



MAINTENANCE AND REPAIR MANUAL

SECO
SV 1010, SV 1016, SV 1025 and SV 1040
C Version

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INTRODUCTION

This Maintenance and Repair Manual covers the Seco Series vacuum pumps models SV 1010 C, SV 1016 C, SV 1025 C and SV 1040 C (see Fig. 1). The Busch Seco SV pump is an oil-free single-stage, rotary dry vane vacuum pump.



- 1 - Gas Inlet
- 2 - Gas outlet (optional)
- 3 - Standard gas outlet w/discharge silencer valve
- 4 - Vacuum relief valve

Fig. 1 - Seco 1025 C Pump

General

All Seco SV single-stage, rotary vane pumps are direct-driven, air-cooled, dry vane, positive displacement pumps. They consist of a rotor mounted concentrically on the drive shaft and positioned eccentrically in a cylindrical stator (see Fig. 2). The rotor has radially sliding

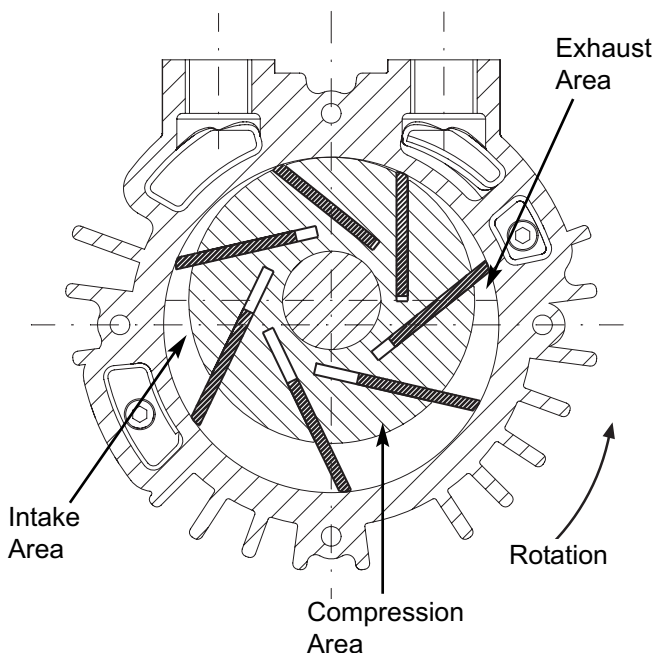


Fig. 2 - Pumping Cycles

vanes that divide the pump chamber into sections. The vane contact with the pump cylinder is maintained by centrifugal force. The vanes are self-lubricating and operate oil-free.

CAUTION: Do not allow any oil, grease, liquid or vapor to enter the pump.

Power Requirements

ALL ELECTRICAL CONNECTIONS SHOULD BE MADE BY A QUALIFIED, COMPETENT ELECTRICIAN IN ACCORDANCE WITH ALL LOCAL AND NATIONAL CODES!

For a copy of commonly used three phase and single phase motor connections, see Fig. 3, 4 and 5.

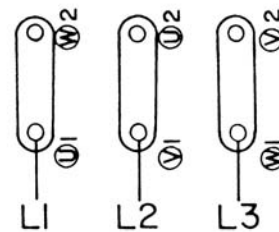


Fig. 3 - AEFG Motor 230V, 3 Phase

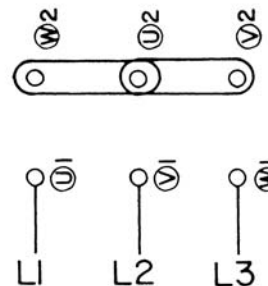


Fig. 4 - AEG Motor 460V, 3 Phase

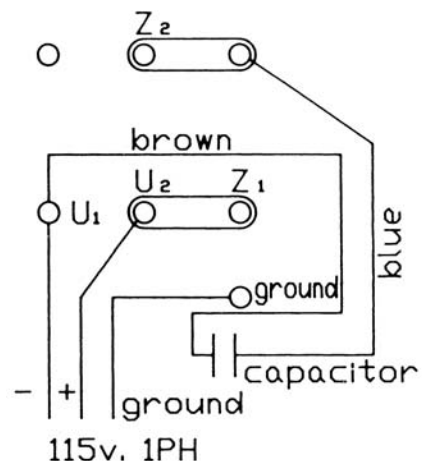


Fig. 5 - AEG Motor 115V, 1 Phase

The motor must be connected in accordance with the electrical codes using a fused switch to protect the motor against electrical or mechanical overloads. The motor starter has to be set consistent with the motor current, listed on the nameplate. For other voltage requirements, contact the factory for motor and/or starter information.

CAUTION: After electrical connection has been made, the rotation of the motor must be checked.

Correct direction of rotation is marked by an arrow on the housing and is clockwise when looking at the motor from the motor's fan side.

Observe the motor fan and jog the motor briefly to make sure it is rotating clockwise. If the motor is rotating backwards, correct as follows:

On 3 phase motors, reverse any two leads of the three at the power connection.

Single-phase motors are normally prewired for the correct direction. In cases where the motor is wired bi-directional, see the schematic on the underside of the terminal box cover for the correct direction.

2.0 SERVICE AND PARTS

Following the instructions in this manual, the technician can completely service and repair the Seco SV pump.

A complete inventory of spare parts is maintained at Busch, Inc. at all times. Parts will be shipped immediately upon request.

The pumps may also be shipped to the Virginia Beach, Virginia factory or nearest authorized service center for repair. For the location of the nearest authorized service center, contact Busch, Inc. in Virginia Beach, Virginia.

Busch, Inc. maintains an excellent repair department staffed by factory-trained technicians who specialize solely in Busch products.

3.0 MAINTENANCE

The required periodic maintenance on the Seco SV pumps is very low. To prevent premature wear and to insure optimum performance, it is recommended that the following steps be performed:

3.1 Inlet Filter

The inlet filter element (Ref. 27) is located inside the filter cover (Ref. 24) at the front of the pump. Access to the filter can be gained by removing the two socket

head cap screws (Ref. 72) retaining the outer plastic cover (Ref. 70) and the three socket head cap screws and copper washers (Ref. 28/29) retaining the filter cover.

The filter cartridge should be cleaned on a weekly basis, depending on the amount of foreign particles to which the pump is exposed.

When cleaning the inlet filters be careful not to knock any foreign particles that have collected inside the housing into the pump. Replace the element if it is extremely dirty or has been subjected to moisture, oil or grease.

3.2 Vacuum Relief Valve

A vacuum relief valve comes installed on the most current models. It is designed to allow a continuous flow of air through the pump to maximize vane life. This valve should be field adjusted to slightly exceed the vacuum level required for the specific application.

3.3 Vane Inspection

Vane wear should be checked every six months or more often when the pump is subjected to severe operating conditions. Vane wear can be checked (see Fig. 6) by following the first three steps of the disassembly procedure. See the values below for wear tolerances:

Pump Model	Minimum Width of Vane
SV1010	27 mm / 1.063 inch
SV1016	27 mm / 1.063 inch
SV1025	33 mm / 1.339 inch
SV1040	33 mm / 1.339 inch

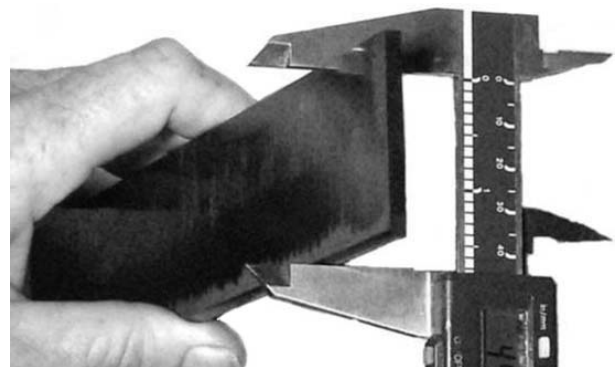


Fig. 6 - Measuring Vane Width

4.0 DISASSEMBLY

4.1 Tools

To completely disassemble/assemble the Seco pumps, the following tools are recommended:

Allen wrenches: 5 mm
 Open end wrench: 10 mm
 Soft hammer: med. size, plastic or rubber
 Gear puller - push-pull type
 Motor shaft support tool (see Fig. 13)
 Socket set with 10 mm socket
 Feeler blades: .06 mm, .07 mm, .09 mm
 Emery cloth: 180 grit
 Flat honing stone
 Cleaning agent: acetone or similar

4.2 Plastic Filter Cover and Filter Housing

Remove the plastic cover (Ref. 70) by removing the two socket head cap screws (Ref. 72) and rubber feet (Ref. 71).

Remove the three hex head bolts and copper washers (Ref. 28/29) and pull the filter housing (Ref. 24) off the pump.

Pry the filter housing gasket (Ref. 22) from the opposite motor side endplate (Ref. 18) and discard the gasket.

4.3 Endplate, Opposite Motor Side

Use an Allen wrench to unscrew the four socket head cap screws (Ref. 19) retaining the endplate (Ref. 18). Set the endplate aside (see Fig. 7).

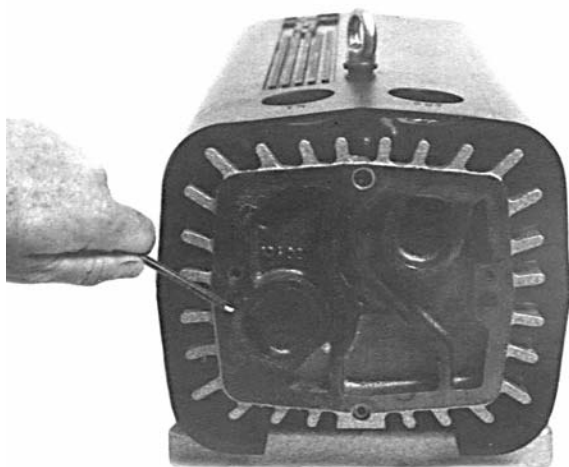


Fig. 7 - Endplate Opposite Motor Side

4.4 Vanes

At this point, the vanes and rotor are exposed for inspection. The vanes can be slid in or out of the rotor slots as required (see Fig. 8). If the maintenance task can be completed without further disassembly, proceed with Steps 7.4, 7.5 and 7.6 of the ASSEMBLY section. Refer to Section 3.3 when inspecting the vanes for wear.



Fig. 8 - Inspecting the Vanes

4.5 Motor Cover, Plastic

Remove the lift ring nut (Ref. 42) and stud (Ref. 45) or the shoulder bolt (Ref. 42) from the top of the pump. Pull the rubber grommet (Ref. 43) and sleeve (Ref. 44) from the plastic cover (Ref. 40).

Roll the pump over on its side, exposing the bottom of the base plate (Ref. 48). Remove the four Phillips head screws (Ref. 50) securing the cooling air housing to the base plate (see Fig. 9). Slide the cooling air housing off the pump and motor. In some cases, it is necessary to remove the electrical junction box cover before sliding the cooling air housing off.

Note: Do not pull the rotor or allow the cylinder to move unless it is necessary, as the rotor clearance is factory set and requires additional operations to reset the clearances during reassembly.

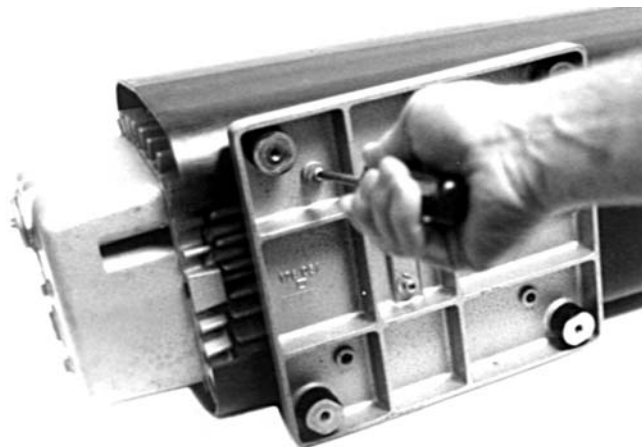


Fig. 9 - Removing the Cooling Air Housing

4.6 Cylinder

Remove two socket head cap screws (Ref. 15) and lockwashers (Ref. 16) (see Fig. 10). Grasp the cylinder (Ref. 14) to prevent it from falling, and set it aside.

Note: The heads of the screws are located down inside the cylinder cavity.

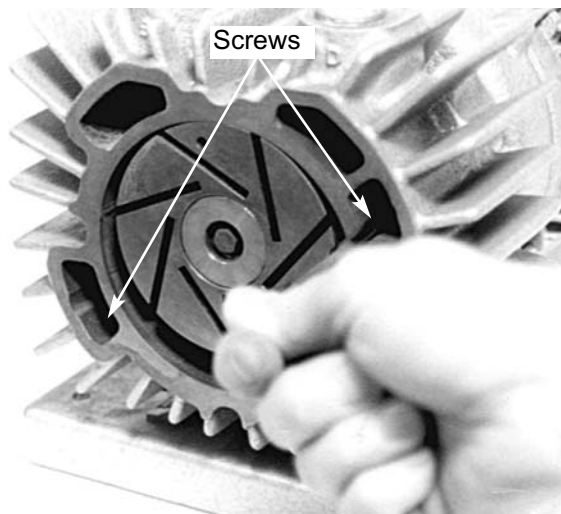


Fig 10 - Cylinder Removal

4.7 Rotor

CAUTION: Do not pull the rotor from the motor shaft by exerting force on any surface other than the rotor and the end of the shaft. Alternate methods could damage the motor bearings.

To remove the rotor (Ref. 5), screw a 5 mm cap screw into a threaded hole in the face of the rotor. Use a long bar or screwdriver between the cap screw and socket to prevent the rotor (Ref. 5) from turning while you unscrew the M6 cap screw (see Fig. 11). Set the cap screw, lockwasher (Ref. 10) and tightening disk (Ref. 8) aside.

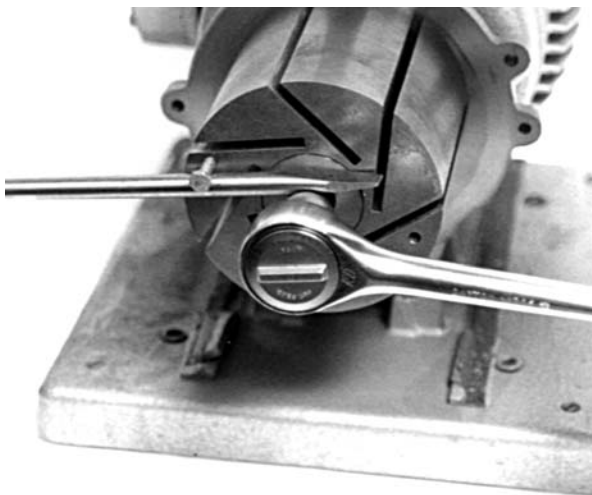


Fig. 11 - Rotor Locking Screw

Install a bar puller on the rotor (see Fig. 12). Advance the puller until the rotor is loose on the shaft and can be removed from the shaft.

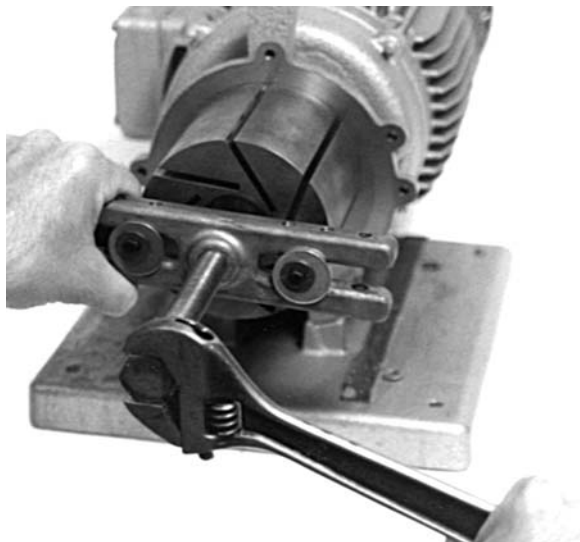


Fig. 12 - Rotor Removal

5.0 CLEANING AND INSPECTION

5.1 General

Use compressed air to blow off all parts. When necessary, soak the parts in a degreasing solution, agitate and scrub to remove any grimy residue, and then rinse and blow dry.

Clean off any surface scale.

Inspect the sealing surfaces. Use a honing stone to polish out nicks and scratches.

5.2 Filter Housing

Use compressed air to blow off the filter element (Ref. 27). Do not damage the pleats. If the element material looks clogged, replace it. Inspect the filter spring for corrosion or damage. Check the silencer valve (Ref. 32) for operation and build-up of residue. Check the vacuum relief valve for any build up of dust or particulate.

5.3 Endplates

Clean the intake and exhaust cavities in the endplate (Ref. 18).

5.4 Rotor

Clean the vane slots. Check the vane movement in the slots. The vanes must drop freely in the slots.

6.0 ASSEMBLY

6.1 Rotor

Set the motor up on end with the fan side of the shaft

resting on the point of the motor shaft support tool (see Fig. 13).

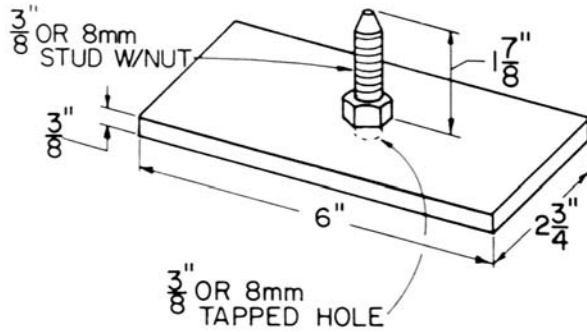


Fig. 13 - Motor Shaft Support Tool

CAUTION: The use of the motor shaft tool prevents side load damage to the motor bearings when the rotor is tapped into position.

Make sure the tolerance ring (Ref. 2) is positioned in the undercut on the shaft (see Fig. 14). Set the rotor down onto the shaft. Be sure the rotor end with threaded holes and tightening disk pocket is at the top. Use a soft hammer to tap the rotor down until there is approximately 1/4" clearance between the rotor and endplate. To set the axial clearance, insert a feeler gauge (see Clearance Chart in Fig. 18) between the rotor face and the motor side endplate (see Fig. 15). Insert the securing disk (Ref. 8) into the pocket in the center of the face of the rotor. Place the M6 hex head cap screw (Ref. 9) and lockwasher (Ref. 10) into the center hole on the tightening disk.

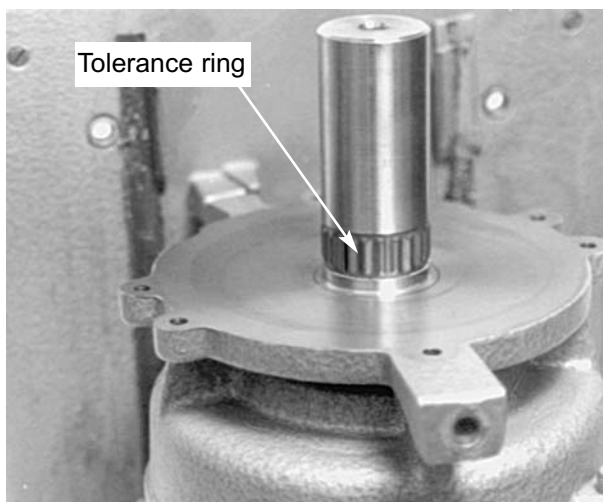


Fig. 14 - Rotor Securing Disk

Tighten the cap screw until the feeler gauge can be pulled out but has a slight amount of resistance.

6.2 Cylinder

Lift the pump off the motor shaft support tool and reposition it on its base plate (Ref. 48). Slide the cylinder

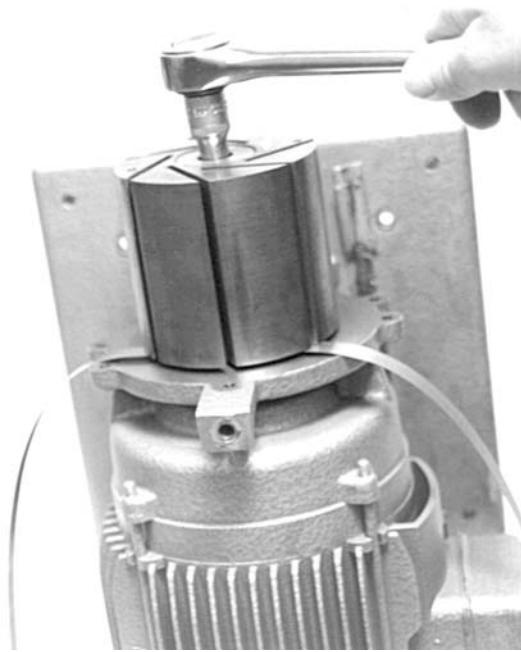


Fig. 15 - Setting Motor Side Axial Clearance

onto the rotor and loosely assemble it to the endplate with two M6 socket head cap screws (Ref. 15). Insert a feeler gauge (see Fig. 18 for thickness) between the top of the rotor and the bore of the cylinder. Move the cylinder up and down until the feeler gauge can be pulled between the rotor and cylinder with a slight resistance. When the correct radial clearance is achieved, tighten the cap screws, locking the cylinder in place (see Fig. 16).



Fig. 16 - Setting the Radial Clearance

6.3 Motor Cover, Plastic

Slide the plastic cover (Ref. 40) over the motor end of the pump until it is in its original position. Roll the pump over on its side exposing the bottom of the base plate. Screw the four socket head cap screws (Ref. 50) into

the base plate, through the two rubber gaskets (Ref. 47) and into the plastic cover. Roll the pump onto its base plate and replace the electrical junction box cover.

Insert the rubber bushing (Ref. 43), spacer (Ref. 46) and sleeve into the top of the plastic cover. On the SV1010 and SV1016, screw the socket head cap screw (Ref. 42) into the pump. On the SV1025 and SV1040, screw the stud (Ref. 45) and eye bolt (Ref. 42) into the pump (see Fig. 17).

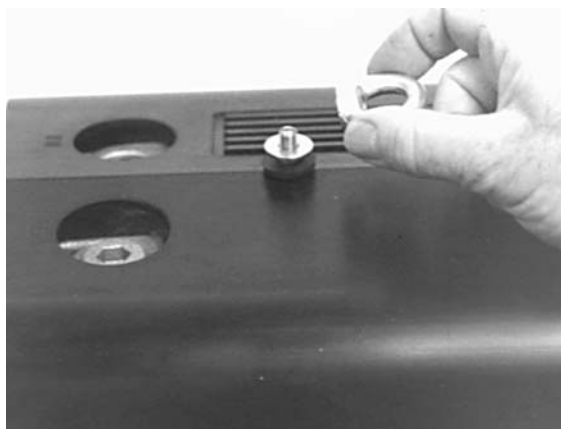


Fig. 17 - Lift Ring

6.4 Vanes

Slide the vanes (Ref. 6) into the vane slots. Make sure the radius edge is matched to the contour of the cylinder bore (see Fig. 2).

6.5 Endplate, Opposite Motor Side

Install the opposite motor side endplate (Ref. 18) to the cylinder. Secure with four M6 socket head cap screws and lockwashers (Ref. 19/20).

6.6 Filter Cover and Plastic Cover

Install a new filter cover gasket (Ref. 22). Do not use the old gasket as it does not seal well when reused. Position the filter element (Ref. 27), retaining spring (Ref. 25) and filter cover (Ref. 24) in place and secure with three socket head cap screws and copper washers (Ref. 28/29).

Position the two rubber feet (Ref. 71) against the filter cover and slide the plastic cover (Ref. 70) over the filter cover, sandwiching the rubber feet between the filter cover and plastic cover while tightening the two socket head cap screws.

7.0 LIMITED STANDARD WARRANTY

Busch, Inc. warrants that all products furnished by it are free from defects in material and workmanship at the time of shipment for a period of 18 months from the date of shipment, or 12 months from the date of instal-

lation, whichever occurs first. Claims must be made during that period and are limited to the replacement or repair of parts claimed to be defective.

In the case of components purchased by Busch, Inc., such as starters, controls, mechanical seals, motors, couplings, etc., the warranty of that manufacturer will be extended to the purchaser in lieu of any warranty by Busch, Inc. The replacement of wear items including, but not limited to, seals, bearings, couplings, exhaust cover gaskets, etc., made in connection with normal service, are not covered by this Warranty.

The Limited Standard Warranty is valid only when the product has been properly installed, used in a normal manner, and serviced according to the operating manual. This warranty shall not extend to products that have been misused, neglected, altered, or repaired without factory authorization during the warranty period. We highly recommend the use of Busch parts to achieve documented performance and efficient operation. The use of parts other than Busch could limit the life expectancy of the equipment and could void any warranties if they are the cause of any damage. Operating conditions beyond our control such as improper voltage, excessive ambient temperatures, or other conditions that would affect the performance or life of the product will also cause the warranty to become void.

Permission to return parts for warranty repair must be obtained, and all returns must be prepaid to the factory. If, after examination, the product or part is found to be defective, it will be repaired or replaced on a no-charge basis and returned, FOB the factory. If it is determined that the Warranty has not been breached by Busch, Inc., then the usual charges for repair or replacement will be made, FOB the factory. Parts or products that are obsolete or those made to special order are not returnable.

This Limited Standard Warranty applies only to the above and is for the period set forth. Busch, Inc.'s maximum liability shall not, in any case, exceed the contract price for the product, part, or component claimed to be defective; and Busch, Inc. assumes no liability for any special, indirect, or consequential damages arising from defective equipment.

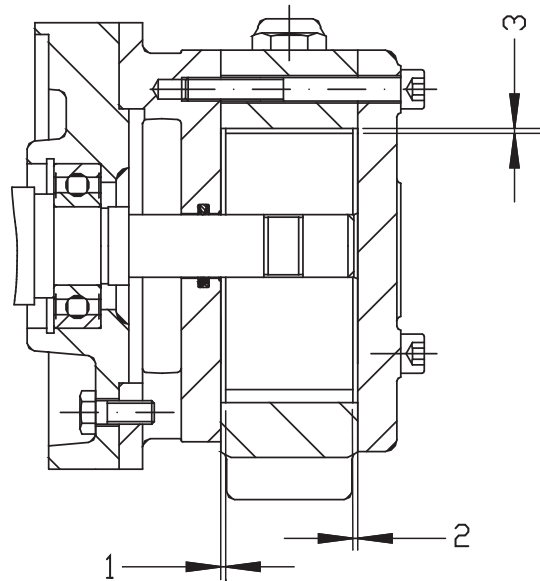
THERE ARE NO WARRANTIES IMPLIED OR EXPRESSED THAT EXTEND BEYOND THOSE CONTAINED IN THIS LIMITED STANDARD WARRANTY.

Note: For extended warranties on your new equipment contact Busch Headquarters at 1-800-USA-PUMP.

Clearances Chart

					1	2	3
Model	Cylinder length	Rotor length	Vane length	Vane thickness	Motor side axial clearance	Opp. motor side axial clearance	Radial clearance
SV 1010	39.97 $\begin{smallmatrix} 0 \\ -0.016 \end{smallmatrix}$	39.85 $\begin{smallmatrix} 0 \\ -0.016 \end{smallmatrix}$	39.83 $\begin{smallmatrix} 0 \\ -0.025 \end{smallmatrix}$	3.95 $\begin{smallmatrix} +0.03 \\ 0 \end{smallmatrix}$	0.05-0.07	0.03-0.08	0.06-0.08
SV 1016	63 $\begin{smallmatrix} +0 \\ -0.019 \end{smallmatrix}$	62.85 $\begin{smallmatrix} +0 \\ -0.019 \end{smallmatrix}$	62.83 $\begin{smallmatrix} +0 \\ -0.03 \end{smallmatrix}$	3.95 $\begin{smallmatrix} +0.03 \\ 0 \end{smallmatrix}$	0.05-0.07	0.06-0.12	0.06-0.08
SV 1025	68.95 $\begin{smallmatrix} +0 \\ -0.019 \end{smallmatrix}$	68.75 $\begin{smallmatrix} +0 \\ -0.019 \end{smallmatrix}$	68.77 $\begin{smallmatrix} +0 \\ -0.03 \end{smallmatrix}$	3.95 $\begin{smallmatrix} +0.03 \\ 0 \end{smallmatrix}$	0.05-0.07	0.11-0.17	0.08-0.1
SV 1040	95 $\begin{smallmatrix} +0 \\ -0.022 \end{smallmatrix}$	94.75 $\begin{smallmatrix} +0 \\ -0.022 \end{smallmatrix}$	94.77 $\begin{smallmatrix} +0 \\ -0.035 \end{smallmatrix}$	3.95 $\begin{smallmatrix} +0.03 \\ 0 \end{smallmatrix}$	0.05-0.07	0.16-0.22	0.08-0.1

Note: All dimensions are in millimeters



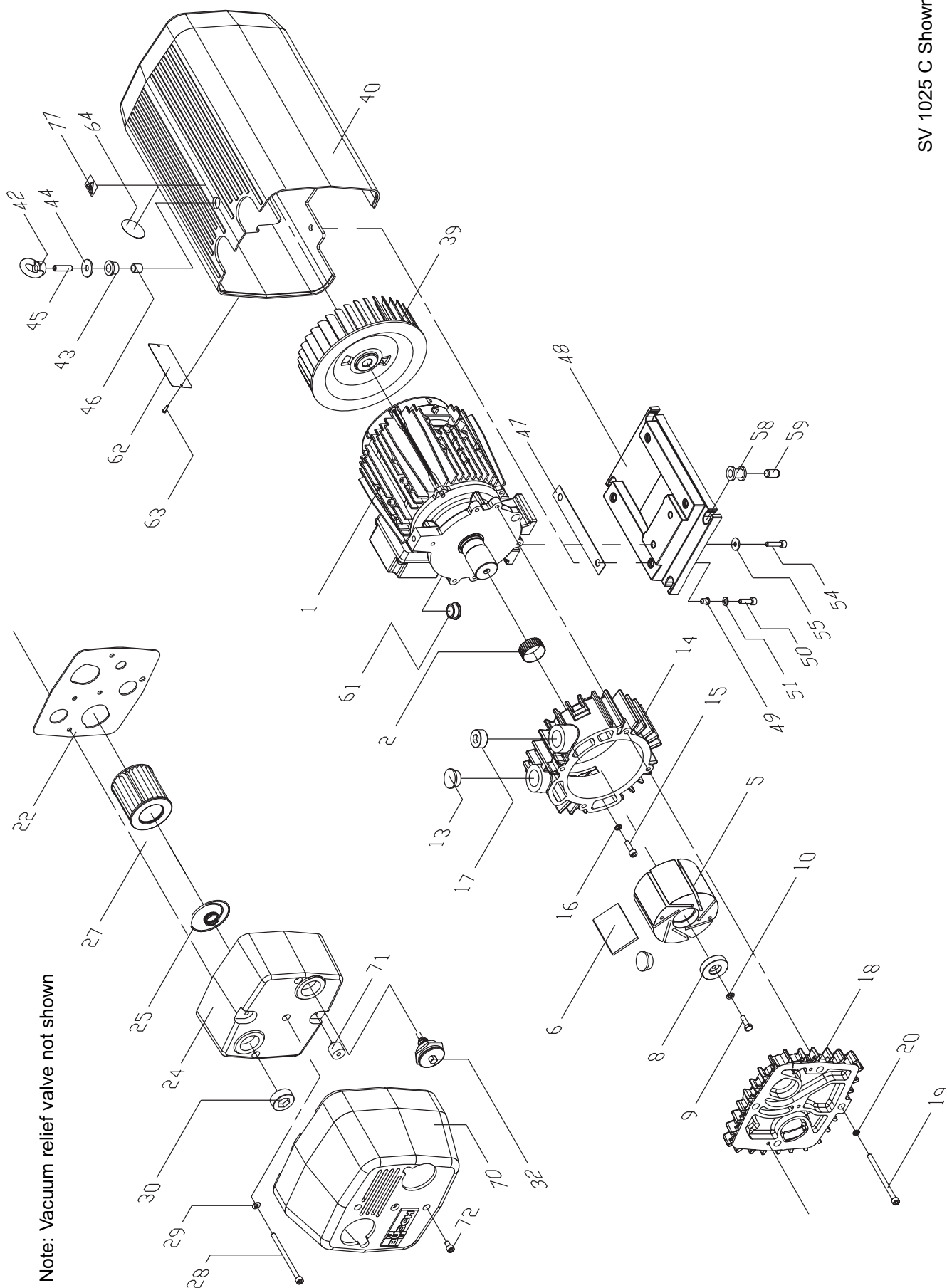
Technical Data Chart

Model	SV 1010	SV 1016	SV 1025	SV 1040
Max. Capacity (ACFM)	7	11.2	17.5	28
Max. Vacuum ("Hg)	25 1/2	25 1/2	26 3/8	26 3/8
Motor (kw)	0.37	0.55	0.90	1.25
Weight (lbs)	42	46	57	84

Fig. 18 - Clearances and Technical Data

Parts List

Ref. No.	Description	Qty.	Ref. No.	Description	Qty.
1	Motor	1	42*	Eye bolt	1
2	Tolerance ring	1	42**	Skt. hd. cap screw	1
5	Rotor	1	43	Rubber lifting eye bushing	1
6	Vane	7	44	Washer	1
8	Alignment disk	1	45	Stud (SV1025/SV1040 only)	1
9	Hex head cap screw	1	46	Lifting eye spacer	1
10	Lock washer	1	47	Rubber mounting gasket	2
13	Plug	1	48	Base plate	1
14	Cylinder	1	49	Threaded insert for base	4
15	Socket head cap screw	2	50	Socket head cap screw	4
16	Lock washer	2	51	Flat washer	4
17	Plug	1	54	Socket head cap screw	2
18	Endplate	1	55	Flat washer	2
19	Socket head cap screw	4	58	Rubber foot	4
20	Lock washer	4	59	Foot sleeve	4
22	Filter cover gasket	1	61	Blind plug	1
24	Filter cover	1	62	Nameplate	1
25	Spring for retaining filter	1	63	Nameplate screw	2
27	Filter cartridge	1	70	Plastic cover for filter cover	1
28	Socket head cap screw	3	71	Rubber foot	2
29	Copper gasket	3	72	Socket head cap screw	2
30	Socket head plug	1			
32	Silencer valve	1	*	For the SV1025 and SV1040 only	
39	Cooling fan	1	**	For the SV1010 and SV1016 only	
40	Plastic cover for motor	1			



Note: Vacuum relief valve not shown

Fig. 19 - Assembly Drawing



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