

WELCH TURBO-MOLECULAR PUMP

Installation Instructions for Seal Cartridge Assembly #41-4319

Procedure

- 1) It is very important to use a clean cornered, close fitting Allen Wrench on the drive pulley set screw. A worn, soft, or misfitting wrench will damage this critical set screw and make removal or adjustment impossible.
- 2) Remove the drive belt, pulley and white ceramic disk.
- 3) Remove the four fillister-head screws holding the cartridge to the transmission housing.
- 4) Install two #10-32 "jack" screws one inch long in the threaded holes of the seal cartridge.
- 5) The two "jack" screws press against the flat surface of the transmission housing and when advanced evenly, they will force the seal cartridge assembly out of the housing until it can be grasped by hand. Care should be taken to remove the cartridge in a straight line. The inner metal face seal of the assembly will remain on the drive shaft when the cartridge is removed.
- 6) Use a pair of long-nosed pliers to grasp the outside of the inner metal face seal. Pull the face seal off the shaft, exercising caution to avoid scratching the drive shaft or the transmission housing. A thin plastic or rubber tube can be used to cover and protect the shaft during this operation. Be sure that the rubber insert portion of the metal face seal is also removed.
- 7) The installation of the new seal cartridge is essentially the reverse order of removal. The new inner metal face seal with rubber insert is first pushed onto the drive shaft with a copper or aluminum tube, or a stiff rubber hose. Extreme caution must be exercised to avoid scratching the metal faces during insertion. This part should fit snugly and evenly against a shoulder inside the transmission housing.
- 8) Feel carefully and remove any burrs or sharp edges in the transmission housing which might scratch or pinch the cartridge assembly "O" rings. Grease these "O" rings and the housing liberally before installing cartridge.

- 9) Push the cartridge assembly onto the drive shaft carefully in a straight line. The carbon face of the assembly, which mates against the inner metal face seal, is very fragile. It can easily be cracked or chipped if the cartridge is "cocked" against the drive shaft.
- 10) Replace the four fillister-head screws removed in step (3).
- 11) When replacing new ceramic disk and pulley:
 - A. Make sure the rubber ring in the ceramic disk is facing the pulley.

NOTE: The shaft and the rubber ring in the ceramic should be dry and not oiled when installing the ceramic disk. The rubber must turn the ceramic without slipping.
 - B. Use the pulley to push the ceramic disk on the shaft. This will keep the rubber ring from being pushed out.
- 12) To permit proper compression of the external seal, the pulley should move freely on the shaft. For the pulley and ceramic disk to be properly positioned, the seal carbon face should be pushed in 1/32" and the pulley set screw tightened on the shaft flat to 30 inch pound torque. If the set screw is too loose, the pulley will rattle and back off causing the external face seal to leak.

February 29, 1968

THE WELCH SCIENTIFIC COMPANY
7300 NORTH LINDER AVENUE
SKOKIE, ILLINOIS 60076

WELCH TURBO-MOLECULAR PUMP

Instructions for Replacing Belt Transmission with Gear Transmission

Gear Drive Transmission Field Conversion Kit #41-4394

Parts consisting of:

- 1 - #41-4332 Gear Drive Transmission
- 1 - #41-4274 Small Gear
- 1 - #41-4701 Special Puller
- 6 - #2-00-9703 Hollow Hd Set Screws #10-32x3/16"
- 1 - #41-4702 Square Hd. Set Screw 3/8-16x2" lg.
- 1 - #41-4703 Allen Wrench

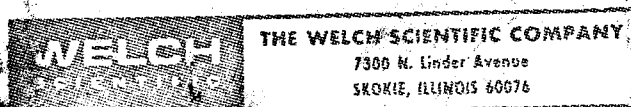
Procedure

1. Reverse 3 phase turbo drive motor rotation by interchanging two power wires at motor terminals. Reverse single phase motors following circuit in motor junction box.
2. To remove small pulley from rotor shaft, keep pulley from turning with an 11/16 box type wrench while unscrewing pulley retaining nut. Pulley then can usually be pulled straight out with the fingers.

If pulley cannot be pulled straight out easily with fingers, DO NOT ATTEMPT TO TURN IT OR A SMALL HIDDEN PIN WILL BE SHEARED OFF. The puller furnished is to be assembled using the six small screws pointing in to grip the pulley. The large screw is inserted to push on the end of the shaft when the screw is turned. The small set screws must bite into the pulley securely to avoid slipping when the large screw pushes on the shaft end. It is expected that the pulley will be ruined by this process but this is of no concern since it is to be replaced by the small gear.

3. Install small gear. If necessary, rotate gear on a pencil covered with fine abrasive paper to get free sliding fit. Engage drive pin in hole in pulley. Retain gear with same elastic stop nut used with pulley. Jam gear with a stick against housing while tightening nut.
4. Install gear transmission with bolts sufficiently tightened to use a rubber mallet to adjust transmission vertical position for correct gear tooth play. Gears are always a little uneven. Adjust to little or no play in tightest rotational position and barely perceptible play in other positions. Tighten bolts and recheck play.
5. Install oil lines and fill transmission and oiler cup as usual.
6. Evacuate and start. The gears whine for a brief period during acceleration. If gears make a slight rattling noise, recheck for excess gear play. The rattle does no harm however.

February 28, 1968



Cartridge External Seal Replacement Kit # 41-4310

- Parts:
- 1 # 41-4317 "O" Ring
 - 1 # 41-4301 Allen Hex Key 7/32"
 - 1 # 41-4734 Outer Seal
 - 1 # 41-4735 Outer Seal Mating Face
 - 1 # 41-4736 Outer Seal Drive Ring
 - 1 # 41-4737 Outer Seal Drive Disc
 - 1 # 41-4738 Allen Hex Key 1/8"

It is very important to use a clean cornered, close fitting Allen Wrench on the drive pulley set screw. A worn soft, or misfitting wrench will damage this critical set screw and make removal or adjustment impossible.

- 1) Remove the drive belt pulley and the white ceramic disk.
- 2) Remove the two screws that hold the plate on the front of the cartridge seal assembly.
- 3) Push out and discard the # 41-4317 "O" Ring around the outside of the seal so that the seal will slip out.
- 4) To install new seal, replace new # 41-4317 "O" Ring in position around the seal. Grease the brass seal case and push seal through ring as far as it will go.
- 5) Replace plate removed in step (2).
- 6) To replace new ceramic disk and pulley:

- A. Make sure the rubber ring in the ceramic disk is facing the pulley.

NOTE: The shaft and the rubber ring in the ceramic should be dry and not oiled when installing the ceramic disk. The rubber must turn the ceramic without slipping.

- B. Use the pulley to push ceramic disk on the shaft. This will keep the rubber ring from being pushed out.

- 8) To permit proper compression of the seal, the pulley should move freely on the shaft. For the pulley and ceramic disk to be properly positioned, the seal carbon face should be pushed in 1/32" and the pulley set screw tightened on the shaft flat to 30 inch pound torque. If the set screw is too loose, the pulley will rattle and back off causing external face seal to leak.

THE WELCH SCIENTIFIC COMPANY
 7300 N. LINDER AVENUE
 SKOKIE, ILLINOIS 60076

REV. NO.
CONT ON SHEET SH NO.

TITLE: WIRE Table
FIRST MADE FOR 143 B 11024

Welch Scientific
REQ. 677-32700

REVISIONS

Power Wiring

543A100P38 (#14 BLK, 3/64")

<u>WIRE</u>	<u>CONNECT To</u>
L1	TB, 1M, 2R
L1	TB, 1FU
L2	TB, 1M, 3R
L2	TB, 1FU, TB(1)
L3	TB, 1M, 2R, 3R
T1	TB, 1M
T2	TB, 1M
T3	TB, 1M
3T2	3R, RECEPT.
3T3	3R, RECEPT.
L1A	1FU, 1R
L2A	1FU, 1R
4T1	1R, RECEPT. (3)
4T2	1R, RECEPT. (3)

543A100P36 (#14 GREEN, 3/64")

GND TB, RECEPT. (2), ENCLOSURE GND.

CONTROL Wiring

543A101P17 (#16, RED 3/64")

<u>WIRE</u>	<u>CONNECT To</u>	<u>WIRE</u>	<u>CONNECT To</u>
L2	1S5, 1M	J1	TB(5), TB(6)
L3	1M, 1R, 2R, 3R (2)	J2	TB(3), TB(4)
3	TB, 3S5		
5	TB, 2S5		
6	TB, 2R, 3S5		
8	TB, 1R		
10	1S5, 2S5, 1M, 3R		

(USE CUSTOMER SIDE OF TERM. BD.)

543A100P38 Aug. 10, 1965

PRINTS

MADE BY C. MOODY JAN. 1965
ISSUED
Re - Aug. 10, 1965.

APPROVALS
[Signature]

GPC DEPT.
Bloomington

DIV OR DEPT. 55-162401
LOCATION CONT ON SHEET FL SH NO. 1