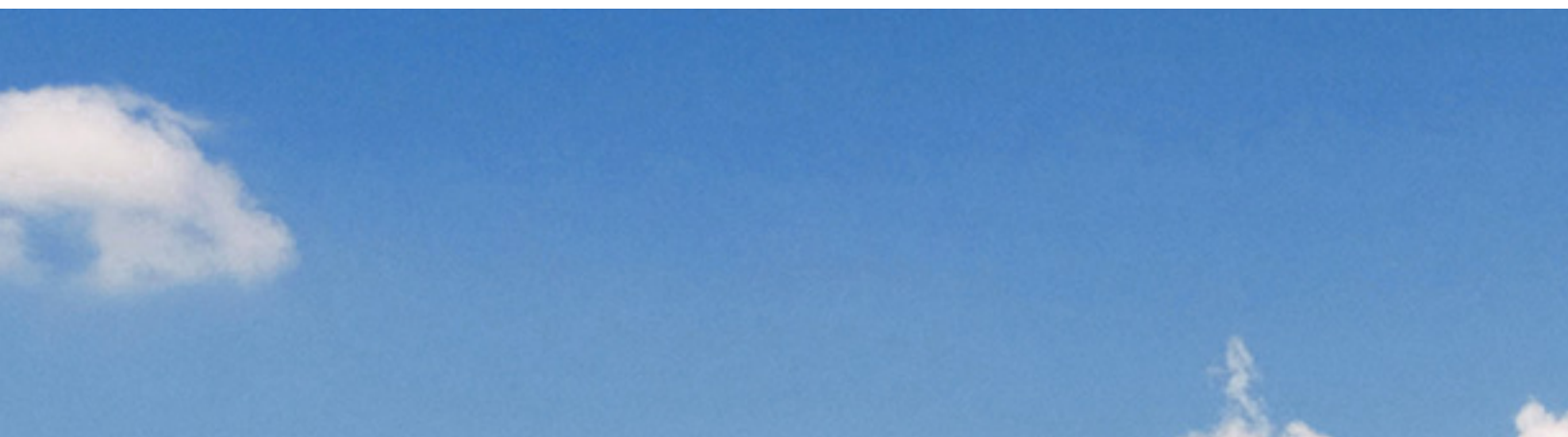


موتور دیزل

Manufacturer	Deutz	تولید کننده
Type	BF4M1013E	تیپ
Number of cylinders	4	تعداد سیلندر ها
Cylinder arrangement	in-line	آرایش سیلندر ها
Cycle	4 stroke	چرخه
Aspiration	Turbo charged	سیستم تنفس
Bore × Stroke , mm	105x120	قطر سیلندر × کورس پیستون
Displacement , Liters	7.15	جا به جایی
Speed Governor	Mechanical	سرعت گاورنر
Cooling System	LIQUID	سیستم خنک کننده
Frequency	50Hz	فرکانس
Starter Motor	12V	استارتر موتور



ژنراتور

Manufacturer	Mecc Alte	تولید کننده
Type	ECP34-1S	تیپ
Exciter type	Brushless	نوع کانتر
Power factor	0.8	ضریب قدرت
Voltage	380	ولتاژ
Frequency	50 Hz	فرکانس
Speed, Rpm	1500	سرعت
Insulation class	H	کلاس عایق
Protection class	IP21	کلاس حفاظتی
Excitation	Brushless	سیستم تمریک

<b>ENGINE</b>	<b>MAKE</b>	<b>MODEL</b>	<b>CONTINUOUS POWER</b> PRP norma ISO 8528-1	<b>85 kVA</b>
	DEUTZ	BF4M1013 E	<b>STAND-BY POWER</b> LTP norma ISO 8528-1	<b>95 kVA</b>
<b>ALTERNATOR</b>	MECC-ALTE	ECP 34-1S/4	<b>400/230 V</b>	

VOLTAGE	HZ	PHASE	COS	PRP KVA/KW	LTP KVA/KW	AMPERAGE A
415/240	50	3	0,8	85,0/68,0	93,5/74,8	130,23
400/230	50	3	0,8	85,0/68,0	93,5/74,8	135,12
380/220	50	3	0,8	85,0/68,0	93,5/74,8	142,23
240/139	50	3	0,8	85,0/68,0	93,5/74,8	225,19
230/133	50	3	0,8	85,0/68,0	93,5/74,8	234,98
220/127	50	3	0,8	85,0/68,0	93,5/74,8	245,66

**GENERAL DATA**

POWER PRP (kWm)	78.50
POWER LTP (kWm)	82.50
No CYLINDERS	4
CYLINDERS CAPACITY (L)	1.20
DIAMETER PER STROKE (mm)	-
COMPRESSION RATIO	-
COOLING SYSTEM	LIQUID
INJECTION	direct
SUCTION	TURBO
SERIES REGULATOR	Mechanical
FLY WHEEL COUPLING	3 - 11,5"

**LUBRICATION SYSTEM**

OIL CAPACITY (L)	11
OIL CONSUMPTION (%)	0,30
MIN. ALARM OIL PRESSURE (BAR)	2,70

**VENTILATION SYSTEM**

AIR COOLING FLOW(m <sup>3</sup> /h)	5400
COMBUSTION AIR FLOW (m <sup>3</sup> /h)	285

**ELECTRICAL SYSTEM**

VDC (V)	12
BATTERY (Ah)	96

**ALTERNATOR CHARACTERISTICS/ ECP 34-1S/4****GENERAL DATA**

POWER PRP (kVA)	85
POWER LTP (kVA)	93,50
EFFICIENCY ALT. 3/4%	91,90
EFFICIENCY ALT. 4/4%	91,50
No POLES	4
VOLTAGE REGULATOR	DSR
No WIRES	12
INSULATION	H
Xd (%)	325
X'd (%)	22,30
X	7,40
DEGREE OF PROTECTION	IP21

**GENERATOR SET CONSUMPTION**

% POWER USED	LITRES / HOUR
50%	10
75%	15
100%	21

**DIMENSIONS (MM)**

LENGTH	WIDTH	HEIGHT
2950	1100	1759

**CAPACITIES**

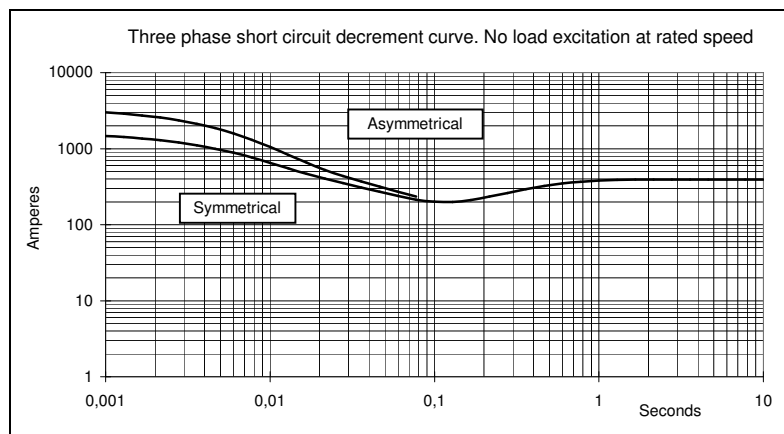
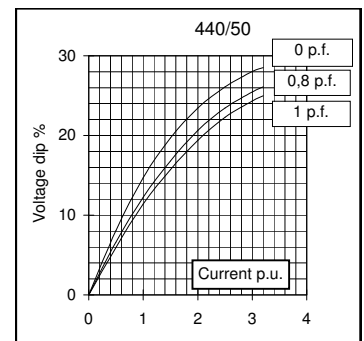
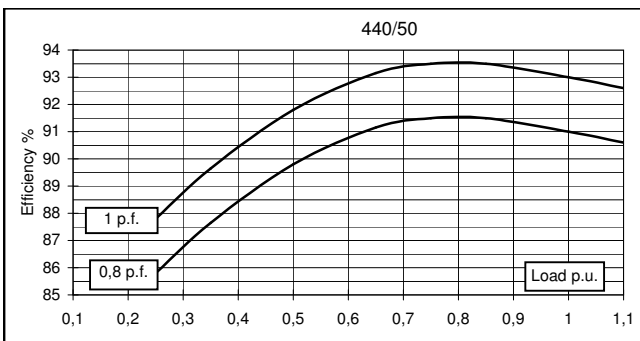
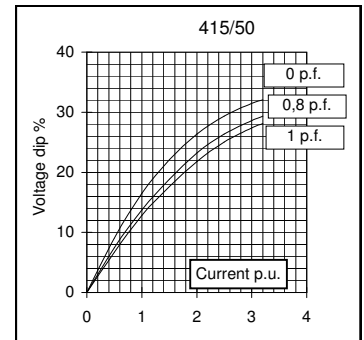
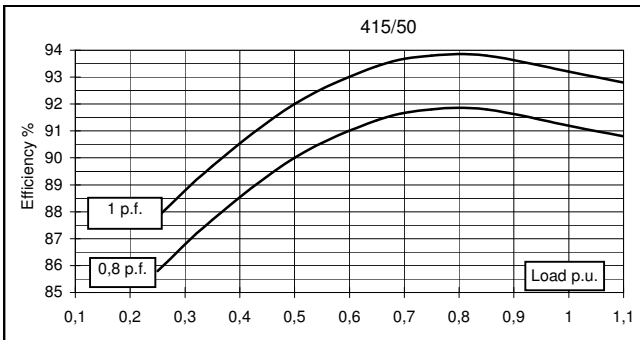
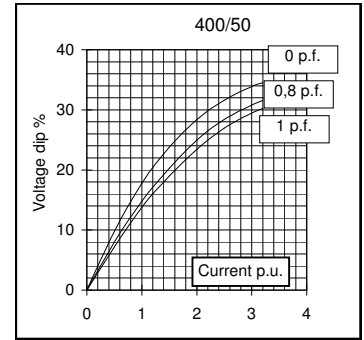
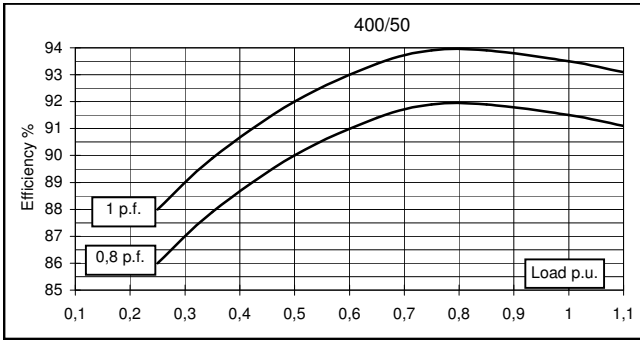
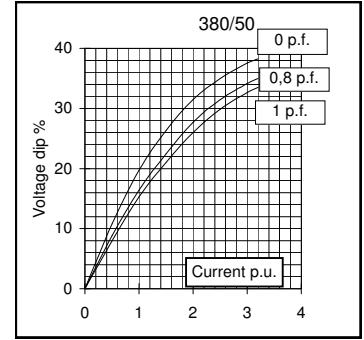
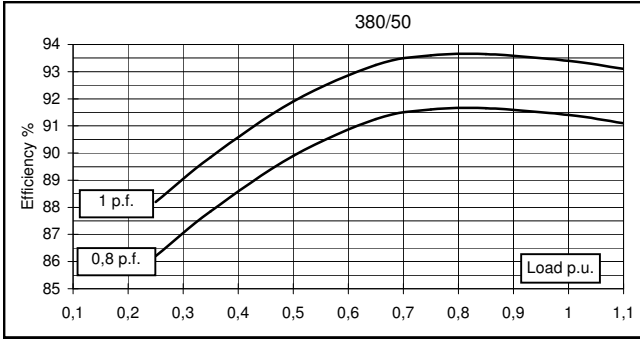
FUEL TANK (litres)	220.00
WEIGHT (kg)	1680.00
NOISE LEVEL (dB (A)) 7 m	64

Electrical Characteristics										
Frequency	Hz	50				60				
Voltage (series star)	V	380	400	415	440	415	440	460	480	
Rated power class H	kVA	85	85	85	70	95	102	102	102	
	kW	68	68	68	56	76	81,6	81,6	81,6	
Rated power class F	kVA	77	77	77	63	85,5	92	92	92	
	kW	61,6	61,6	61,6	50,4	68,4	73,6	73,6	73,6	
Regulation with DSR		±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	%	91,4	91,5	91,2	91	92,7	93,2	93,3	93,4
(see graph. for details)	3/4	%	91,6	91,9	91,8	91,5	93,3	93,5	93,6	93,8
	2/4	%	89,9	90	90	89,8	91,5	91,6	91,7	91,8
	1/4	%	86,2	86	85,8	85,8	87,7	87,7	87,7	87,5
Reactances (f. l.cl. F)	Xd	%	360,1	325	301,9	221,2	404,9	386,8	353,9	325
	Xd'	%	24,7	22,3	20,7	15,2	27,8	26,5	24,3	22,3
	Xd''	%	8,2	7,4	6,9	5,0	9,2	8,8	8,1	7,4
	Xq	%	188,9	170,5	158,4	116,0	212,4	202,9	185,6	170,5
	Xq'	%	188,9	170,5	158,4	116,0	212,4	202,9	185,6	170,5
	Xq''	%	32,7	29,5	27,4	20,1	36,8	35,1	32,1	29,5
	X <sub>2</sub>	%	21,3	19,2	17,8	13,1	23,9	22,8	20,9	19,2
	X <sub>0</sub>	%	4,0	3,6	3,3	2,5	4,5	4,3	3,9	3,6
Short Circuit Ratio	Kcc		0,45	0,50	0,62	1,07	0,35	0,40	0,45	0,50
Time Constants	Td'	sec.	0,04192							
	Td''	sec.	0,00575							
	Tdo'	sec.	1,50							
	Tα	sec.	0,0154							
Short Circuit Current Capacity		%	>300				>350			
Excitation at no load	Amp.		0,4	0,5	0,7	1	0,2	0,3	0,4	0,7
Excitation at full load	Amp.		2,2	2,3	2,5	2,8	1,9	2	2,1	2,2
Overload (long-term)		%	1 hour in a 6 hours period 110% rated load							
Overload per 20 sec.		%	300							
Stator Winding Resistance (20 °C)		Ω	0,03							
Rotor Winding Resistance (20 °C)		Ω	2,477							
Exciter Resistance (20 °C)		Ω	Rotor : 0,410				Stator : 15,28			
Heat dissipation at f.l.cl.H	W		6398	6317	6561	5538	5985	5954	5860	5766
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 %		1,6 / 1,8							
Waveform Distors.(THD) at no load	LL/LN %		2,9 / 3							
<b>Mechanical characteristics</b>										
Protection			IP 21 ( other protection on request )							
DE bearing			6314.2RS							
NDE bearing			6311.2RS							
Weight of wound stator assembly	kg		97							
Weight of wound rotor assembly	kg		63							
Weight of complete generator	kg		331							
Maximun overspeed	rpm		2250							
Unbalanced magnetic pull at f.l.cl.F	kN/mm		4,9							
Cooling air requirement	m <sup>3</sup> /min		19,3				23			
Inertia Constant (H)	sec.		0,111				0,133			
Noise level at 1m/7m	dB(A)		79 / 65				83 / 69			

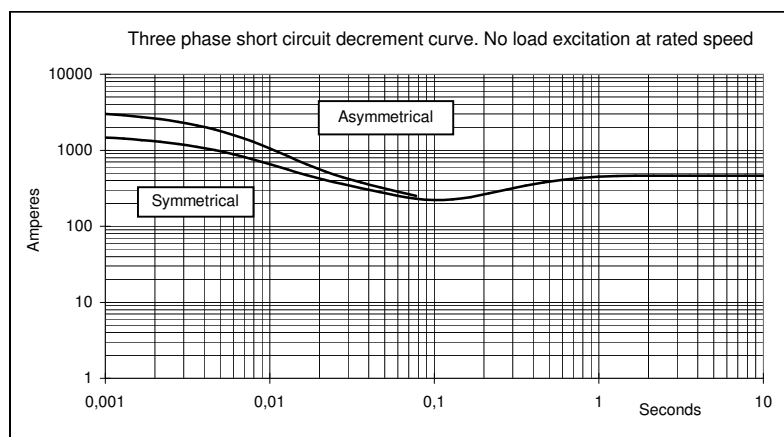
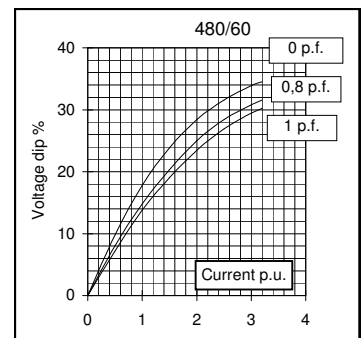
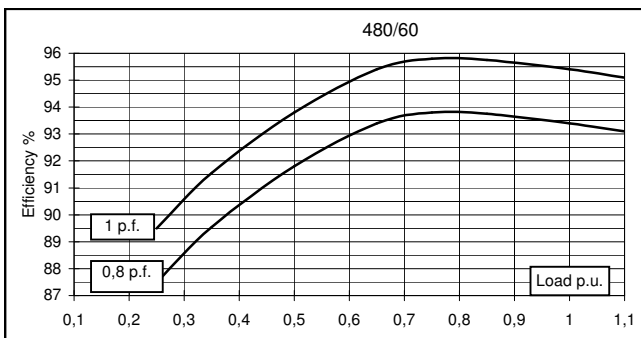
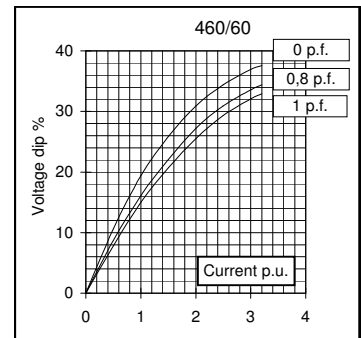
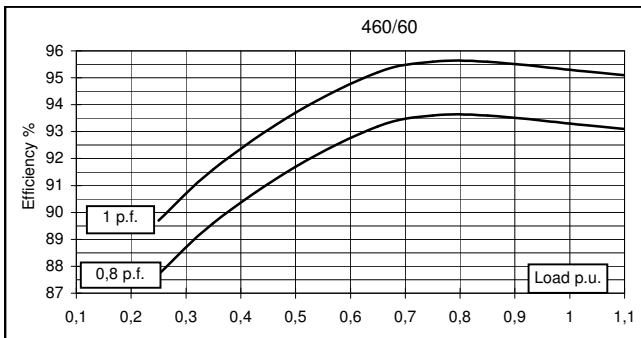
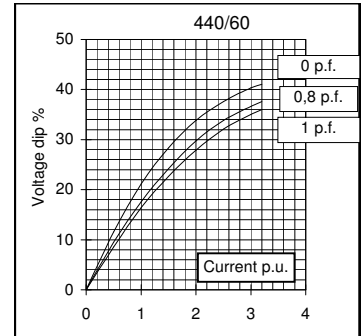
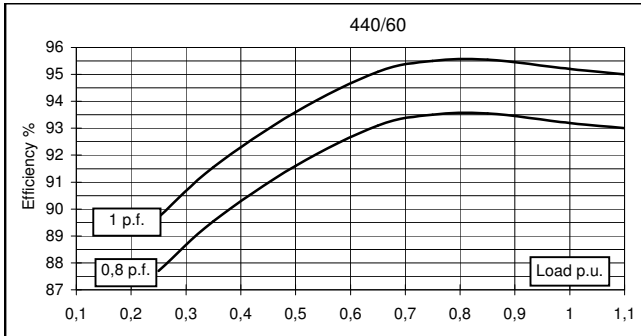
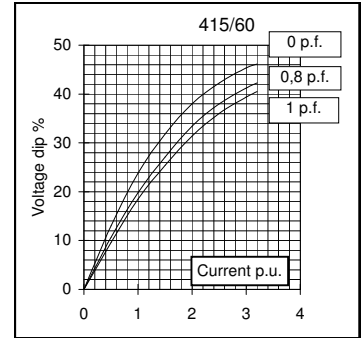
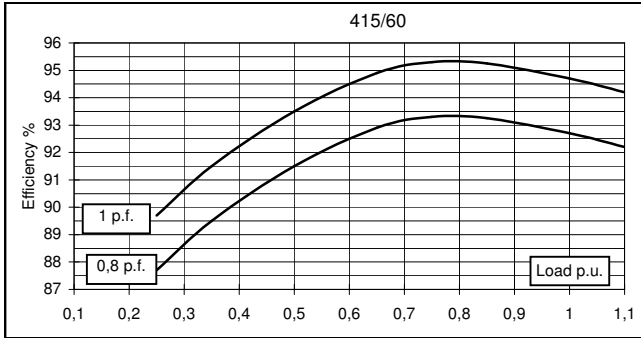
All technical data are to be considered as a reference and they can be modified without any notice.

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50 Hz

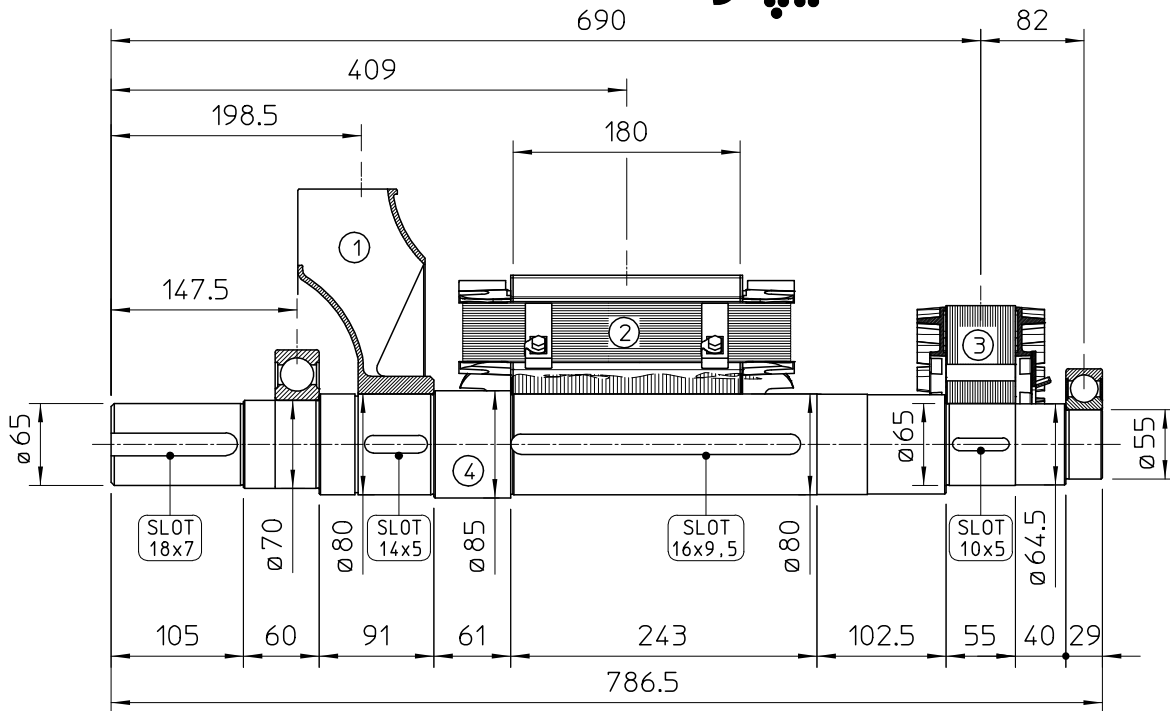


60 Hz



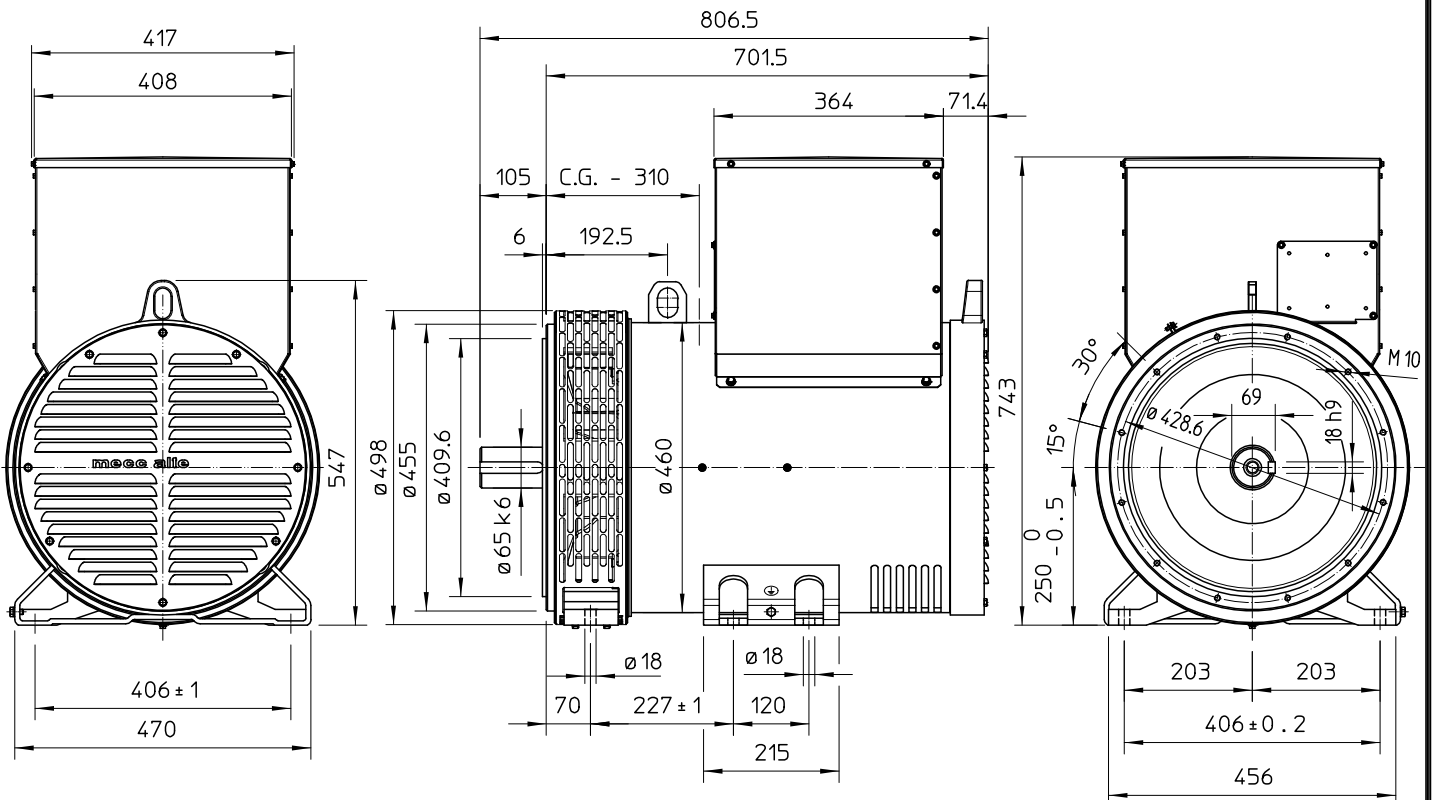


TWO BEARING MOMENTS OF INERTIA



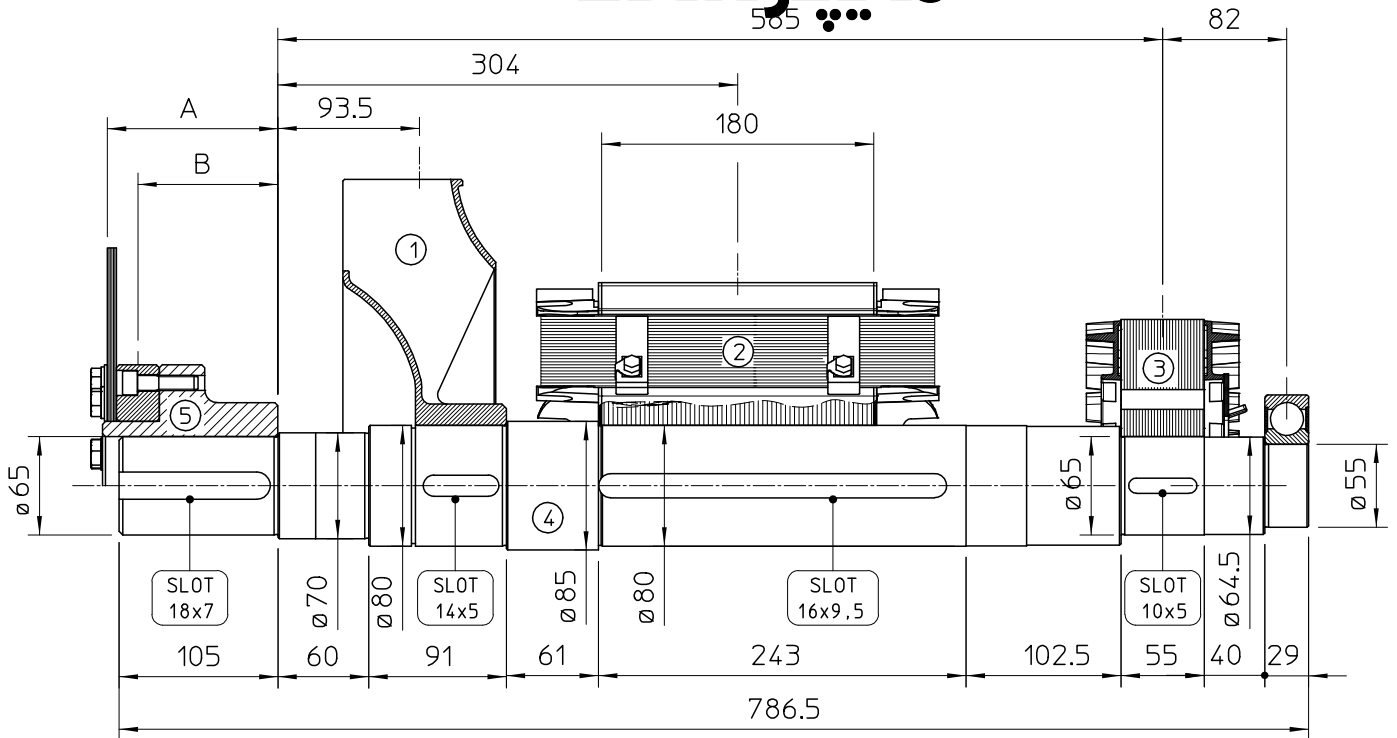
POS.	COMPONENT	WEIGHT (kg)	J (kgm <sup>2</sup> )
1	FAN	3.6	0.0451
2	MAIN ROTOR	64.8	0.5847
3	EX. ROTOR	14.5	0.0874
4	SHAFT	26.8	0.0196
TOTAL		109.7	0.7368

TWO BEARING DIMENSIONS



C.G.= GRAVITY CENTER

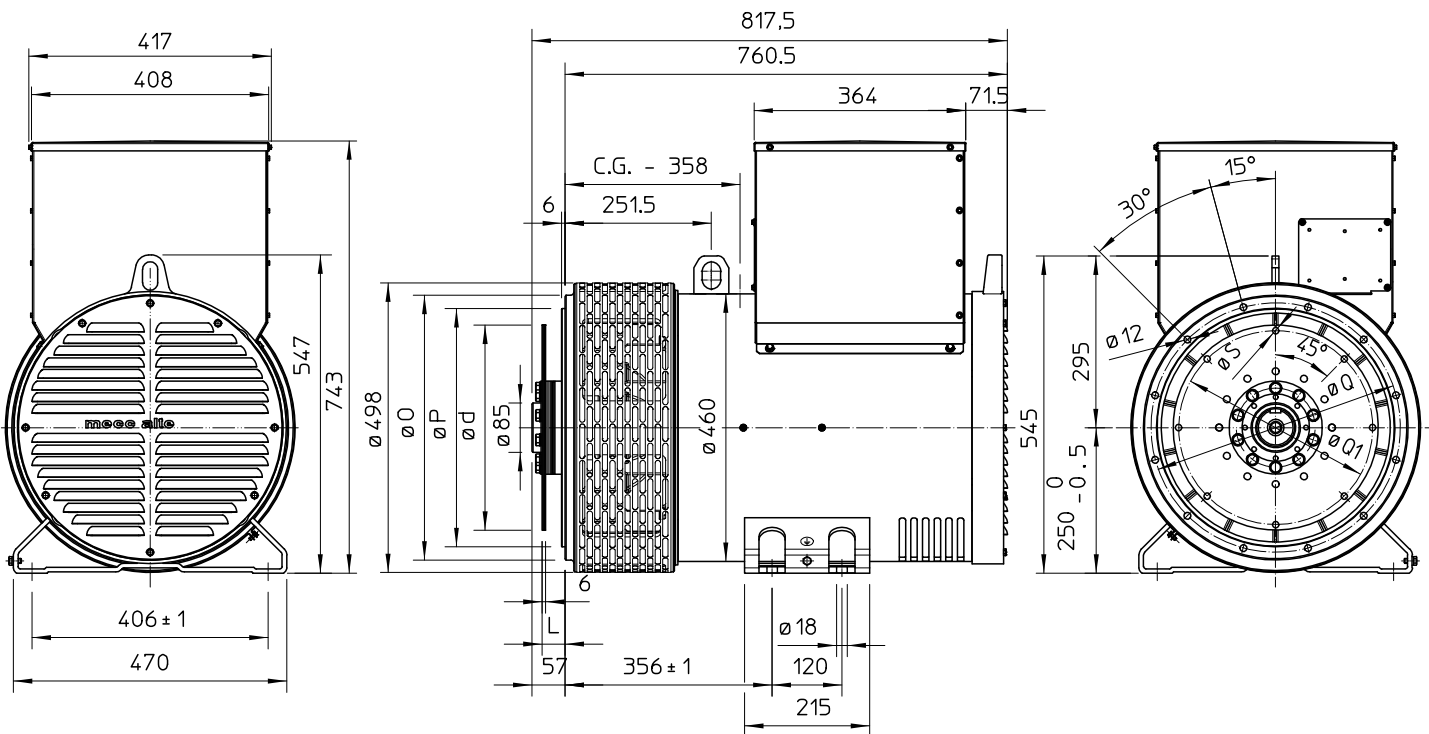
SINGLE BEARING MOMENTS INERTIA



POS.	COMPONENT	WEIGHT (kg)	J (kgm <sup>2</sup> )
1	FAN	3.6	0.0451
2	MAIN ROTOR	64.8	0.5847
3	EX. ROTOR	14.5	0.0874
4	SHAFT	26.8	0.0196
TOTAL		109.7	0.7368

SAE N°	5		SHAFTS COUPLING FLEX PLATE	
	A	B	WEIGHT kg	J kgm <sup>2</sup>
10	112.8	35.6	13.5	0.0770
11 1/2	98.6	71.5	12.4	0.0956
14	84.4	68.6	14.8	0.2360

SINGLE BEARING DIMENSIONS



SAE N.	FLANGIA / FLANGE BRIDE / FLANSCH		
	O	P	Q
3	451	409.6	428.6
2	489	447.7	466.7
1	552	511.2	530.2

SAE N.	GIUNTI A DISCHI / DISC COUPLING DISCQUE DE MONOPALIER / SCHEIBENKUPPLUNG			
	L	d	Q1	S
10	53.8	314.32	295.27	11
11 1/2	39.6	352.42	333.37	11
14	25.4	466.72	438.15	14

C.G.= GRAVITY CENTER

# FAMCO

## هایپر صنعت

### موتور دیزل

Manufacturer	Deutz	تولید کننده
Type	BF4M1013EC	تیپ
Number of cylinders	4	تعداد سیلندر ها
Cylinder arrangement	in-line	آرایش سیلندر ها
Cycle	4 stroke	چرخه
Aspiration	Turbo charged CAC	سیستم تنفس
Bore × Stroke , mm	105X130	قطر سیلندر × کورس پیستون
Displacement , Liters	4.76	جا به جایی
Speed Governor	Mechanical	سرعت گاورنر
Cooling System	water-cooled	سیستم فنک کننده
Starter Motor	12 V	استارتر موتور

## ژنراتور

Manufacturer	Mecc alte	تولید کننده
Type	ECP <sub>34</sub> - 2S	تیپ
Exciter type	Brushless, Self-excited	نوع کانتر
Power factor	0.8	ضریب قدرت
Voltage	380	ولتاژ
Frequency	50 Hz	فرکانس
Speed, Rpm	1500	سرعت
Insulation class	H	کلاس عایق
Protection class	IP <sub>23</sub>	کلاس حفاظتی
Excitation	Brushless	سیستم تمریک

## GENERAL INFORMATION

### DIESEL GENERATOR SET

Model	DE110D5 / DE110D6	
Motor	DEUTZ BF4M1013EC	
Alternator	STAMFORD OR LEROY SOMER	
Speed Control type	Mechanical / Electrical	
Phase	Three	
Fuel Tank Capacity	300 L	
System Voltage	12V	
Frequency	50HZ	60HZ
Air Flow	6100m <sup>3</sup> /h	7600m <sup>3</sup> /h
Combustion air flow	365.3m <sup>3</sup> /h	465.6m <sup>3</sup> /h
Exhaust air flow	1102m <sup>3</sup> /h	1316m <sup>3</sup> /h
Exhaust Temperature	560°C	520°C

### Engine

Maximum output(kw)	88KW(50Hz)	88KW(60Hz)
Number of Cylinders	inline 4	
Aspiration	Turbo charged, CAC	
Cycle	4	
Fuel Type	Diesel	
Combustion Type	Direct Injection	
Cooling Type	Water cooled	
Bore	108mm	
Stroke	130mm	
Displacement	4.76L	
Compression Ratio	19:1	
Lubrication Capacity	11 liter	
Coolant Capacity	7.4 liter	

FUEL CONSUMPTION	1500 RPM	1800 RPM
	L/hr	L/hr
100% Prime Power(1)	25.8	28
75% Prime Power(1)	19.3	21.1
50% Prime Power(1)	13.1	14.5
25% Prime Power(1)	7.2	8.3

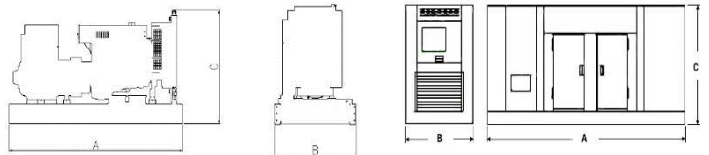
DIMENSION	OPEN	SILENT
Length (A)	2300mm	2900mm
Width (B)	1080mm	1080mm
Height (C)	1580mm	1970mm
Net Weight	1335kg	1735kg

### Alternator

Insulation	Clase "H"
Excitation Type	Self-excitation or PMG
Protection class	IP23

### Certificates

Engine	ISO 3046, BS 5514, DIN 6271
Alternator	UTE NFC 51-111-105-110
	ICE34-1, BS 5000-4999
	NEMA MG 21, VDE 0530
Generator Set	ISO 8528



(1)Prime Power: ratings are as per DIN 6271, BS55114 and ISO-3046 with 10% overload capacity

(2)Standby Power: power available at variable load for up to a maximum of 500 hours during one year of which 300 hours may be for continuous use

(3)Operation at Altitude ≤1500m, Ambient temperature ≤ 40°C).If altitude higher than 1500m, each 300m will cause additional de-rating 4%.

**Certificacion ISO 9001:2000**



# GENERATOR TYPE ECP 34-2S/4 A

Document : DS273A/1

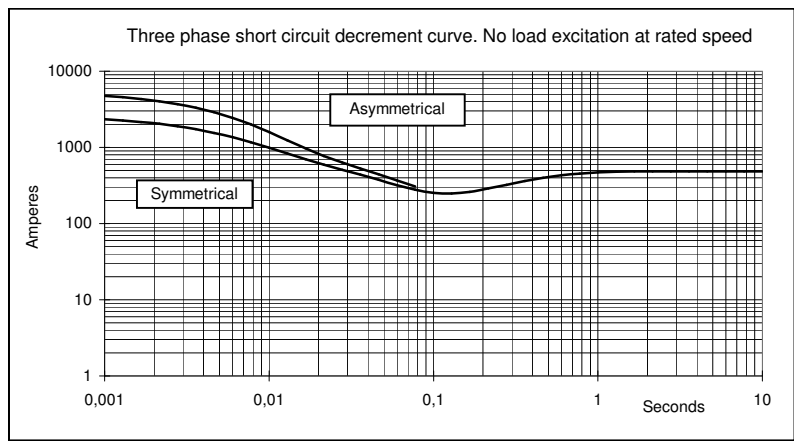
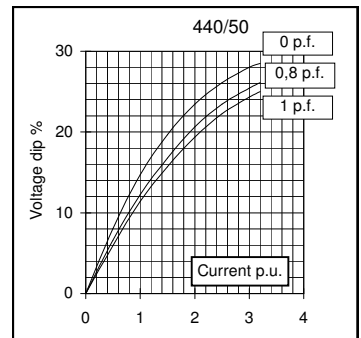
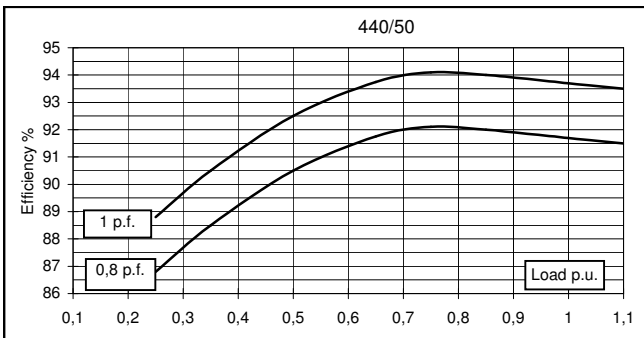
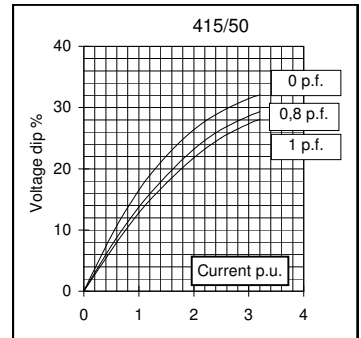
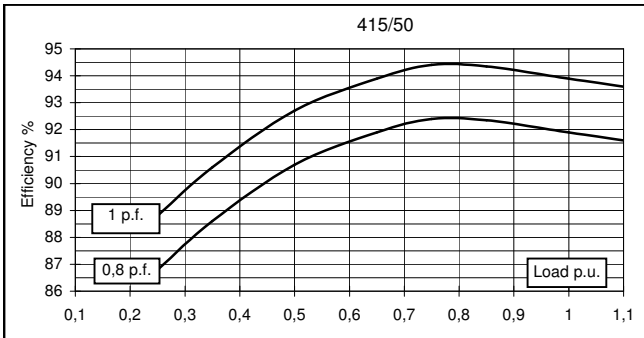
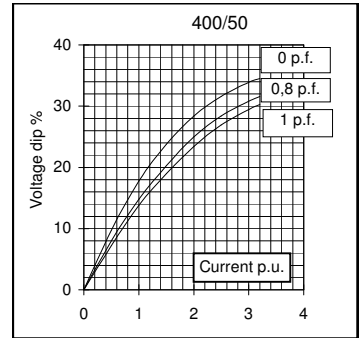
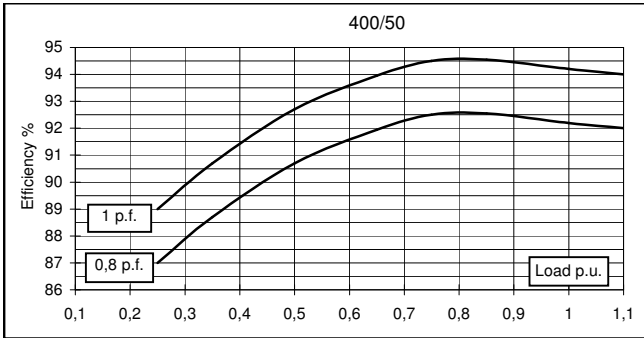
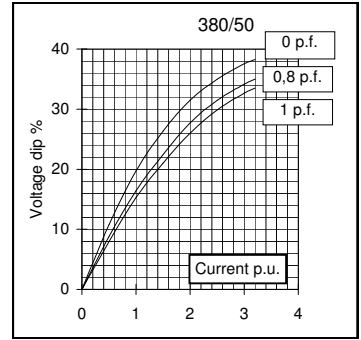
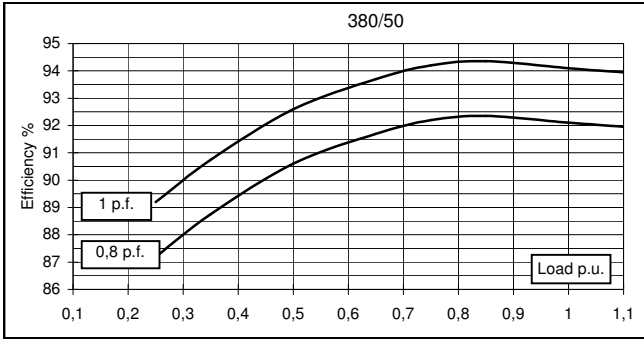
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Electrical Characteristics										
Frequency	Hz	50				60				
Voltage (series star)	V	380	400	415	440	415	440	460	480	
Rated power class H	kVA	105	105	105	85	115	126	126	126	
	kW	84	84	84	68	92	101	101	101	
Rated power class F	kVA	95	95	95	77	104	114	114	114	
	kW	76	76	76	61,6	83,2	91,2	91,2	91,2	
Regulation with DSR		±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	%	92,1	92,2	91,9	91,7	93,1	93,6	93,7	93,8
(see graph. for details)	3/4	%	92,2	92,5	92,4	92,1	93,6	93,8	93,9	94,1
	2/4	%	90,6	90,7	90,7	90,5	92	92,1	92,2	92,3
	1/4	%	87,2	87	86,8	86,8	88,2	88,2	88,2	88
Reactances (f. l.cl. F)	Xd	%	254,8	230	213,7	153,9	280,8	273,7	250,4	230
	Xd'	%	19,5	17,6	16,4	11,8	21,5	20,9	19,2	17,6
	Xd''	%	6,3	5,7	5,3	3,8	7,0	6,8	6,2	5,7
	Xq	%	165,8	149,6	139,0	100,1	182,7	178,0	162,9	149,6
	Xq'	%	165,8	149,6	139,0	100,1	182,7	178,0	162,9	149,6
	Xq''	%	34,6	31,2	29,0	20,9	38,1	37,1	34,0	31,2
	X <sub>2</sub>	%	20,5	18,5	17,2	12,4	22,6	22,0	20,1	18,5
	X <sub>0</sub>	%	3,9	3,5	3,3	2,3	4,3	4,2	3,8	3,5
Short Circuit Ratio	Kcc		0,41	0,47	0,61	0,90	0,32	0,35	0,41	0,47
Time Constants	Td'	sec.	0,0393							
	Td''	sec.	0,0055							
	Tdo'	sec.	1,70							
	Tα	sec.	0,0146							
Short Circuit Current Capacity		%	>300				>350			
Excitation at no load	Amp.		0,5	0,6	0,8	1,1	0,2	0,3	0,4	0,5
Excitation at full load	Amp.		2	2,2	2,3	2,6	1,7	1,9	2	2,2
Overload (long-term)		%	1 hour in a 6 hours period 110% rated load							
Overload per 20 sec.		%	300							
Stator Winding Resistance (20 °C)	Ω		0,02							
Rotor Winding Resistance (20 °C)	Ω		2,951							
Exciter Resistance (20 °C)	Ω		Rotor : 0,410				Stator : 15,28			
Heat dissipation at f.l.cl.H	W		7205	7106	7404	6155	6818	6892	6777	6663
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 %		1,8 / 1,9							
Waveform Distors.(THD) at no load	LL/LN %		2,8 / 2,9							
<b>Mechanical characteristics</b>										
Protection			IP 21 ( other protection on request )							
DE bearing			6314.2RS							
NDE bearing			6311.2RS							
Weight of wound stator assembly	kg		126							
Weight of wound rotor assembly	kg		81							
Weight of complete generator	kg		409							
Maximun overspeed	rpm		2250							
Unbalanced magnetic pull at f.l.cl.F	kN/mm		5,1							
Cooling air requirement	m <sup>3</sup> /min		19,3				23			
Inertia Constant (H)	sec.		0,111				0,133			
Noise level at 1m/7m	dB(A)		79 / 65				83 / 69			

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

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## 50 Hz



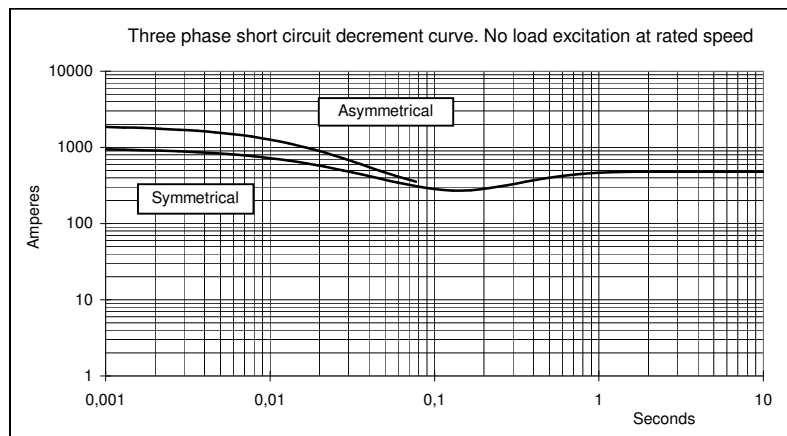
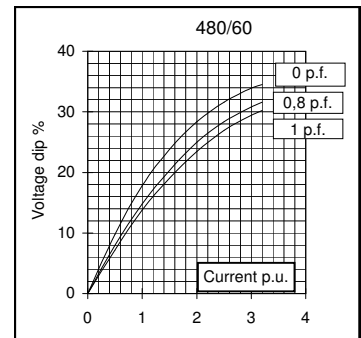
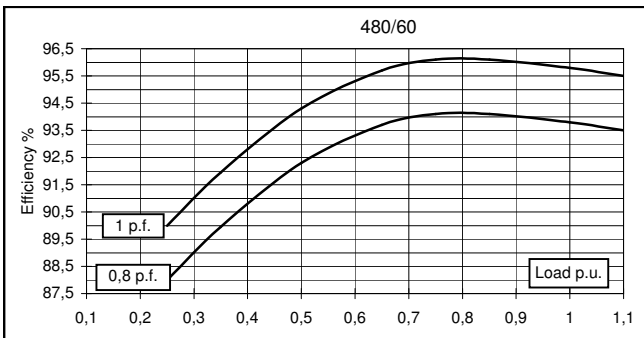
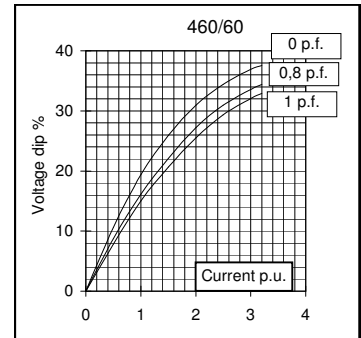
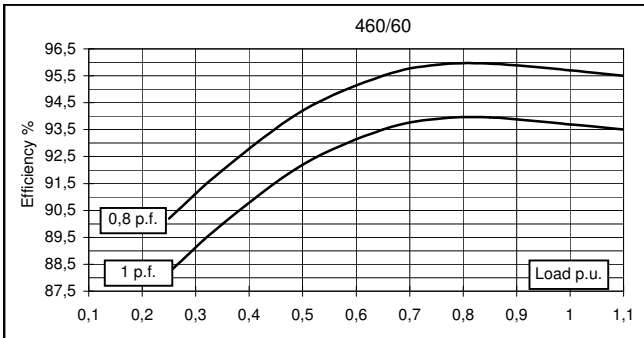
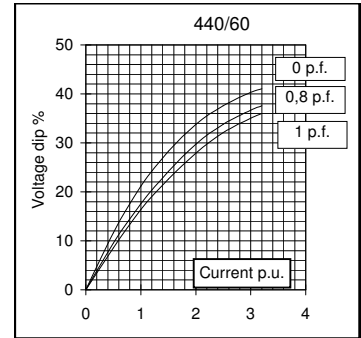
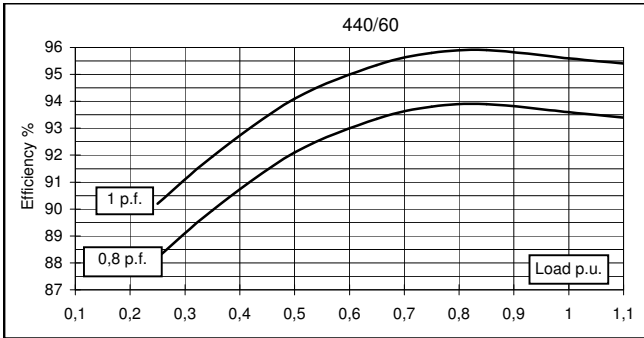
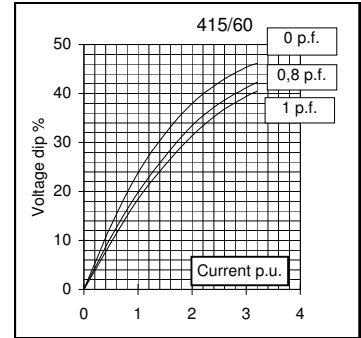
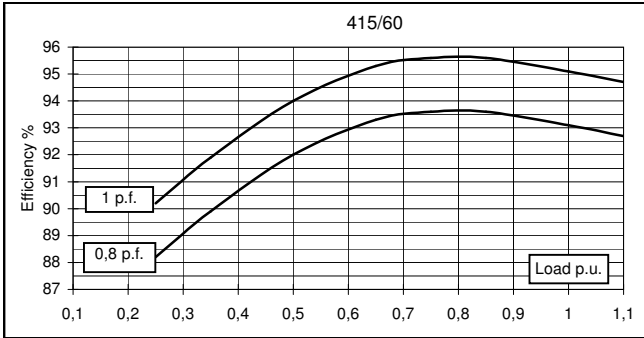


# GENERATOR TYPE ECP 34-2S/4 A

Document : DS273A/3

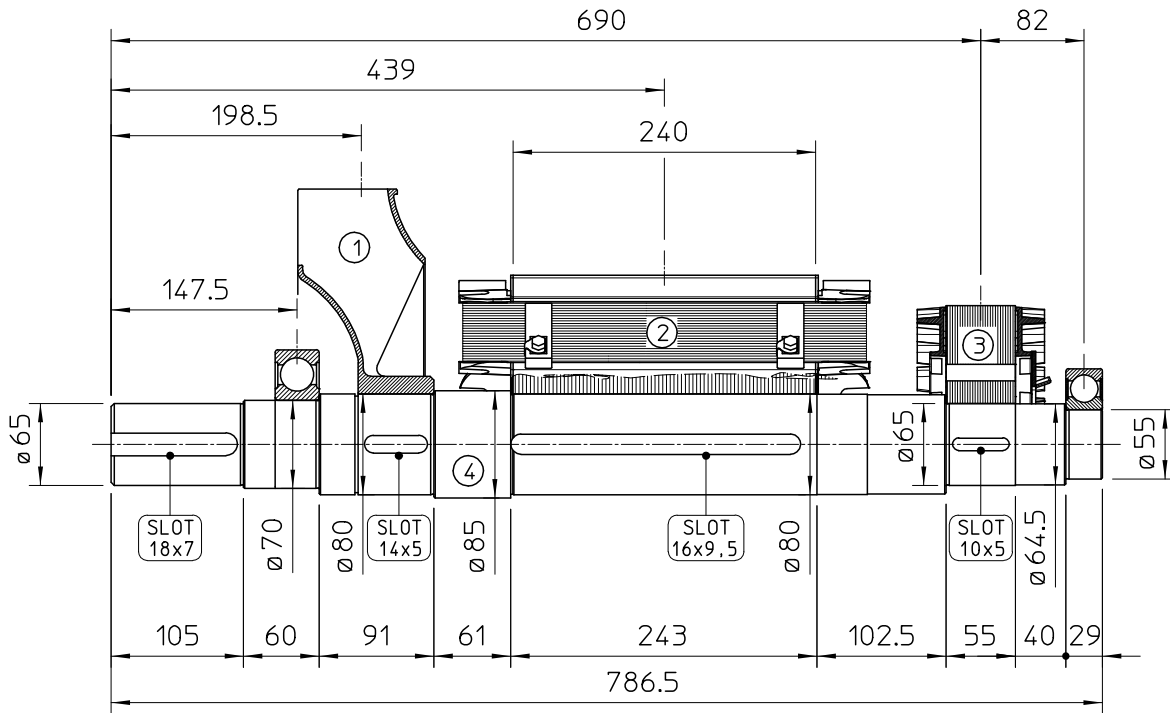
issue 000 date : 11/11/2013

## 60 Hz



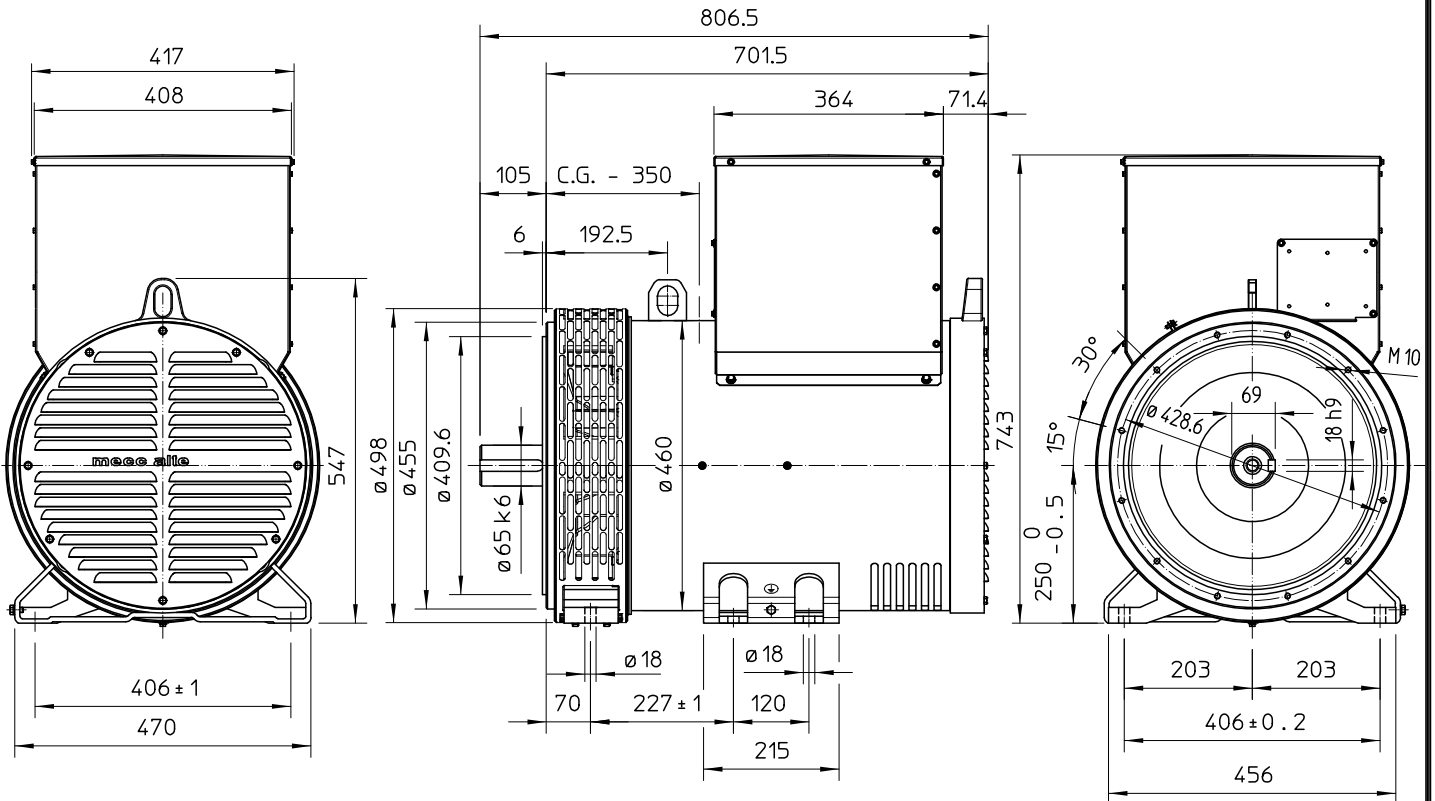


### TWO BEARING MOMENTS OF INERTIA



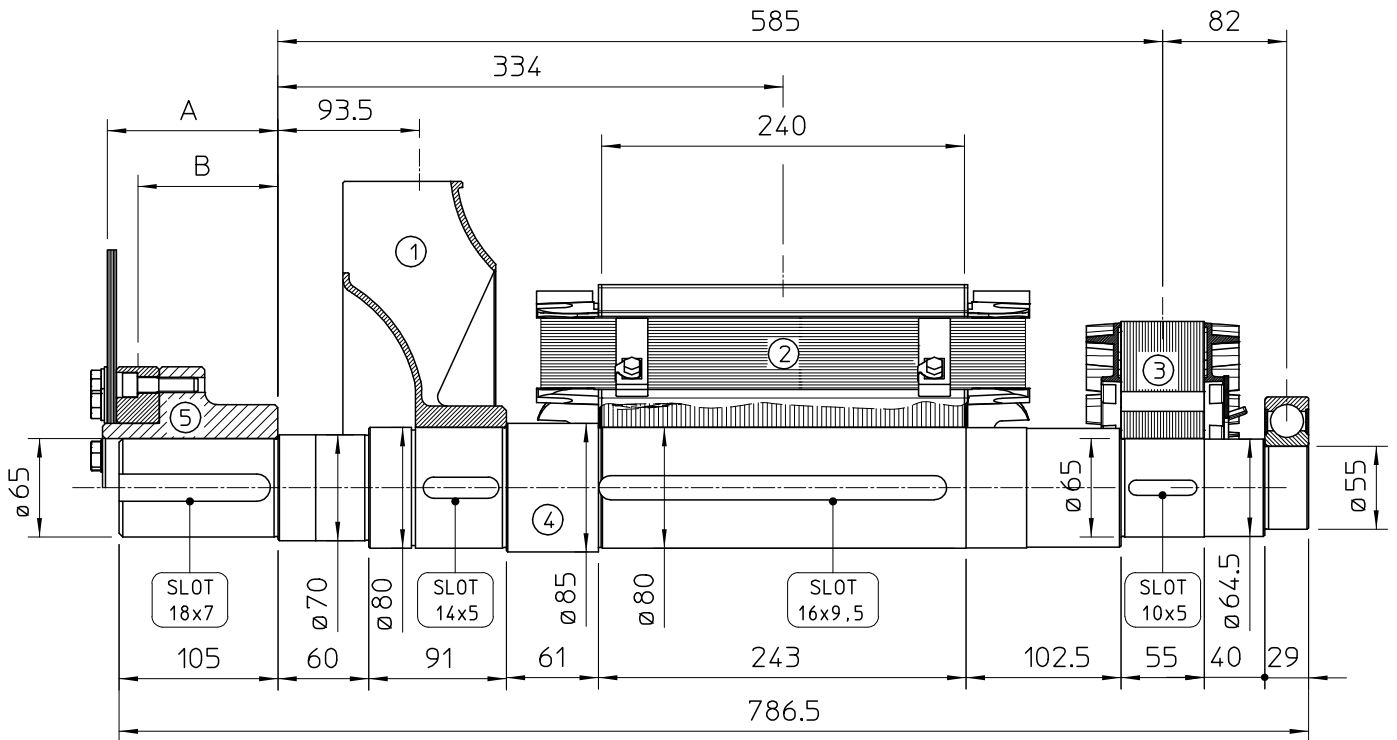
POS.	COMPONENT	WEIGHT (kg)	J (kgm <sup>2</sup> )
1	FAN	3.6	0.0451
2	MAIN ROTOR	83.7	0.7539
3	EX. ROTOR	14.5	0.0874
4	SHAFT	26.8	0.0196
TOTAL		128.6	0.906

### TWO BEARING DIMENSIONS



C.G.= GRAVITY CENTER

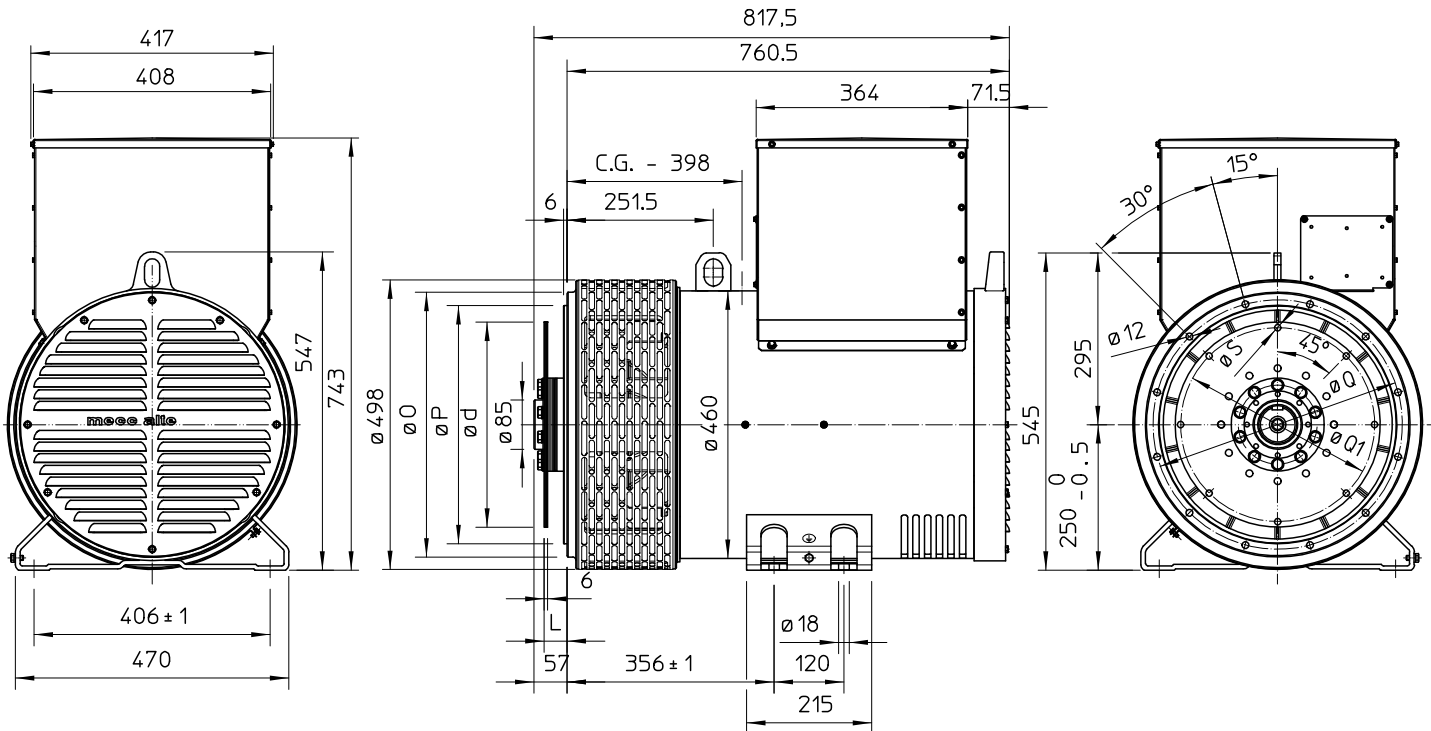
### SINGLE BEARING MOMENTS OF INERTIA



POS.	COMPONENT	WEIGHT (kg)	J (kgm <sup>2</sup> )
1	FAN	3.6	0.0451
2	MAIN ROTOR	83.7	0.7539
3	EX. ROTOR	14.5	0.0874
4	SHAFT	26.8	0.0196
TOTAL		128.6	0.906

SAE N°	5		SHAFTS COUPLING FLEX PLATE	
	A	B	WEIGHT kg	J kgm <sup>2</sup>
10	112.8	35.6	13.5	0.0770
11 1/2	98.6	71.5	12.4	0.0956
14	84.4	68.6	14.8	0.2360

### SINGLE BEARING DIMENSIONS



SAE N.	FLANGIA / FLANGE BRIDE / FLANSCH		
	O	P	Q
3	451	409.6	428.6
2	489	447.7	466.7
1	552	511.2	530.2

SAE N.	GIUNTI A DISCHI / DISC COUPLING DISQUE DE MONOPALIER / SCHEIBENKUPPLUNG			
	L	d	Q1	S
10	53.8	314.32	295.27	11
11 1/2	39.6	352.42	333.37	11
14	25.4	466.72	438.15	14

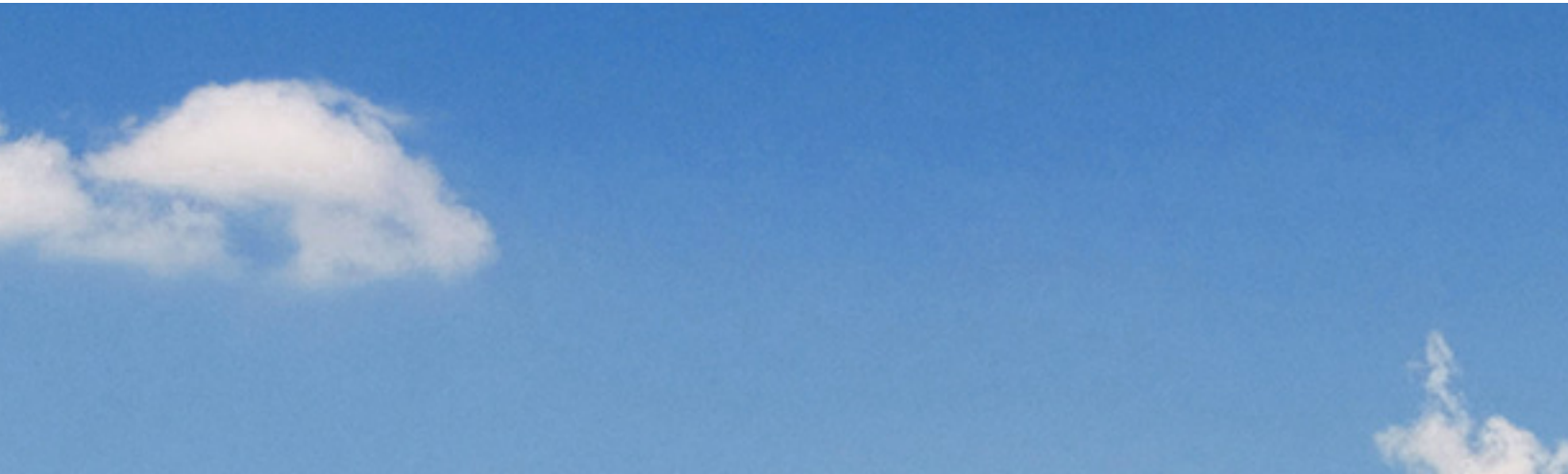
C.G.= GRAVITY CENTER

# FAMCO

## هایپر صنعت

### موتور دیزل

Manufacturer	Deutz	تولید کننده
Type	BF4M1013FC	تیپ
Number of cylinders	4	تعداد سیلندر ها
Cylinder arrangement	in-line	آرایش سیلندر ها
Cycle	4 stroke	چرخه
Aspiration	Turbo charged CAC	سیستم تنفس
Bore × Stroke , mm	105X130	قطر سیلندر × کورس پیستون
Displacement , Liters	4.76	جا به جایی
Speed Governor	Mechanical	سرعت گاورنر
Cooling System	water-cooled	سیستم فنک کننده
Frequency	50Hz	فرکانس



## ژنراتور

Manufacturer	Mecc alte	توليد كننده
Type	ECP34 - 1L	تيپ
Exciter type	Brushless, Self-excited	نوع كانتر
Power factor	0.8	ضريب قدرت
Voltage	380	ولتاژ
Frequency	50 Hz	فرکانس
Speed, Rpm	1500	سرعت
Insulation class	H	كلاس عايق
Protection class	IP23	كلاس حفاظتی
Excitation	Brushless	سیستم تمریک

## GENERAL INFORMATION

### DIESEL GENERATOR SET

Model	DE140D5 / DE143D6	
Motor	DEUTZ BF4M1013FC	
Alternator	STAMFORD OR LEROY SOMER	
Speed Control type	Heizmann EMR	
Phase	Three	
Fuel Tank Capacity	300 L	
System Voltage	12V	
Frequency	50HZ	60HZ
Air Flow	9000m <sup>3</sup> /h	11520m <sup>3</sup> /h
Combustion air flow	482.1m <sup>3</sup> /h	576.2m <sup>3</sup> /h
Exhaust air flow	1389m <sup>3</sup> /h	1653m <sup>3</sup> /h
Exhaust Temperature	530°C	530°C

### Engine

Maximum output(kw)	112KW(50Hz)	114.4KW(60Hz)
Number of Cylinders	inline 4	
Aspiration	Turbo charged, CAC	
Cycle	4	
Fuel Type	Diesel	
Combustion Type	Direct Injection	
Cooling Type	Water cooled	
Bore	108mm	
Stroke	130mm	
Displacement	4.76L	
Compression Ratio	18.1:1	
Lubrication Capacity	11 liter	
Coolant Capacity	7.4 liter	

FUEL CONSUMPTION	1500 RPM	1800 RPM
	L/hr	L/hr
100% Prime Power(1)	32.3	36.5
75% Prime Power(1)	23.5	26.5
50% Prime Power(1)	15.7	17.8
25% Prime Power(1)	8.5	9.8

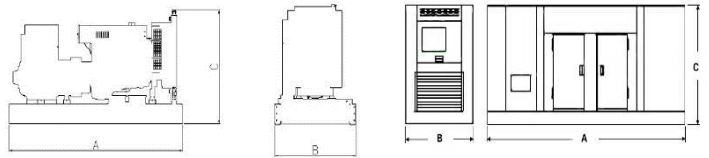
DIMENSION	OPEN	SILENT
Length (A)	2300mm	2900mm
Width (B)	1080mm	1080mm
Height (C)	1580mm	1970mm
Net Weight	1400kg	1800kg

### Alternator

Insulation	Clase "H"
Excitation Type	Self-excitation or PMG
Protection class	IP23

### Certificates

Engine	ISO 3046, BS 5514, DIN 6271
Alternator	UTE NFC 51-111-105-110 ICE34-1, BS 5000-4999 NEMA MG 21, VDE 0530
Generator Set	ISO 8528



(1) Prime Power: ratings are as per DIN 6271, BS5514 and ISO-3046 with 10% overload capacity

(2) Standby Power: power available at variable load for up to a maximum of 500 hours during one year of which 300 hours may be for continuous use

(3) Operation at Altitude  $\leq 1500\text{m}$ , Ambient temperature  $\leq 40^\circ\text{C}$ . If altitude higher than 1500m, each 300m will cause additional de-rating 4%.

**Certificacion ISO 9001:2000**



# GENERATOR TYPE ECP 34-1L/4 A

Document : DS274A/1

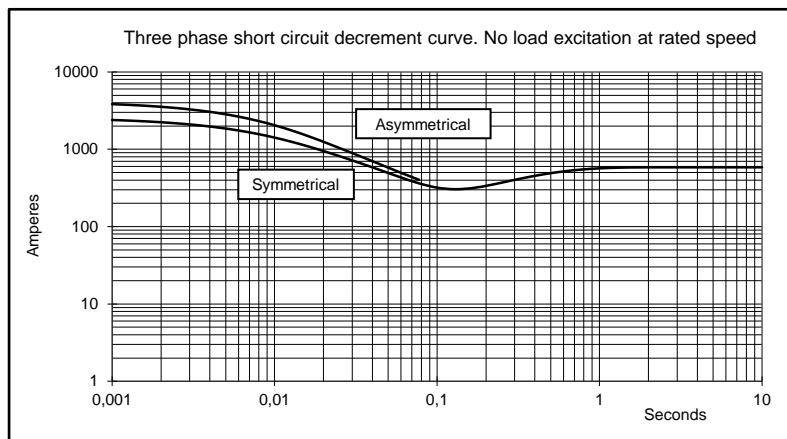
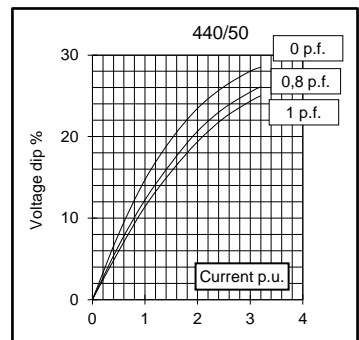
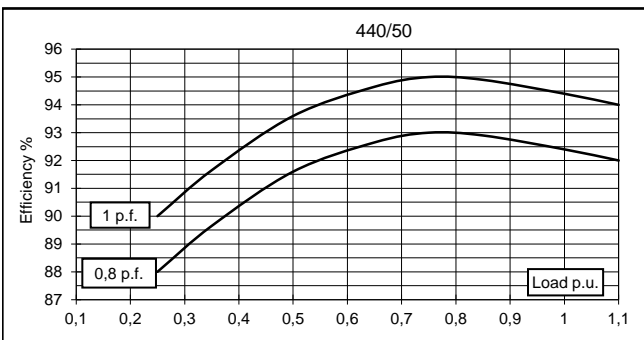
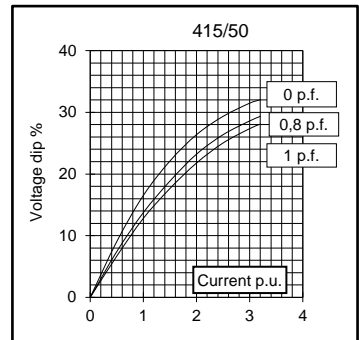
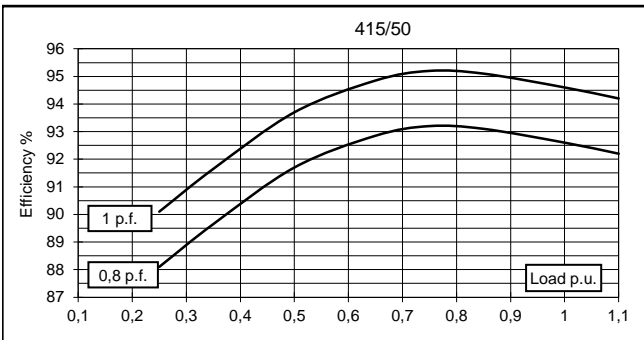
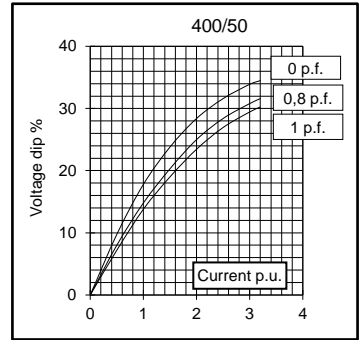
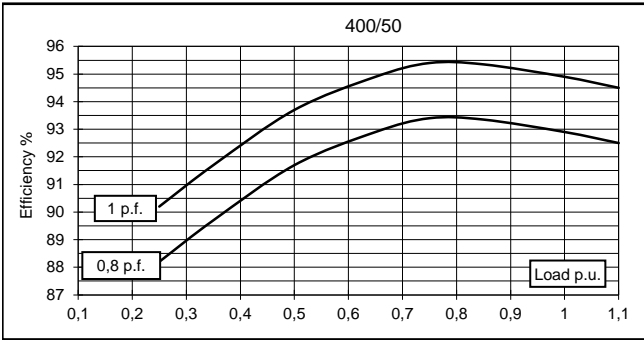
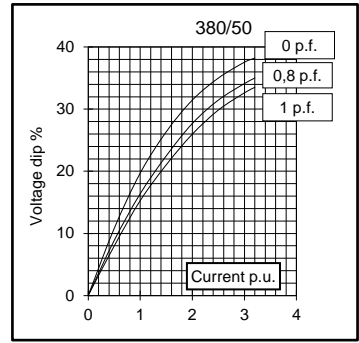
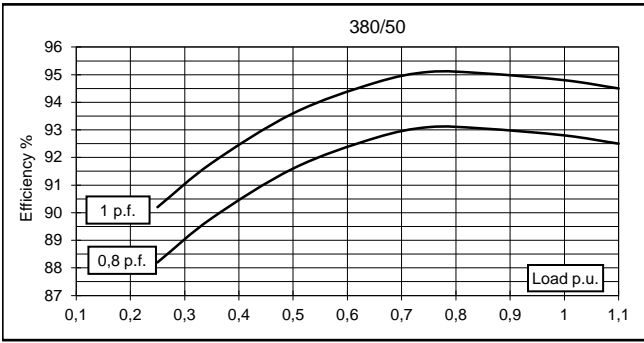
issue 002 date 27/01/2014

Electrical Characteristics										
Frequency	Hz	50				60				
Voltage (series star)	V	380	400	415	440	415	440	460	480	
Rated power class H	kVA	135	135	135	114	140	150	162	162	
	kW	108	108	108	91	112	120	130	130	
Rated power class F	kVA	121	121	121	103	125	135	146	146	
	kW	97	97	97	82	100	108	117	117	
Regulation with DSR		±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	%	92,8	92,9	92,6	92,4	94	94,5	94,7	94,8
(see graph. for details)	3/4	%	93,1	93,4	93,2	93	94,5	95	95,2	95,3
	2/4	%	91,6	91,7	91,7	91,6	93,1	93,3	93,5	93,6
	1/4	%	88,2	88,2	88,1	88	89,3	89,4	89,5	89,3
Reactances (f. l.cl. F)	Xd	%	245	222	202	161	257	250	241	222
	Xd'	%	16,8	15,4	14,4	11,5	19,5	18,0	16,8	15,4
	Xd''	%	8,1	7,6	6,9	5,4	9,7	8,9	8,1	7,6
	Xq	%	148	136	125	112	162	154	148	136
	Xq'	%	148	136	125	112	162	154	148	136
	Xq''	%	31,2	28,4	27,1	25,2	35,4	33	31,2	28,4
	X <sub>2</sub>	%	18,9	17,2	16,6	15,4	22,1	20,7	18,9	17,2
	X <sub>0</sub>	%	3,1	2,7	2,9	2,2	3,6	3,4	3,1	2,7
Short Circuit Ratio	Kcc		0,39	0,45	0,60	0,90	0,30	0,35	0,39	0,45
Time Constants	Td'	sec.	0,039							
	Td''	sec.	0,0085							
	Tdo'	sec.	1,85							
	Tα	sec.	0,0168							
Short Circuit Current Capacity		%	>300				>350			
Excitation at no load	Amp.		0,5	0,6	0,67	0,8	0,3	0,35	0,4	0,5
Excitation at full load	Amp.		2,1	2,1	2,2	2,4	2,3	2,1	2	2
Overload (long-term)		%	1 hour in a 6 hours period 110% rated load							
Overload per 20 sec.		%	300							
Stator Winding Resistance (20°C)	Ω		0,016							
Rotor Winding Resistance (20°C)	Ω		4,142							
Exciter Resistance (20 °C)	Ω		Rotor : 0,410				Stator : 15,28			
Heat dissipation at f.l.cl.H	W		8379	8254	8631	7501	7149	6984	7253	7109
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 %		1,7 / 1,9							
Waveform Distors.(THD) at no load	LL/LN %		2,3 / 2,5							
<b>Mechanical characteristics</b>										
Protection			IP 21 ( other protection on request )							
DE bearing			6314.2RS							
NDE bearing			6311.2RS							
Weight of wound stator assembly	kg		152							
Weight of wound rotor assembly	kg		101,3							
Weight of complete generator	kg		467							
Maximun overspeed	rpm		2250							
Unbalanced magnetic pull at f.l.cl.F	kN/mm		5,7							
Cooling air requirement	m <sup>3</sup> /min		19,3				23			
Inertia Constant (H)	sec.		0,098				0,118			
Noise level at 1m/7m	dB(A)		79 / 65				83 / 69			

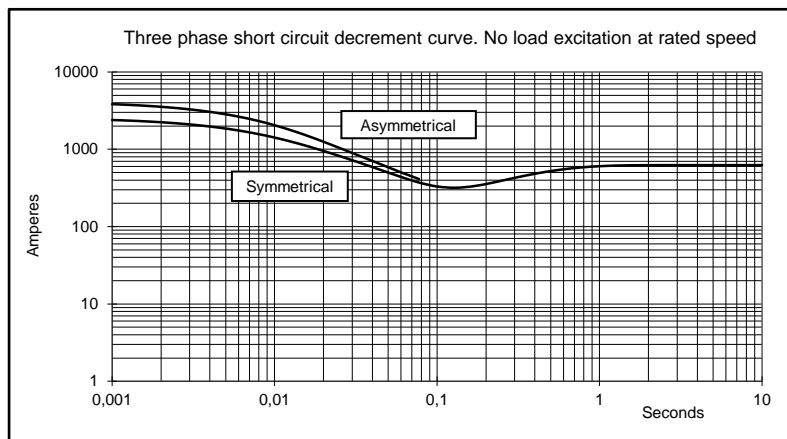
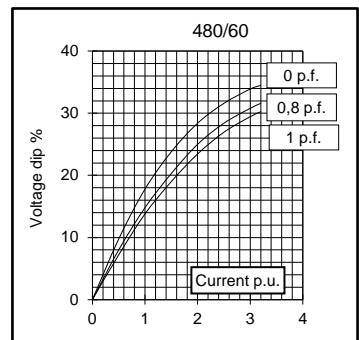
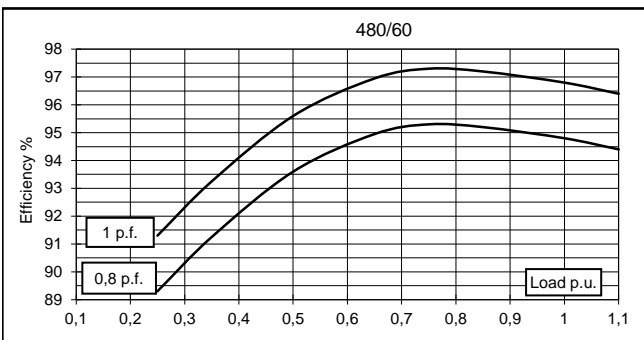
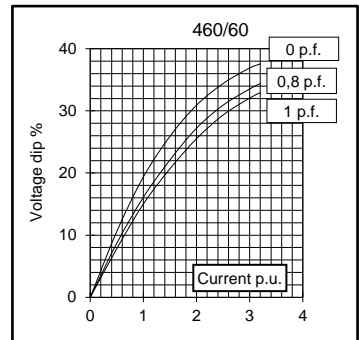
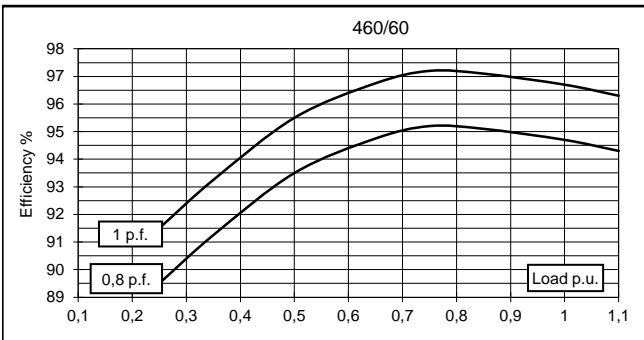
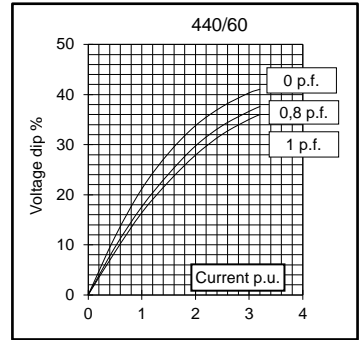
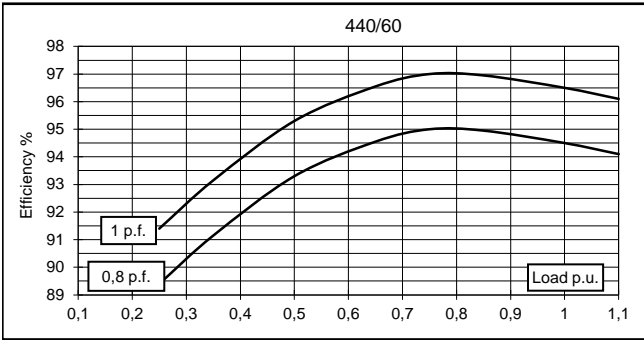
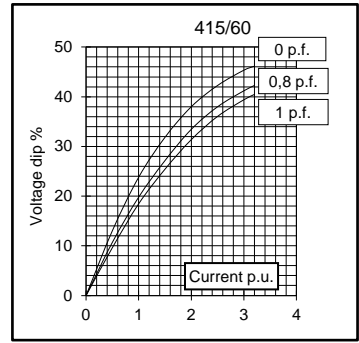
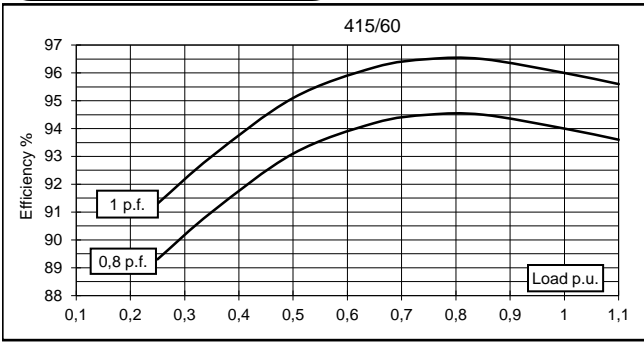
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**50 Hz**

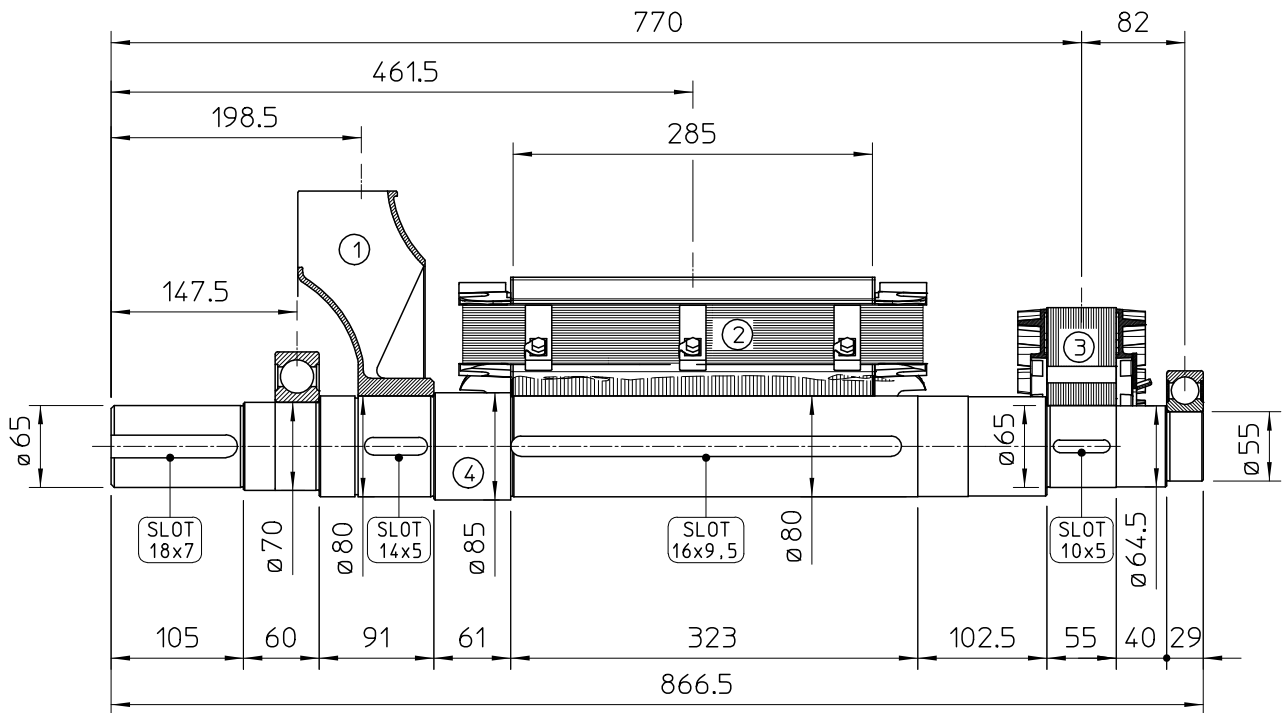


**60 Hz**



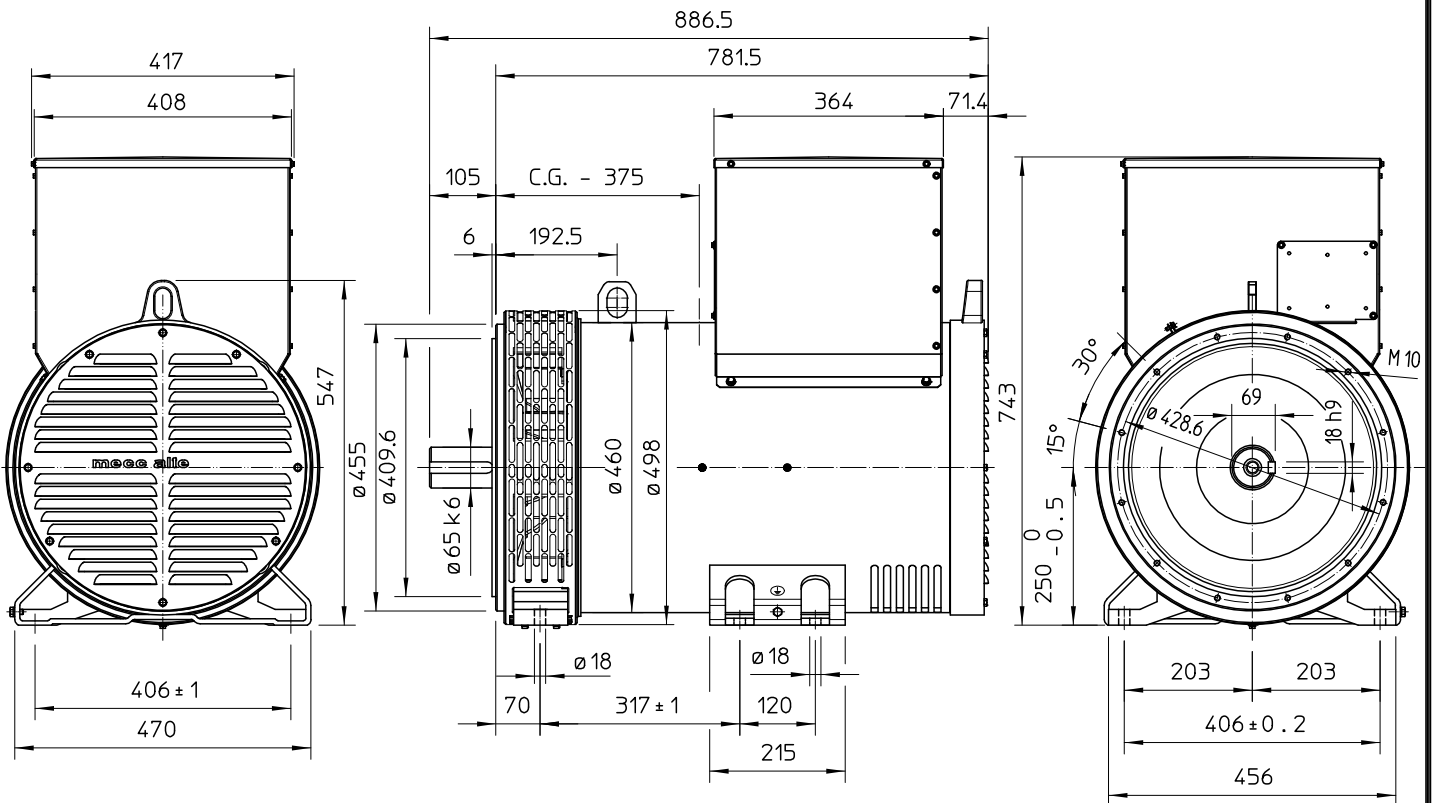


### TWO BEARING MOMENTS OF INERTIA



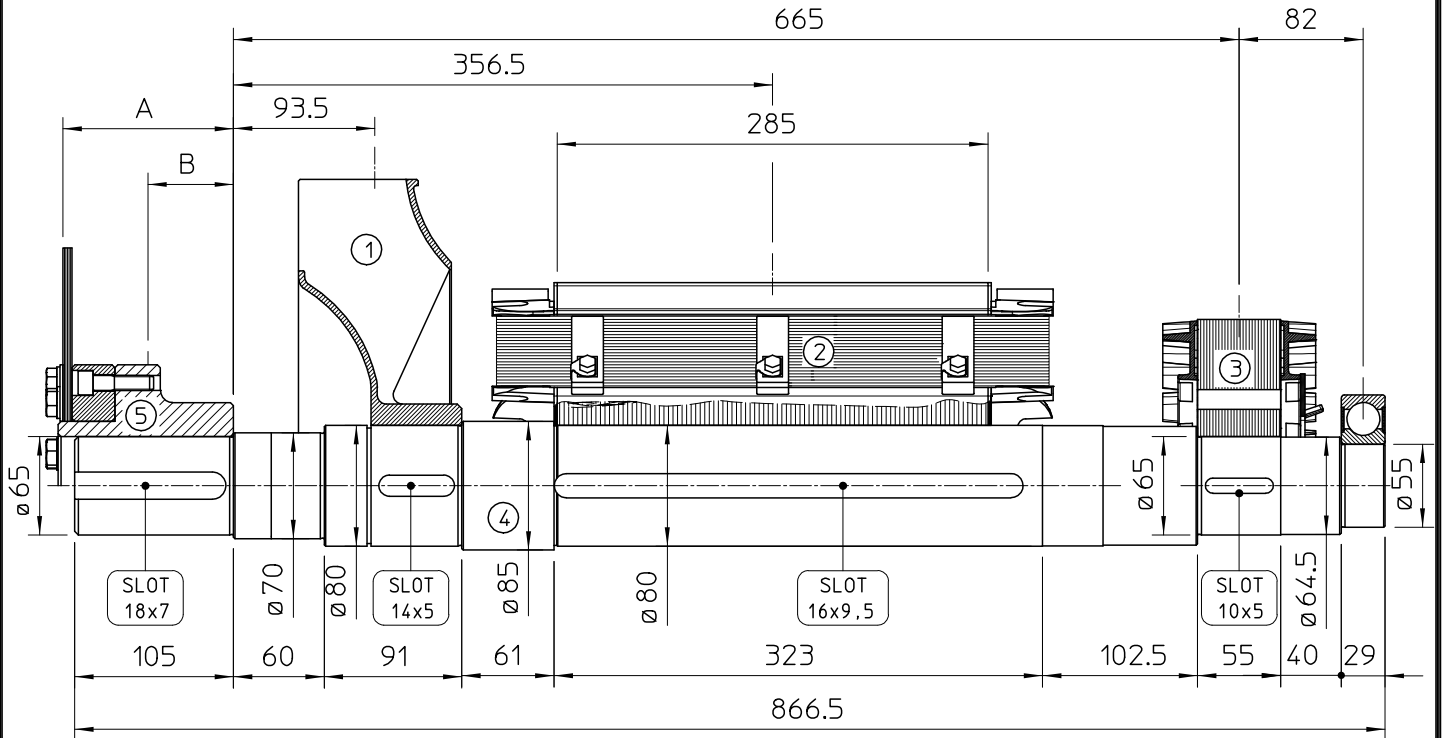
POS.	COMPONENT	WEIGHT (kg)	J (kgm <sup>2</sup> )
1	FAN	3.6	0.0451
2	MAIN ROTOR	101.3	0.9153
3	EX. ROTOR	14.5	0.0874
4	SHAFT	29.6	0.0218
TOTAL		149	1.0696

### TWO BEARING DIMENSIONS



C.G.= GRAVITY CENTER

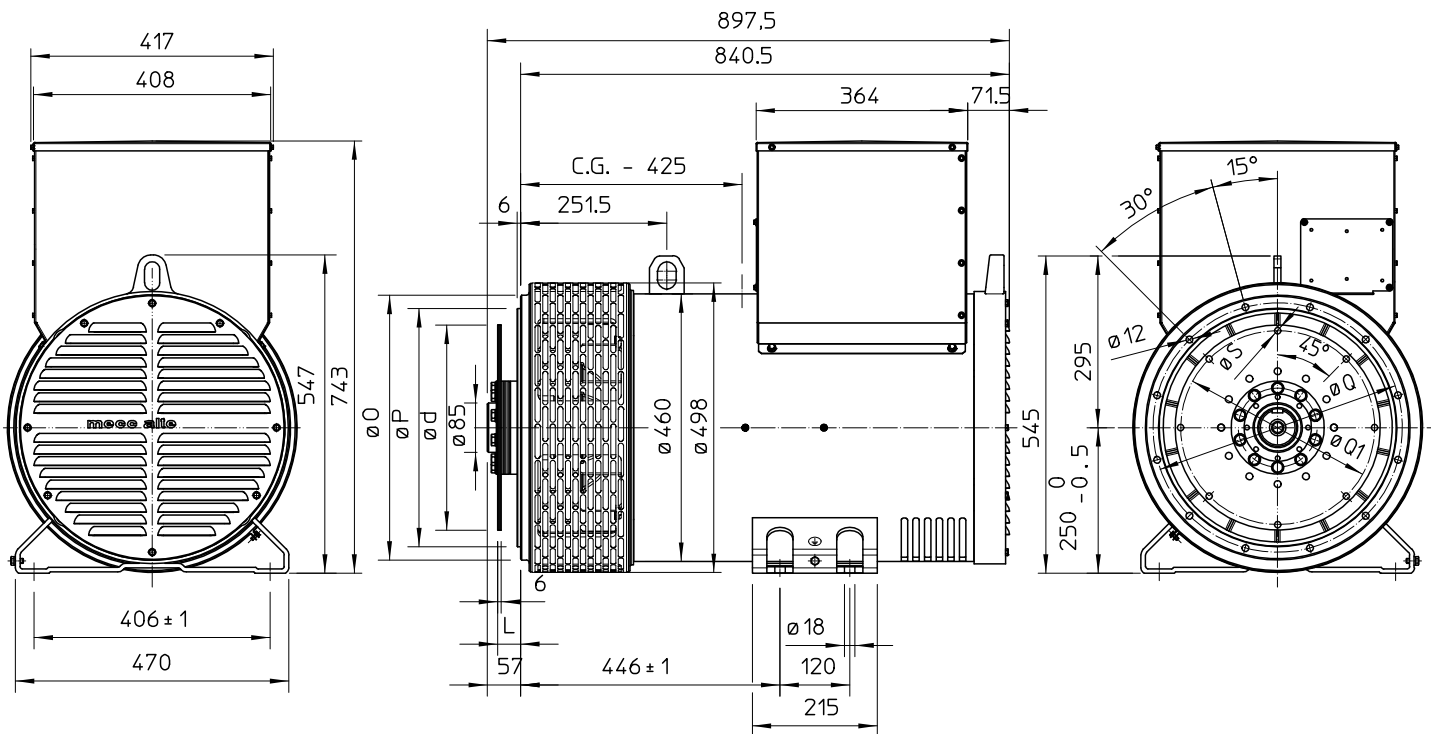
### SINGLE BEARING MOMENTS OF INERTIA



POS.	COMPONENT	WEIGHT (kg)	J (kgm <sup>2</sup> )
1	FAN	3.6	0.0451
2	MAIN ROTOR	101.3	0.9153
3	EX. ROTOR	14.5	0.0874
4	SHAFT	29.6	0.0218
TOTAL		148.8	1.0696

SAE N°	5		SHAFTS COUPLING FLEX PLATE	
	A	B	WEIGHT kg	J kgm <sup>2</sup>
10	112.8	35.6	13.5	0.0770
11 1/2	98.6	71.5	12.4	0.0956
14	84.4	68.6	14.8	0.2360

### SINGLE BEARING DIMENSIONS



SAE N.	FLANGIA / FLANGE BRIDE / FLANSCH		
	O	P	Q
3	451	409.6	428.6
2	489	447.7	466.7
1	552	511.2	530.2

SAE N.	GIUNTI A DISCHI / DISC COUPLING DISCQUE DE MONOPALIER / SCHEIBENKUPPLUNG			
	L	d	Q1	S
10	53.8	314.32	295.27	11
11 1/2	39.6	352.42	333.37	11
14	25.4	466.72	438.15	14

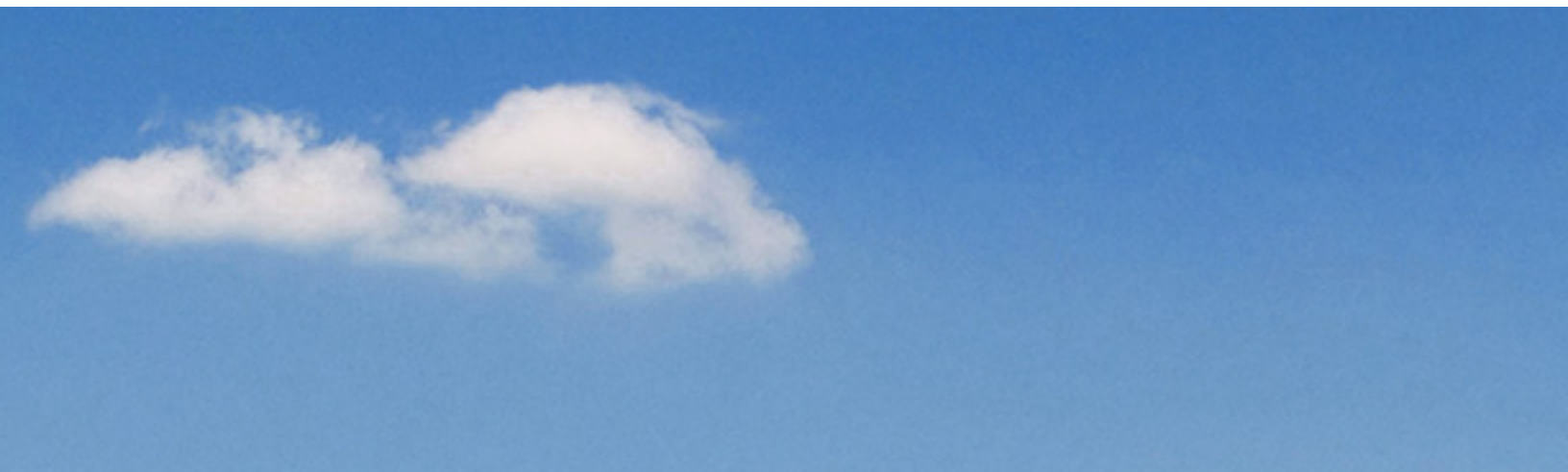
C.G.= GRAVITY CENTER

# FAMCO

## هایپر صنعت

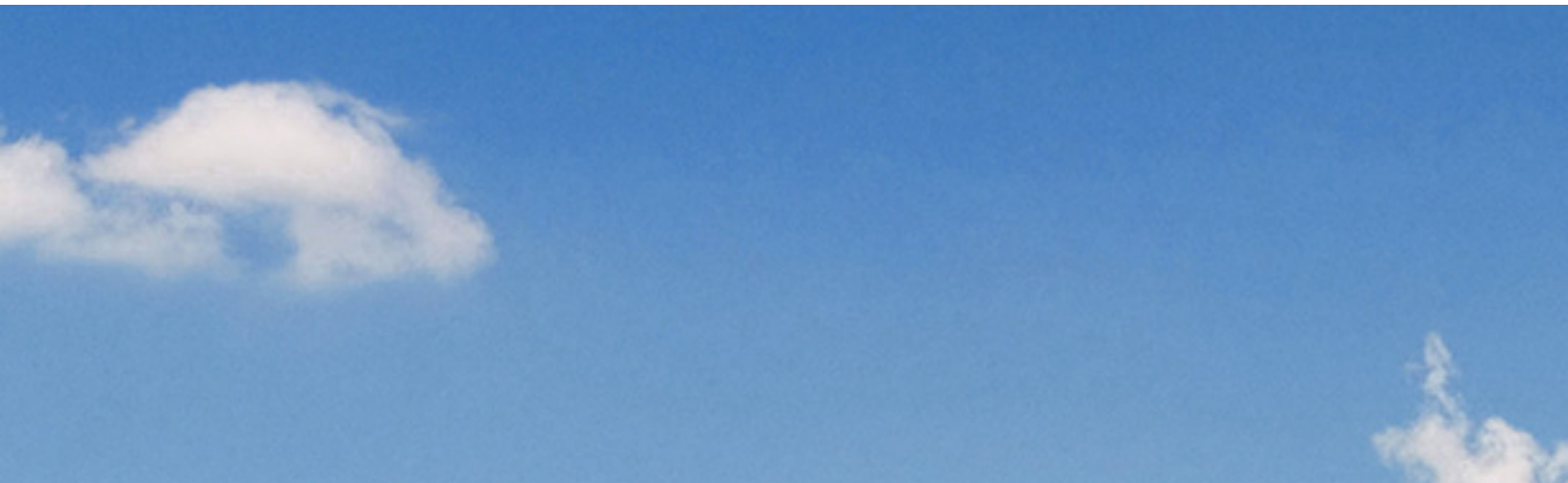
### موتور دیزل

Manufacturer	Deutz	تولید کننده
Type	BF6M1013EC	تیپ
Number of cylinders	4	تعداد سیلندر ها
Cylinder arrangement	in-line	آرایش سیلندر ها
Cycle	4 stroke	چرخه
Aspiration	Turbo charged CAC	سیستم تنفس
Bore × Stroke , mm	105X130	قطر سیلندر × کورس پیستون
Displacement , Liters	4.76	جا به جایی
Speed Governor	Mechanical	سرعت گاورنر
Cooling System	water-cooled	سیستم فنک کننده
Frequency	50Hz	فرکانس



## ژنراتور

Manufacturer	Mecc alte	تولید کننده
Type	ECP34-2L	تیپ
Exciter type	Brushless, Self-excited	نوع کانتر
Power factor	0.8	ضریب قدرت
Voltage	380	ولتاژ
Frequency	50 Hz	فرکانس
Speed, Rpm	1500	سرعت
Insulation class	H	کلاس عایق
Protection class	IP23	کلاس حفاظتی
Excitation	Brushless	سیستم تمریک



## GENERAL INFORMATION

### DIESEL GENERATOR SET

Model	DE165D5 / DE175D6	
Motor	DEUTZ BF6M1013EC	
Alternator	STAMFORD OR LEROY SOMER	
Speed Control type	Mechanical / Electrical	
Phase	Three	
Fuel Tank Capacity	370 L	
System Voltage	12V	
Frequency	50HZ	60HZ
Air Flow	10800m³/h	11500m³/h
Combustion air flow	693.3m³/h	801.2m³/h
Exhaust air flow	1799m³/h	2097m³/h
Exhaust Temperature	535°C	480°C

### Engine

Maximum output(kw)	132KW(50Hz)	140KW(60Hz)
Number of Cylinders	Inline 6	
Aspiration	Turbo charged, CAC	
Cycle	6	
Fuel Type	Diesel	
Combustion Type	Direct Injection	
Cooling Type	Water cooled	
Bore	108mm	
Stroke	130mm	
Displacement	7.15L	
Compression Ratio	19:1	
Lubrication Capacity	20 liter	
Coolant Capacity	9.8 liter	

FUEL CONSUMPTION	1500 RPM	1800 RPM
	L/hr	L/hr
100% Prime Power(1)	38.5	41.8
75% Prime Power(1)	28.9	31.4
50% Prime Power(1)	19.6	21.5
25% Prime Power(1)	10.9	12.4

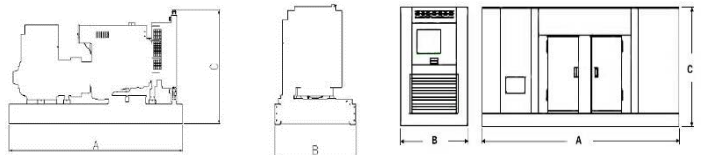
DIMENSION	OPEN	SILENT
Length (A)	2650mm	3250mm
Width (B)	1080mm	1080mm
Height (C)	1650mm	2070mm
Net Weight	2050kg	2550kg

### Alternator

Insulation	Clase "H"
Excitation Type	Self-excitation or PMG
Protection class	IP23

### Certificates

Engine	ISO 3046, BS 5514, DIN 6271
Alternator	UTE NFC 51-111-105-110
	ICE34-1, BS 5000-4999
	NEMA MG 21, VDE 0530
Generator Set	ISO 8528



(1) Prime Power: ratings are as per DIN 6271, BS5514 and ISO-3046 with 10% overload capacity

(2) Standby Power: power available at variable load for up to a maximum of 500 hours during one year of which 300 hours may be for continuous use

(3) Operation at Altitude  $\leq 1500\text{m}$ , Ambient temperature  $\leq 40^\circ\text{C}$ . If altitude higher than 1500m, each 300m will cause additional de-rating 4%.

**Certificacion ISO 9001:2000**



# GENERATOR TYPE ECP 34-2L/4 A

Document : **DS275A/1**

issue 000 date 11/11/2013

Electrical Characteristics										
Frequency	Hz	50				60				
Voltage (series star)	V	380	400	415	440	415	440	460	480	
Rated power class H	kVA	150	150	150	125	150	170	180	180	
	kW	120	120	120	100	120	136	144	144	
Rated power class F	kVA	136	136	136	113	132	150	163	163	
	kW	109	109	109	90,4	106	120	130	130	
Regulation with DSR		±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	%	93,1	93,2	92,9	92,7	94,3	94,8	94,9	95
(see graph. for details)	3/4	%	93,2	93,5	93,4	93,1	94,7	94,9	95	95,2
	2/4	%	91,9	92	92	91,8	93,5	93,6	93,7	93,8
	1/4	%	89,2	89	88,8	88,8	90,2	90,2	90,2	90
Reactances (f. l.cl. F)	Xd	%	265,9	240	223,0	165,3	267,6	269,8	261,3	240
	Xd'	%	16,4	14,8	13,7	10,2	16,5	16,6	16,1	14,8
	Xd''	%	6,9	6,2	5,8	4,3	6,9	7,0	6,8	6,2
	Xq	%	135,3	122,1	113,4	84,1	136,1	137,2	132,9	122,1
	Xq'	%	135,3	122,1	113,4	84,1	136,1	137,2	132,9	122,1
	Xq''	%	29,4	26,5	24,6	18,3	29,5	29,8	28,9	26,5
	X <sub>2</sub>	%	18,3	16,5	15,3	11,4	18,4	18,5	18,0	16,5
	X <sub>0</sub>	%	2,8	2,5	2,3	1,7	2,8	2,8	2,7	2,5
Short Circuit Ratio	Kcc		0,40	0,48	0,55	0,91	0,30	0,35	0,40	0,48
Time Constants	Td'	sec.	0,0401							
	Td''	sec.	0,0095							
	Tdo'	sec.	1,90							
	Tα	sec.	0,017							
Short Circuit Current Capacity		%	>300				>350			
Excitation at no load	Amp.		0,3	0,4	0,5	0,7	0,2	0,3	0,4	0,5
Excitation at full load	Amp.		2,3	2,4	2,5	2,7	2,1	2,3	2,4	2,6
Overload (long-term)		%	1 hour in a 6 hours period 110% rated load							
Overload per 20 sec.		%	300							
Stator Winding Resistance (20 °C)	Ω		0,015							
Rotor Winding Resistance (20 °C)	Ω		3,577							
Exciter Resistance (20 °C)	Ω		Rotor : 0,410				Stator : 15,28			
Heat dissipation at f.l.cl.H	W		8894	8755	9171	7875	7253	7460	7739	7579
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 %		1,7 / 1,8							
Waveform Distors.(THD) at no load	LL/LN %		2,3 / 2,4							
<b>Mechanical characteristics</b>										
Protection			IP 21 ( other protection on request )							
DE bearing			6314.2RS							
NDE bearing			6311.2RS							
Weight of wound stator assembly	kg		168							
Weight of wound rotor assembly	kg		106							
Weight of complete generator	kg		481							
Maximun overspeed	rpm		2250							
Unbalanced magnetic pull at f.l.cl.F	kN/mm		5,6							
Cooling air requirement	m <sup>3</sup> /min		19,3				23			
Inertia Constant (H)	sec.		0,098				0,117			
Noise level at 1m/7m	dB(A)		79 / 65				83 / 69			

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

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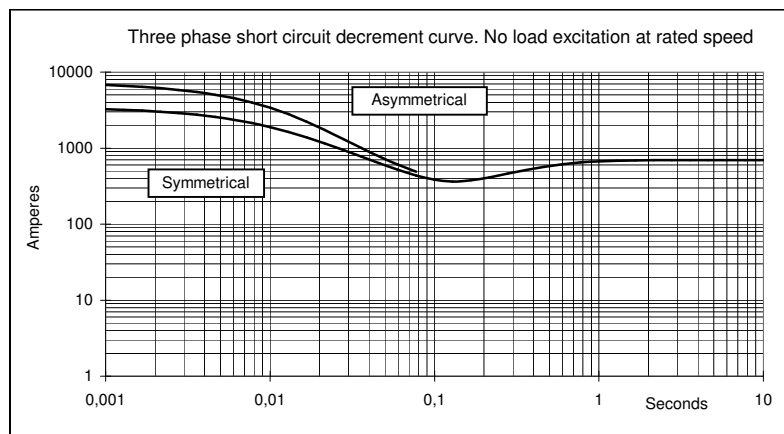
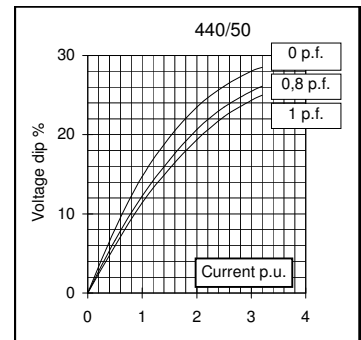
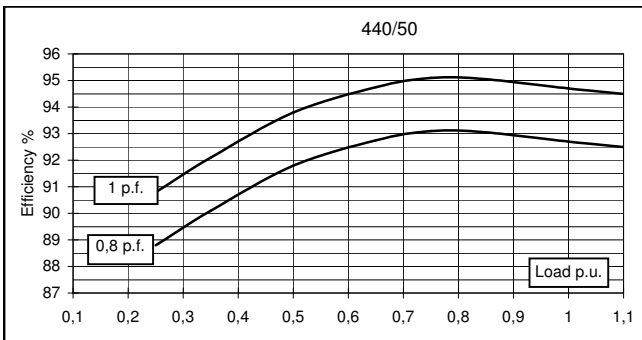
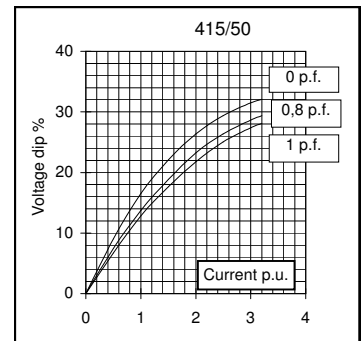
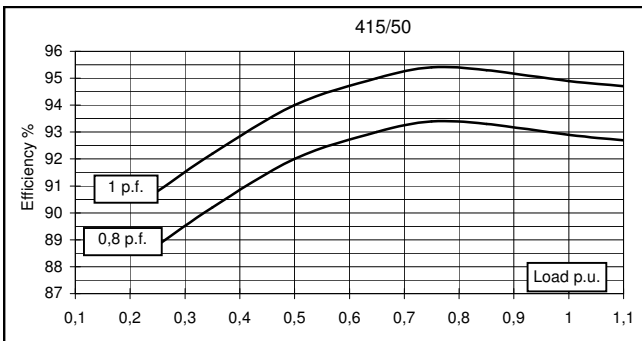
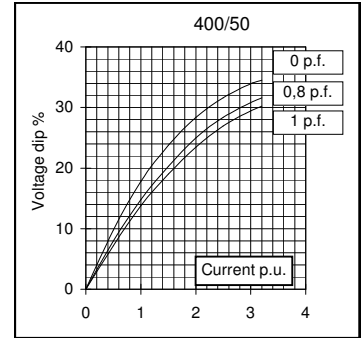
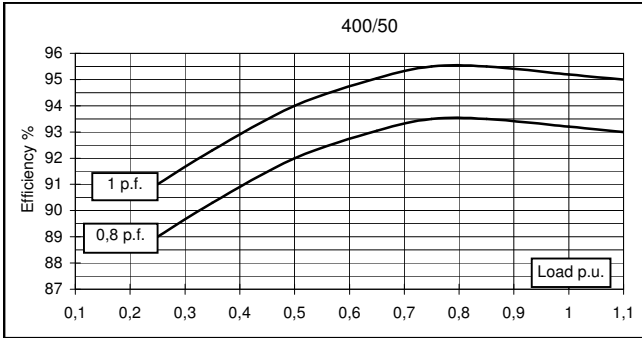
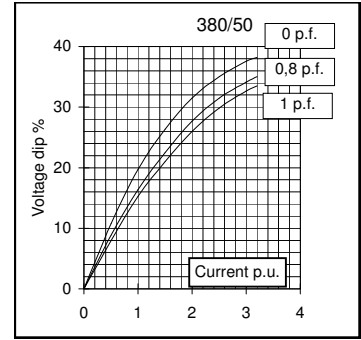
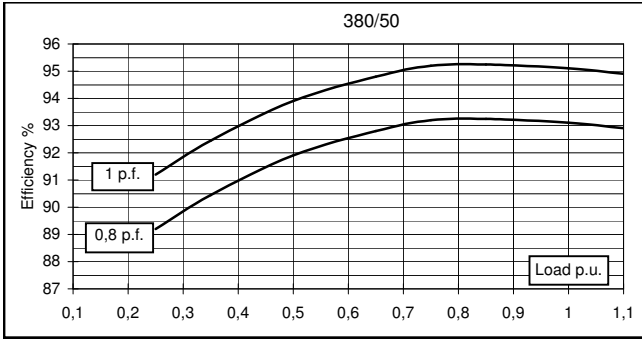


# GENERATOR TYPE ECP 34-2L/4 A

Document : DS275A/2

issue 000 date : 11/11/2013

## 50 Hz



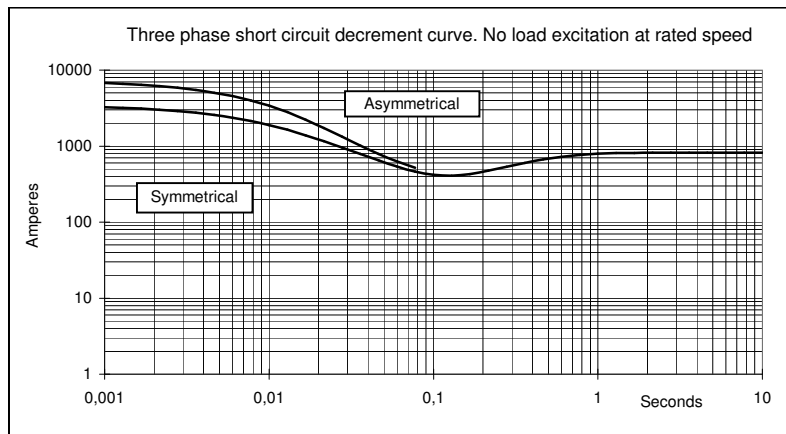
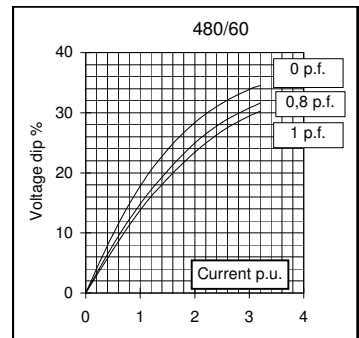
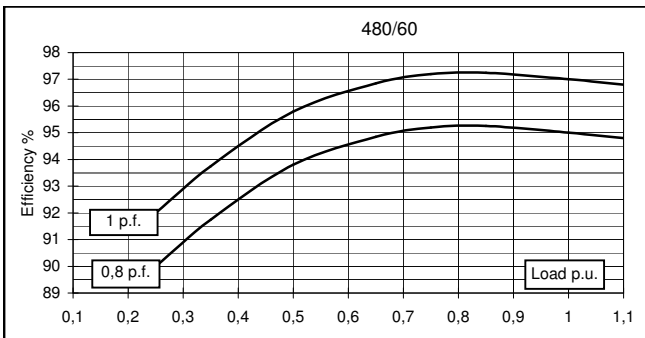
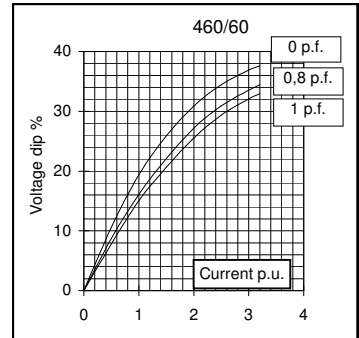
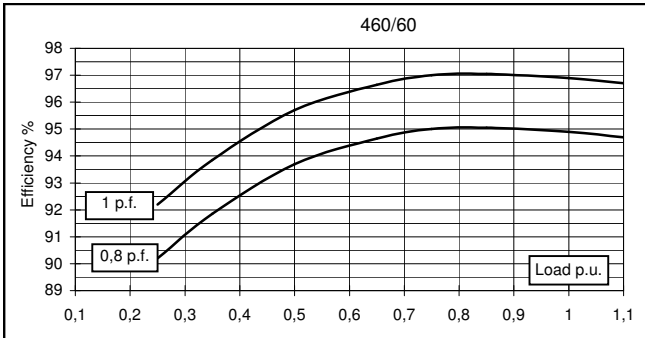
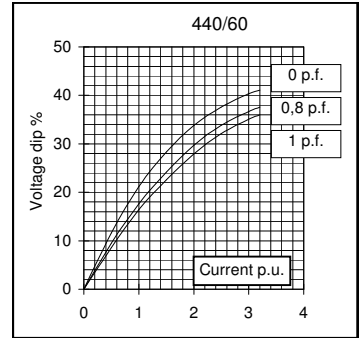
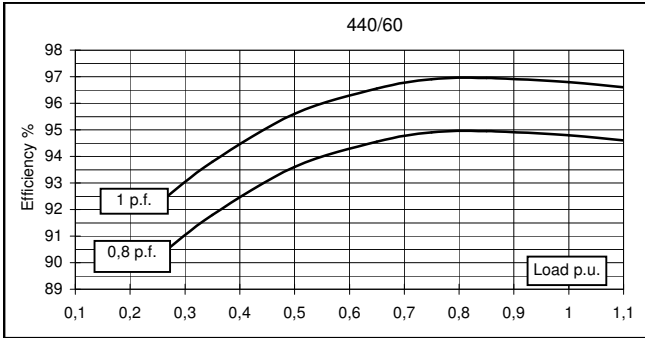
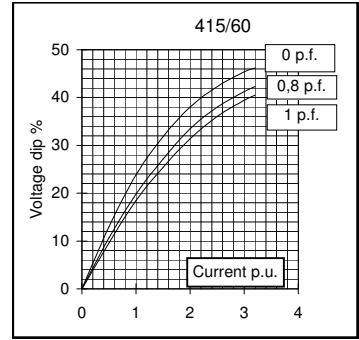
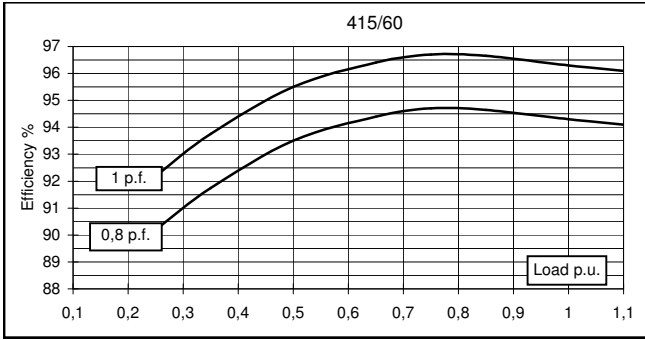


# GENERATOR TYPE ECP 34-2L/4 A

Document : DS275A/3

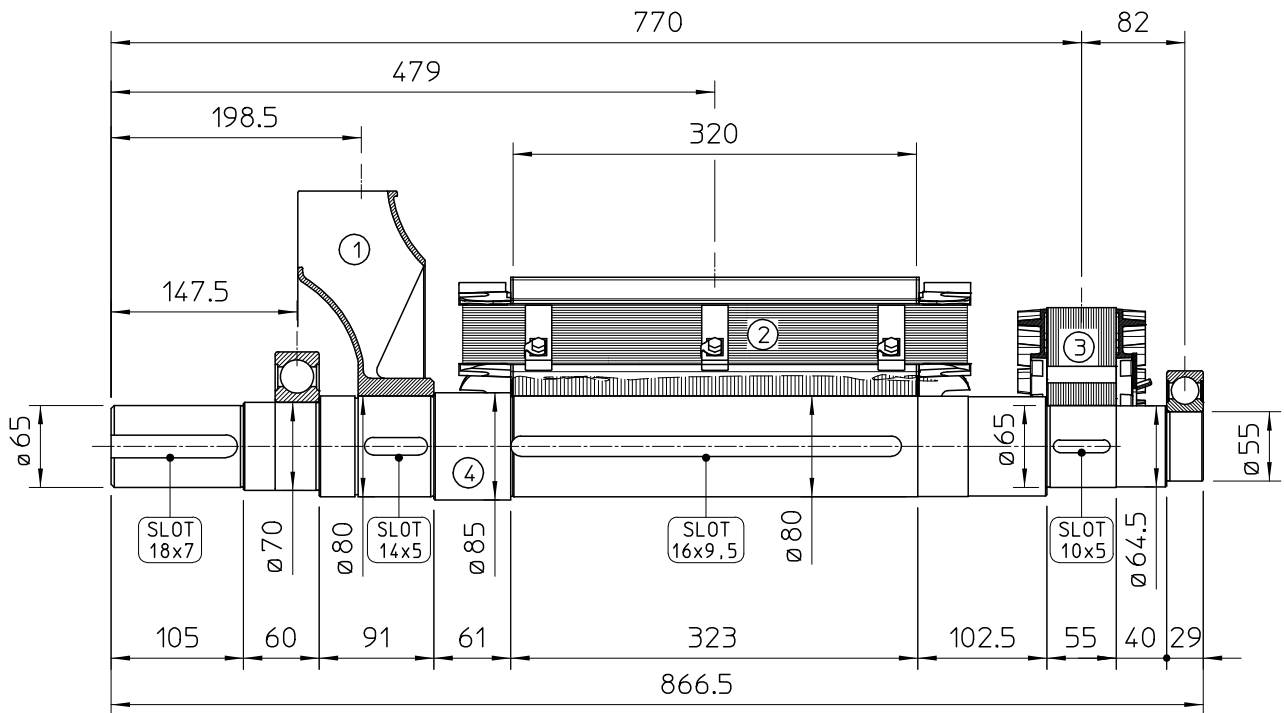
issue 000 date : 11/11/2013

## 60 Hz



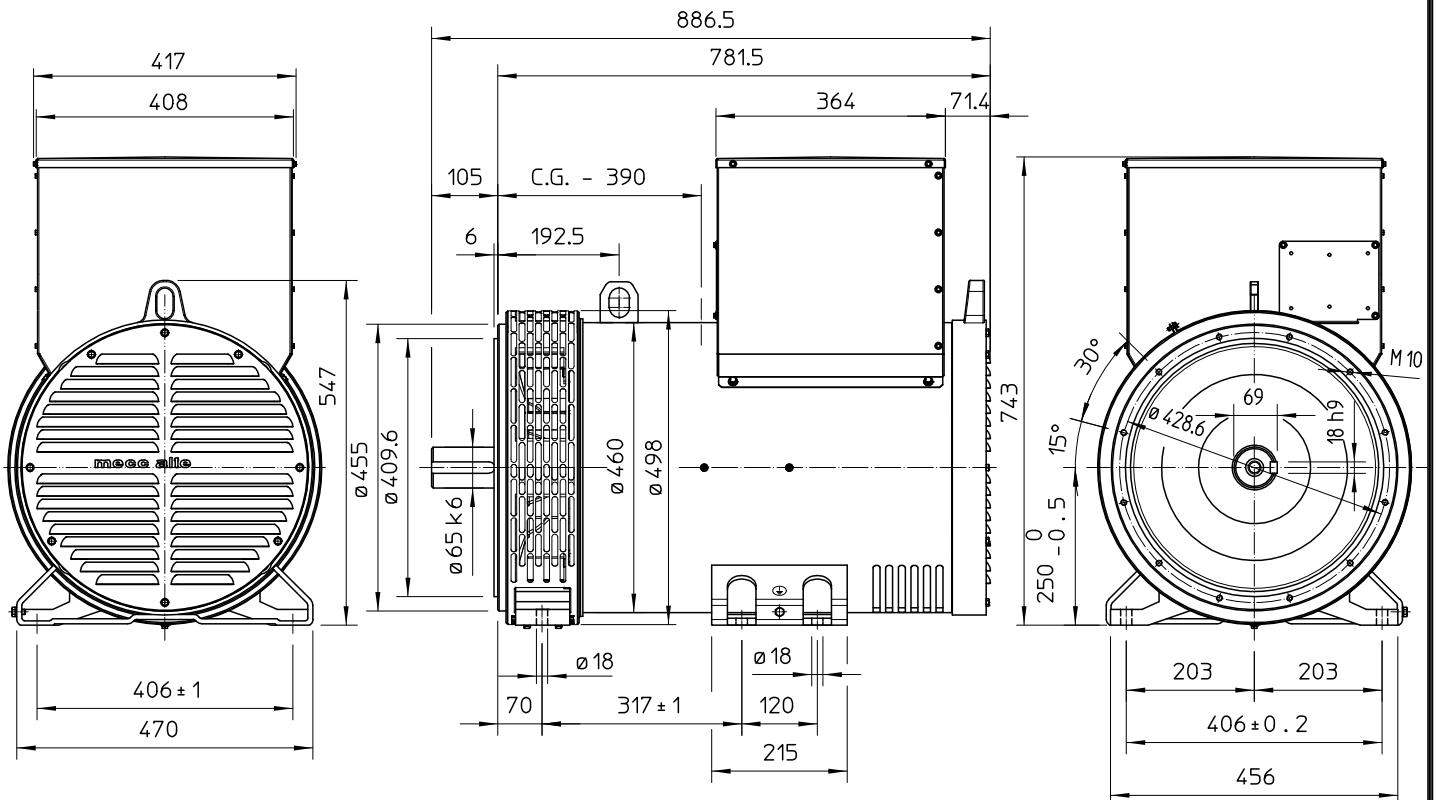


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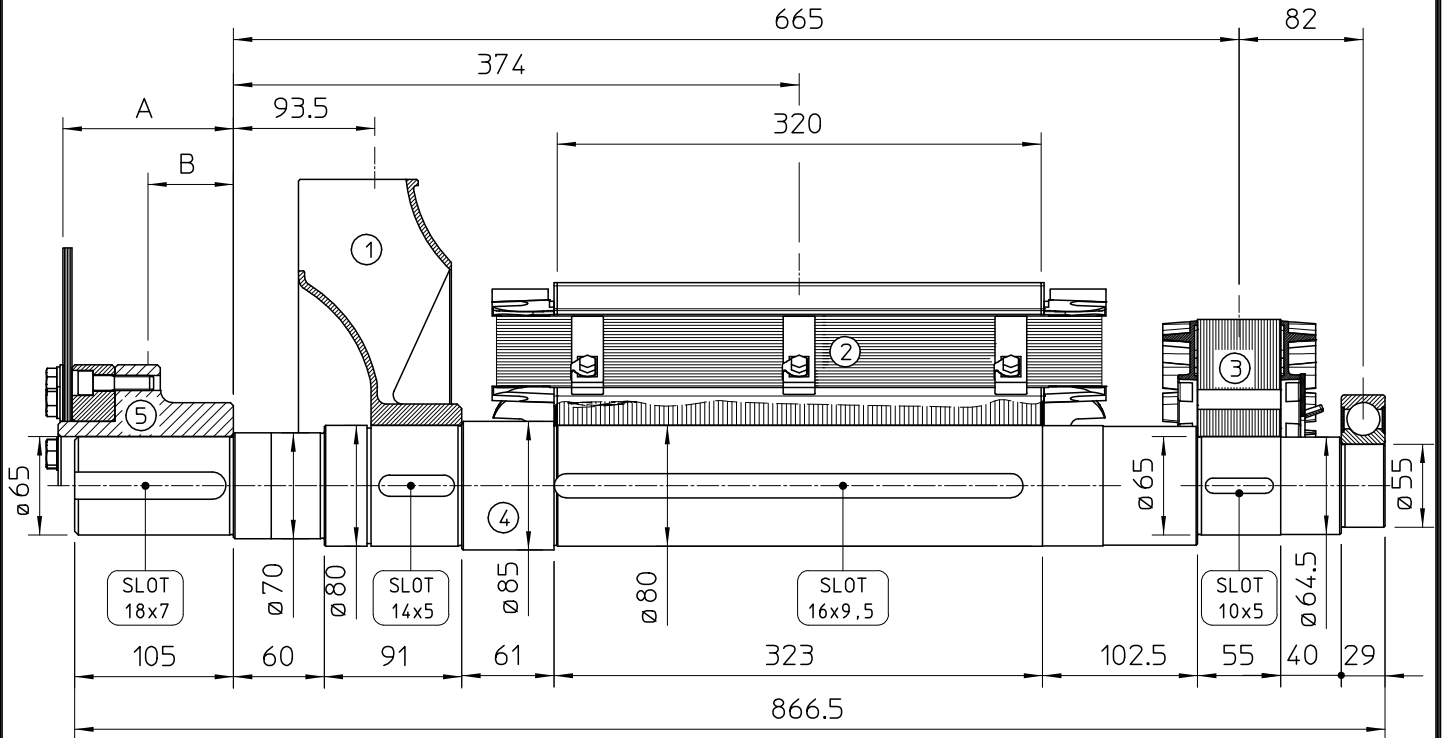
POS.	COMPONENT	WEIGHT (kg)	J (kgm <sup>2</sup> )
1	FAN	3.6	0.0451
2	MAIN ROTOR	107.3	0.9647
3	EX. ROTOR	14.5	0.0874
4	SHAFT	29.6	0.0218
TOTAL		155	1.119

### TWO BEARING DIMENSIONS



C.G.= GRAVITY CENTER

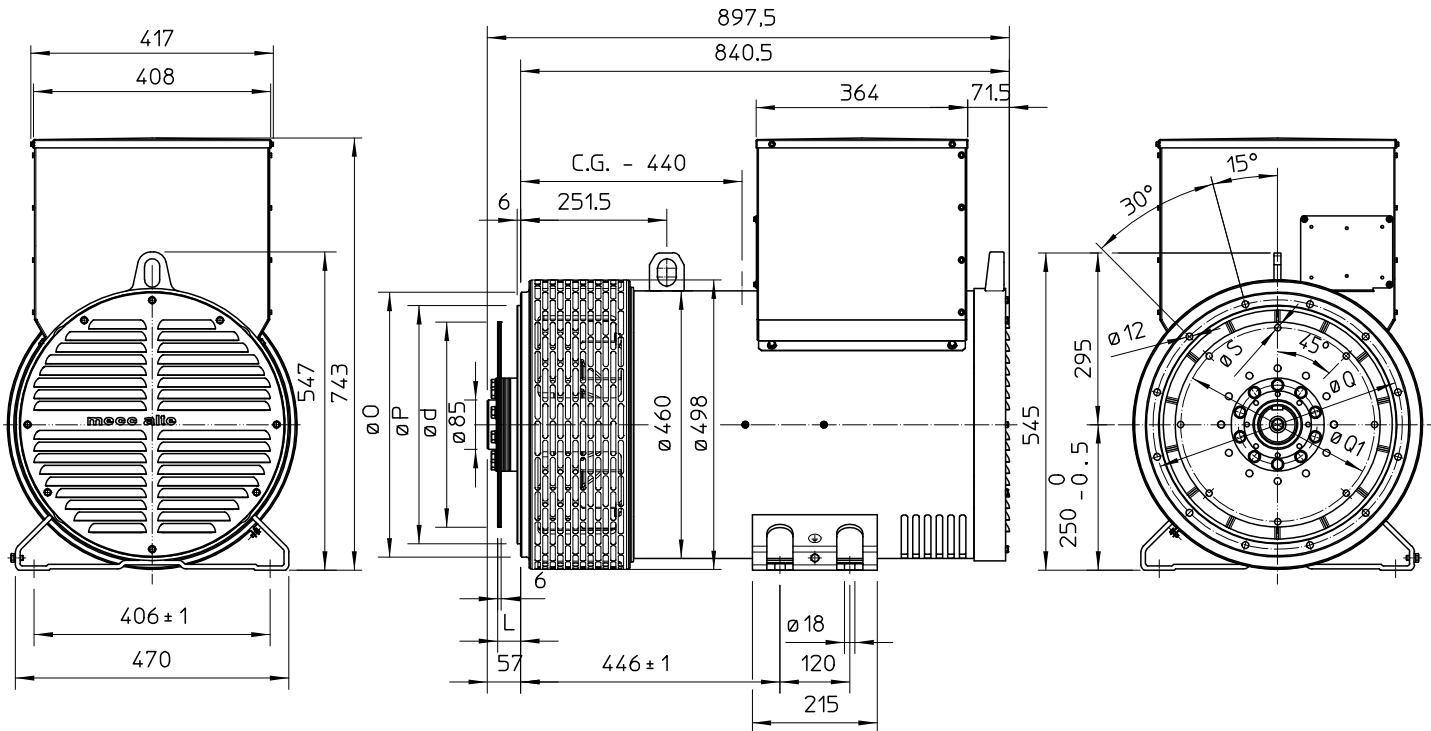
### SINGLE BEARING MOMENTS OF INERTIA



POS.	COMPONENT	WEIGHT (kg)	J (kgm <sup>2</sup> )
1	FAN	3.6	0.0451
2	MAIN ROTOR	107.3	0.9647
3	EX. ROTOR	14.5	0.0874
4	SHAFT	29.6	0.0218
TOTAL		155	1.119

SAE N°	5		SHAFTS COUPLING FLEX PLATE	
	A	B	WEIGHT kg	J kgm <sup>2</sup>
10	112.8	35.6	13.5	0.0770
11 1/2	98.6	71.5	12.4	0.0956
14	84.4	68.6	14.8	0.2360

### SINGLE BEARING DIMENSIONS



SAE N.	FLANGIA / FLANGE BRIDE / FLANSCH		
	O	P	Q
3	451	409.6	428.6
2	489	447.7	466.7
1	552	511.2	530.2

SAE N.	GIUNTI A DISCHI / DISC COUPLING DISCQUE DE MONOPALIER / SCHEIBENKUPPLUNG			
	L	d	Q1	S
10	53.8	314.32	295.27	11
11 1/2	39.6	352.42	333.37	11
14	25.4	466.72	438.15	14

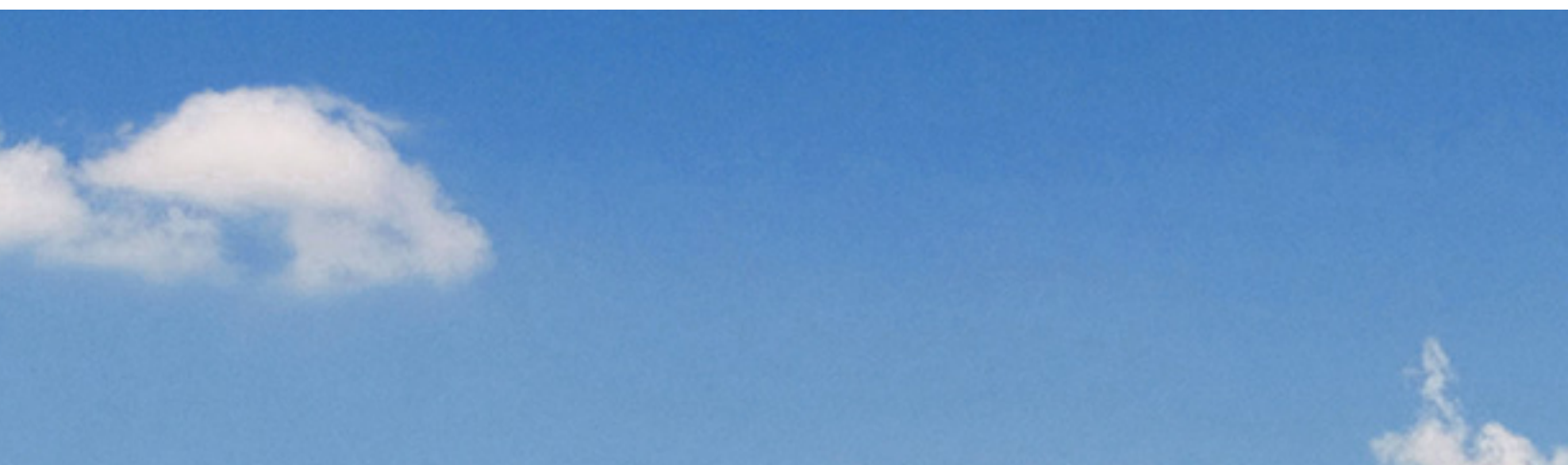
C.G.= GRAVITY CENTER

# FAMCO

## هایپر صنعت

### موتور دیزل

Manufacturer	Deutz	تولید کننده
Type	BF6M1013FC-G2	تیپ
Number of cylinders	4	تعداد سیلندر ها
Cylinder arrangement	in-line	آرایش سیلندر ها
Cycle	4 stroke	چرخه
Aspiration	Turbo charged CAC	سیستم تنفس
Bore × Stroke , mm	105X130	قطر سیلندر × کورس پیستون
Displacement , Liters	4.76	جا به جایی
Speed Governor	Mechanical	سرعت گاورنر
Cooling System	water-cooled	سیستم فنک کننده
Frequency	50Hz	فرکانس



## ژنراتور

Manufacturer	Mecc alte	تولید کننده
Type	ECO38-1S	تیپ
Exciter type	Brushless, Self-excited	نوع کانتر
Power factor	0.8	ضریب قدرت
Voltage	380	ولتاژ
Frequency	50 Hz	فرکانس
Speed, Rpm	1500	سرعت
Insulation class	H	کلاس عایق
Protection class	IP23	کلاس حفاظتی
Excitation	Brushless	سیستم تمریک

## GENERAL INFORMATION

### DIESEL GENERATOR SET

Model	DE200D5 / DE220D6	
Motor	DEUTZ BF6M1013FCG2	
Alternator	STAMFORD OR LEROY SOMER	
Speed Control type	Heizmann EMR	
Phase	Three	
Fuel Tank Capacity	370 L	
System Voltage	12V	
Frequency	50HZ	60HZ
Air Flow	11520m³/h	14760m³/h
Combustion air flow	743.9m³/h	931.4m³/h
Exhaust air flow	2108m³/h	2526m³/h
Exhaust Temperature	540°C	515°C

### Engine

Maximum output(kw)	160KW(50Hz)	176KW(60Hz)
Number of Cylinders	Inline 6	
Aspiration	Turbo charged, CAC	
Cycle	6	
Fuel Type	Diesel	
Combustion Type	Direct Injection	
Cooling Type	Water cooled	
Bore	108mm	
Stroke	130mm	
Displacement	7.15L	
Compression Ratio	18.1:1	
Lubrication Capacity	20 liter	
Coolant Capacity	9.8 liter	

FUEL CONSUMPTION	1500 RPM	1800 RPM
	L/hr	L/hr
100% Prime Power(1)	45.9	52.7
75% Prime Power(1)	34.2	38.9
50% Prime Power(1)	23.1	26.3
25% Prime Power(1)	12.5	14.6

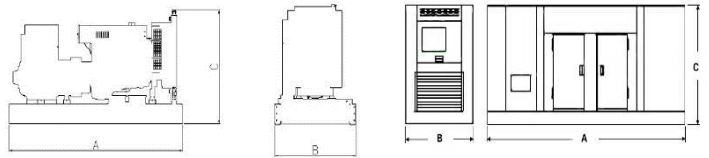
DIMENSION	OPEN	SILENT
Length (A)	2800mm	3450mm
Width (B)	1100mm	1100mm
Height (C)	1650mm	2070mm
Net Weight	2150kg	2750kg

### Alternator

Insulation	Clase "H"
Excitation Type	Self-excitation or PMG
Protection class	IP23

### Certificates

Engine	ISO 3046, BS 5514, DIN 6271
Alternator	UTE NFC 51-111-105-110 ICE34-1, BS 5000-4999 NEMA MG 21, VDE 0530
Generator Set	ISO 8528



(1)Prime Power: ratings are as per DIN 6271, BS55114 and ISO-3046 with 10% overload capacity

(2)Standby Power: power available at variable load for up to a maximum of 500 hours during one year of which 300 hours may be for continuous use

(3)Operation at Altitude  $\leq 1500\text{m}$ , Ambient temperature  $\leq 40^\circ\text{C}$ . If altitude higher than 1500m, each 300m will cause additional de-rating 4%.

### Certificacion ISO 9001:2000



# GENERATOR TYPE ECO 38-1SN/4

Document : DS070A/1

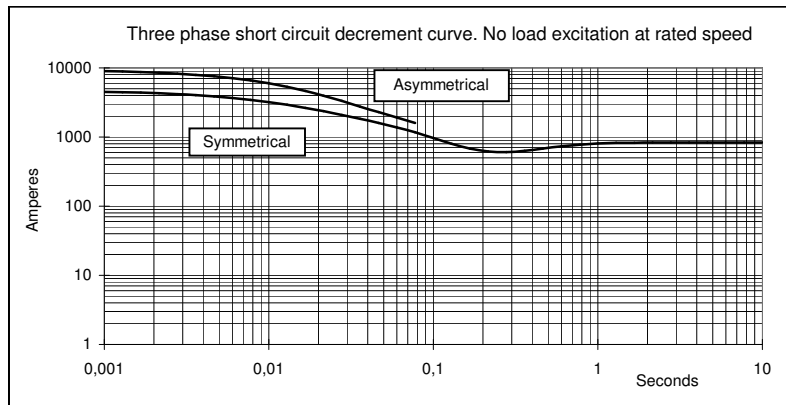
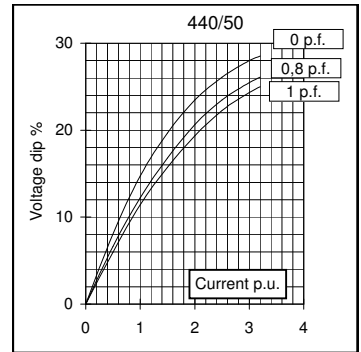
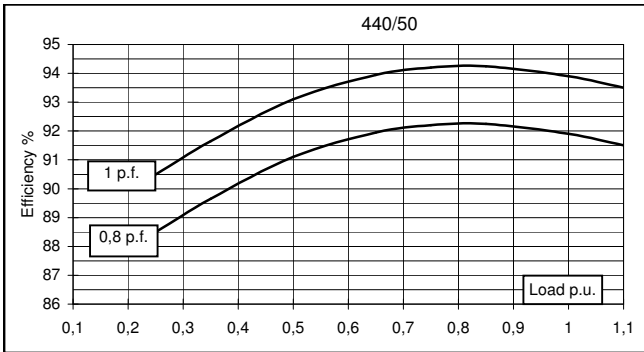
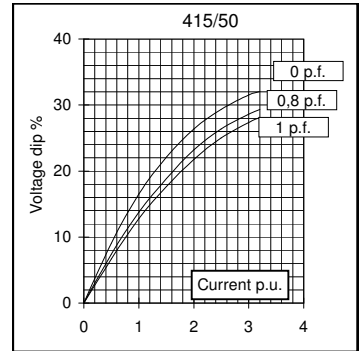
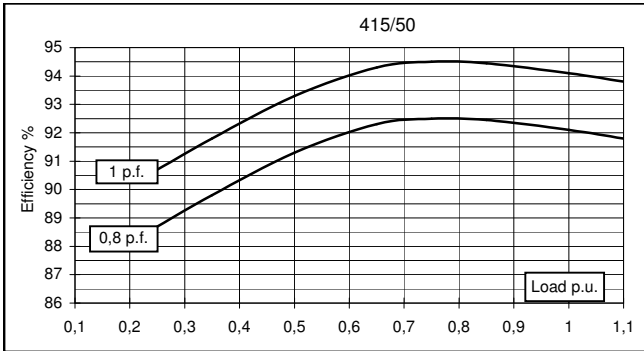
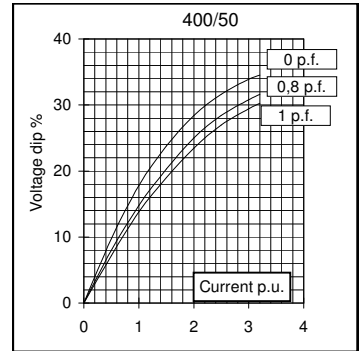
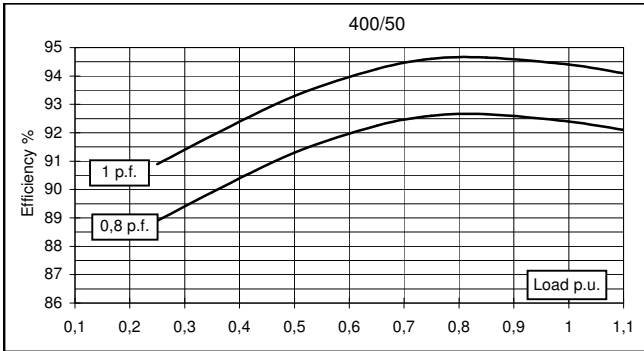
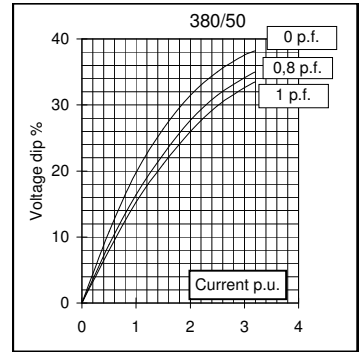
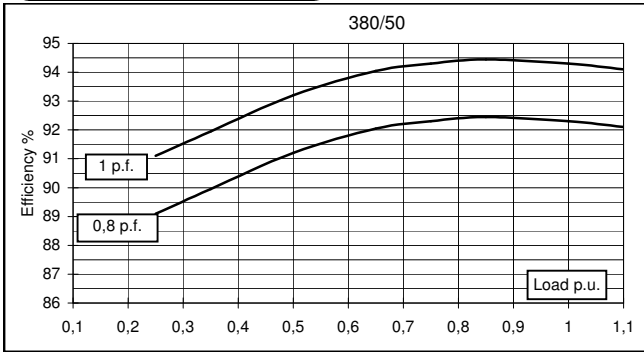
issue 004 date 28/10/2013

Electrical Characteristics										
Frequency	Hz	50				60				
Voltage (series star)	V	380	400	415	440	415	440	460	480	
Rated power class H	kVA	180	180	180	165	210	220	220	220	
	kW	144	144	144	132	168	176	176	176	
Rated power class F	kVA	170	170	170	155	195	205	205	205	
	kW	136	136	136	124	156	164	164	164	
Regulation with DSR		±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	%	92,3	92,4	92,1	91,9	92,7	93,2	93,3	93,4
(see graph. for details)	3/4	%	92,3	92,6	92,5	92,2	93	93,2	93,4	93,6
	2/4	%	91,2	91,3	91,3	91,1	92	92,1	92,2	92,3
	1/4	%	89,1	88,9	88,7	88,5	90,1	90,1	90,1	89,9
Reactances (f. l.cl. F)	Xd	%	218,3	197	183,0	149,2	251,6	234,4	214,5	197
	Xd'	%	10,7	9,7	9,0	7,3	12,4	11,5	10,6	9,7
	Xd''	%	6,1	5,5	5,1	4,2	7,0	6,5	6,0	5,5
	Xq	%	107,4	96,9	90,0	73,4	123,7	115,3	105,5	96,9
	Xq'	%	107,4	96,9	90,0	73,4	123,7	115,3	105,5	96,9
	Xq''	%	21,8	19,7	18,3	14,9	25,2	23,4	21,5	19,7
	X <sub>2</sub>	%	14,2	12,8	11,9	9,7	16,3	15,2	13,9	12,8
	X <sub>0</sub>	%	3,0	2,7	2,5	2,0	3,4	3,2	2,9	2,7
Short Circuit Ratio	Kcc		0,39	0,44	0,60	0,97	0,28	0,35	0,39	0,44
Time Constants	Td'	sec.	0,073							
	Td''	sec.	0,011							
	Tdo'	sec.	0,70							
	Tα	sec.	0,015							
Short Circuit Current Capacity		%	>300				>350			
Excitation at no load	Amp.		0,65	0,7	0,8	1,1	0,35	0,5	0,6	0,65
Excitation at full load	Amp.		2,9	3,1	3,4	3,5	2,5	2,7	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	0,013							
Rotor Winding Resistance (20 °C)		Ω	3,905							
Exciter Resistance (20 °C)		Ω	Rotor : 0,685				Stator : 15,28			
Heat dissipation at f.l.cl.H	W		12013	11844	12352	11634	13230	12841	12639	12437
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 %		2,8 / 2,7							
Waveform Distors.(THD) at no load	LL/LN %		3,1 / 3							
<b>Mechanical characteristics</b>										
Protection			IP 21 (other protection on request)							
DE bearing			6318.2RS							
NDE bearing			6314.2RS							
Weight of wound stator assembly	kg		168							
Weight of wound rotor assembly	kg		103							
Weight of complete generator	kg		510							
Maximun overspeed	rpm		2250							
Unbalanced magnetic pull at f.l.cl.F	kN/mm		4,4							
Cooling air requirement	m <sup>3</sup> /min		32				39			
Inertia Constant (H)	sec.		0,118				0,140			
Noise level at 1m/7m	dB(A)		82 / 69				86 / 73			

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

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**50 Hz**



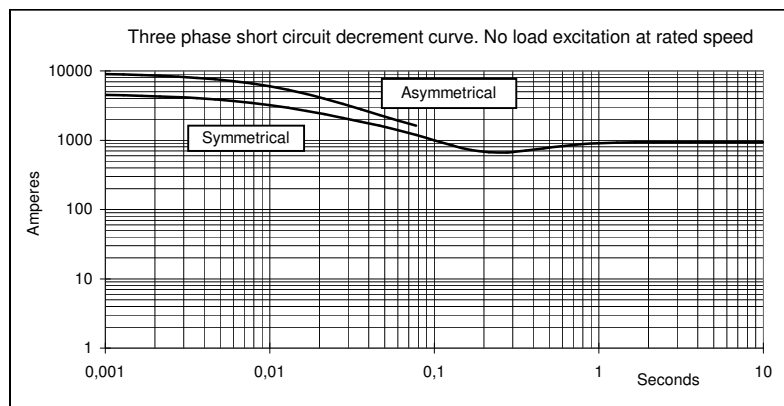
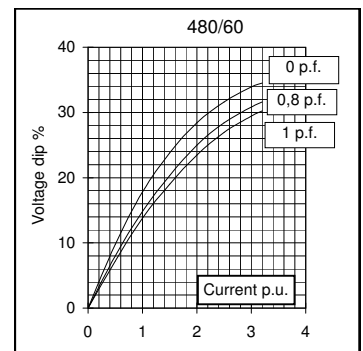
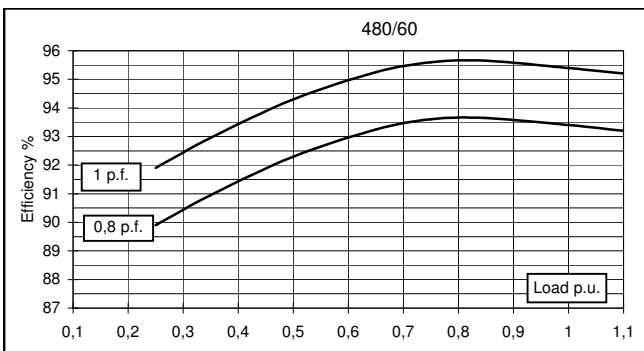
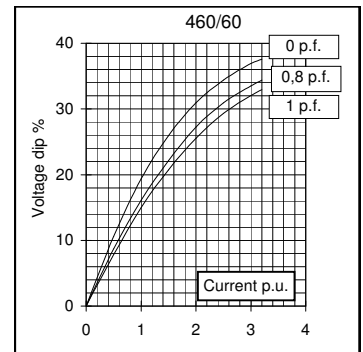
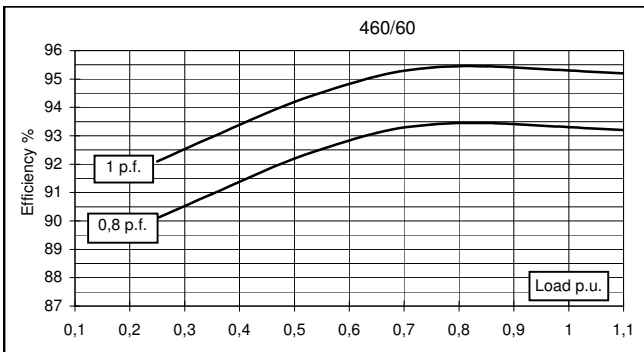
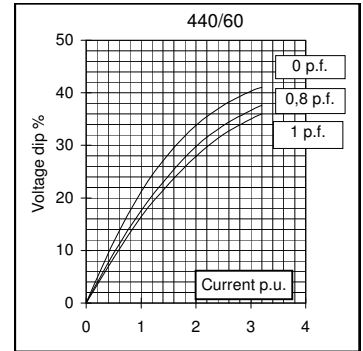
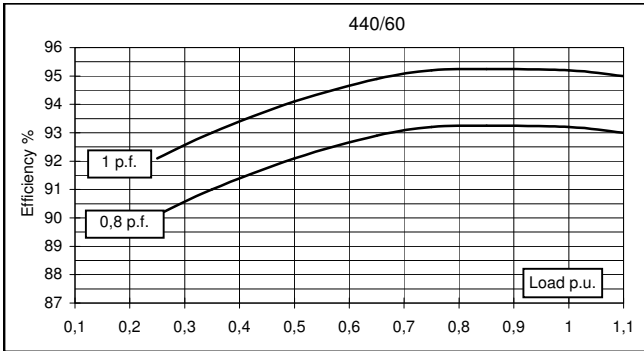
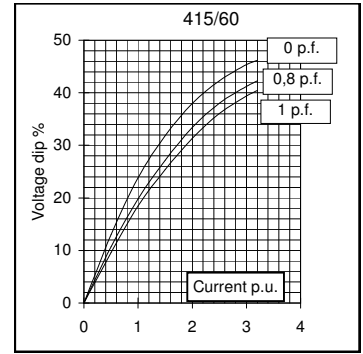
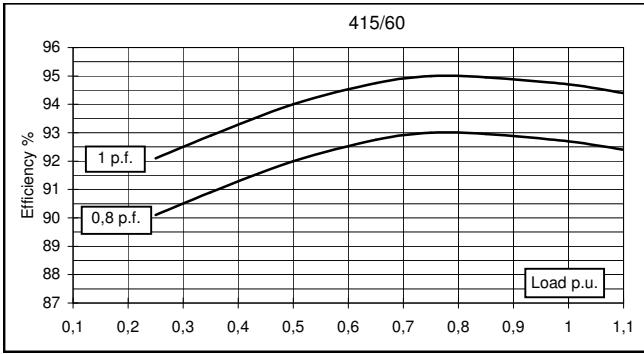


# GENERATOR TYPE ECO 38-1SN/4

Document : DS070A/3

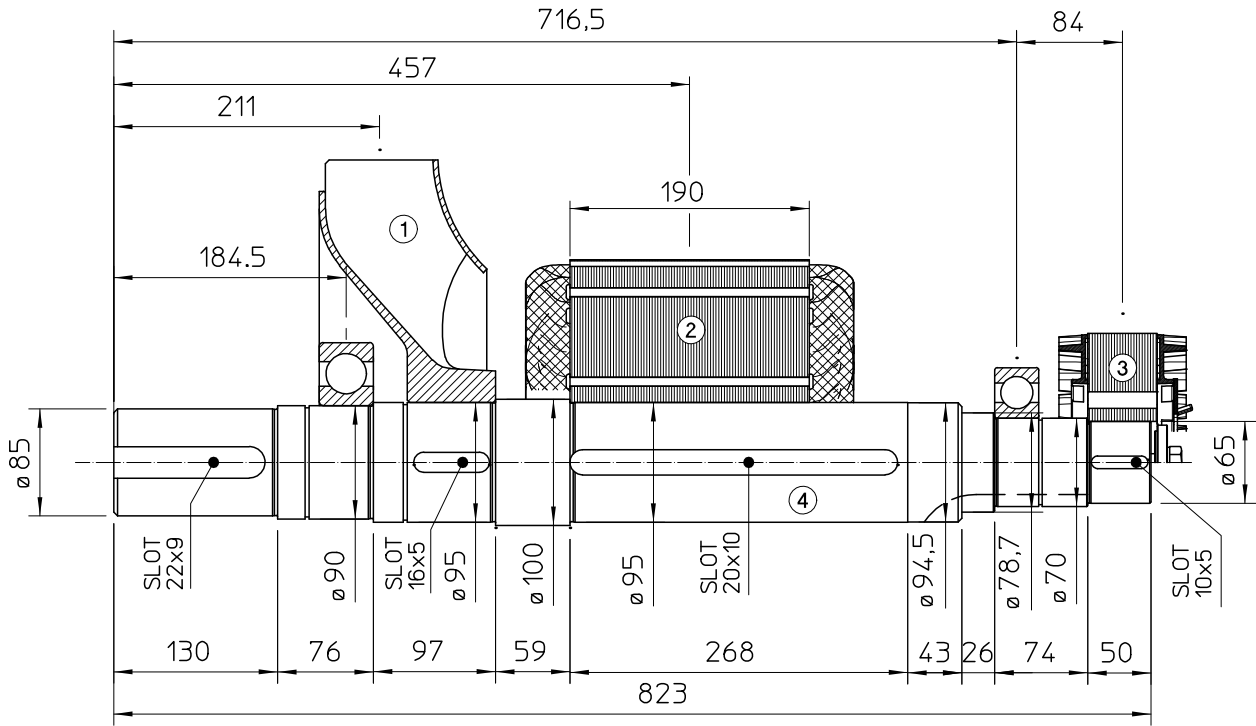
issue 004 date : 28/10/2013

## 60 Hz



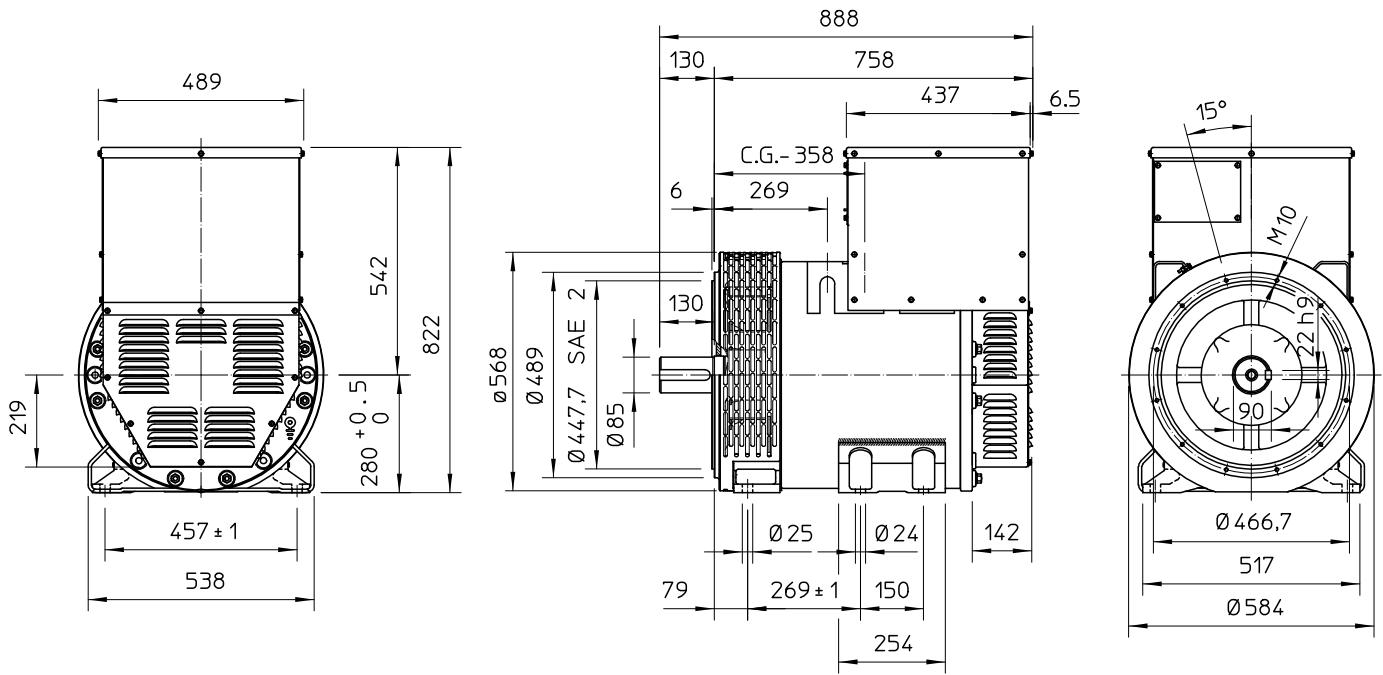


TWO BEARING MOMENTS OF INERTIA



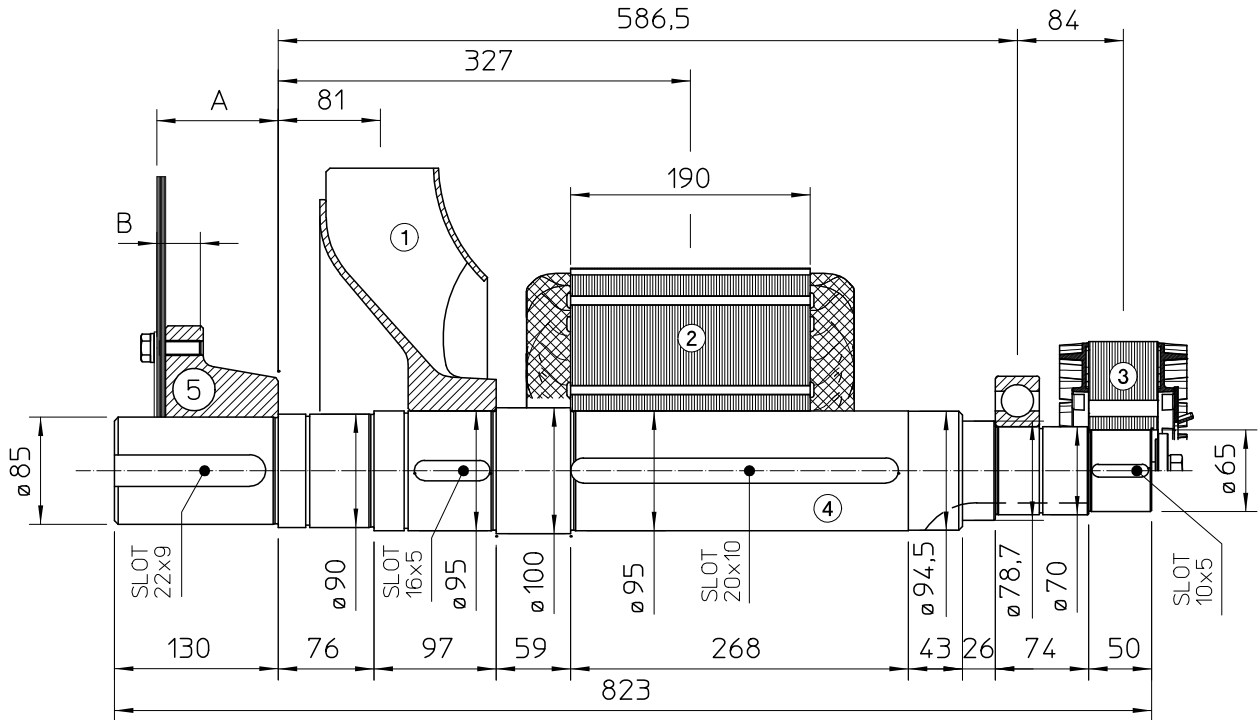
POS.	COMPONENT	WEIGHT (kg)	J (kgm <sup>2</sup> )
1	FAN	6.1	0.1887
2	MAIN ROTOR	103	1.4085
3	EX. ROTOR	14.5	0.0874
4	SHAFT	38.5	0.0397
TOTAL		162.1	1.7243

TWO BEARING DIMENSIONS



C.G.= GRAVITY CENTER

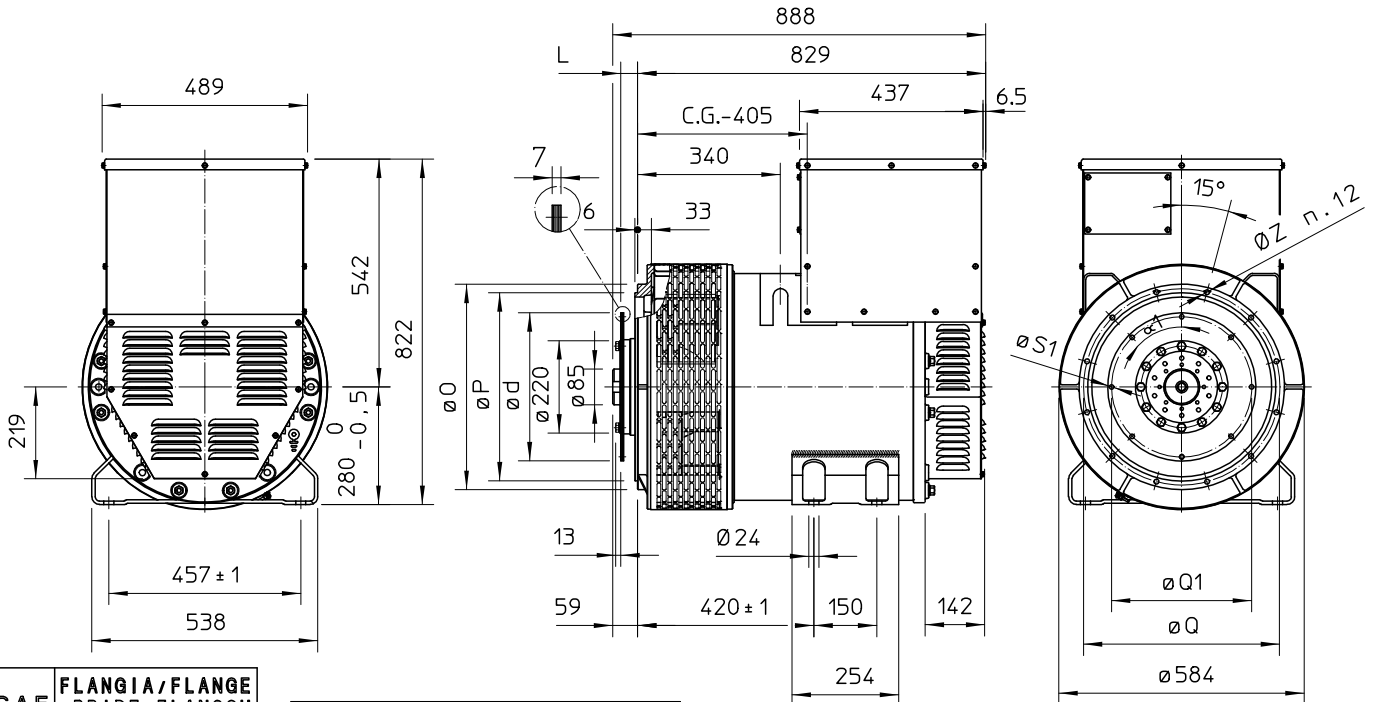
### SINGLE BEARING MOMENTS OF INERTIA



POS.	COMPONENT	WEIGHT (kg)	J (kgm <sup>2</sup> )
1	FAN	6.1	0.1887
2	MAIN ROTOR	103	1.4085
3	EX. ROTOR	14.5	0.0874
4	SHAFT	38.5	0.0397
TOTAL		162.1	1.7243

SAE N°	5		SHAFTS COUPLING FLEX PLATE	
	A	B	WEIGHT kg	J kgm <sup>2</sup>
11.5	110.4	41.1	20.5	0.174
14	96.4	34.7	23.5	0.275

### SINGLE BEARING DIMENSIONS



SAE N.	FLANGIA/FLANGE BRIDE/FLANSCH		
	O	P	Q
3	451	409,6	428,6
2	489	447,7	466,7
1	552	511,2	530,2
1/2	648	584,2	619,1

SAE N.	GIUNTI A DISCHI DISC COUPLING DISQUE DE MONOPALIER SCHEIBENKUPPLUNG					
	L	d	Q1	n <sub>fori</sub>	S1	α1
11 1/2	39,6	352,42	333,37	8	11	45°
14	25,4	466,72	438,15	8	14	45°

C.G.= GRAVITY CENTER

# FAMCO

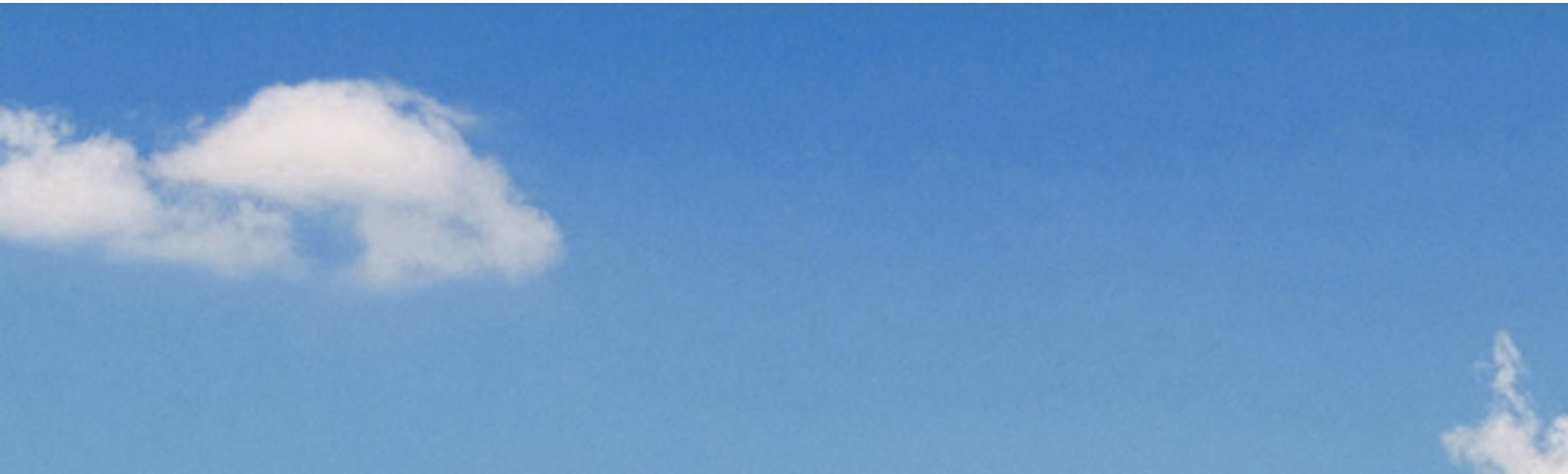
## هایپر صنعت

### موتور دیزل

Manufacturer	Deutz	تولید کننده
Type	BF6M1013FCG3	تیپ
Number of cylinders	6	تعداد سیلندر ها
Cylinder arrangement	in-line	آرایش سیلندر ها
Cycle	4 stroke	چرخه
Aspiration	Turbo charged	سیستم تنفس
Bore × Stroke , mm	105X120	قطر سیلندر × کورس پیستون
Displacement , Liters	4	جا به جایی
Speed Governor	Mechanical/Electronic	سرعت گاورنر
Cooling System	water-cooled	سیستم فنک کننده
Frequency	50Hz	فرکانس
Starter Motor	24V	استارتر موتور

## ژنراتور

Manufacturer	Mecc Alte	توليد كننده
Type	ECO38-2S	تيپ
Exciter type	Brushless	نوع كانتر
Power factor	0.8	ضريب قدرت
Voltage	400-230	ولتاژ
Frequency	50 Hz	فرکانس
Speed, Rpm	1500	سرعت
Insulation class	H	كلاس عايق
Protection class	IP22	كلاس حفاظتي
Excitation	Brushless	سيستم تمرير



**ETDG225**

**Generator Set Technical Data Sheet**

**Water-Cooled DEUTZ BF6M1013FCG3**

**Standby: 180KW/225KVA**

**Prime: 160KW/200KVA**

**at 50Hz,230/400V**

## Generator Set Main Specifications

### 3-PH, 50Hz@1500RPM, 400/230V (Other voltage ranges are available)

- Compacted power units
- Composed of DEUTZ four cycle, water cooled diesel engine and Leroy-Somer alternator
- Cooling radiator and fan
- Electronic governor
- Electrical 12V DC starter & charge alternator motor
- Normal duty, dry type air filter
- Brushless, Self-excited, IP23, Insulation class H and single bearing alternator
- Digital auto-panel control system with emergency stop press bottom
- Welded steel base frame with A/V mounting
- Flexible fuel connection hoses and lube-oil drain hand pump fitted
- Starter batteries with cables and rack
- Industrial type silencer and steel bellows delivered loose
- Mounted main circuit breaker
- Soundproof canopy or container, 8 hours working bottom fuel tank and engine jacket water heater are optional available on the whole range
- According with standards of **ISO8528,ISO3046,ISO3046,ICE34-1GB/T2820-97,GB755**

Prime Power	160KW/200KVA	Standby Power	180KW/225KVA
Rated Speed	1500RPM	Frequency	50Hz
Phase	3 Phase 4 Wires	Rated Voltage	400/230V
Engine Model	BF6M1013FCG3	Alternator Model	LSA46.2M5
Steady Voltage Deviation	≤±1%	Transient Voltage Adjustment · Recovery Time (Sudden deducting / Increasing load)	≤+20% ·4s / -15%·4s
Steady Frequency Drop	≤2%	Transient Frequency Adjustment · Recovery Time (Sudden deducting / Increasing load)	≤+10% ·3s / -7%·3s
Dimension Open Type	2750x1120x1710	Gross Weight	1900
Dimension Silent Type	2910x1300x2160	Gross Weight	2200

- a. **Available in the following voltages:**  
415/240 V·400/230 V·380/220 V·220/127 V·200/115V
- b. **Standby Power: Standby duty operation, under variable load, without over load**
- c. **Prime Power: Continuous duty operation, under variable load 24/24h-10% over load permissible**                      **1 hour/12 hours**
- d. **ISO8258:Rating are given for 25°C ambient temperature.Attitude:100m above sea level.Derating,please contact us or refer to data sheet**

## Engine Main Specifications

### DEUTZ Diesel Engine

Engine Model	BF6M1013FCG3
Number of Cylinder	6
Cylinder Arrangement	In line
Cycle	6
Aspiration	after-cooled turbo-charged
Bore X Stroke (mm X mm)	108X130
Displacement (L)	7.146
Compression Ratio	18.1
Prime Power/Speed(KW/RPM)	183@1500
Standby Power/Speed(KW/RPM)	201@1500
Governor	Electrical(EMR/GAC)
Cooling System	Radiator with water cooled
Speed Stability (%)	≤3
Fuel Consumption at 100% Load(L/H)	50.1
Start Motor System	12 Vdc battery and start motor

Flexible Exhaust Connector

Protection Mach

## **Cooling System**

Block Heater

[Recommended for ambient temperature below 0°C (32°F)]

Radiator Core Guard

## **Controller**

-Automation

External Starting Order

Plug Preheating

-Remote Start Capability

Utility Sensing, 3-Phase

-Engine Parameter Control

Plug Preheating Control

Water Preheating Control

-Measurements

Analog indicator

Line Voltage, Volts

Phase Current, Amps

Single Voltage, Volts

-Safety Device

Overload or Short-circuit Fault

Differential Triggering Fault

-Miscellaneous

Alarm Horn

Battery Charger, 12 Volt

Differential Protection with Time and Sensitivity Adjustment

Permanent insulation Controller

## **Fuel System**

Automatic Fuel Tank Fill Kit

Sub-base Fuel Tank with Secondary Containment Basin

Sub-base Fuel Tank Leak Alarm

Water Separator Fuel Filter

## **Electrical System**

Battery Charger, Equalize/Float Type

Battery isolator Switch

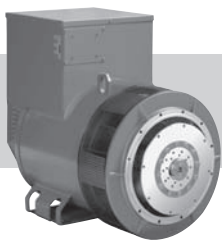
## **Engine and Alternator**

Air Cleaner, Heavy-Duty (with air restriction indicator)

Electronic isochronous Governor

Lube Oil Drain Pump





# meccalte



# ECO 38N

MECCALTE spa - Via Roma, 20 - 36051 CREAZZO (VI) ITALIA  
 Tel. +39 0444/396111 - Fax +39 0444/396166 - e-mail : info@meccalte.it  
 web site: www.meccalte.com

## 4 POLE

### CHARACTERISTICS

#### INDUSTRIAL RATINGS

ambient 40° C

Type	KVA - cos 0.8φ- 3 Phase continuous							Efficiency		
	CL. H (ΔT= 125°C)				CL. F (ΔT= 105°C)			η % CL. H (ΔT= 125°C)		
Series Star Y	380	400	415		380	400	415	2/4	3/4	4/4
Parallel Star YY	190	200	208	IP45	190	200	208			
Series Delta Δ	220	230	240	400 V	220	230	240			
Parallel Delta ΔΔ	110	115	120		110	115	120			
ECO38-1SN/4	180	<b>180</b>	180	145	170	<b>170</b>	170			
ECO38-2SN/4	200	<b>200</b>	200	160	185	<b>185</b>	185	91,7	92,9	92,7
ECO38-3SN/4	225	<b>225</b>	225	180	207	<b>207</b>	207	92	93,3	93
ECO38-1LN/4	250	<b>250</b>	250	200	230	<b>230</b>	230	92,4	93,7	93,4
ECO38-2LN/4	300	<b>300</b>	300	240	275	<b>275</b>	275	92,7	94	93,7
ECO38-3LN/4	350	<b>350</b>	350	280	320	<b>320</b>	320	92,6	93,7	93,5

Type	CL. H (ΔT= 125°C)				CL. F (ΔT= 105°C)			Efficiency		
	CL. H (ΔT= 125°C)				CL. F (ΔT= 105°C)			η % CL. H (ΔT= 125°C)		
Series Star Y	440	460	480		440	460	480	2/4	3/4	4/4
Parallel Star YY	220	230	240	IP45	220	230	240			
Series Delta Δ	254	265	277	480 V	254	265	277			
Parallel Delta ΔΔ	127	133	138		127	133	138			
ECO38-1SN/4	220	220	<b>220</b>	175	205	205	<b>205</b>			
ECO38-2SN/4	240	240	<b>240</b>	192	220	220	<b>220</b>	92,8	94	93,8
ECO38-3SN/4	270	270	<b>270</b>	215	250	250	<b>250</b>	93,4	94,5	94,2
ECO38-1LN/4	300	300	<b>300</b>	240	280	280	<b>280</b>	93,7	94,9	94,5
ECO38-2LN/4	340	360	<b>360</b>	280	310	330	<b>330</b>	93,9	95,1	94,7
ECO38-3LN/4	420	420	<b>420</b>	330	385	385	<b>385</b>	93,3	94,5	94,3

#### STANDBY RATINGS

Type	KVA Temp. Rise / Ambient °C			KVA Temp. Rise / Ambient °C		
	50 Hz			60 Hz		
	163° / 27°	150° / 40°	125° / 27°	163° / 27°	150° / 40°	125° / 27°
ECO38-1SN/4	196	188	188	236	230	230
ECO38-2SN/4	220	211	211	264	253	253
ECO38-3SN/4	250	237	237	300	284	284
ECO38-1LN/4	275	264	264	330	316	316
ECO38-2LN/4	330	315	315	396	378	378
ECO38-3LN/4	370	360	360	444	432	432

Type	J (Kgm <sup>2</sup> ) B3-B14 FORM	Weight (Kg)	Air Volume		Noise dB(A)			
			Air Volume		50 Hz		60 Hz	
			50 Hz (m <sup>3</sup> /min)	60 Hz (m <sup>3</sup> /min)	1m	7m	1m	7m
ECO38-1SN/4	1,7243	510	32	39	82	69	86	73
ECO38-2SN/4	1,8799	560						
ECO38-3SN/4	2,0751	590						
ECO38-1LN/4	2,3481	680						
ECO38-2LN/4	2,8342	765						
ECO38-3LN/4	3,4747	905						

### ACCESSORIES

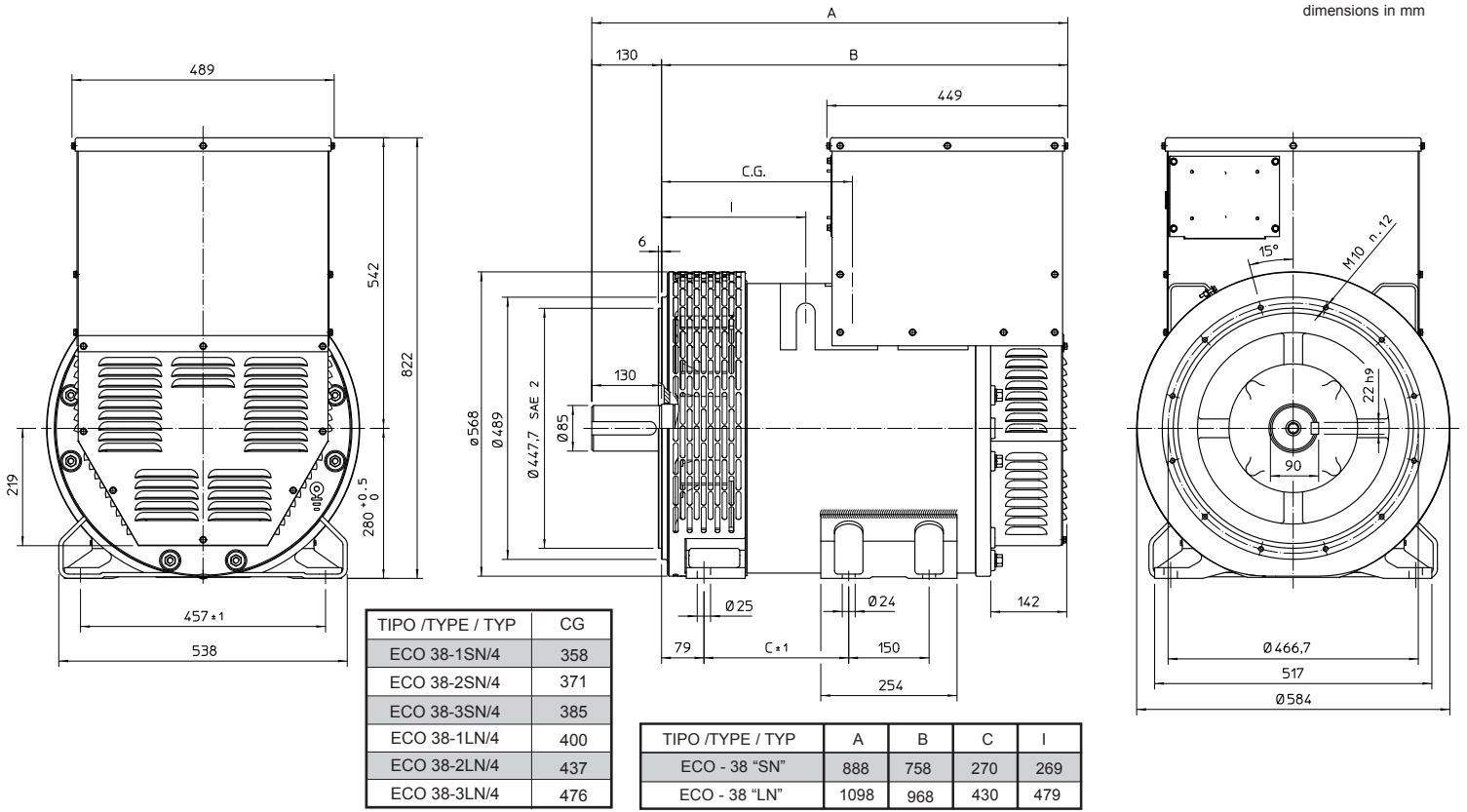
REGULATOR				PARALLEL DEVICE	THERMAL PROTECTION			HEATERS	MECHANICAL PROTECTION		
DSR	DER-1	SR7/2	UVR6		PTC	BIMET. DEVICE	PT100		IP21	IP23	IP45
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● = Standard  
 = Optional

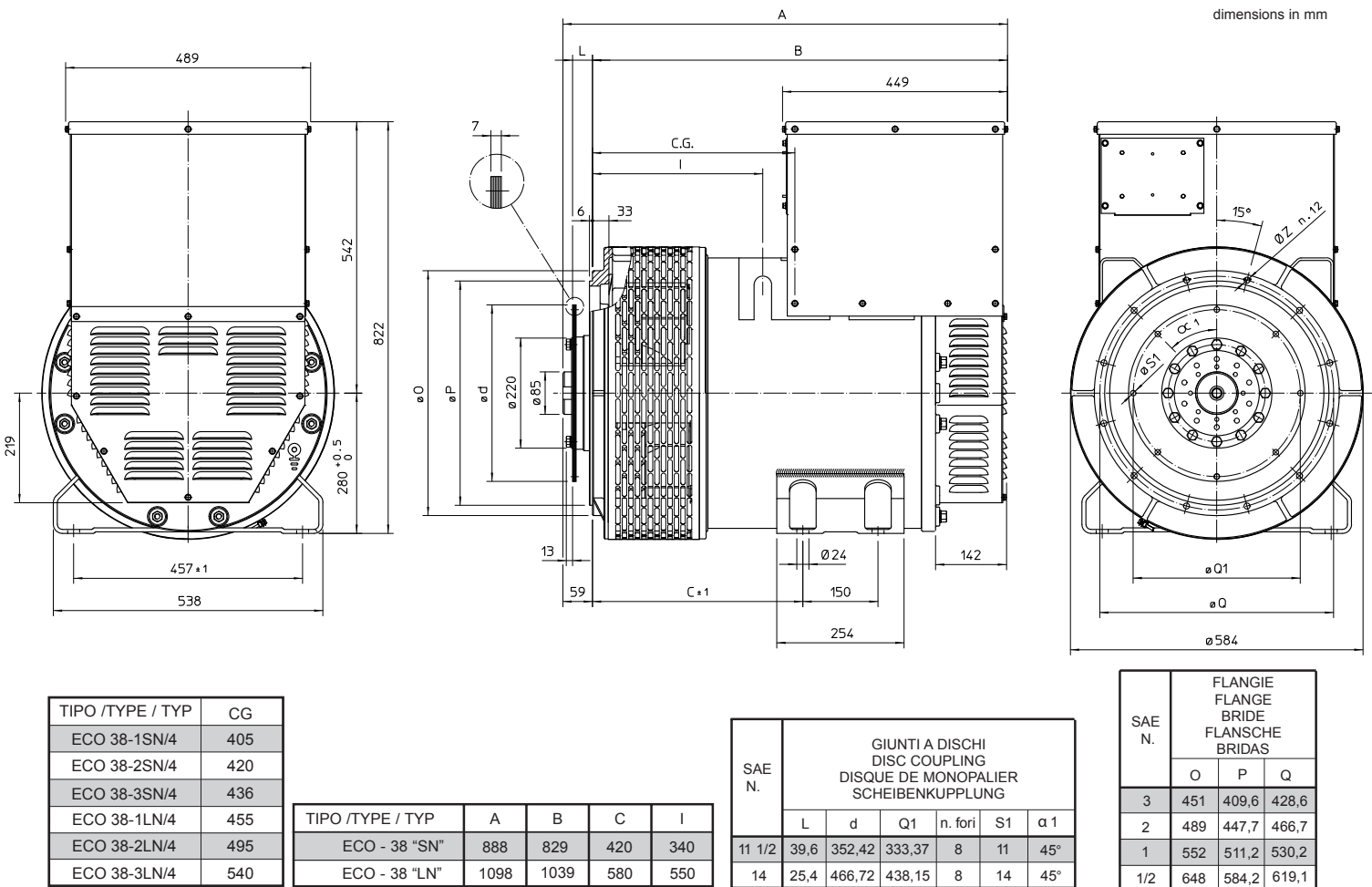
Rating



## OVERALL DIMENSIONS B3-B14 FORM



## OVERALL DIMENSIONS MD35 FORM



# TCD 2013

for power generating sets

90 - 260 kW | 121 - 349 hp at 1500/1800 min<sup>-1</sup> | rpm

EU Stage IIIA / US EPA Tier 3

**FAMCO**  
 هابير صنعت



- Watercooled 4 or 6-cylinder inline engines with turbocharging and charge air cooling.
- The powerful DEUTZ Common Rail (DCR<sup>®</sup>) injection system and the electronic engine control (EMR 4) with intelligent link to the drive management ensure optimum engine performance at low fuel consumption.
- Easy, inexpensive installation due to minimum weight and small installation space.

- Air filter and cooling system are fully pre-assembled.

- Low noise emissions due to acoustically optimized components with very smooth running and high durability.
- Wet cylinder liners, long oil change intervals and easy changing of the engine fluids reduce the running costs and increase the availability of the machinery.
- Best cold starting performance even under extreme conditions.
- The TCD 2013 meets the requirements of the EU Stage IIIA and US EPA Tier 3.

## Technical data

Engine type		TCD 2013 L4 2V	TCD 2013 L6 2V	TCD 2013 L6 4V
No. of cylinders		4	6	6
Bore/stroke	mm   in	108/130   4.3/5.1	108/130   4.3/5.1	108/130   4.3/5.1
Displacement	l   cu in	4.8   293	7.2   439	7.2   439
Weight with cooling system and air filter	kg   lb	660   1455	945   2083	955   2105
Governing standard <sup>1)</sup>		G2	G3	G3

## 50 Hz / 1500 min<sup>-1</sup>

Power		TCD 2013 L4 2V	TCD 2013 L6 2V	TCD 2013 L6 4V
Continuous Power (COP) <sup>2)</sup>	kW   hp	90   121	136   182	226   303
Prime Power (PRP) <sup>3)</sup>	kW   hp	95   128	144   192	238   319
Limited Time Power (LTP) <sup>4)</sup>	kW   hp	100   135	151   202	251   336
Fan power consumption	kW   hp	2.6   3	5.0   7	9.2   12
Typical Generator Output COP <sup>5)</sup>	kVA	99	151	249
Typical Generator Output PRP <sup>5)</sup>	kVA	104	159	263
Typical Generator Output LTP <sup>5)</sup>	kVA	110	168	278

## 60 Hz / 1800 min<sup>-1</sup>

Power output		TCD 2013 L4 2V	TCD 2013 L6 2V	TCD 2013 L6 4V
Continuous Power (COP) <sup>2)</sup>	kW   hp	103   138	156   209	234   314
Prime Power (PRP) <sup>3)</sup>	kW   hp	109   146	165   221	247   332
Limited Time Power (LTP) <sup>4)</sup>	kW   hp	114   153	174   233	260   349
Fan power consumption	kW   hp	4.4   6	8.7   12	15.8   21
Typical Generator Output COP <sup>5)</sup>	kWe	89	136	201
Typical Generator Output PRP <sup>5)</sup>	kWe	94	144	213
Typical Generator Output LTP <sup>5)</sup>	kWe	99	152	225

1) According to ISO 8528-5.

2) Continuous Power: No time limitation, plus 10% additional power for governing purpose only.

3) Prime Power: Average power output ≤ 80%, no time limitation, plus 5% additional power for governing purpose only.

4) Limited Time Running Power: For up to 500 h/year, thereof a maximum of 300 h/year continuous running.

5) In consideration of a generator efficiency level of 90 - 92 % and a power factor of 0.8.

## 50 Hz / 1500 min<sup>-1</sup>

Fuel Consumption (PRP) <sup>6)</sup>		TCD 2013 L4 2V	TCD 2013 L6 2V	TCD 2013 L6 4V
Fuel consumption 25% load	g/kWh   lb/hph	318   0.52	260   0.43	253   0.42
Fuel consumption 50% load	g/kWh   lb/hph	284   0.47	249   0.41	235   0.39
Fuel consumption 75% load	g/kWh   lb/hph	270   0.44	236   0.39	225   0.37
Fuel consumption 100% load	g/kWh   lb/hph	244   0.40	216   0.36	210   0.35

Heat balance & cooling system		TCD 2013 L4 2V	TCD 2013 L6 2V	TCD 2013 L6 4V
Heat dissipation (engine radiator) <sup>2)</sup>	kW   hp	50   67	74   99	133   178
Heat dissipation (CAC) <sup>2)</sup>	kW   hp	19   25	23   31	39   52
Heat dissipation (convection)	kW   hp	9   12	14   19	23   31
Cooling air flow	m <sup>3</sup> /h   cfm	6480   3814	11500   6769	15480   9111

Inlet & exhaust data		TCD 2013 L4 2V	TCD 2013 L6 2V	TCD 2013 L6 4V
max. intake depression	mbar   psi	10   0.15	10   0.15	10   0.15
Combustion air volume	m <sup>3</sup> /h   cfm	450   265	600   353	756   445
max. exhaust gas temperature	°C   °F	530   986	485   905	515   959
Exhaust gas flow	m <sup>3</sup> /h   cfm	1261   742	1587   934	2079   1224

## 60 Hz / 1800 min<sup>-1</sup>

Fuel Consumption (PRP) <sup>6)</sup>		TCD 2013 L4 2V	TCD 2013 L6 2V	TCD 2013 L6 4V
Fuel consumption 25% load	g/kWh   lb/hph	318   0.52	288   0.47	255   0.42
Fuel consumption 50% load	g/kWh   lb/hph	282   0.46	260   0.43	234   0.38
Fuel consumption 75% load	g/kWh   lb/hph	263   0.43	243   0.40	245   0.40
Fuel consumption 100% load	g/kWh   lb/hph	233   0.38	223   0.37	218   0.36

Heat balance & cooling system		TCD 2013 L4 2V	TCD 2013 L6 2V	TCD 2013 L6 4V
Heat dissipation (engine radiator) <sup>7)</sup>	kW   hp	57   76	73   98	141   189
Heat dissipation (CAC) <sup>7)</sup>	kW   hp	20   27	26   35	46   62
Heat dissipation (convection)	kW   hp	10   13	16   21	24   32
Cooling air flow	m <sup>3</sup> /h   cfm	7560   4450	13320   7840	18720   11018

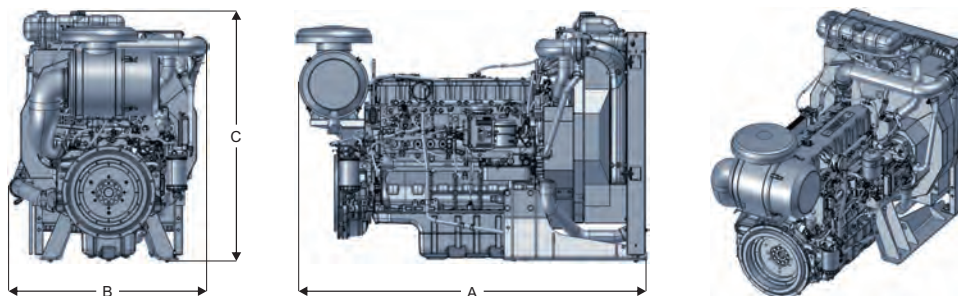
Inlet & exhaust data		TCD 2013 L4 2V	TCD 2013 L6 2V	TCD 2013 L6 4V
max. intake depression	mbar   psi	20   0.29	20   0.29	20   0.29
Combustion air volume	m <sup>3</sup> /h   cfm	492   290	660   388	858   505
max. exhaust gas temperature	°C   °F	540   1004	511   952	485   905
Exhaust gas flow	m <sup>3</sup> /h   cfm	1396   822	1806   1063	2270   1336

6) Refers to diesel with a density of 0.835 kg/dm<sup>3</sup> at 15°C | 6.96 lb/US gallon at 60°F.

7) The heat quantities are valid for the dimensioning of the cooling system.

The data on this data sheet are for information purposes only and are not binding values. The data in the quotation is definitive.

## Dimensions



		A	B	C
TCD 2013 L4 2V	mm	1589	880	1247
TCD 2013 L6 2V	mm	1909	879	1263
TCD 2013 L6 4V	mm	1865	1046	1322

Note: The engine dimensions and weights vary depending on the scope of delivery.

For more information please contact the DEUTZ AG Köln or the responsible sales partner.





# GENERATOR TYPE ECO 38-1LN/4

Document : DS073A/1

issue 004 date 28/10/2013

Electrical Characteristics										
Frequency	Hz	50				60				
Voltage (series star)	V	380	400	415	440	415	440	460	480	
Rated power class H	kVA	250	250	250	230	290	300	300	300	
	kW	200	200	200	184	232	240	240	240	
Rated power class F	kVA	230	230	230	215	270	280	280	280	
	kW	184	184	184	172	216	224	224	224	
Regulation with DSR		±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	%	93,3	93,4	93,1	92,9	93,8	94,3	94,4	94,5
(see graph. for details)	3/4	%	93,4	93,7	93,6	93,3	94,3	94,5	94,7	94,9
	2/4	%	92,3	92,4	92,4	92,2	93,4	93,5	93,6	93,7
	1/4	%	90,1	89,9	89,7	89,5	90,6	90,6	90,6	90,4
Reactances (f. l.cl. F)	Xd	%	229,4	207	192,3	157,4	267,7	246,3	225,4	207
	Xd'	%	15,5	14,0	13,0	10,6	18,1	16,7	15,2	14,0
	Xd''	%	8,0	7,2	6,7	5,5	9,3	8,6	7,8	7,2
	Xq	%	129,6	117	108,7	89,0	151,3	139,2	127,4	117
	Xq'	%	129,6	117	108,7	89,0	151,3	139,2	127,4	117
	Xq''	%	24,4	22	20,4	16,7	28,5	26,2	24,0	22
	X <sub>2</sub>	%	17,7	16,0	14,9	12,2	20,7	19,0	17,4	16,0
	X <sub>0</sub>	%	2,7	2,4	2,2	1,8	3,1	2,9	2,6	2,4
Short Circuit Ratio	Kcc		0,41	0,44	0,68	1,11	0,32	0,38	0,41	0,44
Time Constants	Td'	sec.	0,085							
	Td''	sec.	0,013							
	Tdo'	sec.	1,30							
	Tα	sec.	0,017							
Short Circuit Current Capacity		%	>300				>350			
Excitation at no load	Amp.		0,6	0,71	0,8	0,95	0,4	0,5	0,58	0,7
Excitation at full load	Amp.		2,7	2,8	3	3,2	2,4	2,6	2,7	2,8
Overload (long-term)		%	1 hour in a 6 hours period 110% rated load							
Overload per 20 sec.		%	300							
Stator Winding Resistance (20°C)		Ω	0,0065							
Rotor Winding Resistance (20°C)		Ω	4,887							
Exciter Resistance (20 °C)		Ω	Rotor : 0,685				Stator : 15,28			
Heat dissipation at f.l.cl.H	W		14362	14133	14823	14062	15335	14507	14237	13968
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 / 2,1							
Waveform Distors.(THD) at no load	LL/LN %		2,9 / 3,1							
<b>Mechanical characteristics</b>										
Protection			IP 21 (other protection on request )							
DE bearing			6318.2RS							
NDE bearing			6314.2RS							
Weight of wound stator assembly	kg		231							
Weight of wound rotor assembly	kg		147,5							
Weight of complete generator	kg		680							
Maximun overspeed	rpm		2250							
Unbalanced magnetic pull at f.l.cl.F	kN/mm		5,1							
Cooling air requirement	m <sup>3</sup> /min		32				39			
Inertia Constant (H)	sec.		0,116				0,139			
Noise level at 1m/7m	dB(A)		82 / 69				86 / 73			

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

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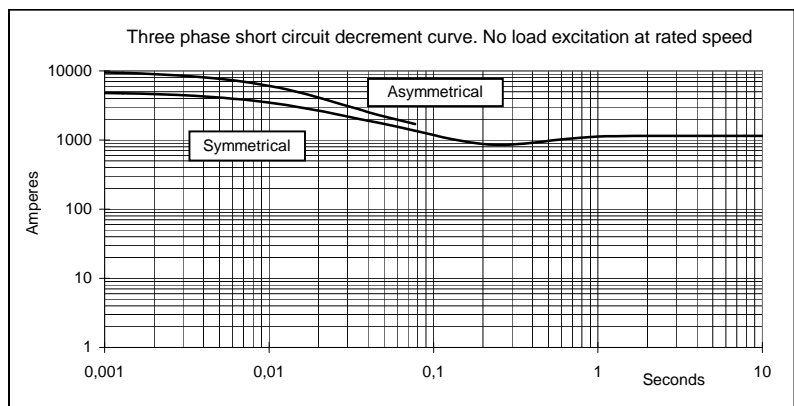
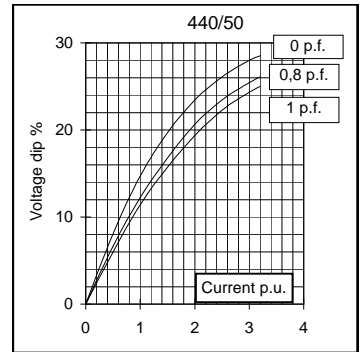
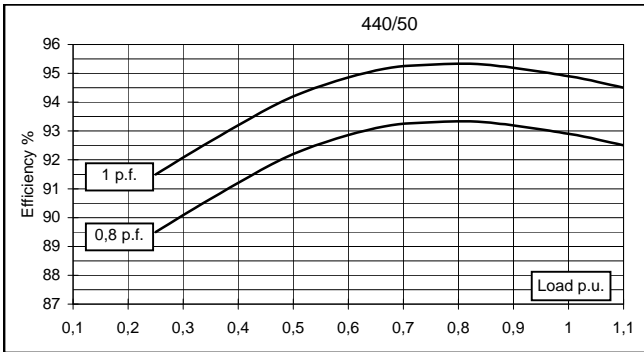
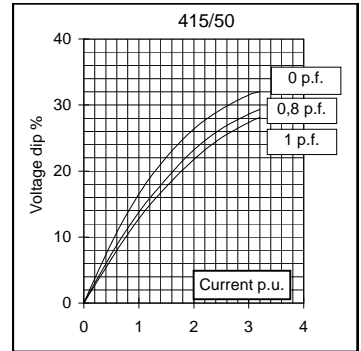
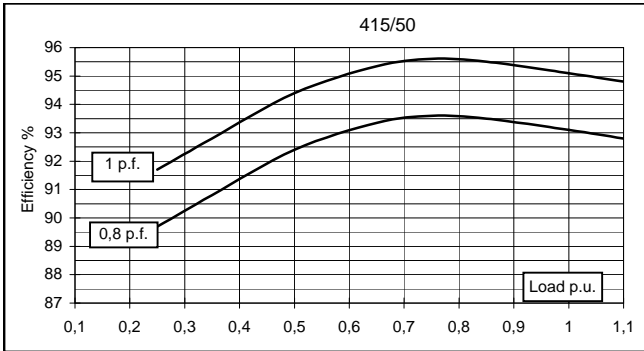
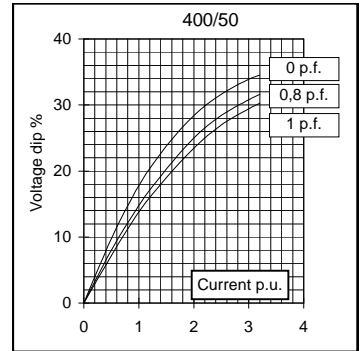
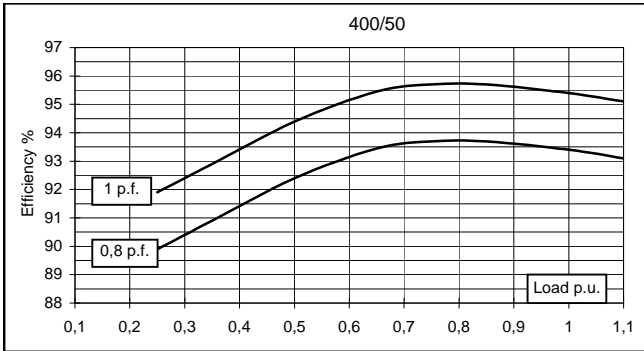
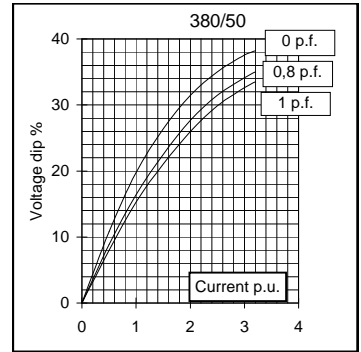
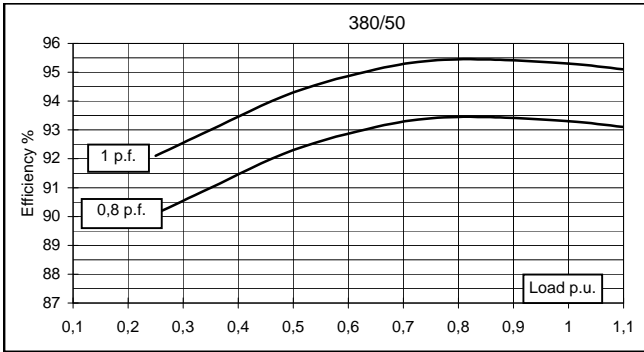


# GENERATOR TYPE ECO 38-1LN/4

Document : DS073A/2

issue 004 date : 28/10/2013

## 50 Hz

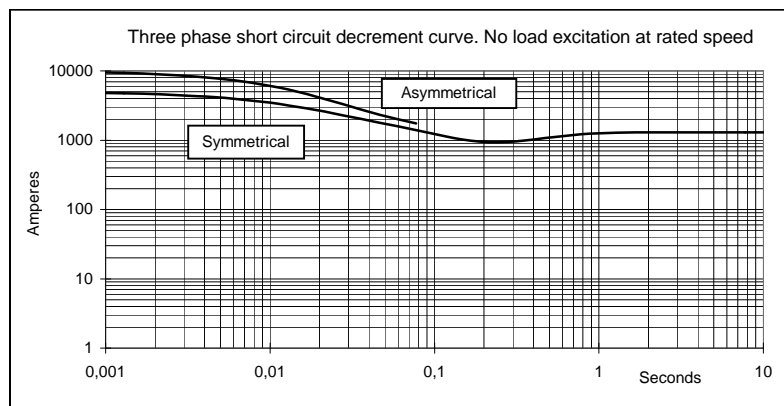
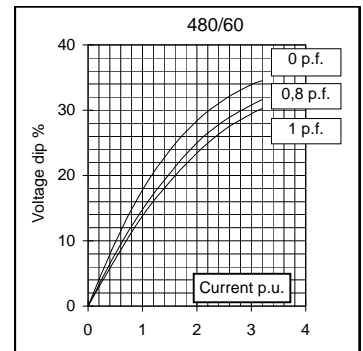
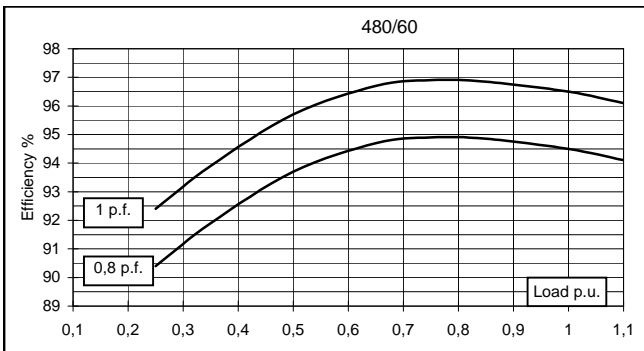
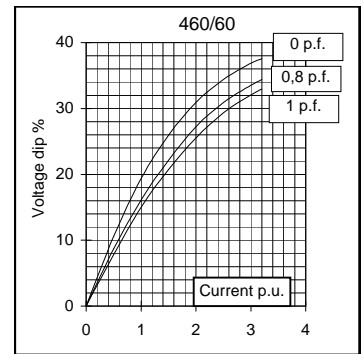
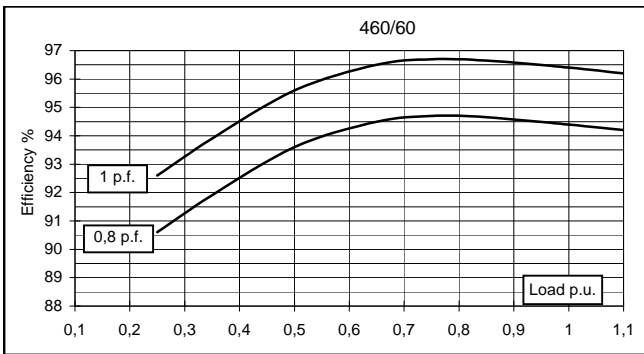
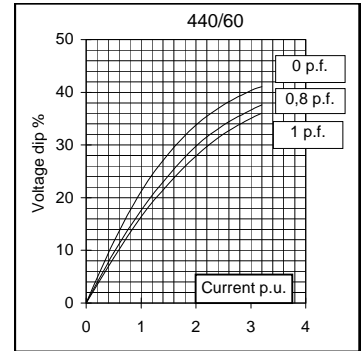
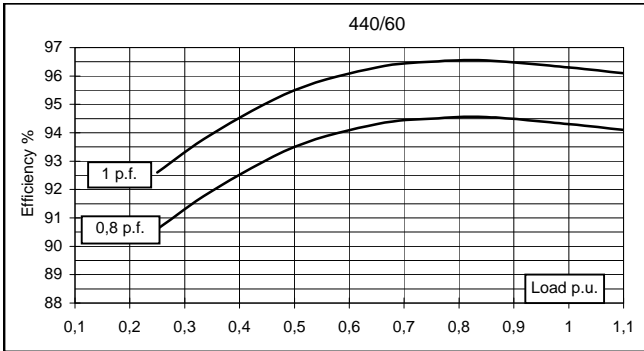
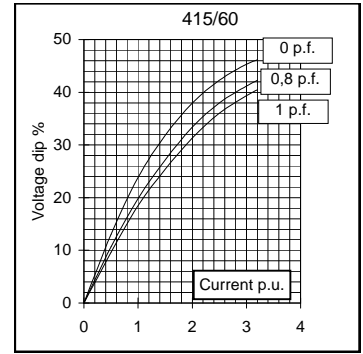
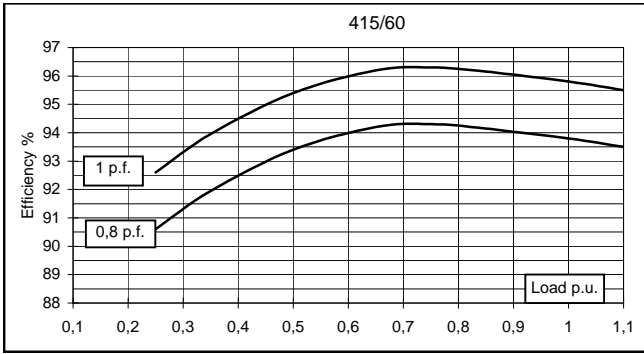




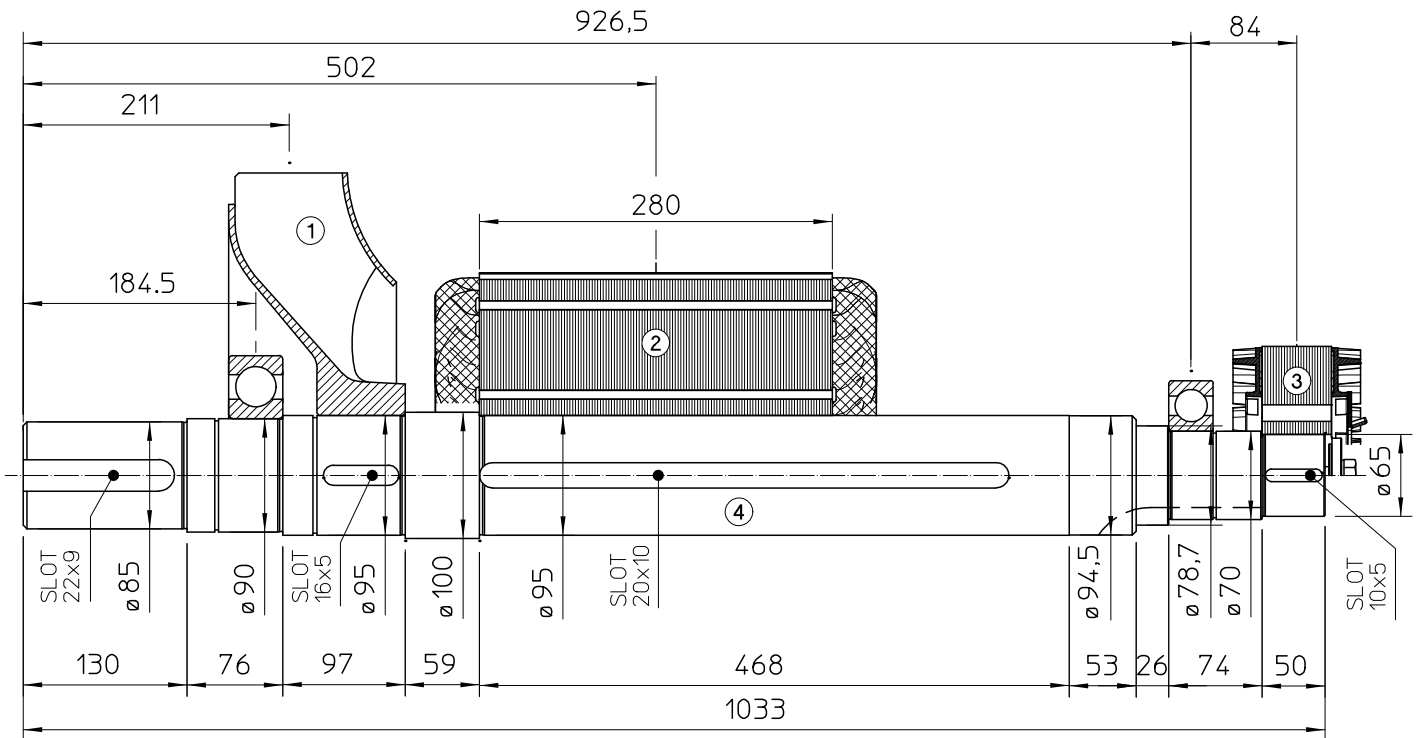
# GENERATOR TYPE ECO 38-1LN/4

Document : DS073A/3  
issue 004 date : 28/10/2013

## 60 Hz

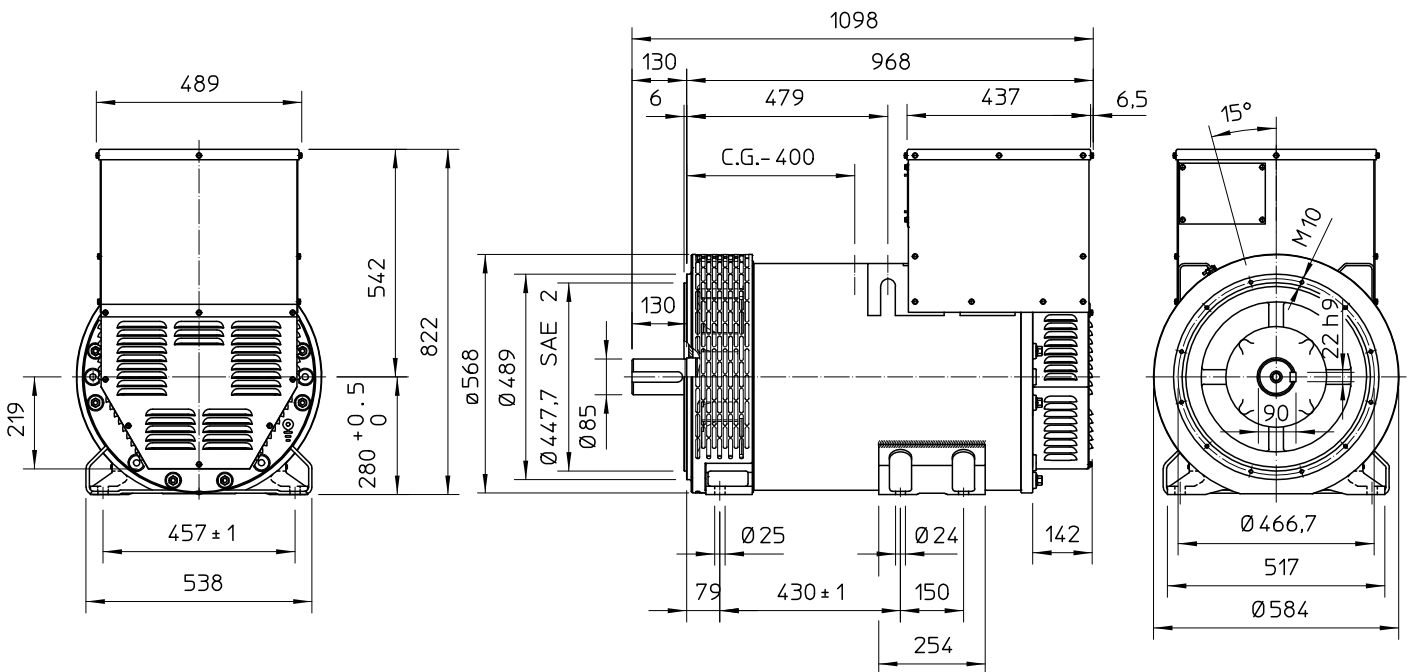


## TWO BEARING MOMENTS OF INERTIA



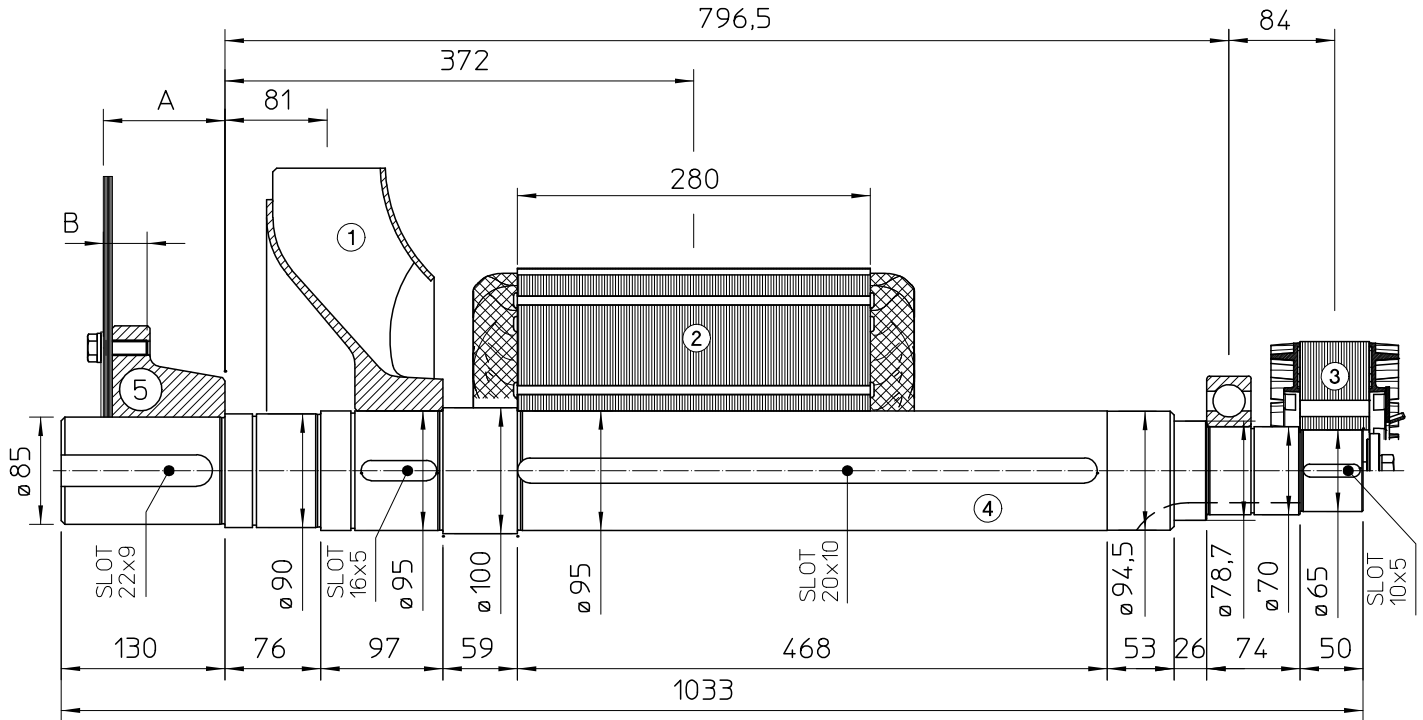
POS.	COMPONENT	WEIGHT (kg)	J (kgm <sup>2</sup> )
1	FAN	6.1	0.1887
2	MAIN ROTOR	147.5	2.0195
3	EX. ROTOR	14.5	0.0874
4	SHAFT	49.9	0.0525
TOTAL		218	2.3481

## TWO BEARING DIMENSIONS





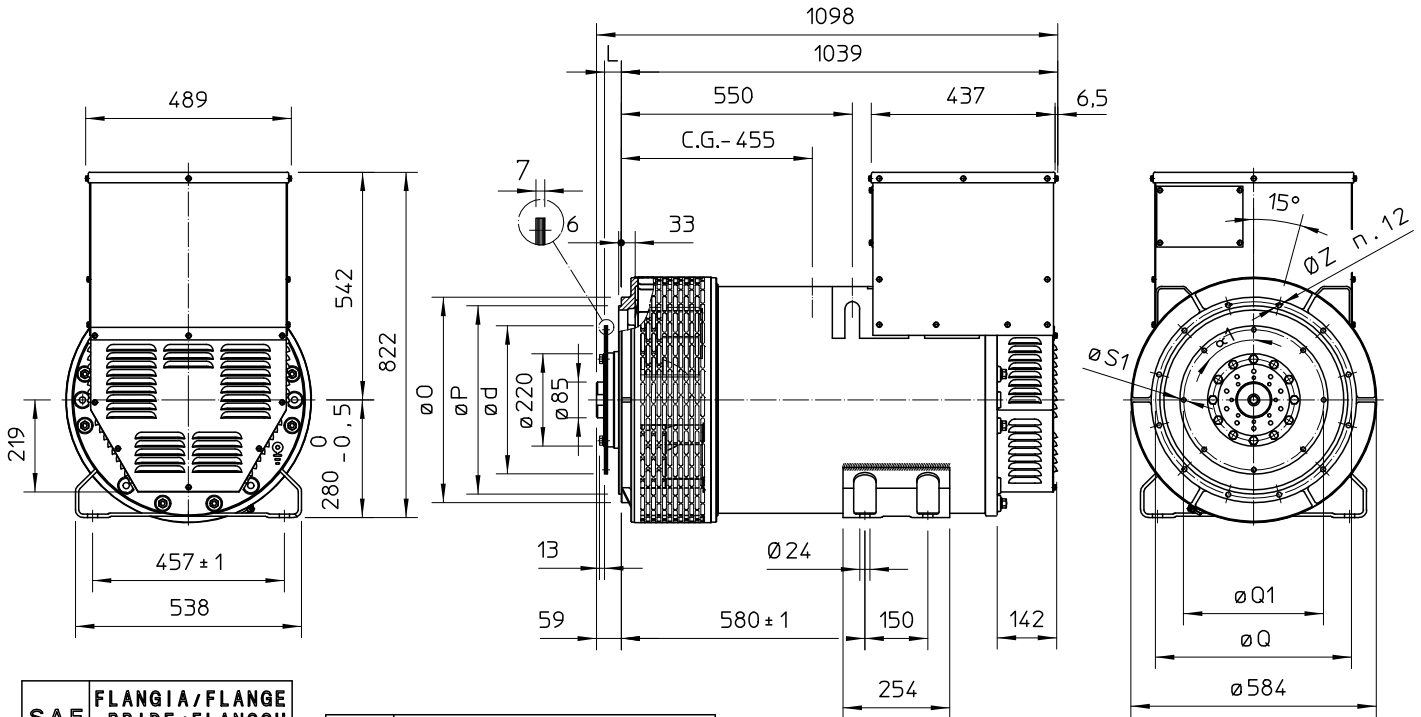
### SINGLE BEARING MOMENTS OF INERTIA



POS.	COMPONENT	WEIGHT (kg)	J (kgm <sup>2</sup> )
1	FAN	6.1	0.1887
2	MAIN ROTOR	147.5	2.0195
3	EX. ROTOR	14.5	0.0874
4	SHAFT	49.9	0.0525
TOTAL		218	2.3481

SAE N°	5		SHAFTS COUPLING FLEX PLATE	
	A	B	WEIGHT kg	J kgm <sup>2</sup>
11.5	110.4	41.1	20.5	0.174
14	96.4	34.7	23.5	0.275

### SINGLE BEARING DIMENSIONS



SAE N.	FLANGIA/FLANGE BRIDE/FLANSCH		
	O	P	Q
3	451	409,6	428,6
2	489	447,7	466,7
1	552	511,2	530,2
1/2	648	584,2	619,1

SAE N.	GIUNTI A DISCHI DISC COUPLING DISQUE DE MONOPALIER SCHEIBENKUPPLUNG				
	L	d	Q1	n <sub>fori</sub>	S1
11 1/2	39,6	352,42	333,37	8	11 45°
14	25,4	466,72	438,15	8	14 45°

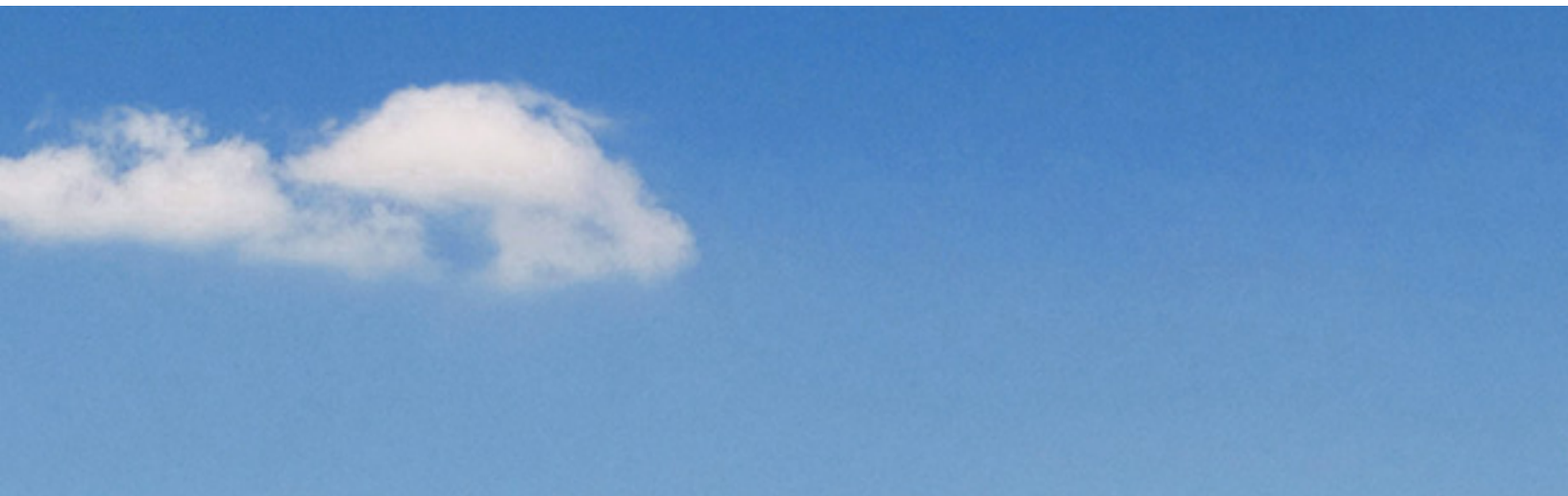
C.G.= GRAVITY CENTER

# FAMCO

## هایپر صنعت

### موتور دیزل

Manufacturer	Deutz	تولید کننده
Type	BF6M1015C-G3	تیپ
Number of cylinders	4	تعداد سیلندر ها
Cylinder arrangement	Vertical in-line	آرایش سیلندر ها
Cycle	4 stroke	چرخه
Aspiration	Turbo charged	سیستم تنفس
Bore × Stroke , mm	105X120	قطر سیلندر × کورس پیستون
Displacement , Liters	4	جا به جایی
Speed Governor	Mechanical/Electronic	سرعت گاورنر
Cooling System	water-cooled	سیستم فنک کننده
Frequency	50Hz	فرکانس
Starter Motor	24V	استارتر موتور



## ژنراتور

Manufacturer	Stamford	توليد كننده
Type	HCI444E	تيپ
Exciter type	Brushless	نوع كانتر
Power factor	0.8	ضريب قدرت
Voltage	400-230	ولتاژ
Frequency	50 Hz	فرکانس
Speed, Rpm	1500	سرعت
Insulation class	H	كلاس عايق
Protection class	IP23	كلاس حفاظتی
Excitation	Brushless	سیستم تمریک

## DEUTZ Diesel Engine Technical Data

Engine Model	BF6M1015C-G3
Number of Cylinders	4
Cylinder arrangement	Vertical in-line
Cycle	Four stroke
Aspiration	Turbocharged
Bore×Stroke (mm×mm)	105x 120
Displacement (Liter)	4
Compression Ratio	17:1
Prime Power/Speed (kW/rpm)	60/1500
Standby Power/Speed (kW/rpm)	66/1500
Speed Governor	Mechanical
Cooling System	water-cooled
Fuel Consumption at 100% Load (g/kWh)	288 (at 1500RPM)
Starter Motor	24V
Alternator	24V

## Alternator Specification

### Stamford Alternator (Standard)

Alternator Model	HCI 544C(Stamford) EN544C(ENEC) Please Refer To The“ Genset Main Technical Data”
Phase/Connect	3-phase 4-wire ,Y type connection
Excitation Model	Self-excite,automatic voltage regulation,Insulation:H,Brushless,Enclosure:IP21—IP23
Power Factor	0.8
The regulating rate of instantaneous voltage:	-15%~ +20%
The time of steady voltage:	≤1.5sec
The waving rate of voltage:	≤1.0%
The regulating rate of steady frequency:	≤5%
regulating rate of instantaneous frequency:	≤±10%
The time of steady frequency:	3sec
The waving rate of frequency:	≤1%

### ENE Alternator (Option) Technical Data

## Reliable Performance

### Voltage regulation

Voltage regulation maintained within  $\pm 0.5\%$  as follow:

- Power factor Between 0.8~1.0 lag
- From no load to full load, any steady load
- Speed droop variation under 4.5%

### Frequency/Speed undulation

• Change load from 0-100%, Frequency/Speed Droop Ratio within 5% .

• Load from 25-100%, any steady load Frequency/Speed undulation within 0.25%

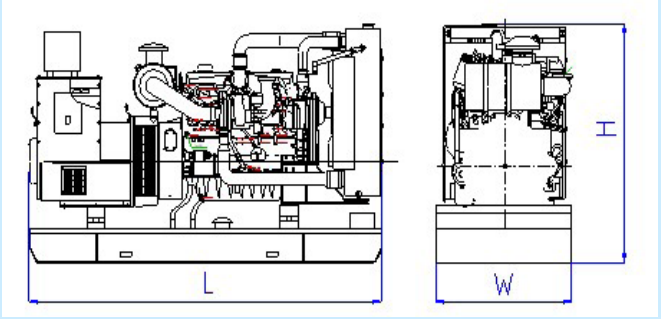
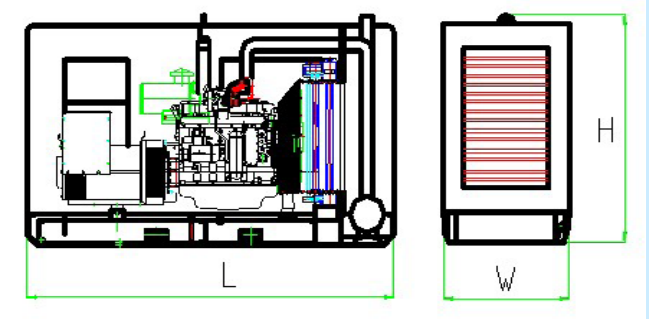
### Effect factor of telecom

- TIF( MA MG1-22) better than 50
- THF( BS EN60034) better than 2%

## Criterion

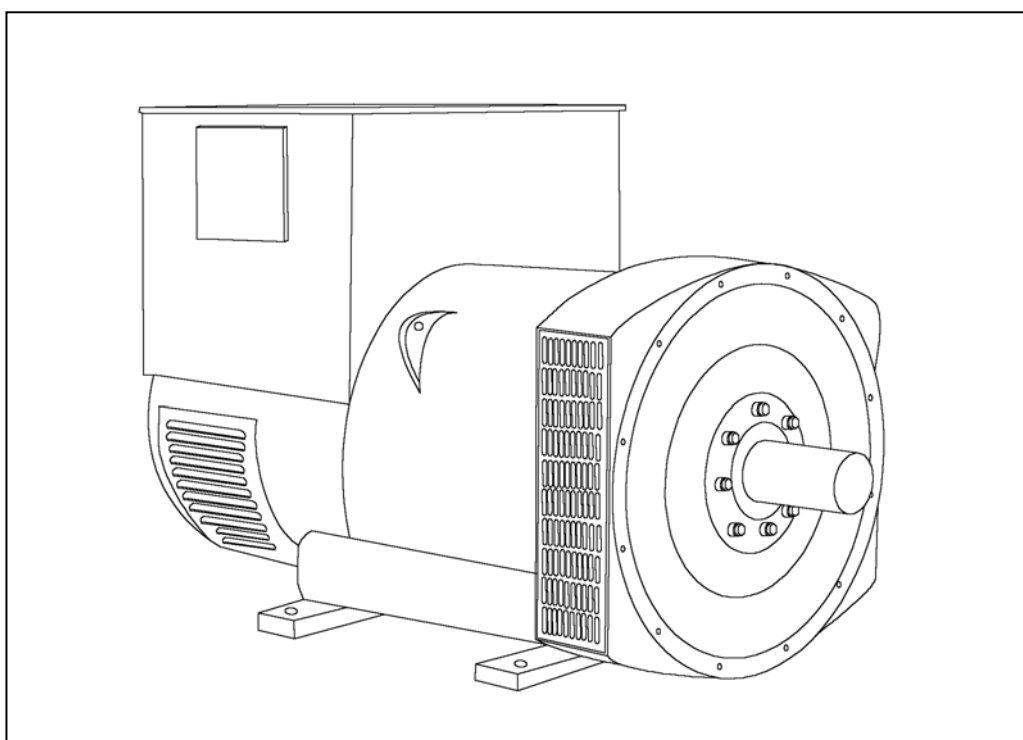
- ISO8528, GB/T2820
- EN12601:2001, EN60034-22:1997, EN60204-1:2006
- ISO9001:2000 Quality Control System

## Dimension and Weight

	<p><b>Open Type</b></p> <p>Overall size (L*W*H) 3100×1900×2100 Weight: 2000kg</p>
	<p><b>Silent Type</b></p> <p>Overall size (L*W*H) 3600×2000×2200 Weight: 3200kg</p>

# STAMFORD<sup>®</sup>

## HCI 434E/444E - Technical Data Sheet



# HCI434E/444E

## SPECIFICATIONS & OPTIONS

**STAMFORD**

### STANDARDS

Newage Stamford industrial generators meet the requirements of BS EN 60034 and the relevant section of other international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC34, CSA C22.2-100, AS1359. Other standards and certifications can be considered on request.

### VOLTAGE REGULATORS

#### AS440 AVR - STANDARD

With this self-excited system the main stator provides power via the Automatic Voltage Regulator (AVR) to the exciter stator. The high efficiency semi-conductors of the AVR ensure positive build-up from initial low levels of residual voltage.

The exciter rotor output is fed to the main rotor through a three-phase full-wave bridge rectifier. The rectifier is protected by a surge suppressor against surges caused, for example, by short circuit or out-of-phase paralleling.

The AS440 will support a range of electronic accessories, including a 'droop' Current Transformer (CT) to permit parallel operation with other ac generators.

#### MX341 AVR

This sophisticated AVR is incorporated into the Stamford Permanent Magnet Generator (PMG) control system.

The PMG provides power via the AVR to the main exciter, giving a source of constant excitation power independent of generator output. The main exciter output is then fed to the main rotor, through a full wave bridge, protected by a surge suppressor. The AVR has in-built protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds.

An engine relief load acceptance feature can enable full load to be applied to the generator in a single step.

If three-phase sensing is required with the PMG system the MX321 AVR must be used.

We recommend three-phase sensing for applications with greatly unbalanced or highly non-linear loads.

#### MX321 AVR

The most sophisticated of all our AVRs combines all the features of the MX341 with, additionally, three-phase rms sensing, for improved regulation and performance.

Over voltage protection is built-in and short circuit current level adjustments is an optional facility.

### WINDINGS & ELECTRICAL PERFORMANCE

All generator stators are wound to 2/3 pitch. This eliminates triplen (3rd, 9th, 15th ...) harmonics on the voltage waveform and is found to be the optimum design for trouble-free supply of non-linear loads. The 2/3 pitch design avoids excessive neutral currents sometimes seen with higher winding pitches, when in parallel with the mains. A fully connected damper winding reduces oscillations during paralleling. This winding, with the 2/3 pitch and carefully selected pole and tooth designs, ensures very low waveform distortion.

### TERMINALS & TERMINAL BOX

Standard generators are 3-phase reconnectable with 12 ends brought out to the terminals, which are mounted on a cover at the non-drive end of the generator. A sheet steel terminal box contains the AVR and provides ample space for the customers' wiring and gland arrangements. It has removable panels for easy access.

### SHAFT & KEYS

All generator rotors are dynamically balanced to better than BS6861:Part 1 Grade 2.5 for minimum vibration in operation. Two bearing generators are balanced with a half key.

### INSULATION/IMPREGNATION

The insulation system is class 'H'.

All wound components are impregnated with materials and processes designed specifically to provide the high build required for static windings and the high mechanical strength required for rotating components.

### QUALITY ASSURANCE

Generators are manufactured using production procedures having a quality assurance level to BS EN ISO 9001.

The stated voltage regulation may not be maintained in the presence of certain radio transmitted signals. Any change in performance will fall within the limits of Criteria 'B' of EN 61000-6-2:2001. At no time will the steady-state voltage regulation exceed 2%.

*NB Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.*

*Front cover drawing typical of product range.*

# HCI434E/444E



## WINDING 311

CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.							
A.V.R.	MX321	MX341						
VOLTAGE REGULATION	± 0.5 %	± 1.0 %	With 4% ENGINE GOVERNING					
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)							
CONTROL SYSTEM	SELF EXCITED							
A.V.R.	AS440							
VOLTAGE REGULATION	± 1.0 %	With 4% ENGINE GOVERNING						
SUSTAINED SHORT CIRCUIT	WILL NOT SUSTAIN A SHORT CIRCUIT							
INSULATION SYSTEM	CLASS H							
PROTECTION	IP23							
RATED POWER FACTOR	0.8							
STATOR WINDING	DOUBLE LAYER LAP							
WINDING PITCH	TWO THIRDS							
WINDING LEADS	12							
STATOR WDG. RESISTANCE	0.009 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED							
ROTOR WDG. RESISTANCE	1.19 Ohms at 22°C							
EXCITER STATOR RESISTANCE	18 Ohms at 22°C							
EXCITER ROTOR RESISTANCE	0.068 Ohms PER PHASE AT 22°C							
R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4, VDE 0875G, VDE 0875N. refer to factory for others							
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%							
MAXIMUM OVERSPEED	2250 Rev/Min							
BEARING DRIVE END	BALL. 6317 (ISO)							
BEARING NON-DRIVE END	BALL. 6314 (ISO)							
	1 BEARING				2 BEARING			
WEIGHT COMP. GENERATOR	1024 kg				1030 kg			
WEIGHT WOUND STATOR	470 kg				470 kg			
WEIGHT WOUND ROTOR	400 kg				377 kg			
WR <sup>2</sup> INERTIA	4.6331 kgm <sup>2</sup>				4.4343 kgm <sup>2</sup>			
SHIPPING WEIGHTS in a crate	1095 kg				1100 kg			
PACKING CRATE SIZE	155 x 87 x 107(cm)				155 x 87 x 107(cm)			
	50 Hz				60 Hz			
TELEPHONE INTERFERENCE	THF<2%				TIF<50			
COOLING AIR	0.8 m <sup>3</sup> /sec 1700 cfm				0.99 m <sup>3</sup> /sec 2100 cfm			
VOLTAGE SERIES STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
VOLTAGE PARALLEL STAR	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
VOLTAGE SERIES DELTA	220/110	230/115	240/120	254/127	240/120	254/127	266/133	277/138
KVA BASE RATING FOR REACTANCE VALUES	350	350	350	350	400	420	440	440
X <sub>d</sub> DIR. AXIS SYNCHRONOUS	3.01	2.71	2.52	2.24	3.47	3.26	3.12	2.87
X' <sub>d</sub> DIR. AXIS TRANSIENT	0.20	0.18	0.17	0.15	0.21	0.20	0.19	0.17
X'' <sub>d</sub> DIR. AXIS SUBTRANSIENT	0.14	0.13	0.12	0.11	0.15	0.14	0.13	0.12
X <sub>q</sub> QUAD. AXIS REACTANCE	2.58	2.33	2.16	1.92	2.92	2.74	2.63	2.41
X'' <sub>q</sub> QUAD. AXIS SUBTRANSIENT	0.36	0.32	0.30	0.27	0.41	0.38	0.37	0.34
X <sub>L</sub> LEAKAGE REACTANCE	0.07	0.06	0.06	0.05	0.08	0.08	0.07	0.07
X <sub>2</sub> NEGATIVE SEQUENCE	0.24	0.22	0.20	0.18	0.28	0.26	0.25	0.23
X <sub>0</sub> ZERO SEQUENCE	0.10	0.09	0.08	0.07	0.10	0.09	0.09	0.08
REACTANCES ARE SATURATED				VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED				
T' <sub>d</sub> TRANSIENT TIME CONST.	0.08s							
T'' <sub>d</sub> SUB-TRANSTIME CONST.	0.019s							
T' <sub>do</sub> O.C. FIELD TIME CONST.	1.7s							
T <sub>a</sub> ARMATURE TIME CONST.	0.018s							
SHORT CIRCUIT RATIO	1/X <sub>d</sub>							



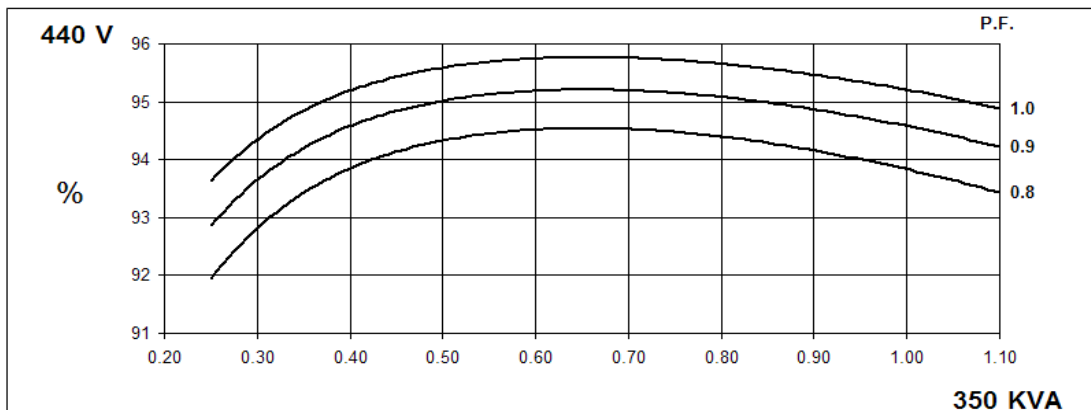
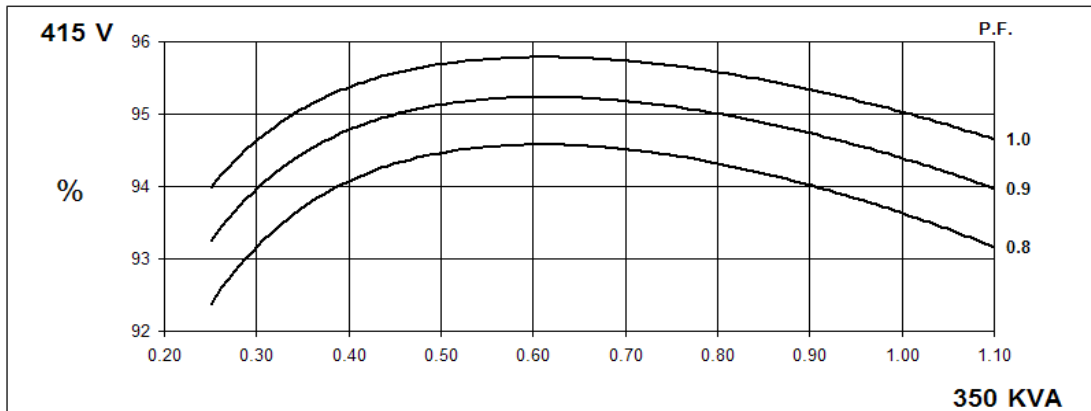
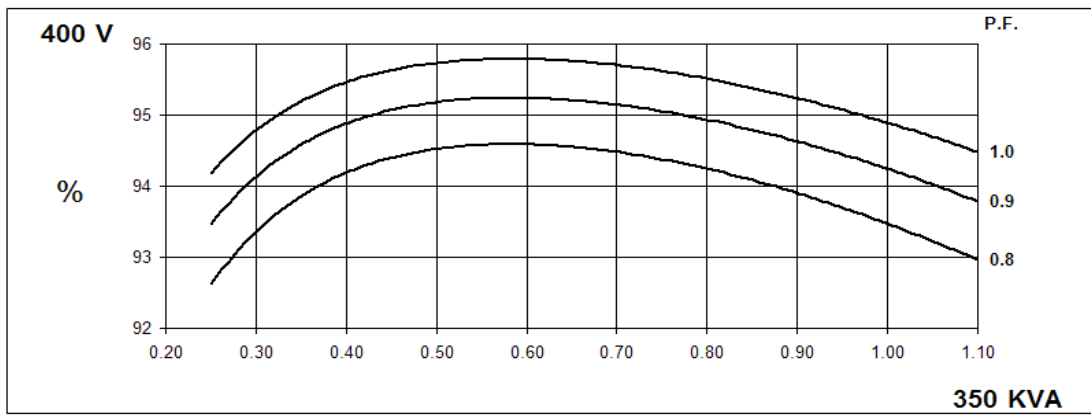
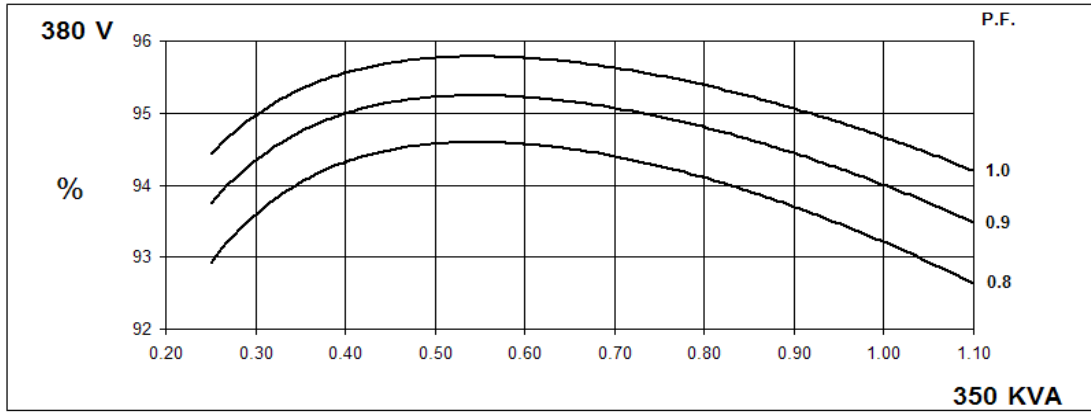
50  
Hz

HCI434E/444E

**STAMFORD**

Winding 311

**THREE PHASE EFFICIENCY CURVES**



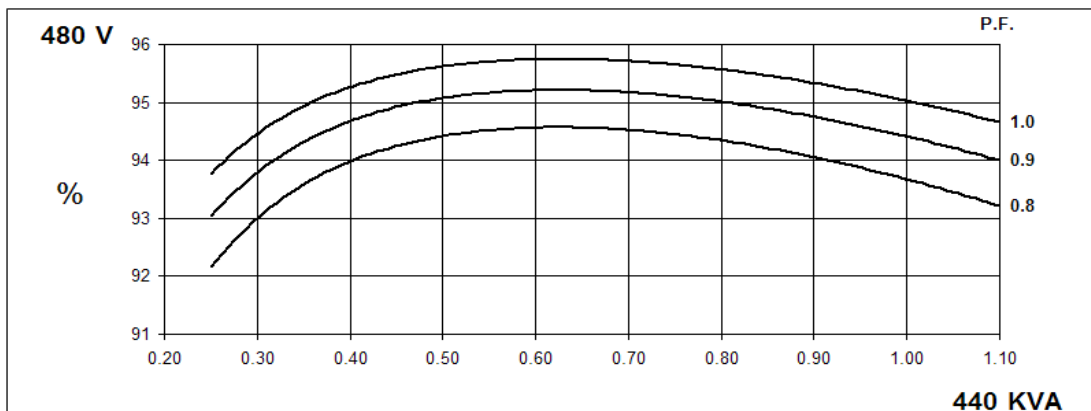
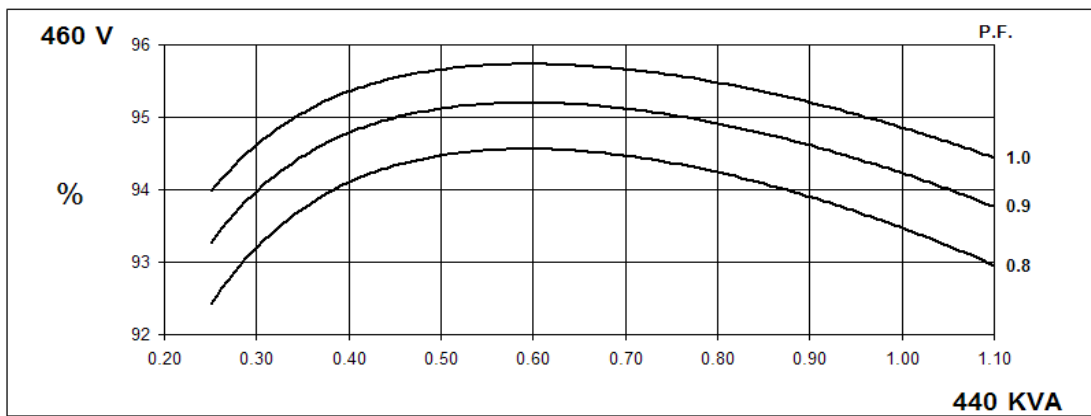
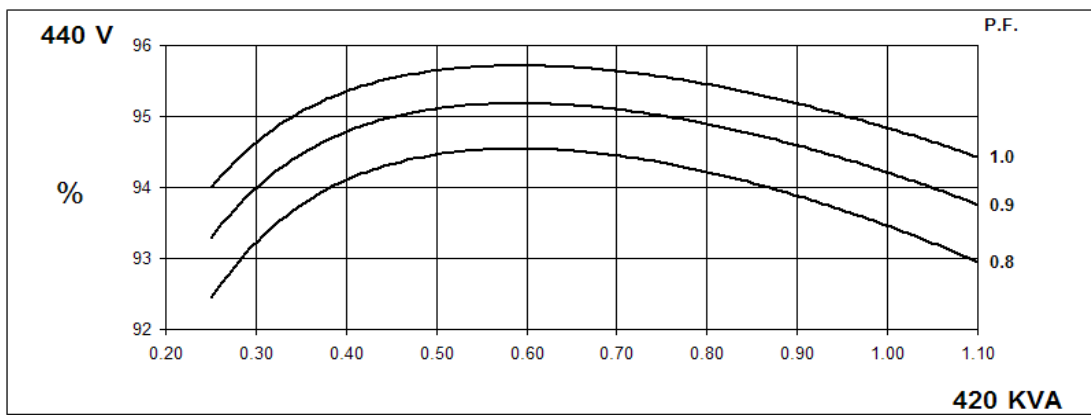
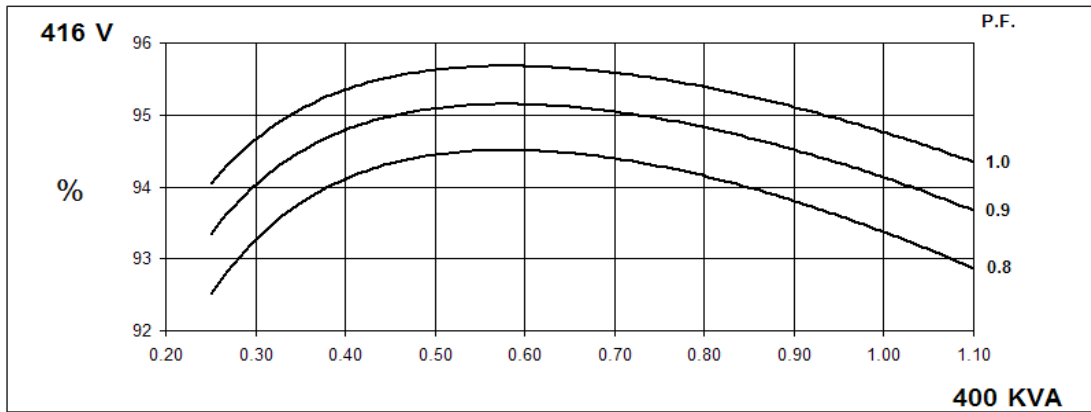
60  
Hz

HCI434E/444E

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Winding 311

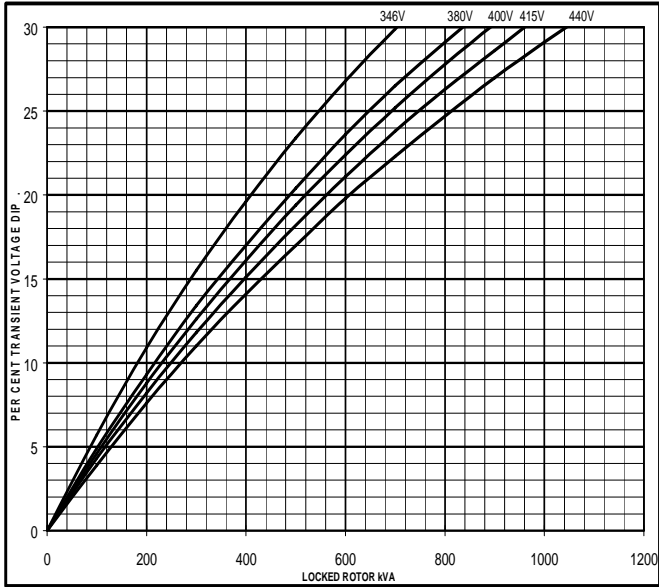
THREE PHASE EFFICIENCY CURVES



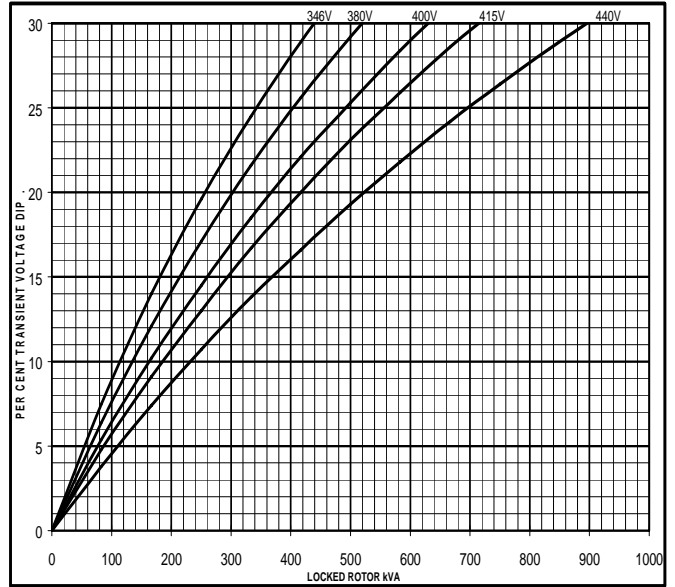
Locked Rotor Motor Starting Curve

50  
Hz

MX

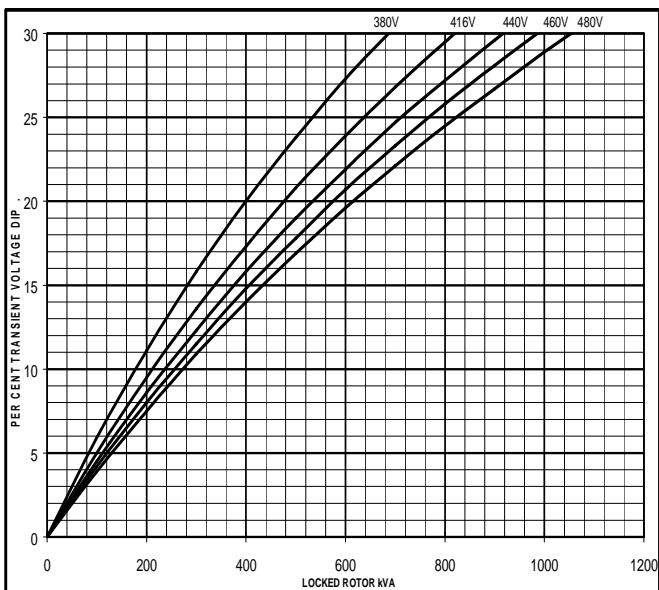


SX

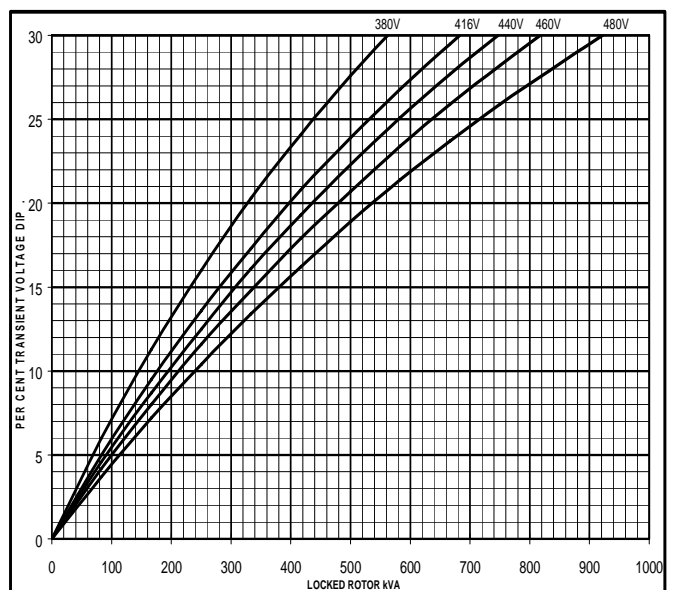


60  
Hz

MX

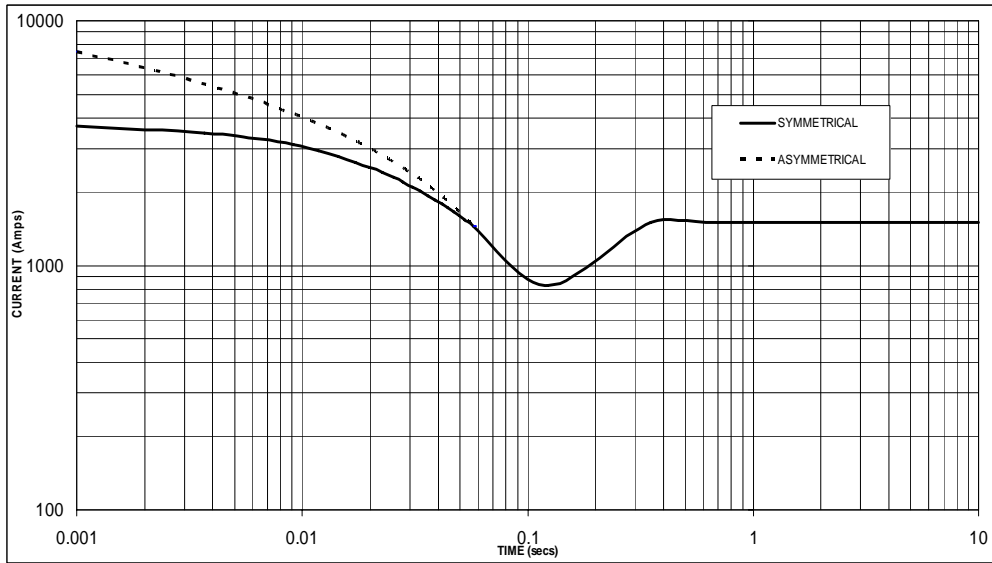


SX



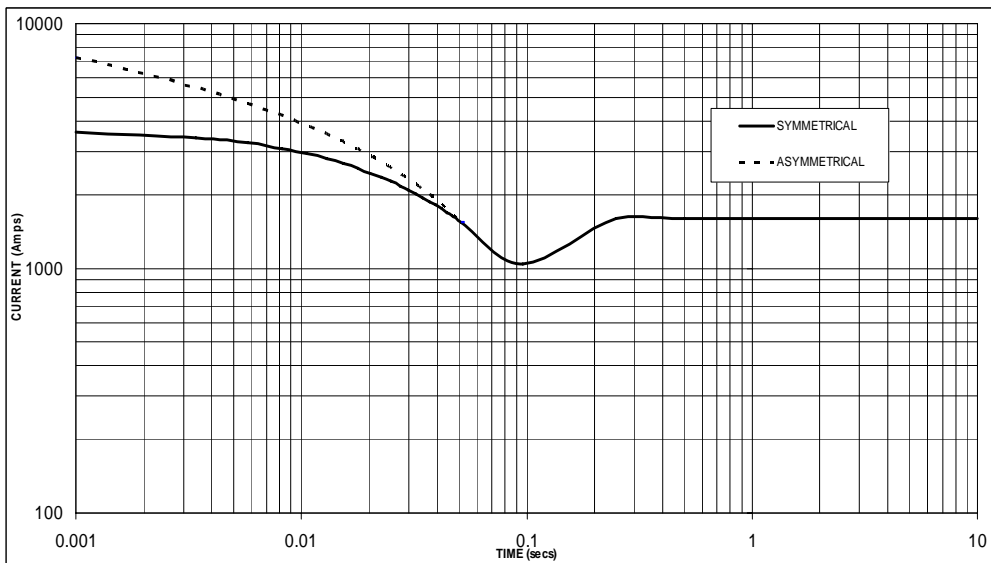
**Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed  
Based on star (wye) connection.**

**50  
Hz**



Sustained Short Circuit = 1,500 Amps

**60  
Hz**



Sustained Short Circuit = 1,600 Amps

**Note 1**

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

50Hz		60Hz	
Voltage	Factor	Voltage	Factor
380v	X 1.00	416v	X 1.00
400v	X 1.05	440v	X 1.06
415v	X 1.10	460v	X 1.10
440v	X 1.16	480v	X 1.15

The sustained current value is constant irrespective of voltage level

**Note 2**

The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

	3-phase	2-phase L-L	1-phase L-N
Instantaneous	x 1.00	x 0.87	x 1.30
Minimum	x 1.00	x 1.80	x 3.20
Sustained	x 1.00	x 1.50	x 2.50
Max. sustained duration	10 sec.	5 sec.	2 sec.

All other times are unchanged

**Note 3**

Curves are drawn for Star (Wye) connected machines. For other connection the following multipliers should be applied to current values as shown :

# HCI434E/444E

## Winding 311 / 0.8 Power Factor

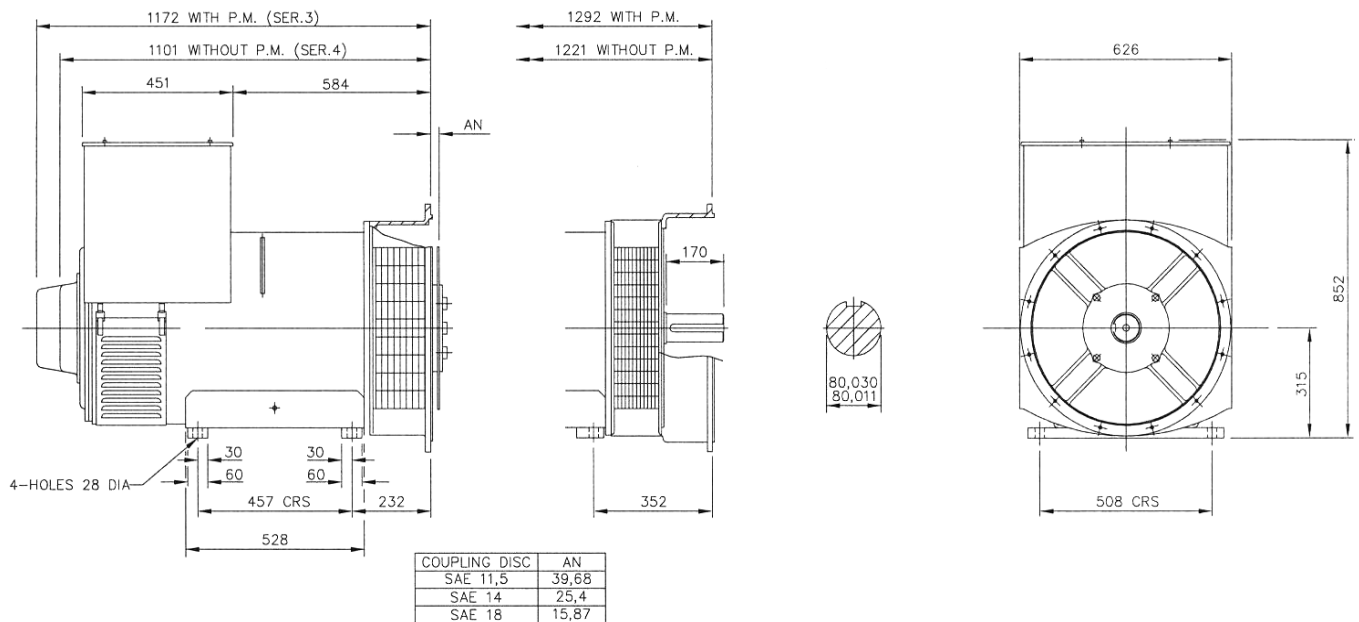
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### RATINGS

Class - Temp Rise	Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C				
<b>50 Hz</b>	Series Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	Parallel Star (V)	190	200	208	220	190	200	208	220	190	200	208	220	190	200	208	220
	Series Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	320	320	320	320	350	350	350	350	370	370	370	370	380	400	380	380
	kW	256	256	256	256	280	280	280	280	296	296	296	296	304	320	304	304
	Efficiency (%)	93.6	93.8	94.0	94.1	93.2	93.5	93.6	93.8	92.9	93.2	93.4	93.6	92.7	92.7	93.2	93.5
	kW Input	274	273	272	272	300	299	299	299	319	318	317	316	328	345	326	325

<b>60 Hz</b>	Series Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	Parallel Star (V)	208	220	230	240	208	220	230	240	208	220	230	240	208	220	230	240
	Series Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	365	385	400	400	400	420	440	440	420	445	460	460	435	455	475	475
	kW	292	308	320	320	320	336	352	352	336	356	368	368	348	364	380	380
	Efficiency (%)	93.8	93.8	93.9	94.0	93.4	93.5	93.5	93.7	93.1	93.2	93.2	93.5	92.9	93.0	93.1	93.3
	kW Input	311	328	341	340	343	359	376	376	361	382	395	394	375	391	408	407

### DIMENSIONS



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