



THREE-PHASE SYNCHRONOUS GENERATOR

TCU228K

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	400	415	380	416	440	460	480
Voltage (YY Connection) - Parallel Star	V	190	200	208	190	208	220	230	240
Voltage (Δ Connection) - Series Delta	V	220	230	240	220	240	254	266	277
Voltage (ΔΔ Connection) - Parallel Delta	V	110	115	120	110	120	127	133	138
Rated power at Class H (125 °C) temperature rise	kVA	117.5	125	120	117.5	130	137.5	144	150
	kW	94	100	96	94	104	110	115	120
Efficiency at Class H (P.F.=0.8)	4/4%	91.0	91.1	91.2	91.1	91.2	91.4	91.6	91.8
	3/4%	91.9	92	92.1	92.0	92.1	92.3	92.5	92.7
	2/4%	91.5	91.6	91.7	91.6	91.7	91.9	92.1	92.3
Efficiency at Class H (P.F.=1.0)	4/4%	92.8	92.9	93.0	92.9	93.0	93.2	93.4	93.6
	3/4%	93.5	93.6	93.7	93.6	93.7	93.9	94.1	94.3
	2/4%	93.3	93.4	93.5	93.3	93.4	93.6	93.8	94

Reactance (%) at Class H

	Kcc	0.3330	0.3480	0.3889	0.2775	0.3008	0.3180	0.3322	0.3469
Short-circuit ratio									
Direct axis synchronous reactance unsaturated	X _d	3.0028	2.8830	2.5712	3.6030	3.3240	3.1449	3.0104	2.8830
Quadrature axis synchronous reactance unsaturated	X _q	1.6352	1.5700	1.4002	1.9621	1.8101	1.7126	1.6394	1.5700
Direct axis transient reactance saturated	X' _d	0.1583	0.1520	0.1356	0.1900	0.1752	0.1658	0.1587	0.1520
Direct axis subtransient reactance saturated	X'' _d	0.1333	0.1280	0.1142	0.1600	0.1476	0.1396	0.1337	0.1280
Quadrature axis subtransient reactance saturated	X'' _q	0.1541	0.1480	0.1320	0.1850	0.1706	0.1614	0.1545	0.1480
Zero sequence reactance unsaturated	X ₀	0.0302	0.0290	0.0259	0.0362	0.0334	0.0316	0.0303	0.0290
Leakage reactance	X _L	0.0854	0.0820	0.0731	0.1025	0.0945	0.0894	0.0856	0.0820
Negative sequence reactance saturated	X ₂	0.1437	0.1380	0.1231	0.1725	0.1591	0.1505	0.1441	0.1380

Open circuit time constant (sec.)	T' _{do}	1.2240							
Short-circuit transient time constant (sec.)	T' _d	0.0500							
Subtransient time constant (sec.)	T'' _d	0.0106							
Armature time constant (sec.)	T _α	0.0157							
No load excitation current	io(A)	0.45			0.45				
Full load excitation current	ic(A)	1.7			1.6				
Full load excitation voltage	uc(V)	49			47				
Stator Winding Resistance (20°C)	ohm	0.04417							
Rotor Winding Resistance (20°C)	ohm	0.8759							
Exciter Stator Resistance (20°C)	ohm	17.66							
Exciter Rotor Phase resistance	ohm	0.05509							
Cooling air requirement	m ³ /sec	0.304			0.365				

Configuration	Single Bearing	Double Bearing
Type of Construction	B2 - SAE	IM B34
Inertia (J) [kgm ²]	1.33	1.28
Total Weight	370	383
Drive end bearing / Lubrication	Not supply	6315 C3-2Z / Prelubricated - sealed for life
Non-drive end bearing / Lubrication	6310 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