



# THREE-PHASE SYNCHRONOUS GENERATOR

## TCU288K

### 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	308	<b>325</b>	312.5	308	338	350	370	390
	kW	246	<b>260</b>	250	246	270	280	296	312
Efficiency at Class H (P.F.=0.8)	4/4%	93.5	<b>93.6</b>	93.6	93.3	93.4	93.5	93.7	93.9
	3/4%	94.1	<b>94.2</b>	94.2	93.7	93.8	93.9	94.1	94.3
	2/4%	93.8	<b>93.9</b>	93.9	93.4	93.5	93.6	93.8	94
Efficiency at Class H (P.F.=1.0)	4/4%	95.1	<b>95.2</b>	95.2	94.8	94.9	95.0	95.2	95.4
	3/4%	95.6	<b>95.7</b>	95.7	95.1	95.2	95.3	95.5	95.7
	2/4%	95.3	<b>95.4</b>	95.4	94.9	95.0	95.1	95.3	95.5

#### Reactance (%) at Class H

	Kcc	0.3690	<b>0.3860</b>	0.4330	0.3070	0.3360	0.3620	0.3740	0.3870
Short-circuit ratio									
Direct axis synchronous reactance unsaturated	X <sub>d</sub>	2.7121	<b>2.5870</b>	2.3109	3.2543	2.9783	2.7628	2.6743	2.5870
Quadrature axis synchronous reactance unsaturated	X <sub>q</sub>	1.6879	<b>1.6100</b>	1.4382	2.0253	1.8535	1.7194	1.6643	1.6100
Direct axis transient reactance saturated	X' <sub>d</sub>	0.1730	<b>0.1650</b>	0.1474	0.2076	0.1900	0.1762	0.1706	0.1650
Direct axis subtransient reactance saturated	X'' <sub>d</sub>	0.1394	<b>0.1330</b>	0.1188	0.1673	0.1531	0.1420	0.1375	0.1330
Quadrature axis subtransient reactance saturated	X'' <sub>q</sub>	0.1719	<b>0.1640</b>	0.1465	0.2063	0.1888	0.1751	0.1695	0.1640
Zero sequence reactance unsaturated	X <sub>0</sub>	0.0315	<b>0.0300</b>	0.0268	0.0377	0.0345	0.0320	0.0310	0.0300
Leakage reactance	X <sub>L</sub>	0.0902	<b>0.0860</b>	0.0768	0.1082	0.0990	0.0918	0.0889	0.0860
Negative sequence reactance saturated	X <sub>2</sub>	0.1562	<b>0.1490</b>	0.1331	0.1874	0.1715	0.1591	0.1540	0.1490

Open circuit time constant (sec.)	T' <sub>do</sub>	1.8060							
Short-circuit transient time constant (sec.)	T' <sub>d</sub>	0.0800							
Subtransient time constant (sec.)	T'' <sub>d</sub>	0.0118							
Armature time constant (sec.)	T <sub>α</sub>	0.0251							
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)	49			47				
Stator Winding Resistance (20°C)	ohm	0.09629							
Rotor Winding Resistance (20°C)	ohm	1.421							
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> ]	3.7	3.62
Total Weight	804	811
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