



# THREE-PHASE SYNCHRONOUS GENERATOR

## TCU188G

### 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-A1	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	<b>400</b>	415	380	416	440	460	480
Voltage ( YY Connection ) - Parallel Star	V	190	<b>200</b>	208	190	208	220	230	240
Voltage ( Δ Connection ) - Series Delta	V	220	<b>230</b>	240	220	240	254	266	277
Voltage ( ΔΔ Connection ) - Parallel Delta	V	110	<b>115</b>	120	110	120	127	133	138
Rated power at Class H (125 °C) temperature rise	kVA	42.5	<b>45.0</b>	42.5	42.5	46.5	50.0	52.5	54.0
	kW	34	<b>36</b>	34	34	37.2	40	42	43.2
Efficiency at Class H (P.F.=0.8)	4/4%	86.8	<b>86.9</b>	87.1	86.7	86.8	87.1	87.4	87.5
	3/4%	88.0	<b>88.1</b>	88.3	88.0	88.1	88.4	88.7	88.8
	2/4%	87.5	<b>87.6</b>	87.8	87.4	87.5	87.8	88.1	88.2
Efficiency at Class H (P.F.=1.0)	4/4%	89.6	<b>89.7</b>	89.9	90.0	90.1	90.4	90.7	90.8
	3/4%	91.0	<b>91.1</b>	91.3	91.3	91.4	91.7	92.0	92.1
	2/4%	90.5	<b>90.6</b>	90.8	90.8	90.9	91.2	91.5	91.6

#### Reactance (%) at Class H

	Kcc	0.3188	<b>0.4100</b>	0.3803	0.2657	0.2913	0.3028	0.3150	0.3337
Short-circuit ratio									
Direct axis synchronous reactance unsaturated	X <sub>d</sub>	3.1363	<b>2.1110</b>	2.6296	3.7632	3.4333	3.3022	3.1748	2.9970
Quadrature axis synchronous reactance unsaturated	X <sub>q</sub>	1.5781	<b>1.2810</b>	1.3231	1.8935	1.7275	1.6616	1.5975	1.5080
Direct axis transient reactance saturated	X' <sub>d</sub>	0.2009	<b>0.1640</b>	0.1685	0.2411	0.2199	0.2116	0.2034	0.1920
Direct axis subtransient reactance saturated	X'' <sub>d</sub>	0.1779	<b>0.1440</b>	0.1492	0.2135	0.1947	0.1873	0.1801	0.1700
Quadrature axis subtransient reactance saturated	X'' <sub>q</sub>	0.2219	<b>0.1800</b>	0.1860	0.2662	0.2429	0.2336	0.2246	0.2120
Zero sequence reactance unsaturated	X <sub>0</sub>	0.0481	<b>0.0390</b>	0.0404	0.0578	0.0527	0.0507	0.0487	0.0460
Leakage reactance	X <sub>L</sub>	0.1099	<b>0.0900</b>	0.0921	0.1318	0.1203	0.1157	0.1112	0.1050
Negative sequence reactance saturated	X <sub>2</sub>	0.1999	<b>0.1620</b>	0.1676	0.2398	0.2188	0.2105	0.2023	0.1910

Open circuit time constant (sec.)	T'do	0.5570							
Short-circuit transient time constant (sec.)	T'd	0.0320							
Subtransient time constant (sec.)	T''d	0.0071							
Armature time constant (sec.)	T <sub>α</sub>	0.0124							
No load excitation current	io(A)	0.5			0.5				
Full load excitation current	ic(A)	1.8			1.7				
Full load excitation voltage	uc(V)	37			35				
Stator Winding Resistance (20°C)	ohm	0.1166							
Rotor Winding Resistance (20°C)	ohm	1.024							
Exciter Stator Resistance (20°C)	ohm	17.22							
Exciter Rotor Phase resistance	ohm	0.07475							
Cooling air requirement	m <sup>3</sup> /sec	0.139			0.167				

Configuration	Single Bearing	Double Bearing
Type of Construction	<b>B2 - SAE</b>	<b>IM B34</b>
Inertia (J) [kgm <sup>2</sup> ]	0.421	0.376
Total Weight	210	218
Drive end bearing / Lubrication	Not supply	6212 C3-2Z / Prelubricated - sealed for life
Non-drive end bearing / Lubrication	6308 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