TYPE CS-SK MOTOR-GENERATOR SETS

INSTRUCTIONS

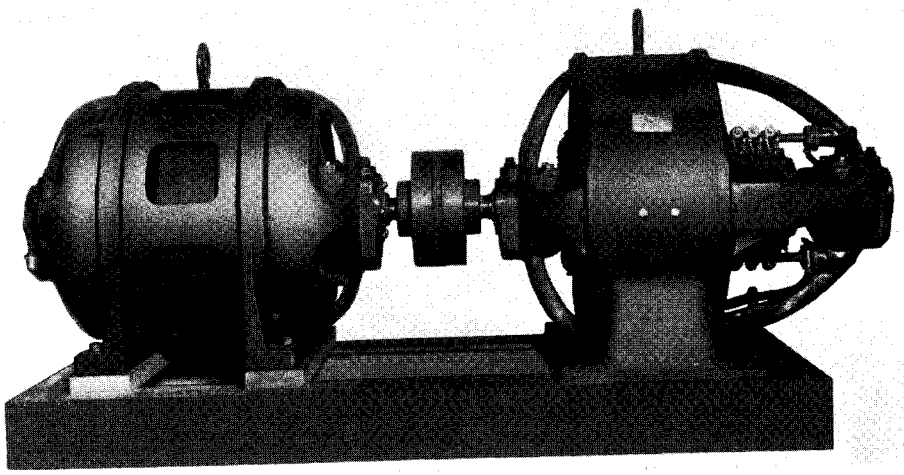

FIG. 1—TWO UNIT, FOUR BEARING INDUCTION MOTOR-GENERATOR

Inspection—After unpacking the motor-generator set, examine carefully to see that no damage has been done during shipment. Check nameplate readings. Make sure that all windings are dried out before exposing to full operating voltages.

Location—Motor-generators not especially constructed for unusual operating conditions must be located in clean, dry, well ventilated, easily accessible places free from acid fumes, dripping water or oil, and excessively high temperatures.

Mounting of Motor-Generator Sets

The bedplate of this set is not designed to be self-supporting and must be securely bolted down to an adequate foundation after lining up with suitable shims placed between the lower surface of the bedplate and the foundation at six or eight uniformly spaced points, depending upon the size of the set.

The final lining up should not be attempted until it is possible to run the set under its own power with or without load. Adjust the thickness of the shims at the various points of support until the vibration while running is a minimum with the foundation bolts securely tightened.

The bedplate should preferably then be grouted in, but if necessary this may be omitted if a heavy timber or steel support is provided.

Motor Connections — Three-Phase—Connect any lead to any motor terminal. To reverse the direction of rotation, interchange any two leads.

Two-Phase, 4 wire—Connect leads from one phase to motor terminals marked T1 and T3 and the leads from the other phase to motor terminals T2 and T4. To reverse the direction of rotation, interchange the leads of one-phase.

Two-Phase, 3 wire—Connect the two outside leads to motor terminals T1 and T2 and the common lead to T3 and T4. To reverse the direction of rotation interchange the two outside leads.

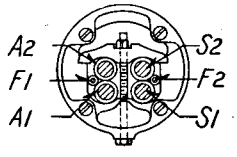

FIG. 2—COMPOUND WOUND

FOR CLOCKWISE ROTATION
(Looking at the Commutator End)
Connect A2 to + line
Connect A1 and F2 to S2
Connect S1 to - line
Connect F1 to field rheostat, thence to + line.

FOR COUNTER-CLOCKWISE ROTATION
(Looking at the Commutator End)
Connect A1 to + line
Connect A2 to F2 to S2
Connect S1 to - line
Connect F1 to field rheostat, thence to + line.

Connect the motor and starter by referring to diagram furnished with starter.

Generator Connections—The accompanying figures show the correct generator connections for both shunt and compound wound machines.

Sealed Sleeve Bearings—When the motor-generator set is installed, put a good grade of light dynamo oil in each bearing housing. Sealed Sleeve Bearings should be oiled only through combination overflow gauge and filling device. Close down cover when through oiling. The correct level of the oil is 1/8" below top of combination overflow gauge and filling device. When motor is first started, check bearing

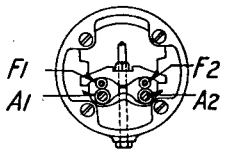

FIG. 3—SHUNT WOUND

FOR CLOCKWISE ROTATION
(Looking at the Commutator End)
Connect A2 to + line
Connect A1 and F2 to - line
Connect F1 to field rheostat, thence to + line.

FOR COUNTER-CLOCKWISE ROTATION
(Looking at the Commutator End)
Connect A1 to + line
Connect A2 to F2 to - line.
Connect F1 to field rheostat, thence to + line.

*To be filed as an Instruction Leaflet and as Renewal Parts Data; for Renewal Parts, see Page 3.

TYPE CS-SK MOTOR-GENERATOR SETS

INSTRUCTIONS—Continued

housings occasionally to see that bearing is not over-heating. The rise in temperature above the surrounding air should not exceed 30° C. measured by thermometer on the outside of the bearing housing.

The conditions surrounding your installation determine the frequency of inspection necessary. A motor-generator set installed in some locations will be more liable to injury than in others.

Make the frequency of bearing inspection depend on the conditions surrounding your application. Do not add oil unless the oil level has dropped more than ⅛" below the top of the combination overflow gauge and filling device.

Do not flood with oil. Do not spill oil over the housing or bracket and the Sealed Sleeve Bearing will not spill oil over the windings.

"Sealed Sleeve Bearings work best when let alone."

The construction of the Sealed Sleeve Bearings is such as to require no "flushing" out. At intervals of about two years, or during general overhaul periods, remove the brackets and wash out bearing housing with hot kerosene. The use of compressed air, where available, or a wire brush is recommended to cleanse housing thoroughly.

It is more economical to replace worn out bearings with new ones, than to rebabbitt the old. New bearings are inexpensive and can be easily obtained by writing the nearest Sales Office of the Company.

Overheated bearings are usually due to one of the following causes: (1) Poor lubrication due to failure of oil rings to revolve, or the use of a poor grade or insufficient quantity of lubricant. (2) Poor alignment causing excessive end thrust or binding. (3) Rough bearing surface. (4) Bent shaft.

If the bearings heat, reduce the load, if possible, and feed a liberal supply of good lubricant. If the bearings continue to heat, it will then be necessary to shut down the set, keeping the armature revolving slowly until the bearings cool in order to prevent "sticking" or "freezing".

To remove a solid bearing from the motor or generator bracket, withdraw the set screw, remove the oil ring slot cover and raise the oil ring so that it will allow the bearing to move freely. It may be necessary to press the bearing out 1¼ times the width of the oil ring so that the oil ring can be raised to clear the bearing. Then press the bearing out. Apply the pressure on the end of the bearing at the outside of the bracket.

Starting—Make certain that all instructions for installing have been complied with and that all connections have been properly made. Then observe the following instructions in the order named:

1. Open line switch on generator and make certain that field rheostat is set with all resistance in.
2. Start motor in line with instructions furnished with starter.
3. When motor-generator is up to full speed, adjust the voltage to proper value by means of field rheostat.
4. Close the circuit-breaker or switch connecting the generator to switchboard, and then close any other switches necessary to supply the load.

Stopping—Reduce the generator voltage (and consequently the load) by adjusting field rheostat. When the load has been reduced, open the circuit-breaker and generator switch and stop motor by opening line switch.

Operation—Failure to generate full voltage may be due to: (1) Slow speed. (2) Open shunt field circuit, caused by faulty connections, or a burned out coil or rheostat. (3) Open armature or series field circuit. (4) Incorrect brush setting. (5) Reversed series or shunt coils. (6) Poor brush contact due to dirty commutator or brush sticking in holders. (7) Loss of residual magnetism.

Parallel Operation—All shunt generators will operate satisfactorily in parallel, but may not divide the load proportionately. Compound wound generators require equalizer connections and in some cases a small resistance must be put in series with the series field of one generator inside the equalizer, to make the generators divide the load proportionately. In no case are generators guaranteed to operate in parallel with any other generator, without adjustment after installation. In case serious difficulty is encountered in obtaining satisfactory division of the load, consult the nearest Office of this Company.

Brushes—The neutral brush position on the generator is fixed for either direction of rotation. The bracket is doweled in position before the generator leaves the Works and the brushes do not require further adjustments.

Care of Commutator and Brushes—Keep commutator clean, wiping it at frequent intervals with a clean canvas cloth free from lint. A piece of paraffin rubbed lightly across the commutator at frequent intervals will furnish sufficient lubrication. The brushes should fit the commutator, making contact over the entire surface of brush. A commutator that is taking on a polish and shows no signs of wear requires no other attention, but a rough, raw, copper-colored commutator should be smoothed with a piece of sand paper or sand stone ground to fit and polished with No. 00 sandpaper. Always lift the brushes when polishing the commutator, and do not replace them until all grit has been removed. Never use emery cloth or emery paper on the commutator.

Exciters for Synchronous Motors—When used as individual exciters for synchronous motors the generators, should in general, be connected for shunt operation and excitation adjustment (if required) obtained from the generator field rheostat without motor field rheostat. This is particularly necessary for units having magnetic starters where the exciter is started at the same time as the motor.

For bus excitation of more than one motor connect the generator compound and maintain rated voltage, using the motor field rheostat for excitation adjustment. It is possible, when the motors are duplicate and excited from one M-G set, and desirable in order to eliminate rheostat losses, to omit the motor field rheostat and connect the exciter shunt, making changes in excitation (of all motors alike), or bus voltage as required, due to starting or stopping a motor, by adjusting the exciter rheostat.

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TYPE CS-SK MOTOR-GENERATOR SETS

RENEWAL PARTS DATA

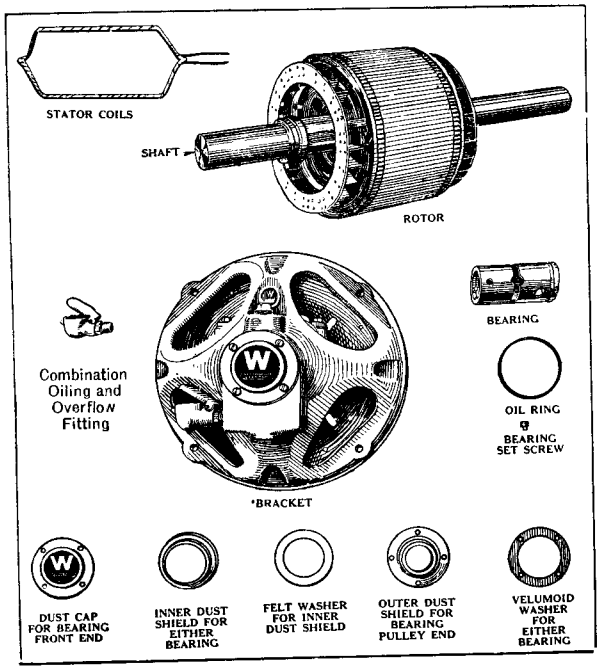

FIG. 4—RENEWAL PARTS FOR TYPE CS MOTORS

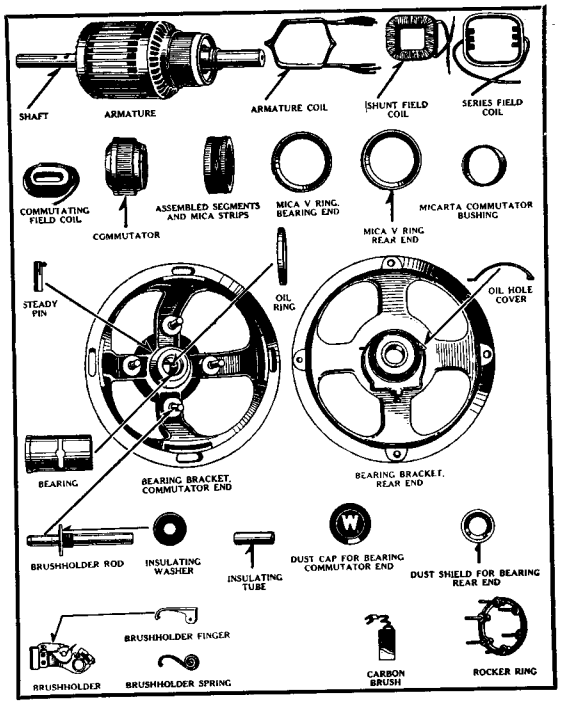

FIG. 5—RENEWAL PARTS FOR TYPE SK GENERATORS

*Specify whether front or rear bracket is desired.

The parts illustrated may vary somewhat in appearance with what you have, depending upon the size of the motor or generator. However, naming the part and giving the Motor or Generator nameplate reading together with the Motor-Generator Set nameplate reading will insure correct shipment.

ORDERING INSTRUCTIONS

Name the part, using the name shown in the illustration. Give the complete name plate reading. State whether shipment is desired by express, freight or by parcel post. Send all orders or correspondence to nearest Sales Office of the company. Small orders should be combined so as to amount to a value of at least $1.00 net. Where the total of the sale is less than this, the material will be invoiced at $1.00.

Recommended Stock of Renewal Parts

Anticipate replacements by carrying an adequate stock of wearing parts.
This list covers the minimum amount of Renewal Parts that should be carried in stock.

FOR TYPE CS MOTORS

For Motors in use up to and including		1	5
		Motor Generator Sets	
NAME OF PART	NO. PER MOTOR	RECOMMENDED FOR STOCK	
Stator Coil	1 Set	⅓ Set	1 Set
Rewinding Material	1 Set	⅓ Set	1 Set
Rotor	1	0	0
Bracket Comp.	2	0	1
Bearing	2	1	2
Oil Ring	2	1	2

FOR TYPE SK GENERATORS

For Generators in use up to and including		1	5
		Motor Generator Sets	
NAME OF PART	NO. PER GENERATOR	RECOMMENDED FOR STOCK	
Armature	1	0	0
Armature Coil	1 Set	⅓ Set	1 Set
Rewinding Material	1 Set	⅓ Set	1 Set
Shunt Field Coil	1 Set	1	2
Series Field Coil	1 Set	1	2
Commutating Field Coil	1 Set	1	2
Brushholder	1 Set	1	½ Set
Brushholder Spring	1 Set	1	2
B. H. Pressure Finger	1 Set	1	2
Carbon Brush	1 Set	1 Set	2 Sets
Bearing	2	1	2
Oil Ring	2	1	2

*To be filed as Renewal Parts Data and as an Instruction Leaflet; for Instructions, see Pages 1 and 2.