



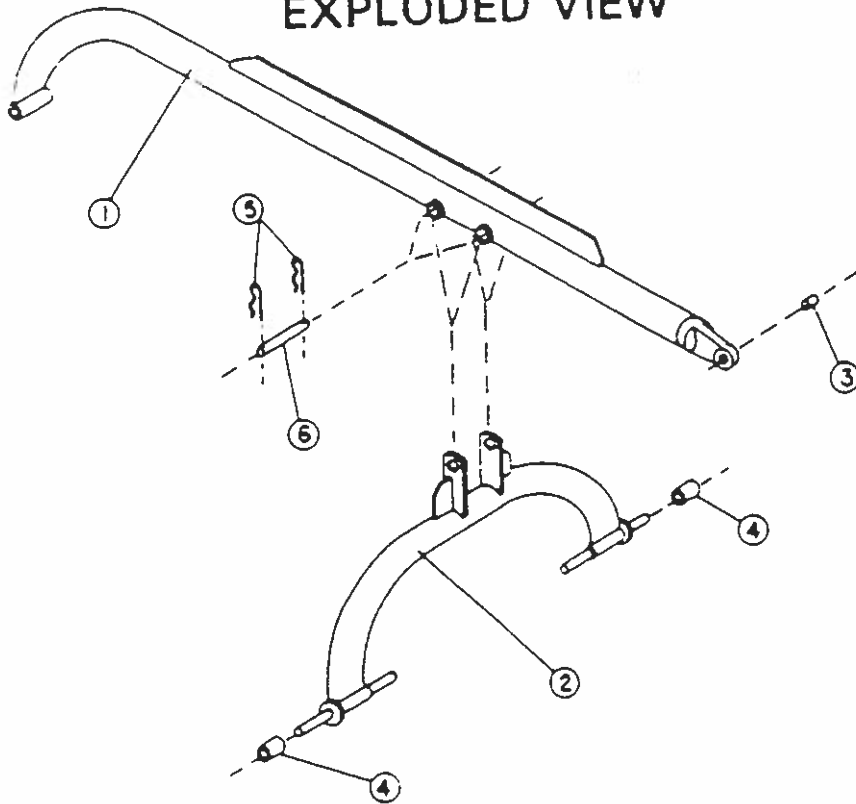


## SAFETY INFORMATION

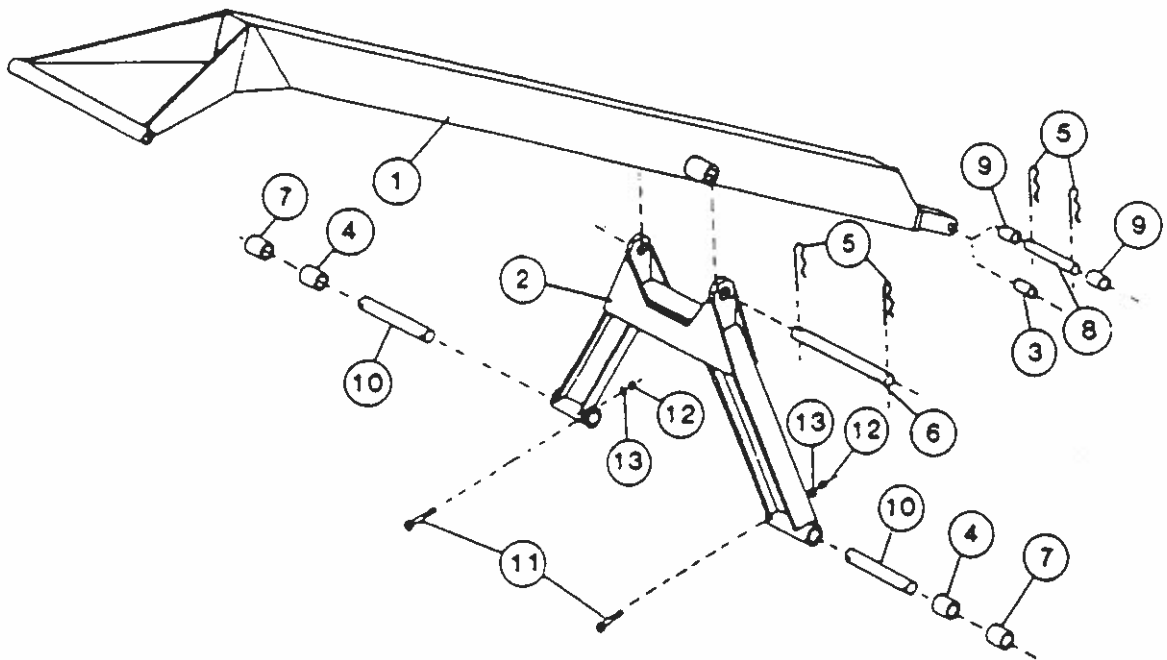
THE USE OF THIS EQUIPMENT IS SUBJECT TO CERTAIN HAZARDS WHICH CANNOT BE PROTECTED AGAINST BY MECHANICAL MEANS OR PRODUCT DESIGN. ALL OPERATORS OF THIS EQUIPMENT MUST READ AND UNDERSTAND THIS ENTIRE MANUAL, PAYING PARTICULAR ATTENTION TO SAFETY AND OPERATING INSTRUCTIONS, PRIOR TO USING THE MCMILLEN HYDRAULIC 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 OSHA 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 25% 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.

# 80-A1-104 3-POINT HITCH MOUNTING EXPLODED VIEW



# 80-A2-282 3-POINT HITCH MOUNTING EXPLODED VIEW



# 80-A1-104 AND 80-A2-282 3-POINT HITCH MOUNTINGS PARTS LIST AND INSTALLATION INSTRUCTIONS

REFERENCE NUMBER	PART NUMBER	DESCRIPTION	QTY REQD	MODELS KIT USED ON:	
				80-A1-104	80-A2-282
1	80-M1-222	Boom	1	X	
	80-M2-167	Boom	1		X
2	80-M1-223	A-Frame	1	X	
	80-M2-168	A-Frame	1		X
3	83-M1-14	Bushing, 1" OD X 3/4" ID X 1-9/16" Long	1	X	X
4	83-M1-17	Bushing, 1-1/8" OD X 7/8"	2	X	X
5	85-P1-35	3/4" Pin Clip	2	X	
	85-P1-37	1-1/4" Pin Clip	4		X
6	85-M1-224	Pin, 3/4" X 6-1/4" Long	1	X	
	85-M2-105	Pin, 1-1/4" X 10-5/16" Lg	1		X
7	83-M1-26	Bushing, 1-7/16" OD X 1-1/8" ID X 1-5/8" Long	2		X
8	85-M1-31	Pin, 1" X 5-3/4" Long	1		X
9	83-M1-32	Bushing, 1-1/4" OD X 1"	2		X
10	85-M2-106	Pin, 7/8" X 6-7/16" Long	2		X
11	85-P1-122	7/16-14 X 2" Long, HHCS, Grade 5	2		X
12	85-P1-18	7/16-14 Hex Nut	2		X
13	85-P1-123	7/16" Split Lockwasher	2		X

1. READ AND UNDERSTAND ALL SAFETY INFORMATION PRIOR TO ATTEMPTING INSTALLATION.

2. Connect a-frame (2) to lift arm pins of your tractor three point hitch by sliding a-frame lift arm pins into lift arms on Category II hitch, use bushings (4) on a-frame lift arm pins. Secure a-frame lift arm pins to lift arms with lynch pins (not provided).

**NOTE: FOR BEST DIGGING RESULTS, RIGID STABILIZERS SHOULD BE USED ON LIFT ARMS.**

2A. **FOR 80-A1-104** If your tractor lift arm spacing is 32", connect lift arms to outer lift arm pins on a-frame. If your tractor lift arm spacing is 26" or less, connect lift arms to inner lift arm pins on a-frame.

2B. **FOR 80-A2-282** If the tractor has a Category III hitch, an additional set of bushings (7) are supplied to slip over the Category II bushings (4).

3. Connect the tractor end of the boom (1) to the top link bracket on your tractor using your tractor upper link pin and secure. If you are attaching to a Category II tractor, bushing (3) is not required but should be saved for future use.

3A. **FOR 80-A2-282** If you are attaching to a Category III tractor, replace the tractor top link pin with the top link pin (8) supplied. Use the two bushings (9) in the holes on each side of the top link bracket. Secure pin (8) with two pin clips (5).

4. Swing a-frame (2) up and attach and secure to boom (1) with pin (6) and pin clips (5).

4A. **FOR 80-A1-104** When attaching the a-frame to the boom, use the adjustment hole in the boom best suited for your tractor. Normally the hole closest to the tractor will be required.

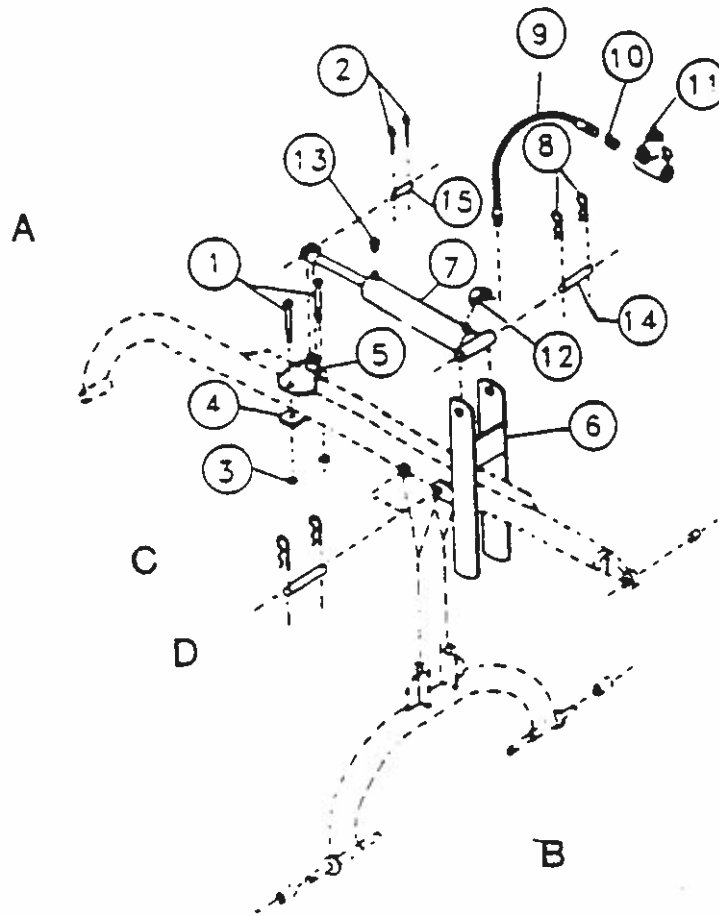
5. Before proceeding further, slowly raise and lower the boom through its complete operating arch and check closely that there are no interferences. If there is any interference, make the proper three point hitch adjustments as per tractor manufacturers recommendations. Consult your tractor dealer before making any modifications as any changes may present a serious safety hazard.

6. Attach and secure auger to drive unit with bolt and nut provided with drive unit assembly.

7. Attach and secure auger to drive unit with bolt and nut provided with drive unit assembly. If additional boom height is required to provide ground clearance for auger, make the proper three point hitch adjustments as per tractor manufacturers recommendations. Consult the tractor dealer before making any modifications as changes may present a serious safety hazard.

8. Refer to the "HYDRAULIC SYSTEM HOOK-UP" section in this manual for hydraulic connection instructions and recommendations.

# 80-A1-110 DOWN PRESSURE KIT EXPLODED VIEW & PARTS LIST



<u>REFERENCE NUMBER</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QTY REQ'D</u>
1	85-P1-127	1/2-13 X 5-1/2" Gr. 5, HHCS	2
2	85-P1-106	3/16" X 3-1/2" Cotter Pin	2
3	85-P1-119	1/2-13 Uni-Torque Locknut	2
4	80-M1-119	Push Block Pad	1
5	80-M1-118	Push Block Weldment	1
6	80-M1-117	Pivot Push Arm Weldment	1
7	88-P1-130	Cylinder	1
8	85-P1-35	Pin Clips	1
9	88-P1-128	Hose Assembly	1
10	88-P2-250	Reducing Bushing	1
11	88-P2-205	Relief Valve	1
12	88-P2-189	90 Street El	1
13	88-P2-93A	Bronze Breather Vent	1
14	85-M1-224	Pin, 3/4" X 6-1/4" Long	1
15	85-P1-129	Pin, 1" X 2" Long	1

# 80-A1-110 DOWN PRESSURE KIT INSTALLATION INSTRUCTIONS

1. DESIGNED FOR ADAPTATION TO MCMILLEN #80-A1-104 3-POINT HITCH MOUNTING ONLY. DO NOT ATTEMPT TO ADAPT TO ANY OTHER MCMILLEN 3-POINT HITCH MOUNTING.

2. READ AND UNDERSTAND ALL SAFETY INFORMATION PRIOR TO ATTEMPTING INSTALLATION.

3. TRACTOR MUST BE EQUIPPED WITH A 3-WAY OR 4-WAY HYDRAULIC REMOTE CONTROL VALVE AND REMOTE OUTLETS.

4. TO AVOID POSSIBLE INJURY, REMOVE AUGER AND DRIVE UNIT FROM BOOM BEFORE INSTALLATION OF DOWN PRESSURE KIT.

5. Remove a-frame to boom pin (D). Install pivot push arm weldment (6) and secure with pin (D) and two pin clips (C).

6. Raise boom to maximum lift height.

7. Attach rear of cylinder (7), with hose port up, to pivot push arm weldment (6) with pin provided. Secure pin (14) with two pin clips (8) provided. Retract cylinder (7) to its minimum length. Push pivot push arm weldment (6) back so that it is tight against the back side of a-frame (B).

8. Loosely assemble push block weldment (5) and push block pad (4) to boom (A) using two bolts (1) and locknuts (3) provided. Do not tighten bolts yet.

9. Attach rod end of cylinder (7) to push block weldment (5) using pin (15). Secure pin (15) with cotter pins (2) provided. Tighten push block weldment (5) and push block pad (4) evenly, making sure bracket is straight and square.

10. Install 90 street el (12) into cylinder port closest to tractor. Attach hose assembly (9) to 90 street el (12). (NOTE: ONE LAYER OF JOINT TAPE SHOULD BE USED ON ALL TAPER PIPE THREAD FITTINGS. DO NOT LET TAPE EXTEND INSIDE OF FITTING AND DO NOT OVER TIGHTEN FITTING).

11. Install reducing bushing (10) on other end of hose assembly (7). Now connect other end of hose (9) with reducing bushing (10) to one of the "P" ports on relief valve (11). See note in step 10 regarding joint connections.

12. Install bronze breather vent (13) into cylinder port closest to rod end. See note in step 10 regarding joint connections.

13. Attach a suitable quick coupler tip to the other "P" port on relief valve (11). The coupler tip is not included and must be obtained locally. Connect quick coupler tip and relief valve (11) to a remote hydraulic outlet on rear of tractor. If tractor is equipped with a 4-way remote control valve, there will be two outlets. Either one can be used depending upon which direction the operator prefers to move the control valve lever to apply pressure.

14. The hose and fittings to connect the relief valve (port marked "tank") to the tractor reservoir should be obtained locally. Hose and fittings must have a minimum pressure rating of 3500 PSI and should be 1/2" I.D. hydraulic hose. The connection to reservoir can be made at an oil fill, oil level check, breather or drain opening. It is preferable to connect a point below oil level to prevent oil foaming. The "tank" port on relief valve is 1/2" NPT.

15. Once all connections (pins & hydraulic) have been made and checked, you are now ready to operate your down pressure kit. **READ AND UNDERSTAND DOWN PRESSURE KIT OPERATING INSTRUCTIONS AND SAFETY INFORMATION PRIOR TO ATTEMPTING TO OPERATE. REFER TO HYDRAULIC HOOKUP.**

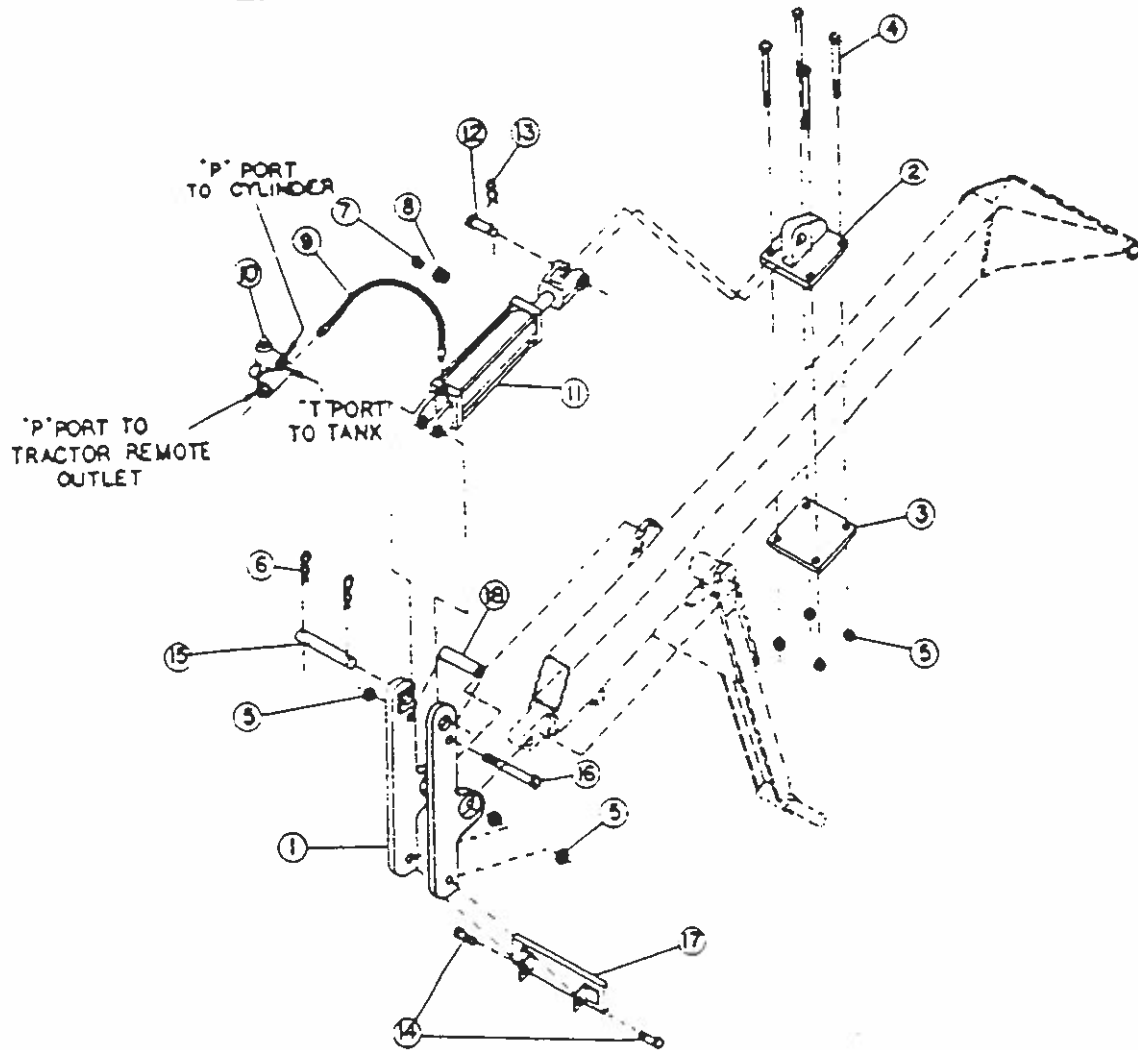
# 80-A1-110 DOWN PRESSURE KIT OPERATING INSTRUCTIONS

1. BEFORE OPERATING DOWN PRESSURE KIT, MAKE SURE ALL HOSES ARE CLEAR OF ALL BOOM, A-FRAME, AND PIVOT PUSH ARM MOVEMENT.

2. To apply down pressure, move the remote outlet control valve lever in the proper direction. As long as lever is activated, down pressure will be applied. Use only enough down pressure to assure positive penetration of auger into the ground. Excessive down pressure will cause the auger to stall.

3. To raise the boom, return control valve lever from down pressure to the neutral position. Activate lift arm control valve lever to raise boom. (NOTE: NEVER ATTEMPT TO RAISE BOOM WITH DOWN PRESSURE CONTROL VALVE ACTIVATED. SERIOUS PERSONAL INJURY OR EQUIPMENT DAMAGE MAY RESULT.)

# 80-A2-293 DOWN PRESSURE KIT EXPLODED VIEW & PARTS LIST



REFERENCE NUMBER	PART NUMBER	DESCRIPTION	QTY REQD
1	80-M2-173A	Pivot Push Arm Weldment	1
2	80-M2-1738	Push Block Weldment	1
3	80-M2-173B2	Push Block Pad	1
4	85-P2-255	Bolt 1/2"-13 X 61-1/2" HHCS Gr. 5	4
5	85-P1-119	1/2" Uni-Torque Lock Nut	7
6	85-P1-37	1-1/4" Pin Clips	2
7	88-P2-93A	1/2" Flush Head Bronze Breather Vent	1
8	88-P2-250	1/2" X 1/4" Reducing Bushing	1
9	88-P2-208	1/2" I.D. Double Wire Braid 3500 PSI. Rated Hyd. Hose 36" Lg., 1/2" Male NPT Both ends.	1
10	88-P2-205	Relief Valve	1
11	88-P2-204	2" Bore Cyl., 8" Stroke with 1/2" NPT Ports	1
12	88-P2-204A	Pin 1" X 7" Long	1
13	88-P2-204B	Pin Clip	1
14	85-P2-45	Bolt 1/2"-13 X 1-3/4" HHCS Gr. 5	1
15	80-M2-173C	Pin 1" X 7" Long	1
16	85-P1-99	Bolt 1/2"-13 X 6" HHCS Gr. 5	1
17	80-M2-173A-4	Push Bar	1
18	80-M2-173A-3	Spacer Tube	1

# 80-A2-293 DOWN PRESSURE KIT INSTALLATION INSTRUCTIONS

1. DOWN PRESSURE KIT ASSEMBLY IS DESIGNED FOR ADAPTION TO MCMILLEN #80-A2-282 3-POINT HITCH MOUNTING ONLY. DO NOT ATTEMPT TO ADAPT TO ANY OTHER MCMILLEN 3-POINT MOUNTING.

2. TRACTOR MUST BE EQUIPPED WITH 3-WAY OR 4-WAY REMOTE CONTROL VALVE AND OUTLETS.

3. TO AVOID POSSIBLE INJURY, REMOVE AUGER AND DRIVE UNIT FROM BOOM BEFORE EACH INSTALLATION OF DOWN PRESSURE KIT.

4. Remove existing a-frame to boom pin. Install pivot push arm weldment (1) to boom. Reconnect boom to a-frame then to upper hitch point on tractor.

5. Raise boom to maximum lift height.

6. Attach rear of cylinder (11), with hose port up, to pivot push arm weldment (1) with pin (15) provided. Secure pin (15) with two pin clips (6) provided. Retract cylinder (11) to its minimum length. Push pivot push arm weldment (1) so that the face is resting firmly against side of a-frame.

7. Loosely assemble push block weldment (2) and push block pad (3) to boom using four bolts (4), nuts (5), provided. Do not tighten bolts yet.

8. Attach rod end of cylinder (11) to push block weldment (2) using pin (12). Secure with pin clip (13) provided. Tighten four bolts (4) on push block weldment (2) and push block pad (3) evenly, making sure bracket is straight and square.

9. Attach hose assembly (9) to cylinder port facing us, at rear of cylinder. (NOTE: ONE LAYER OF JOINT TAPE SHOULD BE USED ON ALL TAPER PIPE THREAD FITTINGS. DO NOT LET TAPE EXTEND INSIDE OF FITTING AND DO NOT OVER TIGHTEN FITTING).

10. Attach other end of hose (9) to one of the "P" ports on relief valve (10). See note in step 9 regarding joint connections.

11. Attach a suitable quick coupler tip to the other "P" port on relief valve (10). The coupler tip is not included and must be obtained locally. connect quick coupler tip and relief valve (10) to a remote hydraulic outlet on rear of tractor. If tractor is equipped with a 4-way remote control valve, there will be two outlets. Either one can be used depending upon which direction the operator prefers to move the control valve lever to apply down pressure.

12. The hose fittings to connect the relief valve (port marked "tank") to the tractor reservoir should be obtained locally. Hose and fittings must have a minimum pressure rating of 2500 PSI and should be 1/2" I.D. hose. The connection to reservoir can be made at an oil fill, oil level check, breather, or drain opening. It is preferable to connect at a point below the oil level to prevent oil foaming. The "tank" port on relief valve is 1/2" NPTF.

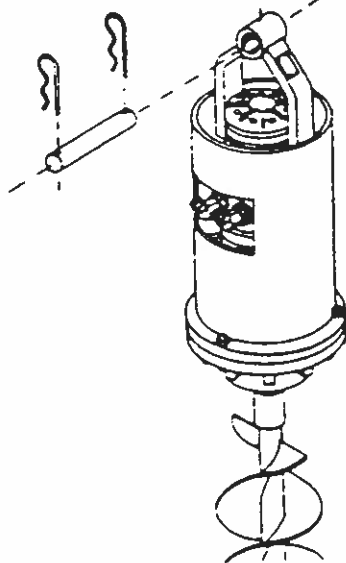
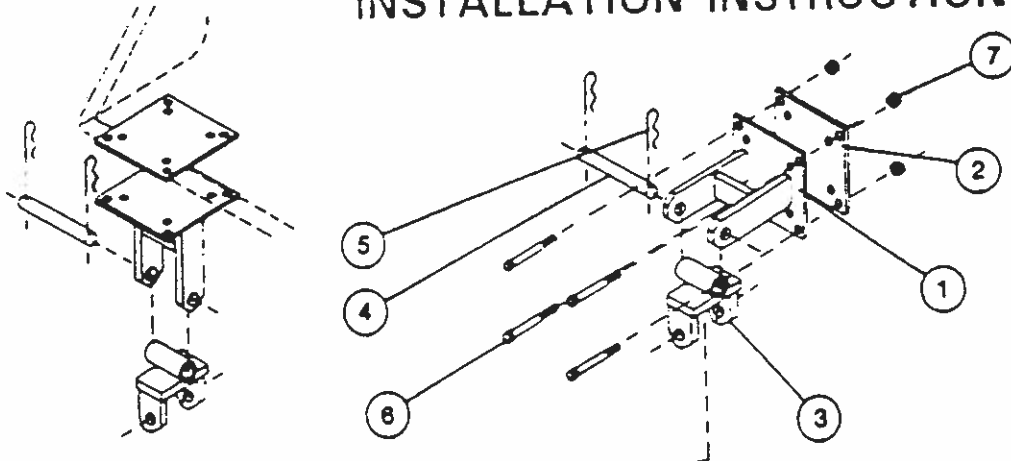
# 80-A2-293 DOWN PRESSURE KIT OPERATING INSTRUCTIONS

1. BEFORE OPERATING DOWN PRESSURE KIT, MAKE SURE ALL HOSES ARE CLEAR OF ALL BOOM, A-FRAME, AND PIVOT PUSH ARM MOVEMENT.

2. To apply down pressure, move the remote outlet control valve lever in the proper direction. As long as lever is activated down pressure will be applied. Use only enough down pressure to assure positive penetration of auger into the ground. Excessive down pressure will cause the auger to stall.

3. To raise the boom, return control valve lever for down pressure to the neutral position. Activate lift arm control valve lever to raise boom. (NOTE: NEVER ATTEMPT TO RAISE BOOM WITH DOWN PRESSURE CONTROL VALVE ACTIVATED. SERIOUS PERSONAL INJURY OR EQUIPMENT DAMAGE MAY RESULT).

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



REFERENCE NUMBER	PART 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, 1-1/4" O X 7-1/4" Long	1
5	85-P1-37	Pin Clip	2
6	85-P1-16	7/16"-14 X 5" Gr. 5 Bolt	4
7	85-P1-18	7/16"-14 Hex Nut	4

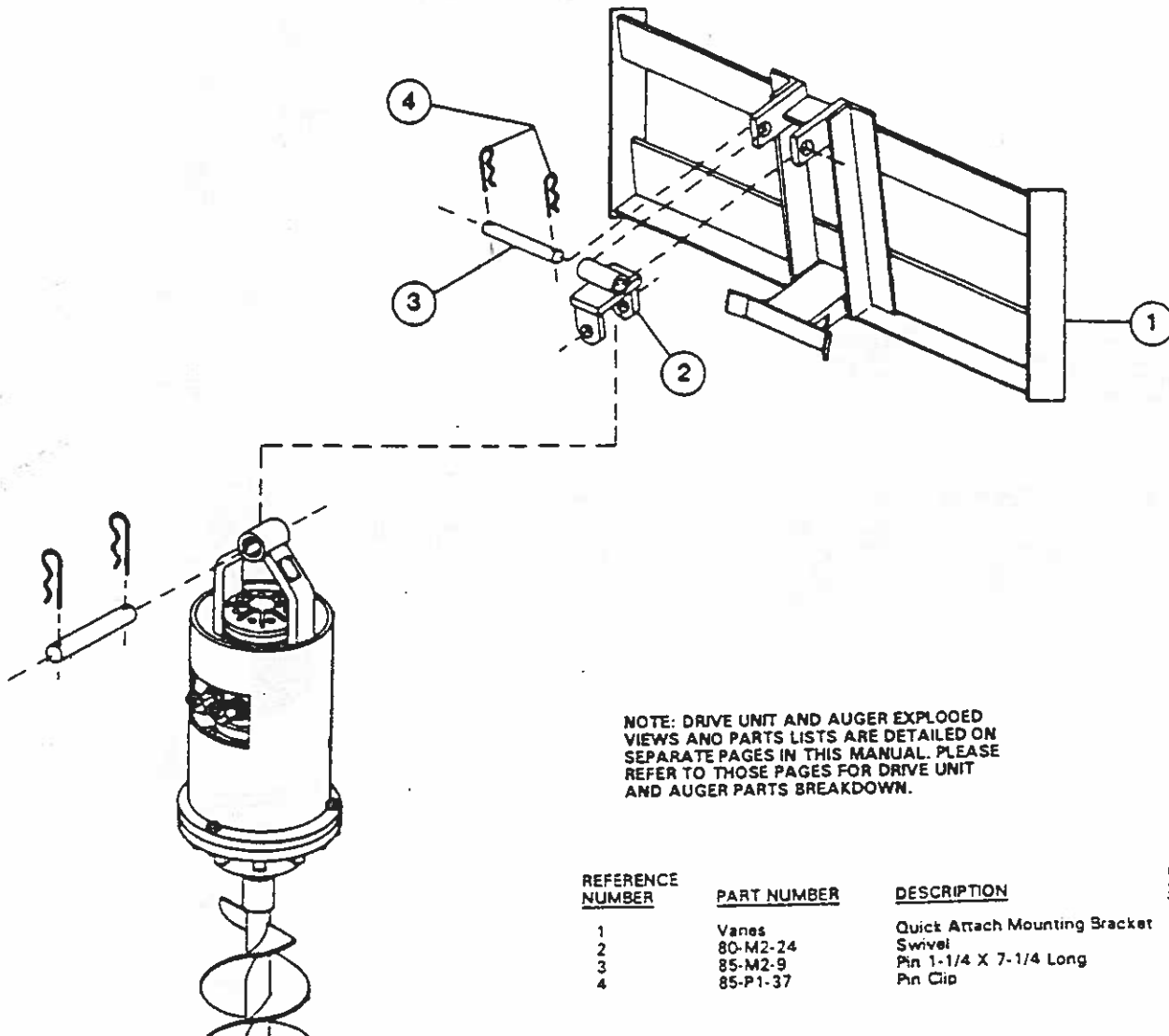
NOTE: DRIVE UNIT AND AUGER EXPLODED VIEWS AND PARTS LISTS ARE DETAILED ON SEPARATE PAGES IN THIS MANUAL. PLEASE REFER TO THOSE PAGES FOR DRIVE UNIT AND AUGER PARTS BREAKDOWN.

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 tractor 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 pin clips (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.



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

1. READ AND UNDERSTAND ALL SAFETY INFORMATION PRIOR TO ATTEMPTING INSTALLATION.
2. Remove bucket or other attachment from vehicle quick attach mechanism.
3. Attach quick attach mounting bracket (1) to vehicle 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 pin clips. (4).
5. Attach and secure drive unit to swivel weldment (2) 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.



# BACKHOE & EXCAVATOR MOUNTINGS EXPLODED VIEW, PARTS LISTS INSTALLATION INSTRUCTIONS

1. READ AND UNDERSTAND ALL SAFETY INFORMATION PRIOR TO ATTEMPTING INSTALLATION.

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 drill 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) with lockwashers (4) and nuts (5). If self-locking nuts are provided, lockwashers will not be required. **OPTIONAL:** After determining correct width, backhoe ears (2) should be welded to backhoe swivel base (1).

4. Attach backhoe mounting to the dipper arm using the dipper arm using the dipper arm pin removed from bucket in step 1. Secure bucket pin as per vehicle manufacturers recommendation.

5. Attach and secure drive unit to backhoe mounting with pin and pin clips provided with the drive unit assembly.

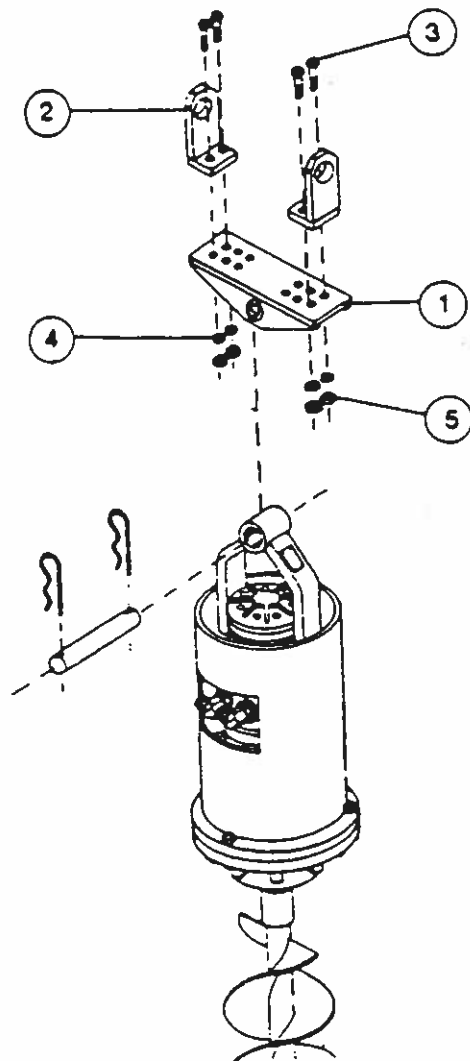
6. Attach and secure auger to drive unit with bolt and nut provided with drive unit assembly.

7. Refer to the "HYDRAULIC SYSTEM HOOK-UP" section in this manual for hydraulic connection instructions and recommendations.

**RECOMMENDED:** AFTER DETERMINING CORRECT WIDTH, BACKHOE EARS (2) SHOULD BE WELDED TO BACKHOE SWIVEL BASE (1)

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.

REFERENCE NUMBER	PART NUMBER	DESCRIPTION	QTY REQD
1	80-M2-21	Backhoe Base Weldment	1
2	Vanes	Backhoe Adaptor Ear	2
3	85-P2-45	1/2"-13 X 1-3/4" Gr. 5	4
4	85-P2-32	1/2" Split Lockwasher	4
5	85-P1-15	1/2"-13 Hex Nut	4



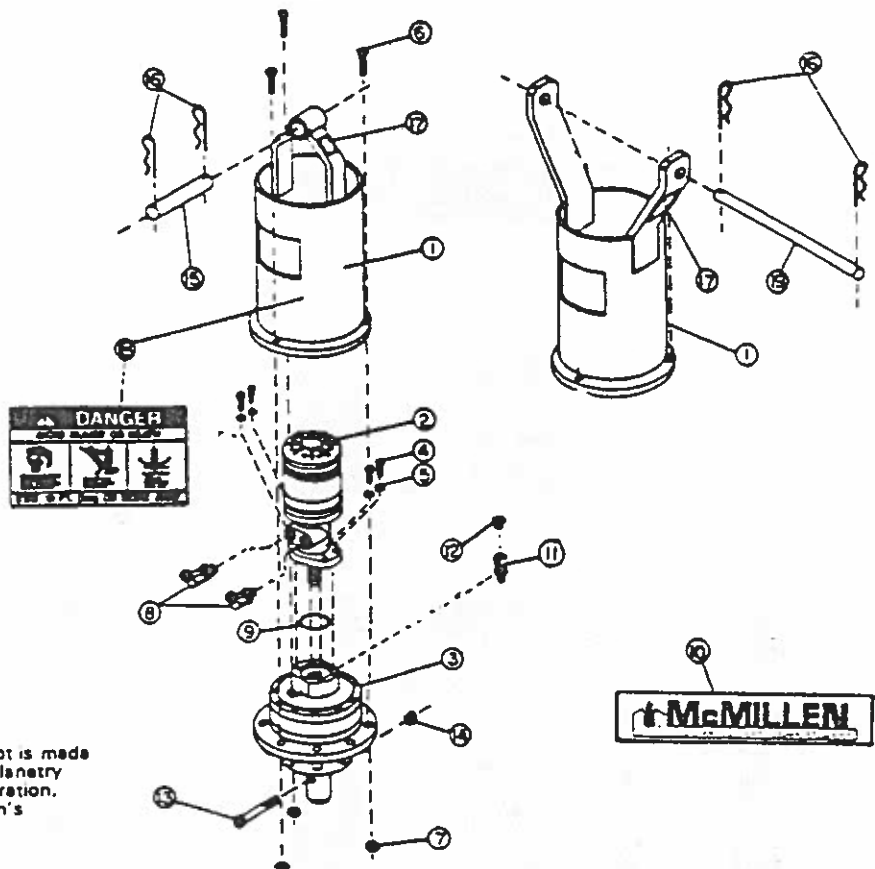
# MODEL 850, 1350, 1850, & 2250 DRIVE UNIT EXPLODED VIEW & PARTS LIST

HYDRAULIC  
MOTOR BREAKDOWN  
SEE PAGE 24.

PLANATARY BREAKDOWN  
SEE PAGE 26.

NOTE: PROVIDE SERIAL NUMBER  
OF DRIVE UNIT WHEN PLACING  
PARTS ORDER.

**WARRANTY NOTE**  
The warranty automatically is void if any attempt is made  
to make field repairs to the hydraulic motor or planetary  
gear reduction. To qualify for warranty consideration,  
the complete unit must be available for McMillen's  
inspection in its original "failed" condition.



REFERENCE NUMBER	PART NUMBER	DESCRIPTION	QTY REQ'D
1	80-M2-164A	Motor Housing & Pendant Weldment	1
	80-M2-164B	3-pt. Hitch Motor Housing Weldment	1
2	81-P2-256	Hydraulic Motor 850	1
	81-P2-257	Hydraulic Motor 1350	1
	81-P2-258	Hydraulic Motor 1850	1
	81-P2-259	Hydraulic Motor 2250	1
3	87-P2-228	Planetary Gear Reduction-2" Round	1
	87-P2-228-H2	Planetary Gear Reduction-2" Hex	1
	87-P2-228R256	Planetary Gear Reduction-2-9/16" Round	1
4	85-P2-19	1/2-13 X 1-1/2" Long HHCS, Gr. 5	4
5	85-P2-32	1/2" Split Lockwasher	4
6	85-P2-203	9/16-12 X 2" Long HHCS, Gr. 5	3
7	85-P2-243	9/16-12 "Uni-Torque" Lock Nut	3
8	88-P1-111	45 "O" Ring Motor Fitting	2
9	88-P2-192	"O" Ring	1
10	M94-0065	McMillen Decal	2
11	88-P2-100A	1/4" In-Line Check Valve	1
12	88-P2-93A	1/4" Bronze Breather Vent	1
13	85-P2-17	5/8-11 S 3-1/2" Long HHCS (round)R2	1
	85-P2-244	3/4-10 X 4" Long HHCS (hex)	1
	85-P2-224	7/8-9 x 4-1/2" Gr. 5 HHCS(round)R256	1
14	85-P2-18	5/8-11 Hex Nut (round)R2	1
	85-P2-245	3/4-10 Hex Nut (hex)	1
	85-P2-225	7/8"-9 Hex Nut (round)R256	1
15	85-M2-17	Pin, 1-1/4" X 6 Long	1
16	85-P1-37	1-1/4" Pin Clip	2
17	89-P2-234	Model # / Serial # ID Plate	1
18	89-P2-237A	Safety Decal	2
19	85-M2-107	Pin, 7/8" X 16-11/16" Long	1

# 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 drill. **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 drill drive unit. The list below shows the most common places 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 cylinder circuit.

## WHEEL LOADERS & TRACTOR LOADERS

Auxiliary hydraulic outlets or bucket tilt (dump) cylinder circuit.

## TRACTOR 3-POINT HITCHES

Remote (auxiliary hydraulic outlets).

## FORKLIFTS

Auxiliary hydraulic outlets or side shift circuit.

3. Determine length of hydraulic hoses required to plumb drive unit into 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 drill's operating capacity.

Models 450, 850, 1350, 1850, and 2250 require two 1/2" (12.7mm) or 3/4" (19mm) ID hydraulic hoses with 1/2" 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 25% 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 drill. **READ AND UNDERSTAND OPERATING INSTRUCTIONS AND SAFETY INFORMATION PRIOR TO OPERATING YOUR EARTH DRILL.**

# OPERATING INSTRUCTIONS

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

2. With the auger raised off the ground and the vehicle engine set at a low RPM, activate the earth drill control valve to determine position. Control valve lever must be in to turn auger in a forward (clockwise) rotation. This is the forward position.

3. 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.

4. Return earth drill 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).

5. Activate the earth drill 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.

6. When 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.

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

8. Return the earth drill control valve to the neutral position to stop the rotation of the auger. Raise the auger out of the hole, move away from the hole, then activate the earth drill 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.

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

10. In some soil conditions or when excessive down pressure is applied, auger may "screw" itself into the ground and become stuck causing earth drill 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.

11. If the auger becomes lodged under rocks, roots, or other large obstructions, do not attempt to raise the auger out of the ground. See step 10 for proper procedure to relieve the auger.

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

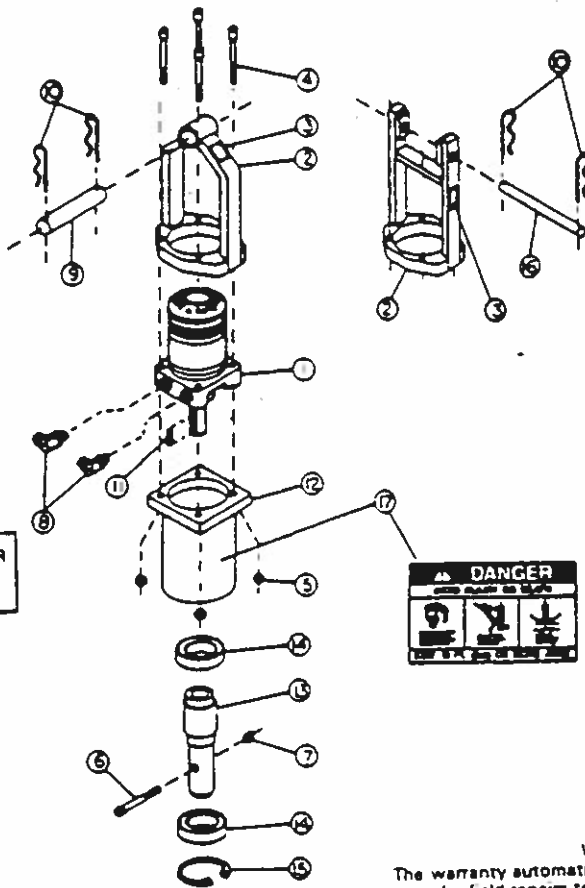
14. Keep Auger Teeth and points in good condition. Check frequently and always keep spares on hand so they can be replaced as wear is detected to avoid damage to tooth holders and auger flighting.

# MAINTENANCE INSTRUCTIONS

1. **CLEAN HYDRAULIC OIL IS ESSENTIAL!** 80% of all hydraulic component failures are caused by contamination of the hydraulic oil. Always keep all dirt and other contaminants from entering hydraulic system during disconnect and connect operations. Always use dust caps and plugs on all quick disconnects when not in use. Tightly cap all hydraulic openings to hold oil in and keep dirt and other contaminants from entering hydraulic system.
2. **CHECK HYDRAULIC OIL DAILY FOR CONTAMINATION.** If contamination is present, determine the source of the problem.
3. **INSPECT ALL HYDRAULIC HOSE ASSEMBLIES DAILY** for cracked and brittle covers caused by excessive heat. Reduced viscosity of hydraulic oil occurs at higher operating temperatures and causes a breakdown of fluid additives such as wear inhibitors. Excessive heat will cause higher internal leakage in drive unit motor which will make the drive unit less efficient. It can also cause seals in the drive unit motor which will make the drive unit less efficient. It can also cause seals in the drive unit motor to become brittle and crack. Replacement of hoses before failure will prevent loss of hydraulic oil, time consuming "bleeding" of the system, hydraulic oil contamination, and component damage caused by cavitation. It will also reduce the chance of personal injury caused by hydraulic fluid.
4. **CHECK AUGER DAILY** for loose, worn or broken cutting teeth and point. Worn teeth or point can drastically affect auger penetration and greatly reduce auger life expectancy. Always keep spare teeth and points on hand. Some digging conditions may require checking teeth and point at more frequent intervals.
5. **CHECK DRIVE UNIT AND ALL ACCESSORIES DAILY** for loose, bent, cracked, or worn bolts and fasteners. Always use grade 5 or harder replacement bolts. Always use lockwashers with standard hex nuts or self locking nuts.
6. **CHECK ALL CONNECTING PINS DAILY** for bends, cracks, breaks, or wear. Replace if any of these conditions exist.
7. **CHECK DRIVE UNIT OUTPUT SHAFT DAILY** for bends, cracks, breaks, or wear. Replace if any of these conditions exist.
8. **FOR MODELS 850, 1350, 1850, & 2250. CHANGE PLANETARY GEAR REDUCTION OIL AFTER FIRST 50 HOURS OF OPERATION, THEN EVERY 1000 HOURS OR IN ONE YEAR, WHICHEVER COMES FIRST.** Use mild extreme pressure lubricant API-GL-5, no.80 or 90 for filling the planetary gear reduction under normal temperature ranges between 0-120F (-18 to 49C). Approximate oil capacity for models 850, 1350, 1850, and 2250 is two pints (.95 liters). **CHECK OIL LEVEL DAILY** to assure proper lubrication is maintained.
9. **WHEN STORING DRIVE UNIT** for any length of time be sure drive unit motor and hoses are full of clean oil. For models 850, 1350, 1850, and 2250 be sure planetary gear reduction is full (to the recommended capacity for each model as outlined in #9) of clean lubricant.
10. Drive Unit output shaft, inside of auger collar, variable auger extension shaft, inside of variable auger extension collar and all connecting pins should be coated liberally with grease to prevent rust and reduce wear.
11. Once paint has been worn off auger, coat liberally with grease as required, to prevent rusting.

# MODELS 450 HYDRAULIC DRIVE UNIT EXPLODED VIEW & PARTS LIST

HYDRAULIC  
MOTOR BREAKDOWN  
SEE PAGE 24



NOTE: PROVIDE SERIAL NUMBER  
OF DRIVE UNIT WHEN PLACING  
PARTS ORDER

McMILLEN

**WARRANTY NOTE**  
The warranty automatically is void if any attempt is made to make field repairs to the hydraulic motor or planetary gear reduction. To qualify for warranty consideration, the complete unit must be available for McMillen's inspection in its original "failed" condition.

REFERENCE NUMBER	PART NUMBER	DESCRIPTION	QTY REQD
1	81-P2-255	Hydraulic Motor 450	1
2	80-M1-219A	Motor Mount Weldment	1
	80-M1-219B	3-Pt. Hitch Motor Mount Weldment (XT0450)	1
3	89-P2-234	Model #/Serial # ID Plate	1
4	85-P1-118	1/2-13 X 3-1/2" Lg Socket Head Cap Screw	4
5	85-P1-119	1/2-13 "Uni-Torque" Lock Nut	4
6	85-P2-17	5/8-11 X 3-1/2" Long, HHCS, Gr. 5	1
7	85-P2-18	5/8-11 Hex Nut	1
8	88-P1-111	45 "O" Ring Motor Fitting	1
9	85-M2-17	Pin, 1-1/4" X 6" Long	1
10	85-P1-37	1-1/4" Pin Clips	2
11	81-A3-636	Hardened Key for Hydraulic Motor	1
12	80-M1-43	Powerhead Housing	1
13	83-M1-44L	Powerhead Shaft	1
14	84-P1-60	Powerhead Bearing	2
15	85-P1-61	Powerhead Snap Ring	1
16	85-M1-221	Pin, 7/8" X 8-3/4" Long (XT10450)	1
17	89-P2-237A	Safety Decal	2
18	89-P2-236	McMillen Decal	2

# MODELS 450, 850, 1350, 1850 & 2250 DRIVE UNITS SPECIFICATIONS

## MODEL 450

MAXIMUM AUGER DIAMETER RECOMMENDED: 12" (305mm)  
 MINIMUM HYDRAULIC FLOW RECOMMENDED: 5 GPM (19 lpm)  
 MAXIMUM HYDRAULIC FLOW RECOMMENDED: 10 GPM (38 lpm)  
 MAXIMUM CONTINUOUS OPERATING PRESSURE: 3000 PSI (211 KG/cm<sup>2</sup>)

OUTPUT SPEED		OUTPUT TORQUE	
FLOW GPM (LPM)	SPEED RPM	PRESSURE PSI (KG/cm <sup>2</sup> )	TORQUE FT/LBS (Nm)
8 (30)	55	2000 (141)	470 (637)
9 (34)	64	2100 (148)	493 (669)
10 (38)	72	2200 (155)	516 (700)
11 (42)	79	2300 (162)	540 (732)
12 (45)	86	2400 (169)	563 (763)
13 (49)	93	2500 (183)	587 (796)
14 (53)	100	2600 (183)	610 (827)
15 (57)	107	2700 (190)	634 (860)
		2800 (197)	657 (891)
		2900 (204)	681 (923)
		3000 (211)	704 (955)

## MODEL 850

MAXIMUM AUGER DIAMETER RECOMMENDED: 24" (610 mm)  
 MINIMUM HYDRAULIC FLOW RECOMMENDED: 8 GPM (30 lpm)  
 MAXIMUM HYDRAULIC FLOW RECOMMENDED: 15 GPM (57 lpm)  
 MAXIMUM CONTINUOUS OPERATING PRESSURE: 3000 PSI (211 KG/cm<sup>2</sup>)

OUTPUT SPEED		OUTPUT TORQUE	
FLOW GPM (LPM)	SPEED RPM	PRESSURE PSI (KG/cm <sup>2</sup> )	TORQUE FT/LBS (Nm)
8 (30)	57	2000 (141)	855 (1159)
9 (34)	64	2100 (148)	898 (1218)
10 (38)	72	2200 (155)	941 (1276)
11 (42)	79	2300 (162)	984 (1334)
12 (45)	86	2400 (169)	1027 (1393)
13 (49)	93	2500 (176)	1069 (1450)
14 (53)	100	2600 (183)	1112 (1508)
15 (57)	107	2700 (190)	1155 (1566)
		2800 (197)	1198 (1624)
		2900 (204)	1240 (1681)
		3000 (211)	1283 (1740)

## MODEL 1850

MAXIMUM AUGER DIAMETER RECOMMENDED: 36" (914 mm)  
 MINIMUM HYDRAULIC FLOW RECOMMENDED: 15 GPM (57 lpm)  
 MAXIMUM HYDRAULIC FLOW RECOMMENDED: 30 GPM (114 lpm)  
 MAXIMUM CONTINUOUS OPERATING PRESSURE: 3000 PSI (211 KG/cm<sup>2</sup>)

OUTPUT SPEED		OUTPUT TORQUE	
FLOW GPM (LPM)	SPEED RPM	PRESSURE PSI (KG/cm <sup>2</sup> )	TORQUE FT/LBS (Nm)
15 (57)	52	2000 (141)	1761 (2388)
16 (61)	55	2100 (148)	1849 (2507)
18 (68)	62	2200 (155)	1937 (2627)
20 (76)	69	2300 (162)	2025 (2746)
22 (83)	76	2400 (169)	2113 (2865)
24 (91)	83	2500 (176)	2200 (2983)
26 (98)	90	2600 (183)	2289 (3104)
27 (106)	97	2700 (190)	2377 (3223)
30 (114)	104	2800 (197)	2465 (3343)
		2900 (204)	2553 (3462)
		3000 (211)	2641 (3581)

## MODEL 1350

MAXIMUM AUGER DIAMETER RECOMMENDED: 30" (762 mm)  
 MINIMUM HYDRAULIC FLOW RECOMMENDED: 10 GPM (38 lpm)  
 MAXIMUM HYDRAULIC FLOW RECOMMENDED: 20 GPM (76 lpm)  
 MAXIMUM CONTINUOUS OPERATING PRESSURE: 3000 PSI (211 KG/cm<sup>2</sup>)

OUTPUT SPEED		OUTPUT TORQUE	
FLOW GPM (LPM)	SPEED RPM	PRESSURE PSI (KG/cm <sup>2</sup> )	TORQUE FT/LBS (Nm)
10 (38)	51	2000 (141)	1204 (1633)
11 (42)	56	2100 (148)	1264 (1714)
12 (45)	61	2200 (155)	1324 (1795)
13 (49)	66	2300 (162)	1384 (1877)
14 (53)	71	2400 (169)	1444 (1958)
15 (57)	78	2500 (176)	1504 (2039)
16 (61)	81	2600 (183)	1565 (2122)
17 (64)	86	2700 (190)	1625 (2204)
18 (68)	91	2800 (197)	1685 (2285)
19 (72)	96	2900 (204)	1745 (2366)
20 (76)	101	3000 (211)	1805 (2448)

## MODEL 2250

MAXIMUM AUGER DIAMETER RECOMMENDED: 36" (914 mm)  
 MINIMUM HYDRAULIC FLOW RECOMMENDED: 20 GPM (76 lpm)  
 MAXIMUM HYDRAULIC FLOW RECOMMENDED: 30 GPM (114 lpm)  
 MAXIMUM CONTINUOUS OPERATING PRESSURE: 3000 PSI (211 KG/cm<sup>2</sup>)

OUTPUT SPEED		OUTPUT TORQUE	
FLOW GPM (LPM)	SPEED RPM	PRESSURE PSI (KG/cm <sup>2</sup> )	TORQUE FT/LBS (Nm)
20 (76)	54	2000 (141)	2267 (3101)
21 (80)	58	2100 (148)	2331 (3261)
22 (83)	59	2200 (155)	2494 (3416)
23 (87)	62	2300 (162)	2608 (3540)
24 (91)	64	2400 (169)	2721 (3721)
25 (95)	67	2500 (176)	2834 (3878)
26 (98)	70	2600 (183)	2948 (4034)
27 (102)	72	2700 (190)	3061 (4200)
28 (106)	75	2800 (197)	3175 (4387)
29 (110)	78	2900 (204)	3288 (4514)
30 (114)	81	3000 (211)	3401 (4670)

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 anytime without notice or obligation.



# TROUBLESHOOTING

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

FOR FURTHER ASSISTANCE, PLEASE CONTACT OUR SERVICE DEPARTMENT AS FOLLOWS:

NORTH AMERICA TOLL FREE: (800) 234-0964

Outside North America (219) 747-6195  
Fax: (219) 747-9161

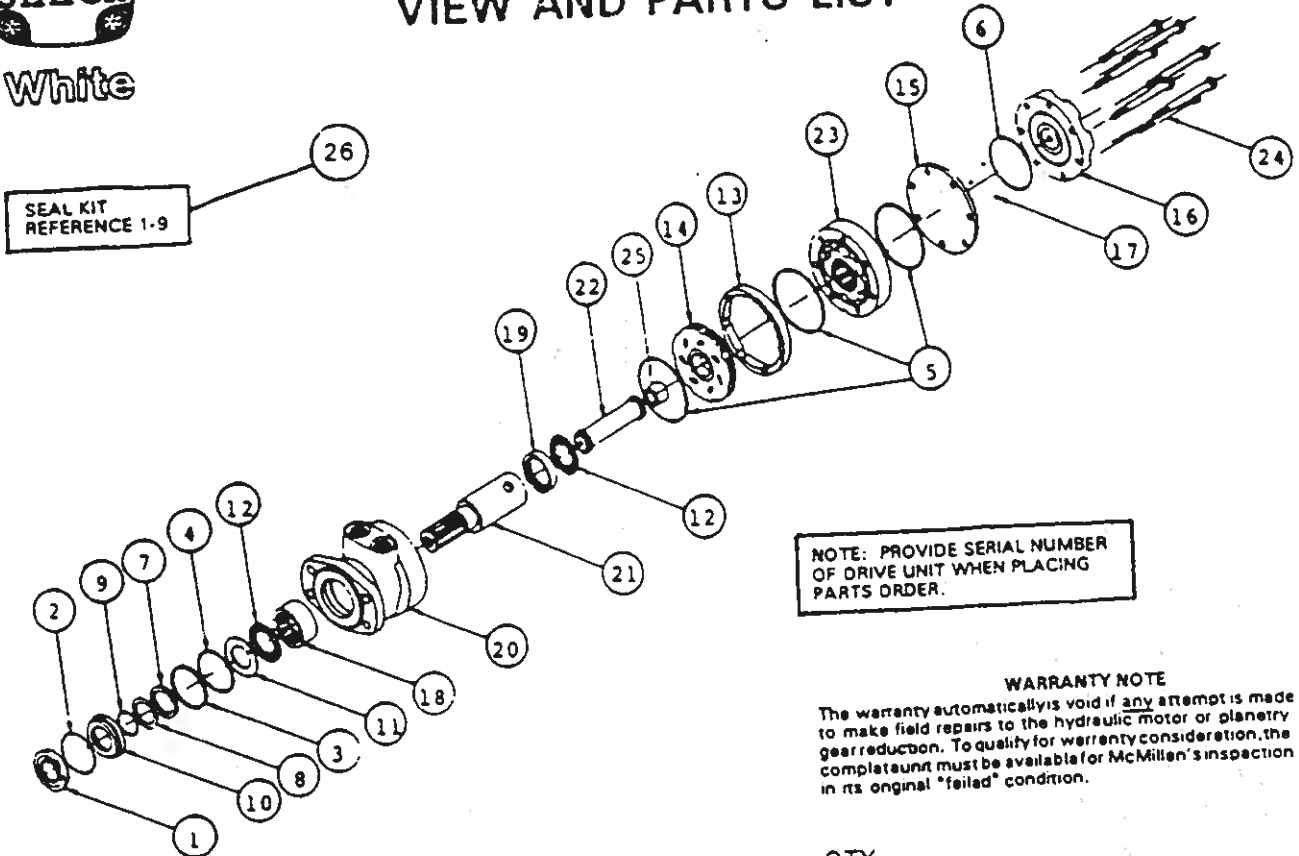
### WARRANTY NOTE:

The warranty automatically is void if any attempt is made to make field repairs to the hydraulic motor or planetary gear reduction. To qualify for warranty consideration, the complete unit must be available for McMillen's inspection in its original "failed" condition.



White

# MODEL 450, 850, 1350, 1850, & 2250 HYDRAULIC MOTOR EXPLODED VIEW AND PARTS LIST



NOTE: PROVIDE SERIAL NUMBER OF DRIVE UNIT WHEN PLACING PARTS ORDER.

**WARRANTY NOTE**  
The warranty automatically is void if any attempt is made to make field repairs to the hydraulic motor or planetary gear reduction. To qualify for warranty consideration, the complete unit must be available for McMillen's inspection in its original "failed" condition.

REFERENCE NUMBER	PART NUMBER	DESCRIPTION	QTY	REQ'D MODELS USED ON
			1	All Models
10	81-A3-909	Seal Carrier	1	All Models
11	81-A3-910	Thrust Washer	2	All Models
12	81-A3-911	Thrust Bearing	1	All Models
13	81-A3-912	Manifold Boot	1	All Models
14	81-A3-913	Manifold CCW	1	All Models
15	81-A3-914	Balance Plate	1	All Models
16	81-A3-915	End Cover	1	All Models
17	N.S.S.	Ball, 3/16" (order reference 15)	4	All Models
18	81-A3-917	Roller Bearing	1	All Models
19	81-A3-918	Roller Bearing	1	850, 1350, 1850, 2250
20	81-A3-919	Housing (Includes 18 & 19)	1	450
	81-A3-935	Housing (Includes 18 & 19)	1	850, 1350, 1850, 2250
21	81-A3-920	Shaft	1	450
	81-A3-934	Shaft (with key)	1	450
22	81-A3-937	Drive Link	1	850, 1350
	81-A3-921	Drive Link	1	1850
	81-A3-927	Drive Link	1	2250
	81-A3-930	Drive Link	1	450, 1850
23	81-A3-928	Rotor Set Assembly	1	850
	81-A3-922	Rotor Set Assembly	1	1350
	81-A3-924	Rotor Set Assembly	1	2250
	81-A3-931	Rotor Set Assembly	1	850
24	81-A3-923	Bolts	7	1350
	81-A3-925	Bolts	7	1850
	81-A3-929	Bolts	7	2250
	81-A3-932	Bolts	7	450
	81-A3-936	Bolts	7	1350
25	81-A3-926	Spacer Drive Link	1	All Models
26	87-A3-933	Seal Kit (Reference 1-9)	1	All Models

# MODEL 450 850, 1350, 1850, AND 2250 HYDRAULIC MOTOR SERVICE PROCEDURES

Prior to disassembly, clean off the exterior of the motor. It may be helpful for later reference to use a felt marker to not the "Top" and "Bottom" of each piece with respect to the piece next to it, as proper reassembly is critical in this regard. There is no internal timing and radial location is important.

## DISASSEMBLY

1. Place motor in vise with shaft end down, clamping around the motor parts.
2. Remove bolts (24) and end cover (16).
3. Remove balance plate (15), taking care not to drop the 3/16 balls (17) located in the holes in the balance plate (15).
4. Remove rotor assembly (23), manifold boot (13), manifold (14), drive link (22), spacer (25) (if req.), and thrust bearing (12).
5. Remove shaft (21) up through housing (20).
6. Turn housing (20) over and pry out dust seal (1).
7. Push the seal carrier (10), thrust washer (11), and thrust bearing (12) down toward the roller bearing (18) located in the housing bore. Remove snap ring (2), steel back-up shim (3), and lathe cut seal (4) from the inner bore groove with a small screwdriver.
8. Lift out the seal carrier (10), thrust washer (11), and thrust bearing (12) from the housing bore. Note that the metal portion of the seal carrier (10) and the thrust washer (11) are not provided in the seal kit #87-A3-933 and must be ordered separately or reused.

## REASSEMBLY

Each part should be washed in clean solvent prior to reassembly. Internal workings of motor must be totally free of dirt or debris. Seals should be lightly oiled prior to installation.

1. Place housing (20) on clean work bench (output end up).
2. Place shaft (21) in housing (20).
3. Place thrust bearing (12) on shaft (21) and into housing (20).
4. Place thrust washer (11) on shaft (21) and into housing (20).
5. Install lathe cut seal (4) into seal groove in bore of housing (20).
6. With viton shaft seal (7) on plastic installation sleeve provided (with large surface area up) place plastic installation sleeve over shaft end, covering all splines, keyways and snap ring grooves. Slide viton shaft seal down the plastic installation sleeve, onto the shaft (21) until the shaft seal (7) contracts the thrust washer. Remove plastic installation sleeve.
7. Carefully install the teflon back-up (8) over the shaft end (21) (flat side up, lipside down.) until the lip on the teflon back-up engages with the viton shaft seal (7).

8. Install metal back-up ring (9) onto the shaft (21) and down against the teflon backup (8).

9. Place the metal shaft seal carrier (10) onto the shaft (21) (large end down).

10. Carefully press metal seal carrier (10) into the lathe cut seal (4).

11. Install the steel back-up shim (3) next to the seal (4). Note that shim must be folded and bent slightly and worked into place with a small screwdriver.

12. Install wire retaining ring (2) next to steel back-up shim (3).

13. Place housing/shaft assembly in vise with shaft end down.

14. Install drive link (22). Tap lightly on drive link end to seat the shaft assembly into the retaining ring. Drive links (22) must be oriented properly with respect to the shaft end and rotor end. The splines on the rotor end are flat on the outside diameter of the spline. The splines on the shaft end are crowned on the outside diameter.

15. Place thrust bearing (12) on the shaft end. Make sure the bearing sits inside the housing bore.

16. Install one body seal (5) into groove in housing (20).

17. Place manifold (14) onto housing (20) aligning bolt holes. **NOTE:** manifold side with only 7 valving holes goes towards housing.

18. Place manifold boot (13) around manifold (14).

19. Install one body seal (5) into groove in "bottom" side of rotor assembly (23). Bottom side has one deep groove in rotor. Place rotor assembly on manifold (14) engaging drive link splines (22). Turn rotor assembly (23) to align bolt holes.

20. If model requires a spacer (25), place spacer on drive link end.

21. Place balance plate (15) onto rotor assembly (23) and install 3/16" check balls (17) into holes provided.

22. Install 3.12" O.D. body seal (6) into the seal groove in the end cover (16).

23. Place end cover (16) onto the balance plate (15) and align bolt holes.

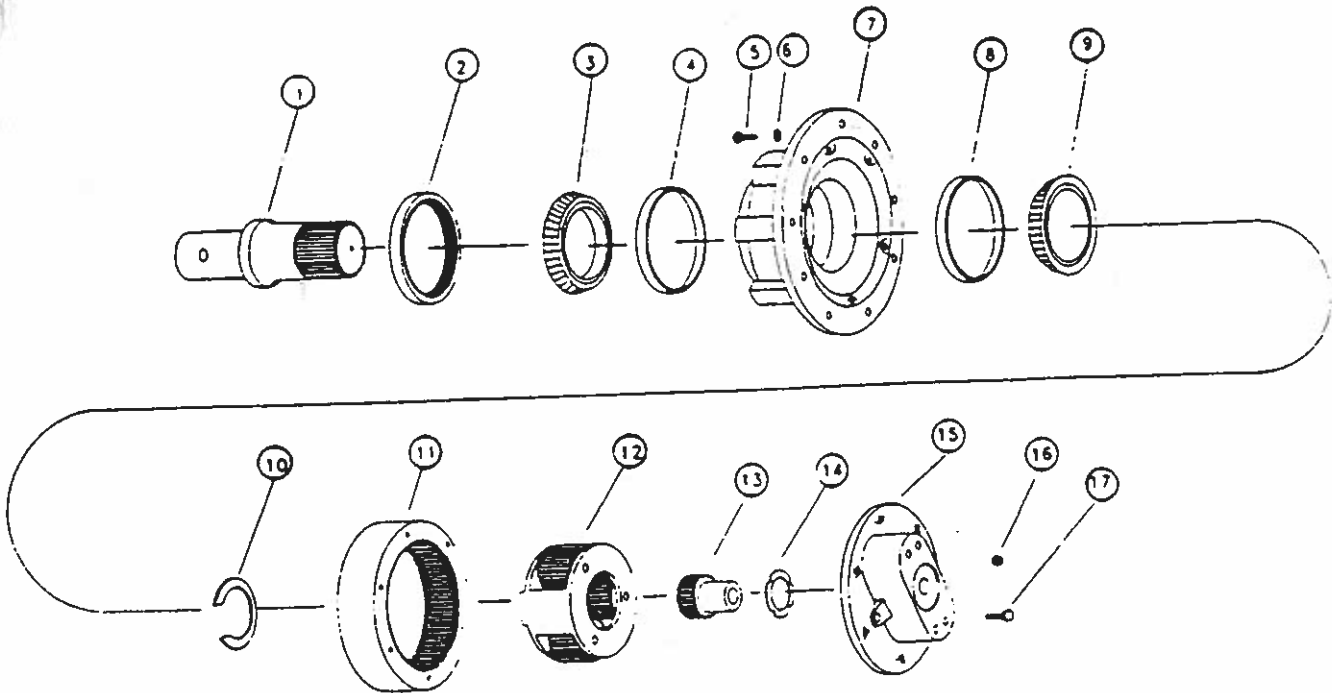
24. Insert seven bolts (24) and torque in a crisscross manner to 50 foot pounds. Remove motor from vise and place on work bench with shaft up.

25. Install dust seal (1) to flush with the pilot face of the housing (20).

## WARRANTY NOTE

The warranty automatically is void if any attempt is made to make field repairs to the hydraulic motor or planetary gear reduction. To qualify for warranty consideration, the complete unit must be available for McMillen's inspection in its original "failed" condition.

# MODEL 850, 1350, 1850, & 2250 PLANETARY GEAR REDUCTION EXPLODED VIEW AND PARTS LIST



**NOTE: PROVIDE SERIAL NUMBER  
OF DRIVE UNIT WHEN PLACING  
PARTS ORDER.**

## WARRANTY NOTE:

The warranty automatically is void if any attempt is made to make field repairs to the hydraulic motor or planetary gear reduction. To qualify for warranty consideration, the complete unit must be available for McMillen's inspection in its original "failed" condition.

REFERENCE NUMBER	PART NUMBER	DESCRIPTION	QTY REQ'D
1	87-A3-700	2" Round Output Shaft	1
	87-A3-701	2" Hexagon Output Shaft	1
	87-A3-737	2-9/16" Round Output Shaft	1
2	87-A3-702	Oil Seal	1
3	87-A3-703	Bearing Cone	2
4 & 8	87-A3-704	Bearing Cup	6
5	87-A3-705	Bolt	6
6	87-A3-706	Flat Washer	1
7	87-A3-707	Hub	1
9	87-A3-708	Bearing Cone	1
10	87-A3-709	Retaining Ring Set	1
11	87-A3-710	Ring Gear	1
12	87-A3-711	Carrier Assembly	1
13	87-A3-712	Sun Gear	1
14	87-A3-713	Thrust Washer	1
15	87-A3-714	Cover	1
16	87-A3-715	Magnetic Pipe Plug	8
17	87-A3-716	Bolt	8

# PLANETARY GEAR REDUCTION 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.

It is important to airblast all parts and wipe them with a clean, lintless cloth before assembly.

It is a good idea to check all replacement parts closely before installing to ensure that no damage occurred during shipment.

## 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 bearing cones or cups. Use only an arbor press or other suitable tool.

## DISASSEMBLY

1. Index mark all sections with a punch. Be sure to align these marks when reassembling.

2. Remove bolts (17) from cover (15). Lift cover (15) from assembly. Thrust washer (14) usually remains with cover (15).

3. Lift sun gear (13) from carrier assembly (12).

4. Remove carrier assembly (12).

5. Remove six hex head bolts (5) and washers (6) from hub (7). Pull ring gear (11) from remaining assembly. It may be necessary to strike ring gear (11) with a rubber mallet to loosen from hub (7).

6. **WARNING! EYE PROTECTION SHOULD BE WORN DURING RETAINING RING REMOVAL.** Remove retaining ring (10) from groove in output shaft (1). Pull output shaft (1) from hub (7).

**NOTE:** To remove retaining ring use retaining ring expander tool.

7. Remove oil seal (2) and bearing cones (3 & 9) from hub (7). Inspect bearing cups (4 & 8) in hub (7) and remove only if replacement is required.

## ASSEMBLY

1. Press new bearing cups (4 & 8) into each side of hub (7). It is recommended that bearing cups (4 & 8) and cones (3 & 9) be replaced in sets.

2. Assemble bearing cone (3) into cup (4) at seal end of hub (7).

3. Lubricate lips of oil seal(2) and lower hub(7) onto output shaft(1). Keep hub(7) centered to prevent damage to oil seal(2).

4. **WARNING! EYE PROTECTION SHOULD BE WORN DURING RETAINING RING INSTALLATION.** Assemble bearing cone (9) over output shaft (1) and into bearing cup (8). Select the thickest retaining ring (10) that can be assembled into ring groove on output shaft (1) above bearing. Bearings should have from .000-.006 inches (.00-.15mm) endplay when proper retaining ring (10) is installed.

5. Apply a bead of silicone sealant to face of hub (7) that mates with ring gear (11). See instructions on sealant package.

**NOTE:** Silicone sealant should be applied in a continuous bead, which should be centered on the inside of the hole at each bolt hole location.

6. Assemble ring gear (11) to hub (7) being careful to align all bolt holes.

7. Install six hex head bolts (5) and washers (6). Torque bolts to 52-60 FT/LBS (70.5-81.3 Nm).

8. Place carrier assembly (12) into ring gear (11) aligning the gear teeth. Carrier splines mesh with splines on output shaft (1). Place sun gear (13) into carrier assembly (12). Sun gear (13) should turn freely by hand.

9. Apply a bead of silicone sealant to cover face of ring gear (11). See **NOTE** in step 5 for proper silicone seal application.

10. Secure thrust washer (14) with tangs engaged in cover (15). **NOTE:** thrust washer (14) can be secured to cover (15) with a small amount of grease or silicone sealant. Assemble cover (15) to ring gear (11).

11. Install eight bolts (17) and torque to 20-25 FT/LBS (27.1-33.9 Nm).

12. Position unit with output shaft pointing down (towards ground) and fill unit until oil just begins to flow from fill plug (approximately 2 pints - .95 liter). Install magnetic pipe plug (16) and standard pipe plug (18). On all models in cover (15). (See drive unit assembly page).

## CARRIER ASSEMBLY

The carrier assembly (12) must be serviced in its entirety to protect the integrity of the planetary gear reduction.

## LUBRICATION RECOMMENDATIONS

Use mild extreme pressure lubricant API-GL-5, no. 80 or 90 for filling the planetary gear reduction under normal temperature ranges between 0-120F (-18 to 49C). Approximate oil capacity is two pints (.95 liter). Change oil after first 50 hours of operation, then every 1000 hours or in one year, whichever occurs first. Check oil level frequently to assure proper lubrication level is maintained.

## WARRANTY NOTE

The warranty note automatically is void if any attempt is made to make field repairs to the hydraulic motor or planetary gear reduction. To qualify for warranty consideration, the complete unit must be available for McMillen's inspection in its original "failed" condition.

## HDP STYLE AUGER PARTS LIST

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>AUGER DIAMETER:</u>					
		<u>6"</u> <u>QTY</u>	<u>8"</u> <u>QTY</u>	<u>9"</u> <u>QTY</u>	<u>10"</u> <u>QTY</u>	<u>12"</u> <u>QTY</u>	<u>15"</u> <u>QTY</u>
82-P2-12	Hardened Drive-In Wisdom Tooth	2	2	2	2	2	2
82-P2-13	3-1/2" Fishtail Point	1	1	1	1	1	1
82-P2-21	Hardened Drive-In Chisel Tooth		2	2	2	2	4

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>AUGER DIAMETER:</u>					
		<u>16"</u> <u>QTY</u>	<u>18"</u> <u>QTY</u>	<u>20"</u> <u>QTY</u>	<u>24"</u> <u>QTY</u>	<u>30"</u> <u>QTY</u>	<u>36"</u> <u>QTY</u>
82-P2-12	Hardened Drive-In Wisdom Tooth	2	2	2	2	2	2
82-P2-13	3-1/2" Fishtail Point	1	1	1	1	1	1
82-P2-21	Hardened Drive-In Chisel Tooth	4	4	4	6	8	10

## HDF STYLE AUGER PARTS LIST

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>AUGER DIAMETER:</u>						
		<u>4"</u> <u>QTY</u>	<u>6"</u> <u>QTY</u>	<u>8"</u> <u>QTY</u>	<u>9"</u> <u>QTY</u>	<u>10"</u> <u>QTY</u>	<u>12"</u> <u>QTY</u>	<u>15"</u> <u>QTY</u>
82-P2-12BN	Hardened Bolt-on Wisdom Tooth		2	2	3	3	4	5
82-P2-13	3-1/2" Fishtail Point		1	1	1	1	1	1
82-A2-26		1						

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>AUGER DIAMETER:</u>					
		<u>16"</u> <u>QTY</u>	<u>18"</u> <u>QTY</u>	<u>20"</u> <u>QTY</u>	<u>24"</u> <u>QTY</u>	<u>30"</u> <u>QTY</u>	<u>36"</u> <u>QTY</u>
82-P2-12BN	Hardened Bolt-on Wisdom Tooth	5	6	6	8	9	11
82-P2-13	3-1/2" Fishtail Point	1	1	1	1	1	1

## HTF STYLE AUGER PARTS LIST

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>AUGER DIAMETER:</u>			
		<u>18"</u> <u>QTY</u>	<u>24"</u> <u>QTY</u>	<u>30"</u> <u>QTY</u>	<u>36"</u> <u>QTY</u>
82-P2-12BN	Hardened Bolt-on Wisdom Tooth	7	10	11	13
82-P2-13	3-1/2" Fishtail Point	1	1	1	1

**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.