



# THREE-PHASE SYNCHRONOUS GENERATOR

**TCU288L**

## 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	<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	332.5	<b>350</b>	337.5	332.5	360	385	400	420
	kW	266	<b>280</b>	270	266	288	308	320	336
Efficiency at Class H (P.F.=0.8)	4/4%	93.6	<b>93.7</b>	93.5	93.7	93.8	94.0	94.1	94.2
	3/4%	94.2	<b>94.3</b>	94.3	94.2	94.3	94.5	94.6	94.7
	2/4%	94.0	<b>94.1</b>	94.1	94	94.1	94.3	94.4	94.5
Efficiency at Class H (P.F.=1.0)	4/4%	95.1	<b>95.2</b>	95.2	95	95.1	95.3	95.4	95.5
	3/4%	95.7	<b>95.8</b>	95.8	95.5	95.6	95.8	95.9	96
	2/4%	95.5	<b>95.6</b>	95.6	95.3	95.4	95.6	95.7	95.8

#### Reactance (%) at Class H

	Kcc	0.3195	<b>0.3360</b>	0.3755	0.2663	0.2950	0.3084	0.3241	0.3364
Short-circuit ratio									
Direct axis synchronous reactance unsaturated	X <sub>d</sub>	3.1295	<b>2.9730</b>	2.6633	3.7551	3.3901	3.2430	3.0851	2.9730
Quadrature axis synchronous reactance unsaturated	X <sub>q</sub>	1.7947	<b>1.7050</b>	1.5274	2.1535	1.9442	1.8599	1.7693	1.7050
Direct axis transient reactance saturated	X' <sub>d</sub>	0.1821	<b>0.1730</b>	0.1550	0.2185	0.1973	0.1887	0.1795	0.1730
Direct axis subtransient reactance saturated	X'' <sub>d</sub>	0.1463	<b>0.1390</b>	0.1245	0.1756	0.1585	0.1516	0.1442	0.1390
Quadrature axis subtransient reactance saturated	X'' <sub>q</sub>	0.1822	<b>0.1731</b>	0.1551	0.2186	0.1974	0.1888	0.1796	0.1731
Zero sequence reactance unsaturated	X <sub>0</sub>	0.0337	<b>0.0320</b>	0.0287	0.0404	0.0365	0.0349	0.0332	0.0320
Leakage reactance	X <sub>L</sub>	0.0937	<b>0.0890</b>	0.0797	0.1124	0.1015	0.0971	0.0924	0.0890
Negative sequence reactance saturated	X <sub>2</sub>	0.1642	<b>0.1560</b>	0.1398	0.1970	0.1779	0.1702	0.1619	0.1560

Open circuit time constant (sec.)	T' <sub>do</sub>	1.8280							
Short-circuit transient time constant (sec.)	T' <sub>d</sub>	0.0800							
Subtransient time constant (sec.)	T'' <sub>d</sub>	0.0120							
Armature time constant (sec.)	T <sub>α</sub>	0.0258							
No load excitation current	io(A)	0.5			0.5				
Full load excitation current	ic(A)	1.9			1.8				
Full load excitation voltage	uc(V)	48			46				
Stator Winding Resistance (20°C)	ohm	0.009608							
Rotor Winding Resistance (20°C)	ohm	1.441							
Exciter Stator Resistance (20°C)	ohm	17.12							
Exciter Rotor Phase resistance	ohm	0.06603							
Cooling air requirement	m <sup>3</sup> /sec	0.535			0.64				

Configuration	Single Bearing	Double Bearing
Type of Construction	<b>B2 - SAE</b>	<b>IM B34</b>
Inertia (J) [kgm <sup>2</sup> ]	3.8	3.7
Total Weight	814	821
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