

Welch®

OWNER'S MANUAL FOR CHEMSTAR® DRY MODELS: 2070, 2080



WARNING

Be sure to properly identify intake and exhaust before using the pump.
See Section 2.15



CAUTION

Do not pump liquids with the pump. Pumping liquids will cause the pump
to stop working.

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INSTRUCTION
WARNING AND CAUTION
PLEASE READ BEFORE OPERATION

While reading your manual, please pay close attention to areas labeled:
WARNING AND CAUTION.

The description of each is found below.

WARNING

Warnings are given where failure to observe instruction could result in injury or death to people.

CAUTION

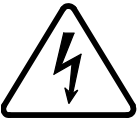
Cautions are found where failure to observe the instruction could result in damage to the equipment, associated equipment and process.

These units conform to the SI International system of units of measurement.

The following symbols (with recommendation of IEC1010) of warning will be found on the pump.



Caution - Refer to accompanying documents



Caution - Risk of electrical shock



Caution - Hot surface

WARNING

Motor includes a self resetting thermal cutout and the pump could restart without actuation under fault condition.

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Section 1: SAFETY INFORMATION

- 1.10 Caution: To Prevent Injury...
- 1.11 Never operate this product if it has a damaged cord or plug. If it is not working properly, has been dropped, damaged or has fallen into water, replace the cord of same type and rating.
- 1.12 Keep the cord away from heated surfaces. All electrical products generate heat. To avoid serious burns never touch unit during or immediately after operation.
- 1.13 Never block any air openings or place it on a soft surface where the openings may be blocked. To ensure proper ventilation, keep unit a minimum of one inch from any wall or obstruction. The air openings are for ventilation of the motor inside the housing.
- 1.14 Models 2070 and 2080 are thermally protected and can automatically restart when the protector resets. Always disconnect power source before servicing.
- 1.15 Never drop or insert fingers or any other object into any openings.
- 1.16 Do not operate this product where oxygen is being administered.
- 1.17 Wear safety glasses and goggles when operating this product.
- 1.18 Use only in well ventilated areas. The motor on all pumps are totally enclosed fan cooled



WARNING
Do not operate the pumps in an atmosphere containing flammable or explosive gases/vapors

- 1.19 Be sure to properly identify intake and discharge before using pump. See Section 2.5.
Models 2070 and 2080 have one exhaust port on the pump. See Section 2.15.



WARNING
Remove plug from Exhaust Port before using

- 1.20 Caution: To Reduce Risk Of Electrical Shock...
- 1.21 Do not disassemble. Disassembly or attempted repairs if accomplished incorrectly can create electrical shock hazard. Refer servicing to qualified service agencies only.
- 1.22 Unit is supplied with a three pronged plug. Be sure to connect pump to a properly grounded outlet only.

- 1.30 Warning: To Reduce Risk of Electrocutation...
- 1.31 Do not use this product in or near area where it can fall or be pulled into water or other liquids.
- 1.32 Do not reach for this product if it has fallen into liquid. Unplug immediately.
- 1.33 Never operate this product outdoors in the rain or in a wet area.
- 1.40 Danger: To Reduce Risk of Explosion or Fire...
- 1.41 Do not use this pump in or near explosive atmospheres or where aerosol (spray) products are being used.
- 1.42 Do not use this product near flames.



WARNING
Failure to observe the above safety precautions could result in Severe
bodily injury, including death in some cases

Section 2: INSTALLATION

2.10 Environmental Conditions

The Pump is rated for indoor use only. Maximum altitude 2000 meters. Operating temperature range 10°C to 40°C.

2.11 Introduction

Intended use of the proprietary oil-less vacuum system consisting of a vacuum blower in combination with a PTFE diaphragm pump providing deep dry vacuum for chemical resistant applications.

This manual has been compiled not only for the care and maintenance of the Chemstar Dry now in your possession, but as a helpful reference and guide to prevent many problems which can occur if used improperly.

2.12 Unpacking

Carefully remove the Chemstar Dry from the shipping case. Handles are provided on the lower front and back of the unit to assist in carrying, lifting and removing from the carton. Preserve all paperwork for future reference. If damage has occurred from shipment a claim must be filed with the carrier immediately; preserve the shipping carton for inspection by the carrier. If you are required to communicate with your dealer or Welch Vacuum be sure to include your order numbers for quick identification. Do not return the pump to the factory without obtaining returned goods authorization. *See "Service & Support" on www.welchvacuum.com.

2.13 System Mounting

Rubber feet are attached to the bottom of the pump. Rubber feet are excellent for applications involving a semi-flexible surface such as a bench top; they help to isolate noise and eliminate creeping. The Chemstar Dry system must be positioned with feet on a flat horizontal surface.

2.14 Pump Location



WARNING

Don't operate this pump in an atmosphere containing flammable or explosive gas



WARNING

The motor is thermally protected and will automatically restart unexpectedly when the overload device resets

The Chemstar Dry should be located preferably in a clean, dry and well ventilated area. Please be sure not to block the ventilation ports located on the motor housing. The pump should be placed where the surrounding temperature remains between 10°C and 40°C (50°F and 104°F). Always check to insure the location chosen is protected from direct or indirect moisture contact. The pump should be located as closely to its system in order to utilize it most efficiently.

2.15 Discharge Provisions

Chemstar Dry intake and exhaust fittings are NW25 with a 3/8-18 NPT threaded ID. All systems come with two hose barbs and a muffler which are supplied loose. The hose barb accepts 3/8" ID. hose. By threading the hose barb in the exhaust port of the pump, a vent line can be attached which allows gases and vapors pumped through the system to be piped from the work area into a hood. Vent lines will muffle noise coming from the vacuum pump.



WARNING

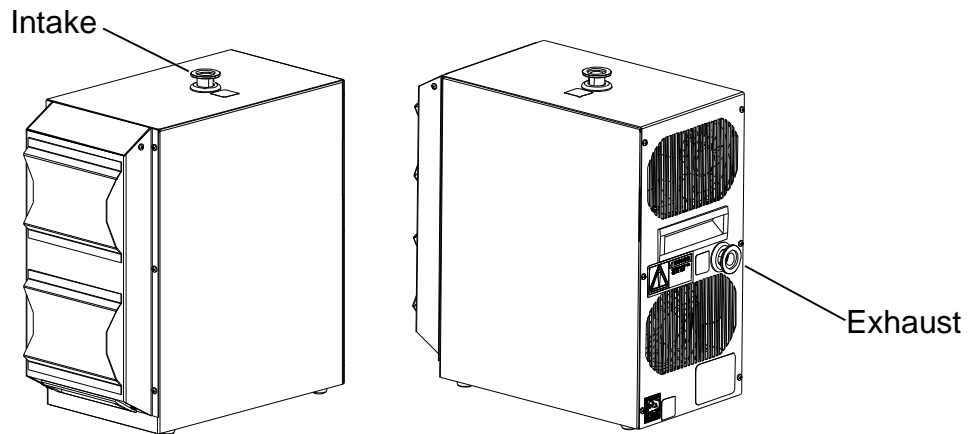
Never block the discharge port. If the exhaust is blocked, pressure will build-up in the pump which can lead to the pump head bursting creating the potential of serious injury. Remove plug from exhaust port.



WARNING

Remove plug from exhaust port before operating

Properly identify the intake and exhaust of the pump



2.16 Electrical Power

2.16.1 Power Source Review

Review the power source and the motor rating to be sure they agree in voltage, phase and frequency. Serious damage may occur to the motor if it is connected to an improper voltage. All Welch pumps must be grounded. Grounding reduces the risk of electric shock in the event of an electrical short circuit. The plug must be plugged into an outlet properly grounded. Consult your local electrical codes if you have doubts.

Identification Symbols: Power Off / Power On 

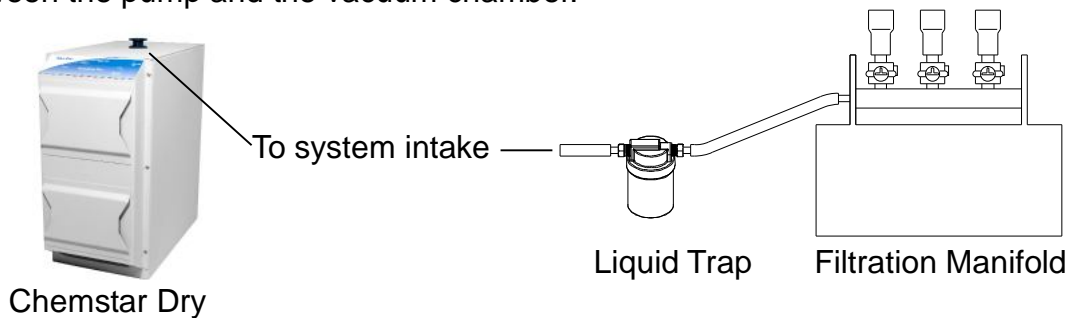
Section 3: OPERATION

3.10 Starting

Before attaching the pump to a system it is well to familiarize yourself with the function and action of the pressure vacuum pump which you have acquired. Review the power requirements as described in Section 2.16. Welch recommends running the pump for a few minutes to warm it up before use. The warm-up improves the pumps ability to pass water and organic vapor. A warm pump will handle more vapor without liquefying it than a cold pump.

3.11 Cleanliness

Take every precaution to prevent foreign particulates or liquid from entering the pump. Particulates will damage the pump's performance. If you find that particulates or liquid will come off during the process of evacuation, a simple liquid trap can be made out of readily available material for protecting the pump. The trap would consist of a filtering flask placed between the pump and the vacuum chamber.



3.12 Leak Detection

Eliminating all leaks in a vacuum system is a key to obtaining maximum vacuum. The pump must remove this added volume of leaked gas to maintain the desired vacuum. Leaks can be located by slightly pressuring the system and painting the suspected area with a thick soap solution. Escaping air will produce soap bubbles.

3.13 Operating Pressure Range

Vacuum pumps are designed to be run from slightly below atmospheric to their maximum vacuum level on the intake side. Consult the Specification Table in the back of this manual for the ratings for your specific model.

3.14 The Effects of Unwanted Vapor and Automatic Gas Ballast

Systems which contain undesirable vapors cause difficulty both from the standpoint of attaining desirable ultimate pressures. A vapor is defined as the gaseous form of any substance which is usually a liquid or a solid. Water, oil, and mercury vapors are three of the more common vapors encountered in typical vacuum systems. When such vapors exist in a system, the vapors or mixtures of gas and vapors are subject to condensation within the pump; the precipitated liquid may thus ultimately solidify on the PTFE heads and diaphragm causing corrosion.

The 2070 pump is equipped with automatic gas ballast valve to prevent vapor condensation in the pump. Every unit has gas ballast ON by factory setting. The gas ballast ON is indicated by blinking RAMP UP lights. The gas ballast valve is closed when three RAMP UP lights stop blinking and they are steady.

To disable gas ballast feature, press and hold power button until you hear two beeps, break and three beeps. The RAMP UP light will turn ON steady.

To enable gas ballast feature, press and hold power button until you hear two beeps, break and three beeps. The RAMP UP lights will start blinking.

3.15 Shutdown Procedures

After use, Welch recommends the pump be run for about 2 minutes disconnected from the vacuum process. The air pumped through the mechanism will purge out water vapor or droplets of condensate that may have formed on the inside of the pump. This purge of the pump mechanism helps prevent build up of solute crystals inside of the pump head. Over time, these crystals will shorten pump lifetime.

3.16 User Interface

Power ON/OFF Function – To power-on or power-off the unit when in normal power mode the power button must be pressed for one half second and released.

Enable Power Mode feature – Power Mode feature ensures that the unit will automatically start-up after any AC power interruption. To enable the power mode feature press and hold the power button until two beeps are heard. Immediately release the power button. The Power Mode LED turns on. The unit will now automatically power-up when AC power is supplied to the unit.

Disable Power Mode feature – To disable the power mode feature press and hold the power button until two beeps are heard. Immediately release the power button. The Power Mode LED turns off.

Power-up sequence.

1. Press Power button to start power up.
 2. Five second Vent period with two second LED test – all LED's will turn on for two seconds and Vent valve will stay open for the entire five seconds.
 3. Diaphragm pumps will be started at end of five second Vent period.
 4. There is a two second delay after the diaphragm pumps are started before the blower is started.
 5. When blower has successfully started the first RAMP LED will come on.
 6. When the blower has reached 1500 rpm's the second RAMP LED will come on.
 7. When the blower has reached the maximum RPM the last RAMP LED will come on.
 8. The MAX VAC LED will come on when the current draw of the blower has dropped to a predetermined fixed point indicating vacuum somewhere below 1 Torr has been reached.
- NOTE: This may take up to an hour on a pump that has just been turned on after having completely cooled down.

Power-down sequence.

1. Press Power button to start power-down sequence.
2. The MAX VAC LED and third RAMP LED will go off and the blower will begin a ramp down to a fixed RPM matching the pumping speed of the diaphragm pumps. The POWER ON and second RAMP LED's will flash in unison indicating the shutdown mode is in progress.
3. Ten seconds after the start of power-down sequence the VENT valve will open to purge the pump.
4. When the blower has finished its ramp down the second RAMP LED will go out and now the last RAMP LED will flash in unison with POWER ON LED. The total time from this point to the unit fully powering down will be 95 seconds.
5. After ten seconds the Vent valve will open.
6. Fifteen seconds before the unit powers down the blower is shut off along with the last RAMP LED.

Power-down sequence continue.

7. Ten seconds later the diaphragm pumps are turned off

8. Five seconds later the VENT valve is closed and unit power is off.

3.17 Fault Modes. Call factory in case of fault condition. Phone 847-676-8800.

Section 4: SPECIFICATION

4.10 Specification Chart

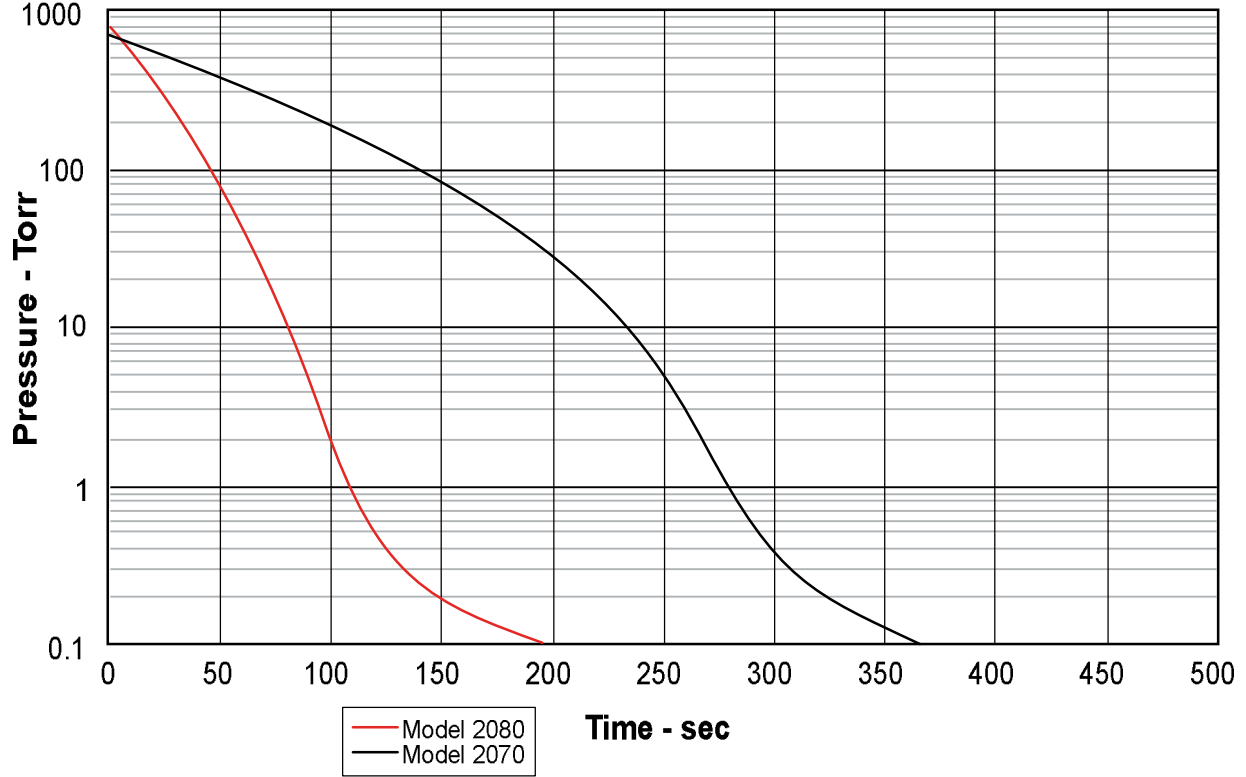
Model	2070	2080
Maximum Flow LPM (m ³ /hr) @ 50 or 60Hz	150 (9) @ 2 torr	300 (18) @ 2 torr
Flow @1Torr(1.33 mbar), LPM (m ³ /hr)	140 (8.4)	286 (17.2)
Ultimate Vacuum Pressure, torr (mbar)	0.05 (0.07)	0.05 (0.07)
Inlet / Outlet Connection	NW25	NW25
Weight lbs (Kg)	50 (22.7)	88 (40)
Running Amps	3	6
Free Air Displacement Diaphragm Pump LPM	35	120
Overall Dimensions Lx W x H, in. (cm)	18.1 x 8.5 x 18.4 (45.9 x 21.6 x 46.7)	22.5 x 10.5 x 17.8 (57.2 x 26.7 x 45.2)
Ordering Information		
Wired for 115V, 60Hz, 1 Ph, with North American plug	2070B-01	2080B-01
Wired for 230V, 50/60 Hz, 1 Ph, supplied with Schuko and UK cord sets	2070C-02	2080C-02

Note:

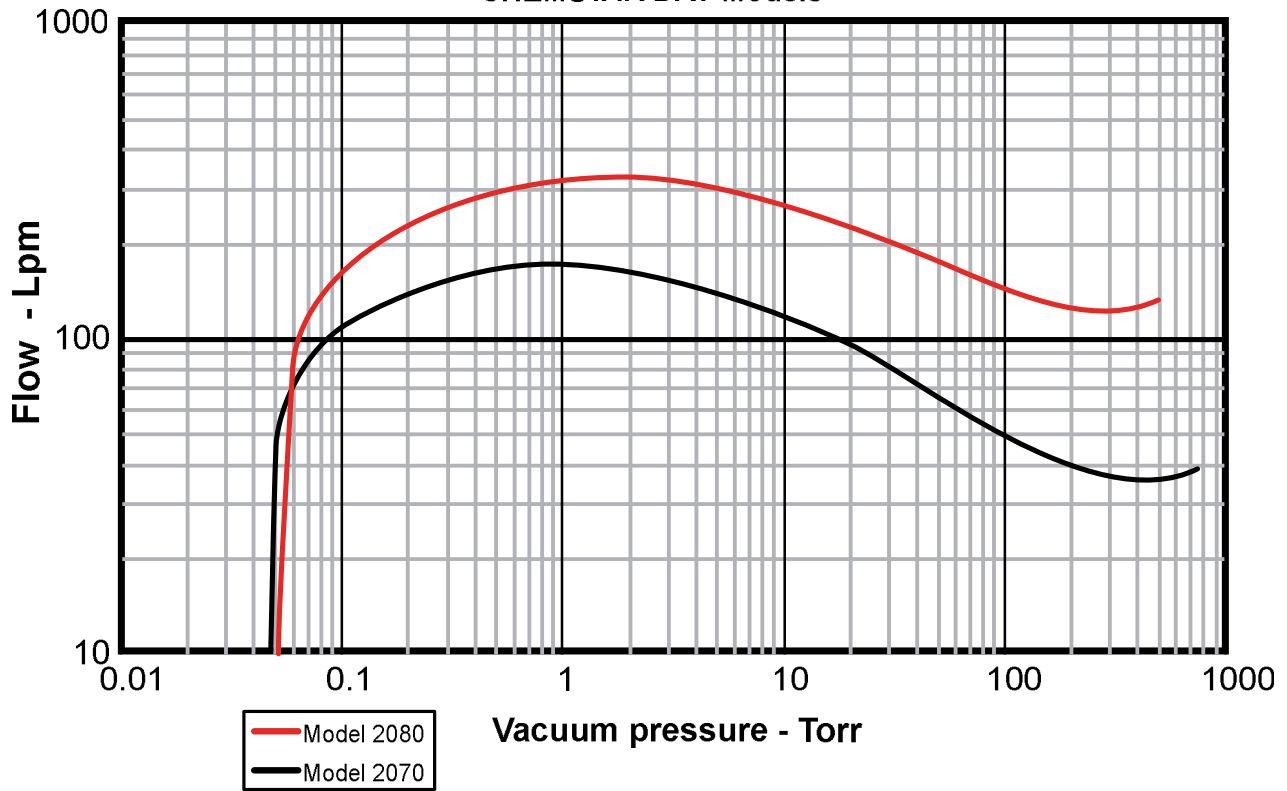
2070C-02 Fuse Replacement. Replace only with 250Vac, 3A, 5x20mm, Qty 2, non-time Delay.

4.20 Performance Charts

Pumpdown on 41-L tank
CHEMSTAR DRY Models

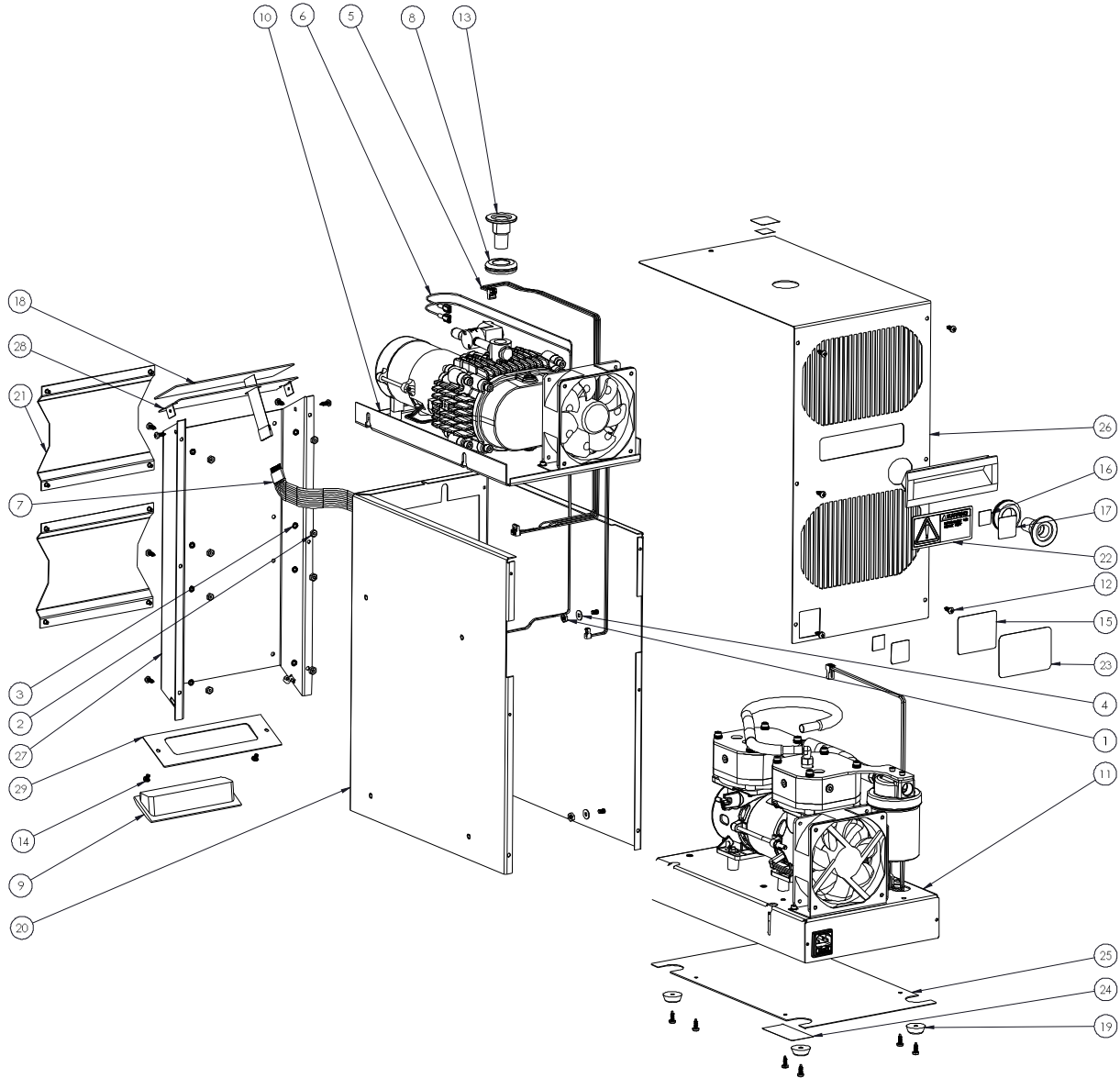


Pumping Speed
CHEMSTAR DRY Models



Section 5: DRAWINGS

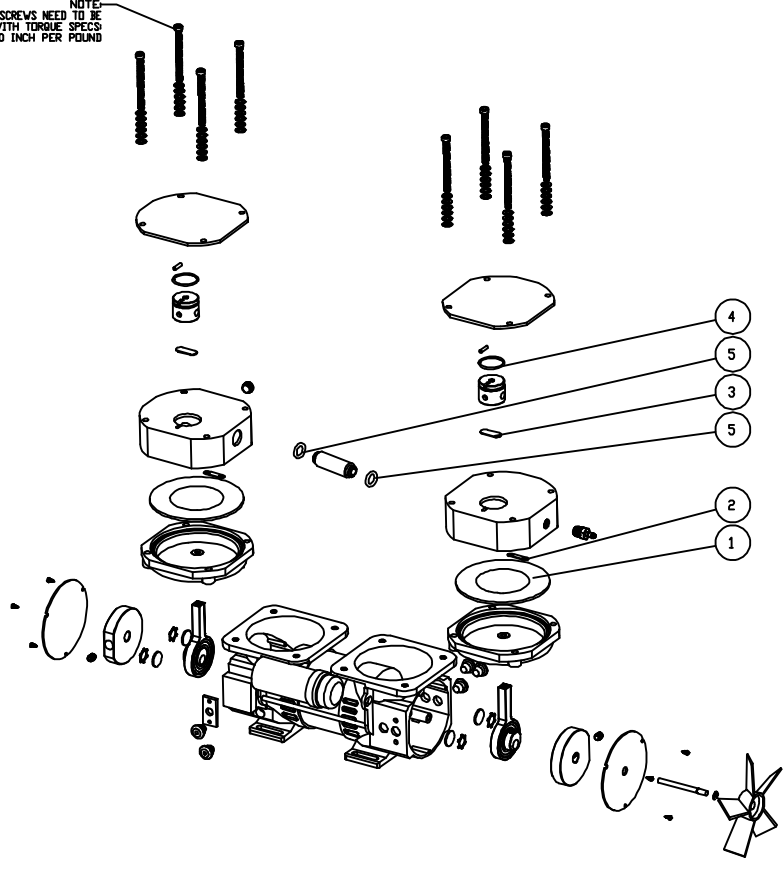
5.10 Exploded View



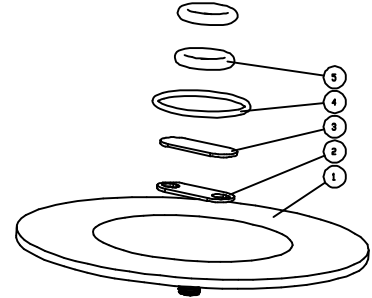
ITEM NO.	DESCRIPTION	QTY.	ITEM NO.	DESCRIPTION	QTY
1	NUT HEX 10-32 X 3/8 X 1/8	8	16	LABEL .75 X 0.75 - WHITE MYLAR	
2	NUT, HEX #8 MEDIUM SS	8	17	CLEAR OVERLAY 1.125" X 1.125"	
3	WASHER, LOCK SPLIT #8 MED 18-8	8	18	LBL FRONT PANEL	
4	WASHER BRASS FLAT # 10	8	19	BUMPER RUBBER 31/32"	4
5	WIRE ASSY CONTROL TO CONTROLLER	1	20	SHROUD ASSY	1
6	WIRE ASSY SOLENOID	1	21	SHROUD ASSY BAFFLE	2
7	WIRE ASSY KEYPAD	1	22	LABEL WARNING FOR DRY PUMP	1
8	GROMMET	2	23	LABEL CLEAR COAT FOR 67-1653; 3.25" X 2.25"	1
9	HANDLE	2	24	LABEL, DO NOT OPEN	1
10	BASE ASSY BLOWER	1	25	COVER BASE	1
11	BASE ASSY PUMP	1	26	COVER ASSY	1
12	SCREW #8 X 1/2"SELF-DRILLING	22	27	FRONT COVER ASSY	1
13	FITTING-INTAKE	2	28	COVER FRONT PANEL	1
14	SCREW PAN HEAD 8-32	2	29	COVER HANDLE	1
15	NAMEPLATE 2.38 X 2.00	1			

5.20 Dimensional Drawing

NOTE:
ALL HEADSCREWS NEED TO BE
TIGHTEN WITH TORQUE SPECS
13.00 - 13.50 INCH PER POUND



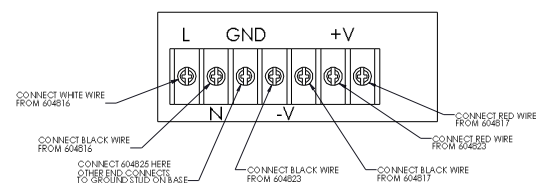
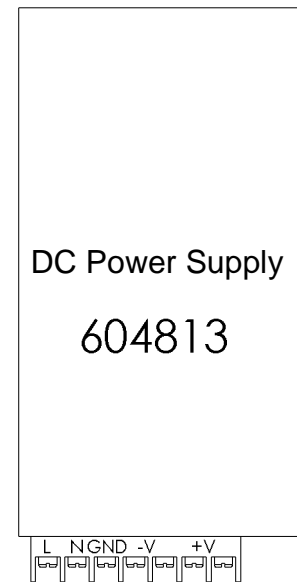
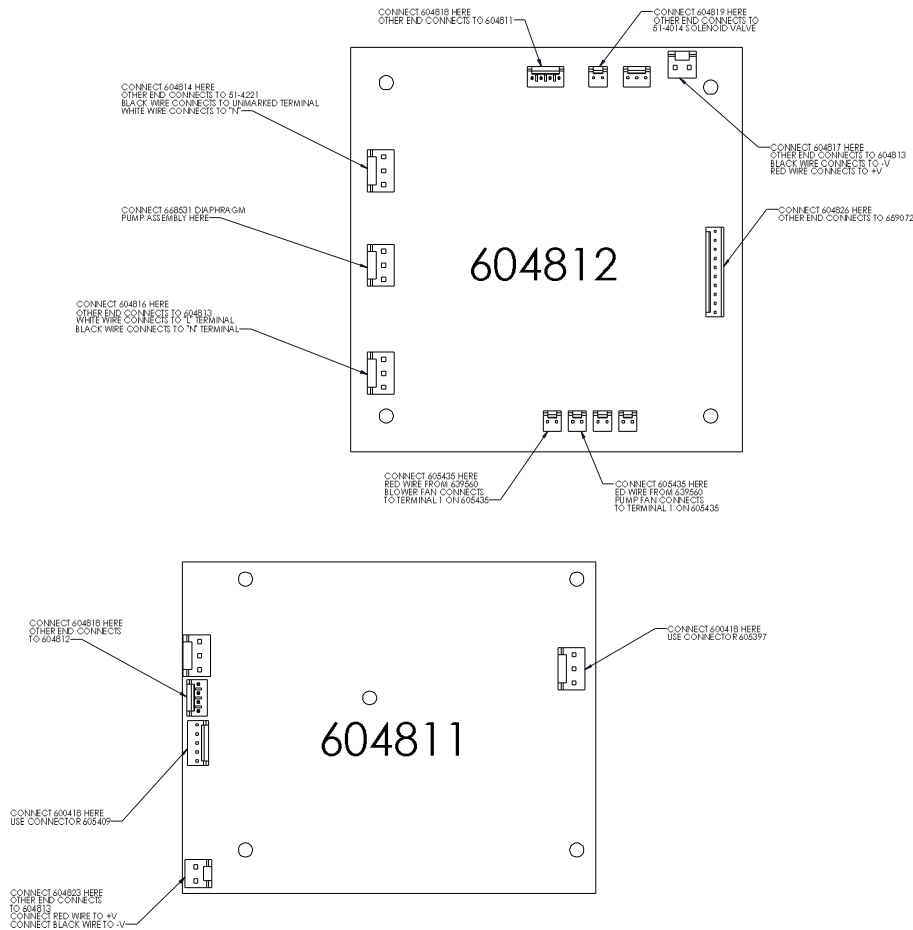
REPAIR KIT 2047K-01



1 61-3059	1 DIAPHRAGM MOLD
2 61-3706	1 INTAKE VALVE
3 61-3706A	1 EXHAUST VALVE
4 66-0166	1 O-RING #021, FLUOROELASTOMER
5 66-0167	2 O-RING 10.5 x 3.0 VITON

This Kit is a one Head Service Kit

5.30 System Electronic Boards



Section 6: MAINTENANCE AND REPAIR

6.10 General Maintenance. Call factory, Phone 847-676-8800.

Section 7: WARRANTY

UNPACKING

Inspect the pump carefully. If any damage has occurred, file claim with the carrier immediately. Save the shipping container for carrier to inspect.

OPERATING PUMP

Refer to the enclosed Instruction/Operation Manual for all information to properly operate and maintain the pump.

WARRANTY

This Welch Vacuum product is warranted to be free from defects in material and workmanship. The liability of Welch-Ilmvac under this warranty is limited to servicing, adjusting, repairing or replacing any unit or component part which in the judgment of Welch-Ilmvac has not been misused, abused or altered in any way causing impaired performance or rendering it inoperative. No other warranties are expressed or implied. The method of executing this warranty: servicing, adjusting, repairing or replacing shall be at the discretion of Welch-Ilmvac. Vacuum pumps that have been used for any period, however short, will be repaired under this warranty rather than replaced.

The warranty is effective for one year from the date of original purchase when:

1. The warranty card has been completed and returned.
2. The product is returned to the factory or other designated service centers, freight prepaid.
3. The product in our judgment is defective through no action or fault of the user.

If the product has become defective through misuse, abuse, or alteration, repairs will be billed regardless of the age of the product. In this event, an estimate of the repair costs will be submitted and authorization of these charges will be required before the product is repaired and returned.

To obtain a return authorization number, please fill in the on-line request form on www.welchvacuum.com. Products without a return authorization number will be refused by our receiving department. Before shipping, properly pack the pump, insure it against loss or damage, and on the outside of the pump packaging and the packing slip write in the return authorization number. Pumps damaged due to improper packaging are the customer's responsibility.

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