



# THREE-PHASE SYNCHRONOUS GENERATOR

## TCU428D

### 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-2	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 ( Δ Connection ) - Series Delta	V	220	<b>230</b>	240	220	240	254	266	277
Rated power at Class H (125 °C) temperature rise	kVA	1093	<b>1150</b>	1100	1093	1190	1250	1315	1375
	kW	874	<b>920</b>	880	874	952	1000	1052	1100
Efficiency at Class H (P.F.=0.8)	4/4%	95.4	<b>95.5</b>	95.5	95.3	95.4	95.5	95.7	95.8
	3/4%	95.6	<b>95.7</b>	95.7	95.5	95.6	95.7	95.9	96
	2/4%	95.0	<b>95.1</b>	95.1	94.8	94.9	95.0	95.2	95.3
Efficiency at Class H (P.F.=1.0)	4/4%	96.1	<b>96.2</b>	96.2	95.9	96.0	96.1	96.3	96.4
	3/4%	96.3	<b>96.4</b>	96.4	96.1	96.2	96.3	96.5	96.6
	2/4%	95.8	<b>95.9</b>	95.9	95.5	95.6	95.7	95.9	96

#### Reactance (%) at Class H

	Kcc	0.3200	<b>0.3400</b>	0.3800	0.2700	0.2930	0.3100	0.3240	0.3400
Short-circuit ratio	Kcc	0.3200	<b>0.3400</b>	0.3800	0.2700	0.2930	0.3100	0.3240	0.3400
Direct axis synchronous reactance unsaturated	Xd	3.1326	<b>2.9760</b>	2.6445	3.7588	3.4140	3.2078	3.0899	2.9652
Quadrature axis synchronous reactance unsaturated	Xq	1.8105	<b>1.7200</b>	1.5284	2.1724	1.9731	1.8540	1.7858	1.7138
Direct axis transient reactance saturated	X'd	0.1916	<b>0.1820</b>	0.1617	0.2299	0.2088	0.1962	0.1890	0.1813
Direct axis subtransient reactance saturated	X''d	0.1411	<b>0.1340</b>	0.1191	0.1692	0.1537	0.1444	0.1391	0.1335
Quadrature axis subtransient reactance saturated	X''q	0.1642	<b>0.1560</b>	0.1386	0.1970	0.1790	0.1682	0.1620	0.1554
Zero sequence reactance unsaturated	X0	0.0263	<b>0.0250</b>	0.0222	0.0316	0.0287	0.0269	0.0260	0.0249
Leakage reactance	X <sub>L</sub>	0.0958	<b>0.0910</b>	0.0809	0.1149	0.1044	0.0981	0.0945	0.0907
Negative sequence reactance saturated	X2	0.1537	<b>0.1460</b>	0.1297	0.1844	0.1675	0.1574	0.1516	0.1455

Open circuit time constant (sec.)	T'do	2.7230							
Short-circuit transient time constant (sec.)	T'd	0.1280							
Subtransient time constant (sec.)	T''d	0.0104							
Armature time constant (sec.)	Tα	0.0290							
No load excitation current	io(A)	0.95			0.95				
Full load excitation current	ic(A)	2.3			2.2				
Full load excitation voltage	uc(V)	56			55				
Stator Winding Resistance (20°C)	ohm	0.002346							
Rotor Winding Resistance (20°C)	ohm	1.811							
Exciter Stator Resistance (20°C)	ohm	19.96							
Exciter Rotor Phase resistance	ohm	0.04177							
Cooling air requirement	m <sup>3</sup> /sec	1.58			1.9				

Configuration	Single Bearing	Double Bearing
Type of Construction	<b>B2 - SAE</b>	<b>IM B34</b>
Inertia (J) [kgm <sup>2</sup> ]	25.7	25.6
Total Weight	2296	2323
Drive end bearing / Lubrication	Not supply	6228 C3-2Z / Prelubricated - sealed for life
Non-drive end bearing / Lubrication	6321 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