



THREE-PHASE SYNCHRONOUS GENERATOR

TCU288D

Datasheet For 4 Poles - 50Hz @ 1500rpm / 60Hz @ 1800rpm

Ambient Temperature	40 °C	Excitation	Brushless	Short Circuit Current Capacity (with PMG)	≥300%
Temperature Rise	125 °C	Winding Pitch	2 / 3	Method of Cooling	IC01
Service Duty	Continuous	Power Factor	0.8	Direction of Rotation	Counter-clockwise
Phase	3	Insulation Class	Class H	Maximum Over-speed	2250 rpm
Pole	4	Waveform : TIF	<50	Degree of Protection	IP21
Voltage Regulation	+/- 0.5%	Waveform : THF	<2%	Radio interference	Class B Group 1
AVR Model	ETC-1	Altitude	≤1000 m.a.s.l	Total Harmonic Content	< 3% - At no load

Electrical and Mechanical Characteristic

Frequency	Hz	50			60				
		1500			1800				
Round per minute	rpm								
Voltage (Y Connection) - Series Star	V	380	400	415	380	416	440	460	480
Voltage (YY Connection) - Parallel Star	V	190	200	208	190	208	220	230	240
Voltage (Δ Connection) - Series Delta	V	220	230	240	220	240	254	266	277
Voltage (ΔΔ Connection) - Parallel Delta	V	110	115	120	110	120	127	133	138
Rated power at Class H (125 °C) temperature rise	kVA	190	200	192.5	190	207.5	220	230	240
	kW	152	160	154	152	166	176	184	192
Efficiency at Class H (P.F.=0.8)	4/4%	92.3	92.4	92.3	92.2	92.3	92.4	92.6	92.8
	3/4%	93.0	93.1	93.0	92.9	93.0	93.1	93.3	93.5
	2/4%	92.7	92.8	92.7	92.5	92.6	92.7	92.9	93.1
Efficiency at Class H (P.F.=1.0)	4/4%	93.9	94	93.9	93.9	94.0	94.1	94.3	94.5
	3/4%	94.6	94.7	94.6	94.6	94.7	94.8	95.0	95.2
	2/4%	94.3	94.4	94.3	94.2	94.3	94.4	94.6	94.8

Reactance (%) at Class H

	Kcc	0.3310	0.3490	0.3897	0.2759	0.3029	0.3194	0.3337	0.3484
Short-circuit ratio									
Direct axis synchronous reactance unsaturated	X _d	3.0211	2.8700	2.5663	3.6250	3.3010	3.1307	2.9969	2.8700
Quadrature axis synchronous reactance unsaturated	X _q	1.8632	1.7700	1.5827	2.2356	2.0358	1.9308	1.8482	1.7700
Direct axis transient reactance saturated	X' _d	0.2284	0.2170	0.1940	0.2741	0.2496	0.2367	0.2266	0.2170
Direct axis subtransient reactance saturated	X'' _d	0.1905	0.1810	0.1618	0.2286	0.2082	0.1974	0.1890	0.1810
Quadrature axis subtransient reactance saturated	X'' _q	0.2200	0.2090	0.1869	0.2640	0.2404	0.2280	0.2182	0.2090
Zero sequence reactance unsaturated	X ₀	0.0389	0.0370	0.0331	0.0467	0.0426	0.0404	0.0386	0.0370
Leakage reactance	X _L	0.1347	0.1280	0.1145	0.1617	0.1472	0.1396	0.1337	0.1280
Negative sequence reactance saturated	X ₂	0.2053	0.1950	0.1744	0.2463	0.2243	0.2127	0.2036	0.1950

Open circuit time constant (sec.)	T' _{do}	1.4806							
Short-circuit transient time constant (sec.)	T' _d	0.0786							
Subtransient time constant (sec.)	T'' _d	0.0092							
Armature time constant (sec.)	T _α	0.0206							
No load excitation current	io(A)	0.5			0.5				
Full load excitation current	ic(A)	1.9			1.8				
Full load excitation voltage	uc(V)	50			48				
Stator Winding Resistance (20°C)	ohm	0.02424							
Rotor Winding Resistance (20°C)	ohm	0.9955							
Exciter Stator Resistance (20°C)	ohm	17.12							
Exciter Rotor Phase resistance	ohm	0.06603							
Cooling air requirement	m ³ /sec	0.43			0.51				

Configuration	Single Bearing	Double Bearing
Type of Construction	B2 - SAE	IM B34
Inertia (J) [kgm ²]	2.5	2.4
Total Weight	563	571
Drive end bearing / Lubrication	Not supply	6218 C3-2Z / Pre-lubricated - sealed for life
Non-drive end bearing / Lubrication	6311 C3-2Z / Pre-lubricated - sealed for life	
Recovery time - sec.	0.5	
Stator winding	DOUBLE LAYER CONCENTRIC	
Number of Terminal	12	
Rotor	with damping cage	
Overload	110% rated load for 1 hour	

STANDARD COMPLIANCE - IEC 60034-1; CEI 2-3; BS 4999-5000; VDE 0530; NF 51-100,111; OVE M-10, NEMA MG 1.22.

Data and Technical Specification are subject to change in order to update or improve the products, without prior notice