mechanical purposes. Between 30–40% disappears with the exhaust gases while 20–30% must be radiated to the surrounding air.

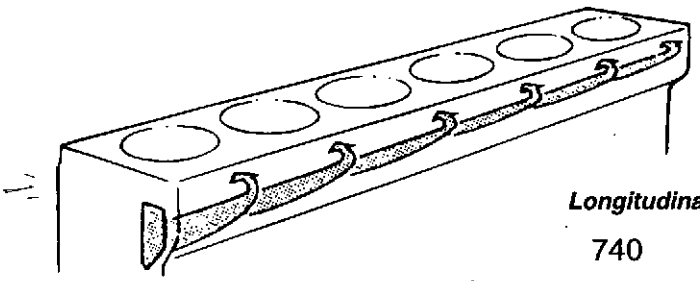
Volvo Penta uses water to dissipate the excess heat. Water is the most effective cooling agent, and can absorb four times more heat than air.

The coolant water is led from the cylinder block and heads to a common longitudinal water channel in the engine block. A cast pipe leads to the engine's thermostat housing.

The holes to the cooling channels for each cylinder have been individually dimensioned to provide exactly the same flow of water.

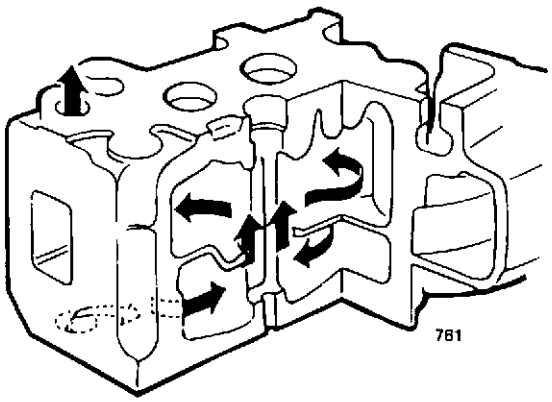
The 16-litre engine has zone divided and calibrated cooling of cylinder liner and head. This provides effective cooling and an identical working environment in each cylinder, which in turn leads to greater efficiency and lower exhaust emissions.

From the cylinder block, the water is led down to the water pump and then into the engine and its integral components such as, the oil cooler, intercooler, etc. When the engine has reached its operating temperature, the sleeve thermostats open a channel to the engine's radiator.



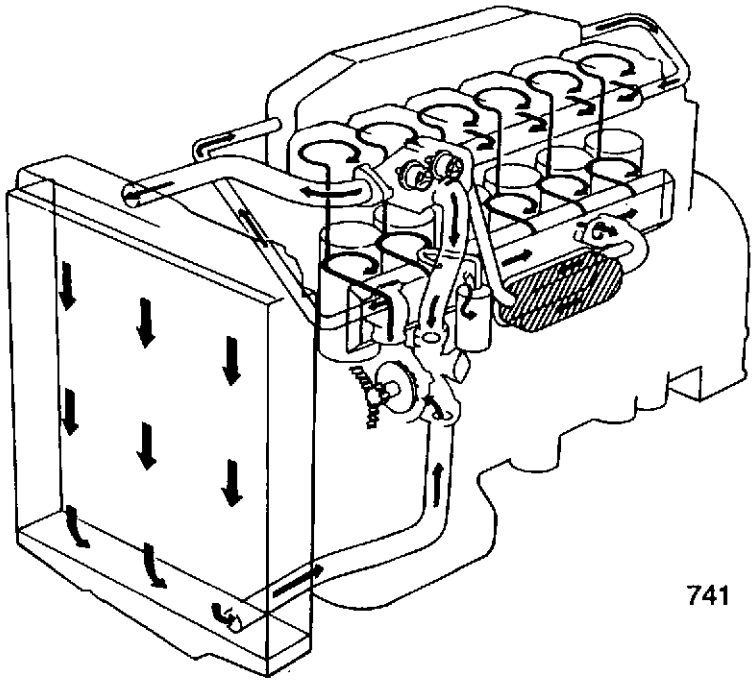
Longitudinal channel

740



781

Individually dimensioned holes to each cylinder



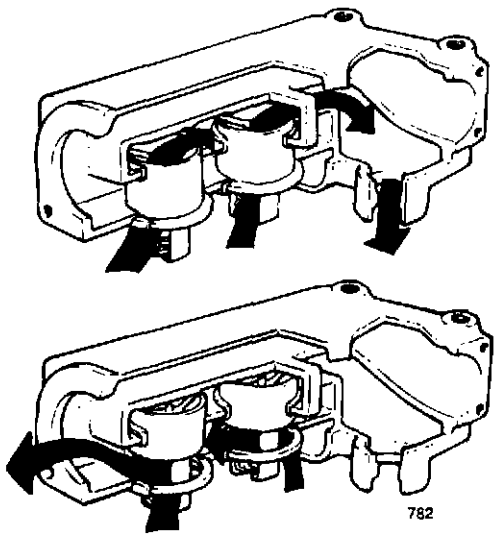
741

The sleeve thermostat

Sleeve thermostats are used on all engines, this type of thermostat allows large volumes of water to pass *with the smallest possible pressure drop* across the thermostat. This, together with the design of the cooling system, contributes to optimum water circulation to *all* parts of the engine.

The thermostat is a vital component which helps to utilize the power output potential of the engine as well as increasing its service life.

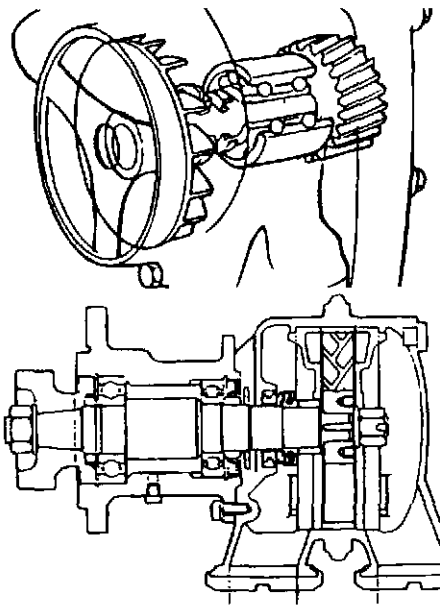
The 16 litre engine is equipped with two large sleeve thermostats.



Circulation pump

The circulation pump is gear driven. To reduce the vibration and inertia factors, Volvo Penta have introduced a highly *efficient, plastic, maintenance free* impeller. The pump shaft is sealed by means of a slide ring seal working against a ceramic surface.

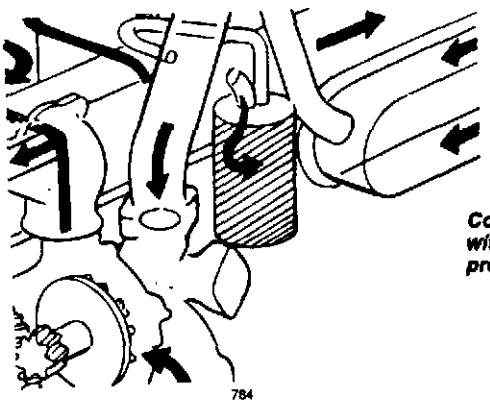
The 16-litre engine uses a new design of integral sealing of the pump shaft. This gives a much longer service life and *allows cast iron impellers to be used.* The pump's low pressure and high efficiency level minimizes "parasitic" losses.



Coolant filter

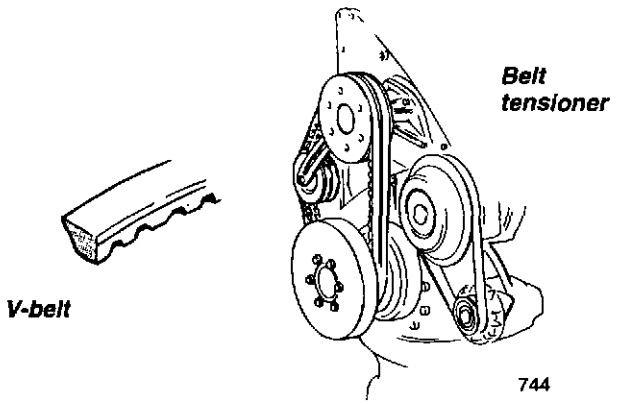
A paper filter in the longitudinal water channel of the 16-litre engine mechanically filters any impurities, i.e. sand from moulds, etc. Filtration reduces the wear on seals and helps to maintain full capacity by preventing any blockages.

The filter contains an inhibitor that extends the life of the coolant's anti-corrosion and anti-erosion properties, thereby extending coolant *change intervals from one to two years.*



V-belts

Volvo Penta engines have automatic belt tensioners which give pliable and constant belt tension. The inner surfaces of the V-belts are serrated. This reduces heat generation by 20°C compared to the conventional raw-edge cut belt and gives four to eight times longer service life.



Oil cooler

Lubricating oil evens out the temperature differences in the engine and through the oil cooler, it transfers the active heat from the engine to the oil cooler.

The 6, 7 and 16 litre engines use plate oil coolers. The plate oil cooler is effective and easily installed, thanks to the oil channels being routed directly into the block, thus eliminating external piping. Push fit water pipes make rubber hoses unnecessary.

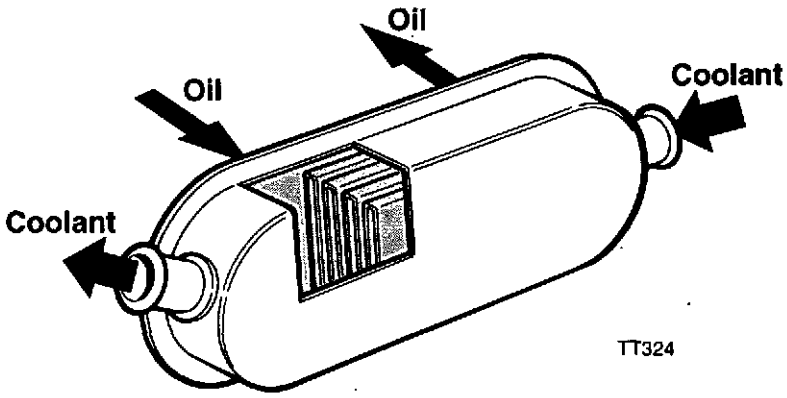


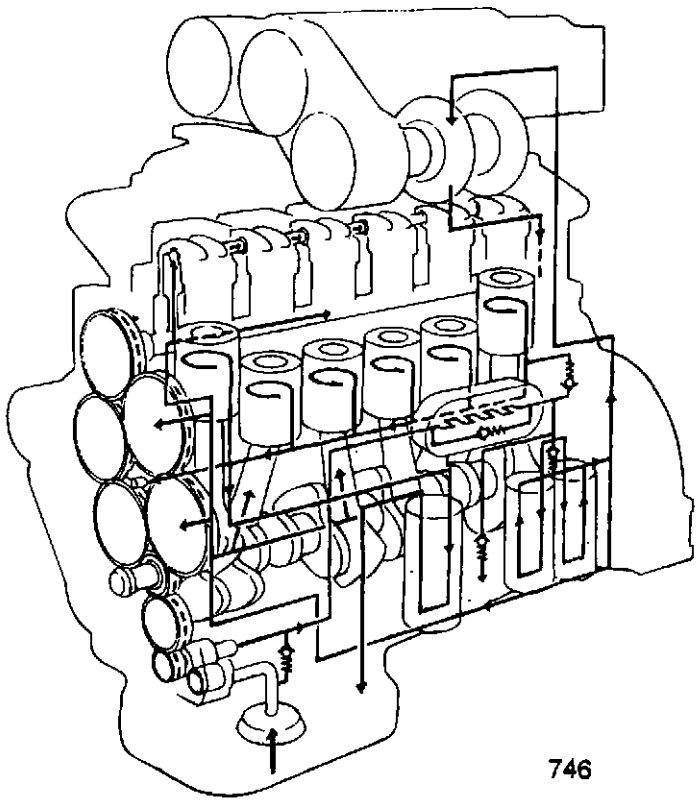
Plate oil cooler for 6, 7 and 16 litre engines

Lubricating system

The engine's lubricating system has many functions. The most important of which is to prevent wear between the moving parts of the engine. The lubricating oil also transfers heat from different parts of the engine and transports any impurities to the oil filter.

Lubricating oil pump

Volvo Penta uses a high capacity, gear driven oil pump. The oil pump on the 16 litre engine is equipped with a relief valve which opens should the oil pressure become too high, e.g., when starting from cold. In such cases, the oil is led through a channel, back to the suction side of the pump.



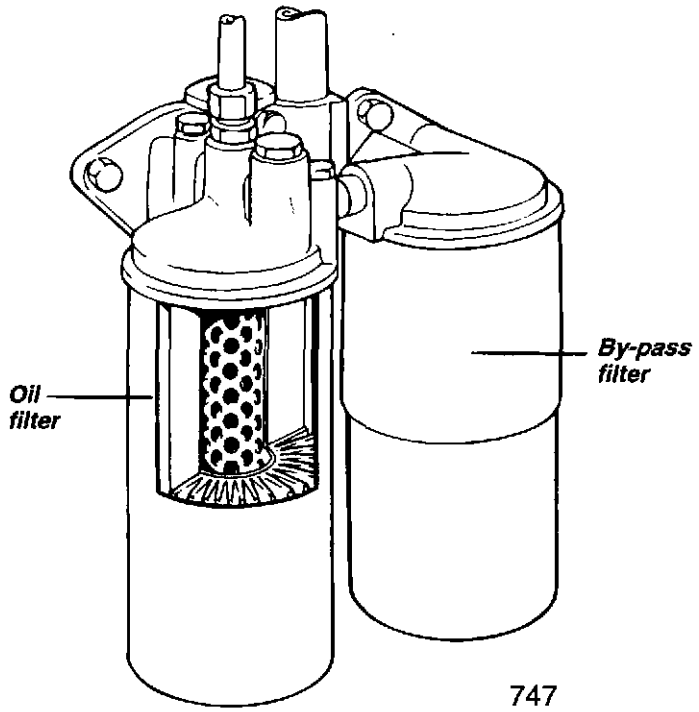
Oil filter with relief valve
All Volvo Penta engines are equipped with full-flow oil filters, i.e., all the lubricating oil passes through the filter. To protect the engine from oil starvation due to a possible blockage in the filter, a relief valve is fitted on the console on top of the filter.

The valve opens when the oil pressure exceeds a certain level due to a blockage. When the valve is open, all the oil passes into the engine unfiltered. The location of the valve on the top of the filter prevents any "dumping" of collected impurities into the engine.

Volvo filters are thoroughly tested and withstand a pressure of 1600 kPa (232 lb/in^2).

By-pass filter
A secondary (by-pass) filter provides additional partial filtration of the oil. The by-pass filter is fitted, as standard, to all Volvo Penta 7 and 16 litre engines.

Approximately 5% of the lubricating oil passes through the by-pass filter, which is fitted in series with the standard filter. The oil passes very slowly through the by-pass filter and its filter material. The low speed at which the oil passes through the filter allows the surface forces of the filter material to extract minute particles suspended in the oil. This considerably contributes to extending the service life of the engine.

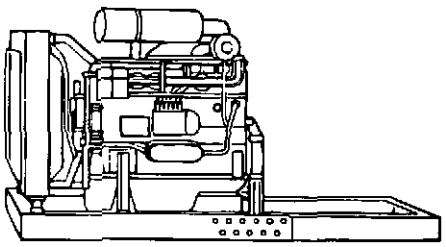


TD 610 G

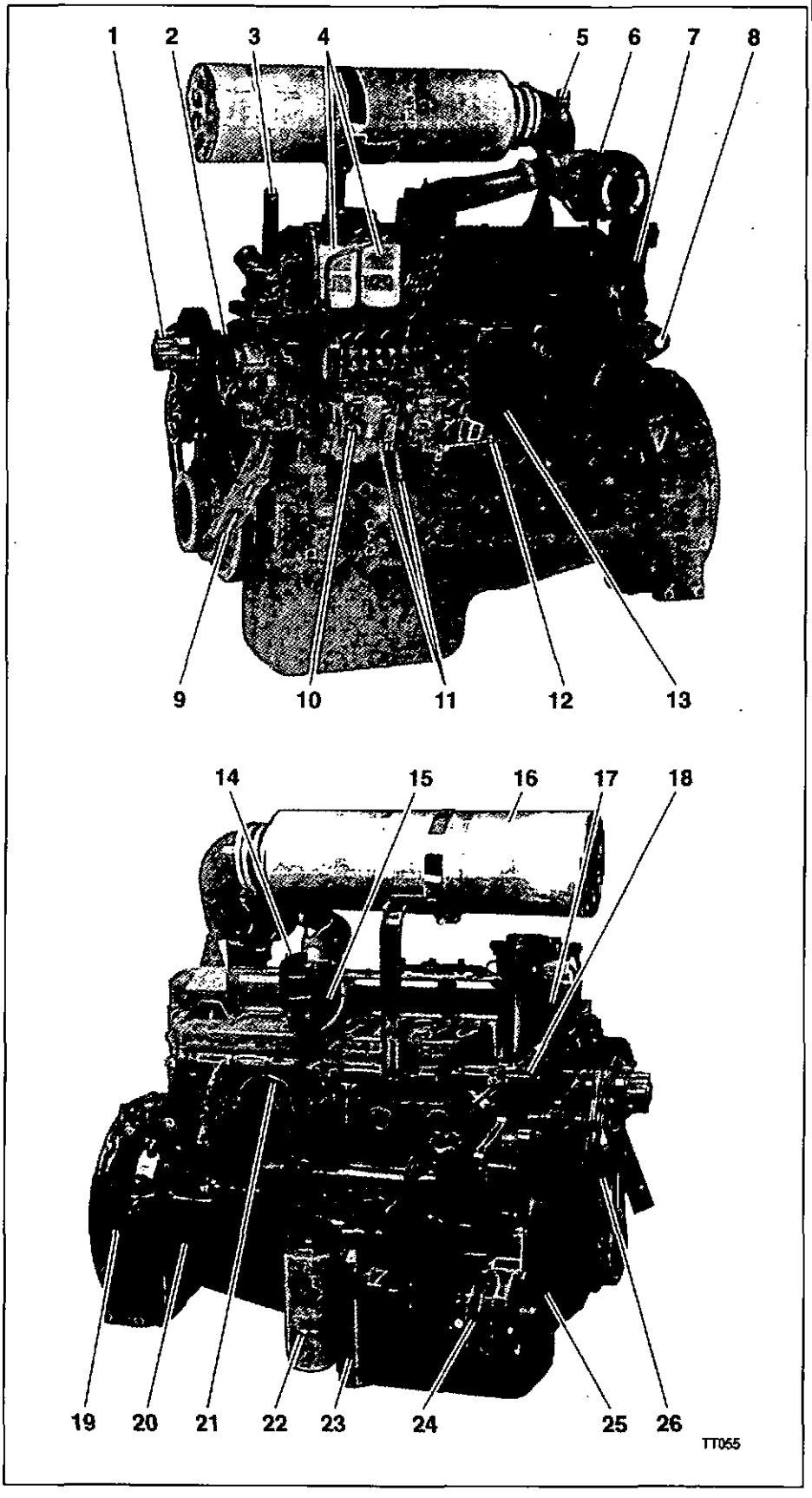
Gen Set engine — Gen Pac

TD 610 G
- Turbocharged
- Diesel fuel
- Displacement indication (l)
- Generation
- Version
- Generator drive

Gen Pac – Gen Set engine mounted on an extendable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



1. Fan hub
2. Gear driven coolant pump
3. Lift eyelet
4. Twin fuel filters of throw-away type
5. Air restriction indicator
6. Turbo-charger
7. Air cooled exhaust manifold
8. Lift eyelet
9. Coolant pipe, inlet
10. Injection pump
11. Fuel pipes for tank connection
12. Manual speed control
13. Stop solenoid
14. Relay for inlet manifold heater
15. Inlet manifold heater
16. Air filter of throw-away type
17. Coolant pipe, outlet
18. Cable iron
19. Flywheel housing SAE 2
20. Starter motor
21. Crankcase ventilation
22. Full-flow filter of spin-on type
23. Oil cooler
24. Alternator
25. Vibration damper
26. Automatic belt tensioner

Standard equipment TD 610 G

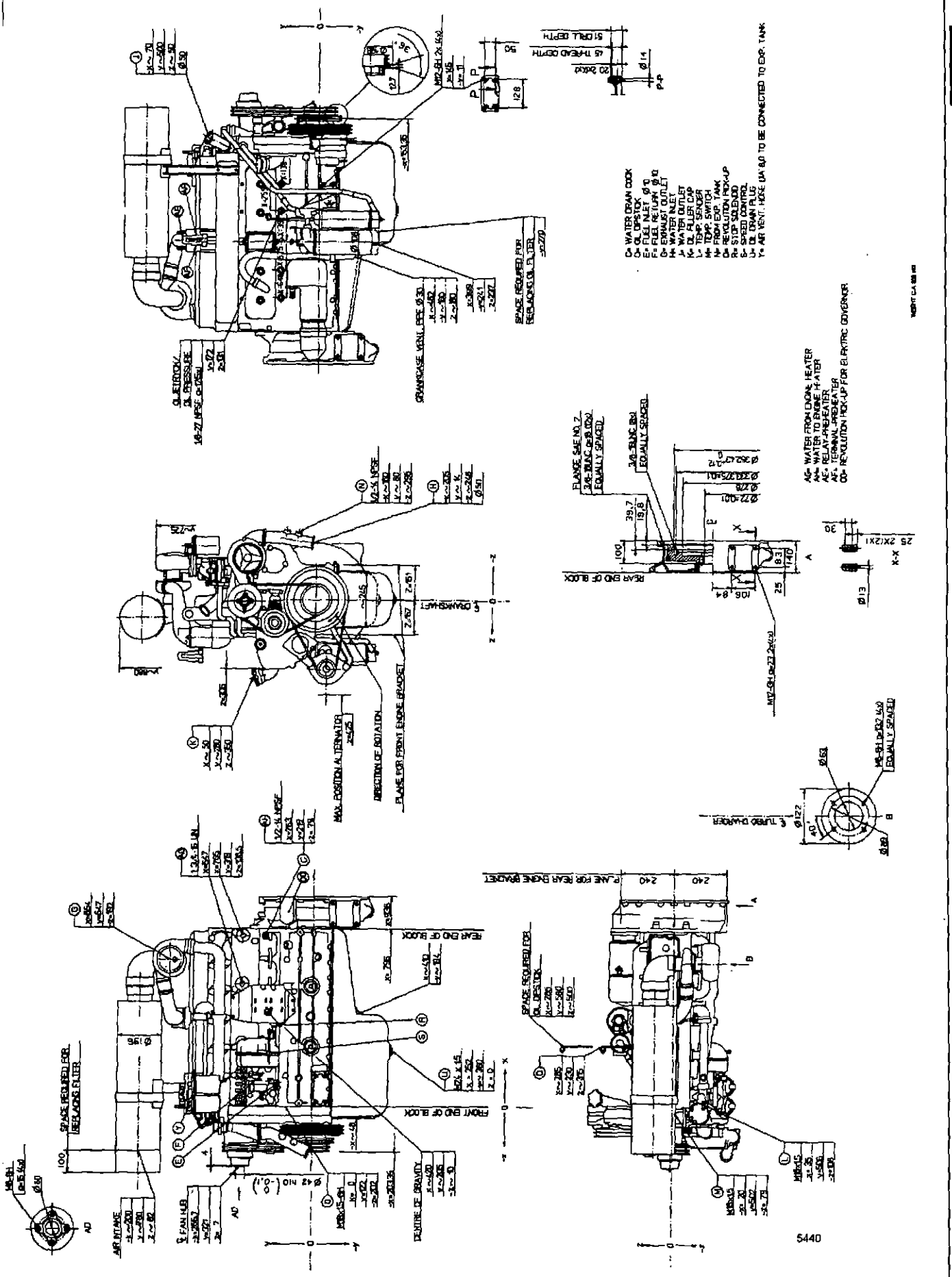
		Engine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 2	•	•
	Flywheel for 11.5" flex. plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with RSV centrifugal governor	•	•
25	***Intake and exhaust system***		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-charger	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator	–	•
	Radiator guard	–	•
	Gear-driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
27	**Control system**		
	Manual speed control	•	•
	Electrical stop energized to run	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, right side	•	•
33	**Starting system**		
	Starter motor, Bosch 5.4 kW/24 V	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and senders**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

– optional equipment or not applicable
• included in standard specification

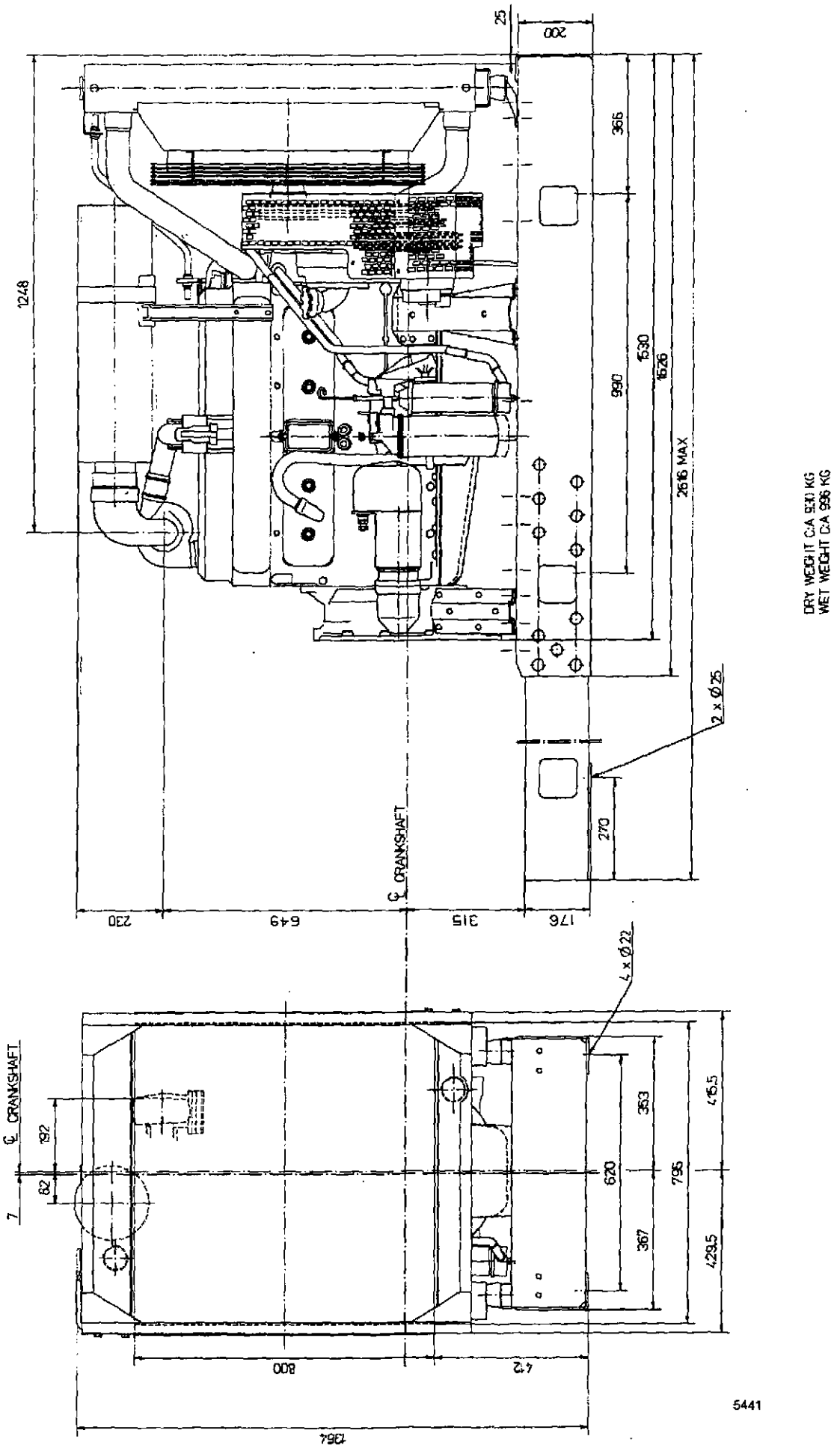
Technical description

- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head gaskets against high temperatures.
- Efficient and reliable turbo-charger.
- Full flow disposable spin-on oil filter, for extra high filtration.
- *Full flow oil cooler.*
- The lubricating oil level can be measured during operation.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Gear driven, highly efficient coolant pump.
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system including accurate mechanical governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Nitro-carburized transmission gears for heavy duty operation.
- Viscous crankshaft vibration damper to withstand single bearing alternator torsional vibrations.
- Automatic fan belt tensioner.
- Replaceable valve guides and valve seats.

TD 610 G
Drawing no. 891431-08



TD 610 G Gen Pac
Drawing no. 887098-05



Technical data TD 610 G

General

In line four stroke diesel engine with direct injection

Turbocharged		Bore		98.43 mm / 3.88 in	
Number of cylinders	6	Stroke		120 mm / 4.72 in	
Displacement, total	5.48 litres / 335 in^3	Compression ratio		15:1	
Firing order	1-5-3-6-2-4	Dry weight	GenPac 930 kg	Engine only	655 kg
Rotation direction, anti-clockwise viewed towards flywheel		Wet weight	GenPac 996 kg	Engine only	690 kg

TD 610 G	Speed, rpm	1500	1800
Performance	Test no.	99000022	99000024
Prime Power			
without fan	kW / hp	102 / 139	105 / 143
with fan	kW / hp	100 / 136	101 / 138
Continuous Standby Power			
without fan	kW / hp	102 / 139	105 / 143
with fan	kW / hp	100 / 136	101 / 138
Standby Power			
without fan	kW / hp	112 / 152	115 / 156
with fan	kW / hp	110 / 149	111 / 151
Torque at			
Prime Power	Nm / lbft	649 / 479	557 / 410
Standby Power	Nm / lbft	713 / 526	610 / 450
Mean piston speed	m/s / ft/sec	6.0 / 19.7	7.2 / 23.6
Effective mean pressure at Prime Power	MPa / psi	1.49 / 216	1.28 / 186
Max combustion pressure at Prime Power	MPa / psi	13.5 / 1958	13.1 / 1900
Total mass moment of inertia, J (mR^2)	kgm^2 / $lbft^2$	1.5 / 35.6	
Degree of irregularity at Prime Power		1:96	1:159
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	13	17

Engine noise emission

Test standards: ISO 3744-1981 (E)
sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

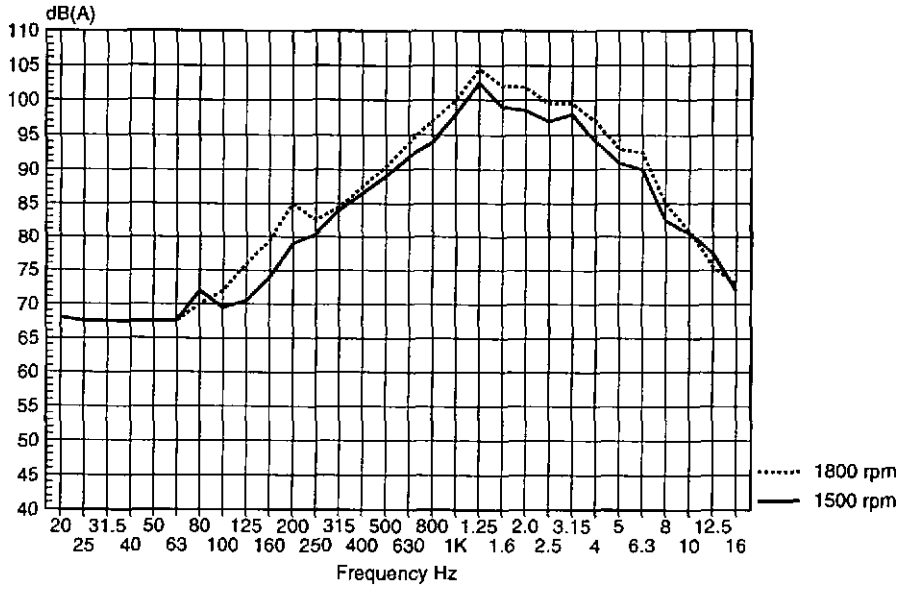
Measured sound power Lw

	Speed, rpm	1500	1800
No load	dB(A)	–	–
Prime Power	dB(A)	106.5	108.4
Standby Power	dB(A)	106.8	108.6

Calculated sound pressure Lp at 1 m

	Speed, rpm	1500	1800
No load	dB(A)	–	–
Prime Power	dB(A)	94.5	96.4
Standby Power	dB(A)	94.8	96.6

Sound power level TD 610 G
Third octave band analysis



TD 610 G	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	108	112
Standby power	dB(A)	109	113

Load acceptance
Test condition: warm engine
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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.4	1.5	0.5	0.5	20–100				
0–40	2.7	2.9	0.5	0.5	40–100				
0–60	3.8	4.2	0.5	0.5	60–100				
0–75		7.5		1.0	75–100				
0–88	10		1.9						
100–0	5.9	8.0	0.7	1.4					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20		1.0		0.5	20–100				
0–40		2.2		0.5	40–100				
0–60		3.3		0.6	60–100				
0–93		8.7		2.0	93–100		0.8		0.6
0–100	8.7	10.6	2.0	6.7	–100				
100–0		5.7		0.5					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TD 610 G	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	3	3
0°C ambient temperature *)	s	16	16
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	5	5
0°C ambient temperature *)	s	18	18

*) With manifold heater engaged, lubricating oil 15 W/40

Derating

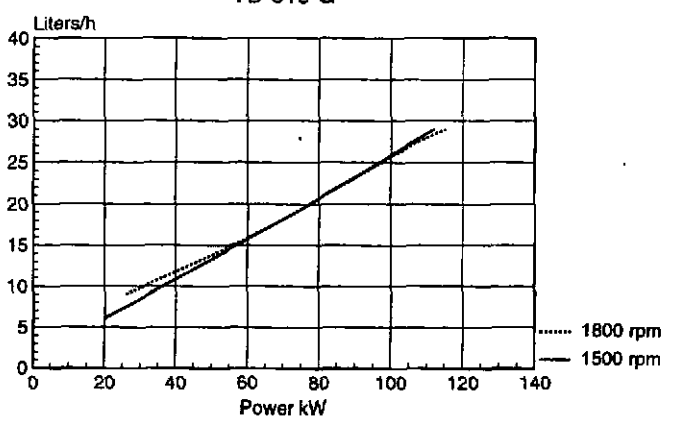
The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating.
For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude derating factor <3000 m	4%/500 m
Altitude derating factor >3000 m	6%/500 m
Ambient temperature derating factor	2%/5°C
Humidity	No derating

TD 610 G	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litre/h / US gal/h	0.21 / 0.055	0.21 / 0.055
Standby Power	litre/h / US gal/h	0.25 / 0.066	0.26 / 0.069
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	22	
Oil sump capacity			
max	litres	20	
min	litres	14	
Oil change interval			
CD oil quality	h	200	
VDS oil quality	h	400	
Engine angularity limits			
front up	degrees	22	
front down	degrees	45	
side tilt	degrees	45	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	110	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	250 / 0.405	281 / 0.456
50% of Prime Power	g/kWh / lb/hph	224 / 0.363	228 / 0.370
75% of Prime Power	g/kWh / lb/hph	217 / 0.352	218 / 0.353
100% of Prime Power	g/kWh / lb/hph	214 / 0.347	217 / 0.352
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	249 / 0.409	268 / 0.434
50% of Standby Power	g/kWh / lb/hph	221 / 0.358	226 / 0.366
75% of Standby Power	g/kWh / lb/hph	214 / 0.347	219 / 0.355
100% of Standby Power	g/kWh / lb/hph	216 / 0.350	216 / 0.350
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	130	140
Feed pump pressure	kPa	100–150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Mechanical RSV/Bosch	
Injection pump type/make		MW 100/Bosch	
Injection timing	°B.T.D.C.	23	

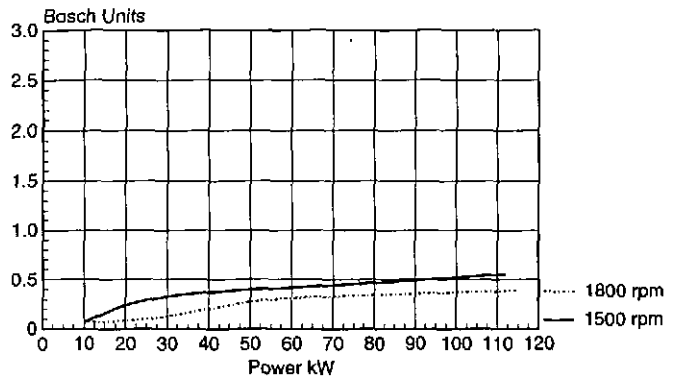
Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

Fuel consumption
TD 610 G

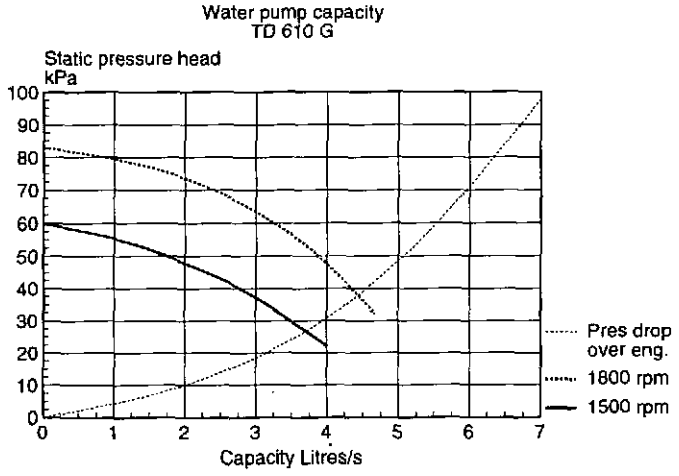


TD 610 G	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at -			
Prime Power, (at 27°C)	m^3/min / cfm	6.2 / 218	8.0 / 283
Standby Power, (at 27°C)	m^3/min / cfm	6.7 / 235	8.2 / 288
Air intake restriction, clean filter	kPa	Not available	
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	76 / 4322	85 / 4830
Standby Power	kW / BTU/min	86 / 4890	91 / 5180
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	505 / 940	480 / 895
Standby Power	°C / °F	550 / 1020	505 / 940
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	17.7 / 625	20.0 / 706
Standby Power	m^3/min / cfm	19.5 / 689	21.2 / 746
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	13 / 739	10 / 569
Standby Power	kW / BTU/min	15 / 853	13 / 739
Heat rejection to coolant at			
Prime Power	kW / BTU/min	67 / 3810	69 / 3920
Standby Power	kW / BTU/min	73 / 4150	75 / 4270
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	0.65	
Radiator core thickness (std size)	mm	73	
Fan diameter	mm	620	
Fan power consumption	kW / hp	2 / 3	4 / 5
Fan drive ratio		1.01:1	
Coolant capacity			
engine	litres	12.0	
std radiator with hoses	litres	24	
Coolant pump	drive/ratio	gear/1.30:1	
Coolant flow with standard system	l/s	3.2	3.9
Minimum coolant flow	l/s	2.3	2.8
Maximum external coolant system restriction	kPa	45	62
Thermostat			
start to open	°C	75	
fully open	°C	88	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TD 610 G



Water pump capacity
TD 610 G



Cooling performance

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

Engine speed rpm	Air on temp °C	110% OF PRIME POWER Air flow m^3/s	Max additional external restriction Pa	STANDBY POWER Air flow m^3/s	Max additional external restriction Pa
1500	30	1.05	285	1.05	285
	40	1.25	245	1.25	245
	50	1.70	190	1.70	190
	55	1.95	165	1.95	165
	66	3.40	0	3.40	0
1800	30	1.05	440	1.05	440
	40	1.25	385	1.25	385
	50	1.60	325	1.60	325
	55	1.90	285	1.90	285
	70	4.00	0	4.00	0

TD 610 G	**Speed, rpm**	**1500**	**1800**
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		3.37:1	
Starter motor	make/type/kW	Bosch/KB/5.4	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel		140	
Number of teeth on starter motor		9	
Inrush current at +20°C	Amp	800	
Cranking current at +20°C	Amp	330	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2x143	
minimum at >+5°C	Ah	2x70	
Stop solenoid			
pull current	Amp	35	
hold current	Amp	0.4	
Inlet manifold heater (at 20 V)	kW	3.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	max 290	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	max 12	max 16
down	kW	max 15	max 14
right	kW	max 8	max 13
Timing gear at compressor PTO	Nm	max 110	
speed ratio direction of rotation viewed from flywheel side		0.91:1/clockwise	
Timing gear at servo pump PTO	Nm	max 38	
speed ratio direction of rotation viewed from flywheel side		1.58:1/clockwise	

TD 610 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	**Engine**	1	–	TD 610 G	868301		
	Gen Pac	–	2	TD 610 G Gen Pac	868302		
	Ratings	3	3	Prime Power 1500 rpm	133092056		102 kW (100 kW with fan)
		4	4	Standby Power 1500 rpm	133092042		112 kW (110 kW with fan)
		5	5	Prime Power 1800 rpm	133092041		105 kW (101 kW with fan)
		6	6	Standby Power 1800 rpm	133092043		115 kW (111 kW with fan)
212	**Flywheel housing**	1	–	Flywheel housing	133091630	x	With dual starter motor connections
218	**Engine suspension**	1	•	Fixed front	848592	x	290 mm to crankshaft centre
		2	•	Fixed rear	848593	x	290 mm to crankshaft centre
		13	–	Flexible front	863337	x	297 mm to crankshaft centre
		14	–	Flexible rear	863339	x	297 mm to crankshaft centre
22	**Lubrication system**	1	1	Oil drain pump	133092251	x*	Manual
23	**Fuel system**	1	•	Flexible fuel hoses	133092923	x*	Two pcs, L=400mm
		3	3	Electronic governor 1500/1800 rpm	3826100	x	Customer fitted kit. Incl control unit and speed sender.
		8	8	Overspeed trip switch	3826109	x	Including speed sender.
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	133099080	x*	Mounted on base frame
25	**Intake and exhaust system**	1	1	Air filter elbow connection	843465	x	
		2	2	Flexible exhaust pipe 3.5"	848862	x	
		3	3	Exhaust elbow	3826825	x	
		5	5	Silencer, 3.5" Heavy Duty	863046	x	With connecting flanges
		6	6	Silencer, industrial type	844727	x	With connecting flanges
		10	10	Heat guard	133099012	x*	Exhaust manifold and turbo
26	**Cooling system**	1	•	Radiator, 0,65 m^2	3825568	x	Incl fan guard and mounting parts
		17	•	Radiator guard	863012	x	
		19	•	Thrust type fan	865978	x	Ø 620 mm, incl. 58 mm hub extension
		20	–	Suction type fan	865977	x	Ø 620 mm, incl. 58 mm hub extension
		–	22	Suction type fan	133092641	x	Ø 620 mm
		37	•	Belt guard	133092933	x*	For fan and alternator belts
		39	39	Coolant filter	828046	x	
27	**Control system**	1	1	Electric lever control	133092703	x*	
		4	4	Electrical stop, 24 V	866293	x	Energized to run. For el governor
31	**Battery**	1	1	Battery box	864171	x	
		2	2	Connection cables	864173		Incl main switch
33	**Starting system**	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run
37	**Electrical wiring**	2	2	Connection for senders	863033	x	For 38.8
		3	3	Engine wiring	133093631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3,
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5
38	**Instrument, switches and senders**	1	1	Instrument panel	873626	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	133093622	x*	
		5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		7	7	Oil temp gauge and sender	863452	x	Not in comb with oil drain pump
		8	8	Speed sender	133093623	x*	See also 37.2

** Reference to corresponding customer fitted kit*

TD 610 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
38	**Instrument, switches and senders**	9	9	Tachometer/ hour meter	873722	x	For Ø 72 mm mounting hole
		10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9
		11	11	Hour meter	858877	x	
		12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	
		14	•	Coolant temp and oil pressure switches	133093621	x*	103°C temp setting
		15	–	Coolant temp and oil pressure switches	133093625	x*	97°C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	1	1	Flexible coupling ME 194	845816	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865078	x	Separately mounted. 220–240 V.
		3	3	Tool kit	849167	x	
		4	4	Engine heater 2000 W	3825491	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825388	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994104	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994101	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	133090401	x	[1]
		4	4	Instruction book, English		x	[1] One included in engine order no.
		5	5	Instruction book, German	133090403	x	[1]
		6	6	Instruction book, French	133090404	x	[1]
		7	7	Instruction book, Spanish	133090405	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745690		
		10	10	Maintenance kit, 2500 h	876754	x	
		11	11	Maintenance kit, 5000 h	875755	x	
	Engine Packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	133091905	x	
		–	14	Plastic wrapping		x	Included in engine order no.
		–	15	Wooden box	133091907	x	

* *Reference to corresponding customer fitted kit.*
[1]) *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted equipment order no.		Corresponding factory fitted equipment
22.1	133092251	Oil drain pump	866535
23.1	133092923	Flexible fuel hoses	843466
23.9	133099080	Fuel filter/water separator	3826744
25.10	133099012	Heat guard	3826942
26.37	133092933	Belt guard	3825569
27.1	133092703	Electric lever control	866024
37.3	133093631	Engine wiring	863137
38.4	133093622	Senders	866811
38.8	133093623	Speed sender	863136
38.14	133093621	Switches 103°C	866800
38.15	133093625	Switches 97°C	866801

Notes

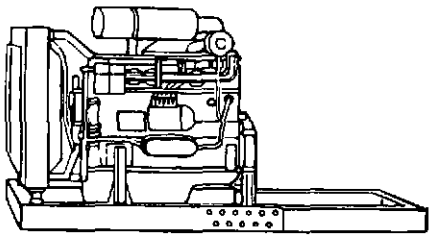
TWD 610 G

Gen Set engine — Gen Pac

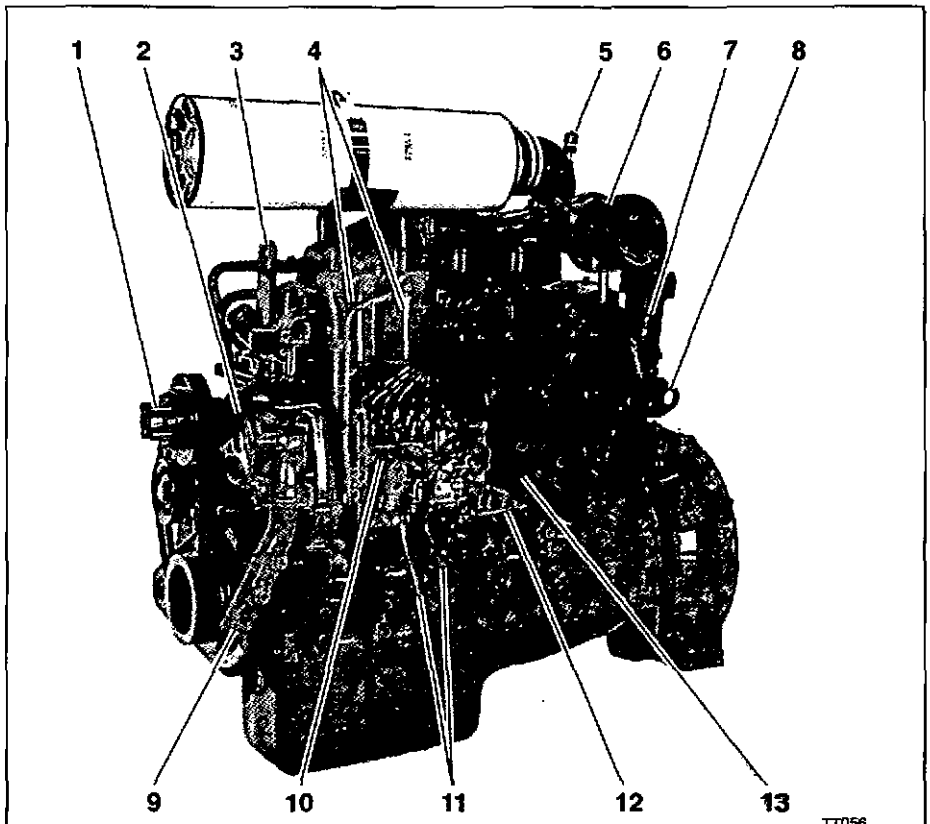
TWD 610 G

- Turbocharged
- Water to air intercooled
- Diesel fuel
- Displacement indication (l)
- Generation
- Version
- Generator drive

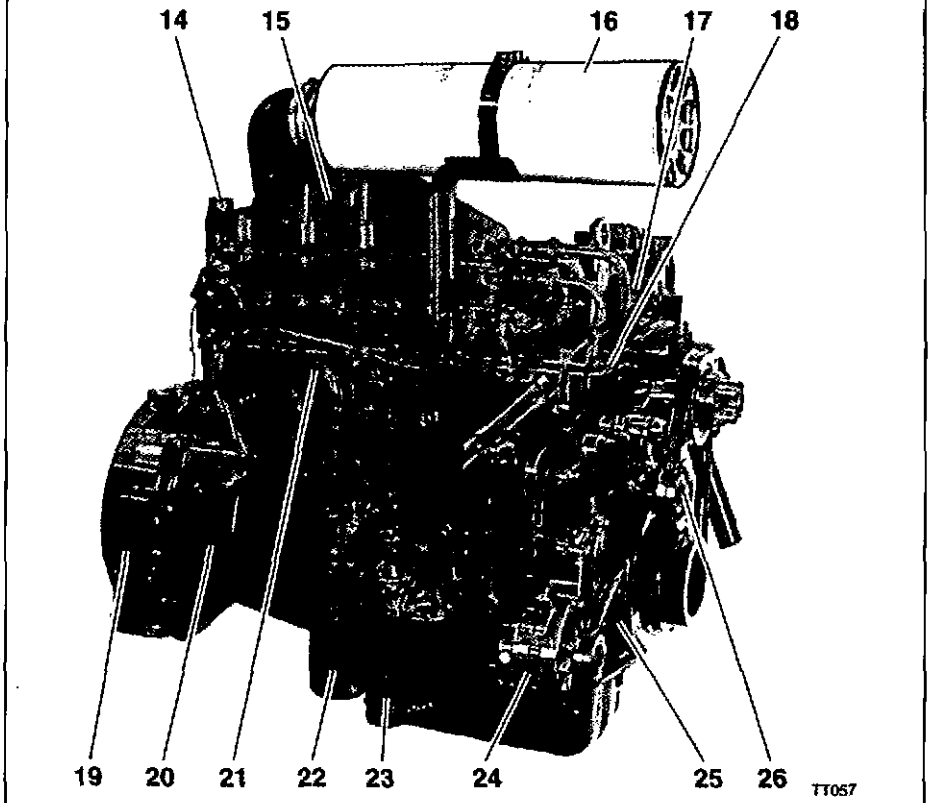
Gen Pac – Gen Set engine mounted on an extendable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



TT056



TT057

1. Fan hub
2. Gear driven coolant pump
3. Lift eyelet
4. Twin fuel filters of throw-away type
5. Air restriction indicator
6. Turbo-charger
7. Air cooled exhaust manifold
8. Lift eyelet
9. Coolant pipe, inlet
10. Injection pump
11. Fuel pipes for tank connection
12. Manual speed control
13. Stop solenoid
14. Relay for inlet manifold heater
15. Intercooler
16. Air filter of throw-away type
17. Coolant pipe, outlet
18. Cable iron
19. Flywheel housing SAE 2
20. Starter motor
21. Crankcase ventilation
22. Full-flow filter of spin-on type
23. Oil cooler
24. Alternator
25. Vibration damper
26. Automatic belt tensioner

Standard equipment

TWD 610 G

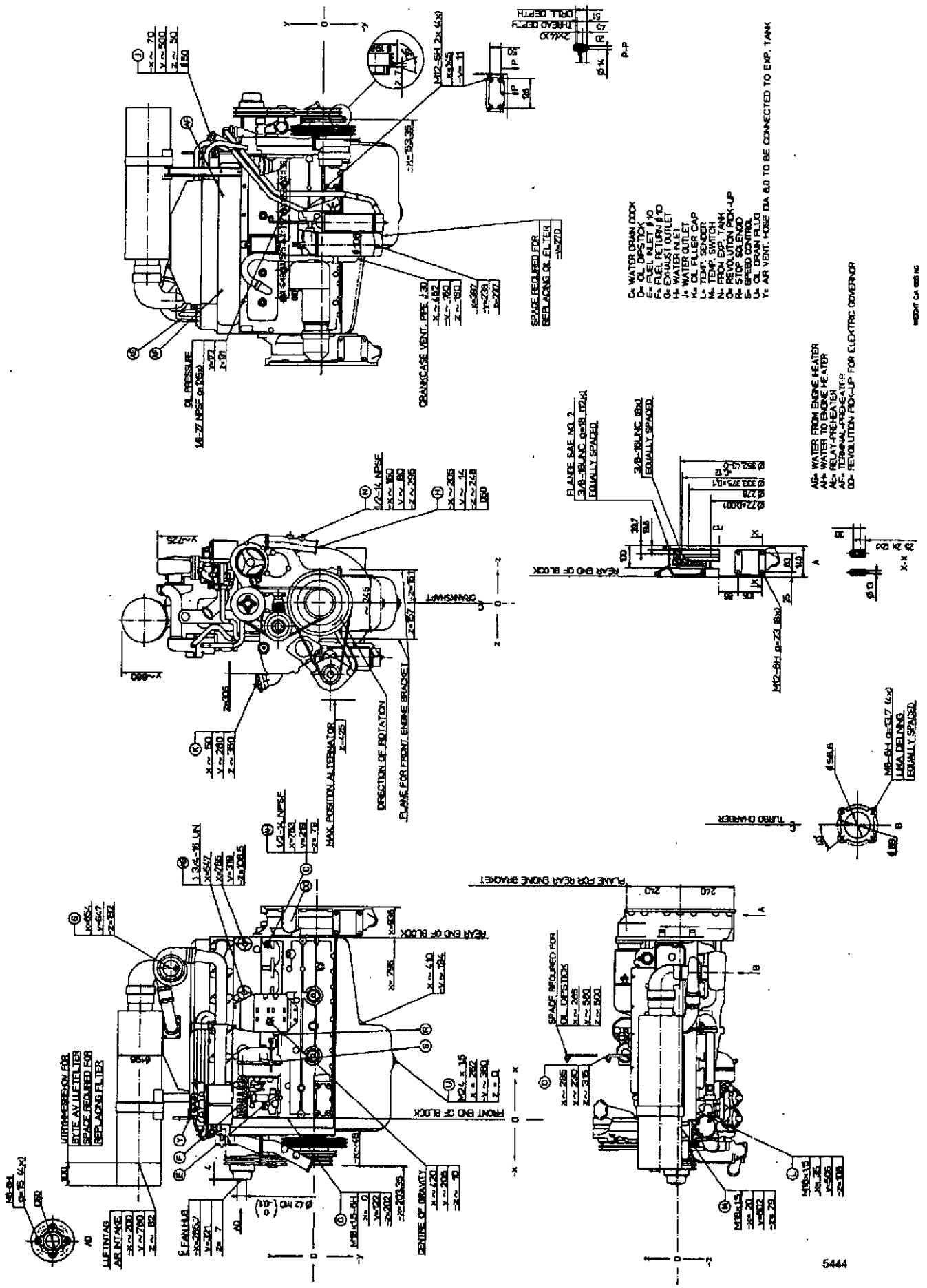
		Engine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 2	•	•
	Flywheel for 11.5" flex. plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with RSV centrifugal governor	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-charger	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator	–	•
	Radiator guard	–	•
	Gear-driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
	Intercooler	•	•
27	**Control system**		
	Manual speed control	•	•
	Electrical stop energized to run	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, right side	•	•
33	**Starting system**		
	Starter motor, Bosch 5.4 kW/24 V	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and senders**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

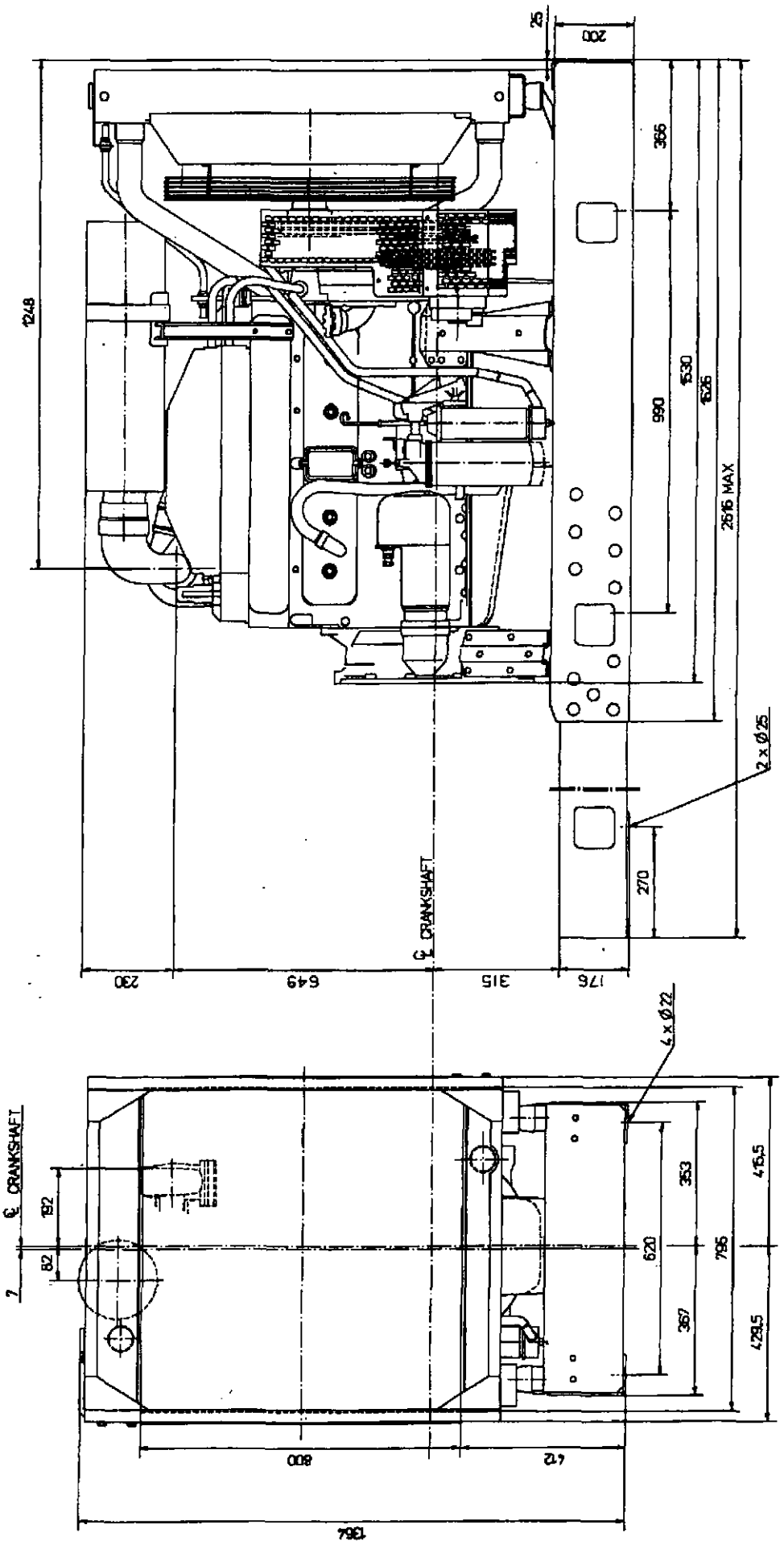
– optional equipment or not applicable
• included in standard specification

Technical description

- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head gaskets against high temperatures.
- Efficient and reliable turbo-charger.
- Water to air intercooler.
- Full flow disposable spin-on oil filter, for extra high filtration.
- Full flow oil cooler.
- The lubricating oil level can be measured during operation.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Gear driven, highly efficient coolant pump.
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system including accurate mechanical governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Nitro-carburized transmission gears for heavy duty operation.
- Viscous crankshaft vibration damper to withstand single bearing alternator torsional vibrations.
- Automatic fan belt tensioner.
- Replaceable valve guides and valve seats.

TWD 610 G
Drawing no. 891442-08





DRY WEIGHT APP. 930 KG
WET WEIGHT APP. 986 KG

5445

Technical data TWD 610 G

General

In line four stroke diesel engine with direct injection

Turbocharged and water to air intercooled		Bore	98.43 mm / 3.88 in
Number of cylinders	6	Stroke	120 mm / 4.72 in
Displacement, total	5.48 litres / 335 in^3	Compression ratio	15:1
Firing order	1-5-3-6-2-4	Dry weight GenPac 940 kg	Engine only 655 kg
Rotation direction, anti-clockwise viewed towards flywheel		Wet weight GenPac 1006 kg	Engine only 690 kg

TWD 610 G	**Speed, rpm**	**1500**	**1800**
Performance	Test no.	23000274 / A1621	23000275
Prime Power			
without fan	kW / hp	116 /158	130 / 177
with fan	kW / hp	114 / 155	126 / 172
Continuous Standby Power			
without fan	kW / hp	135 / 184	130 / 177
with fan	kW / hp	133 / 181	126 / 171
Standby Power			
without fan	kW / hp	148 / 202	143 / 194
with fan	kW / hp	146 / 198	139 / 189
Torque at			
Prime Power	Nm / lbft	738 / 544	690 / 508
Standby Power	Nm / lbft	942 / 695	758 / 559
Mean piston speed	m/s / ft/sec	6.0 / 19.7	7.2 / 23.6
Effective mean pressure at Prime Power	MPa / psi	1.69 / 246	1.58 / 229
Max combustion pressure at Prime Power	MPa / psi	11.8 / 1712	11.5 / 1668
Total mass moment of inertia, J (mR^2)	kgm^2 / $lbft^2$	1.5 / 35.6	
Degree of irregularity at Prime Power		1:71	1:135
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	13	17

Engine noise emission

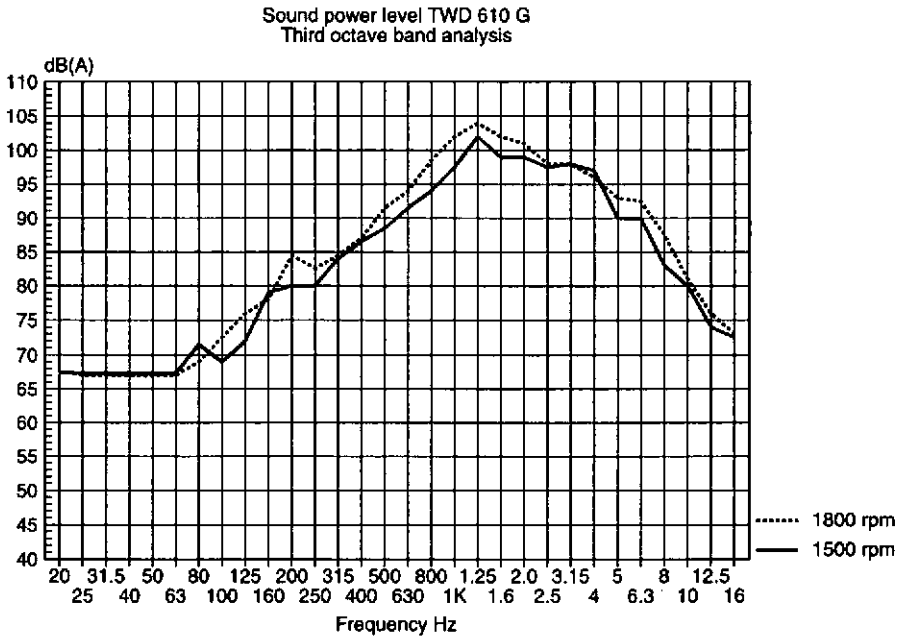
Test standards: ISO 3744-1981 (E)
sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

Measured sound power Lw

	Speed, rpm	**1500**	**1800**
No load	dB(A)	–	–
Prime Power	dB(A)	107.2	109.4
Standby Power	dB(A)	107.6	109.6

Calculated sound pressure Lp at 1 m

	Speed, rpm	**1500**	**1800**
No load	dB(A)	–	–
Prime Power	dB(A)	95.2	97.4
Standby Power	dB(A)	95.6	97.6



TWD 610 G	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	109	113
Standby power	*dB(A)*	*111*	113

Load acceptance

Test condition: warm engine

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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.3	1.7	0.6	0.7	20–100				
0–40	3.2	4.2	0.8	1.1	40–100				
0–57		10.0		2.0	58–100				
0–60	6.9	15.5	1.4	2.9	60–100				
0–69	10.0		2.0		80–100				
100–0	7.7	9.6	0.8	2.0					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.0	1.1	0.5		20–100				
0–40	2.2	2.6	0.6		40–100				
0–60	4.0	3.0	0.9		60–100				
0–70		8.2	1.6		70–100				
0–80	*10*		2.4	*5.5*	*90–100*				
100–0	6.5	7.0	0.5	0.5					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TWD 610 G	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	5	5
0°C ambient temperature*)	s	21	21
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	14	10
0°C ambient temperature *)	s	39	34

*) With manifold heater engaged, lubricating oil 15 W/40

Derating

The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating.

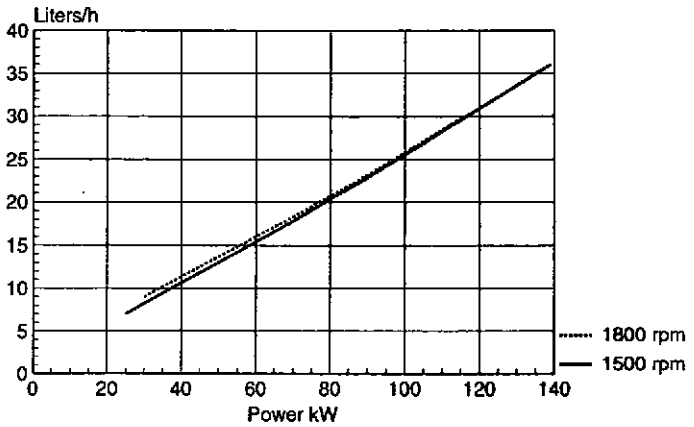
For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude derating factor <3000 m	4%/500 m
Altitude derating factor >3000 m	6%/500 m
Ambient temperature derating factor	1.5%/5°C
Humidity	No derating

TWD 610 G	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litre/h / US gal/h	0.15 / 0.094	0.16 / 0.042
Standby Power	litre/h / US gal/h	0.17 / 0.045	0.18 / 0.048
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	22	
Oil sump capacity			
max	litres	20	
min	litres	14	
Oil change interval			
CD oil quality	h	200	
VDS oil quality	h	400	
Engine angularity limits			
front up	degrees	22	
front down	degrees	45	
side tilt	degrees	45	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	110	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	253 / 0.410	260 / 0.421
50% of Prime Power	g/kWh / lb/hph	224 / 0.363	224 / 0.363
75% of Prime Power	g/kWh / lb/hph	212 / 0.344	216 / 0.350
100% of Prime Power	g/kWh / lb/hph	214 / 0.347	220 / 0.357
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	233 / 0.377	256 / 0.415
50% of Standby Power	g/kWh / lb/hph	216 / 0.350	221 / 0.358
75% of Standby Power	g/kWh / lb/hph	212 / 0.343	217 / 0.352
100% of Standby Power	g/kWh / lb/hph	218 / 0.353	220 / 0.357
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	130	140
Feed pump pressure	kPa	100–150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Mechanical RSV/Bosch	
Injection pump type/make		MW 100/Bosch	
Injection timing	°B.T.D.C.	16	

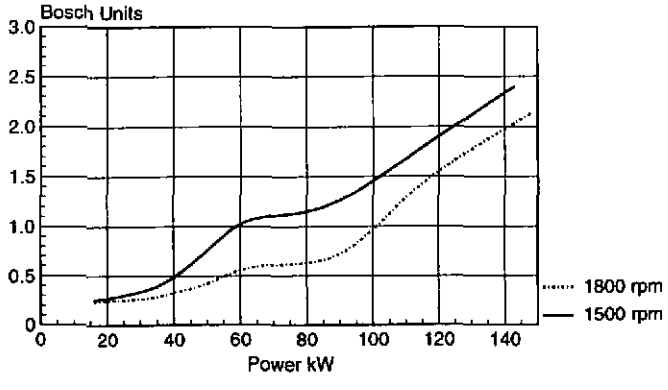
Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

Fuel consumption
TWD 610 G

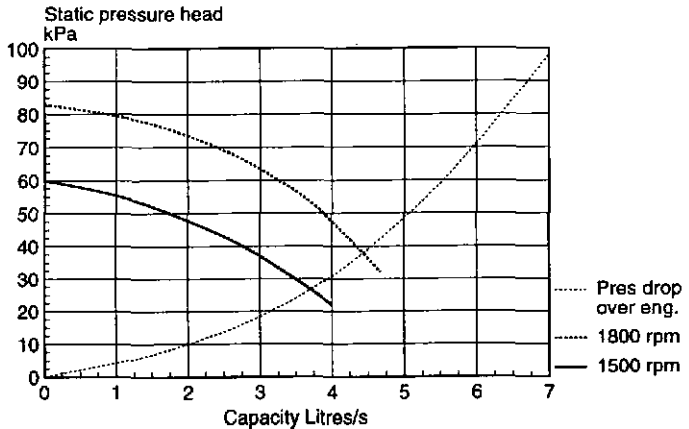


TWD 610 G	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	7.7 / 272	9.8 / 346
Standby Power, (at 27°C)	m^3/min / cfm	8.8 / 311	10.5 / 370
Air intake restriction, clean filter	kPa	Not available	
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	90 / 5118	110 / 6255
Standby Power	kW / BTU/min	120 / 6822	126 / 7170
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	540 / 1004	520 / 968
Standby Power	°C / °F	600 / 1110	540 / 1000
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	20.8 / 735	25.8 / 911
Standby Power	m^3/min / cfm	26.0 / 918	29.0 / 1023
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	10 / 568	10 / 568
Standby Power	kW / BTU/min	12 / 682	11 / 626
Heat rejection to coolant at			
Prime Power	kW / BTU/min	77 / 4378	89 / 5061
Standby Power	kW / BTU/min	95 / 5400	98 / 5570
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	0.65	
Radiator core thickness (std size)	mm	73	
Fan diameter	mm	620	
Fan power consumption	kW / hp	2 / 3	4 / 5
Fan drive ratio		1.01:1	
Coolant capacity			
engine	litres	12.9	
std radiator with hoses	litres	24	
Coolant pump	drive/ratio	gear/1.30:1	
Coolant flow with standard system	l/s	3.2	3.9
Minimum coolant flow	l/s	2.5	2.9
Maximum external coolant system restriction	kPa	42	59
Thermostat			
start to open	°C	75	
fully open	°C	88	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TWD 610 G



Water pump capacity
TWD 610 G



Cooling performance

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

Engine speed rpm	Air on temp °C	110% OF PRIME POWER Air flow m^3/s	Max additional external restriction Pa	STANDBY POWER Air flow m^3/s	Max additional external restriction Pa
1500	30	1.20	255	1.50	220
	40	1.55	210	1.95	170
	50	2.05	155	2.70	105
	55	2.50	120	3.40	0
	61	3.40	0		
1800	30	1.50	365	1.50	365
	40	1.85	300	1.85	300
	50	2.55	215	2.55	215
	55	3.10	155	3.10	155
	60	4.00	0	4.00	0

TWD 610 G	**Speed, rpm**	**1500**	**1800**
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		3.37:1	
Starter motor	make/type/kW	Bosch/KB/5.4	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel		140	
Number of teeth on starter motor		9	
Inrush current at +20°C	Amp	800	
Cranking current at +20°C	Amp	330	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2x143	
minimum at >+5°C	Ah	2x70	
Stop solenoid			
pull current	Amp	35	
hold current	Amp	0.4	
Inlet manifold heater (at 20 V)	kW	3.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	max 290	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	max 12	max 16
down	kW	max 15	max 14
right	kW	max 8	max 13
Timing gear at compressor PTO	Nm	max 110	
speed ratio direction of rotation viewed from flywheel side		0.91:1/clockwise	
Timing gear at servo pump PTO	Nm	max 38	
speed ratio direction of rotation viewed from flywheel side		1.58:1/clockwise	

TWD 610 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	Engine	1	–	TWD 610 G	868303		
	Gen Pac	–	2	TWD 610 G Gen Pac	868304		
	Ratings	3	3	Prime Power 1500 rpm	133092057		116 kW (114 kW with fan)
		4	4	Standby Power 1500 rpm	133092018		148 kW (146 kW with fan)
		5	5	Prime Power 1800 rpm	133092058		130 kW (126 kW with fan)
		6	6	Standby Power 1800 rpm	133092051		143 kW (139 kW with fan)
212	Flywheel housing	1	–	Flywheel housing	133091630	x	With dual starter motor connections
218	Engine suspension	1	•	Fixed front	848592	x	290 mm to crankshaft centre
		2	•	Fixed rear	848593	x	290 mm to crankshaft centre
		13	–	Flexible front	863337	x	297 mm to crankshaft centre
		14	–	Flexible rear	863339	x	297 mm to crankshaft centre
22	Lubrication system	1	1	Oil drain pump	133092251	x*	Manual
23	Fuel system	1	•	Flexible fuel hoses	133092923	x*	Two pcs, L=400mm
		3	3	Electronic governor 1500/1800 rpm	3826100	x	Customer fitted kit. Incl control unit and speed sender.
		8	8	Overspeed trip switch	3826109	x	Including speed sender.
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	133099080	x*	Mounted on baseframe
25	Intake and exhaust system	1	1	Air filter elbow connection	843465	x	
		2	2	Flexible exhaust pipe	848862	x	
		3	3	Exhaust elbow	3826825	x	
		5	5	Silencer, 3.5" Heavy Duty	863046	x	With connecting flanges
		6	6	Silencer, industrial type	844727	x	With connecting flanges
		10	10	Heat guard	133099012	x*	Exhaust manifold and turbo
26	Cooling system	1	•	Radiator, 0,65 m2	3825568	x	Incl fan guard and mounting parts
		17	•	Radiator guard	863012	x	
		19	•	Thrust type fan	865978	x	Ø 620 mm, incl. 58 mm hub extension
		20	•	Suction type fan	865977	x	Ø 620 mm, incl. 58 mm hub extension
		–	22	Suction type fan	133092641	x	Ø 620 mm
		37	•	Belt guard	133092933	x*	For fan and alternator belts
		39	39	Coolant filter	828046	x	
27	Control system	1	1	Electric lever control	133092703	x*	
		4	4	Electrical stop, 24 V	866293	x	Energized to run. For el governor
31	Battery	1	1	Battery box	864171	x	
		2	2	Connection cables	864173		Incl main switch
33	Starting system	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run
37	Electrical wiring	2	2	Connection for senders	863033	x	For 38.8
		3	3	Engine wiring	133093631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5
38	Instrument, switches and senders	1	1	Instrument panel	873626	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	133093622	x*	
		5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		7	7	Oil temp gauge and sender	863452	x	Not in comb with oil drain pump
		8	8	Speed sender	133093623	x*	See also 37.2

* Reference to corresponding customer fitted kit

TWD 610 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
38	**Instrument, switches and senders**	9	9	Tachometer/ hour meter	873722	x	For Ø 72 mm mounting hole
		10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9
		11	11	Hour meter	858877	x	
		12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	
		14	•	Coolant temp and oil pressure switches	133093621	x*	103°C temp setting
		15	–	Coolant temp and oil pressure switches	133093625	x*	97°C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	2	2	Flexible coupling ME 214	845817	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865078	x	Separately mounted. 220–240 V.
		3	3	Tool kit	849167	x	
		4	4	Engine heater 2000 W	3825491	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825388	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994104	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994101	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	133090421	x	[1]
		4	4	Instruction book, English		x	[1] One included in engine order no.
		5	5	Instruction book, German	133090423	x	[1]
		6	6	Instruction book, French	133090424	x	[1]
		7	7	Instruction book, Spanish	133090425	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745690		
		10	10	Maintenance kit, 2500 h	876754	x	
		11	11	Maintenance kit, 5000 h	875757	x	
	Engine Packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	133091905	x	
		–	14	Plastic wrapping		x	Included in engine order no.
		–	15	Wooden box	133091907	x	

* *Reference to corresponding customer fitted kit*
[1]) *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted equipment order no.		Corresponding factory fitted equipment
22.1	133092251	Oil drain pump	866535
23.1	133092923	Flexible fuel hoses	843466
23.9	133099080	Fuel filter/water separator	3826744
25.10	133099012	Heat guard	3826942
26.37	133092933	Belt guard	3825569
27.1	133092703	Electric lever control	866024
37.3	133093631	Engine wiring	863137
38.4	133093622	Senders	866811
38.8	133093623	Speed sender	863136
38.14	133093621	Switches 103°C	866800
38.15	133093625	Switches 97°C	866801

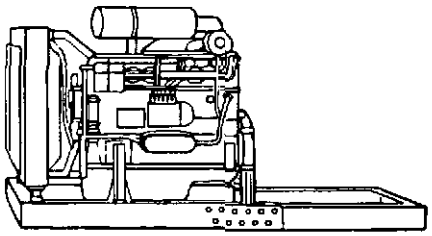
Notes

TD 710 G

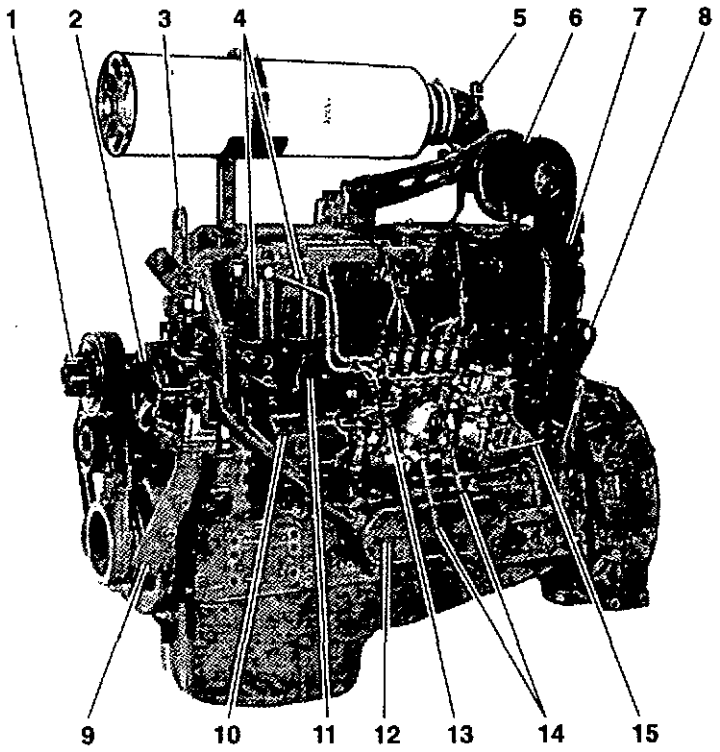
Gen Set engine — Gen Pac

TD 710 G
- Turbocharged
- Diesel fuel
- Displacement indication (l)
- Generation
- Version
- Generator drive

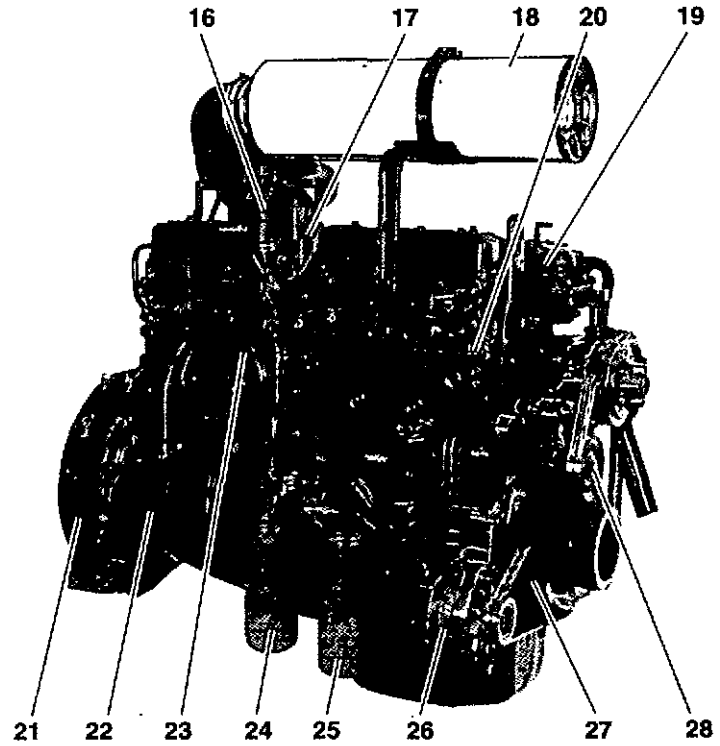
Gen Pac – Gen Set engine mounted on an expandable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



TT058



TT059

1. Fan hub
2. Gear driven coolant pump
3. Lift eyelet
4. Twin fuel filters of throw-away type
5. Air restriction indicator
6. Turbo-charger
7. Air cooled exhaust manifold
8. Lift eyelet
9. Coolant pipe, Inlet
10. Pump coupling guard
11. Stop solenoid
12. Oil cooler
13. Injection pump
14. Fuel pipes for tank connection
15. Manual speed control
16. Relay for inlet manifold heater
17. Inlet manifold heater
18. Air filter of throw-away type
19. Coolant pipe, outlet
20. Cable iron
21. Flywheel housing SAE 2
22. Starter motor
23. Crankcase ventilation
24. Full-flow filter of spin-on type
25. By-pass filter of spin-on type
26. Alternator
27. Vibration damper
28. Automatic belt tensioner

Standard equipment TD 710 G

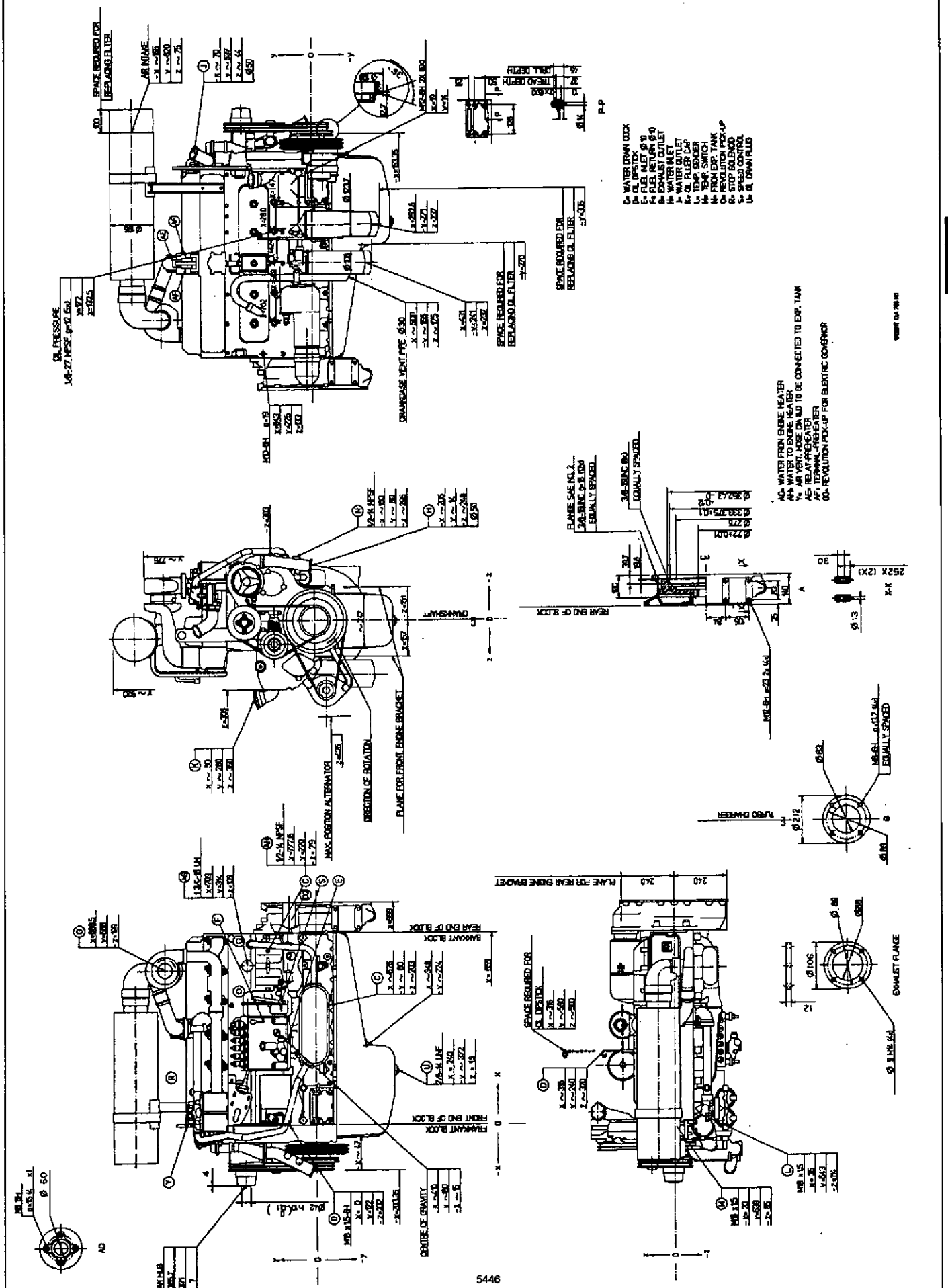
		En-gine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 2	•	•
	Flywheel for 11.5" flex. plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
	By-pass oil filter of spin-on type	•	•
	Oil-cooler, side mounted	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with RSV centrifugal governor	•	•
	Pump coupling guard	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-charger	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator	–	•
	Radiator guard	–	•
	Gear-driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
27	**Control system**		
	Manual speed control	•	•
	Electrical stop energized to run	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, right side	•	•
33	**Starting system**		
	Starter motor, Bosch 5.4 kW/24 V	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and senders**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

– optional equipment or not applicable
• included in standard specification

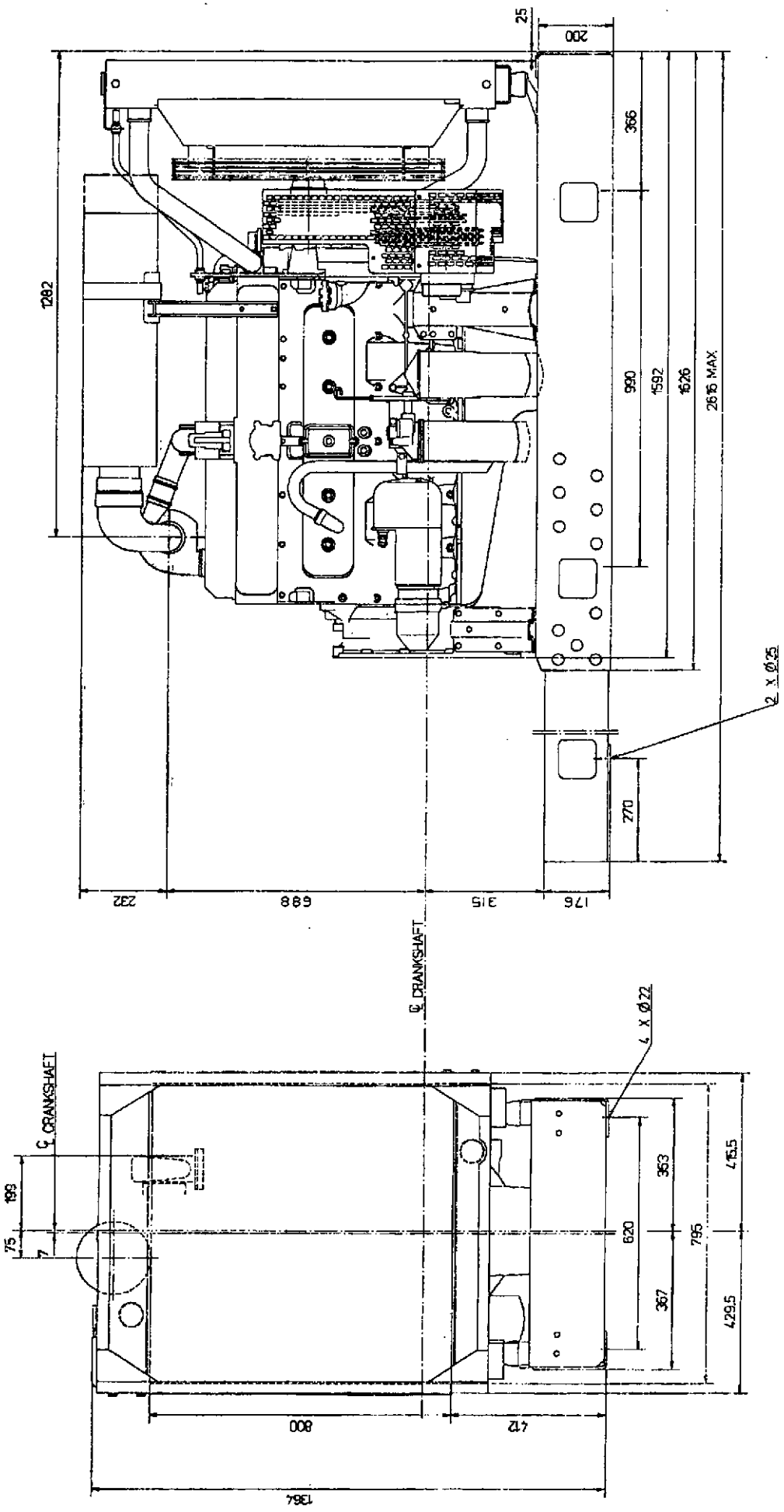
Technical description

- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head gaskets against high temperatures.
- Efficient and reliable turbocharger.
- Full flow disposable spin-on oil filter, for extra high filtration.
- The lubricating oil level can be measured during operation.
- Full flow oil cooler.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Gear driven, maintenance-free coolant pump with high degree of efficiency.
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system including mechanical governor with accurate characteristics.
- Gear type lubricating oil pump, gear driven by the transmission.
- Nitro-carburized transmission gears for heavy duty operation.
- Viscous type crankshaft vibration damper to withstand single bearing alternator torsional vibrations.
- Piston cooling for low piston temperature and reduced ring temperature.
- Keystone top compression rings for long service life.
- Automatic fan drive belt tensioner.
- Replaceable valve guides and valve seats.
- Tapered connecting rods for reduced risk of piston cracks.

Drawing no. 891434-07



TD 710 G Gen Pac
Drawing no. 887100-06



DRY WEIGHT APP: 1085 KG
WET WEIGHT APP: 1149 KG

5447

Technical data TD 710 G

General

In line four stroke diesel engine with direct injection

Turbocharged		Bore		104.77 mm / 4.12 in	
Number of cylinders	6	Stroke		130 mm / 5.12 in	
Displacement, total	6.73 litres / 411 in^3	Compression ratio		14.5:1	
Firing order	1-5-3-6-2-4	Dry weight	GenPac 1085 kg	Engine only	785 kg
Rotation direction, anti-clockwise viewed towards flywheel		Wet weight	GenPac 1149 kg	Engine only	827 kg

TD 710 G	**Speed, rpm**	**1500**	**1800**
Performance	Test no.	21000763	21000764
Prime Power			
without fan	kW / hp	144 / 196	143 / 194
with fan	kW / hp	142 / 193	139 / 189
Continuous Standby Power			
without fan	kW / hp	144 / 196	156 / 212
with fan	kW / hp	142 / 193	152 / 207
Standby Power			
without fan	kW / hp	158 / 215	171 / 233
with fan	kW / hp	156 / 212	167 / 228
Torque at			
Prime Power	Nm / lbft	916 / 676	760 / 560
Standby Power	Nm / lbft	1010 / 745	907 / 669
Mean piston speed	m/s / ft/sec	6.5 / 21.3	7.8 / 25.6
Effective mean pressure at Prime Power	MPa / psi	1.71 / 248	1.42 / 206
Max combustion pressure at Prime Power	MPa / psi	14.1 / 2044	12.7 / 1840
Total mass moment of inertia, J (mR^2)	kgm^2 / $lbft^2$	1.63 / 38.7	
Degree of irregularity at Prime Power		1:67	1:131
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	17	24

Engine noise emission

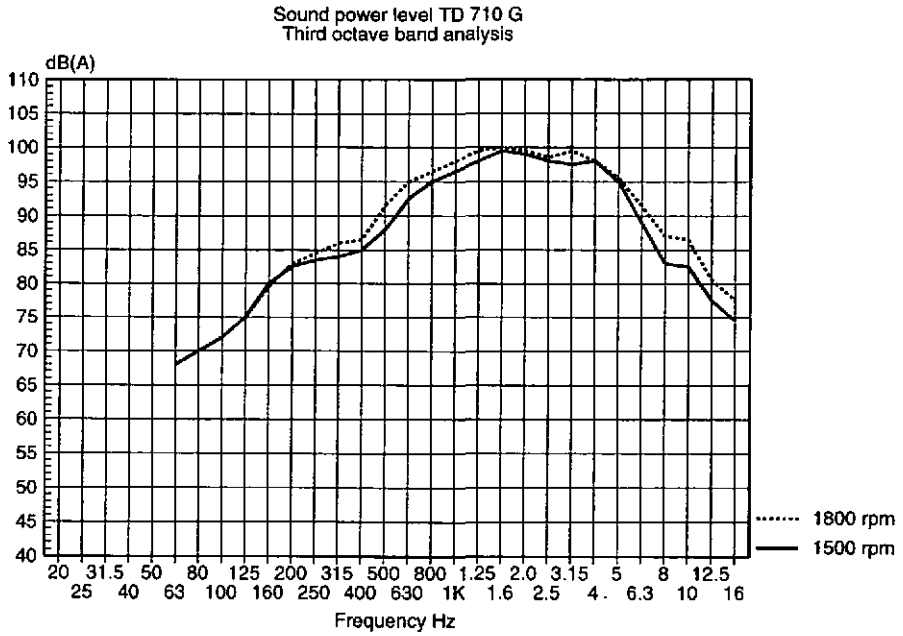
Test standards: ISO 3744-1981 (E) sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

Measured sound power Lw

	Speed, rpm	**1500**	**1800**
No load	dB(A)	–	–
Prime Power	dB(A)	107.6	108.9
Standby Power	dB(A)	107.9	109.3

Calculated sound pressure Lp at 1 m

	Speed, rpm	**1500**	**1800**
No load	dB(A)	–	–
Prime Power	dB(A)	95.6	96.9
Standby Power	dB(A)	95.9	97.3



TD 710 G	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	110	114
Standby power	dB(A)	111	115

Load acceptance

Test condition: warm engine

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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.8	2.0	0.6	1.0	20–100				
0–40	3.7	4.0	0.8	0.8	40–100				
0–60	5.6	6.0	0.8	0.9	60–100	5.4		1.7	
0–70		10.0		1.8	70–100				
0–76	10.0		1.8	8.3	76–100	1.2		0.6	
100–0	7.6	5.2	1.0	1.8					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	0.8	1.3	0.5	0.5	20–100	6.0		1.3	
0–40	2.3	2.7	0.5	0.6	40–100	4.3		1.0	
0–60	3.3	4.0	1.2	1.0	60–100	2.7	5.0	0.8	2.2
0–80	4.3	5.7	1.0	1.0	80–100	1.2	1.7	0.5	1.0
0–90		10.0		1.8	90–100		0.7		0.5
0–100	7.7		1.6						
100–0	5.7	6.7	0.6	0.9					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TD 710 G	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	4	4
0°C ambient temperature *)	s	21	21
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	6	5
0°C ambient temperature *)	s	24	22

*) With manifold heater engaged, lubricating oil 15 W/40

Derating

The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating.

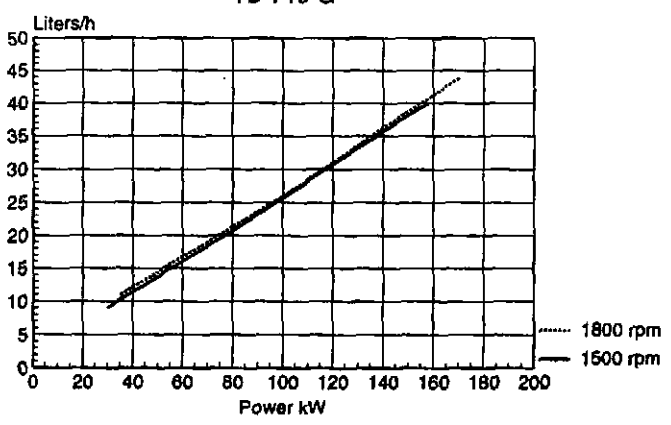
For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude derating factor <3000 m	4%/500 m
Altitude derating factor >3000 m	6%/500 m
Ambient temperature derating factor	2%/5°C
Humidity	No derating

TD 710 G	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litres/h / US gal/h	0.18 / 0.048	0.19 / 0.050
Standby Power	litres/h / US gal/h	0.21 / 0.055	0.23 / 0.061
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	29	
Oil sump capacity			
max	litres	24	
min	litres	17	
Oil change interval			
CD oil quality	h	200	
VDS oil quality	h	400	
Engine angularity limits			
front up	degrees	16	
front down	degrees	40	
side tilt	degrees	40	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	110	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	250 / 0.405	276 / 0.447
50% of Prime Power	g/kWh / lb/hph	215 / 0.349	229 / 0.371
75% of Prime Power	g/kWh / lb/hph	212 / 0.344	217 / 0.352
100% of Prime Power	g/kWh / lb/hph	214 / 0.347	216 / 0.350
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	244 / 0.395	260 / 0.421
50% of Standby Power	g/kWh / lb/hph	216 / 0.350	221 / 0.358
75% of Standby Power	g/kWh / lb/hph	211 / 0.342	216 / 0.350
100% of Standby Power	g/kWh / lb/hph	216 / 0.350	218 / 0.353
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	115	130
Feed pump pressure	kPa	100–150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Mechanical RSV/Bosch	
Injection pump type/make		P 3000/Bosch	
Injection timing	°B.T.D.C.	20	

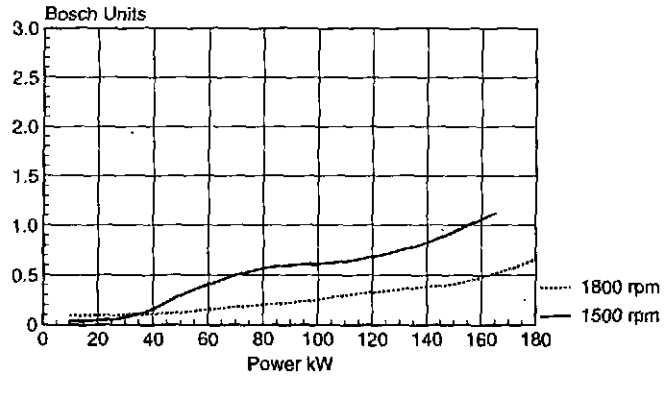
Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

Fuel consumption
TD 710 G

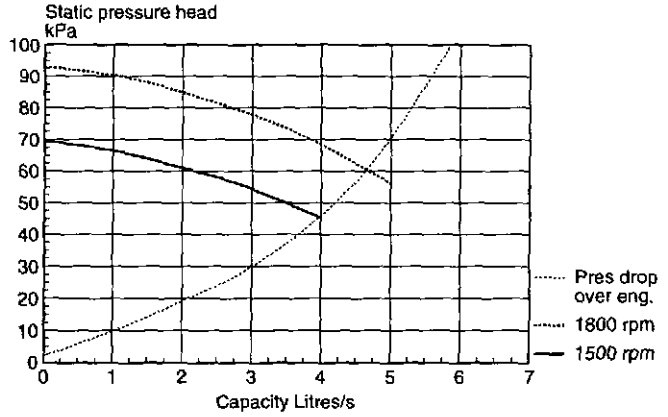


TD 710 G	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	8.8 / 311	10.1 / 358
Standby Power, (at 27°C)	m^3/min / cfm	9.3 / 330	11.3 / 400
Air intake restriction, clean filter	kPa	Not available	
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	118 / 6710	120 / 6820
Standby Power	kW / BTU/min	140 / 7960	148 / 8420
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	575 / 1065	525 / 975
Standby Power	°C / °F	605 / 1120	575 / 1070
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	26.1 / 722	27.5 / 971
Standby Power	m^3/min / cfm	28.5 / 1006	32.5 / 1148
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	10 / 569	11 / 626
Standby Power	kW / BTU/min	13 / 739	14 / 796
Heat rejection to coolant at			
Prime Power	kW / BTU/min	93 / 5290	95 / 5400
Standby Power	kW / BTU/min	106 / 6030	112 / 6370
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with *clean fresh water*	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	0.65	
Radiator core thickness (std size)	mm	73	
Fan diameter	mm	620	
Fan power consumption	kW / hp	2 / 3	4 / 5
Fan drive ratio		1.01:1	
Coolant capacity			
engine	litres	15.0	
std radiator with hoses	litres	24	
Coolant pump	drive/ratio	gear/1.30:1	
Coolant flow with standard system	l/s	3.4	4.1
Minimum coolant flow	l/s	2.6	3.1
Maximum external coolant system restriction	kPa	35	50
Thermostat			
start to open	°C	75	
fully open	°C	88	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		*10% of total cooling system capacity*	

Smoke emission
TD 710 G



Water pump capacity
TD 710 G



Cooling performance

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

Engine speed rpm	Air on temp °C	110% OF PRIME POWER Air flow m^3/s	Max additional external restriction Pa	STANDBY POWER Air flow m^3/s	Max additional external restriction Pa
1500	30	1.80	195	1.80	195
	40	2.35	145	2.35	145
	50	3.45	0	3.45	0
1800	30	1.60	345	1.80	320
	40	2.05	280	2.35	245
	50	2.85	190	3.35	135
	54			4.05	0
	55	3.50	105	–	–
	58	4.05	0	–	–

TD 710 G	**Speed, rpm**	**1500**	**1800**
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		3.37:1	
Starter motor	make/type/kW	Bosch/KB/5.4	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel		140	
Number of teeth on starter motor		9	
Inrush current at +20°C	Amp	800	
Cranking current at +20°C	Amp	330	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2x143	
minimum at >+5°C	Ah	2x70	
Stop solenoid			
pull current	Amp	35	
hold current	Amp	0.4	
Inlet manifold heater (at 20 V)	kW	3.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	max 420	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	max 16	max 22
down	kW	max 23	max 24
right	kW	max 12	max 21
Timing gear at compressor PTO	Nm	max 110	
speed ratio direction of rotation viewed from flywheel side		0.91:1/clockwise	
Timing gear at servo pump PTO	Nm	max 38	
speed ratio direction of rotation viewed from flywheel side		1.58:1/clockwise	

TD 710 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	**Engine**	1	–	TD 710 G	868468		
	Gen Pac	–	2	TD 710 G Gen Pac	868469		
	Ratings	3	3	Prime Power 1500 rpm	134142084		144 kW (142 kW with fan)
		4	4	Standby Power 1500 rpm	134142067		158 kW (156 kW with fan)
		5	5	Prime Power 1800 rpm	134142066		143 kW (139 kW with fan)
		6	6	Standby Power 1800 rpm	134142068		171 kW (167 kW with fan)
212	***Flywheel housing***	1	–	*Flywheel housing*	134141630	x	With dual starter motor connections
218	**Engine suspension**	1	•	Fixed front	848592	x	290 mm to crankshaft centre
		2	•	Fixed rear	848593	x	290 mm to crankshaft centre
		13	–	Flexible front	863337	x	297 mm to crankshaft centre
		14	–	Flexible rear	863339	x	297 mm to crankshaft centre
22	**Lubrication system**	1	1	Oil drain pump	134142231	x*	Manual
23	**Fuel system**	1	•	Flexible fuel hoses	134142923	x*	Two pcs, L=400mm
		3	3	Electronic governor 1500/1800 rpm	134142721	x*	Incl control unit Electrical stop, see 27.3
		7	7	Mounting kit for separate electronic governor	843332	x	For other el. governor than GAC
		8	8	*Overspeed trip switch*	134143641	x*	*Including speed sender*
		9	9	*Fuel filter/water separator*	8159966	x	
		–	9	*Fuel filter/water separator*	134149080	x*	*Mounted on base frame*
25	**Intake and exhaust system**	1	1	Air filter elbow connection	843465	x	
		2	2	Flexible exhaust pipe	848862	x	
		3	3	Exhaust elbow	3826825	x	
		5	5	Silencer, 3.5" Heavy Duty	863046	x	With connecting flanges
		6	6	Silencer, industrial type	844727	x	With connecting flanges
		10	10	Heat guard	134149012	x*	Exhaust manifold and turbo
26	**Cooling system**	1	•	Radiator, 0.65 m2	3825568	x	Incl fan guard and mounting parts
		17	•	Radiator guard	863012	x	
		19	•	Thrust type fan	865978	x	Ø 620 mm, for 26.1 incl. 58 mm fan hub extension
		20	–	Suction type fan	865977	x	Ø 620 mm, for 26.1 incl. 58 mm fan hub extension
		–	22	Suction type fan	134142655	x	Ø 620 mm
		23	–	Thrust type fan	849162	x	Ø 680 mm. Order also 26.35. Not for 26.1
		24	–	Suction type fan	849161	x	Ø 680 mm. Order also 26.35. Not for 26.1
		36	–	Fan drive	134142693	x*	For 26.24
		37	•	Belt guard	134142933	x*	For fan and alternator belts
		39	39	Coolant filter	828046	x	
27	**Control system**	1	1	Electric lever control	134142703	x*	Not in comb with electronic governor
		3	3	Electrical stop, 24 V	134142804	x*	Energized to run. For el governor
31	**Battery**	1	1	Battery box	864171	x	
		2	2	Connection cables	864173		Incl main switch
33	**Starting system**	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run
37	**Electrical wirings**	3	3	*Engine wiring*	134143631	x*	
		4	4	*Extension cable 2.5 m*	863867	x	For 37.3
		5	5	*Extension cable 8.0 m*	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5
38	**Instrument, switches and senders**	1	1	Instrument panel	873626	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	134143622	x*	

TD 710 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
38	**Instrument, switches and senders**	5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		8	8	Speed sender	134143623	x*	Not together with 23.8
		9	9	Tachometer/ hour meter	873722	x	For Ø 72 mm mounting hole
		10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9
		11	11	Hour meter	858877	x	
		12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	
		14	•	Coolant temp and oil pressure switches	134143621	x*	103°C temp setting
		15	–	Coolant temp and oil pressure switches	134143625	x*	97°C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	2	2	Flexible coupling ME 214	845817	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865078	x	Separately mounted. 220–240 V.
		3	3	Tool kit	849167	x	
		4	4	Engine heater 2000 W	3825491	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825388	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994104	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994101	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	134140401	x	[1]
		4	4	Instruction book, English		x	[1])One included in engine order no.
		5	5	Instruction book, German	134140403	x	[1]
		6	6	Instruction book, French	134140404	x	[1]
		7	7	Instruction book, Spanish	134140405	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745690		
		10	10	Maintenance kit 2500 h	876758	x	
		11	11	Maintenance kit 5000 h	875759	x	
	Engine Packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	134141902	x	
		–	14	Plastic wrapping		x	Included in engine order no.
		–	15	Wooden box	134141909	x	

** Reference to corresponding customer fitted kit.*
[1]) *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately – See next page!

TD 710 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted equipment order no.		Corresponding factory fitted equipment
22.1	134142231	Oil drain pump	866536
23.1	134142923	Flexible fuel hoses	843466
23.3	134142721	Electronic governor	3825505
23.8	134143641	Overspeed trip switch	866292
23.9	134149080	Fuel filter/water separator	3826744
25.10	134149012	Heat guard	3827128
26.36	134142693	Fan drive	866402
26.37	134142933	Belt guard	3825569
27.1	134142703	Electric lever control	866024
27.3	134142804	Electrical stop, 24 V	866293
37.3	134143631	Engine wiring	863137
38.4	134143622	Senders	866811
38.8	134143623	Speed sender	863136
38.14	134143621	Switches 103°C	866800
38.15	134143625	Switches 97°C	866801

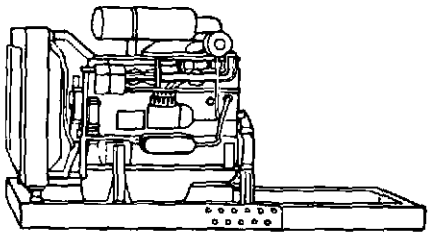
TWD 710 G

Gen Set engine — Gen Pac

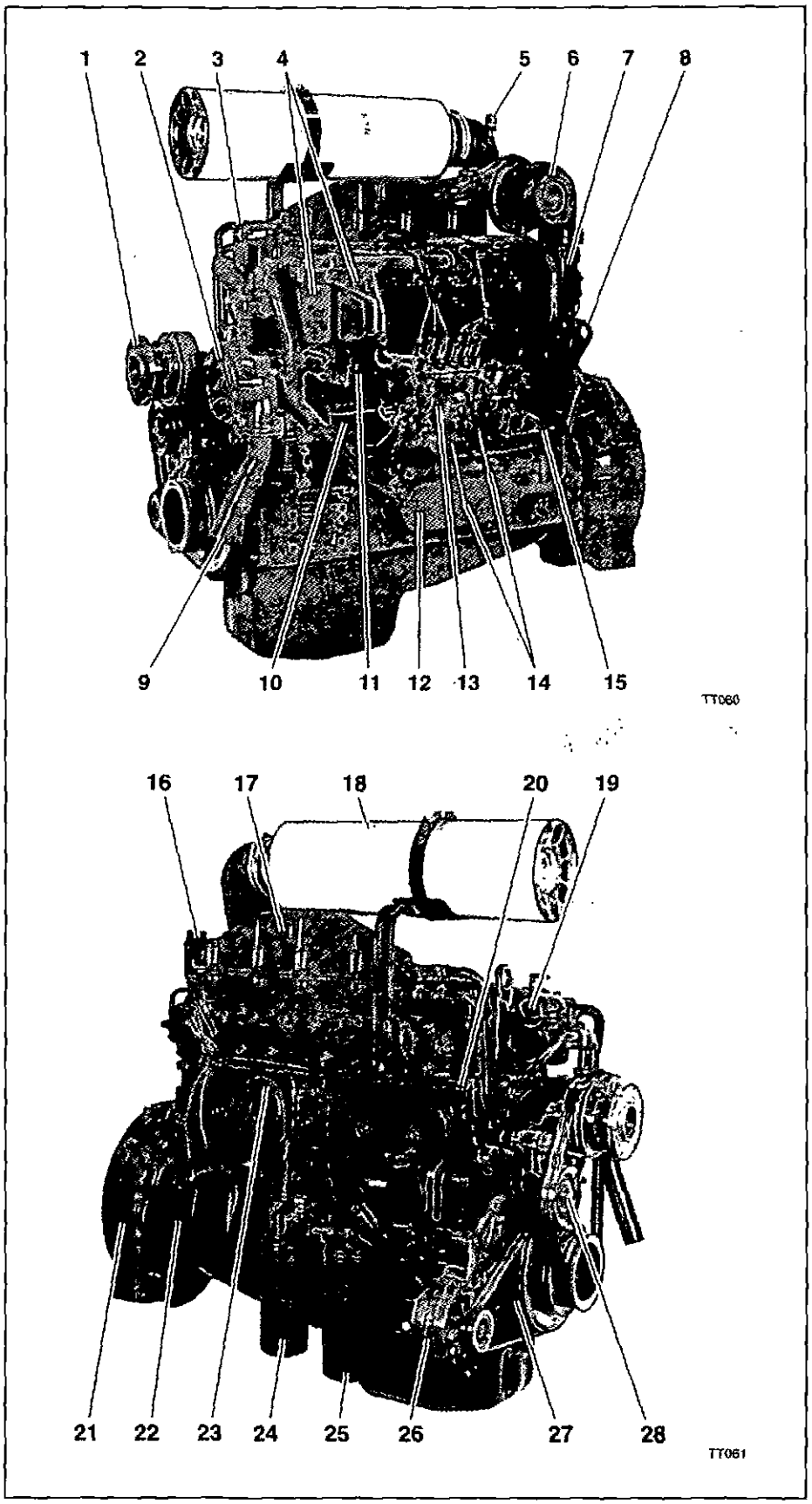
TWD 710 G

- Turbocharged
- Water to air intercooled
- Diesel fuel
- Displacement indication (l)
- Generation
- Version
- Generator drive

Gen Pac – Gen Set engine mounted on an extendable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



1. Fan hub
2. Gear driven coolant pump
3. Lift eyelet
4. Twin fuel filters of throw-away type
5. Air restriction indicator
6. Turbo-charger
7. Air cooled exhaust manifold
8. Lift eyelet
9. Coolant pipe, inlet
10. Pump coupling guard
11. Stop solenoid
12. Oil cooler
13. Injection pump
14. Fuel pipes for tank connection
15. Manual speed control
16. Relay for inlet manifold heater
17. Inlet manifold heater
18. Air filter of throw-away type
19. Coolant pipe, outlet
20. Cable iron
21. Flywheel housing SAE 2
22. Starter motor
23. Crankcase ventilation
24. Full-flow filter of spin-on type
25. By-pass filter of spin-on type
26. Alternator
27. Vibration damper
28. Automatic belt tensioner

Standard equipment

TWD 710 G

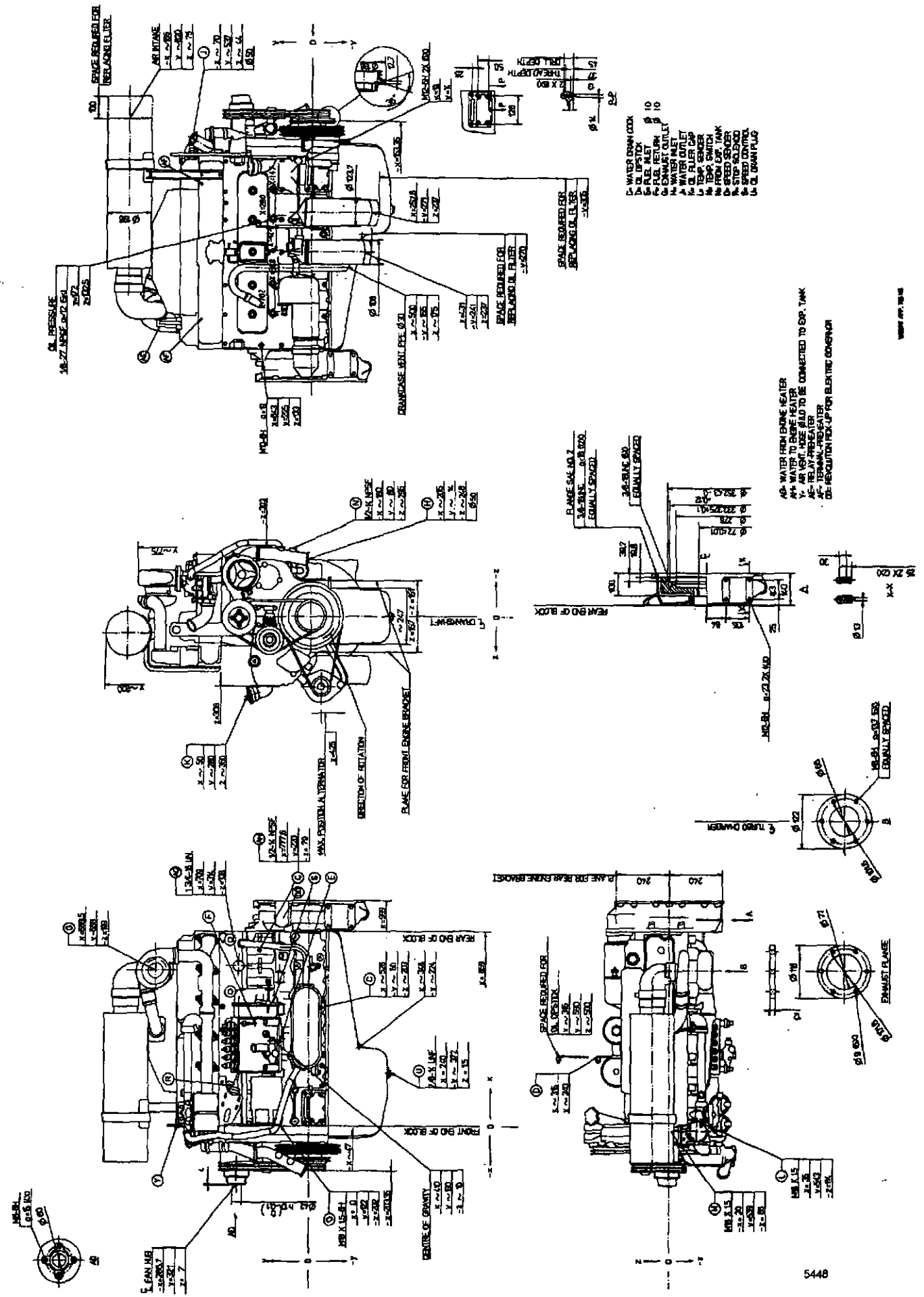
		Engine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 2	•	•
	Flywheel for 11.5" flex. plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
	By-pass oil filter of spin-on type	•	•
	Oil-cooler, side mounted	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with RSV centrifugal governor	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-charger	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator	–	•
	Radiator guard	–	•
	Gear-driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
	Intercooler	•	•
27	**Control system**		
	Manual speed control	•	•
	Electrical stop energized to run	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, right side	•	•
33	**Starting system**		
	Starter motor, Bosch 5.4 kW/24 V	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and senders**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	***Engine Packing***		
	Plastic wrapping	•	•

– optional equipment or not applicable
• included in standard specification

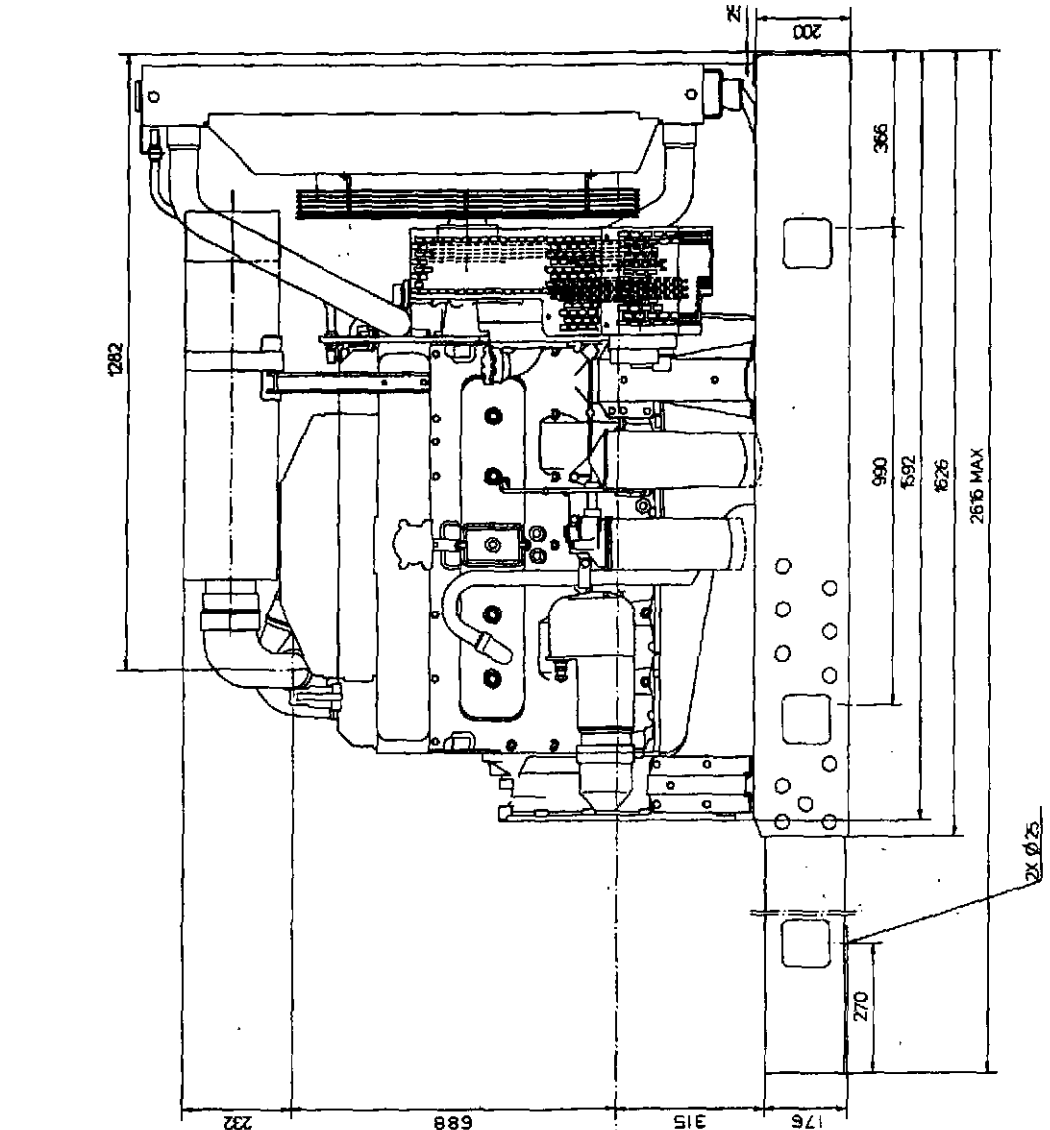
Technical description

- Complies with TA -luft exhaust emission regulation.
- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head gaskets against high temperatures.
- Efficient and reliable turbo-charger.
- Water to air intercooler.
- Full flow disposable spin-on oil filter, for extra high filtration.
- Full flow oil cooler.
- The lubricating oil level can be measured during operation.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Gear driven, highly efficient coolant pump.
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system including accurate mechanical governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Nitro-carburized transmission gears for heavy duty operation.
- Viscous crankshaft vibration damper to withstand single bearing alternator torsional vibrations.
- Piston cooling for low piston temperature and reduced ring temperature.
- Keystone top compression rings for long service life.
- Automatic fan belt tensioner.
- Replaceable valve guides and valve seats.
- Tapered connecting rods to reduce the risk of piston cracking.

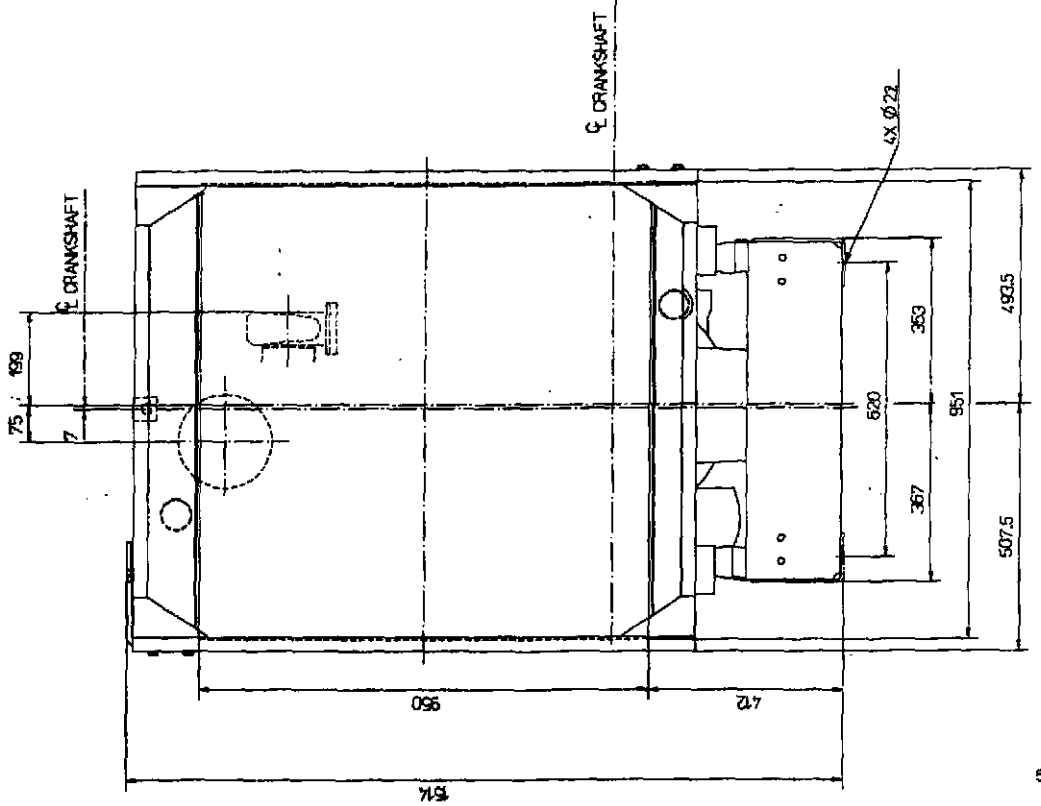
TWD 710 G
Drawing no. 891441-08



TWD 710 G Gen Pac
Drawing no. 887101-07



DRY WEIGHT APP. 1095 KG
WET WEIGHT APP. 1158 KG



5449

Technical data TWD 710 G

General

In line four stroke diesel engine with direct injection					
Turbocharged and water to air intercooled		Bore		104.77 mm / 4.12 in	
Number of cylinders	6	Stroke		130 mm / 5.12 in	
Displacement, total	6.73 litres / 411 in^3	Compression ratio		14.5:1	
Firing order	1-5-3-6-2-4	Dry weight	GenPac 1095 kg	Engine only	795 kg
Rotation direction, anti-clockwise viewed towards flywheel		Wet weight	GenPac 1158 kg	Engine only	835 kg

TWD 710 G	**Speed, rpm**	**1500**	**1800**
Performance	Test no.	24000239	24000238
Prime Power			
without fan	kW / hp	154 / 209	169 / 230
with fan	kW / hp	152 / 206	165 / 225
Continuous Standby Power			
without fan	kW / hp	165 / 224	182 / 248
with fan	kW / hp	163 / 222	178 / 242
Standby Power			
without fan	kW / hp	181 / 246	199 / 271
with fan	kW / hp	179 / 243	195 / 266
Torque at			
Prime Power	Nm / lbft	980 / 723	896 / 641
Standby Power	Nm / lbft	1150 / 848	1060 / 782
Mean piston speed	m/s / ft/sec	6.5 / 21.3	7.8 / 25.6
Effective mean pressure at Prime Power	MPa / psi	1.8 / 261	1.7 / 247
Max combustion pressure at Prime Power	MPa / psi	12.6 / 1830	12.5 / 1810
Total mass moment of inertia, J (mR^2)	kgm^2 / $lbft^2$	1.63 / 38.7	
Degree of irregularity at Prime Power		1:54	1:102
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	17	24

Engine noise emission
Test standards: ISO 3744-1981 (E) sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

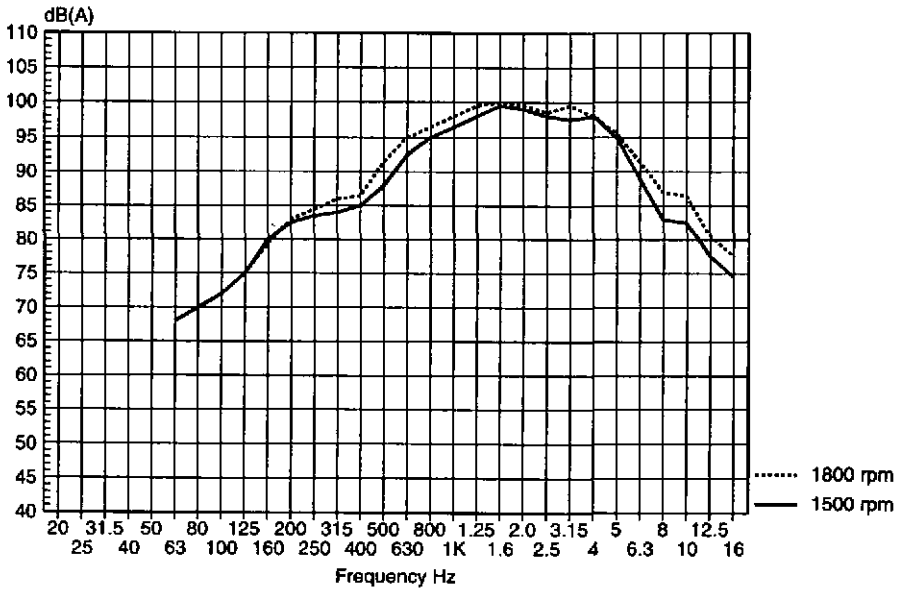
Measured sound power Lw

	Speed, rpm	**1500**	**1800**
No load	dB(A)	–	–
Prime Power	dB(A)	107.4	109.0
Standby Power	dB(A)	107.9	109.4

Calculated sound pressure Lp at 1 m

	Speed, rpm	**1500**	**1800**
No load	dB(A)	–	–
Prime Power	dB(A)	95.4	97.0
Standby Power	dB(A)	95.9	97.4

Sound power level TWD 710 G
Third octave band analysis



TWD 710 G	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	110	114
Standby power	dB(A)	111	115

Load acceptance

Test condition: warm engine

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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	2.0	2.8	1.1	2.0	20–100				
0–40	6.2	8.1	1.1	2.4	40–100				
0–50		10.0		2.6	50–100				
0–60	10.0		2.6		60–100	3.4		1.2	
100–0	10.0	16.0	1.8	1.8					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.4	1.6	0.5	0.8	20–100				
0–40	2.8	3.8	0.5	0.8	40–100				
0–60	4.5	4.7	0.5	0.8	60–100				
0–70		10.0		1.7	70–100		3.9		1.4
0–83	10.0		1.7		85–100				
100–0	7.3	9.0	0.8	0.9					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TWD 710 G	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	4	4
0°C ambient temperature *)	s	31	31
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	5	7
0°C ambient temperature *)	s	33	35

*) With manifold heater engaged, lubricating oil 15 W/40

Derating

The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating.

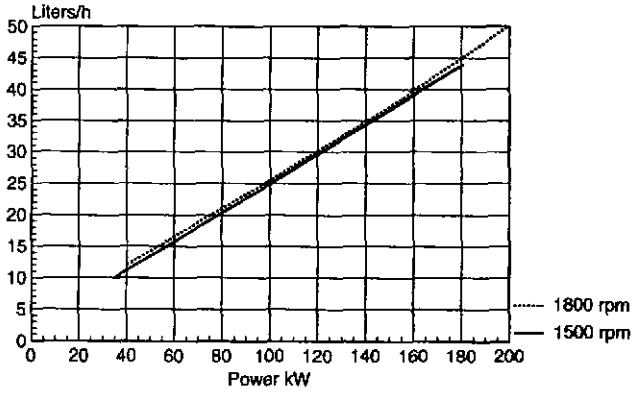
For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude derating factor <3000 m	4%/500 m
Altitude derating factor >3000 m	6%/500 m
Ambient temperature derating factor	1.5%/5°C
Humidity	No derating

TWD 710 G	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litre/h / US gal/h	0.17 / 0.045	0.19 / 0.050
Standby Power	litre/h / US gal/h	0.20 / 0.053	0.22 / 0.058
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	29	
Oil sump capacity			
max	litres	24	
min	litres	17	
Oil change interval			
CD oil quality	h	200	
VDS oil quality	h	400	
Engine angularity limits			
front up	degrees	16	
front down	degrees	40	
side tilt	degrees	40	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	110	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	240 / 0.389	251 / 0.407
50% of Prime Power	g/kWh / lb/hph	217 / 0.352	218 / 0.353
75% of Prime Power	g/kWh / lb/hph	209 / 0.339	209 / 0.339
100% of Prime Power	g/kWh / lb/hph	206 / 0.333	208 / 0.337
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	234 / 0.379	242 / 0.392
50% of Standby Power	g/kWh / lb/hph	213 / 0.345	214 / 0.347
75% of Standby Power	g/kWh / lb/hph	207 / 0.336	208 / 0.337
100% of Standby Power	g/kWh / lb/hph	206 / 0.333	210 / 0.340
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	115	130
Feed pump pressure	kPa	100–150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Mechanical RSV/Bosch	
Injection pump type/make		P3000/Bosch	
Injection timing std	° B.T.D.C.	17	
Injection timing TA-luft setting	° B.T.D.C.	11	

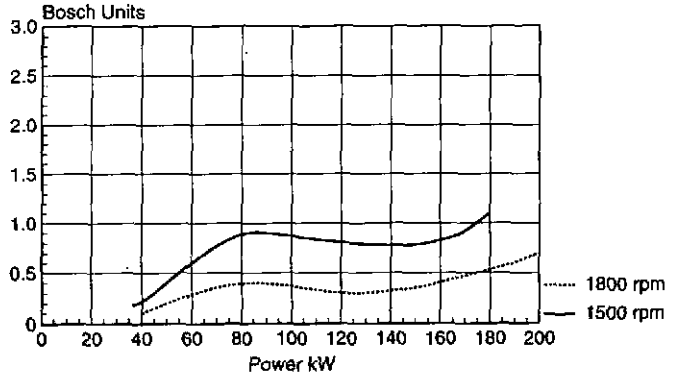
Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

Fuel consumption
TWD 710 G

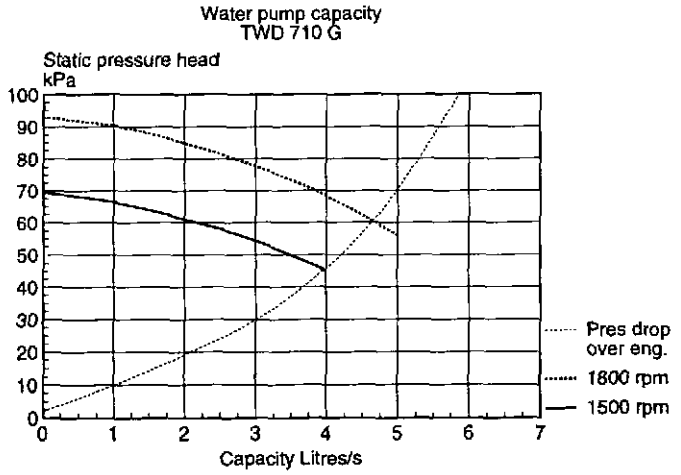


TWD 710 G	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	10.0 / 353	12.9 / 456
Standby Power, (at 27°C)	m^3/min / cfm	11.5 / 406	14.3 / 505
Air intake restriction, clean filter	kW	Not available	
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	115 / 6540	131 / 7450
Standby Power	kW / BTU/min	134 / 7620	152 / 8640
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	540 / 1004	495 / 923
Standby Power	°C / °F	560 / 1040	525 / 975
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	28.2 / 996	33.2 / 1172
Standby Power	m^3/min / cfm	32.6 / 1153	37.6 / 1330
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	12 / 682	12 / 682
Standby Power	kW / BTU/min	14 / 796	13 / 739
Heat rejection to coolant at			
Prime Power	kW / BTU/min	95 / 5402	105 / 5971
Standby Power	kW / BTU/min	112 / 6370	131 / 7450
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	0.90	
Radiator core thickness (std size)	mm	73	
Fan diameter	mm	620	
Fan power consumption	kW / hp	2 /3	4 / 5
Fan drive ratio		1.01:1	
Coolant capacity			
engine	litres	15.9	
std radiator with hoses	litres	26	
Coolant pump	drive/ratio	gear/1.30:1	
Coolant flow with standard system	l/s	3.4	4.1
Minimum coolant flow	l/s	2.8	3.1
Maximum external coolant system restriction	kPa	32	45
Thermostat			
start to open	°C	75	
fully open	°C	88	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TWD 710 G



Water pump capacity
TWD 710 G



Cooling performance

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

Engine speed rpm	Air on temp °C	110% OF PRIME POWER Air flow m^3/s	Max additional external restriction Pa	STANDBY POWER Air flow m^3/s	Max additional external restriction Pa
1500	30	1.60	230	1.75	225
	40	2.00	195	2.25	190
	50	2.70	155	3.20	115
	55	3.30	105	4.00	0
	59	4.00	0	–	–
1800	30	1.70	350	2.10	315
	40	2.15	300	2.70	265
	50	2.90	245	3.75	170
	55	3.55	190	4.75	0
	61	4.80	0	–	–

TWD 710 G	**Speed, rpm**	**1500**	**1800**
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		3.37:1	
Starter motor	make/type/kW	Bosch/KB/5.4	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel		140	
Number of teeth on starter motor		9	
Inrush current at +20°C	Amp	800	
Cranking current at +20°C	Amp	330	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2x143	
minimum at >+5°C	Ah	2x70	
Stop solenoid			
pull current	Amp	35	
hold current	Amp	0.4	
Inlet manifold heater (at 20 V)	kW	3.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	max 420	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	max 16	max 22
down	kW	max 23	max 24
right	kW	max 12	max 21
Timing gear at compressor PTO	Nm	max 110	
speed ratio direction of rotation viewed from flywheel side		0.91:1/clockwise	
Timing gear at servo pump PTO	Nm	max 38	
speed ratio direction of rotation viewed from flywheel side		1.58:1/clockwise	

TWD 710 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	Engine	1	–	TWD 710 G	868470		
	Gen Pac	–	2	TWD 710 G Gen Pac	868471		
	Ratings	3	3	Prime Power 1500 rpm	134142035		154 kW (152 kW with fan)
		4	4	Standby Power 1500 rpm	134142075		181 kW (179 kW with fan)
		5	5	Prime Power 1800 rpm	134142036		169 kW (165 kW with fan)
		6	6	Standby Power 1800 rpm	134142076		199 kW (195 kW with fan)
	TA-luft Rating	7	7	Prime Power 1500 rpm	134140912		154 kW (152 kW with fan)
212	Flywheel housing	1	–	Flywheel housing	134141630	x	With dual starter motor connections
218	Engine suspension	1	•	Fixed front	848592	x	290 mm to crankshaft centre
		2	•	Fixed rear	848593	x	290 mm to crankshaft centre
		13	–	Flexible front	863337	x	297 mm to crankshaft centre
		14	–	Flexible rear	863339	x	297 mm to crankshaft centre
22	Lubrication system	1	1	Oil drain pump	134142231	x*	Manual
23	Fuel system	1	•	Flexible fuel hoses	134142923	x*	Two pcs, L=400mm
		3	3	Electronic governor 1500/1800 rpm	134142713	x*	Incl control unit Electrical stop, see 27.3
		7	7	Mounting kit for separate electronic governor	843332	x	For other el governor than GAC
		8	8	Overspeed trip switch	134143641	x*	Speed sender included
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	134149080	x*	Mounted on base frame
25	Intake and exhaust system	1	1	Air filter elbow connection	843465	x	
		2	2	Flexible exhaust pipe	848857	x	
		3	3	Exhaust elbow	3826826	x	
		5	5	Silencer, 4.0" Heavy Duty	863047	x	With connecting flanges
		–	7	Silencer, engine mounted	863142	x	Incl mounting parts
		10	10	Heat guard	134149012	x*	Exhaust manifold and turbo
26	Cooling system	2	•	Radiator, 0.90 m^2	3825574	x	Incl fan guard and mounting parts.
		17	•	Radiator guard	863013	x	
		19	•	Thrust type fan	865978	x	Ø 620 mm, for 26.2 incl. 58 mm fan hub extension
		20	–	Suction type fan	865977	x	Ø 620 mm, for 26.2 incl. 58 mm fan hub extension
		–	22	Suction type fan	134142654	x	Ø 620 mm
		23	–	Thrust type fan	849162	x	Ø 680 mm. Order also 26.35. Not for 26.2
		24	–	Suction type fan	849161	x	Ø 680 mm. Order also 26.35. Not for 26.2
		36	–	Fan drive	134142693	x*	For 26.24
		37	•	Belt guard	134142933	x*	For fan and alternator belts
		39	39	Coolant filter	828046	x	
27	Control system	1	1	Electric lever control	134142703	x*	Not in comb with electronic governor
		3	3	Electrical stop	134142804	x*	Energized to run. For el governor
31	Battery	1	1	Battery box	864171	x	
		2	2	Connection cables	864173		Incl main switch
33	Starting system	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run
37	Electrical wiring	3	3	Engine wiring	134143631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5
38	Instrument, switches and senders	1	1	Instrument panel	873626	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	134143622	x*	

TWD 710 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. En-gine	Gen Pac	Option	Order no.	See option descr.	Note
38	**Instrument, switches and senders**	5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		8	8	Speed sender	134143623	x*	Not together with 23.8
		9	9	Tachometer/ hour meter	873722	x	For Ø 72 mm mounting hole
		10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9
		11	11	Hour meter	858877	x	
		12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	
		14	•	Coolant temp and oil pressure switches	134143621	x*	103°C temp setting
		15	–	Coolant temp and oil pressure switches	134143625	x*	97°C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	2	2	Flexible coupling ME 214	845817	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865078	x	Separately mounted. 220–240 V.
		3	3	Tool kit	849167	x	
		4	4	Engine heater 2000 W	3825491	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825388	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994104	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994101	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	134140421	x	[1]
		4	4	Instruction book, English			[1] One included in engine order no.
		5	5	Instruction book, German	134140423	x	[1]
		6	6	Instruction book, French	134140424	x	[1]
		7	7	Instruction book, Spanish	134140425	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745690		
		10	10	Maintenance kit 2500 h	876758	x	
		11	11	Maintenance kit 5000 h	876730	x	
	Engine Packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	134141902	x	
		–	14	Plastic wrapping		x	Included in engine order no.
		–	15	Wooden box	134141909	x	

** Reference to corresponding customer kitted kit*
[1] *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately – see next page!

TWD 710 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted equipment order no.		Corresponding factory fitted equipment
22.1	134142231	Oil drain pump	866536
23.1	134142923	Flexible fuel hoses	843466
23.3	134142713	Electronic governor	3825505
23.8	134143641	Overspeed trip switch	866292
23.9	134149080	Fuel filter/water separator	3826744
25.10	134149012	Heat guard	3827128
26.36	134142693	Fan drive	866402
26.37	134142933	Belt guard	3825569
27.1	134142703	Electric lever control	866401
27.3	134142804	Electrical stop, 24 V	866293
37.3	134143631	Engine wiring	863137
38.4	134143622	Senders	866811
38.8	134143623	Speed sender	863136
38.14	134143621	Switches 103°C	866800
38.15	134143625	Switches 97°C	866801

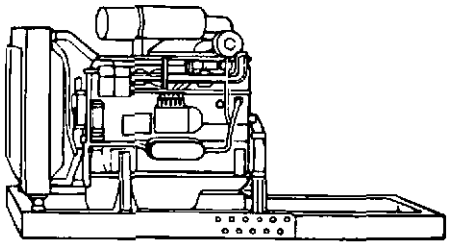
TAD 730 G

Gen Set Engine – Gen Pac

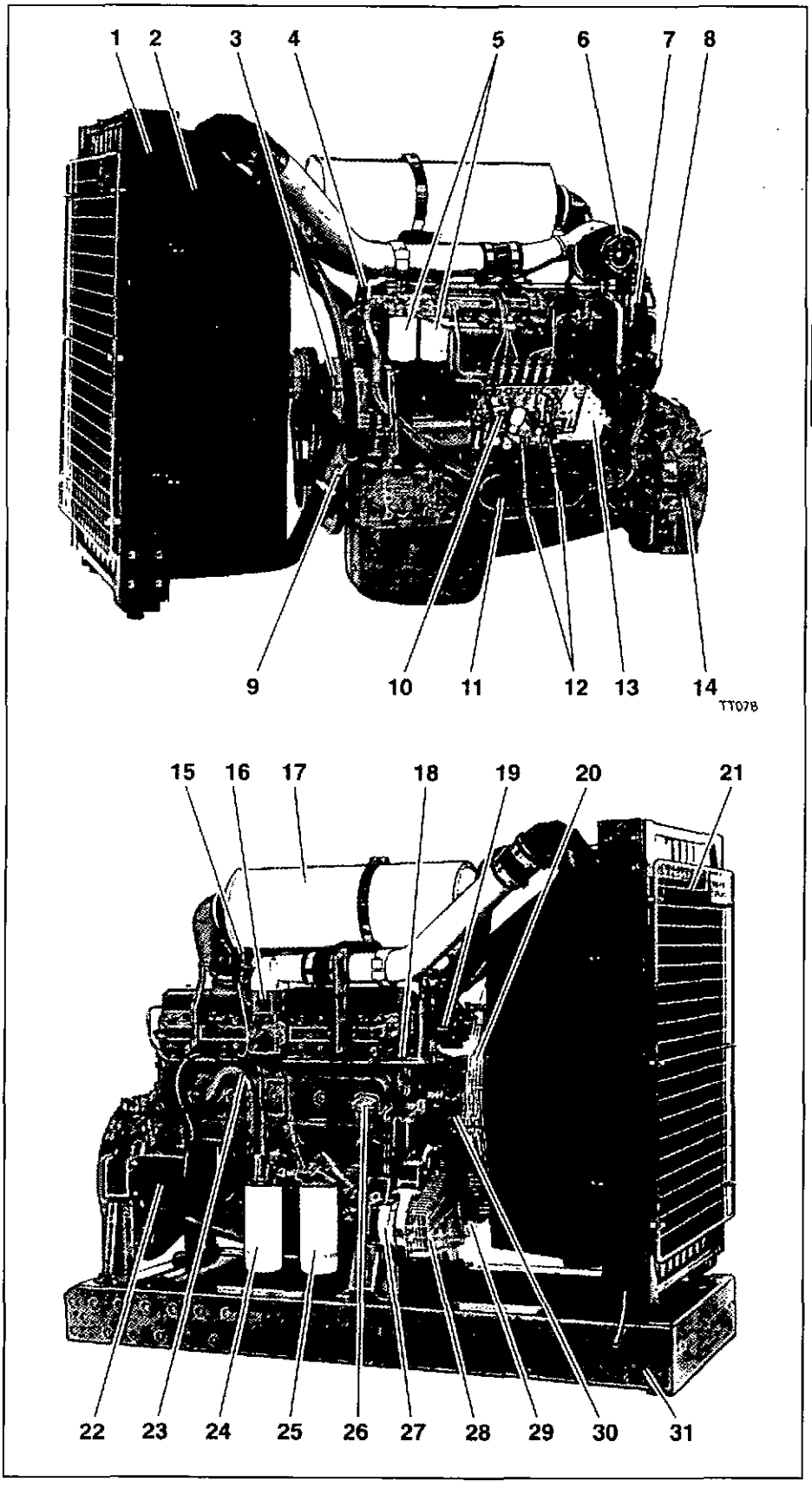
TAD 730 G

- Turbocharged
- Air to air intercooled
- Diesel fuel
- Displacement indication (l)
- Generation
- Version
- Generator drive

Gen Pac – Gen Set Engine mounted on an expandable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



1. Tropical radiator
2. Intercooler
3. Gear driven coolant pump
4. Lift eyelet
5. Twin fuel filters of throw-away type
6. Turbo-charger
7. Air cooled exhaust manifold
8. Lift eyelet
9. Coolant pipe, inlet
10. Injection pump
11. Oil cooler
12. Fuel pipes for tank connection
13. Electric speed governor
14. Flywheel housing SAE 2
15. Relay for inlet manifold heater
16. Inlet manifold heater
17. Air filter
18. Cable iron
19. Coolant pipe, outlet
20. Fan guard
21. Radiator guard *)
22. Starter motor
23. Crankcase ventilation
24. Full-flow oil filter of spin-on type
25. By-pass oil filter
26. Oil filler
27. Alternator
28. Belt guard *)
29. Vibration damper
30. Automatic belt tensioner
31. Expandable base frame

*) Optional

Standard equipment

TAD 730 G

		Engine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 2	•	•
	Flywheel for 11.5" flex. plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
	By-pass oil filter of spin-on type	•	•
	Oil-cooler, side mounted	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with GAC electric governor	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-charger	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator and intercooler	•[1])	•
	Radiator guard	–	•
	Gear-driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
	Intercooler	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, right side	•	•
33	**Starting system**		
	Starter motor, Bosch 5.4 kW/24 V	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and senders**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

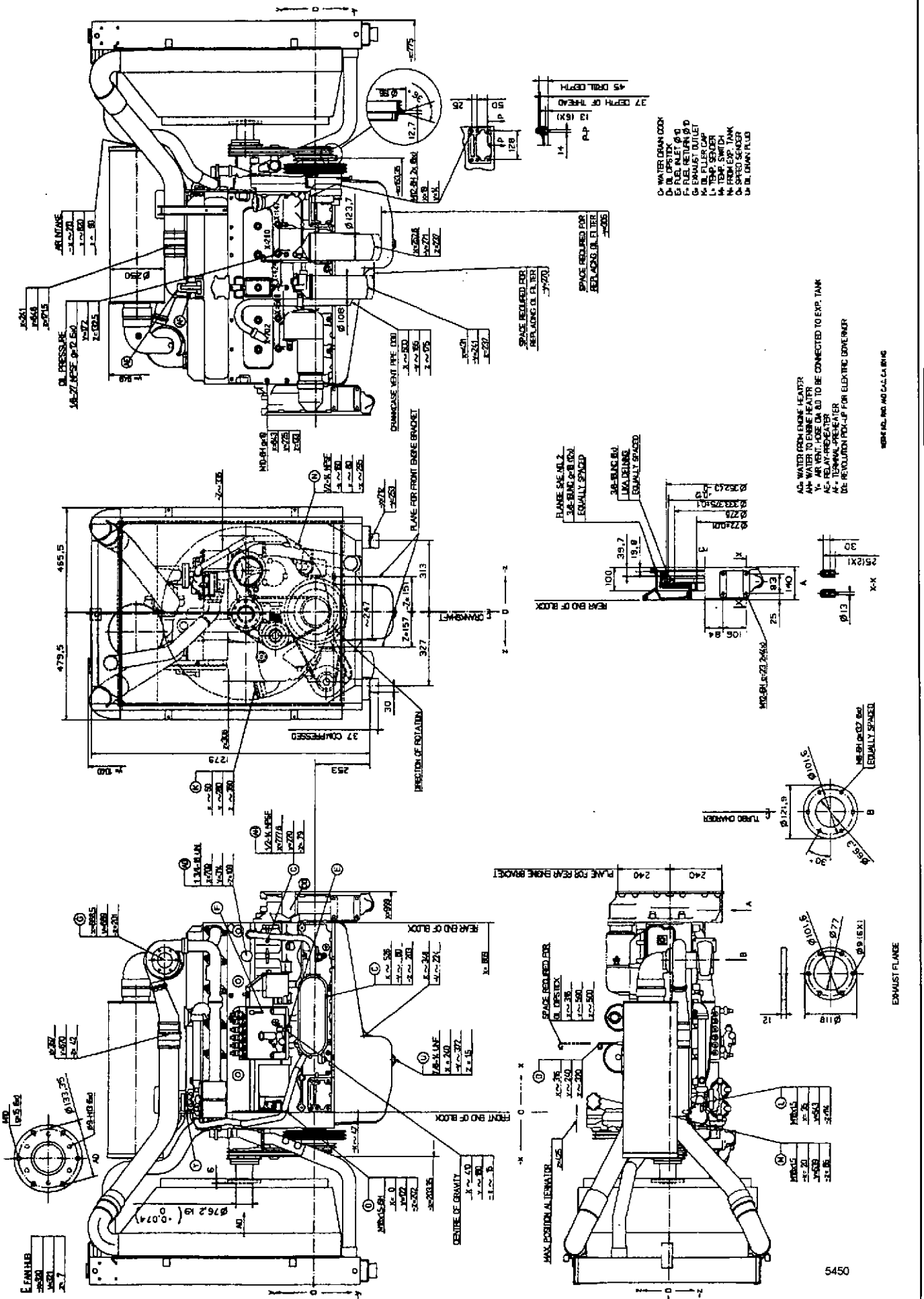
[1]) Must be ordered

– optional equipment or not applicable
• included in standard specification

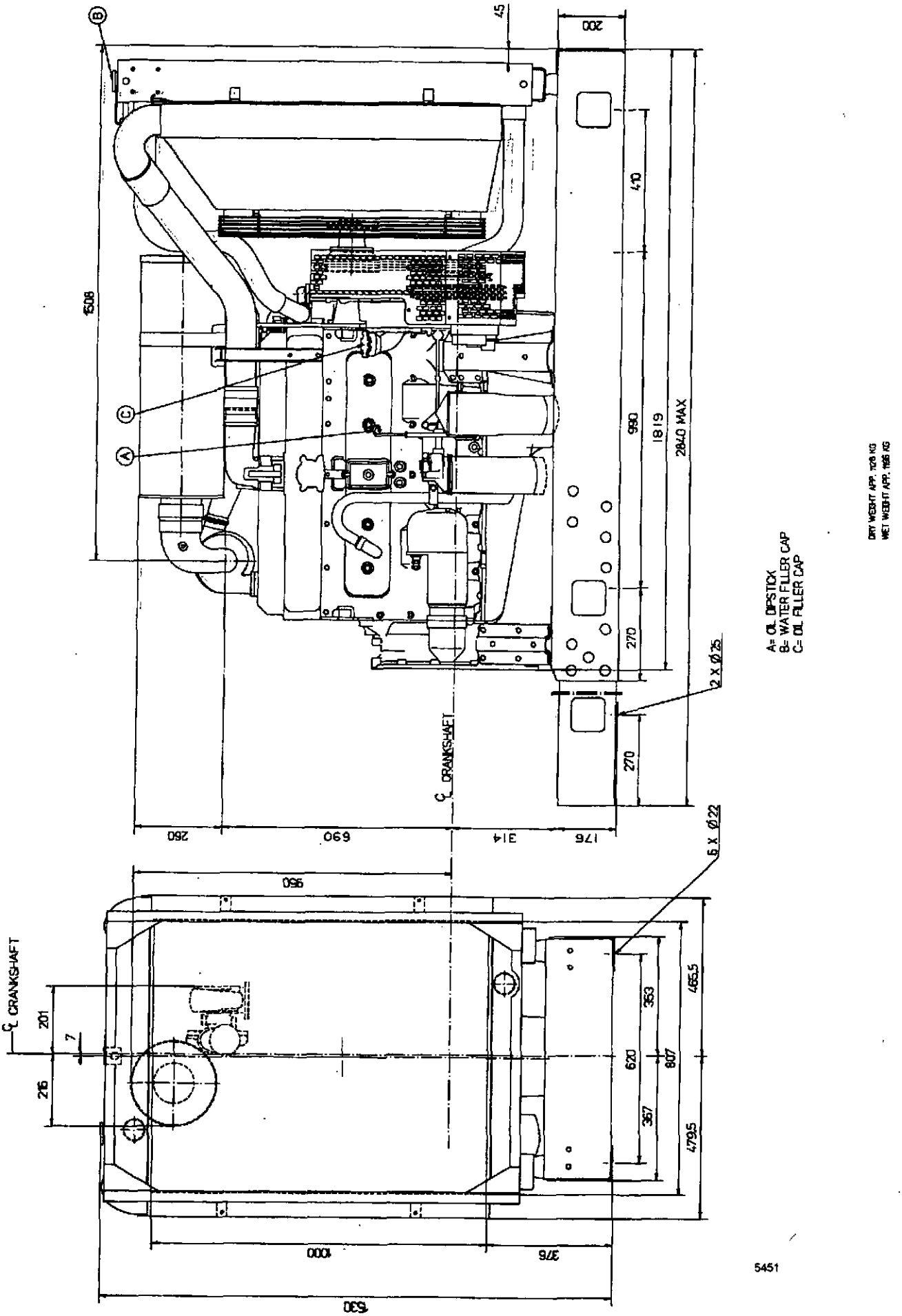
Technical description

- Complies with TA -luft exhaust emission regulation.
- *Optimized cast iron cylinder block* with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head gaskets against high temperatures.
- Efficient and reliable turbo-charger.
- Air to air intercooler.
- Full flow disposable spin-on oil filter, for extra high filtration.
- Full flow oil cooler.
- The lubricating oil level can be measured during operation.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Gear driven, highly efficient coolant pump.
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system *including accurate electronic* governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Nitro-carburized transmission gears for heavy duty operation.
- *Viscous crankshaft vibration* damper to withstand single bearing alternator torsional vibrations.
- Piston cooling for low piston temperature and reduced ring temperature.
- Keystone top compression rings for long service life.
- Automatic fan belt tensioner.
- Replaceable valve guides and valve seats.
- Tapered connecting rods to reduce the risk of piston cracking.

TAD 730 G
Drawing no. 891850-02



TAD 730 G Gen Pac
Drawing no. 891854-02



Technical data TAD 730 G

General

In line four stroke diesel engine with direct injection
Turbocharged and air to air intercooled

Number of cylinders	6	Bore	104.77 mm / 4.12 in
Displacement, total	6.73 litres / 411 in^3	Stroke	130 mm / 5.12 in
Firing order	1-5-3-6-2-4	Compression ratio	15.6:1
Rotation direction, anti-clockwise viewed towards flywheel		Dry weight Gen Pac 1128 kg	Engine only 901 kg*)
		Wet weight Gen Pac 1196 kg	Engine only 964 kg*)

*) Including radiator and intercooler

TAD 730 G	Speed, rpm	1500	1800
Performance	Test no.	29000572	29000573
Prime Power			
without fan	kW / hp	180 / 245	199 / 271
with fan	kW / hp	176 / 239	192 / 261
Continuous Standby Power			
without fan	kW / hp	185 / 252	212 / 288
with fan	kW / hp	181 / 246	205 / 279
Standby Power			
without fan	kW / hp	203 / 276	233 / 317
with fan	kW / hp	199 / 271	226 / 307
Torque at			
Prime Power	Nm / lbft	1146 / 845	1055 / 778
Standby Power	Nm / lbft	1292 / 953	1236 / 912
Mean piston speed	m/s / ft/sec	6.5 / 21.3	7.8 / 25.6
Effective mean pressure at			
Prime Power	MPa / psi	2.1 / 304	2.0 / 290
Max combustion pressure at			
Prime Power	MPa / psi	14.0 / 2030	14.0 / 2030
Total mass moment of inertia, J (mR^2)	kgm^2 / $lbft^2$	1.66 / 39.4	
Degree of irregularity at			
Prime Power		1:45	1:82
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	17	24

Engine noise emission

Test standards: ISO 3744-1981 (E)
sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

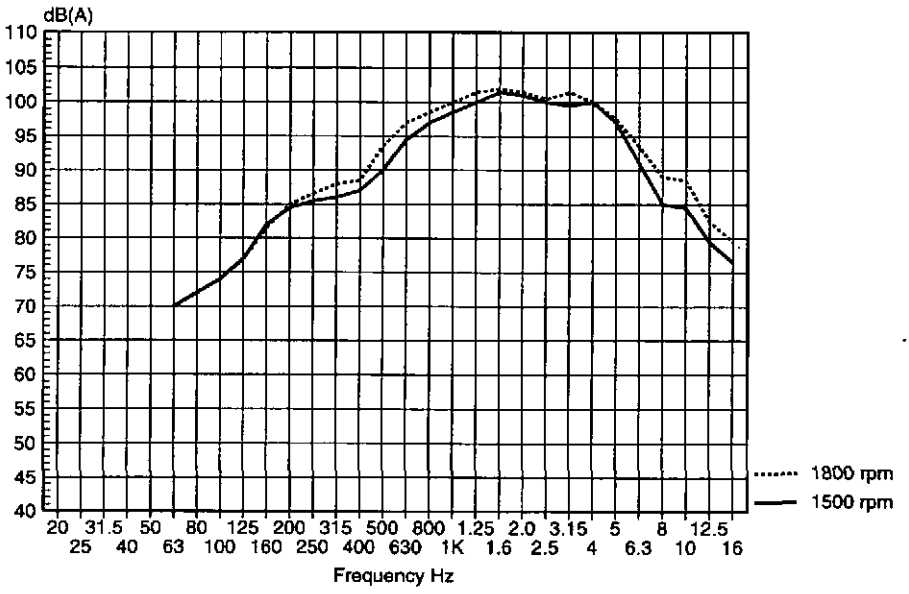
Measured sound power Lw

	Speed, rpm	1500	1800
No load	dB(A)	–	–
Prime Power	dB(A)	109.2	110.8
Standby Power	dB(A)	109.9	111.4

Calculated sound pressure Lp at 1 m

	Speed, rpm	1500	1800
No load	dB(A)	–	–
Prime Power	dB(A)	97.2	98.2
Standby Power	dB(A)	97.9	99.4

Sound power level TAD 730 G
Third octave band analysis



TAD 730 G	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	111	115
Standby power	dB(A)	112	116

Load acceptance
Test condition: warm engine
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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.8	2.0	1.0	1.0	20–100				
0–40	3.5	4.0	1.4	1.4	40–100				
0–56		10.0		2.7					
0–60	8.0	15.6	1.8	4.4					
0–63	10.0		2.7		63–100	6.8		2.8	
0–70		>15		8					
0–80	>15		8		80–100	2.8	6.4	1.0	6.0
100–0	9.0	10.0	1.2	1.2					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.8	2.0	0.8	0.8	20–100				
0–40	3.4	4.0	1.4	1.5	40–100	11.0		3.2	
0–60	5.5	7.3	1.9	2.4	60–100	4.7		1.8	
0–66		10.0		2.5					
0–76	10.0	>15	2.6	8	80–100	2.0	5.3	1.1	4.5
0–91	>15		5.4						
100–0	7.3	9.3	1.2	1.4					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TAD 730 G	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	8	9
0°C ambient temperature *)	s	7	8
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	14	14
0°C ambient temperature *)	s	10	11

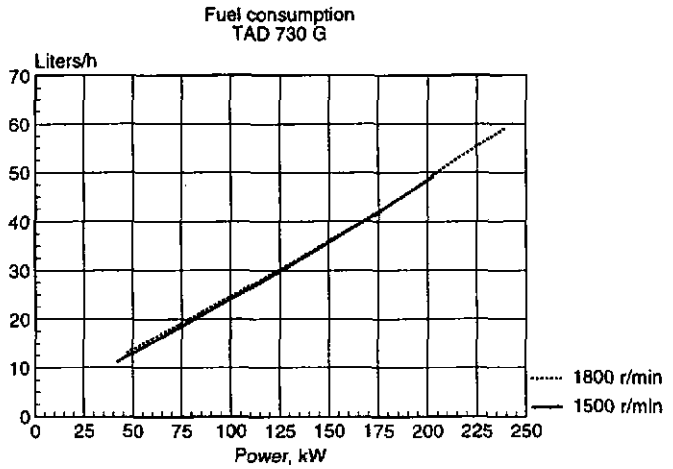
*) With manifold heater engaged, lubricating oil 15 W/40

Derating
The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without deration.
For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude deration factor <3000 m	4%/500 m
Altitude deration factor >3000 m	6%/500 m
Ambient temperature deration factor	1.5%/5°C
Humidity	No derating

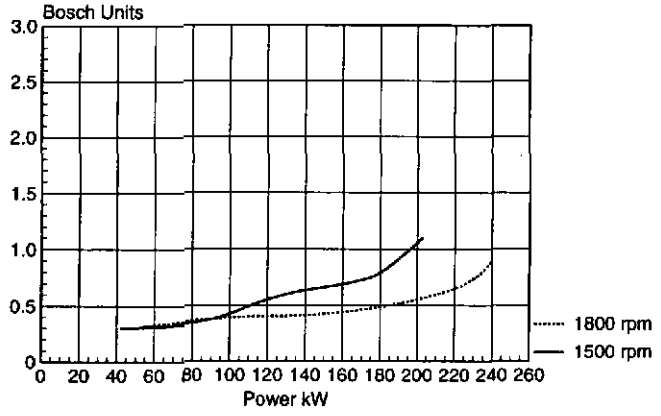
TAD 730 G	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litre/h / US gal/h	0.09 / 0.02	0.13 / 0.03
Standby Power	litre/h / US gal/h	0.14 / 0.04	0.15 / 0.04
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	29	
Oil sump capacity			
max	litres	24	
min	litres	16	
Oil change interval			
CD oil quality	h	200	
VDS oil quality	h	400	
Engine angularity limits			
front up	degrees	16	
front down	degrees	40	
side tilt	degrees	40	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	110	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	222 / 0.360	233 / 0.378
50% of Prime Power	g/kWh / lb/hph	203 / 0.329	208 / 0.337
75% of Prime Power	g/kWh / lb/hph	199 / 0.323	200 / 0.324
100% of Prime Power	g/kWh / lb/hph	201 / 0.326	202 / 0.328
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	219 / 0.355	228 / 0.370
50% of Standby Power	g/kWh / lb/hph	201 / 0.326	203 / 0.329
75% of Standby Power	g/kWh / lb/hph	198 / 0.321	200 / 0.324
100% of Standby Power	g/kWh / lb/hph	203 / 0.329	206 / 0.334
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	110	125
Feed pump pressure	kPa	150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		*Electronic/GAC*	
Injection pump type/make		P3000/Bosch	
Injection timing	° B.T.D.C.	11	

Fuel consumption data is based on a diesel *fuel with a calorific value of 42.7 MJ/kg* (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

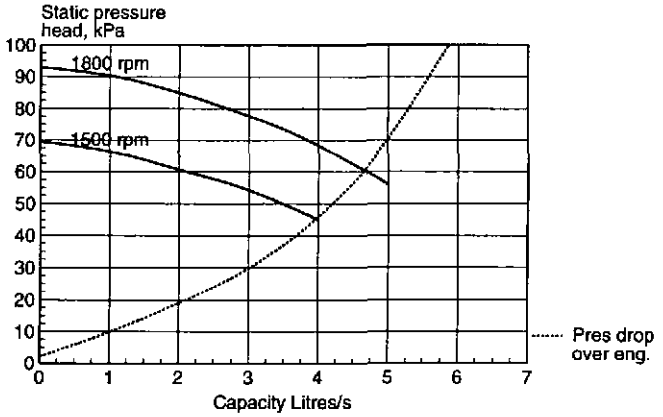


TAD 730 G	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	10.7 / 378	13.8 / 489
Standby Power, (at 27°C)	m^3/min / cfm	11.7 / 414	15.2 / 537
Air intake restriction, clean filter(s)	kPa / In wc	0.5 / 2.01	0.9 / 3.61
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	144 / 8189	170 / 9668
Standby Power	kW / BTU/min	163 / 9270	200 / 11374
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	570 / 1058	510 / 950
Standby Power	°C / °F	595 / 1105	550 / 1022
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	30.1 / 1063	36.7 / 1296
Standby Power	m^3/min / cfm	34.6 / 1223	42.2 / 1490
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	11 / 625	13 / 739
Standby Power	kW / BTU/min	12 / 682	14 / 796
Heat rejection to coolant at			
Prime Power	kW / BTU/min	88 / 5004	89 / 5061
Standby Power	kW / BTU/min	98 / 5570	104 / 5910
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	0.80	
Radiator core thickness (std size)	mm	73	
Intercooler core area (std size)	m^2	0.75	
Intercooler core thickness (std size)	mm	68	
Fan diameter	mm	750	
Fan power consumption	kW / hp	4 / 5	7 / 10
Fan drive ratio		1.01:1	
Coolant capacity			
engine	litres	15.9	
std radiator with hoses	litres	21	
Coolant pump	drive/ratio	1.30:1	
Coolant flow with standard system	l/s	3.4	4.1
Minimum coolant flow	l/s	Not available	
Maximum external coolant system restriction	kPa	Not available	
Thermostat			
start to open	°C	75	
fully open	°C	88	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator (Gen Pac radiator)	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TAD 730 G



Water pump capacity
TAD 730 G



Cooling performance

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

Engine speed	Air on temp	110% OF PRIME POWER Air flow	Max additional external	STANDBY POWER Air flow	Max additional external
rpm	*°C*	*m^3/s*	*restriction Pa*	*m^3/s*	*restriction Pa*
1500	30	1.70	515	1.80	505
	40	2.10	445	2.25	425
	50	2.75	310	2.95	270
	55	3.25	180	3.45	130
	58			3.85	0
	60	3.85	0	–	–
1800	30	1.85	770	2.05	740
	40	2.80	675	2.60	625
	50	3.00	525	3.35	440
	55	3.50	395	3.90	255
	60			4.60	0
	63	4.60	0	–	–

TAD 730 G	**Speed, rpm**	**1500**	**1800**
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		3:37:1	
Starter motor	make/type/kW	Bosch/KB/5.4	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel		140	
Number of teeth on starter motor		9	
Inrush current at +20°C	Amp	800	
Cranking current at +20°C	Amp	330	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2x143	
minimum at >+5°C	Ah	2x70	
Stop solenoid			
pull current	Amp	–	
hold current	*Amp*	–	
Inlet manifold heater (at 20 V)	kW	3.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	max 420	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	max 16	max 22
down	kW	max 23	max 24
right	kW	max 12	max 21
Timing gear at compressor PTO	Nm	max 110	
speed ratio direction of rotation viewed from flywheel side		0.91:1/clockwise	
Timing gear at servo pump PTO	Nm	max 38	
speed ratio direction of rotation viewed from flywheel side		1.58:1/clockwise	

TAD 730 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	**Engine**	1	–	TAD 730 G	868546		Order also 26.7
	Gen Pac	–	2	TAD 730 G Gen Pac	868547		
	Ratings	3	3	Prime Power 1500 rpm	134152014		180 kW (176 kW with fan)
		4	4	Standby Power 1500 rpm	134152012		203 kW (199 kW with fan)
		5	5	Prime Power 1800 rpm	134152015		199 kW (192 kW with fan)
		6	6	Standby Power 1800 rpm	134152013		233 kW (226 kW with fan)
218	**Engine suspension**	1	•	Fixed front	848592	x	290 mm to crankshaft centre
		2	•	Fixed rear	848593	x	290 mm to crankshaft centre
22	**Lubrication system**	1	1	Oil drain pump	134152231	x*	Manual
23	**Fuel system**	1	•	Flexible fuel hoses	134152923	x*	Two pcs, L=400mm
		3	3	Electronic governor 1500/1800 rpm		x	Incl in engine order no. Electrical stop, see 27.3
		8	8	Overspeed trip switch	134153641	x*	Speed sender included
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	134159080	x*	Mounted on base frame
25	**Intake and exhaust system**	1	1	Air filter elbow connection	866137	x	
		2	2	Flexible exhaust pipe	848857	x	
		3	3	Exhaust elbow	3826826	x	
		5	5	Silencer, 4.0" Heavy Duty	863047	x	With connecting flanges
		–	9	Crankcase ventilation	134159053	x	Extension pipe
		9	9	Crankcase ventilation	3825364	x	Extension pipe
		10	10	Heat guard	134159014	x*	Exhaust manifold and turbo
26	**Cooling system**	7	•	Radiator, 0.80 m^2	3825575	x	Incl fan, fan guard, intercooler and mounting parts.
		17	•	Radiator guard	866073	x	
		25	•	Thrust type fan		x	Ø 750 mm, included in 26.7
		37	•	Belt guard	134152933	x*	For fan and alternator belts
		39	39	Coolant filter	828046	x	
27	**Control system**	3	3	Electrical stop	134152803	x*	Energized to run. For el governor
31	**Battery**	1	1	Battery box	864171	x	
		2	2	Connection cables	864173		Incl main switch
33	**Starting system**	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run
37	**Electrical wiring**	3	3	Engine wiring	134153631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5
38	**Instrument, switches and senders**	1	1	Instrument panel	873626	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	134153602	x*	
		5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		8	8	Speed sender	134153603	x*	Not together with 23.8
		9	9	Tachometer/ hour meter	873722	x	For Ø 72 mm mounting hole
		10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9
		11	11	Hour meter	858877	x	
		12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	

** Reference to corresponding customer fitted kit*

TAD 730 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
38	**Instrument, switches and senders**	14	•	*Coolant temp and oil pressure switches*	134153601	x*	103° C temp setting
		15	–	Coolant temp and oil pressure switches	134153625	x*	97° C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	2	2	Flexible coupling ME 214	845817	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865078	x	Separately mounted. 220–240 V.
		3	3	Tool kit	849167	x	
		4	4	Engine heater 2000 W	3825491	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825388	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994104	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994101	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	134150421	x	[1]
		4	4	Instruction book, English			[1] One included in engine order no.
		5	5	Instruction book, German	134150423	x	[1]
		6	6	Instruction book, French	134150424	x	[1]
		7	7	Instruction book, Spanish	134150425	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745690		
		10	10	Maintenance kit, 2500 h	876737	x	
		11	11	Maintenance kit, 5000 h	876738	x	
	Engine Packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	134151902	x	
		–	14	Plastic wrapping		x	Included in engine order no.
		–	15	Wooden box	134151906	x	

** Reference to corresponging customer fitted kit*
[1] *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted equipment order no.		Corresponding factory fitted equipment
22.1	134152231	Oil drain pump	866536
23.1	134152923	Flexible fuel hoses	843466
23.9	134159080	*Fuel filter/water separator*	3826744
25.10	134159014	Heat guard	3827128
26.37	134152933	Belt guard	3825569
27.3	134152803	Electrical stop	866293
37.3	134153631	Engine wiring	866137
38.4	134153602	Senders	866811
38.8	134153603	Speed sender	863144
38.14	134153601	Switches 103°C	866800
38.15	134153603	Switches 97°C	866801

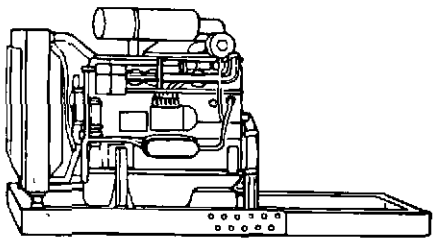
Notes

TD 1010 G

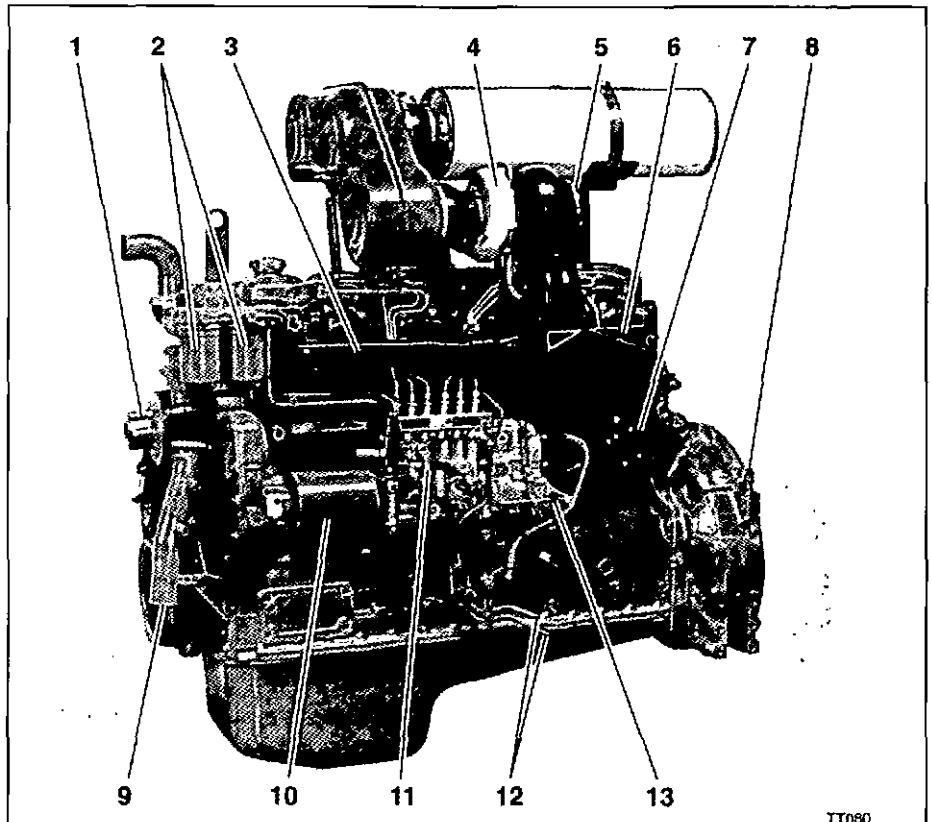
Gen Set engine — Gen Pac

TD 1010 G
- Turbocharged
- Diesel fuel
- Displacement indication (l)
- Generation
- Version
- Generator drive

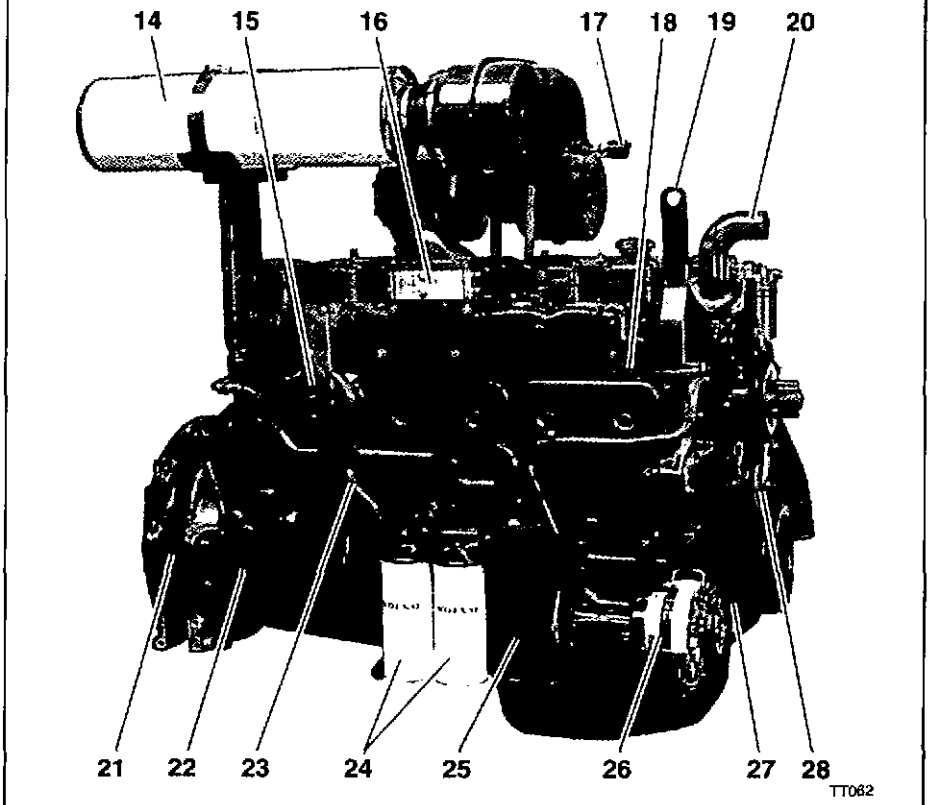
Gen Pac – Gen Set engine mounted on an extendable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



TT080



TT082

1. Fan hub
2. Twin fuel filters of throw-away type
3. Air cooled exhaust manifold
4. Turbo-charger
5. Connecting flange, exhaust line
6. Heat radiation protection
7. Stop solenoid
8. Lift eyelet
9. Coolant pipe, inlet
10. Pump coupling guard
11. Injection pump
12. Fuel pipes for tank connection
13. Manual speed control
14. Double air filters of throw-away type
15. Relay for inlet manifold heater
16. Inlet manifold heater
17. Air restriction indicator
18. Cable iron
19. Lift eyelet
20. Coolant pipe, outlet
21. Flywheel housing SAE 1
22. Starter motor
23. Crankcase ventilation
24. Twin full-flow oil filters of spin-on type
25. Oil cooler
26. Alternator
27. Vibration damper
28. Automatic belt tensioner

Standard equipment

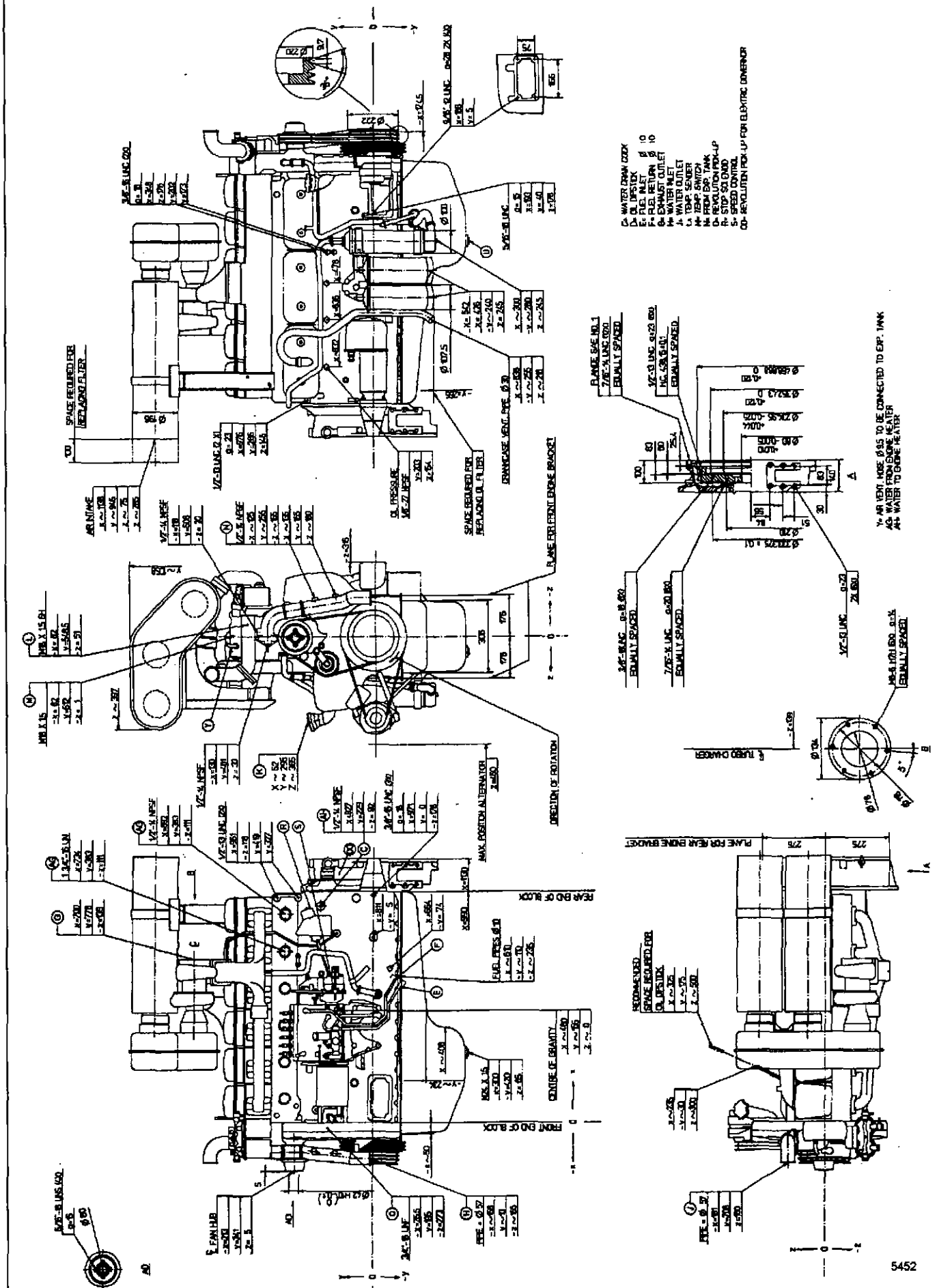
TD 1010 G

		Engine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	***Flywheel***		
	Flywheel housing with connection acc. to SAE 1	•	•
	Flywheel for 14" flexible plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
	Oil cooler, side-mounted	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, *with RSV centrifugal* governor	•	•
	Pump coupling guard	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-charger	•	•
	Crankcase ventilation	•	•
26	***Cooling system***		
	Tropical radiator	–	•
	Radiator guard	–	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
27	**Control system**		
	Manual speed control	•	•
	Electrical stop energized to run	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, right side	•	•
33	**Starting system**		
	Starter motor, Bosch 5.4 kW/24 V	•	•
	Connecting facility for extra starter motor	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instrument and senders**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

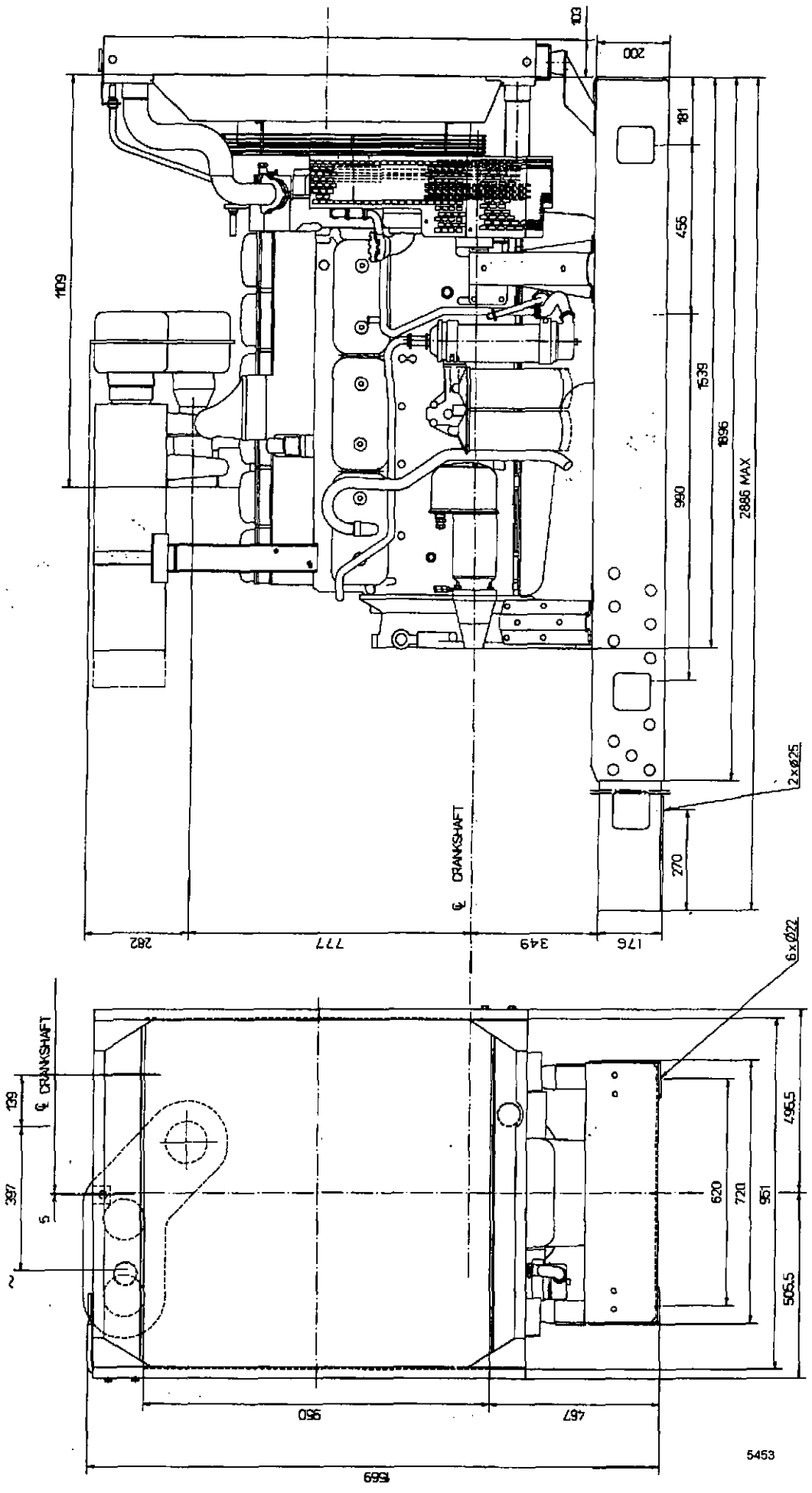
– optional equipment or not applicable
• included in standard specification

Technical description

- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head gaskets against high temperatures.
- Efficient and reliable turbo-charger.
- Full flow disposable spin-on oil filter, for extra high filtration.
- Full flow oil cooler.
- The lubricating oil level can be measured during operation.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Belt driven, highly efficient coolant pump.
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system including accurate mechanical governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Nitro-carburized transmission gears for heavy duty operation.
- Viscous crankshaft vibration damper to withstand single bearing alternator torsional vibrations.
- Automatic fan belt tensioner.
- Replaceable valve guides and valve.


C- WATER DRAIN COCK
D- OIL DIPSTICK
E- FUEL INLET
F- FUEL RETURN Ø 10
G- EXHAUST OUTLET
H- WATER INLET
J- WATER OUTLET
L- TEMP. SENDER
M- TEMP. SWITCH
N- FROM EXP. TANK
O- REVOLUTION PICK-UP
R- STOP SOLENOID
S- SPEED CONTROL
CO- REVOLUTION PICK-UP FOR ELEKTRIC GOVERNOR
Y- AIR VENT. HOSE Ø 9.5 TO BE CONNECTED TO EXP. TANK
AG- WATER FROM ENGINE HEATER
AH- WATER TO ENGINE HEATER
SPACE REQUIRED FOR REPLACING FILTER
AIR INTAKE
OIL PRESSURE
CRANKCASE VENT. PIPE Ø 32
FLANGE FOR FRONT BRAKE BRACKET
DIRECTION OF ROTATION
MAX. POSITION ALTERNATOR
REAR END OF BLOCK
FRONT END OF BLOCK
CENTRE OF GRAVITY
FUEL PRES. Ø 10
FLANGE SAE NO. 1
TURBO CHARGER
PLANE FOR REAR ENGINE BRACKET
SPACE REQUIRED FOR OIL DIPSTICK
5452

TD 1010 G Gen Pac
Drawing no. 887102-04



Technical data TD 1010 G

General

In line four stroke diesel engine with direct injection
Turbocharged

Number of cylinders	6	Bore		120.65 mm / 4.75 in	
Displacement, total	9.60 litres / 586 in^3	Stroke		140 mm / 5.51 in	
Firing order	1-5-3-6-2-4	Compression ratio		14.3:1	
Rotation direction, anti-clockwise viewed towards flywheel		Dry weight GenPac	1230 kg	Engine only	990 kg
		Wet weight GenPac	1280 kg	Engine only	1025 kg

TD 1010 G	Speed, rpm	1500	1800
Performance	Test no.	20000026	20000027
Prime Power			
without fan	kW / hp	182 / 248	203 / 276
with fan	kW / hp	176 / 239	192 / 261
Continuous Standby Power			
without fan	kW / hp	186 / 253	214 / 291
with fan	kW / hp	180 / 245	203 / 276
Standby Power			
without fan	kW / hp	204 / 277	234 / 318
with fan	kW / hp	198 / 269	223 / 303
Torque at			
Prime Power	Nm / lbft	1158 / 855	1076 / 794
Standby Power	Nm / lbft	1300 / 959	1240 / 915
Mean piston speed	m/s / ft/sec	7.0 / 23.0	8.4 / 27.6
Effective mean pressure at Prime Power	MPa / psi	1.52 / 220	1.40 / 204
Max combustion pressure at Prime Power	MPa / psi	12.5 / 1810	13.0 / 1890
Total mass moment of inertia, J (mR^2)	kgm^2 / $lbft^2$	2.54 / 60.3	
Degree of irregularity at Prime Power		1:89	1:200
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	22	31

Engine noise emission

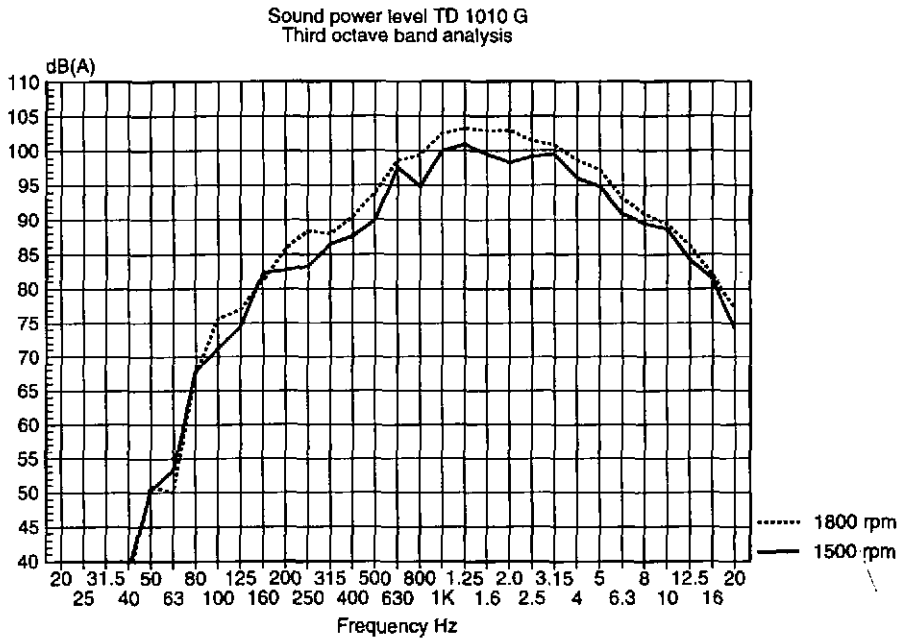
Test standards: ISO 3744-1981 (E)
sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

Measured sound power Lw

	Speed, rpm	1500	1800
No load	dB(A)	103.5	105.6
Prime Power	dB(A)	109.1	111.9
Standby Power	dB(A)	109.4	112.8

Calculated sound pressure Lp at 1 m

	Speed, rpm	1500	1800
No load	dB(A)	91.5	93.6
Prime Power	dB(A)	97.1	99.9
Standby Power	dB(A)	97.4	100.8



TD 1010 G	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	111	114
Standby power	dB(A)	112	115

Load acceptance

Test condition: warm engine

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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.6	2.0	1.6	2.0	20–100				
0–40	3.6	4.0	0.7	0.8	40–100	9.6		2.8	
0–60	5.5	6.0	0.6	0.7	50–100	3.6		0.9	
0–75		10.0		2.0	75–100		3.5		1.6
0–80	7.9	17.2	1.4	3.2	80–100	1.6	3.6	0.5	2.4
0–84	10.0		1.6		84–100				
100–0	9.8	10.8	1.8	1.0					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.5	1.7	1.0	1.0	20–100	5.7		1.0	
0–40	2.6	3.0	0.9	1.0	40–100	5.6		0.9	
0–60	3.7	4.3	1.2	1.0	60–100	2.7	5.0	0.8	3.8
0–80	5.2	6.0	1.0	1.0	80–100	1.3	1.7		1.4
0–95		10.0		2.2	95–100		1.0		2.2
0–100	7.1		1.4						
100–0	6.5	8.2	0.8	1.0					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TD 1010 G	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	5	5
0°C ambient temperature *)	s	35	35
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	8	6
0°C ambient temperature *)	s	43	36

*) With manifold heater engaged, lubricating oil 15 W/40

Derating

The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating.

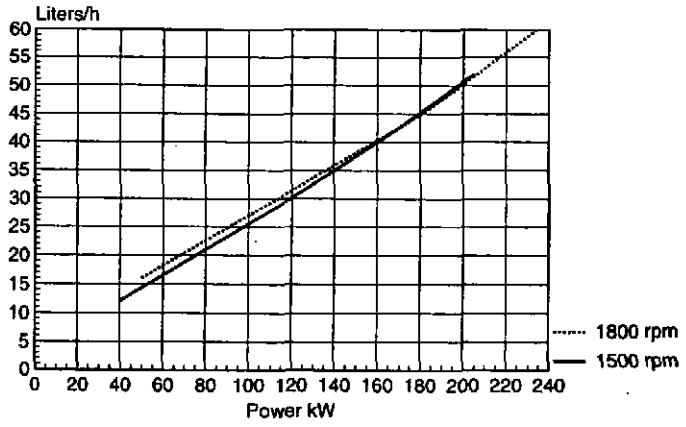
For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude derating factor <3000 m	4%/500 m
Altitude derating factor >3000 m	6%/500 m
Ambient temperature derating factor	2%/5°C
Humidity	No derating

TD 1010 G	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litre/h / US gal/h	0.12 / 0.032	0.14 / 0.037
Standby Power	litre/h / US gal/h	0.15 / 0.039	0.17 / 0.045
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	25	
Oil sump capacity			
max	litres	21	
min	litres	12	
Oil change interval			
CD oil quality	h	200	
VDS oil quality	h	400	
Engine angularity limits			
front up	degrees	22	
front down	degrees	30	
side tilt	degrees	45	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	95	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	245 / 0.392	260 / 0.416
50% of Prime Power	g/kWh / lb/hph	218 / 0.349	221 / 0.353
75% of Prime Power	g/kWh / lb/hph	209 / 0.334	211 / 0.337
100% of Prime Power	g/kWh / lb/hph	210 / 0.340	210 / 0.340
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	241 / 0.391	246 / 0.399
50% of Standby Power	g/kWh / lb/hph	214 / 0.347	218 / 0.353
75% of Standby Power	g/kWh / lb/hph	209 / 0.339	210 / 0.340
100% of Standby Power	g/kWh / lb/hph	214 / 0.347	215 / 0.348
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	115	130
Feed pump pressure	kPa	100–150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Mechanical RSV/Bosch	
Injection pump type/make		P3000/Bosch	
Injection timing	° B.T.D.C.	24	

Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

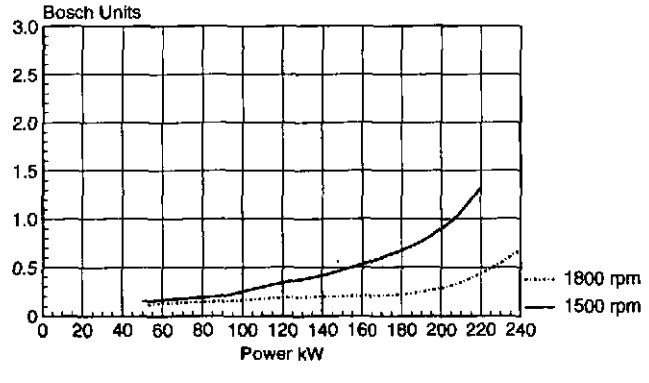
Fuel consumption
TD 1010 G



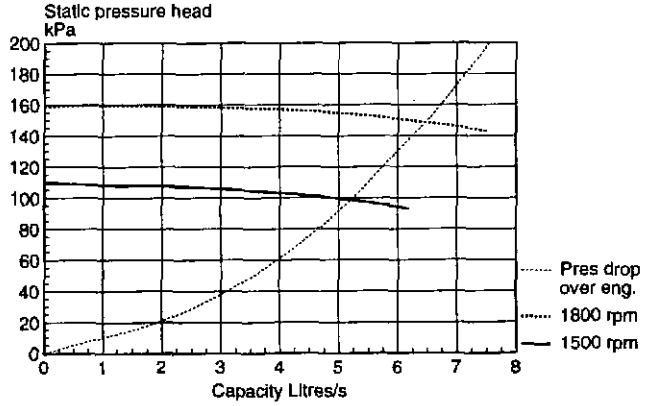
TD 1010 G	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	12.1 / 427	15.5 / 547
Standby Power, (at 27°C)	m^3/min / cfm	13.0 / 458	16.8 / 595
Air intake restriction, clean filters	kPa	Not available	
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	163 / 9274	169 / 9610
Standby Power	kW / BTU/min	179 / 10200	208 / 11800
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	570 / 1060	510 /950
Standby Power	°C / °F	605 / 1120	560 / 1040
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	36.2 / 1277	44.0 / 1553
Standby Power	m^3/min / cfm	40.1 / 1418	49.6 / 1753

Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	14 / 797	16 / 906
Standby Power	kW / BTU/min	16 / 910	18 / 1020
Heat rejection to coolant at			
Prime Power	kW / BTU/min	107 / 6088	114 / 6460
Standby Power	kW / BTU/min	119 / 6770	135 / 7680
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	0.90	
Radiator core thickness (std size)	mm	73	
Fan diameter	mm	620	
Fan power consumption	kW / hp	6 / 8	11 / 15
Fan drive ratio		1.54:1	
Coolant capacity			
engine	litres	16.3	
std radiator with hoses	litres	26	
Coolant pump	drive/ratio	belt/1.54:1	
Coolant flow with standard system	l/s	4.9	5.8
Minimum coolant flow	l/s	4.2	4.9
Minimum external coolant system restriction	kPa	47	66
Thermostat			
start to open	°C	75	
fully open	°C	88	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TD 1010 G



Water pump capacity
TD 1010 G



Cooling performance

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

Engine speed rpm	Air on temp °C	110% OF PRIME POWER Air flow m^3/s	Max additional external restriction Pa	STANDBY POWER Air flow m^3/s	Max additional external restriction Pa
1500	30	1.45	675	1.65	650
	40	1.85	595	2.10	565
	50	2.55	495	2.90	455
	55	3.10	435	3.45	400
	67			5.95	0
	69	5.95	0	–	–
1800	30	1.65	1010	1.95	950
	40	2.20	870	2.50	810
	50	2.90	725	3.35	660
	55	3.50	635	4.05	575
	67			7.15	0
	70	7.15	0	–	–

TD 1010 G	**Speed, rpm**	**1500**	**1800**
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		3.37:1	
Starter motor	make/type/kW	Bosch/KB/5.4	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel		156	
Number of teeth on starter motor		11	
Inrush current at +20°C	Amp	850	
Cranking current at +20°C	Amp	350	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2x143	
minimum at >+5°C	Ah	2x88	
Stop solenoid			
pull current	Amp	35	
hold current	Amp	0.4	
Inlet manifold heater (at 20 V)	kW	4.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	max 590	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	max 32	max 40
down	kW	max 21	max 31
right	kW	max 29	max 46
Timing gear at compressor PTO	Nm	max 110	
speed ratio direction of rotation viewed from flywheel side		0.91:1/clockwise	
Timing gear at servo pump PTO	Nm	max 67	
speed ratio direction of rotation viewed from flywheel side		0.86:1/clockwise	

TD 1010 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	**Engine**	1	–	TD 1010 G	868366		
		–	2	TD 1010 G Gen Pac	868367		
	Ratings	3	3	Prime Power 1500 rpm	135092010		182 kW (176 kW with fan)
		4	4	Standby Power 1500 rpm	135092022		205 kW (198 kW with fan)
		5	5	Prime Power 1800 rpm	135092011		203 kW (192 kW with fan)
		6	6	Standby Power 1800 rpm	135092023		234 kW (223 kW with fan)
218	**Engine suspension**	3	–	Fixed front, low	843457	x	226 mm to crankshaft centre
		4	–	Fixed rear, low	843339	x	226 mm to crankshaft centre
		7	•	Fixed front, high	865983	x	325 mm to crankshaft centre
		8	•	Fixed rear, high	865984	x	325 mm to crankshaft centre
		15	–	Flexible front upper bracket	843459	x	2 pcs, incl rubber cushions
		16	–	Lower bracket for 218.15, 218.18	820744	x	262 mm to crankshaft centre 1 pcs included
		17	–	Lower bracket for 218.15, 218.18	820822	x	297 mm to crankshaft centre 1 pcs included
		18	–	Flexible rear upper bracket	843463	x	2 pcs, incl rubber cushions Lower bracket, see 218.16–17
22	**Lubrication system**	1	1	Oil drain pump	135092201	x*	Manual
23	**Fuel system**	1	•	Flexible fuel hoses	135092923	x*	Two pcs, L=400mm
		3	3	Electronic governor 1500/1800 rpm	135092721	x*	Incl control unit Electrical stop, see 27.3
		7	7	Mounting kit for separate electronic governor	843332	x	For other el. governor than GAC
		8	8	Overspeed trip switch	135093641	x*	Speed sender included
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	135099080	x*	Mounted on base frame
25	**Intake and exhaust system**	1	1	Air filter elbow connection	843465	x	Two pcs are required
		2	2	Flexible exhaust pipe	847114	x	
		3	3	Exhaust elbow	3826823	x	
		4	4	Silencer, absorbtion type	843469	x	With pipe clamps
		5	5	Silencer, 4" Heavy Duty	863047	x	With connecting flanges
		–	9	Silencer, engine mounted	863198	x	Incl mounting parts
		10	10	Heat guard	135099012	x*	Exhaust manifold and turbo
26	**Cooling system**	3	•	Radiator, 0.90 m^2	3825578	x	Incl fan guard and mounting parts
		17	•	Radiator guard	863013	x	
		19	•	Thrust type fan	865289	x	Ø 620 mm, for 26.3 incl. 50 mm fan hub extension
		20	–	Suction type fan	863074	x	Ø 620 mm, for 26.3 incl. 50 mm fan hub extension
		–	26	Suction type fan	135092601	x	Ø 620 mm
		37	•	Belt guard	135092933	x*	For fan and alternator belts
		39	39	Coolant filter	828046	x	
27	**Control system**	1	1	Electric lever control	135092702	x*	Not in comb with electronic governor
		3	3	Electrical stop	135092804	x*	Energized to run. For el. governor
31	**Battery**	1	1	Battery box	864171	x	
		2	2	Connection cables	864173		Incl main switch
33	**Starting system**	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run

** Reference to corresponding customer fitted kit*

TD 1010 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
37	**Electrical wiring**	3	3	Engine wiring	135093631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5
38	**Instrument, switches and senders**	1	1	Instrument panel	873626	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	135093626	x*	
		5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		7	7	Oil temp gauge and sender	863452	x	Not in comb with oil drain pump
		8	8	Speed sender	135093627	x*	Not in comb with 23.8
		9	9	Tachometer/ hour meter	873722	x	For Ø 72 mm mounting hole
		10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9
		11	11	Hour meter	858877	x	
		12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	
		14	•	Coolant temp and oil pressure switches	135093621	x*	103°C temp setting
		15	–	Coolant temp and oil pressure switches	135093625	x*	97°C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	2	2	Flexible coupling ME 214	845817	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865078	x	Separately mounted. 220–240 V.
		3	3	Tool kit	844481	x	
		4	4	Engine heater 2000 W	3825491	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825388	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994105	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994102	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	135090401	x	[1]
		4	4	Instruction book, English			[1] One included in engine order no.
		5	5	Instruction book, German	135090403	x	[1]
		6	6	Instruction book, French	135090404	x	[1]
		7	7	Instruction book, Spanish	135090405	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745720		
		10	10	Maintenance kit, 2500 h	876760	x	
		11	11	Maintenance kit, 5000 h	876761	x	
	Engine packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	135091902	x	
		–	14	Plastic wrapping		x	Included in engine order no.
		–	15	Wooden box	135091910	x	

* Reference to corresponding customer fitted kit
[1]) *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately. – See next page!

TD 1010 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted *equipment* order no.		Corresponding *factory fitted* equipment
22.1	135092201	Oil drain pump	862937
23.1	135092923	Flexible fuel hoses	843466
23.3	135092721	Electronic governor	3825506
23.6	135093627	Overspeed tripswitch	866411
23.9	135099080	Fuel filter/water separator	3826744
25.10	135099012	Heat guard	3826759
26.37	135092933	Belt guard	3825573
27.1	135092702	Electric lever control	866403
27.3	135092804	Electrical stop	866293
37.3	135093631	Engine wiring	862625
38.4	135093626	Senders	863620
38.8	135093627	Speed sender	862323
38.14	135093621	Switches 103°C	862924
38.15	135093625	Switches 97°C	863962

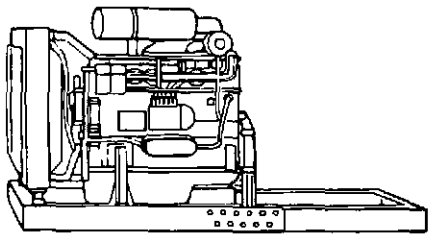
TWD 1010 G

Gen Set engine — Gen Pac

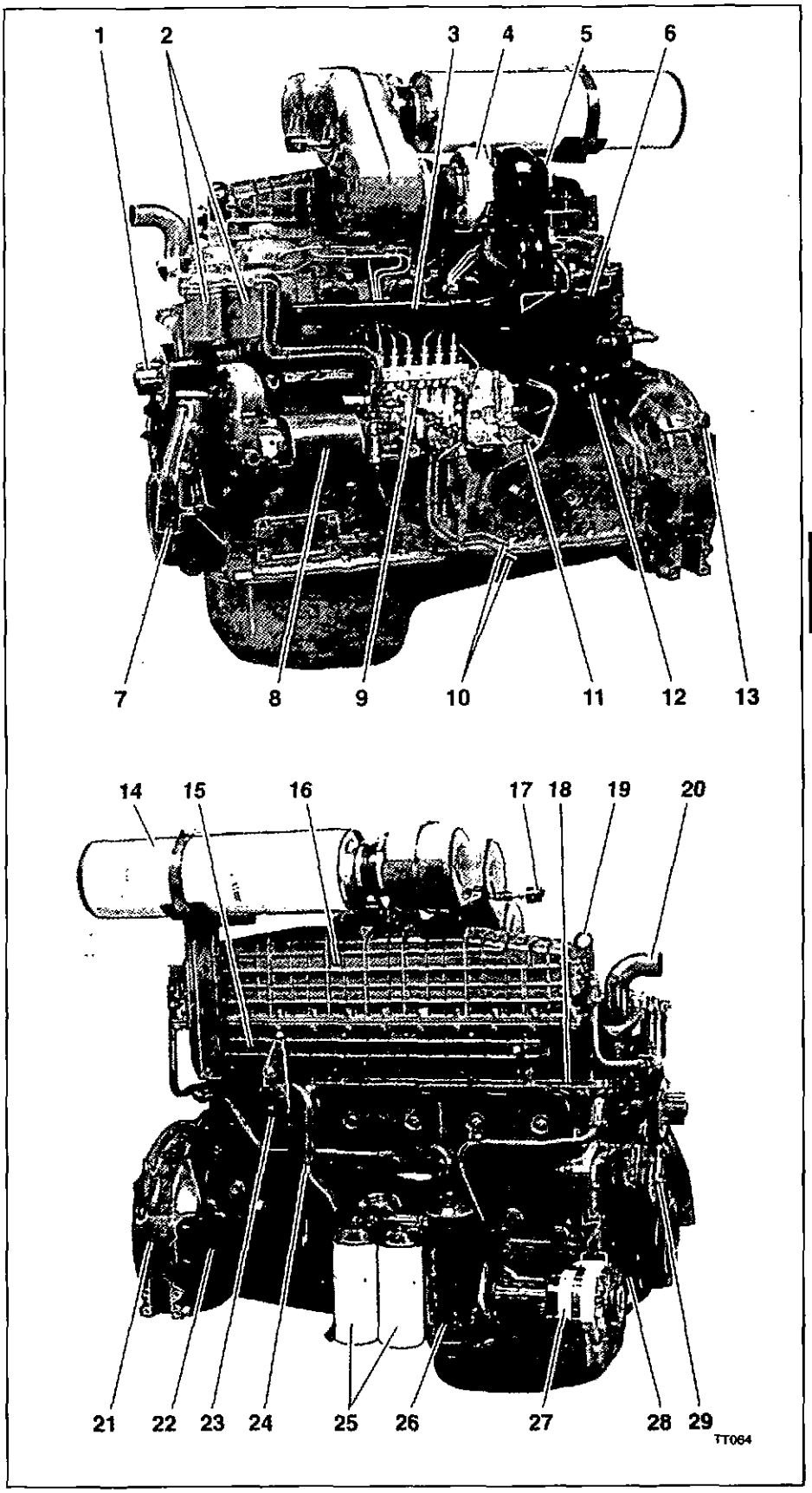
TWD 1010 G

- Turbocharged
- Water to air intercooled
- Diesel fuel
- Displacement indication (l)
- Generation
- Version
- Generator drive

Gen Pac – Gen Set engine mounted on an extendable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



1. Fan hub
2. Twin fuel filters of throw-away type
3. Air cooled exhaust manifold
4. Turbo-charger
5. Connecting flange, exhaust line
6. Heat radiation protection
7. Coolant pipe, inlet
8. Pump coupling guard
9. Injection pump
10. Fuel pipes for tank connection
11. Manual speed control
12. Stop solenoid
13. Lift eyelet
14. Double air filters of throw-away type
15. Inlet manifold heater
16. *Intercooler*
17. Air restriction indicator
18. Cable iron
19. Lift eyelet
20. Coolant pipe, outlet
21. Flywheel housing SAE 1
22. Starter motor
23. Relay for inlet manifold heater
24. Crankcase ventilation
25. Twin full-flow oil filters of spin-on type
26. Oil cooler
27. Alternator
28. Vibration damper
29. Automatic belt tensioner

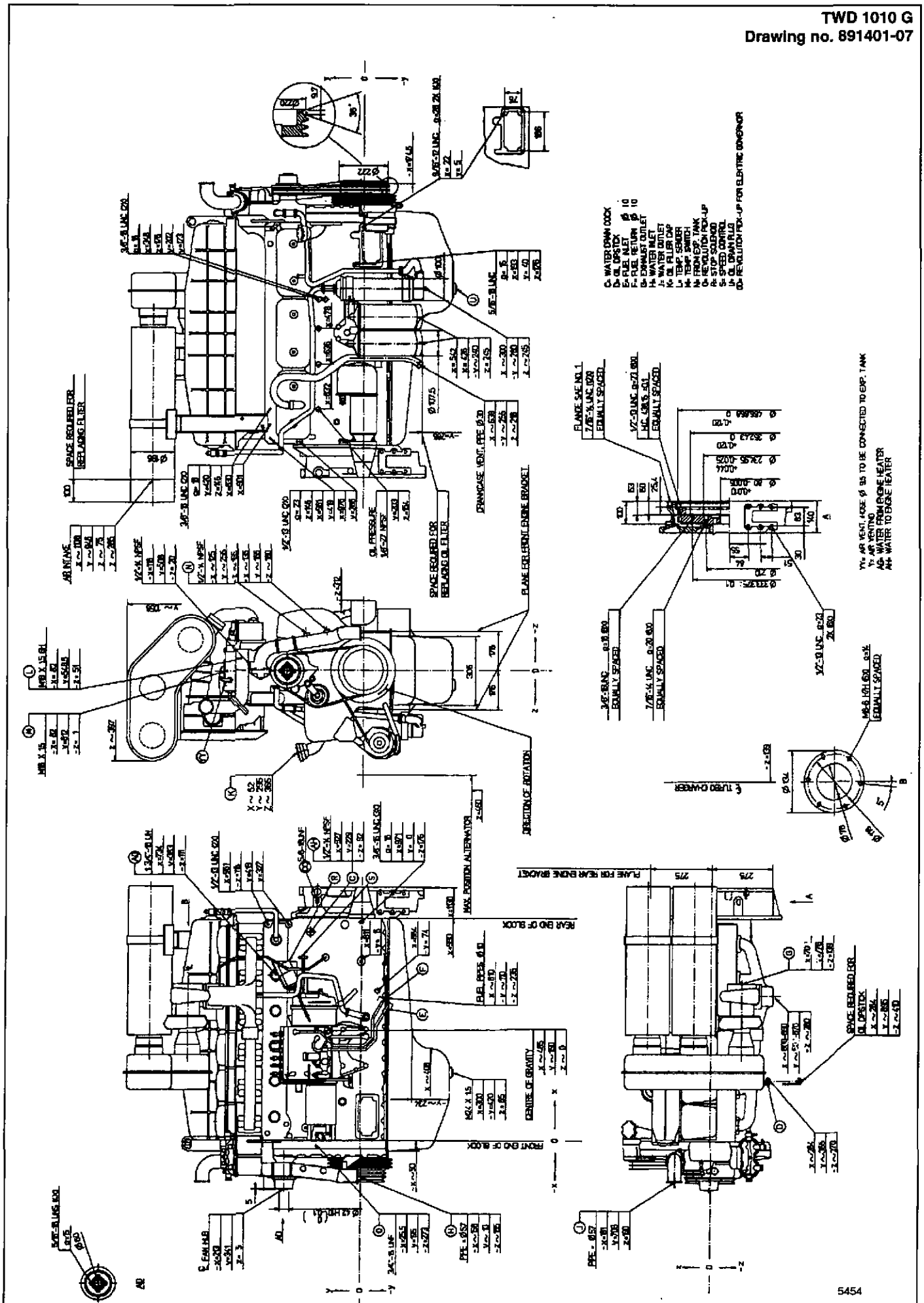
Standard equipment
TWD 1010 G

		Engine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 1	•	•
	Flywheel for 14" flex. plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with RQ centrifugal governor	•	•
	Pump coupling guard	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-compressor	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator	–	•
	Radiator guard	–	•
	Belt-driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
	Intercooler	•	•
27	**Control system**		
	Manual speed control	•	•
	Electrical stop energized to run	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, right side	•	•
33	**Starting system**		
	Starter motor, Bosch 5.4 kW/24 V	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and senders**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

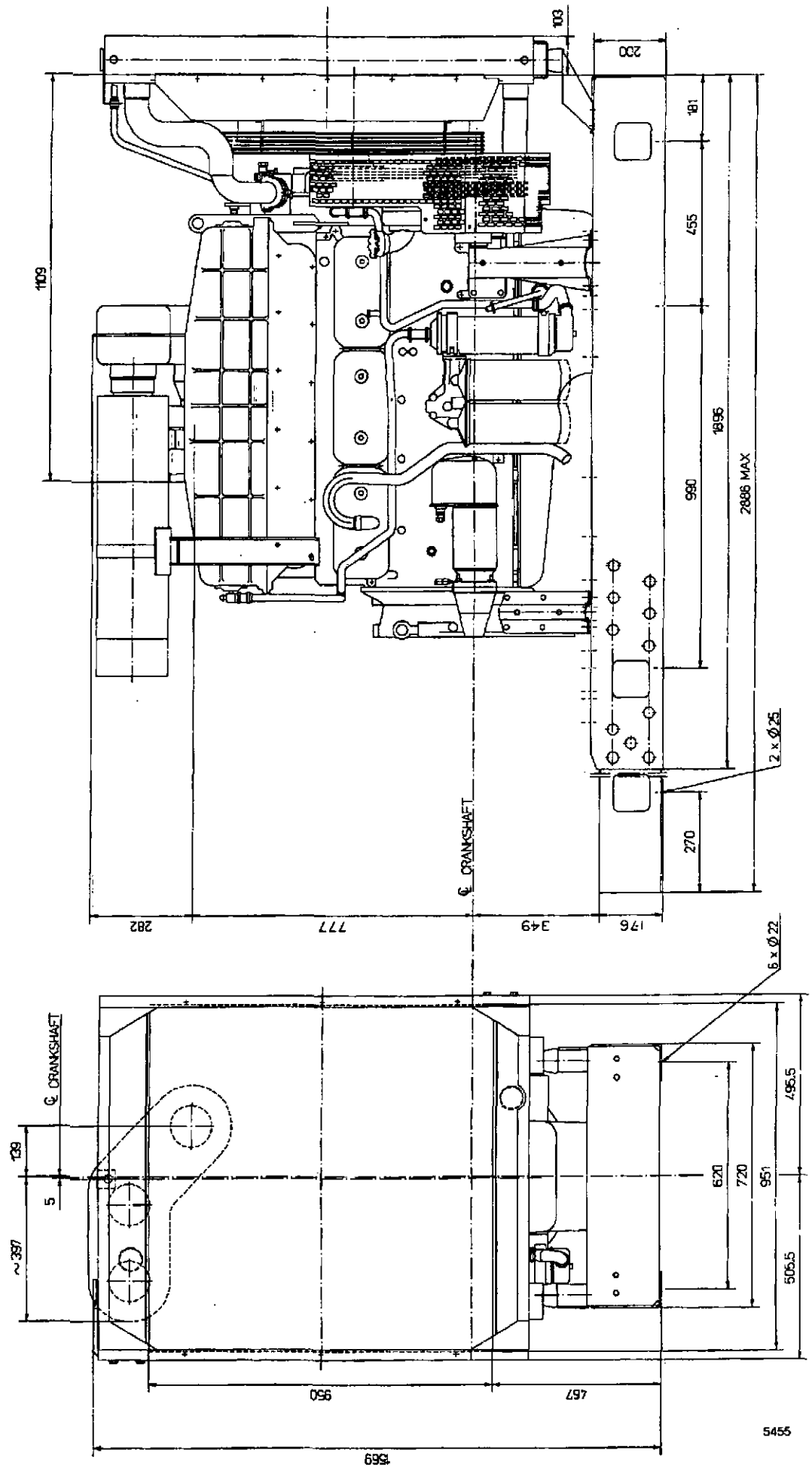
– optional equipment or not applicable
• included in standard specification

Technical description

- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head gaskets against high temperatures.
- Efficient and reliable turbo-charger.
- Water to air intercooler.
- Full flow disposable spin-on oil filter, for extra high filtration.
- Full flow oil cooler.
- The lubricating oil level can be measured during operation.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Belt driven, highly efficient coolant pump.
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system including accurate mechanical governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Nitro-carburized transmission gears for heavy duty operation.
- Viscous crankshaft vibration damper to withstand single bearing alternator torsional vibrations.
- Automatic fan belt tensioner.
- Replaceable valve guides and valve.


TWD 1010 G
5454

TWD 1010 G Gen Pac
Drawing no. 887103-04



DRY WEIGHT CA 1230 KG
WET WEIGHT CA 1280 KG

Technical data TWD 1010 G

General

In line four stroke diesel engine with direct injection
Turbocharged and water to air intercooled

Number of cylinders	6	Bore			120.65 mm / 4.75 in
Displacement, total	9.60 litres / 586 in^3	Stroke			140 mm / 5.51 in
Firing order	1-5-3-6-2-4	Compression ratio			14.3:1
Rotation direction, anti-clockwise viewed towards flywheel		Dry weight	GenPac	1230 kg	Engine only 990 kg
		Wet weight	GenPac	1280 kg	Engine only 1030 kg

TWD 1010 G	Speed, rpm	1500	1800
Performance	Test no.	21001019	21001020
Prime Power			
without fan	kW/hp	204 / 277	231 / 314
with fan	kW/hp	198 / 269	220 / 299
Continuous Standby Power			
without fan	kW/hp	208 / 282	238 / 324
with fan	kW/hp	201 / 273	227 / 309
Standby Power			
without fan	kW/hp	227 / 309	261 / 355
with fan	kW/hp	221 / 301	250 / 340
Torque at			
Prime Power	Nm/lbft	1298 / 960	1225 / 904
Standby Power	Nm/lbft	1440 / 1060	1380 / 1020
Mean piston speed	m/s/ft/sec	7.0 / 23.0	8.4 / 27.6
Effective mean pressure at Prime Power	MPa/psi	1.70 / 247	1.60 / 233
Max combustion pressure at Prime Power	MPa/psi	13.0 / 1880	12.5 / 1810
Total mass moment of inertia, J (mR^2)	$kgm^2/lbft^2$	2.54 / 60.3	
Degree of irregularity at Prime Power		1:74	1:169
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	22	31

Engine noise emission

Test standards: ISO 3744-1981 (E) sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

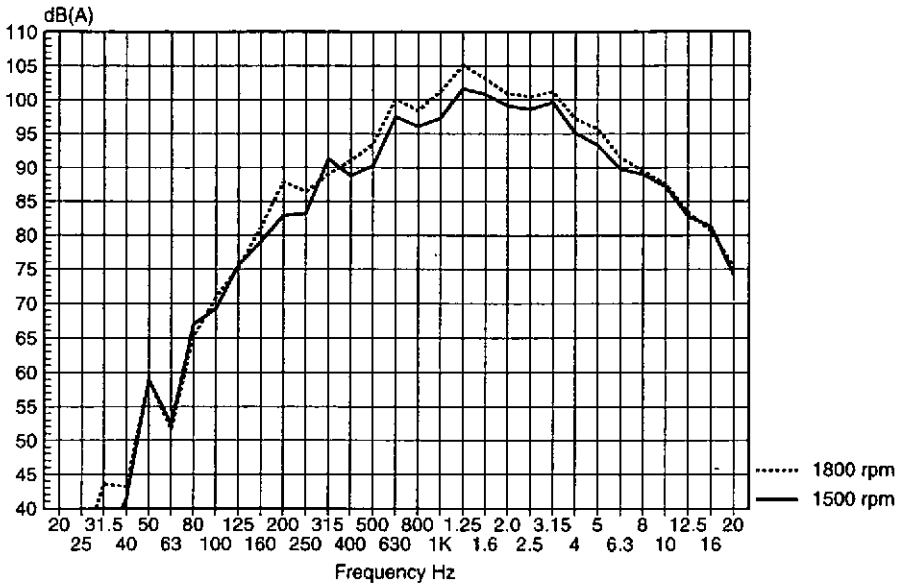
Measured sound power Lw

	Speed, rpm	1500	1800
No load	dB(A)	–	–
Prime Power	dB(A)	109.0	111.9
Standby Power	dB(A)	109.3	112.6

Calculated sound pressure Lp at 1m

	Speed, rpm	1500	1800
No load	dB(A)	–	–
Prime Power	dB(A)	97.0	99.9
Standby Power	dB(A)	97.3	100.6

Sound power level TWD 1010 G
Third octave band analysis



TWD 1010 G	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	112	116
Standby power	dB(A)	112	116

Load acceptance

Test condition: warm engine

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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.4	1.6	0.5	0.5	20–100				
0–40	2.6	2.8	0.6	0.6	40–100				
0–60	4.0	4.4	1.2	1.2	60–100	4.4		1.6	
0–69		10.0		2.0	69–100				
0–77	10.0		1.8		77–100	1.4		1.0	
0–82				9.0	82–100		2.6		3.2
0–93			7.0						
100–0	7.2	8.8	0.8	0.8					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.1	1.2	0.5	0.5	20–100				
0–40	2.1	2.5	0.8	0.9	40–100	4.6		1.3	
0–60	3.3	3.6	1.2	0.9	60–100	2.6	5.3	0.8	3.9
0–80	4.8	6.6	1.5	1.6	80–100	1.3	1.8	0.8	1.4
0–89		10.0		2.2	–100				
0–100	10.0		2.2						
100–0	5.6	7.0	0.5	0.5					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TWD 1010 G	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	5	5
0°C ambient temperature*)	s	42	42
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	11	13
0°C ambient temperature *)	s	59	58

*) With manifold heater engaged, lubricating oil 15 W/40

Derating

The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating.

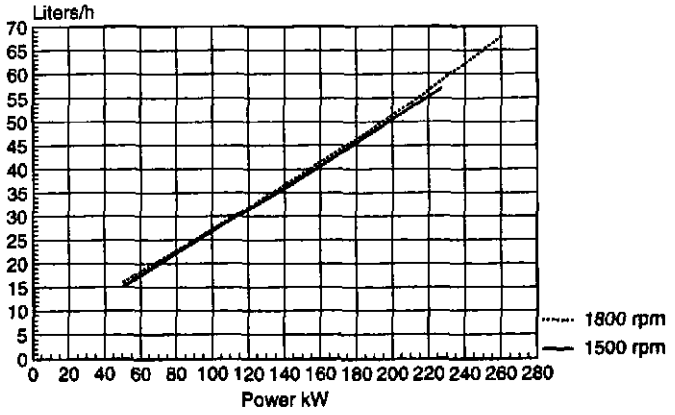
For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude derating factor <3000 m	4%/500 m
Altitude derating factor >3000 m	6%/500 m
Ambient temperature derating factor	1.5%/5°C
Humidity	No derating

TWD 1010 G	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litre/h / US gal/h	0.12 / 0.032	0.13 / 0.034
Standby Power	litre/h / US gal/h	0.14 / 0.037	0.17 / 0.045
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	25	
Oil sump capacity			
max	litres	21	
min	litres	12	
Oil change interval			
CD oil quality	h	200	
VDS oil quality	h	400	
Engine angularity limits			
front up	degrees	22	
front down	degrees	30	
side tilt	degrees	45	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	100	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	254 / 0.406	260 / 0.416
50% of Prime Power	g/kWh / lb/hph	220 / 0.352	226 / 0.361
75% of Prime Power	g/kWh / lb/hph	212 / 0.339	215 / 0.344
100% of Prime Power	g/kWh / lb/hph	211 / 0.342	213 / 0.345
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	247 / 0.400	256 / 0.415
50% of Standby Power	g/kWh / lb/hph	217 / 0.352	222 / 0.360
75% of Standby Power	g/kWh / lb/hph	211 / 0.342	213 / 0.345
100% of Standby Power	g/kWh / lb/hph	213 / 0.345	219 / 0.355
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	115	130
Feed pump pressure	kPa	100–150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Mechanical RQ/Bosch	
Injection pump type/make		P3000/Bosch	
Injection timing	° B.T.D.C.	22	

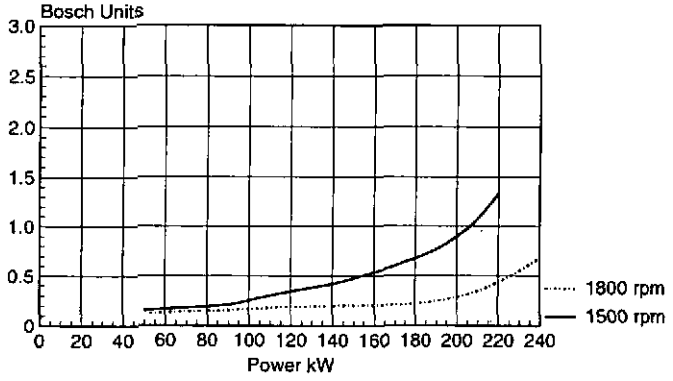
Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

Fuel consumption
TWD 1010 G

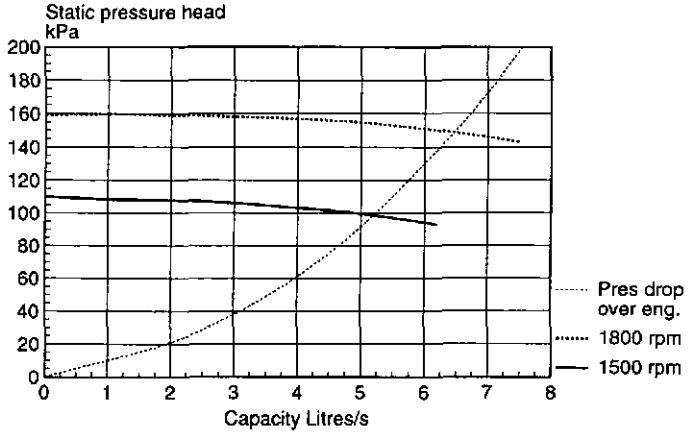


TWD 1010 G	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	14.1 / 498	18.0 / 635
Standby Power, (at 27°C)	m^3/min / cfm	15.2 / 537	20.1 / 710
Air intake restriction, clean filters	kPa	Not available	
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	168 / 9559	201 / 11436
Standby Power	kW / BTU/min	182 / 10300	234 / 13300
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	540 / 1005	500 / 930
Standby Power	°C / °F	560 / 1040	530 / 990
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	40.8 / 1440	48.0 / 1694
Standby Power	m^3/min / cfm	44.3 / 1564	55.1 / 1946
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	16 / 910	17 / 967
Standby Power	kW / BTU/min	18 / 1020	20 / 1140
Heat rejection to coolant at			
Prime Power	kW / BTU/min	122 / 6942	134 / 7624
Standby Power	kW / BTU/min	130 / 7390	151 / 8590
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	0.90	
Radiator core thickness (std size)	mm	73	
Fan diameter	mm	620	
Fan power consumption	kW / hp	6 / 8	11 / 15
Fan drive ratio		1.54:1	
Coolant capacity			
engine	litres	19.5	
std radiator with hoses	litres	26	
Coolant pump	drive/ratio	belt/1.54:1	
Coolant flow with standard system	l/s	4.9	5.8
Minimum coolant flow	l/s	4.4	5.2
Maximum external coolant system restriction	kPa	43	60
Thermostat			
start to open	°C	75	
fully open	°C	88	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TWD 1010 G



Water pump capacity
TWD 1010 G



Cooling performance

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

Engine speed rpm	Air on temp °C	110% OF PRIME POWER Air flow m^3/s	Max additional external restriction Pa	STANDBY POWER Air flow m^3/s	Max additional external restriction Pa
1500	30	1.80	625	1.90	610
	40	2.35	540	2.50	515
	50	3.15	425	3.35	410
	55	3.70	385	4.05	365
	63			5.95	0
	65	5.95	0	–	–
1800	30	2.15	910	2.35	870
	40	2.75	775	3.05	725
	50	3.71	615	4.15	580
	55	4.50	545	5.00	505
	63			7.15	0
	65	7.15	0	–	–

TWD 1010 G	**Speed, rpm**	**1500**	**1800**
Electrical system			
Voltage and type		*24 V/insulated from earth*	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		3.37:1	
Starter motor	make/type/kW	Bosch/KB/5.4	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel		156	
Number of teeth on starter motor		11	
Inrush current at +20°C	Amp	850	
Cranking current at +20°C	Amp	350	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2x143	
minimum at >+5°C	Ah	2x88	
Stop solenoid			
pull current	Amp	35	
hold current	Amp	0.4	
Inlet manifold heater (at 20 V)	kW	4.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	max 590	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	max 32	max 40
down	kW	max 21	max 31
right	kW	max 29	max 46
Timing gear at compressor PTO	Nm	max 110	
speed ratio direction of rotation viewed from flywheel side		0.91:1/clockwise	
Timing gear at servo pump PTO	Nm	max 67	
speed ratio direction of rotation viewed from flywheel side		0.86:1/clockwise	

TWD 1010 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	**Engine**	1	–	TWD 1010 G	868368		
	Gen Pac	–	2	TWD 1010 G Gen Pac	868369		
	Ratings	3	3	Prime Power 1500 rpm	135092012		204 kW (198 kW with fan)
		4	4	Standby Power 1500 rpm	135092030		227 kW (221 kW with fan)
		5	5	Prime Power 1800 rpm	135092013		231 kW (220 kW with fan) [1]
		6	6	Standby Power 1800 rpm	135092031		261 kW (250 kW with fan) [1]
							[1]) Order also 23.2 or 23.3
218	**Engine suspension**	3	–	Fixed front, low	843457	x	226 mm to crankshaft centre
		4	–	Fixed rear, low	843339	x	226 mm to crankshaft centre
		7	•	Fixed front, high	865983	x	325 mm to crankshaft centre
		8	•	Fixed rear, high	865984	x	325 mm to crankshaft centre
		15	–	Flexible front upper bracket	843459	x	2 pcs, incl rubber cushions
		16	–	Lower bracket for 218.15, 218.18	820744	x	262 mm to crankshaft centre 1 pcs included
		17	–	Lower bracket for 218.15, 218.18	820822	x	297 mm to crankshaft centre 1 pcs included
		18	–	Flexible rear upper bracket	843463	x	2 pcs, incl rubber cushions Lower bracket, see 218.16–17
22	**Lubrication system**	1	1	Oil drain pump	135092201	x*	Manual
23	**Fuel system**	1	•	Flexible fuel hoses	135092923	x*	Two pcs, L=400mm
		2	2	Mechanical governor set for 1800 rpm	135092706		
		3	3	Electronic governor 1500/1800 rpm	135092723	x*	Incl control unit Electrical stop, see 27.3
		7	7	Mounting kit for separate electronic governor	843332	x	For other el. governor than GAC
		8	8	Overspeed trip switch	135093641	x*	Speed sender included
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	135099080	x*	Mounted on base frame
25	**Intake and exhaust system**	1	1	Air filter elbow connection	843465	x	Two pcs are required
		2	2	Flexible exhaust pipe	847114	x	
		3	3	Exhaust elbow	3826823	x	
		4	4	Silencer, absorbtion type	843469	x	With pipe clamps
		5	5	Silencer, 5" Heavy Duty	863048	x	With connecting flanges
		–	9	Silencer, engine mounted	863198	x	Incl mounting parts
		10	10	Heat guard	135099012	x*	Exhaust manifold and turbo
26	**Cooling system**	3	•	Radiator, 0.90 m^2	3825578	x	Incl fan guard and mounting parts
		17	•	Radiator guard	863013	x	
		19	•	Thrust type fan	865289	x	Ø 620 mm, for 26.3 incl. 50 mm fan hub extension
		20	–	Suction type fan	863074	x	Ø 620 mm, for 26.3
		–	22	Suction type fan	135092601	x	Ø 620 mm
		37	•	Belt guard	135092933	x*	For fan and alternator belts
		39	39	Coolant filter	828046	x	
27	**Control system**	1	1	Electric lever control	135092707	x*	(1500 rpm) Not in comb. with el gov.
		2	2	Electric lever control	135092708	x*	(1800 rpm) Not in comb. with el gov.
		3	3	Electrical stop	135092804	x*	Energized to run. For el. governor
31	**Battery**	1	1	Battery box	864171	x	
		2	2	Connection cables	864173		Incl main switch
33	**Starting system**	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run

** Reference to corresponding customer fitted kit.*

TWD 1010 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen-Pac	Option	Order no.	See option descr.	Note
37	**Electrical wiring**	3	3	Engine wiring	135093631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5
38	**Instrument, switches and senders**	1	1	Instrument panel	873626	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	135093626	x*	
		5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		7	7	Oil temp gauge and sender	863452	x	Not in comb with oil drain pump
		8	8	Speed sender	135093627	x*	Not in comb with 23.8
		9	9	Tachometer/ hour meter	873722	x	For Ø 72 mm mounting hole
		10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9
		11	11	Hour meter	858877	x	
		12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	Excl wiring
		14	•	Coolant temp and oil pressure switches	135093621	x*	103°C temp setting
		15	–	Coolant temp and oil pressure switches	135093625	x*	97°C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	2	2	Flexible coupling ME 214	845817	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865078	x	Separately mounted. 220–240 V.
		3	3	Tool kit	844481	x	
		4	4	Engine heater 2000 W	3825491	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825388	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994105	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994102	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	135090401	x	[1]
		4	4	Instruction book, English			[1] One included in engine order no.
		5	5	Instruction book, German	135090403	x	[1]
		6	6	Instruction book, French	135090404	x	[1]
		7	7	Instruction book, Spanish	135090405	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745720		
		10	10	Maintenance kit, 2500 h	876760	x	
		11	11	Maintenance kit, 5000 h	876761	x	
	Engine packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	135091902	x	
		–	14	Plastic wrapping		x	Included in engine order no.
		–	15	Wooden box	135091910	x	

** Reference to corresponding customer fitted kit.*
[1]) *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately. – See next page !

TWD 1010 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted equipment order no.		Corresponding factory fitted equipment
22.1	135092201	Oil drain pump	862937
23.1	135092923	Flexible fuel hoses	843466
23.3	135092723	Electronic governor	3825506
23.8	135093641	Overspeed tripswitch	866411
23.9	135099080	Fuel filter/water separator	3826744
25.10	135099012	Heat guard	3826759
26.37	135092933	Belt guard	3825573
27.1	135092707	Electric lever control	866409
27.2	135092708	Electric lever control	866409
27.3	135092804	Electrical stop	866293
37.3	135093631	Engine wiring	862625
38.4	135093626	Senders	863620
38.8	135093627	Speed sender	862323
38.14	135093621	Switches 103°C	862924
38.15	135093625	Switches 97°C	863962

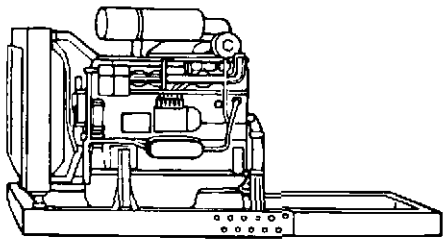
TAD 1030 GE

Gen Set Engine – Gen Pac

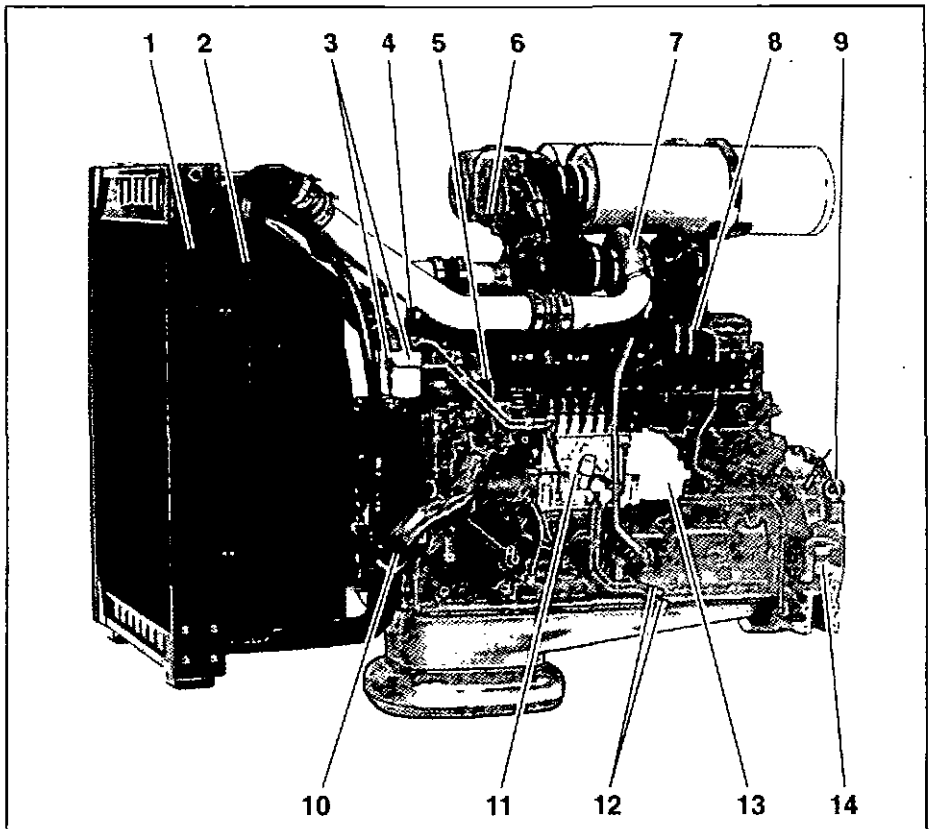
TAD 1030 GE

- Turbocharged
- Air to air intercooled
- Diesel fuel
- Displacement indication (l)
- Generation
- Version
- Generator drive
- Emission controlled

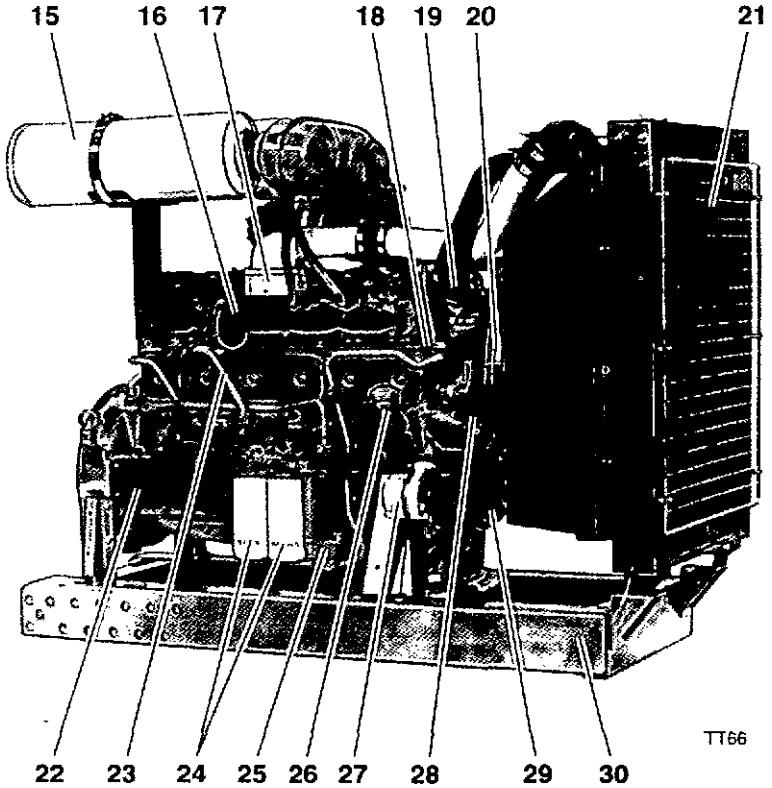
Gen Pac – Gen Set Engine mounted on an expandable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



TT65



TT66

1. Tropical radiator
2. Intercooler
3. Twin fuel filters of throw-away type
4. Lift eyelet
5. Gear driven coolant pump
6. Air restriction indicator
7. Turbo-charger
8. Air cooled exhaust manifold
9. Lift eyelet
10. Coolant pipe, inlet
11. Injection pump
12. Fuel pipes for tank connection
13. Electric speed governor
14. Flywheel housing SAE 1
15. Air filter
16. Relay for inlet manifold heater
17. Inlet manifold heater
18. Cable iron
19. Coolant pipe, outlet
20. Fan guard
21. Radiator guard *)
22. Starter motor
23. Crankcase ventilation
24. Full-flow oil filters of spin-on type
25. Oil cooler
26. Oil filler
27. Alternator
28. Automatic belt tensioner
29. Vibration damper
30. Expandable base frame

*) Optional

Standard equipment
TAD 1030 GE

		En-gine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 1	•	•
	Flywheel for 14" flexible plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of *spin-on type*	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with GAC electric governor	•	•
	Pump coupling guard	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-compressor	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator and intercooler	•[1])	•
	Radiator guard	–	•
	Gear driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
	Intercooler	•	•
32	***Alternator***		
	Alternator 60 A/24 V low, right side	•	•
33	**Starting system**		
	Starter motor, Bosch 5.4 kW/24 V	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and senders**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

[1]) Must be ordered

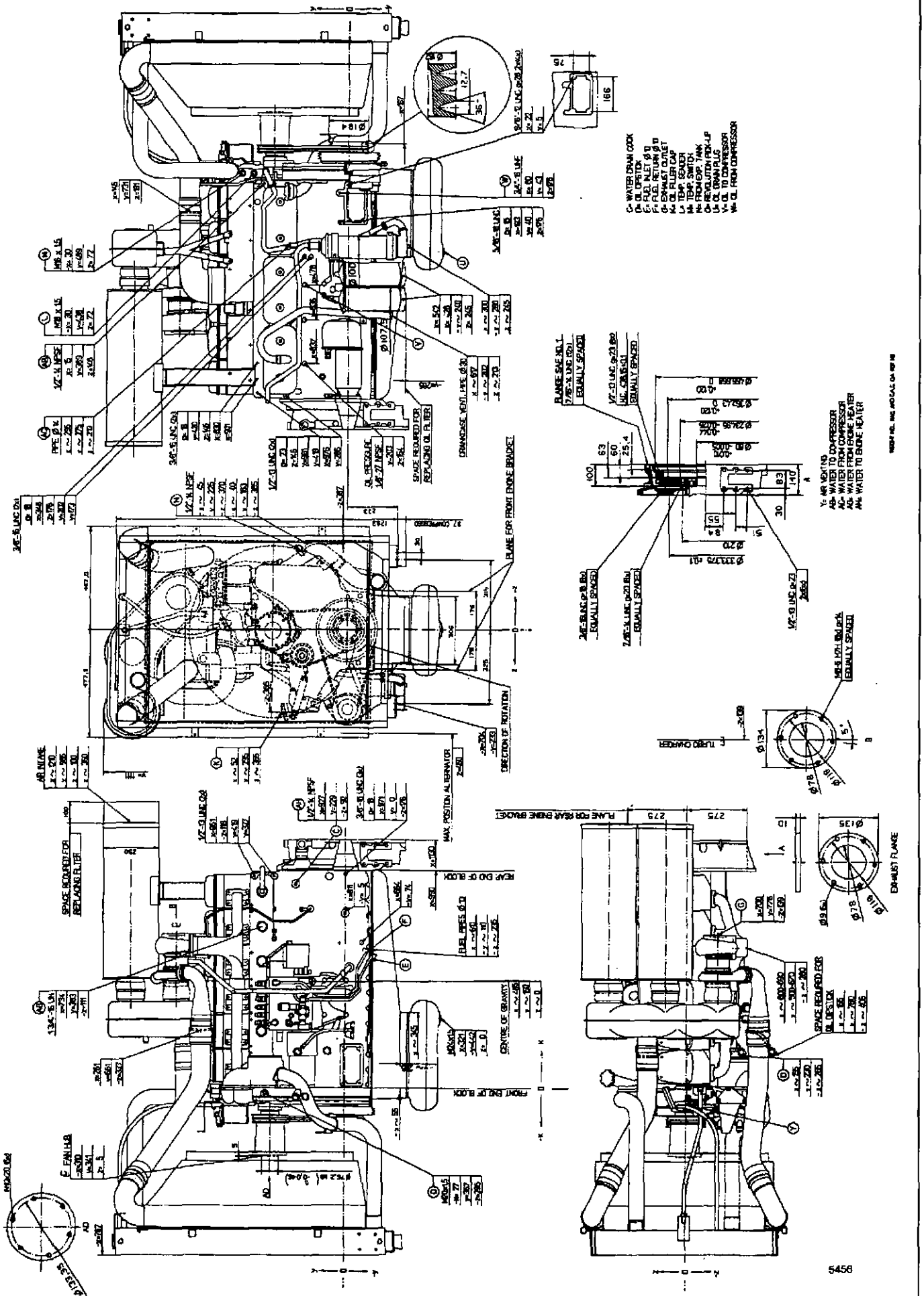
– optional equipment or not applicable
• included in standard specification

TAD1030GE

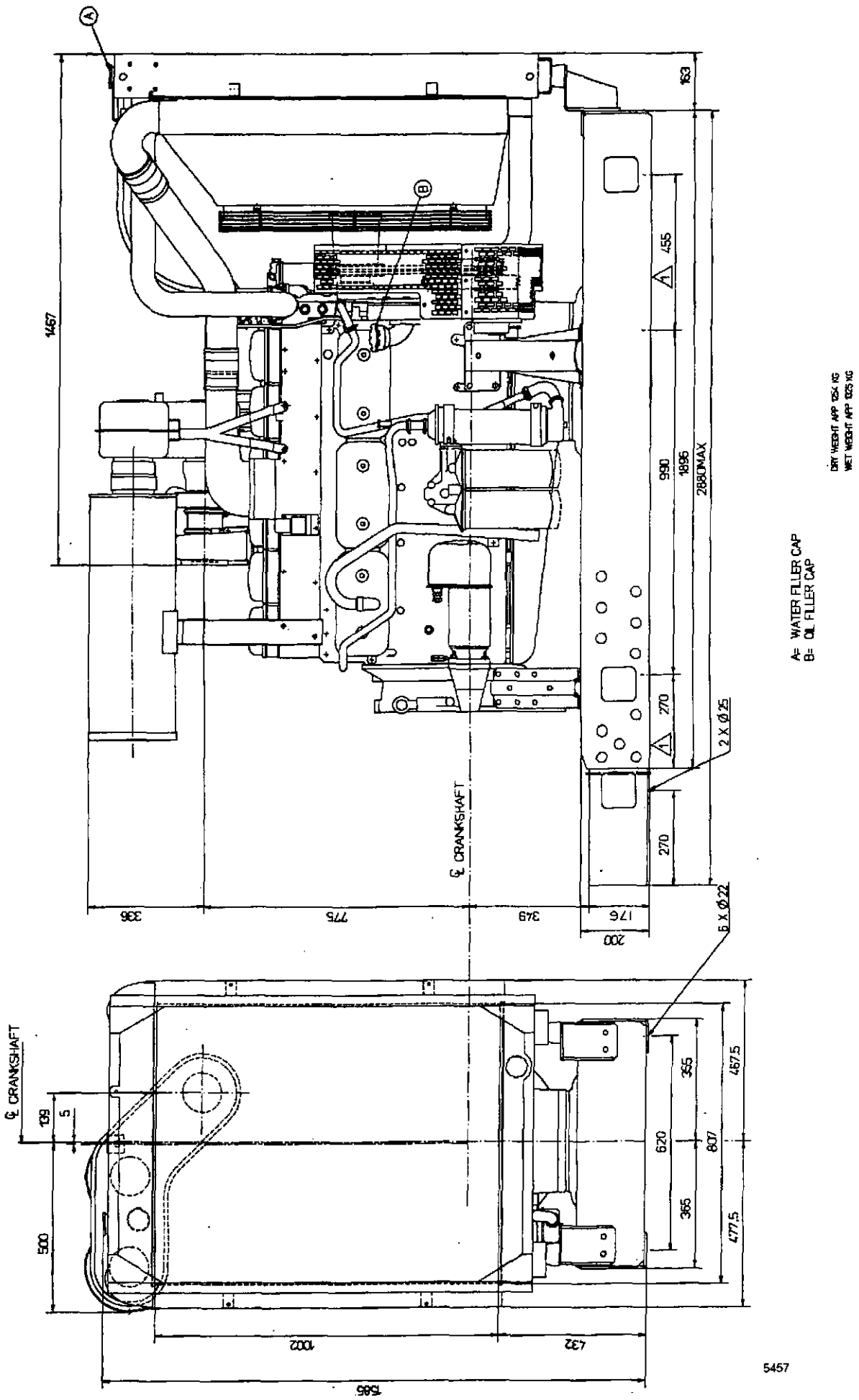
Technical description

- Complies with EPA, CARB and TA -luft exhaust emission regulation.
- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head gaskets against high temperatures.
- Efficient and reliable turbo-charger.
- Air to air intercooler.
- *Full flow disposable spin-on oil* filter, for extra high filtration.
- Full flow oil cooler.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder *block. Reliable sleeve thermostat* with minimum pressure drop.
- Gear driven, highly efficient coolant *pump.*
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system including accurate electronic governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Nitro-carburized transmission gears for heavy duty operation.
- Viscous crankshaft vibration damper to withstand single bearing alternator torsional vibrations.
- Piston cooling for low piston temperature and reduced ring temperature.
- Keystone top compression rings for long service life.
- Automatic fan belt tensioner.
- Replaceable valve guides and valve.

TAD 1030 GE
Drawing no. 891852-02



TAD 1030 GE Gen Pac
Drawing no. 891856-03



5457

Technical data TAD 1030 GE

General

In line four stroke diesel engine with direct injection
Turbocharged and air to air intercooled

Number of cylinders	6	Bore	120.65 mm / 4.75 in
Displacement, total	9.60 litres / 586 in^3	Stroke	140 mm / 5.51 in
Firing order	1-5-3-6-2-4	Compression ratio	15.0:1
Rotation direction, anti-clockwise viewed towards flywheel		Dry weight Genpac 1254 kg	Engine only 1107 kg*)
		Wet weight Genpac 1325 kg	Engine only 1163 kg*)

*) Including radiator and intercooler

TAD 1030 GE	Speed, rpm	1500	1800
Performance	**Test no.**	*21000496*	*DP 93/0114*
Prime Power			
without fan	kW / hp	229 / 311	242 / 329
with fan	kW / hp	224 / 305	233 / 317
Continuous Standby Power			
without fan	kW / hp	246 / 335	264 / 359
with fan	kW / hp	241 / 328	255 / 347
Standby Power			
without fan	kW / hp	270 / 367	289 / 393
with fan	kW / hp	265 / 360	280 / 381
Torque at			
Prime Power	Nm / lbft	1460 / 1080	1280 / 940
Standby Power	Nm / lbft	1720 / 1270	1530 / 1230
Mean piston speed	m/s / ft/sec	7.0 / 23.0	8.4 / 27.6
Effective mean pressure at			
Prime Power	MPa / psi	1.91 / 277	1.68 / 244
Max combustion pressure at			
Prime Power	*MPa / psi*	12.4 / 1800	11.0 / 1600
Total mass moment of inertia, J (mR^2)	kgm^2 / $lbft^2$	2.57 / 61.0	
Degree of irregularity at			
Prime Power		1:57	1:128
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	22	31

Engine noise emission

Test standards: ISO 3744-1981 (E)
sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

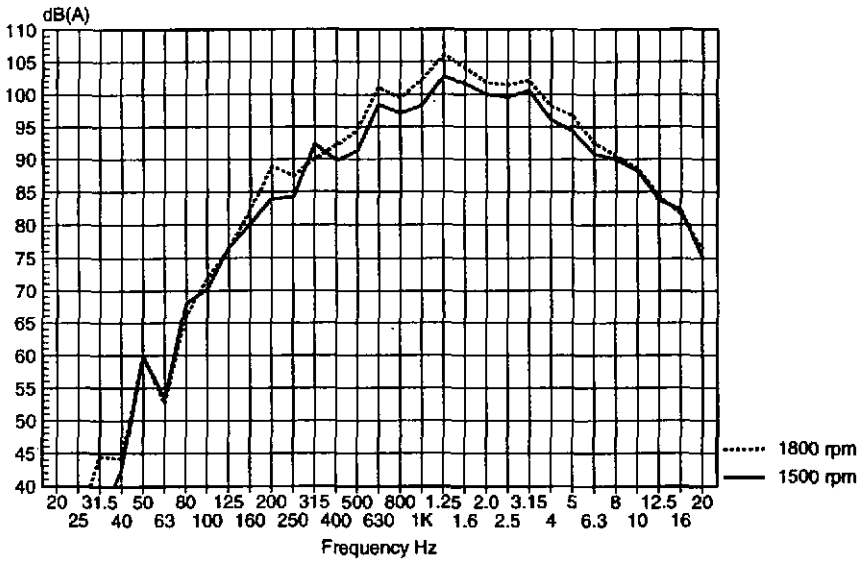
Measured sound power Lw

	Speed, rpm	1500	1800
No load	dB(A)	–	–
Prime Power	dB(A)	109.9	112.4
Standby Power	dB(A)	110.3	113.6

Calculated sound pressure Lp at 1 m

	Speed, rpm	1500	1800
No load	dB(A)	–	–
Prime Power	dB(A)	97.9	100.4
Standby Power	dB(A)	98.3	101.6

Sound power level TAD 1030 GE
Third octave band analysis



TAD 1030 GE	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	112	116
Standby power	dB(A)	113	117

Load acceptance
Test condition: warm engine
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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	0.5	0.6	0.9	1.0	20–100				
0–40	1.5	2.3	1.4	1.8	40–100				
0–57		10.0		3.6	–100				
0–60	5.5	12.6	2.8	5.7	60–100		3.2		2.6
0–67	10.0		3.6						
0–100–0	2.3	2.9	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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	0.5	0.6	0.7	0.7	20–100				
0–40	1.1	1.6	0.8	0.8	40–100		5.4		4.6
0–60	4.0	6.6	2.0	3.1	60–100		1.8		2.2
0–67		10.0		4.0	–100				
0–74	10.0		4.0						
0–100–0	2.6	3.3	1.5	1.5					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TAD 1030 GE	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	7.3	6.6
+5°C ambient temperature	s	6.5	7.0
–15°C ambient temperature *)	s	8.0	9.0
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	9.0	8.0
+5°C ambient temperature	s	7.5	8.6
–15°C ambient temperature *)	s	9.0	10.0

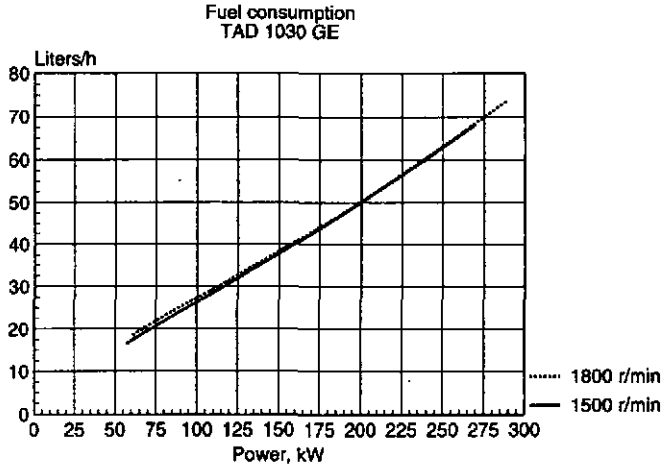
*) With manifold heater engaged, lubricating oil 15 W/40

Derating
The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without deration.
For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude deration factor <3000 m	4%/500 m
Altitude deration factor >3000 m	6%/500 m
Ambient temperature deration factor	1.5%/5°C
Humidity	No derating

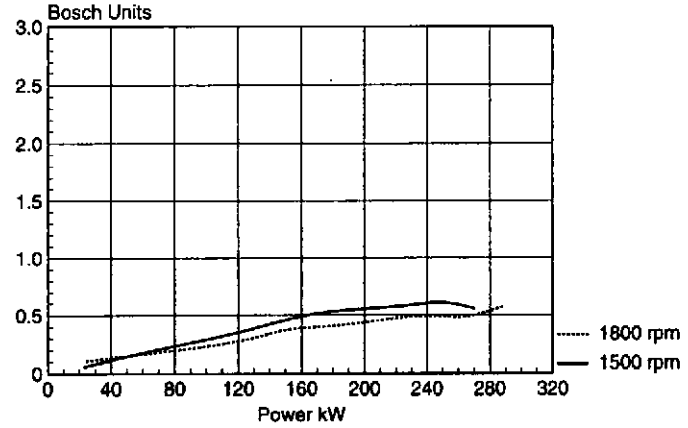
TAD 1030 GE	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litre/h / US gal/h	0.10 / 0.026	0.11 / 0.029
Standby Power	litre/h / US gal/h	0.12 / 0.032	0.13 / 0.034
Recommended lubricating oil to meet the specification of		*MIL-L-2104D or E, API CD or CF,* CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	36	
Oil sump capacity			
max	litres	32	
min	litres	22	
Oil change interval			
CD oil quality	h	200	
VDS oil quality	h	400	
Engine angularity limits			
front up	degrees	20	
front down	degrees	28	
side tilt	degrees	40	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	100	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	241 / 0.391	254 / 0.412
50% of Prime Power	g/kWh / lb/hph	214 / 0.347	219 / 0.355
75% of Prime Power	g/kWh / lb/hph	208 / 0.337	210 / 0.340
100% of Prime Power	g/kWh / lb/hph	209 / 0.338	211 / 0.342
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	236 / 0.382	247 / 0.400
50% of Standby Power	g/kWh / lb/hph	212 / 0.343	214 / 0.347
75% of Standby Power	g/kWh / lb/hph	209 / 0.339	210 / 0.340
100% of Standby Power	g/kWh / lb/hph	212 / 0.344	214 / 0.347
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	110	125
Feed pump pressure	kPa	100–150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Electronic/GAC	
Injection pump type/make		P7000/Bosch	
Injection timing	° B.T.D.C.	12	15

Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

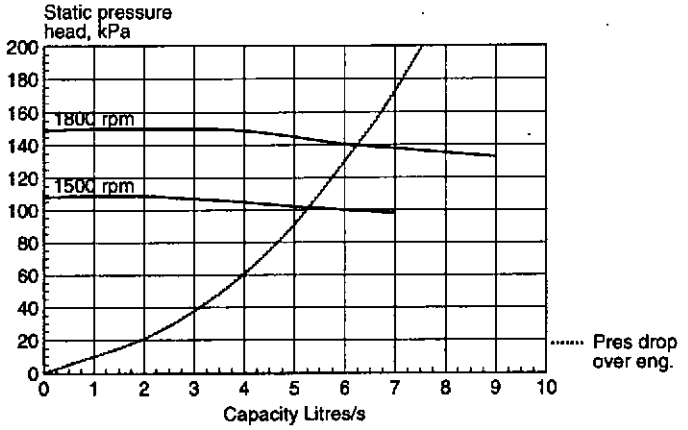


TAD 1030 GE	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	17.0 / 600	21.9 / 773
Standby Power, (at 27°C)	m^3/min / cfm	19.7 / 696	24.6 / 870
Air intake restriction, clean filter(s)	kPa / In wc	0.50 / 2.0	0.65 / 2.6
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	212 / 12055	221 / 12570
Standby Power	kW / BTU/min	247 / 14045	262 / 14900
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	510 / 950	460 / 860
Standby Power	°C / °F	530 / 985	430 / 915
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	47.6 / 1681	51.8 / 1829
Standby Power	m^3/min / cfm	57.8 / 2041	63.6 / 2246
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	14 / 800	15 / 850
Standby Power	kW / BTU/min	16 / 910	17 / 970
Heat rejection to coolant at			
Prime Power	kW / BTU/min	88 / 5000	93 / 5290
Standby Power	kW / BTU/min	105 / 5970	115 / 6540
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	0.80	
Radiator core thickness (std size)	mm	73	
Intercooler core area (std size)	m^2	0.75	
Intercooler core thickness (std size)	mm	68	
Fan diameter	mm	750	
Fan power consumption	kW / hp	5 / 7	9 / 11
Fan drive ratio		1.10:1	
Coolant capacity			
engine	litres	16.3	
std radiator with hoses	litres	21	
Coolant pump	drive/ratio	gear/1.58:1	
Coolant flow with standard system	l/s	4.8	5.8
Minimum coolant flow	l/s	Not available	
Maximum external coolant system restriction	kPa	Not available	
Thermostat			
start to open	°C	82	
fully open	°C	95	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator (Gen Pac radiator)	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TAD 1030 GE



Water pump capacity
TAD 1030 GE



Cooling performance

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

Engine speed	Air on temp	110% OF PRIME POWER Air flow	Max additional external restriction	STANDBY POWER Air flow	Max additional external restriction
rpm	°C	m^3/s	Pa	m^3/s	Pa
1500	30	2.00	590	2.20	560
	40	2.45	495	2.70	450
	50	3.15	330	3.50	230
	53			3.80	140
	55	3.60	190	4.00	60
	56			4.15	0
	59	4.15	0	–	
1800	30	2.20	880	2.50	830
	40	2.70	765	3.10	685
	50	3.45	575	3.90	435
	55	3.95	415	4.60	160
	58			5.00	0
	62	5.00	0	–	–

TAD 1030 GE	**Speed, rpm**	**1500**	**1800**
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		3.75:1	
Starter motor	make/type/kW	Bosch/KB/5.4	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel		156	
Number of teeth on starter motor		11	
Inrush current at +20°C	Amp	850	
Cranking current at +20°C	Amp	350	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2×143	
minimum at >+5°C	Ah	2×88	
Stop solenoid			
pull current	Amp	35	
hold current	Amp	0.4	
Inlet manifold heater (at 20 V)	kW	4.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	max 590	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	max 32	max 40
down	kW	max 21	max 31
right	kW	max 29	max 46
Timing gear at compressor PTO	Nm	max 100	
speed ratio direction of rotation viewed from flywheel side		0.90:1/clockwise	
Timing gear at servo pump PTO	Nm	max 35	
speed ratio direction of rotation viewed from flywheel side		1.58:1/clockwise	

TAD 1030 GE Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. En-gine	Gen Pac	Option	Order no.	See option descr.	Note
20	**Engine**	1	–	TAD 1030 GE	868644		Order also 26.8
	Gen Pac	–	2	TAD 1030 GE Gen Pac	868645		
	Ratings	3	3	Prime Power 1500 rpm	135100902		229 kW (224 kW with fan)
		4	4	Standby Power 1500 rpm	135100901		270 kW (265 kW with fan)
		5	5	Prime Power 1800 rpm	135100903		242 kW (233 kW with fan)
		6	6	Standby Power 1800 rpm	135100904		289 kW (280 kW with fan)
	Certified ratings	9	9	Standby Power 1800 rpm	135108904	x	289 kW (280 kW with fan) EPA/CARB
218	**Engine suspension**	3	–	Fixed front, low	843457	x	226 mm to crankshaft centre
		4	–	Fixed rear, low	843339	x	226 mm to crankshaft centre
		7	•	Fixed front, high	865983	x	325 mm to crankshaft centre
		8	•	Fixed rear, high	865984	x	325 mm to crankshaft centre
22	**Lubrication system**	1	1	Oil drain pump	135102201	*x	Manual
23	**Fuel system**	1	•	Flexible fuel hoses	135102923	x*	Two pcs, L=400 mm
		3	3	Electronic governor 1500/1800 rpm		x	Incl in engine order no. Electrical stop, see 27.3
		8	8	Overspeed trip switch	135103641	x*	Speed sender included
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	135109080	x*	Mounted on base frame
25	**Intake and exhaust system**	1	1	Air filter elbow connection	866137	x	Two pcs are required
		2	2	Flexible exhaust pipe	847114	x	
		3	3	Exhaust elbow	3826823	x	
		4	4	*Silencer, absorbtion type*	843469	x	*With pipe clamps*
		5	5	Silencer, 5" Heavy Duty	863048	x	With connecting flanges
		–	9	Crankcase ventilation	135109053	x	Extension pipe
		9	9	Crankcase ventilation	3825363	x	Extension pipe
		10	10	Heat guard	135109012	x*	Exhaust manifold and turbo
26	**Cooling system**	8	•	Radiator, 0.80 m^2	3825580	x	Incl fan, fan guard, intercooler and mounting parts
		17	•	Radiator guard	866073	x	
		25	•	Thrust type fan		x	Ø 750 mm, incl. in 26.8
		37	•	Belt guard	135102933	x*	For fan and alternator belts
		39	39	Coolant filter	828046	x	
27	**Control system**	3	3	Electrical stop	135102803	x*	Energized to run. For el. governor
31	**Battery**	1	1	Battery box	864171	x	
		2	2	Connection cables	864173		Incl main switch
33	**Starting system**	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run
37	**Electrical wiring**	3	3	Engine wiring	135103631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5
38	**Instrument, switches and senders**	1	1	Instrument panel	873626	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	135103602	x*	
		5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	*Coolant temp and oil* pressure gauges	862923	x	*Numerical dial plates*
		7	7	Oil temp gauge and sender	863452	x	Not in comb with oil drain pump
		8	8	Speed sender	135103603	x*	Not in comb with 23.8

TAD 1030 GE Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
38	**Instrument, switches and senders**	9	9	Tachometer/ hour meter	873722	x	For Ø 72 mm mounting hole
		10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9
		11	11	Hour meter	858877	x	
		12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	
		14	•	Coolant temp and oil pressure switches	135103601	x*	103° C temp setting
		15	–	Coolant temp and oil pressure switches	135103621	x*	97° C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	2	2	Flexible coupling ME 214	845817	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865078	x	Separately mounted. 220–240 V.
		3	3	Tool kit	844481	x	
		4	4	Engine heater 2000 W	3825491	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825388	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994105	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994102	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	135100421	x	[1]
		4	4	Instruction book, English			[1] One included in engine order no.
		5	5	Instruction book, German	135100423	x	[1]
		6	6	Instruction book, French	135100424	x	[1]
		7	7	Instruction book, Spanish	135100425	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745720		
		10	10	Maintenance kit, 2500 h	876739	x	
		11	11	Maintenance kit, 5000 h	876740	x	
	Engine packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	135101904	x	
		–	14	Plastic wrapping		x	Included in engine order no.
		–	15	Wooden box	135101906	x	

** Reference to corresponding customer fitted kit.*
[1] *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted equipment order no.	Corresponding factory fitted equipment	
22.1	135102201	Oil drain pump	862937
23.1	135102923	Flexible fuel hoses	843466
23.8	135103641	Overspeed tripswitch	866306
23.9	135109080	Fuel filter/water separator	3826744
25.10	135109012	Heat guard	3826759
26.37	135102933	Belt guard	3826767
27.3	135102803	Electric lever control	866293
37.3	135103631	Engine wiring	862628
38.4	135103602	Senders	862925
38.8	135103603	Speed sender	862327
38.14	135103601	Switches 103°C	862924
38.15	135103621	Switches 97°C	863962

Notes

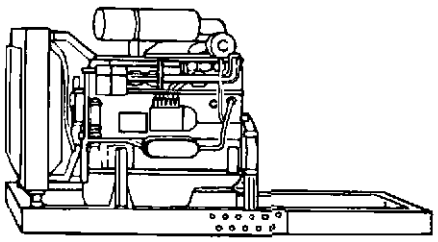
TD 1210 G

Gen Set engine — Gen Pac

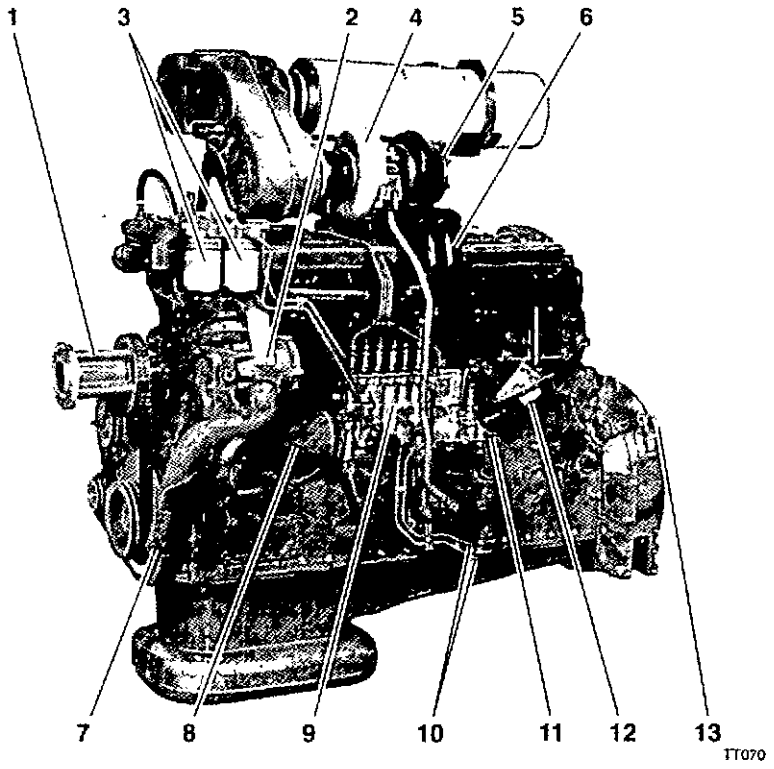
TD 1210 G

Turbocharged
Diesel fuel
Displacement indication (l)
Generation
Version
Generator drive

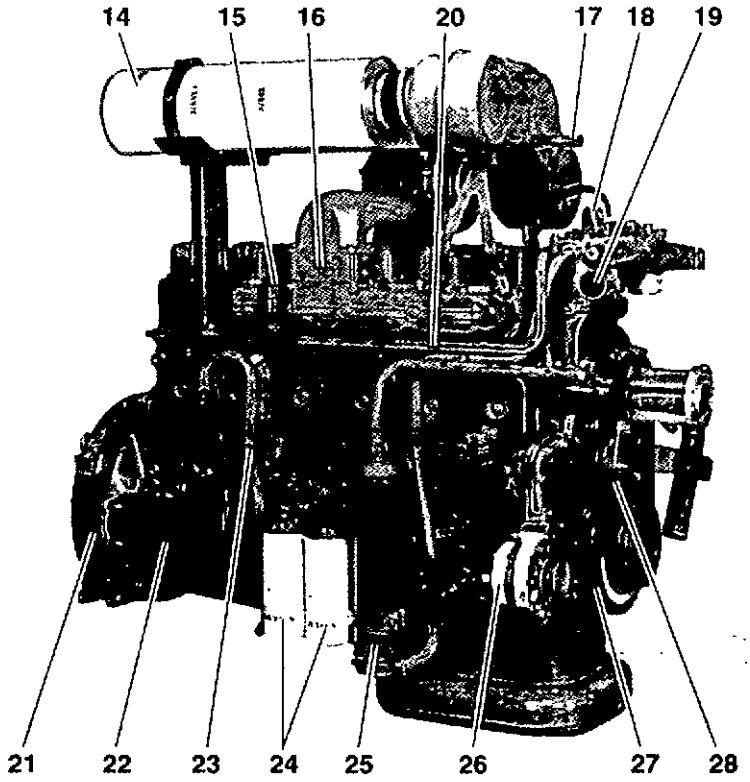
Gen Pac – Gen Set engine mounted on an extendable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



TT070



TT071

1. Fan hub
2. Gear driven coolant pump
3. Twin fuel filters of throw-away type
4. Turbo-charger
5. Connecting flange, exhaust line
6. Air cooled exhaust manifold
7. Coolant pipe, inlet
8. Pump coupling guard
9. Injection pump
10. Fuel pipes for tank connection
11. Manual speed control
12. Stop solenoid
13. Lift eyelet
14. Double air filters of throw-away type
15. Relay for inlet manifold heater
16. Inlet manifold heater
17. Air restriction indicator
18. Radiator support
19. Coolant pipe, outlet
20. Cable iron
21. Flywheel housing SAE 1
22. Starter motor
23. Crankcase ventilation
24. Twin full-flow oil filters of spin-on type
25. Oil cooler
26. Alternator
27. Vibration damper
28. Automatic belt tensioner

Standard equipment

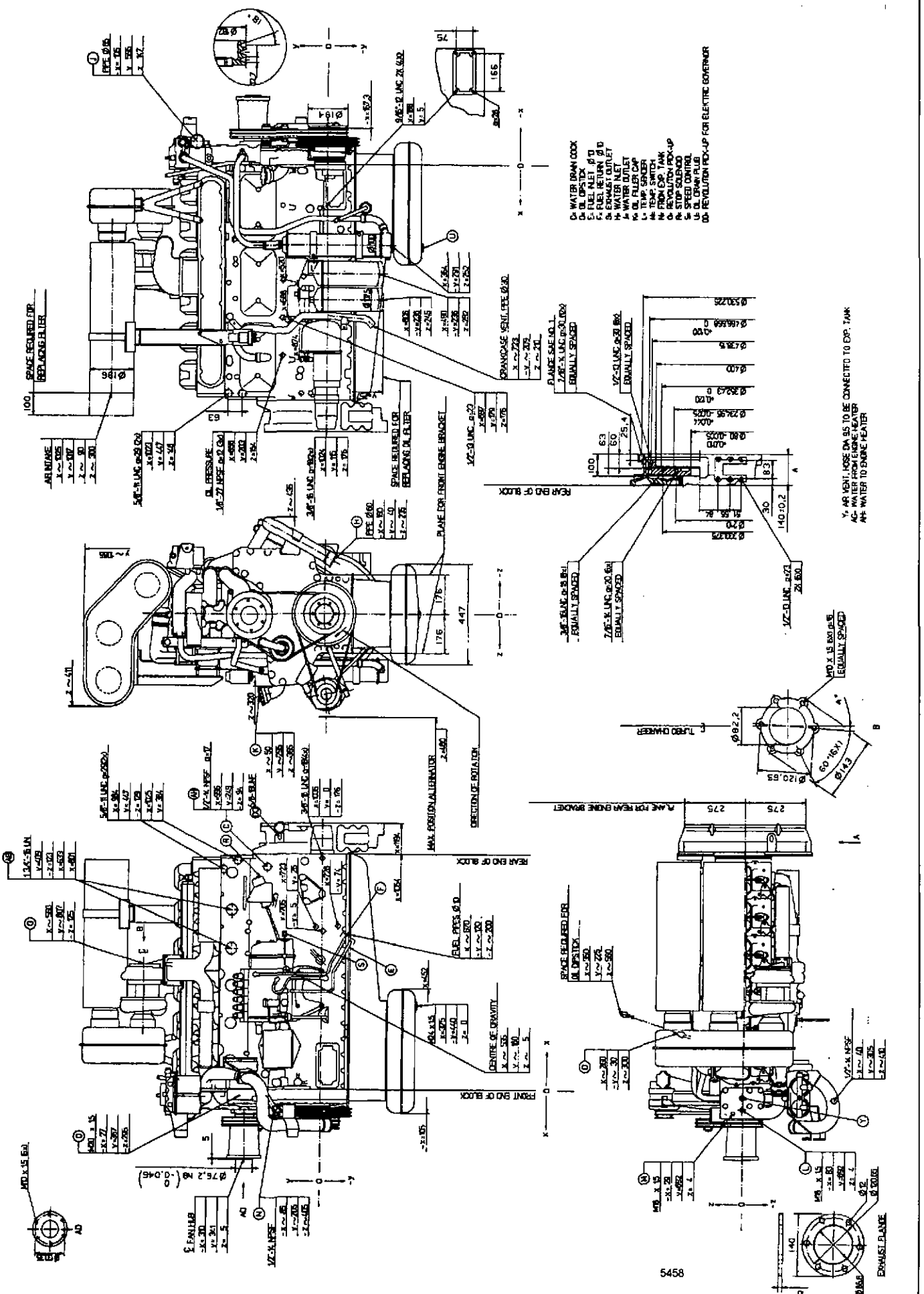
TD 1210 G

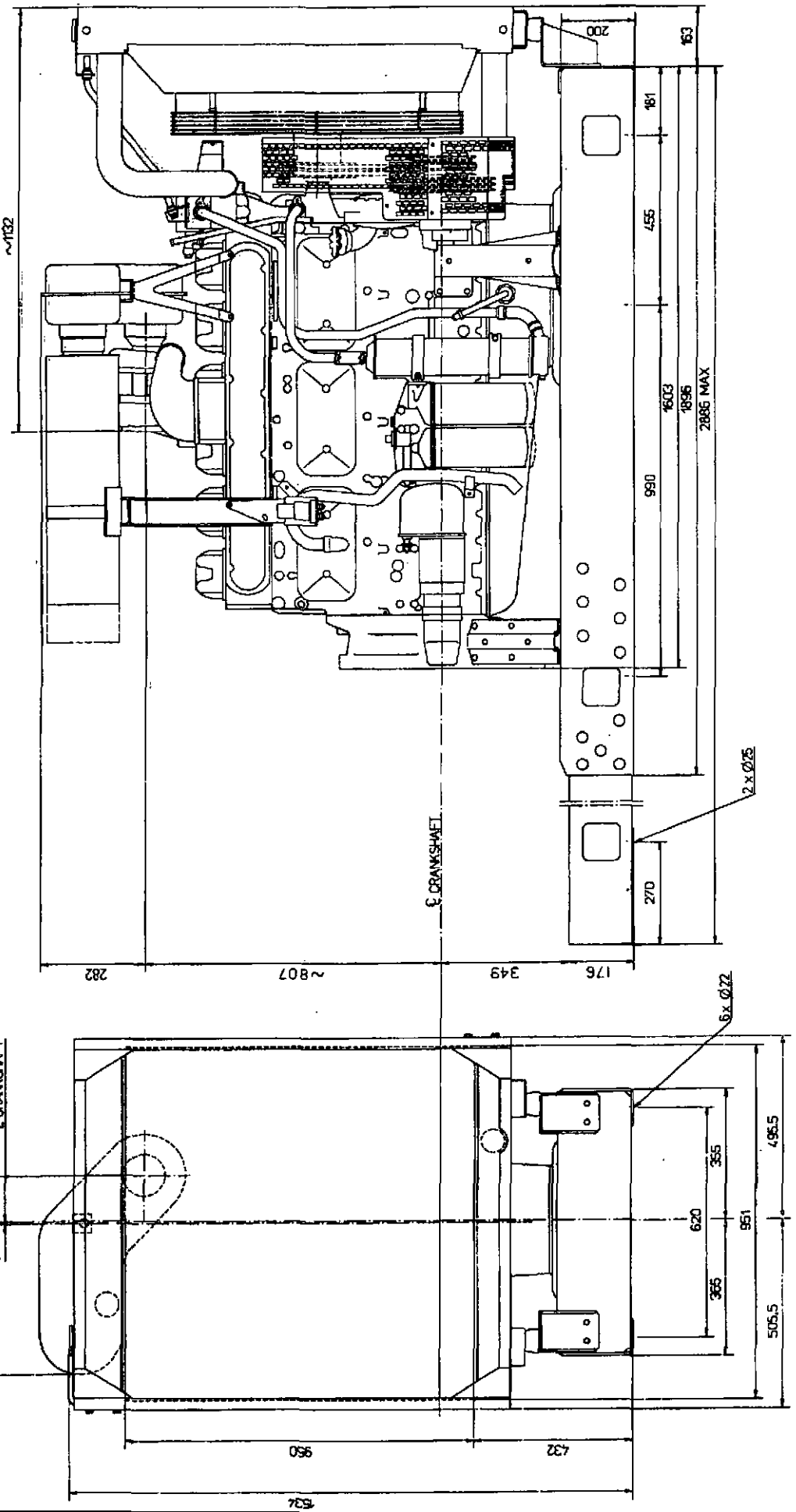
		Engine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 1	•	•
	Flywheel for 14"flexible plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with RSV centrifugal governor	•	•
	Oil-cooler, side-mounted	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-charger	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator	–	•
	Radiator guard	–	•
	Gear-driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
27	**Control system**		
	Manual speed control	•	•
	Electrical stop energized to run	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, right side	•	•
33	**Starting system**		
	Starter motor, Bosch 6.6 kW/24 V	•	•
	Connecting facility for extra starter motor	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and senders**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

– optional equipment or not applicable
• included in standard specification

Technical description

- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head gaskets against high temperatures.
- Efficient and reliable turbo-charger.
- Full flow disposable spin-on oil filter, for extra high filtration.
- Full flow oil cooler.
- The lubricating oil level can be measured during operation.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Gear driven, highly efficient coolant pump.
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system including accurate mechanical governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Nitro-carburized transmission gears for heavy duty operation.
- Viscous crankshaft vibration damper to withstand single bearing alternator torsional vibrations.
- Piston cooling for low piston temperature and reduced ring temperature.
- Keystone top compression rings for long service life.
- Automatic fan belt tensioner.
- Replaceable valve guides and valve seats.




~1132
200
153
161
455
930
1603
1896
2886 MAX
2 x Ø25
270
℄ CRANKSHAFT
282
~807
349
176
6 x Ø22
℄ CRANKSHAFT
125
5
117
411
355
620
365
496.5
951
505.5
960
432
1532
DRY WEIGHT APP. 1395 KG
WET WEIGHT APP. 1477 KG
5459

Technical data TD 1210 G

General

In line four stroke diesel engine with direct injection

Turbocharged		Bore			130.17 mm / 5.12 in	
Number of cylinders	6	Stroke			150 mm / 5.91 in	
Displacement, total	11.98 litres / 731 in^3	Compression ratio			14.2:1	
Firing order	1-5-3-6-2-4	Dry weight	GenPac	1395 kg	Engine only	1110 kg
Rotation direction, anti-clockwise viewed towards flywheel		Wet weight	GenPac	1472 kg	Engine only	1165 kg

TD 1210 G	Speed, rpm	1500	1800
Performance	Test no.	21000676	21000677
Prime Power			
without fan	kW / hp	223 / 303	256 / 348
with fan	kW / hp	217 / 295	245 / 333
Continuous Standby Power			
without fan	kW / hp	245 / 333	261 / 355
with fan	kW / hp	239 / 325	250 / 340
Standby Power			
without fan	kW / hp	267 / 363	286 / 389
with fan	kW / hp	261 / 355	275 / 375
Torque at			
Prime Power	Nm / lbft	1419 / 1047	1358 / 1002
Standby Power	Nm / lbft	1700 / 1250	1510 / 1110
Mean piston speed	m/s / ft/sec	7.5 / 24.6	9.0 / 29.5
Effective mean pressure at Prime Power	MPa / psi	1.49 / 216	1.42 / 207
Max combustion pressure at Prime Power	MPa / psi	11.8 / 1710	12.1 / 1750
Total mass moment of inertia, J (mR^2)	kgm^2 / $lbft^2$	2.74/65.0	
Degree of irregularity at Prime Power		1:91	1:204
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	32	40

Engine noise emission

Test standards: ISO 3744-1981 (E) sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

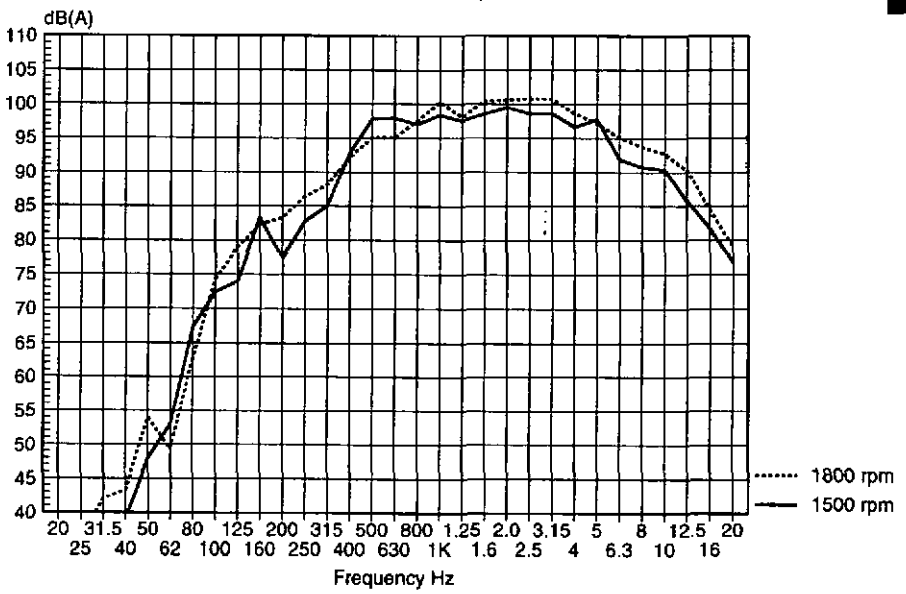
Measured sound power Lw

	Speed, rpm	1500	1800
No load	dB(A)	104.4	106.7
Prime Power	dB(A)	109.2	110.6
Standby Power	dB(A)	110.2	111.3

Calculated sound pressure Lp at 1 m

	Speed, rpm	1500	1800
No load	dB(A)	92.4	94.7
Prime Power	dB(A)	97.2	98.6
Standby Power	dB(A)	98.2	99.3

Sound power level TD 1210 G
Third octave band analysis



TD 1210 G	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	112	116
Standby power	dB(A)	113	117

Load acceptance

Test condition: warm engine

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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	2.7	2.9	1.5	1.6	20–100				
0–40	5.0	5.7	0.9	1.0	40–100	8.6		1.5	
0–60	7.1	8.6	1.2	1.4	60–100	4.0		1.0	
0–70		10.0		1.9	70–100				
0–85	10.0		1.6		85–100	1.8	0.6	0.5	2.4
100–0	11.4	11.6	1.5	2.0					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.5	1.9	1.2	1.2	20–100	6.4		1.0	
0–40	3.1	4.0	0.9	1.0	40–100	4.7		0.8	
0–60	5.0	6.7	0.9	0.8	60–100	3.0		0.7	
0–80					80–100	1.3	3.5	0.6	3.0
0–85		10.0		1.6	85–100				
0–100	9.1		1.9						
100–0		8.0		1.4					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TD 1210 G	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	3	3
0°C ambient temperature *)	s	19	19
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	6	4
0°C ambient temperature *)	s	23	22

*) With manifold heater engaged, lubricating oil 15 W/40

Derating

The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating.

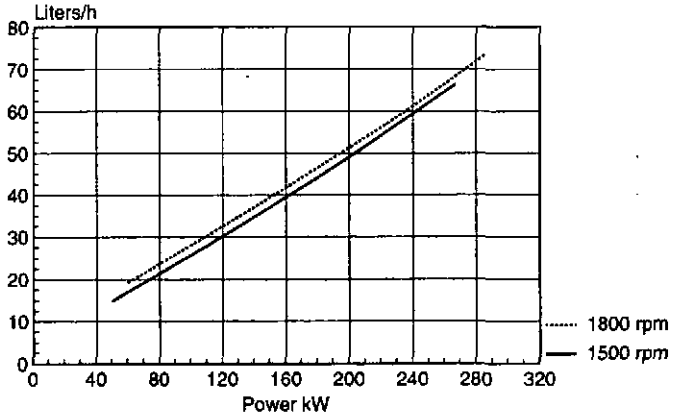
For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude derating factor <3000 m	4%/500 m
Altitude derating factor >3000 m	6%/500 m
Ambient temperature derating factor	2%/5°C
Humidity	No derating

TD 1210 G	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litre/h / US gal/h	0.35 / 0.092	0.39 / 0.103
Standby Power	litre/h / US gal/h	0.45 / 0.119	0.48 / 0.123
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	38	
Oil sump capacity			
max	litres	34	
min	litres	25	
Oil change interval			
CD oil quality	h	200	
VDS oil quality	h	400	
Engine angularity limits			
front up	degrees	20	
front down	degrees	28	
side tilt	degrees	40	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	105	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	241 / 0.385	260 / 0.418
50% of Prime Power	g/kWh / lb/hph	213 / 0.343	224 / 0.360
75% of Prime Power	g/kWh / lb/hph	206 / 0.331	215 / 0.346
100% of Prime Power	g/kWh / lb/hph	206 / 0.331	213 / 0.345
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	232 / 0.376	254 / 0.412
50% of Standby Power	g/kWh / lb/hph	209 / 0.339	221 / 0.358
75% of Standby Power	g/kWh / lb/hph	205 / 0.332	215 / 0.348
100% of Standby Power	g/kWh / lb/hph	209 / 0.339	216 / 0.350
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	115	130
Feed pump pressure	kPa	100–150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Mechanical RSV/Bosch	
Injection pump type/make		P3000/Bosch	
Injection timing	°B.T.D.C.	24	

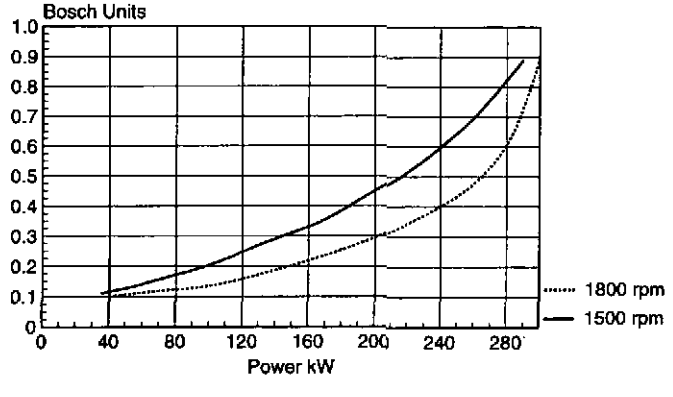
Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

Fuel consumption
TD 1210 G

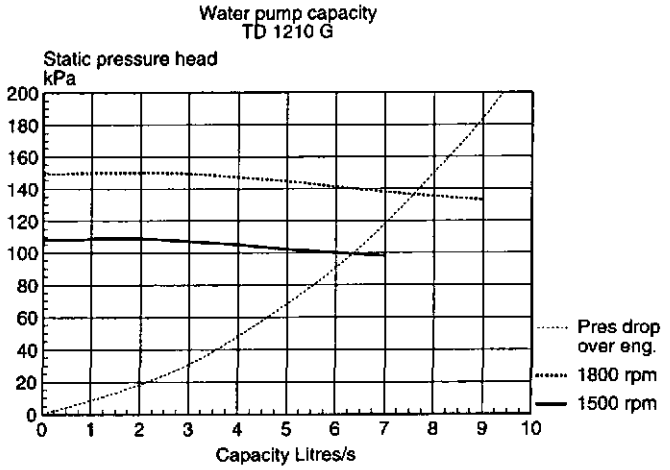


TD 1210 G	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	16.1 / 568	21.1 / 745
Standby Power, (at 27°C)	m^3/min /cfm	18.5 / 653	22.5 / 795
Air intake restriction, clean filters	kPa	Not available	
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	183 / 10412	229 / 13030
Standby Power	kW / BTU/min	234 / 13300	260 / 14800
Exhaust gas temperature after turbine at			
Prime Power	°C/°F	560 / 1040	540 / 1000
Standby Power	°C/°F	605 / 1120	575 / 1070
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	46.7 / 1648	57.8 / 2040
Standby Power	m^3/min / cfm	54.8 / 1936	63.1 / 2230
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	17 / 967	19 / 1081
Standby Power	kW / BTU/min	20 / 1140	22 / 1250
Heat rejection to coolant at			
Prime Power	kW / BTU/min	122 / 6940	142 / 8080
Standby Power	kW / BTU/min	145 / 8250	157 / 8930
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	0.90	
Radiator core thickness (std size)	mm	73	
Fan diameter	mm	750	
Fan power consumption	kW / hp	6 / 8	11 / 15
Fan drive ratio		1.00:1	
Coolant capacity			
engine	litres	23.0	
std radiator with hoses	litres	26	
Coolant pump	drive/ratio	gear/1.58:1	
Coolant flow with standard system	l/s	6.4	7.7
Minimum coolant flow	l/s	5.3	6.2
Maximum external coolant system restriction	kPa	41	57
Thermostat			
start to open	°C	75	
fully open	°C	88	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TD 1210 G



Water pump capacity
TD 1210 G



Cooling performance

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

Engine speed rpm	Air on temp °C	110% OF PRIME POWER Air flow m^3/s	Max additional external restriction Pa	STANDBY POWER Air flow m^3/s	Max additional external restriction Pa
1500	30	1.80	860	2.15	745
	40	2.30	655	2.80	495
	50	3.10	395	3.70	250
	55	3.60	260	4.40	160
	60			5.45	0
	64	5.45	0	–	–
1800	30	2.15	1160	2.35	1110
	40	2.75	940	2.95	870
	50	3.60	620	3.95	505
	55	4.30	390	4.70	300
	63			6.55	0
	64	6.55	0	–	–

TD 1210 G	**Speed, rpm**	**1500**	**1800**
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		3.75:1	
Starter motor	make/type/kW	Bosch/KB/6.6	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel		156	
Number of teeth on starter motor		11	
Inrush current at +20°C	Amp	900	
Cranking current at +20°C	Amp	380	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2x152	
minimum at >+5°C	Ah	2x105	
Stop solenoid			
pull current	Amp	35	
hold current	Amp	0.4	
Inlet manifold heater (at 20 V)	kW	4.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	max 590	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	max 30	max 50
down	kW	max 19	max 31
right	kW	max 30	max 50
Timing gear at compressor PTO	Nm	max 100	
speed ratio direction of rotation viewed from flywheel side		0.91:1/clockwise	
Timing gear at servo pump PTO	Nm	max 35	
speed ratio direction of rotation viewed from flywheel side		1.58/:1/clockwise	

TD 1210 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	**Engine**	1	–	TD 1210 G	868370		
	Gen Pac	–	2	TD 1210 G Gen Pac	868371		
	Ratings	3	3	Prime Power 1500 rpm	136182014		223 kW (217 kW with fan)
		4	4	Standby Power 1500 rpm	136182027		267 kW (261 kW with fan)
		5	5	Prime Power 1800 rpm	136182015		256 kW (245 kW with fan)
		6	6	Standby Power 1800 rpm	136182028		286 kW (275 kW with fan)
218	**Engine suspension**	5	–	Fixed front, low	843455	x	290 mm to crankshaft centre
		6	–	*Fixed rear, low*	*843337*	x	*290 mm to crankshaft centre*
		9	•	Fixed front, high	865983	x	325 mm to crankshaft center
		10	•	Fixed rear, high	865984	x	325 mm to crankshaft center
		15	–	Flexible front upper bracket	843459	x	2 pcs, incl rubber cushions
		16	–	Lower bracket for 218.15, 218.18	820744	x	262 mm to crankshaft centre 1 pcs included
		17	–	Lower bracket for 218.15, 218.18	*820822*	x	297 mm to crankshaft centre 1 pcs included
		18	–	Flexible rear upper bracket	843463	x	2 pcs, incl rubber cushions Lower bracket, see 218.16–17
22	**Lubrication system**	1	1	Oil drain pump	136182201	x*	Manual
23	**Fuel system**	1	•	Flexible fuel hoses	136182923	x*	Two pcs, L=400mm
		3	3	Electronic governor 1500/1800 rpm	136182721	x*	Incl control unit Electrical stop, see 27.3
		7	7	Mounting kit for separate electronic governor	843332	x	For other el. governor than GAC
		8	8	Overspeed trip switch	136183641	x*	Speed sender included
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	136189080	x*	Mounted on base frame
25	**Intake and exhaust system**	1	1	Air filter elbow connection	843465	x	Two pcs are required
		2	2	Flexible exhaust pipe	845981	x	
		3	3	Exhaust elbow	3826822	x	
		5	5	Silencer, 5" Heavy Duty	863048	x	With connecting flanges
		–	9	Silencer, engine mounted	863199	x	Incl mounting parts
		10	10	Heat guard	136189012	x*	Exhaust manifold and turbo
26	**Cooling system**	4	•	Radiator, 0.90 m^2	3825581	x	Incl fan guard and mounting parts
		17	•	Radiator guard	863013	x	
		26	•	Thrust type fan	863039	x	Ø 750 mm
		27	–	Suction type fan	863038	x	Ø 750 mm
		–	28	Suction type fan	136182631	x	Ø 750 mm
		37	•	Belt guard	136182933	x*	For fan and alternator belts
		39	39	Coolant filter	828046	x	
27	**Control system**	1	1	Electric lever control	136182711	x*	Not in comb with electronic governor
		3	3	Electrical stop	136182821	x*	Energized to run. For el. governor
31	**Battery**	1	1	Battery box	864171	x	
		2	2	Connection cables	864173		Incl main switch
33	**Starting system**	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run
37	**Electrical wiring**	3	3	Engine wiring	136183631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5

** Reference to corresponding customer fitted kit*

TD 1210 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
38	**Instrument, switches and senders**	1	1	Instrument panel	873626	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	136183622	x*	
		5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		7	7	Oil temp gauge and sender	863452	x	Not in comb with oil drain pump
		8	8	Speed sender	136183627	x*	Not in comb with 23.8
		9	9	Tachometer/ hour meter	873722	x	For Ø 72 mm mounting hole
		10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9
		11	11	Hour meter	858877	x	
		12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	
		14	•	Coolant temp and oil pressure switches	136183621	x*	103°C temp setting
		15	–	Coolant temp and oil pressure switches	136183625	x*	97°C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	3	3	Flexible coupling ME 240	845818	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865078	x	Separately mounted. 220–240 V.
		3	3	*Tool kit*	844481	x	
		4	4	Engine heater 2000 W	3825491	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825388	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994105	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994102	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	136180401	x	[1]
		4	4	Instruction book, English			[1] One included in engine order no.
		5	5	Instruction book, German	136180403	x	[1]
		6	6	Instruction book, French	136180404	x	[1]
		7	7	Instruction book, Spanish	136180405	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745750		
		10	10	Maintenance kit, 2500 h	876762	x	
		11	11	Maintenance kit, 5000 h	876763	x	
	Engine packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	136181902	x	
		–	14	Plastic wrapping		x	Included in engine order no.
		–	15	Wooden box	136181904	x	

** Reference to corresponding customer fitted kit*
[1] *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately. – See next page !

TD 1210 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted equipment order no.		Corresponding factory fitted equipment
22.1	136182201	Oil drain pump	862936
23.1	136182923	Flexible fuel hoses	843466
23.3	136182721	Electronic governor	3825506
23.8	136183641	Overspeed tripswitch	866306
23.9	136189080	Fuel filter/water separator	3826744
25.10	136189012	Heat guard	3826129
26.37	136182933	Belt guard	3826768
27.1	136182711	Electric lever control	866403
27.3	136182821	Electrical stop	866293
37.3	136183631	Engine wiring	862628
38.4	136183622	Senders	862925
38.8	136183627	Speed sender	862327
38.14	136183621	Switches 103°C	862924
38.15	136183625	Switches 97°C	863962

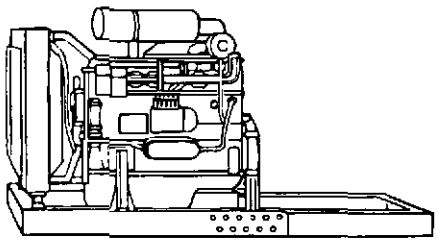
TWD 1210 G

Gen Set engine — Gen Pac

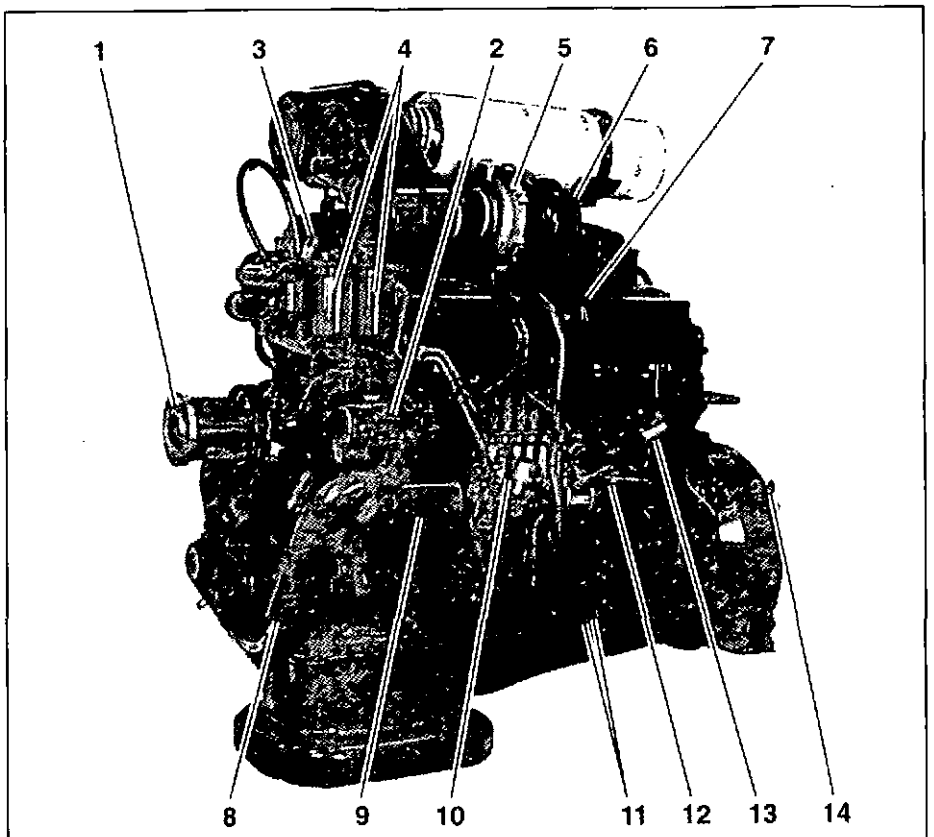
TWD 1210 G

- Turbocharged
- Water to air intercooled
- Diesel fuel
- *Displacement indication (l)*
- Generation
- Version
- Generator drive

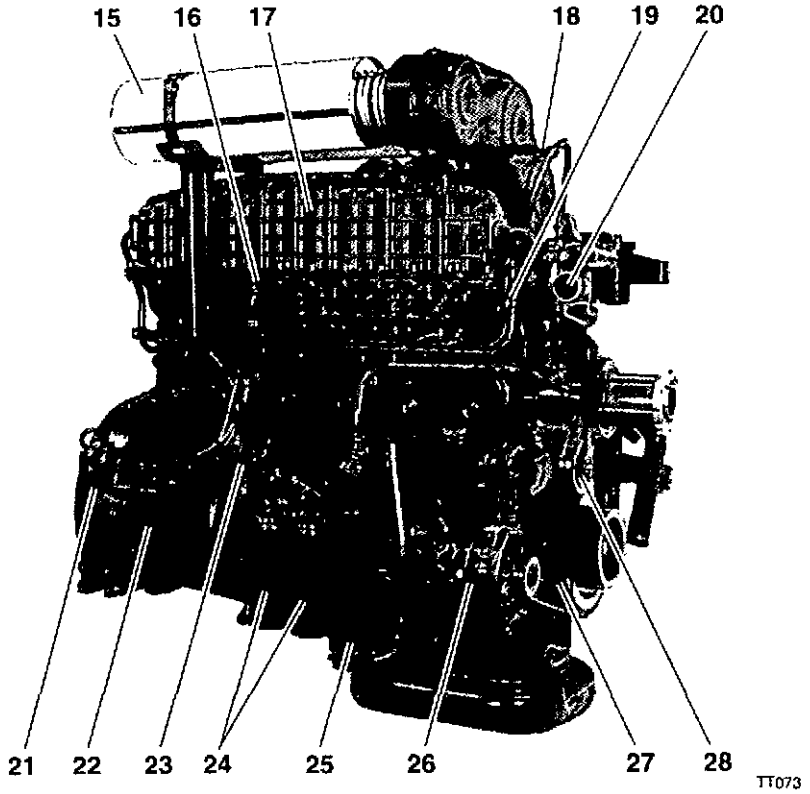
Gen Pac – Gen Set engine mounted on an extendable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



TT072



TT073

1. Fan hub
2. Gear driven coolant pump
3. Radiator support
4. Twin fuel filters of throw-away type
5. Turbo-charger
6. Connecting flange, exhaust line
7. *Air cooled exhaust manifold*
8. Coolant pipe, inlet
9. Pump coupling guard
10. Injection pump
11. Fuel pipes for tank connection
12. Manual speed control
13. Stop solenoid
14. Lift eyelet
15. Double air filters of throw-away type
16. Relay for inlet manifold heater
17. Intercooler
18. Air restriction indicator
19. Cable iron
20. Coolant pipe, outlet
21. Flywheel housing SAE 1
22. Starter motor
23. Crankcase ventilation
24. Twin full-flow oil filters of spin-on type
25. Oil cooler
26. Alternator
27. Vibration damper
28. Automatic belt tensioner

Standard equipment

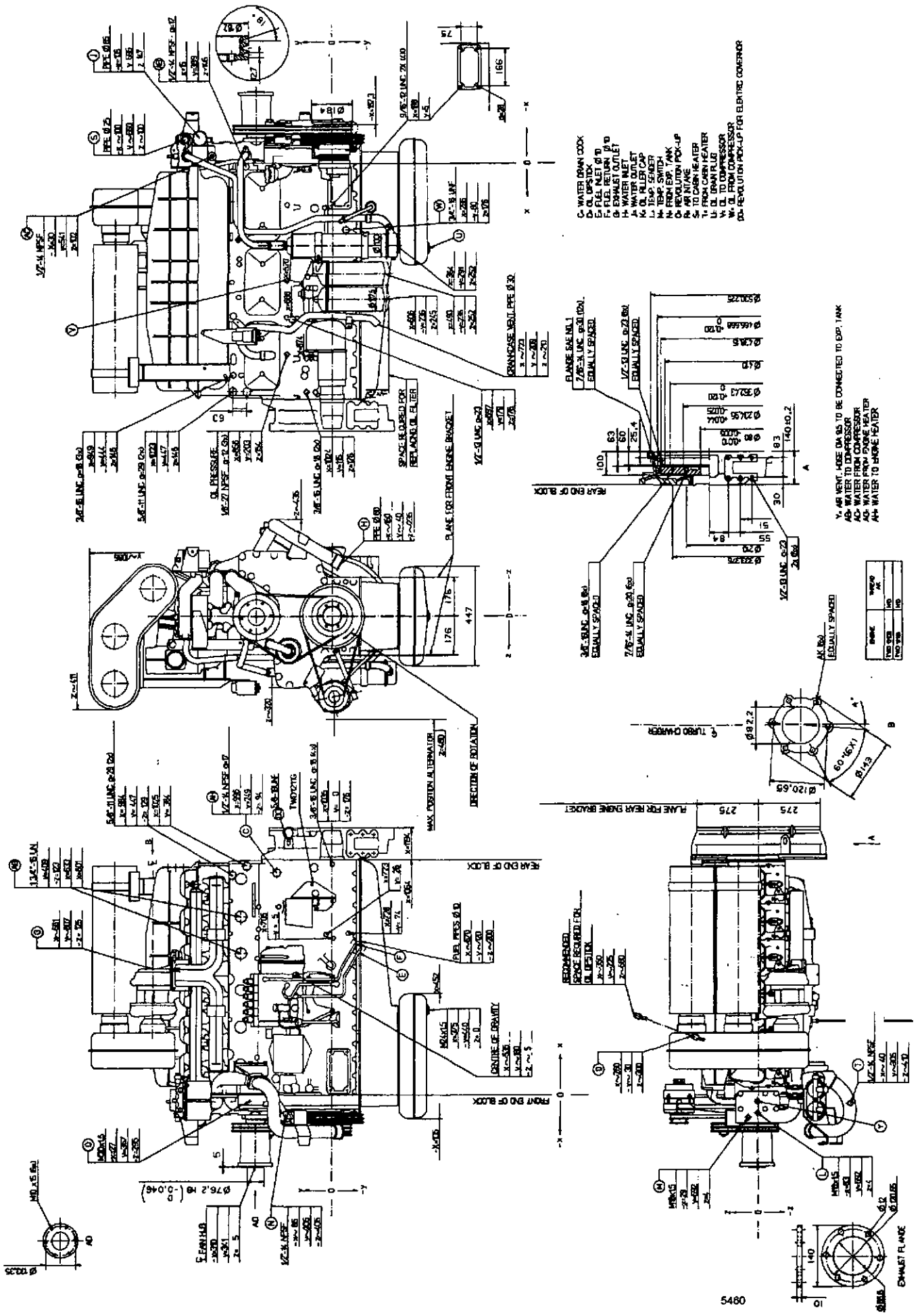
TWD 1210 G

		En-gine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 1	•	•
	Flywheel for 14" flexible plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with RQ-governor, 1500 rpm	•	•
	Oil-cooler, side-mounted	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-charger	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator	–	•
	Radiator guard	–	•
	Gear-driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
	Intercooler	•	•
27	**Control system**		
	Manual speed control	•	•
	Electrical stop energized to run	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, right side	•	•
33	**Starting system**		
	Starter motor, Bosch 6.6 kW/24 V	•	•
	Connecting facility for extra starter motor	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and switches**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

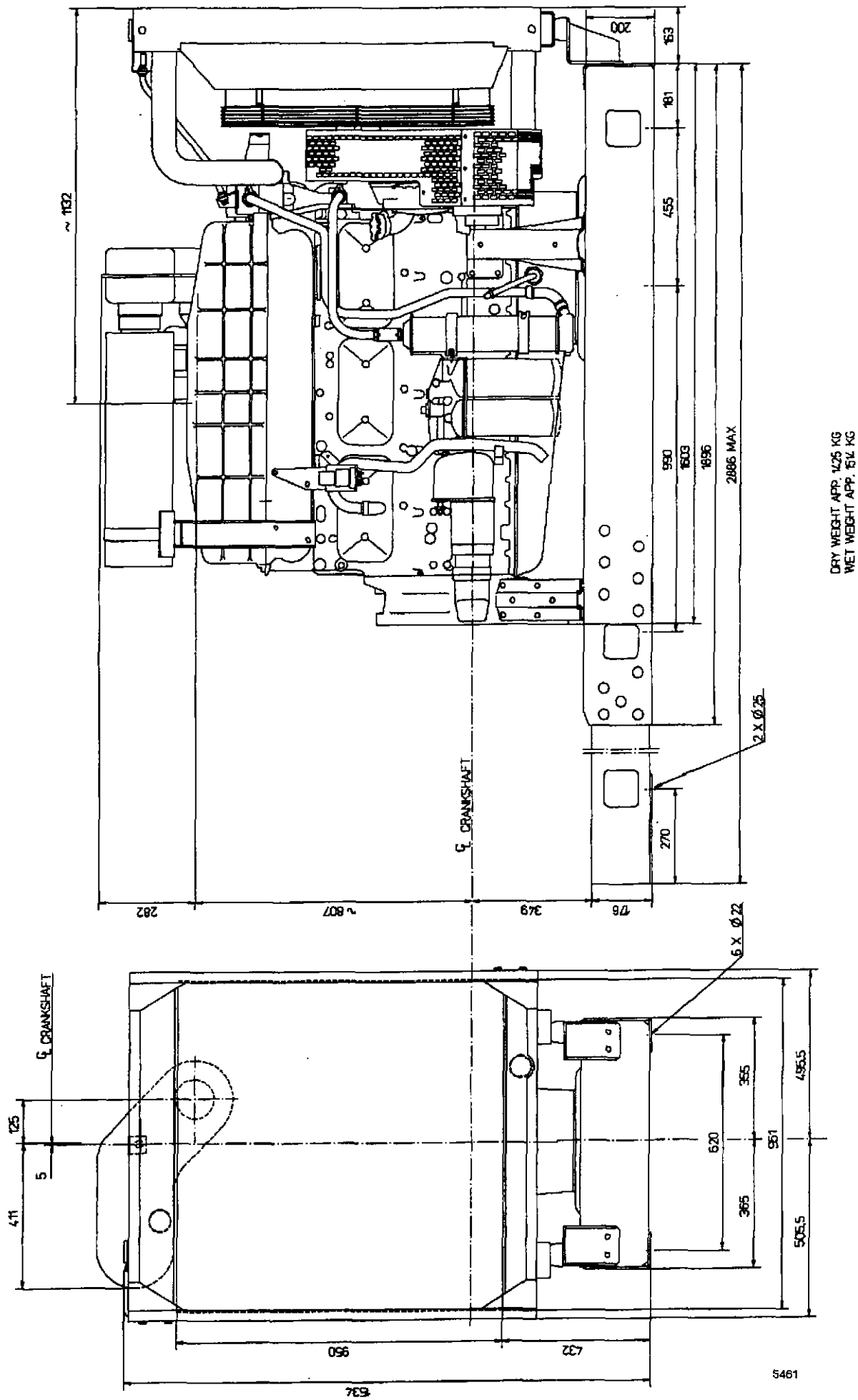
– optional equipment or not applicable
• included in standard specification

Technical description

- Complies with TA -luft exhaust emission regulation.
- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head gaskets against high temperatures.
- Efficient and reliable turbo-charger.
- Water to air intercooler.
- Full flow disposable spin-on oil filter, for extra high filtration.
- Full flow oil cooler.
- The lubricating oil level can be measured during operation.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Gear driven, highly efficient coolant pump.
- Twin fuel filters of throw-away type.
- Nitro-carbonized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system including accurate mechanical governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Nitro-carbonized transmission gears for heavy duty operation.
- Viscous crankshaft vibration damper to withstand single bearing alternator torsional vibrations.
- Piston cooling for low piston temperature and reduced ring temperature.
- Keystone top compression rings for long service life.



TWD 1210 G Gen Pac
Drawing no. 887105-04



Technical data TWD 1210 G

General

In line four stroke diesel engine with direct injection
Turbocharged and water to air intercooled

Number of cylinders	6	Bore		130.17 mm / 5.12 in	
Displacement, total	11.98 litres / 731 in^3	Stroke		150 mm / 5.91 in	
Firing order	*1-5-3-6-2-4*	Compression ratio		13.9:1	
Rotation direction, anti-clockwise viewed towards flywheel		*Dry weight* GenPac	1425 kg	*Engine only*	1140 kg
		Wet weight GenPac	1507 kg	Engine only	1200 kg

TWD 1210 G	**Speed, rpm**	**1500**	**1800**
Performance	Test no.	99000087	99000088
Prime Power			
without fan	kw / hp	268 / 365	283 / 385
with fan	*kW / hp*	*262 / 356*	*272 / 370*
Continuous Standby Power			
without fan	kW / hp	268 / 364	286 / 389
with fan	kW / hp	262 / 356	275 / 374
Standby Power			
without fan	kW / hp	294 / 400	313 / 426
with fan	kW / hp	288 / 392	302 / 411
Torque at			
Prime Power	Nm / lbft	1705 / 1258	1500 / 1108
Standby Power	Nm / lbft	1870 / 1380	1660 / 1220
Mean piston speed	m/s / ft/sec	7.5 / 24.6	9.0 / 29.5
Effective mean pressure at Prime Power	MPa / psi	1.79 / 260	1.57 / 228
Max combustion pressure at Prime Power	MPa / psi	12.5 / 1810	12.3 / 1780
Total mass moment of inertia, J (mR^2)	kgm^2 / $lbft^2$	2.74/65.0	
Degree of irregularity at Prime Power		1:70	1:162
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	32	40

Engine noise emission

Test standards: ISO 3744-1981 (E)
sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

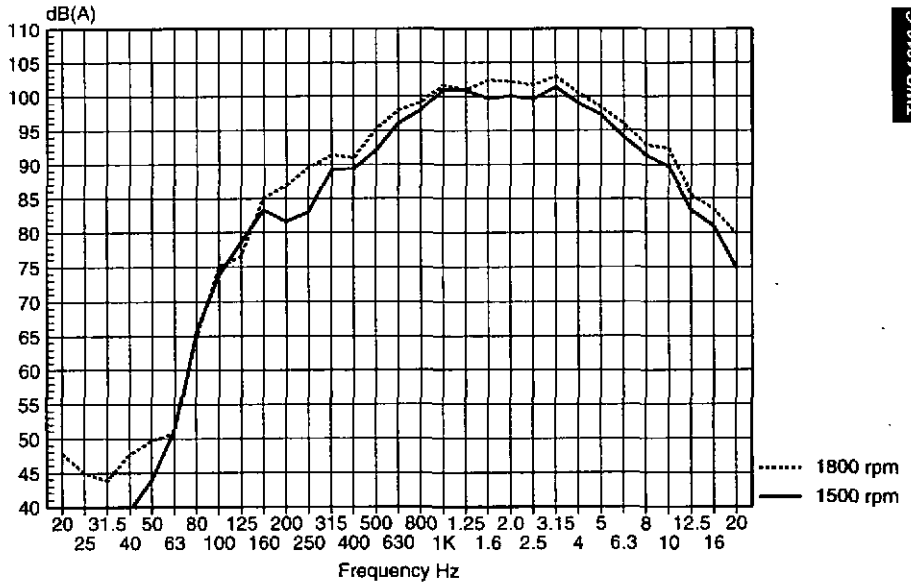
Measured sound power Lw

	Speed, rpm	**1500**	**1800**
No load	dB(A)	104.9	107.6
Prime Power	dB(A)	109.6	111.5
Standby Power	dB(A)	110.0	111.6

Calculated sound pressure Lp at 1 m

	Speed, rpm	**1500**	**1800**
No load	dB(A)	92.9	95.6
Prime Power	dB(A)	97.6	99.5
Standby Power	dB(A)	98.0	99.6

Sound power level TWD 1210 G
Third-octave band analysis



TWD 1210 G	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	113	117
Standby power	dB(A)	114	117

Load acceptance

Test condition: warm engine

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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.2	1.3	0.5	0.5	20–100				
0–40	2.7	3.0	0.5	0.6	40–100				
0–60	5.3	7.0	0.8	1.0	60–100	5.4		2.1	
0–65		10.0		1.4	65–100				
0–71	10.0		1.3		71–100	1.4		0.5	
0–90			7.5	8.0	90–100	0.4	1.8	0.5	2.5
100–0	8.8	9.8	0.5	0.7					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.3	1.4	0.5	0.5	20–100				
0–40	2.9	3.4	0.7	0.8	40–100				
0–60	4.8	5.3	1.0	1.1	60–100				
0–80	7.0		1.2		80–100		3.7		6.8
0–90		10.0		1.4	90–100		2.0		2.1
0–100	10.0		1.6						
100–0	6.4	7.3	0.5	0.5					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TWD 1210 G	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	3	3
0°C ambient temperature *)	s	29	29
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	12	12
0°C ambient temperature *)	s	33	34

*) With manifold heater engaged, lubricating oil 15 W/40

Derating

The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating.

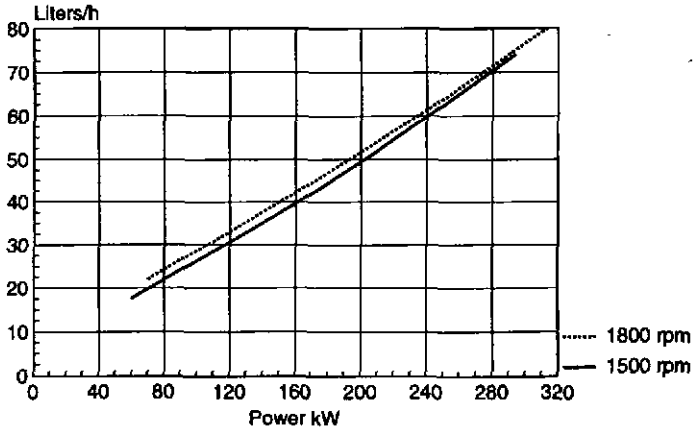
For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude derating factor <3000 m	4%/500 m
Altitude derating factor >3000 m	6%/500 m
Ambient temperature derating factor	1.5%/5°C
Humidity	No derating

TWD 1210 G	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litre/h / US gal/h	0.38 / 0.100	0.42 / 0.111
Standby Power	litre/h / US gal/h	0.43 / 0.114	0.46 / 0.121
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	38	
Oil sump capacity			
max	litres	34	
min	litres	25	
Oil change interval			
CD oil quality	h	200	
VDS oil quality	h	400	
Engine angularity limits			
front up	degrees	20	
front down	degrees	28	
side tilt	degrees	40	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	105	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	238 / 0.383	255 / 0.410
50% of Prime Power	g/kWh / lb/hph	211 / 0.339	221 / 0.355
75% of Prime Power	g/kWh / lb/hph	205 / 0.330	215 / 0.346
100% of Prime Power	g/kWh / lb/hph	207 / 0.335	214 / 0.344
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	234 / 0.379	252 / 0.408
50% of Standby Power	g/kWh /l b/hph	210 / 0.340	218 / 0.353
75% of Standby Power	g/kWh / lb/hph	206 / 0.334	214 / 0.347
100% of Standby Power	g/kWh / lb/hph	211 / 0.342	216 / 0.350
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	115	130
Feed pump pressure	kPa	100–150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Mechanical RQ/Bosch	
Injection pump type/make		P3000/Bosch	
Injection timing standard	°B.T.D.C.	20	
Injection timing TA-luft setting	°B.T.D.C.	17	

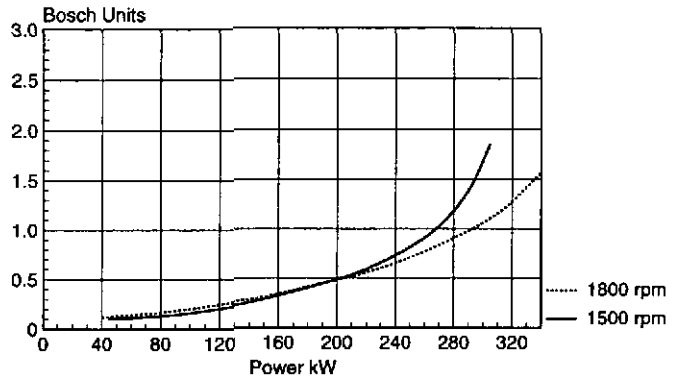
Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

Fuel consumption
TWD 1210 G

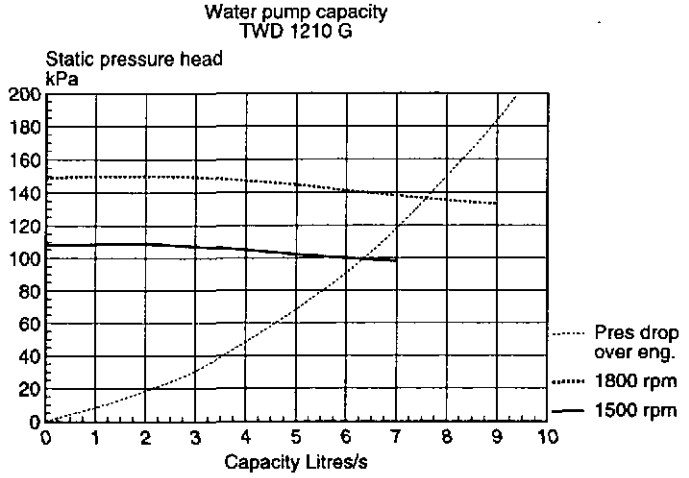


TWD 1210 G	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	20.9 / 739	25.5 / 898
Standby Power, (at 27°C)	m^3/min / cfm	22.6 / 796	27.1 / 955
Air intake restriction, clean filters	kPa	Not available	
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	225 / 12800	254 / 14450
Standby Power	kW / BTU/min	253 / 14400	284 / 16200
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	530 / 985	490 / 915
Standby Power	°C / °F.	545 / 1010	515 / 955
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	57.1 / 2015	64.8 / 2280
Standby Power	m^3/min / cfm	62.5 / 2202	70.1 / 2470
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	19 / 1080	22 / 1250
Standby Power	kW / BTU/min	22 / 1250	24 / 1360
Heat rejection to coolant at			
Prime Power	kW / BTU/min	146 / 8300	159 / 9050
Standby Power	kW / BTU/min	161 / 9160	178 / 10100
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	0.90	
Radiator core thickness (std size)	mm	73	
Fan diameter	mm	750	
Fan power consumption	kW / hp	6 / 8	11 / 15
Fan drive ratio		1.00:1	
Coolant capacity			
engine	litres	26.2	
std radiator with hoses	litres	26	
Coolant pump	drive/ratio	gear/1.58:1	
Coolant flow with standard system	l/s	6,4	7,7
Minimum coolant flow	l/s	5.6	6.6
Maximum external coolant system restriction	kPa	34	47
Thermostat			
start to open	°C	75	
fully open	°C	88	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TWD 1210 G



Water pump capacity
TWD 1210 G



Cooling performance

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

Engine speed rpm	Air on temp °C	110% OF PRIME POWER Air flow m^3/s	Max additional external restriction Pa	STANDBY POWER Air flow m^3/s	Max additional external restriction Pa
1500	30	2.55	440	2.55	440
	40	3.25	340	3.25	340
	50	4.45	160	4.45	160
	55	5.40	15	5.40	15
	56			5.45	0
1800	30	2.85	935	2.85	935
	40	3.60	635	3.60	635
	50	5.00	275	5.00	275
	55	6.00	110	6.00	110
	57			6.55	0

TWD 1210 G	**Speed, rpm**	***1500***	***1800***
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		3.75:1	
Starter motor	make/type/kW	Bosch/KB/6.6	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel		156	
Number of teeth on starter motor		11	
Inrush current at +20°C	Amp	900	
Cranking current at +20°C	Amp	380	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2x152	
minimum at >+5°C	Ah	2x105	
Stop solenoid			
pull current	Amp	35	
hold current	Amp	0.4	
Inlet manifold heater (at 20 V)	kW	4.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	max 590	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	max 30	max 50
down	kW	max 19	max 31
right	kW	max 30	max 50
Timing gear at compressor PTO	Nm	max 100	
speed ratio direction of rotation viewed from flywheel side		0.91:1/clockwise	
Timing gear at servo pump PTO	Nm	max 35	
speed ratio direction of rotation viewed from flywheel side		1.58/:1/clockwise	

TWD 1210 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	**Engine**	1	–	TWD 1210 G	868372		
	Gen Pac	–	2	TWD 1210 G Gen Pac	868373		
	Ratings	3	3	Prime Power 1500 rpm	136182016		268 kW (262 kW with fan)
		4	4	Standby Power 1500 rpm	136182035		294 kW (288 kW with fan)
		5	5	Prime Power 1800 rpm	136182017		283 kW (272 kW with fan) [1])
		6	6	Standby Power 1800 rpm	136182036		313 kW (302 kW with fan) [1])
	TA-luft Rating	7	7	Prime Power 1500 rpm	136180901		268 kW (262 kW with fan) [1]) Order also 23.2, 23.4 or 23.6
218	**Engine suspension**	5	–	Fixed front, low	843455	x	290 mm to crankshaft centre
		6	–	Fixed rear, low	843337	x	290 mm to crankshaft centre
		9	•	Fixed front, high	865983	x	325 mm to crankshaft center
		10	•	Fixed rear, high	865984	x	325 mm to crankshaft center
		15	–	Flexible front upper bracket	843459	x	2 pcs, incl rubber cushions
		16	–	Lower bracket for 218.15, 218.18	820744	x	262 mm to crankshaft centre
		17	–	Lower bracket for 218.15, 218.18	820822	x	297 mm to crankshaft centre
		18	–	Flexible rear upper bracket	843463	x	2 pcs, incl rubber cushions Lower bracket, see 218.16–17
22	**Lubrication system**	1	1	Oil drain pump	136182201	x*	Manual
23	**Fuel system**	1	•	Flexible fuel hoses	136182923	x*	Two pcs, L=400mm
		2	2	Mech governor set for 1800 rpm	136182703	x	RQ-governor
		3	3	Electronic governor 1500 rpm	136182722	x*	Incl control unit and electr. stop
		4	4	Electronic governor 1800 rpm	136182725	x*	Incl control unit and electr. stop
		5	5	RQ-governor 1500 rpm for overspeed protection	136182731	x	Mech, governor set up for other el. governor than GAC
		6	6	RQ-governor 1800 rpm for overspeed protection	136182732	x	Mech, governor set up for other el. governor than GAC
		7	7	Mounting kit for separate electronic governor	843332	x	For other el. governor than GAC
		8	8	Overspeed trip switch	136183641	x*	Speed sender included
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	136189080	x*	Mounted on base frame
25	**Intake and exhaust system**	1	1	Air filter elbow connection	843465	x	Two pcs are required
		2	2	Flexible exhaust pipe	845981	x	
		3	3	Exhaust elbow	3826822		
		5	5	Silencer, 5" Heavy Duty	863048	x	With connecting flanges
		10	10	Heat guard	136189012	x*	Exhaust manifold and turbo
26	**Cooling system**	4	•	Radiator, 0.90 m^2	3825581	x	Incl fan guard and mounting parts
		17	•	Radiator guard	863013	x	
		26	•	Thrust type fan	863039	x	Ø 750 mm
		27	–	Suction type fan	863038	x	Ø 750 mm
		–	28	Suction type fan	136182631	x	Ø 750 mm
		37	•	Belt guard	136182933	x*	For fan and alternator belts
		39	39	Coolant filter	828046	x	
27	**Control system**	1	1	Electric lever control	136182733	x*	(1500 rpm) Not in comb. with el governor
		2	2	Electric lever control	136182734	x*	(1800 rpm) Not in comb. with el governor
31	**Battery**	1	1	Battery box	864171	x	
		2	2	Connection cables	864173		Incl main switch

** Reference to corresponding customer fitted kit*

TWD 1210 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
33	**Starting system**	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run
37	**Electrical wiring**	3	3	Engine wiring	136183631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5
38	**Instrument, switches and senders**	1	1	Instrument panel	873626	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	136183622	x*	pressure senders
		5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		7	7	Oil temp gauge and sender	863452	x	Not in comb with oil drain pump
		8	8	Speed sender	136183627	x*	Not in comb with 23.8
		9	9	Tachometer/ hour meter	873722	x	For Ø 72 mm mounting hole
		10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9
		11	11	Hour meter	858877	x	
		12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	
		14	•	Coolant temp and oil pressure switches	136183621	x*	103°C temp setting
		15	–	Coolant temp and oil pressure switches	136183625	x*	97°C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	3	3	Flexible coupling ME 240	845818	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865078	x	Separately mounted. 220–240 V.
		3	3	Tool kit	844481	x	
		4	4	Engine heater 2000 W	3825491	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825388	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994105	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994102	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	136180421	x	[1]
		4	4	Instruction book, English			[1] One included in engine order no.
		5	5	Instruction book, German	136180423	x	[1]
		6	6	Instruction book, French	136180424	x	[1]
		7	7	Instruction book, Spanish	136180425	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745750		
		10	10	Maintenance kit, 2500 h	876733	x	
		11	11	Maintenance kit, 5000 h	876734	x	
	Engine packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	136181902	x	
		–	14	Plastic wrapping		x	Included in engine order no.
		–	15	Wooden box	136181904	x	

** Reference to corresponding customer fitted kit*
[1] *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately. – See next page !

TWD 1210 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted equipment order no.		Corresponding factory fitted equipment
22.1	136182201	Oil drain pump	862936
23.1	136182923	Flexible fuel hoses	843466
23.3	136182722	Electronic governor 1500 rpm	3825507
23.4	136182725	Electronic governor 1800 rpm	3825508
23.8	136183641	Overspeed tripswitch	866306
23.9	136189080	Fuel filter/water separator	3826744
25.10	136189012	Heat guard	3826129
26.37	136182933	Belt guard	3826768
27.1	136182733	Electric lever control 1500 rpm	866409
27.2	136182834	Electric lever control 1800 rpm	866409
37.3	136183631	Engine wiring	862628
38.4	136183622	Senders	862925
38.8	136183627	Speed sender	862327
38.14	136183621	Switches 103°C	862924
38.15	136183625	Switches 97°C	863962

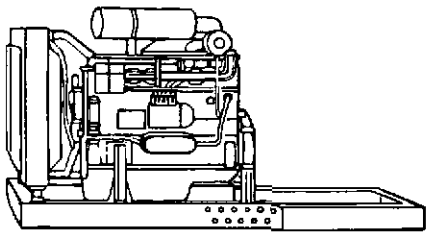
TWD 1211 G

Gen Set engine — Gen Pac

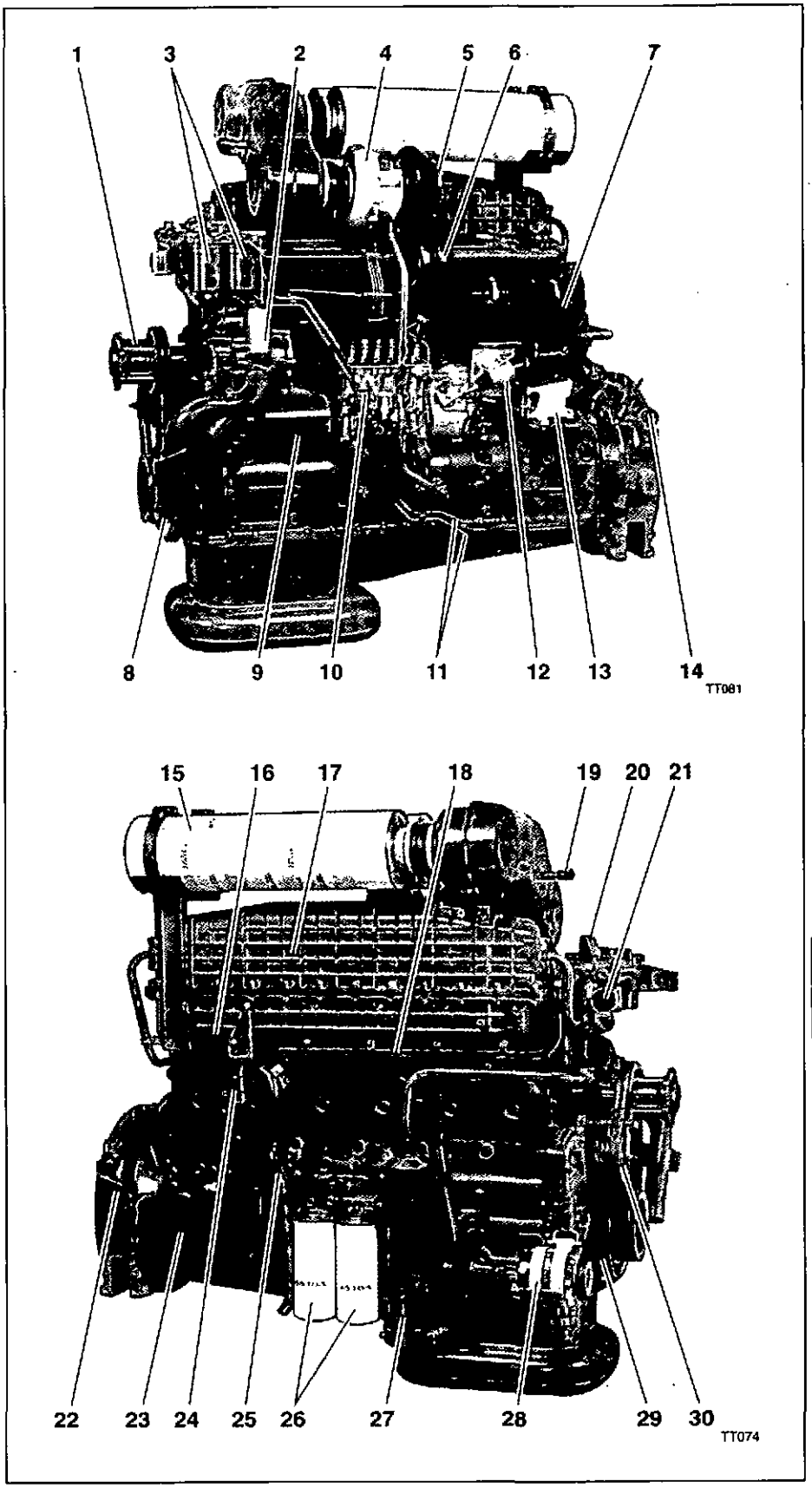
TWD 1211 G

- Turbocharged
- Water to air intercooled
- Diesel fuel
- Displacement indication (l)
- Generation
- Version
- Generator drive

Gen Pac – Gen Set engine mounted on an extendable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



1. Fan hub
2. Gear driven coolant pump
3. Twin fuel filters of throw-away type
4. Turbo-charger
5. Connecting flange, exhaust line
6. Air cooled exhaust manifold
7. Heat radiation protection
8. Coolant pipe, inlet
9. Pump coupling guard
10. Injection pump
11. Fuel pipes for tank connection
12. Stop solenoid
13. Electronic speed governor
14. Lift eyelet
15. Double air filters of throw-away type
16. Inlet manifold heater
17. Intercooler
18. Cable iron
19. Air restriction indicator
20. Radiator support
21. Coolant pipe, outlet
22. Flywheel housing SAE 1
23. Starter motor
24. Relay for inlet manifold heater
25. Crankcase ventilation
26. Twin full-flow oil filters of spin-on type
27. Oil cooler
28. Alternator
29. *Vibration damper*
30. Automatic belt tensioner

Standard equipment

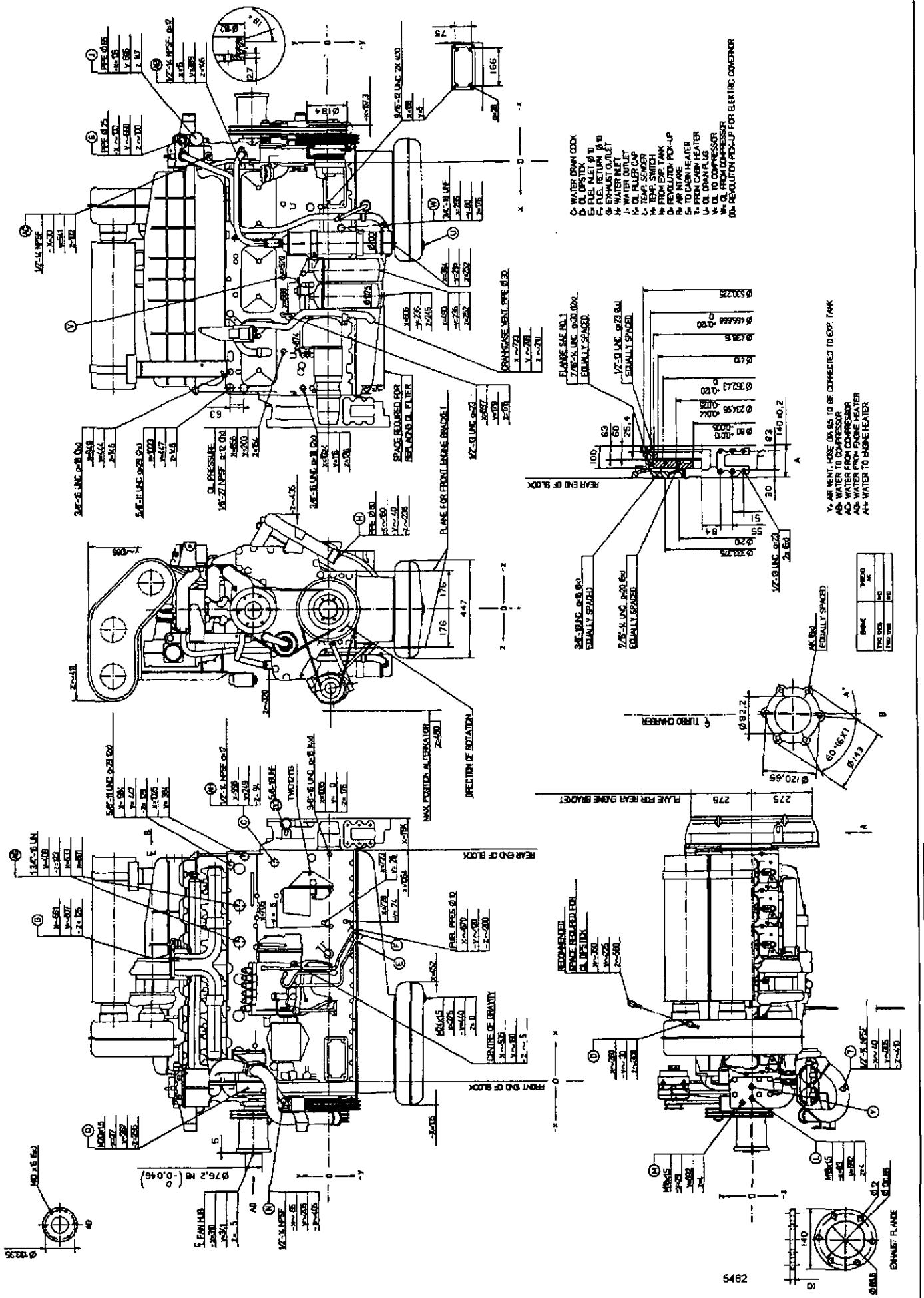
TWD 1211 G

		Engine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 1	•	•
	Flywheel for 14" flexible plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
	Oil-cooler, side-mounted	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with GAC electric governor	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-charger	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator	–	•
	Radiator guard	–	•
	Gear-driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
	Intercooler	•	•
27	**Control system**		
	Manual speed control	•	•
	Electrical stop energized to run	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, right side	•	•
33	**Starting system**		
	Starter motor, Bosch 6.6 kW/24 V	•	•
	Connecting facility for extra starter motor	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and senders**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

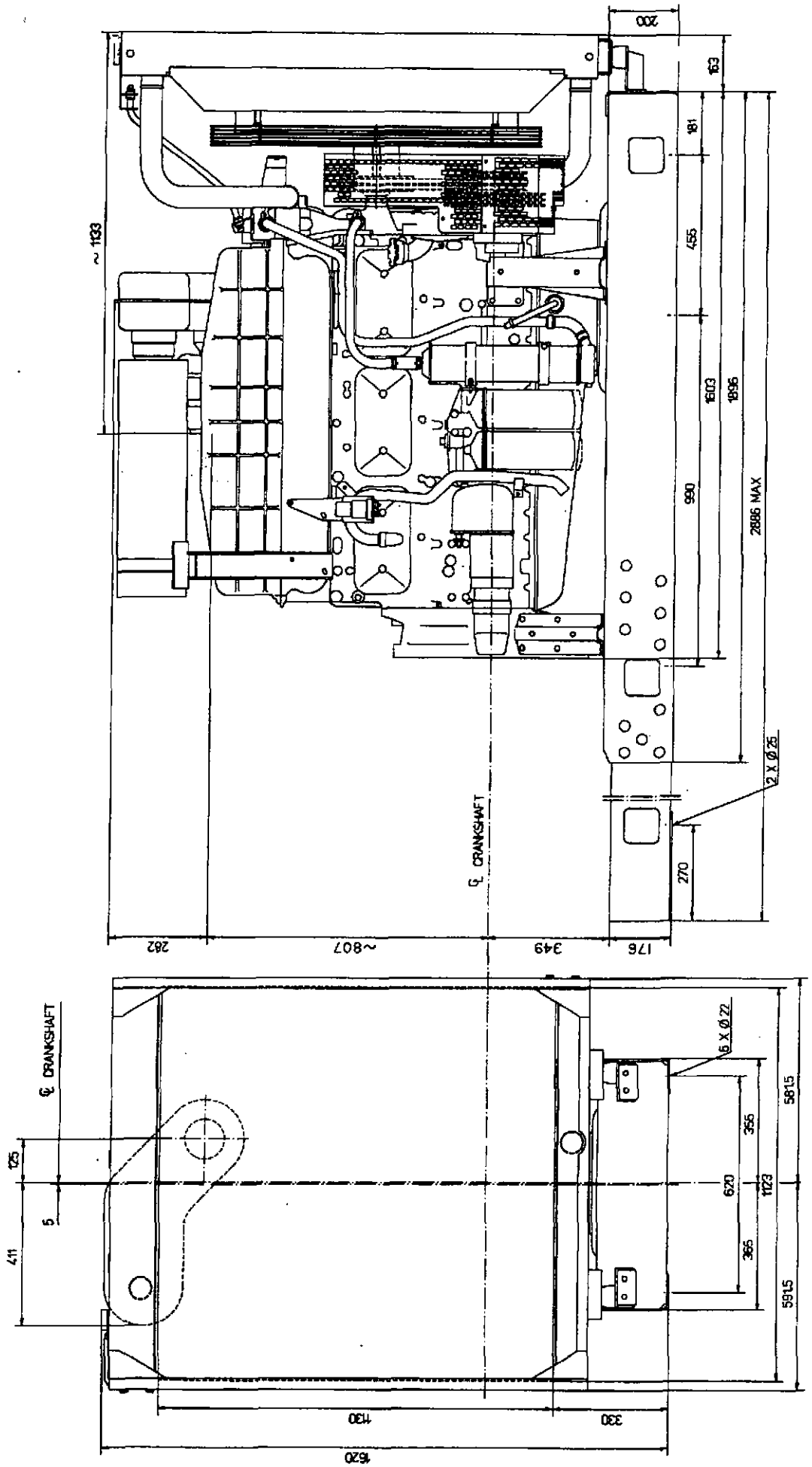
– optional equipment or not applicable
• included in standard specification

Technical description

- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head gaskets against high temperatures.
- Efficient and reliable turbo-charger.
- Water to air intercooler.
- Full flow disposable spin-on oil filter, for extra high filtration.
- Full flow oil cooler.
- The lubricating oil level can be measured during operation.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Gear driven, highly efficient coolant pump.
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system with GAC electronic governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Nitro-carburized transmission gears for heavy duty operation.
- Viscous crankshaft vibration damper to withstand single bearing alternator torsional vibrations.
- Piston cooling for low piston temperature and reduced ring temperature.
- Automatic fan belt tensioner.
- Replaceable valve guides and valve seats.



TWD 1211 G Gen Pac
Drawing no. 887106-04



DRY WEIGHT APP. 1425 KG
WET WEIGHT APP. 1514 KG

5463

TWD 1211 G

Technical data TWD 1211 G

General

In line four stroke diesel engine with direct injection
Turbocharged and water to air intercooled

Number of cylinders	6	Bore		130.17 mm / 5.12 in	
Displacement, total	11.98 litres / 731 in^3	Stroke		150 mm / 5.91 in	
Firing order	1-5-3-6-2-4	Compression ratio		13.3:1	
Rotation direction, anti-clockwise viewed towards flywheel		Dry weight GenPac	1425 kg	Engine only	1140 kg
		Wet weight GenPac	1514 kg	Engine only	1200 kg

TWD 1211 G	Speed, rpm	1500	1800
Performance	Test no.	20000045	20000044
Prime Power			
without fan	kW / hp	288 / 392	311 / 423
with fan	kW / hp	282 / 384	300 / 408
Continuous Standby Power			
without fan	kW / hp	288 / 392	311 / 423
with fan	kW / hp	282 / 384	300 / 408
Standby Power			
without fan	kW / hp	314 / 427	341 / 464
with fan	kW / hp	308 / 419	330 / 449
Torque at			
Prime Power	Nm / lbft	1833 / 1353	1649 / 1217
Standby Power	Nm / lbft	2000 / 1475	1810 / 1335
Mean piston speed	m/s / ft/sec	7.5 / 24.6	9.0 / 29.5
Effective mean pressure at Prime Power	MPa / psi	1.92 / 279	1.73 / 251
Max combustion pressure at Prime Power	MPa / psi	12.7 / 1840	12.1 / 1750
Total mass moment of inertia, J (mR^2)	kgm^2 / $lbft^2$	2.80 / 66.4	
Degree of irregularity at Prime Power		1:59	1:136
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	32	40

Engine noise emission

Test standards: ISO 3744-1981 (E) sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

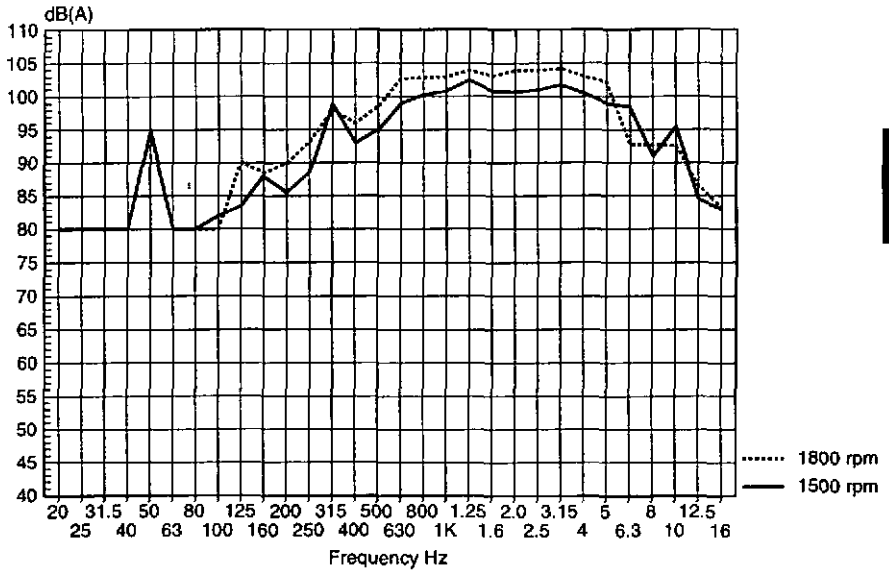
Measured sound power Lw

	Speed, rpm	1500	1800
No load	dB(A)	105.5	106.5
Prime Power	dB(A)	111.0	113.2
Standby Power	dB(A)	111.5	114.0

Calculated sound pressure Lp at 1 m

	Speed, rpm	1500	1800
No load	dB(A)	93.5	94.5
Prime Power	dB(A)	99.0	101.2
Standby Power	dB(A)	99.5	102.0

Sound power level TWD 1211 G
Third octave band analysis



TWD 1211 G	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	113	118
Standby power	dB(A)	114	117

Load acceptance

Test condition: warm engine

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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	2.3	2.6	1.0	1.0	20–100				
0–40	5.3	6.0	1.6	1.8	40–100				
0–57		10.0		3.0	57–100				
0–60	9.2		2.7		60–100	8.2		4.0	
0–62	10.0		3.2		62–100	5.6		2.4	
100–0	10.4	9.6	1.0	1.0					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	2.2	2.3	0.9	1.0	20–100	–		–	
0–40	3.9	4.3	1.3	1.2	40–100	8.3		2.6	
0–60	5.7	6.3	1.9	2.0	60–100	5.0		2.0	
0–71		10.0		2.2	71–100				
0–78	10.0		2.2		78–100	2.3		1.2	
100–0		6.5		2.0					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TWD 1211 G	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	5	5
0°C ambient temperature *)	s	24	24
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s		
0°C ambient temperature *)	s		

*) With manifold heater engaged, lubricating oil 15 W/40

Derating

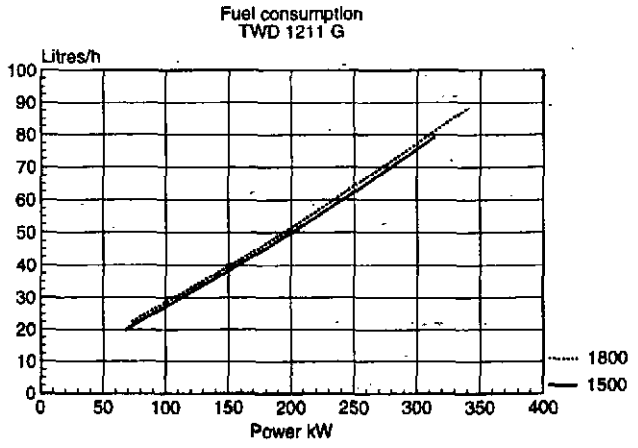
The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating.

For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude derating factor <3000 m	4%/500 m
Altitude derating factor >3000 m	6%/500 m
Ambient temperature derating factor	1.5%/5°C
Humidity	No derating

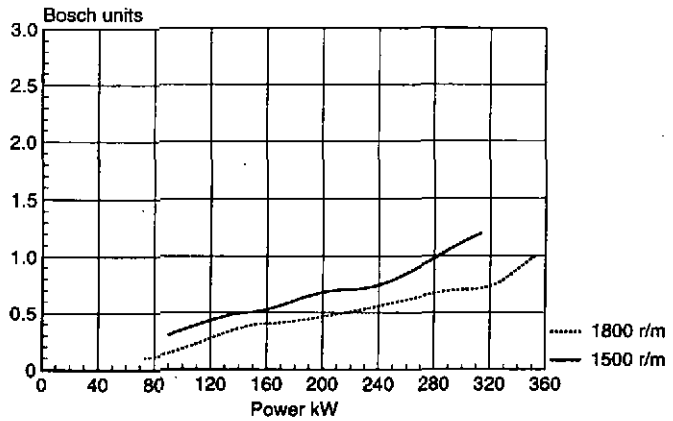
TWD 1211 G	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litre/h / US gal/h	0.42 / 0.111	0.46 / 0.122
Standby Power	litre/h / US gal/h	0.43 / 0.114	0.47 / 0.124
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	38	
Oil sump capacity			
max	litres	34	
min	litres	25	
Oil change interval			
CD oil quality	h	200	
VDS oil quality	h	*400*	
Engine angularity limits			
front up	degrees	20	
front down	degrees	28	
side tilt	degrees	40	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	*70*	
Lubrication oil temperature			
normal	°C	105	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh/lb/hph	241 / 0.388	252 / 0.405
50% of Prime Power	g/kWh/lb/hph	214 / 0.344	220 / 0.354
75% of Prime Power	g/kWh/lb/hph	209 / 0.339	215 / 0.348
100% of Prime Power	g/kWh/lb/hph	210 / 0.340	216 / 0.350
Specific fuel consumption at			
25% of Standby Power	g/kWh/lb/hph	239 / 0.387	248 / 0.402
50% of Standby Power	g/kWh/lb/hph	213 / 0.345	218 / 0.353
75% of Standby Power	g/kWh/lb/hph	209 / 0.339	216 / 0.350
100% of Standby Power	g/kWh/lb/hph	212 / 0.344	218 / 0.353
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	115	130
Feed pump pressure	kPa	100–150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Electric/GAC	
Injection pump type/make		P3000/Bosch	
Injection timing	°B.T.D.C.	22	

Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 *kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).*

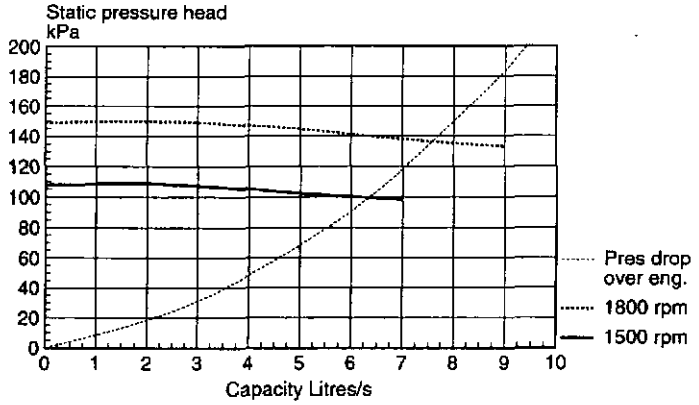


TWD 1211 G	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	20.5 / 723	24.9 / 880
Standby Power, (at 27°C)	m^3/min / cfm	21.8 / 772	26.7 / 942
Air intake restriction, clean filters	kPa	Not available	
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	251 / 14280	286 / 16270
Standby Power	kW / BTU/min	280 / 15920	321 / 18250
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	585 / 1085	545 / 1010
Standby Power	°C / °F	595 / 1100	565 / 1050
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	60.4 / 2130	67.8 / 2390
Standby Power	m^3/min / cfm	64.5 / 2278	74.2 / 2618
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	21 / 1195	23 / 1310
Standby Power	kW / BTU/min	24 / 1365	26 / 1480
Heat rejection to coolant at			
Prime Power	kW / BTU/min	157 / 8935	176 / 10015
Standby Power	kW / BTU/min	172 / 9780	194 / 11030
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	1.25	
Radiator core thickness (std size)	mm	73	
Fan diameter	mm	790	
Fan power consumption	kW / hp	6 / 8	11 / 15
Fan drive ratio		1.00:1	
Coolant capacity			
engine	litres	26.2	
std radiator with hoses	litres	33	
Coolant pump	drive/ratio	gear/1.58:1	
Coolant flow with standard system	l/s	6.4	7.7
Minimum coolant flow	l/s	5.6	6.6
Maximum external coolant system restriction	kPa	34	47
Thermostat			
start to open	°C	75	
fully open	°C	88	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TWD 1211 G



Water pump capacity
TWD 1211 G



Cooling performance

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

Engine speed rpm	Air on temp °C	110% OF PRIME POWER Air flow m^3/s	Max additional external restriction Pa	STANDBY POWER Air flow m^3/s	Max additional external restriction Pa
1500	30	2.35	605	2.35	605
	40	3.00	535	3.00	535
	50	4.10	300	4.10	300
	55	4.85	205	4.85	205
	64			7.25	0
1800	30	2.75	875	2.75	875
	40	3.55	775	3.55	775
	50	4.70	510	4.70	510
	55	5.60	305	5.60	305
	65			8.70	0

TWD 1211 G	**Speed, rpm**	**1500**	**1800**
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		3.75:1	
Starter motor	make/type/kW	Bosch/KB/6.6	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel		156	
Number of teeth on starter motor		11	
Inrush current at +20°C	Amp	900	
Cranking current at +20°C	Amp	350	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2x152	
minimum at >+5°C	Ah	2x105	
Stop solenoid			
pull current	Amp	35	
hold current	Amp	0.4	
Inlet manifold heater (at 20 V)	kW	4.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	max 590	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	max 30	max 50
down	kW	max 19	max 31
right	kW	max 30	max 50
Timing gear at compressor PTO	Nm	max 100	
speed ratio direction of rotation viewed from flywheel side		0.91:1/clockwise	
Timing gear at servo pump PTO	Nm	max 35	
speed ratio direction of rotation viewed from flywheel side		1.58/:1/clockwise	

TWD 1211 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	**Engine**	1	–	TWD 1211 G	868417		
	Gen Pac	–	2	TWD 1211 G Gen Pac	868418		
	Ratings	3	3	Prime Power 1500 rpm	136182018		288 kW (282 kW with fan)
		4	4	Standby Power 1500 rpm	136182043		314 kW (308 kW with fan)
		5	5	Prime Power 1800 rpm	136182019		311 kW (300 kW with fan) [1]
		6	6	Standby Power 1800 rpm	136182044		341 kW (330 kW with fan) [1]
							[1])Order also 23.4
218	**Engine suspension**	5	–	Fixed front, low	843455	x	290 mm to crankshaft center
		6	–	Fixed rear, low	843337	x	290 mm to crankshaft center
		9	•	Fixed front, high	865983	x	325 mm to crankshaft center
		10	•	Fixed rear, high	865984	x	325 mm to crankshaft center
		15	–	Flexible front, upper bracket	843459	x	2 pcs, incl rubber cushions
		16	–	Lower bracket for 218.15, 218.18	820744	x	262 mm to crankshaft centre 1 pcs included
		17	–	Lower bracket for 218.15, 218.18	820822	x	297 mm to crankshaft centre 1 pcs included
		18	–	Flexible rear upper bracket	843463	x	2 pcs, incl rubber cushions Lower bracket, see 218.16–17
22	**Lubrication system**	1	1	Oil drain pump	136182201	x*	Manual
23	**Fuel system**	1	•	Flexible fuel hoses	136182923	x*	Two pcs, L=400 mm
		3	3	Electronic governor 1500 rpm		x	Incl in engine order no. Incl control unit and electr. stop
		4	4	Electronic governor 1800 rpm	136182725	x*	Incl control unit and electr. stop
		8	8	*Overspeed trip switch*	136183641	x*	*Speed sender included*
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	136189080	x*	Mounted on base frame
25	**Intake and exhaust system**	1	1	Air filter elbow connection	843465	x	Two pcs are required
		2	2	Flexible exhaust pipe	845981	x	
		3	3	Exhaust elbow	3826822	x	
		5	5	Silencer, 5" Heavy Duty	863048	x	With connecting flanges
		10	10	Heat guard	136189012	x*	Exhaust manifold and turbo
26	**Cooling system**	5	•	Radiator, 1.25 m^2	3825582	x	Incl fan guard and mounting parts
		17	•	Radiator guard	863014	x	
		29	•	Thrust type fan	863040	x	Ø 790 mm for 26.5
		30	–	Suction type fan	865979	x	Ø 790 mm for 26.5
		–	31	Suction type fan	136182614	x	Ø 790 mm
		32	–	Thrust type fan	863042	x	Ø 890 mm
		33	–	Suction type fan	863041	x	Ø 890 mm
		37	•	Belt guard	136182933	x*	For fan and alternator belts
		39	39	Coolant filter	828046	x	
31	**Battery**	1	1	Battery box	864171	x	
		2	2	Connection cables	864173		Incl main switch
33	**Starting system**	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run
37	**Electrical wiring**	3	3	Engine wiring	136183631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5

* *Reference to corresponding customer fitted kit*

TWD 1211 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
38	**Instrument, switches and senders**	1	1	Instrument panel	873626	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	136183622	x*	
		5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		7	7	Oil temp gauge and sender	863452	x	Not in comb with oil drain pump
		8	8	Speed sender	136183627	x*	Not in comb with 23.8
		9	9	Tachometer/ hour meter	873722	x	For Ø 72 mm mounting hole
		10	10	*Adapter ring*	873721	x	*Ø 80-72 mm, for 38.9*
		11	11	Hour meter	858877	x	
		12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	
		14	•	Coolant temp and oil pressure switches	136183621	x*	103°C temp setting
		15	–	Coolant temp and oil pressure switches	136183625	x*	97°C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	3	3	Flexible coupling ME 240	845818	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865078	x	Separately mounted. 220–240 V.
		3	3	Tool kit	844481	x	
		4	4	Engine heater 2000 W	3825491	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825388	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994105	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994102	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	136180421	x	[1]
		4	4	Instruction book, English			[1] One included in engine order no.
		5	5	Instruction book, German	136180423	x	[1]
		6	6	Instruction book, French	136180424	x	[1]
		7	7	Instruction book, Spanish	136180425	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745750		
		10	10	Maintenance kit, 2500 h	876733	x	
		11	11	Maintenance kit, 5000 h	876734	x	
	Engine packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	136181902	x	
		–	14	Plastic wrapping		x	Included in engine order no.
		–	15	Wooden box	136181904	x	

** Reference to corresponding customer fitted kit*
[1]) *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately. – See next page !

TWD 1211 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted equipment order no.		Corresponding factory fitted equipment
22.1	136182201	Oil drain pump	862936
23.1	136182923	Flexible fuel hoses	843466
23.4	136182725	Electronic governor 1800 rpm	3825508
23.8	136183641	Overspeed tripswitch	866306
23.9	136189080	Fuel filter/water separator	3826744
25.10	136189012	Heat guard	3826129
26.37	136182933	Belt guard	3826768
37.3	136183631	Engine wiring	862628
38.4	136183622	Senders	862925
38.8	136183627	Speed sender	862327
38.14	136183621	Switches 103°C	862924
38.15	136183625	Switches 97°C	863962

TAD 1231 GE

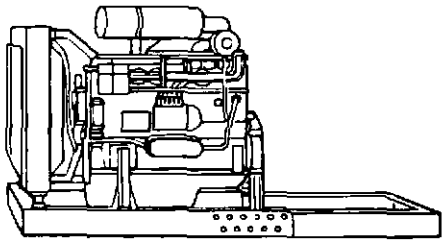
Gen Set Engine – Gen Pac

TAD 1231 GE

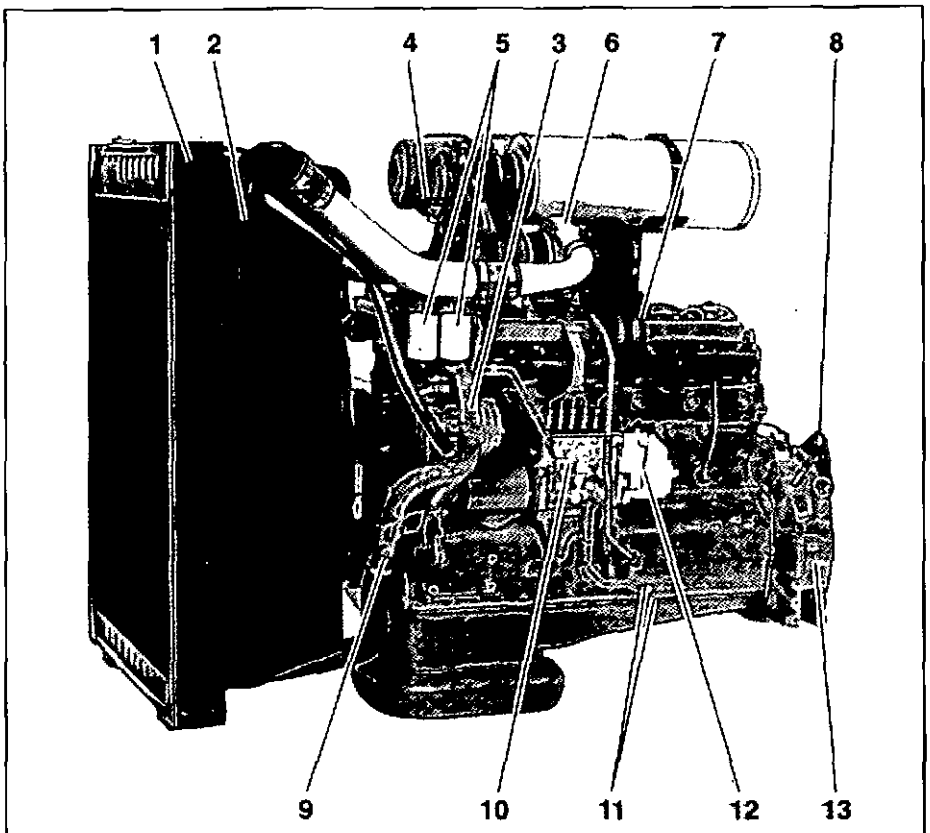
- Turbocharged
- Air to air intercooled
- Diesel fuel
- Displacement indication (l)
- Generation
- Version
- Generator drive
- *Emission controlled*

Gen Pac – Gen Set Engine mounted on an expandable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and *simplified transportation.*

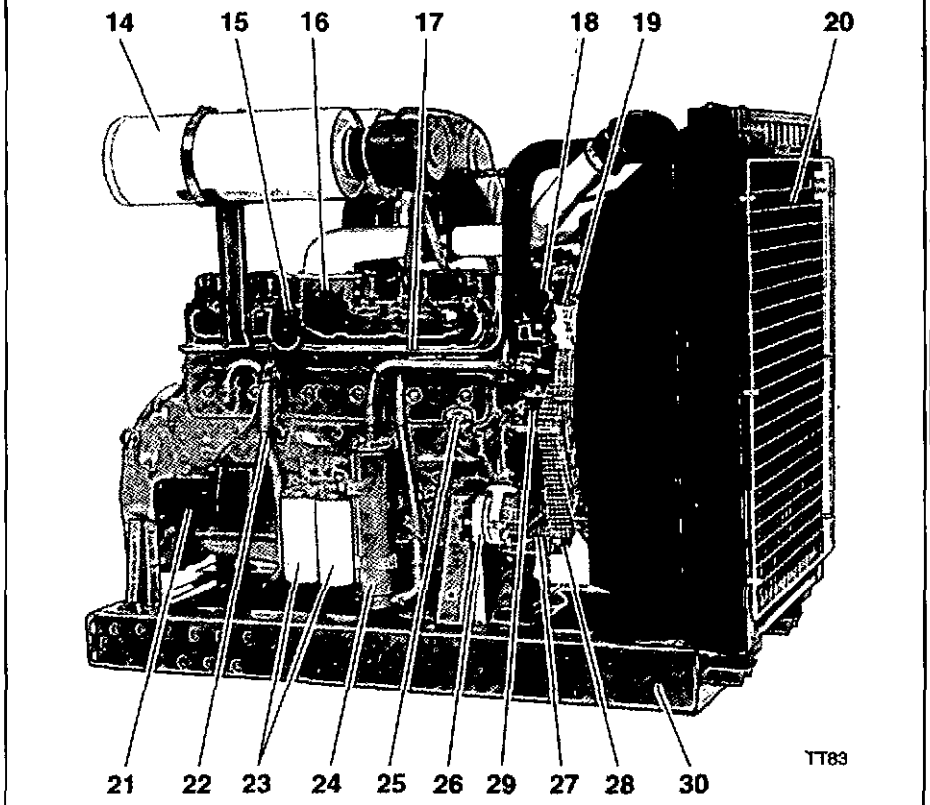
1. Tropical radiator



TT125



TT82



TT83

2. Intercooler
3. *Gear driven coolant pump*
4. Air restriction indicator
5. Twin fuel filters of throw-away type
6. Turbo-charger
7. *Air cooled exhaust manifold*
8. Lift eyelet
9. Coolant pipe, inlet
10. Injection pump
11. *Fuel pipes for tank connection*
12. Electric speed governor
13. Flywheel housing SAE 1
14. Air filter
15. *Relay for inlet manifold heater*
16. Inlet manifold heater
17. Cable iron
18. Coolant pipe, outlet
19. *Fan guard*
20. Radiator guard *)
21. Starter motor
22. Crankcase ventilation
23. *Full-flow oil filters of spin-on type*
24. Oil cooler
25. Oil filler
26. Alternator
27. *Belt guard* *)
28. Vibration damper
29. Automatic belt tensioner
30. Expandable base frame

*) Optional

Standard equipment

TAD 1231 GE

		Engine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 1	•	•
	Flywheel for 14" flexible plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
	Oil-cooler, side-mounted	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with GAC electric governor	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-charger	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator and intercooler	•[1])	•
	Radiator guard	–	•
	Gear-driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
	Intercooler	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, right side	•	•
33	**Starting system**		
	Starter motor, Bosch 6.6 kW/24 V	•	•
	Connecting facility for extra starter motor	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and switches**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

[1]) Must be ordered

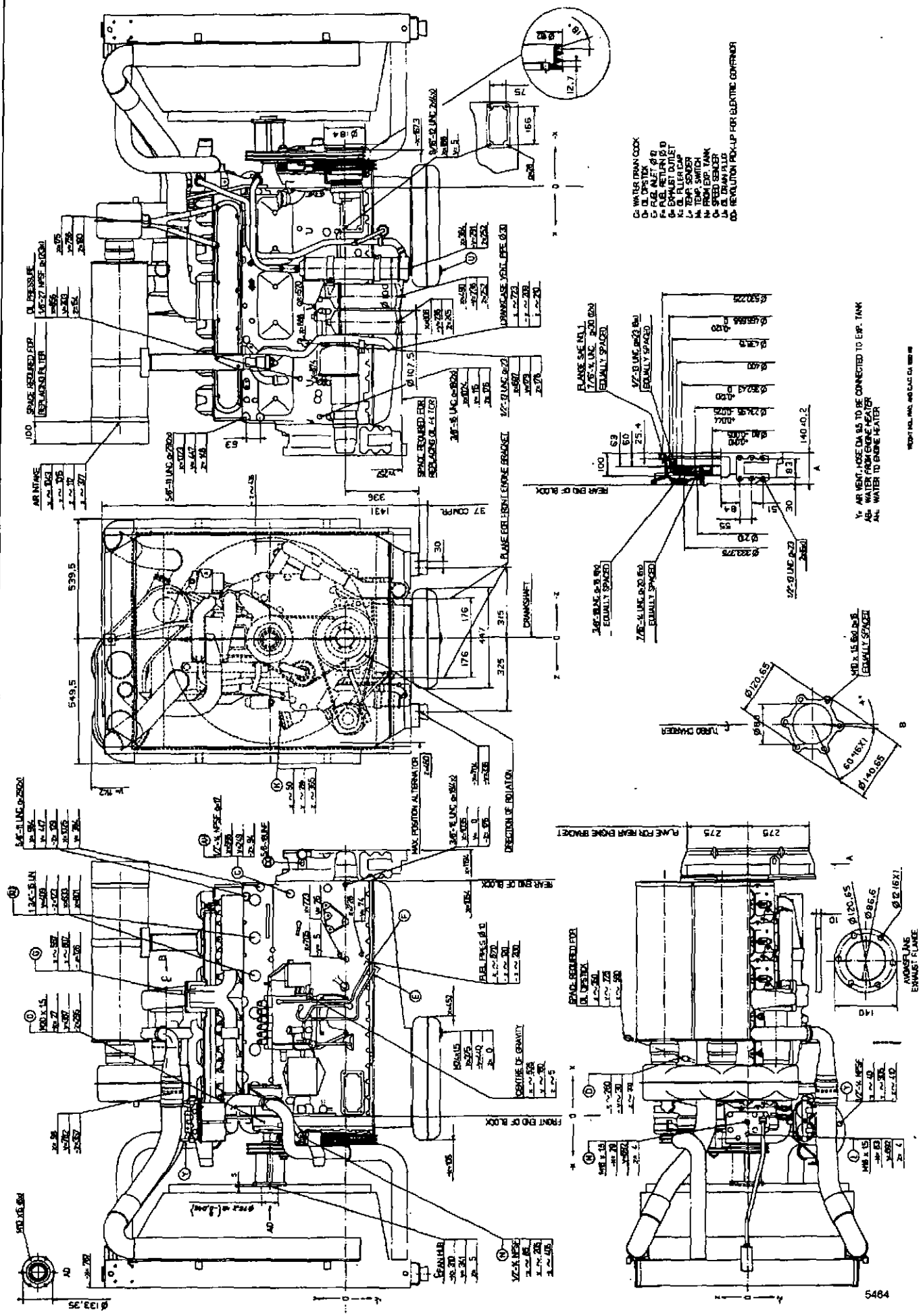
– optional equipment or not applicable
• included in standard specification

TAD 1231GE

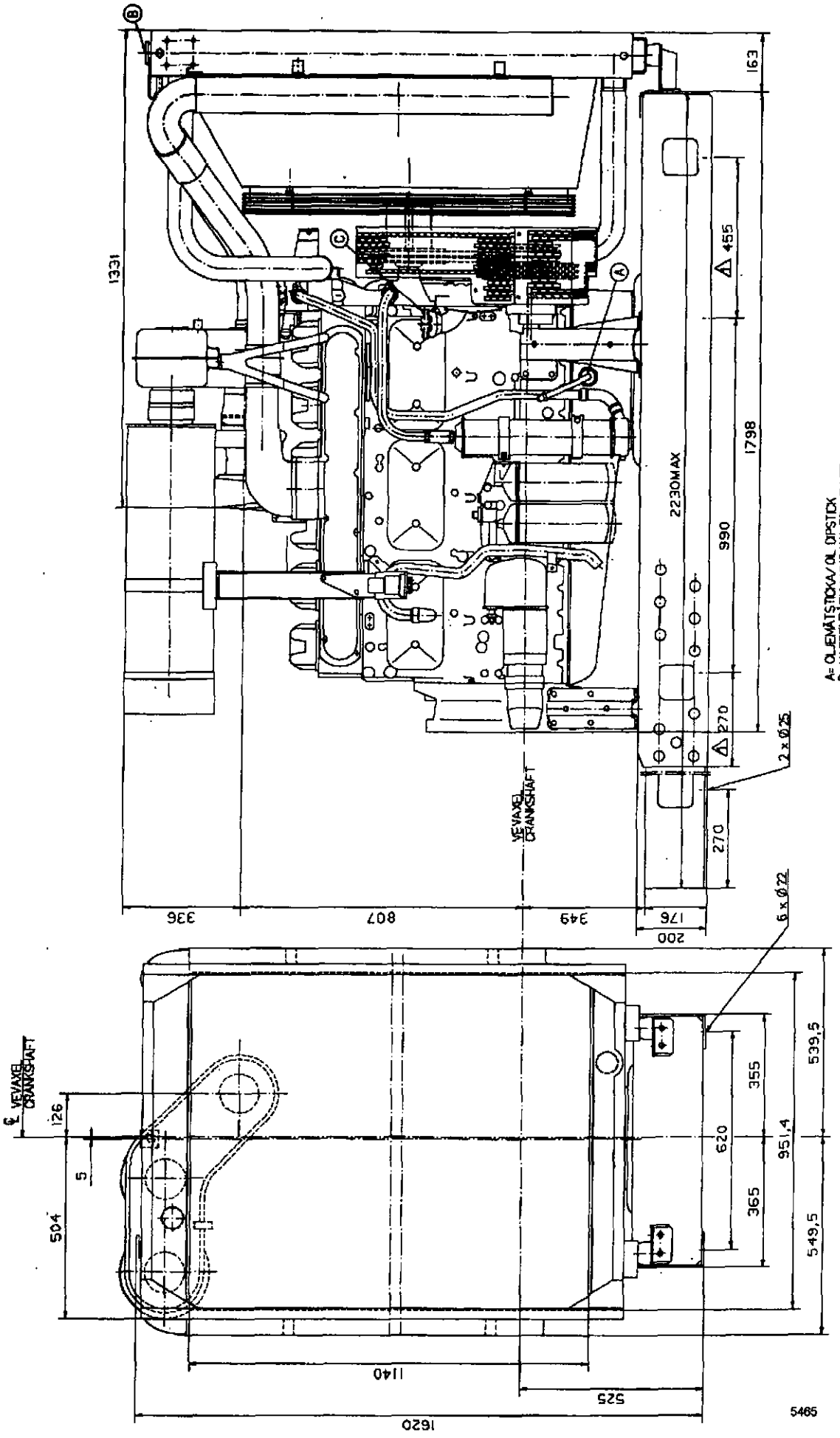
Technical description

- Complies with TA -luft exhaust emission and EPA/CARB in accordance with D2 cycle ISO 8178.
- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head gaskets against high temperatures.
- Efficient and reliable turbo-charger.
- Air to air intercooler.
- Full flow disposable spin-on oil filter, for extra high filtration.
- Full flow oil cooler.
- The lubricating oil level can be measured during operation.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Gear driven, highly efficient coolant pump.
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system including accurate electronic governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Nitro-carburized transmission gears for heavy duty operation.
- Viscous crankshaft vibration damper to withstand single bearing alternator torsional vibrations.
- Piston cooling for low piston temperature and reduced ring temperature.
- Keystone top compression rings for long service life.
- Automatic fan belt tensioner.
- Replaceable valve guides and valve seats.

TAD 1231 GE
Drawing no. 891851-01



TAD 1231 GE Gen Pac
Drawing no. 891855-03



TAD 1231GE

Technical data TAD 1231 GE

General

In line four stroke diesel engine with direct injection
Turbocharged and air to air intercooled

Number of cylinders	6	Bore	130.17 mm / 5.12 in
Displacement, total	11.98 litres / 731 in^3	Stroke	150 mm / 5.91 in
Firing order	1-5-3-6-2-4	Compression ratio	14.0:1
Rotation direction, anti-clockwise viewed towards flywheel		Dry weight Gen Pac 1434 kg	Engine only 1250 kg*)
		Wet weight Gen Pac 1514 kg	Engine only 1330 kg*)

*) Including radiator and intercooler

TAD 1231 GE	Speed, rpm	1500	1800
Performance	Test no.	21000743/744	21000746/750
Prime Power			
without fan	kW / hp	289 / 393	311 / 423
with fan	kW / hp	282 / 383	300 / 408
Continuous Standby Power			
without fan	kW / hp	289 / 393	311 / 423
with fan	kW / hp	282 / 383	300 / 408
Standby Power			
without fan	kW / hp	315 / 428	341 / 464
with fan	kW / hp	308 / 419	330 / 449
Torque at			
Prime Power	Nm / lbft	1833 / 1353	1645 / 1217
Standby Power	Nm / lbft	2000 / 1475	1810 / 1336
Mean piston speed	m/s / ft/sec	7.5 / 24.6	9.0 / 29.5
Effective mean pressure at			
Prime Power	MPa / psi	2.01 / 292	1.73 / 251
Max combustion pressure at			
Prime Power	MPa / psi	12.9 / 1871	12.6 / 1827
Total mass moment of inertia, J (mR^2)	kgm^2 / $lbft^2$	2.80 / 66.4	
Degree of irregularity at			
Prime Power		1:48	1:99
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	32	40

Engine noise emission

Test standards: ISO 3744-1981 (E)
sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

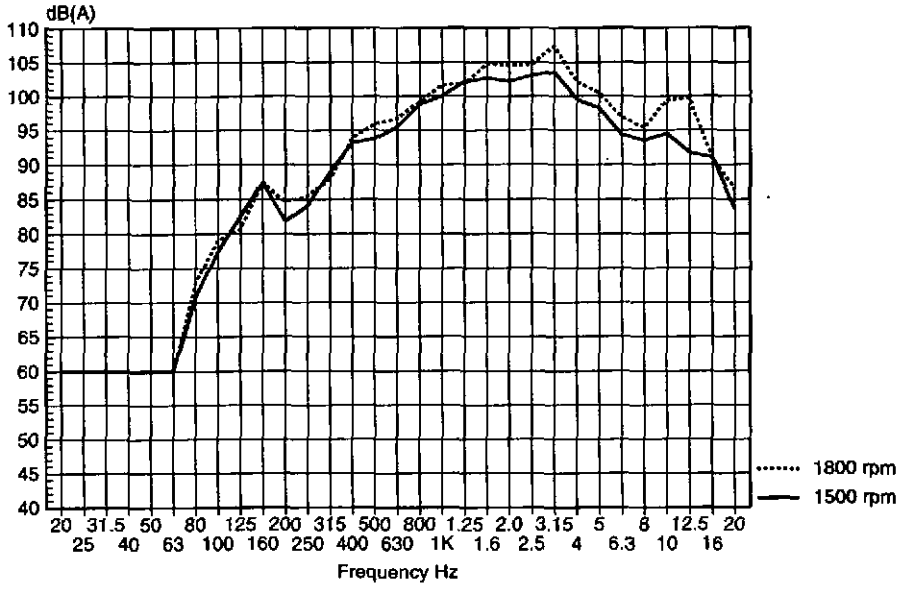
Measured sound power Lw

	Speed, rpm	1500	1800
No load	dB(A)	105.1	107.2
Prime Power	dB(A)	111.8	114.0
Standby Power	dB(A)	112.8	114.2

Calculated sound pressure Lp at 1 m

	Speed, rpm	1500	1800
No load	dB(A)	93.1	95.2
Prime Power	dB(A)	99.8	102.0
Standby Power	dB(A)	100.8	102.2

Sound power level TAD 1231 GE
Third octave band analysis



TAD 1231 GE	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	114	118
Standby power	dB(A)	114	118

Load acceptance

Test condition: warm engine

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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.9	2.0	0.8	0.7	20–100				
0–40	3.0	3.8	1.2	1.2	40–100				
0–54		10							
0–60	5.8	8.6	2.0	3.1	60–100				
0–62	10.0		3.0						
100–0	7.7	8.6	1.6	2.0					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.2	1.6	0.8	1.4	20–100				
0–40	2.3	3.4	1.5	1.8	40–100				
0–60	4.4	5.9	2.0	2.2	60–100				
0–74		10	4.5		74–100				
0–80	10	>15	3.4		80–100				
0–100	>15								
100–0	5.9	7.3	2.0	1.9					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TAD 1231 GE	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	5.0	5.0
+5°C ambient temperature	s	4.0	3.3
−15°C ambient temperature*)	s	9.3	9.0
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	6.1	5.6
+5°C ambient temperature	s	5.0	5.5
−15°C ambient temperature *)	s	10.0	11.0

*) With manifold heater engaged, lubricating oil 15 W/40

Derating

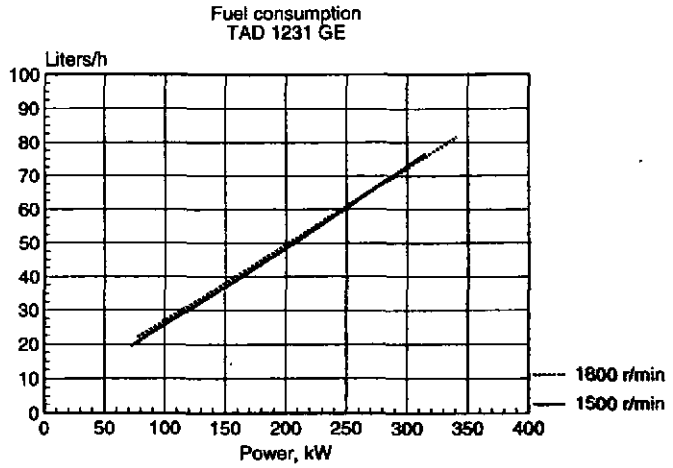
The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without deration.

For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude deration factor <3000 m	4%/500 m
Altitude deration factor >3000 m	6%/500 m
Ambient temperature deration factor	1.5%/5°C
Humidity	No derating

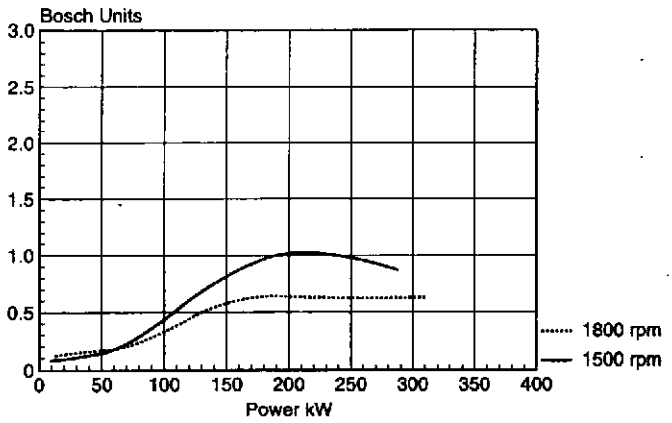
TAD 1231 GE	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	*litre/h / US gal/h*	0.18 / 0.048	0.21 / 0.055
Standby Power	litre/h / US gal/h	0.19 / 0.050	0.25 / 0.066
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	38	
Oil sump capacity			
max	litres	34	
min	litres	25	
Oil change interval			
CD oil quality	h	200	
VDS oil quality	h	400	
Engine angularity limits			
front up	degrees	20	
front down	degrees	28	
side tilt	degrees	40	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	105	
max	°C	120	
Oil filter micron size	*mm*	*0.040*	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	225 / 0.365	239 / 0.388
50% of Prime Power	g/kWh / lb/hph	207 / 0.336	212 / 0.344
75% of Prime Power	g/kWh / lb/hph	203 / 0.329	204 / 0.331
100% of Prime Power	g/kWh / lb/hph	202 / 0.328	203 / 0.329
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	222 / 0.360	238 / 0.386
50% of Standby Power	g/kWh / lb/hph	205 / 0.332	210 / 0.341
75% of Standby Power	g/kWh / lb/hph	202 / 0.328	204 / 0.331
100% of Standby Power	g/kWh / lb/hph	204 / 0.331	201 / 0.326
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	145	165
Feed pump pressure	kPa	100–150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Electronic/GAC	
Injection pump type/make		P7000/Bosch	
Injection timing	°B.T.D.C.	12	15

Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

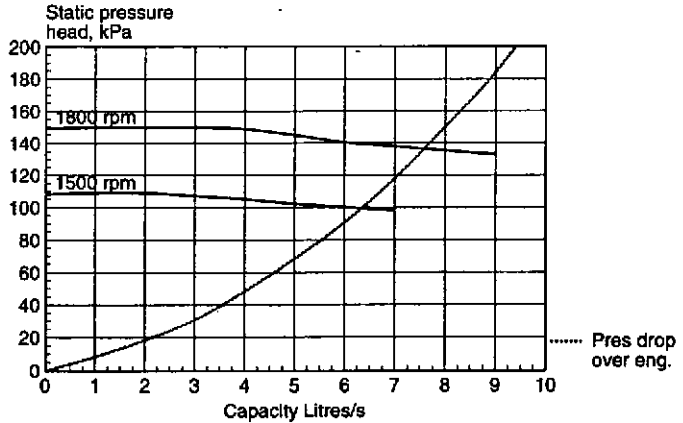


TAD 1231 GE	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	20.0 / 707	24.0 / 850
Standby Power, (at 27°C)	m^3/min / cfm	21.2 / 749	25.5 / 899
Air intake restriction, clean filter(s)	kPa / In wc	0.6 / 2.4	0.9 / 3.6
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	242 / 13755	263 / 14900
Standby Power	kW / BTU/min	264 / 15000	282 / 16000
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	535 / 995	510 / 950
Standby Power	°C / °F	570 / 1056	510 / 950
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	55.4 / 1956	60.3 / 2130
Standby Power	m^3/min / cfm	60.7 / 2143	65.0 / 2296
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	17 / 966	19 / 1080
Standby Power	kW / BTU/min	18 / 1020	20 / 1130
Heat rejection to coolant at			
Prime Power	kW / BTU/min	97 / 5510	105 / 5970
Standby Power	kW / BTU/min	106 / 6030	114 / 6480
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	1.10	
Radiator core thickness (std size)	mm	73	
Intercooler core area (std size)	m^2	0.90	
Intercooler core thickness (std size)	mm	68	
Fan diameter	mm	890	
Fan power consumption	kW / hp	6 / 8	11 / 15
Fan drive ratio		0.90:1	
Coolant capacity			
engine	litres	23	
std radiator with hoses	litres	25	
Coolant pump	drive/ratio	gear / 1.58:1	
Coolant flow with standard system	l/s	6.1	7.3
Minimum coolant flow	l/s	Not available	
Maximum external coolant system restriction	kPa	Not available	
Thermostat			
start to open	°C	82	
fully open	°C	95	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator (Gen Pac radiator)	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TAD 1231 GE



Water pump capacity
TAD 1231 GE



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

Engine speed	Air on temp	110% OF PRIME POWER Air flow	Max additional external restriction	STANDBY POWER Air flow	Max additional external restriction
rpm	°C	m^3/s	Pa	m^3/s	Pa
1500	30	2.40	565	2.40	565
	40	2.70	510	2.70	510
	50	3.50	390	3.50	390
	62	5.40	0	5.40	0
1800	30	2.95	815	2.95	815
	40	3.00	780	3.00	780
	50	3.95	620	3.95	620
	64	6.60	0	6.60	0

TAD 1231 GE	**Speed, rpm**	**1500**	**1800**
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		4.26:1	
Starter motor	make/type/kW	Bosch/KB/6.6	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel		156	
Number of teeth on starter motor		11	
Inrush current at +20°C	Amp	900	
Cranking current at +20°C	Amp	380	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2×150	
minimum at >+5°C	Ah	2×105	
Stop solenoid			
pull current	Amp	–	
hold current	Amp	–	
Inlet manifold heater (at 20 V)	kW	4.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	max 590	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	max 30	max 50
down	kW	max 19	max 31
right	kW	max 30	max 50
Timing gear at compressor PTO	Nm	max 100	
speed ratio direction of rotation viewed from flywheel side		0.91:1/clockwise	
Timing gear at servo pump PTO	Nm	*max 35*	
speed ratio direction of rotation viewed from flywheel side		1.58:1/clockwise	

TAD 1231 GE Specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	**Engine Gen Pac**	1	–	TAD 1231 GE	868791		Order also 26.9
		–	2	TAD 1231 GE Gen Pac	868793		
	Ratings	3	3	Prime Power 1500 rpm	136200901		289 kW (282 kW with fan)
		4	4	Standby Power 1500 rpm	136200902		315 kW (308 kW with fan)
		5	5	Prime Power 1800 rpm	136200903		311 kW (300 kW with fan)
		6	*6*	*Standby Power 1800 rpm*	*136200904*		*341 kW (330 kW with fan)*
	Certified ratings	9	9	Standby Power 1800 rpm	136208904	x	341 kW (330 kW with fan) EPA/CARB
218	**Engine suspension**	9	•	Fixed front	865983	x	325 mm to crankshaft centre
		10	•	Fixed rear	865984	x	325 mm to crankshaft centre
22	**Lubrication system**	1	1	Oil drain pump	136202201	x*	Manual
23	**Fuel system**	1	•	Flexible fuel hoses	136202923	x*	Two pcs, L=400 mm
		3	3	Electronic governor 1500/1800 rpm		x	Incl. in engine order no. (Electrical stop, see 27.3
		8	8	Overspeed trip switch	136203641	x*	Speed sender included
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	136209080	x*	Mounted on base frame
25	**Intake and exhaust system**	1	1	Air filter elbow connection	866137	x	Two pcs are required
		2	2	Flexible exhaust pipe	845981	x	
		3	3	Exhaust elbow	3826822	x	
		5	5	Silencer, 6" Heavy Duty	863049	x	With connecting flanges
		–	9	Crankcase ventilation	136209053	x	Extension pipe
		9	9	Crankcase ventilation	3825362	x	Extension pipe
		10	10	Heat guard	136209012	x*	Exhaust manifold and turbo
26	**Cooling system**	9	•	Radiator, 1.10 m^2	3825583	x	Incl fan, fan guard, intercooler and mounting parts
		17	•	Radiator guard	866019	x	
		32	•	Thrust type fan		x	Ø 890 mm, incl. in 26.9
		37	•	Belt guard	136202933	x*	For fan and alternator belts
		39	39	Coolant filter	828046	x	
27	**Control system**	3	3	Electrical stop	136202803	x*	Energized to run. For el. governor
31	**Battery**	1	1	Battery box	864171	x	
		2	2	Connection cables	864173		Incl main switch
33	**Starting system**	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run
37	**Electrical wiring**	3	3	Engine wiring	136203631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5
38	**Instrument, switches and senders**	1	1	Instrument panel	873626	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	136203602	x*	
		5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		7	7	Oil temp gauge and sender	863452	x	Not in comb with oil drain pump
		8	8	Speed sender	136203603	x*	Not in comb with 23.8
		9	9	Tachometer/ hour meter	873722	x	For Ø 72 mm mounting hole
		10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9
		11	11	Hour meter	858877	x	

TAD 1231 GE Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
38	**Instrument, switches and senders**	12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	
		14	•	Coolant temp and oil pressure switches	136203601	x*	103° C temp setting
		15	–	Coolant temp and oil pressure switches	136203621	x*	97° C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	3	3	Flexible coupling ME 240	845818	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865078	x	Separately mounted. 220–240 V.
		3	3	Tool kit	844481	x	
		4	4	Engine heater 2000 W	3825491	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825388	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994105	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994102	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	136200421	x	[1]
		4	4	Instruction book, English			[1] One included in engine order no.
		5	5	Instruction book, German	136200423	x	[1]
		6	6	Instruction book, French	136200424	x	[1]
		7	7	Instruction book, Spanish	136200425	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745750		
		10	10	Maintenance kit, 2500 h	876741	x	
		11	11	Maintenance kit, 5000 h	876742	x	
	Engine packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	136201902	x	
		–	14	Plastic wrapping		x	Included in engine order no.
			15	Wooden box	136201904	x	

** Reference to corresponding customer fitted kit*
[1]) *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted equipment order no.		Corresponding factory fitted equipment
22.1	136202201	Oil drain pump	862936
23.1	136202923	Flexible fuel hoses	843466
23.8	136203641	Overspeed trip switch	866306
23.9	136209080	Fuel filter/water separator	3826744
25.10	136209012	Heat guard	3826129
26.37	136202933	Belt guard	3826768
27.3	136202803	Electric lever control	866293
37.3	136203631	Engine wiring	862628
38.4	136203602	Senders	862925
38.8	136203603	Speed sender	862327
38.14	136203601	Switches 103°C	862924
38.15	136203621	Switches 97°C	863962

Notes

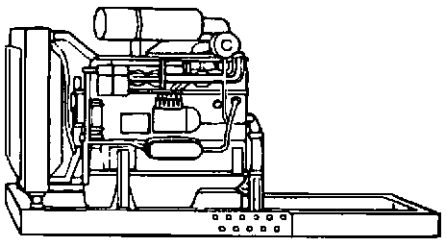
TAD 1232 GE

Gen Set Engine – Gen Pac

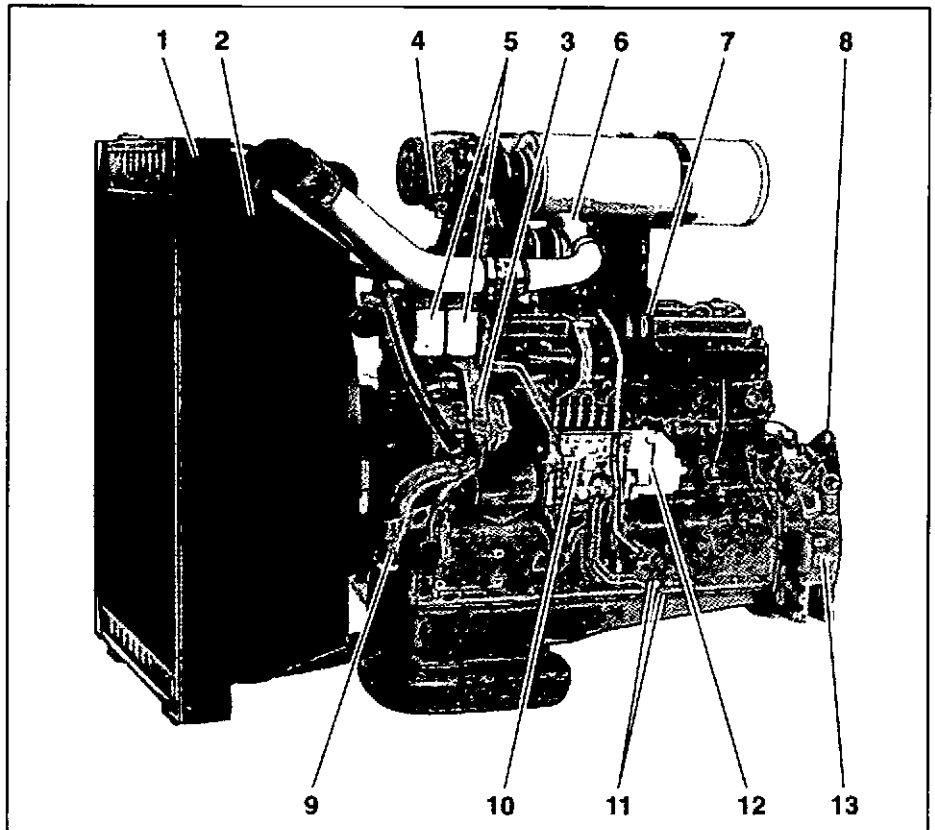
TAD 1232 GE

- Turbocharged
- Air to air intercooled
- Diesel fuel
- Displacement indication (l)
- Generation
- Version
- Generator drive
- Emission controlled

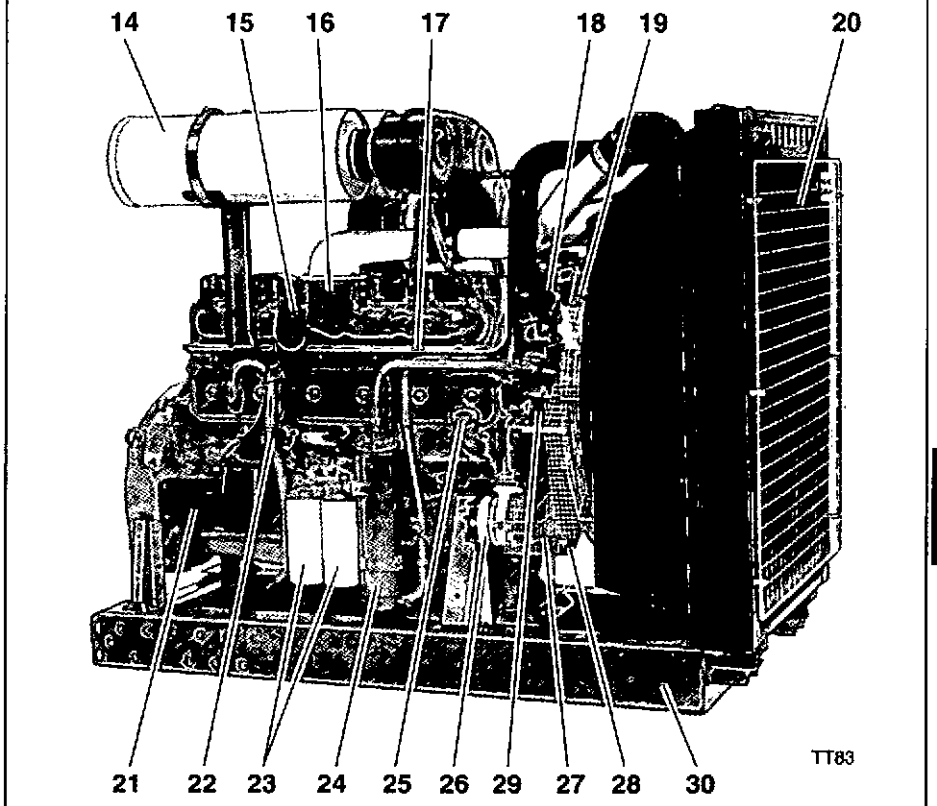
Gen Pac – Gen Set Engine mounted on an expandable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



TT82



TT83

1. Tropical radiator
2. Intercooler
3. Gear driven coolant pump
4. Air restriction indicator
5. Twin fuel filters of throw-away type
6. Turbo-charger
7. Air cooled exhaust manifold
8. Lift eyelet
9. Coolant pipe, inlet
10. Injection pump
11. Fuel pipes for tank connection
12. Electric speed governor
13. Flywheel housing SAE 1
14. Air filter
15. Relay for inlet manifold heater
16. Inlet manifold heater
17. Cable iron
18. Coolant pipe, outlet
19. Fan guard
20. Radiator guard *)
21. Starter motor
22. Crankcase ventilation
23. Full-flow oil filters of spin-on type
24. Oil cooler
25. Oil filler
26. Alternator
27. Belt guard *)
28. Vibration damper
29. Automatic belt tensioner
30. Expandable base frame

*) Optional

Standard equipment

TAD 1232 GE

		Engine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 1	•	•
	Flywheel for 14" flexible plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
	Oil-cooler, side-mounted	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with GAC electric governor	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-charger	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator and intercooler	•[1])	•
	Radiator guard	–	•
	Gear-driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
	Intercooler	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, right side	•	•
33	**Starting system**		
	Starter motor, Bosch 6.6 kW/24 V	•	•
	Connecting facility for extra starter motor	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and switches**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

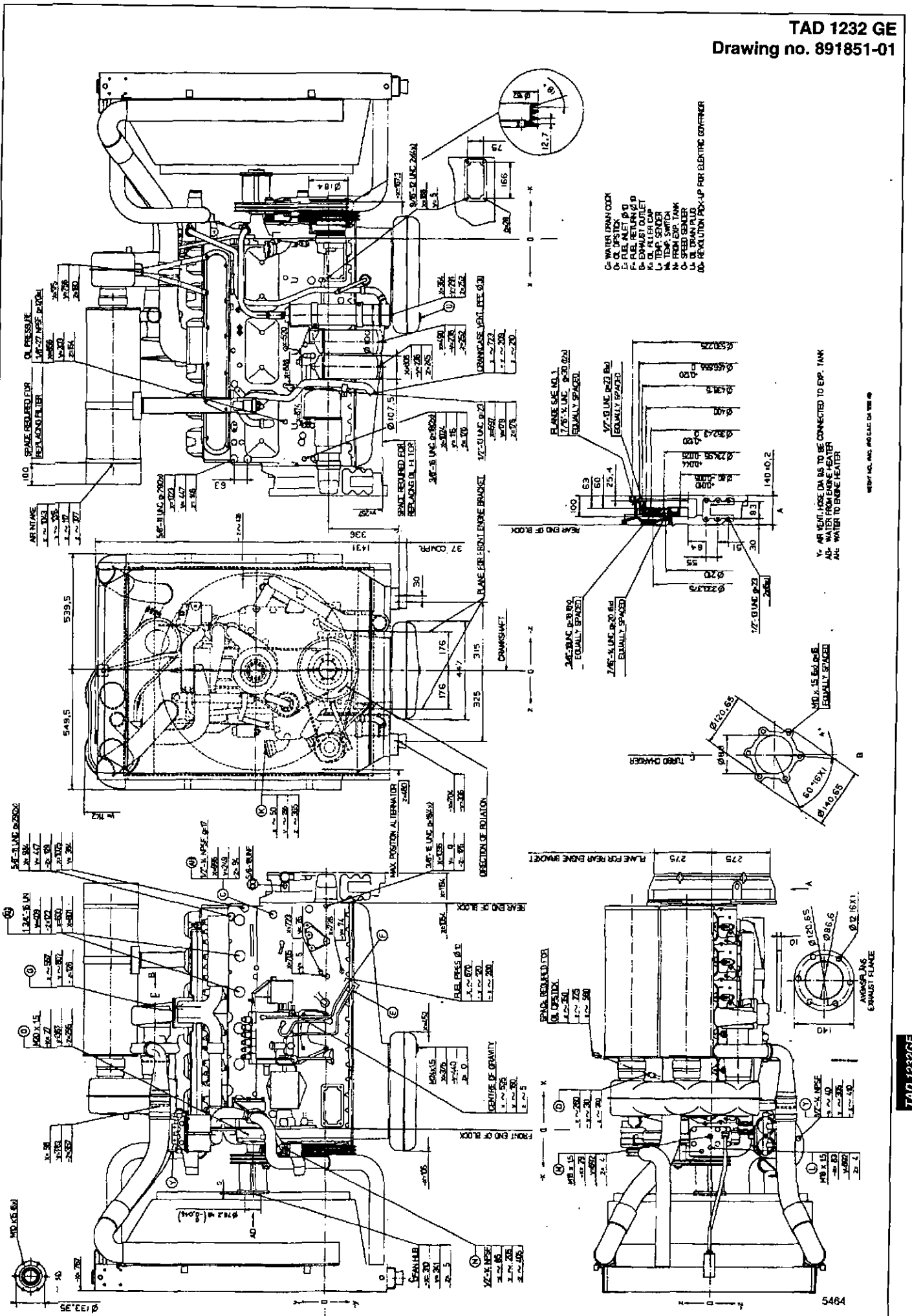
[1]) Must be ordered.

– optional equipment or not applicable
• included in standard specification

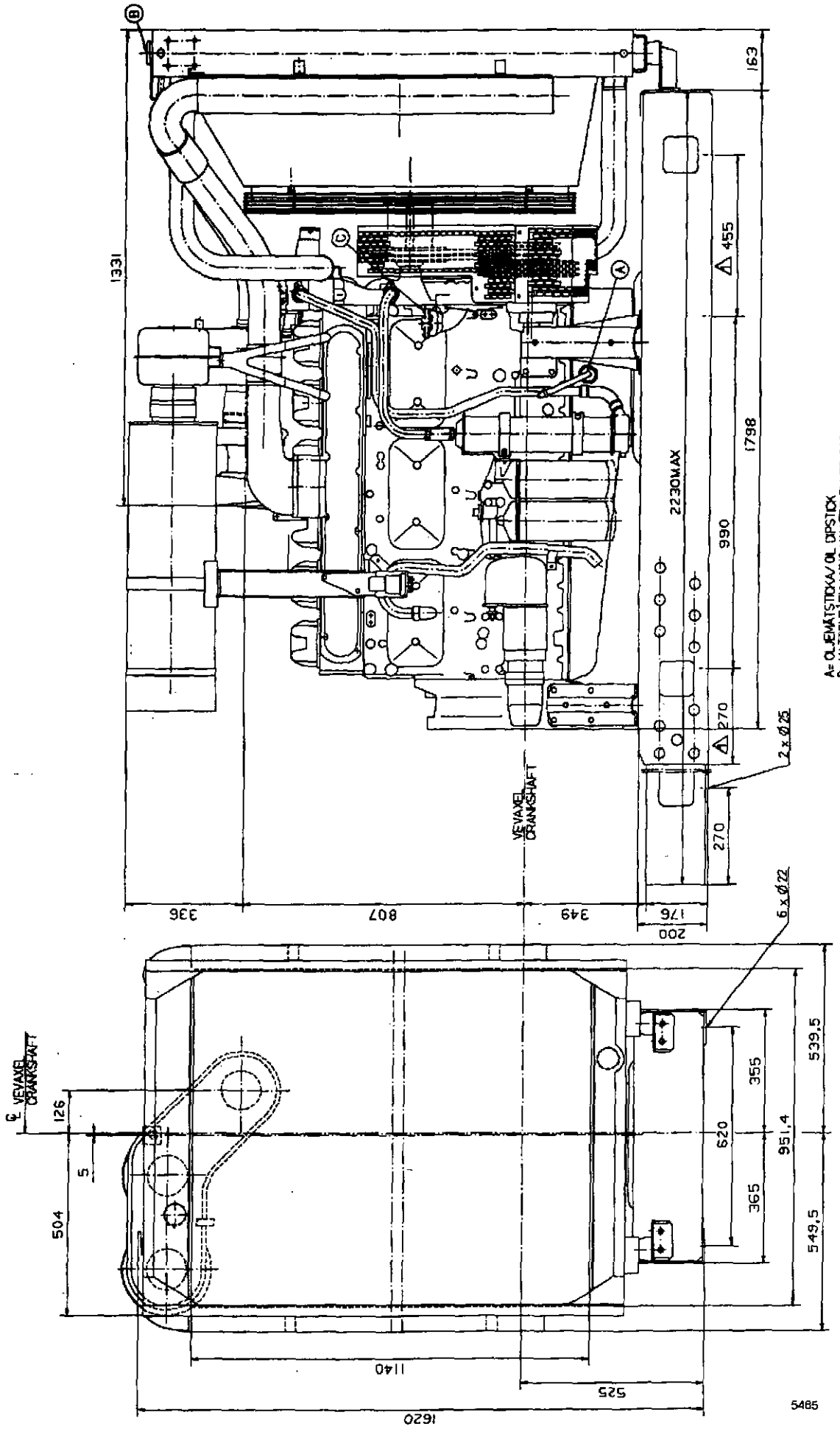
Technical description

- Complies with TA -luft exhaust emission and EPA/CARP in accordance with D2 cycle ISO 8178.
- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head gaskets against high temperatures.
- Efficient and reliable turbo-charger.
- Air to air intercooler.
- Full flow disposable spin-on oil filter, for extra high filtration.
- Full flow oil cooler.
- The lubricating oil level can be measured during operation.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Gear driven, highly efficient coolant pump.
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system including accurate electronic governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Nitro-carburized transmission gears for heavy duty operation.
- Viscous crankshaft vibration damper to withstand single bearing alternator torsional vibrations.
- Piston cooling for low piston temperature and reduced ring temperature.
- Keystone top compression rings for long service life.
- Automatic fan belt tensioner.
- Replaceable valve guides and valve seats.

TAD 1232 GE
Drawing no. 891851-01



TAD 1232 GE Gen Pac
Drawing no. 891855-03



TAD 1232GE

Technical data TAD 1232 GE

General

In line four stroke diesel engine with direct injection
Turbocharged and air to air intercooled

Number of cylinders	6	Bore	130.17 mm / 5.12 in
Displacement, total	11.98 litres / 731 in^3	Stroke	150 mm / 5.91 in
Firing order	1-5-3-6-2-4	Compression ratio	14.0:1
Rotation direction, anti-clockwise viewed towards flywheel		Dry weight Gen Pac 1434 kg	Engine only 1250 kg*)
		Wet weight Gen Pac 1514 kg	*Engine only* 1330 kg*)
		*) Including radiator and intercooler	

TAD 1232 GE	**Speed, rpm**	**1500**	**1800**
Performance	Test no.	21000675/676	21000677/678
Prime Power			
without fan	kW / hp	330 / 449	352 /479
with fan	kW / hp	323 / 439	341 /464
Continuous Standby Power			
without fan	kW / hp	330 / 449	360 / 490
with fan	kW / hp	323 / 439	349 / 475
Standby Power			
without fan	kW / hp	363 / 494	392 / 533
with fan	kW / hp	356 / 481	381 / 518
Torque at			
Prime Power	Nm / lbft	2102 / 1550	1870 / 1380
Standby Power	*Nm / lbft*	*2308 / 1700*	*2080 / 1530*
Mean piston speed	m/s / ft/sec	7.5 / 24.6	9.0 / 29.5
Effective mean pressure at			
Prime Power	MPa / psi	2.20 / 319	1.96 /284
Max combustion pressure at			
Prime Power	MPa / psi	12.8 / 1860	13.8 / 2000
Total mass moment of inertia, J (mR^2)	kgm^2 / lbft^2	2.80 / 66.4	
Degree of irregularity at			
Prime Power		1:48	1:99
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	32	40

Engine noise emission

Test standards: ISO 3744-1981 (E)
sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

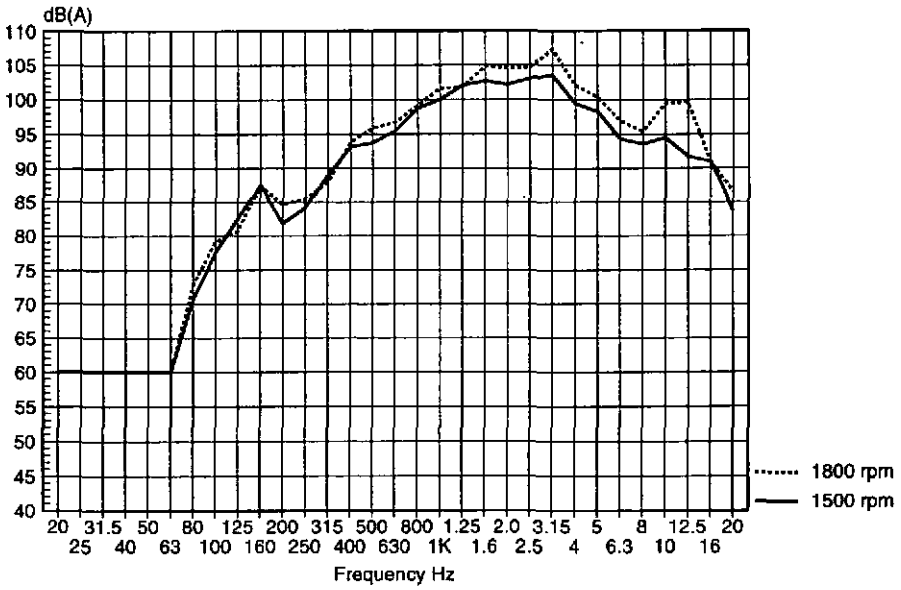
Measured sound power Lw

	Speed, rpm	**1500**	**1800**
No load	dB(A)	105.1	107.2
Prime Power	dB(A)	111.8	114.0
Standby Power	dB(A)	112.8	114.2

Calculated sound pressure Lp at 1 m

	Speed, rpm	**1500**	**1800**
No load	dB(A)	93.1	95.2
Prime Power	dB(A)	99.8	102.0
Standby Power	dB(A)	100.8	102.2

Sound power level **TAD 1232 GE**
Third octave band analysis



TAD 1232 GE	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	114	118
Standby power	dB(A)	114	118

Load acceptance

Test condition: warm engine

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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	2.1	2.1	0.7	0.8	20–100				
0–40	4.2	4.8	1.5	1.5	40–100				
0–54		10.0		3.0	54–100				
0–56	10.0		3.1		56–100				
0–60	14.0	22	3.3	4.6	60–100				
0–62	>15		3.6		62–100				
0–67			5.2		67–100				
0–78		43		8.0	78–100				
100–0	10.1	9.5	2.4	2.6					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.1	1.7	0.9	0.8	20–100				
0–40	2.3	3.3	1.5	0.8	40–100				
0–60	5.9	10.0	2.4	2.8	60–100				
0–64	8.0		2.9		64–100				
0–68	10.0		2.9		68–100				
100–0	7.6	7.6	1.4	1.4					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TAD 1232 GE	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	5.0	5.0
+5°C ambient temperature	s	4.0	3.3
–15°C ambient temperature *)	s	9.3	9.0
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	6.1	5.6
+5°C ambient temperature	s	5.0	5.5
–15°C ambient temperature *)	s	10.0	11.0

*) With manifold heater engaged, lubricating oil 15 W/40

Derating

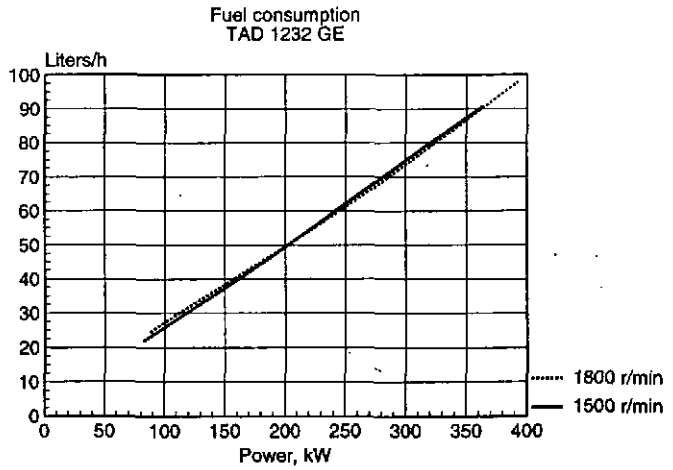
The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without deration.

For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude deration factor <3000 m	4%/500 m
Altitude deration factor >3000 m	6%/500 m
Ambient temperature deration factor	1.5%/5°C
Humidity	No derating

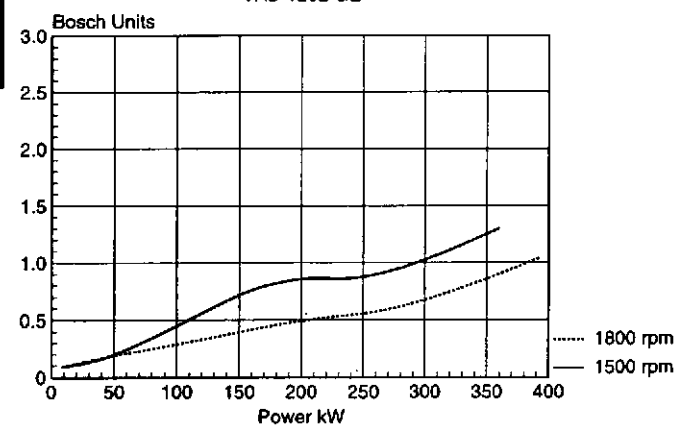
TAD 1232 GE	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litre/h / US gal/h	0.18 / 0.048	0.21 / 0.055
Standby Power	litre/h / US gal/h	0.19 / 0.050	0.25 / 0.066
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	38	
Oil sump capacity			
max	litres	34	
min	litres	25	
Oil change interval			
CD oil quality	h	200	
VDS oil quality	h	400	
Engine angularity limits			
front up	degrees	20	
front down	degrees	28	
side tilt	degrees	40	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	105	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	222 / 0.360	234 / 0.379
50% of Prime Power	g/kWh / lb/hph	206 / 0.334	210 / 0.341
75% of Prime Power	g/kWh / lb/hph	204 / 0.339	204 / 0.331
100% of Prime Power	g/kWh / lb/hph	208 / 0.337	206 / 0.334
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	220 / 0.357	231 / 0.375
50% of Standby Power	g/kWh / lb/hph	205 / 0.332	207 / 0.336
75% of Standby Power	g/kWh / lb/hph	209 / 0.339	204 / 0.331
100% of Standby Power	g/kWh / lb/hph	210 / 0.341	210 / 0.341
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	145	165
Feed pump pressure	kPa	100–150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Electronic/GAC	
Injection pump type/make		P7000/Bosch	
Injection timing	°B.T.D.C.	12	15

Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

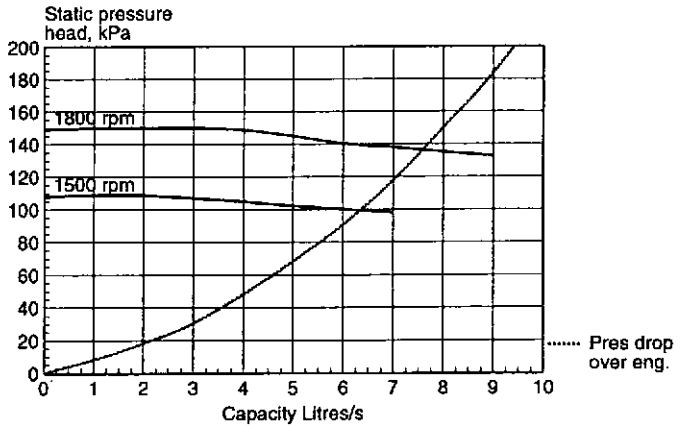


TAD 1232 GE	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	22.3 / 790	26.8 / 950
Standby Power, (at 27°C)	m^3/min / cfm	24.9 / 880	29.1 / 1030
Air intake restriction, clean filter(s)	kPa / In wc	0.6 / 2.4	0.9 / 3.6
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	292 / 16600	312 / 17700
Standby Power	kW / BTU/min	328 / 18600	359 / 20400
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	575 / 1071	525 / 977
Standby Power	°C / °F	580 / 1072	540 / 1004
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	65.2 / 2302	71.5 / 2525
Standby Power	m^3/min / cfm	73.4 / 2592	79.7 / 2822
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	20 / 1140	22 / 1250
Standby Power	kW / BTU/min	22 / 1250	23 / 1300
Heat rejection to coolant at			
Prime Power	kW / BTU/min	113 / 6420	113 / 6420
Standby Power	kW / BTU/min	120 / 6830	122 / 6940
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	1.10	
Radiator core thickness (std size)	mm	73	
Intercooler core area (std size)	m^2	0.90	
Intercooler core thickness (std size)	mm	68	
Fan diameter	mm	890	
Fan power consumption	kW / hp	7 / 9	11 / 15
Fan drive ratio		0.90:1	
Coolant capacity			
engine	litres	23	
std radiator with hoses	litres	25	
Coolant pump	drive/ratio	gear / 1.58:1	
Coolant flow with standard system	l/s	6.1	7.3
Minimum coolant flow	l/s	Not available	
Maximum external coolant system restriction	kPa	Not available	
Thermostat			
start to open	°C	82	
fully open	°C	95	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator (Gen Pac radiator)	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TAD 1232 GE



Water pump capacity
TAD 1232 GE



Cooling performance

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

Engine speed	Air on temp	110% OF PRIME POWER Air flow	Max additional external restriction	STANDBY POWER Air flow	Max additional external restriction
rpm	°C	m^3/s	Pa	m^3/s	Pa
1500	30	2.70	530	2.70	530
	40	3.45	410	3.45	410
	50	4.60	205	4.60	205
	55	5.40	0	5.40	0
1800	30	3.10	795	3.10	795
	40	3.95	640	3.95	640
	50	5.25	370	5.25	370
	56	6.60	0	6.60	00

TAD 1232 GE	**Speed, rpm**	**1500**	**1800**
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	*Hz/alternator rev*	*6*	
drive ratio		4.26:1	
Starter motor	make/type/kW	Bosch/KB/6.6	
Starter motor solenoid			
pull current	Amp	12	
hold current	Amp	6	
Number of teeth on flywheel		156	
Number of teeth on starter motor		11	
Inrush current at +20°C	Amp	900	
Cranking current at +20°C	Amp	380	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2x150	
minimum at >+5°C	Ah	2x105	
Stop solenoid			
pull current	Amp	–	
hold current	Amp	–	
Inlet manifold heater (at 20 V)	kW	4.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	max 590	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	max 30	max 50
down	kW	max 19	max 31
right	kW	max 30	max 50
Timing gear at compressor PTO	Nm	max 100	
speed ratio direction of rotation viewed from flywheel side		0.91:1/clockwise	
Timing gear at servo pump PTO	Nm	max 35	
speed ratio direction of rotation viewed from flywheel side		1.58:1/clockwise	

TAD 1232 GE Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	Engine Gen Pac	1	–	TAD 1232 GE	868792		Order also 26.9
		–	2	TAD 1232 GE Gen Pac	868794		
	Ratings	3	3	Prime Power 1500 rpm	136200905		330 kW (323 kW with fan)
		4	4	Standby Power 1500 rpm	136200906		363 kW (356 kW with fan)
		5	5	Prime Power 1800 rpm	136200907		352 kW (341 kW with fan)
		6	6	Standby Power 1800 rpm	136200908		392 kW (381 kW with fan)
	Certified ratings	9	9	Standby Power 1800 rpm	136208906	x	392 kW (381 kW with fan) EPA/CARB
218	Engine suspension	9	•	Fixed front	865983	x	325 mm to crankshaft centre
		10	•	Fixed rear	865984	x	325 mm to crankshaft centre
22	Lubrication system	1	1	Oil drain pump	136202201	x*	Manual
23	Fuel system	1	•	Flexible fuel hoses	136202923	x*	Two pcs, L=400 mm
		3	3	Electronic governor 1500/1800 rpm		x	Incl. in engine order no. (Electrical stop, see 27.3
		8	8	Overspeed trip switch	136203641	x*	Speed sender included
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	136209080	x*	Mounted on base frame
25	Intake and exhaust system	1	1	Air filter elbow connection	866137	x	Two pcs are required
		2	2	Flexible exhaust pipe	845981	x	
		3	3	Exhaust elbow	3826822	x	
		5	5	Silencer, 6" Heavy Duty	863049	x	With connecting flanges
		–	9	Crankcase ventilation	136209053	x	Extension pipe
		9	9	Crankcase ventilation	3825362	x	Extension pipe
		10	10	Heat guard	136209012	x*	Exhaust manifold and turbo
26	Cooling system	9	•	Radiator, 1.10 m^2	3825583	x	Incl fan, fan guard, intercooler and mounting parts
		17	•	Radiator guard	866019	x	
		32	•	Thrust type fan		x	Ø 890 mm, incl. in 26.9
		37	•	Belt guard	136202933	x*	For fan and alternator belts
		39	39	Coolant filter	828046	x	
27	Control system	3	3	Electrical stop	136202803	x*	Energized to run. For el. governor
31	Battery	1	1	Battery box	864171	x	
		2	2	Connection cables	864173		Incl main switch
33	Starting system	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run
37	Electrical wiring	3	3	Engine wiring	136203631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5
38	Instrument, switches and senders	1	1	Instrument panel	873626	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	136203602	x*	
		5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		7	7	Oil temp gauge and sender	863452	x	Not in comb with oil drain pump
		8	8	Speed sender	136203603	x*	Not in comb with 23.8
		9	9	Tachometer/ hour meter	873722	x	For Ø 72 mm mounting hole
		10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9
		11	11	Hour meter	858877	x	

TAD 1232 GE Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
38	**Instrument, switches and senders**	12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	
		14	•	Coolant temp and oil pressure switches	136203601	x*	103° C temp setting
		15	–	Coolant temp and oil pressure switches	136203621	x*	97° C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	3	3	Flexible coupling ME 240	845818	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865078	x	Separately mounted. 220–240 V.
		3	3	Tool kit	844481	x	
		4	4	Engine heater 2000 W	3825491	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825388	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994105	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994102	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	136200421	x	[1]
		4	4	Instruction book, English			[1] One included in engine order no.
		5	5	Instruction book, German	136200423	x	[1]
		6	6	Instruction book, French	136200424	x	[1]
		7	7	Instruction book, Spanish	136200425	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745750		
		10	10	Maintenance kit, 2500 h	876741	x	
		11	11	Maintenance kit, 5000 h	876742	x	
	Engine packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	136201902	x	
		–	14	Plastic wrapping		x	Included in engine order no.
			15	Wooden box	136201904	x	

** Reference to corresponding customer fitted kit*
[1]) *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted equipment order no.		Corresponding factory fitted equipment
22.1	136202201	Oil drain pump	862936
23.1	136202923	Flexible fuel hoses	843466
23.8	136203641	Overspeed trip switch	866306
23.9	136209080	Fuel filter/water separator	3826744
25.10	136209012	Heat guard	3826129
26.37	136202933	Belt guard	3826768
27.3	136202803	Electric lever control	866293
37.3	136203631	Engine wiring	862628
38.4	136203602	Senders	862925
38.8	136203603	Speed sender	862327
38.14	136203601	Switches 103°C	862924
38.15	136203621	Switches 97°C	863962

Notes

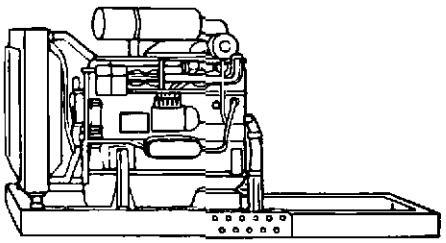
TWD 1630 G

Gen Set Engine – Gen Pac

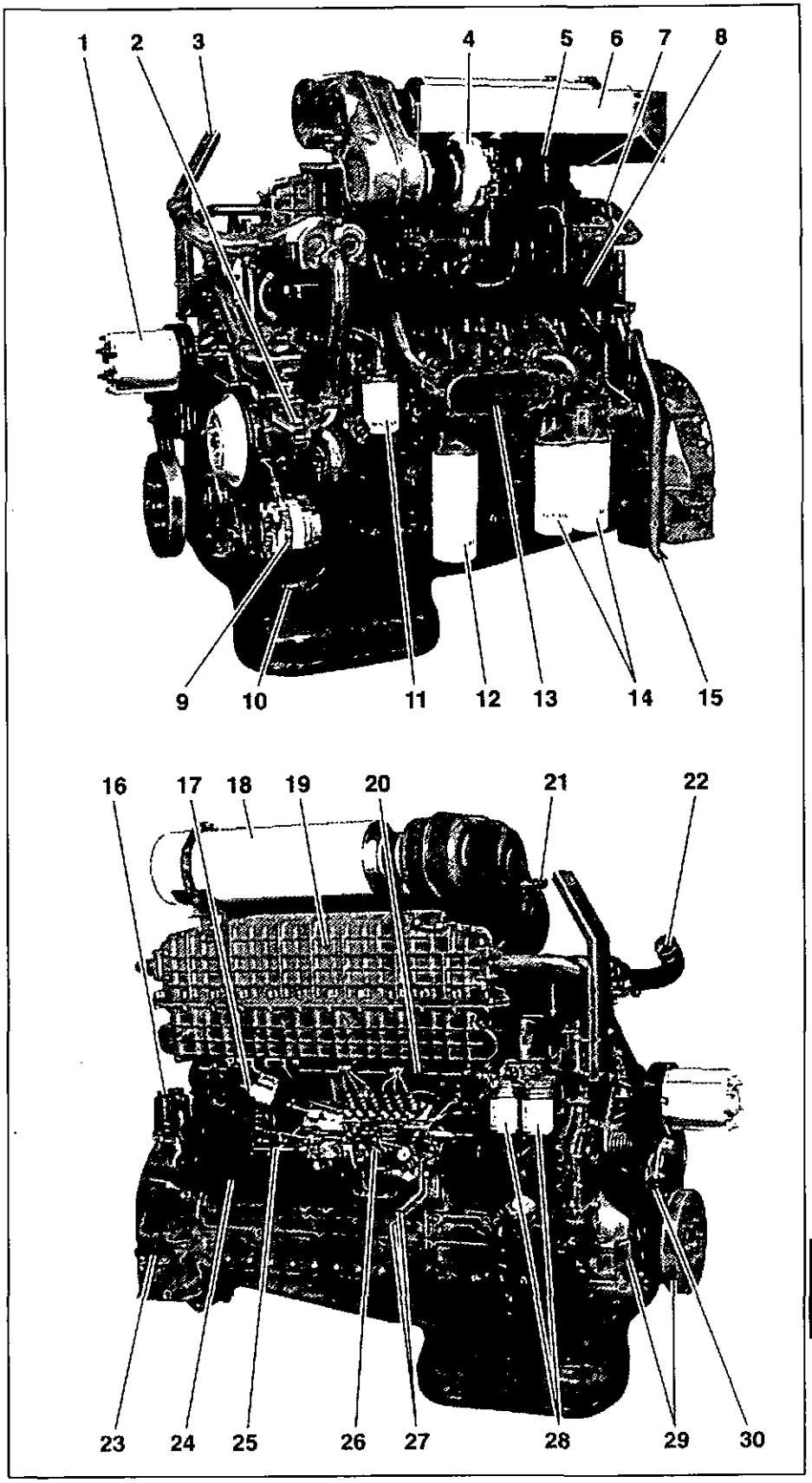
TWD 1630 G

- Turbocharged
- Water to air intercooled
- Diesel fuel
- Displacement indication (l)
- Generation
- Version
- Generator drive

Gen Pac – Gen Set Engine mounted on an expandable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



1. Fan hub
2. Gear driven coolant pump
3. Radiator support
4. Turbo-charger
5. Connecting flange, exhaust line
6. Heat radiation protection
7. Lift eyelet
8. Air cooled exhaust manifold
9. Alternator
10. Coolant pipe, inlet
11. Coolant filter
12. By-pass oil filter of spin-on type
13. Oil cooler
14. Twin full-flow oil filters of spin-on type
15. Crankcase ventilation
16. Relay for inlet manifold heater
17. Stop solenoid
18. Double air filters of throw-away type
19. Intercooler
20. Cable iron
21. Air restriction indicator
22. Coolant pipe, outlet
23. Flywheel housing SAE 1
24. Starter motor
25. Manual speed control
26. Injection pump
27. Fuel pipes for tank connection
28. Twin fuel filters of throw-away type
29. Double vibration dampers
30. Automatic belt tensioner

Standard equipment

TWD 1630 G

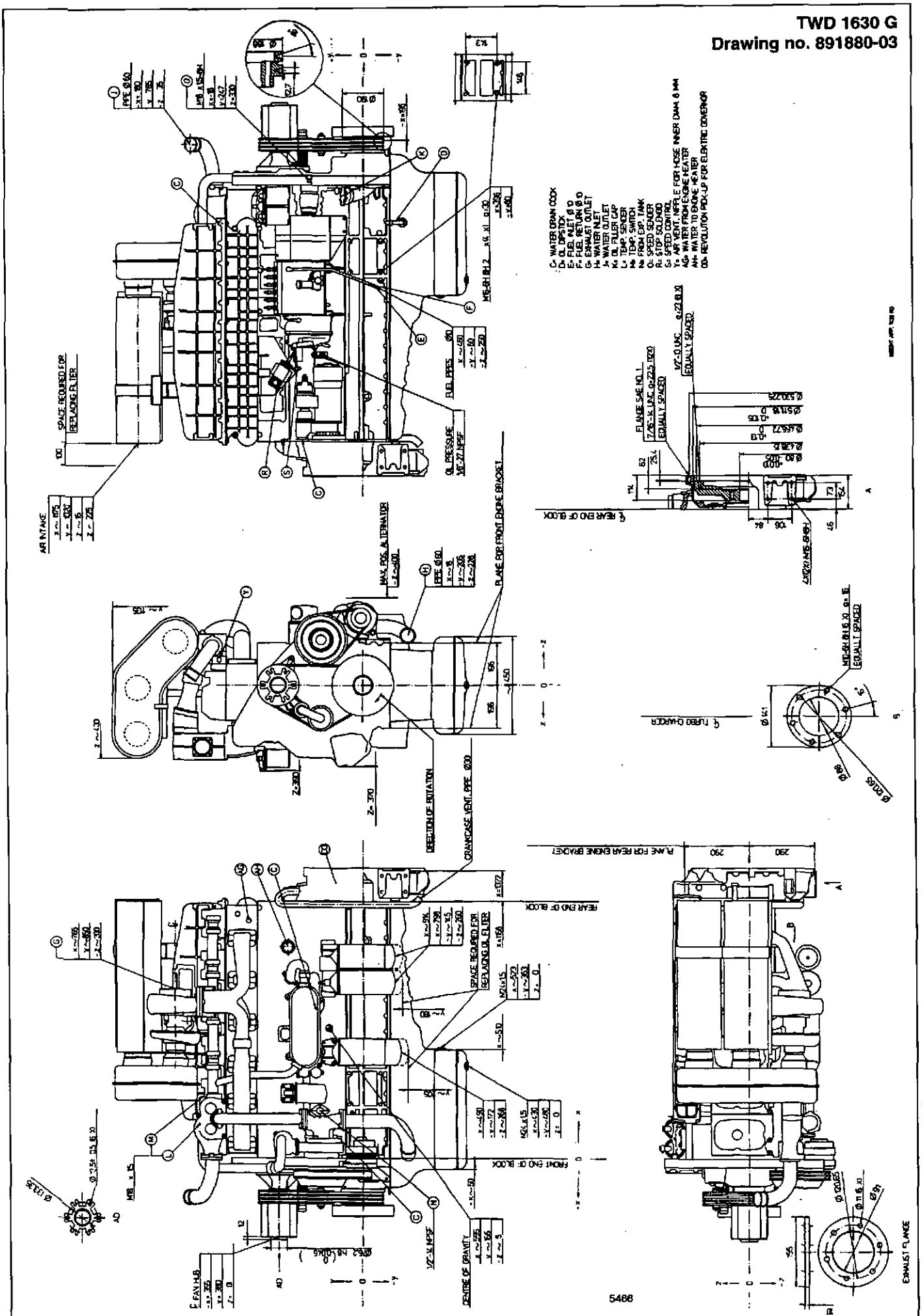
		Engine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 1	•	•
	Flywheel for 14" flexible plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
	By-pass oil filter of spin-on type	•	•
	Oil-cooler, side-mounted	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with RQ governor	•	•
	Pump coupling guard	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-charger	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator	–	•
	Radiator guard	–	–
	Gear-driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
	Intercooler	•	•
27	**Control system**		
	Manual speed control	•	•
	Electrical stop energized to run	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, left side	•	•
33	**Starting system**		
	Starter motor, Bosch 7.5 kW/24 V	•	•
	Connecting facility for extra starter motor	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and senders**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

– optional equipment or not applicable
• included in standard specification

Technical description

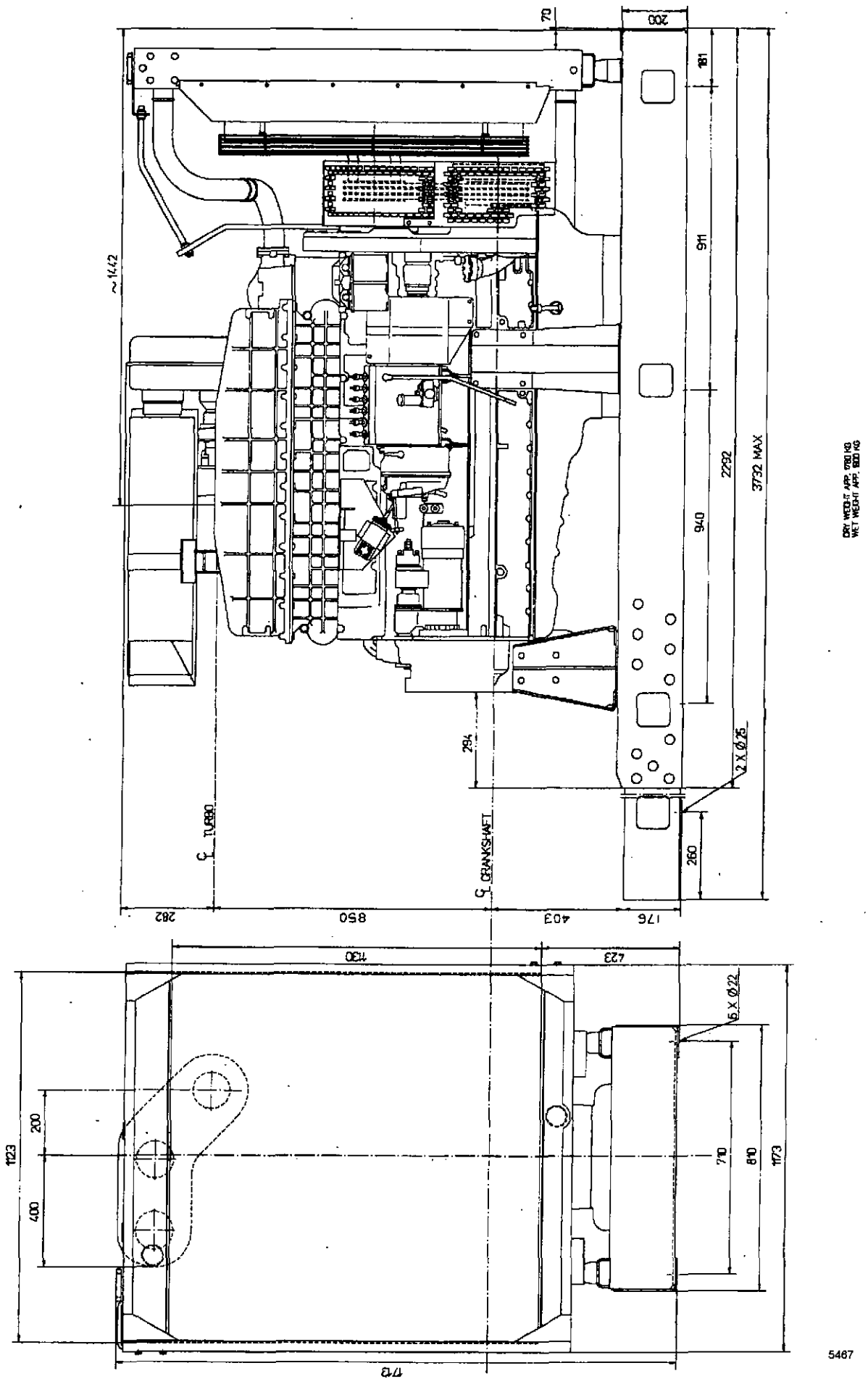
- Complies with TA -luft exhaust emission regulation.
- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head sealing against high temperatures.
- Efficient and reliable turbo-charger.
- Water to air intercooler.
- Full flow disposable spin-on oil filter, for extra high filtration.
- Full flow oil cooler.
- The lubricating oil level can be measured during operation.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Gear driven, highly efficient coolant pump.
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system including accurate mechanical governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Two viscous type crankshaft vibration dampers to withstand single bearing alternator torsional vibrations.
- Piston cooling for low piston temperature and reduced ring temperature.
- Keystone top compression rings for long service life.
- Automatic fan drive belt tensioner.
- Replaceable valve guides and valve seats.
- Tapered connecting rods to reduce the risk of piston cracking.

TWD 1630 G
Drawing no. 891880-03



TWD 1630 G

TWD 1630 G Gen Pac
Drawing no. 891880-02



Technical data TWD 1630 G

General

In line four stroke diesel engine with direct injection					
Turbocharged and water to air intercooled		Bore		144.00 mm / 5.67 in	
Number of cylinders	6	Stroke		165 mm / 6.50 in	
Displacement, total	16.12 litres / 984 in^3	Compression ratio		15.0:1	
Firing order	1-5-3-6-2-4	*Dry weight*	*GenPac* 1780 kg	*Engine only*	1428 kg
Rotation direction, anti-clockwise viewed towards flywheel		Wet weight	GenPac 1900 kg	Engine only	1520 kg

TWD 1630 G	**Speed, rpm**	**1500**	**1800**
Performance	Test no.	2100584	2100585
Prime Power			
without fan	kW / hp	359 / 488	391 / 532
with fan	kW / hp	350 / 476	376 / 511
Continuous Standby Power			
without fan	kW / hp	362 / 492	406 / 552
with fan	kW / hp	353 / 480	391 / 532
Standby Power			
without fan	kW / hp	398 / 541	445 / 605
with fan	kW / hp	389 / 529	430 / 585
Torque at			
Prime Power	Nm / lbft	2290 / 1690	2070 / 1530
Standby Power	Nm / lbft	2530 / 1870	2360 / 1740
Mean piston speed	*m/s / ft/sec*	8.3 / 27.2	9.9 / 32.5
Effective mean pressure at			
Prime Power	MPa / psi	1.78 / 258	1.62 / 234
Max combustion pressure at			
Prime Power	MPa / psi	13.6 / 1970	12.5 / 1810
Total mass moment of inertia, J (mR$^{2)}$)	kgm^2 / lbft^2	4.22 / 100	
Degree of irregularity at			
Prime Power		1:73	1:177
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	40	54

Engine noise emission

Test standards: ISO 3744-1981 (E)
sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

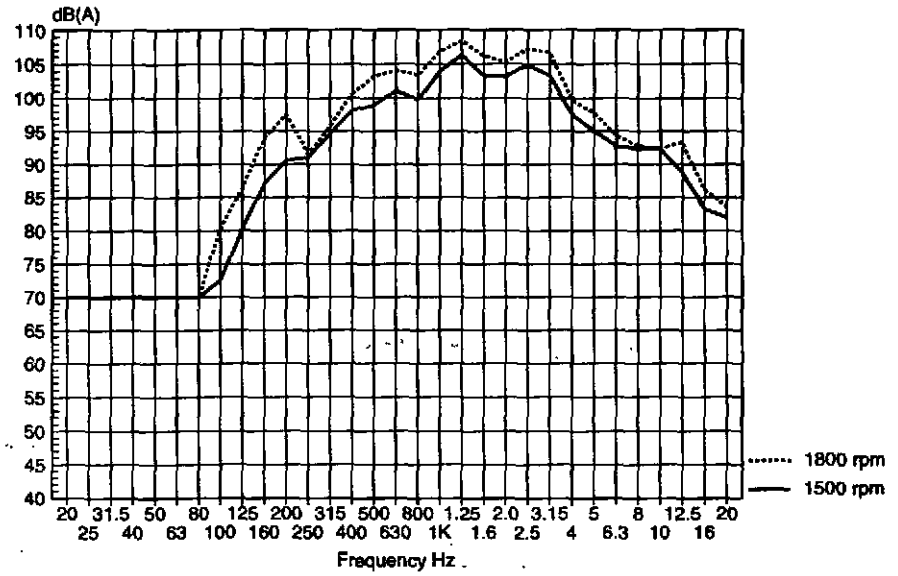
Measured sound power Lw

	Speed, rpm	**1500**	**1800**
No load	dB(A)	–	–
Prime Power	dB(A)	112.7	115.4
Standby Power	dB(A)	114.3	116.5

Calculated sound pressure Lp at 1 m

	Speed, rpm	**1500**	**1800**
No load	dB(A)	–	–
Prime Power	dB(A)	100.7	103.4
Standby Power	dB(A)	102.7	104.5

Sound power level TWD 1630 G
Third octave band analysis



TWD 1630 G	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	114	118
Standby power	dB(A)	114	119

Load acceptance

Test condition: warm engine

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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.4	1.5	0.5	0.5	20–100				
0–40	2.5	2.9	0.5	0.5	40–100				
0–60	4.5	5.4	0.6	0.9	60–100				
0–70		10.0		1.8	70–100		4.3		2.9
0–78	10.0		19						
0–100	> 15.0	> 15.0	5.6	6.5					
100–0	5.9	6.8	0.5	0.5					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	1.2	1.4	0.5	0.5	20–100				
0–40	2.2	2.4	0.5	0.5	40–100				
0–60	3.8	5.0	0.7	0.9	60–100				
0–76		10.0		1.9	76–100				
0–86	10.0		1.8						
0–100	>15.0	>15.0							
100–0	5.7	5.9	0.5	0.5					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TWD 1630 G	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	4	6
0°C ambient temperature *)	s	7	7
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	4	6
0°C ambient temperature *)	s	7	7

*) With manifold heater engaged, lubricating oil 15 W/40

Derating

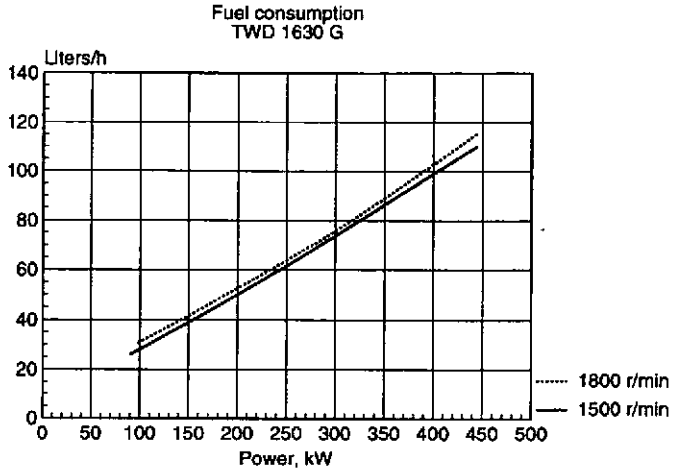
The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without deration.

For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude deration factor <3000 m	4%/500 m
Altitude deration factor >3000 m	6%/500 m
Ambient temperature deration factor	1.5%/5°C
Humidity	No derating

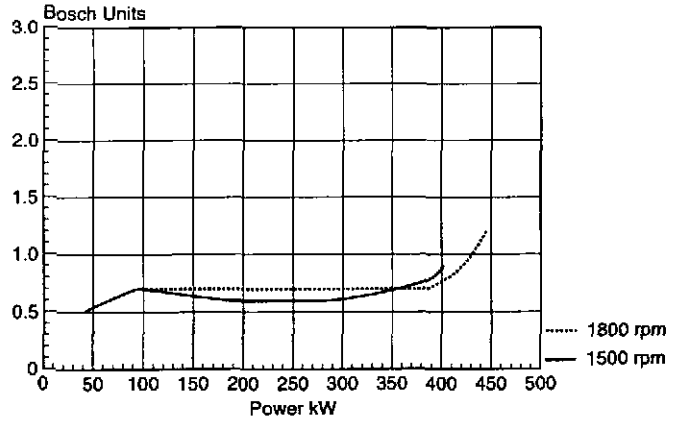
TWD 1630 G	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litre/h / US gal/h	0.13 / 0.034	0.14 / 0.037
Standby Power	litre/h / US gal/h	0.15 / 0.040	0.16 / 0.042
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	64	
Oil sump capacity			
max	litres	57	
min	litres	40	
Oil change interval			
CD oil quality	h	300	
VDS oil quality	h	600	
Engine angularity limits			
front up	degrees	Not available	
front down	degrees	Not available	
side tilt	degrees	Not available	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	105	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	241 / 0.391	261 / 0.423
50% of Prime Power	g/kWh / lb/hph	213 / 0.345	220 / 0.357
75% of Prime Power	g/kWh / lb/hph	206 / 0.334	211 / 0.342
100% of Prime Power	g/kWh / lb/hph	206 / 0.334	212 / 0.344
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	235 / 0.381	251 / 0.407
50% of Standby Power	g/kWh / lb/hph	209 / 0.339	216 / 0.350
75% of Standby Power	g/kWh / lb/hph	205 / 0.332	210 / 0.341
100% of Standby Power	g/kWh / lb/hph	208 / 0.337	218 / 0.353
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	150	170
Feed pump pressure	kPa	100–150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Mechanical RQ/Bosch	
Injection pump type/make		P7000/Bosch	
Injection timing	°B.T.D.C	21	25

Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

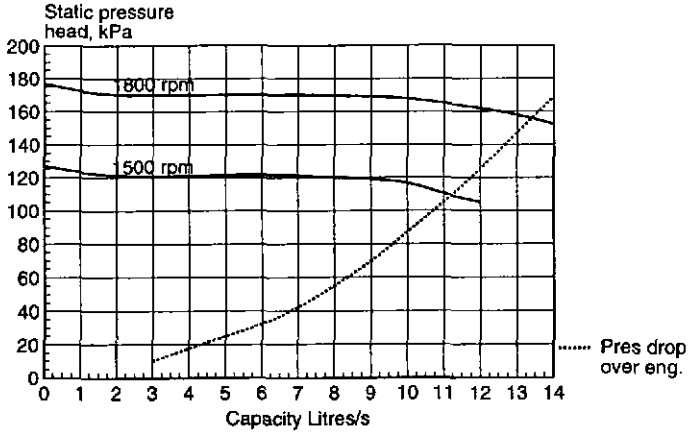


TWD 1630 G	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	27.2 / 961	32.4 / 1144
Standby Power, (at 27°C)	m^3/min / cfm	30.0 / 1059	36.0 / 1271
Air intake restriction, clean filter(s)	kPa / In wc	2.4 / 9.6	3.1 / 12.4
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	293 / 16700	332 / 18900
Standby Power	kW / BTU/min	336 / 19100	407 / 23100
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	480 / 895	455 / 850
Standby Power	°C / °F	500 / 930	500 / 930
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	70.2 / 2479	79.3 / 2800
Standby Power	m^3/min / cfm	79.2 / 2797	93.3 / 3294
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	22 / 1250	24 / 1360
Standby Power	kW / BTU/min	24 / 1360	27 / 1540
Heat rejection to coolant at			
Prime Power	kW / BTU/min	209 / 11900	236 / 13420
Standby Power	kW / BTU/min	234 / 13300	271 / 15400
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	1.25	
Radiator core thickness (std size)	mm	73	
Intercooler core area (std size)	mm	–	
Intercooler core thickness (std size)	mm	–	
Fan diameter	mm	890	
Fan power consumption	kW / hp	9 / 12	15 / 20
Fan drive ratio		1.00:1	
Coolant capacity			
engine	litres	38	
std radiator with hoses	litres	29	
Coolant pump	drive/ratio	gear 1.48:1	
Coolant flow with standard system	l/s	9.1	10.9
Minimum coolant flow	l/s	8.2	9.8
Maximum external coolant system restriction	kPa	62	88
Thermostat			
start to open	°C	75	
fully open	°C	88	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator (Gen Pac radiator)	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TWD 1630 G



Water pump capacity
TWD 1630 G



Cooling performance

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

Engine speed	Air on temp	110% OF PRIME POWER Air flow	Max additional external restriction	STANDBY POWER Air flow	Max additional external restriction
rpm	°C	m^3/s	Pa	m^3/s	Pa
1500	30	4.25	540	4.35	530
	40	5.65	265	5.75	245
	46	7.05	0	7.05	0
1800	30	5.15	795	5.60	715
	40	6.85	375	7.55	190
	44	–	–	8.70	0
	46	8.70	0	–	–

TWD 1630 G	**Speed, rpm**	**1500**	**1800**
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		4.06:1	
Starter motor	make/type/kW	Bosch/KE/7.5	
Starter motor solenoid			
pull current	Amp	51	
hold current	Amp	7	
Number of teeth on flywheel		153	
Number of teeth on starter motor		12	
Inrush current at +20°C	Amp	950	
Cranking current at +20°C	Amp	400	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2×176	
minimum at >+5°C	Ah	2×110	
Stop solenoid			
pull current	Amp	35	
hold current	Amp	0.4	
Inlet manifold heater (at 20 V)	kW	4.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	–	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	–	–
down	kW	–	–
right	kW	–	–
Timing gear at compressor PTO	Nm	max 130	
speed ratio direction of rotation viewed from flywheel side		1.12:1/clockwise	
Timing gear at servo pump PTO	Nm	max 55	
speed ratio direction of rotation viewed from flywheel side		1.68:1/clockwise	

TWD 1630 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	**Engine**	1	–	TWD 1630 G	868701		
	Gen Pac	–	2	TWD 1630 G Gen Pac	868702		
	Ratings	3	3	Prime Power 1500 rpm	138032005		359 kW (350 kW with fan)
		4	4	Standby Power 1500 rpm	138032006		397 kW (388 kW with fan)
		5	5	Prime Power 1800 rpm	138030903		391 kW (376 kW with fan) [1]
		6	6	Standby Power 1800 rpm	138030904		445 kW (430 kW with fan) [1]
							[1] Order also 23.2, 23.4 or 23.6
218	**Engine suspension**	11	•	Fixed front	3825523	x	379 mm to crankshaft center.
		12	•	Fixed rear	3825524	x	379 mm to crankshaft center.
22	**Lubrication system**	1	1	Oil drain pump	138032201	x*	Manual
23	**Fuel system**	1	•	Flexible fuel hoses	138032923	x*	Two pcs, L=400 mm
		2	2	Mech governor set for 1800 rpm	138032702		RQ-governor
		3	3	Electronic governor 1500 rpm	138032720	x*	Incl control unit and electr. stop
		4	4	Electronic governor 1800 rpm	138032721	x*	Incl control unit and electr. stop
		5	5	RQ-governor 1500 rpm for overspeed protection	138032730	x	Mech. governor set up for other el. governor than GAC
		6	6	RQ-governor 1800 rpm for overspeed protection	138032731	x	Mech. governor set up for other el. governor than GAC
		8	8	Overspeed trip switch	138033641	x*	Speed sender included
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	138039080	x*	Mounted on base frame
25	**Intake and exhaust system**	1	1	Air filter elbow connection	843465	x	Two pcs are required
		2	2	Flexible exhaust pipe	849374	x	
		3	3	Exhaust elbow	3826838	x	
		5	5	Silencer, 6" Heavy Duty	863049	x	With connecting flanges
		10	10	Heat guard	138039013	x*	Exhaust manifold and turbo
26	**Cooling system**	6	•	Radiator, 1.25 m^2	3825584	x	Incl fan guard and mounting parts
		17	•	Radiator guard	863014	x	
		32	•	Thrust type fan	848924	x	Ø 890 mm
		33	–	Suction type fan	848925	x	Ø 890 mm
		–	34	Suction type fan	138032610	x	Ø 890 mm
		37	•	Belt guard	138032933	x*	For fan and alternator belts
27	**Control system**	1	1	Electric lever control	138032710	x*	1500 rpm Not in comb with electr gov.
		2	2	Electric lever control	138032711	x*	1800 rpm Not in comb with electr gov.
31	**Battery**	1	1	Battery box	864171	x	
		2	2	Connection cables	864172		Incl main switch
33	**Starting system**	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run
37	**Electrical wiring**	3	3	Engine wiring	138033631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5
38	**Instrument, switches and senders**	1	1	Instrument panel	873627	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	138033622	x*	
		5	5	Coolant temp and oil pressure gauges	872440	x	

** Reference to corresponding customer fitted kit*

TWD 1630 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. En-gine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
38	**Instrument, switches and senders**	6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		7	7	Oil temp gauge and sender	863452	x	Not in comb with oil drain pump
		8	8	Speed sender	866531	x	Not in comb with 23.8
		9	9	Tachometer/ hour meter	873723	x	For Ø 72 mm mounting hole
		10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9
		11	11	Hour meter	858877	x	
		12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	
		14	•	Coolant temp and oil pressure switches	138033621	x*	103°C temp setting
		15	–	Coolant temp and oil pressure switches	138033625	x*	97°C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	4	4	Flexible coupling CF D-275	864170	x	Available later
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865098	x	Separately mounted. 220–240 V.
		3	3	Tool kit	863058	x	
		4	4	Engine heater 2000 W	3825492	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825389	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994106	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994103	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	138030401	x	[1]
		4	4	Instruction book, English			[1] One included in engine order no.
		5	5	Instruction book, German	138030403	x	[1]
		6	6	Instruction book, French	138030404	x	[1]
		7	7	Instruction book, Spanish	138030405	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745780		
		10	10	Maintenance kit, 2500 h	876743	x	
		11	11	Maintenance kit, 5000 h	876744	x	
	Engine packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	138031904	x	
		–	14	Plastic wrapping		x	Included in engine order no.
		–	15	Wooden box	138031906	x	

* Reference to corresponding customer fitted kit
[1]) *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately – See next page!

TWD 1630 G Order specification – optional equipment

Factory fitted equipment: 9-digit number.
Customer fitted equipment: 6 or 7-digit numbers

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted *equipment* order no.		Corresponding *factory fitted* equipment
22.1	138032201	Oil drain pump	862025
23.1	138032923	Flexible fuel hoses	843466
23.3	138032720	Electronic governor 1500 rpm	3825509
23.4	138032721	Electronic governor 1800 rpm	3825510
23.8	138033641	Overspeed trip switch	866302
23.9	138039080	Fuel filter/water separator	3826744
25.10	138039013	Heat guard	3827067
26.37	138032933	Belt guard	3825537
27.1	138032710	Electric lever control 1500 rpm	862764
27.2	138032711	Electric lever control 1800 rpm	862764
37.3	138033631	Engine wiring	866298
38.4	138033622	Senders	862925
38.14	138033621	Switches 103°C	866047
38.15	138033625	Switches 97°C	866048

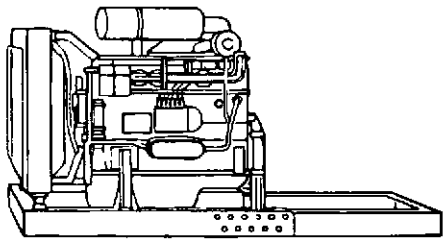
TAD 1630 GE

Gen Set Engine – Gen Pac

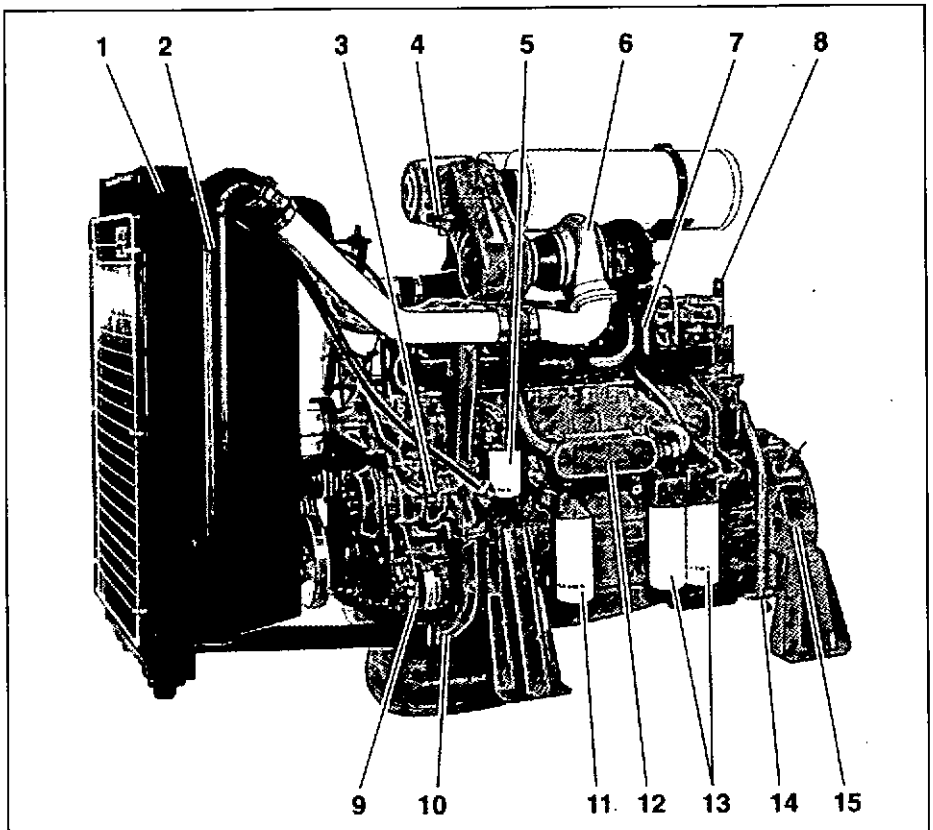
TAD 1630 GE

- Turbocharged
- Air to air intercooled
- Diesel fuel
- Displacement indication (l)
- Generation
- Version
- Generator drive
- Emission controlled

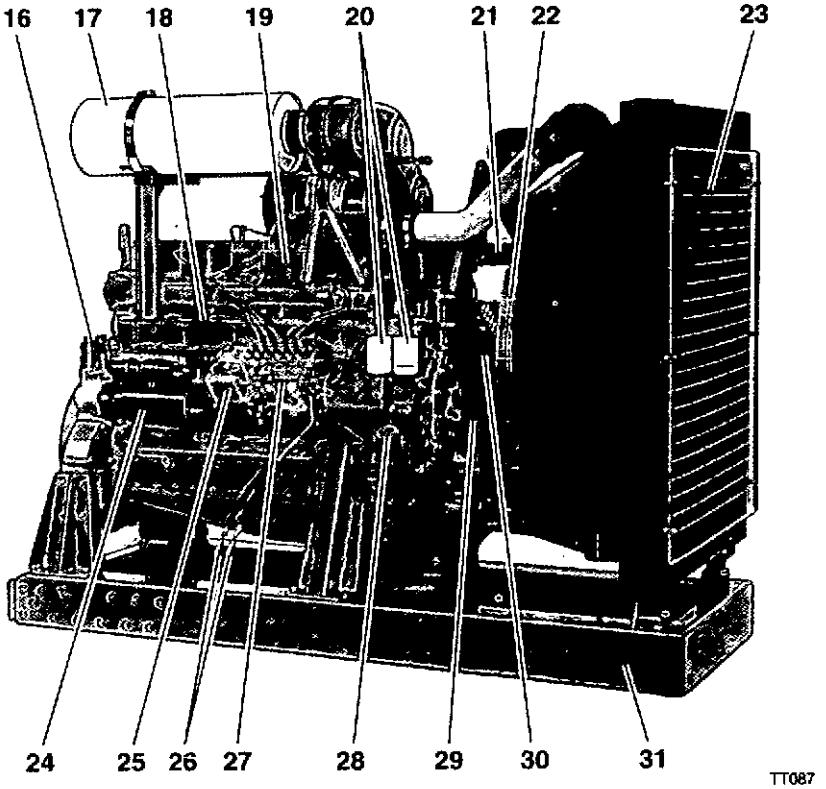
Gen Pac – Gen Set Engine mounted on an expandable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



TT86



TT087

1. Tropical radiator
2. Intercooler
3. Gear driven coolant pump
4. Air restriciton indicator
5. Coolant filter
6. Turbo-charger
7. Air cooled exhaust manifold
8. Lift eyelet
9. Alternator
10. Coolant pipe, inlet
11. By-pass oil filter of spin-on type
12. Oil cooler
13. Full-flow oil filters of spin-on type
14. Crankcase ventilation
15. Flywheel housing SAE 1
16. Relay for inlet manifold heater
17. Air filter
18. Cable iron
19. Inlet manifold heater
20. Twin fuel filters of throw-away type
21. Coolant pipe, outlet
22. Fan guard
23. Radiator guard *)
24. Starter motor
25. Electric speed governor
26. Fuel pipes for tank connection
27. Injection pump
28. Oil filler
29. Belt guard *)
30. Automatic belt tensioner
31. Expandable base frame

*) Optional

Standard equipment

TAD 1630 GE

		Engine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 1	•	•
	Flywheel for 14" flexible plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
	By-pass oil filter of spin-on type	•	•
	Oil-cooler, side-mounted	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with GAC electric governor	•	•
	Pump coupling guard	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-charger	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator and intercooler	•[1]	•
	Radiator guard	–	•
	Gear-driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	–
	Intercooler	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, left side	•	•
33	**Starting system**		
	Starter motor, Bosch 7.5 kW/24 V	•	•
	Connecting facility for extra starter motor	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and senders**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

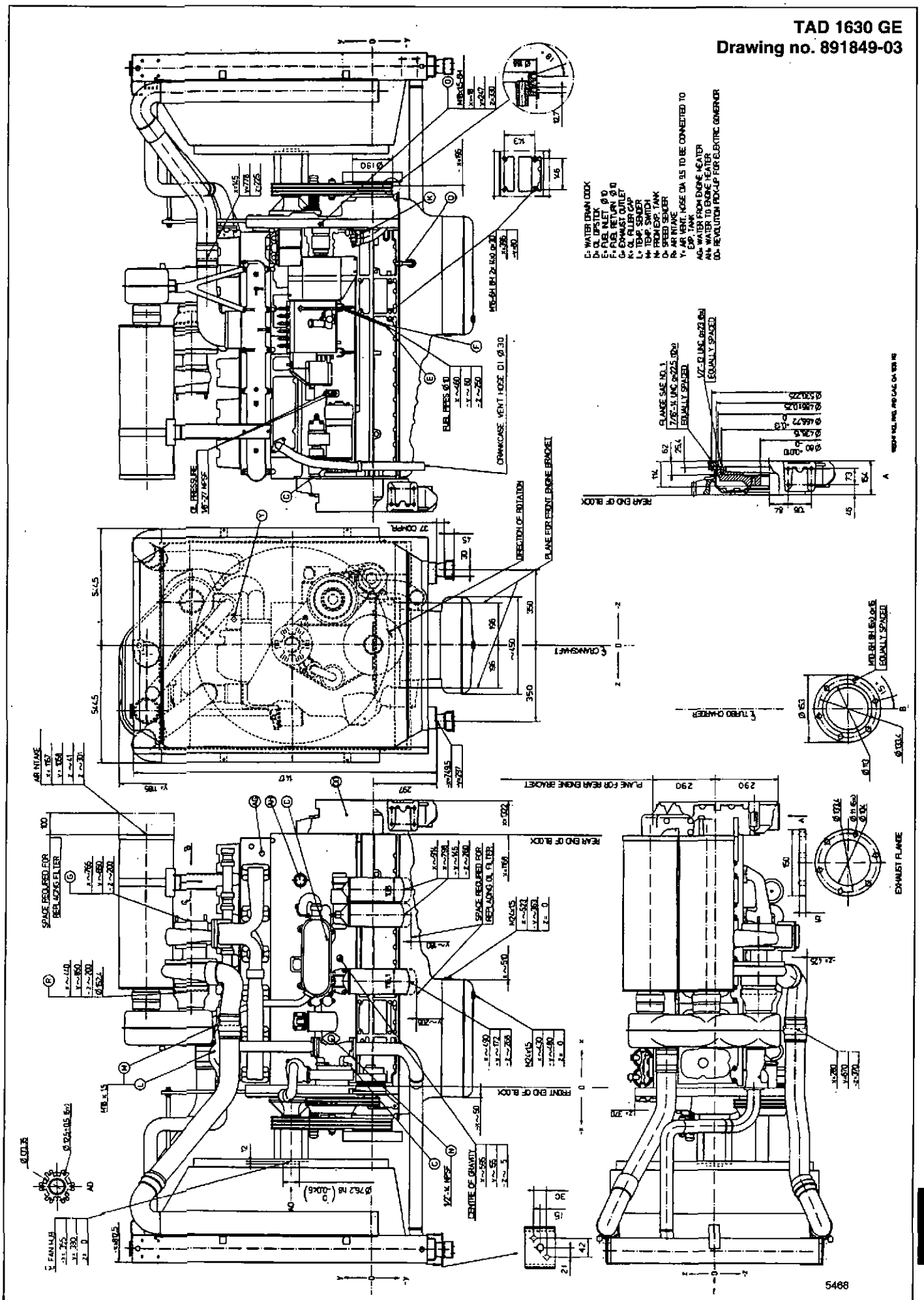
[1] Must be ordered

– optional equipment or not applicable
• included in standard specification

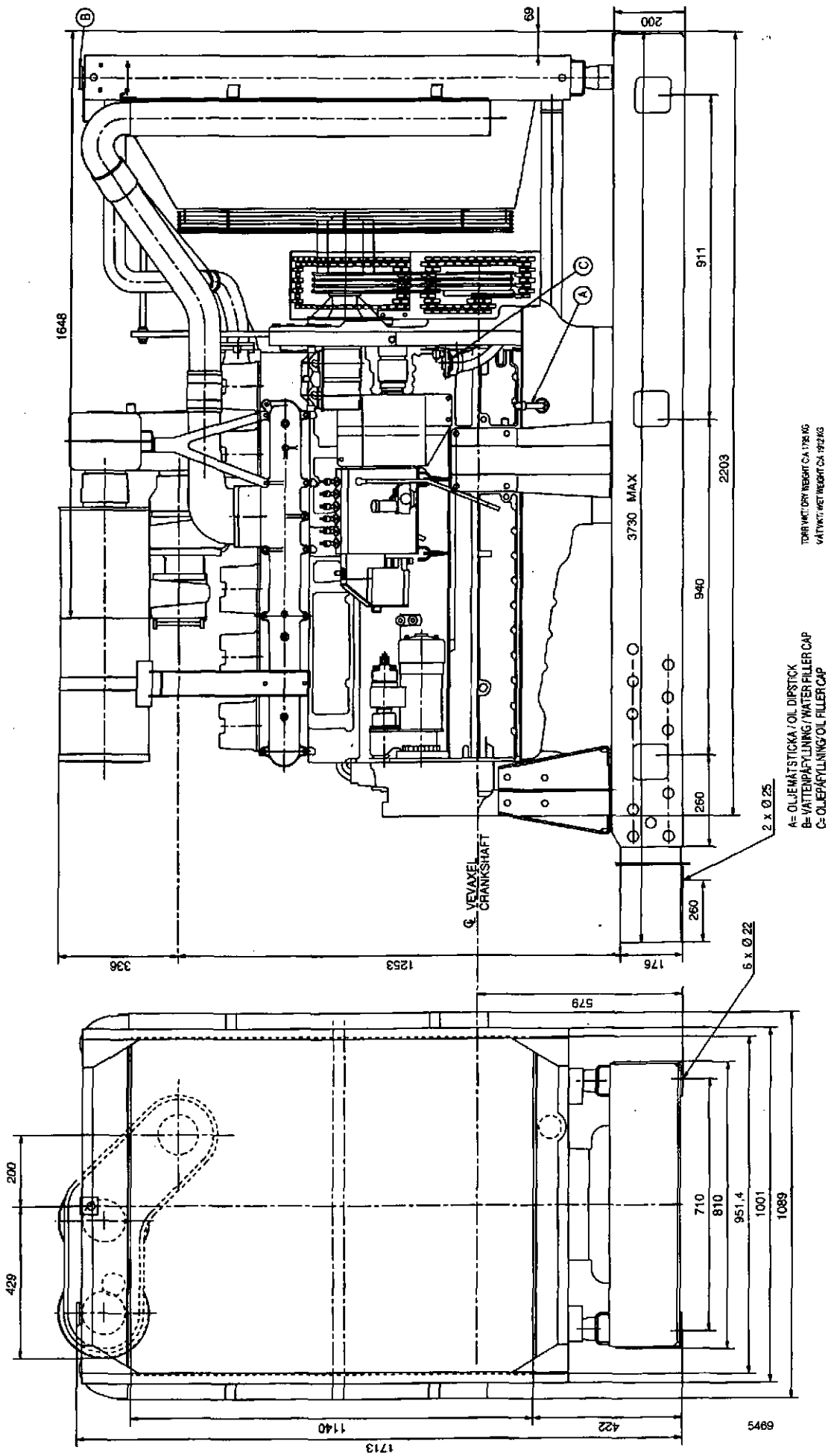
Technical description

- Complies with EPA, CARB and TA -luft exhaust emission regulation.
- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head sealing against high temperatures.
- Efficient and reliable turbo-charger.
- Air to air intercooler.
- Full flow disposable spin-on oil filter, for extra high filtration.
- Full flow oil cooler.
- The lubricating oil level can be measured during operation.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Gear driven, highly efficient coolant pump.
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- Electrical starter heater in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system including accurate electronic governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Two viscous type crankshaft vibration dampers in series withstand single bearing alternator torsional vibrations.
- Piston cooling for low piston temperature and reduced ring temperature.
- Keystone top compression rings for long service life.
- Automatic fan belt tensioner.
- Replaceable valve guides and valve seats.
- Tapered connecting rods to reduce the risk of piston cracking.

TAD 1630 GE
Drawing no. 891849-03



TAD 1630 GE Gen Pac
Drawing no. 891853-03



Technical data TAD 1630 GE

General

In line four stroke diesel engine with direct injection
Turbocharged and air to air intercooled

Number of cylinders	6	Bore	144.00 mm / 5.67 in
Displacement, total	16.12 litres / 984 in^3	Stroke	165 mm / 6.50 in
Firing order	1-5-3-6-2-4	Compression ratio	15.0:1
Rotation direction, anti-clockwise viewed towards flywheel		Dry weight Gen Pac 1795 kg	Engine only 1538 kg*)
		Wet weight Gen Pac 1912 kg	Engine only 1650 kg*)
		*) Including radiator and intercooler	

TAD 1630 GE	Speed, rpm	1500	1800
Performance	Test no.	B3130	21000665/66
Prime Power			
without fan	kW / hp	407 / 554	450 / 612
with fan	kW / hp	395 / 537	430 / 585
Continuous Standby Power			
without fan	kW / hp	407 / 554	450 / 612
with fan	kW / hp	395 / 537	430 / 585
Standby Power			
without fan	kW / hp	447 / 608	494 / 672
with fan	kW / hp	435 / 592	474 / 645
Torque at			
Prime Power	Nm / lbft	2590 / 1910	2390 / 1760
Standby Power	Nm / lbft	2850 / 2100	2620 / 1930
Mean piston speed	m/s / ft/sec	8.3 / 27.2	9.9 / 32.5
Effective mean pressure at			
Prime Power	MPa / psi	2.02 / 293	1.86 / 270
Max combustion pressure at			
Prime Power	MPa / psi	15.0 / 2180	15.5 / 2250
Total mass moment of inertia, J (mR^2)	kgm^2 / $lbft^2$	4.22 / 100.1	
Degree of irregularity at			
Prime Power		1:60	1:135
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	40	54

Engine noise emission

Test standards: ISO 3744-1981 (E)
sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

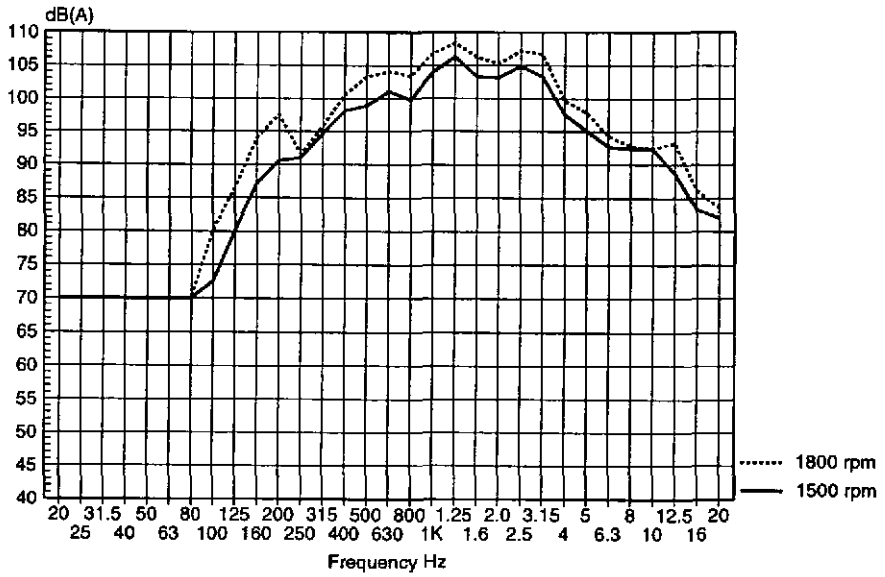
Measured sound power Lw

	Speed, rpm	1500	1800
No load	dB(A)	–	–
Prime Power	dB(A)	113.9	116.1
Standby Power	dB(A)	114.5	116.5

Calculated sound pressure Lp at 1 m

	Speed, rpm	1500	1800
No load	dB(A)	–	–
Prime Power	dB(A)	101.9	104.1
Standby Power	dB(A)	102.5	104.5

Sound power level TAD 1630 GE
Third octave band analysis



TAD 1630 GE	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	115	119
Standby power	dB(A)	115	119

Load acceptance

Test condition: warm engine

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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	2.4	2.4	0.9	0.9	20–100	>16	>16	5	14
0–40	4.4	4.4	1.1	1.1	40–100	12.6	>16	3.2	10
0–60	6.8	8.4	1.6	2.0	60–100	5.6	10.8	2.4	8.6
0–63		10.0		2.2	63–100		10.8		13.2
0–69	10.0		2.2		69–100	4.4		1.8	
0–80	>16	>16	4.2	5	80–100	2.8	4.4	1.2	5.4
0–100	>16	>16	5.6	8.0					
100–0	9.6	10.4	1	1.1					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	2.0	2.0	1.2	1.2	20–100	12.3	>16	2.8	13.3
0–40	3.7	4.0	1.3	1.3	40–100	6.3	10.7	2.2	8.7
0–60	5.5	6.2	1.4	1.4	60–100	4.2	6.0	1.0	5.2
0–75		10.0			75–100		3.3		4.0
0–80	10.0	12.3	2.3	2.6	80–100	2.3	2.7	1.2	2.4
0–100	>16		4.8						
100–0	7.7	8.5	1.2	1.2					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TAD 1630 GE	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	4	6
0°C ambient temperature *)	s	7	7
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	4	6
0°C ambient temperature *)	s	7	7

*) With manifold heater engaged, lubricating oil 15 W/40

Derating

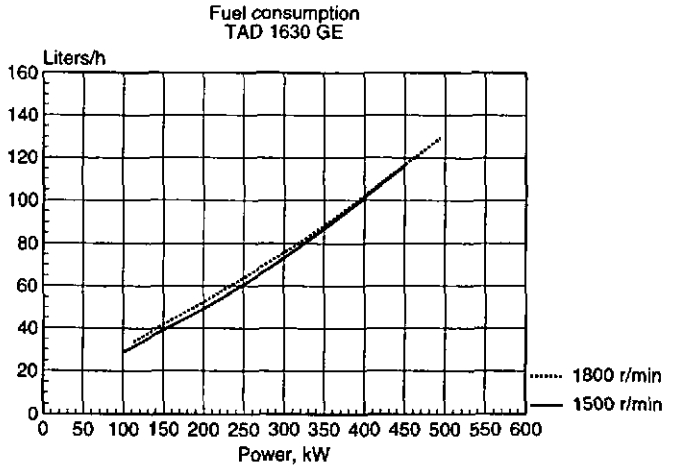
The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without deration.

For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude deration factor <3000 m	4%/500 m
Altitude deration factor >3000 m	6%/500 m
Ambient temperature deration factor	1.5%/5°C
Humidity	No derating

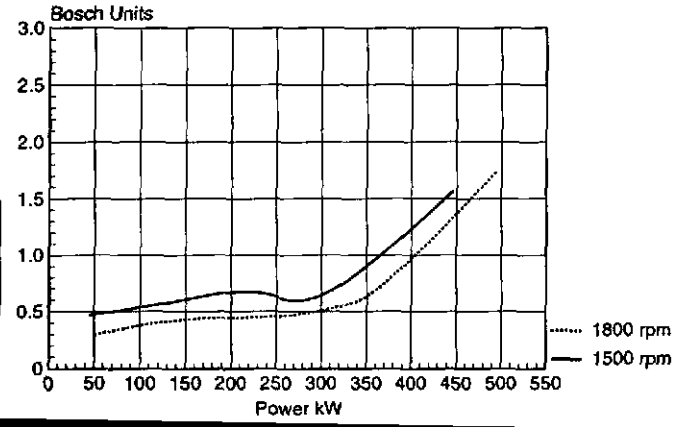
TAD 1630 GE	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litre/h / US gal/h	0.11 / 0.029	0.17 / 0.045
Standby Power	litre/h / US gal/h	0.18 / 0.048	0.21 / 0.055
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	64	
Oil sump capacity			
max	litres	57	
min	litres	40	
Oil change interval			
CD oil quality	h	300	
VDS oil quality	h	600	
Engine angularity limits			
front up	degrees	Not available	
front down	degrees	Not available	
side tilt	degrees	Not available	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	105	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	238 / 0.386	251 / 0.407
50% of Prime Power	g/kWh / lb/hph	210 / 0.340	215 / 0.348
75% of Prime Power	g/kWh / lb/hph	202 / 0.327	208 / 0.337
100% of Prime Power	g/kWh / lb/hph	209 / 0.339	213 / 0.345
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	235 / 0.381	244 / 0.395
50% of Standby Power	g/kWh / lb/hph	202 / 0.340	213 / 0.345
75% of Standby Power	g/kWh / lb/hph	204 / 0.330	210 / 0.340
100% of Standby Power	g/kWh / lb/hph	216 / 0.350	220 / 0.356
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D JIS KK 2204, EN 590	
Total fuel flow	litres/h	145	165
Feed pump pressure	kPa	150	
Feed pump max suction head	m	2	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Electronic/GAC	
Injection pump type/make		P 7000/Bosch	
Injection timing	°B.T.D.C.	19	21

Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

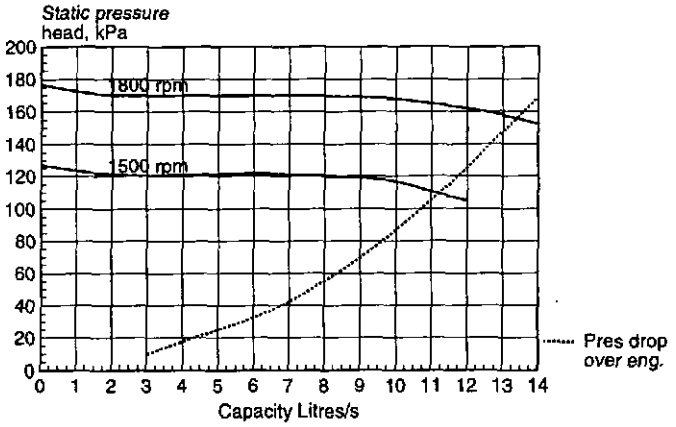


TAD 1630 GE	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 27°C)	m^3/min / cfm	32.0 / 1130	39.1 / 1381
Standby Power, (at 27°C)	m^3/min / cfm	34.8 / 1229	41.7 / 1473
Air intake restriction, clean filter(s)	kPa / In wc	1.3 / 5.1	1.8 / 7.1
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	354 / 20132	399 / 22691
Standby Power	kW / BTU/min	405 / 23032	454 / 25819
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	490 / 915	455 / 850
Standby Power	°C / °F	510 / 950	490 / 915
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	81.7 / 2885	91.5 / 3231
Standby Power	m^3/min / cfm	90.3 / 3189	101.3 / 3577
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	24 / 1370	27 / 1540
Standby Power	kW / BTU/min	27 / 1540	30 / 1710
Heat rejection to coolant at			
Prime Power	kW / BTU/min	179 / 10180	204 / 11602
Standby Power	kW / BTU/min	188 / 10692	224 / 12739
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	1.10	
Radiator core thickness (std size)	mm	73	
Intercooler core area (std size)	m^2	0.90	
Intercooler core thickness (std size)	mm	68	
Fan diameter	mm	890	
Fan power consumption (Std.)	kW / hp	12 / 16	20 / 27
Fan drive ratio		1.12:1	
Coolant capacity			
engine	litres	35	
std radiator with hoses	litres	25	
Coolant pump	drive/ratio	gear / 1.48:1	
Coolant flow with standard system	l/s	8.7	10.5
Minimum coolant flow	l/s	Not available	
Maximum external coolant system restriction	kPa	Not available	
Thermostat			
start to open	°C	82	
fully open	°C	95	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator (Gen Pac radiator)	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TAD 1630 GE



Water pump capacity
TAD 1630 GE



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

Engine speed	Air on temp	110% OF PRIME POWER Air flow	Max additional external restriction	STANDBY POWER Air flow	Max additional external restriction
rpm	°C	m^3/s	Pa	m^3/s	Pa
Fan ∅ 890 mm standard, fan drive ratio 1.12:1					
1500	30	3.95	720	3.95	720
	40	4.95	515	4.95	515
	49	6.85	0	6.85	0
1800	30	5.15	985	5.15	985
	40	6.75	565	6.75	565
	46	8.40	0	8.40	0

TAD 1630 GE	Speed, rpm	1500	1800
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		4.06:1	
Starter motor	make/type/kW	Bosch/KE/7.5	
Starter motor solenoid			
pull current	Amp	51	
hold current	Amp	7	
Number of teeth on flywheel		153	
Number of teeth on starter motor		12	
Inrush current at +20°C	Amp	950	
Cranking current at +20°C	Amp	400	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2×176	
minimum at >+5°C	Ah	2×110	
Stop solenoid			
pull current	Amp	–	
hold current	Amp	–	
Inlet manifold heater (at 20 V)	kW	4.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	–	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	–	–
down	kW	–	–
right	kW	–	–
Timing gear at compressor PTO	Nm	max 130	
speed ratio direction of rotation viewed from flywheel side		1.12:1/clockwise	
Timing gear at servo pump PTO	Nm	max 55	
speed ratio direction of rotation viewed from flywheel side		1.68:1/clockwise	

TAD 1630 GE Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	**Engine**	1	–	TAD 1630 GE	868550		Order also 26.10
	Gen Pac	–	2	TAD 1630 GE Gen Pac	868551		
	Ratings	3	3	Prime Power 1500 rpm	138032001		407 kW (395 kW with fan)
		4	4	Standby Power 1500 rpm	138032003		447 kW (435 kW with fan)
		5	5	Prime Power 1800 rpm	138032002		450 kW (430 kW with fan)
		6	6	Standby Power 1800 rpm	138032004		494 kW (474 kW with fan)
	Certified ratings	9	9	Standby Power 1800 rpm	138038901	x	494 kW (474 kW with fan) EPA/CARB
218	**Engine suspension**	11	•	Fixed front	3825523	x	379 mm to crankshaft center.
		12	•	Fixed rear	3825524	x	379 mm to crankshaft center.
22	**Lubrication system**	1	1	Oil drain pump	138032201	x*	Manual
23	**Fuel system**	1	•	Flexible fuel hoses	138032923	x*	Two pcs, L=400 mm
		3	3	Electronic governor 1500/1800 rpm		x	Incl in engine order no. Electrical stop, see 27.3
		8	8	Overspeed trip switch	138033641	x*	Speed sender included
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	138039080	x*	Mounted on base frame
25	**Intake and exhaust system**	1	1	Air filter elbow connection	866137	x	Two pcs are required
		2	2	Flexible exhaust pipe	3825596	x	
		3	3	Exhaust elbow	3826839	x	
		5	5	Silencer, 7" Heavy Duty	863318	x	With connecting flanges
		–	9	Crankcase ventilation	138039053	x	Extension pipe
		9	9	Crankcase ventilation	3825295	x	Extension pipe
		10	10	Heat guard	138039013	x*	Exhaust manifold and turbo
26	**Cooling system**	10	•	Radiator, 1.10 m^2	3825585	x	Incl fan, fan guard, intercooler and mounting parts
		17	•	Radiator guard	866019	x	
		32	•	Thrust type fan		x	Ø 890 mm, incl. in 26.10
		37	•	Belt guard	138032933	x*	For fan and alternator belts
27	**Control system**	3	3	Electrical stop	138032803	x*	Energized to run. For el. governor
31	**Battery**	1	1	Battery box	864171	x	
		2	2	Connection cables	864172		Incl main switch
33	**Starting system**	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run
37	**Electrical wiring**	3	3	Engine wiring	138033631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5
38	**Instrument, switches and senders**	1	1	Instrument panel	873627	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	138033622	x*	
		5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		7	7	Oil temp gauge and sender	863452	x	Not in comb with oil drain pump
		8	8	Speed sender	866531	x	Not in comb with 23.8
		9	9	Tachometer/ hour meter	873723	x	For Ø 72 mm mounting hole
		10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9

** Reference to corresponding customer fitted kit.*

TAD 1630 G Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. En-gine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
38	**Instrument, switches and senders**	11	11	Hour meter	858877	x	
		12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	
		14	•	Coolant temp and oil pressure switches	138033621	x*	103° C temp setting
		15	–	Coolant temp and oil pressure switches	138033625	x*	97° C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	5	5	Flexible coupling CF D-350	3826032	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865098	x	Separately mounted. 220–240 V.
		3	3	Tool kit	863058	x	
		4	4	Engine heater 2000 W	3825492	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825389	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994106	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994103	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	138030401	x	[1]
		4	4	Instruction book, English		x	[1] One included in engine order no.
		5	5	Instruction book, German	138030403	x	[1]
		6	6	Instruction book, French	138030404	x	[1]
		7	7	Instruction book, Spanish	138030405	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745780		
		10	10	Maintenance kit, 2500 h	876745	x	
		11	11	Maintenance kit, 5000 h	876746	x	
	Engine packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	138031904	x	
		–	14	Plastic wrapping		x	Included in engine order no.
		–	15	Wooden box	138031906	x	

** Reference to corresponding customer fitted kit.*
[1]) *If more than one instruction book is required, please see optional equipment*

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted equipment order no.		Corresponding factory fitted equipment
22.1	138032201	Oil drain pump	862025
23.1	138032923	Flexible fuel hoses	843466
23.8	138033641	Overspeed trip switch	866302
23.9	138039080	Fuel filter/water separator	3826744
25.10	138039013	Heat guard	3827067
26.37	138032933	Belt guard	3825537
27.3	138032803	Electrical stop	866293
37.3	138033631	Engine wiring	866298
38.4	138033622	Senders	862925
38.14	138033621	Switches 103°C	866047
38.15	138033625	Switches 97°C	866048

Notes

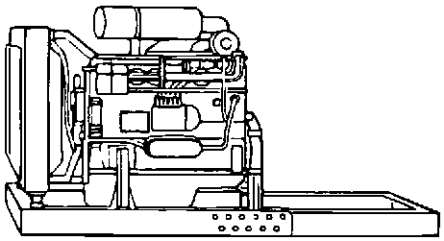
TAD 1631 GE

Gen Set Engine – Gen Pac

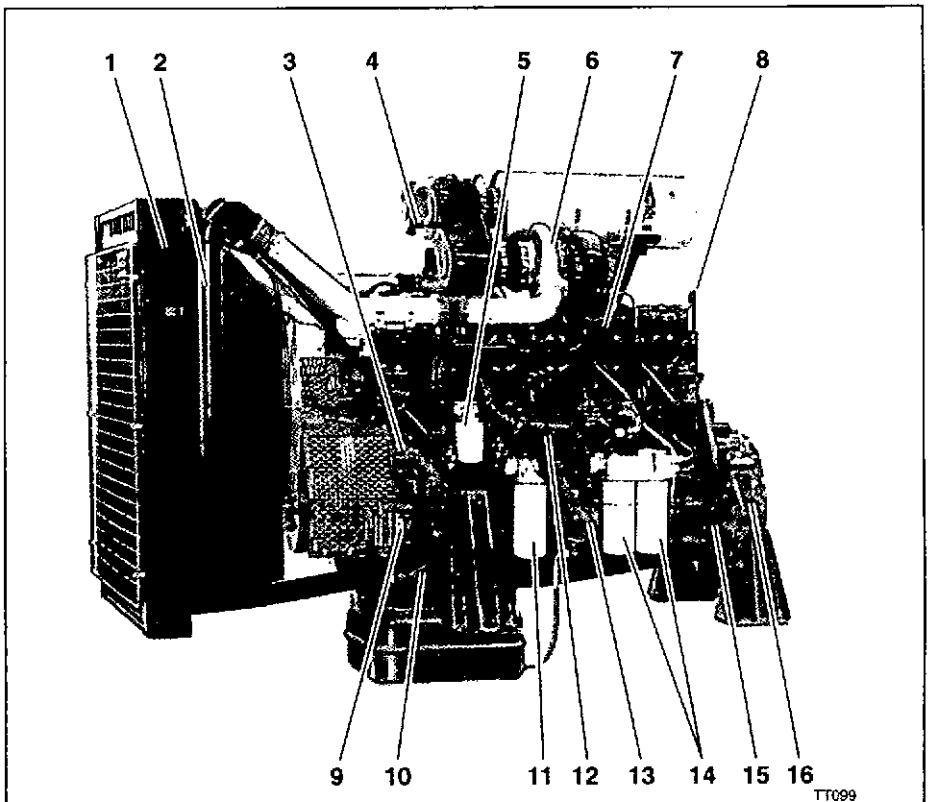
TAD 1631 GE

- Turbocharged
- Air to air intercooled
- Diesel fuel
- Displacement indication (l)
- Generation
- Version
- Generator drive
- Emission controlled

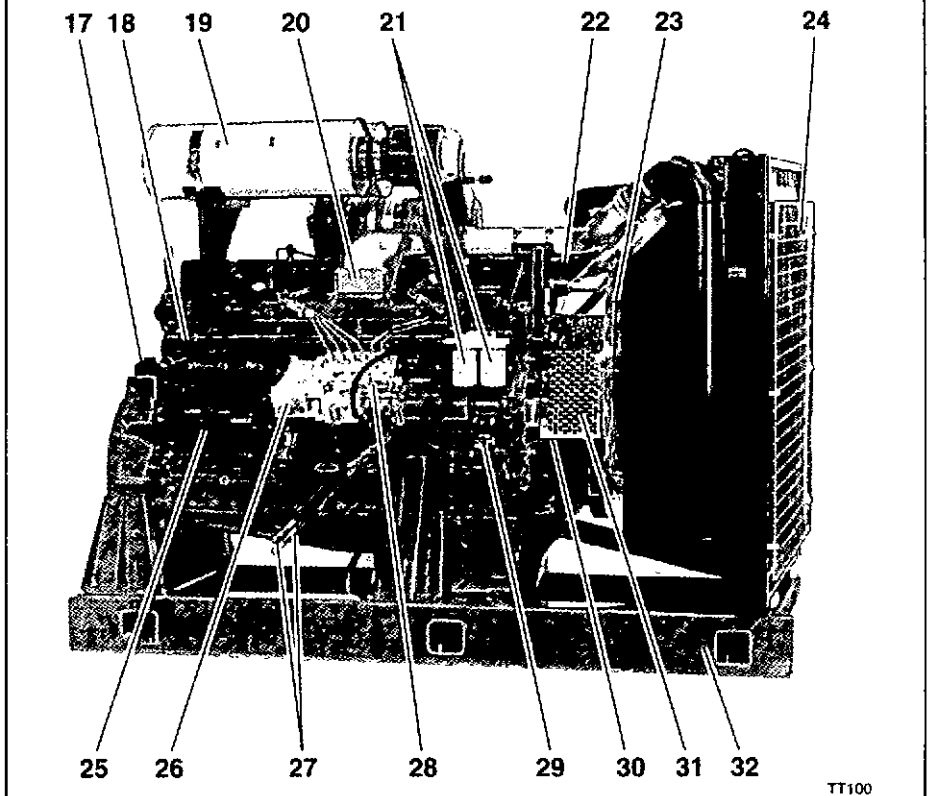
Gen Pac – Gen Set Engine mounted on an expandable base frame. Complete unit with engine, radiator, radiator core guard, fan, fan and belt guards providing reduced delivery time and installation cost and simplified transportation.



TT125



TT099



TT100

1. Tropical radiator
2. Intercooler
3. Gear driven coolant pump
4. Air restriciton indicator
5. Coolant filter
6. Turbo-charger
7. Air cooled exhaust manifold
8. Lift eyelet
9. Alternator
10. Coolant pipe, inlet
11. By-pass oil filter of spin-on type
12. Oil cooler
13. Oil drain pump *(optional)*
14. Full-flow oil filters of spin-on type
15. Crankcase ventilation
16. Flywheel housing SAE 1
17. Relay for inlet manifold heater
18. Cable iron
19. Air filter
20. Inlet manifold heater
21. Twin fuel filters
22. Coolant pipe, outlet
23. Fan guard
24. Radiator guard *(Standard on Gen Pac)*
25. Starter motor
26. Electric speed govenor
27. Fuel pipes for tank connection
28. Injection pump
29. Oil filler
30. Belt guard *(Standard on Gen Pac)*
31. Automatic belt tensioner
32. Expandable base frame

Standard equipment

TAD 1631 GE

		Engine	Gen Pac
20	**Engine**		
	Automatic belt tensioner	•	•
	Lift eyelets	•	•
212	**Flywheel**		
	Flywheel housing with connection acc. to SAE 1	•	•
	Flywheel for 14" flexible plate and flexible coupling	•	•
	Vibration damper	•	•
218	**Engine suspension**		
	Fixed front and rear suspension	–	•
22	**Lubrication system**		
	Oil dip stick	•	•
	Full-flow oil filter of spin-on type	•	•
	By-pass oil filter of spin-on type	•	•
	Oil-cooler, side-mounted	•	•
23	**Fuel system**		
	Twin fuel filters of throw-away type	•	•
	Flexible fuel lines	–	•
	Injection pump, Bosch, with GAC electric *governor*	•	•
	Pump coupling guard	•	•
25	**Intake and exhaust system**		
	Air filter of throw-away type	•	•
	Air restriction indicator	•	•
	Air-cooled exhaust manifold	•	•
	Connecting flange for exhaust line	•	•
	Turbo-charger	•	•
	Crankcase ventilation	•	•
26	**Cooling system**		
	Tropical radiator and intercooler	•[1]	•
	Radiator guard	–	•
	Gear-driven coolant pump	•	•
	Fan hub	•	•
	Thrust fan	–	•
	Fan guard	–	•
	Belt guard	–	•
	Intercooler	•	•
32	**Alternator**		
	Alternator 60 A/24 V low, left side	•	•
33	**Starting system**		
	Starter motor, Bosch 7.5 kW/24 V	•	•
	Connecting facility for extra starter motor	•	•
	Electrical starter heater	•	•
37	**Electrical wiring**		
	Cable iron	•	•
38	**Instruments and senders**		
	Temp.- and oil pressure switches for auto. stop/alarm 103°C	–	•
89	**Other equipment**		
	Expandable base frame	–	•
90	**Engine Packing**		
	Plastic wrapping	•	•

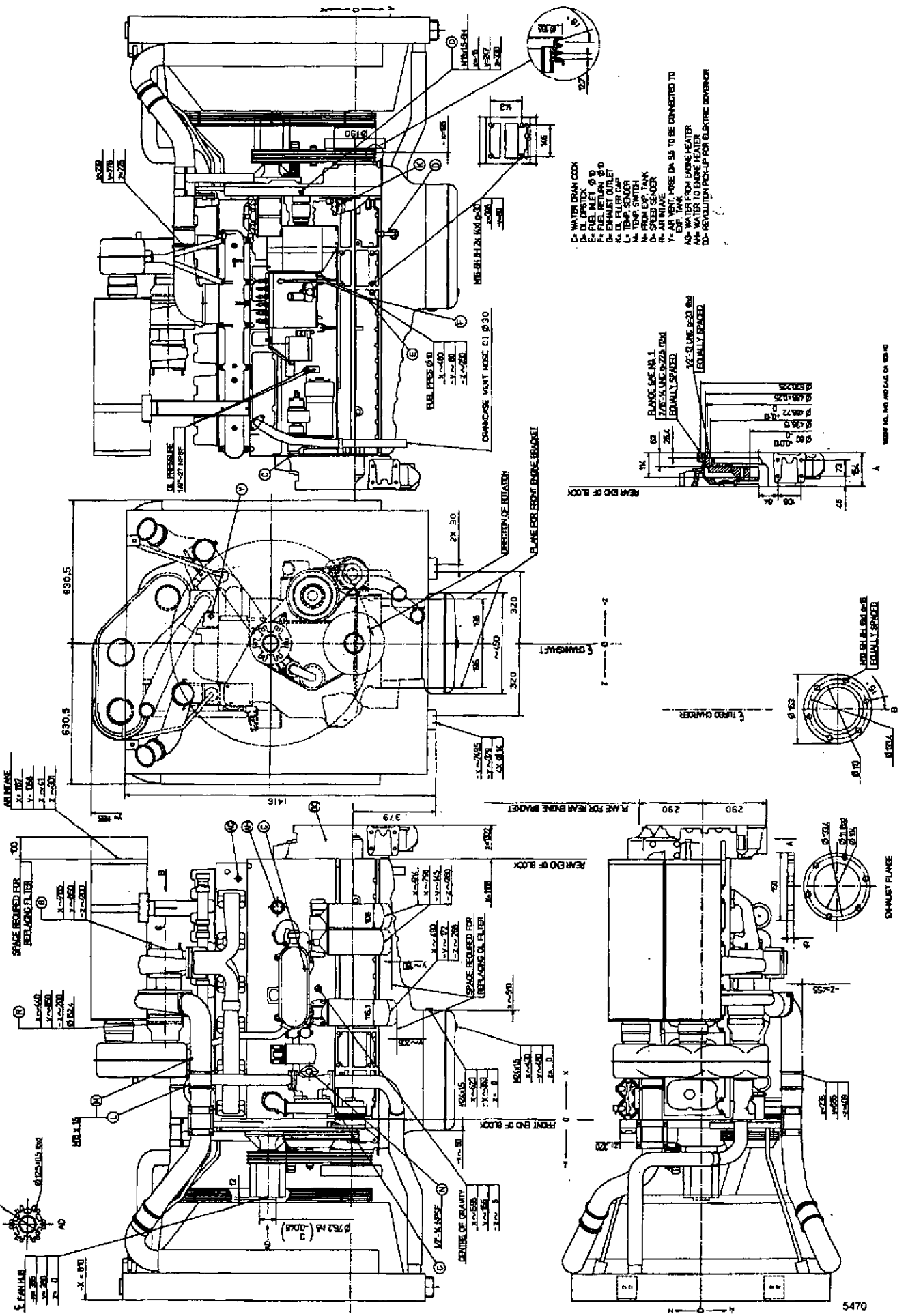
[1] Must be ordered

– optional equipment or not applicable
• included in standard specification

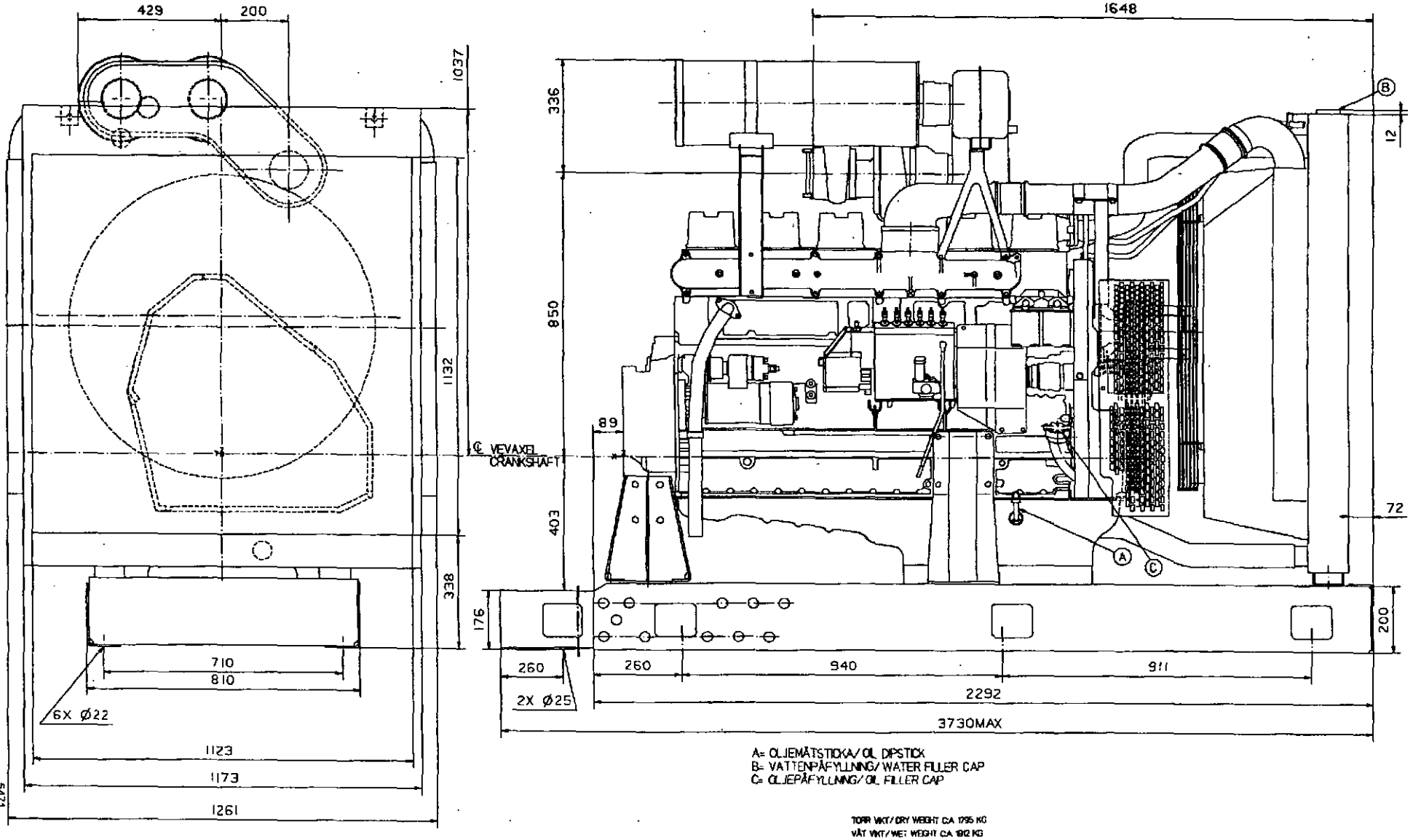
Technical description

- Complies with EPA, CARB and TA -luft exhaust emission regulation.
- Optimized cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners with flame barrier that protects the cylinder head sealing against high temperatures.
- Efficient and reliable turbo-charger.
- Air to air intercooler.
- *Full flow disposable spin-on oil* filter, for extra high filtration.
- Full flow oil cooler.
- The lubricating oil level can be measured during operation.
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop.
- Gear driven, highly efficient coolant pump.
- Twin fuel filters of throw-away type.
- Nitro-carburized crankshaft with seven bearings for moderate load on main bearings.
- *Electrical starter heater* in the intake manifold for improved starting performance and reduced smoke emission.
- Bosch fuel injection system including accurate electronic governor.
- Gear type lubricating oil pump, gear driven by the transmission.
- Two viscous type crankshaft vibration dampers in series withstand single bearing alternator torsional vibrations.
- Piston cooling for low piston temperature and reduced ring temperature.
- Keystone top compression rings for long service life.
- Automatic fan belt tensioner.
- Replaceable valve guides and valve seats.
- Tapered connecting rods to reduce the risk of piston cracking.

TAD 1631 GE
Drawing no. 3590011-01



5470



A= OLJEMÄTSTICKA/ OIL DIPSTICK
B= VATTENPÅFYLLNING/ WATER FILLER CAP
C= OLJEPÅFYLLNING/ OIL FILLER CAP

TORR VIKT/ DRY WEIGHT CA 1795 KG
VÅT VIKT/ WET WEIGHT CA 1912 KG

5471

TAD 1631 GE Gen Pac
Drawing no. 3590012-03

Technical data TAD 1631 GE

General

In line four stroke diesel engine with direct injection
Turbocharged and air to air intercooled

Number of cylinders	6	Bore	144.00 mm / 5.67 in
Displacement, total	16.12 litres / 984 in^3	Stroke	165 mm / 6.50 in
Firing order	1-5-3-6-2-4	Compression ratio	15.0:1
Rotation direction, anti-clockwise viewed towards flywheel		Dry weight Gen Pac 1795 kg	Engine only 1538 kg*)
		Wet weight Gen Pac 1912 kg	Engine only 1650 kg*)

*) Including radiator and intercooler

TAD 1631 GE	Speed, rpm	1500	1800
Performance	Test no.	21000065	21000063
Prime Power			
without fan	kW / hp	442 / 601	505 / 687
with fan	kW / hp	430 / 585	484 / 658
Continuous Standby Power			
without fan	kW / hp	442 / 601	505 / 687
with fan	kW / hp	430 / 585	484 / 658
Standby Power			
without fan	kW / hp	485 / 660	558 / 759
with fan	kW / hp	473 / 643	537 / 730
Torque at			
Prime Power	Nm / lbft	2814 / 2075	2679 / 1976
Standby Power	Nm / lbft	3088 / 2278	2960 / 2183
Mean piston speed	m/s / ft/sec	8.3 / 27.2	9.9 / 32.5
Effective mean pressure at			
Prime Power	MPa / psi	2.2 / 319	2.1 / 305
Max combustion pressure at			
Prime Power	MPa / psi	14.4 / 2089	15.2 / 2205
Total mass moment of inertia, J (mR^2)	kgm^2 / lbft^2	4.22 / 100.1	
Degree of irregularity at			
Prime Power		1:52	1:108
Residual speed droop at load increase from 0 to 100%	%	≤ 5	
Friction Power	kW	40	54

Engine noise emission

Test standards: ISO 3744-1981 (E)
sound power (without fan, intake and exhaust noise)
Tolerance ± 0.75 dB(A)

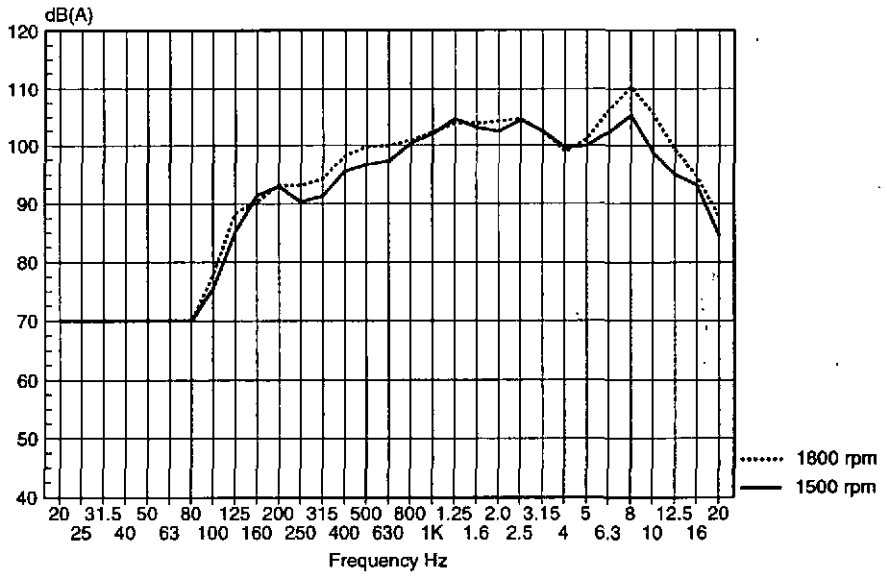
Measured sound power Lw

	Speed, rpm	1500	1800
No load	dB(A)	–	–
Prime Power	dB(A)	113.9	116.1
Standby Power	dB(A)	114.5	116.5

Calculated sound pressure Lp at 1 m

	Speed, rpm	1500	1800
No load	dB(A)	–	–
Prime Power	dB(A)	101.9	104.1
Standby Power	dB(A)	102.5	104.5

Sound power level TAD 1631 GE
Third octave band analysis



TAD 1631 GE	Speed, rpm	1500	1800
Unsilenced exhaust noise			
Data calculated as sound pressure Lp			
Assumed microphone distance 1 m			
Prime power	dB(A)	115	119
Standby power	dB(A)	116	120

Load acceptance
Test condition: warm engine, AVR with load acceptance function connected.
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	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	3.3	4.0	0.5	2.0	20–100	63.0		6.5	
0–40	6.1	7.6	1.0	3.0	40–100	16.8	18.6	3.5	6.0
0–52		10.0		1.3	52–100		15.0		1.7
0–60	10.0	14.7	2.5	4.5	60–100	9.3	9.3	1.5	1.5
0–80	21.8	40.5	4.0	6.6	80–100	4.1	4.0	1.0	3.0
0–100	83.5		13.0						
100–0	12.0	13.3	1.0	2.0					

Single step load performance at 1800 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	St-by	Prime	St-by		Prime	St-by	Prime	St-by
0–20	3.3	3.3	1.0	2.0	20–100	18.7	28.5	4.0	6.0
0–40	5.6	6.3	1.2	2.0	40–100	10.9	11.9	2.0	5.3
0–60		10.0		4.0	60–100		7.0		2.0
0–75	10.0		2.0		75–100	6.4		1.0	
0–80	15.4	17.6	3.0	4.5	80–100	3.4	4.0	1.0	2.5
0–100	29.8	55.8	4.5	5.0					
100–0	9.4	9.0	1.0	1.5					

Prime= based on Prime Power rating St-by= based on Standby Power rating

TAD 1631 GE	Speed, rpm	1500	1800
Cold start performance			
Time from start to no load speed			
+20°C ambient temperature	s	2.2	3.0
+5°C ambient temperature *)	s	5.0	7.0
Time from start to stay within 0.8% of no load speed			
+20°C ambient temperature	s	2.2	3.0
+5°C ambient temperature *)	s	5.0	7.0

*) With manifold heater engaged, lubricating oil 15 W/40

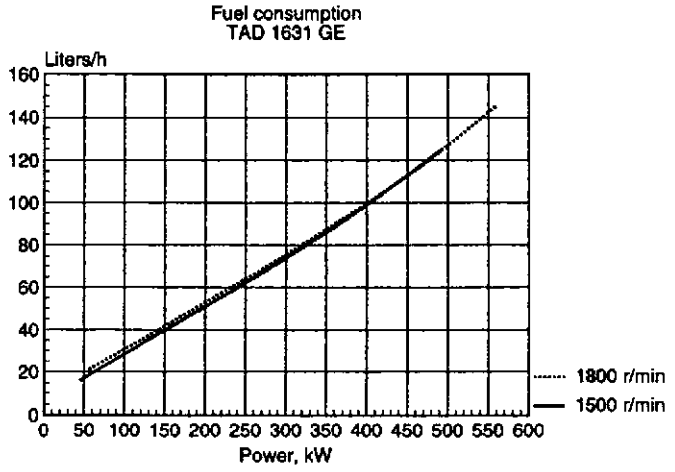
Derating
The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without deration.

For operation at higher altitudes and temperatures the power should be derated according to the following factors:

Altitude deration factor <3000 m	4%/500 m
Altitude deration factor >3000 m	6%/500 m
Ambient temperature deration factor	1.5%/5°C
Humidity	No derating

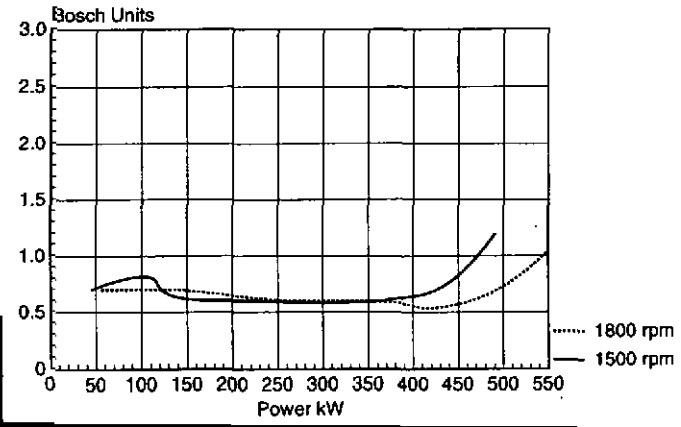
TAD 1631 GE	Speed, rpm	1500	1800
Lubrication system			
Lubricating oil consumption at			
Prime Power	litre/h / US gal/h	0.12 / 0.032	0.16 / 0.042
Standby Power	litre/h / US gal/h	0.13 / 0.034	0.18 / 0.048
Recommended lubricating oil to meet the specification of		MIL-L-2104D or E, API CD or CF, CCMC D4 or D5 and Volvo Drain Specification (VDS)	
Oil system capacity including filters	litres	64	
Oil sump capacity			
max	litres	57	
min	litres	40	
Oil change interval			
CD oil quality	h	200	
VDS oil quality	h	400	
Engine angularity limits			
front up	degrees	Not available	
front down	degrees	Not available	
side tilt	degrees	Not available	
Oil pressure			
at rated speed	kPa	300–500	
shut down switch setting	kPa	70	
Lubrication oil temperature			
normal	°C	105	
max	°C	120	
Oil filter micron size	mm	0.040	
Fuel system			
Specific fuel consumption at			
25% of Prime Power	g/kWh / lb/hph	230 / 0.373	240 / 0.389
50% of Prime Power	g/kWh / lb/hph	210 / 0.340	214 / 0.347
75% of Prime Power	g/kWh / lb/hph	205 / 0.332	208 / 0.337
100% of Prime Power	g/kWh / lb/hph	209 / 0.339	212 / 0.344
Specific fuel consumption at			
25% of Standby Power	g/kWh / lb/hph	227 / 0.368	236 / 0.383
50% of Standby Power	g/kWh / lb/hph	208 / 0.337	212 / 0.344
75% of Standby Power	g/kWh / lb/hph	205 / 0.332	208 / 0.337
100% of Standby Power	g/kWh / lb/hph	213 / 0.345	217 / 0.352
Recommended fuel to conform to		ASTM-D975-No1-D and 2-D DIN 51601, EN 590	
Total fuel flow	litres/h	205	215
Feed pump pressure	kPa	200	
Feed pump max suction head	m	3	
Fuel filter micron size	mm	0.008	
Governor type/make, standard		Electronic/GAC	
Injection pump type/make		R1500/Bosch	
Injection timing	°B.T.D.C.	17	21

Fuel consumption data is based on a diesel fuel with a calorific value of 42.7 MJ/kg (18360 BTU/pound) and a density of 0.84 kg/litre (7.01 lb /US gal, 8.42 lb/Imp gal).

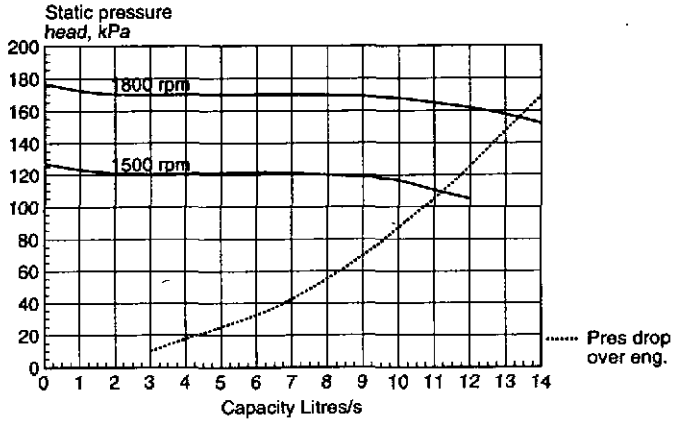


TAD 1631 GE	Speed, rpm	1500	1800
Intake and exhaust system			
Air consumption at			
Prime Power, (at 25°C)	m^3/min / cfm	31.8 / 1123	39.3 / 1388
Standby Power, (at 25°C)	m^3/min / cfm	34.3 / 1211	41.8 / 1476
Air intake restriction, clean filter(s)	kPa / In wc	1.5 / 6.0	2.2 / 8.8
Max allowable air intake restriction	kPa / In wc	5 / 20.1	5 / 20.1
Air filter type		single stage paper cartridge	
Air filter cleaning efficiency	%	99.85	
Heat rejection to exhaust at			
Prime Power	kW / BTU/min	369 / 20984	415 / 23600
Standby Power	kW / BTU/min	416 / 23657	482 / 27410
Exhaust gas temperature after turbine at			
Prime Power	°C / °F	550 / 1015	520 / 965
Standby Power	°C / °F	565 / 1045	560 / 1035
Max allowable back-pressure in exhaust line	kPa / In wc	5 / 20.1	7 / 28.1
Exhaust gas flow at			
Prime Power	m^3/min / cfm	90.3 / 3189	105.0 / 3708
Standby Power	m^3/min / cfm	99.0 / 3496	116.6 / 4117
Cooling system			
Heat rejection radiation from engine at			
Prime Power	kW / BTU/min	26 / 1478	30 / 1706
Standby Power	kW / BTU/min	29 / 1649	33 / 1877
Heat rejection to coolant at			
Prime Power	kW / BTU/min	180 / 10236	211 / 11999
Standby Power	kW / BTU/min	195 / 11089	235 / 13364
Recommended coolant		Volvo ethylen glycol or Volvo anticorrosion additive together with clean fresh water	
Radiator cooling system type		Closed circuit	
Radiator core area (std size)	m^2	1.25	
Radiator core thickness (std size)	mm	73	
Intercooler core area (std size)	m^2	1.06	
Intercooler core thickness (std size)	mm	68	
Fan diameter	mm	890	
Fan power consumption, drive ratio 1.00:1	kW / hp	12 / 16	21 / 29
Fan drive ratio		1.00:1	
Coolant capacity			
engine	litres	35	
std radiator with hoses	litres	29	
Coolant pump	drive/ratio	gear / 1.48:1	
Coolant flow with standard system	l/s	8.7	10.5
Minimum coolant flow	l/s	Not available	
Maximum external coolant system restriction	kPa	Not available	
Thermostat			
start to open	°C	82	
fully open	°C	95	
Maximum static pressure head	kPa	50	
Pressure cap setting on standard radiator (Gen Pac radiator)	kPa	70	
Maximum top tank temperature	°C	103	
Minimum temperature entering engine	°C	68	
Shutdown switch setting	°C	103	
Recommended drawdown capacity		10% of total cooling system capacity	

Smoke emission
TAD 1631 GE



Water pump capacity
TAD 1631 GE



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

Engine speed	Air on temp	110% OF PRIME POWER Air flow	Max additional external restriction	STANDBY POWER Air flow	Max additional external restriction
rpm	°C	m^3/s	Pa	m^3/s	Pa
Fan Ø 890 mm high pressure, fan drive ratio 1.00:1					
1500	30	4.15	760	4.15	760
	40	5.35	365	5.35	365
	49	7.05	0	7.05	0
1800	30	5.45	975	5.45	975
	40	7.10	355	7.10	355
	50	8.70	00	8.70	00
Fan Ø 890 mm high pressure, fan drive ratio 1.12:1					
1500	30	4.15	1090	4.15	1110
	40	5.35	735	5.35	765
	50	7.20	145	7.20	200
	53	8.00	0	8.40	90
1800	30	5.45	1445	5.45	1445
	40	7.10	800	7.10	800
	50	9.85	0	9.85	0

TAD 1631 GE	**Speed, rpm**	**1500**	**1800**
Electrical system			
Voltage and type		24 V/insulated from earth	
Alternator make/output	Amp	Valeo/60	
tacho output	Hz/alternator rev	6	
drive ratio		4.06:1	
Starter motor	make/type/kW	Bosch/KE/7.5	
Starter motor solenoid			
pull current	Amp	51	
hold current	Amp	7	
Number of teeth on flywheel		153	
Number of teeth on starter motor		12	
Inrush current at +20°C	Amp	950	
Cranking current at +20°C	Amp	400	
Crank engine speed at +20°C	rpm	200	
Starter motor battery capacity			
maximum	Ah	2×176	
minimum at >+5°C	Ah	2×110	
Stop solenoid			
pull current	Amp	35	
hold current	Amp	0.4	
Inlet manifold heater (at 20 V)	kW	4.0	
Power relay for the manifold heater	Amp	1	
Power take off			
Front end in line with crank shaft	Nm	–	
Front end belt pully load:			
Direction of load viewed from flywheel side:			
left	kW	–	–
down	kW	–	–
right	kW	–	–
Timing gear at compressor PTO	Nm	max 130	
speed ratio direction of rotation viewed from flywheel side		1.12:1/clockwise	
Timing gear at servo pump PTO	Nm	max 55	
speed ratio direction of rotation viewed from flywheel side		1.68:1/clockwise	

TAD 1631 GE Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. En-gine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
20	**Engine**	1	–	TAD 1631 GE	868767		Order also 26.12
	Gen Pac	–	2	TAD 1631 GE Gen Pac	868768		
	Ratings	3	3	Prime Power 1500 rpm	138032015		442 kW (430 kW with fan)
		4	4	Standby Power 1500 rpm	138032017		485 kW (473 kW with fan)
		5	5	Prime Power 1800 rpm	138030901		505 kW (484 kW with fan)
		6	6	Standby Power 1800 rpm	138030902		558 kW (537 kW with fan)
	Certified ratings	9	9	Standby Power 1800 rpm	138038902	x	558 kW (537 kW with fan) EPA/CARB
218	**Engine suspension**	11	•	Fixed front	3825523	x	379 mm to crankshaft center.
		12	•	Fixed rear	3825524	x	379 mm to crankshaft center.
22	**Lubrication system**	1	1	Oil drain pump	138032201	x*	Manual
23	**Fuel system**	1	•	Flexible fuel hoses	138032923	x*	Two pcs, L=400 mm
		3	3	Electronic governor 1500/1800 rpm		x	Incl in engine order no. Electrical stop, see 27.3
		8	8	Overspeed trip switch	138033641	x*	Speed sender included
		9	9	Fuel filter/water separator	8159966	x	
		–	9	Fuel filter/water separator	138039080	x*	Mounted on base frame
25	**Intake and exhaust system**	1	1	Air filter elbow connection	866137	x	Two pcs are required
		2	2	Flexible exhaust pipe	3825596	x	
		3	3	Exhaust elbow	3826839	x	
		5	5	Silencer, 7" Heavy Duty	863318	x	With connecting flanges.
		–	9	Crankcase ventilation	138039053	x	Extension pipe
		9	9	Crankcase ventilation	3825295	x	Extension pipe
		10	10	Heat guard	138039013	x*	Exhaust manifold and turbo
26	**Cooling system**	12	•	Radiator, 1.25 m2	3825476	x	Incl fan, fan guard, intercooler and mounting parts
		15	–	Fan drive pulley	138032605	x*	Ratio 1.12:1
		–	16	Fan drive pulley	138032602	x	Ratio 1.12:1
		17	•	Radiator guard	863014	x	
		35	•	Thrust type fan		x	Ø 890 mm high pressure, incl. in 26.12
		37	•	Belt guard	138032933	x*	For fan and alternator belts
27	***Control system***	3	3	*Electrical stop*	138032803	x*	*Energized to run. For el. governor*
31	**Battery**	1	1	Battery box	864171	x	
		2	2	Connection cables	864172		Incl main switch
33	**Starting system**	1	1	Starter switch	848073	x	
		2	2	Diode	1624394	x	For stop system, energized to run
37	**Electrical wiring**	3	3	Engine wiring	138033631	x*	
		4	4	Extension cable 2.5 m	863867	x	For 37.3
		5	5	Extension cable 8.0 m	863868	x	For 37.3
		6	6	Terminal box	864238	x	For 37.3, 37.4, 37.5
38	**Instrument, switches and senders**	1	1	Instrument panel	873627	x	With instrument lighting
		2	2	Fault indication system	863788	x	For 38.1
		4	4	Coolant temp and oil pressure senders	138033622	x*	
		5	5	Coolant temp and oil pressure gauges	872440	x	
		6	6	Coolant temp and oil pressure gauges	862923	x	Numerical dial plates
		7	7	Oil temp gauge and sender	863452	x	
		8	8	Speed sender	866531	x	Not in comb with 23.8
		9	9	Tachometer/ hour meter	873723	x	For Ø 72 mm mounting hole

** Reference to corresponding customer fitted kit.*

TAD 1631 GE Order specification – optional equipment

Factory fitted equipment: 9-digit number
Customer fitted equipment: 6 or 7-digit numbers
– Not applicable • Included in standard specification

	Group	Pos.no. Engine	Pos.no. Gen Pac	Option	Order no.	See option descr.	Note
38	**Instrument, switches and senders**	10	10	Adapter ring	873721	x	Ø 80-72 mm, for 38.9
		11	11	Hour meter	858877	x	
		12	12	Coolant level switch	862624	x	
		13	13	Horn for acoustic alarm	872874	x	
		14	•	Coolant temp and oil pressure switches	138033621	x*	103° C temp setting
		15	–	Coolant temp and oil pressure switches	138033625	x*	97° C temp setting
		16	16	Voltmeter	866706	x	
41	**Power transmission**	5	5	Flexible coupling CF D-350	3826032	x	
89	**Other equipment**	–	1	Vibration isolator	863728	x	6 pieces in kit. Used between base frame and floor.
		2	2	Engine heater 750 W	865098	x	Separately mounted. 220–240 V.
		3	3	Tool kit	863058	x	
		4	4	Engine heater 2000 W	3825492	x	Separately mounted. 220–240 V.
		5	5	Connection, engine heater	3825389	x	Included in 89.2 and 89.4
90	**Miscellaneous**	1	1	Extended coverage	3994106	x	Prime power. Order also 20.3 or 20.5
		2	2	Extended coverage	3994103	x	Std.-by power. Order also 20.4 or 20.6
		3	3	Instruction book, Swedish	138030401	x	[1]
		4	4	Instruction book, English			[1] One included in engine order no.
		5	5	Instruction book, German	138030403	x	[1]
		6	6	Instruction book, French	138030404	x	[1]
		7	7	Instruction book, Spanish	138030405	x	[1]
		8	8	Workshop manual		x	See optional equipment.
		9	9	Spare part catalogue	7745780		
		10	10	Maintenance kit, 2500 h	876824	x	
		11	11	Maintenance kit, 5000 h	876825	x	
	Engine packing	12	–	Plastic wrapping		x	Included in engine order no.
		13	–	Wooden box	138031910	x	
		–	14	Plastic wrapping		x	Included in engine order no.
		–	15	Wooden box	138031908	x	

** Reference to corresponding customer fitted kit.*
[1]) If more than one instruction book is required, please see optional equipment

Optional equipment ordered separately. Supplied loose without engine.

Pos. Nr.	Factory fitted equipment order no.		Corresponding factory fitted equipment
22.1	138032201	Oil drain pump	862025
23.1	138032923	Flexible fuel hoses	843466
23.8	138033641	Overspeed trip switch	866302
23.9	138039080	Fuel filter/water separator	3826744
25.10	138039013	Heat guard	3827067
26.15	138032605	Fan drive pulley	3825599
26.37	138032933	Belt guard	3825537
27.3	138032803	Electrical stop	866293
37.3	138033631	Engine wiring	866298
38.4	138033622	Senders	862925
38.14	138033621	Switches 103°C	866047
38.15	138033625	Switches 97°C	866048

Notes

Optional equipment
Descriptions

The numbers refer to the order specifications in each engine section

20.8–20.9 EPA/CARB certified rating

Engines designated "GE" meet the US EPA and CARB regulations. This means that exhaust emissions are lower than the required limits, measured according to ISO 8178 D2 5 mode test cycle, see also "exhaust emissions" in the general section of this book.

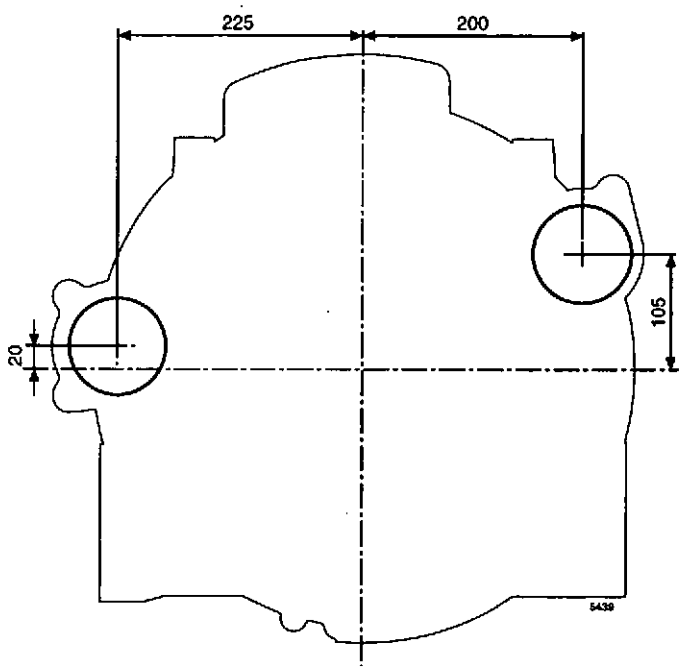
EPA/CARB maximum exhaust emission limits for 130–560 kW engine power (individual engine exhaust emission data will be supplied on request):

Nox 9,20 g/kWh
CO 11,50 g/kWh
HC 1,30 g/kWh
PM 0,54 g/kWh

The certified power rating is identical to standard power ratings in power setting, injection timing and engine performance. The certified rating also has a label with EPA and CARB approval code number and also measures for fuel injection equipment tamper resistance. There is a special emission related 5 years or 3000 hours warranty period included (which ever occurs first) for USA. For details about the warranty, see publication no 7738054-1 included in each certified engine delivery.

Note that the injection timing can be different at 1500 and 1800 rpm, see also technical data for individual engines. It is therefore not possible to alter the speed between 1500 and 1800 rpm without changing the injection timing setting. This must be carried out by authorized personnel only.

212.1 Flywheel housing with dual starter connections
SAE 2 connection.
Note that early manufactured flywheel housings have M10 instead of 3/8" UNC connecting face threads.

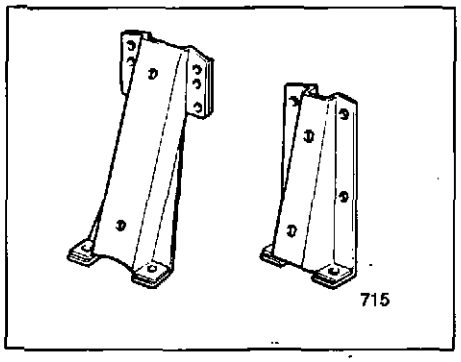


218.1 Fixed front engine bracket
218.2 Fixed rear engine bracket

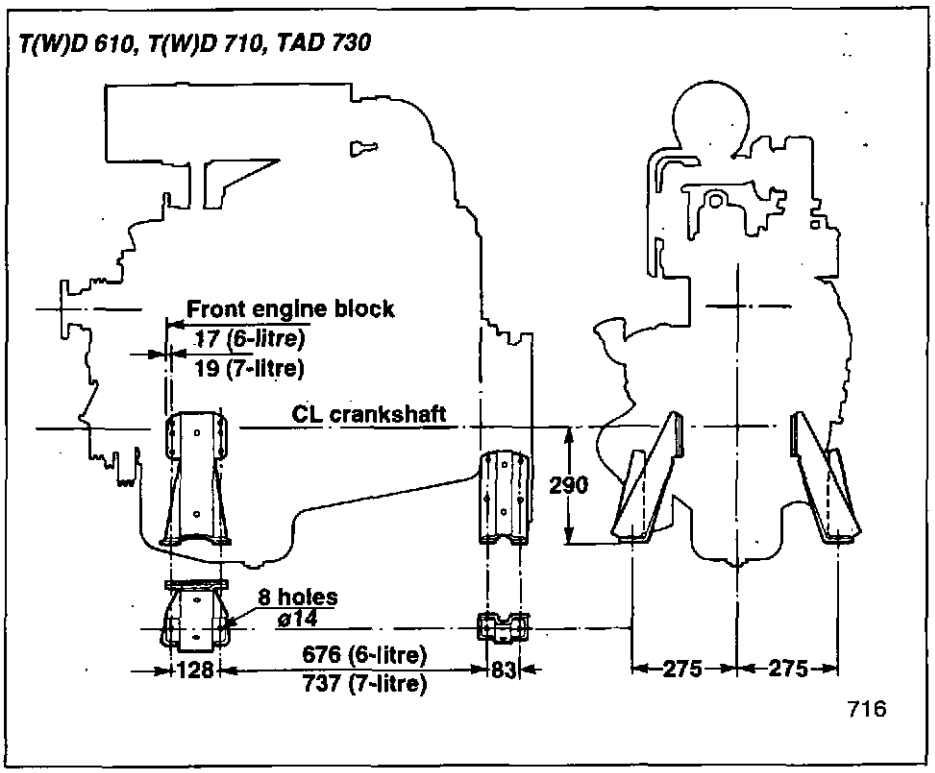
Material	5 mm steel plate
Surface	Green paint

When used on installations where substantial jolting or very powerful vibrations may occur, specific calculations should be made to ensure that suitable brackets are used.

Order number includes:
2 brackets
Fittings



T(W)D 610, T(W)D 710, TAD 730



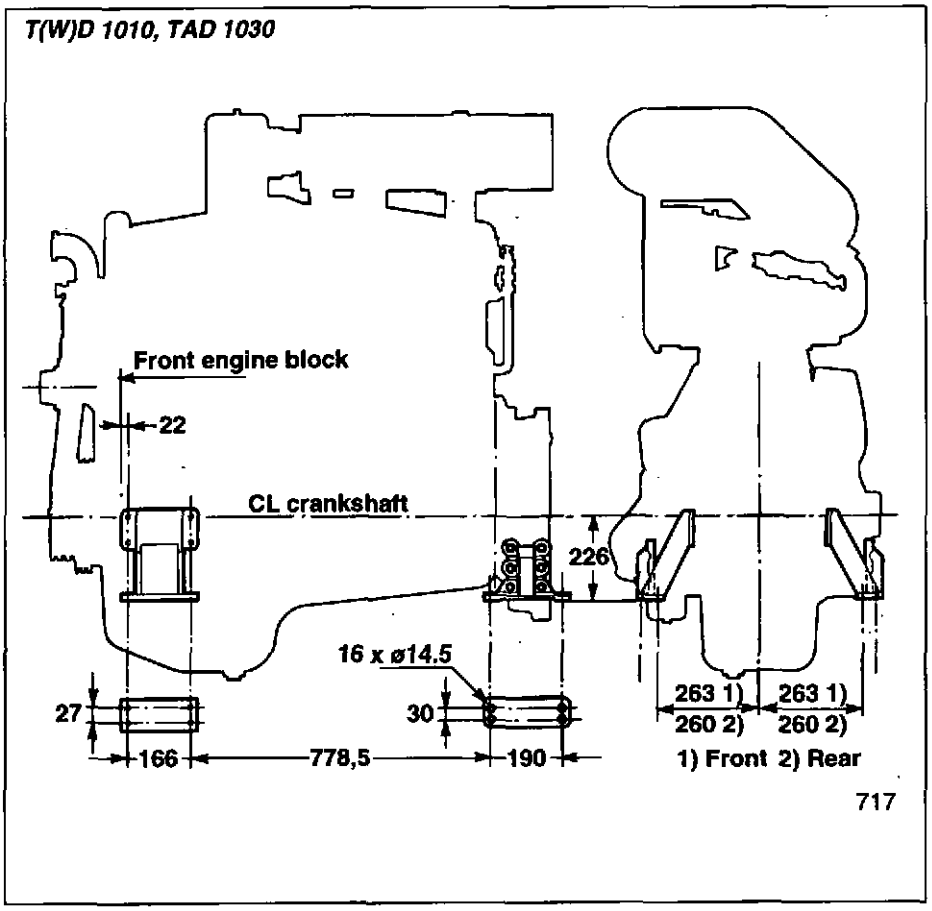
218.3 Fixed front engine bracket, low
218.4 Fixed rear engine bracket, low

Material	Cast iron
Surface	Green paint

When used on installations where substantial jolting or very powerful vibrations may occur, specific calculations should be made to ensure that suitable brackets are used.

Order number includes:
2 brackets
Fittings

T(W)D 1010, TAD 1030



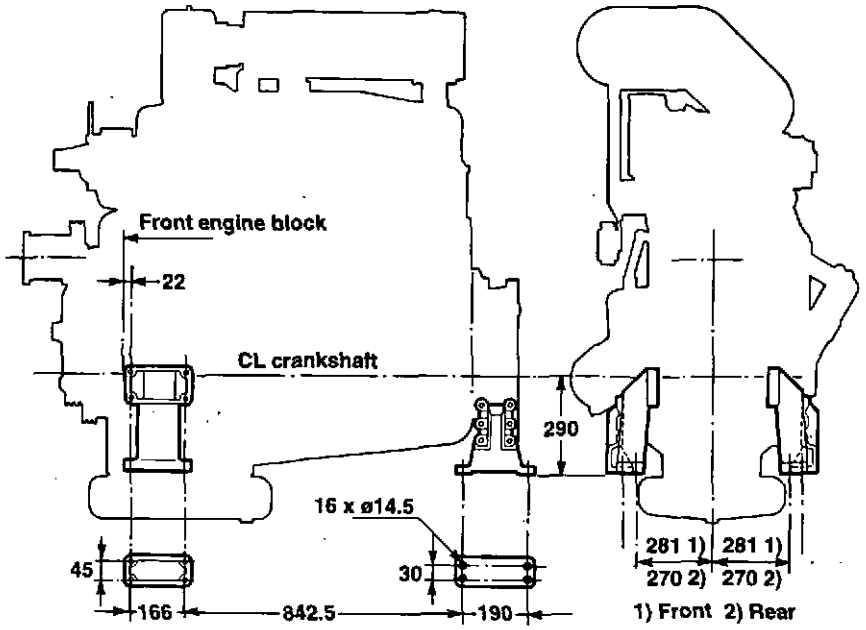
218.5 Fixed front engine bracket, low
218.6 Fixed rear engine bracket, low

Material	5 mm steel plate
Surface	Green paint

When used on installations where substantial jolting or very powerful vibrations may occur, specific calculations should be made to ensure that suitable brackets are used.

Order number includes:
2 brackets
Fittings

T(W)D 1210, TWD 1211



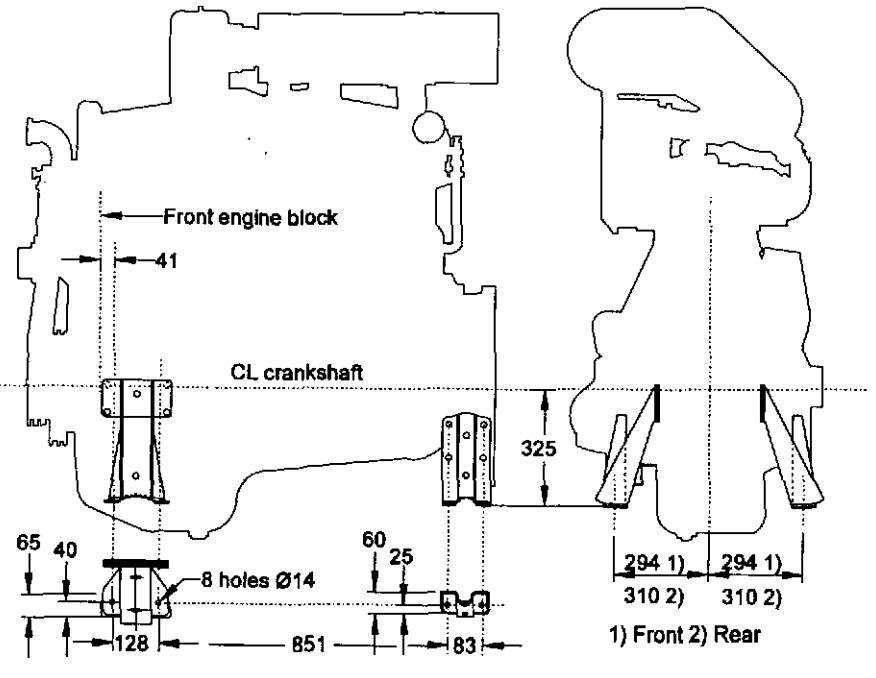
218.7 Fixed front engine bracket, high
218.8 Fixed rear engine bracket, high

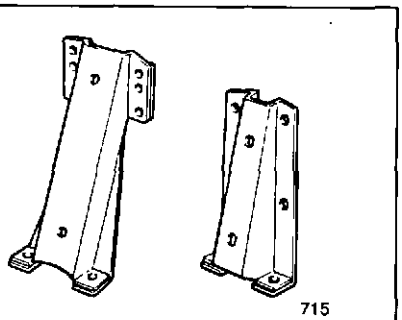
Material	5 mm steel plate
Surface	Green paint

When used on installations where substantial jolting or very powerful vibrations may occur, specific calculations should be made to ensure that suitable brackets are used.

Order number includes:
2 brackets.
Fittings

T(W)D 1010, TAD 1030



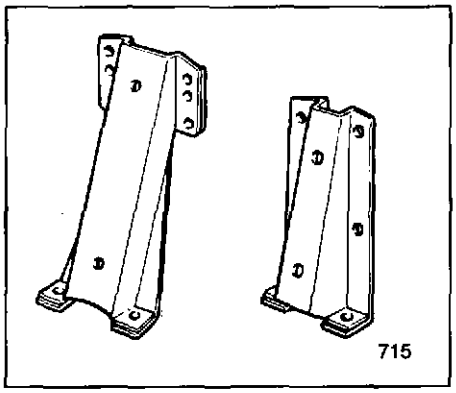


218.9 Fixed front engine bracket, high
218.10 Fixed rear engine bracket, high

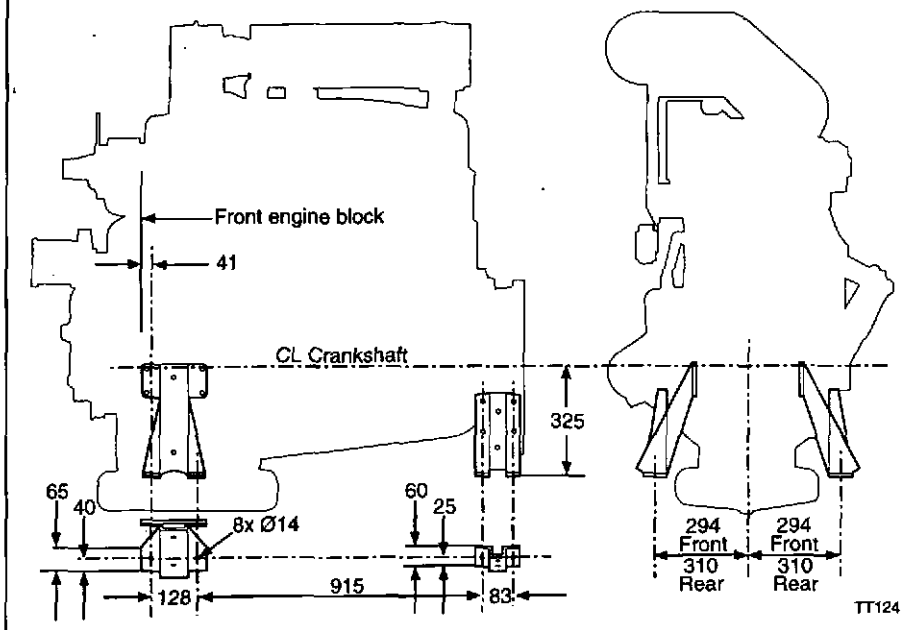
Material	Cast iron
Surface	Green paint

When used on installations where substantial jolting or very powerful vibrations may occur, specific calculations should be made to ensure that suitable brackets are used.

Order number includes:
2 brackets
Fittings



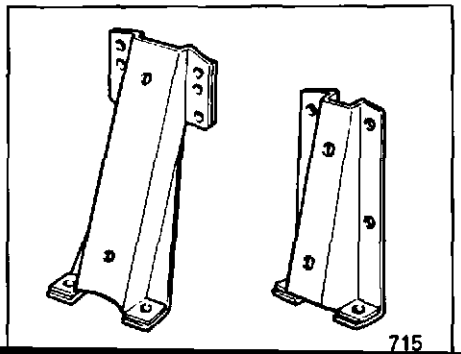
T(W)D 1210, TWD 1211, TAD 1231, TAD 1232



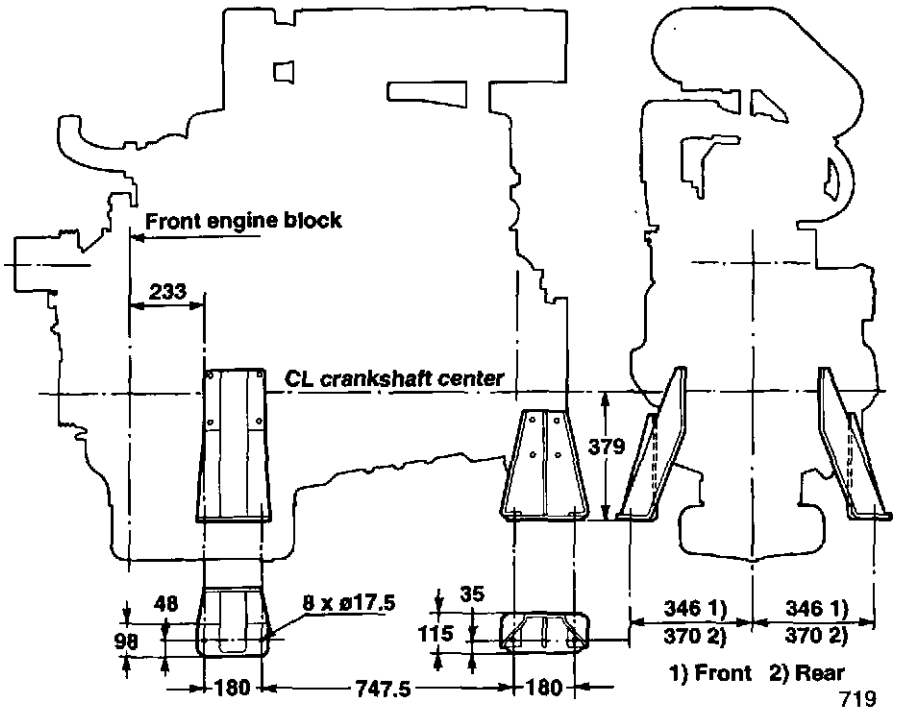
218.11 Fixed front bracket
218.12 Fixed rear bracket

Material	Welded 6 mm steel
Surface	Green paint

The brackets are included in the engine order number.



TWD 1630, TAD 1630, TAD 1631



218.13 Flexible front engine suspension
218.14 Flexible rear engine suspension

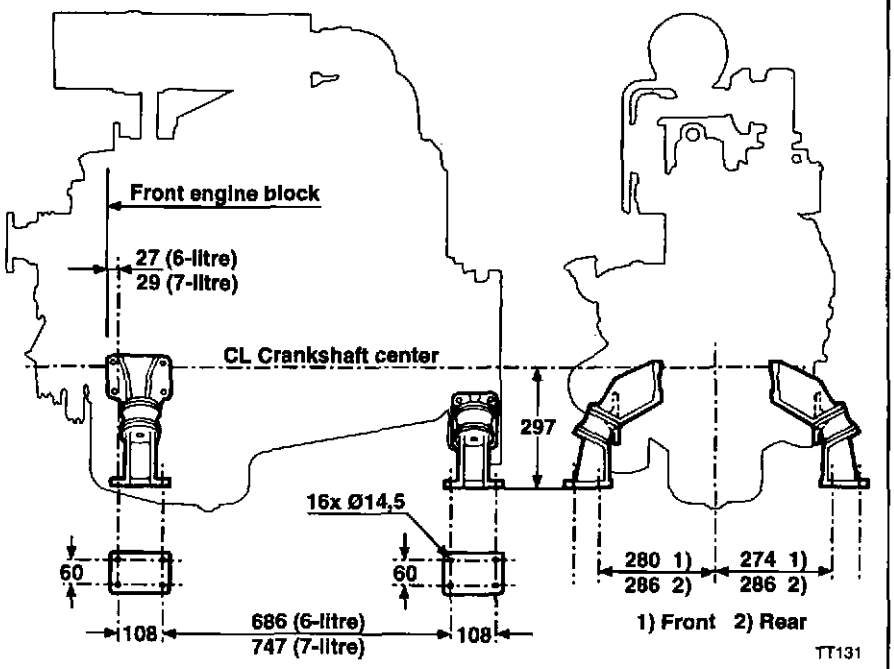
Material	Cast iron
Surface	Green paint
Rubber block spring constant	11772±1776 N/cm (1200 kp/cm)

The flexible engine suspension consists of upper and lower bracket with an intermediate rubber block. The upper and lower front brackets should be connected with a plaited copper wire earthing strip.

Order number for front engine suspension includes:
2 upper brackets
2 rubber blocks
2 lower brackets
1 earthing strip
Fittings

Order number for rear engine suspension includes:
2 upper brackets
2 rubber blocks
2 lower brackets
Fittings

T(W)D 610–710



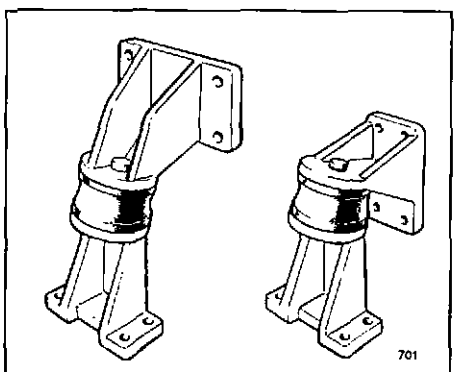
218.15 Flexible front upper bracket
218.16 Lower bracket, 262 mm
218.17 Lower bracket. 297 mm
218.18 Flexible rear upper bracket

Material	Cast iron
Surface	Green paint
Rubber block	11772±1776 N/cm (1200 kp/cm)

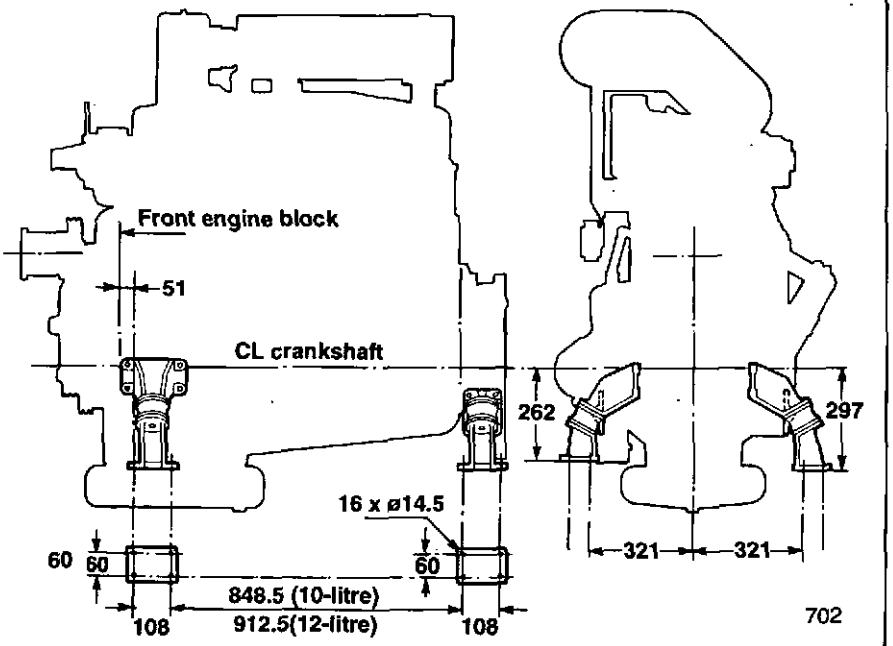
The flexible engine suspension consists of upper and lower bracket with an intermediate rubber block. The front upper and lower bracket should be connected with a plaited copper wire earthing strip.

Order numbers for upper bracket include:
2 upper brackets
2 rubber blocks
1 earthing strip

Order numbers for lower bracket include:
1 lower bracket



T(W)D 1010–1210, TWD 1211

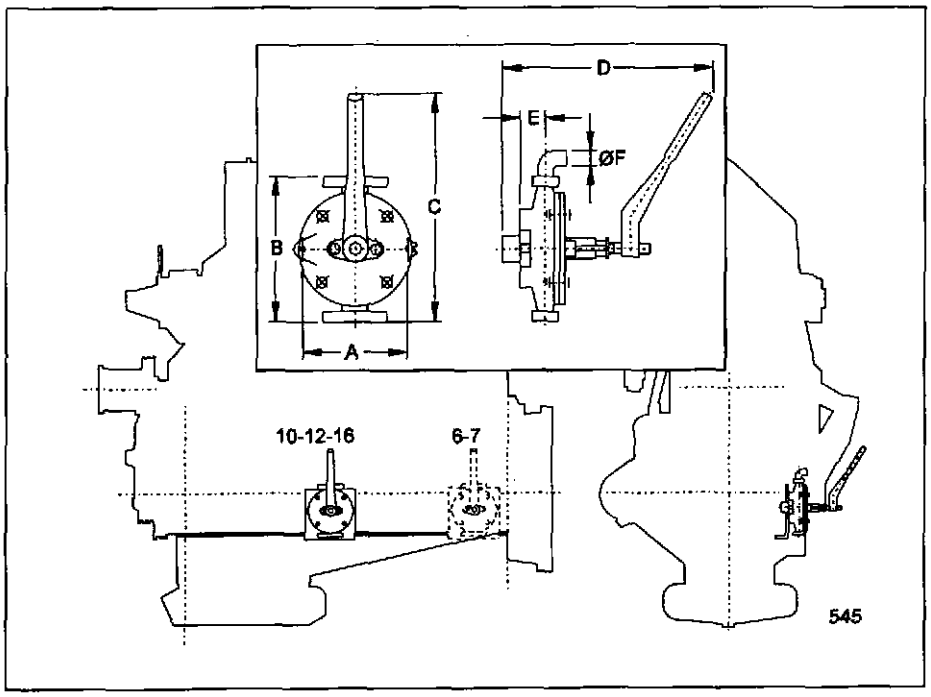


22.1 Oil drain pump

Wobble type oil drain pump for oil sump draining
Mounting position: Left side of engine block

Engine	A	B	C	D	E	F
610-1232	123	183	201	286	34	20
1630, 1631	130	177	285	268	33	20

Order numbers include:
Oil drain pump, bracket, spacing sleeves, pipe elbow, rubber hose, mounting parts.

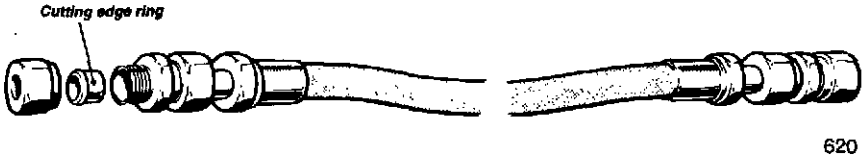


23.1 Flexible fuel hoses

For vibration-free connection of engine *fuel pipes to fuel lines from the tank.*

Material	Cord-reinforced rubber
Couplings	*Ermeto*
Fuel pipe diam	10 mm
Max working pressure	460 kPA
Length	400 mm
Thread	M16x1.5

Order number includes:
2 flexible fuel hoses

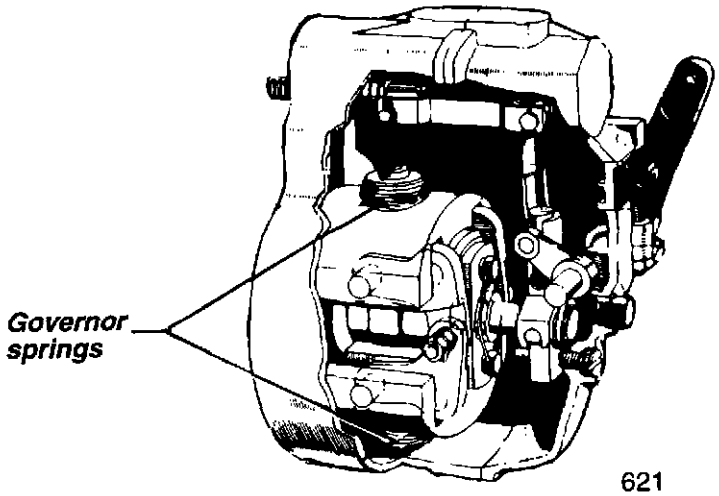


620

23.2 Mechanical RQ-governor set for 1800 rpm

The RQ centrifugal speed governor can not be adjusted from 1500 to 1800 rpm. To alter the speed the governor springs must be changed. This must be carried out in the factory.

Order number includes:
4 governor springs, 1800 rpm, factory mounted.



621

23.3 Electronic governor 1500 rpm
23.4 Electronic governor 1800 rpm
The Governor America Corporation (GAC) electronic speed governor system controls the engine speed in droop or isochronous mode.

Electronic governors are factory fitted and set for 4.5% droop, run together with the specific engine and marked with order and engine numbers.

The system incorporates:
1. Control unit.
2. Engine speed sender for electronic governor.
3. Electromagnetic actuator controls the injection pump fuel rod.
4. Stop solenoid, std on TWD 1210, 1211, 1630.
5. Batteries, 24 V, not included.

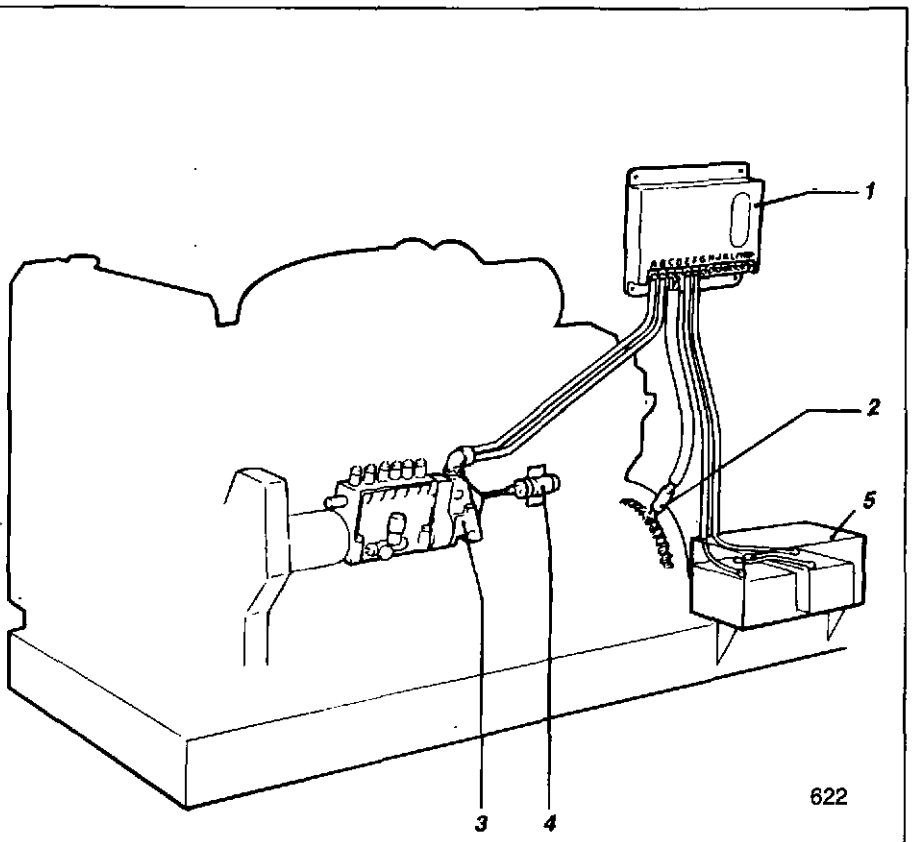
Note!
The use of an electronic governor is recommended for 12- and 16-litre engines when coupled to two-bearing generators with soft flexible coupling.

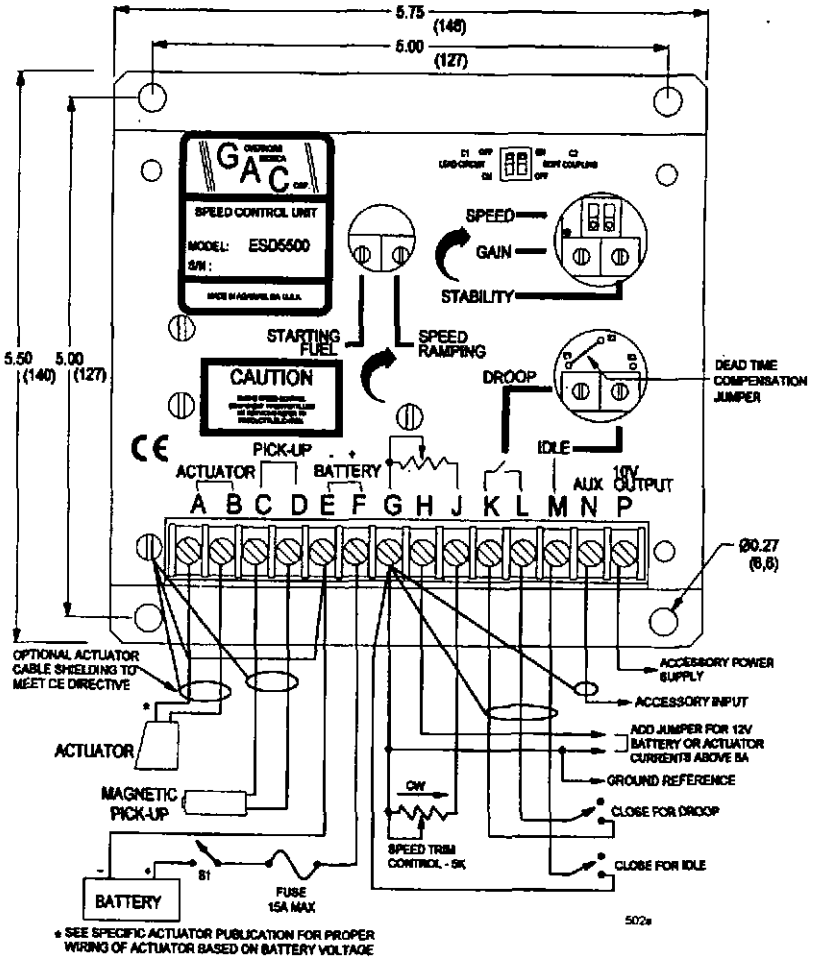
Control unit
The control unit performance is isochronous (0% droop). Droop governing between 1 and 5% is also possible. Start up smoke limiter is built in to the control unit. When the supply voltage is switched off (S1) the engine stops.

Specifications:

Designation	ESD 5500 CE
Steady state stability	0.25% or better
Speed range/Governor	1k-7.5kHz
Droop	0-5% regulation
Speed drift with temp	±1% max
Remote variable speed range	500-7.5kHz, or any part thereof
Remote speed trim control	5 kOhm/2 W
Terminal sensitivity	
J	100 Hz/Volt, 5.0 k impedance
L	735 Hz/Volt, 65 k impedance
N	148 Hz/Volt, 1 M impedance
P	10 VDC supply, 20 mA max
Ambient operating temp range	–40°C to +85°C
Input voltage	10–40 VDC (transient & reverse voltage protected)
Max actuator current at 25°C	10A
Speed sensor signal	0.25–120 V RMS
Vibration	5 G, 20–500 Hz
Mounting	Any position, vertically preferred

Detailed instructions for the installation and adjustment of the GAC electronic governor system are included with each delivery.





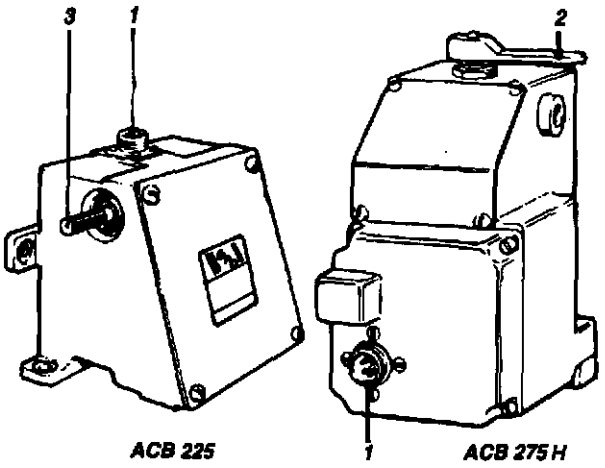
Engine speed sender
The magnetic engine speed sender is fitted on the flywheel housing above the flywheel ring gear. As the ring gear teeth pass the tip of the speed sender, an alternating current of one cycle per tooth is induced.

Output Voltage 1–30 V
Pickup thread 5/8"-18 UNF-2A
Connector included
For Hz/rev, see starter motor ring gear in technical information.

Actuator
The electro-magnetic actuator is connected to the injection pump fuel rod and controls the fuel quantity.
Two types of actuator are supplied:
- Actuator type ACB 275 H is fitted directly onto the injection pump.
- Actuator type ACB 225 is separately fitted and used in combination with an RQ governor.

1. Connector
2. Stop lever
3. Throttle lever

Note!
Engines equipped with ACB 225 can not be operated at low idle.



Specification

	ACB 225	ACB 275
Engine	TWD 1210 TWD 1211 TWD 1630	TD 610 TWD 610 T(W)D 710 TAD 730 T(W)D 1010 TAD 1030 TD 1210 TAD 1231 TAD 1232 TAD 1630 TAD 1631
Max shaft angular travel	25°CW/CCW	–
Operating voltage	12 or 24 VDC	12 or 24 VDC
Normal operating current	1.5 A at 24 VDC	1.5 A at 24 VDC
Max cont current	4 A at 24 VDC	4.5 A at 24 VDC
Temperature range	–55°C to +95°C	–40°C to +85°C
Connector	Included	Included

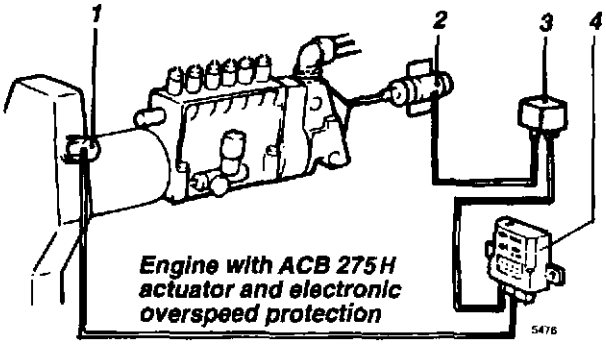
Overspeed protection system
For safety reasons, an overspeed protection system must always be installed. An overspeed trip switch can be feed by either generator frequency or engine speed.

The Volvo Penta electronic overspeed trip switch shuts down the engine at an adjustable engine speed, usually 15% higher than the operating speed. It is optional for all engines and includes, (see also 23.8):

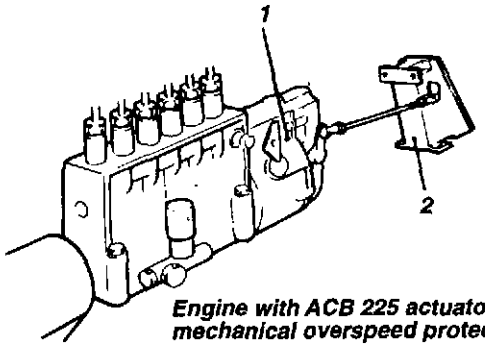
1. Engine speed sender, mounted in the timing gear casing
2. Stop solenoid (optional on most models)
3. Relay for power shut off
4. Overspeed trip switch

Engines equipped with ACB 225 electronic governor use the RQ governor for overspeed protection (included in electronic governor order no.) The normal governor springs are then exchanged for overspeed protection springs. This then limits the engine speed to 15% above the normal operating speed. If an engine shut down is required. See system described above.

1. RQ Governor
2. Actuator ACB 225



Engine with ACB 275 H actuator and electronic overspeed protection



Engine with ACB 225 actuator and RQ mechanical overspeed protection

Electronic governor accessories
Accessories are available such as automatic synchronizers, load sharing modules, power ramp control (used when paralleling with the mains), remote speed control, load anticipation modules etc.

Interface modules are available to facilitate the use of GAC load sharing modules and auto synchronizers with other manufacturer's speed controls such as the Cummins EFC system, Barber Coolman and Woodward.

Accessories are not sold by Volvo Penta. Contact the GAC (Governor America Corporation) local representative or contact:

Hügli & Co
4900 Langenthal, Switzerland
Tel (+41)62 916 50 30
Fax (+41)62 916 50 35

Governors America Corporation
720 Silver Street
Agawam, MA 01001, USA
Tel (413)786-5600
Fax (413)786-5666

Load Sharing Modules LSM 100 and LSM 672 CE and LSM 201 CE
The function of the Load Sharing Module is to proportionally share load between two or more generator sets while the system frequency is held constant. As an accessory to the Electronic Governing System, the module measures the true power current, and through a parallel cable inter-connection, continuously controls the governing system to share the load between multiple generators. A load anticipation circuit is also included to maximise performance in a single or parallel operation. In addition to its primary function of load sharing, the LSM 672 also contains adjustable monitors for forward and reverse power and is available with a load ramping feature.

The enhanced multifunction load control LSM 201 contains all the functions of the LSM 672. Still higher accuracy is reached by its electronic power measurement. It provides soft loading and unloading of generators. A built in bargraph allows optical power reading. Parallel cable relay is built in.

The line current measurements are usually taken from existing CT's used for ammeters.

Synchronizer SYC 6714
The SYC 6714 is designed to provide smooth, fast, automatic paralleling of generators at an economic price. The synchronizer is an accessory module which automatically adjusts the engine governor to obtain an equal phase relationship between the oncoming generator and the main bus. A breaker closer signal (sync check) function is provided, and the unit activates an internal relay to parallel the generator to the main bus. The normal time for synchronization is usually less than 3 seconds when the generator sets are at rated speed with optimum governor performance settings. The synchronizer can be used with EAM modules to interface with competitive governors. For generator phase voltage matching, the VMA 100 module is available.

Load Anticipation Module LAM 100
Increased governor system performance is achieved by sensing electrical load changes prior to engine speed changes. The signal transmitted to the speed control unit by the LAM 100 causes the governor system to react to the load change more quickly and thus improves genset transient performance.

Interface Modules
Interface Modules are available to facilitate the use of G-A-C load sharing modules and auto synchronizers with other manufacturer's speed controls.

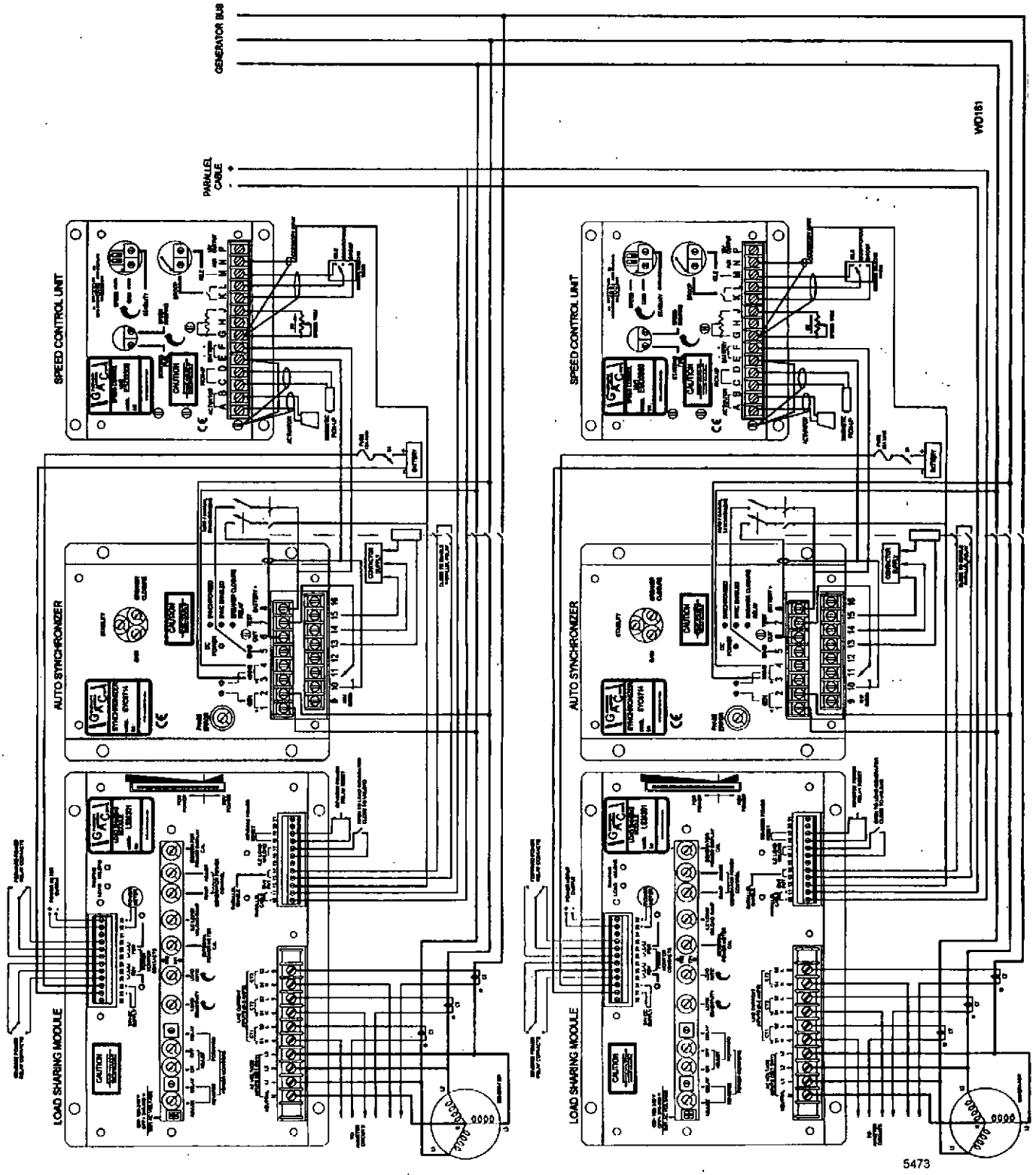
- **EAM 100** allows GAC load sharing modules and synchronizers to be used with CUMMINS EFC speed controls.
- **EAM 101** allows GAC load sharing modules and synchronizers to be used with DYNA 8000 and DYNA 1 controls.
- **EAM 103** allows for Barber Colman load sharing modules and synchronizer to be used with GAC speed control units.
- **EAM 104** allows for GAC load sharing modules and synchronizer to be used with DDEC 3 controllers.
- **EAM 105** allows for GAC load sharing modules and synchronizer to be used with Heinzmann KG6-04/10-04 speed controls.
- **EAM 106** allows GAC load sharing modules and synchronizers to be used with *CUMMINS EFC digital speed controls.*
- **LSSI 100** allows GAC load sharing modules and synchronizers to be used with Woodward 2301 load sharing controls with grounded parallel cable designs.

Generator Power Control PRC 100
The Power Ramp Control, PRC 100A is designed to regulate the power output of one to five engine generators in parallel with a main utility bus. The device can smoothly control the power output of all the generators by using ramping to load/unload or load limit. It can also be controlled by an external power signal to regulate the export or import of power to maintain the mains at a specific power level.

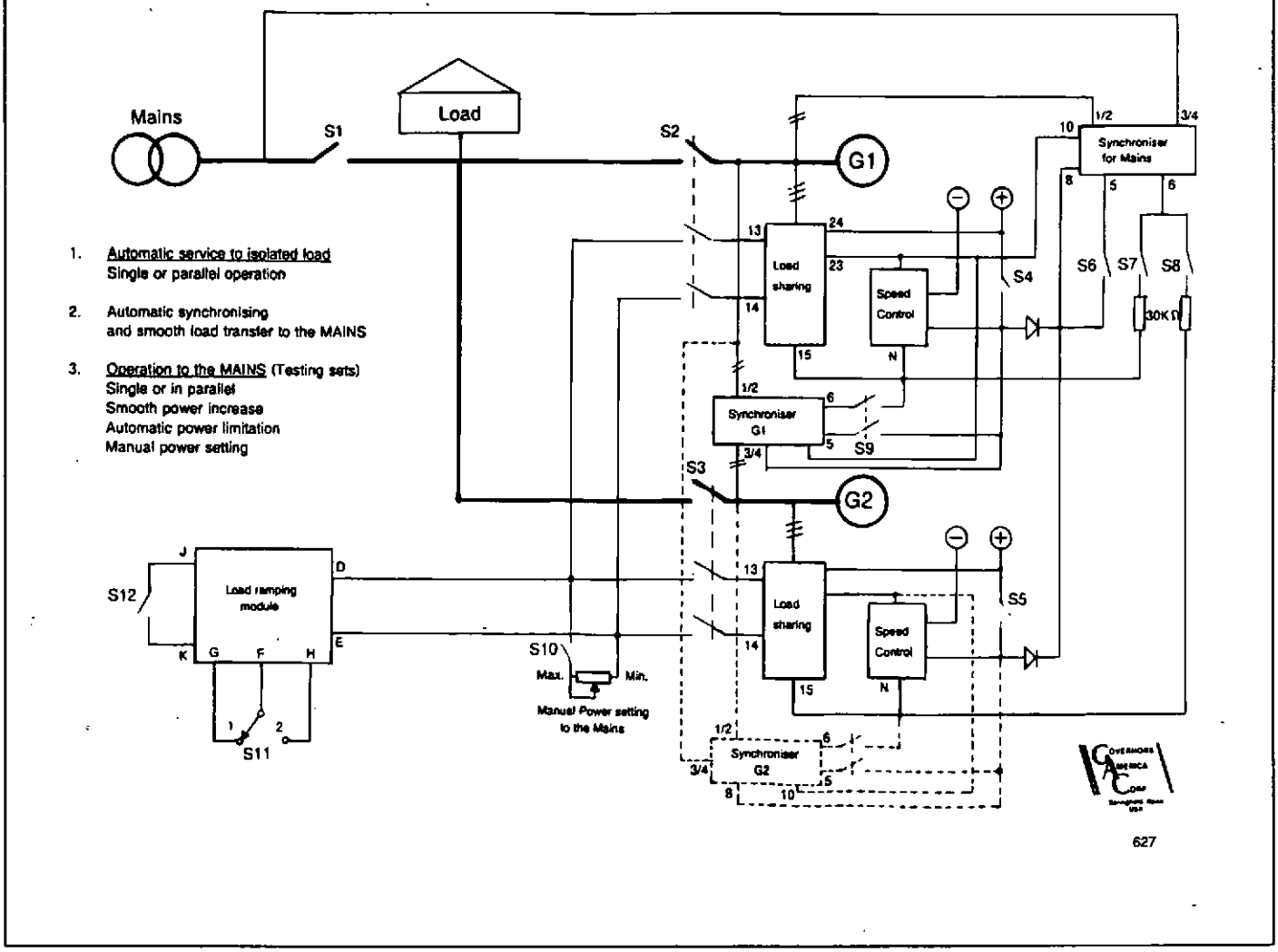
The Power Control Interface PCI 101 provides generators or main power control with a 0-20 ma input when LSM units are used in a power control strategy.

Load sharing, synchronizer, Power ramp control and load anticipation

Wiring diagram showing 2 GenSets
to isolated load using one
synchroniser SYC 6714 CE and
one LSM 201 CE loadsharing
for each set.
Up to 20 sets can be paralleled this way.



Power export to the mains



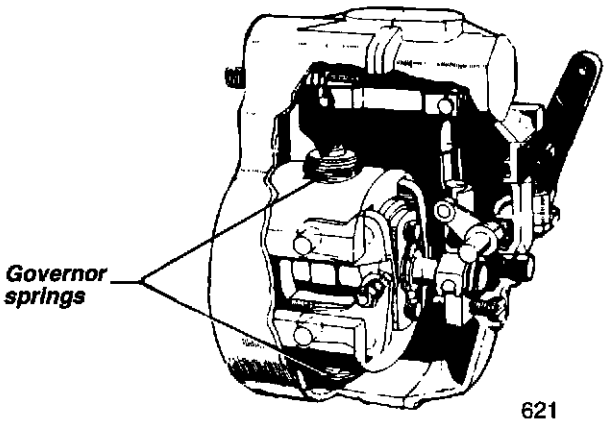
1. Automatic service to isolated load
   Single or parallel operation
2. Automatic synchronising
   and smooth load transfer to the MAINS
3. Operation to the MAINS (Testing sets)
   Single or in parallel
   Smooth power increase
   Automatic power limitation
   Manual power setting

Operating situation	Operating sequence
1. MAINS failure	- Both sets are started - After approx. 3 seconds stable running at nominal speed, Synchroniser G1 is switched on - Synchroniser G1 signals: in phase - Sets are connected and share existing load
2. MAINS restored	- Both sets are synchronised back to MAINS - MAINS Synchroniser is switched on - Synchroniser signals: in phase - MAINS contactor closes, PRC 100 is simultaneously switched to 1, unload - PRC 100 signals: zero load - Both sets are disconnected from the MAINS - After cooling, sets are stopped
3. Service to the MAINS Export power (for tests)	- Both sets are started - After approx. 3 seconds stable running at nominal speed, Synchroniser "MAINS" is switched ON - Synchroniser signals: in phase - Sets are connected to the MAINS and stay at zero load - PRC 100 is switched to pos. 2 (load) - Power increased smoothly to max. set load or to any manually set load below max. load.
4. Removal from MAINS	- PRC 100 is switched to pos. 1 (unload) or power is manually reduced to zero - PRC 100 signals "zero load" - Sets are disconnected from Mains - After cooling, sets are stopped

23.5–23.6 Mechanical RQ-governor for overspeed protection

Engines with RQ-governor can be equipped with an electronic governor other than GAC, such as Woodward, Barber Coolman, Heinzman or the equivalent. The RQ governor springs must then be changed from regulating to overspeed protection springs. This must be carried out in the factory.

Order number includes:
New governor springs, 1500 or 1800 rpm overspeed protection, factory mounted.



23.7 Mounting kit for separate electronic governor

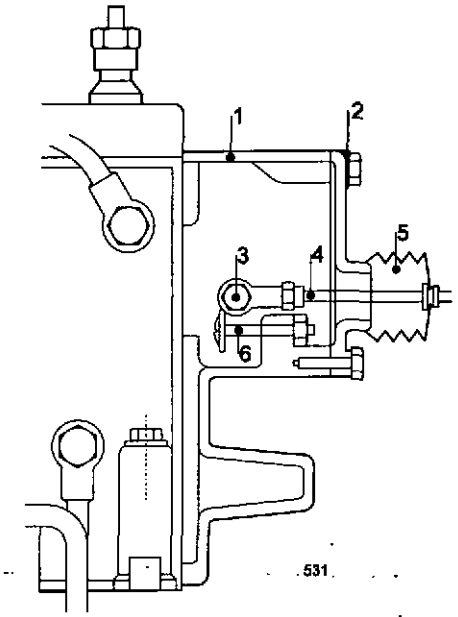
The kit is intended for the mounting of an electronic governor of a make other than that supplied by Volvo Penta and which replaces the standard governor.

Note: For safety reasons, an overspeed protection system must always be installed in an electronic governor system.

(See also 23.3–4 Electronic governor)

Order number includes:
1. Housing
2. Cover
3. Actuating rod head (2 pcs)
4. Actuating rod
5. Bellow
6. Max fuel setting screw

Fittings and mounting instructions



23.8 Overspeed trip switch

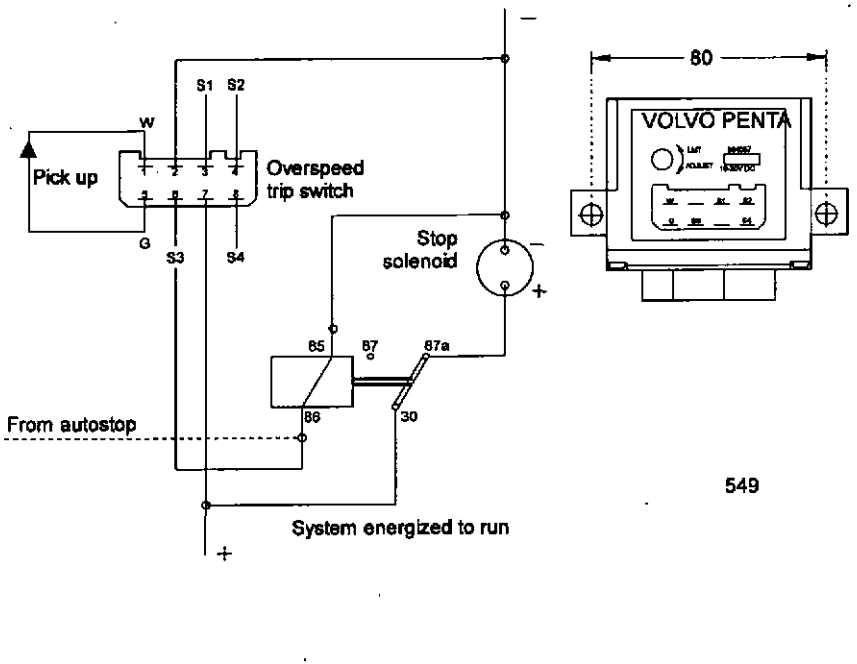
Functions:
- Overspeed trip signal
- Starter motor cut out
- No start alarm
- Low oil pressure override (start)

Voltage	10–30 V
Output	max 0,15 A/switch
Switch S1	open over 160 Hz
S2	closed 6 sec after S1 has opened
S3	closed at 780–1700 Hz and stays closed until power disappears. Adjust with pot. to 15% above nominal speed.
S4	open below 160 Hz
Switching relay	24 V

Speed sender sensing transmission gears:

6–12 litre engine	30 Hz/rev
16 litre engine	37 Hz/rev

Order number includes:
Overspeed trip relay
Switch relay
Base connection
Speed sender
Electrical connection

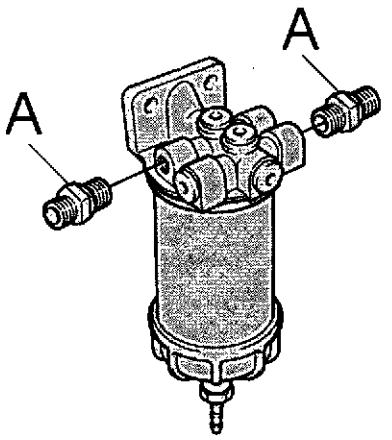


23.9 Fuel filter / water separator
Order no 8159966

The filter is intended for installation between the fuel tank and the engine. Water and other impurities are collected in the transparent bowl beneath, from where they can be simply drained off by means of the drain valve.

Weight	1,2 kg
Flow, max	341 l / hour
Degree of separation	30µ
Degree of water separation	95%
Filter element	Replaceable paper filter
Replacement filter element	Order no. 8159975

Fuel line fittings not included
A = 10 x 16 x 1.5



TR002

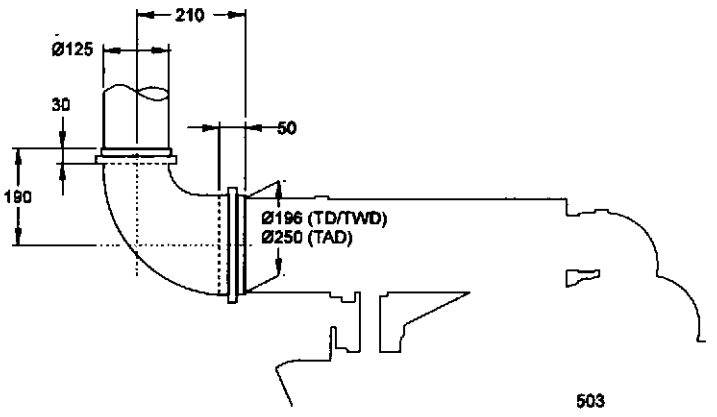
25.1 Air filter elbow connection

The elbow is used for leading intake air from outside the engine room, which is strongly recommended if the engine room temperature exceeds 30°. The engine intake air connection and the filter must not bear any of the weight of the intake line.

Material	PVC, reinforced with ribs
Angle	90°
Filter connection	Hose clamps

Order number includes:
1 connection elbow
2 hose clamps

Two elbows are required for 10–16 litre engines.



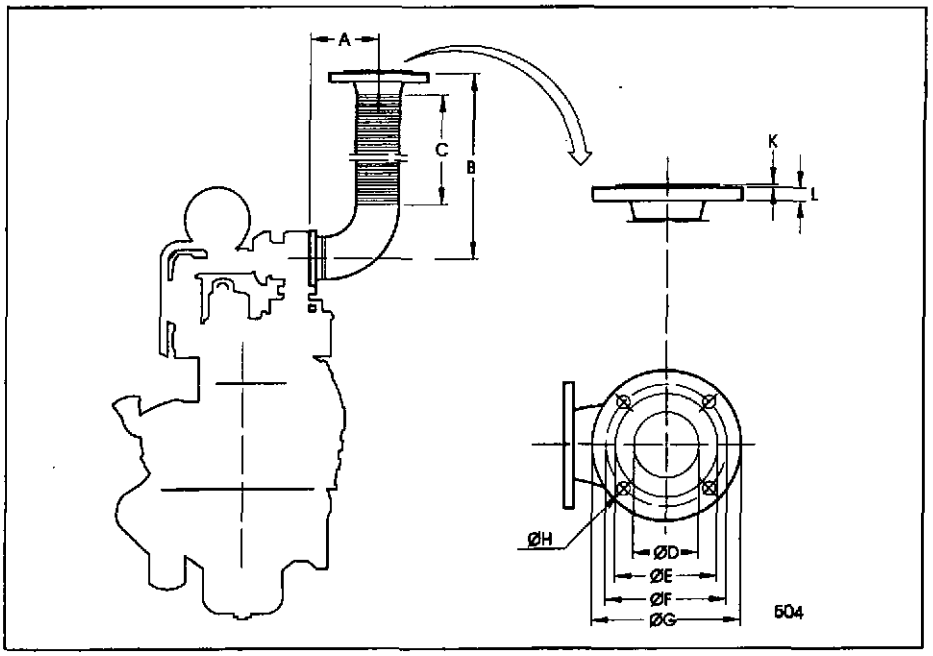
503

25.2 Flexible exhaust pipe

The flexible exhaust pipe is connected to the turbo charger and prevents vibrations and thermal stresses from being transferred from the exhaust line to the engine. The pipe should preferably be fitted vertically with the exhaust line support close to the exhaust pipe.
The exhaust pipe should not be subject to torsional or axial load.

Material Acid-proof steel

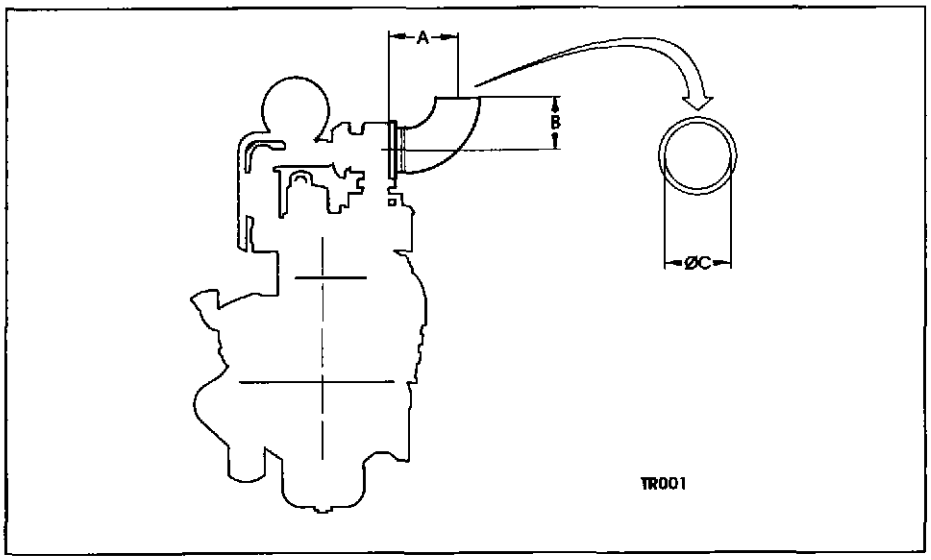
Order number includes:
Exhaust pipe
1 welding flange for exhaust line
Fittings



	Dimensions, mm									
Engine	A	B	C	D	E	F	G	H	K	L
T(W)D 610, TD 710	110	443	300	70	110	130	160	14x4	3	11
TWD 710, TAD 730	100	435	300	70	110	130	160	14x4	3	11
T(W)D 1010, TAD 1030	140	475	300	107	148	170	210	18x4	3	13
T(W)D 1210, TWD 1211 TAD 1231, TAD 1232 TWD 1630	130	475	300	107	148	170	210	18x4	3	13
TAD 1630, TAD 1631	172	529	258	151	173	225	265	18x8	0.5	18

25.3 Exhaust elbow

The order number includes no outlet welding flange.



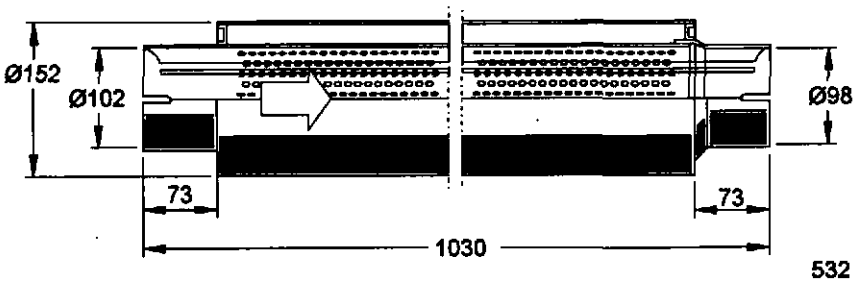
	A	B	C
TD 610/710, TWD 610	110	110	70
TWD 710, TAD 730	100	100	71
TD 1010, TWD 1010, TAD 1030	140	132	98
TD 1210, TWD 1210/1211 TAD 1231/1232	130	132	98
TWD 1630	136	132	98
TAD 1630/1631	172	223	115

25.4 Silencer, absorption type

The silencer is of the absorption type and intended for use in applications with normal demands on sound absorption, e.g. non-residential areas.

Material	1.5 mm steel sheet
Volume	15 dm^3
Damping material	Glass wool
Attenuation	N/A
Surface	Protective paint
Mounting	Clamps

Order number includes:
Silencer
Fixtures

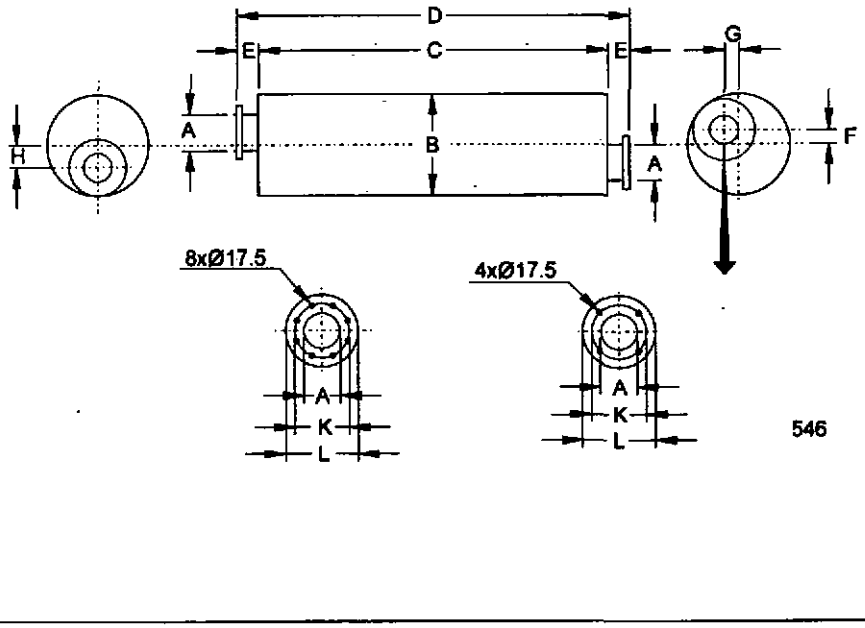


25.5 Silencer, Heavy Duty

Heavy Duty silencer is recommended for use in applications with high demands on sound absorption. The silencer is of the three-chamber type with gas expansion under low flow resistance in chambers one and two and absorption damping of high frequencies in chamber three.

Material	Welded heavy gauge steel sheet
Type	Three-chamber
Damping material	Glass wool
Attenuation	approx. 30 dB(A)
Surface	Protective aluminium paint
Mounting	Flange according to British Standard Table D

Order No includes:
Silencer
Separate connection for welding to exhaust line
Fittings



Size	Weight	Dimensions, mm										Flange
	kg, approx.	A	B	C	D	E	F	G	H	K	L	holes
3.5"	27	88.9	254	1016	1170	76.2	25.4	44.5	50.8	165.1	203.2	4
4"	27	101.6	280	1220	1370	76.2	28.6	52.4	58.7	177.8	215.9	4
5"	55	127.0	356	1220	1370	76.2	36.5	65.1	74.6	209.5	254.0	8
6"	75	152.4	407	1524	1676	76.2	44.5	77.8	88.9	235.0	279.4	8
7"	100	178	455	1600	1750	75	50	87	100	190	305	8

25.6 Silencer, industrial type

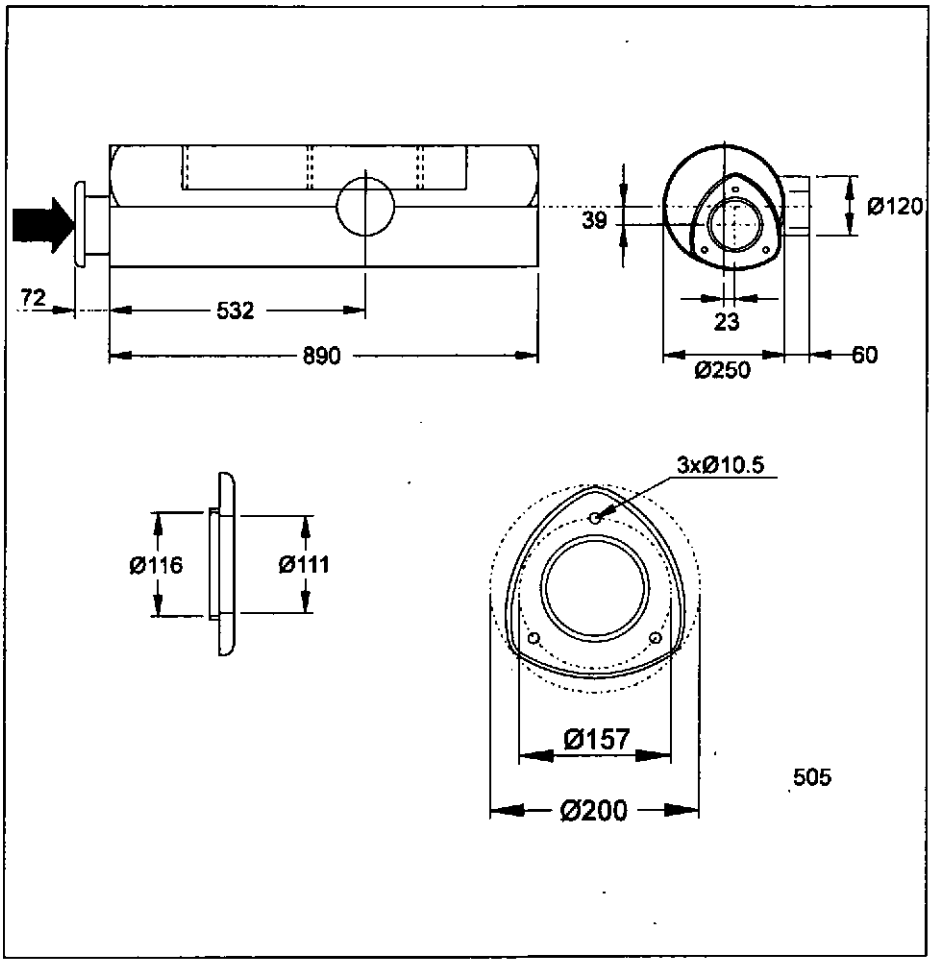
The silencer is of the multi chamber primary type and intended for use in applications with low demands on sound absorption, e.g. non-residential areas. The output flange is angled 90° to the input flange.

Material	1.5 mm steel sheet
Volume	41 dm^3
Attenuation	approx. 15 dB(A)
Surface	Black heat resistant paint (600°C)
Mounting	Inlet – tube piece without flange

Back-pressure in relation to air consumption

Air consumption kg/s (m^3/h)	Back-pressure kPa (mm WG)
0.20 (600)	2.95 (300)
0.30 (900)	6.20 (630)
0.35 (1050)	8.15 (830)
0.40 (1200)	10.60 (1080)
0.42 (1260)	11.80 (1200)

Order number includes:
Silencer
Separate connection for welding to exhaust line
Fittings

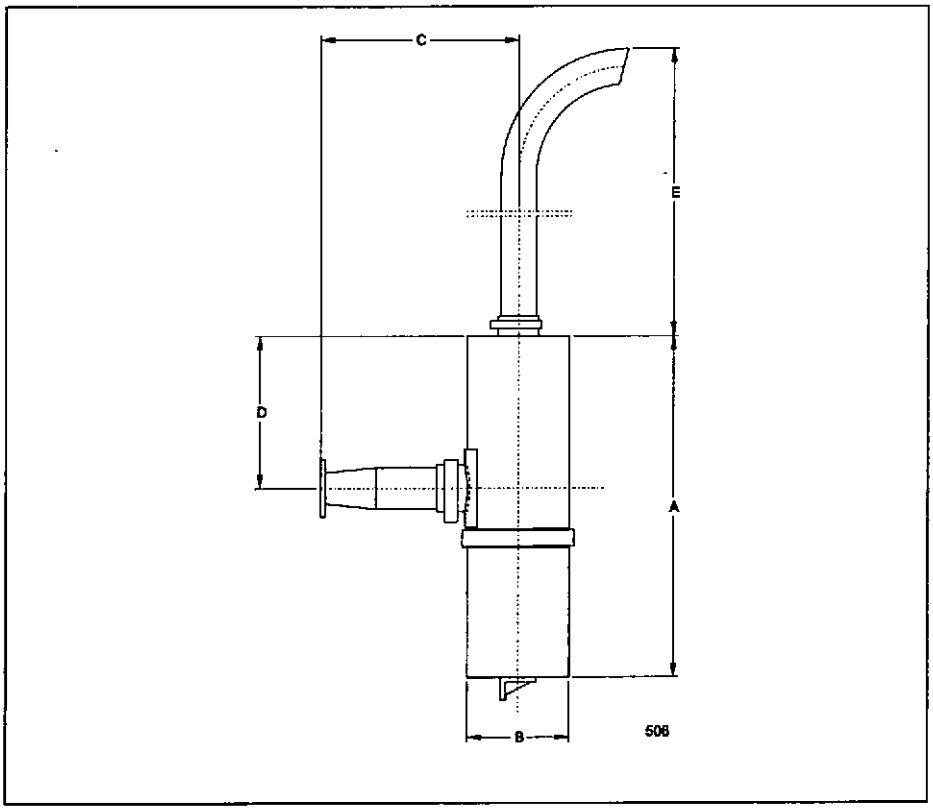


25.7 Silencer, engine mounted

The industrial type silencer is of the chamber type and is intended for mounting on Gen Pac engines.

	Dimensions, mm				
Order No	A	B	C	D	E
863142	510	250	400	320	680

Attenuation approx. 15 dB(A)
Order number includes:
Silencer
Exhaust inlet pipe
Exhaust outlet pipe
Brackets and mounting parts

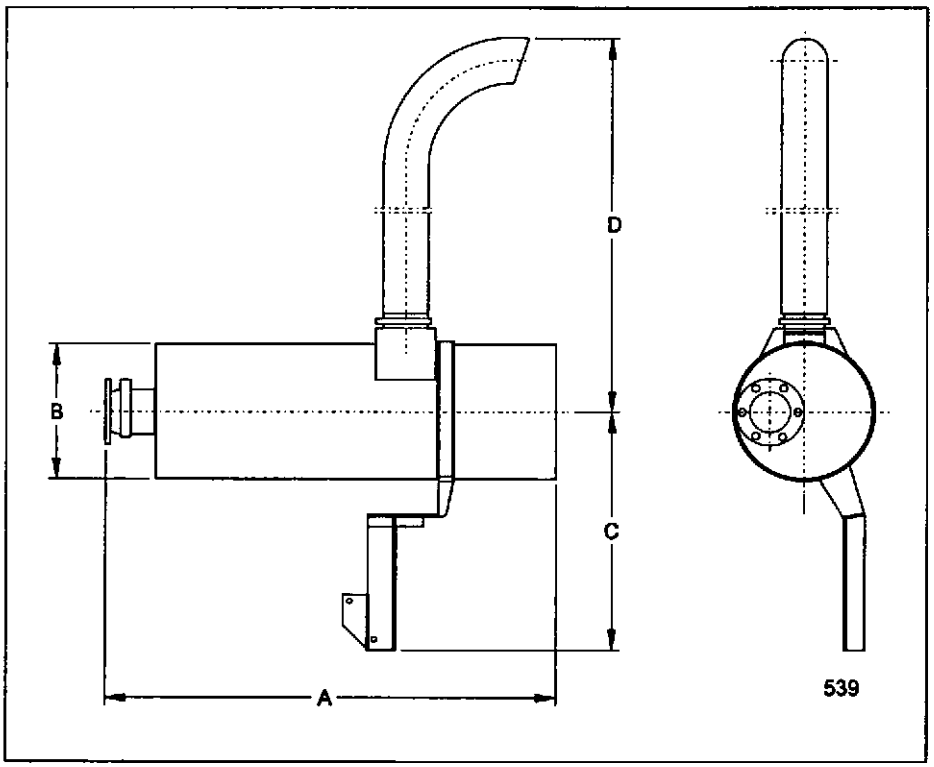


25.8 Silencer, engine mounted

The silencer is of the chamber type and is intended for mounting on Gen Pac engines.
Attenuation approx. 15 dB(A)

	Dimensions, mm			
Order No	A	B	C	D
863198	715	250	423	770
863199	715	250	423	770

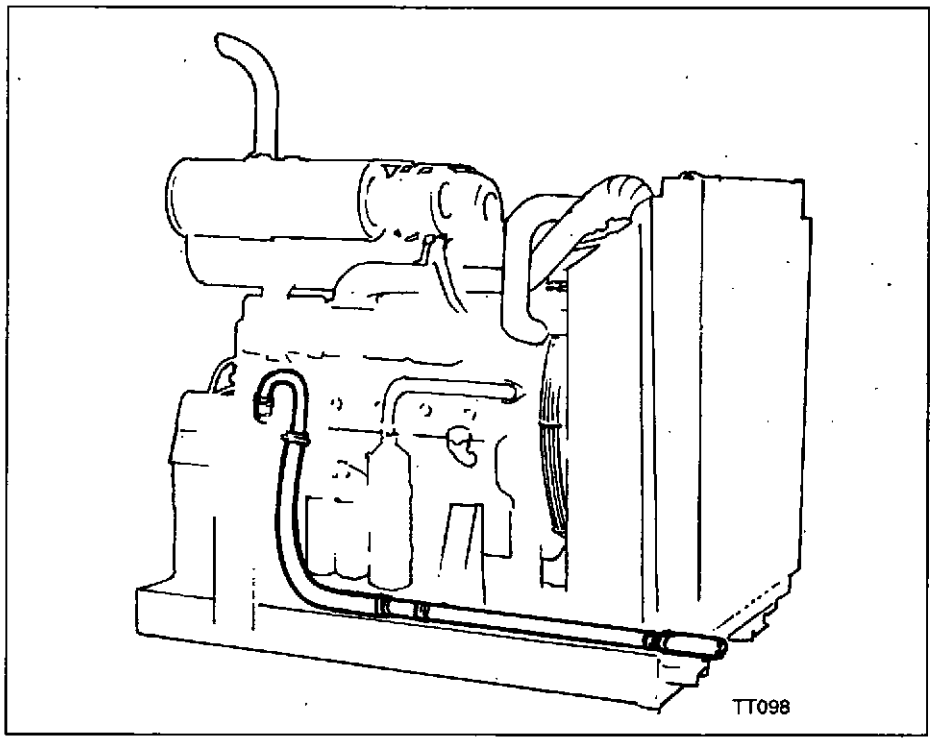
Order number includes:
Silencer
Exhaust outlet pipe
Brackets and mounting parts



25.9 Crankcase ventilation Extension pipe

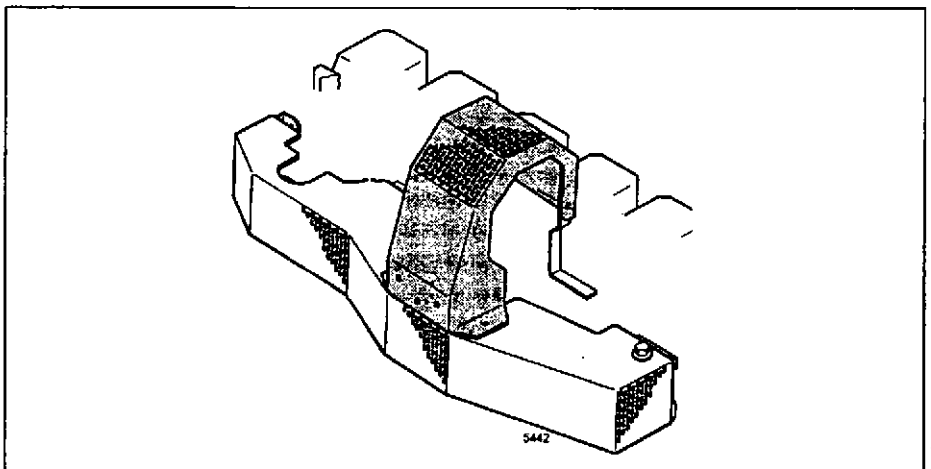
The extension pipe is intended to avoid the blow -by outlet from the crankcase ventilation to pollute the intercooler and radiator, on TAD engines.

Order number includes:
Connecting pipe
Hose
Outlet pipe
Brackets and mounting parts
Mounting instruction



25.10 Heat guard

Designed to meet the European safety Standard EN 294.

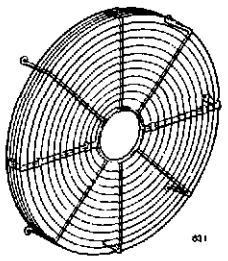


26.1 – 26.6 Radiator and fan guard

Type	Tubular
Material	Brass
Surface	Black paint
Expansion tank	Integrated
Mounting	Flexible on rubber blocks
Pressure cap setting	70 kPa

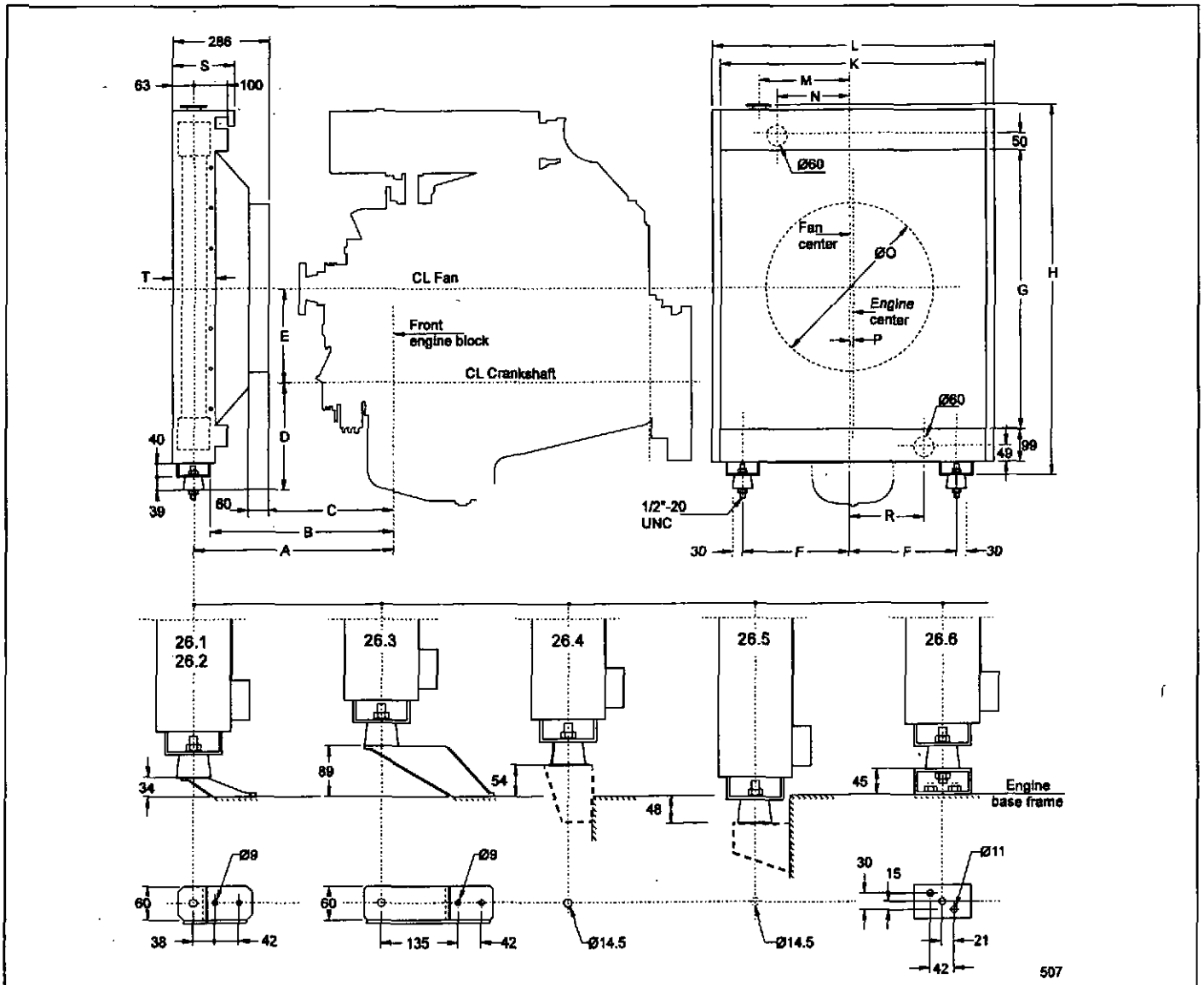
Order number includes:
- Radiator
- Fan shroud
- Fan guard
- Radiator support
- Hoses
- Fittings
- Mounting instructions

Fan guard designed to meet the European safety standard EN 294



Pos No	For engine	Area m^2	Weight kg	Volume litres	Fin spacing mm
26.1	T(W)D 610, TD 710	0.65	49	15	3.2
26.2	TWD 710	0.90	62	19	3.2
26.3	T(W)D 1010	0.90	62	19	3.2
26.4	T(W)D 1210	0.90	62	19	3.2
26.5	TWD 1211	1.25	78	25	3.2
26.6	TWD 1630	1.25	78	25	3.2

Pos	A	B	C	D	E	F	G	H	K	L	M	N	O	P	R	S	T
26.1	505	442	282	256	321	320	801	1091	795	845	226	220	640	7	220	183	126
26.2	505	442	282	256	321	320	951	1241	951	1001	304	220	640	7	220	183	126
26.3	449	386	226	236	341	320	951	1241	951	1001	304	220	640	5	220	183	126
26.4	509	446	281	270	341	320	951	1241	951	1001	304	220	770	5	220	183	126
26.5	509	446	286	373	341	320	1132	1421	1123	1173	390	300	810	5	122	183	126
26.6	544	481	321	334	380	320	1132	1421	1123	1173	390	300	910	0	122	208	126



26.7 – 26.12 Radiator, intercooler and fan guard

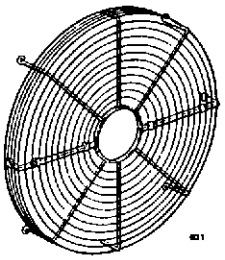
Type	Tubular
Material	Brass
Surface	Black paint
Expansion tank	Integrated
Mounting	On rubber blocks (Fixed for TAD 1630/1)
Pressure cap setting	70 kPa

Intercooler:

Type	Tubular
Material	Aluminium
Surface	Black paint
Mounting	Fixed

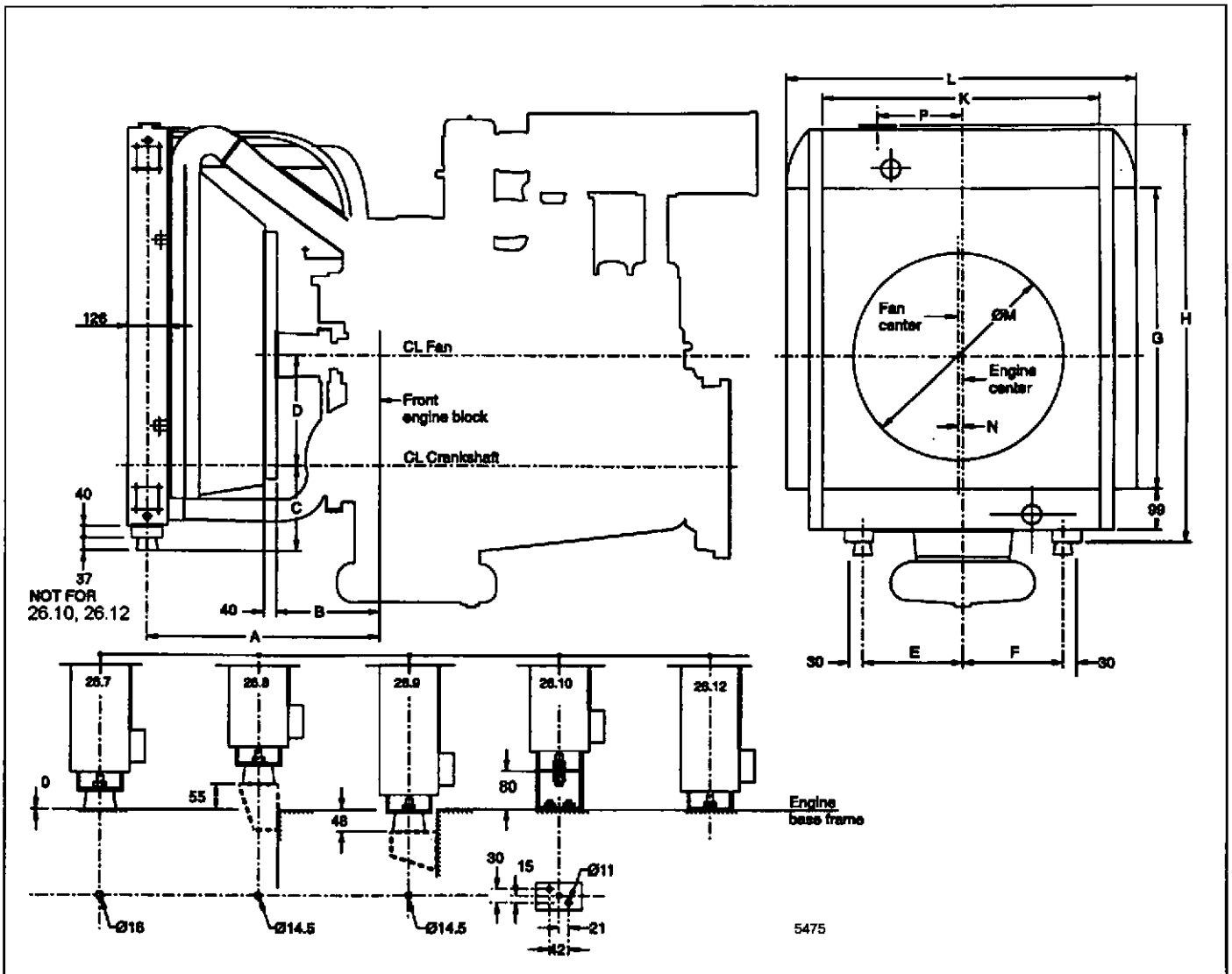
Order number includes:
Radiator and intercooler, Fan shroud, Fan guard, Radiator support, Hoses, Fittings, Mounting instructions

Fan guard designed to meet the European safety standard EN 294



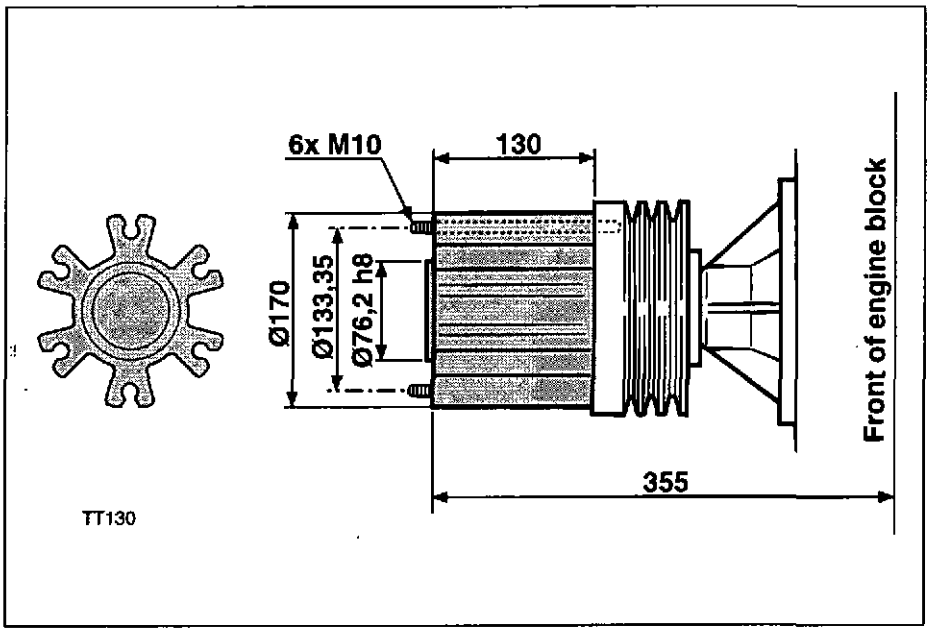
Pos No	For engine	Area m^2	Weight kg	Volume litres	Fin spacing mm
26.7	TAD 730	0.80	111	17	2.3
26.8	TAD 1030	0.80	111	17	2.3
26.9	TAD 1231, TAD 1232	1.10	134	20	2.3
26.10	TAD 1630	1.10	134	20	2.3
26.12	TAD 1631	1.25	148	25	2.3

Pos	A	B	C	D	E	F	G	H	K	L	M	N	P
26.7	712	304	290	321	327	313	1000	1291	795	945	768	7	232
26.8	704	296	270	341	325	315	1000	1291	795	945	768	5	230
26.9	704	296	373	341	325	315	1140	1429	951	1089	908	5	308
26.10	750	342	289	380	320	320	1140	1429	951	1089	908	0	303
26.12	747	339	379	380	320	320	1132	1421	1123	1261	908	0	390



26.15, 26.16 Fan drive ratio 1.12:1

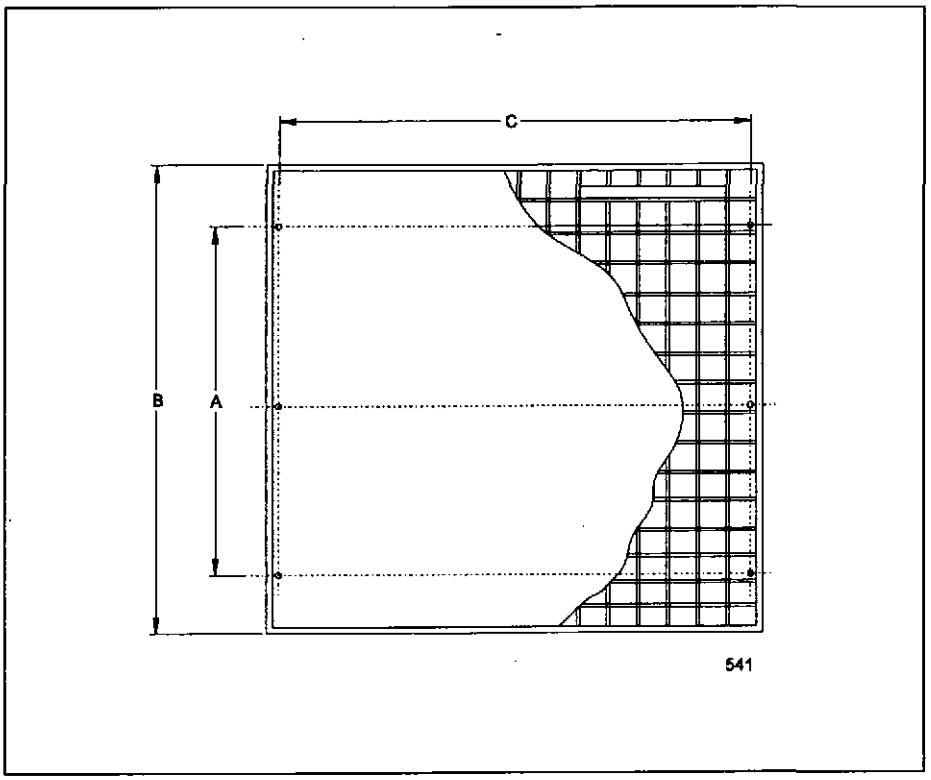
Increased fan speed is available (see technical data regarding cooling performance) when high external cooling air pressure is required for ducts, accoustics etc.



26.17 Radiator guard

Material	Welded round steel bar
Surface	Galvanized

For radiator m^2	A	B	C
0.65	600	800	811
0.80	828	1028	811
0.90	750	950	967
1.10	966	1166	967
1.25	930	1130	1139

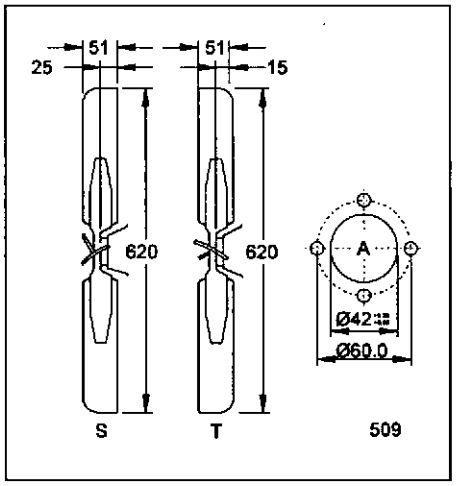


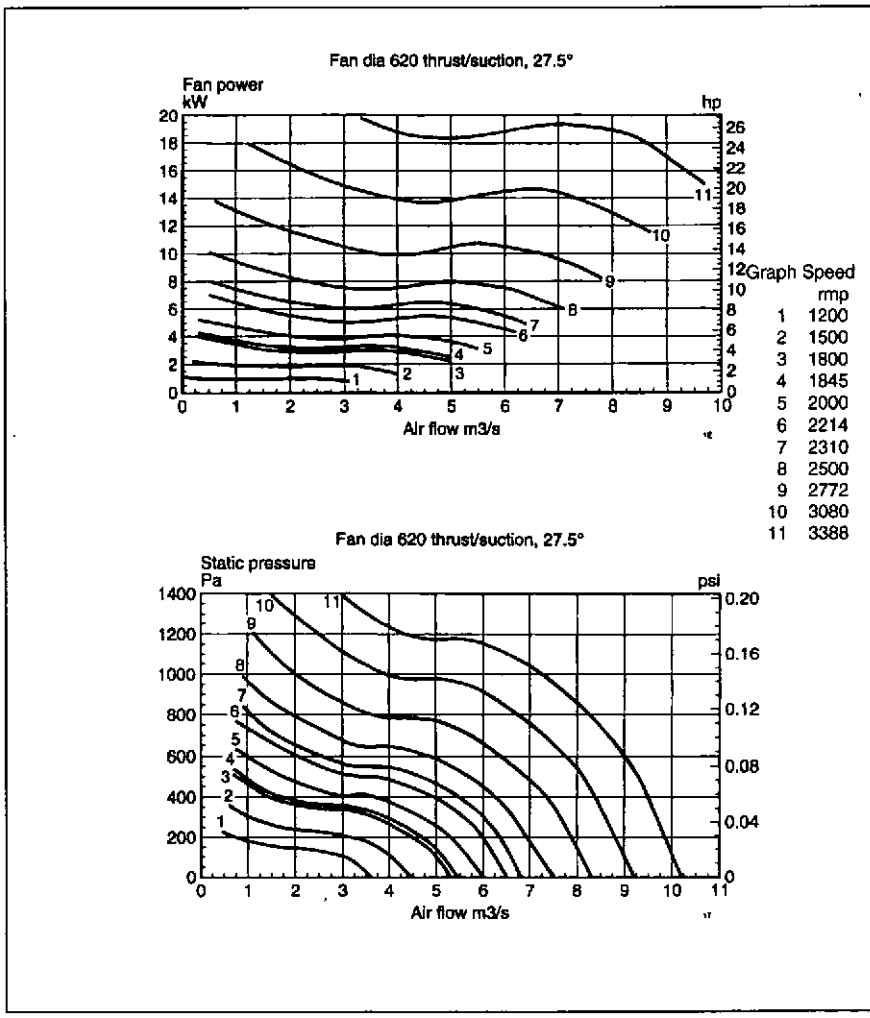
26.19, 20, 22
Fan Ø620 mm

Number of blades	8
Blade angle	27.5°
Max permissible speed:	4380 rpm

Fan	Type S = Suction T = Thrust	Connection
26.19	T	A [1]
26.20	S	A [1]
26.22	S	A [2]

[1] T(W)D 610: Incl 58 mm hub extension
T(W)D 1010: Incl 50 mm hub extension
T(W)D 710: Incl 58 mm hub extension
[2] Incl 13 mm fan hub extension

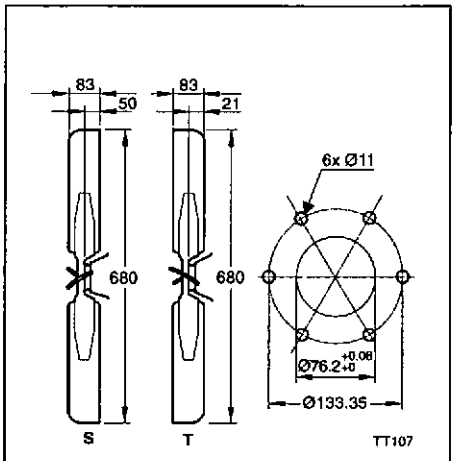


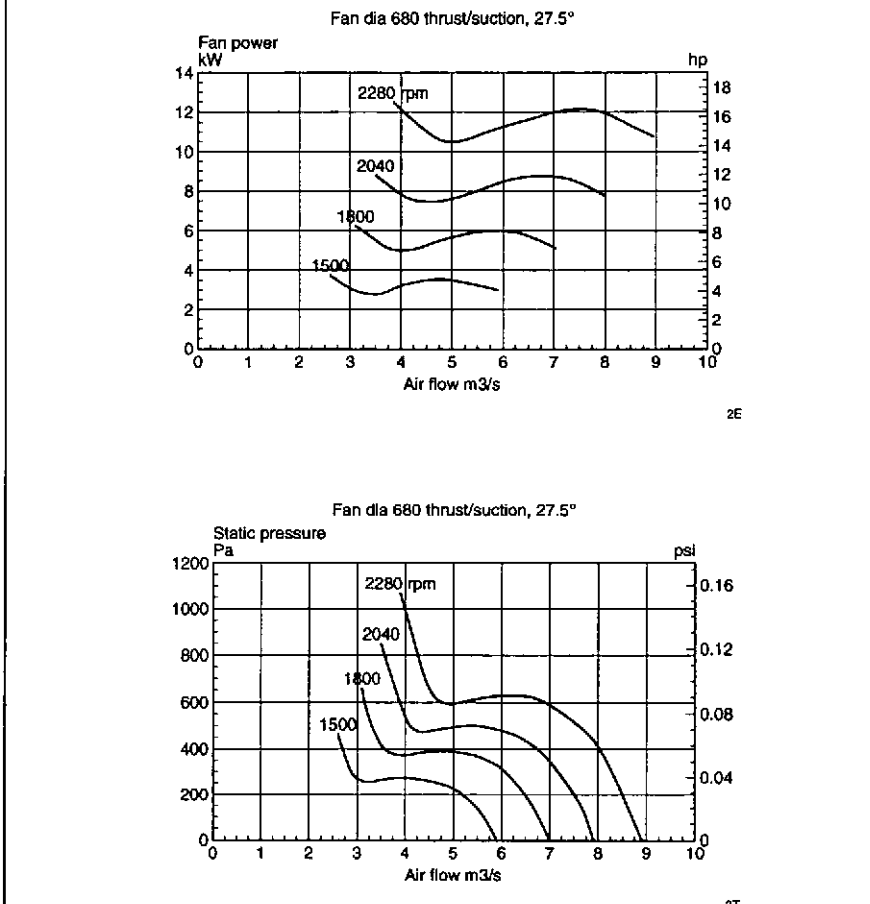


26.23, 24
Fan Ø680 mm

Number of blades	8
Blade angle	27.5°
Max permissible speed:	3600 rpm

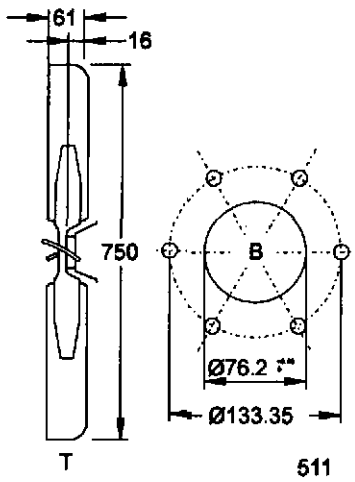
Fan	Type S = Suction T = Thrust
26.23	T
26.24	S

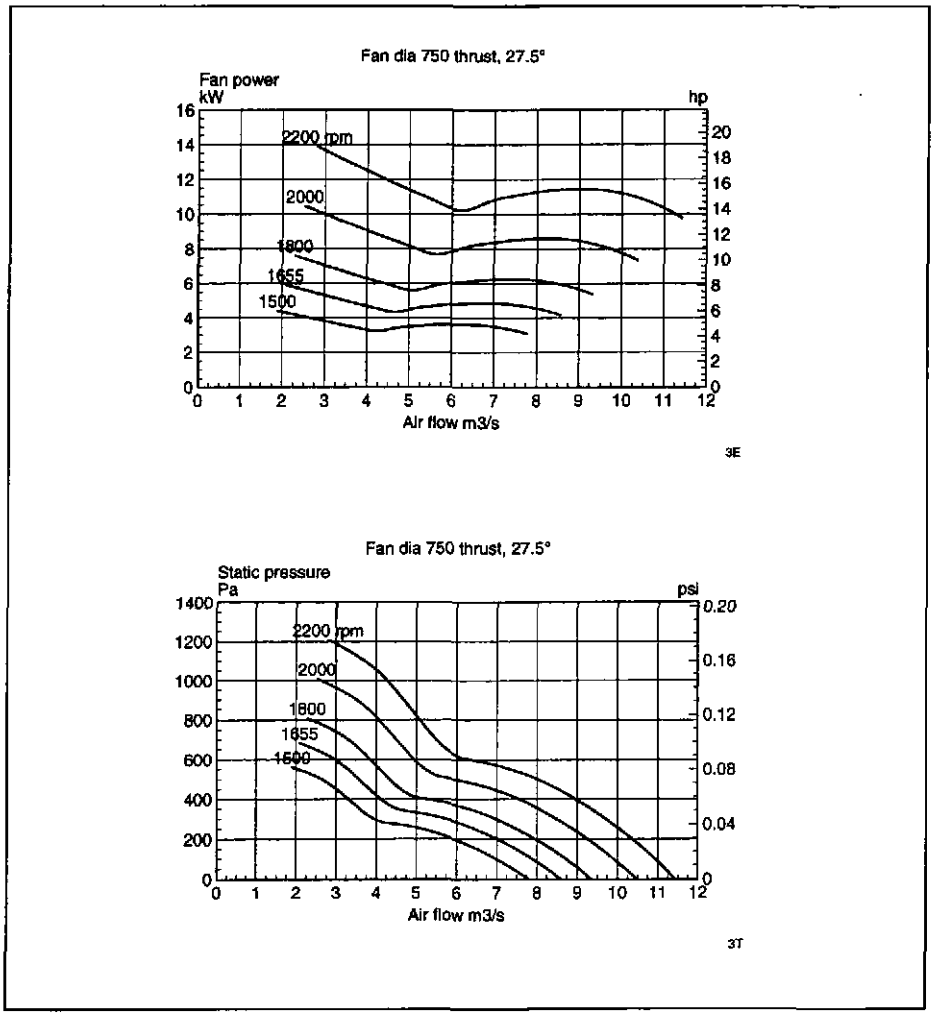




26.25
Fan Ø750 mm

Number of blades	8
Blade angle	27.5°
Max permissible fan speed:	3690 rpm
Fan type = Thrust	

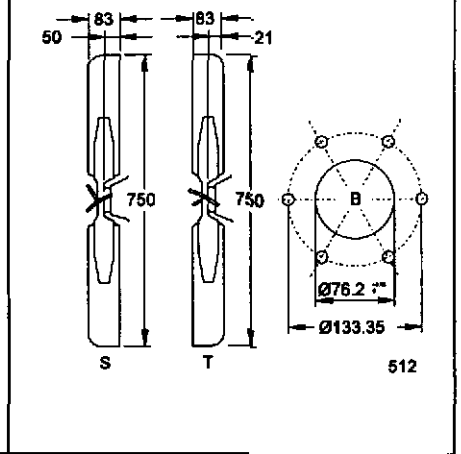


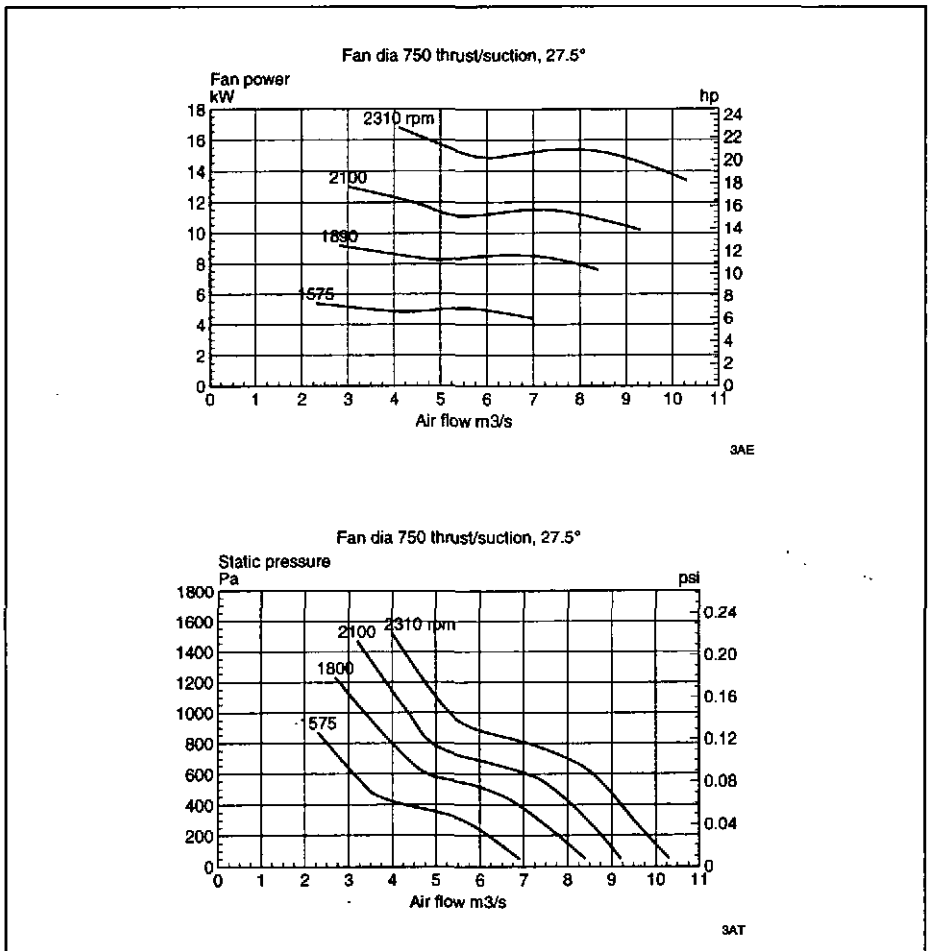


26.26, 27, 28
Fan Ø750 mm

Number of blades	8
Blade angle	27.5°
Max permissible fan speed:	3345 rpm

Fan	Type S = Suction T = Thrust
26.26	T
26.27	S
26.28	S

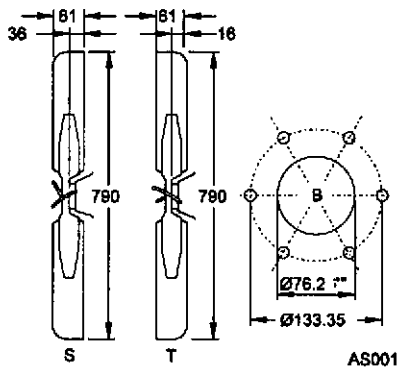


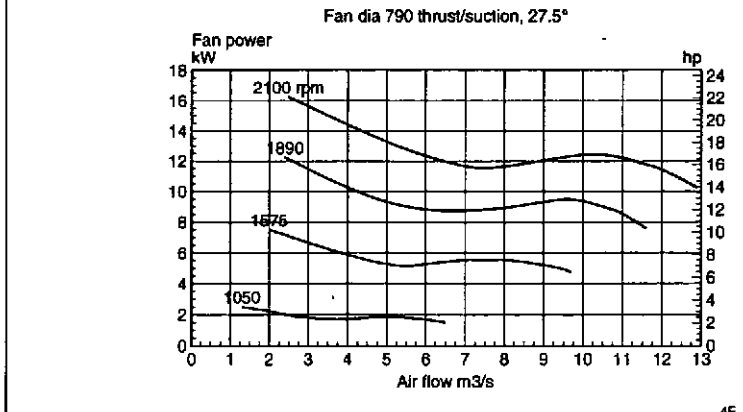


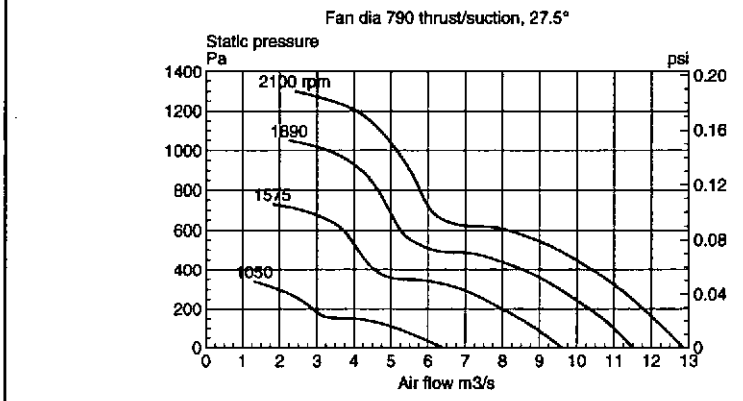
26.29, 30, 31
Fan Ø790 mm

Number of blades 8
Blade angle 27.5°
Max permissible fan speed: 3610 rpm

Fan	Type S = Suction T = Thrust
26.29	T
26.30	S
26.31	S



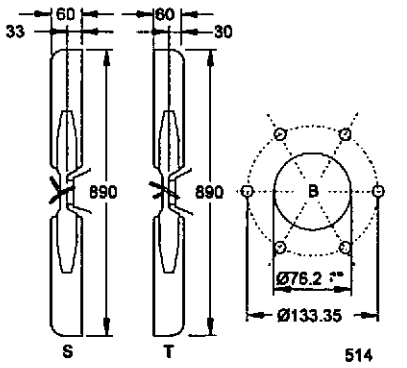


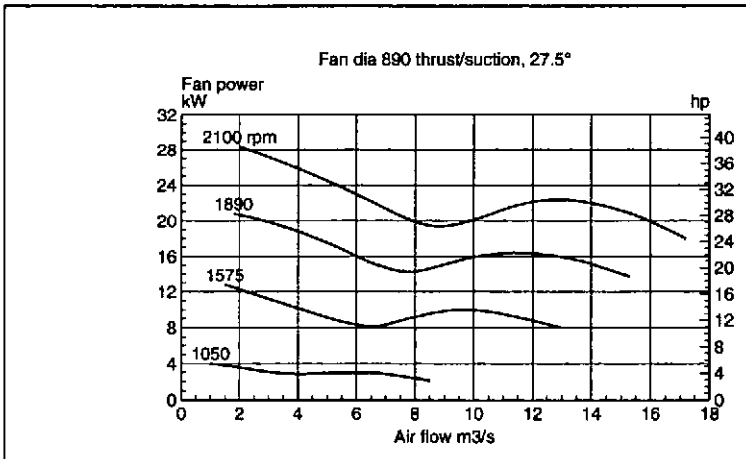


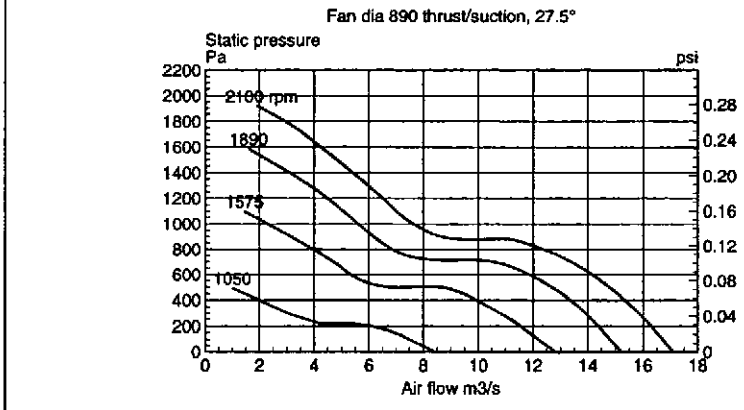
26.32, 33, 34
Fan Ø890 mm

Number of blades 8
Blade angle 27.5°
Max permissible fan speed: 3450 rpm

Fan	Type S = Suction T = Thrust
26.32	T
26.33	S
26.34	S

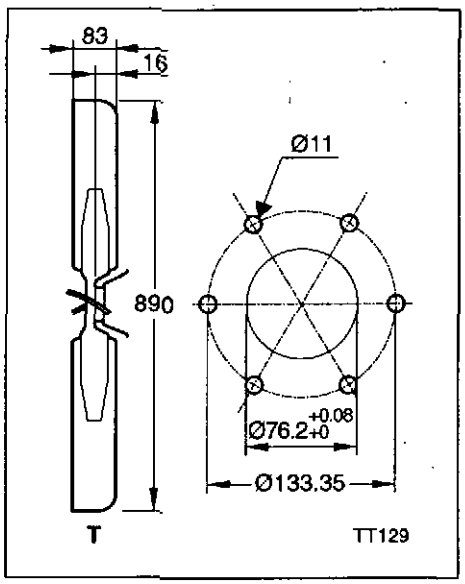


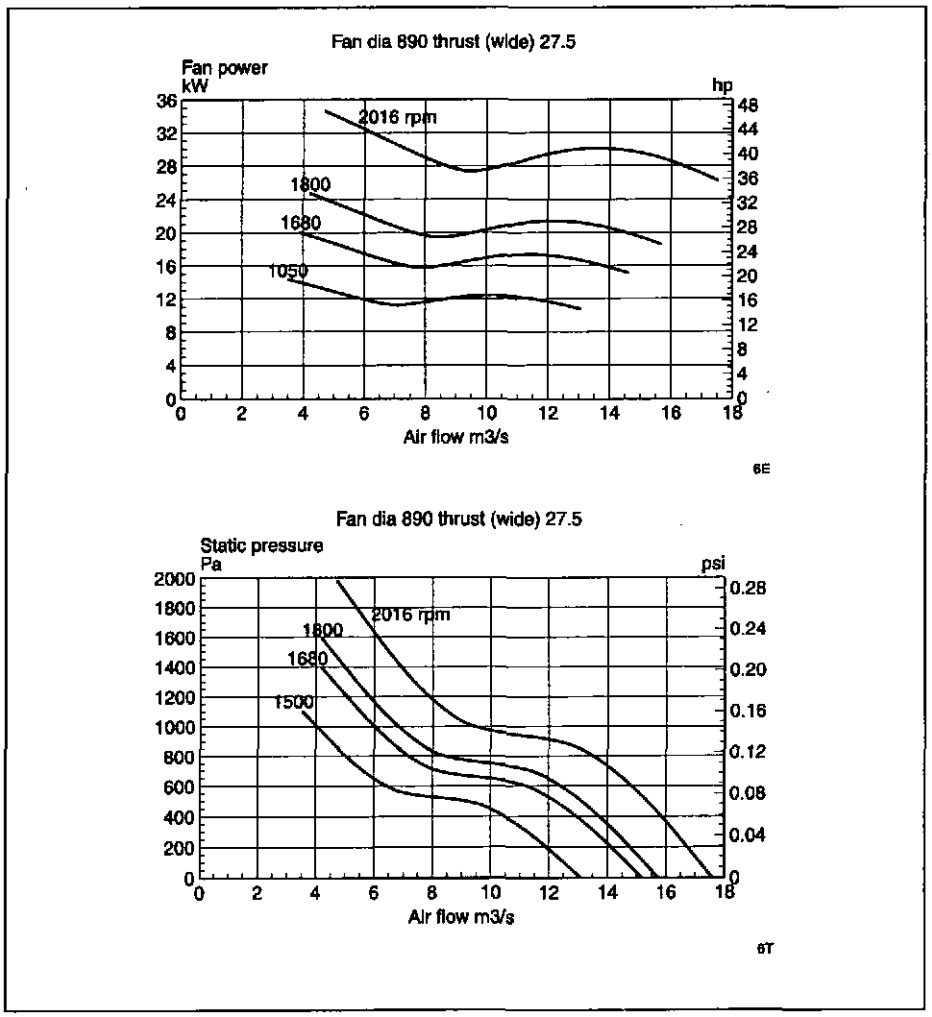




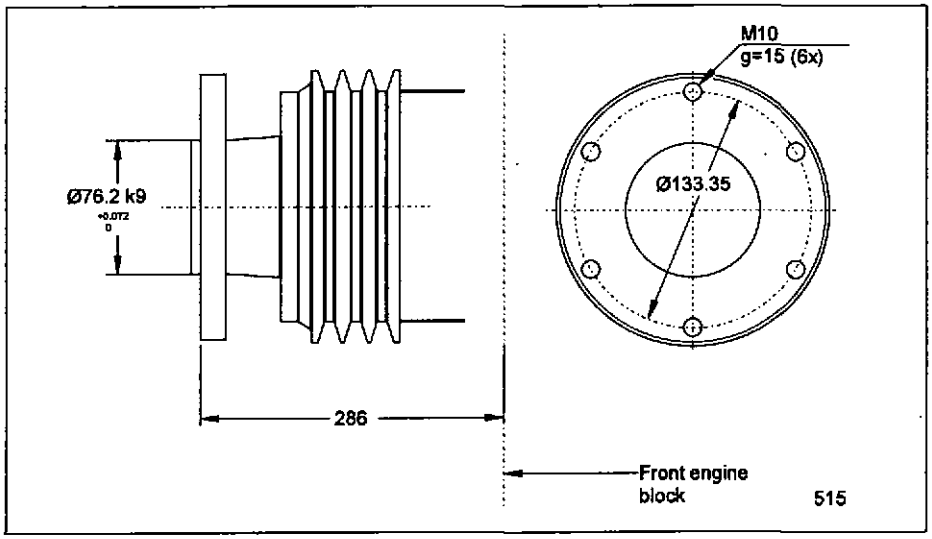
26.35
Fan Ø 890 mm high pressure fan

Number of blades	8
Blade angle	27.5°
Max permissible fan speed:	3450 rpm
Fan type = Thrust	





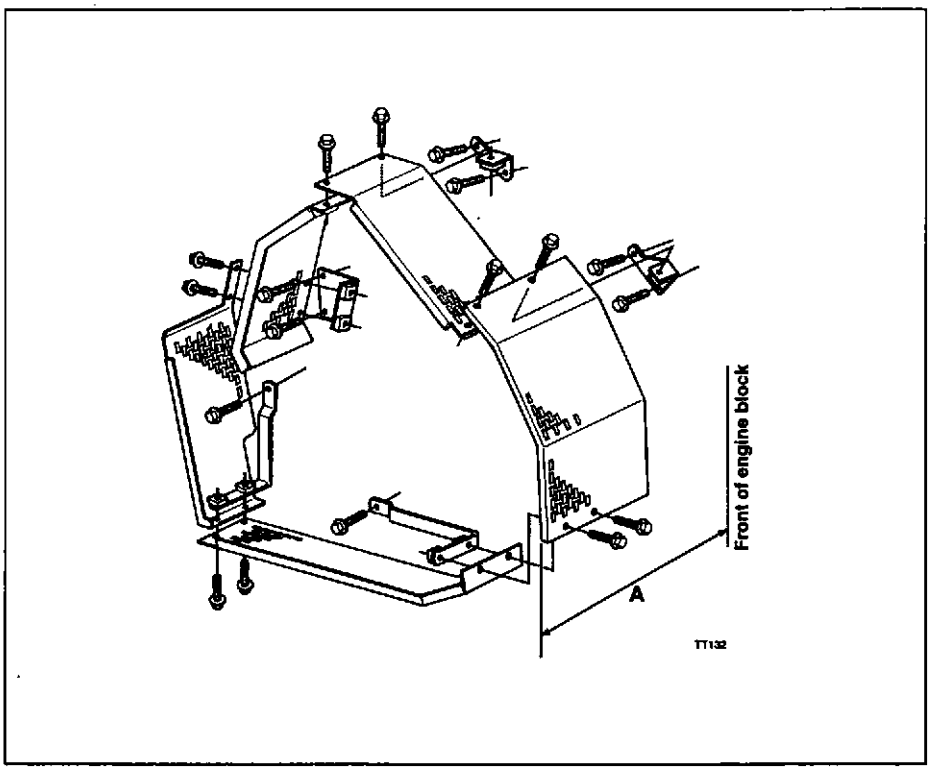
26.36 Fan drive
For use with Ø 680 mm cooling air fan.
Ratio 1.00:1



26.37 Belt guard

Guard for fan belts and alternator belts designed to meet European safety standards EN 294.

Engine size	A
6, 7 Litres	245 mm
10 Litres	220 mm
12 Litres	225 mm
16 Litres	280 mm

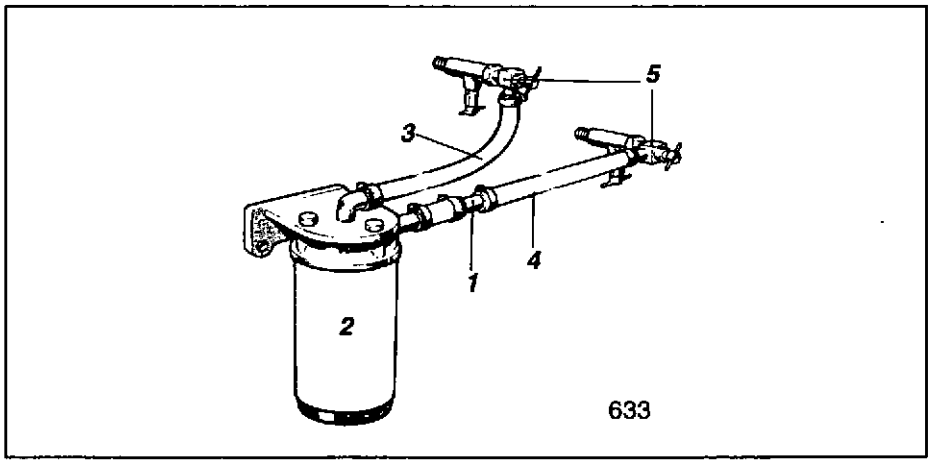


26.39 Coolant filter

Type	By-pass filter Throw-away filter insert
Insert change interval	First time: 100-150 h Thereafter: every 600 h

Filter functions:

- Mechanical filtration, removes impurities and prevents blockade of the system.
- Water softener to prevent scale formation.
- Rust-protection, removes rust and prevents formation of new rust.
- pH-value check, an additive maintains the acid/alkali balance.
- Corrosion protection, a magnesium diode protects the system against corrosion caused by galvanic currents.



Filter components:

1. Flow indicator, facilitates checking of flow and coolant condition.
2. Filter with filter insert
3. Rubber outlet hose
4. Rubber inlet hose
5. Shut-off cocks

Order number includes:
Coolant filter
Flow indicator
Bracket and filter attachment
Rubber hoses
Cocks and nipples
Fittings
Mounting instruction

27.1, 27.2 Electrical lever control

The electrical speed governor lever control is intended for remote fine adjustment of engine speed setting. It is mounted on the mechanical governor lever control.

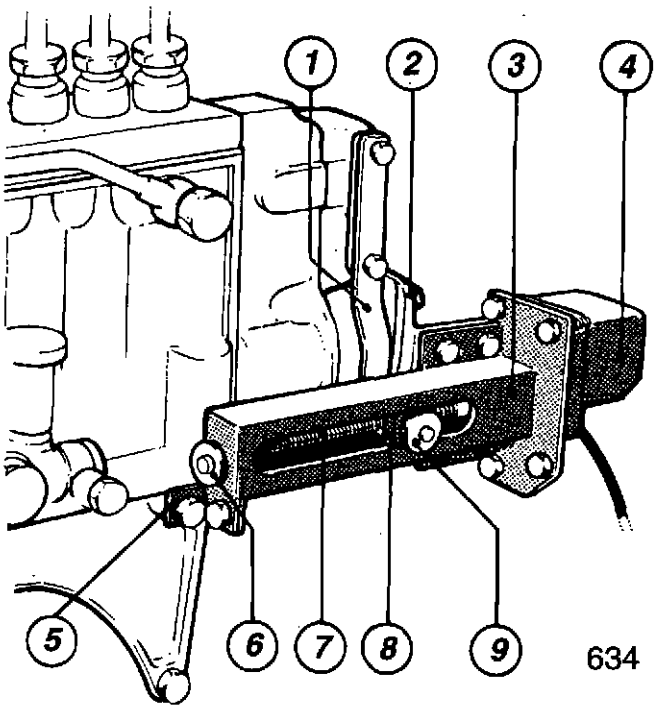
Voltage	24 V
Max current consumption approx	0.3 A
Initial torque	7.0 Nm
Max torque during 180 s	2.0 Nm
Operating torque	0.5 Nm
Speed (reduction outgoing shaft)	
Without el resistance connected (see wiring diagram)	approx 0.85 r/s
With el resistance connected	approx 0.42 r/s
Control time 100 engine revs, no el resistance	11 s
Manual fine adjustment 1 control screw turn corresponds to	10 engine revs
Slip coupling release torque	0.5 Nm

Components
1. Extra lever mounted on the governor lever
2. Mounting bracket
3. Holder
4. Control motor
5. Mounting bracket
6. Manual fine adjustment knob
7. Fine thread control screw, connected to the slip coupling
8. Carrier for connection of the governor lever to the control screw 8
9. Knob for rough adjustment. The carrier is released from the control screw by turning the knob inwards.
   The carrier can then be freely moved along the control screw to achieve desired speed.

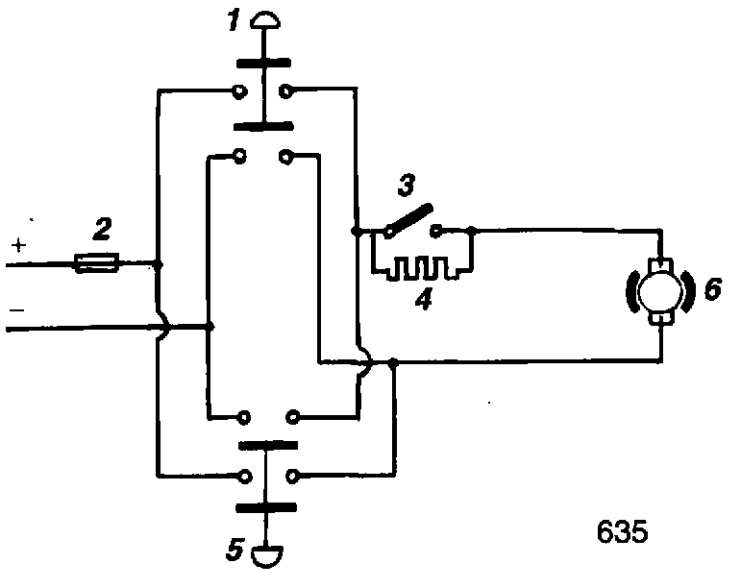
Note:
A heat radiation guard should always be used for control motor protection

Wiring example for el speed control (829801 P01), (wiring not included), see illustration
1. Increase engine speed
2. Fuse 8A
3. Quick speed range
4. Resistor 25 ohm 50 W
5. Reduce engine speed
6. Control motor

Order number includes:
Control motor
Holder
Slip clutch
Control screw
Carrier
2 knobs
Brackets
Extra governor lever
Fittings



634



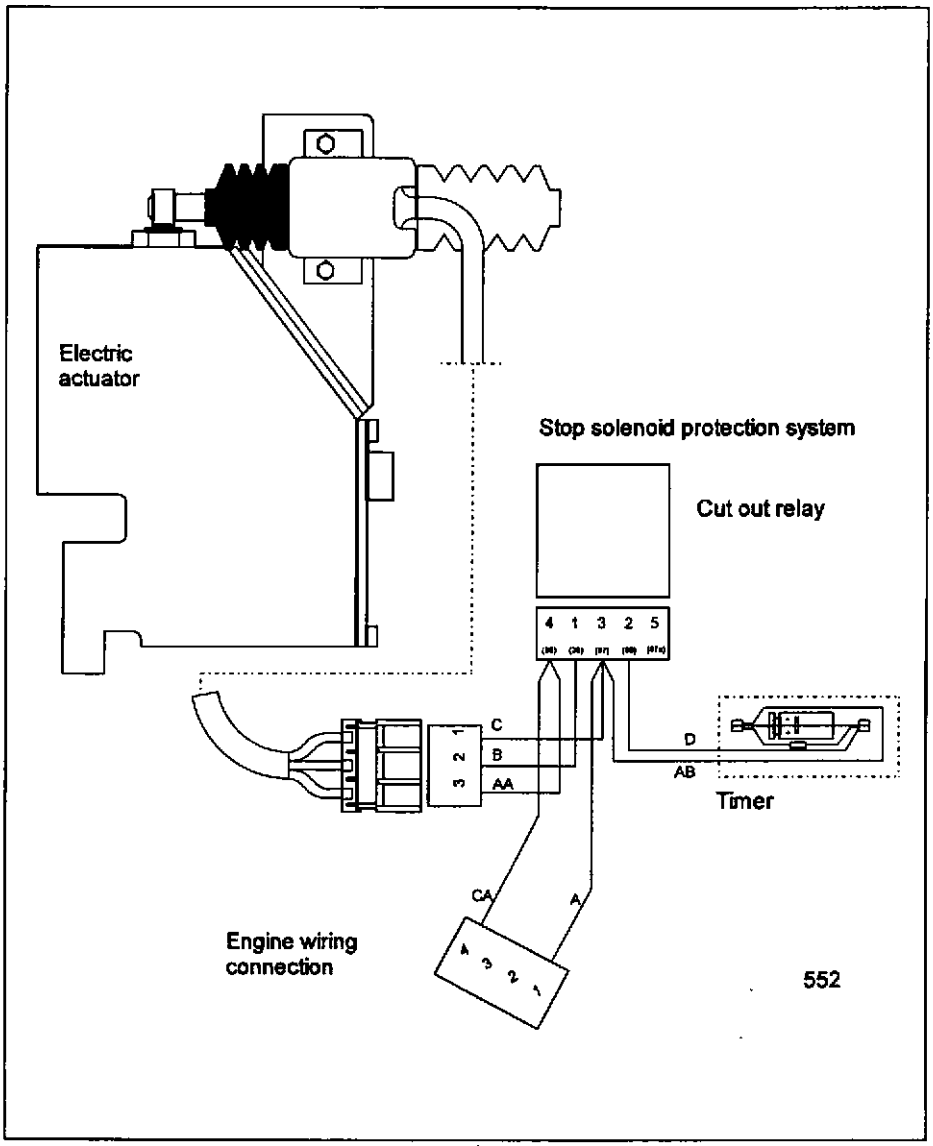
635

27.3 Electrical stop for el governor

The electrical stop is used for fuel shut off on electronic governor systems. When the power supply to the control unit is interrupted, the engine stops. A separate 24 V stop system (with stop solenoid) should only be fitted when required.

Pull current	25 A
Hold current	0.5 A

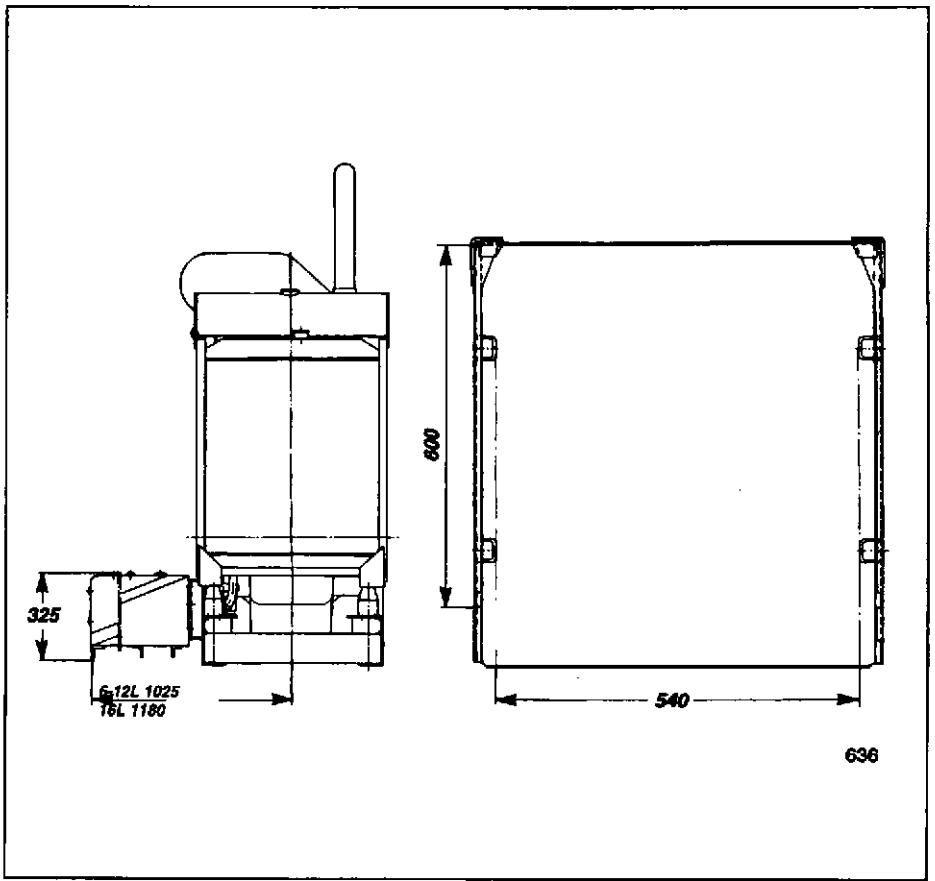
Connector, is included in order no.



31.1 Battery box

Internal dimensions

W x L x H	600 x 540 x 250



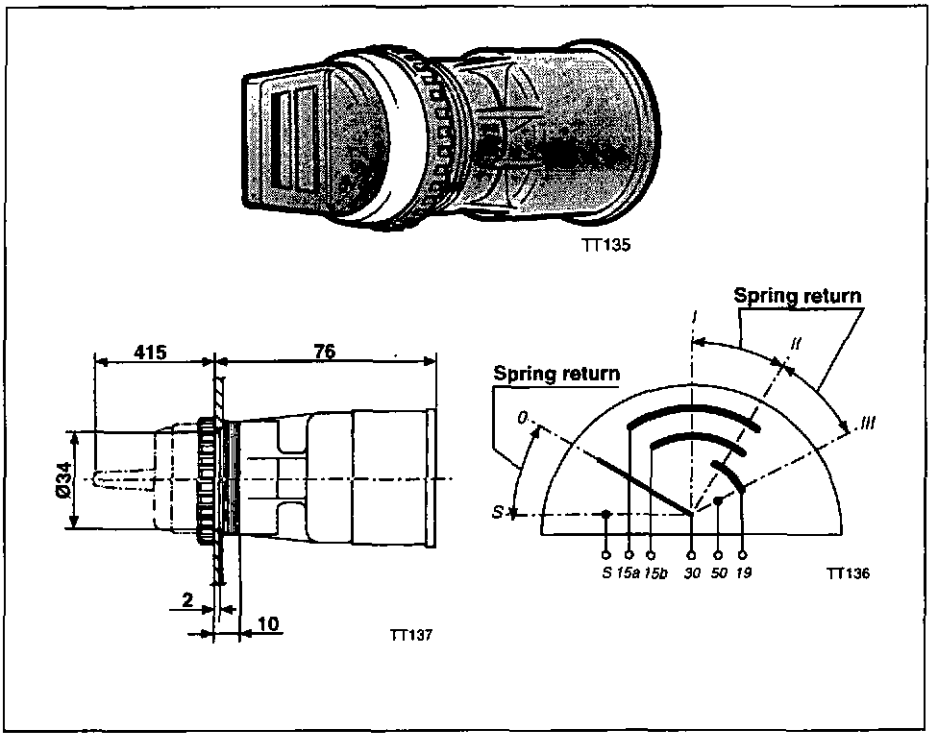
33.1, 33.2 Starter switch

The starter switch has automatic restart protection and must be turned to S before a new start attempt is made. The switch housing has removable grooves for adjusting to installation plate of 2–10 mm thickness.

Switch positions:
- 0 – The key can be removed
- S – Stop position if the engine is equipped with stop solenoid
- I – Running position
- II – Glow position, the starter heater is activated
- III – Start position, the starter motor is engaged

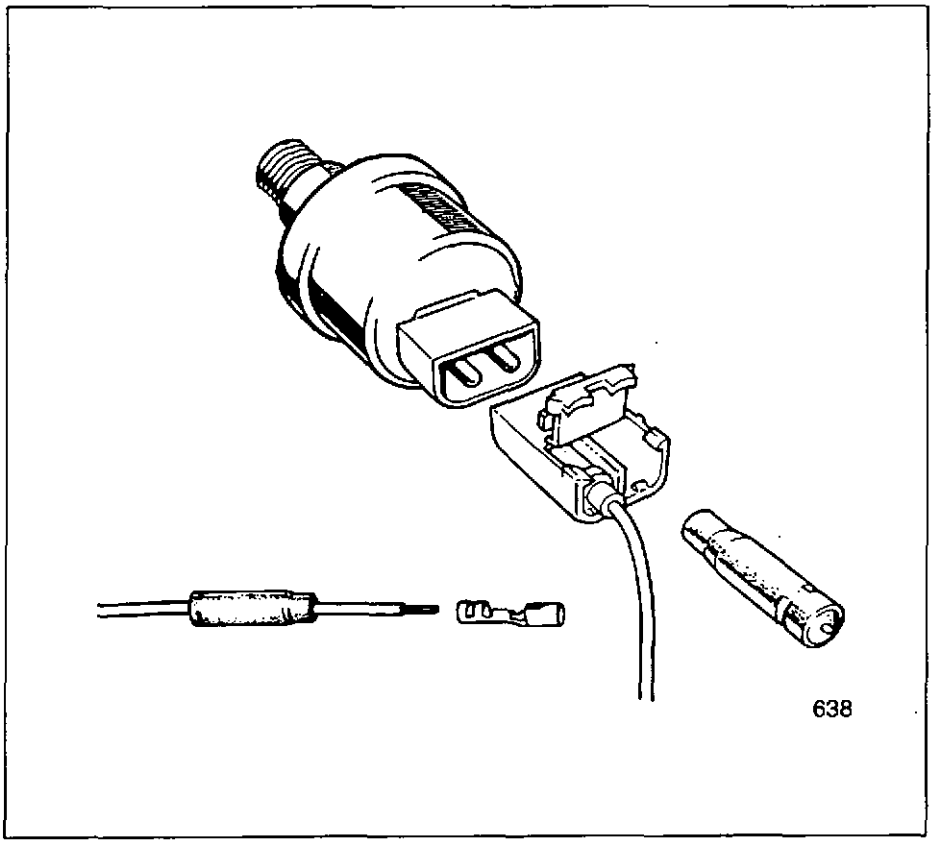
Max rated current 2 A

If the switch is used in a system energized to run, order also 33.2 diode, 3 A. To be fitted between 50 and 15 a alternatively 15 b.



37.2 Connection for electrical switches and senders

The kit contains
2 Cable terminals 1.5–3.5 mm^2
1 Socket housing 2p
2 Socket housings/moisture proof

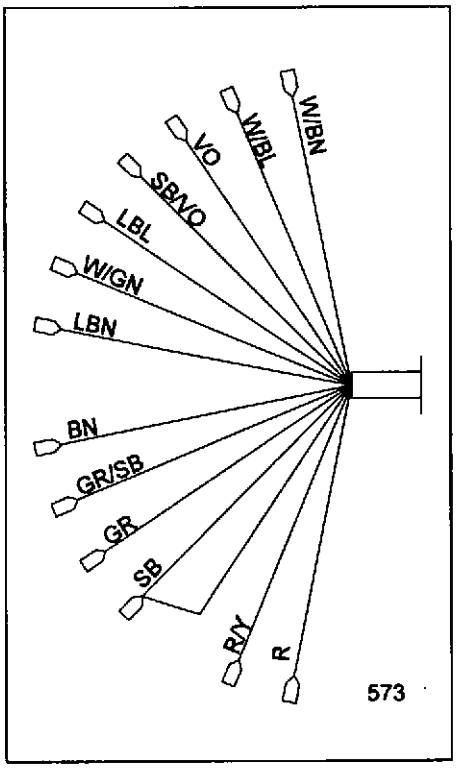


37.3 Engine wiring

The engine wiring connects senders, switches alternator, starter motor, stop solenoid etc. with the instrument panel (38.1) or to the terminal box (37.6) by means of spade connectors. The available free length is approx. 0.5 m from the starter motor.

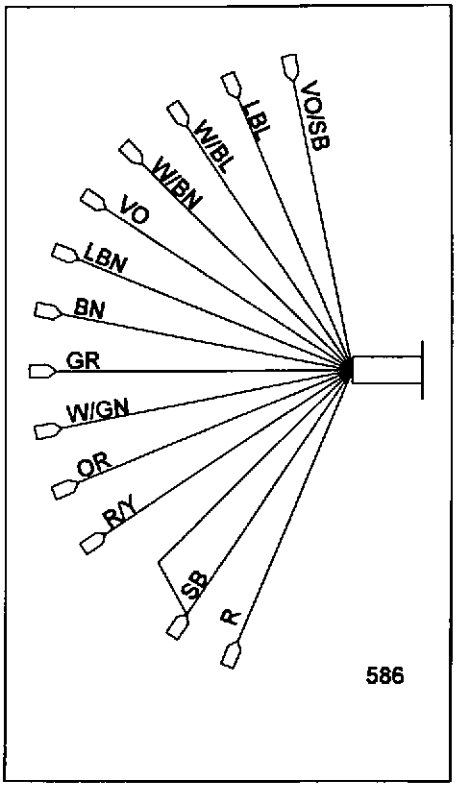
6–12 litre engines

Component	Colour Code	Area mm^2	Connector
Speed sender	GR	1.5	
	GR/SB	1.5	
Oil pressure switch	W/BL	1.5	
Oil pressure sender	LBL	1.5	
Coolant temp sender	LBN	1.5	
Coolant temp switch	W/BN	1.5	
Stop solenoid	VO	2.5	
Coolant level switch	W/GN	1.5	
	SB	1.5	
Generator	BN	1.5	Flat terminal
	R	10.0	
	SB	10.0	
Starter motor	R/Y	2.5	
	R	10.0	
	R	4.0	
	SB	10.0	
	SB	4.0	
Alarm	VO/SB	1.5	
	SB	1.5	



16 litre engine

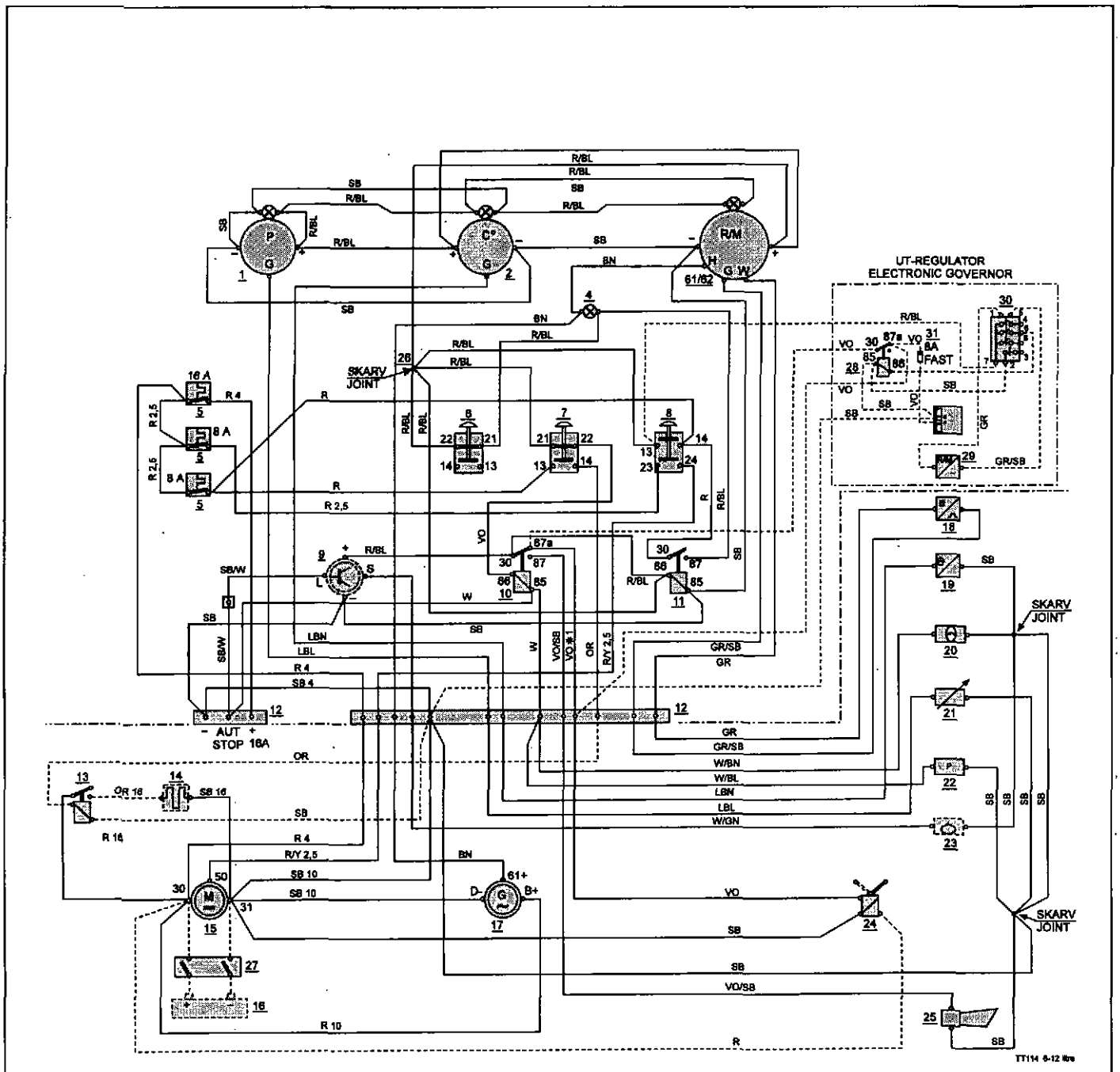
Component	Colour Code	Area mm^2	Connector
Oil pressure switch	W/BL	1.5	
Oil pressure sender	LBL	1.5	
Coolant temp sender	LBN	1.5	
Coolant temp switch	W/BN	1.5	
Stop solenoid	VO	2.5	
Coolant level switch	W/GN	1.5	
	SB	1.5	
Generator	BN	1.5	
	GR	1.5	
	R	10.0	
	SB	10.0	
Starter motor	R/Y	6.0	Flat terminal
	R	10.0	
	R	4.0	
	SB	10.0	
	SB	4.0	
Alarm	VO/SB	1.5	
	SB	1.5	
Starter relay	R/Y	1.5	
	SB	1.5	
Starter element relay	OR	1.5	
	SB	1.5	
	OR	16	



Engine wiring diagram
Engines 6-12 litres

1. Oil pressure gauge
2. Coolant temp gauge
3. Hour meter/tachometer
4. Warning lamp, battery charge
5. Automatic fuse (manual reset)
6. Stop button
7. Interlock button
8. Start button
9. Relay for coolant level alarm/shutdown
10. Relay for coolant temp and oil pressure alarm/shutdown
11. Hold relay
12. Terminal bar, 16 A fuse for automatic stop
13. Relay for preheater element
14. Preheater element
15. Starter motor
16. Battery
17. Alternator
18. Speed sender
19. Coolant temp sender
20. Coolant temp guard (Normally OFF)
21. Oil pressure sender
22. Oil pressure guard (Normally OFF)
23. Coolant level guard (Optional)
24. Stop solenoid (Energized to run)
25. Horn
26. Connection
27. Main switch
28. Relay
29. Tachometer sender
30. Overspeed switch
31. Fuse

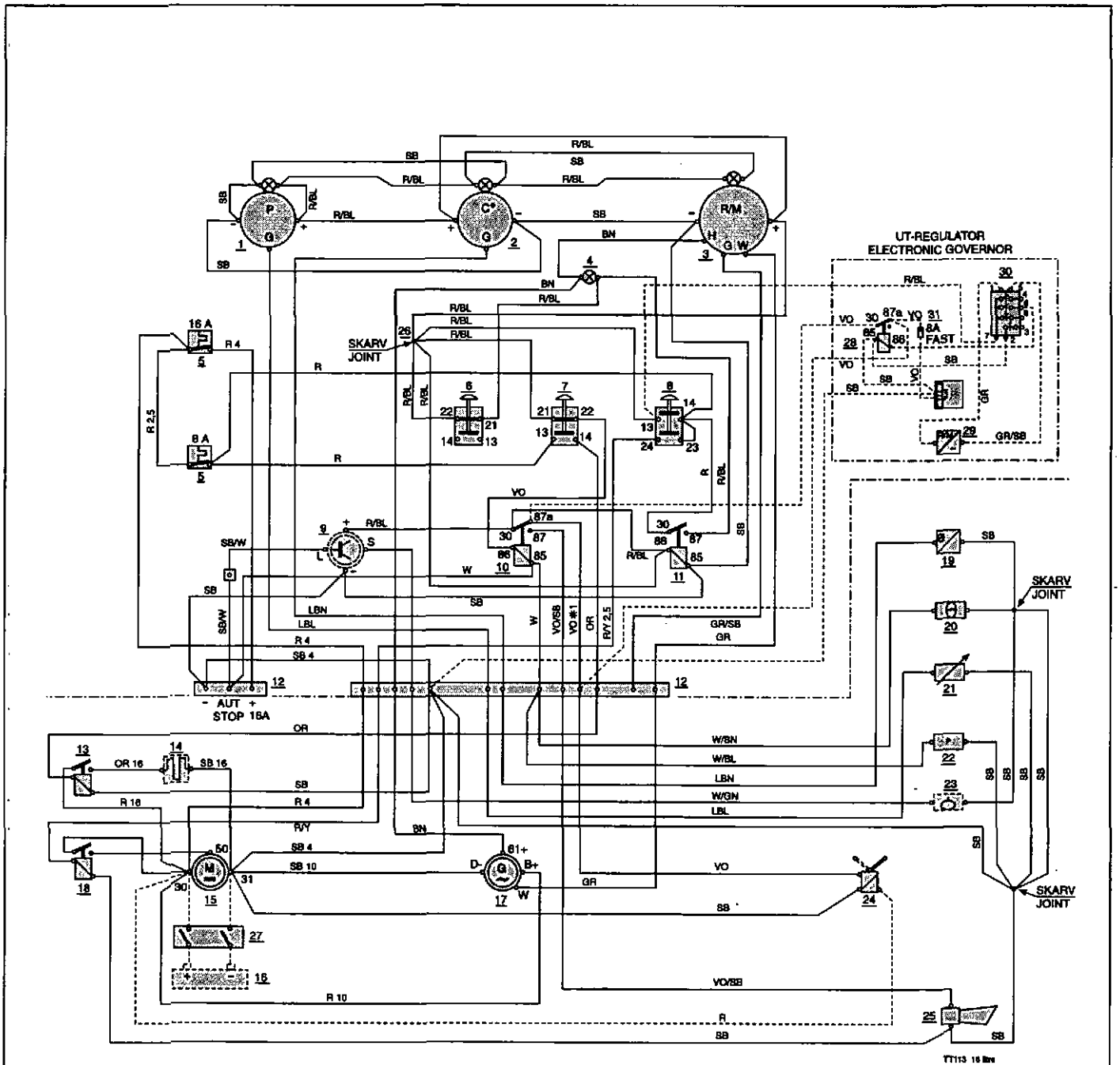
Battery cable area depends on battery location
Cable length max 2 m = 70 mm^2 cable area
Cable length max 4 m = 120 mm^2 cable area



Engine wiring diagram
Engines 16 litres

1. Oil pressure gauge
2. Coolant temp gauge
3. Hour meter/tachometer
4. Warning lamp, battery charge
5. Automatic fuse (manual reset)
6. Stop button
7. Interlock button
8. Start button
9. Relay for coolant level alarm/shutdown
10. Relay for coolant temp and oil pressure alarm/shutdown
11. Hold relay
12. Terminal bar, 16 A fuse for automatic stop
13. Relay for preheater element
14. Preheater element
15. Starter motor
16. Battery
17. Alternator
18. Start relay
19. Coolant temp sender
20. Coolant temp guard (Normally OFF)
21. Oil pressure sender
22. Oil pressure guard (Normally OFF)
23. Coolant level guard (Optional)
24. Stop solenoid (Energized to run)
25. Horn
26. Connection
27. Main switch
28. Relay
29. Tachometer sender
30. Overspeed switch
31. Fuse 8 A

Battery cable area depends on battery location
Cable length max 2 m = 70 mm^2 cable area
Cable length max 4 m = 140 mm^2 cable area

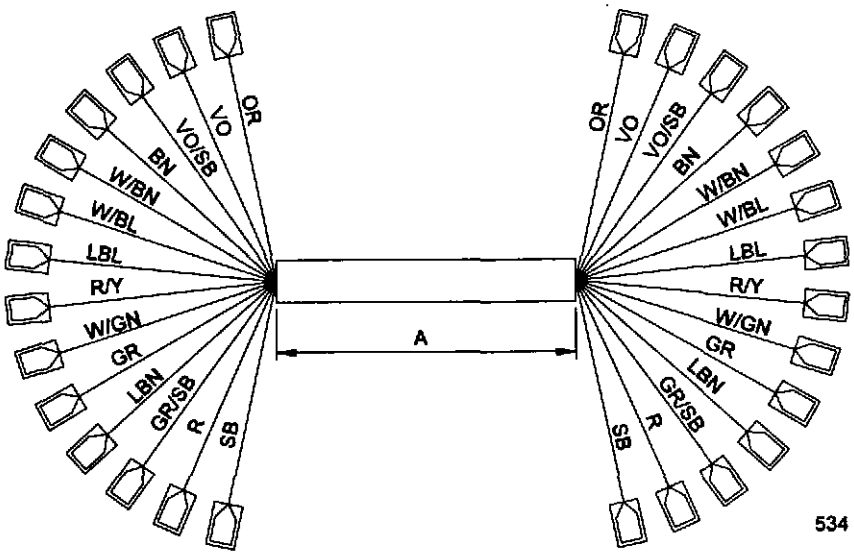


37.4, 37.5 Extension cable

Pos	Length A
37.4	2500 mm
37.5	8000 mm

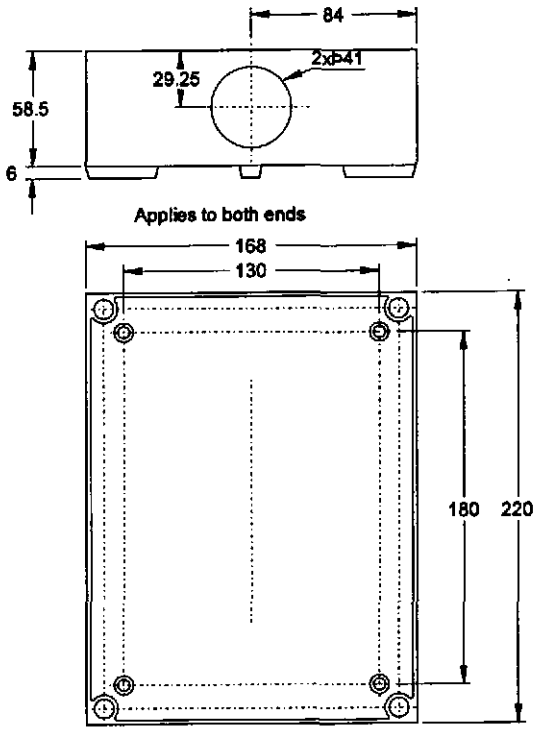
Connectors Spade connectors

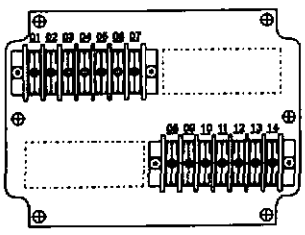
Colour code:
OR = Orange
VO = Violet
SB = Black
BN = Brown
W = White
BL = Blue
LBL = Light Blue
R = Red
Y = Yellow
GN = Green
GR = Grey
LBN = Light Brown



37.6 Terminal box

To be located max 400 mm from cable iron.
Connection – see illustration.





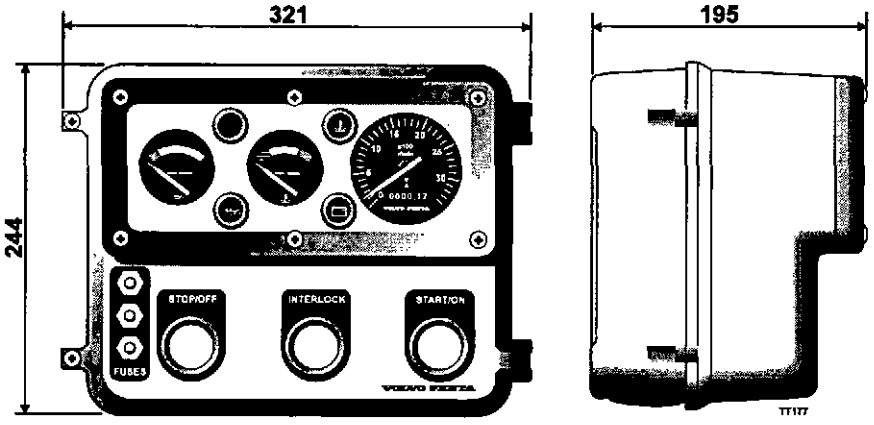
NO	COLOUR	FROM
01	SB	NEGATIVE -
02	GR/SB	REV G
03	GR	REV W
04	LBN	TEMP
05	LBL	OIL
06	GN/W	WATER LEVEL
07	W	AUT STOP OIL PR WATER TEMP
08	BN	ALTERNATOR 61+
09	VO/SB	ALARM
10	VO	STOP
11	R/Y	START 50
12	R	POSITIVE +
13	OR	PRE HEATING
14	-	

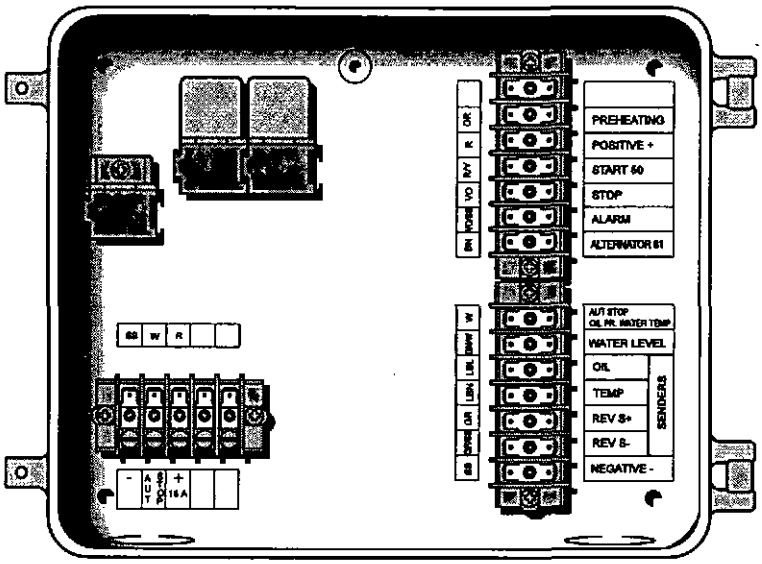
535

38.1 Instrument panel

The instrument panel incorporates an automatic stop system for low lubricating oil pressure, high coolant temp, and (optional) low coolant level.
Voltage 24 V

Functions:
Oil pressure gauge
Coolant temp gauge
Hour meter/Tachometer
Stop button
Interlock/preheat button
Start button
Battery charge indicating lamp
Instrument lighting
Automatic fuses
Space for fault indicating equipment, see 38.2

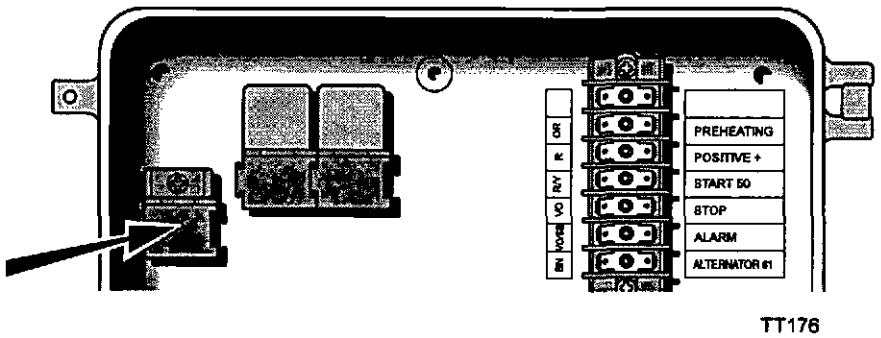


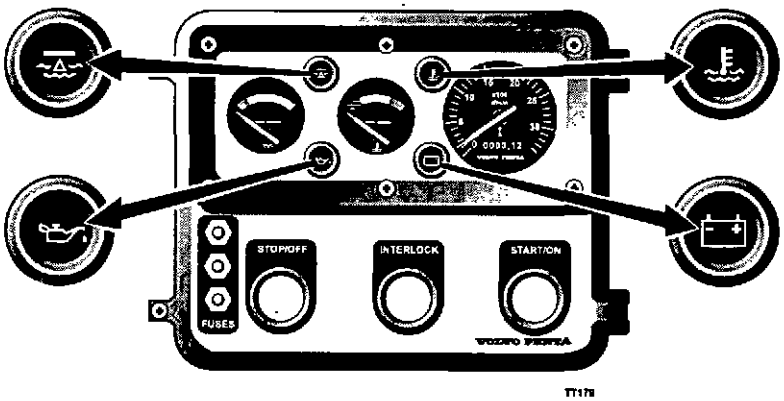


38.2 Fault indication system

For indication of failure causing engine shut down. A relay trips when a fault is first discovered and activates the corresponding warning lamp which remains on until reset.

Functions:
Relay, activated by switches for
– oil pressure
– coolant level
– coolant temperature





38.4 Coolant temp and oil pressure senders

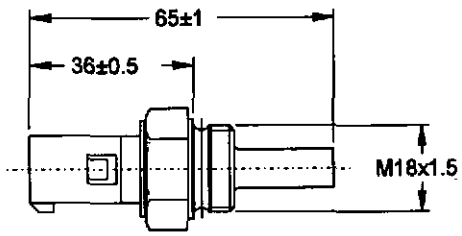
Coolant temp gauge		
Temp °C	Ohm	Tolerance
60	134	±13.5
90	51.2	±4.5
120	22.7	±3.0

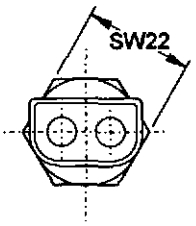
Oil pressure gauge		
Pressure, bar	Ohm	Tolerance
0	10	+3, -5
2	52	±4
4	88	±4
6	124	±5

Rated voltage 6–24 V

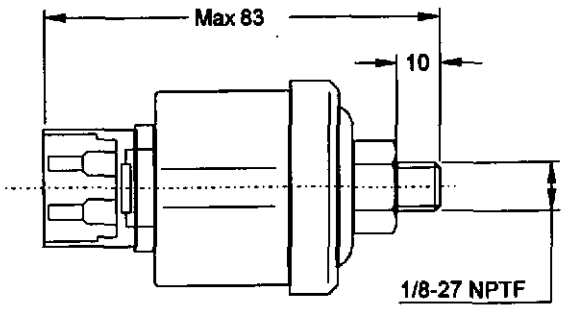
Ambient operating temp range:
Temp sender: -30 to +120 °C
Pressure sender: -25 to +100 °C

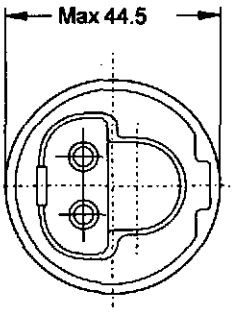
Electrical connectors included, see 37.2





Coolant temp





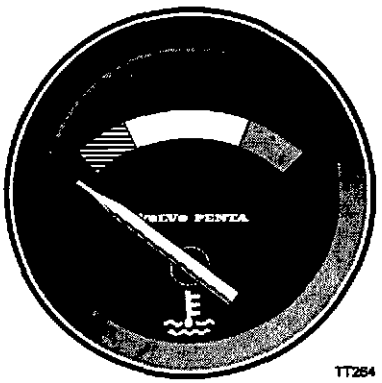
Oil pressure

517

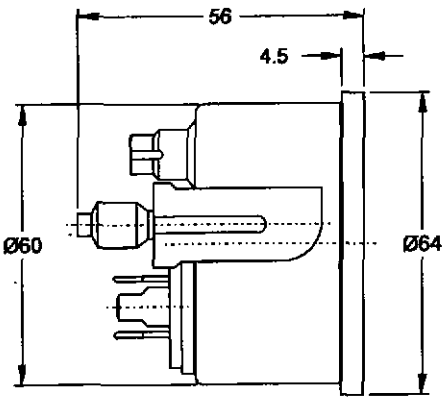
38.5 Coolant temp and oil pressure gauges

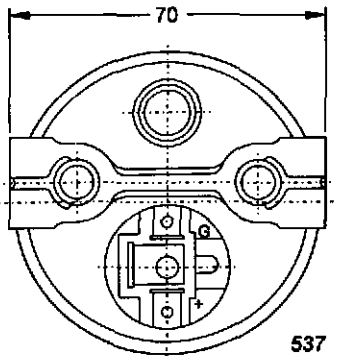
Order number includes:
2 Lamps 24 V
2 Lamp socket
1 Coolant temp gauge
1 Oil pressure gauge
Fittings

TT265



TT264



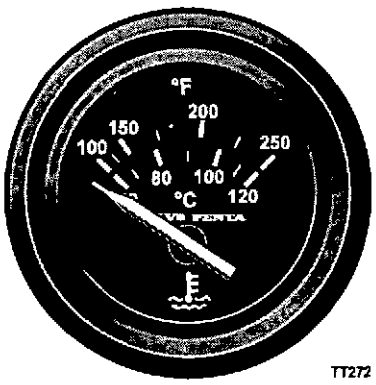


537

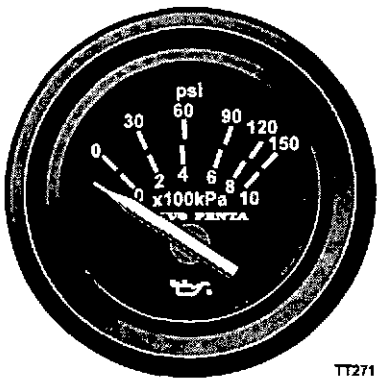
38.6 Coolant temp and oil pressure gauges

Type Numerical scale plate

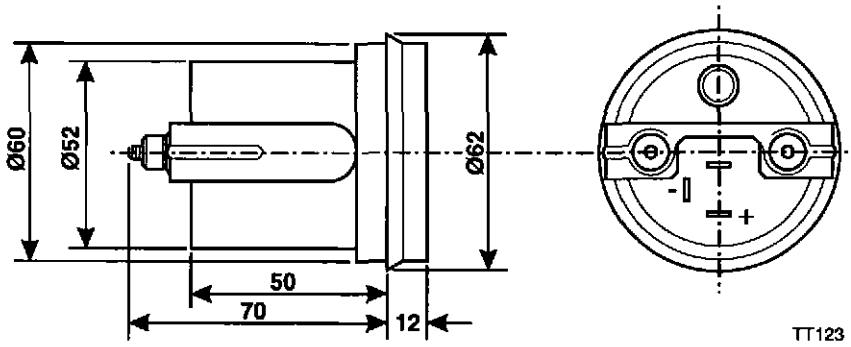
Order number includes:
2 Lamps 24 V
2 Lamp sockets
1 Coolant temp gauge
1 Oil pressure switch
Fittings



TT272



TT271

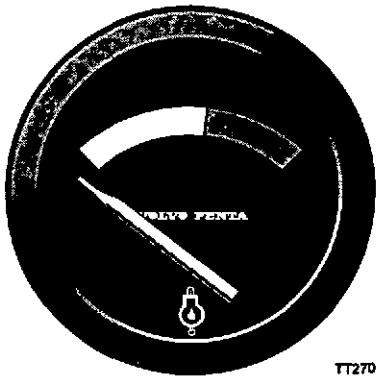


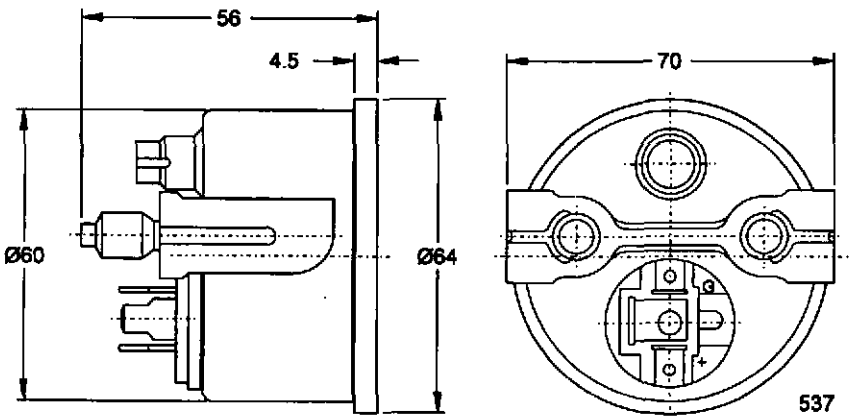
TT123

38.7 Oil temp gauge and sender

The sender will replace the oil sump drain plug (M24x1.5)

Order number includes
1 Lamp socket
1 Lamp 24 V
1 Temp sender (See 38.4)
1 Adaptor M18 to M24x1.5
1 Oil temp gauge
Fittings


TT270



537

38.8 Speed sender

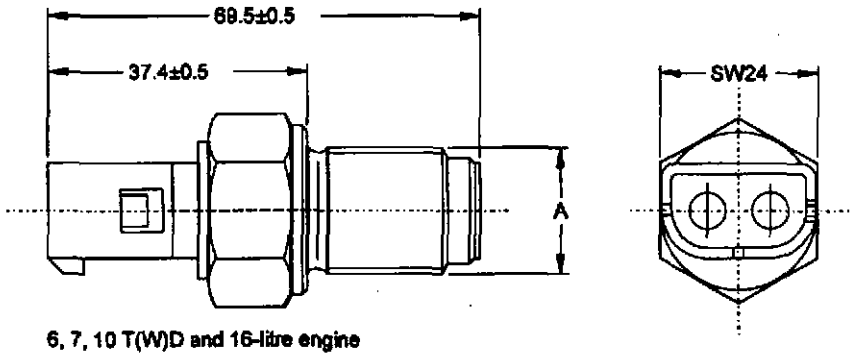
The sender picks up pulses from the timing gear teeth and transmits them to the tachometer for monitoring of engine speed.

Engine	A
6, 7-litre	M18x1.5
10-litre (TD, TWD)	3/4"-16 UNF-2A
10-litre (TAD)	M20x1.5
12-litre	M20x1.5
16-litre	M18x1.5

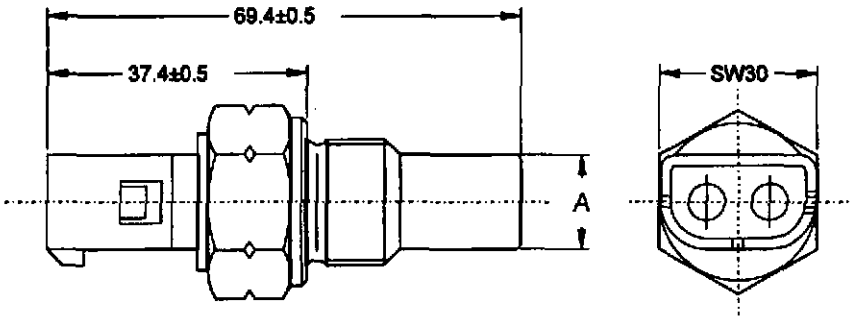
Frequency	
6–12-litre	30 Hz/rev
16-litre	37 Hz/rev

Ambient operating temp range
- 40 to +100 °C.

Order number includes:
Speed sender
Electrical connectors, if not otherwise stated.



6, 7, 10 T(W)D and 16-litre engine



10 (TAD) and 12-litre engine

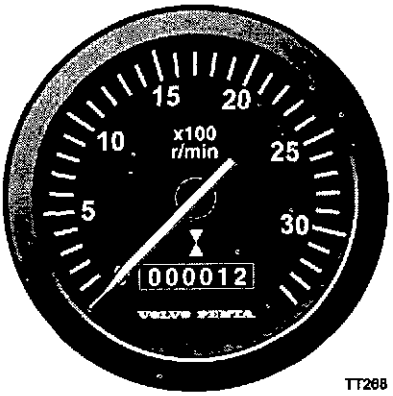
5474

38.9 Tachometer/ hour meter Ø 72 mm

For 6 -12 litres engines.
The tachometer counts to 3400 rpm.
The tachometer counts magnetic pulses from the speed sender. 1 rpm corresponds to the number of teeth of the crankshaft transmission wheel.
The hour meter shows operating time.

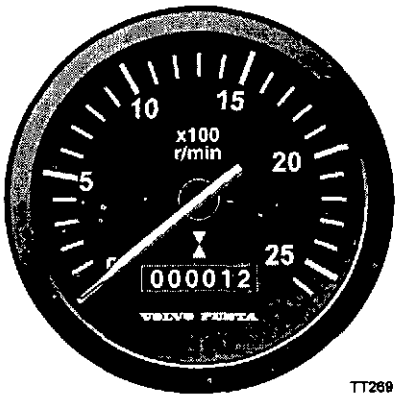
For 16 litres engines.
The tachometer counts to 2600 rpm
The tachometer counts magnetic pulses from the alternator tacho output marked " W ".
The hour meter shows operating time.

Order number includes:
1 Lamp 24 V
1 Lamp holder
1 Tachometer
Fittings



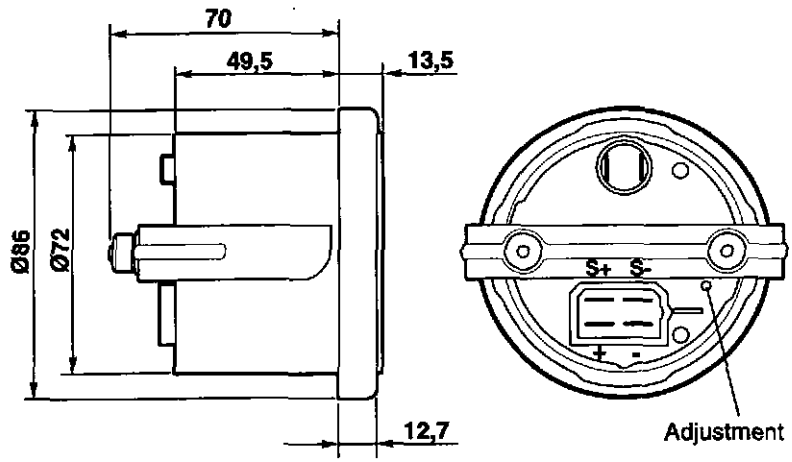
TT268

For 6 -12 litres engines.



TT269

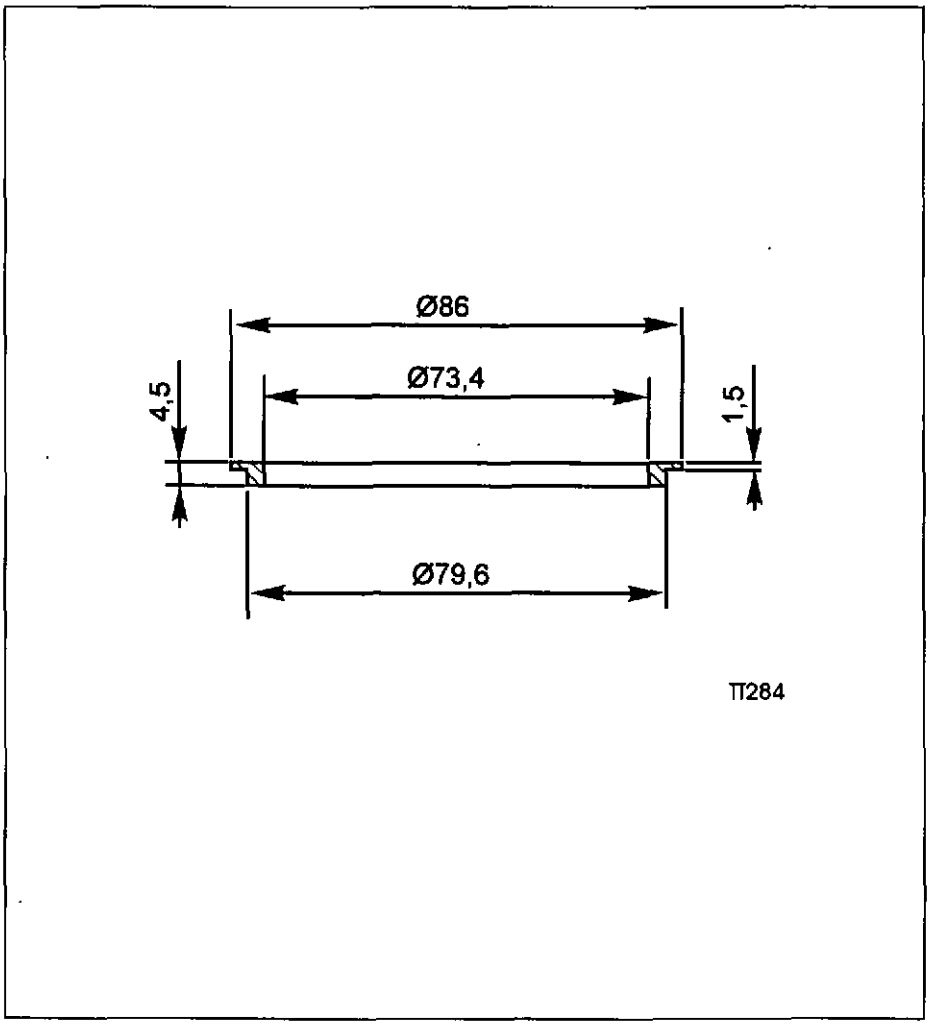
For 16 litres engines.



TT308

38.10 Adapter ring Ø 80 - 72 mm

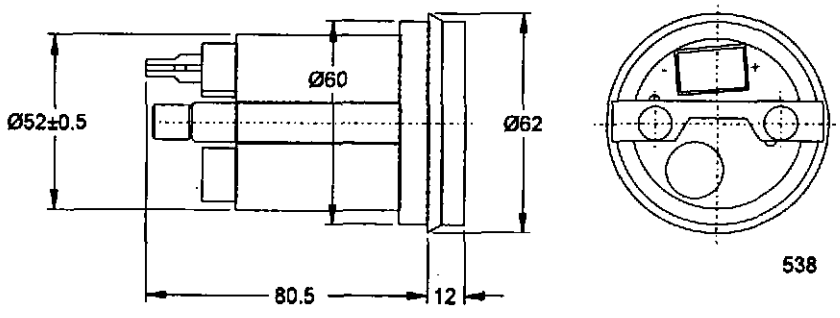
To be used when mounting 38.9 in 80 mm hole.



38.11 Hour meter

The hour meter shows the operating time, i.e. the time when the generator produces current, in hours and minutes.

Order number includes:
1 Lamp holder
1 Lamp 12 V
1 Lamp 24 V
1 Hour meter
Fittings

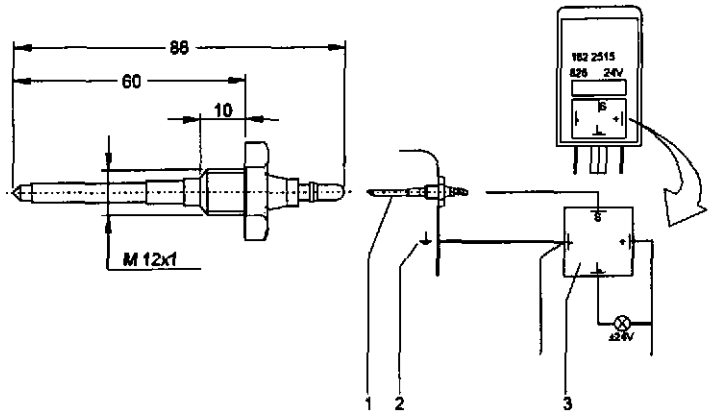


38.12 Coolant level indicator

The indicator consists of a sensor and a control relay, which is connected to an alarm or engine shut-down device of the customer's choice. A time delay of 6 seconds prevents alarm or shut-down due to coolant ripple. Under normal operation, the sensor is earthed through the coolant.

1. Level sensor
2. Earth lead
3. Relay

Order number includes:
Level sensor
Control relay and fittings

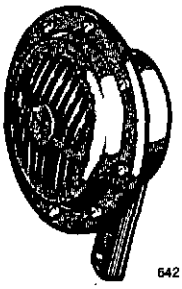


520

38.13 Horn for acoustic alarm

Type	Loud-tone horn
Diameter	155 mm
Surface	Black enamel
Weight	1.5 kg
Current draw	approx 2A
Frequency	290 Hz
Mounting hole, spring holder	Ø10.5 mm

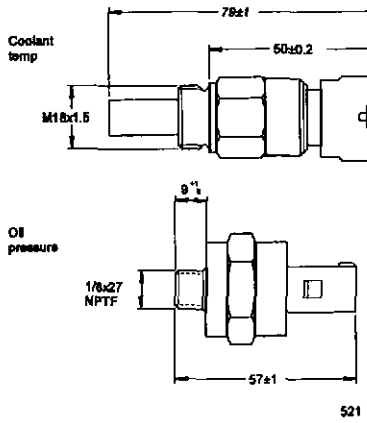
Order number includes:
Signal horn


642

38.14, 15 Coolant temp and oil pressure switches

For automatic engine shut down or failure indication by means of a visual or acoustic alarm

	38.14	38.15
Coolant temp switch		
Temp setting	103±3°C Pressurized system	97±3°C Non-pressurized system
Rated voltage	6–24 V	6–24 V
Max power draw	3 W	3 W
Ambient operating temperature range	–30 to +120°C	
Oil pressure switch		
Pressure setting	0.7±0.15 bar	
Rated voltage	12–24 V	
Max power draw	15 W	
Type: Normally open, will close at abnormal engine operation.		
Ambient operating temperature range	–40 to +140°C	

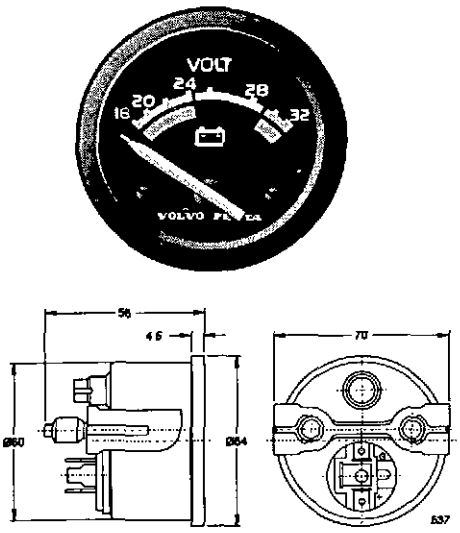


521

Order number includes:
Coolant temp switch
Oil pressure switch
Electrical connector (see 37.2), included if not otherwise specified.

38.16 Voltmeter

Order number includes:
1 Voltmeter 24 V
1 Lamp 24 V
1 Lamp holder
Fittings



537

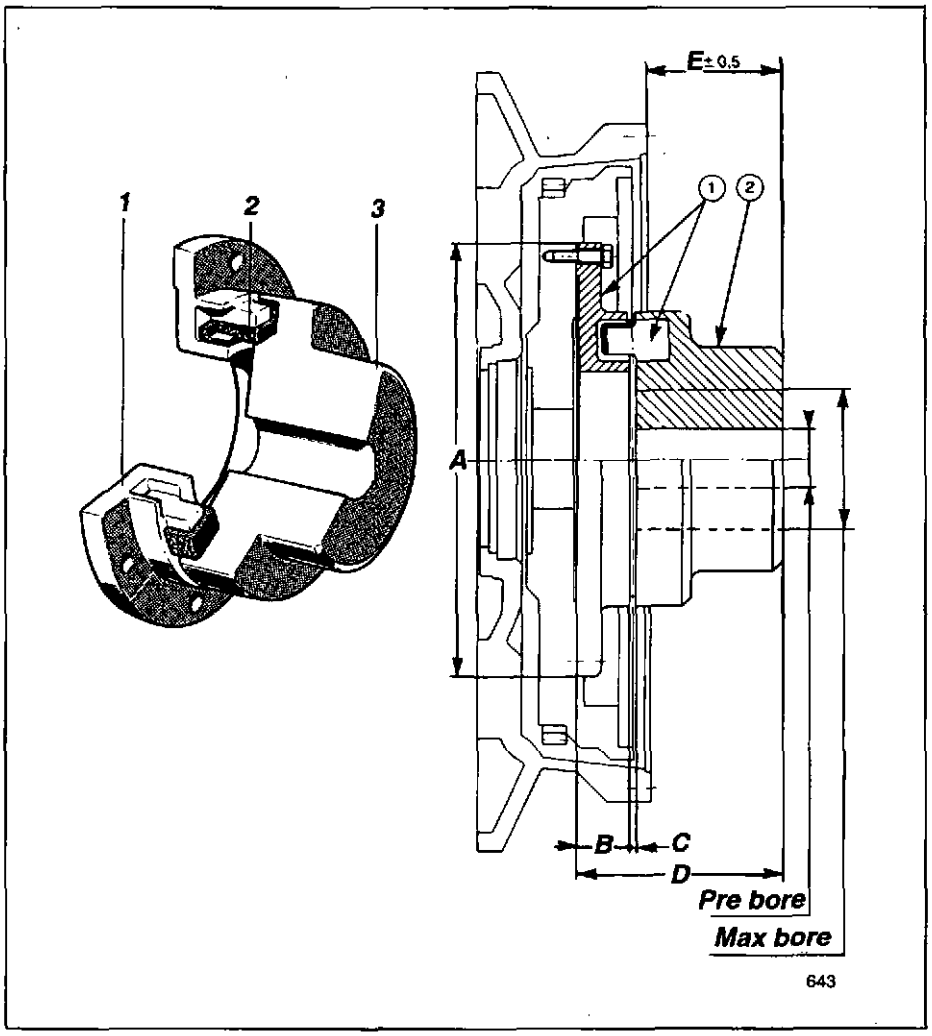
41.1, 41.2, 41.3 Flexible coupling

The ME-couplings are used for the direct coupling of generators etc. to Volvo Penta engines. Specific torsional vibration calculations should be made when used with different inertias to ensure that the couplings are suitable. Please contact Volvo Penta for further information.

The ME-couplings withstand normal trancient torques. Where extreme torques may occur, steel couplings or couplings with overload protection must be used.

Note. The couplings are pre-drilled at the factory, additional drilling must be carried out by the customer to ensure a precise fit.

Type	Nor-Max ME 194 ME 214 ME 240
Shore hardness	75
Material	Cast iron
Working temperature	–25°C – +100°C



Components:
1. Coupling flange
2. Rubber element
3. Pre-drilled coupling half

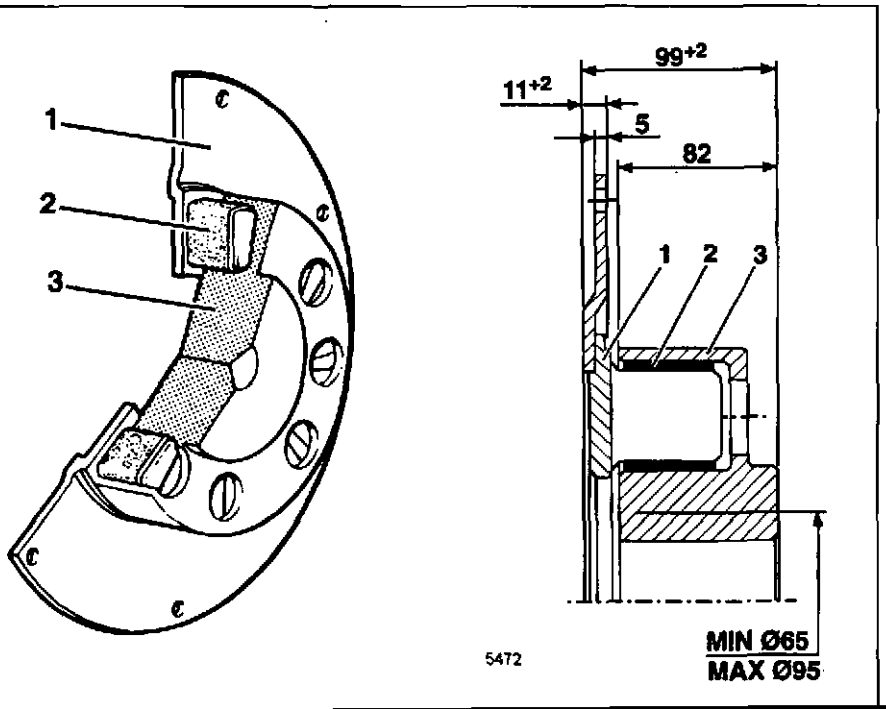
Pos	Engine	Coupling type	Prebore Ø mm	Max bore Ø mm	A mm	B	C	D	E
41.1	TD 610 G	ME194	26	85	352.42	38	3.5±1.5	141.5	101.8
41.2	TWD 610 & 7-litre	ME214	39	95	352.42	42	4±2	156	116.3
	10-litre	ME214	39	95	352.42	42	4±2	156	96
41.3	12-litre	ME240	48	110	352.42	45	4±2	169	109

41.4 Flexible coupling

The CFD-coupling is used for direct-flanging of generators, etc., to Volvo Penta engines. Specific calculations should be made when used with different inertias to ensure that suitable couplings are used. Please contact Volvo Penta for further information.
The CFD-coupling withstands normal trancient torques. Where extreme torques may occur, steel couplings or couplings with overload protection must be used.
Note. The coupling is pre-drilled at the factory, additional drilling must be carried out by the customer to ensure a precise fit.

Type Centaflex	Centaflex D-275-14-93
Nominal torque	5000 Nm
Shore hardness	75

Components:
1. Coupling flange
2. Rubber element (16 pcs)
3. Pre-drilled coupling half

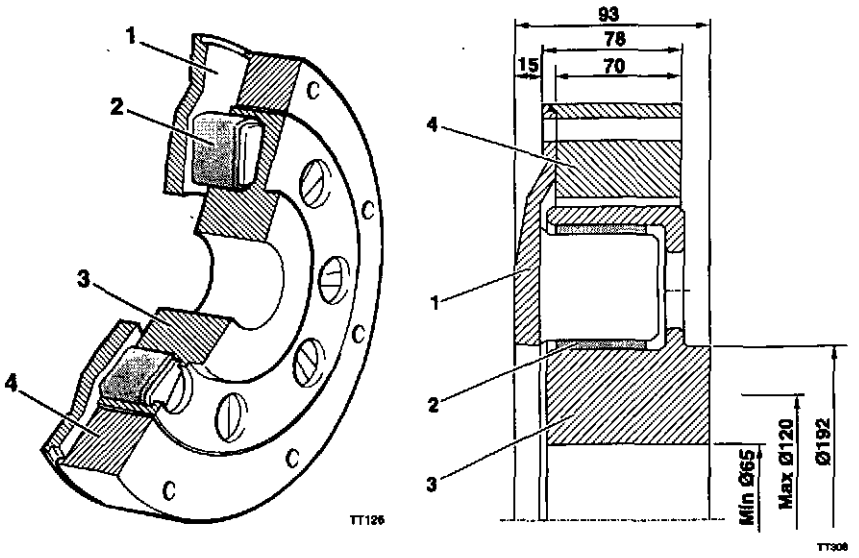


41.5 Flexible coupling

The CFD-coupling is used for direct-flanging of generators, etc., to Volvo Penta engines. Specific *calculations should be made when used* with different inertias to ensure that suitable couplings are used. Please contact Volvo Penta for further information.

The CFD-coupling withstands normal trancient torques. Where extreme torques may occur, steel couplings or couplings with overload protection must be used. Note. The coupling is pre-drilled at the factory, additional drilling must be carried out by the customer to ensure a precise fit.

Type Centaflex D-350-SAE14-ZM
Nominal torque 5000 Nm
Shore hardness 50

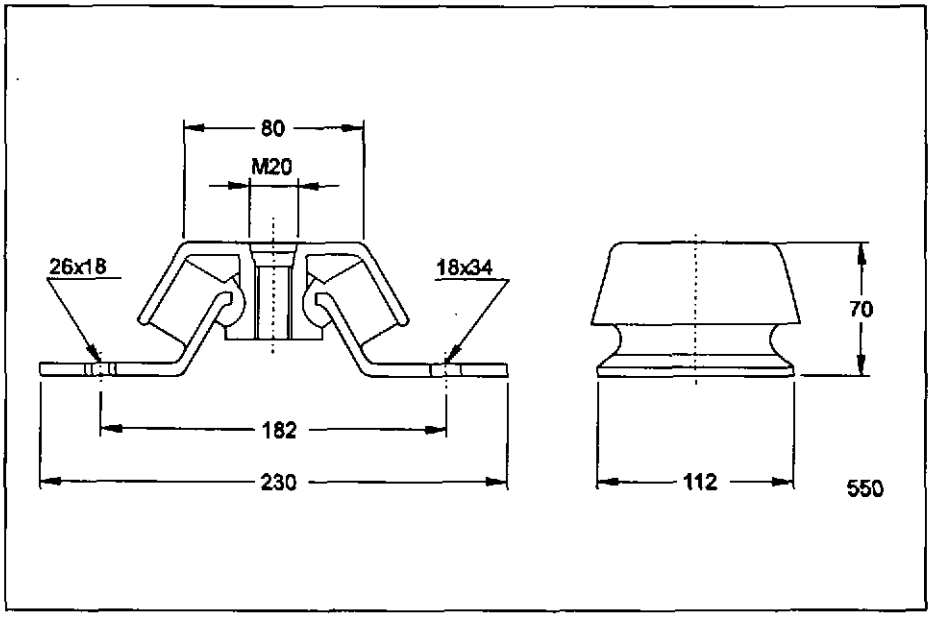


89.1 Vibration isolator

The isolators are used between engine base frame and floor on gen set applications.

Rubber hardness	65 shore
Spring constant	1300 N/mm

Order number includes:
6 Vibration isolators
6 Washers
6 Screws M20x30



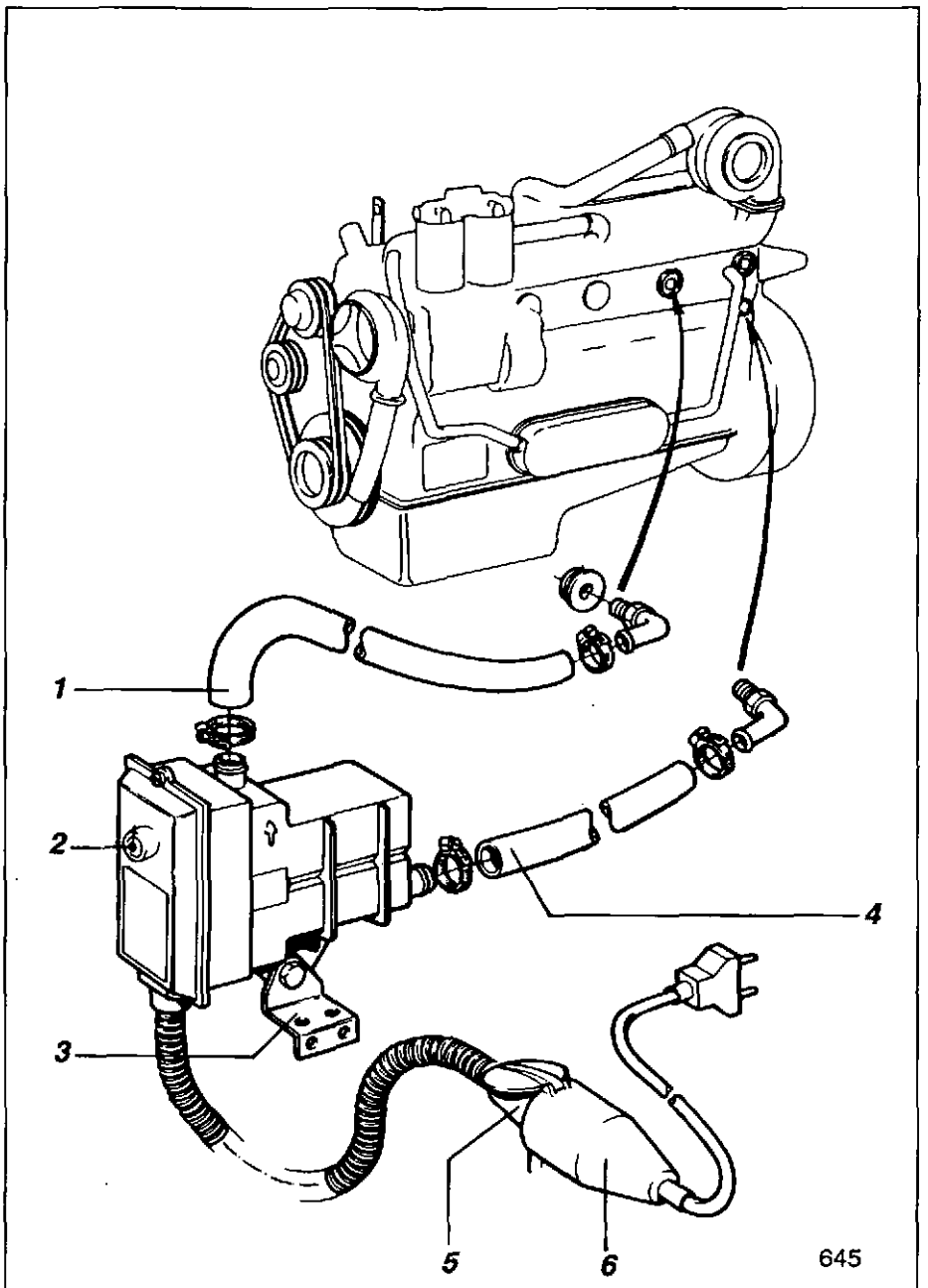
89.2 or 89.4 Engine heater

The **750 W** engine heater is intended for standby gensets installed indoors (>+5°C).
The **2000 W** engine heater is intended for gensets installed outdoors in cold areas.
The engine heaters heats and circulates coolant through the engine block which reduces hunting and white smoke during start up. It also reduces battery and engine wear. The heater should be separately mounted in a protected location.

Make	Calix
Power output	750 W or 2000 W
Voltage	220–240V Protective earthing
Thermostat shut-off	50°C
Overheat protection	Double
Cable length	1 m
Extension cable length	4.8 m
Cable area	3x1.5 mm^2 (3x15 AWG)
Dimensions LxWxH	160x65x100 mm

Components:
1. Outlet
2. Reset button for overheat protection
3. Bracket for mounting of heater
4. Inlet
5. Connector with protective cap
6. Appliance plug with protective cap

Order number includes:
Engine heater, complete
Extension cable
Hoses and hose clamps
Fittings
Mounting instructions



89.5 Connection kit

for other engine heaters than 89.2 or 89.4.

This kit is included in 89.2 and 89.4

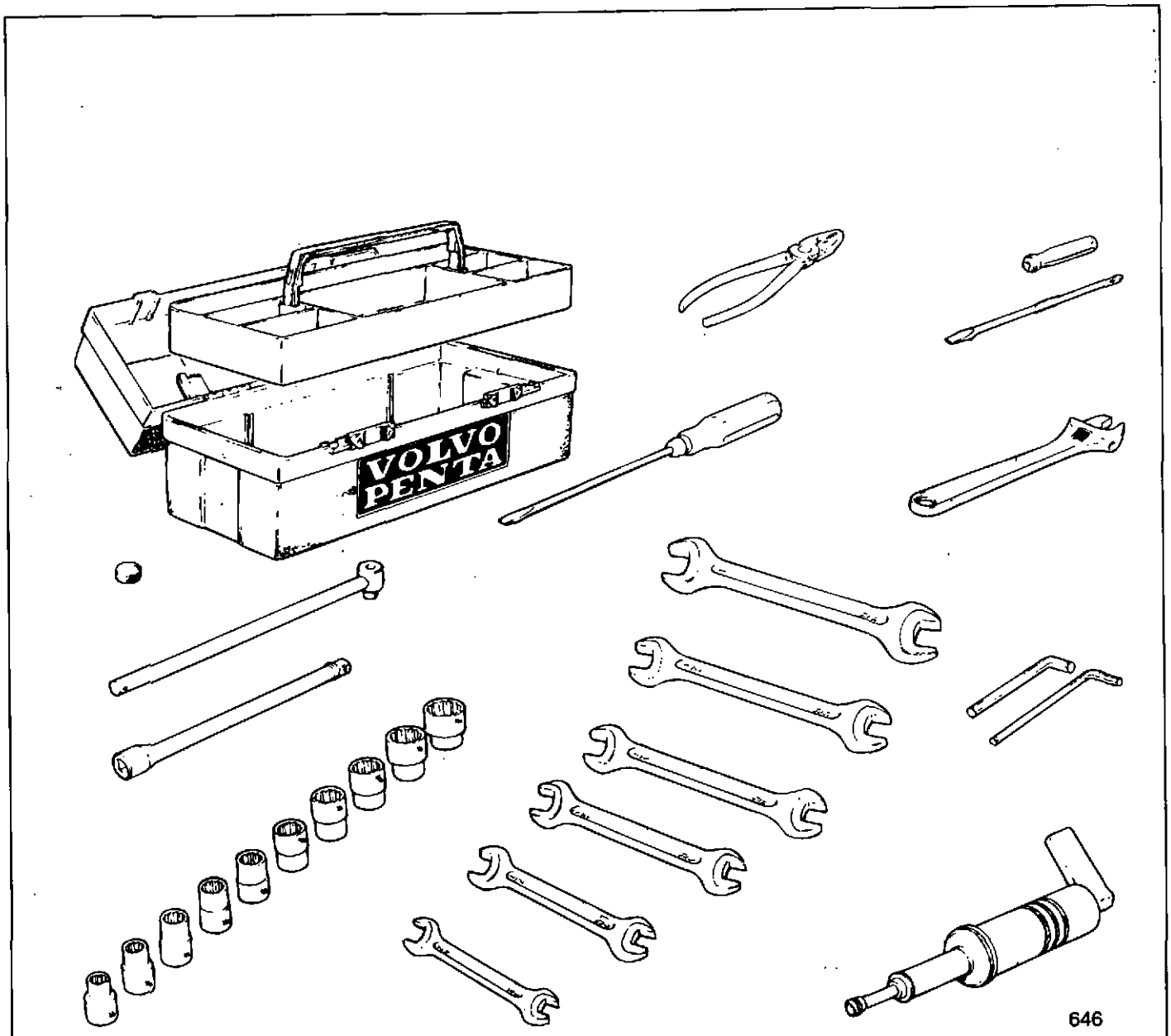
Order number includes:
Hose 19 x 4. Length 1250 mm
Hose clamps 4 pcs
Nipples 1/2" - 14 NPTF, 2 pcs
Mounting instructions

89.3 Tool kit

6, 7 litre engine
1. Plastic tool box
2. Combination pliers
3. Adjustable wrench 6x3/4"
4. Screwdriver 300 mm
5. Combination screwdriver – slotted/Phillips screws
6. Socket set with 10 sockets 10–30 mm Angle handle and extension
7. Set of open ended wrenches with 10 widths 10–24 mm

10, 12 litre engine
1. Plastic tool box
2. Combination pliers
3. Two adjustable wrenches 6 and 8"
4. Screwdriver 300 mm
5. Combination screwdriver – slotted/Phillips screws
6. Socket set with 10 sockets 3/8"–15/16" Angle handle and extension
8. Set of open ended wrenches with 12 widths 3/8"–1"
9. Open ended wrench 41 mm
10. Two hexagonal Allen keys, 1/4" and 5/16"
11. Grease gun
12. Twelve protective caps for pressure pipes.

16 litre engine
1. Plastic tool bag
2. Combination pliers
3. Adjustable wrench
4. Screwdriver 300 mm
5. Screwdriver 2–0.8x6 R
6. U-wrench 9/16–5/8"
7. U-wrench 11/16–3/4"
8. U-wrench 30x30x65
9. Set of open ended wrenches 10–11, 12–13, 14–15, 1–19, 22–24 mm
10. Hexagonal wrench N 12 M14 R
11. Hexagonal wrench 1/4" R



90.1 Extended Coverage, Prime Power applications.
Extended Coverage Prime Power is an optional +12 months extension of the standard 12 months Volvo Penta International Limited Warranty *(unlimited hours of operation).*

90.2 Extended Coverage, Standby Power applications.
Extended Coverage Standby Power is an optional +24 months extension of the standard 24 months Volvo Penta International Limited Warranty *(maximum 500 hours / year).*

Definition of Standby applications.
This relates to engines which are used to supply standby electrical power at varying output in areas with well-established electrical power supplies if the normal power supply should fail. This does not include peak shaving operation. The operation period is limited to a maximum of 500 hours annualy.

Volvo Penta Extended Coverage

Volvo Penta offers Extended Coverage for the entire engine range. The objective is to provide the end user of Volvo Penta generating set diesel engines with the best possible operational reliability and total operational economy.

Features:
- Optional +12 months for prime power applications **coverage of repair cost** which occurs as a result of defects in material or workmanship.
- Optional +24 months for standby applications (see definition) **coverage of repair cost** which occurs as a result of defects in material or workmanship.
- Preventive condition tests. Repair before failure.

Benefits:
- Long term protection against unexpected repair cost.
- Unscheduled downtime minimized.
- Greatest reliability for Standby operation.

Conditions:

The Extended Coverage applies where Volvo Penta is represented.
The plan is based on close co-operation between the end user and the Volvo Penta representative.

Condition Test.
Required from the end user is the carrying out of a condition test every 1200 hours of operation, or once a year, whichever occurs first.
The condition test is a preventive check up of the engine's condition and is carried out either by an authorised Volvo Penta dealer, or a workshop approved by Volvo Penta. The condition test is chargeable to the end user.

Maintenance.
Records of all maintenance should be kept for evaluation at the condition test. Usage of genuine Volvo Penta Parts is a condition in order to obtain and maintain all benefits of the extended coverage.

Extended Coverage can be purchased for engines already delivered, however no later than 3 months after commissioning date. Commissioning date is equal to shipping date from factory unless the warranty registration card is completed and returned to Volvo Penta, Warranty Administration department .

Please see **Extended Coverage Policy** for further conditions.

90.3–90.8
Publications
If more than one instruction book is required, order the documentation denoted IB. Workshop manual, installation handbook and electronic speed governor manual, can be ordered with the engine order, see documentation denoted WM, IH, ESG.

		SWE	ENG	GER	FRA	SPA
TD 610 G, TD 710 G		7731615	7733331	7731617	7731618	7731619
TWD 610 G	VM:	7738324	7738326	7738327	7738328	–
		7738056	8838038	7735224	7735225	–
TWD 710 G, TAD 730 G	T:	7738329	7738330	7738331	7738332	–
	WM	7738056	7738038	7735224	7735225	–
TAD 1030 GE	T:	7738333	7738335	7738336	7738337	–
	WM	7738057	7737797	7735114	7735115	–
TD 1010 G, TWD 1010 G	WM:	7753320	7753330	7753340	7753350	7753360
TD 1210 G		+7734806	–	+7734808	+7734809	+7734811
TWD 1210 G, TAD 1211 G,	T.	7738338	7738339	7738340	7738342	–
TAD 1231 GE, TAD 1232 GE	WM:	7738057	7737797	7735114	7735115	–
TWD 1630 GE,	T:	7738343	7738344	7738345	7738346	–
TAD 1630 GE	WM:	7738419	7738422			–
TAD 1631 GE						
ALL ENGINES	IH		7735684			
	ESG		7737689			
ALL ENGINES	IB:	**SWE**	**ENG**	**GER**	**FRA**	**SPA**
		7738102	7738116	7738106	7738107	7738109
		ITA	**FIN**	**DUT**	**POR**	**GRE**
		7738111	7738113	77380104	7738114	7738116
		MANDARIN				
		7738128				

IB = Instruction Book
WM = Workshop Manual
+ = Order also this supplement
T = Technical data
IH = Installation Handbook
ESG = Electronic Speed Governor, function - trouble shooting

90.10
Maintenance kit estimated for 2500 hours running

Description	Quantity Engine, size				
	6 L	7 L	10 L	12 L	16 L
Gasket, valve cover			2		
Gasket, valve cover		2	2	6	
Oil filter	6	6	12	12	12
Fuel filter	6	6	6	6	6
Oil filter, by-pass		6			6
Air filter	2	2	4	4	4
Drive belt, alternator	1	1	1	1	1
Drive belt, alternator	1	1	1	1	1
Sealant	1	1	1	1	1
Sealant ring, thermostat	1	1	1	1	1
Sealant ring, thermostat	1	1	1	1	1
Thermostat	1	1	1	1	2
Water filter					5

90.11
Maintenance kit estimated for 5000 hours running

Description	Quantity Engine, size				
	6 L	7 L	10 L	12 L	16 L
Gasket kit, cylinder head	2	2	6	6	6
Gasket kit, decarbonizing	1	1	1	1	1
Sleeve	6	6	6	6	6
Gasket kit, conn. turbo		1	1	1	1
Repair kit, water pump	1		1	1	1
Oil filter	12	12	24	24	24
Fuel filter	12	12	12	12	12
Oil filter, by-pass		12			
Air filter	4	4	8	8	8
Gasket kit, overhaul			1	1	1
Gasket kit, manifold	1	1	1	1	1
Drive belt, alternator	2	2	2	2	2
Drive belt, alternator	2	2	2	2	2
Sealant	1	1	1	1	1
Gasket, valve cover		2	6	6	6
Gasket, valve cover			6		
Seal ring, sleeve	6	6	6		
Seal ring, thermostat	1	1	1	1	1
Seal ring, thermostat	1	1	1	1	1
Thermostat	1	1	1	1	1
Water filter					10
Nozzle	6	6	6	6	6
Intake valve	3	3	2	2	
Exhaust valve	3	3	2	2	
Steel ring	6	6			
O-ring	6	6			
Gasket kit charge air cooler			1 (TWD)	1 (TWD)	

Note !
Maintenance kits has to be ordered separately from engine order

90.12–15 Engine Packing dimensions (mm)

Pos. No.	Length	Width	Height
TD 610 G, TWD 610 G			
90.12	1420	840	1431
90.13	1440	883	1478
90.14	1633	1100	1466
90.15	2067	1184	1742
TD 710 G, TWD 710 G			
90.12	1420	840	1465
90.13	1440	883	1478
90.14	1633	1100	1505
90.15	2067	1184	1742
TAD 730 G			
90.12	1420	840	1488
90.13	1440	883	1478
90.14	1851	1100	1625
90.15	2067	1184	1742
TD 1010 G, TWD 1010 G			
90.12	1580	935	1669
90.13	1700	1094	1750
90.14	2000	1100	1678
90.15	2288	1338	1842
TAD 1030 G			
90.12	1580	935	1669
90.13	1700	1094	1750
90.14	2059	1100	1731
90.15	2288	1338	1842
TD 1210 G, TWD 1210 G, TWD 1211 G			
90.12	1580	935	1669
90.13	1700	1094	1750
90.14	2059	1100	1715
90.15	2288	1338	1812
TAD 1231 G, TAD 1232 G			
90.12	1580	935	1669
90.13	1700	1094	1750
90.14	2059	1100	1763
90.15	2288	1338	1842
TWD 1630 G, TAD 1630 GE			
90.12	1865	975	1765
90.13	1935	1094	1882
90.14	2292	1173	1808
90.15	2610	1344	2047
TAD 1631 GE			
90.12	1865	975	1765
90.13	1935	1094	1882
90.14	2292	1270	1808
90.15	2610	1444	2047

90.10
Maintenance kit estimated for 2500 hours running

Description	Quantity Engine, size 6 L	7 L	10 L	12 L	16 L
Gasket, valve cover			2		
Gasket, valve cover		2	2	6	
Oil filter	6	6	12	12	12
Fuel filter	6	6	6	6	6
Oil filter, by-pass		6			6
Air filter	2	2	4	4	4
Drive belt, alternator	1	1	1	1	1
Drive belt, alternator	1	1	1	1	1
Sealant	1	1	1	1	1
Sealant ring, thermostat	1	1	1	1	1
Sealant ring, thermostat	1	1	1	1	1
Thermostat	1	1	1	1	2
Water filter					5

90.11
Maintenance kit estimated for 5000 hours running

Description	Quantity Engine, size 6 L	7 L	10 L	12 L	16 L
Gasket kit, cylinder head	2	2	6	6	6
Gasket kit, decarbonizing	1	1	1	1	1
Sleeve	6	6	6	6	6
Gasket kit, conn. turbo		1	1	1	1
Repair kit, water pump	1		1	1	1
Oil filter	12	12	24	24	24
Fuel filter	12	12	12	12	12
Oil filter, by-pass		12			
Air filter	4	4	8	8	8
Gasket kit, overhaul			1	1	1
Gasket kit, manifold	1	1	1	1	1
Drive belt, alternator	2	2	2	2	2
Drive belt, alternator	2	2	2	2	2
Sealant	1	1	1	1	1
Gasket, valve cover		2	6	6	6
Gasket, valve cover			6		
Seal ring, sleeve	6	6	6		
Seal ring, thermostat	1	1	1	1	1
Seal ring, thermostat	1	1	1	1	1
Thermostat	1	1	1	1	1
Water filter					10
Nozzle	6	6	6	6	6
Intake valve	3	3	2	2	
Exhaust valve	3	3	2	2	
Steel ring	6	6			
O-ring	6	6			
Gasket kit charge air cooler			1 (TWD)	1 (TWD)	

Note !
Maintenance kits has to be ordered separately from engine order

90.12–15 Engine Packing dimensions (mm)

Pos. No.	Length	Width	Height
TD 610 G, TWD 610 G			
90.12	1420	840	1431
90.13	1440	883	1478
90.14	1633	1100	1466
90.15	2067	1184	1742
TD 710 G, TWD 710 G			
90.12	1420	840	1465
90.13	1440	883	1478
90.14	1633	1100	1505
90.15	2067	1184	1742
TAD 730 G			
90.12	1420	840	1488
90.13	1440	883	1478
90.14	1851	1100	1625
90.15	2067	1184	1742
TD 1010 G, TWD 1010 G			
90.12	1580	935	1669
90.13	1700	1094	1750
90.14	2000	1100	1678
90.15	2288	1338	1842
TAD 1030 G			
90.12	1580	935	1669
90.13	1700	1094	1750
90.14	2059	1100	1731
90.15	2288	1338	1842
TD 1210 G, TWD 1210 G, TWD 1211 G			
90.12	1580	935	1669
90.13	1700	1094	1750
90.14	2059	1100	1715
90.15	2288	1338	1812
TAD 1231 G, TAD 1232 G			
90.12	1580	935	1669
90.13	1700	1094	1750
90.14	2059	1100	1763
90.15	2288	1338	1842
TWD 1630 G, TAD 1630 GE			
90.12	1865	975	1765
90.13	1935	1094	1882
90.14	2292	1173	1808
90.15	2610	1344	2047
TAD 1631 GE			
90.12	1865	975	1765
90.13	1935	1094	1882
90.14	2292	1270	1808
90.15	2610	1444	2047