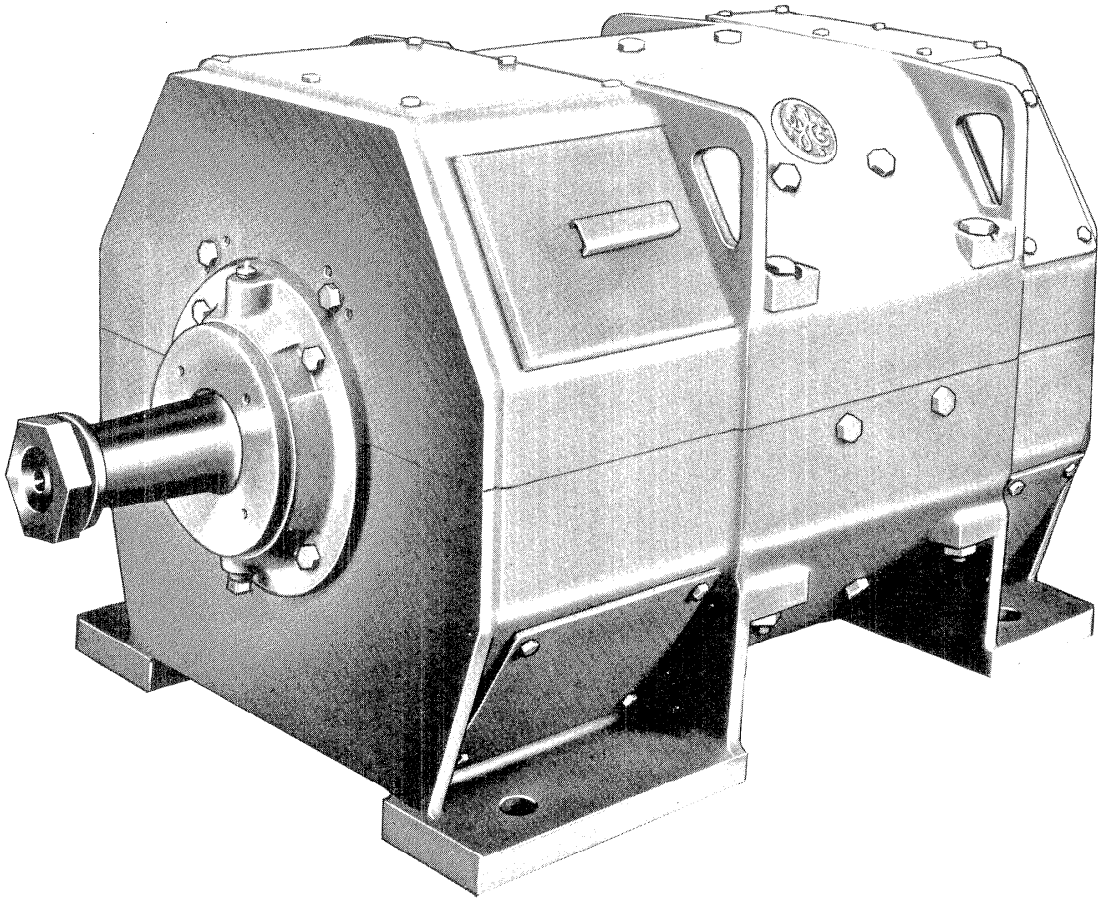
GE Motors

# Instructions

## Armored Motors
## Type MD800™



GEH-3258K

| TABLE 2 | | | |
|---|---|---|---|
| SPEED LIMIT DEVICE – MAX. CURRENT RATINGS | | | |
| NORMALLY OPEN OR CLOSED CONTACTS | | | |
| 115 VAC | 230 VAC | 120 VDC | 240 VDC |
| 3.0 amps | 1.5 amps | 2.5 amps | 0.8 amp |

## Thermostats

The thermostat is a protective device. It is not intended to limit motor loading or provide normal insulation life. When supplied, it is mounted in contact with a commutating coil, which is the only accessible part of the armature circuit. Since factors such as shaft speed, ventilation (blower or shaft fan), current ripple (SCR phase-back), and short time overload affect the temperature relationship between the armature and commutating field, complete protection from all conditions resulting from overtemperature is not possible. The device is especially useful in guarding against loss of normal ventilation air, high ambient temperature, and prolonged operation of self-ventilated motors at very low speeds.

Thermostats may be used in alarm or relay circuits within rating limits shown in **Table 3**.

| TABLE 3 | | | | |
|---|---|---|---|---|
| THERMOSTAT – MAXIMUM CURRENT RATINGS | | | | |
| NORMALLY OPEN OR CLOSED CONTACTS | | | | |
| LOAD | 125 VAC | 250 VAC | 600 VAC | 30 VDC |
| DO NOT USE ABOVE 600 VAC or 30 VDC | | | | |
| Resistive | 5 amps | 2.5 amps | 1 amp | 5 amps |
| *Inductive | 3 amps | 1.5 amps | 0.5 amps | 1.5 amps |

*Suitable for Pilot Duty only (Relay coils).

**WARNING: Thermostats automatically reset after the motor has cooled somewhat. In order to prevent property damage or injury to personnel, the control circuit should be designed to prevent the automatic starting of the motor when the thermostat resets.**

## Ventilation System

See that blowers or central systems are ready to supply cooling air. Air filters should be in place. Blowers should be checked for correct rotation.

## General Mechanical Inspection

Check the inside of the machine for tools, metal chips, or any other foreign material that may have accumulated during storage or installation. Make sure that all rotating parts have enough clearance from any stationary parts. Turn the machine over by hand, if possible, and check for scraping noises or any other signs of mechanical interference. Check the tightness of the bolts in the feet, couplings, frame split, bearing housings, and any other bolts that may have been disturbed.

## Tightening Bolted Joints

**CAUTION: Special instructions apply to bolted joints from "Z" vintage motors in frames MD804 through MD812. Refer to Instruction Book GEH-4246.**

Since loose bolts can cause both electrical and mechanical failures, all bolts and nuts must be kept tight. Maintenance schedules must include the checking of bolt tightness. **Table 4** gives the torque values to be used in this maintenance procedure.

The information in **Table 4** applies to all bolted joints except when non-metallic parts (e.g., fluid bed parts, polyester glass moldings) are bolted to metallic parts. Here, lower torque values as listed in **Table 5** are recommended to prevent parts from fracturing.

The following precautions which apply to the tightening of bolted joints should be observed in maintenance procedures:

(1) Use a torque wrench for tightening **only**. When necessary to loosen bolts, use another type of wrench.

(2) The pressure bearing surfaces and the threads of nuts and bolts should be clean, dry, and free from oil and grease when torqued to the values given. Oiled threads require that torque values be reduced 10 percent.

(3) When initially tightening a bolted joint, the final turn must be tightened with the torque wrench to obtain an accurate setting.

(4) In checking the tightness of bolted joints, the torque wrench should be applied at the higher value of torque given in the Tables to ensure adequate tightness.

Loose pole bolts will cause serious failures on industrial equipment. Even though all of these pole bolts are

### Removal of Shaft From Armature

The armature core and commutator are pressed on the shaft. If it becomes necessary to replace a shaft, remove the bearings as described earlier. Remove the fan hub in a similar manner. Then, obtain a steel pipe or sleeve which will just fit over the shoulder onto the shaft at the drive end and long enough to press the armature core and commutator off of the shaft. Support the armature on this pipe so that the pressure is exerted on the shaft at the commutator end. Protect the end of the shaft when pressing. (Refer to **Fig. 8**.)

The pressing tonnage for shaft removal will normally range between 10 tons (9000 kilograms) and 200 tons (180,000 kilograms). It is likely that damage may result to the commutator end shaft extension in this operation. Usually the shaft is being replaced so this damage is of no concern. If required, the damage to the shaft threads can be minimized by using a shaft nut to distribute the load.

Heating of the armature in an oven to approximately 150°C before pressing will usually reduce removal tonnage to be within the above range.

### Removal of Brushholder

Each brushholder is individually bolted to a support which is bolted to the motor frame. To remove a brushholder, disconnect the brush pigtail and loosen the bolt sufficiently to remove the brushholder.

### Removal of Field Coils

(1) Lift or remove the top half of the frame as described under **Removal of Armature**.

(2) Disconnect the cables to the coil to be removed, and take out the bolts which hold the pole piece to the frame. Remove the complete pole piece and coil assembly. In order to remove some coil and pole assemblies, it is necessary to remove the adjacent poles first. The armature must be removed from the frame for proper access to coils and poles in the bottom frame half.

(3) When removing connections and coils, take care to prevent bumping coils and terminals which can result in damage to the coil coating. Reassemble bolts, washers, and nuts on coil terminal.

**NOTE: Do not dislodge or otherwise damage insulation washers molded between coil terminals. Do not lose insulation bolts for field coil terminations.**

## ASSEMBLY – HORIZONTAL MOTOR

### Installing Field Coils (Armature Removed)

(1) Always assemble the bottom center commutating coil first, since it cannot be installed if the two adjacent exciting poles are in the frame.

(2) Assemble the pole piece and coil assembly into the frame and secure it with bolts through the frame. It is recommended that new lock washers be used on the pole piece bolts when reassembling the field coil in the frame. Draw the bolts up tight to seat the pole piece in the position on the frame. For motors with compensating windings, **Fig. 6** illustrates the brazed type connections. **Fig. 6B** illustrates how to assemble the bolted type pole face connections. (Refer to the **Reconnection of Pole Face Assemblies** section for connection and post treatment of pole face windings.)

(3) Tie all cables into neat sturdy bundles. Tie cable bundles to cable anchors in the frame so that bundles are suspended securely in position. Locate cable bundles away from sharp corners, moving parts, brush rigging, and hand hole openings.

(4) Insulate all internal bolted coil connections as described below:

A) Apply a small amount of insulating putty as required to smooth sharp corners and fill all voids to round out the joint for easier taping.

B) Apply tape. Several lengths may be used, but start each length so that one or more full turns of tape secure previous tape end. Joint insulation taping should completely cover the bolt, nut, washers, terminals, etc., extending approximately 1/4" to 1/2" (6-13 mm.) onto the cable and/or lead insulation, resulting in at least 3 tape thicknesses minimum coverage.

C) Paint the tape surface with fast-drying insulating varnish.

### Assembly of Brushholder

(1) Install the brushholder on the support as high off of the commutator as possible. Tighten the bolt sufficiently to hold the brushholder in place until after the frame is closed on the armature. Remove brushes from the brushholders to prevent brush breakage when the armature is installed.

(2) After the frame halves have been assembled in place together with the armature, release the bolt

(6) Loop a rope sling around the two shaft extensions, and carefully lift the armature avoiding damage to field coils and other parts. The armature core should be placed on a clean, padded surface to prevent damage to the armature core bands.

For the removal of MDV820 through MDV824, refer to **Fig. 12**.

Remove the motor from its vertical mounting position and place it in a horizontal position. Carefully remove pinions, couplings, brake wheels, and shaft guards from the shaft extensions and remove the armature following the instructions for removal of armature from a horizontal type motor.

### Removal of Commutator End Bearing

For the MDV804 through the MDV818, refer to **Figs. 11, 16 & 18.**

(1) Take out the cap screws and remove the bearing cap from the bearing cartridge.

(2) Remove cap screws and the circular locking ring. Take out the split ring which fits in the groove in the shaft.

(3) Install a suitable puller with the studs through the holes in the bearing cartridge, and pull the cartridge with the ball bearing and collar from the shaft. This bearing will be brinelled and must be discarded.

(4) Remove the ball bearing from the cartridge by tapping lightly with a mallet on the collar.

For MDV820 through MDV824, refer to **Fig. 12.**

(1) To remove the bearing assembly, first take off the bearing cap.

(2) Using a suitable puller in the grooves provided in the shaft collar, remove the collar from the shaft.

(3) Install a suitable puller using studs through the threaded holes in the bearing cartridge and pull the cartridge, thrust collar, and ball bearing from the shaft. The ball bearing may become brinelled during removal and should be discarded.

(4) Remove the ball bearing from the cartridge by gently tapping with a mallet on the thrust collar. Excessive tapping may cause the ball bearing to further brinell or become disassembled.

### Removal of Failed Drive End Bearing (Refer to Figs. 11 and 12.)

(1) The outer race of the drive end roller bearing can be removed by taking off the bearing cap. With a suitable puller, pull the outer race and rollers from their seat in the bearing cartridge.

(2) The bearing inner race is removed from the shaft by using a suitable puller engaged behind the thrust collar. Pull the collar and inner race from the shaft together.

## ASSEMBLY – VERTICAL MOTOR

Only the procedures peculiar to the assembly of vertical motors are contained in the following paragraphs. For other procedures, refer to the instructions on **Assembly – Horizontal Motors.**

### Replacement Bearings

The bearings of MD800 Armored Motors are mounted on the shaft with a heavy interference fit. For this reason, bearings with greater radial internal clearance than normal (C3 or C4) must be used.

### Assembly of Commutator End Bearing

For the MDV804 through the MDV818, refer to **Figs. 11, 16 & 18.**

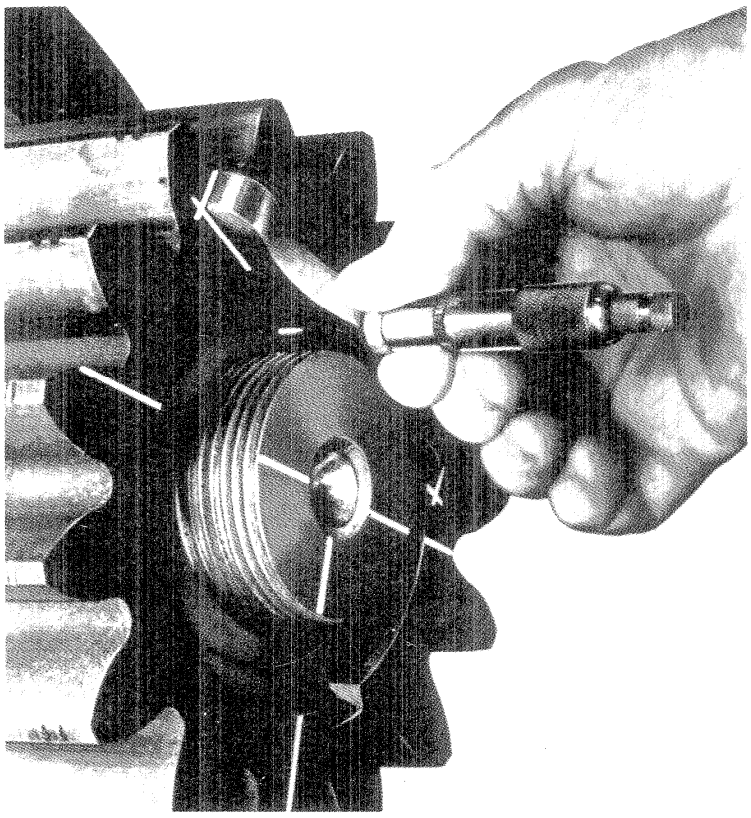
(1) Pack a small amount of sealing grease (D6A2D) in the labyrinth groove on the inside of the cartridge, and place the collar in the cartridge. (Refer to **Table 10** for grease sources.)

(2) Assemble the ball bearing into the cartridge by tapping evenly on the outer race with a mallet until it seats firmly against the shoulder at the bottom of the bore. Cool the bearing in a freezer or heat the cartridge in an oven to 100°C, to make this job easier and to prevent damage to the bearing or cartridge.

**NOTE: For a bearing with a seal, assemble the bearing with the seal down or toward the center of the armature.**

(3) Heat the assembly in an oven to 110°C. Place the cartridge assembly on the shaft and press against the inner race of the bearing. Press the bearing on the shaft until the split ring will just enter the groove in the shaft.

(4) Assemble the split ring in the groove in the shaft and lock it into place by attaching the locking ring



MICROMETER DEPTH GAGE BEING USED TO MEASURE PINION ADVANCE. (NOTE THAT LINE-UP MARKS USED TO LOCATE GAGE, PINION, AND SHAFT IN IDENTICAL POSITIONS FOR "HOT" AND "COLD" MEASUREMENT)

**Fig. 13 Micrometer Depth Gage Being Used To Measure Pinion Advance**

(8) The brake wheel mounting is similar to the coupling or pinion mounting. Because it does not transmit continuous torque, the brake wheel requires only 50% of the advance onto the shaft at 50% of the temperature difference shown in **Table 7** for couplings or pinions. For example, an MD802 brake wheel advance and temperature difference are 50% of the **Table 7** values or .0055" to .007" (0.14 mm. to 0.18 mm.) at a temperature difference of 35°C (62.5°F).

## RECONNECTION OF POLE FACE ASSEMBLIES

A red insulating coating is applied over the stator end turns, coils, poles, and internal surfaces of compensated wound machines to cover and seal all exposed copper, thereby retaining high insulation resistance to prevent nuisance electrical trips. This coating, applied at the factory over connected assemblies by electrostatic spray to achieve full coverage also, as might be expected, penetrates portions of the clamped joints.

Before reconnecting pole face bars or pole face assemblies, for bolted connections remove all coating from mating surfaces using mechanical methods. To prevent high resistant joints, the connection surfaces must be clean and free of coating and foreign materials.

Clean the reconnected parts and adjacent area using the procedure described in the **Cleaning of Windings** section of this Instruction Book. Apply two coats of GE A50CD615A red air dry enamel to the connections and surrounding area, allowing 30 minutes drying time between coats. The application method preferred is conventional spray; application by brush is acceptable. (Refer to **Table 8** for material description.)

**TABLE 8**
**COATING MATERIAL**

| KNOWN SOURCE FOR GE A50CD615A |
|---|
| GLYPTAL, INC. |
| 305 EASTERN AVE. |
| CHELSEA, MA 02150 |
| SUPPLIER'S DESIGNATION: 1201E |

## MDP804 THRU MDP812 MOTORS

# EXPLODED VIEW – HORIZONTAL

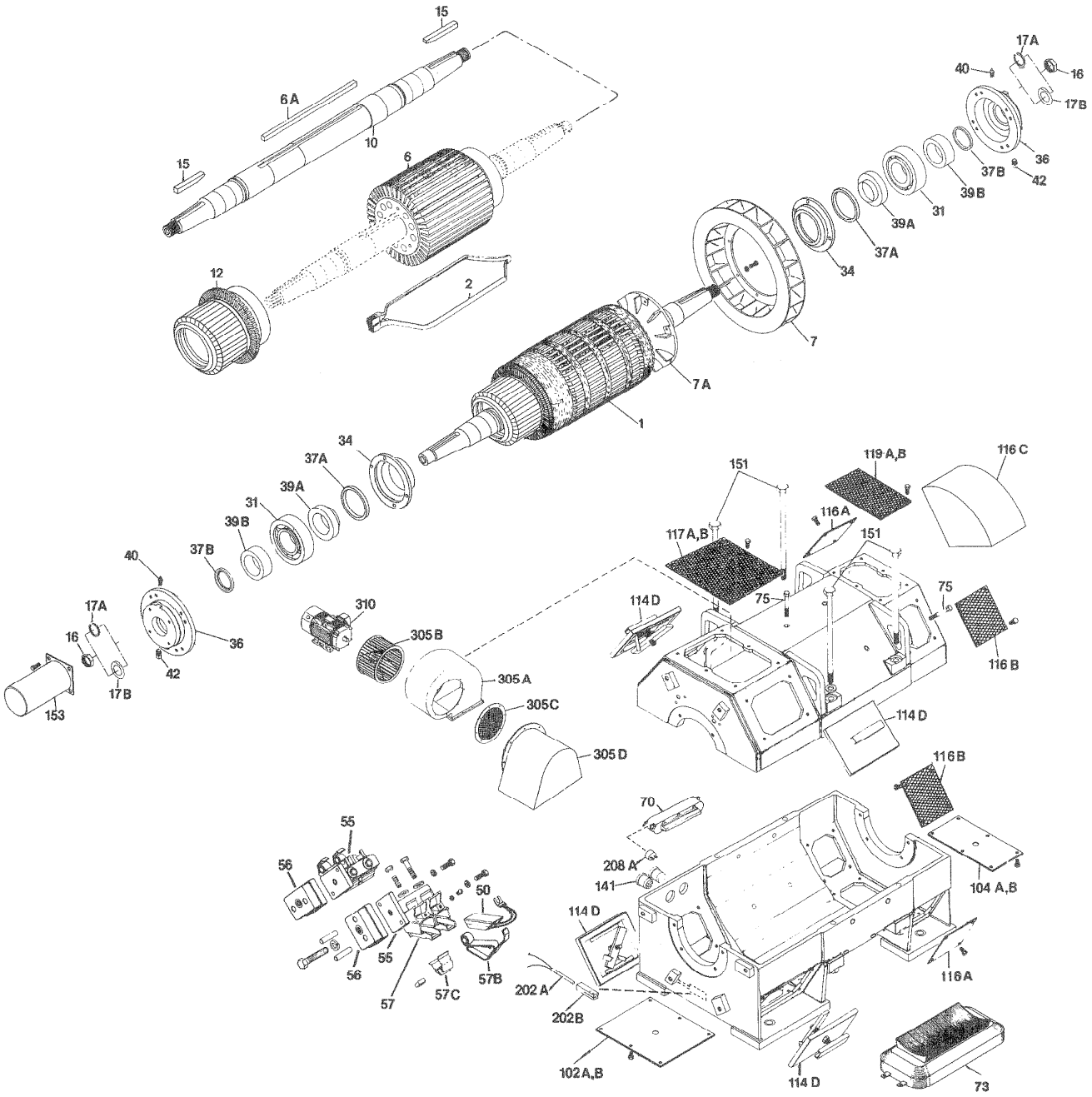





Figure 15

## MDP822 MOTORS

# EXPLODED VIEW – HORIZONTAL

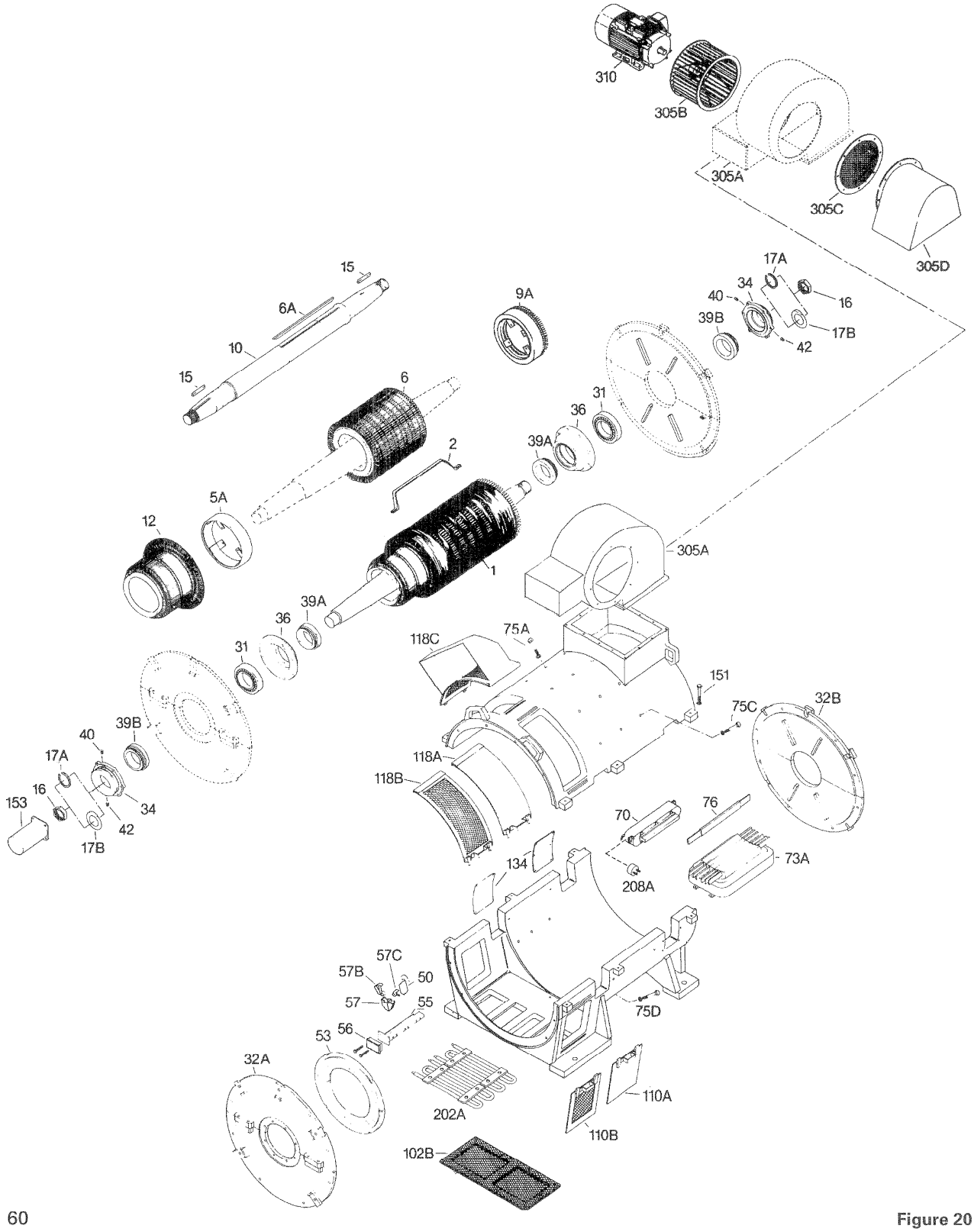





Figure 20