



# THREE-PHASE SYNCHRONOUS GENERATOR

**TCU428B**

## 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	<b>ETC-2</b>	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	1500			1800				
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	865	<b>912.5</b>	875	865	950	1000	1050	1095
	kW	692	<b>730</b>	700	692	760	800	840	876
Efficiency at Class H (P.F.=0.8)	4/4%	94.8	<b>94.9</b>	94.9	94.7	94.8	94.9	95.2	95.3
	3/4%	95.1	<b>95.2</b>	95.2	95.0	95.1	95.2	95.5	95.6
	2/4%	94.5	<b>94.6</b>	94.6	94.3	94.4	94.5	94.8	94.9
Efficiency at Class H (P.F.=1.0)	4/4%	95.6	<b>95.7</b>	95.7	95.4	95.5	95.6	95.9	96
	3/4%	95.8	<b>95.9</b>	95.9	95.7	95.8	95.9	96.2	96.3
	2/4%	95.2	<b>95.3</b>	95.3	95.1	95.2	95.3	95.6	95.7

#### Reactance (%) at Class H

	Kcc	0.3340	<b>0.3500</b>	0.3940	0.2790	0.3040	0.3230	0.3360	0.3510
Short-circuit ratio	X <sub>cc</sub>	0.3340	<b>0.3500</b>	0.3940	0.2790	0.3040	0.3230	0.3360	0.3510
Direct axis synchronous reactance unsaturated	X <sub>d</sub>	2.9925	<b>2.8490</b>	2.5380	3.5907	3.2882	3.0962	2.9767	2.8490
Quadrature axis synchronous reactance unsaturated	X <sub>q</sub>	1.8119	<b>1.7250</b>	1.5367	2.1741	1.9910	1.8747	1.8023	1.7250
Direct axis transient reactance saturated	X' <sub>d</sub>	0.2006	<b>0.1910</b>	0.1702	0.2407	0.2204	0.2076	0.1996	0.1910
Direct axis subtransient reactance saturated	X'' <sub>d</sub>	0.1492	<b>0.1420</b>	0.1265	0.1790	0.1639	0.1543	0.1484	0.1420
Quadrature axis subtransient reactance saturated	X'' <sub>q</sub>	0.1712	<b>0.1630</b>	0.1452	0.2054	0.1881	0.1771	0.1703	0.1630
Zero sequence reactance unsaturated	X <sub>0</sub>	0.0273	<b>0.0260</b>	0.0232	0.0328	0.0300	0.0283	0.0272	0.0260
Leakage reactance	X <sub>L</sub>	0.1029	<b>0.0980</b>	0.0873	0.1235	0.1131	0.1065	0.1024	0.0980
Negative sequence reactance saturated	X <sub>2</sub>	0.1597	<b>0.1520</b>	0.1354	0.1916	0.1754	0.1652	0.1588	0.1520

Open circuit time constant (sec.)	T' <sub>do</sub>	2.4730							
Short-circuit transient time constant (sec.)	T' <sub>d</sub>	0.1220							
Subtransient time constant (sec.)	T'' <sub>d</sub>	0.0090							
Armature time constant (sec.)	T <sub>α</sub>	0.0304							
No load excitation current	io(A)	0.7			0.7				
Full load excitation current	ic(A)	2			1.9				
Full load excitation voltage	uc(V)	48			47				
Stator Winding Resistance (20°C)	ohm	0.002814							
Rotor Winding Resistance (20°C)	ohm	1.462							
Exciter Stator Resistance (20°C)	ohm	19.96							
Exciter Rotor Phase resistance	ohm	0.04177							
Cooling air requirement	m <sup>3</sup> /sec	1.51			1.81				

Configuration	Single Bearing	Double Bearing
Type of Construction	<b>B2 - SAE</b>	<b>IM B34</b>
Inertia (J) [kgm <sup>2</sup> ]	19.8	19.7
Total Weight	1899	1923
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