

Operation and Service Manual for WYCO

Hydraulic Paving Vibrators





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CHAPTER 1 GENERAL INFORMATION

a) Purpose of Vibration

The use of internal vibration is required to improve the workability of low slump concrete used in slip form paving. Low slump concrete reduces edge slump conditions, which allows the concept of slip form paving to work. Also, lower slump concrete generally means a lower water to cement ratio, which increases pavement strength. Vibration increases the workability of concrete by fluidizing it and helps to provide a smooth workable surface. Equally important, it consolidates the concrete reducing entrapped air, honey combing, cold jointing and other internal flaws which would reduce pavement strength.

b) Vibrator Positioning and Spacing

Proper positioning and operation of vibrators in the paving slip form molds is important to provide proper consolidation of the concrete. Generally, the distance between vibrators should be between 12 and 24 inches depending on mix design, paver speed, vibrator speed and numerous other factors.

The proper position of the vibrators should be with their tips angled downward slightly and as close to the center of the slab as possible. With the vibrator tip angled down into the center of the slab, the opening created by the vibrator will have a tendency to fill with a more uniform mixture. Also, the highly vibrated concrete directly next to the vibrator will be spread over a larger area reducing the chance of localized over-vibration. The angle also helps to increase the area vibrated by not directing vibration straight down into the subbase.

c) Vibrator Speed (VPM) Vibrations per Minute

Historically, vibrator speed has been between 5,000 and 10,800 VPM, although in some areas, the trend is to reduce speeds to

between 5,000 and 8,000 VPM. As with vibrator spacing, the optimum vibrator speed depends on many factors. These include, but are not limited to mix design, paver speed and vibrator spacing. Regardless of what optimum speed is required it is important to closely monitor vibrator speed to ensure a consistent quality and more uniformly consolidated pavement.

d) Paver Travel Speed

Paver travel speed will affect consolidation. If the paver speed is too high, the vibrators may not be vibrating in the mix for a long enough duration to adequately consolidate it. If the paver travel speed is too slow, over-vibration will occur, driving entrained air out and segregating the mix.

e) Mix Design and Slump

Mix design and slump have an influence on concrete consolidation. A high slump concrete will consolidate easier than a low slump concrete. However, if the slump is too high it will cause edge slump problems and lower the strength of the concrete. If the mix consists of fine aggregate and one size of large coarse aggregate, it will be harder to consolidate and finish the slab. It is recommended to use a mix that uses at least two aggregate sizes, one large and one small. The smaller aggregate mixed in with the larger aggregate will fill some of the larger voids, thus making finishing and consolidation easier.



**CHAPTER 2
VIBRATOR DESIGN FUNDAMENTALS**

a) Rotor

The rotor is the component that generates vibration. A vibration impulse is generated every revolution. It is essentially a shaft with material removed from one side to create an unbalance. The greater the unbalance, the greater the centrifugal force that can be generated. The following lists the potential centrifugal forces generated by the rotor at different speeds:

<u>Speed</u>	<u>VPM</u>	<u>Force</u>	<u>2000#</u>	<u>2500#</u>
5,000.....		448		562
6,000.....		677		809
7,000.....		877		1,101
8,000.....		1,145		1,438
9,000.....		1,450		1,820
10,000.....		1,790		2,247
10,800.....		2,088		2,621

b) Bearing and Bearing Cups

Two bearings are located on each end of the rotor. Each bearing is individually sealed and lubricated with high temperature grease. The bearings are separated from each other by a shim, which prevents interaction between the bearing outer races. The bearing inner races and shims are clamped together on both ends of the rotor using threaded components. The bearings fit into high precision ground bearing cups. The clearance between the bearing outer diameters and the bearing cup inner diameters is extremely small. A hardened cup is permanently pressed into the head housing. The other cup is slotted to prevent rotation and it mates with the motor housing.

c) Hydraulic Motor

Forcing hydraulic oil through it operates the Hydraulic Motor. The oil passes between two gears, causing the output shaft to turn. The output shaft is centered on the motor. A gear is internally mounted on the output shaft and mates with an idler gear. A lip seal assembly

is used to seal between the aluminum hydraulic motor housing and the output shaft. Controlling the oil flow through the motor can control the motor speed.

d) Square Head Housing

The Square Head Housing has four flat sides which are beneficial for transmitting vibration to the mix. It supports the rotor through the bearings and bearing cups. The external surfaces are case hardened for wear resistance.

e) Oldham Style Drive Components

The components that transmit rotation from the hydraulic motor to the rotor are of a design known as Oldham drive. These components allow for a slight misalignment between motor and rotor axes of rotation. The output shaft from the hydraulic motor has two flat parallel surfaces. These flat surfaces mate with a slot in the driver. The driver also has flat surfaces, which mates with the slot in the driver sleeve. The driver sleeve screws on to the end of the rotor. The drive slots are located 90 degrees from each other. Small amounts of misalignment are compensated for with a small amount of relative motion between the flats and the slots.

f) Vibration Isolator

The rubber vibration isolator is used to reduce transmission of vibration to the mounting bar of the paver. It allows for a small amount of relative motion required to create vibration while maintaining support for the vibrator.

g) Hydraulic Hoses and Quick Disconnects

Two hydraulic hose connections are required. The pressure hose is the smaller diameter hose and it supplies hydraulic oil to the vibrator. The return hose is the larger diameter hose and hydraulic oil exits through it. Quick disconnects are used on the end of each vibrator hose. Generally, the female quick disconnect is attached to the pressure line.





The quick disconnects can be attached to each other when removed from the machine to prevent contamination.

h) Protective Hoses and Plugs

A rubber protective hose surrounds the hydraulic hoses leaving the vibrator, preventing wear due to concrete abrasion. This protective hose is attached to the vibrator with hose clamps. A rubber plug supports the hydraulic hoses where the hydraulic hoses leave the vibrator, preventing it from rubbing against metal. Another plug is located where the hydraulic hoses leave the protective hose. This plug primarily is used to prevent foreign material from entering the protective hose.

CHAPTER 3 INSTALLATION AND OPERATING REQUIREMENTS

a) Mounting Vibrators

See figure line art drawings for illustrations of item numbers listed in parenthesis.

Angle bracket mounted vibrators are intended to be mounted on a round bar having an outside diameter of 2" to 2-7/8". Generally the vibrator tip should be angled downward 15 to 30 degrees. Attach the top clamp (23) around the mounting bar and tighten the two bolts (24), nuts (20) and lock washers (19).

Straight bracket mounted vibrators (page 9) should be mounted with two isolators.

b) Hydraulic Hose Connection

The hydraulic hoses exiting the vibrator are supplied with quick disconnects. Normally the male quick disconnect is attached to the pressure line, but this can vary. The smaller diameter hose is the pressure. Always ensure that these hoses are attached accordingly or the oil seal in the hydraulic motor will fail very quickly.



THE SEAL ON THE HYDRAULIC MOTOR WILL FAIL QUICKLY IF THE HOSES ARE IMPROPERLY CONNECTED.



ENSURE THAT THE QUICK DISCONNECTS ARE CLEAN PRIOR TO ASSEMBLY OR LEAKAGE MAY OCCUR. WHENEVER A VIBRATOR IS NOT CONNECTED TO A PAVER, CONNECT THE PRESSURE AND RETURN LINES TOGETHER TO AVOID CONTAMINATION.



IT IS IMPORTANT TO MINIMIZE THE AMOUNT OF HOSE CONNECTED TO THE RETURN LINE. EXCESSIVE AMOUNTS OF RETURN HOSE WILL INCREASE BACK PRESSURE ON THE HYDRAULIC MOTOR SEAL, CAUSING PREMATURE HYDRAULIC MOTOR SEAL FAILURE.

c) Oil filtration

The hydraulic oil must be properly filtered to ensure proper operation and to prevent wear and damage due to contaminants.



IT IS IMPORTANT THAT THE HYDRAULIC FLUID BE PROPERLY FILTERED TO 10 MICRON ABSOLUTE (ISO 17/13 FLUID CLEANLINESS). OIL THAT IS NOT PROPERLY FILTERED MAY CAUSE DAMAGE TO THE HYDRAULIC MOTOR.

d) Vibrator Performance and Oil Supply

Oil Pressure

Oil pressure will vary depending on oil temperature, flow rate, oil viscosity and the amount of hose connected between manifold and vibrator. A vibrator in good condition should operate with a pressure of 700 PSI to 1200 PSI at 4 GPM and 140° F.

Temperature

The hydraulic oil temperature should be maintained between 100° F and 180° F with 140° F being optimum.



UNDER 100°F, EXCESSIVE PRESSURE IS REQUIRED TO OPERATE THE VIBRATOR AT NORMAL SPEEDS. TEMPERATURES ABOVE 196° F



COULD CAUSE SERIOUS DAMAGE. WHEN EXCESSIVE TEMPERATURES ARE ENCOUNTERED, FOLLOW THE PAVER MANUFACTURING RECOMMENDATIONS TO REMEDY THE SITUATION.

the most. The rule then can be read giving the operating speed.

Flow Rate

The flow rate of the hydraulic oil through the vibrator directly affects the speed of the vibrator. When the flow is increased or decreased the vibrator speed increases or decreases, respectively. Oil temperature, oil viscosity and the condition of the vibrator can affect the relationship between flow and vibrator speed. Typical vibrator speed at 4 GPM is approximately 10,800 VPM and typical vibrator speed at 3 GPM is approximately 8,100 VPM.

e) Trouble Shooting

To aid in trouble shooting the following tools are available from Wyco Tool:

Hydraulic Test Kit
(Wyco PN 419850)

This kit can measure pressure and flow in either the pressure or return line of the vibrator. It mates with the standard vibrator quick disconnects.

Vibrating Reed-Type Tachometer
(Wyco PN 419855)

This is a reed type tachometer that quickly measures vibration speed when put in contact with the rubber protective hose close to the vibrator. When put in contact, the reed that vibrates the most is the operating speed.

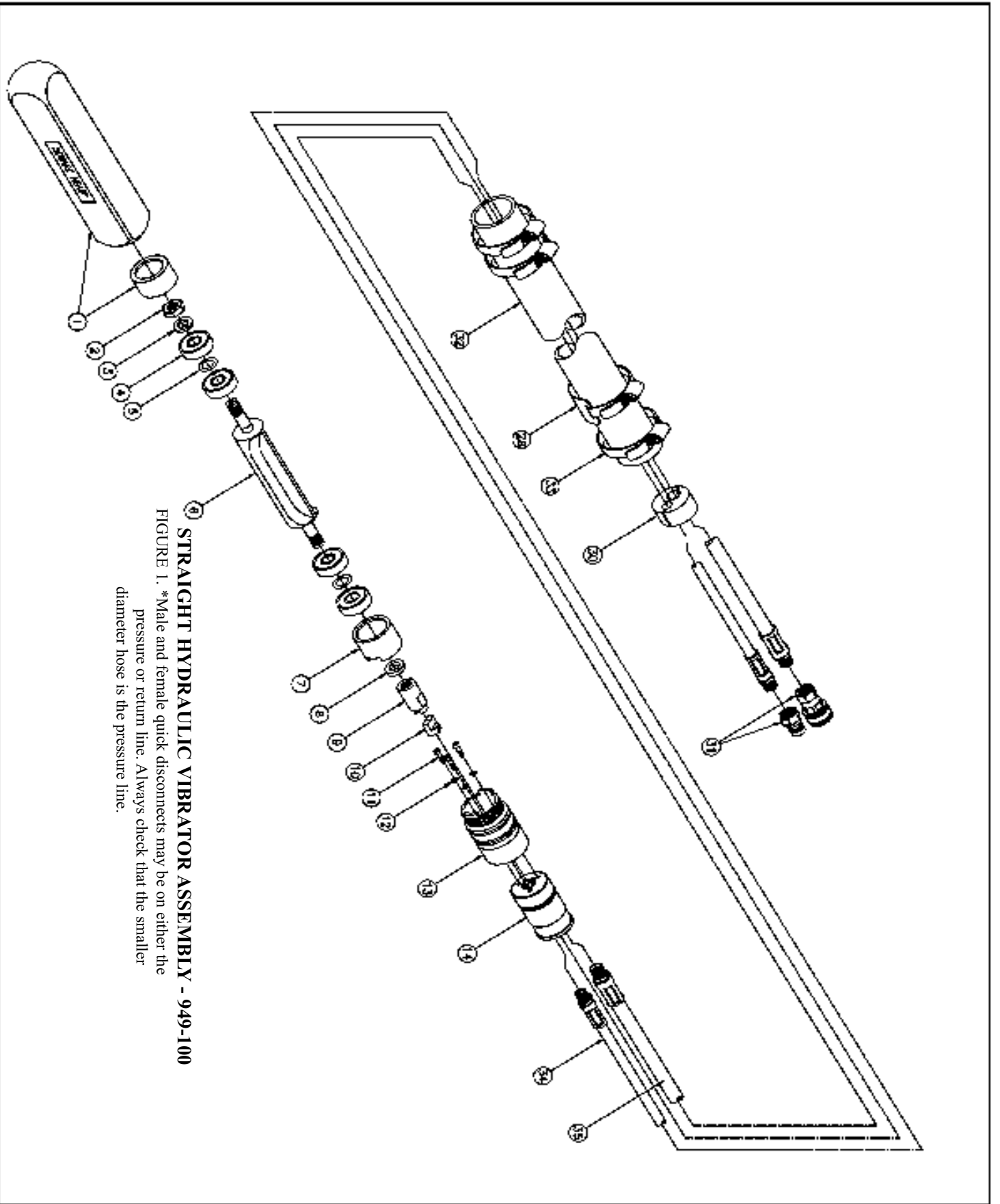
Slide Rule Tachometer
(Wyco PN 001000)

This is a less expensive alternative to the tachometer above. It is slightly more difficult to use and more fragile, but it will provide an accurate reading. When put in contact with the rubber protective hose near the vibrator, a wire is extended until it deflects



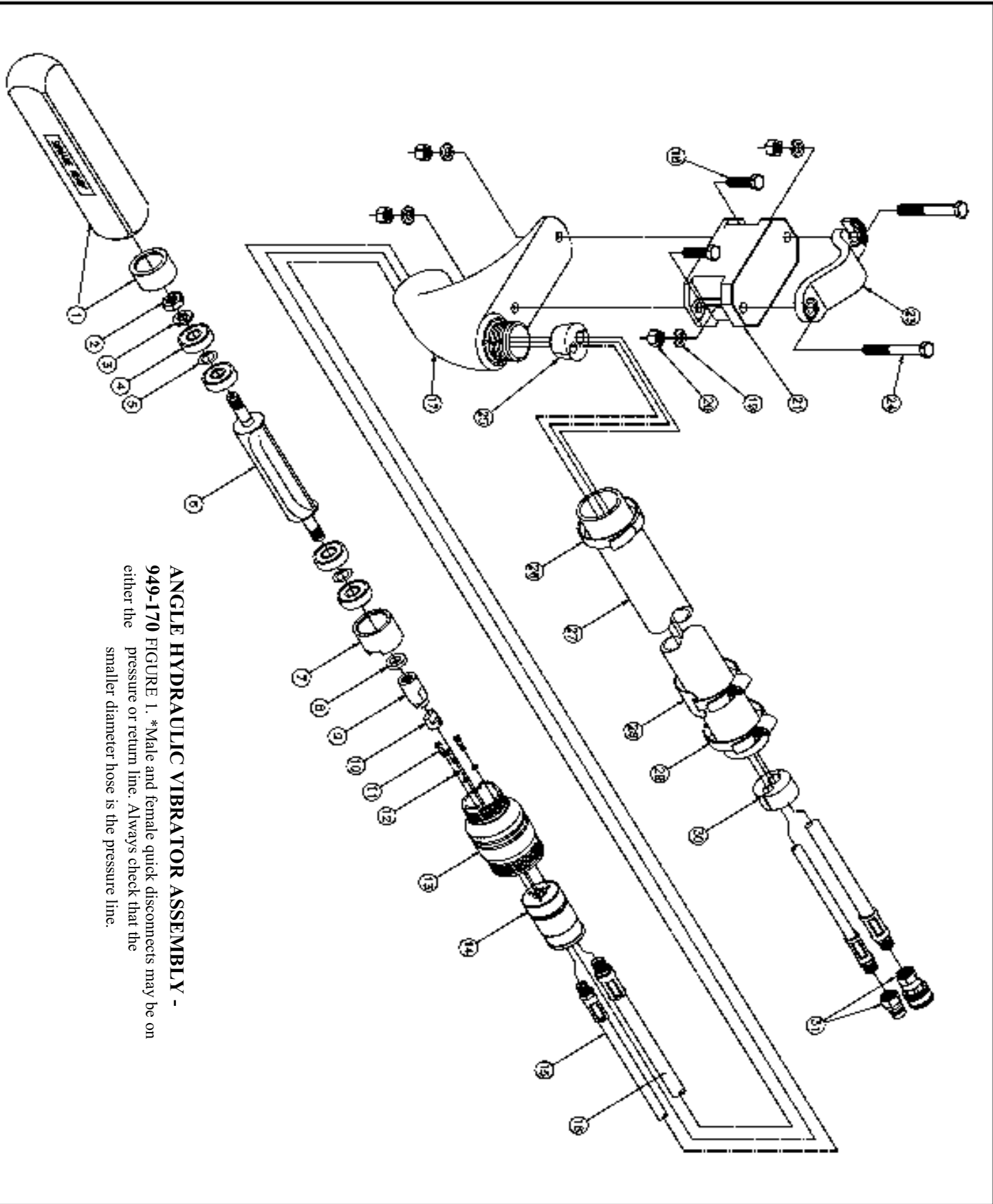
TROUBLE SHOOTING CHART

<u>Trouble</u>	<u>Possible Causes</u>	<u>Solutions</u>
Vibrator not running	1) Required oil flow and pressure not supplied 2) Failed bearings 3) Hydraulic motor locked up	1) Supply required oil flow and pressure 2) Replace eccentric bearings per Chapter 4, Section c 3) Replace hydraulic motor per Chapter 4, Section e
Vibrator running slow	1) Vibrator head full of oil 2) Required oil flow and pressure not supplied 3) Hydraulic motor worn internally	1) Replace hydraulic motor shaft seal per Chapter 4, Section d and bearings per Chapter 4, Section c 2) Supply required oil flow and pressure; Check pressure setting on relief valve 3) Remove and replace hydraulic motor
Oil found in protective hose	1) Hydraulic hose connections loose near vibrator 2) Hydraulic hose or hose fittings damaged 3) Hydraulic motor shaft seal leaking and seal around outside of motor also leaking	1) Check NPT threads, apply Teflon tape and tighten 2) Replace damaged hose or hose fittings 3) Replace hydraulic motor shaft seal per Chapter 4, Section d and replace seal on outside of motor



STRAIGHT HYDRAULIC VIBRATOR ASSEMBLY - 949-100

FIGURE 1. *Male and female quick disconnects may be on either the pressure or return line. Always check that the smaller diameter hose is the pressure line.



ANGLE HYDRAULIC VIBRATOR ASSEMBLY -
949-170 FIGURE 1. *Male and female quick disconnects may be on either the pressure or return line. Always check that the smaller diameter hose is the pressure line.

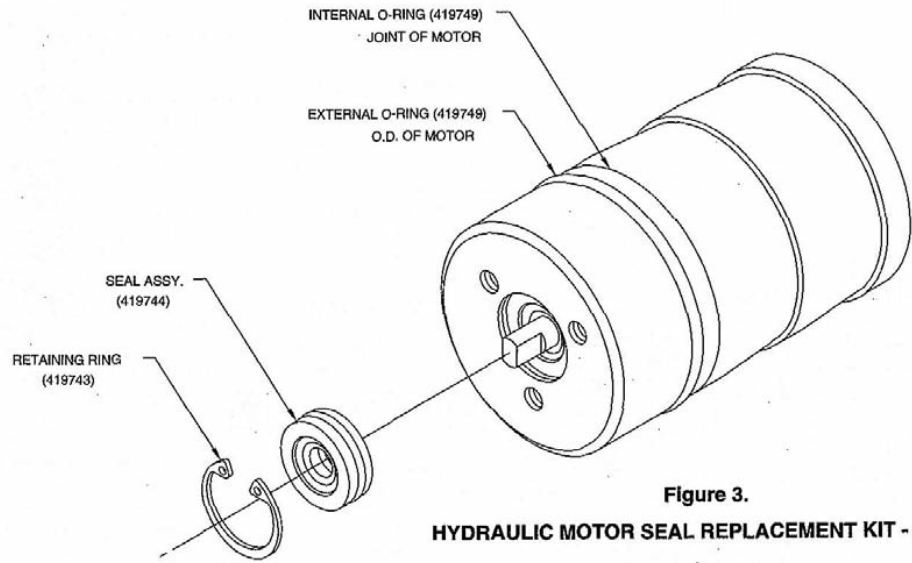


Figure 3.
HYDRAULIC MOTOR SEAL REPLACEMENT KIT - 419747

HYDRAULIC VIBRATOR ASSEMBLY PARTS LIST

ITEM	QTY	U/M	DESCRIPTION	PART NUMBER	
				STRAIGHT 949-100	ANGLE 949-170
1	1	EA	SQUARE Head Housing with Lower Bearing Cup	589-400	589-400
2	1	EA	Hex Nut	432707	432707
3	1	EA	Washer	887011	887011
4	4	EA	Bearing	419661	419661
5	2	EA	Shim	419697	419697
6	1	EA	Rotor	719660	719660
7	1	EA	Upper Bearing Cup, Slotted	419668	419668
8	1	EA	Spacer	419666	419666
9	1	EA	Driver Sleeve	419659	419659
10	1	EA	Driver	419656	419656
11	3	EA	Socket Head Cap Screw (No. 10-32 x 7/8 inch long)	419660	419660
12	3	EA	Lock Washer (No. 10 split ring)	415362	415362
13	1	EA	Hydraulic Motor Housing	589404	589403
14	1	EA	Hydraulic Motor	418-000	418-000
15	1	EA	Hydraulic Hose Assembly (1/4 hose with 1/4 NPT male threads) 8'	-	212508
16	1	EA	Hydraulic Hose Assembly (3/8 hose with 3/8 NPT male threads) 8'	-	213708
17	1	EA	Angle Mounting Bracket	-	419771
18	2	EA	Hex Head Bolt	-	439712
19	4	EA	Lock Washer(1/2 inch split ring)	-	439704
20	4	EA	Hex Nut (1/2-13)	-	439703
21	1	EA	Isolator	-	419720
23	1	EA	Clamp	-	419729
24	2	EA	Hex Head Bolt (1/2-13 x 3-1/2 inch long)	-	439708
25	1	EA	Rubber Plug, Tapered	-	419684
26	1	EA	Punch Lock Clamp	-	259601
27	4	FT	Protective Hose	-	219500
28	1	EA	Name Plate	669600	669600
29	1	EA	Hose Clamp (No. 36)	-	259611
30	1	EA	Rubber Plug (No. 11), Straight	419685	419685
31	1	EA	Quick Disconnect Set	419692	419692
32	6	FT	Protective Hose	219500	-
33	3	EA	Hose Clamp (No. 36)	259611	-
34	1	EA	Hydraulic Hose Assembly (1/4 hose with 1/4 NPT male threads) 9'	212509	-
35	1	EA	Hydraulic Hose Assembly (3/8 hose with 3/8 NPT male threads) 9'	213709	-

MOTOR SPECIFICATIONS AND HYDRAULIC REQUIREMENTS

DATA BELOW IS BASED IN 225 SSU HYDRAULIC FLUID

FLOW: 4 GPM
 PRESSURE: 700 P.S.I.; Max. 1200 P.S.I. with oil at 130° F
 INLET: ¼" NPT
 OUTLET: 3/8" NPT
 FILTRATION: 10 Micron Absolute (ISO 17/13 Fluid Cleanliness)
 FLUID TEMP: 100° F Minimum; 180° F Maximum

*NOTE: A. DO NOT OPERATE ABOVE 10,800 VPM
 B. ALWAYS DISCONNECT INLET (1/4) HOSE FIRST
 C. TO ENSURE PROPER HYDRAULIC MOTOR SEAL LIFE, MAINTAIN A BACK PRESSURE TO THE MOTOR OF LESS THAN 50 PSI.
 D. MALE AND FEMALE QUICK DISCONNECTS MAY BE ON EITHER THE PRESSURE OR THE RETURN LINE. ALWAYS CHECK THAT THE SMALLER DIAMETER HYDRAULIC HOSE IS THE PRESSURE HOSE.*





CHAPTER 4 SERVICE AND ASSEMBLY INSTRUCTIONS

a) Maintenance interval

It is recommended that Wyco vibrators be maintained at regular intervals. The recommended maintenance interval for vibrators operated between 8,000 VPM and 10,800 VPM is 600 hours. The recommended maintenance interval for vibrators operated under 8,000 VPM is 1,200 hours. These instructions should be followed for preventative maintenance, which includes bearing and hydraulic motor seal replacement.

b) Special Tools Required

33 inch pipe wrench

2 inch Girth-Grip toothless pipe wrench (straight vibrators)

3 inch Girth-Grip toothless pipe wrench (angle vibrators)

Punch Lock clamp set

Tapered guide (used for hydraulic motor seal installation, Wyco Tool #419754)

Large crescent wrench which opens to 2-3/8"

c) Bearing replacement

1) Head Housing Removal

See figure 1 or 2 for illustrations of item numbers listed in parentheses.



Clamp the hydraulic motor housing (13) in the pipe jaws of a vise. Using a large crescent wrench, loosen the square head housing (1) from the motor housing (right hand threads). Unscrew until the parts can be easily turned by hand.

2) Rotor Assembly Removal



Clamp the flats of the driver sleeve (9) in a vise. Pull the head housing (1) off of the rotor assembly.

Note: If there is hydraulic oil in the head, the seal on the hydraulic motor (14) needs to be changed as described in **Section d.**

If the hydraulic motor shaft cannot be turned by hand, the motor may be locked and may require replacement, as described in **Section e.**

If the rotor does not come out by hand it needs to be tapped off. Tap on the open end of the square head housing (1) with a rubber hammer while rotating the housing 90 degrees every couple of taps. Do not damage the end of the head housing by hitting it directly with a hammer. If the rotor is stuck in the housing, a piece of wood can be used to protect the head housing threads while using a hammer to dislodge the rotor assembly.



3) Rotor Disassembly



Clamp the rib of rotor (6) in a vise. Unscrew the driver sleeve (9) (left hand thread). Remove the spacer (8) from the rotor. Remove the upper bearing cup assembly from the rotor assembly. Press the bearings (4) and shim (5) out of upper bearing cup (7). Unscrew the hex nut (2) from the opposite end of the rotor (left hand thread). Remove washer (3), the remaining two bearings and .005 inch thick shim.

4) Cleaning

Prior to assembly, ensure all of the parts are cleaned and free of foreign material. Inspect hoses for any damage and replace when necessary.

Note: Clean parts to prevent binding during assembly. Contamination may cause early failure of bearings.

If reusing the upper bearing cup (7), polish the inside with Scotch Brite to remove discoloration. Also, ensure that the inside of the square housing (1) is thoroughly cleaned. Replace isolator if broken or rubber is split or worn.

Note: It is recommended that new bearings and shims always be installed when rebuilding a vibrator. Regreased bearings will not last as long as new bearings.

5) Bearing replacement



Clamp the rib of the rotor (6) in a vise. If the rotor has been previously used, polish the shafts that the bearings fit over with Scotch Brite. Slide a bearing (4) onto the rotor end with the shortest length of thread. The writing on the outer race of the bearing should face toward the rotor. Then slide a .005 inch thick shim (5) onto the rotor.



Note: Do not use more than one shim between bearings.





Slide another bearing onto the rotor with the writing on the outer race facing away from the rotor and the other bearing.



Slide a washer (3) onto the rotor. Note that the washer is thinner than the spacer (8) used on the other end of the rotor.



Securely tighten hex nut (2) on the end of the rotor (left hand thread).

Repeat the bearing/shim/bearing assembly on the opposite end. Slide spacer (8) onto the rotor. Securely tighten driver sleeve (9) on the end of the rotor (left hand thread).

6) Rotor Square Head Housing Assembly



Install the upper bearing cup (7) over the bearings on the driver sleeve (9) end of the rotor assembly.



Clamp the motor housing (13) in a vise with the motor shaft facing upward. Apply a liberal amount of grease to both ends of driver (10) where the driver contacts the driver sleeve slot and the hydraulic motor drive shaft. Insert the driver into the driver sleeve. The grease will hold the driver in place during assembly. Hold the rotor vertically with the driver pointing downward. Align the rotor so the slot in the driver lines up with the flat surfaces on the shaft of the hydraulic motor. Also align the upper bearing cup (7) slot to mate with the motor housing (13). Engage the driver with the hydraulic motor shaft.



Once the rotor is engaged to the motor housing, slide the head housing over the rotor and begin to engage the threads.



Clamp the bracket in the pipe clamps of a vise and tighten the head housing.

d) Hydraulic Motor Seal Replacement

The Wyco hydraulic motor will provide thousands of hours of life under normal service conditions. However, if hydraulic oil is contaminated or fluid temperature is not maintained below 180° F, then premature failure of motor shaft seals or motor efficiency degradation will occur. If back pressure in the return line is greater than 50 PSI, premature failure of the motor shaft may occur.

If hydraulic oil is found in the square head housing, the hydraulic motor seal has worn and requires replacement.

If more than 5 GPM is required to turn 10,000 VPM and the oil temperature is 140° F or less, then the hydraulic motor efficiency has fallen below 80 percent and it should be replaced.



Apply No. 2 Permatex on the motor housing threads. Place the square head housing over the rotor assembly and screw onto the motor housing by hand until snug (right hand thread).



Seals

1) Seal Removal

It may be possible to remove the hydraulic motor seal assembly without removing the hydraulic motor from the vibrator assembly. This procedure is described below. In the event that it doesn't work, proceed to **Section e**.



With the square head housing (1) removed from the vibrator assembly, reach into the motor housing with snap ring pliers and remove the retaining ring (see drawing # 419747). The seal assembly may be removed by connecting the return line hydraulic hose (16) (largest hose) to a 100-psi pressure regulated air supply.



WARNING!



INJURY MAY RESULT FROM IMPROPER REMOVAL OF SEAL. FOLLOW THESE INSTRUCTIONS CAREFULLY.

Shut off the air supply with a quick opening valve. Use an appropriate quick disconnect or threaded connector to attach the air supply to the return line (largest of the two hoses). Hold the open end of the motor housing firmly against the floor or other hard surface in case the seal breaks free suddenly. Quickly open the valve to dislodge the seal from its seat. If the seal does not come out proceed to **Section e** for information on how to remove the motor for seal removal and closer inspection.

2) Seal Replacement



Place a tapered guide over the hydraulic motor (14) shaft (Wyco tool part # 419754). Assembly without the tapered guide could tear the seal lip and cause leakage.



Lubricate the seal lip and O-ring with STP or clean hydraulic oil and press the seal assembly into the motor. Be sure that the lip end of the seal faces toward the motor. Replace the retaining ring and return to **Section c6** if bearings have already been replaced, otherwise return to **Section c2**.

e) **Hose, Hydraulic Motor and Alternate Hydraulic Motor Seal Removal**

1) **Protective hose removal**



Loosen or remove the hose clamp (29) from the end of the protective hose (27). Remove the rubber plug (30) from the end of the protective hose.

Generally, the protective hose (27) and the hose clamp (29) need to be cut off. Take care not to damage the hydraulic hoses (15,16).



Remove the rubber plug (25) from the upper end of the mounting bracket.



Clamp the bracket (17) in a vise and unscrew the motor housing (13) (right hand thread) using a Girth-Grip wrench or pipe wrench.

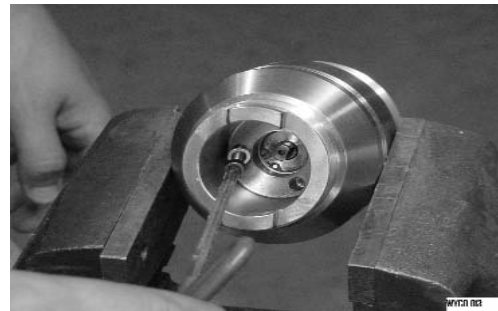
Note: The hydraulic hoses need to turn with the motor housing inside the angle bracket while unthreading.

Unscrew the hydraulic hoses attached to the motor and install temporary ¼ NPT and 3/8 NPT plugs to prevent dirt from entering hydraulic motor.

2) **Motor Housing Removal**

Clamp the hydraulic motor housing (13) in the pipe jaws of a vise. Using a large crescent wrench, loosen the square head housing (1) from the motor housing (right hand threads). Unscrew until the parts can be easily turned by hand.

3) **Hydraulic Motor Removal**



To remove hydraulic motor (14) from the motor housing (13), clamp the motor housing in a vise and remove the three socket head cap screws (11) and lock washers (12).

Note: Never clamp the hydraulic motor in vise or apply wrenches to it. The hydraulic motor is made of aluminum and any deformation can cause internal damage.

If there has been silicon sealant applied, peel off the sealant at the hydraulic motor to motor housing interface. Thread a matching 2 or 3 inch long pipe nipple into each port of the hydraulic motor and hand tighten. Clamp both nipples close to the

motor between the jaws of a large crescent or pipe wrench and rotate the motor in either direction to break the silicone sealant that was applied to the motor to housing interface. Clean all sealant residue from the parts.

4) Alternate Seal Replacement

Repeat the process described in **Section d** with the hydraulic motor removed from the motor housing (13). Replace the seal as described in **Section d**. If the seal does not come out, repeat the process using a hydraulic hand pump.

f) Assembly

1) Hydraulic Motor to Motor Housing Assembly



*Applying silicon sealant is optional

Rotate the shaft coming out of the hydraulic motor (14) by hand to insure that the hydraulic motor is not locked internally (temporary plugs may have to be loosened). Place the hydraulic motor into motor housing (13). Be sure the O-ring on the hydraulic motor is in its proper position and is not damaged. Lubricate with light coat of hydraulic oil before inserting. Rotate the motor on the housing until the three holes in the hydraulic motor align with the holes in the motor housing. Thread in one socket head cap screw (11) with a lock washer (12). Clamp the other housing in a vise and thread the other two cap screws and lock washers in place. Tighten all three screws securely. Add a bead of Dow Corning RTV 732 silicon rubber sealant or equivalent into the space between the motor housing and the hydraulic motor.

Thread the hydraulic hoses (15 and 16) into the hydraulic motor using three wraps of Teflon tape on the threads.

Note: Do not over tighten the hose fittings into the hydraulic motor. Over tightening could cause the aluminum motor to crack.

Apply No. 2 Permatex to the threaded end of motor housing (13). Insert the hoses into the angle bracket and screw the motor housing to angle bracket (17).

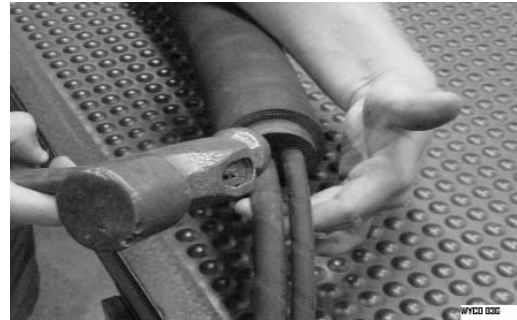
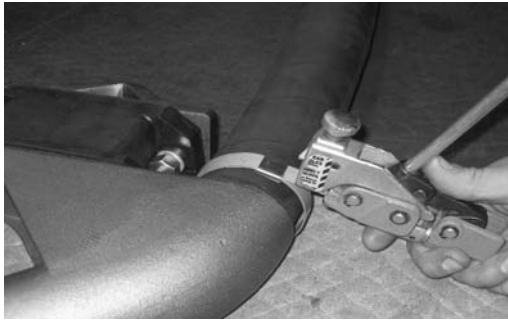
Note: The hydraulic hoses need to turn with the motor housing inside the angle bracket while tightening.



Tighten the motor housing to the angle bracket using a Girth Wrench or pipe wrench.



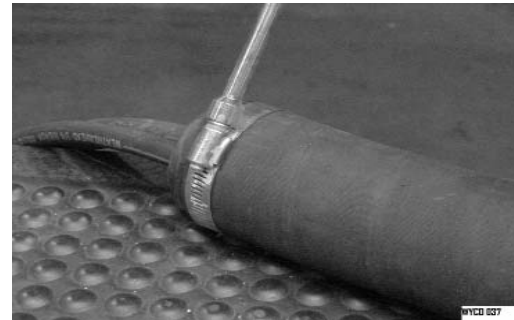
Install the rubber plug (25) around the hydraulic hoses and tap into place in the angle bracket.



Install the rubber plug (30) around the hydraulic hoses at the opposite end of the protective hose and tap in until it is flush with the end.



Install the protective hose (27) completely onto the hose barb of the angle bracket. Position the Punch Lock Clamp (26) over the protective hose about ¼ inch apart over the hose barb section.



Install one hose clamp (29) directly over the rubber plug at the end of protective hose (27) and tighten. Reuse the nameplate (28) with the remaining hose clamp. Impression stamp the service date on the nameplate for future reference.

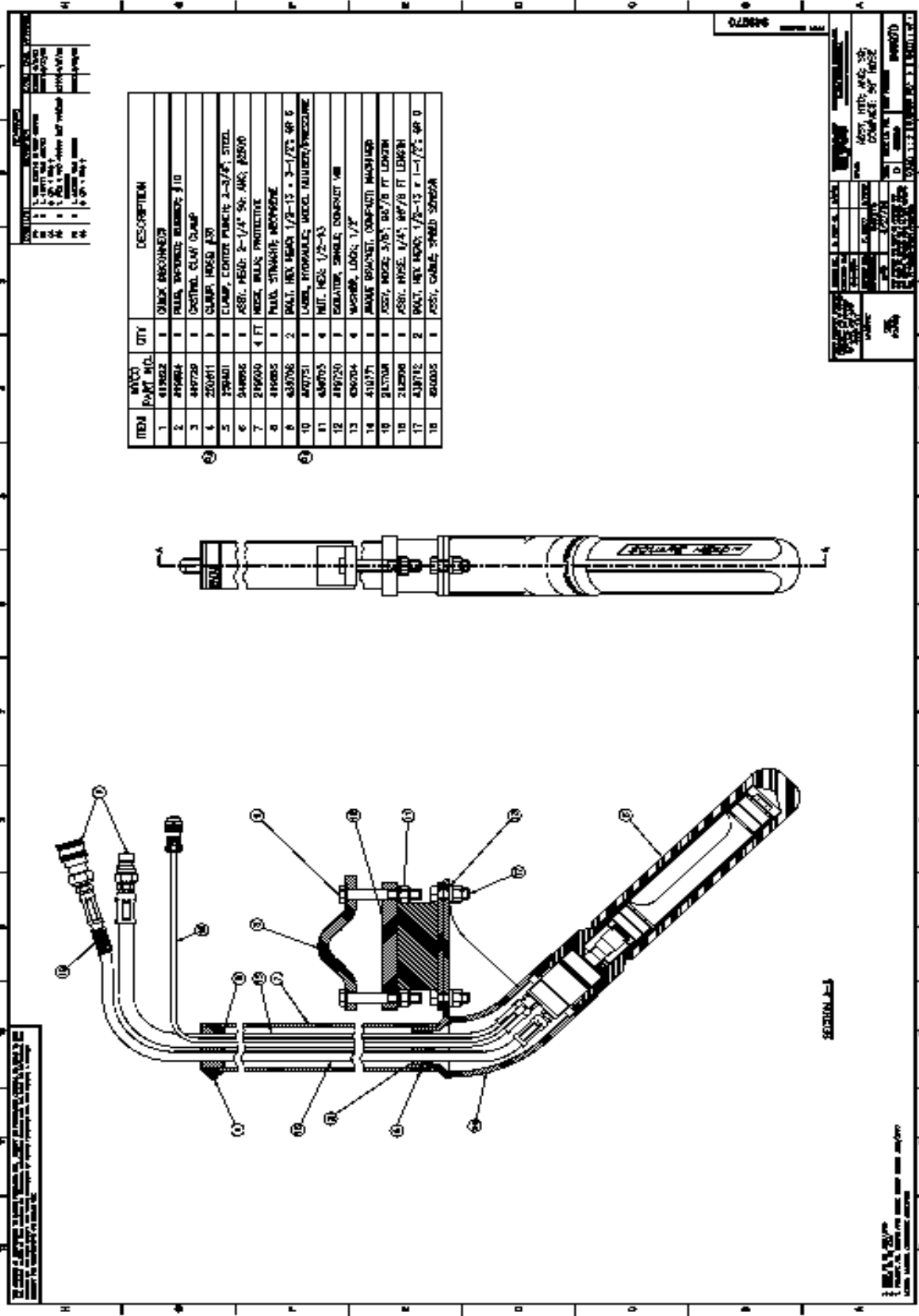


Tighten and lock the clamp according to the manufacturer's instructions.

If bearings have been replaced, replace the square housing assembly. Return to **Section c6** for assembly instructions. If bearings have not been replaced go to **Section c2**.

g) Speed Sensing/Smart Vibrators

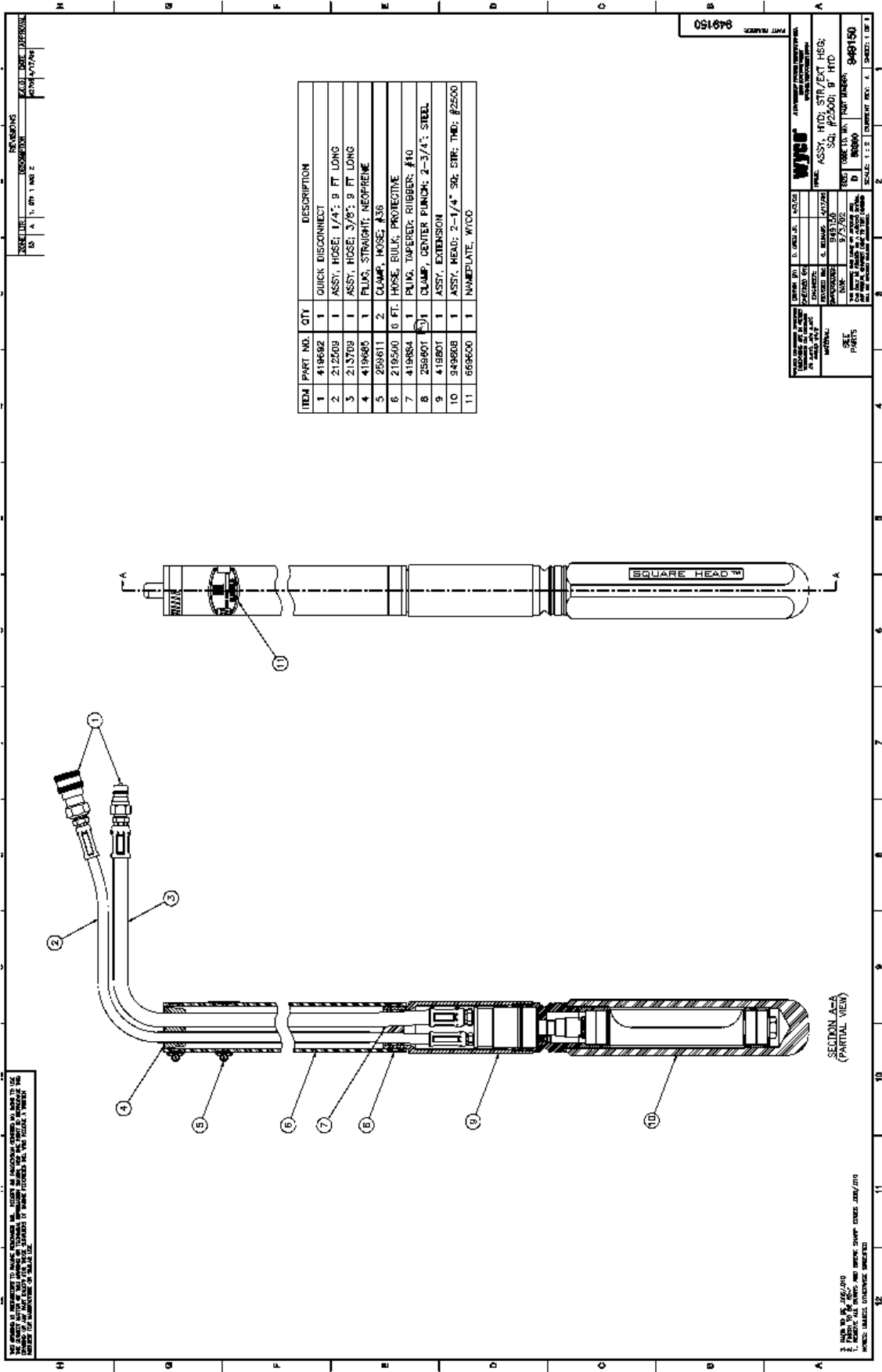
When Wyco Tool supplies vibrators that have the speed sensing option, a cable exits the back of the hydraulic motor next to the hydraulic hoses. This armored and shielded cable (Wyco # 420-005) extends 9 feet away from the hydraulic motor. It runs parallel to the hydraulic hose and inside the protective hose. When the protective hose is greater than 8 feet, an extension cable will be needed to exit the rubber plug.



ITEM	AVCO PART NO.	QTY	DESCRIPTION
1	419022	1	QUICK DISCONNECT
2	419042	1	BALL BEARING; BALLS: #10
3	447220	1	DEFLECT CLAMP CLAMP
4	200811	1	CLAMP HOSE 3/8"
5	370401	1	CLAMP, CENTER PUNCH 3-3/4" STEEL
6	344906	1	ASSY. HEAD: 2-1/4" SW. AWG. #2000
7	246000	4 FT	HOSE, STRAIGHT, NEOPRENE
8	419005	1	PLUG, STRAIGHT, NEOPRENE
9	433706	2	BALL, HEX HEAD, 1/2"-13 x 3-1/2", GR 6
10	407751	1	WASHER, FLANGE, 1/2" X 1/2"
11	407753	4	NUT, HEX, 1/2"-13
12	419750	1	EXHAUST, SINGLE, COMBUST VM
13	406704	4	WASHER, LOCK, 1/2"
14	410371	1	WASHER, BRACKET, COMBUST, WASHING
15	212700	1	ASSY. HOSE 3/8" ID, 7/8 FT LENGTH
16	212700	1	ASSY. HOSE 1/4" ID, 7/8 FT LENGTH
17	419712	2	BALL, HEX HEAD, 1/2"-13 x 1-1/2", GR 0
18	404005	1	ASSY. COUPLER, STUB, 3/8" DIA

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SECTION A-A
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ITEM	PART NO.	QTY	DESCRIPTION
1	419882	1	QUICK DISCONNECT
2	212509	1	ASSY. HOSE 1/4"; 9 FT LONG
3	213709	1	ASSY. HOSE 3/8"; 9 FT LONG
4	419880	1	PLUG, STRAIGHT, NEOPRENE
5	259811	2	CLAMP, HOSE, #38
6	218540	8	FT. HOSE, BULK, PROTECTIVE
7	419884	1	RING, TAPERED, RUBBER, #10
8	259801	1	CLAMP, CENTER PUNCH; 2-3/4"; STEEL
9	419801	1	ASSY. EXTENSION
10	349808	1	ASSY. HEAD; 2-1/4" SQ. EXT; TMD; #2500
11	659800	1	NAMEPLATE, W/CO

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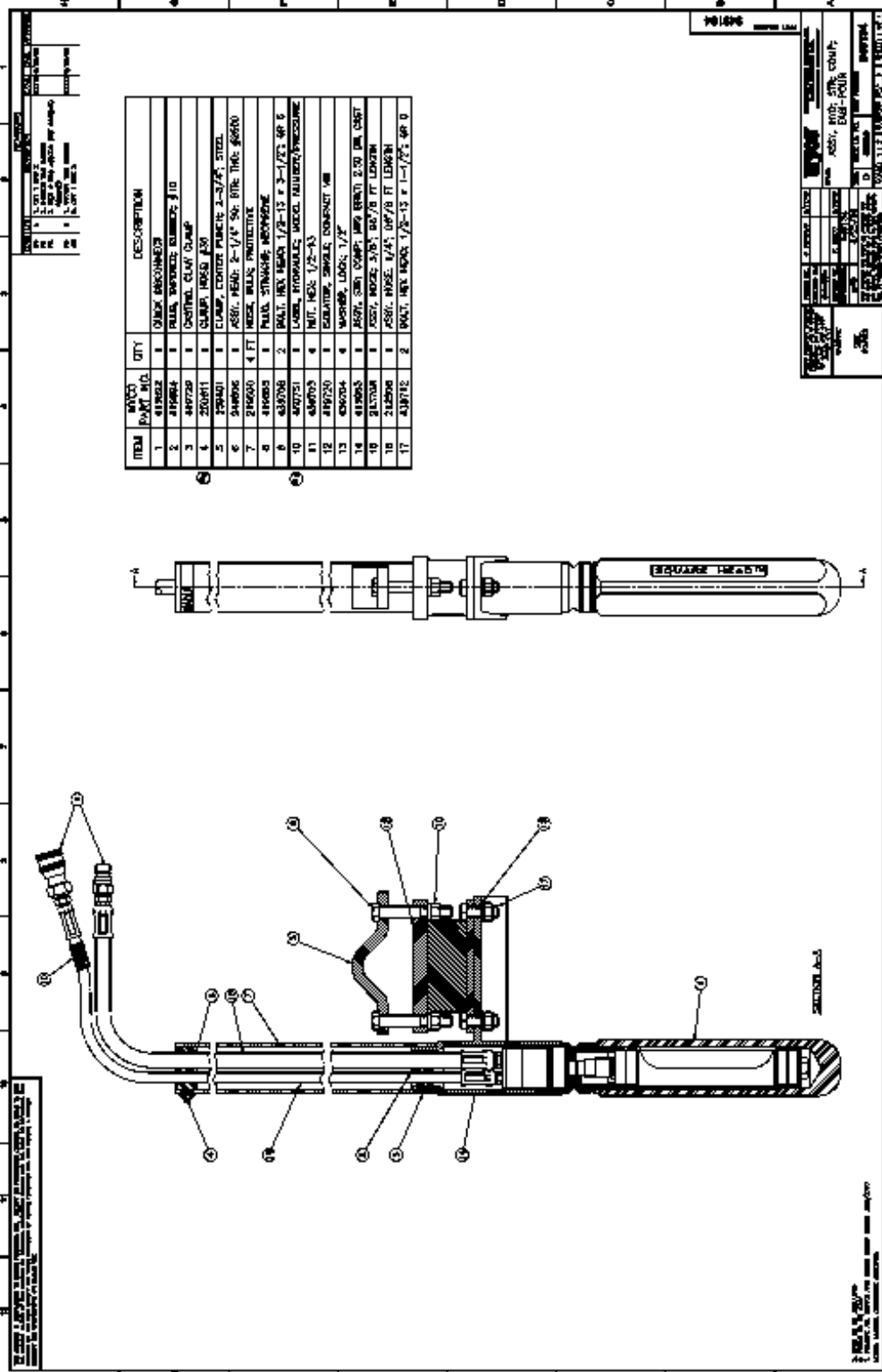
DATE: 9/7/02
 DRAWN BY: JAMIESON
 CHECKED BY: JAMIESON
 PART NUMBER: 949150

SCALE: 1:1

SECTION A-A
 (PARTIAL VIEW)

1. HEAD TO 259801
 2. HOSE TO 212509
 3. HOSE TO 213709
 4. HOSE TO 218540
 5. HOSE TO 259811
 6. HOSE TO 419884
 7. HOSE TO 419880
 8. HOSE TO 419882

949150



Form #W110
 Printed in U.S.A. 8/06

