موتور دیزل : Volvo-Penta	ژنراتور : Meccalte

Standby		Prime		
KVA	KW	KVA	KW	
705	564	637	509	دیزل ژنراتور

VOLVO PENTA GENSET ENGINE

TWD1643GE

613 kW (834 hp) at 1500 rpm, 674 kW (917 hp) at 1800 rpm, acc. to ISO 3046

The TWD1643GE is a powerful, reliable and economical Generating Set Diesel Engine built on the dependable in-line six design.

Durability & low noise

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

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

Low exhaust emission

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

The TWD1643GE is certified for EPA Tier 2. An additional feature is that TWD1643GE fulfils EU Stage 2 exhaust emission levels.

Easy service & maintenance

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

Features

- Cooling system (55°C)
- Fully electronic with Volvo Penta EMS 2
- Dual frequency switch (between 1500 rpm and 1800 rpm)
- High power density
- Emission compliant
- Low noise levels
- Low fuel consumption
- Gen Pac configuration
- Compact design for the power class

Technical description

Engine and block

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

Lubrication system

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

Fuel system

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

Cooling system

- TWD-cooling system with optimized priority and cold start valves
- Two water cooled charge air coolers
- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop
- Belt driven, maintenance-free coolant pump with high degree of efficiency

Turbo charger

- Efficient and reliable dual stage turbo chargers
- Intermediate charge air coolers for both turbo chargers
- Waste gate system for the high pressure turbo charger

Electrical system

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

VOLVO PENTA

TWD1643GE

Technical Data

General

Engine designation	TWD1643GE
No. of cylinders and configuration	in-line 6
Method of operation	4-stroke
Bore, mm (in.)	144 (5.67)
Stroke, mm (in.)	165 (6.50)
Displacement, l (in³)	16.12 (983.7)
Compression ratio	16.5:1
Dry weight, kg (lb)	1700 (3748)
Dry weight with Gen Pac, kg (lb)	2200 (4850)
Wet weight, kg (lb)	1770 (3902)
Wet weight with Gen Pac, kg (lb)	2370 (5225)

Performance	**1500 rpm**	**1800 rpm**
with fan, kW (hp) at:		
Prime Power	536 (729)	585 (796)
Max Standby Power	596 (811)	644 (876)

Lubrication system	**1500 rpm**	**1800 rpm**
Oil consumption, liter/h (US gal/h) at:		
Prime Power	0.10 (0.026)	0.10 (0.026)
Max Standby Power	0.11 (0.029)	0.11 (0.039)
Oil system capacity incl filters, liter	48	

Fuel system	**1500 rpm**	**1800 rpm**
Specific fuel consumption at:		
Prime Power, g/kWh (lb/hph)		
25 %	215 (0.349)	224 (0.363)
50 %	196 (0.318)	201 (0.326)
75 %	196 (0.318)	197 (0.319)
100 %	199 (0.323)	202 (0.327)
Max Standby Power, g/kWh (lb/hph)		
25 %	210 (0.340)	220 (0.357)
50 %	195 (0.316)	200 (0.324)
75 %	196 (0.318)	198 (0.321)
100 %	200 (0.324)	204 (0.331)

Intake and exhaust system	**1500 rpm**	**1800 rpm**
Air consumption, m³/min (cfm) at:		
Prime Power	44 (1541)	53 (1874)
Max Standby Power	47 (1658)	55 (1937)
Max allowable air intake restriction, kPa (PSI)	5 (0.7)	5 (0.7)
Heat rejection to exhaust, kW (BTU/min) at:		
Prime Power	415 (23601)	472 (26842)
Max Standby Power	463 (26330)	530 (30141)
Exhaust gas temperature after low pressure turbine, °C (°F) at:		
Prime Power	450 (842)	422 (792)
Max Standby Power	463 (865)	461 (862)
Max allowable back-pressure in exhaust line, kPa (PSI)	10 (1.5)	10 (1.5)
Exhaust gas flow, m³/min (cfm) at:		
Prime power	101.6 (3586)	119 (4201)
Max Standby Power	111.8 (3949)	130.1 (4593)

Standard equipment

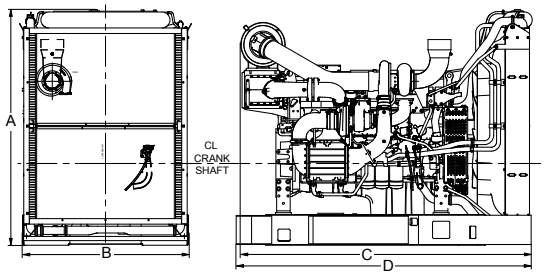
	Engine	Gen Pac
Engine		
Automatic belt tensioner	•	•
Lift eyelets	•	•
Flywheel		
Flywheel housing with conn. acc. to SAE 1	•	•
Flywheel for 14" flex. plate and flexible coupling	•	•
Vibration dampers	•	•
Engine suspension		
Fixed front suspension	•	•
Lubrication system		
Oil dipstick	•	•
Full-flow oil filter of spin-on type	•	•
By-pass oil filter of spin-on type	•	•
Oil cooler, side mounted	•	•
Low noise oil sump	•	•
Fuel system		
Fuel filters of spin-on type	•	•
Electronic unit injectors	•	•
Pre-filter with water separator	•	•
Intake and exhaust system		
Air filter without rain cover	•	•
Air restriction indicator	•	•
Air cooled exhaust manifold	•	•
Connecting flange for exhaust pipe	•	•
Exhaust flange with v-clamp	•	•
Turbo chargers, dual stage, right side	•	•
Cooling system		
TWD-cooling system	•	•
Belt driven driven coolant pump	•	•
Fan hub	•	•
Pusher fan	–	•
Fan guard	–	•
Belt guard	–	•
Control system		
Engine Management System (EMS) with CAN-bus interface SAE J1939	•	•
CIU, Control Interface Unit	–	–
DCU, Display Control Unit	–	–
Alternator		
Alternator 80A / 24 V	•	•
Starting system		
Starter motor, 7.0kW, 24 V	•	•
Instruments and senders		
Temp. and pressure for automatic stop/alarm	•	•
Other equipment		
Expandable base frame	–	•
Engine Packing		
Plastic wrapping	•	•

– optional equipment or not applicable

• included in standard specification

Dimensions TWD1643GE

Not for installation



A* = 1925 mm / 76 in
B* = 1350 mm / 53.1 in (max width 1401 mm / 55.2 in)
C = 2362 mm / 93 in
D = 2399 mm / 94.5 in (During transport)
D = Max 3255 mm / 128.2 in

* Including radiator and intercooler

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

Power Standards

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

Exhaust emissions

The TWD1643GE is certified for EPA Tier 2. An aditional feature is that TWD1643GE fulfils EU Stage 2 exhaust emission levels.

Rating Guidelines

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

Information

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

AB Volvo Penta
SE-405 08 Göteborg, Sweden
www.volvopenta.com

GENERATOR TYPE ECO 40-1.5L/4

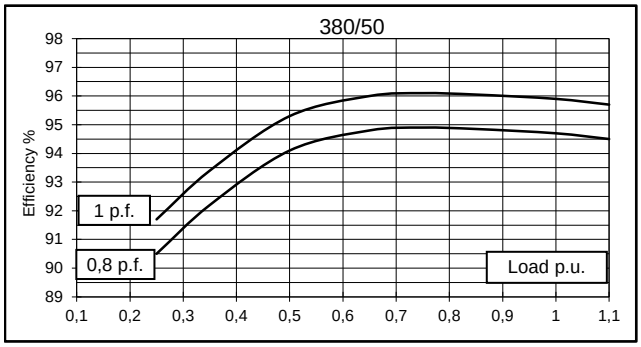
Document : **DS069A/1**
issue 006 date 21/03/2014

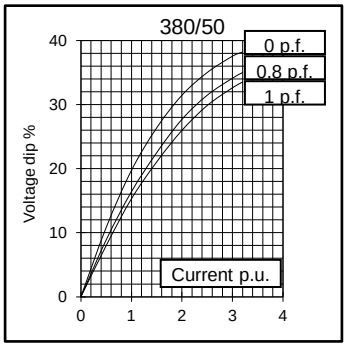
Electrical Characteristics									
Frequency		Hz	50				60			
Voltage (parallel star)		V	380	400	415	440	415	440	460	480
Rated power class H		kVA	620	620	620	570	660	700	744	744
		kW	496	496	496	456	528	560	595	595
Rated power class F		kVA	560	560	560	515	600	632	672	672
		kW	448	448	448	412	480	506	538	538
Regulation with		DER1	±1% with any power factor and speed variations between -5% +30%							
Insulation class			H							
Execution			Brushless							
Stator winding			12 ends							
Rotor			with damping cage							
Efficiencies class H	4/4	%	94,7	94,9	94,6	94,4	95,4	95,8	95,9	96,1
(see graph. for details)	3/4	%	94,9	95,1	94,9	94,6	95,6	96	96,1	96,3
	2/4	%	94,1	94,2	94,1	94	94,8	94,9	95	95,2
	1/4	%	90,5	90,6	90,6	90,4	91,6	91,6	91,7	91,8
Reactances (f. l.cl. F)	Xd	%	285	250	135	85	430	370	285	250
	Xd'	%	19,6	18,4	17,6	16,4	20,9	19,6	19,6	18,4
	Xd"	%	10,8	9,8	9,1	8,7	11,4	10,7	10,8	9,8
	Xq	%	156	146	128	114	162	158	156	146
	Xq'	%	156	146	128	114	162	158	156	146
	Xq"	%	23,7	22,3	21,2	20,7	24,3	23,4	23,7	22,3
	X_2	%	12,4	11,5	10,7	9,3	13,4	12,6	12,4	11,5
	X_0	%	3,1	2,7	2,5	2,2	3,5	3,2	3,1	2,7
Short Circuit Ratio	Kcc		0,35	0,40	0,75	1,30	0,23	0,27	0,35	0,40
Time Constants	Td'	sec.	0,15							
	Td"	sec.	0,019							
	Tdo'	sec.	3,10							
	Tα	sec.	0,04							
Short Circuit Current Capacity		%	>300				>350			
Excitation at no load		Amp.	0,65	0,74	0,8	0,95	0,47	0,54	0,6	0,65
Excitation at full load		Amp.	3	3,1	3,5	3,6	2,3	2,5	2,8	3
Overload (long-term)		%	1 hour in a 6 hours period 110% rated load							
Overload per 20 sec.		%	300							
Stator Winding Resistance (20°C)		Ω	0,0087							
Rotor Winding Resistance (20°C)		Ω	1,376							
Exciter Resistance (20 °C)		Ω	Rotor : 0,050				Stator : 8,85			
Heat dissipation at f.l.cl.H		W	27759	26655	28313	27051	25459	24551	25447	24155
Telephone Interference			THF < 2%				TIF < 40			
Radio interference			EN61000-6-3, EN61000-6-2. For others standards apply to factory							
Waveform Distors.(THD) at f. load		LL/LN %	2,2 / 2,4							
Waveform Distors.(THD) at no load		LL/LN %	2,4 / 2,5							
Mechanical characteristics										
Protection			IP 21 (other protection on request)							
DE bearing			6322							
NDE bearing			6318.2RS							
Weight of wound stator assembly		kg	524							
Weight of wound rotor assembly		kg	369							
Weight of complete generator		kg	1380							
Maximun overspeed		rpm	2250							
Unbalanced magnetic pull at f.l.cl.F		kN/mm	6,1							
Cooling air requirement		m^3/min	54				64,8			
Inertia Constant (H)		sec.	0,179				0,214			
Noise level at 1m/7m		dB(A)	94 / 82				98 / 88			

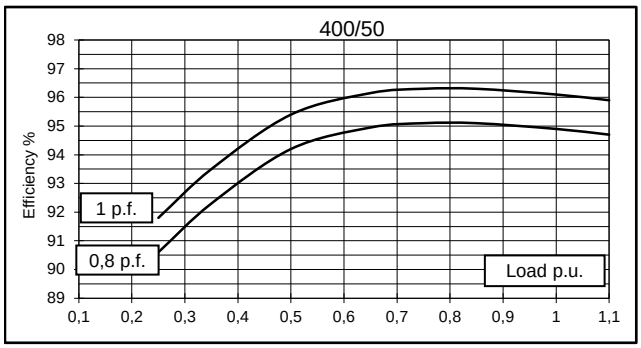
All technical data are to be considered as a reference and they can be modified without any notice.

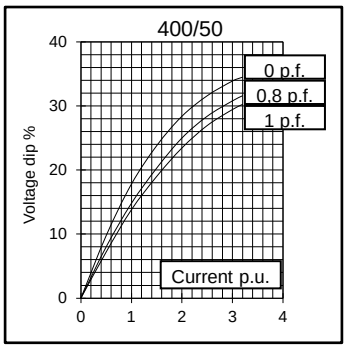
GENERATOR TYPE ECO 40-1.5L/4

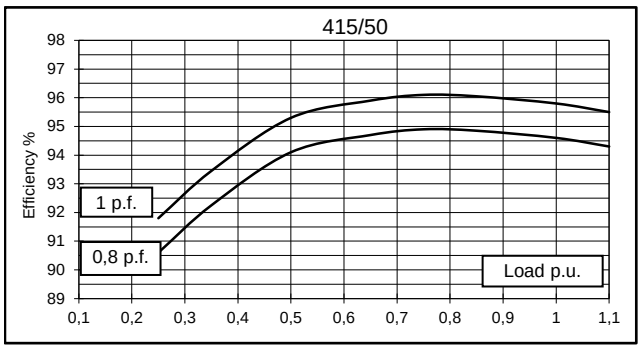
50 Hz

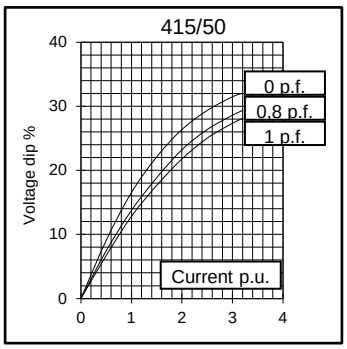


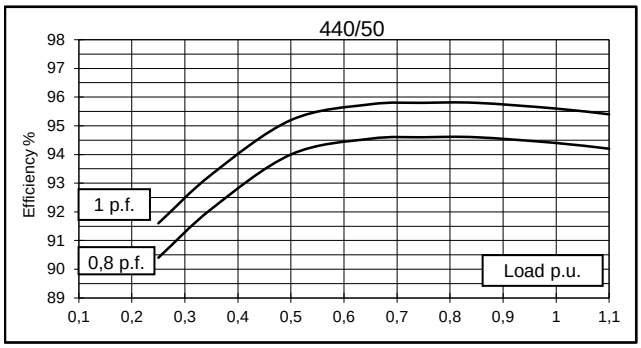


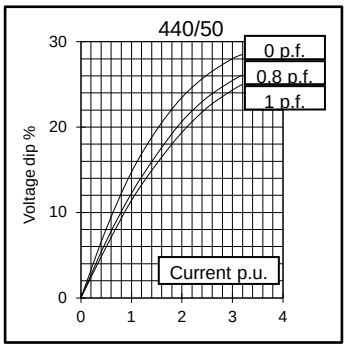


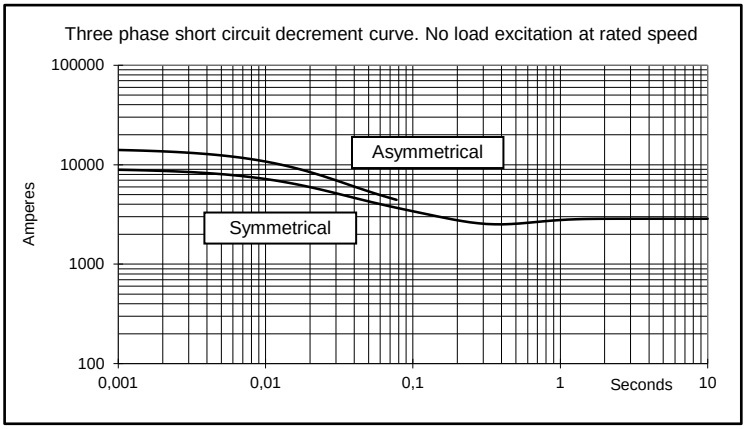






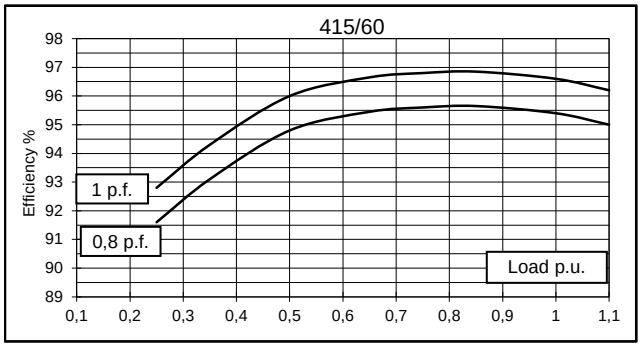


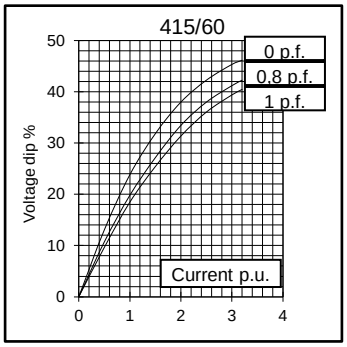


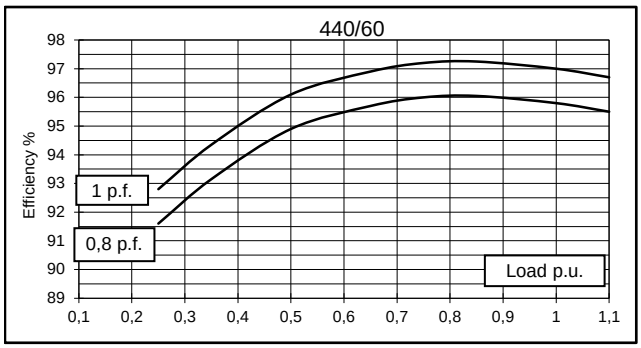


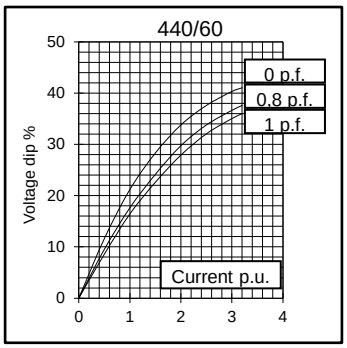
GENERATOR TYPE ECO 40-1.5L/4

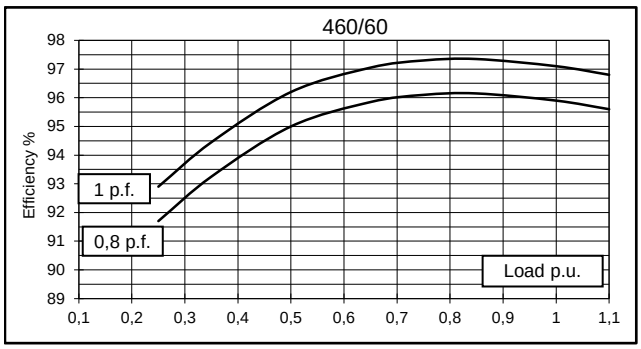
60 Hz

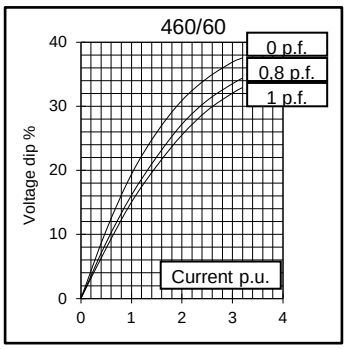


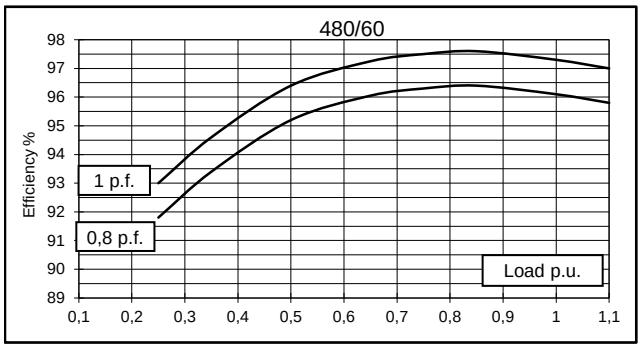


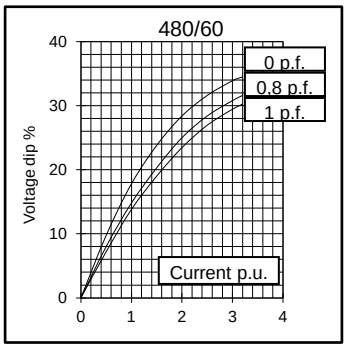


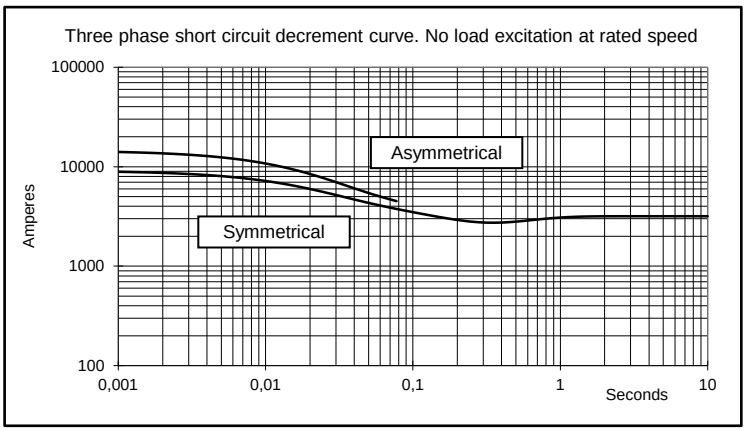




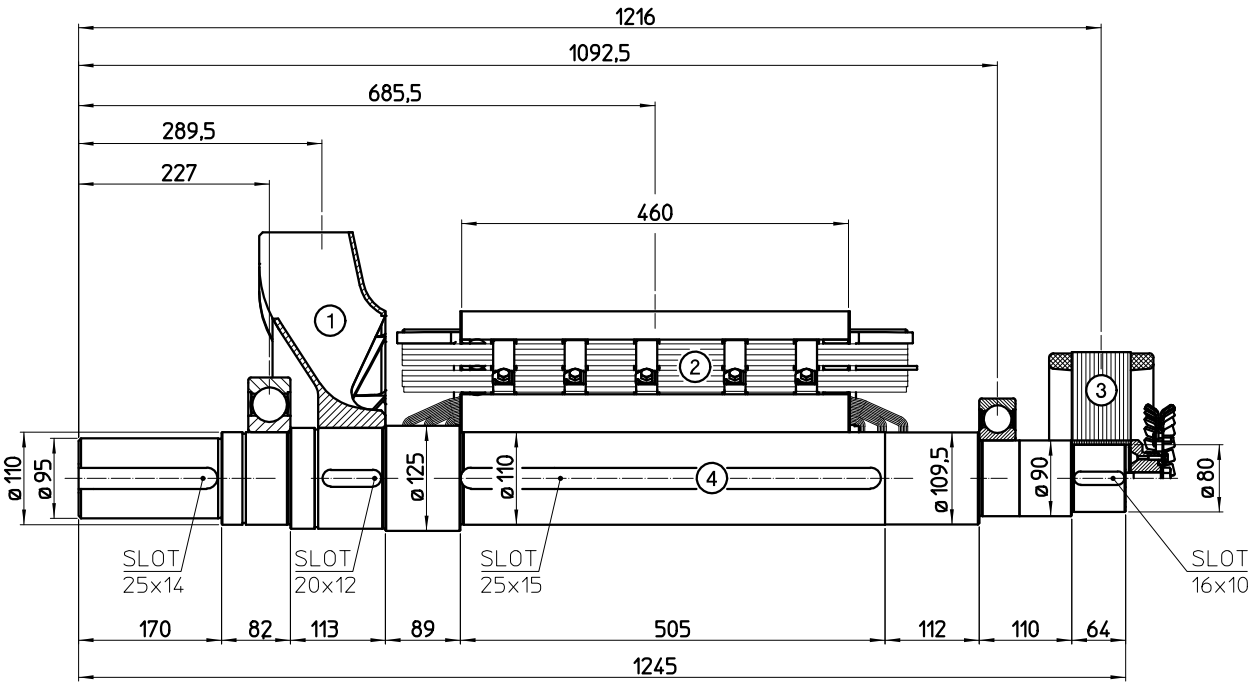






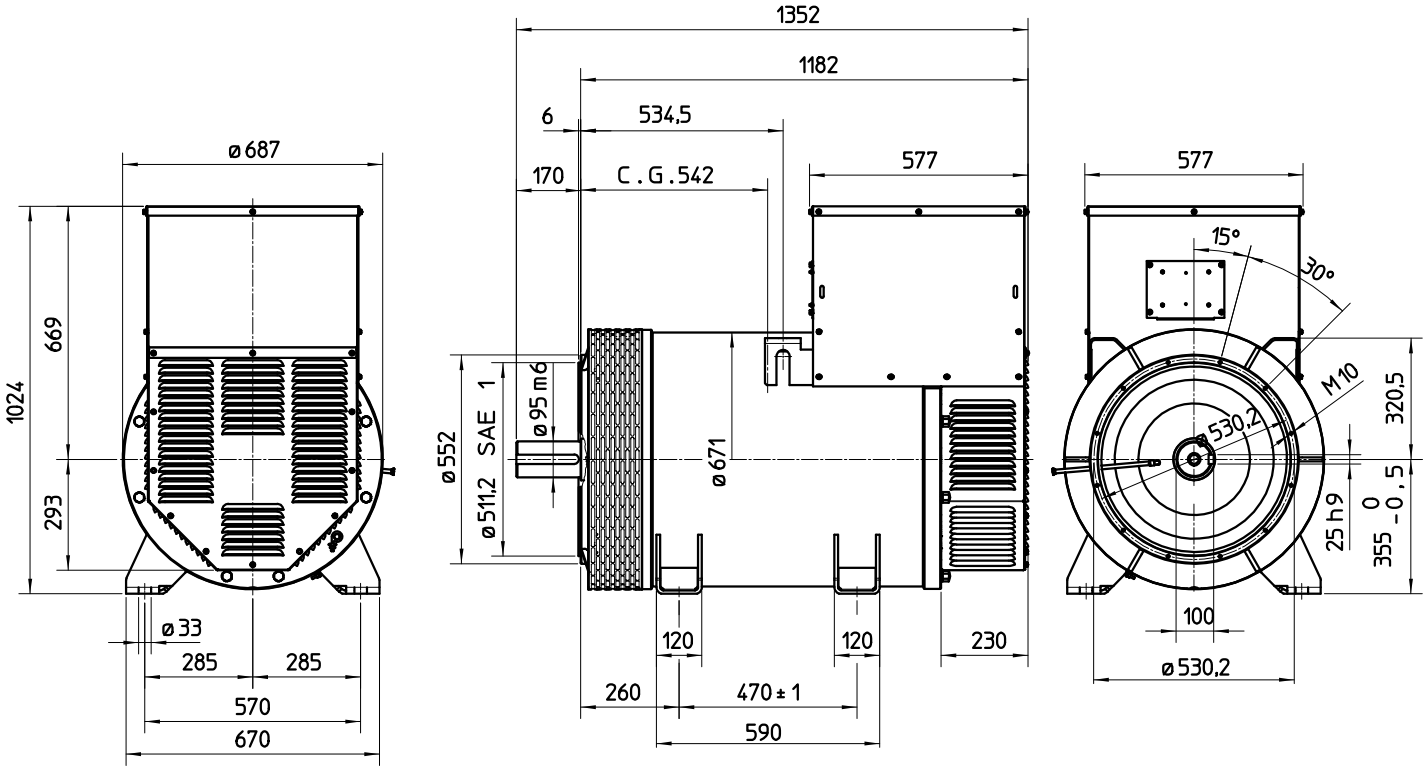


TWO BEARING MOMENTS OF INERTIA



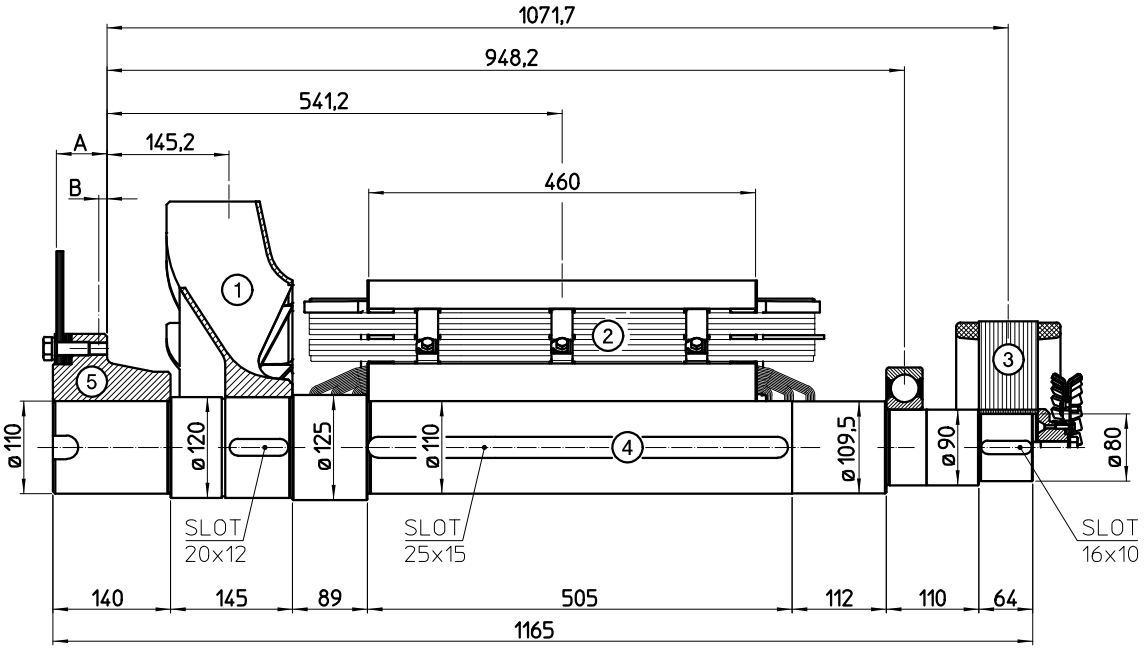
	COMPONENT	WEIGHT kg	J kgm ^{2}
1	FAN	10,2	0,335
2	MAIN ROTOR	369	7.715
3	EX. ROTOR	35	0,562
4	SHAFT	85.7	0.127
	TOTAL	499.9	8.739

TWO BEARING DIMENSIONS



C.G.= GRAVITY CENTER

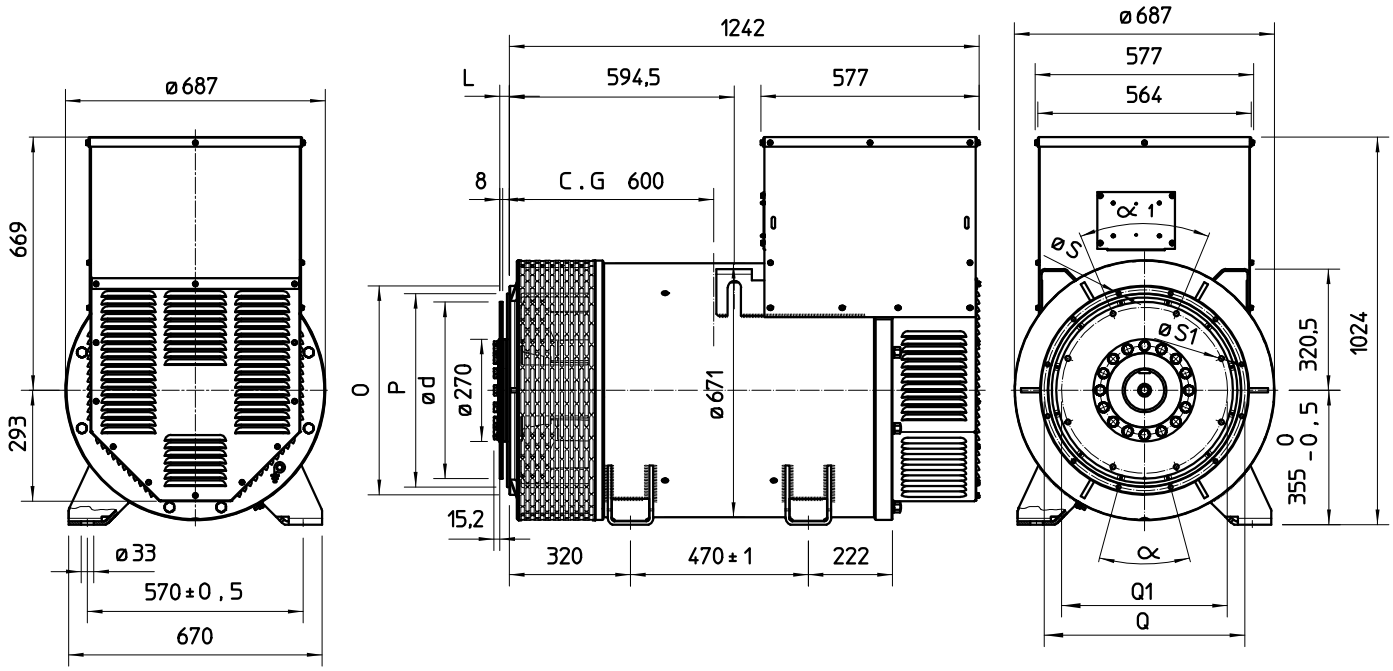
SINGLE BEARING MOMENTS OF INERTIA



	COMPONENT	WEIGHT kg	J kgm ^{2}
1	FAN	10,2	0,335
2	MAIN ROTOR	369	7.715
3	EX. ROTOR	35	0,562
4	SHAFT	84.2	0.129
	TOTAL	498.4	8.741

Sae No	⑤ SHAFTS COUPLING FLEX PLATE			
	A	B	WEIGHT kg	J kgm^2
14	60	9,6	41,4	0,511
18	50	6,6	45,1	0,858

SINGLE BEARING DIMENSIONS



SAE N.	FLANGIA / FLANGE BRIDE / FLANSCH					
	O	P	Q	N. FORI	S	∝
1	552	511,2	530,2	12	11	30°
1/2	648	584,2	619,1	12	14	30°
0	711	647,7	679,5	16	14	22,5°
00	883	787,4	850,9	16	14	22,5°

VOL. N.	GIUNTI A DISCHI / DISC COUPLING DISCQUE DE MONOPALIER / SCHEIBENKUPPLUNG					
	L	d	Q1	N. FORI	S1	∝1
14	25,4	466,72	438,15	8	14	45°
18	15,7	571,5	542,92	6	17	60°

C.G.= GRAVITY CENTER