Minnich
CONCRETE VIBRATORS & DOWEL PIN DRILLS

High Cycle Flex Shaft Operator/Service Manual

Hours of Operation
8:00AM to 4:30PM Mon. – Fri. Eastern Standard Time

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MINNICH MANUFACTURING CO.
WARRANTY AND SERVICE AGREEMENT

Minnich Manufacturing Co. warrants to the original purchaser that, if any part of the product proves defective in material or workmanship within one year from purchase, and is returned to Minnich Manufacturing Co. within 90 days after the defect is discovered, Minnich Manufacturing Co. will at its option repair or replace said part. Product shipped to Minnich Manufacturing Co. freight prepaid will be returned freight prepaid. Product shipped to Minnich Manufacturing Co. freight collect will be returned freight collect.

LIMITATIONS:

Warranty does not apply to repairs that are required because of normal wear or tear, parts or products that are damaged as a result of misuse, neglect, accident or fire, or of lightning, flooding or other acts of God, or by improper installation or maintenance, of which Minnich Manufacturing Co. will be the sole judge. Warranty does not apply to parts or products that have been modified by an unauthorized party that has in Minnich Manufacturing Co.'s judgment affected their performance or reliability. Warranty does not apply if the part or product substantially fulfills the performance specifications.

Minnich Manufacturing Co. shall not in any event be liable for the cost of any special, indirect, or consequential damages as a result of this product.

SERVICE:

Out of warranty service is available through Minnich Manufacturing Co.

GENERAL SAFETY RULES

This manual contains NOTES, CAUTIONS, and WARNINGS. These MUST be followed to prevent the possibility of improper use, incorrect servicing, damaging the equipment, or personal injury. Read and comply with all NOTES, CAUTIONS and WARNINGS included in these instructions.

NOTE: Notes contain additional information important to the operation of the equipment.

CAUTION: Cautions provide important information to prevent mistakes that could result in damage to the equipment.

 **WARNING:** Warnings alert one to practices or conditions that could lead to personal injury or death!

 **WARNING**

Read and understand all instructions.
Failure to follow all instructions listed below may result in electric shock, fire and/or serious injury.

 **WARNING**
DO NOT USE TOOL IF IT IS IN NEED OF SERVICE!

SAVE THESE INSTRUCTIONS

- WORK AREA –

Keep your work area clean and well lit.

Cluttered and dark areas invite accidents.

DO NOT operate power tools in explosive atmospheres, such as, in the presence of flammable liquids, gases, or dust.

Power tools create sparks that may ignite the dust or fumes.

Keep bystanders, children, and visitors away while operating a power tool.

Distractions can cause you to lose control.

- ELECTRICAL SAFETY -

Grounded tools must be plugged into an outlet properly installed and grounded in accordance with all codes and ordinances. Never remove the grounding prong or modify the plug in any way. DO NOT use any adapter plugs. Check with a qualified electrician if you are in doubt as to whether the outlet is properly grounded.

If the tools should electrically malfunction or break down, grounding provides a low resistance path to carry electricity away from the user.

Avoid body contact with grounded surfaces such as pipes, radiators, ranges and refrigerators.

There is an increased risk of electric shock if your body is grounded.

DO NOT expose power tools to rain or wet conditions.

Water entering a power tool will increase the risk of electric shock.

DO NOT abuse the cord. Never use the cord to carry the tools or pull the plug from an outlet. Keep cord away from heat, oil, sharp edges, or moving parts. Replace damaged cords immediately.

Damaged cords increase the risk of electric shock.

When operating a power tool outside, use outdoor extension cords marked "W-A or "W".

These cords are rated for outdoor use and reduce the risk of electric shock.

- PERSONAL SAFETY -

Stay alert, watch what you are doing and use common sense when operating a power tool. DO NOT use tool while tired or under influence of drugs, alcohol or medication.

A moment of inattention while operating power tools may result in serious personal injury.

Dress properly. DO NOT wear loose clothing, or jewelry. Tie up long hair. Keep your hair, clothing, and gloves away from moving parts.

Loose clothes, jewelry, or long hair can be caught in moving parts.

Avoid accidental starting. Be sure switch is off before plugging in.

Carrying tools with your finger on the switch or plugging in tools that have switches on invites accidents.

DO NOT overreach. Keep proper footing and balance at all times.

Proper footing and balance enables better control of the tool in unexpected situations.

Use safety equipment. Always wear eye protection.

Dust mask, non-skid safety shoes, hard hat, or hearing protection must be used for appropriate conditions.

- TOOL USE AND CARE -

DO NOT force tool. Use the correct tool for your application.

The correct tool will do the job better and safer at the rate for which it is designed.

DO NOT use tool if switch does not turn it on or off.

Any tool that cannot be controlled with the switch is dangerous and must be repaired.

Disconnect the plug from the power source before making any adjustments, changing accessories, or storing the tool.

Such preventive safety measures reduce the risk of starting the tool accidentally.

Store tools out of the reach of children and other untrained persons.

Tools are dangerous in the hands of untrained users.

Maintain tools with care. Keep tools clean.

Properly maintained tools are less likely to bind and are easier to control.

Check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the tools operation. If damaged, have the tool serviced before using.

Many accidents are caused by poorly maintained tools.

Use only accessories that are recommended by the manufacturer for your model.

Accessories that may be suitable for one tool may become hazardous when used on another tool.

- SERVICE -

Tool service must be performed only by qualified repair personnel.

Service or maintenance performed by unqualified personnel could result in a risk of injury.

When servicing a tool, use only identical replacement parts. Follow instructions in the maintenance section of this manual.

Use of unauthorized parts or failure to follow maintenance instructions may create a risk of injury.

GROUNDING INSTRUCTIONS

The electric vibrator motors must be grounded while in use to protect the operator from electric shock. The vibrator motors are equipped with a 4-conductor electric cord and a 4-prong twist lock grounding type plug to fit a properly grounded mating receptacle.

FUNCTIONAL DESCRIPTION

The MINNICH line of Flex Shaft vibrators is a system of fully interchangeable components that fulfill the requirements of any job.

The electric motors are available in 115/230 volts. They are designed to be splash-proof.

The flexible shafts are available in two (2) diameters - 7/8" and 1 3/16" and six (6) lengths – 2', 5', 7', 10', 14' and 21'. Couplings are available to join several lengths together.

The vibrating heads are available in six (6) sizes - 3/4", 1", 1 3/8", 1 3/4", 2" and 2 3/8" diameters.

Shaft Length	2' (.6m)	5' (1.5m)	7' (2.1m)	10' (3.0m)	14' (4.3m)	21' (6.4m)
7/8" (22.2mm) OD Casing Recommended Head Sizes	3/4", 1", 1-3/8", 1-3/4"	3/4", 1", 1-3/8", 1-3/4"	3/4", 1", 1-3/8", 1-3/4"	3/4", 1", 1-3/8"	3/4", 1"	3/4", 1"
1-3/16" (30.1mm) OD Casing Recommended Head Sizes	1-3/8", 1-3/4", 2", 2-3/8"	1-3/8", 1-3/4", 2", 2-3/8"	1-3/8", 1-3/4", 2", 2-3/8"	1-3/8", 1-3/4", 2", 2-3/8"	1-3/8", 1-3/4", 2", 2-3/8"	1-3/8", 1-3/4", 2", 2-3/8"

Head Diameter	Centrifugal Force*	Amplitude	Diameter of Influence
3/4" (19mm)	105lbs. (467N)	.050" (1.27mm)	4"-6" (101mm-152mm)
1" (25mm)	150lbs. (671N)	.056" (1.42mm)	5"-7"- (127mm-177mm)
1-3/8" (35mm)	424lbs. (1886N)	.070" (1.77mm)	8"-14" (203mm-355mm)
1-3/4" (45mm)	795lbs. (3536N)	.102" (2.59mm)	16"-20" (406mm-508mm)
2" (50mm)	1000lbs. (4448N)	.090" (2.28mm)	20"-124" (2508mm-609mm)
2-3/8" (60mm)	1186lbs. (5275N)	.092" (2.33mm)	23"-27" (584mm-685mm)

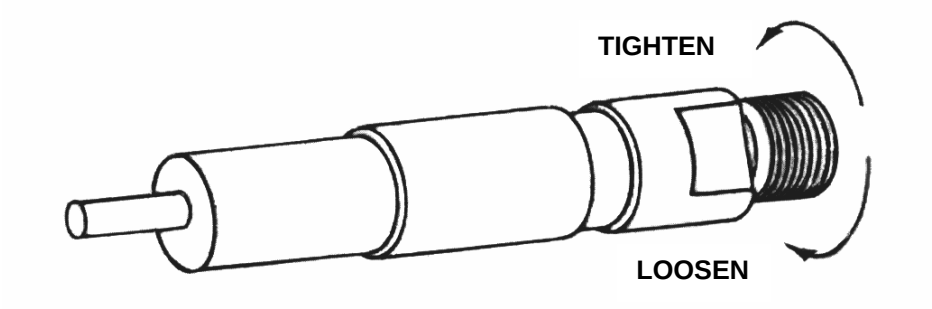
*centrifugal force at 10,5000VPM

ASSEMBLY

CAUTION: Turn the switch off and unplug the motor before performing any maintenance or fitting any components to the motor.

ASSEMBLING SHAFT TO MOTOR

1. The end of casing with the strain relief spring goes into the motor casing adapter.
2. Insert inner core of the shaft into the core adapter on motor. Make sure the core is fully inserted.
3. Coat threads on casing coupler with Permatex Form-A-Gasket #2.
4. Thread casing coupler counterclockwise into adapter on power unit and tighten securely using open end wrenches on the flats. **NOTE** – These are Left-Hand Threads.



ASSEMBLING VIBRATOR HEAD TO SHAFT.

1. Coat threads on casing coupler with Permatex Form-A-Gasket #2.
2. Push core toward motor end to make certain it is still engaged in the motor. Insert exposed end of core into head core adapter.
3. Holding casing coupler with an open end wrench on the flats, thread the head on counterclockwise and securely tighten with a pipe wrench.
   CAUTION: Put pipe wrench only on the very end of the head to which the flexible shaft is being attached.

OPERATION

Match vibrator motor, shaft and head assembly to the job. Select the shortest shaft possible to do the job to assure maximum power at the head.

Avoid sharp bends in the flexible shaft for greatest efficiency and shaft life. This is true both in operation and storage. **DO NOT** allow the flexible shaft to hang or be dragged over sharp edges of the forms during operation.
DO NOT use shaft or cord to pull motor.

To vibrate concrete, dip vibrating head vertically into the mix. Allow to vibrate until the surface around the head becomes glossy and no large air bubbles break the surface – usually 10-20 seconds. Withdraw the head slowly, then move and immerse vibrator head in new location.
CAUTION: Over – vibration will cause a separation of the aggregates and will weaken the concrete.

DO NOT operate the vibrating head out of the mix for more than two minutes to prevent overheating and permanent damage to bearings and seals. Wet concrete keeps the head at safe operating temperature.
NOTE: A new head will run slightly warmer for a short time than a broken in head. Once the seals seat the temperature of the head will drop.

The electric motors work in 115/230 volt three phase 180 cycle current.

MAINTENANCE

CAUTION: Turn the switch off and unplug the motor before performing any maintenance or fitting any components to the motor. When servicing use only identical replacement parts.

PERIODIC MAINTENANCE SCHEDULE

BEFORE OPERATING

1. Inspect air inlet filter and outlet vent holes. Clean or replace dirty or clogged filter
2. Inspect electrical cords for undue wear or damage. Replace damaged cords. DO NOT use damaged cords.

EVERY 50 HOURS

Clean and lubricate the core in the flexible shaft.

EVERY 100 HOURS

Change oil in vibrator head.

MOTORS

Wipe off motor with damp rag after each use to prevent concrete build-up.
CAUTION: Never spray with or dip electric motor in water. This will increase the risk of electric shock.

Clean intake and exhaust areas to insure unrestricted air flow. Restricted air flow could cause motor to overheat.

Remove end cover over air filter and clean air filter element as often as required by working conditions. To clean filter, remove and wash in warm, soapy water. Make sure filter is completely dry before reinstalling.

FLEXIBLE SHAFTS

LUBRICATION – After every 50 hours of operation, remove the inner core and wipe it clean. Coat core with a 1/16" layer of MINNICH #002120-00000 high temperature grease.
CAUTION: DO NOT use solvents. Solvents trapped in the core or casing will breakdown the new grease and risk premature failure.

Reverse the core in the casing with every lubrication, to even the wear and extend service life.

Replace worn or broken casing to prevent damage to core and head.

To insure long life of flexible shafts, avoid putting undue bends in them. Whenever a casing becomes kinked, or worn to extreme, replace with original equipment.

Never install a new core in a kinked casing or a kinked core in a new casing. This will cause the new parts to fail prematurely.

Core and casing assemblies are shipped from the factory pre-lubricated. However, separate cores and casings are shipped without lubrication and must be lubricated with MINNICH #002120-00000 high temperature grease at assembly as noted above.

Always apply Permatex Form-A-Gasket #2 to the threads of the casing adapter when reassembling the core and casing assembly to the vibrator head and motor.

Break in a newly lubricated core and casing assembly before putting it to work. During this break-in the core could rattle a little bit and draw the motor speed down, causing the motor to draw more current. After this break-in period, the unit will run smoothly.

VIBRATOR HEADS

The vibrator heads require very little maintenance since they are lubricated with oil and sealed at the factory.

Wash concrete and dirt from heads after each job or at the end of a workday – whichever occurs first.

To extend the bearing life in the head, change the oil in the head after every 100 hours of operation.

TO CHANGE OIL IN HEADS:

1. Secure tip of vibrator head in vise and use a chain or pipe wrench on the casing adapter, rotating adapter counterclockwise for a right hand thread. Remove head from vise and drain out old oil in a container and dispose properly.
2. Insert open end of head into the appropriate size bump tube. With open end facing down, strike bottom end of bump tube on a block of wood until eccentric weight assembly drops out.
3. Flush eccentric weight assembly and housing with clean solvent and wipe all parts clean.
4. Inspect bearings, core adapter and seals for signs of wear. If parts pass inspection, reassemble eccentric weight assembly into the housing. Clamp head vertically in a vise and refill with proper amount of MINNICH #002119-00000 long life oil (see chart on page 13).
   NOTE: If there are signs of wear (grooving) from the seals on the core adapter, worn seals or looseness in the bearings see the service portion of the manual for further instructions.
5. Put oil on core adapter for ease of assembly of casing adapter containing the two (2) seals. Start thread of adapter into housing for a turn or two. Stop and apply a generous coating of Permatex Form-A-Gasket #1 all around the threads on the casing adapter.
   NOTE: It is very important that the casing adapter fits tightly against the housing. In order to guarantee a waterproof seal, allow 15 minutes for sealant to set up.

SERVICE

ELECTRIC MOTORS

CAUTION: Turn the switch off and unplug the motor before performing any maintenance to the motor. When servicing use only identical replacement parts.

TO REPLACE FILTER #28

TO REMOVE:

1. Set motor in upright position and secure with end cover #30 up.
2. Using a blade point screwdriver, remove end cover #30 by removing four (4) screws #31 and four (4) lockwashers #3.
3. Remove filter #28 leaving end cover spacer #29 in the middle.

TO REPLACE:

1. Place filter #28 over centered end cover spacer #29.
2. Place end cover #30 on spacer #29 so as to align the four (4) holes with tapped holes in motor housing #13.
3. Using a blade point screwdriver, replace the four (4) lockwashers #3 and four (4) screws #31. Tighten into motor housing #13.

TO REPLACE MOTOR SWITCH #32

TO REMOVE:

1. Disconnect electric cable #18 from power source.
2. Using a wrench, remove motor switch weather cap #36 and motor switch nut #35 from barrel of motor switch #32. **NOTE:** The vertical groove in the threaded barrel of the switch is toward the electric cable #18.
3. Using a blade point screwdriver, remove the four (4) screws #2 and four (4) lockwashers #3 that hold the switch cover plate #34 onto motor housing #13 and remove. Remove #33 switch sleeve.
4. Using a blade point screwdriver, disconnect the two (2) lead wires from the electric cable #18 and two (2) from the field #12 from the motor switch #32.
5. Remove switch.

TO REPLACE:

1. Before beginning, refer to "TO REPLACE FILTER #28" and remove end cover #30 and filter #28. This is done to see the lead wires of field #12 and lead wires of electric cable #18 after they are connected to motor switch #32, to insure they are not coming in contact with anything.
   NOTE: Once you remove end cover #30 be certain to clean and inspect filter #28.
2. With the vertical groove on threaded barrel of motor switch #32 facing toward electric cable #18, to insure "ON/OFF" will agree with markings on motor switch cover plate #34, connect two (2) lead wires from electric cable #18 and two (2) lead wires from field #12 to motor switch #32. Install switch sleeve #33 around switch.
3. When pushing motor switch #32 into motor switch opening in the motor housing #13, position lead wires to allow motor switch #32 to lie flat.
4. Position motor switch cover plate #34 on motor switch #32 by inserting the key in the center hole into the vertical groove in the threaded barrel of the switch. This will locate the "OFF" position on motor switch cover plate #34 toward the electric cable #18. Secure switch cover plate with four (4) screws #2 and four (4) lockwashers #3 onto motor housing #13.
5. Replace motor switch nut #35 and motor switch weather cap #36 onto the barrel of motor switch #32 and tighten securely. **NOTE:** A small amount of silicone dielectric compound placed inside motor switch weather cap #36 will ease installation of it and provide additional sealing.
6. Install filter #28 and end cover spacer #29.
7. Replace end cover #30 and secure with four (4) screws #31 and four (4) lockwashers #3.

TO REPLACE ELECTRIC CABLE #18

TO REMOVE:

1. Disconnect electric cable #18 from power source.
2. Using a wrench, remove motor switch weather cap #36 and motor switch nut #35.
3. Using a blade point screwdriver, remove four (4) screws #2 and four (4) lockwashers #3 from motor switch cover plate #34. Remove cover plate.
4. Refer to "TO REPLACE FILTER #28" and remove end cover #30 and filter #28.
5. Remove switch sleeve #33.
6. Using a blade point screwdriver, disconnect the two (2) lead wires from electric cable #18 from motor switch #32. Disconnect the black wire of stator & cable at the terminal connectors. Disconnect ground wire (green) from motor housing #13 by unthreading screw #26 with lockwasher #25 from motor housing #13.
7. Using a wrench, unscrew the spiral flex nut (part of strain relief #23) from the strain relief body.
8. Turn the electric cable #18 until it becomes free and pull it out.

TO REPLACE:

1. Take electric cable #18 and install and crimp terminal #22 on all three (3) wires and #50 terminal on black wire.
2. Slip spiral flex nut (round end first) onto electrical cable #18.
3. Slip electric cable #18 through the rubber sleeve in the strain relief body so that 1/4" of outside covering extends inside the motor housing #13 with the ground wire (green) facing in the down position toward isolators on motor housing #13.
4. While holding the electric cable #18 in position screw the spiral flex nut onto the strain relief body and tighten with wrench.
5. Feed ground wire (green) through vent hole and secure to motor housing #13 with screw #26 and lockwasher #25.
6. Connect the red and white shorter lead wires of electric cable #18 to motor switch #32 and tighten screws.
7. Connect black wire from stator & black wire from cable together with the terminal connectors. Install switch sleeve #33 over the switch terminals.
8. Refer to steps "3" through "5" of "TO REPLACE MOTOR SWITCH #32" to finish installation.

TO REPLACE ROTOR #8

TO REMOVE:

1. Remove end cover #30, spacer #29 and filter #28.
2. Remove (4) #2 screws and (4) #3 washers from end cap #4. You **DO NOT** need to remove casing adaptor #1 from end cap.
3. With mallet & straight edge of screw driver, tap bottom center of bearing #11 to loosen rotor and end cap from housing.
4. Turn rotor upside down and tap end cap with mallet to remove end cap #4 and spring washer #5 from rotor and bearing assembly.

TO REPLACE:

1. Place roto0r down in stator and tap with mallet to seat bearing #11 in bearing housing #41.
2. Replace spring washer #5 on top of bearing with tabs facing down next to bearing.
3. Replace end cap #4, with attached casing adaptor #1, over bearing #7 and spring washer #5. Make sure springwasher does not get pinched under end cap.
4. With hand pressure press end cap in place. The (5) screws #2 on the end cap will be facing the switch opening in motor housing #13.
5. Replace (4) #2 screws and (4) #3 lockwashers.

TO REPLACE STATOR #12

TO REMOVE:

1. Remove rotor as in the “TO REPLACE ROTOR #8” procedure.
2. Do steps 1-3 of switch replacement.
3. Disconnect the red and white wires of stator from switch #32 and the black wire terminal #45 from black cable wire terminal #50.
4. Turn motor housing #13 upright and remove (2) #9 screws and (2) #10 lockwashers from stator housing #42.
5. Remove stator housing and stator from motor housing #13.
6. Remove (2) #44 screws and (2) #10 lockwashers from stator retainer #43 at bottom of stator housing #42.
7. Remove stator #12 from stator housing #42.

TO REPLACE:

1. Place stator #12 in stator housing #42 with wires opposite stator retainer holes in housing.
2. Secure stator in housing with stator retainer and (2) #44 screws and (2) #10 lockwashers.
3. Place stator housing in motor housing #13, with motor housing switch opening facing you, wires will be at right of switch opening in motor housing, with wires pointing to the switch opening in housing #13.
4. Secure stator housing with (2) #9 screws and (2) #10 lockwashers.
5. Connect black wire terminal #45 with black wire terminal #50 of cable.
6. Connect white wire to switch opposite white wire of cable.
7. Connect red wire to switch opposite white wire of cable.
8. Replace switch steps 2-5.
9. Replace rotor steps 1-5.

VIBRATOR HEADS

All vibrator heads are equipped with seals in the casing adapter to keep the grease from the flexible shaft out of the vibrator head and to retain the oil in the vibrator head.

TO DISASSEMBLE HEADS:

1. Secure tip of vibrator head in vise and use a chain or pipe wrench on the casing adapter #51, rotating adapter counterclockwise for a right hand thread. Remove head from vise and drain out old oil in a container and dispose of properly.
2. Insert open end of head into the appropriate size bump tube. With open end facing down, strike bottom end of bump tube on a block of wood until the eccentric weight assembly drops out.
3. Flush eccentric weight assembly, casing adapter #51 and housing #44 with clean solvent and wipe all parts clean.

Inspect bearings #46, core adapter #48, and seals #50 for any signs of wear. If there are signs of wear on the polished part of the core adapter #48, both core adapter #48 and seals #50 must be replaced. If the bearings #46 show any signs of looseness, they must be replaced. Replace both pairs.

TO DISASSEMBLE ECCENTRIC WEIGHT ASSEMBLY:

1. Place eccentric weight assembly in vise. If you have a 1/4" drive ratchet, place square driver inside the female end of core adapter #48, and turn counterclockwise for a right hand thread. If a 1/4" drive ratchet is not available, place vise grips or locking pliers on the back end of core adapter #48 (next to the bearing), where the material is the heaviest and remove, being very careful not to damage or mar the polished portion of the core adapter #48.
2. On opposite end use a wrench or spanner wrench (vise grips or locking pliers if spanner is not available) to remove bearing locknut #45.
3. Slip bearings #46 off eccentric weight #47.

TO REPLACE OIL SEALS #50:

NOTE: To replace the oil and grease seals #50 in the casing adapter #51, an arbor press is ideal for this operation. If a press is not available, a properly sized socket wrench will work. The casing adapters #51 are machined with a step inside the I.D. to insure the seals #50 are properly seated when installed.

CAUTION: In all cases the oil and grease seals #50 are inserted into the casing adapter #51 **back to back**. Also, it is advisable to press one seal #50 into place, then the other. Apply a light coating of grease to the outside diameter of seal #50 before pressing into casing adapter #51. Some plastic sealing material may be shaved off the outside diameter of seal #50 as it is pressed into place. Remove this after pressing **each** seal to avoid any chance of this residue entering into the seal area or the bearings and resulting in a premature failure.

1. On the 3/4 in. (19mm) and 1 in. (25mm) heads, the oil and grease seals #50a and #50b are removed by pushing them out of the female end of the casing adapter #51 and replaced by pushing oil seal #50a in first (lip down) 1 9/16 in. deep for the 3/4 in. head and 1 1/2 in. deep for the 1 in. head followed by the grease seal #50b (lip up) through the female end of the adapter.
2. On the 1 3/8 in. (35mm), 1 3/4 in. (45mm) and the 2 in. (50mm) heads, the oil and grease seals #50 are removed by pushing them out of the male end of the casing adapter #51 and replaced by pushing them in through the male end of the adapter, being sure they have been properly seated against the step described earlier.
3. On the 2 3/8 in. (59mm) head, the oil and grease seals #50 are removed by pushing them out through the female end that the head housing threads into, and replaced through the same end, being sure they have been properly seated against the step described earlier.

TO ASSEMBLE ECCENTRIC WEIGHT ASSEMBLY:

1. Place eccentric weight #47 in vise.
2. Install two (2) bearings #46 on one end and secure with locknut #45 using either a wrench or spanner wrench (depending on type of locknut used).
3. Install two (2) bearings #46 on other end and secure with core adapter #48. If you have a 1/4" drive ratchet, place square driver inside the female end of core adapter #48 and tighten turning clockwise for a right hand thread. If a 1/4" drive ratchet is not available, place vise grips or locking pliers on the back end of core adapter #48 (next to the bearing), where the material is the heaviest and remove, being very careful not to damage or mar the polished portion of the core adapter #48.

TO ASSEMBLE HEADS:

1. Place housing #44 in vise vertically with open end up.
2. Take eccentric weight assembly and put a light coating of head lubricating oil MINNICH #002119 and lubricate the bearing #46 outer races.
3. With core adapter #48 pointing up, take the eccentric assembly and slide into the housing #44. You may have to tap the core adapter #48 to properly seat the bearings into the housing #44.
4. Refill vibrator with the proper amount of MINNICH #002119 long life oil (see chart below).
5. Put a light coat of oil or grease on polished surface of core adapter #48 for ease of assembly of casing adapter #51 containing the two seals #50. Start thread of adapter into the housing for a turn or two. Stop and apply a generous coating of Permatex Form-A-Gasket #2 all around the threads on the casing adapter #51. Tighten adapter with a chain or pipe wrench and remove excess sealant. **NOTE:** It is very important that the casing adapter #51 fits tightly against the vibrator housing #44. In order to guarantee a water proof seal, allow 15 minutes for sealant to set up.

When threading vibrator head back on to the flexible shaft casing, always put Permatex Form-A-Gasket #2 on casing end to insure a water tight seal. Thread head on and tighten with a chain or pipe wrench on head and open end wrench on flats on casing.

PARTS AND SERVICE NOTES

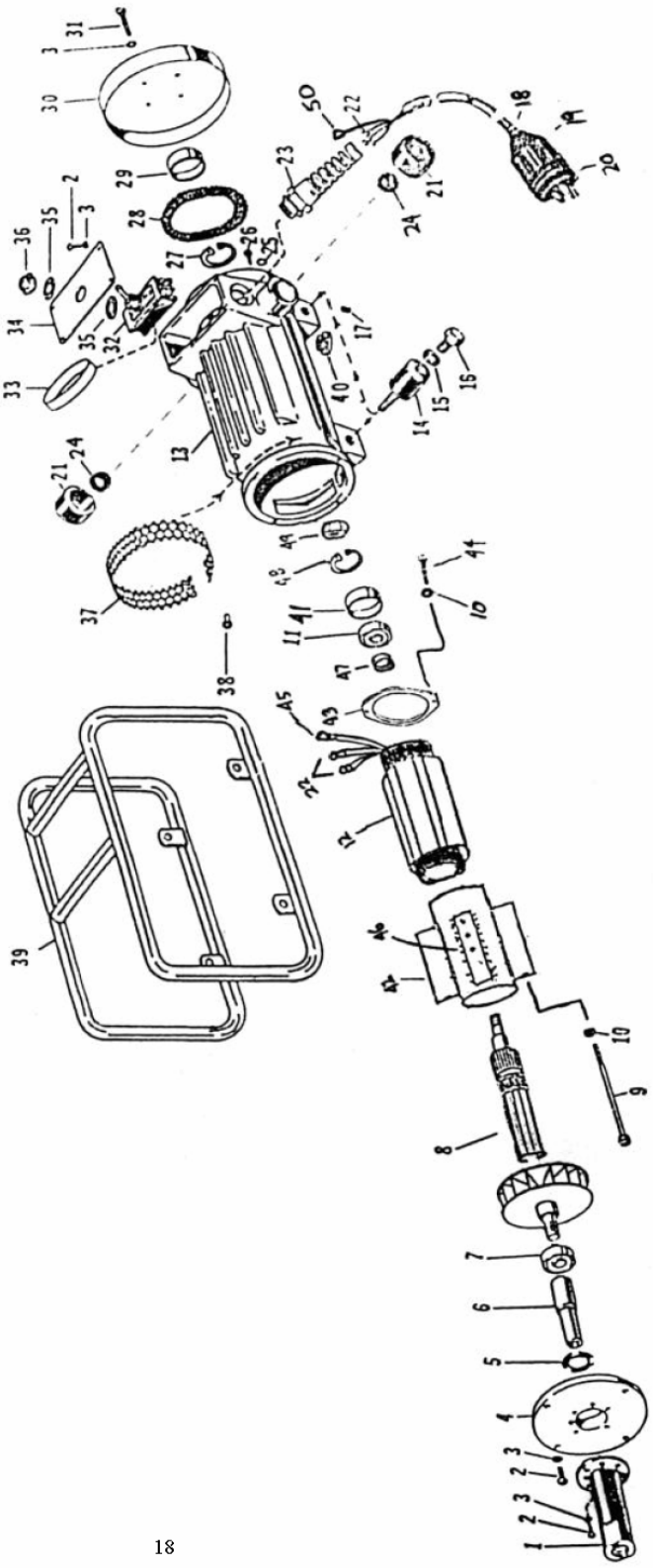
Part numbers shown in **BOLD** type are recommended spare parts. These parts are subject to wear under normal operating conditions and may need periodic replacement. It's suggested that these items be stocked to satisfy the expected service needs of this model. The actual stocking quantities of these and other service parts used in more extensive repairs will be dependent upon the service practices of each customer.

Grease - Flexible Shaft----------Part No. 002120-00000
Oil - Lubricating ----------Part No. 002119-00000

Lubricating Oil Capacities

Head Dia.	Oil Capacity
3/4"	1/4 oz.
1"	1/2 oz.
1 3/8"	1/2 oz.
1 3/4"	3/4 oz.
2"	1 oz.
2 3/8"	1 oz.

ELECTRIC MOTOR



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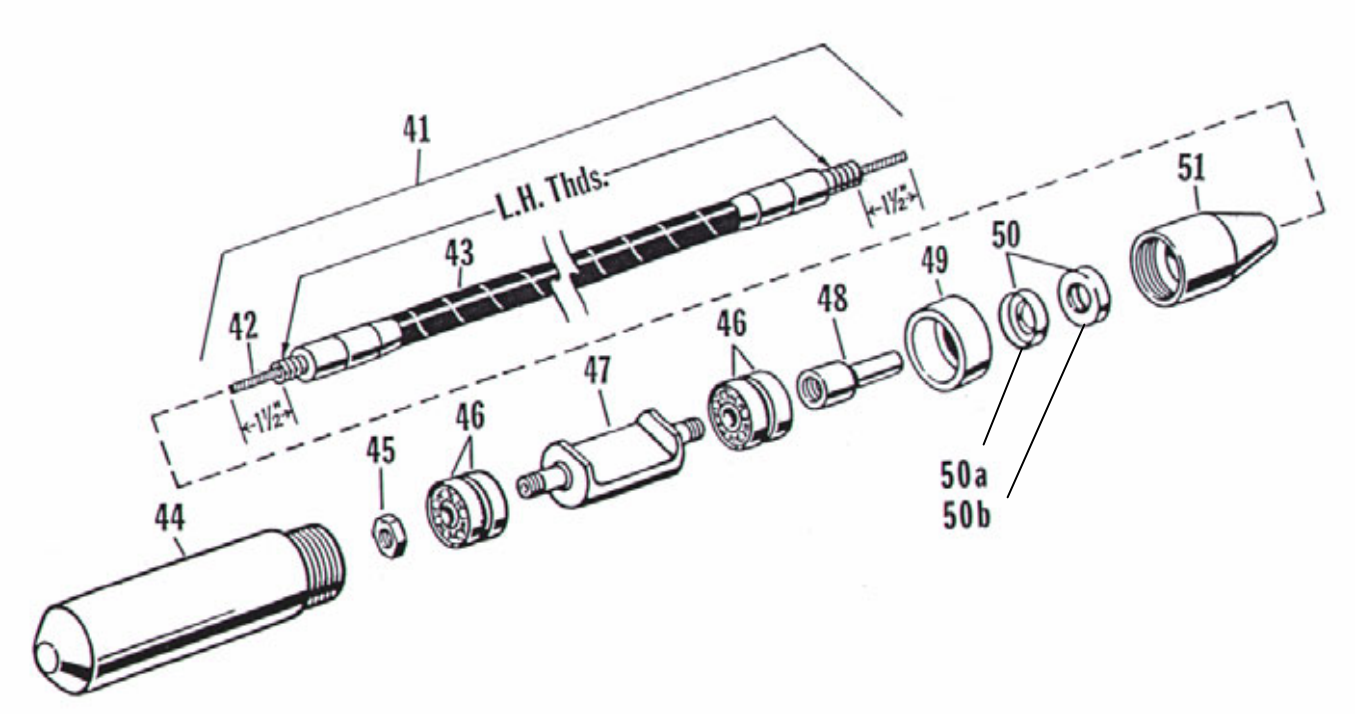
Electric Motor Parts Sheet

FIG #	PART #	DESCRIPTION	QTY
1	002189-00000	Casing Adapter	1
2	006703-0.620	Screw, 10-24x5/8" Long Pan Hd. Th'd. Cutting	14
3	006145-00000	Lockwasher #10	18
4	002014-00000	End Cap	1
5	002061-00000	Spring Washer	1
6	002678-00000	Core Adapter	1
7	**002037-00000**	Bearing	1
8	000758-00001	Rotor	1
9	020123-00000	Screw, 8-32x3 1/2" Long Th'd. Forming	2
10	006144-00000	Lockwasher #8	4
11	**001803-00002**	Bearing	1
12	0A6611-00000	Stator Assy 230 Volt	1
12	00A661-00000	Stator Assy 115 Volt	1
13	010313-00000	Motor Housing	1
14	002042-00000	Isolator	4
15	006148-00000	Lockwasher 5/16"	4
16	006037-0.620	Bolt, 5/16"-18x5/8" Long	4
17	006320-0.250	Set Screw, 10-24 x 1/4" Long	2
18	000684-00000	Cable 12-4 (Black) 115 Volt	1
18	010679-00000	Cable 12-4 (Yellow) 230 Volt	1
19	000685-00000	Cover Male Plug	1
20	000686-00000	Male Hubbell Plug	1
21	002049-00000	Brush Housing Cover	2
22	020352-00000	Terminal - Electric Cable	3
22	020352-00000	Terminal - Stator	2
23	010212-00000	Strain Relief	1
24	010309-00000	Dome Plug	1
25	006143-00000	Lockwasher #6	1
26	002067-00000	Screw, 6-32 x 1/2" Long Pan Hd. Th'd Cutting	1
27	002034-00000	Retaining Ring	1
28	**008150-00000**	Filter	1
29	002109-00000	Spacer, End Cover	1
30	002103-00000	End Cover	1
31	002108-00000	Screw, 10-24 x 1" Long Stainless Steel Pan Hd.	4
32	020361-00000	Motor Switch	1
32-1	A20361-00001	Motor Switch (Includes Part No. 33, 35 & 36)	
33	020364-00000	Motor Switch Sleeve	1
34	002050-00003	Motor Switch Cover Plate, 115 Volt	1
35	020362-00000	Motor Switch Nut	2
36	020363-00000	Motor Switch Weather Cap	1
37	002059-00000	Air Vent Cover	1
38	002048-00000	Pop Rivet, Air Vent Cover	1
39	0A7595-00000	Motor Frame	1
40	010214-00000	Plug-Inspection	1
41	010514-00000	Bushing	1
42	010372-00000	Stator Housing	1
43	010371-00000	Stator Retainer	1
44	006256-0.750	RHMS #8-32 x 3/4	2
45	020290-00000	Terminal (Stator)	1
46	010312-00000	Set Screw #5-40 x 3/8	6
47	000908-00000	Spacer, End Cover	1
48	006378-00010	Retaining Ring	1
49	006071-00000	Nut, 5/16-24 UNF	1

50	020350-00001	Terminal - Electric Cable	1

VIBRATOR HEADS AND SHAFTS PARTS SHEET



FLEXIBLE SHAFT (order 1 Core & 1 Casing for Complete Assembly)							
Fig. No.	2' Long	5' Long	7' Long	10' Long	14' Long	21' Long	Description
41	0A2216-00000	0A2217-00000	0A2218-00000	0A2244-00000	0A2245-00000	0A8148-00000	7/8" Core & Casing
41	0A8163-00000	0A8164-00000	0A8165-00000	0A8166-00000	0A8167-00000	0A8168-00000	1 3/16 Core & Casing
42	008151-00000	008152-00000	008153-00000	008154-00000	008155-00000	008156-00000	5/16 Core
43	0A2211-00000	0A2212-00000	0A2213-00000	0A2220-00000	0A2229-00000	0A8149-00000	7/8" Dia. Casing
43	0A8157-00000	0A8158-00000	0A8159-00000	0A8160-00000	0A8161-00000	0A8162-00000	1 3/16 Dia. Casing

HEADS							
	A2231	A2232	A2233	A2234	A2235	A2236	
Fig. No.	3/4" Dia	1" Dia	1 3/8" Dia	1 3/4" Dia	2" Dia	2 3/8" Dia	Complete Head Assy.
44	0A2158-00000	0A2026-00000	0A2046-00000	0A2018-00000	0A2146-00000	00A745-00000	Housing
45	006362-00000	002023-00000	002023-00000	001244-00000	000651-00000	000651-00000	Lock nut, Bearing
46	**002156-00000**	**002038-00001**	**002039-00000**	**002040-00000**	**002041-00000**	**002041-00000**	**Bearing (4)**
47	002153-00000	002025-00000	002032-00000	001241-00000	002142-00000	006542-00000	Weight, Eccentric
48	0A2679-00000	002676-00000	002021-00000	002024-00000	002028-00000	002028-00000	Core Adapter
49						000655-00001	Housing Bearing
50			020451-00000	020221-00000	020221-00000	020221-00000	Seal (2)
50a	002681-00000	002681-00000					Seal (Oil)
50b	002677-00000	002677-00000					Seal (Grease)
51	002192-00000	002193-00000	002194-00000	002195-00000	002196-00000	002197-00000	Casing Adapter

High Cycle Flex Shaft Specs.

Weight	14lbs. (6.4kg)
Amperage	3(115V), 1.5(230V) 3ph 180 cycle
Shafts	2', 5', 7', 10', 14', 21'
Heads	3/4" thru 2-3/8"

Recommended AWG Wire Size for Extension Cords		
Rated Amps		3 Amps
Extension Cord Lengths	25' (7.6m)	18ga
	50' (15.3m)	14ga
	100' (30.5m)	12ga
	150' (45.8m)	10ga
	200' (61.0m)	8ga

Shaft Length	2' (.6m)	5' (1.5m)	7' (2.1m)	10' (3.0m)	14' (4.3m)	21' (6.4m)
7/8" (22.2mm) OD Casing Recommended Head Sizes	3/4", 1", 1-3/8", 1-3/4"	3/4", 1", 1-3/8", 1-3/4"	3/4", 1", 1-3/8", 1-3/4"	3/4", 1", 1-3/8"	3/4", 1"	3/4", 1"
1-3/16" (30.1mm) OD Casing Recommended Head Sizes	1-3/8", 1-3/4", 2", 2-3/8"	1-3/8", 1-3/4", 2", 2-3/8"	1-3/8", 1-3/4", 2", 2-3/8"	1-3/8", 1-3/4", 2", 2-3/8"	1-3/8", 1-3/4", 2", 2-3/8"	1-3/8", 1-3/4", 2", 2-3/8"

Head Diameter	Centrifugal Force	Amplitude	Diameter of Influence
3/4" (19mm)	105lbs. (467N)	.050" (1.27mm)	4"-6" (101mm-152mm)
1" (25mm)	150lbs. (671N)	.056" (1.42mm)	5"-7"- (127mm-177mm)
1-3/8" (35mm)	424lbs. (1886N)	.070" (1.77mm)	8"-14" (203mm-355mm)
1-3/4" (45mm)	795lbs. (3536N)	.102" (2.59mm)	16"-20" (406mm-508mm)
2" (50mm)	1000lbs. (4448N)	.090" (2.28mm)	20"-124" (2508mm-609mm)
2-3/8" (60mm)	1186lbs. (5275N)	.092" (2.33mm)	23"-27" (584mm-685mm)