



# THREE-PHASE SYNCHRONOUS GENERATOR

## TCU428C

### 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	950	<b>1000</b>	965	950	1040.0	1100	1150	1200
	kW	760	<b>800</b>	772	760	832	880	920	960
Efficiency at Class H (P.F.=0.8)	4/4%	95.2	<b>95.3</b>	95.3	95.1	95.2	95.3	95.5	95.6
	3/4%	95.5	<b>95.6</b>	95.6	95.4	95.5	95.6	95.8	95.9
	2/4%	94.8	<b>94.9</b>	94.9	94.7	94.8	94.9	95.1	95.2
Efficiency at Class H (P.F.=1.0)	4/4%	95.7	<b>95.8</b>	95.8	95.7	95.8	95.9	96.1	96.2
	3/4%	96.0	<b>96.1</b>	96.1	95.9	96.0	96.1	96.3	96.4
	2/4%	95.4	<b>95.5</b>	95.5	95.3	95.4	95.5	95.7	95.8

#### Reactance (%) at Class H

	Kcc	0.3165	<b>0.3330</b>	0.3716	0.2637	0.2889	0.3054	0.3190	0.3331
Short-circuit ratio	X <sub>cc</sub>	0.3165	<b>0.3330</b>	0.3716	0.2637	0.2889	0.3054	0.3190	0.3331
Direct axis synchronous reactance unsaturated	X <sub>d</sub>	3.1600	<b>3.0020</b>	2.6913	3.7917	3.4612	3.2747	3.1347	3.0020
Quadrature axis synchronous reactance unsaturated	X <sub>q</sub>	2.1048	<b>1.9996</b>	1.7926	2.5256	2.3055	2.1812	2.0880	1.9996
Direct axis transient reactance saturated	X' <sub>d</sub>	0.2352	<b>0.2234</b>	0.2003	0.2822	0.2576	0.2437	0.2333	0.2234
Direct axis subtransient reactance saturated	X'' <sub>d</sub>	0.1751	<b>0.1663</b>	0.1491	0.2100	0.1917	0.1814	0.1737	0.1663
Quadrature axis subtransient reactance saturated	X'' <sub>q</sub>	0.1901	<b>0.1806</b>	0.1619	0.2281	0.2082	0.1970	0.1886	0.1806
Zero sequence reactance unsaturated	X <sub>0</sub>	0.0313	<b>0.0297</b>	0.0266	0.0375	0.0342	0.0324	0.0310	0.0297
Leakage reactance	X <sub>L</sub>	0.1213	<b>0.1152</b>	0.1033	0.1455	0.1328	0.1257	0.1203	0.1152
Negative sequence reactance saturated	X <sub>2</sub>	0.1826	<b>0.1735</b>	0.1555	0.2191	0.2000	0.1893	0.1812	0.1735

Open circuit time constant (sec.)	T' <sub>do</sub>	2.5310							
Short-circuit transient time constant (sec.)	T' <sub>d</sub>	0.1260							
Subtransient time constant (sec.)	T'' <sub>d</sub>	0.0092							
Armature time constant (sec.)	T <sub>α</sub>	0.0288							
No load excitation current	io(A)	0.7			0.7				
Full load excitation current	ic(A)	2.3			2.2				
Full load excitation voltage	uc(V)	56			54				
Stator Winding Resistance (20°C)	ohm	0.002609							
Rotor Winding Resistance (20°C)	ohm	1.601							
Exciter Stator Resistance (20°C)	ohm	19.76							
Exciter Rotor Phase resistance	ohm	0.04177							
Cooling air requirement	m <sup>3</sup> /sec	1.46			1.75				

Configuration	Single Bearing	Double Bearing
Type of Construction	<b>B2 - SAE</b>	<b>IM B34</b>
Inertia (J) [kgm <sup>2</sup> ]	22.3	22.2
Total Weight	2047	2079
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