wyco
Division of Badger Meter

Concrete Vibrator

Hydraulic Paving

VBR-UM-02436-EN-04 (December 2018)

User Manual

CONTENTS

WARNING: This product can expose you to chemicals including lead, which are known to the State of California to cause cancer, and Chromium, which are known to the State of California to cause birth defects and/or other reproductive harm. For more information go to *www.P65Warnings.ca.gov*

SCOPE OF THIS MANUAL

This manual describes the operation and service of the Wyco Hydraulic Paving Vibrators. The electronic version of this manual is available on our website at *www.wycotool.com*.

IMPORTANT

Read this manual carefully before attempting any operation or maintenance. Keep the manual in an accessible location for future reference.

Unpacking and Inspection

Upon opening the shipping container, visually inspect the product and applicable accessories for any physical damage such as scratches, loose or broken parts, or any other sign of damage that may have occurred during shipment.

NOTE: If damage is found, request an inspection by the carrier's agent within 48 hours of delivery and file a claim with the carrier. A claim for equipment damage in transit is the sole responsibility of the purchaser.

SAFETY CONSIDERATIONS

Terminology and Symbols

⚠ DANGER Indicates a hazardous situation, which, if not avoided, is estimated to be capable of causing death or serious personal injury.

⚠ WARNING Indicates a hazardous situation, which, if not avoided, could result in severe personal injury or death.

⚠ CAUTION Indicates a hazardous situation, which, if not avoided, is estimated to be capable of causing minor or moderate personal injury or damage to property.

GENERAL INFORMATION

Purpose of Vibration

Internal vibration improves the workability of low slump concrete used in slip form paving. Low slump concrete reduces edge slump conditions, allowing the concept of slip form paving to work. 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. Vibration also consolidates the concrete, reducing entrapped air, honey combing, cold jointing and other internal flaws that reduce pavement strength.

Vibrator Positioning and Spacing

Proper positioning and operation of vibrators in the paving slip form molds provides proper consolidation of the concrete. Generally, the distance between vibrator insertions should be 12…24 in. depending on mix design, paver speed, vibrator speed and other factors.

Vibrators should be positioned 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.

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 5000 and 8000 vpm. As with vibrator spacing, the optimum vibrator speed depends on many factors, including but 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 maintain a consistent quality and more uniformly consolidated pavement.

Paver Travel Speed

Paver travel speed affects 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 occurs, driving entrained air out and segregating the mix.

Mix Design and Slump

Mix design and slump influence concrete consolidation. A high slump concrete will consolidate easier than a low slump concrete. However, if the slump is too high it causes edge slump problems and lowers 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. Use a mix that uses at least two aggregate sizes, one large and one small. Mixing the smaller aggregate in with the larger aggregate fills some of the larger voids, making finishing and consolidation easier.

VIBRATOR DESIGN FUNDAMENTALS

Rotor

The rotor generates vibration. Every revolution generates a vibration impulse. The rotor 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 table lists the potential centrifugal forces generated by the rotor at different speeds:

Speed	Force	
	2000#	2500#
5000	448	562
6000	677	809
7000	877	1101
8000	1145	1438
9000	1450	1820
10,000	1790	2247
10,800	2088	2621

Bearing and Bearing Cups

Two bearings are located on each end of the rotor. Each bearing is 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.

Hydraulic Motor

The Hydraulic Motor is operated by forcing pressurized hydraulic oil through it. 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 creates a seal between the aluminum hydraulic motor housing and the output shaft. Control the oil flow through the motor to control the motor speed.

Square Head Housing

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

Oldham Style Drive Components

The Oldham Drive transmits rotation from the hydraulic motor to the rotor. The drive allows for a slight misalignment between motor and rotor axes of rotation. The output shaft from the hydraulic motor tang has two flat parallel surfaces. These flat surfaces mate with a slot in the driver. The driver also has flat surfaces, which mate with the slot in the driver sleeve. The driver sleeve screws onto 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.

Vibration Isolator

The rubber Vibration Isolator reduces 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.

Hydraulic Hoses and Quick Disconnects

Two hydraulic hose connections are required for operation. 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, and the male disconnect is connected to the return line. The hose that the male and female disconnects are connected to depends on the style of vibrator. The quick disconnects can be attached to each other when removed from the machine to prevent contamination.

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.

INSTALLATION AND OPERATING REQUIREMENTS

Mounting Vibrators

See*Angle Hydraulic Vibrator Assembly on page 12* 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…2-7/8 in. Angle the vibrator tip downward 15…30 degrees. Attach the top clamp (23) around the mounting bar and tighten the two bolts (24), nuts (20) and lockwashers (19).

Mount straight bracket mounted vibrators with two isolators.

Hydraulic Hose Connection

The hydraulic hoses exiting the vibrator are supplied with quick disconnects. Normally the female quick disconnect is attached to the pressure line and the male to the return line, but this depends on the style of the vibrator. The pressure hose has a smaller diameter. Always make sure that these hoses are attached accordingly or the oil seal in the hydraulic motor will fail very quickly.

⚠CAUTION

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

⚠CAUTION

MAKE SURE 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.

⚠CAUTION

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.

Oil Filtration

The hydraulic oil must be filtered to maintain proper operation and to prevent wear and damage due to contaminates.

⚠CAUTION

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

Vibrator Performance and Oil Supply

Oil Pressure

Oil pressure varies depending on oil temperature, flow rate, oil viscosity and the amount of hose connected between manifold and vibrator. A vibrator in good condition operates with a pressure of 700…1200 psi at 4 gpm and 140° F.

Temperature

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

⚠CAUTION

AT TEMPERATURES 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.

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 8100 vpm.

Troubleshooting

The following tools are available from Wyco to aid in troubleshooting.

Hydraulic Test Kit – Wyco product number 419-850

This kit measures 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 product number 419855

The reed-type tachometer 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 product number 001000

The slide rule tachometer is a less expensive alternative to the reed-type tachometer. 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 the most. The rule then can be read giving the operating speed.

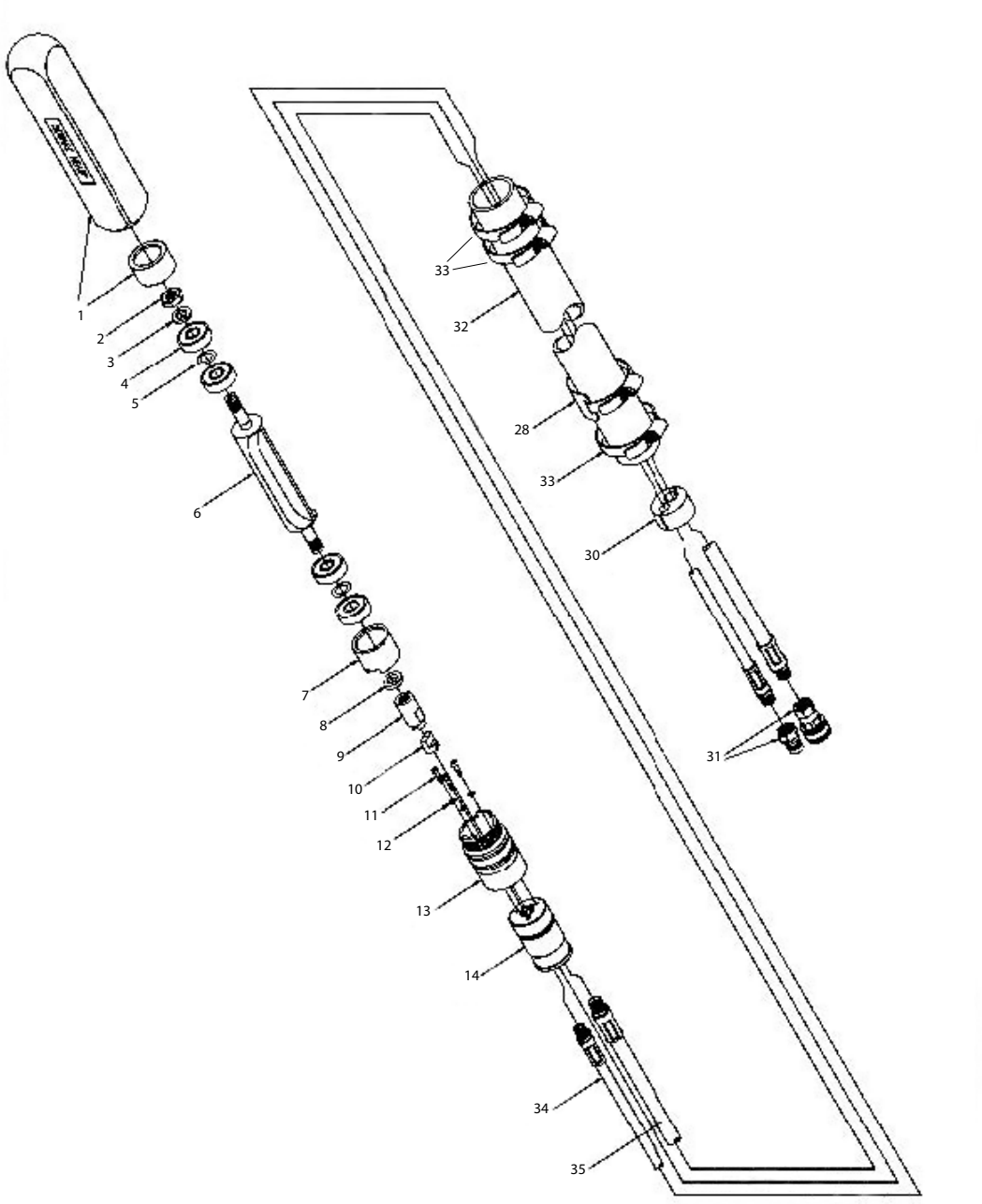
Troubleshooting Chart

Trouble	Possible Causes	Solutions
Vibrator not running	Required oil flow and pressure not supplied	Supply required oil flow and pressure
	Failed bearings	Replace eccentric bearings (see *Bearing replacement on page 16*)
	Hydraulic motor locked up	Replace the hydraulic motor (See *Hose, Hydraulic Motor and Alternate Hydraulic Motor Seal Removal on page 23*)
Vibrator running slow	Vibrator head full of oil	Replace the hydraulic motor shaft seal (see *Hydraulic Motor Seal Replacement on page 21*) and the bearings (see *Bearing replacement on page 16*)
	Required oil flow and pressure not supplied	Supply required oil flow and pressure; Check pressure setting on the relief valve
	Hydraulic motor worn internally	Remove and replace the hydraulic motor
Oil found in the protective hose	Hydraulic hose connections loose near vibrator	Check NPT threads, apply Teflon tape and tighten
	Hydraulic hose or hose fittings damaged	Replace the damaged hose or hose fittings
	The hydraulic motor shaft seal is leaking and the seal around the outside of the motor is also leaking	Replace the hydraulic motor shaft seal (see *Hydraulic Motor Seal Replacement on page 21*) and replace the seal on the outside of the motor

VIBRATOR DRAWINGS

Straight Hydraulic Vibrator Assembly (949-100 exploded view)

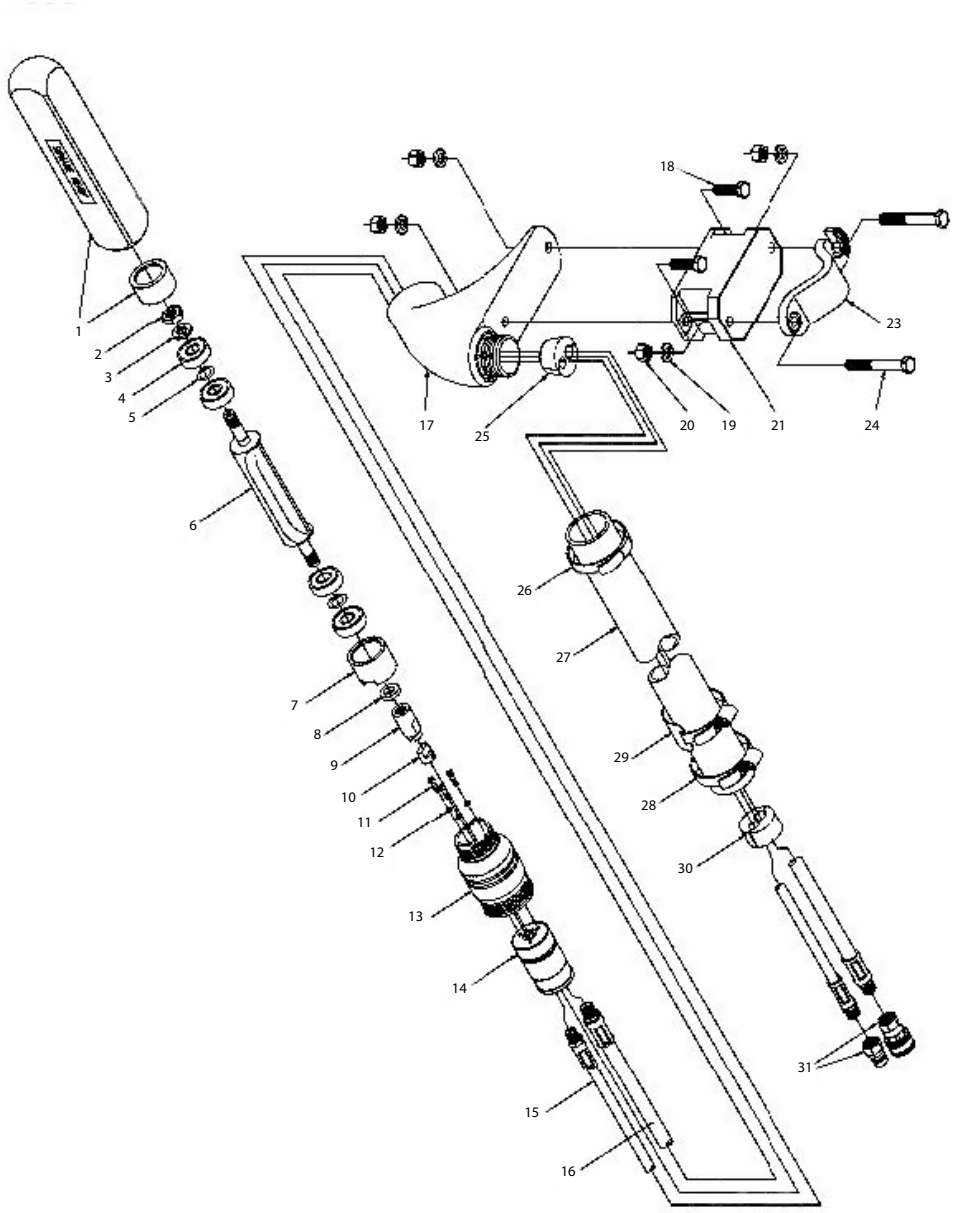
NOTE: See *Hydraulic Vibrator Assembly Part Numbers on page 13* for item descriptions



*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 exploded view)

NOTE: See *Hydraulic Vibrator Assembly Part Numbers on page 13* for item descriptions.



*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.

Hydraulic Vibrator Assembly Part Numbers

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 [2,3]	589-400 [2,3]
2	1	ea	Hex nut	432707 [3]	432707 [3]
3	1	ea	Washer	887011 [3]	887011 [3]
4	4	ea	Bearing	419661 [1,2,3]	419661 [1,2,3]
5	2	ea	Shim	419697 [1,2,3]	419697 [1,2,3]
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, 10-32 × 7/8 in. (22.23 mm) long	419660	419660
12	3	ea	Lockwasher, 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 ft	—	212508 [3]
16	1	ea	Hydraulic hose assembly, 3/8 hose with 3/8 NPT male threads, 8 ft	—	213708 [3]
17	1	ea	Angle mounting bracket	—	419771
18	2	ea	Hex head bolt	—	439712
19	4	ea	Lockwasher, 1/2 in. (12.7 mm) split ring	—	439704
20	4	ea	Hex Nut, 1/2-13	—	439703
21	1	ea	Isolator	—	419720
23	1	ea	Clamp	—	419729 [1,2,3]
24	2	ea	Hex head bolt, 1/2-13 × 3-1/2 in. (88.90 mm) long	—	439708
25	1	ea	Rubber plug, tapered	—	419684
26	1	ea	Punch lock clamp	—	259601 [1,2,3]
27	4	ft	Protective hose	—	219500 [1,2,3]
28	1	ea	Hose Clamp	259611	259611
29	1	ea	Nameplate	669600	669600
30	1	ea	Rubber plug, straight	419685	419685
31	1	ea	Quick disconnect set	419692 [3]	419692 [3]
32	6	ft	Protective hose	219500 [1,2,3]	—
33	3	ea	Hose clamp	259611 [1,2,3]	259611 [1,2,3]
34	1	ea	Hydraulic hose assembly, 1/4 hose with 1/4 NPT male threads, 9 ft	212509 [3]	—
35	1	ea	Hydraulic hose assembly, 3/8 hose with 3/8 NPT male threads, 9 ft	213709 [3]	—

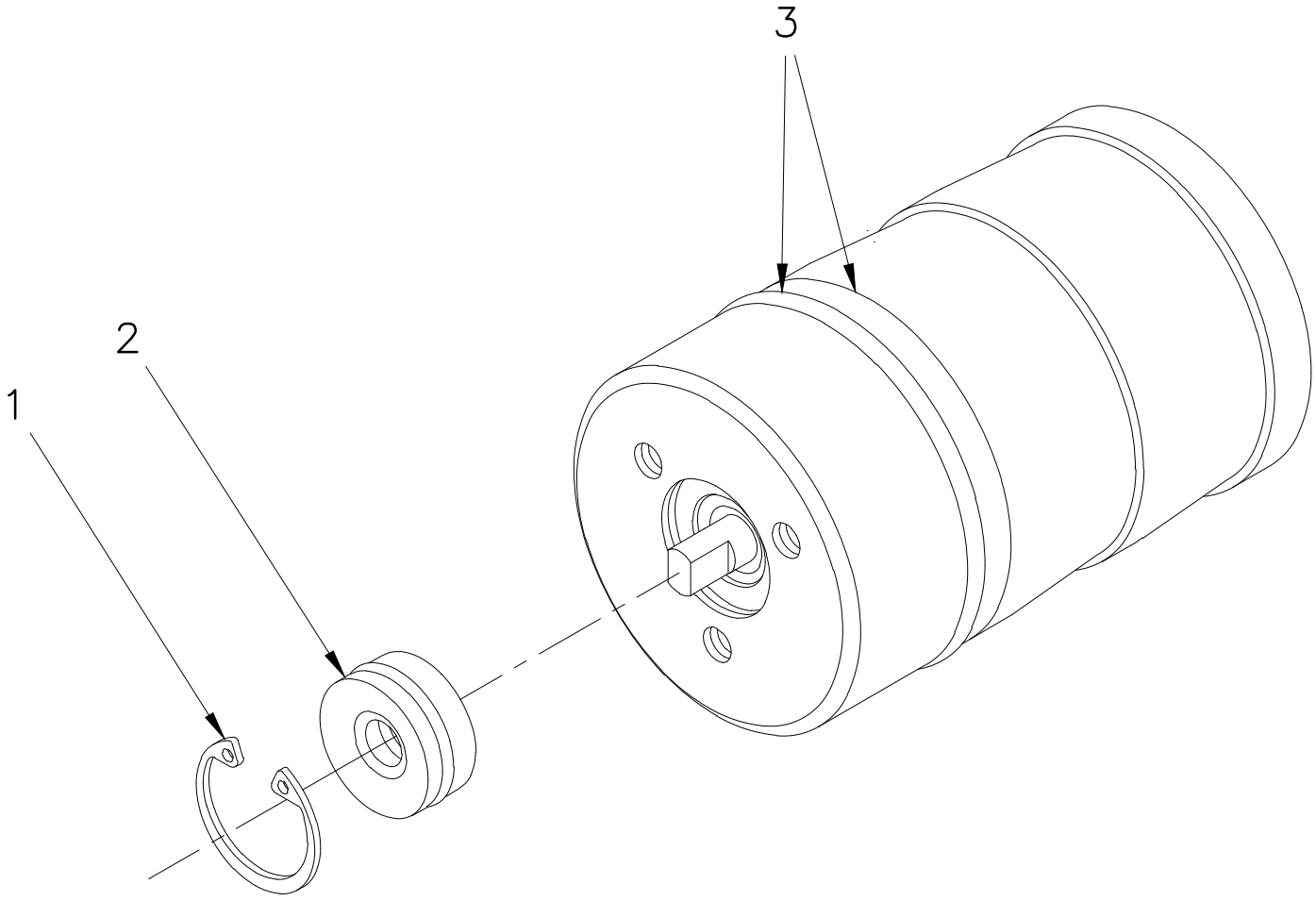
Recommended Maintenance Parts:

[1]Tier one

[2]Tier two

[3]Tier three

Hydraulic Motor Seal Replacement Kit (419-747)



Item	Part Number	Qty	Description
1	419743 [1,2,3]	1	Ring, retaining, hydraulic motor
2	419744 [1,2,3]	1	Assembly, seal holder, hydraulic motor
3	419749 [1,2,3]	2	O-ring, gasket, hydraulic motor

Recommended Maintenance Parts:

[1]Tier one

[2]Tier two

[3]Tier three

MOTOR SPECIFICATIONS AND HYDRAULIC REQUIREMENTS

Data below is based in 225 SSU hydraulic fluid.

Flow	4 GPM
Pressure	700…1200 psi with oil at 140° F
Inlet	1/4 in. (6.35 mm) NPT
Outlet	3/8 in. (9.53 mm) NPT
Filtration	10 µ absolute, ISO 17/13 Fluid Cleanliness
Fluid temp	100…180° F

- Do not operate above 10,800 vpm.
- Always disconnect inlet (1/4 in.) hose first.
- To verify proper hydraulic motor seal life, maintain a back pressure to the motor of less than 50 psi.
- 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.

SERVICE AND ASSEMBLY INSTRUCTIONS

Maintenance Interval

Maintain Wyco vibrators at regular intervals. Service any vibrators operated at 8000…10,800 vpm every 600 hours. Service any vibrators operated under 8000 vpm every 1200 hours. Use this schedule for preventative maintenance, including bearing and hydraulic motor seal replacement.

Special Tools Required

- 33 in. pipe wrench
- 2 in. Girth-Grip toothless pipe wrench (straight vibrators)
- 3 in. Girth-Grip toothless pipe wrench (angle vibrators)
- Punch Lock clamp set
- Tapered guide (used for hydraulic motor seal installation, Wyco #419754)
- Large crescent wrench that opens to 2-3/8 in.

Bearing replacement

Head Housing Removal

See *Angle Hydraulic Vibrator Assembly on page 12* for illustrations of the item numbers listed in parentheses.

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

Figure 1: Loosen square head housing

Rotor Assembly Removal

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

NOTE: If there is hydraulic oil in the head, change the seal on the hydraulic motor (14). See *Hydraulic Motor Seal Replacement on page 21*.
If the hydraulic motor shaft cannot be turned by hand, the motor may be locked and may require replacement. See *Hose, Hydraulic Motor and Alternate Hydraulic Motor Seal Removal on page 23* .

If the rotor does not come out by hand, tap it 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.

Figure 2: Tap with rubber hammer

NOTE: Do not damage the end of the head housing by hitting it directly with a metal hammer. If the rotor is stuck in the housing, use a piece of wood to protect the head housing threads while using a hammer to dislodge the rotor assembly.

Rotor Disassembly

1. Clamp the rib of the rotor (6) in a vise.
2. Unscrew the driver sleeve (9) (left hand thread).

Figure 3: Unscrew driver sleeve

3. Remove the spacer (8) from the rotor.
4. Remove the upper bearing cup assembly from the rotor assembly.
5. Press the bearings (4) and the shim (5) out of the upper bearing cup (7).
6. Unscrew the hex nut (2) from the opposite end of the rotor (left hand thread).
7. Remove the washer (3), the remaining two bearings and the 0.005 in. thick shim.

Cleaning

Prior to assembly, make sure 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. Make sure that the inside of the square housing (1) is thoroughly cleaned. Replace the isolator if broken, or if the rubber is split or worn.

NOTE: Install new bearings and shims when rebuilding a vibrator. Regreased bearings will not last as long as new bearings.

Bearing replacement

1. Clamp the rib of the rotor (6) in a vise.
2. If the rotor has been previously used, polish the shafts that the bearings fit over with Scotch Brite.
3. 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.

Figure 4: Slide bearing onto rotor

4. Slide a 0.005 in. thick shim (5) onto the rotor.

Figure 5: Slide shim onto rotor

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

5. Slide another bearing onto the rotor with the writing on the outer race facing away from the rotor and the other bearing.
6. Slide a washer (3) onto the rotor. The washer is thinner than the spacer (8) used on the other end of the rotor.

Figure 6: Slide washer onto rotor

7. Tighten the hex nut (2) on the end of the rotor (left hand thread).

Figure 7: Tighten hex nut

8. Repeat steps 3…5 on the opposite end of the rotor.
9. Slide the spacer (8) onto the rotor.
10. Securely tighten the driver sleeve (9) on the end of the rotor (left hand thread).

Rotor Square Head Housing Assembly

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

Figure 8: Install upper bearing cup

2. Clamp the motor housing (13) in a vise with the motor shaft facing upward.

Figure 9: Clamp motor housing in vise

3. Apply a liberal amount of grease to both ends of the driver (10) where the driver contacts the driver sleeve slot and the hydraulic motor drive shaft.
4. Insert the driver into the driver sleeve. The grease will hold the driver in place during assembly.
5. Hold the rotor vertically with the driver pointing down.
6. Align the rotor so the slot in the driver lines up with the flat surfaces on the shaft of the hydraulic motor. At the same time, align the upper bearing cup (7) slot to mate with the motor housing (13).
7. Engage the driver with the hydraulic motor shaft.
8. Once the rotor is engaged to the motor housing, slide the head housing over the rotor and begin to engage the threads.

Figure 10: Slide head housing over rotor

9. Apply No. 2 Permatex to the motor housing threads.

Figure 11: Apply Permatex

10. Place the square head housing over the rotor assembly.
11. Screw onto the motor housing by hand until snug (right hand thread).
12. Clamp the bracket in the pipe clamps of a vise.
13. Tighten the head housing.

Figure 12: Tighten head housing

Hydraulic Motor Seal Replacement

The Wyco hydraulic motor provides 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 may 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 needs to be replaced.

Retaining Ring Removal

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 *Figure 13*.

Figure 13: Remove retaining ring

Seal Removal

It is 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 does not work, proceed to *Hose, Hydraulic Motor and Alternate Hydraulic Motor Seal Removal on page 23*. You need a 100 psi, pressure-regulated air supply.

⚠WARNING

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

1. Shut off the air supply with a quick opening valve.
2. Use quick disconnect or threaded connector to attach the air supply to the return line hydraulic hose (16) (largest of the two hoses).
3. Hold the open end of the motor housing firmly against the floor or another hard surface in case the seal breaks free suddenly.
4. Quickly open the valve to dislodge the seal from its seat. If the seal does not come out, proceed to *Hose, Hydraulic Motor and Alternate Hydraulic Motor Seal Removal on page 23* for information on how to remove the motor for seal removal and closer inspection.

Seal Replacement

1. Place a tapered guide over the hydraulic motor shaft (14) (Wyco part # 419754).

NOTE: Assembly without the tapered guide could tear the seal lip and cause leakage.

Figure 14: Place tapered guide

2. Lubricate the seal lip and O-ring with STP or clean hydraulic oil.
3. Press the seal assembly into the motor. Be sure that the lip end of the seal faces toward the motor.

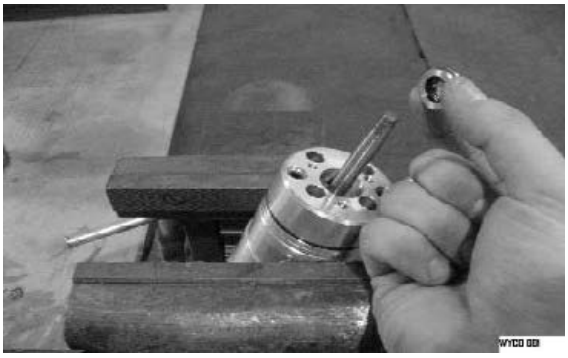


Figure 15: Press seal into motor

4. Replace the retaining ring.

If the bearings have already been replaced, see *Rotor Square Head Housing Assembly on page 20*. If the bearings need to be replaced, see *Rotor Assembly Removal on page 17*.

Hose, Hydraulic Motor and Alternate Hydraulic Motor Seal Removal

Protective Hose Removal

1. Loosen or remove the hose clamp (29) from the end of the protective hose (27).

Figure 16: Remove rubber plug

2. Remove the rubber plug (30) from the end of the protective hose.
3. Cut off the protective hose (27) and the hose clamp (29) if necessary. Take care not to damage the hydraulic hoses (15,16).
4. Remove the rubber plug (25) from the upper end of the mounting bracket.

Figure 17: Loosen hose clamp

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

Figure 18: Unscrew motor housing

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

7. Unscrew the hydraulic hoses attached to the motor.
8. Install temporary 1/4 NPT and 3/8 NPT plugs to prevent dirt from entering hydraulic motor.

Motor Housing Removal

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

Hydraulic Motor Removal

1. Clamp the motor housing (13) in a vise.

NOTE: Never clamp the hydraulic motor (14) in a vise or apply wrenches to it. The hydraulic motor is made of aluminum and any deformation can cause internal damage.

2. Remove the three socket head cap screws (11) and the lockwashers (12).

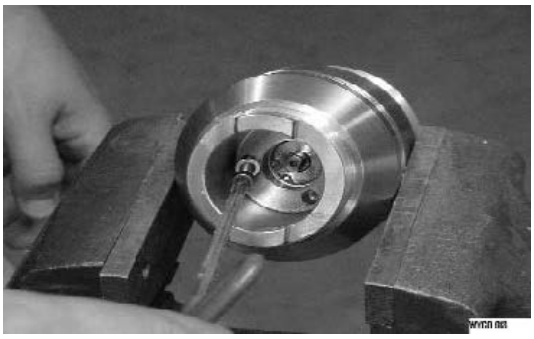


Figure 19: Remove screws and washers

3. If silicon sealant has been applied, peel off the sealant at the hydraulic motor to motor housing interface.
4. Thread a matching 2 or 3 in. long pipe nipple into each port of the hydraulic motor.
5. Hand tighten pipe nipples.
6. Clamp both nipples close to the motor between the jaws of a large crescent or pipe wrench.
7. Rotate the motor in either direction to break the silicone sealant that was applied to the motor to housing interface.
8. Clean all sealant residue from the parts.

Alternate Seal Replacement

Repeat the process described in *Seal Removal on page 22* with the hydraulic motor removed from the motor housing (13). Replace the seal as described in *Seal Replacement on page 22*. If the seal does not come out, repeat the process using a hydraulic hand pump.

Assembly

Hydraulic Motor-to-Motor Housing Assembly

1. Rotate the shaft coming out of the hydraulic motor (14) by hand to make sure the hydraulic motor is not locked internally (temporary plugs may have to be loosened).
2. Place the hydraulic motor into the motor housing (13).

NOTE: Be sure the O-ring on the hydraulic motor is in its proper position and is not damaged.

3. Lubricate the hydraulic motor with a light coat of hydraulic oil before inserting.
4. Rotate the motor on the housing until the three holes in the hydraulic motor align with the holes in the motor housing.
5. Thread in one socket head cap screw (11) with a lockwasher (12).
6. Clamp the other housing in a vise and thread the other two cap screws and lockwashers in place.
7. Tighten all three screws securely.
8. (Optional) Add a bead of Dow Corning RTV 732 silicon rubber sealant or equivalent into the space between the motor housing and the hydraulic motor.

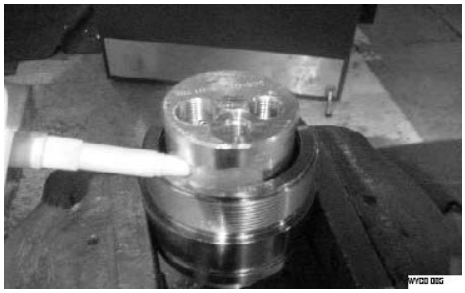


Figure 20: Add a bead of sealant

9. 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.

10. Apply No. 2 Permatex to the threaded end of motor housing (13).
11. 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.

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

Figure 21: Tighten motor housing

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

Figure 22: Tap into place

14. Install the protective hose (27) completely onto the hose barb of the angle bracket.

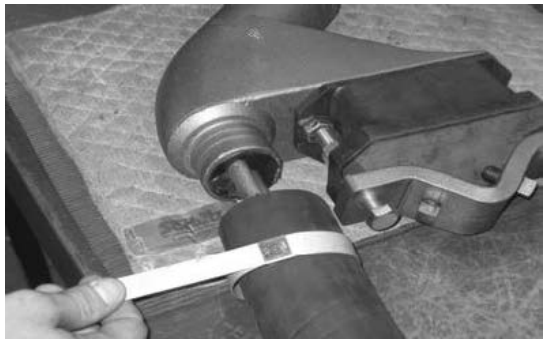


Figure 23: Install protective hose

15. Position the Punch Lock Clamp (26) over the protective hose about 1/4 in. apart over the hose barb section.

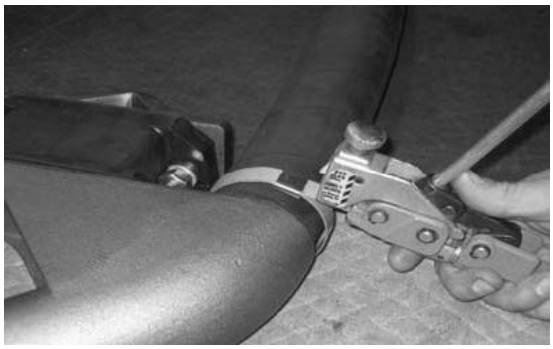


Figure 24: Punch lock clamp

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

Figure 25: Tighten and lock clamp

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

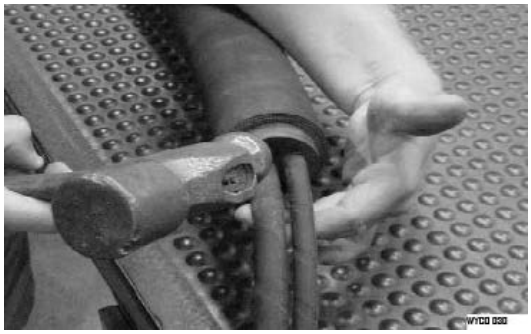


Figure 26: Tap in rubber plug

19. Install one hose clamp (29) directly over the rubber plug at the end of the protective hose (27).

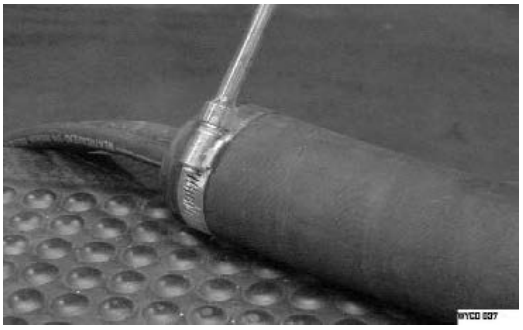


Figure 27: Install hose clamp

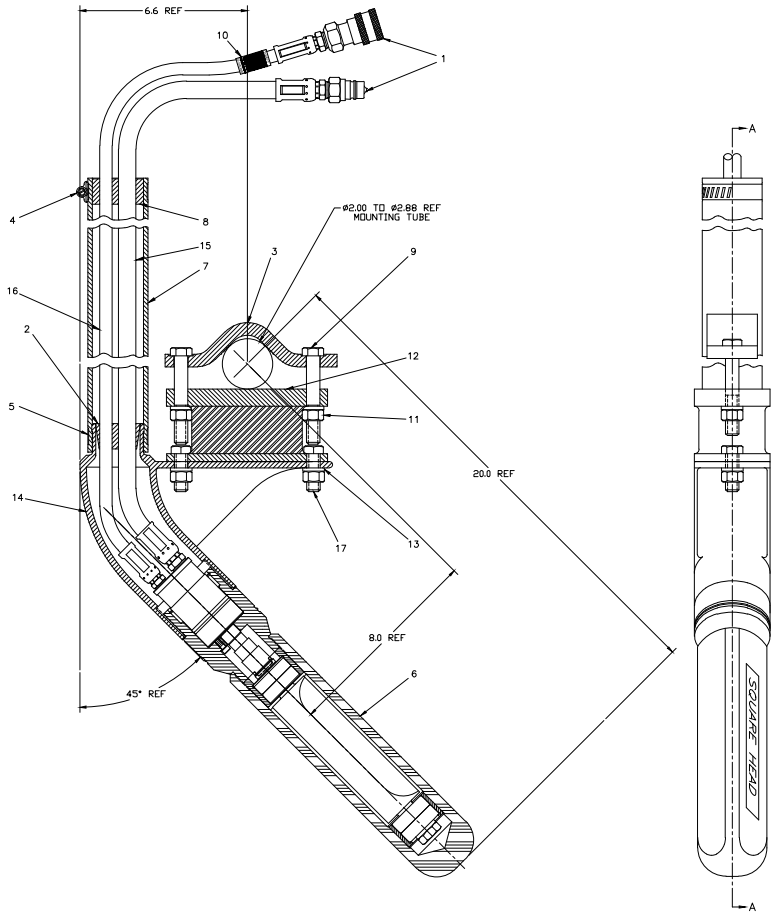
20. Tighten the hose clamp.
21. Reuse the nameplate (28) with the remaining hose clamp.
22. Impression stamp the service date on the nameplate for future reference.

If the bearings have been replaced, replace the square housing assembly as described in *Rotor Square Head Housing Assembly on page 20*. If the bearings have not been replaced, go to *Rotor Assembly Removal on page 17*.

Speed Sensing/Smart Vibrators

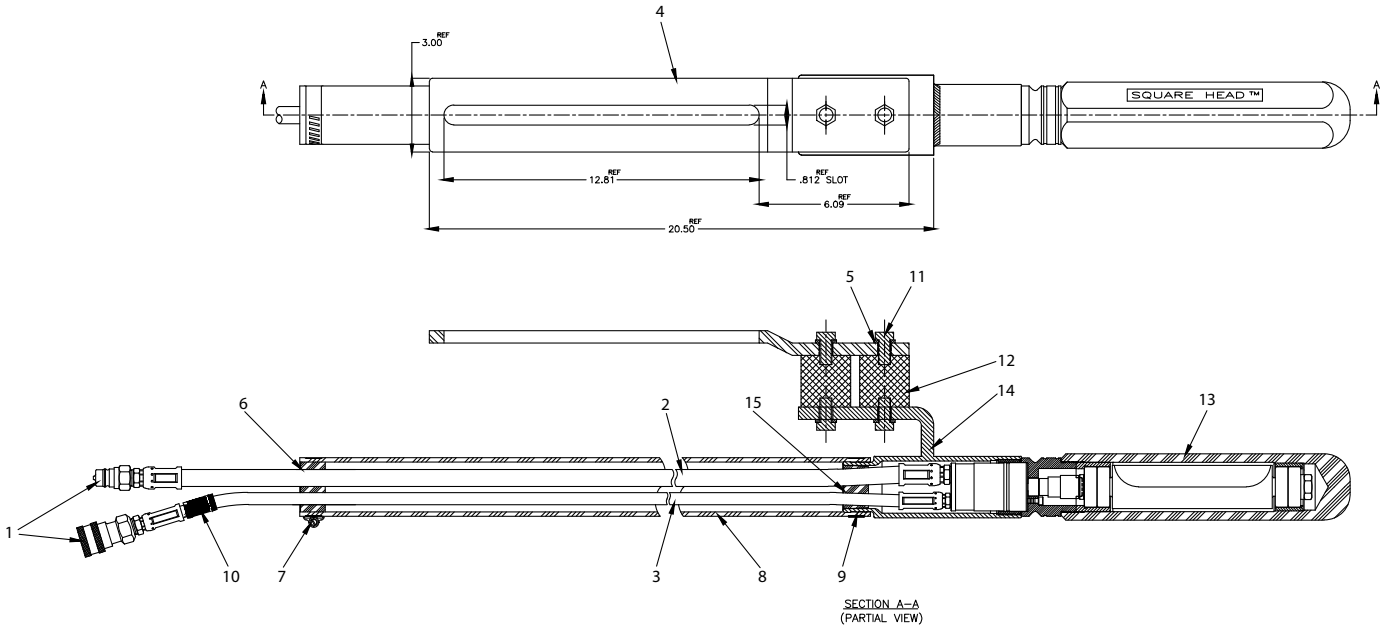
When Wyco supplies vibrators that have the speed sensing option, a cable exits the back of the hydraulic motor next to the hydraulic hoses. This armored and shielded cable (Wyco # 420-005) extends 9 feet away from the hydraulic motor. It runs parallel to the hydraulic hose and inside the protective hose.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

Assembly, Hydraulic, Angled, Square, Compact, 96 in. Hose (949-170)



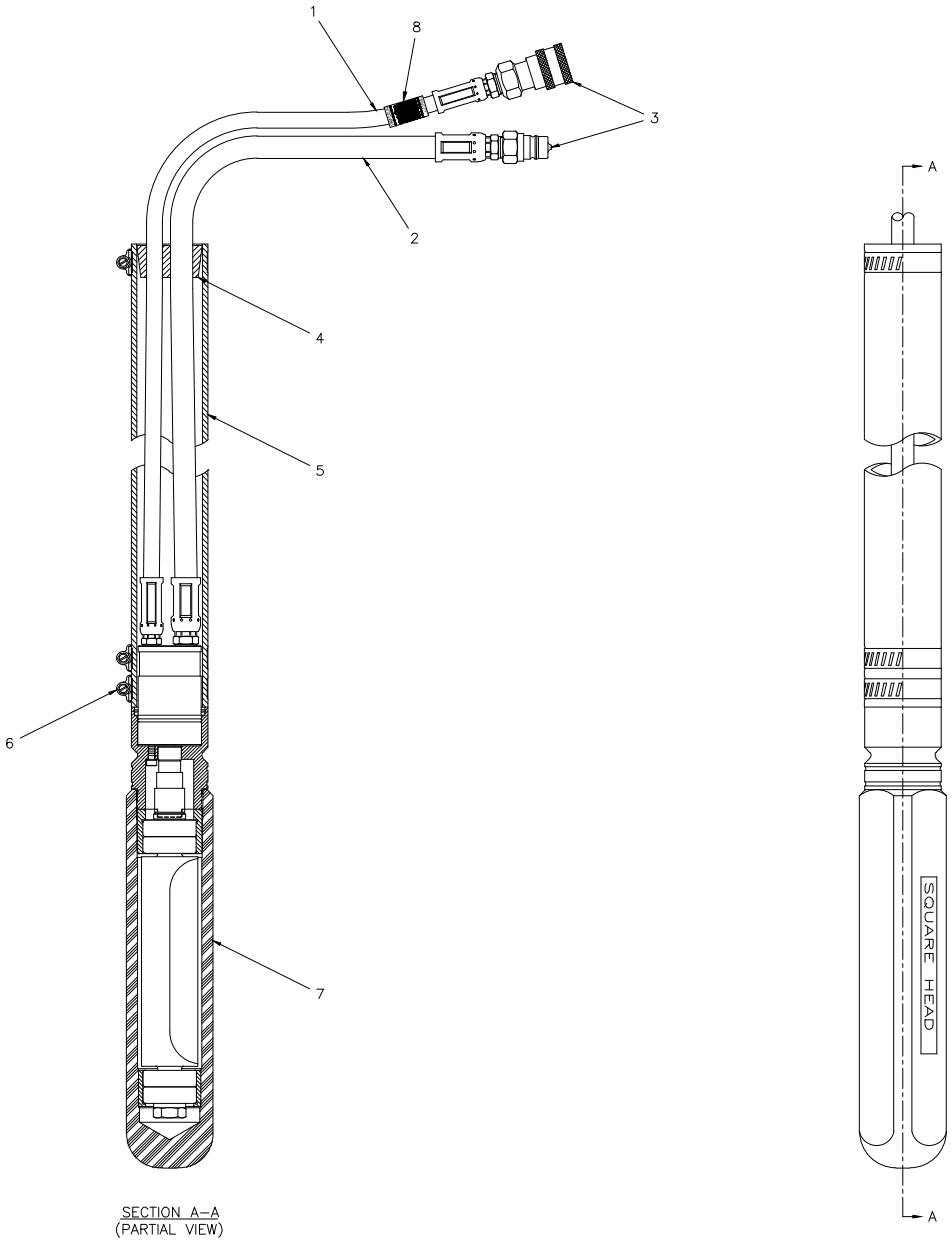
Item	Part No.	Qty	Description
1	419692	1	Quick disconnect
2	419684	1	Plug, tapered, rubber, #10
3	419729	1	Casting, claw clamp
4	259611	1	Clamp, hose, #36
5	259601	1	Clamp, center punch, 2-3/4 in. (69.85 mm), steel
6	949668	1	Assembly, square head, 2-1/4 in., ang, #2500
7	219500	4 ft	Hose, bulk, protective
8	419685	1	Plug, straight, neoprene
9	439708	2	Bolt, hex head, 1/2-13 × 3-1/2 in. (88.90 mm), GR 5
10	660751	1	Label, hydraulic, model number/pressure
11	439703	4	Nut, hex, 1/2-13
12	419720	1	Isolator, single, compact vib
13	439704	4	Washer, lock, 1/2 in. (12.7 mm)
14	419771	1	Angle bracket, compact, machined
15	213708	1	Assembly, hose, 3/8 in. (9.53 mm), 96 in./ 8 ft length
16	212508	1	Assembly, hose, 1/4 in. (6.35 mm), 96 in./ 8 ft length
17	439712	2	Bolt, hex head, 1/2-13 × 1-1/2 in. (38.10 mm), GR 8

Assembly, Hydraulic, Straight or Bent, Square, #2500 (950-130)



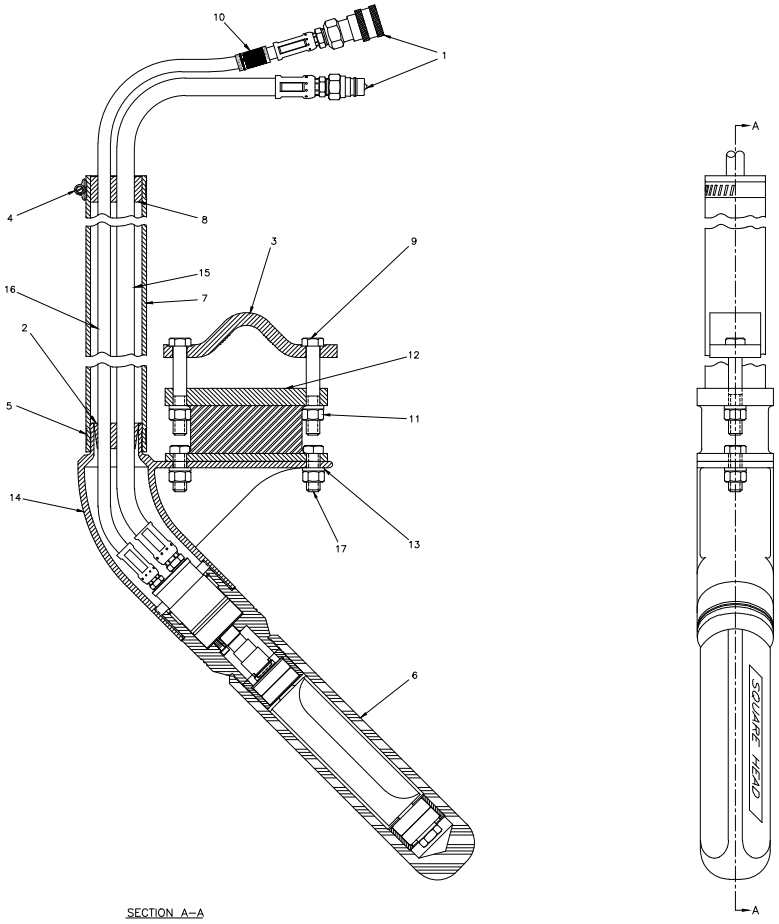
Item	Part No.	Qty	Description
1	419692	1	Quick disconnect
2	419642	1	Assembly, hose, return, 186 in./15.5 ft long
3	419644	1	Assembly, hose, pressure, 186 in./15.5 ft long
4	419962	1	Bar, mounting, 2 hose, slotted offset
5	439704	4	Washer, lock, 1/2 in. (12.70 mm)
6	419685	1	Plug, straight, neoprene
7	259611	1	Clamp, hose, #36
8	219500	96 in./ 8ft	Hose, bulk, protective
9	259601	1	Clamp, center punch, 2-3/4 in. (69.85 mm), steel
10	660751	1	Label, hydraulic, model number/pressure
11	439711	4	Bold, hex head, 1/2-13 × 1 in. (25.40 mm), grade 8
12	419726	2	Isolator, J3424-5
13	949808	1	Assembly, square head, 2-1/4 in., str, thd, #2500
14	419960	1	Tube, Straight, 2 hole, bent mount
15	419684	1	Plug, tapered, rubber, #10

Assembly, Hydraulic, Straight, Square, #2500, 9 ft Hydraulic (949-100)



Item	Part No.	Qty	Description
1	212509	1	Assembly, hose, pressure, 108 in. long
2	213709	1	Assembly, hose, return, 108 in. long
3	419692	1	Quick disconnect
4	419685	1	Plug, straight, neoprene
5	219500	6 ft	Hose, bulk, protective
6	259611	3	Clamp, hose, #36
7	949708	1	Assembly, head, 2-1/4 sq, str, #2500
8	660751	1	Label, hydraulic, model number/pressure

Assembly, Hydraulic, Angled, #GT11-123-A, 138 in./11.5 ft Hose (949-190)



Item	Part No.	Qty	Description
1	419692	1	Quick disconnect
2	419684	1	Plug, tapered, rubber, #10
3	419729	1	Casting, claw clamp
4	259611	1	Clamp, hose, #36
5	259601	1	Clamp, center punch, 2-3/4 in. (69.85 mm), steel
6	949668	1	Assembly, square head, 2-1/4 in., ang, #2500
7	219500	4 ft	Hose, bulk, protective
8	419685	1	Plug, straight, neoprene
9	439708	2	Bolt, hex head, 1/2-13 × 3-1/2 in. (88.90 mm), GR 5
10	660751	1	Label, hydraulic, model number/pressure
11	439703	4	Nut, hex, 1/2-13
12	419720	1	Isolator, single, compact vib
13	439704	4	Washer, lock, 1/2 in. (12.7 mm)
14	419771	1	Angle bracket, compact, machined
15	419647	1	Assembly, hose, return, 138 in./ 11.5 ft length
16	419649	1	Assembly, hose, pressure, 138 in./ 11.5 ft length
17	439712	2	Bolt, hex head, 1/2-13 × 1-1/2 in. (38.10 mm), GR 8

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