

Chart of Common Difficulties on Rotating Electrical Machines

Symptoms													Symptoms														
M Serration and grooving of commutator or slip ring	L Excessive commutator wear-surface blackened	K Copper dragging	J Excessive commutator wear or slip ring wear-bright surface	I Unequal brush wear	H Rapid brush wear- while commutation good	G Flexible burnt out or discoloured	F Brushes and brush holders too hot	E Commutator-slip ring-too hot	D Sparking vicious and trailing around commutator	C Green in sparks	B Sparking at entering edge	A Sparking at leaving edge	Wear of slip ring on one polarity	N Copper picking in brush face	O Brush chatter	P Commutator surface streaky	Q Commutator has unsymmetrical burn marks	R Commutator has symmetrical burn marks	S Commutator has wavy pattern	T Ghost marks on steel slip rings	U Glazed contact surface of brush	V Pitted contact surface of brush	W Chipping of brush edges or brush breakage	X Failure to develop a protective skin	Y Insufficient voltage on self exciting machines	Z	
PROBABLE CAUSE OF TROUBLE													REMEDY														
1 Interpole Field too strong																										Weaken interpole by divert or by increase gap	1
2 Interpole field too weak																										Strengthen interpole fields by reducing air gap	2
3 Interpole air gap too small																										Enlarge air gap to decrease effective interpole flux	3
4 Interpole air gap too large																										Reduce air gap to increase effective interpole gap	4
5 Air gaps uneven(?bearings worn)																										Renew bearings and realign machine	5
6 Overload machine																										Reduce and limit load on machine	6
7 Vibration from external causes, i.e. Prime mover,nearby forge hammer etc.																										Locate and remove cause of vibration or mount machine on shock absorbers	7
8 Vibration from internal causes, i.e. out of balance, poor alignment etc																										Balance armature and check for bearing wear	8
9 Quasi electrolytic wear of slip ring																										Reverse the polarity of rings periodically	9
10 Oil and dirt on commutator or slip ring																										Clean commutator or slip ring	10
11 Resistance between brushes and brush arms not uniform																										Clean and tighten the connections	11
12 Grains of abrasive in brush contact face																										Re bed and clean the brush face	12
13 Faults in armature winding or equaliser connections																										Locate and cure fault or consult manufacturer	13
14 Mica proud																										Recess mica, or use more abrasive brush	14
15 Commutator or slip ring eccentric																										Turn or re grind preferably at near rated speed	15
16 Commutator riser connections open circuited																										Re-solder connections	16
17 High or low commutator segments																										Tighten commutator, turn, or re-grind	17
18 Commutator loose																										Tighten commutator, re-mica if necessary,turn or re-grind	18
19 Flats on commutator or slip ring																										Locate and remove cause of flattening, turn or re-grind	19
20 Spring pressure too low																										Adjust spring pressure to that recommended for brush grade	20
21 Spring pressure too high																										Adjust spring pressure to that recommended for brush grade	21
22 Spring pressure unequal																										Adjust spring pressure uniformly to that recommended for brush grade	22
23 Brush grade unsuitable for machine duty																										Select one of our alternative grades or ask for our recommendation	23
24 Brush arc of contact excessive																										Reduce the effective thickness of brush, preferably consult manufacturer	24
25 Brush arc of contact insufficient																										Apply suitable circumferential stagger, preferably consult manufacturer	25
26 Brush flexible connection faulty																										Fit a new brush with a sound flexible connection	26
27 brush flexible too short or too stiff																										Use brushes with flexible of correct length & flexibility	27
28 imperfect brush bedding in																										Bed brushes by our recommended method	28
29 Radial brush holders mounted at small reaction angle																										Adjust holders to a radial position & correct distance from comm	29
30 Reaction type holder mounted trailing																										Reverse holders or direction of rotation	30
31 Brush sticking or sluggish in brush holder																										Check that brush size is correct, clean brushes and holders, remove any burrs	31
32 Brushes too loose in brush holder(?holders worn)																										Replace holders , or order brushes of correct dimension	32
33 Terminal connections loose or dirty																										Clean terminals and terminal block, Tighten screws	33
34 Brush holder mounted too far from commutator or slip ring																										Adjust holder to be 2mm from commutator	34
35 Incorrect brush position																										Adjust holders to correct position	35
36 Unequal brush holder spacing or alignment																										Correct spacing and alignment of holders	36
37 Humidity of atmosphere low																										Humidify the cooling air or draw air from normal humidity source	37
38 Humidity of atmosphere excessive																										Enclose machine or draw cooling air from normal humidity source	38
39 Dusty atmosphere																										Remove cause if possible or install filter	39
40 Gas or acid fumes in atmosphere																										Arrange clean air cooling	40
41 Long periods of low or steady loads.																										Change brush grade, ask for recommendation	41