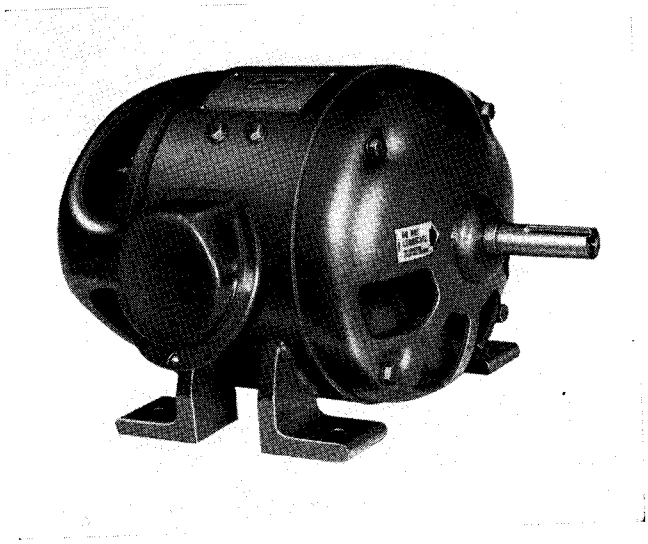
INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

DIRECT-CURRENT *Life-Line* MOTORS AND GENERATORS

TYPE SK, ½ TO 3 HP, ½ TO 2 KW

(Frames 203 Through 225 with Prelubricated Ball Bearings)



LIFE-LINE Type SK Motors and Generators in NEMA frame sizes 203 through 225 are direct-current machines designed for a wide variety of constant and variable speeds, plus constant and variable voltage applications. The armature is completely encased in a rolled steel frame. Steel end brackets offer special support to the prelubricated ball bearings.

Warranty. The Corporation in connection with apparatus sold agrees to correct any defect or defects in workmanship or material which may develop under proper or normal use during the period of one year from the date of shipment, by repair or by replacement f.o.b. factory of the defective part or parts, and such correction shall constitute a fulfillment of all the Corporation's liabilities in respect to said apparatus, unless otherwise stated in the quotation.

Any defects that may develop should be referred to the nearest Westinghouse Sales Office for complete servicing information.

RECEIVING

Unpack the machine and make certain that it was not damaged during shipment. Turn the shaft by hand to see that it turns freely.

Check to see that the nameplate data agrees with the voltage of the power supply provided for the machine.

The shaft extension is coated with a slushing compound to prevent rusting during shipment and storage. This slushing compound may be removed by wiping with any petroleum solvent, such as benzine, gasoline, turpentine, Stoddard solvent, etc. See precautions under "Maintenance", page 4, for use of these solvents.

INSTALLATION

Mounting. Locate the machine in a place that is clean, dry and well-ventilated. If protecting shields or guards are used, they must not obstruct the free flow of air around the machine. The external air temperature should not exceed 40 degrees C or 104 degrees F.

Fasten to a rigid foundation using bolts or screws of the largest size permitted by the drilling in the mounting feet. The machine must rest evenly on all mounting pads.

For wall or ceiling horizontal mounting, the rear end bracket may be rotated 90 degrees or 180 degrees and the front bracket covers changed to the top openings to offer greater protection from falling objects or dripping liquids.

Method of Drive. Any of the following drive methods may be used depending on the particular application:

1. ***Flat Belt Drive.*** Mount the machine on the slide rails or bedplate, which allows for adjusting the belt tension.

Mount the pulley on the machine so that the inner face of the pulley is in line with the shoulder on the shaft extension.

Use a belt wide enough to carry the load without excessive tension. Wide, single ply belts are preferable to double ply belts due to the lower bearing pressures that result.

The smallest pulley should not be less in diameter than that recommended by the belt manufacturer for the belt used, and in no case less in diameter than indicated in Table No. 1.

Align the pulleys so that the belt runs true, and tighten the belt just enough to prevent slippage. Where the pulleys are not of approximately the same diameter, the distance between shaft centers should be greater than twice the diameter of the larger pulley. For short center distances, an idler pulley or a V-belt drive should be employed.

Table No. 1

PULLEY SIZE FOR FLAT BELT DRIVES

FRAME	PULLEY DIMENSIONS	
	MIN. DIAM. (inches)	MAX. WIDTH (inches)
203-204	2½	3
224	2½	3½
225	3	3½

2. ***V-Belt Drive.*** Mount the machine on the slide rails or bedplate, which allows for adjusting the belt tension.

Mount the sheave on the machine close to the bearing housing allowing sufficient clearance for armature end play.

The smallest sheave should not be less in diameter than that recommended by the belt manufacturer for the belt used, and in no case less in diameter than indicated in Table No. 2.

Sheaves should be carefully aligned. Belt tension should be just sufficient to eliminate excessive sag in the slack of the belt. V-belts do not require as much tension as flat belts.

Table No. 2

SHEAVE SIZE FOR V-BELT DRIVES

FRAME	SHEAVE DIMENSIONS	
	MIN. PITCH DIAM. (inches)	MAX. WIDTH (inches)
203-204	2¼	3
224	2¼	3½
225	2½	3½

3. ***Chain Drive.*** Mount the machine on the slide rails or bedplate, which allows for adjusting the chain tension.

Mount the sprocket on the machine close to the bearing housing, allowing sufficient clearance for armature end play, and align the sprockets accurately.

4. ***Gear Drive.*** Mount the machine and driven unit so as to maintain accurate alignment. The gears must mesh accurately to prevent vibration.

Mount the gear on the machine close to the bearing housing to minimize the overhang, allowing sufficient clearance for armature end play.

Dowel the machine to the base.

5. ***Direct Drive.*** The machine shaft and the driven or driving shaft must be carefully aligned.

Dowel the machine to the base.

Note: Pulleys, pinions or coupling halves should have a close sliding fit on the shaft extension and must be securely locked to avoid hammering out in operation. If it is necessary to drive the part into position, it is important, on ball bearing machines, that the end of the shaft opposite the extension be backed up so that the force of the blow is not taken in the bearing. Use a pinion puller for removing tight pulleys.

Electrical Connections. Connect the motor and starter by referring to the diagrams furnished with the starter and as given in Diagrams No. 1, 2, 3 and 4 on page 3.

Connect the generator and field rheostat by referring to diagrams furnished with the field rheostat and as given in Diagrams No. 5 and 6 on page 3.

Install all wiring and fusing in accordance with the National Electric Code, and local requirements.

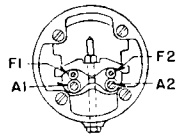
The conduit box on the side of the machine is designed with three conduit knock-outs to suit various mounting conditions. Where it is desired to extend conduit from above or one side, remove the four mounting screws, and turn the conduit box 90 degrees or 180 degrees so that the knock-out will be in the desired position. The recommended method of connecting the conduit is shown in Fig. 1.

When the machine is mounted on a bedplate, or on slide rails for belt adjustment, flexible metallic conduit should be used to protect the leads to the machine. In making this connection, a squeeze connector should be used for attaching the flexible conduit to the conduit box. Squeeze connectors may be straight, 45 degrees or 90 degrees.

MOTOR CONNECTIONS

(Rotation Facing Commutator End)

DIAGRAM NO. 1. Shunt Wound Motor Without Compensating Coils



MOTOR TERMINALS*

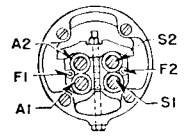
CLOCKWISE ROTATION

Connect A1 and F2 to − line
Connect A2 to starting resistance, then to + line
Connect F1 to + line

COUNTER-CLOCKWISE ROTATION

Connect A2 and F2 to − line
Connect A1 to starting resistance, then to + line
Connect F1 to + line

DIAGRAM NO. 2. Shunt Wound Motor With Compensating Coils, and Compound Wound



MOTOR TERMINALS*

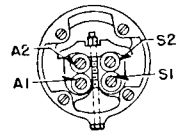
CLOCKWISE ROTATION

Connect S2 and F2 to − line
Connect A1 to S1
Connect A2 to starting resistance, then to + line
Connect F1 to + line

COUNTER-CLOCKWISE ROTATION

Connect S2 and F2 to − line
Connect A2 to S1
Connect A1 to starting resistance, then to + line
Connect F1 to + line

DIAGRAM NO. 3. Series Wound Motor



MOTOR TERMINALS*

CLOCKWISE ROTATION

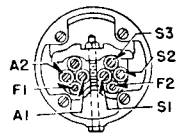
Connect S2 to − line
Connect A1 to S1
Connect A2 to starting resistance, then to + line

COUNTER-CLOCKWISE ROTATION

Connect S2 to − line
Connect A2 to S1
Connect A1 to starting resistance, then to + line

DIAGRAM NO. 4. Type SK Elevator Motor, Compound Wound—Classes II and III (See Note below)

(For Class I Motors, Use Diagram No. 1)



MOTOR TERMINALS*

CLOCKWISE ROTATION

Connect S2 and F2 to − line
Connect A1 to S1
Connect A2 to starting resistor, then to + line
Connect F1 to + line

COUNTER-CLOCKWISE ROTATION

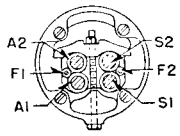
Connect S2 and F2 to − line
Connect A2 to S1
Connect A1 to starting resistor, then to + line
Connect F1 to + line

NOTE: Diagram indicates connection for starting, the full series field being in circuit. Under normal running conditions the series field is short circuited. In classes II and III motors, the series field may be cut out in two steps by short-circuiting S2 and S3, then S1 and S3.

GENERATOR CONNECTIONS

(Rotation Facing Commutator End)

DIAGRAM NO. 5. Compound Wound Generator



GENERATOR TERMINALS*

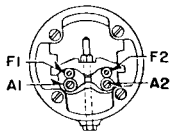
CLOCKWISE ROTATION

Connect A2 to + line
Connect A1 and F2 to S2
Connect S1 to − line
Connect F1 to field rheostat, then to + line

COUNTER-CLOCKWISE ROTATION

Connect A1 to + line
Connect A2 to F2 to S2
Connect S1 to − line
Connect F1 to field rheostat, then to + line

DIAGRAM NO. 6. Shunt Wound Generator



GENERATOR TERMINALS*

CLOCKWISE ROTATION

Connect A2 to + line
Connect A1 and F2 to − line
Connect F1 to field rheostat, then to + line

COUNTER-CLOCKWISE ROTATION

Connect A1 to + line
Connect A2 to F2 to − line
Connect F1 to field rheostat, then to + line

* Terminal locations are for leads out right-hand side looking at commutator end. When leads are out left-hand side looking at commutator end, location and markings will be upside down.

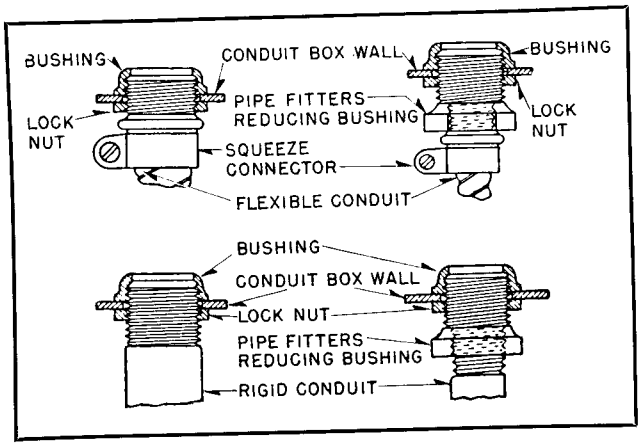


FIG. 1. Method of Connecting Conduit

OPERATION

Motor. Run the motor without load to check the connections, and direction of rotation. To start or stop the motor, refer to the instructions furnished with the starter.

Generator.

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

1. Start each generator with the circuit breaker or the line switch open and all the resistance of the field rheostat in the field circuit.

2. When the generator is up to full speed, adjust the voltage to the proper value by means of the field rheostat.

3. Close the circuit breaker or switch connecting the generator to the switchboard, and then close any other switches necessary to apply the load.

When starting a generator for parallel operation, the voltage of the generator must be made to agree in direction and strength with that of the bus bars of the generator already in operation; then close the circuit breaker, the equalizer switch and the load switch. The equalizer switch and load switch are sometimes combined in a three pole switch; if single pole equalizer switches are used, the generator must not be connected in parallel until the equalizer circuit is complete. On closing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