Bulletin SVP T5C
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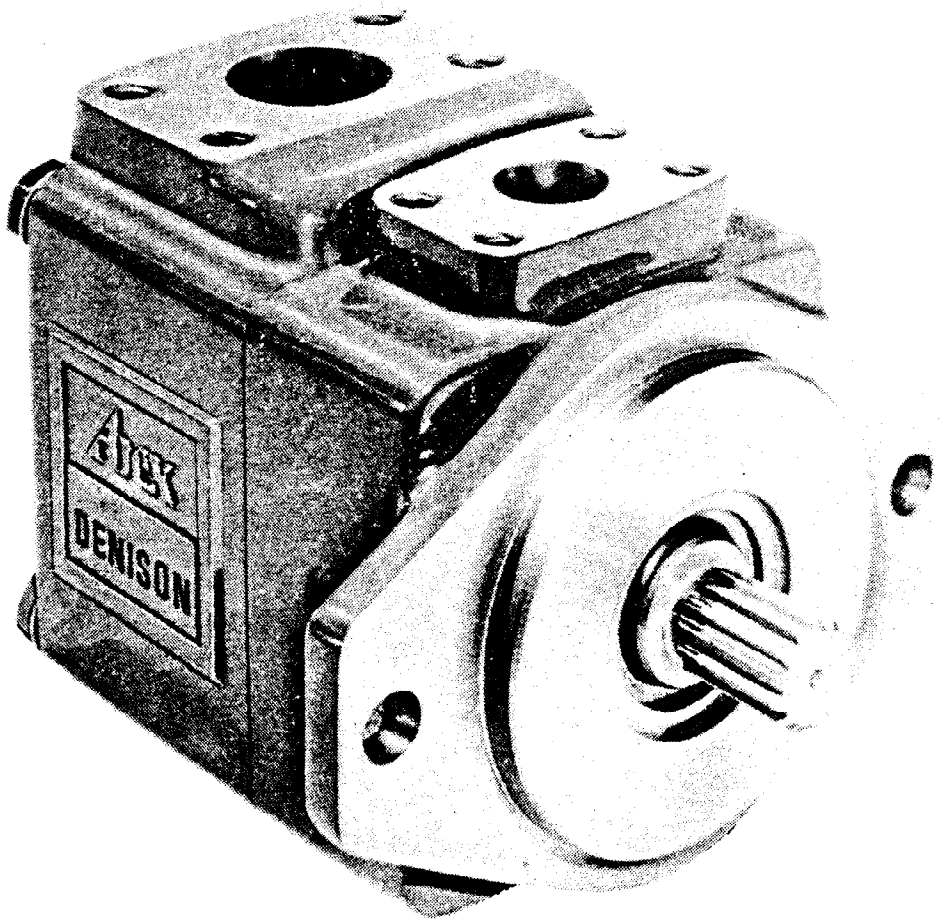
Abex | DENISON | SERVICE LITERATURE

VANE TYPE PUMP-SERIES T5C & T5SC

MODEL A INSTALLATION, OPERATION AND OVERHAUL INSTRUCTIONS



Vane Type Pump Series T5C

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Section I
INTRODUCTION AND DESCRIPTION

GENERAL

This manual covers installation, operation, maintenance and overhaul instructions for the Abex/ Denison T5C and T5SC vane type hydraulic pump.

DESCRIPTION

The Denison T5C series vane pumps are efficient, compact units designed for continuous duty up to 3000 PSI and 2800 RPM and intermittent duty up to 3500 PSI and 2800 RPM.*

Seven basic models are offered in this series and supply rated deliveries of 5, 8, 10, 14, 17, 22 and 25 GPM at 1200 RPM at 100 PSI. Refer to Table 1 for detailed operating characteristics.

The T5C and T5SC vane pumps consist of four basic components: (A) a housing or body, (B) a unitized cartridge consisting of; rotor, vanes, vane holdout pins, cam ring, bearing and port plates, (C) a shaft and bearing and (D) a mounting cap. (See Figure 1.)

The T5C and T5SC vane pumps feature the use of a unitized pumping cartridge. The unitized cartridge assembly is pre-tested at the factory and provides for ease and speed of disassembly and assembly in the event it becomes necessary or desirable to make repairs, overhaul or revise the GPM delivery.

THEORY OF OPERATION

The pumping operation of this unit (each cartridge) is obtained by providing a fixed interior cam surface and a rotating inner member (rotor) containing vanes which are held in contact with the inner cam surface. As the rotor is rotated by the drive shaft, the vanes are urged outward against the outward sloping cam surface, forming a cavity at the inlet ports of the port plates. Atmospheric pressure and suction created by the in and out action of the rotating vanes fill the inlet cavity with fluid.

As the rotation continues and the vanes that had previously moved outward and now have fluid trapped between them and the port plates, follow

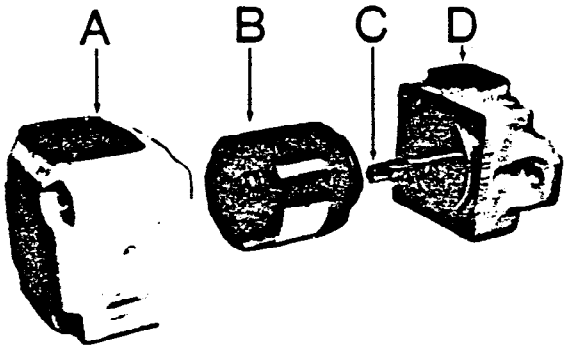


FIG. I

the inward slope of the cam which decreases the cavity containing the trapped fluid and discharges the fluid at system pressure through the pressure port openings in the port plates.

The rotating portion of the unitized cartridges feature the use of pressure actuated vanes which are urged against the cam ring by hollow pins located in the bottom of each rotor vane slot. Initial force to bring the vanes in contact with the cam ring contour during start up is provided by centrifugal force. The instant hydraulic pressure is obtained, the pins instantaneously separate from the bottom of the vanes in the pressure zone (inward sloping portion of cam) and allows fluid to fill the cavity under the pins until the pressure, which, in turn, provides the force necessary to keep the vanes in contact with the cam ring contour.

NOTE: When operating the pump at the Maximum outlet pressure, the pump shaft rotation should not be allowed to fall below 600 RPM in order to maintain proper vane to cam ring contact. **

The inlet or suction flow feeds through the 1½" port in the housing, through the large ports of each

*Rating apply only to the T5C series when using hydraulic fluid containing anti-wear additives.

▌ Denotes change.

TABLE I
THEORETICAL OPERATION CHARACTERISTICS * (T5C ONLY)

Basic Model	Displ. in 3/rev	Speed Rev/min	Delivery @ 100 PSI GPM	Input H.P. vs. Pressure		
				1000 PSI	2000 PSI	3000 PSI
T5C-005**	0.96	1200	5.0	3.6	7.0	a
		1800	7.5	5.2	10.0	a
		2800	11.6	9.0	16.8	24.6
T5C-008**	1.56	1200	8.0	5.0	10.0	—
		1800	12.0	8.0	15.0	23.0
		2800	18.6	13.4	25.8	37.0
T5C-010	2.00	1200	10.0	6.0	13.0	19.0
		1800	15.0	10.0	20.0	29.0
		2800	23.3	15.7	32.5	45.9
T5C-014	2.73	1200	14.0	9.0	18.0	26.0
		1800	21.0	14.0	27.0	39.0
		2800	32.7	21.3	41.4	61.6
T5C-017	3.49	1200	18.0	12.0	22.0	33.0
		1800	27.0	18.0	34.0	50.3
		2800	42.0	28.0	53.8	78.4
T5C-022	4.23	1200	22.0	13.0	26.0	40.0
		1800	33.0	20.0	40.0	60.0
		2800	51.3	33.6	62.7	94.1
T5C-025	4.84	1200	25.2	15.0	30.0	
		1800	37.7	23.0	45.0	b
		2500	52.4	32.0	62.0	

*Values shown are average values when using a hydraulic fluid of 120 SUS @ 100°F (SAE 10 @ 120°F) at an operating temp. of 125°-135°F.

**When using the 005 or 008 cam ring @ 2000 PSI the min. shaft speed is 1200 RPM.

(a) To avoid excessive heating, these internally drained pumps must not be operated for more than 5 seconds at a time at speeds or viscosities below which internal leakage exceeds 50% of the theoretical delivery.

(b) "C" 025 cartridge is limited to 2500psi (172 bar) and 2500 rpm.

port plate and through the center hole in the suction zone of the cam ring.

Initial axial clamping pressure is provided to the port plate and cam ring by means of a square section seal under the pressure plate. The instant system pressure is obtained, internal hydraulic pressure proportional to system pressure provides the necessary force required to maintain axial port plate and cam ring clamping.

To determine the performance characteristics of a given model, refer to Table 1.

Actual GPM Delivery of each cam size may be determined by subtracting the internal leakage from the theoretical delivery @ 100 PSI given in Table I. Internal leakage rates are:

TYPICAL LEAKAGE

120 SUS Fluid (Sae 10 @ 120°F)	60 SUS Fluid (SAE 10 @ 180°F)
1.2 GPM/1000 PSI	1.8 GPM/1000 PSI

Section II
INSTALLATION

MOUNTING

This pump may be mounted in any position, however, it is recommended that a horizontal position be used whenever possible. The inlet and outlet port arrangement allows four relative positions in 90° intervals. If desired, the porting relationship may be changed by removing the four bolts securing the housing to the mounting cap and rotating the housing and mounting cap to the desired porting arrangement. When replacing the four bolts, they must be torqued to the recommended value. (115 ft. lbs.) The mounting hub and bolt hole location conform to SAE-B, 2-bolt standard in both the spline and key shaft options. The pump shaft must be in alignment with the power source shaft and should be checked with a dial indicator. The mounting pad or adapter into which the pump pilots must be concentric with the power source shaft within 0.010 TIR. This concentricity is particularly important if the pump shaft is rigidly connected to the power source without a flexible coupling.

PIPING

All fluid lines, either pipe, tubing or hose, must be of adequate size and strength to assure free flow to and from the pump. *Do Not Use Galvanized Pipe.* Galvanized coating may flake off after continued use. An undersize inlet line will restrict the fluid flow to the pump and prevent proper operation and may cause damage due to cavitation. Inlet piping must be sized to meet or exceed minimum inlet requirements as outlined in Table II. If rigid pipe or tubing is used, the workmanship must be accurate in order to eliminate strain on the pump housing or mounting cap or the fluid connectors. Sharp bends in the lines should be eliminated whenever possible. All system piping must be cleaned with solvent or an equivalent cleaning agent before connecting to the pump.

TABLE II

Minimum Inlet Pressure vs. RPM @ Pump Inlet

Speed	Gauge Pressure				Absolute Pressure	
	PSIG	Bar	in. Hg.	mm Hg.	PSIA	Bar
1200	— 3	—0.20	(—)6	(—)152	8.0	0.55
1500	— 3	—0.20	(—)6	(—)152	9.0	0.62
1800	— 3	—0.20	(—)6	(—)152	10.5	0.72
2400	—1.5[a]	—0.10[a]	(—)3[a]	(—) 76[a]	13.0[a]	0.90[a]
2800	+1.0[a]	+0.07[a]	+ 2[a]	+ 50[a]	15.2[a]	1.05[a]

[a] Except for pumps with 025 cam rings which are rated as follows at their 2500 rpm max.

2500	+1.0	+0.07	+2.0	+50	15.2	1.05

Note: Be sure the entire hydraulic system is free of dirt, lint, scale and other foreign material before operating the pump.

FLUIDS

Type — It is recommended that fluid used in the T5C pump have a petroleum base and contain agents which provide oxidation inhibition and anti-rust, anti-foam and de-aerating properties.

Anti-wear additives — It is strongly recommended that fluid used contain the necessary additives to secure high anti-wear characteristics. Comparative operating pressure and speed limits for anti-wear and non-anti-wear fluids are shown in Table III below.

TABLE III

OPERATING SPECIFICATIONS

Fluid Type	Denison Fluid Spec.	T5C Continuous			T5C Intermittent *			T5SC Continuous			T5SC Intermittent *		
		Speed RPM	Pressure PSI	Bar	Speed RPM	Pressure PSI	Bar	Speed RPM	Pressure PSI	Bar	Speed RPM	Pressure PSI	Bar
Antiwear Petroleum Base	HF-0 HF-2	2800	2500	172	2800	3000	207	2800	3000	207	2800	3500	241
Crankcase Oils	HF-6	2800	2500	172	2800	3000	207	2800	2500	172	2800	3000	207
Non Antiwear Petroleum Base	HF-1	2800	2000	138	2800	2500	172	2800	2500	172	2800	3000	207
Water-in-Oil Emulsions	HF-3	—	—	—	—	—	—	1800	2000	138	1800	2500	172
Water Glycols	HF-4	—	—	—	—	—	—	1800	2000	138	1800	2500	172
Synthetic Fluids	HF-5	--	--	—	—	—	—	1800	2500	172	1800	3000	207

* Pressure indicated is not to exceed 12 seconds per minute of operation.

Automotive Crankcase Oils – Certain types of these fluids (API Service Class MS or new API class SC, SD or SE) contain detergents, anti-wear additives and other properties as previously specified. The fact that detergents tend to hold water in suspension as an emulsion may cause precipitates to form which might contribute to filtration problems. These fluids may be used only if little or no water is present.

Non-petroleum Base or Fire Resistant Fluids – When it becomes necessary to use these types of fluids, the T5SC pump should be used on some types (Fyrguel 220 or equivalent) and must be used with other fire-resistant fluids. To determine performance characteristics or ratings for a particular fluid, a Denison Sales Representative should be consulted.

Operating Temperature – For the most efficient pump operation, an inlet oil temperature of 125° - 135° F is recommended. The maximum inlet oil temperature for mobile applications should not exceed 180° F or 160° F for industrial applications.

Pump Inlet Conditions – During the pump operation, the inlet conditions must be sufficient to provide filling without cavitation. The use of an improper grade of oil, improper or restrictive inlet piping may result in an inlet vacuum in excess of recommendations and will reduce the pump service life or may cause damage to the pump parts. An inlet pressure of 1 to 10 PSIG is desirable. During high speed operation, it is particularly important to provide proper inlet pressures. If a pressurized or boosted inlet system is used, the inlet pressure must not exceed 20 PSIG.

Refer to Table II for minimum inlet requirements.

Note: When an inlet strainer is used, it should have a minimum capacity equal to twice the GPM output of the pump.

Section III
OPERATING INSTRUCTIONS

PRE-START CHECK

Before initial starting of the pump, the following checks should be made:

a. Check the rotation of the power source to be sure the pump will rotate in the direction indicated by the arrow on the pump identification tag.

b. Check inlet and discharge to be sure all connections are tight and connected properly.

c. Check all mounting bolts and flanges to be sure they are tight and properly aligned.

d. When possible the rotating element or pump shaft should be rotated by hand to assure that it rotates freely.

PRIMING

If the pump is installed with a positive head on the inlet, priming will be instantaneous upon start up. It is recommended that a minimum pump shaft speed of 600 RPM be obtained for priming, however, this speed will vary with different inlet and outlet conditions. When a pressure relief valve is used at the outlet, it should be backed off to the minimum setting. When possible, an air bleed off should be provided in the circuit to facilitate purging the system of air. When it is not possible or practical to provide a positive head the pump inlet or the installation is such that a suction lift results, the following procedure is recommended.

a. Manually fill the pump housing with fluid.
b. Start rotation in a jogging manner until a prime is picked up.
c. Bleed off air that may become trapped in the pump.

To prevent possible damage to the internal parts, the pump should never be started dry or without internal lubrication.

Note: If the pump does not prime properly or pressure cannot be obtained, it should be shut down and condition corrected.

Section IV
MAINTENANCE

GENERAL

The internal parts of this pump are lubricated by the operating fluid, therefore, preventative maintenance is limited to keeping the fluid in the system clean. The system filters should be replaced frequently and if a suction strainer is used it must not be allowed to become restricted. When possible, dirt should not be allowed to accumulate on the pump or around the shaft seal. All fittings and bolts should be tight. *Note: It is especially important that the suction or inlet piping and fittings be tight and in good repair to prevent air from being drawn into the system.*

In the event the pump does not perform properly or a malfunction occurs, refer to the "Trouble Shooting Chart" before proceeding with an overhaul.

TABLE IV
TROUBLESHOOTING

Trouble	Probable Cause	Possible Remedy
External Leakage	a. Seal failure b. Porosity in casting c. Damaged or defective seal between housing and mounting cap.	a. Replace seal. b. Replace casting. c. Replace seal.
Leakage at Fittings	a. Cracked or damaged flange or fittings. b. Damaged or defective flange threads. c. Damaged or defective "O" ring seal. d. Burr on mating surfaces.	a. Replace flange or fittings. b. Replace flange. c. Replace "O" ring seal. d. Remove burr.
Loss In Pump RPM Under Load.	a. Power source too small for pump being used.	a. Provide larger power source. See HP requirements for pump being used.
Pump Not Delivering Oil	a. Pump does not prime. b. Wrong direction on shaft rotation. c. Tank fluid level too low. d. Fluid inlet line or suction strainer clogged as undersized. e. Air leak in suction line. f. Fluid viscosity too heavy to pick up prime. g. Broken pump shaft or internal parts.	a. Bleed air from system. b. Reverse direction of shaft. Convert pump to reverse direction of rotation. (Check rotation arrows on ident. plate & cam ring.) c. Add fluid and check level to be certain suction line is submerged. d. Clean strainer of all foreign material Provide proper size strainer (should have a capacity equal to 2 x pump volume in GPM). e. Tighten and seal connections. Replace seals. f. Use lighter viscosity fluid. g. Replace damaged parts per overhaul instructions.
Pump Not Developing Pressure	a. Relief valve setting too low. b. Relief valve sticking open. c. Vane hold out pins not loading vanes. d. Free recirculation of fluid to tank being allowed.	a. Reset relief valve. b. Check for defective or malfunctioning valve. c. Disassemble and check pins & pin bores for burrs or damage: Check for foreign material. d. Check directional control valve for open center or neutral position. Check for open bypass valve.
Noisy or Erratic Operation	a. Air leak at pump inlet or suction lines.	a. Check for air leaks by pouring system fluid around joints and listen for change in sould level. Tighten as required.

TABLE IV – TROUBLE SHOOTING (cont'd.)

Trouble	Probable Cause	Possible Remedy
Noisy or Erratic Operation (cont'd.)	b. Housing and mounting cap separation. c. Restricted or clogged inlet line or strainer. d. Excessive pump RPM (cavitation). e. Worn vanes, cam ring or port plates. f. Worn vane holdout pins or clogged oil feed holes in pins. g. Worn bearings.	b. Check bolts for proper torque. c. Provide larger inlet line or strainer. Clean strainer. d. Provide power source that does not exceed maximum pump RPM recommendations. e. Disassemble per overhaul instructions and replace worn parts. f. Disassemble per overhaul instructions. Replace pins if worn or clean if clogged. g. Disassemble and replace.
Seal Failure	a. Excessive inlet pressure.	a. Decrease inlet pressure. Inlet pressure must not exceed PSI.

Problems encountered not indicated in this table should be referred to the Customer Service Center or nearest Abex/Denison representative.

Section V
OVERHAUL

GENERAL

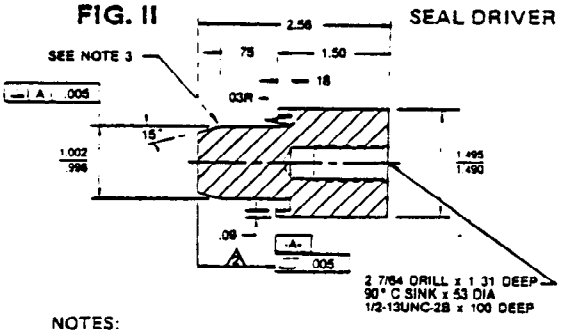
The instructions contained in this section cover a complete disassembly, inspection and assembly of the T5C and T5SC vane type Abex/Denison pump. Sometimes a malfunction can be corrected without removing the pump from the installation by replacing the cartridge assembly. This can be accomplished by removing the four (4) housing screws and removing the rear housing.

Drain all fluid from the pump and thoroughly clean the exterior surface. Prepare a clean, lint free surface on which to place the internal parts for inspection and repair.

SPECIAL TOOLS

A special tool is required to properly install the shaft seal. A shaft seal driver of proper size must be used to install the shaft seal. The remainder of the pump disassembly and assembly can be accomplished with normal repair shop tools and good repair practices. Refer to Figure II for proper configuration and dimensions for the seal driver tools and good repair practices. Refer to Figure II for proper configuration and dimensions for the seal driver and protective cone.

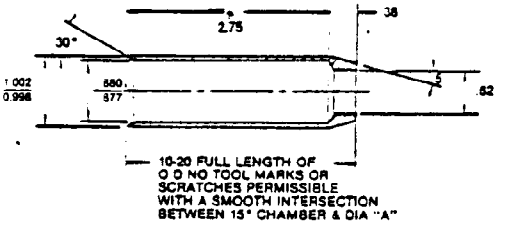
FIG. II SEAL DRIVER



NOTES:
1. Remove all burrs and break sharp edges .010/.005R.
2. Length ⚠ to be heat treated to RC 50-55.
3. Length ⚠ to have a 10-20 full length, with a smooth intersection between chamfer and dia. "A."
4. Grease O.D. of length ⚠ before installing shaft seal onto tool to prevent damage to the seal.

Material 4140 or equivalent.

PROTECTIVE CONE



DISASSEMBLY

See figure V for item number reference.

1. Secure the pump in a vise or other suitable holding fixture with the shaft (9) entended down. Clamp the vise on the front mounting cap (11) not the rear housing.
2. Remove the four housing screws (1) and the rear housing (2). Notice the inlet port of the housing with reference to the outlet port in the mounting cap.
3. Remove the O-ring (3) from the housing (2).
4. Firmly grasp the unitized cartridge assembly (4) and while rotating it, pull outward and remove the complete cartridge from the mounting cap (11). Sometimes it will be necessary to hook a gear puller under the cam ring (4e), in the open ports, to remove the cartridge. Place the cartridge assembly on a clean smooth surface for disassembly and inspection later. See page 12.
5. Remove the internal snap ring (5) from the front mounting cap (11).
6. Remove the remainder of the pump from the vise and drive the shaft assembly (items 6, 7, 8 and 9) from the mounting cap (11) by gently tapping the coupling end of the shaft with a lead or plastic tipped hammer.
7. Examine the bearing for wear before removing it from the shaft. Apply a little pressure to the outer race and rotate the bearing to check the balls and race for wear or cracks. Check for looseness. Remove bearing from shaft if a replacement is needed. Inspect the outside diameter of the shaft at the point of contact with the bearing in the cartridge and also the sealing surface diameter for the shaft seal.
8. If the bearing is defective remove snap ring (6) and press bearing (7) from the shaft (9). Remove snap ring (8).

"WARNING"

Snap ring (8) must be removed by passing over the bearing surface of the shaft and not the shaft seal surface. A damaged seal surface will cause the seal to leak. See figure III.

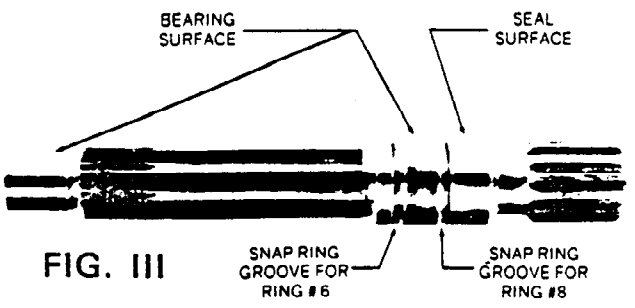


FIG. III

9. Press shaft seal (10) from front mounting cap (11).

REASSEMBLY

Immerse the seals and bearing in clean hydraulic fluid to make the reassembly easier and to provide initial lubrication.

SHAFT END

1. Place the front mounting cap (11) in a clean surface with the large open end facing up. Use a shaft seal driver (see figure II) and drive the shaft seal (10) into the cap. Make certain that the open side of the seal is toward the inside of the cap. The shaft seal driver will prevent damage to the seal during installation.
2. Pass snap ring (8) over the internal end of the shaft (9) and install it in the snap ring groove between the bearing surface and the seal surface. Do not allow the snap ring to touch the seal surface on the shaft. Press bearing (7) over the same end of the shaft and install snap ring (6). See shaft sketch in disassembly procedure, paragraph (8) Figure III. Be sure (6 and 8) are fully seated in groove.

"CAUTION"

When installiing bearing (7) use care to prevent damaging or distorting snap ring (8).

3. Apply lubricating fluid to the inside of the shaft seal (10) and install the shaft assembly (6, 7, 8 and 9) in the mounting cap (11).
4. Install snap ring (5) in the cap (11) and against bearing (7) to hold the shaft assembly in place. Make certain snap ring (5) is fully seated in the groove.

CARTRIDGE & HOUSING

1. Install O-ring (3) in rear housing (2).
2. Place the rear housing (2) on a clean surface with the open end up and insert the unitized cartridge assembly (4) in the housing. Make certain that Driv-Lok pin (4b) enteres the drilled hole in the housing (2).
3. Apply lubricating fluid to the two seals (4m) and (4n) on the cartridge and O-ring (3) in the rear housing.
4. Install the mounting cap with the shaft assembly by inserting the shaft down through the cartridge. Rotate the shaft to pass through the rotor and to enter the shaft into the bearing in the rear port plate.
5. Position the inlet port of the rear housing and the outlet port of the front mounting cap in the required position by turning the mounting cap and shaft assembly.
6. Install the four screws (1) and torque to 115 ft./lbs.

UNITIZED PUMPING CARTRIDGE ASSEMBLY
Item 4 "C" Size

DISASSEMBLY

SEE FIGURE IV FOR ITEM NUMBER REFERENCE

1. Remove the two screws (4a) from the port plate (4c).
2. Remove the port plate assembly (4c). The Driv-Lok pin (4b) is pressed into the port plate and should not be removed unless a replacement is required.
3. Remove dowel pin (4d), cam ring (4e), and dowel pin (4j).
4. Remove the vanes (4f), the rotor (4h), and the pins (4g) from the rotor.
5. Remove the seals (4m, 4n and back-up ring 4q) from the pressure plate.

CLEANING AND INSPECTION

Wash all metal parts in cleaning solvent and dry thoroughly. Discard the rubber seals. Place all the parts on a clean lint free surface and inspect for wear marks, nicks and burrs. Light scoring on the wear surfaces of the port plate and pressure plate may be removed by lapping. The vanes must move freely in the rotor slots and not bind or have excessive play. The edges of the vanes and the rotor slots may be stoned with a fine India stone to remove all burrs. Inspect the cam ring for excessive wear (ripples or washboard marks on the contour). Replace a badly worn or defective cam ring and any parts that can not be reconditioned.

All metal parts that have been lapped or stoned, must be washed again in cleaning solvent and dried before they are assembled.

Make centain that all internal passages in the port plate, pressure plate, rotor, vanes and vane pins are open and clean.

REASSEMBLY

This "C" cartridge is made up using the same parts regardless of the direction of rotation. Refer to page 12, Figure IV and observe that screws (4a) and dowel pins (4d and 4j) are not inserted in the same holes for left-hand (CCW) as for right-hand (CW) operation. The arrow on the cam ring (4e) must point in the direction that the pump is intended to run.

1. Place the pressure plate (4k) on a clean flat surface with the wear face up and apply clean hydraulic fluid to the face.

Again, check the rotation of the pump where this cartridge will be used.

2. Insert dowel pin (4j) in the pressure plate (4k) using the hole nearest the arrow that indicates the desired rotation.
3. Center the rotor assembly (4h) on the pressure plates (4k) with the splined side of the rotor up.
4. Insert one vane holdout pin (4g) in each vane slot in the rotor assembly. The holdout pins must move freely and be inserted against the bottom of the hole.
5. Install the vanes (4f) in the rotor with the bottom of the vane toward the center of the rotor. (The bottom is the precision ground flat surface).
6. Place the cam ring (4e) over the dowel pin (4j). *The arrow on the cam ring must indicate the same direction as the arrow which is closer to dowel pin (4j) in the pressure plate (4k).*
7. Install dowel pin (4d) in the cam ring. If the Driv-Lok pin (4b) was removed from the port plate (4c), it must be replaced.
8. Press the Driv-Lok pin (4b) into the hole provided in the back of the port plate (4c) (grooved end first).
9. Pour hydraulic fluid over the cam ring and rotor assembly and install the port plate (4c) over the dowel pin (4d). The port plate must be positioned to allow the two screws (4a) to pass through the cam ring and enter the pressure plate.
10. Insert the two screws (4a) and tighten with a screw driver. Install seals (4m, 4n and back-up ring 4p) on the pressure plate.

T5C & T5SC
UNITIZED CARTRIDGE PARTS LIST

REFER TO FIGURE IV

ITEM 4 UNITIZED CARTRIDGE ASSEMBLY FOR T5C*		These parts and common parts listed below are a complete T5C Unitized Cartridge Assembly			
Right Hand (CW) or Left Hand (CCW)		4c Port Plate & Bearing Ass'y.	4e Cam Ring	4m Seal	4n Seal
Model No.	Code No.				
T5C-005-R	S14-20593	S14-25993	034-48782	691-10238	691-10229
T5C-005-L	S14-26001				
T5C-008-R	S14-20594		034-48784		
T5C-008-L	S14-26002				
T5C-010-R	S14-20192		034-48573		
T5C-010-L	S14-26003				
T5C-014-R	S14-20193		034-48574		
T5C-014-L	S14-26004				
T5C-017-R	S14-20194		034-48575	#238.$	#239$
T5C-017-L	S14-26005				
T5C-022-R	S14-20195		034-48576		
T5C-022-L	S14-26006				
T5C-025-R	S14-28783		034-70337		
T5C-025-L	S14-28784				
QTY.	1	1	1	1	1

ITEM 4 UNITIZED CARTRIDGE ASSEMBLY FOR T5SC**		These parts and common parts listed below are a complete T5SC Unitized Cartridge Assembly.			
Right Hand (CW) or Left Hand (CCW)		4c Port Plate & Bearing Ass'y.	4e Cam Ring	4m Seal	4n Seal
Model No.***	Code No.***				
T5SC-005-R	S14-25043-5	S14-28765	034-70741	691-10238***	691-10229***
T5SC-005-L	S14-26008-5				
T5SC-008-R	S14-25044-5		034-70742		
T5SC-008-L	S14-26009-5				
T5SC-010-R	S14-25039-5		034-70743		
T5SC-010-L	S14-26010-5				
T5SC-014-R	S14-25040-5		034-70744		
T5SC-014-L	S14-26011-5				
T5SC-017-R	S14-25041-5		034-70745		
T5SC-017-L	S14-26012-5				
T5SC-022-R	S14-25042-5		034-70746		
T5SC-022-L	S14-26013-5				
T5SC-025-R	S14-40453-5		034-70874		
T5SC-025-L	S14-40454-5				
QTY.	1	1	1	1	1

*For use with petroleum base fluids.

**For severe duty applications.

***Add -5 to the end of model and code no. when ordering a kit requiring Viton A seals. Change seal prefix to 695 when ordering seal separately.

COMMON UNITIZED CARTRIDGE PARTS FOR ALL MODELS

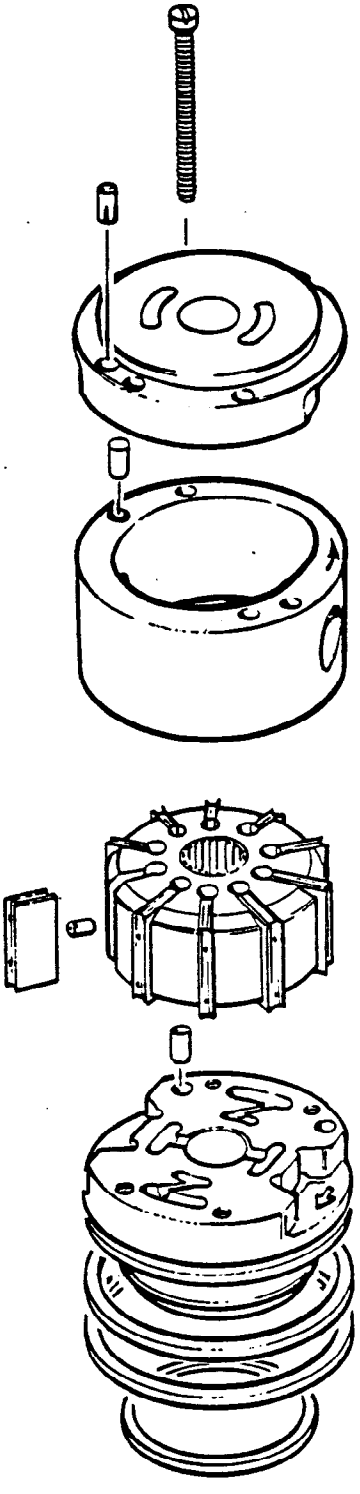
Item	Qty	Part No.	Description
4a	2	317-06266	6-32 x 2¼ Fillester Hd. Screw
4b	1	323-82010	3/16 x ½ Driv-Lok Pin
4d	1	324-21208	3/16 x ½ Dowel Pin
4f	10	034-48577	Vane

Item	Qty	Part No.	Description
4g	10	034-24982	Vane Holdout Pin
4h	1	S14-23178	Rotor Assembly
4j	1	324-21208	3/16 x ½ Dowel Pin
4k	1	034-48571	Pressure Plate
4p	1	618-15016	Back-up ring

2107-239

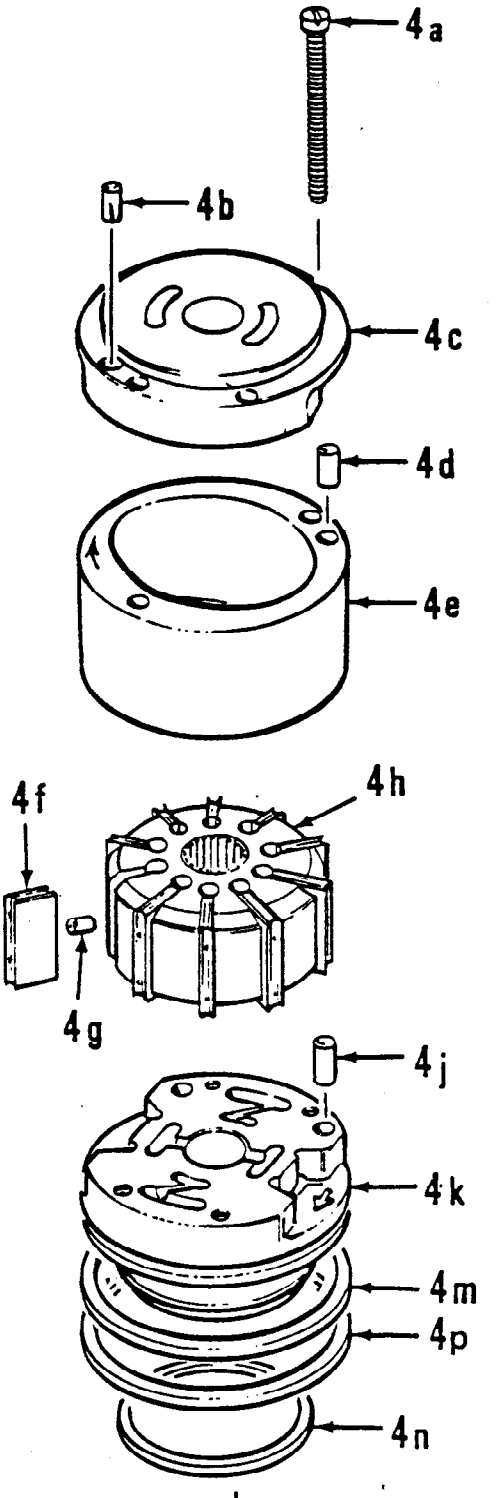
UNITIZED CARTRIDGE
for T5C & T5SC

Refer to page 11 for parts list



R

Parts in position for right-hand (CW) rotation.



L

Parts in position for left-hand (CCW) rotation.

FIG. IV

T5C & T5SC PARTS LIST

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	306-40038	Hex head cap screw ½-13 x 4½	4
2	034-48564	Housing	1
3	*671-00244 (s) **675-00244 (s)	O-ring (70-6230-22)	1
4	See pg. 12 & Fig. IV	Unitized cartridge assy.	1
5	356-30244	Internal snap ring N5000-244	1
6	034-70777	External snap ring 5100-98	1
7	230-82054	Ball bearing ND-3305	1
8	034-70777	External snap ring 5100-98	1
9	034-70815 034-70814 034-70880	#3 Shaft SAE-B spline - Std. #1 shaft - Keyed SAE-B (2.81 Lg.) Std. #2 Shaft - Keyed (2.31 Lg.)	1
Not Shown	034-48690 034-49622	Key for #1 Shaft Key for #2 Shaft	1 1
10	*620-82012 (s) **620-82068 (s)	Shaft seal 471224 (NAT) Shaft seal	1
11	034-48565	Mounting cap	1
(s) (s)	*S 14-20196 **S 14-20196-5	Seal kit (includes cartridge seals)	1 1
	S14-24569 S14-24570 S14-25645	#3 Shaft assembly (#6, 7, 8, & 9) #1 Shaft assembly (#6, 7, 8, 9, & Key) #2 Shaft assembly (#6, 7, 8, 9, & Key)	1 1 1

*For use with petroleum base fluids and severe duty applications.
**For use with fluids requiring Viton A seals.

Foot mounting bracket kit (optional): Code No. S14-10785
(includes 1 pt. no. 034-27263 bracket and 2 screws no. 306-20160 (½-13 x 1")
***Add -5 to the end of model and code no. when ordering a kit requiring Viton A seals. Change seal prefix to 695 when ordering seal separately.

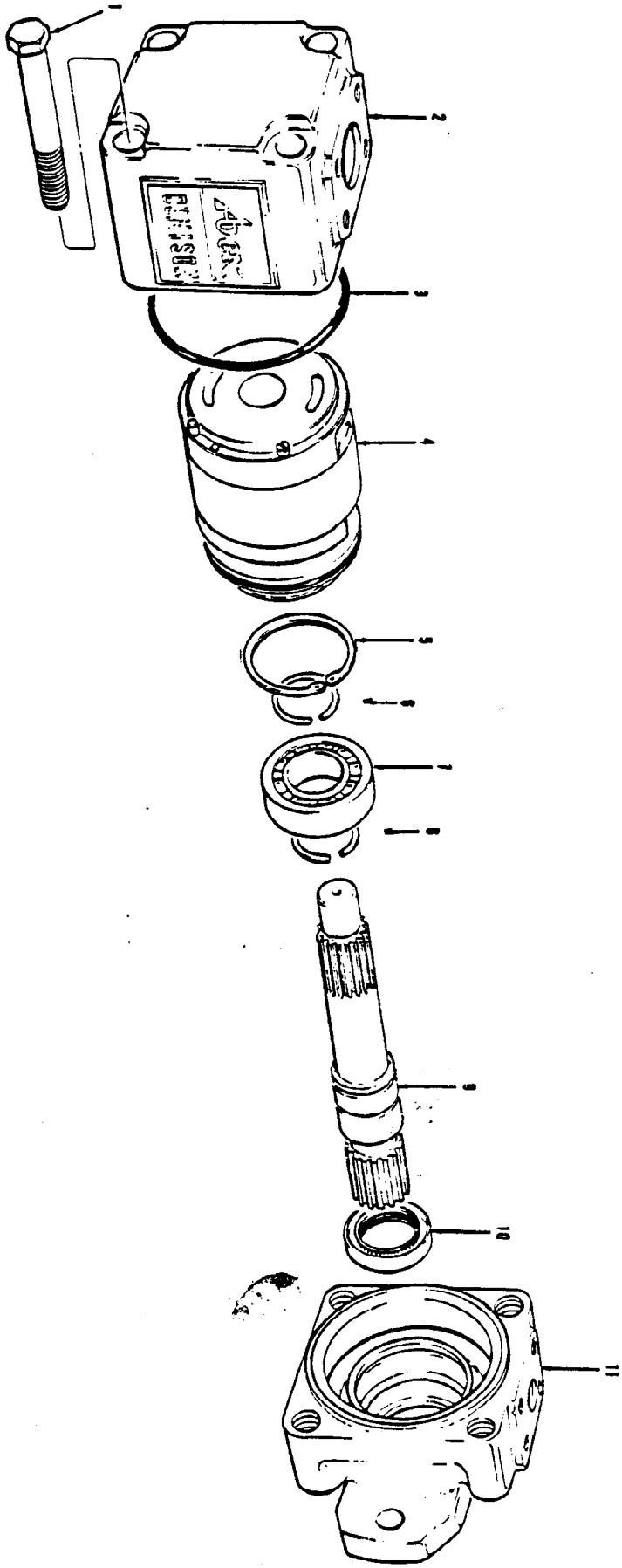


FIG. V

MODEL No. KEY SERIES T5C

T5C – 022 – 1 R 00 – A 1 – * *

Van Pump Series

Cartridge Size (GPM @ 1200 RPM)
- 005 - 5 GPM
- 008 - 8 GPM
- 010 - 10 GPM
- 014 - 14 GPM
- 017 - 17 GPM
- 022 - 22 GPM
- 025 - 25 GPM

Shaft (See dimensional view)
- 1 – Keyed, SAE - B (2.81 L G)
- 3 – Splined, SAE - B (1.62 L G)
- 2 – Keyed, NON-SAE (2.31 L G)

Special Modification (Standard – Omitted)

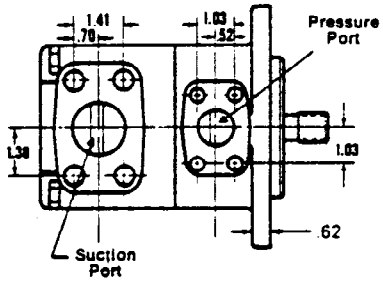
Seal Compound 1 = Buna N, 5 = Viton A

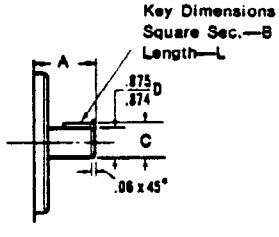
Design Letter – Subject to Change by Manufacturer

Porting Combinations

Pump Rotation – Viewed from the Shaft End
R – Clockwise L – Counterclockwise

DIMENSIONS



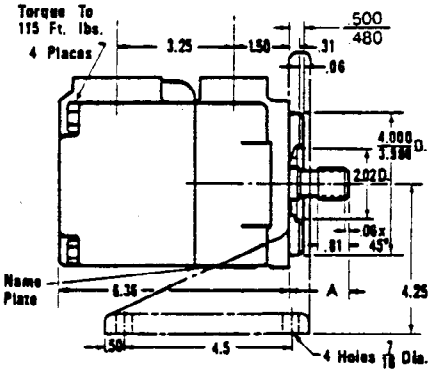


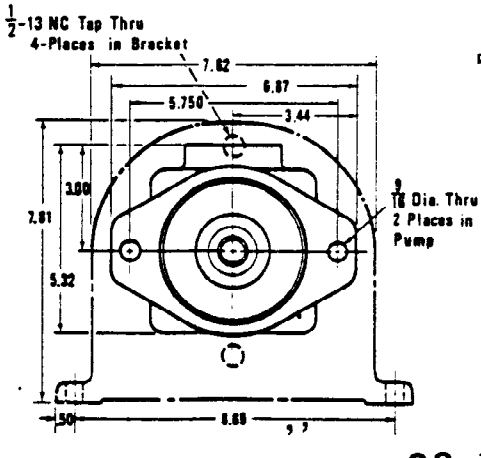
SHAFT DIMENSIONS

Shaft Code	Shaft Type	Shaft Std.	Shaft Length A	Key Dimensions: Square Key Sec. B	Key Dimensions: Dimension over Key C	Key Dimensions: Lgth. of Key L
1	Keyed	SAE-B	2.81	.250 / .248	.982 / .975	1.50
3	Splined	SAE-B	1.62	•	•	•
2	Keyed	Non SAE	2.31	.188 / .186	.966 / .961	1.25

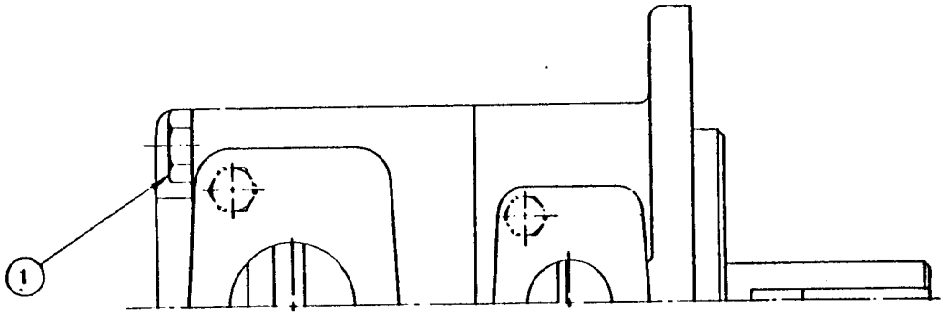
SPLINE DATA

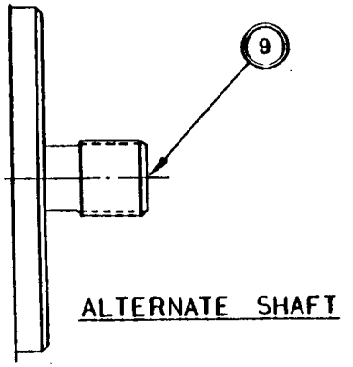
13 teeth, 16/32 diametral pitch, 30° pressure angle.



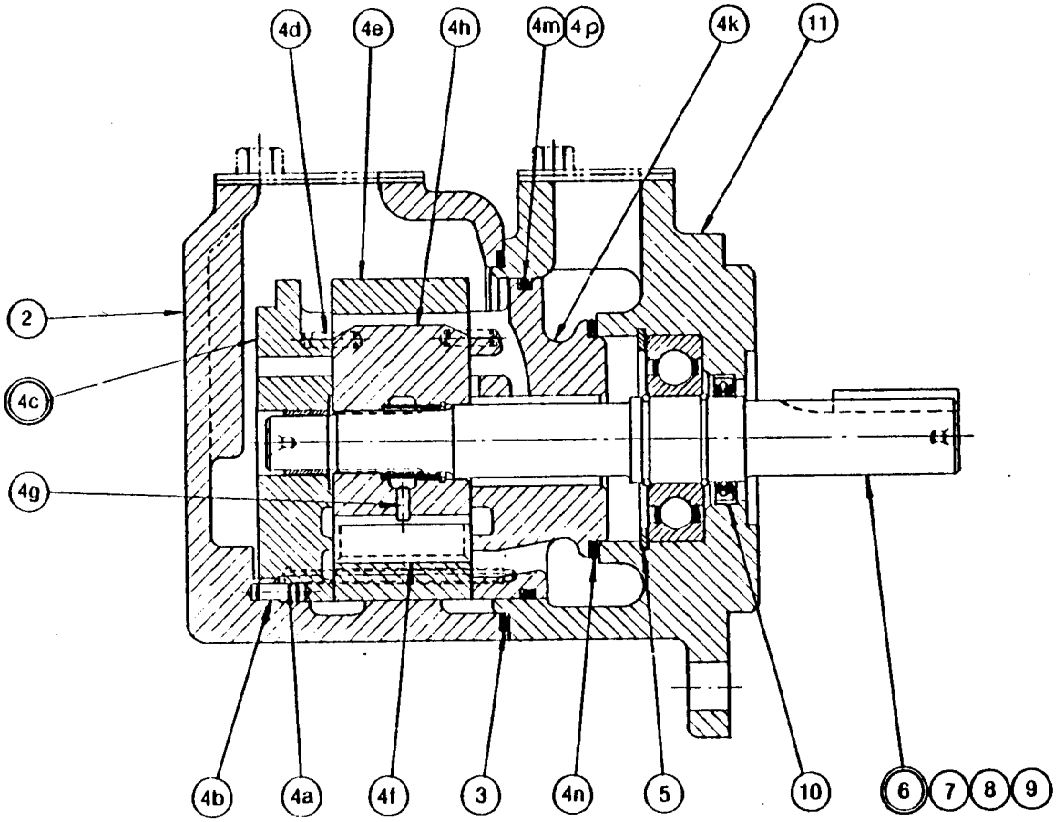


23-7235





ALTERNATE SHAFT



SECTION A-A