



THREE-PHASE SYNCHRONOUS GENERATOR

TCU288E

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	212.5	225	215	212.5	232.5	247.5	257.5	270
	kW	170	180	172	170	186	198	206	216
Efficiency at Class H (P.F.=0.8)	4/4%	92.6	92.7	92.6	92.7	92.8	92.9	93.1	93.2
	3/4%	93.3	93.4	93.3	93.3	93.4	93.5	93.7	93.8
	2/4%	93.0	93.1	93.0	93.0	93.1	93.2	93.4	93.5
Efficiency at Class H (P.F.=1.0)	4/4%	94.1	94.2	94.1	94.3	94.4	94.5	94.7	94.8
	3/4%	94.8	94.9	94.8	94.9	95.0	95.1	95.3	95.4
	2/4%	94.5	94.6	94.5	94.6	94.7	94.8	95.0	95.1

Reactance (%) at Class H

	Kcc	0.3309	0.3460	0.3901	0.2758	0.3023	0.3174	0.3332	0.3463
Short-circuit ratio									
Direct axis synchronous reactance unsaturated	X _d	3.0222	2.8880	2.5638	3.6264	3.3084	3.1503	3.0011	2.8880
Quadrature axis synchronous reactance unsaturated	X _q	1.8994	1.8150	1.6112	2.2790	2.0792	1.9799	1.8861	1.8150
Direct axis transient reactance saturated	X' _d	0.2239	0.2140	0.1900	0.2687	0.2452	0.2334	0.2224	0.2140
Direct axis subtransient reactance saturated	X'' _d	0.1852	0.1770	0.1571	0.2223	0.2028	0.1931	0.1839	0.1770
Quadrature axis subtransient reactance saturated	X'' _q	0.2177	0.2080	0.1846	0.2612	0.2383	0.2269	0.2161	0.2080
Zero sequence reactance unsaturated	X ₀	0.0387	0.0370	0.0328	0.0465	0.0424	0.0404	0.0384	0.0370
Leakage reactance	X _L	0.1287	0.1230	0.1092	0.1544	0.1409	0.1342	0.1278	0.1230
Negative sequence reactance saturated	X ₂	0.2014	0.1925	0.1709	0.2417	0.2205	0.2100	0.2000	0.1925

Open circuit time constant (sec.)	T' _{do}	1.5180							
Short-circuit transient time constant (sec.)	T' _d	0.0780							
Subtransient time constant (sec.)	T'' _d	0.0096							
Armature time constant (sec.)	T _α	0.0224							
No load excitation current	io(A)	0.5			0.5				
Full load excitation current	ic(A)	1.8			1.6				
Full load excitation voltage	uc(V)	55			50				
Stator Winding Resistance (20°C)	ohm	0.02061							
Rotor Winding Resistance (20°C)	ohm	1.057							
Exciter Stator Resistance (20°C)	ohm	17.12							
Exciter Rotor Phase resistance	ohm	0.06603							
Cooling air requirement	m ³ /sec	0.44			0.531				

Configuration	Single Bearing	Double Bearing
Type of Construction	B2 - SAE	IM B34
Inertia (J) [kgm ²]	2.72	2.62
Total Weight	593	601
Drive end bearing / Lubrication	Not supply	6218 C3-2Z / Prelubricated - sealed for life
Non-drive end bearing / Lubrication	6311 C3-2Z / Prelubricated - 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