



# THREE-PHASE SYNCHRONOUS GENERATOR

## TCU318E

### 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	475	<b>500</b>	480.0	475	520	550	575	600
	kW	380	<b>400</b>	384	380	416	440	460	480
Efficiency at Class H (P.F.=0.8)	4/4%	94.2	<b>94.4</b>	94.4	94.1	94.6	94.5	94.6	94.8
	3/4%	94.5	<b>94.7</b>	94.7	94.4	94.3	94.8	94.9	95.1
	2/4%	94.0	<b>94.2</b>	94.2	94.0	94.6	94.4	94.5	94.7
Efficiency at Class H (P.F.=1.0)	4/4%	95.2	<b>95.4</b>	95.4	95.1	94.2	95.5	95.6	95.8
	3/4%	95.5	<b>95.7</b>	95.7	95.4	95.3	95.8	95.9	96.1
	2/4%	95.1	<b>95.3</b>	95.3	95.0	95.6	95.4	95.5	95.7

#### Reactance (%) at Class H

	Kcc	0.3580	<b>0.3770</b>	0.4230	0.2980	0.3270	0.3460	0.3610	0.3770
Short-circuit ratio									
Direct axis synchronous reactance unsaturated	X <sub>d</sub>	2.7926	<b>2.6530</b>	2.3661	3.3509	3.0588	2.8940	2.7703	2.6530
Quadrature axis synchronous reactance unsaturated	X <sub>q</sub>	2.0589	<b>1.9560</b>	1.7445	2.4705	2.2552	2.1337	2.0425	1.9560
Direct axis transient reactance saturated	X' <sub>d</sub>	0.1968	<b>0.1870</b>	0.1668	0.2362	0.2156	0.2040	0.1953	0.1870
Direct axis subtransient reactance saturated	X'' <sub>d</sub>	0.1547	<b>0.1470</b>	0.1311	0.1857	0.1695	0.1604	0.1535	0.1470
Quadrature axis subtransient reactance saturated	X'' <sub>q</sub>	0.1926	<b>0.1830</b>	0.1632	0.2311	0.2110	0.1996	0.1911	0.1830
Zero sequence reactance unsaturated	X <sub>0</sub>	0.0337	<b>0.0320</b>	0.0285	0.0404	0.0369	0.0349	0.0334	0.0320
Leakage reactance	X <sub>L</sub>	0.1011	<b>0.0960</b>	0.0856	0.1213	0.1107	0.1047	0.1002	0.0960
Negative sequence reactance saturated	X <sub>2</sub>	0.1737	<b>0.1650</b>	0.1472	0.2084	0.1902	0.1800	0.1723	0.1650

Open circuit time constant (sec.)	T' <sub>do</sub>	2.2780							
Short-circuit transient time constant (sec.)	T' <sub>d</sub>	0.0950							
Subtransient time constant (sec.)	T'' <sub>d</sub>	0.0130							
Armature time constant (sec.)	T <sub>α</sub>	0.0273							
No load excitation current	io(A)	0.5			0.5				
Full load excitation current	ic(A)	2			1.9				
Full load excitation voltage	uc(V)	48			46				
Stator Winding Resistance (20°C)	ohm	0.006199							
Rotor Winding Resistance (20°C)	ohm	1.216							
Exciter Stator Resistance (20°C)	ohm	16.32							
Exciter Rotor Phase resistance	ohm	0.0374							
Cooling air requirement	m <sup>3</sup> /sec	0.722			0.866				

Configuration	Single Bearing	Double Bearing
Type of Construction	<b>B2 - SAE</b>	<b>IM B34</b>
Inertia (J) [kgm <sup>2</sup> ]	6.56	6.45
Total Weight	1139	1158
Drive end bearing / Lubrication	Not supply	6319 C3-2Z / Prelubricated - sealed for life
Non-drive end bearing / Lubrication	6314 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