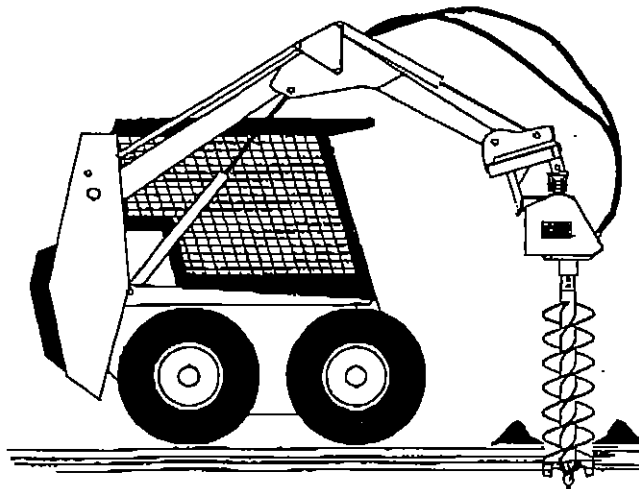


# **McMILLEN**

## **CONSTRUCTION EQUIPMENT ATTACHMENTS**

### **"C" SERIES HYDRAULIC EARTH AUGER ATTACHMENT OPERATOR'S MANUAL**

SERIAL NUMBER \_\_\_\_\_



**MODELS  
820, 1320, 1820 & 2220**



**WARNING!**

**AVOID DEATH OR INJURY**

**READ AND UNDERSTAND THIS ENTIRE MANUAL BEFORE  
INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT**

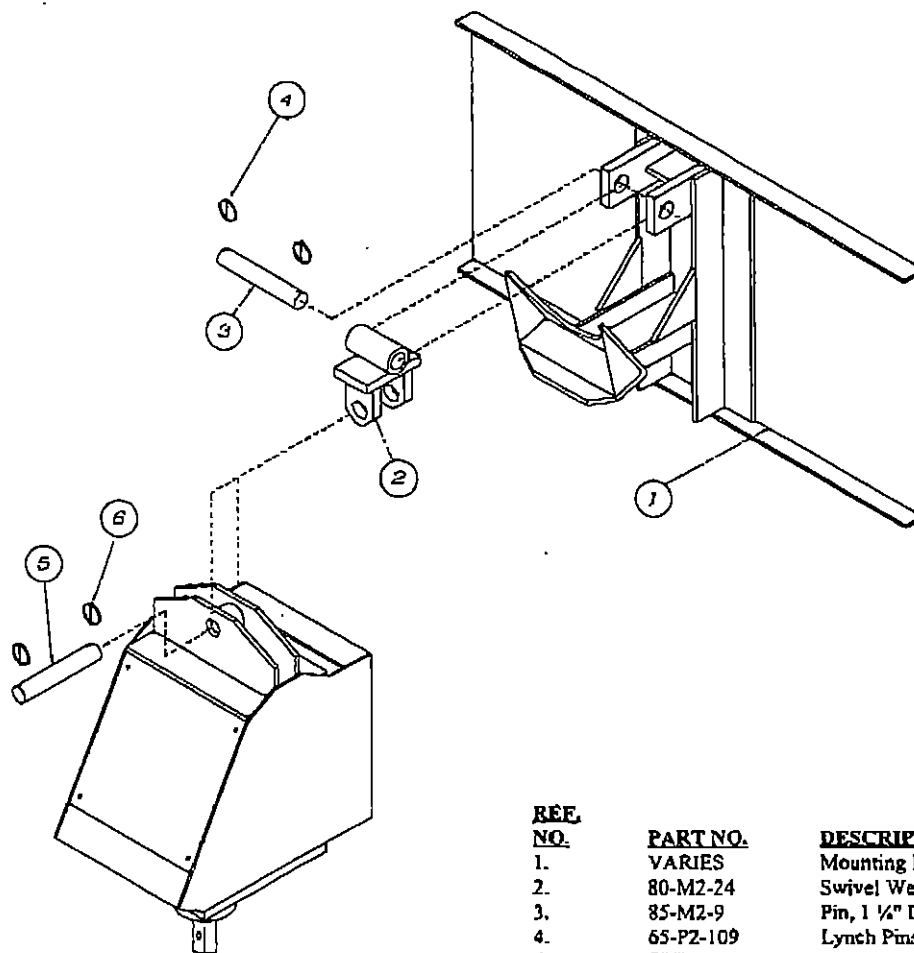


# SAFETY INFORMATION

THE USE OF THIS EQUIPMENT IS SUBJECT TO CERTAIN HAZARDS WHICH CANNOT BE PROTECTED AGAINST BY MECHANICAL MEANS OR PRODUCT DESIGN. ALL OPERATORS OF THIS EQUIPMENT MUST READ AND UNDERSTAND THIS ENTIRE MANUAL, PAYING PARTICULAR ATTENTION TO SAFETY AND OPERATING INSTRUCTIONS, PRIOR TO USING THE MCMILLEN HYDRAULIC EARTH AUGER. IF THERE IS SOMETHING IN THIS MANUAL YOU DO NOT UNDERSTAND, ASK YOUR SUPERVISOR TO EXPLAIN IT TO YOU. FAILURE TO OBSERVE THESE SAFETY PRECAUTIONS CAN RESULT IN DEATH OR SERIOUS INJURY OR SERIOUS EQUIPMENT DAMAGE.

- ⚠ All bystanders should be kept a minimum of 10 feet (3 meters) away from working area of the earth auger. Never operate the earth auger controls from the ground. Always operate the vehicle and earth auger from the correct operating position.
- ⚠ Always wear an approved hard hat and safety eye protection when operating or servicing this equipment. Do not wear loose fitting clothing, flopping cuffs, dangling neckties and scarves, or rings and wrist watches that can catch moving parts.
- ⚠ An operator must not use drugs or alcohol which can change his alertness or coordination. An operator taking prescription or over-the-counter drugs should seek medical advice on whether or not he can safely operate equipment.
- ⚠ Always locate underground electrical wires, telephone cables, gas, water and sewer lines before digging. Maintain safe clearance and avoid contact with any underground or overhead utility lines or electrically charged conductors.
- ⚠ Never alter or remove any safety decals or shields. Replace all missing or damaged safety decals or safety shields. Check this manual for location of these items and replace immediately if damaged or illegible.
- ⚠ Never adjust a relief valve for a pressure higher than recommended by vehicle manufacturer.
- ⚠ Whenever changing or installing this or other attachments, make sure all connections are securely fastened.
- ⚠ Travel only with the earth auger in a safe transport position to prevent uncontrolled movement. Drive slowly over rough ground and on slopes. Tether earth auger with a chain, if necessary, to prevent uncontrolled swinging of earth auger when moving from hole to hole. Remove earth auger from vehicle when transporting to and from job site.
- ⚠ Before exiting vehicle, lower earth auger to ground, turn off vehicle engine and lock vehicle brakes.
- ⚠ Never check a pressurized system for leaks with your bare hand. Oil escaping from pinhole leaks under pressure can penetrate skin and could cause serious infection. Hold a piece of cardboard up next to suspected leaks and wear a face shield or safety eye protection. If any fluid is injected into the skin, it must be removed within a few hours by a doctor familiar with this type of injury.
- ⚠ Before disconnecting hydraulic lines or fittings be sure to relieve all pressure by cycling all hydraulic controls after shutdown. Remember hydraulic systems are under pressure whenever the engine is running and may hold pressure after shutdown. Before applying pressure to the system make sure all connections are tight and that there is no damage to lines, fittings and hoses.
- ⚠ Flow and pressure gauges, fittings and hoses must have a continuous operating pressure rating of at least 4X higher than highest pressures of the system.
- ⚠ Avoid steep hillside operation which could cause the vehicle to overturn. Consult your vehicle operator's and safety manuals for maximum incline allowable.
- ⚠ Never perform any work on an earth auger unless you are authorized - and qualified - to do so. Always read the operator service manual(s) before any repair is made. After completing maintenance or repair, check for correct functioning of the earth auger. If not functioning properly always tag "DO NOT OPERATE" until all problems are corrected.
- ⚠ This manual covers the safe use, installation, operation and service instructions for the earth auger only. Always read the operating and safety manuals prepared for your vehicle and any other attachments before using them.

# SKID STEER LOADERS & OTHER QUICK ATTACH MOUNTINGS EXPLODED VIEW, PARTS LISTS & INSTALLATION INSTRUCTIONS



<u>REF. NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY. REQ'D</u>
1.	VARIES	Mounting Bracket	1
2.	80-M2-24	Swivel Weldment	1
3.	85-M2-9	Pin, 1 1/4" Dia. x 7 1/2" Long	1
4.	65-PZ-109	Lynch Pins	2
5.	SEE DRIVE UNIT BREAKDOWN ON PAGES 14 & 15		
6.	SEE DRIVE UNIT BREAKDOWN ON PAGES 14 & 15		

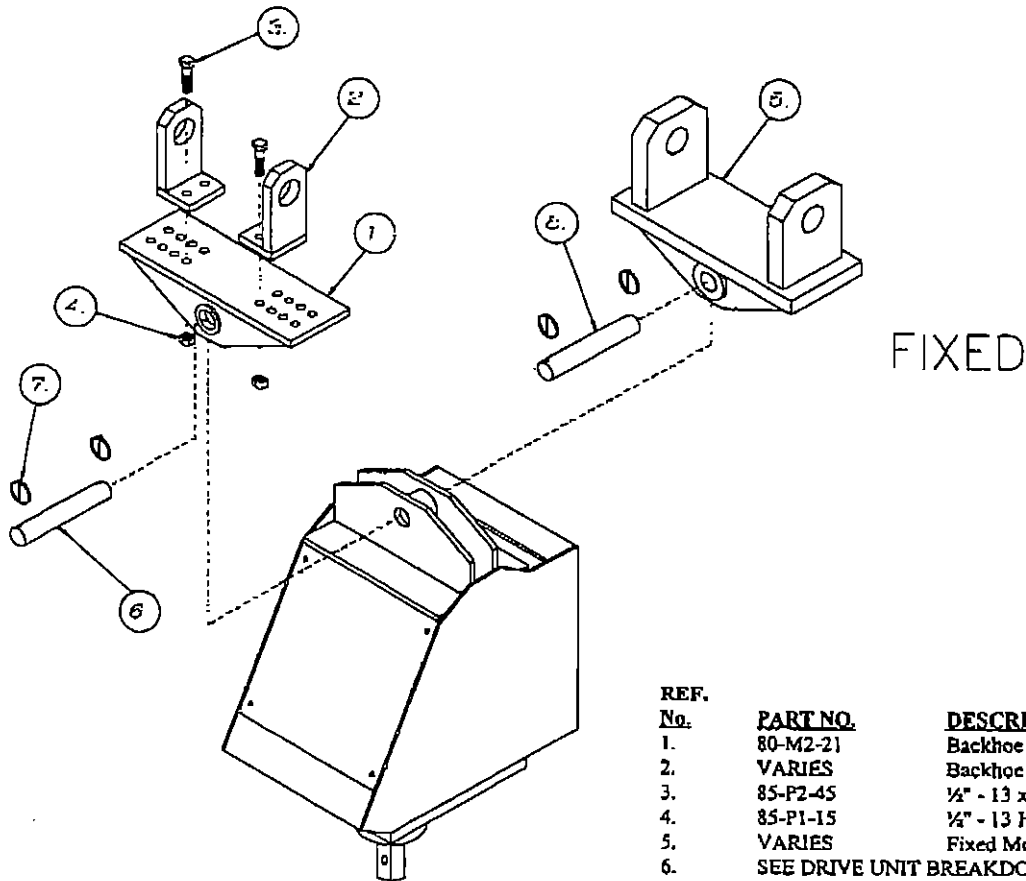
**NOTE:** Drive Unit and Auger exploded views and parts lists are detailed on separate pages in this manual. Please refer to those pages for Drive Unit and Auger parts breakdown.

1. READ AND UNDERSTAND ALL SAFETY INFORMATION PRIOR TO ATTEMPTING INSTALLATION. ONLY ORIGINAL EQUIPMENT AND AUTHORIZED MCMILLEN PARTS MAY BE USED.
2. Remove bucket or other attachment from vehicle quick-attach mechanism.
3. Attach quick attach mounting bracket (1) to vehicle quick-attach mechanism. Secure quick-attach mechanism as per vehicle manufacturers recommendations.
4. Attach swivel weldment (2) to the quick-attach mounting bracket (1) with pin (3). Secure pin (3) with Lynch Pins (4).
5. Attach and secure drive unit to swivel weldment (2) with pin and Lynch Pins provided with the drive unit assembly.
6. Attach and secure auger to drive unit with bolt and nut provided with drive unit assembly.
7. Refer to the "HYDRAULIC SYSTEM HOOK-UP" section in this manual for hydraulic connection instructions and recommendations.

## BACKHOE & EXCAVATOR MOUNTINGS

### EXPLODED VIEW, PARTS LIST & INSTALLATION INSTRUCTIONS

#### UNIVERSAL

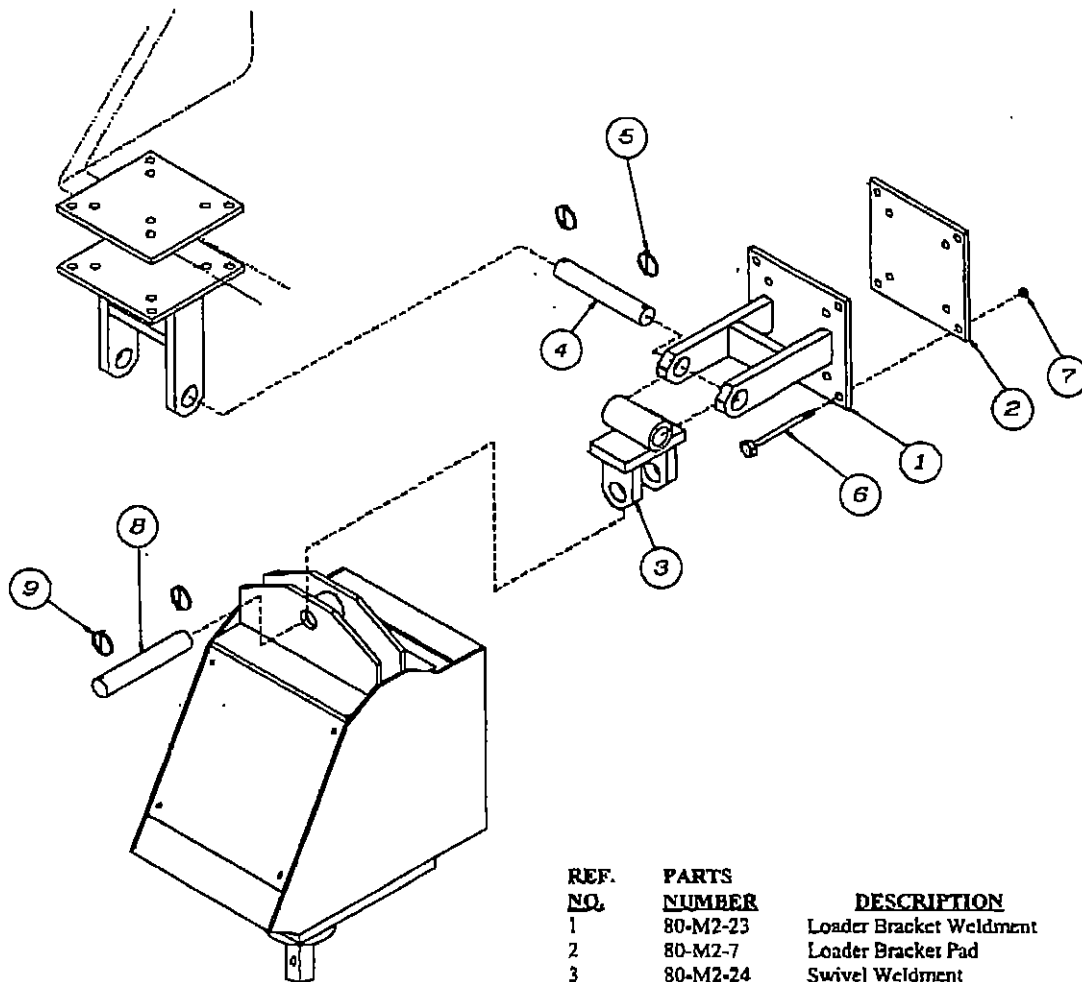


REF. No.	PART NO.	DESCRIPTION	QTY REQ'D
1.	80-M2-21	Backhoe Swivel Base	1
2.	VARIES	Backhoe Adaptor Ear	2
3.	85-P2-45	½" - 13 x 1 ¼" Gr. 5 HHCS	4
4.	85-P1-15	½" - 13 Hex Nut	4
5.	VARIES	Fixed Mount	1
6.	SEE DRIVE UNIT BREAKDOWN ON PAGES 14 & 15		
7.	SEE DRIVE UNIT BREAKDOWN ON PAGES 14 & 15		

**NOTE:** Drive Unit and Auger exploded views and parts lists are detailed on separate pages in this manual. Please refer to those pages for Drive Unit and Auger parts breakdown.

1. **READ AND UNDERSTAND ALL SAFETY INFORMATION PRIOR TO ATTEMPTING INSTALLATION. ONLY ORIGINAL EQUIPMENT AND AUTHORIZED MCMILLEN PARTS MAY BE USED.**
2. Remove bucket from dipper arm and curl cylinder pin connections. The dipper arm pin will be used to attach backhoe mounting to backhoe dipper arm. Curl cylinder pin will not be required for earth auger installation.
3. If using a Universal (adjustable width) Backhoe Mounting, assemble by spacing the two ears (2) to the same width as the dipper arm and secure to the backhoe swivel base (1) with four bolts (3). Secure bolts (3) and nuts (4). After determining correct width, backhoe ears must be welded to the backhoe swivel base (1).
4. Attach backhoe mounting (Universal or Fixed) to the dipper arm using the dipper arm pin removed from the bucket in step (1). Secure bucket pin as per vehicle manufacturers recommendations.
5. Attach and secure drive unit to backhoe mounting with pin and Lynch Pins provided with the drive unit assembly.
6. Attach and secure auger to drive unit with bolt and nut provided with drive unit assembly.
7. Refer to the "HYDRAULIC SYSTEM HOOK-UP" section in this manual for hydraulic connection instructions and recommendations.

## 80-A2-14 UNIVERSAL LOADER MOUNTING EXPLODED VIEW, PARTS LIST & INSTALLATION INSTRUCTIONS



REF. NO.	PARTS NUMBER	DESCRIPTION	QTY REQ'D
1	80-M2-23	Loader Bracket Weldment	1
2	80-M2-7	Loader Bracket Pad	1
3	80-M2-24	Swivel Weldment	1
4	85-M2-9	Pin, 1-1/2" O x 7-1/4" Long	1
5	65-P2-109	Lynch Pins	2
6	85-P1-16	7/16"-14 x 5" Gr. S Bolt	4
7	85-P1-18	7/16"-14 Hex Nut	4
8	SEE DRIVE UNIT BREAKDOWN ON PAGES 14 & 15		
9	SEE DRIVE UNIT BREAKDOWN ON PAGES 14 & 15		

**NOTE:** Drive Unit and Auger exploded views and parts lists are detailed on separate pages in this manual. Please refer to those pages for Drive Unit and Auger parts breakdown.

1. READ AND UNDERSTAND ALL SAFETY INFORMATION PRIOR TO ATTEMPTING INSTALLATION.
2. The 80-A2-14 Universal Loader Mounting can be used to adapt your McMillen Hydraulic Earth Drill to the side of the loader arms, lip of bucket or fork lift forks. DO NOT USE ON SKID STEER LOADERS.
3. Place loader bracket pad (2) on the inside of the loader arm, top of bucket lip (for mounting on lip of bucket you'll need to drill two 7/16" diameter holes through bucket), or top of fork lift fork. Opposite side of loader bracket pad (2). Insert four bolts (6) and secure with four nuts (7).
4. Attach swivel Weldment (3) to the loader bracket weldment (1) with pin (4). Secure pin (4) with Lynch Pins (5).
5. Attach and secure drive unit to swivel weldment (3) with pin and pin clips provided with the drive unit assembly.
6. Attach and secure auger to drive unit with bolt and nut provided with drive unit assembly.
7. Refer to the 'HYDRAULIC SYSTEM HOOK-UP' section in this manual for hydraulic connection instructions and recommendations.

## HYDRAULIC SYSTEM HOOK-UP INSTRUCTIONS

1. Once the installation instructions are complete you are now ready to make the hydraulic connections necessary to operate your earth auger. **READ AND UNDERSTAND SAFETY INFORMATION PRIOR TO MAKING HYDRAULIC CONNECTIONS.**

2. Your equipment dealer is in the best position to advise you as to where the best place on your machine is to make the hydraulic connections to power your earth auger drive unit. The list below shows the most common place to "tap" into the hydraulic system on various types of machines.

### SKID STEER LOADERS

Auxiliary hydraulic outlets.

### BACKHOES & EXCAVATORS

Auxiliary hydraulic outlets or Bucket Curl Lines.

### FORKLIFTS

Auxiliary hydraulic outlets or side shift circuit.

3. Determine length of hydraulic hoses required to plumb drive unit in the place on your machine where you'll be "tapping" into the hydraulics. Be sure the two hydraulic hoses are long enough to perform at the full range of the earth auger's operating capacity.

Models 820, 1320, 1820 and 2220 require two 1/2" (12.7mm) ID hydraulic hoses with 1/2" (12.7mm) male N.P.T. fittings on one end of each hose to connect hoses to drive unit fittings.

Fittings on the other end of each hydraulic hose should match the threads on hydraulic quick couplers to be used.

**⚠ WARNING! HOSES AND FITTINGS MUST HAVE A CONTINUOUS OPERATING PRESSURE RATING OF AT LEAST 4X HIGHER THAN HIGHEST PRESSURES OF THE SYSTEM YOU ARE "TAPPING" INTO.**

4. Once all hydraulic connections have been made and checked for leaks and proper hose lengths, you are now ready to operate your earth auger. **READ AND UNDERSTAND OPERATING INSTRUCTIONS AND SAFETY INFORMATION PRIOR TO OPERATING YOUR EARTH AUGER**

## OPERATING INSTRUCTIONS

1. After all installation instructions have been completed, safety information read and understood and the rest of this operator's manual has been reviewed, your McMillen Hydraulic Earth Auger is now ready for use.

2. Before beginning to dig, experiment with auger speed to determine a suitable auger RPM. Generally in light and sandy soils a high RPM is desirable. In hard, rocky or frozen soils a slower RPM is desirable. To increase auger RPM, increase vehicle engine RPM. To decrease auger RPM, decrease vehicle engine RPM.

3. Return earth auger control valve to neutral position to stop the auger. Lower the auger to the ground so that only the center point penetrates the ground about 2"(51mm).

4. Activate the earth auger control valve so auger is turning in a forward (clockwise) rotation. Use only enough down pressure to assure positive penetration of auger into the ground. Ease up on down pressure if auger rotation slows down drastically or stalls. Excessive down pressure will cause the auger to stall frequently.

5. When the auger has penetrated the ground about 24" (610mm), raise the auger from the hole to clean the dirt out. Repeat this procedure until the desired hole depth is obtained.

6. Once the required hole depth is reached, allow the auger to turn a few seconds at this depth to clean the hole.

7. Return the earth auger control valve to the neutral position to stop the rotation of the auger. Raise the auger out of the hole, move it away from the hole, then activate the earth auger control valve to spin the loose soil off of the auger.

**NOTE:** Do not reverse the auger rotation to remove from the hole as loose soil on the auger flights will fall back into the hole.

8. If necessary, repeat steps 7 & 8 to obtain a cleaner hole.

9. In some soil conditions or when excessive down pressure is applied, auger may "screw" itself into the ground and become stuck causing earth auger to stall. If this happens, reverse the auger rotation (counter-clockwise) by moving the control valve lever to the reverse position and slowly raise the auger. Once unstuck, return the control valve lever to the forward rotation position and continue digging.

10. If the auger hits a large obstruction the vehicle hydraulic relief valve will open and bypass the oil to stall (stop) the auger. This does not damage the unit in anyway but serves as a protection device. Whenever this happens simply reverse the auger rotation and raise the auger. Once unstuck you can continue digging.

11. Avoid excessive side loading to earth auger which can cause drive unit or auger damage.

12. Keep auger teeth and points in good condition. Check frequently and always keep spares on hand so they can be replaced when wear is detected to avoid damage to tooth holders and auger flighting.

<b>DAILY INSPECTION</b>	
<b>ITEM</b>	<b>INSPECT FOR</b>
Hydraulic Oil Hydraulic Hoses  Auger Point Auger Teeth Output Shaft Output Shaft All Bolts Connecting Pins	Cleanliness and contamination Damage, Leakage, Cracked or Brittle Covers(a sign of excessive heat) Excessive wear or loose fit Excessive wear or loose fit Bends, cracks, breaks or wear Damage or leakage Cracks, breaks, or other damage Bends, cracks, breaks or wear

<b>MAINTENANCE</b>		
<b>ITEM</b>	<b>INTERVAL</b>	<b>DESCRIPTION</b>
Drive Chain	120 Hours	Lubricate with a high quality commercial chain lubricant. Apply to a warm chain if possible. Free play should not exceed 1/2". Replace if excessive. Remove and clean if dirty.
Output Shaft Bearings	1000 Hours or yearly whichever occurs first	Grease with Amoco Super Permalube or equivalent Lithium based grease with EP-2 additive.
Auger Point	As needed for wear	Replace
Auger Teeth	As needed for wear	Replace
All Bolts	As needed	Replace



**WARNING !**

**PERFORM MAINTENANCE ONLY WHEN DRIVE UNIT IS DISCONNECTED FROM POWER SOURCE.**

**STORAGE**

**When storing Drive Unit for any length of time, adhere to the following instructions:**

1. Drain drive unit motor and hoses of used hydraulic fluid and replace with new, clean hydraulic fluid.
2. Clean and lubricate chain fully to prevent corrosion, being sure to work lubricant into all joints.
3. Coat ALL exposed unpainted metal surfaces with grease to prevent corrosion.

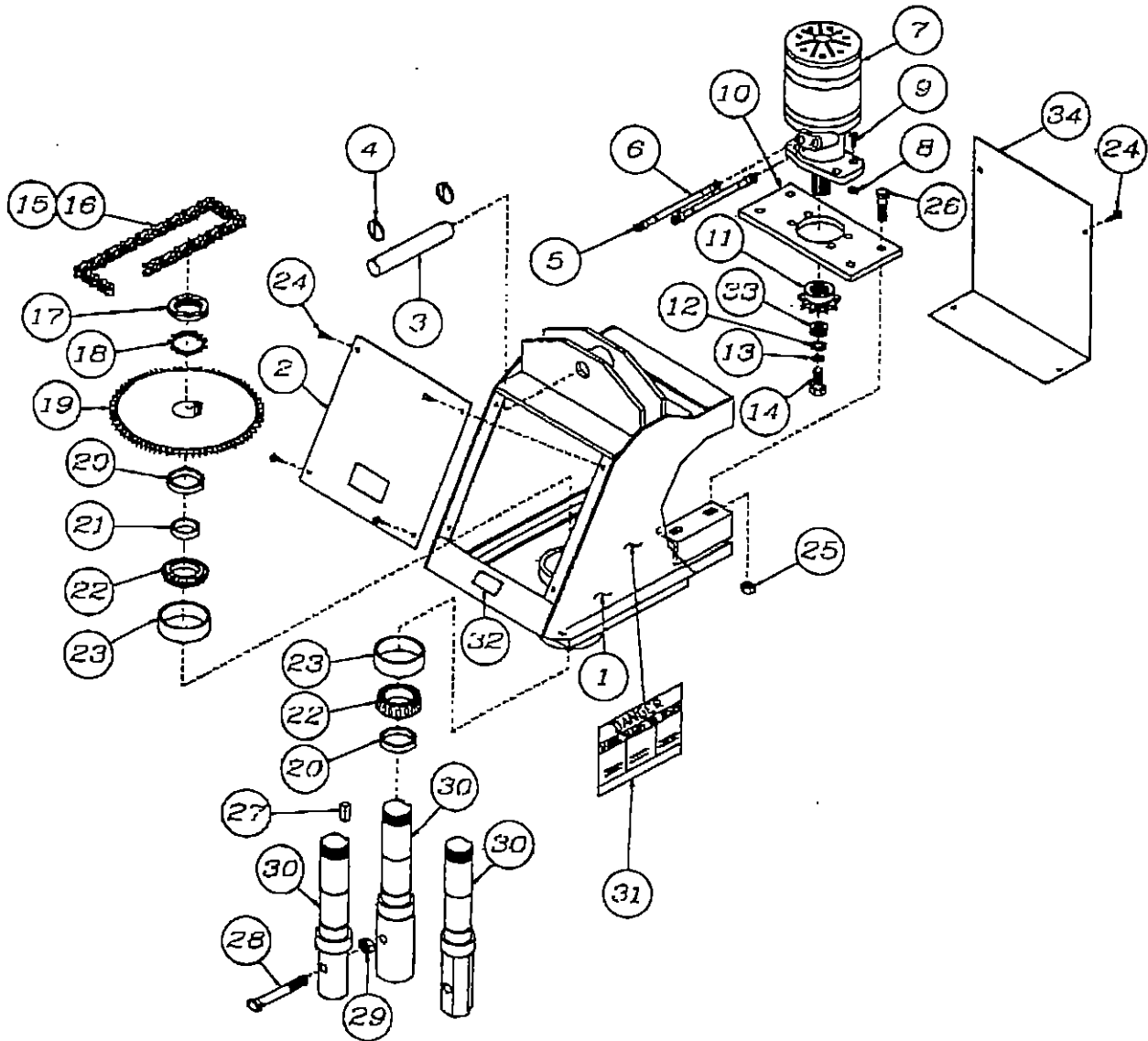
<b>TROUBLESHOOTING</b>		
<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>SOLUTION</b>
Slow Speed	Low flow (LPM)  Line restrictions  Fittings or connections to small  Oil filter dirty  Hydraulic pump worn or damaged	Check with flow meter. If low, investigate cause.  Clear lines  Replace with proper sizes.  Replace  See Dealer for repair.
Insufficient Digging Power	Worn teeth or point  Low system pressure(Bar)  Relief valve damaged or setting wrong  Excessive load	Replace  Check with pressure gauge. If low investigate cause.  Adjust or replace as required.  Reduce load to within machine specifications.
Reverse Direction	Hoses reversed	Re-install hoses correctly.
Excessive Oil Heating	Line restrictions  Fluid dirty  Insufficient quantity of hydraulic fluid	Re-install hoses correctly.  Replace hydraulic fluid and filter.  Fill reservoir to proper lever. Increase reservoir storage capacity.
Oil leaks	Hoses loose or damaged  Fittings loose or damaged  Hydraulic motor seals worn or damaged	Tighten or replace  Tighten or replace  See Dealer for repair

FOR FURTHER ASSISTANCE, PLEASE CONTACT YOUR DEALER, OR CALL OUR SERVICE DEPARTMENT AS FOLLOWS:

NORTH AMERICA TOLL FREE: (800)234-0964  
 Outside North America: (219)747-6750  
 Fax: (219)747-9161



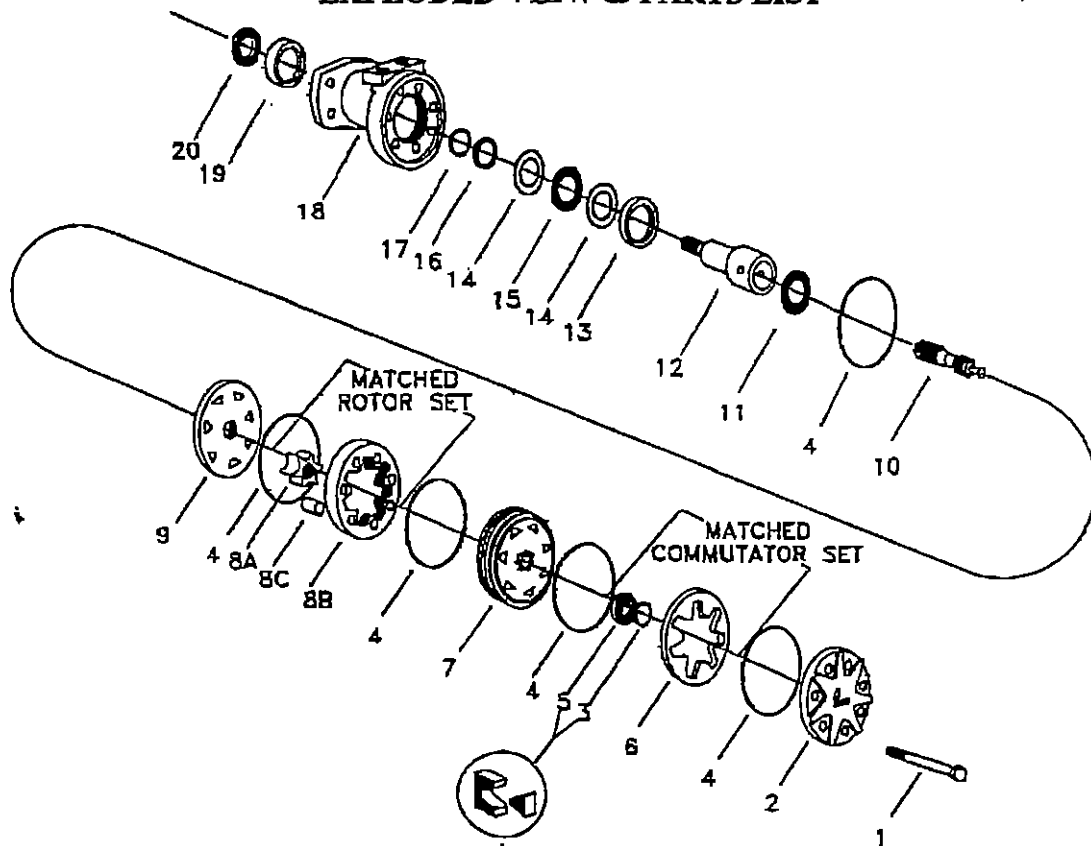
# MODELS 820, 1320, 1820 & 2220 DRIVE UNIT EXPLODED VIEW



**MODELS 820, 1320, 1820 & 2220  
DRIVE UNIT PARTS LIST**

<u>REF #</u>	<u>PARTS #</u>	<u>DESCRIPTION</u>	<u>QTY. REQ'D</u>	<u>MODELS USED ON</u>
1	80-M2-228	Main Frame Weldment	2	All Models
2	80-M1-403	Safety cover	1	All Models
		Hanger Weldment		
3	85-M2-17	Pin, 1-1/4" Dia. x 6" Long	1	All Models
4	65-P2-109	Lynch Pins	2	All Models
5	88-P1-120	Plastic Pipe Plug	2	All Models
6	88-P2-264	1/2" Hydraulic Hose Assy	2	All Models
7	81-P2-261	820 Hydraulic Motor	1	820
	81-P2-262	1320 Hydraulic Motor	1	1320
	81-P2-263	1820 Hydraulic Motor	1	1820
	81-P2-189A	2220 Hydraulic Motor	1	2220
8	85-P1-119	1/2"-13 Locknut	4	All Models
9	85-P2-45	1/2"-13 x 1-3/4" Gr. 5 HHCS	4	All Models
10	80-M1-411	Motor Base	1	All Models
11	87-P2-261	Drive Sprocket	1	All Models
12	85-P2-211	5/8" SAE washer	1	All Models
13	85-P2-98	5/8" Lockwasher	1	All Models
14	85-P2-275	5/8"-18 x 1" Gr. 5 HHCS	1	All Models
15	87-P2-271	Chain	1	All Models
16	87-P2-272	Connecting Link	1	All Models
17	85-P2-269	Bearing Locknut	1	All Models
18	85-P2-270	Bearing Nut Lockwasher	1	All Models
19	87-P2-268	Driven Sprocket	1	820, 1320, 1820
	87-P2-276	Driven Sprocket	1	2220
20	84-P2-266	Bearing Seal	2	All Models
21	83-M2-204	Output Shaft Spacer	1	All Models
22	84-P2-264	Bearing Cone	2	All Models
23	84-P2-265	Bearing Cup	2	All Models
24	85-P2-301	1/4"-20 HHCS x 1/2" Long	1	All Models
25	85-P2-262	1/2"-13 Locknut	4	All Models
26	85-P2-247	1/2"-13 x 1 1/2" Gr. 5 HHCS	4	All Models
27	85-P2-257	1/2" x 1-1/4" Square Key	1	820, 1320, 1820
	85-P2-257	1/2" x 1-1/4" Square Key	2	2220
28	85-P2-244	5/8"-11 x 3-1/2" Gr. 5 HHCS	1	All 2" Rnd. Dia.
	85-P2-244	7/8"-9 x 4-1/2" Gr. 5 HHCS	1	All 2-9/16" Dia.
	85-P2-244	3/4"-10 x 4" Gr. 5 HHCS	1	All 2" Hex
29	85-P2-18	5/8"-11 Nut	1	All 2" Rnd. Dia.
	85-P2-225	7/8"-9 Nut	1	All 2-9/16" Dia.
	85-P2-245	3/4"-10 Nut	1	All 2" Hex
30	83-M2-205	2" round Output Shaft	1	820, 1320, 1820
	83-M2-206	2-9/16" Round Output Shaft	1	820, 1320, 1820
	83-M2-207	2" Hex Output Shaft	1	820, 1320, 1820
	83-M2-218	2" Round w/2 Keyways	1	2220
	83-M2-219	2-9/16" Round w/2 Keyways	1	2220
	83-M2-220	2" Hex w/2 Keyways	1	2220
31	89-P2-239	Safety Pin	1	
32	89-P2-23-	Serial # Tag	1	All Models
33	85-P1-157	Shims	2	All Models
34	80-M1-410	Safety Cover	1	All Models

## HYDRAULIC MOTOR EXPLODED VIEW & PARTS LIST



Note: Assemble seal flat side out as shown in enlarged view of sectioned segments of items number 5 and 3.

REFERENCE NUMBER	PART NUMBER	DESCRIPTION	QTY REQ'D	MODEL USED ON
1	81-A3-600	Bolt	7	1320
1	81-A3-601	Bolt	7	1820
1	81-A3-641	Bolt	7	820
1	81-A3-648	Bolt	7	2220
2	81-A3-604	End Cover	1	All Models
3*	81-A3-605	Commutator	1	All Models
4*	81-A3-606	Seal Ring	5	All Models
5 & 6	81-A3-607	Commutator Assy.	1	All Models
7	81-A3-609	Manifold	1	All Models
8	81-A3-613	Rotor Set	1	1320
8	81-A3-614	Rotor Set	1	1820
8	81-A3-642	Rotor Set	1	820
8	81-A2-647	Rotor Set	1	2220
9	81-A3-616	Wear Plate	1	All Models
10	81-A3-620	Drive Link	1	1320
10	81-A3-621	Drive Link	1	1820
10	81-A3-643	Drive Link	1	820
10	81-A3-646	Drive Link	1	2220
11	81-A3-622	Thrust Bearing	1	All Models
12	81-A3-625	Coupling Shaft	1	820, 1320, 1820, 2220
13	81-A3-626	Inner Bearing	1	All Models
14	81-A3-627	Thrust Washer	2	All Models
15	81-A3-628	Thrust Bearing	1	All Models
16*	81-A3-629	Inner Seal	1	All Models
17	81-A3-650	Backup Washer	1	All Models
18	81-A3-632	Housing Assy.	1	820, 1320, 1820, 2220
19	81-A3-633	Outer Bearing	1	All Models
20*	81-A3-634	Dirt & Water Seal	1	All Models
"	81-A3-635	Seal Kit (Included*)	1	All Models

## HYDRAULIC MOTOR SERVICE PROCEDURES

### GENERAL INSTRUCTIONS

To facilitate the repair of these units and before any work is done, we suggest that you first read all of the steps used in disassembly and assembly of the unit.

Dirt is the enemy of any hydraulic system. The first requirement of good maintenance of hydraulic equipment is cleanliness. **MAKE SURE YOU DISASSEMBLE AND ASSEMBLE YOUR HYDRAULIC EQUIPMENT IN A CLEAN AREA.**

As you disassemble the motor clean all parts, except seals, in clean petroleum based solvent, and blow dry. do not use cloth to dry parts. Clean parts separately to avoid nicks and burrs. Do not force or abuse closely fitted parts.

**⚠ WARNING! SINCE THEY ARE FLAMMABLE, BE EXTREMELY CAREFUL WHEN USING ANY SOLVENT. EVEN A SMALL EXPLOSION OR FIRE COULD CAUSE INJURY OR DEATH.**

**⚠ WARNING! WEAR EYE PROTECTION AND BE SURE TO COMPLY WITH OSHA OR OTHER MAXIMUM PRESSURE REQUIREMENTS.**

### CAUTION

If prying off sections becomes necessary, take extreme care not to mar or damage machined surfaces. Excessive force while prying can result in misalignment and seriously damage parts.

If parts are stubborn during assembly, do not force them and never employ an iron hammer.

Never hammer bearings into bores. Use only an arbor press or other suitable tool.

### DISASSEMBLY

1. Place the motor in a soft jawed vise, with coupling shaft (12) pointed down and the vise jaws clamping firmly on the sides of the housing (18) mounting flange or port bosses.
2. Scribe an alignment mark down and across the motor components from the end cover (2) to housing (18) to facilitate reassembly orientation where required.
3. Remove seven bolts (1). Inspect bolts for damaged threads or scaling rings, under the bolt head. Replace damaged bolts.
4. Remove end cover assembly (2) and seal ring (4). Discard seal ring.
5. Thoroughly wash end cover (2) in proper solvent and blow dry. Inspect end cover for cracks and the bolt head recesses for good bolt head sealing surfaces. Replace end cover as necessary.

**NOTE:** A polished pattern (not scratches) on the cover from rotation of the commutator (5) is normal. Discoloration would indicate excess fluid temperatures, thermal shock, or excess speed and require system investigation for cause and close inspection of end cover, commutator, manifold, and rotor set.

6. Remove commutator ring (6). Inspect commutator ring for cracks or burrs.
7. Remove commutator (5) and seal ring (3). Remove seal ring from commutator, using an air hose to blow air into ring groove until seal ring is lifted out and discard seal ring. Inspect commutator for cracks or burrs, wear, scoring, spalling or brinelling. If any of these conditions exist, replace commutator and commutator ring as a matched set.
8. Remove manifold (7) and inspect for cracks, surface scoring, brinelling or spalling. Replace manifold if any of these conditions exist. A polished pattern of the ground surfaces from commutator or rotor rotation is normal. Remove and discard the seal rings (4) that are on both sides of the manifold.
9. Remove rotor set (8) and wearplate (9) together to retain the rotor set in its assembled form, maintaining the same rotor vane (8C) to stator (8B) contact surfaces. The drive link (10) may come away from the coupling shaft (12) with the rotor set and wearplate. You may have to shift the rotor set on the wearplate to work the drive link out of the rotor (8A) and wearplate. Inspect the rotor set in its assembled form for nicks, scoring or spalling on any surface and for broken or worn splines. If the rotor set component requires replacement, the complete rotor set must be replaced as it is a matched set. Inspect the wearplate for cracks, brinelling or scoring. Discard seal ring (4) that is between the rotor set and wearplate.

**NOTE:** The rotor set (8) components may become disassembled during service procedures. Marking the surface of the rotor and stator that is facing up with etching ink or grease pencil before removal from motor will ensure correct reassembly of rotor into stator and rotor set into motor. Marking all rotor components and mating spline components for exact repositioning at assembly will ensure maximum wear life and performance of rotor set and motor.

**NOTE:** Motors may have a rotor set with two stator halves (8B & 8D) with a seal ring (4) between them and two sets of seven vanes (8C & 8E). Discard seal ring only if stator halves become disassembled during service procedures.

**NOTE:** A polished pattern on the wear plate from rotor rotation is normal.

10. Place rotor set (8) and wearplate (9) on a flat surface and center rotor (8A) in stator (8B) such that two rotor lobes (180° degrees apart) and roller vane (8C) centerline are on lobe to roller vane clearance with a feeler gage at this common centerline. If there is more than .005 inches (0.13mm) of clearance, replace rotor set.

**NOTE:** If rotor set (8) has two stator halves (8B & 8D) and two sets of seven vanes (8C & 8E) as shown in the alternate construction rotor set assembly view, check the rotor lobe to roller vane clearance at both ends of rotor.

(CONTINUED ON NEXT PAGE)

## HYDRAULIC MOTOR SERVICE PROCEDURES

(CONTINUED FROM PREVIOUS PAGE)

11. Remove drive link (10) from coupling shaft (12) if it was not removed with rotor set and wearplate. Inspect drive for cracks and worn or damaged splines. No perceptible lash (play) should be noted between mating spline parts.
12. Remove thrust bearing (11) from top of coupling shaft (12). Inspect for wear, brinelling, corrosion and a full complement of retained rollers
13. Check exposed portion of coupling shaft (12) to be sure you have removed all signs of rust and corrosion which might prevent its withdrawal through the seal and bearing. Crocus cloth or fine emery paper may be used. Remove key (12A) and retaining ring (12F) on applicable models.
14. Remove coupling shaft (12), by pushing on the output end of shaft. Inspect coupling shaft bearing and seal surfaces for spalling, nicks, grooves, severe wear or corrosion and discoloration. Inspect for damaged or worn internal and external splines or keyway. Replace coupling shaft if any of these conditions exist.

**NOTE:** Minor shaft wear in seal area is permissible. If wear exceeds .020 inches (0.51mm) diametrically, replace coupling shaft.

**NOTE:** A slight "polish" is permissible in the shaft bearing areas. Anything more would require coupling shaft replacement.

15. Remove and discard seal ring (4) from housing (18).

**NOTE:** Motors have a thrust bearing (15) sandwiched between two thrust washers (14) that cannot be removed from the housing (18) unless bearing (13) is removed for replacement.

16. Remove seal (16) and back up washer (17) from housing (18). Discard both. To remove seal (16) and back up washer (17) from motor housing, work them around unseated thrust washer (14) and thrust bearing (15) and out of the housing.
17. Remove housing (18) from vise, invert it and remove and discard seal (20). A blind hole bearing or seal puller is required.
18. Inspect housing (18) assembly for cracks, the machined surfaces for nicks, burrs, brinelling or corrosion. Remove burrs that can be removed without changing dimensional characteristics. Inspect tapped holes for thread damage. If housing is defective in these areas, discard the housing assembly.
19. If the housing (18) assembly has passed inspection to this point, inspect the housing bearings (19) and (13) and if they are captured in the housing cavity the two thrust washers (14) and thrust bearing (15). The bearing rollers must be firmly retained in the bearing cages, but must rotate and orbit freely. All rollers and thrust washers must be free of brinelling and corrosion. A bearing or thrust washer that does not pass inspection must be replaced. If the housing has passed this inspection the disassembly of the motor is completed.

**NOTE:** The depth location of bearing (13) in relation to the housing wearplate surface and the depth or location of bearing (19) in relation to the beginning of bearing counter bore should be measured and noted before removing the bearings. This will facilitate the correct reassembly of new bearings.

20. If the bearings, bushings, or thrust washers must be replaced use a suitable size bearing puller to remove bearings (19) and (13) from housing (18) without damaging the housing. Remove thrust washers (14) and thrust bearing (15) if they were previously retained in the housing bearing (13).

### GENERAL INSTRUCTIONS

Replace all seals and seal rings with new ones each time you reassemble the motor. Lubricate all seals and seal rings with SAE 10W40 oil or clean grease before assembly.

Unless otherwise indicated, do not oil or grease parts before assembly.

Wash all parts in clean petroleum-based solvents before assembly. Blow them dry with compressed air. Remove any paint chips from mating surfaces of the end cover, commutator set, manifold, rotor set, wearplate housing and from port and sealing areas.

### ASSEMBLY

1. If the housing (18) bearing components were removed for replacement, thoroughly coat and pack a new outer bearing (19) with clean corrosion resistant grease. Press the new bearing into the counterbore at the mounting flange end of the housing, using the appropriate sized bearing mandrel which will press bearing (19) into the housing to a required depth of .290/.310 inches (7.37/7.87mm) from outside end of bearing counterbore.

**NOTE:** Bearing mandrel must be pressed against the lettered end of bearing shell. Take care that housing bore is square with the press base and the bearing is not cocked when pressing a bearing into the housing. **CAUTION:** If a bearing mandrel is not available and alternate methods are used to press in bearing support and correct relationship to adjacent components when assembled. **CAUTION:** Because the bearings (13) and (19), have a press fit into the housing they must be discarded when removed. They must not be reused.

2. The motor housing (18) requires that you assemble a new backup washer (17), new seal (16) with the lip facing out, new thrust washer (14), new thrust bearing (15) and a new second thrust washer (14) in that order before pressing in the inner housing bearing (13). When these components are in place, press new bearing (13) into the housing (18) to a depth of .105/.125 inches (2.67/3.18mm) below the housing wearplate contact face.
3. Apply a small amount of clean grease to a new dirt and water seal (20) and press it into the housing (18) outer bearing counterbore. The dirt and water seal (20) must be pressed in with the lip facing out and until the seal is flush to .020 inches (.51mm) below the end of housing.
4. Place housing (18) assembly into a soft jawed vise with coupling shaft bore down, clamping against the mounting base flange.

(CONTINUED ON NEXT PAGE)

## HYDRAULIC MOTOR SERVICE PROCEDURES

(CONTINUED FROM PREVIOUS PAGE)

5. Assemble a new backup washer (17) and new seal (16) with the seal lip facing out, into their respective counterbores in housing (18) if they were not assembled in step 2. Housings (18) that did not require replacement of the bearing package will require that the two "captured" thrust washers (14) and thrust bearing (15) be unseated and vertical to the counterbore and that new backup washer (17) and new seal (16) be worked around the thrust bearing package and placed into their respective counterbores. The seal lip must face out of the seal counterbores. Be sure the thrust bearing package is resealed correctly after assembly of the seal and backup washer.
6. Apply masking tape around splines or keyway on coupling shaft (12) to prevent damage to seal.
7. Be sure a generous amount of clean corrosion resistant grease has been applied to the lower (outer) housing bearing (19). Install the coupling shaft (12) into housing (18), seating it against the second thrust washer (14). **CAUTION:** The outer bearing (19) is not lubricated by the system's hydraulic fluid. Be sure it is thoroughly packed with E/M Lubricant #K-70M grease.
8. Install thrust bearing (11) onto the end of coupling shaft (12).
9. Apply a small amount of clean grease to a new seal ring (4) and insert it into the housing (18) seal ring groove.

**NOTE:** One or two alignment studs screwed finger tight into housing (18) bolt holes, approximately 180 degrees apart, will facilitate the assembly and alignment of components as required in the following procedures. The studs can be made by cutting off the heads of  $\frac{3}{8}$ -24 UNF 2A bolts that are over .5 inch (12.7mm) longer than the bolts (1) used in the motor.

10. Install drive link (10) the long splined end down into the coupling shaft (12) and engage the drive link splines into mesh with the coupling shaft splines.

**NOTE:** Use any alignment marks put on the coupling shaft and drive link before disassembly to assemble the drive link splines in their original position in the mating coupling shaft splines.

11. Assemble wearplate (9) over the drive link (10) and alignment studs onto the housing (18).
12. Apply a small amount of clean grease to a new seal ring (4) and assemble it into seal ring groove on the wearplate side of the rotor set stator (8B).
13. Install the assembled rotor set (8) onto wearplate (9) with rotor (8A) counterbore and seal ring side down and the splines into mesh with the drive link splines.

**NOTE:** It may be necessary to turn one alignment stud out of the housing (18) temporarily to assemble rotor set (8) or manifold (7) over the drive link.

**NOTE:** If necessary, go to the appropriate "ROTOR SET COMPONENT ASSEMBLY PROCEDURES."

**NOTE:** The rotor set rotor counterbore side must be down against wearplate for drive link clearance and to maintain the original rotor drive link spline contact. A rotor set without a counterbore and that was not etched before disassembly can be reinstalled using the drive link spline pattern on the rotor splines if apparent, to determine which side was down. The rotor set has a seal ring groove on the wearplate contact side of the stator (8B).

14. Apply clean grease to a new seal ring (4) and assemble it in the seal ring groove in the rotor set contact side of manifold (7).

**NOTE:** The manifold (7) is made up of several plates bonded together permanently to form an integral component. The manifold surface that must contact the rotor set has it's series of irregular shaped cavities on the largest circumference or circle around the inside diameter. The polished impression left on the manifold by the rotor set is another indication of which surface must contact the rotor set.

15. Assemble the manifold (7) over the alignment studs and drive link (10) and onto the rotor set. Be sure the correct manifold surface is against the rotor set.
16. Apply grease to a new seal ring (4) and insert it in the seal ring groove exposed on the manifold (7).
17. Assemble the commutator ring (6) over the alignment studs onto the manifold (7).
18. Assemble a new seal ring (3) flat side up, into commutator (5) and assemble commutator over the end of the drive link (10) onto the manifold (7) with seal ring side up.
19. Assemble a new seal ring (4) into end cover (2) and assemble end cover over the alignment studs and onto the commutator set.
20. Assemble the seven special bolts (1) and screw in finger tight. Remove and replace two alignment studs with bolts after the other bolts are in place. Alternately and progressively tighten the bolts to pull the end cover and other components into place with a final torque of 45-55 FT/LBS (61-75Nm).
21. Replace key (12A) and retaining ring (12F) on motors with a keyed coupling shaft. Assembly of motor is now complete.

### ROTOR SET ASSEMBLY PROCEDURE ONE PIECE STATOR CONSTRUCTION

A disassembled rotor (8A), stator (8B) and vanes (8C) that cannot be readily assembled by hand can be assembled by the following procedures.

1. Place stator (8B) onto wearplate (9) with seal ring (4) side down, after following motor assembly steps 1 through 12. Be sure the seal ring (4) is in place.
2. If assembly alignment studs are not being utilized, align stator bolt holes with wearplate and housing bolt holes and turn two bolts (1) finger tight into bolt holes approximately 180 degrees apart to retain stator and wearplate stationary.

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## HYDRAULIC MOTOR SERVICE PROCEDURES

(CONTINUED FROM PREVIOUS PAGE)

3. Assemble the rotor (8A), counterbore down if applicable, into stator (8B) and onto wear plate (9) with rotor splines into mesh with drive link (10) splines.

**NOTE:** If the manifold side of the rotor was etched during motor disassembly, this side should be up. If the rotor is not etched and does not have a counterbore, use the drive link spline contact pattern apparent on the rotor splines to determine the rotor side that must be against the wearplate.

4. Assemble six vanes (8C), or as many vanes that will readily assemble into the stator vane pockets.

**CAUTION:** Excessive force used to push the rotor vanes into place could shear off the coating applied to the stator vane pockets.

5. Grasp the output end of coupling shaft (12) with locking pliers or other appropriate turning device and rotate coupling shaft, drive link and rotor to seat the rotor and assembled vanes (8C) into stator (8B), creating the necessary clearance to assemble the seventh or full complement of seven vanes. Assemble the seven vanes using minimum force.

6. Remove the two assembled bolts (1) if used to retain stator and wearplate.

Go to the Motor Assembly step 14 to continue motor assembly.

### ROTOR SET ASSEMBLY PROCEDURE TWO PIECE STATOR CONSTRUCTION

A disassembled rotor set (8) that cannot be readily assembled by hand and has a two piece stator can be assembled by the following procedures.

1. Place stator half (8B) onto wearplate (9) with seal ring (4) side down, after following motor assembly steps 1 through 12. Be sure the seal ring is in place.
2. Align stator bolt holes with wearplate and housing bolt holes and turn two alignment studs finger tight into bolt holes approximately 180 degrees apart to retain stator half and wearplate stationary.
3. Assemble rotor (8A), counterbore down if applicable, into stator half (8B), and onto wearplate (9) with rotor splines into mesh with drive link (10) splines.

**NOTE:** Use any marking you applied to rotor set components to reassemble the components in their original relationship to ensure ultimate wear, life and performance.

4. Assemble six vanes (8C), or as many vanes that will readily assemble into the stator vane pockets.

**CAUTION:** Excessive force used to push the rotor vanes into place could shear off the coating applied to the stator vane pockets.

5. Grasp the output end of coupling shaft (12) with locking pliers or other appropriate turning device and rotate coupling shaft, drive link and rotor to seat the rotor and the assembled vanes (8C) into stator half (8B), creating the necessary clearance to assemble the seventh of full complement of seven vanes. Assemble the seven vanes using minimum force.

6. Place second stator half (8D) on a flat surface with seal ring groove up. Apply a small amount of grease to a new seal ring (4) and assemble it into stator half ring groove.

7. Assemble the second stator half (8D) over the two alignment studs and rotor (8A) with seal ring side down onto the first stator half (8B) aligning any timing marks applied for this purpose.

**CAUTION:** If the stator half (8B) is a different height (thickness) than stator half (8D) the stator vanes (8C) or (8E) of the same length (height) as the stator half must be reassembled in their respective stator half for the rotor set to function properly.

8. Assemble six vanes (8E), or as many vanes that will readily assemble into the stator vane pockets.

9. Grasp the output end of coupling shaft (12) with locking pliers or other appropriate turning device and rotate coupling shaft, drive link and rotor to seat the rotor and the assembled vanes (8E) into stator (8D), creating the necessary clearance to assemble the seventh or full complement of seven vanes. Assemble the seven vanes using minimum force.

Go to Motor Assembly step 14 to continue motor assembly.

### FINAL CHECKS

Pressurize the motor with 100 PSI dry air or nitrogen and submerge in solvent to check for internal leaks.

Check motor for rotation. Torque required to rotate coupling shaft should not be more than 50 FT/LBS (68 Nm).

Use hydraulic test stand if available, to check operation of the motor.

## **INSTALLING A NEW OUTPUT SHAFT SPROCKET**

**NOTE: ONLY ORIGINAL EQUIPMENT AND AUTHORIZED MCMILLEN PARTS MAY BE USED.**

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Disconnect the drive unit from the power source.</li> <li>2. Remove the (8) 1/4" bolts and remove the safety covers.</li> <li>3. Remove the (4) 1/2" bolts from motor base. Push the motor forward to free the chain and remove the motor. Set the motor in a safe place to avoid damage.</li> <li>4. Remove the chain.</li> <li>5. Straighten the tab on the sprocket lockwasher. Remove the locknut and lockwasher.</li> <li>6. Using a gear puller - remove the sprocket from the output shaft being careful not to damage the shaft threads or lose the key(s).</li> <li>7. Coat inside of new sprocket with an antisieze lubricant.</li> </ol> | <p>Install the new sprocket with the hub toward the bearing Main Frame.</p> <ol style="list-style-type: none"> <li>8. Tap the key(s) into position being careful not to damage the threads.</li> <li>9. Replace and tighten the lockwasher and locknut. Re-bend the tab on the lockwasher to lock it into place - (NOTE: Moderate force with no end-to-end play when rotating the shaft is required. If not - retighten).</li> <li>10. Replace the chain.</li> <li>11. Replace the motor, wrapping the chain around the motor sprocket. Replace and tighten the (4) 1/2" motor bolts.</li> <li>12. Replace the safety covers and secure with the (8) 1/4" bolts.</li> </ol> |
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## **INSTALLING A NEW MOTOR SHAFT SPROCKET**

**NOTE: ONLY ORIGINAL EQUIPMENT AND AUTHORIZED MCMILLEN PARTS MAY BE USED.**

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Follow Steps 1-3 from the section "Installing a New Output Shaft Sprocket".</li> <li>2. Remove the 5/8" bolt, the lockwasher and the flatwasher from the motor shaft. Remove the sprocket from motor shaft.</li> <li>3. Install the new sprocket with the hub side toward the motor. Replace the 5/8" bolt, lockwasher and flatwasher.</li> </ol> | <ol style="list-style-type: none"> <li>4. Replace the motor, wrapping the chain around the motor sprocket. Replace and tighten the (4) 1/2" motor base bolts.</li> <li>5. Replace the safety covers and secure with the (8) 1/4" bolts.</li> </ol> |
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## **INSTALLING OUTPUT SHAFT BEARINGS**

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## **INSTALLING A NEW OUTPUT SHAFT AND SEALS**

**NOTE: ONLY ORIGINAL EQUIPMENT AND AUTHORIZED MCMILLEN PARTS MAY BE USED.**

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Follow steps 1-7 from the section "Installing a New Output Shaft Sprocket".</li> <li>2. Using a brass hammer, remove the shaft from the bearing housing.</li> <li>3. Remove the output shaft spacer.</li> <li>4. Remove the (2) seals from the bearing housing.</li> <li>5. Remove the bearing rollers from the bearing housing.</li> <li>6. Clean all parts of dirt, old grease and corrosion.</li> <li>7. Repack the bearing rollers with new grease (See Maintenance section for grease specifications) being sure to work grease thoroughly in between all rollers. Remove excess grease from inside diameter.</li> </ol> | <ol style="list-style-type: none"> <li>8. With new shaft standing on end (threads up) slip (1) greased bearing roller (thick side down) over shaft. Press bearing onto shaft until it bottoms out on shoulder.</li> <li>9. Place new shaft with bearing into main frame weldment.</li> <li>10. Slip other greased bearing roller (thick side up) over shaft until it seats itself fully in bearing housing.</li> <li>11. Replace the output shaft spacer.</li> <li>12. Press both new seals (flar side out) into main frame weldment, being careful not to damage them, until flush with bearing housing face.</li> <li>13. Follow steps 8-12 from the Section "Installing a New Output Shaft Sprocket".</li> </ol> |
|---|---|



# DRIVE UNIT SPECIFICATIONS

## MODEL 820

Maximum Auger Diameter: 18"(457mm)  
 Minimum Hydraulic Flow: 6 GPM (23 lpm)  
 Maximum Hydraulic Flow: 15 GPM (57 lpm)  
 Maximum Continuous Operating PSI: 3000 PSI (KG/CM<sup>2</sup>)  
 Output Shaft Options: 2" (51mm) Round  
 2-9/16"(65mm) Round  
 2" (51mm) Hexagon

OUTPUT SPEED		OUTPUT TORQUE	
FLOW	SPEED	PRESSURE	TORQUE
GPM (LPM)	RPM	PSI (KG/CM <sup>2</sup> )	Ft/lbs. (Nm)
6 (23) =	51	2000 (141) =	709 (961)
7 (26) =	60	2100 (148) =	744 (1008)
8 (30) =	69	2200 (155) =	779 (1056)
9 (34) =	77	2300 (162) =	815 (1105)
10 (38) =	86	2400 (169) =	850 (1152)
11 (42) =	95	2500 (176) =	886 (1201)
12 (45) =	103	2600 (183) =	921 (1248)
13 (49) =	112	2700 (190) =	957 (1297)
14 (53) =	121	2800 (197) =	992 (1345)
15 (57) =	129	2900 (204) =	1027 (1392)
		3000 (211) =	1063 (1441)

## MODEL 1820

Maximum Auger Diameter: 36"(914mm)  
 Minimum Hydraulic Flow: 15 GPM (57 lpm)  
 Maximum Hydraulic Flow: 30 GPM (114 lpm)  
 Maximum Continuous Operating PSI: 3000 PSI (211 KG/CM<sup>2</sup>)  
 Output Shaft Options: 2" (51mm) Round  
 2-9/16"(65mm) Round  
 2" (51mm) Hexagon

OUTPUT SPEED		OUTPUT TORQUE	
FLOW	SPEED	PRESSURE	TORQUE
GPM (LPM)	RPM	PSI (KG/CM <sup>2</sup> )	Ft/lbs. (Nm)
15 (57) =	50	2000 (141) =	1822 (2470)
16 (61) =	53	2100 (148) =	1914 (2595)
17 (64) =	57	2200 (155) =	2005 (2714)
18 (68) =	60	2300 (162) =	2096 (2842)
19 (72) =	63	2400 (169) =	2187 (2965)
20 (76) =	67	2500 (176) =	2278 (3088)
21 (79) =	70	2600 (183) =	2369 (3212)
22 (83) =	73	2700 (190) =	2460 (3335)
23 (87) =	77	2800 (197) =	2552 (3460)
24 (91) =	80	2900 (204) =	2643 (3583)
25 (95) =	84	3000 (211) =	2734 (3707)
26 (98) =	87		
27 (102) =	90		
28 (106) =	94		
29 (110) =	97		
30 (114) =	100		

## MODEL 1320

Maximum Auger Diameter: 30"(762mm).  
 Minimum Hydraulic Flow: 10 GPM (38 lpm).  
 Maximum Hydraulic Flow: 25 GPM (95 lpm).  
 Maximum Continuous Operating PSI: 3000 PSI (211 KG/CM<sup>2</sup>)  
 Output Shaft Options: 2" (51mm) Round  
 2-9/16"(65mm) Round,  
 2" (51mm) Hexagon.

OUTPUT SPEED		OUTPUT TORQUE	
FLOW	SPEED	PRESSURE	TORQUE
GPM (LPM)	RPM	PSI (KG/CM <sup>2</sup> )	Ft/lbs. (Nm)
10 (38) =	50	2000 (141) =	1225 (1661)
11 (42) =	55	2100 (148) =	1286 (1743)
12 (45) =	60	2200 (155) =	1347 (1826)
13 (49) =	65	2300 (162) =	1409 (1910)
14 (53) =	70	2400 (169) =	1470 (1993)
15 (57) =	75	2500 (176) =	1531 (2076)
16 (61) =	80	2600 (183) =	1593 (2160)
17 (64) =	85	2700 (190) =	1654 (2242)
18 (68) =	90	2800 (197) =	1715 (2325)
19 (72) =	95	2900 (204) =	1776 (2408)
20 (76) =	100	3000 (211) =	1838 (2492)
21 (79) =	105		
22 (83) =	110		
23 (87) =	115		
24 (91) =	120		
25 (95) =	125		

## MODEL 2220

Maximum Auger Diameter: 36"(914 mm)  
 Minimum Hydraulic Flow: (17 GPM)  
 Maximum Hydraulic Flow: (30 GPM)  
 Maximum Continuous Operating PSI: 3000 PSI (211 KG/CM<sup>2</sup>)  
 Output Shaft Options: 2" (51mm) Round  
 2-9/16"(65mm) Round  
 2" (51mm) Hexagon

OUTPUT SPEED		OUTPUT TORQUE	
FLOW	SPEED	PRESSURE	TORQUE
GPM (LPM)	RPM	PSI (KG/CM <sup>2</sup> )	Ft/lbs. (Nm)
17 (64) =	45	2000 (141) =	2309 (3131)
18 (68) =	47	2100 (148) =	2424 (3286)
19 (72) =	50	2200 (155) =	2539 (3442)
20 (76) =	53	2300 (162) =	2655 (3600)
21 (79) =	55	2400 (169) =	2770 (3756)
22 (83) =	58	2500 (176) =	2886 (3913)
23 (87) =	61	2600 (183) =	3001 (4069)
24 (91) =	63	2700 (190) =	3117 (4226)
25 (95) =	66	2800 (197) =	3232 (4382)
26 (98) =	68	2900 (204) =	3348 (4539)
27 (102) =	71	3000 (211) =	3463 (4695)
28 (106) =	74		
29 (110) =	76		
30 (114) =	79		

Output speed and torque specifications are based on theoretical values and are provided for comparative purposes only.

McMillen is continually striving to improve its products. Therefore, we reserve the right to make changes to our products or specifications at any time without notice or obligation.

**HDP STYLE AUGER PARTS LIST**

AUGER DIAMETER		6"	8"	9"	10"	12"	15"	16"
		152mm	203mm	229mm	254mm	305mm	381mm	406mm
<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>
82-P2-12G	Hardened Drive-In Gage Tooth	2	2	2	2	2	2	2
82-P2-13	3-1/2" Fishtail Point	1	1	1	1	1	1	1
82-P2-21	Hardened Drive-In Chisel Tooth		2	2	2	2	4	4

AUGER DIAMETER		18"	20"	24"	30"	36"	*42"	*48"
		457mm	508mm	610mm	762mm	914mm	1067mm	1219mm
<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>
82-P2-12G	Hardened Drive-In Gage Tooth	2	2	2	2	2	2	2
82-P2-13	3-1/2" Fishtail Point	1	1	1	1	1	1	1
82-P2-21	Hardened Drive-In Chisel Tooth	4	4	6	8	10	14	18

**HDF STYLE AUGER PARTS LIST**

AUGER DIAMETER		4"	6"	8"	9"	10"	12"	15"
		152mm	203mm	229mm	254mm	305mm	381mm	406mm
<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>
82-P2-12GBN	Hardened Bolt-on Gage Tooth	-	2	2	2	2	2	2
82-P2-12BN	Hardened Bolt-on Wisdom Tooth	-	-	-	1	1	2	3
82-P2-13	3-1/2" Fishtail Point	-	1	1	1	1	1	1
82-A2-26	4-1/2" Fishtail Point	1	-	-	-	-	-	-

AUGER DIAMETER		16"	18"	20"	24"	30"	36"
		457mm	508mm	610mm	762mm	914mm	1067mm
<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>
82-P2-12GBN	Hardened Bolt-on Gage Tooth	2	2	2	2	2	2
82-P2-12BN	Hardened Bolt-on Wisdom Tooth	3	4	4	6	7	9
82-P2-13	3-1/2" Fishtail Point	1	1	1	1	1	1

**HTF STYLE AUGER PARTS LIST**

AUGER DIAMETER		18"	24"	30"	36"	*42"	*48"
		457mm	610mm	762mm	914mm	1067mm	1219mm
<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>	<u>QTY</u>
82-P2-12GBN	Hardened Bolt-on Gage Tooth	4	4	4	4	4	4
82-P2-12BN	Hardened Bolt-on Wisdom Tooth	3	6	7	9	11	13
82-P2-13	3-1/2" Fishtail Point	1	1	1	1	1	1

\* *McMillen does not recommend augers exceeding 36" diameter for C-Series Drive Units.*

**NOTE:** Contact your dealer for optional hardfaced or carbide wear components. If you have any special auger needs or applications, feel free to contact McMillen.