



SM SERIES ALTERNATOR

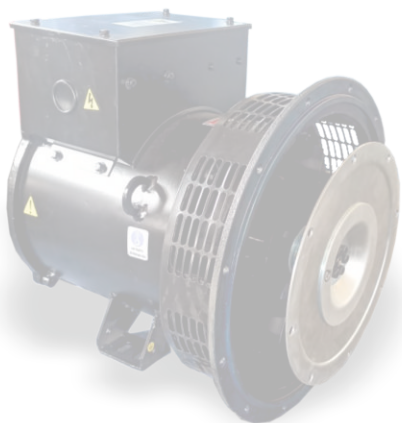
5 - 200 kvA

Ratings Chart

50 Hz Single Phase		
230V, 0.8PF, 4 Pole, 1500 RPM		
Frame (G1R*)	kVA	kW
160SM1F	5	4
160SM1E	7.5	6
160SM2A	10	8
160SM3B	12.5	10
160SM4C	15	12
160SM5A	20	16
200SM1F	25	20
200SM2A	30	24
200SM3E	35	28
200SM3A	40	32
200SM4A	45	36
200SM4B	50	40
250SM1D	63	50.4
250SM3B	82.5	66

G1R* : Single Bearing Brushless

50 Hz Three Phase		
415V, 0.8PF, 4 Pole, 1500 RPM		
Frame (G1R*)	kVA	kW
160SM1F	7.5	6
160SM1E	10	8
160SM2A	12.5	10
160SM2A	15	12
160SM3B	20	16
160SM4C	25	20
160SM5A	30	24
200SM1E	35	28
200SM1E	40	32
200SM2A	45	36
200SM2B	50	40
200SM3A	63	50.4
200SM4B	75	60
200SM4C	82.5	66
200SM4X	90	72
250SM1B	100	80
250SM1D	125	100
250SM2A	140	112
250SM2B	160	128
250SM3B	180	144
250SM3D	200	160



Key Features

Flexibility & Stock Optimisation

Customer can buy options separately and mount them according to their requirements:

- ✓ Space Heater
- ✓ Diode failure detector
- ✓ Remote trimmer
- ✓ BTB

New AVR Concept

- ✓ Choice of AVR position
- ✓ Safe and easily accessible

Retrofitting

- ✓ Options required after installation can be mounted according to actual needs: BTB, Space heater

Premium Performance

- ✓ Compactness
- ✓ Top class ratio length / kVA
- ✓ Optimized management cost
- ✓ Minimized cost of ownership
- ✓ Performs in all environments

Assembly

- ✓ Quick and easy generator set assembly
- ✓ Up to 20% reduction in generator set assembly time
- ✓ Easily accessible adaptor, diode board and terminal box.
- ✓ Easy Accessibility to mount SAE Endshield

Easy Maintenance

- ✓ Spare parts easy to replace
- ✓ Easily removable End Covers

Easy assembly & accessibility

- ✓ Large entry openings allow fast and safe coupling procedures

Quality

- ✓ Lighter and 15 % compact than previous alternator
- ✓ High quality CGPISL design and manufacture
- ✓ Robust steel and cast iron exterior

Compliance

- ✓ Compliant with codes and standards globally
- ✓ IP23 protection as standard
- ✓ UL certified
- ✓ IEC and NEMA compliant

Safety

- ✓ No sharp edges
- ✓ SAE adaptor made through large openings which allow safe operation

Compatibility

- ✓ Variety of SAE options to fit all major engines
- ✓ Convertible from 50Hz to 60Hz and vice-versa

Reliability

- ✓ Designed to perform for atleast 20,000 hours
- ✓ Strict supplier selection and manufacturing processes



Standard Features

Main Components	160SM	200SM	250SM
Magnetic steel	Low losses, insulated on both sides		
Stator body	Fabricated steel		
Endshield	Cast iron		
Shaft	Carbon steel - Hot rolled		
Fan	Nylon with mineral glass filled		
Terminal Board	DMC 605		
	1 Ph - 4 Terminals	1 Ph - 4 Terminals	1 Ph - 8 Terminals
	3 Ph - 6/7 Terminals	3 Ph - 7 Terminals	3 Ph - 8 Terminals
Construction	160SM	200SM	250SM
Enclosure	Open Drip Proof		
Cooling system	IC01 as per IEC 60034-6		
Degree of protection	IP23 as per IEC 60034-5		
Mounting	Horizontal single bearing - IM 2105 (double bearing available on request)		
Technical Data	160SM	200SM	250SM
Insulation system	Class H for stator and rotor		
Protective treatments	Impregnation with epoxy resin through high quality process		
Winding pitch	2/3		
Bearing Data	160SM	200SM	250SM
Bearing type	Sealed Bearings		
	6305ZZ	6309ZZ	6310ZZ
Bearing lifetime	≥ 20,000 Hrs		
Operation at reduced speed	All regulators work to reduce the excitation current in order to protect the excitation system when the generator is used at reduced speed		
Excitation System	160SM	200SM	250SM
Excitation Type	Brushless with rotating rectifier as standard.		
Auxiliary winding	Optional		Standard
Applicable standards	160SM	200SM	250SM
Standards	IEC : 60034, BS : 5000 (Part 99), EN : 50081, IS : 4722 & 13364 (Part I & II) with CE mark		
AVR	160SM	200SM	250SM
AVR model	SR 7/3		SMR
AVR position	Front mounted : Choice of position (Either on right side or left side viewed from Drive End)		
AVR supply	Mains as standard		Auxiliary winding
Voltage sensing	2 Phase		
Accuracy	± 1% (@ rated load, balanced and not deforming, P.F. 0.8)		
Limiters	U/F Under Frequency		
Operating conditions	160SM	200SM	250SM
Overload during S1 continuous duty	10% for 1 hour / 15% for 10 minutes / 30% for 4 minutes / 50% for 2 minutes		
Air inlet	Axial and radial		
Damper cage	Rotor is provided with damper cage as standard		
Radio interference	Limits permitted by VDE0875 (N)		
THD	No load < 2.5%. Non distorting balanced linear load < 5%		
Parallel operations	All generators are provided with an amply sized damper cage and are suitable for parallel operations with other generators, when equipped with the paralleling unit (available on 200SM & 250SM frame size)		
Transient ratings	The voltage drop due to the application of full load at 0.8 power factor inductive varies between 15% and 18% of the rated voltage: the output voltage recovers to within 3% of the rated value in less than 0.5 seconds		

Altitude

The rated outputs refer to installation up to 1000 m a.s.l. Above this level the following derating factors must be applied.

Altitude	< 1000 m	< 1500 m	< 2000 m	< 2500 m	< 3000 m
K factor	1.00	0.96	0.93	0.90	0.86

Ambient Temperature

The rated outputs given in this catalogue are based on a maximum ambient temperature of 40°C. When operating at different ambient temperatures the output rating can be obtained by applying the factors as in the following table.

Ambient Temperature (°C)	30	35	40	45	50	50
K factor	1.04	1.00	1.00	0.96	0.93	0.9

Power Factor

The nominal power factor is 0.8 lagging. For different power factor values the following derating factors must be applied.

Power Factor	1.0	0.8	0.7	0.6	0.5	0.3	0
K factor	1.00	1.00	0.93	0.88	0.84	0.82	0.80

Voltage and Frequency

Generators can operate at 50 Hz and 60 Hz with below voltage values. Other voltages are possible with optional adapted windings.

Connection	Voltage (V)	
	50 Hz	60 Hz
Series star	380 - 440	380 - 480
Parallel star	190 - 220	190 - 240
Series delta	220 - 254	220 - 277

Temperature Rise Derating Factor

- a. Class H insulation system with class H Rise : 1 (Standard)
- b. Class H insulation system with class F Rise : 0.89
- c. Class H insulation system with class B Rise : 0.79

Options Available

Frame Size	160SM	200SM	250SM
Operating conditions			
Auxiliary Winding	O	O	S
Special voltage including 380 V, R3, R6 (LV only)	O	O	O
Provision for parallel operation with similar generators with AVR	NA	O	O
Heatings			
Anti-condensation heaters (V=220 V)	O	O	O
Temperature sensors			
N. 3 PTC thermistors	NA	O	O
N. 3 PT100 resistance temperature detectors in stator winding	NA	O	O
N. 3 PT100 on bearings	NA	O	O
Painting			
Non standard colour	O	O	O
Special painting cycle	O	O	O

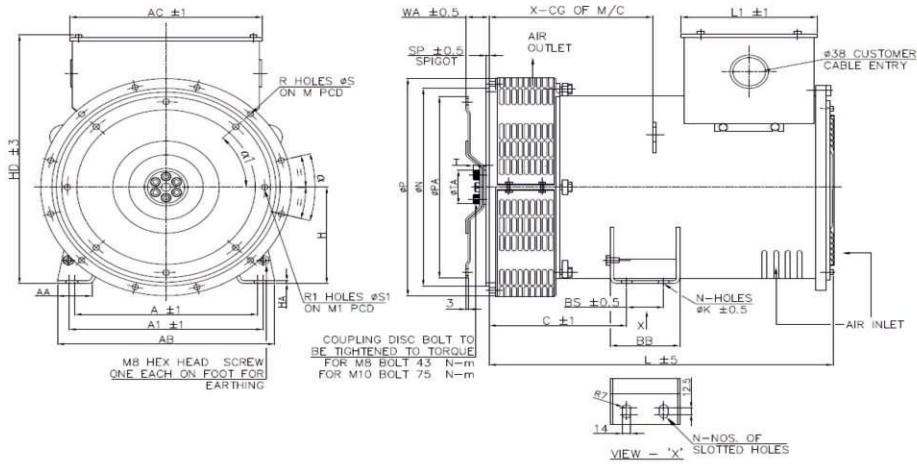
(O : Optional; S : Standard; NA : Not Applicable)

Coupling

Frame	SAE5	SAE4	SAE3	SAE2	SAE1
160	•	•	•	•	
200			•	•	
250			•	•	•
C. Disc	6.5" & 7.5"	6.5" & 7.5"	10" & 11.5"	10" & 11.5"	11.5" & 14"

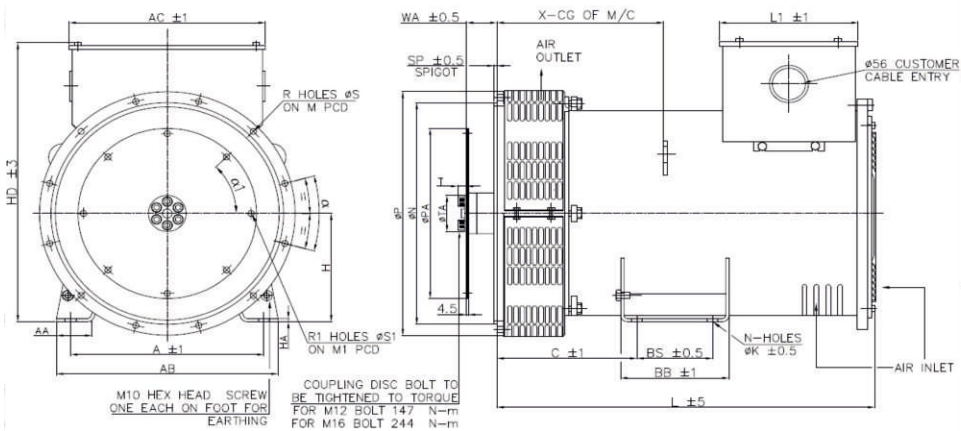
Dimensional Details

Dimension Drawing For Single Bearing 'SM Series' AC Generator (160SM frame)



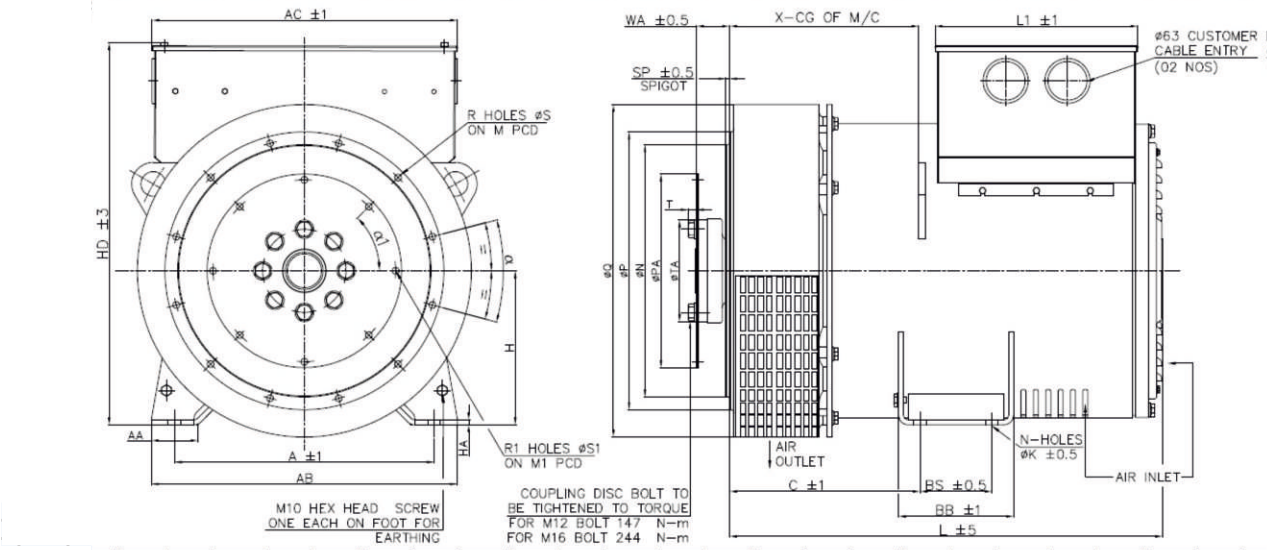
FRAME	M/C WT. (Kg)	FOOT FIXING								OVERALL						
		A	A1	AA	AB	H	BB	BS	C	N	HA	HD	AC	L	L1	X
160 SM1F	80	254	279	60	318	158/160	50	-	186	2	4	400	287	400	186	162
160 SM1E	88						80	30		4				417		169
160 SM2A	96															434
160 SM3B	106								486							212
160 SM4C	120								529							237
160 SM5A	145															

Dimension Drawing For Single Bearing 'SM Series' AC Generator (200SM frame)



FRAME	M/C WT. (Kg)	FOOT FIXING									OVERALL					
		A	AA	AB	H	BB	BS	C	N	ΦK	HA	HD	AC	L	L1	X
200 SM1E	161	340	62	390	200/198	94	-	238	2	19	6	514	341	519	234	227
200 SM1F	167					138	80	283	4					559		238
200 SM2A	180													614		308
200 SM2B	192															
200 SM3E	216															
200 SM3A	236							700								
200 SM4A	260															
200 SM4B	272															
200 SM4C	298															
200 SM4X	360															

Dimension Drawing For Single Bearing 'SM Series' AC Generator (250SM frame)



FRAME	M/C WT. (Kg)	FOOT FIXING								OVERALL						
		A	AA	AB	H	BB	BS	C	N	ΦK	HA	HD	AC	L	L1	X
250SM1B	315	420	76	495	250/248	186	116	SAE 2,3 : 308	4	19	8	615	494	SAE 2,3 : 699	328	314
250SM1D	376							SAE1 : 322.2						SAE 1 : 713		341
250SM2A	403							SAE 2,3 : 378						SAE 2,3 : 669		366
250 SM2B	453							SAE1 : 392.2						SAE 1 : 683		
250SM3B	503							SAE 2,3 : 458						SAE 2,3 : 849		408
250SM3D	553							SAE1 : 472.2						SAE 1 : 863		

Details of SAE Flange and Coupling Disc

SAE No.	FLANGE							COUPLING DISC SAE
	ΦN	ΦP	M	ΦQ 250 FR	R	ΦS	α	
5	314.3	356	333.4	-	8	11	45°	6.5" - 7.5"
4	362.0	405	381.0	-	12	11	30°	6.5" - 7.5" - 10"
3	409.6	450	428.6	540	12	11	30°	10" - 11.5"
2	447.7	490	466.7	540	12	11	30°	10" - 11.5"
1	511.18	553	530.2	553	12	12.5	30°	14"

SAE No.	COUPLING DISC							
	ΦPA	M1	R1	ΦS1	α1	φTA	T	WA
6.5"	215.9	200	6	9	60°	152	17	30.2
7.5"	241.3	222.3	8	9	45°			30.2
10"	314.32	295.3	8	11	45°	62	17	53.8
11.5"	352.42	333.4	8	11	45°			39.6
14"	466.72	438.2	8	13.5	45°	165	17	25.4



APPLICATIONS

SM SERIES ALTERNATOR