



# INSTRUCTIONS

## OILGEAR TYPE "H" AXIAL PISTON MOTORS

BULLETIN 956600B

### REFERENCE MATERIAL

H-111 Parts Drwg. - - - - - DS-956603	H-6017 Parts Drwg. - - - - - DS-956605
H-311 Parts Drwg. - - - - - DS-956600	Oil Recommendations - - - - - Bul. 90000
H-811 Parts Drwg. - - - - - DS-956604	Fire Resistant Fluids - - - - - Bul. 90001
H-1211 Parts Drwg. - - - - - DS-956608	Piping Information - - - - - Bul. 90011
H-2011 Parts Drwg. - - - - - DS-956608	

### TO THE USER AND OPERATOR OF OILGEAR TYPE "H" MOTORS

These instructions are written to simplify your work of installing, operating and maintaining Oilgear Type "H" Motors. Your acquaintance with the construction, principle of operation and characteristics of these units will help you attain satisfactory performance, reduce shutdowns and increase the motor's life. We feel confident the Oilgear motor will operate to your satisfaction if these instructions are adhered to. Some Oilgear units have been modified from those described in this bulletin and other changes may be made without notice.

### I PREPARATION & INSTALLATION

#### A. MOUNTING

Type "H" Motors can be mounted in any position. Sizes 1 thru 20 are furnished with either round face or angle bracket mounting. Size 60 units are foot mounted. Secure motor to a rigid mounting surface. On motors with tachometer extension shafts, provide rigid mounting for tachs.

#### B. PIPING

See Oilgear "Piping Information" bulletin. Pressure at port "B" provides clockwise rotation and pressure at port "A" counter-clockwise facing driveshaft. Circuit must be arranged to maintain at least 100 psi back pressure on each of these ports when stopping or reversing. Fill case with hydraulic fluid prior to initial start up. Connect case drain line from port "I" to reservoir above the high fluid level. Drain must be arranged so case remains full of fluid but without maintaining more than 25 feet of head.

#### C. DRIVE

Turn driveshaft a few revolutions manually to make sure all parts are free. Use direct, belt, silent chain or gear drive. Provide an easy slip fit for coupling, pulley sheave, sprocket or gear and fasten with set screw above key. Do not use a drive fit.

#### D. FLUID RECOMMENDATIONS

See reference bulletins. To assure long unit life, keep hydraulic fluid clean at all times.

#### E. COOLING

When motors are operated at full or peak load, auxiliary cooling may be necessary. Fluid temperature should not exceed limits specified in the reference bulletins. Cooling system recommendations can be obtained from The Oilgear Company

### II CONSTRUCTION

Type "H" motors consist of a driveshaft and cylinder assembly (containing a number of axially-spaced pistons) which is carried front and rear in anti-friction bearings. The front housing also contains a thrust bearing and the case, or rear head, contains a flat valve. On motors with rear heads wear plates are interposed between the flat valve and cylinder. The size 60 motor is equipped with a bearing compensating thrust plate with pistons in the front housing.

### III PRINCIPLE OF OPERATION

In operation, fluid delivered to one port of the motor flows through one crescent shaped port in the flat valve to the pistons in the cylinder open to that port. These pistons are forced against the thrust bearing which is mounted at a fixed angle with respect to the driveshaft. The piston forces acting on the downward slope of the thrust bearing and sides of the piston bores in cylinder cause a resultant force which rotates the thrust ring, inner race of thrust bearing, cylinder and driveshaft. The pistons forced inward by the upward slope of the thrust bearing discharge the oil behind the pistons through the other crescent port of the flat valve to the return line.

Small bridges in the flat valve separate the port "A" crescent from the port "B" crescent. Fluid delivered to port "B" results in clockwise rotation of driveshaft, port "A" results in counter clockwise rotation of driveshaft.

### IV SPECIFICATIONS

#### A. STANDARD RATINGS

1. Displacement in cubic inches per revolution.
  2. Speed range in revolutions per minute. \*
  3. Continuous net pressure in psi.
  4. Continuous torque in pound inches. †
- X Pin protrusion, inches.

Size	1	2	3	4	"X"
111	.29	1-1620	1100	42	1/2"
311	.687	1-1620	1100	100	1/2"
811	1.94	1-1600	1100	272	5/8"
1211	4.83	1-1100	1100	702	3/4"
2011	7.55	1-1070	1100	1040	3/4"
6017	19.0	1-810	1100	4360	1-3/16"

NOTE: † Approximately 50% higher starting and peak torques permissible 10% of the time.

\* Maximum speeds obtained with corresponding Oilgear pumps operating at normal speeds. Higher output speeds permissible on applications approved by Oilgear.

### V MALFUNCTIONS & CAUSES

#### A. LOSS OF SPEED

1. Worn or grooved flat valve.
2. Cylinder and pistons leaking.
3. End of driveshaft or wear plates worn or grooved.

4. Compensating pistons sticking.

#### B. EXCESSIVE NOISE

1. Worn bearings.
2. Pitting, galling or binding of thrust bearing.
3. Pistons sticking in cylinder.
4. Insufficient back pressure.

#### C. EXCESSIVE HEAT

1. Worn flat valve.
2. Worn driveshaft, cylinder and piston assembly.
3. Worn bearings.

### VI TESTING

Motors can be checked for excessive slip by removing case drain line and observing flow under no load and load conditions or by making a positive slip check. To make a positive slip check, first block off the pump and make a positive slip check on it (see pump instruction bulletin) to see how much stroke is required to raise 1000 psi. Then, connect motor to pump, stall motor output shaft, and determine the amount of pump stroke now needed to raise 1000 psi. A new unit requires approximately an additional 2.5% of total pump stroke to raise pressure. NOTE: Only if slip is excessive for the particular application, is repair necessary.

### VII DISASSEMBLY

See reference parts drawing. Disconnect piping and remove motor from machine. Remove socket head cap screws holding front bearing housing to motor case and pull front housing and driveshaft and cylinder assembly from motor case. Remove shaft seal gland and seal from front housing and driveshaft being careful not to damage seal on edges of keyway. Remove retaining ring or lock washer and nut holding bearing to driveshaft. On size 3 units, the gland holds front shaft bearing in place. Press driveshaft and cylinder assembly out toward case end of motor. Remove thrust bearing (on size 3 and 60 units retaining ring must be removed) and front driveshaft bearing from front bearing housing. On size 60 units remove bearing compensating thrust plate, tumblers, pistons and springs. On size 1, 20 and 60 units unscrew socket head cap screws and remove rear head from motor case and withdraw wear plates from flat valve and end of cylinder. To remove flat valve on all sizes, press down on flat

valve and remove snap ring. Withdraw flat valve and compensating piston assembly from guide pins and remove tumblers, pistons and springs from motor case, end head or flat valve. Remove compensating pistons and "O" rings. Remove needle bearings on sizes 1, 20 and 60 motors.

### VIII INSPECTION

Clean all parts thoroughly. Inspect all bearings for galling, pitting or binding and replace if necessary. Inspect pistons and piston bores in cylinder. Check flat valve and mating surface on end of driveshaft for grooves or scratches. If unit has wear plates, check wear plates for grooves or scratches. Replace any parts which appear unduly worn. If driveshaft or cylinder are damaged, they will have to be replaced as an assembly. Check for hardening or deterioration of all seals and gaskets. Replace if necessary. Check to make certain that flat valve guide pins are not bent or broken and that they protrude amount shown in Col. "X" of "Specifications" from face of rear head or inside of case.

### IX ASSEMBLY

See reference parts drawing. Install compensating pistons with taps outward in flat valve and springs, pistons and tumblers in motor case, rear head or flat valve and place flat valve on guide pins. Replace snap ring. On size 1, 20 and 60 units install wear plates on pins in flat valve and end of cylinder. Caution: Make certain that bronze wear plate is installed on cylinder with the highest boss facing flat valve and the steel wear plate is mounted on flat valve with small V-slots facing the bronze wear plate. Install needle bearings and O'rings. Install rear heads on motor cases. Lower driveshaft and cylinder assembly into position in case. Place O' ring in large counterbore in motor case. Install thrust bearing in front bearing housing and bolt assembly in place on motor case (on size 60 motors first install compensating plate, springs, pistons, tumblers and O'rings). Install front shaft bearing and retaining rings and replace shaft seal gland and seal. Turn motor over by hand to make certain that all working parts are free. Mount motor on machine and reconnect piping.

### OILGEAR EXCHANGE SERVICE

Standard replacement pumps and motors are available to users of Oilgear equipment where comparable units will be returned in exchange. These rebuilt and tested replacements are usually carried in stock for quick delivery, subject to prior requests. When standard replacements must be modified to replace units which are special, shipment will depend on availability of parts and assembly and test time necessary.

To obtain this service, place an order for an exchange unit and for repair of the worn pump or motor (give serial number and type designation). The replacement will be shipped F.O.B. our factory, Milwaukee, Wisconsin. User retains the replacement and returns the worn unit prepaid to The Oilgear Company for reconditioning and test. When the unit is reconditioned and stocked, the user is billed the cost of reconditioning, or a flat rate exchange price, if one has been applied to that particular type of unit.