



# Preventative Maintenance Service Guide

## Standard System Models

- ❖ 1 HD 4.16P
- ❖ 1 HD 4.25P
- ❖ 1 HD 4.40P
- ❖ 1 HD 4.10C
- ❖ 1 HD 4.16C

## Custom Central System Models

- ❖ 60D
- ❖ 80D
- ❖ 100D
- ❖ 140D
- ❖ 200D
- ❖ 250D
- ❖ 400D

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## INTRODUCTION

The BaseVac Series Dental dry suction systems are designed to perform with a minimum of preventative maintenance. The unique construction of the Becker brand rotary vane vacuum pump will provide up to 8000 hours of life on normal wear components. This excludes the requirement of filter replacements on all systems and bearing grease lubrication on custom central systems.

The following guideline will help to ensure your BaseVac system runs smoothly through the 8000 hour period and provides details for service to extend the system to its 20 year service life expectancy.

“Good equipment requires good service”

Thank you

**BaseVac Dental is a product of R. E. Morrison Equipment**

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## MODELS 1 HD 4.16 / 1 HD 4.25 / 1 HD 4.40

\*\*Same information applies to double and triple systems, example: 2HD4.40 and 3HD4.40\*\*

START-UP CHECK LIST (To be done during the first hour of operation)



Important: Refer to BaseVac installation guide

1. Inspect all hose and piping connections from the air/water separator to the inlet prefilter on the BaseVac system (clear bowl/white filter housing)
2. Connect high level switch from air/water separator to the control panel on the pump
3. Inspect exhaust piping to ensure P-trap condensate drain is installed at the lowest point prior to the pump exhaust connection. Ensure brass hose barb and clear tubing is unobstructed to the drain. This trap ensures condensation formed in the exhaust piping cannot drain back into the pump. The exhaust is designed to be hot. Ensure plastic pipe is well supported to prevent sagging when warm
4. Start pump record inlet voltage at the pump it must be a minimum of 220 volt on single phase systems and 208 volt on 3 phase systems
5. Record amperage of the pump at start-up and again after 1 hour



**Refer to installation guide for normal amperage limits**

6. With the system blocked at the inlet to the air/water separator view the vacuum gauge after 5 minutes. The gauge should show 25" HG. Make sure the black knob with the red sticker is wound fully clockwise during vacuum test
7. Connect BaseVac to the piping System. Record Change in vacuum gauge reading after 5 minutes
8. Ensure all suction tools in the clinic are closed, remove all picadilly type tips, then record vacuum levels
9. With the pump off, place all suction tools in the water basin in each operatory in the open position with it half full of water. Start pump and record vacuum levels, this will be the normal operating level during full operatory operation

# SERVICE REQUIRED

## A. IN FIRST HOUR OF OPERATION

1. Observe amalgam separation for clogging due to higher than normal suction. Clean if necessary
2. Observe and clean BaseVac inlet prefilter, should it be necessary
3. Observe condensate fitting on exhaust piping p-trap and ensure it is open. Air may move in or out depending on length and orientation of the exhaust. Condensate will only drain when the pump shuts off or when accumulated volume exceeds exhaust air pressure
4. Inspect and tighten all clamps and fittings

## B. ONE MONTH FROM START UP

1. Inspect and record all vacuum levels
2. Ensure voltage and amperage are with normal limits (Preferably at the facilities busiest time to inspect effect of full electrical load)
3. View inlet prefilter (clear/white bowl) if wet or dirty inspect air water separator to ensure drain valve is locked open with clear split tube stop, change filter if required
4. Observe air/water separator, clear non return drain valve, clean if required
5. Record vacuum level fluctuations for future reference

## C. AFTER 6 MONTHS

1. Repeat steps 1 thru 5 from B " 1 month from start up"
2. Shut pump off, allow air/water separator to drain. With the pump off, remove pump front cover (see installation guide or vane replacement guide) inspect internal pump filter , replace if required
3. With the system still off, remove air/water separator lid and ensure high level float switch is clean and moves freely
4. Restart system, record vacuum and amperage levels for future reference

#### D. AFTER 2000 RUNNING HOURS

1. Repeat step 1 thru 5 from B “1 month from start up”
2. Follow vane replacement guide procedures to measure and record vane width



Please refer to the Vane Replacement Guide

- ❖ Repeat “after 2000 running hours” every 2000 hour intervals, replace vanes only when minimum width has been achieved

# SERVICE KITS

## MODELS 1 HD 4.10 / 1 HD 4.16 / 1 HD 4.25 / 1 HD 4.40

### 1.0 FILTER KITS

Model	Inlet Prefilter Part #	Internal Filter Part #	Kit* Part #
HD 4.10	<b>2800507</b> (FP252RE)	<b>2800509</b> (909518)	<b>410518</b>
HD 4.16	<b>2800507</b> (FP252RE)	<b>2800504</b> (909519)	<b>416519</b>
HD 4.25	<b>2800507</b> (FP252RE)	<b>2800501</b> (909505)	<b>425505</b>
HD 4.40	<b>2800507</b> (FP252RE)	<b>2800501</b> (909505)	<b>440505</b>

\*Kit includes prefilter o-ring seal, prefilter, internal filter.

### 1.1 VANE KITS

Model	Qty	Part Number	Sable Part Number
HD 4.10	7	(90132700)	<b>2800205</b>
HD 4.16	7	(90134700)	<b>2800204</b>
HD 4.25	7	(90134900)	<b>2800201</b>
HD 4.40	7	(90135200)	<b>2800202</b>

## 1.2 MISCELLANIOUS SERVICE PARTS

	<b>Part</b>	<b>Part Number</b>	<b>Sable Number</b>
1.21	Exhaust valve assembly	(72750206)	<b>2800508</b>
1.22	Exhaust p-trap with drain	(CP6609P/69921)	<b>2800510</b>
1.23	Water separator drain non return valve	(1500C15)	<b>2800905</b>

	<b>Part</b>	<b>Part Number</b>	<b>Sable Number</b>
1.24	1 HD Systems Air/Water separator high level switch	SSR25-1-4.5A-C	<b>2800512</b>
1.25	2 HD Systems Air/Water separator high level switch	SSR25-1-4.5A-C2	<b>2800513</b>
1.26	Vacuum regulating valve assembly	73600199613	<b>2800514</b>
1.27	Vacuum regulating valve o-ring (when required some models are shipped with valves without o-rings)	55252	<b>2800515</b>
1.28	Vacuum gauge	7210931	<b>2800516</b>
1.29	Vacuum flex hose 12 ½ feet 1 ½" ID	100CL1.5-125	<b>2800517</b>
1.30	Vacuum flex hose 25 feet 1 ½" ID	100CL1.5-25	<b>2800518</b>
1.31	Inline pump check valve-1" NPT	MAST-700-1	<b>2800519</b>
1.32	Grease gun with grease amblygon TA15/2	A3303	<b>2800520</b>

# CUSTOM CENTRAL SYSTEM SERVICE SCHEDULE

## A. SERVICE REQUIRED AT TIME OF COMMISSIONING

1. Inspect all pipe connection and flex hose connections, tighten if required, ensure exhaust piping condensate drain is installed and open
2. Check and record voltage at the BaseVac control panel
3. Bump start each vacuum pump verify direction of rotation, correct if necessary
4. With the piping system between the air/water separator and the clinic closed, start all pumps, and then run for 10 minutes. Record vacuum level and amperage

If vacuum level does not reach 24-25"HG adjust vacuum relief on each pump (turn the black knob with red stickers clockwise)

5. With all suction tools closed, start all pumps, record vacuum, if vacuum does not reach 22"HG, check piping for leaks. Shut pump off
6. With all suction open in a basin of water, start all pumps. Record vacuum level, this is the systems normal running cycle
7. With the clinic running at maximum, shut off one pump. If vacuum level is between 7 to 12"HG, one pump is the normal load. Restart pumps until normal load is reached

## B. SERVICE AFTER 1 MONTH

1. Preferably at the end of the day, observe tank drain cycle and normal restart of the pumps
2. Inspect pump inlet filter for signs of moisture. If moisture is present:
  - first check to ensure tank rinse occurs with pumps in off position
  - check to ensure drain is clear
  - check to ensure exhaust piping is clear and open
  - replace pump internal exhaust filter
3. Grease bearings with amblygon TA15/2 grease, 4 shots per bearing

## C. AFTER EACH 2000 HOUR INTERVAL

1. Repeat steps in B
2. Record amperage and hour meter
3. Schedule 4000 hour vane inspection

## D. AFTER 4000 HOURS

1. Repeat steps in B

2. Refer to vane replacement guide and measure vane width against minimum width. Do not replace vanes until they reach minimum width

#### **E. REPEAT 2000 HOUR INTERVAL SERVICE**

#### **F. BETWEEN 7000-8000 HOURS**

1. Follow vane replacement guide to exchange vanes as required
2. Reset service intervals as if new, noting hour history on previous vane set and scheduling dates as required

## Service Kits

### FILTER KITS

Model	Inlet Filter	Exhaust	Filter Kit
D60	909507	909510	D60F
D80	909507	909510	D80F
D100	909507	909514	D100F
D140	909507	909514	D140F
D200	909512	N/A	D200F
D250	909512	N/A	D250F
D400	909540	N/A	D400F

### VANE KITS

Model	Qty	Part Number	Kit Part Number
D60	4	901329	**D60KV
D80	4	901330	**D80KV
D100	4	901333	**D100KV
D140	4	901334	**D140KV
D200	5	901367	**D200KV
D250	5	901367	**D250KV
D400	10	901373	**D400KV

\*\*Kit includes: Inlet filter, Exhaust filter and amblygon grease dispenser



## **BROKEN VANE REPLACEMENT**

### **VT SERIES**

**VT 3.10 UP TO VT 3.40  
VT 4.10 UP TO VT 4.40**

**VT – VACUUM PUMP  
DT – PRESSURE BLOWER**



Becker Vacuum Pumps are leaders in their field in dependability and design. The nature of an oil-free, carbon vane, rotary sliding vane vacuum pump is that the vanes do wear out eventually.

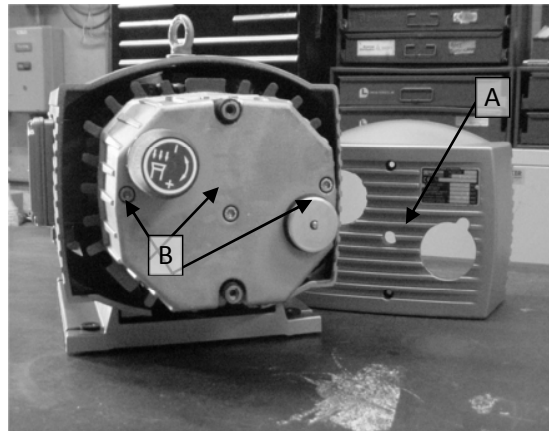
The Becker VT series vacuum pump requires a minimum amount of preventative maintenance to ensure optimum vane life and volumetric performance. Please do not over maintain this pump. Maintenance after the initial 500 hour break-in period should be limited to once every 6 months, inspect the vane width.

To remove the risk of broken vanes you may wish to replace them at the minimum width (see chart). In the event the vanes have chipped severely or broken, it is important to remove all of the broken pieces to ensure they do not re-enter the pump and break or chip the new set just installed.

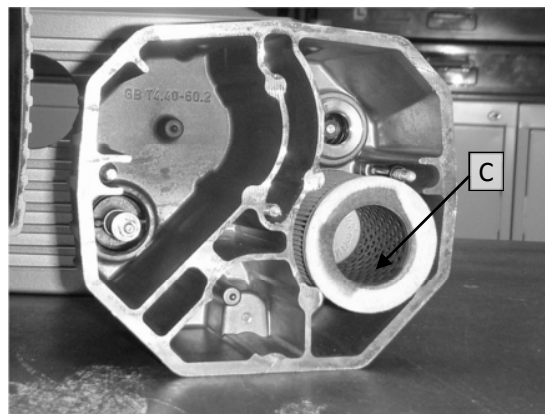
PUMP MODEL	VANE WIDTH (mm)	
	New	Minimum
VT 4.10	27	21
VT 4.16	35.5	27
VT 4.25	43	34
VT 4.40	43	34

**NOTE:** Broken vanes will be easily visible during the inspection of both the inlet filter and exhaust housing. The inlet filter will have a heavy coating of dust on the inside and there will be broken pieces inside the exhaust housing.

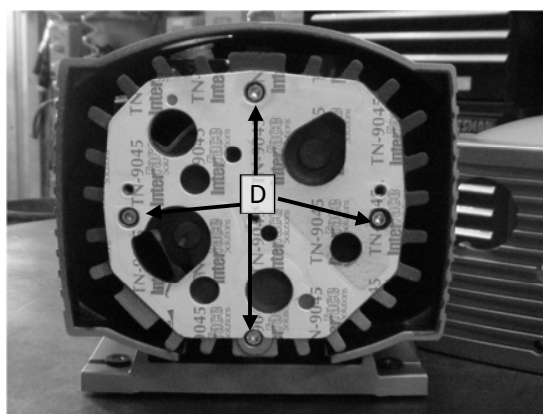
1. Disconnect exhaust with a 5mm allen key. Remove the plastic pump cover (A) and the filter housing (B) from the pump.



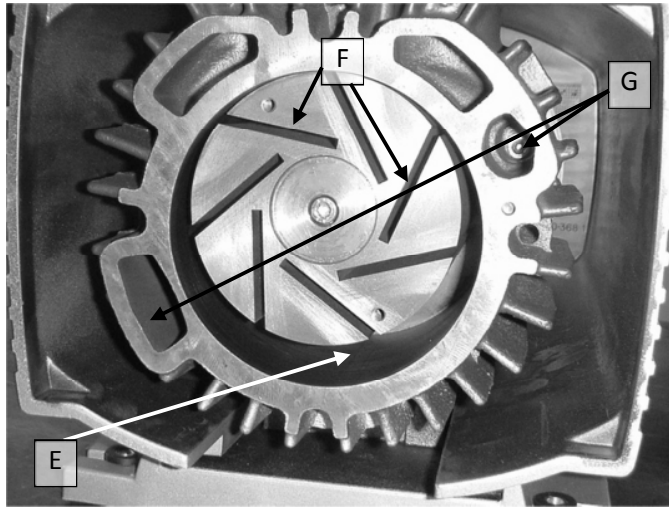
2. Remove inlet filter (c) and any other filters inside the housing and discard. Do not re-use these filters



3. Remove the end shield (D) to gain access to the pump housing.

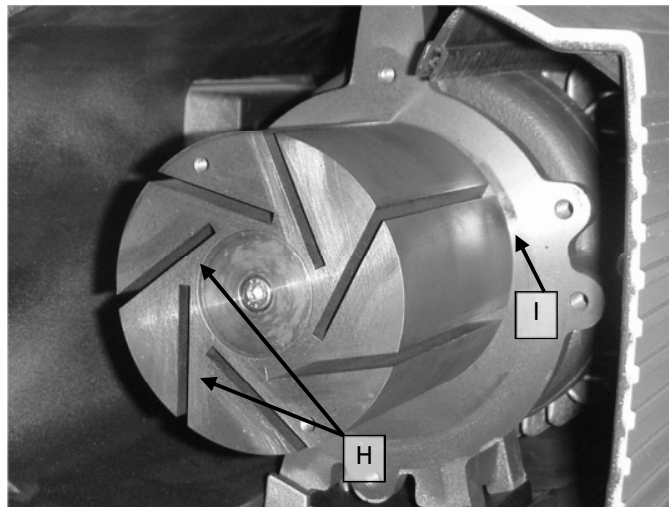


4. Remove the broken vanes from the housing (E) and rotor vane slots (F).



5. Remove the pump housing (G) from the back end shield. Using compressed air, blow out the filter housing and pump housing while there are removed from the pump. Blow out the rotor vane slots (H) and the space between the rotor and back end shield (I). Be sure to spin the rotor. Use a flashlight to check for broken pieces.

Care should be taken during this step to remove all broken pieces. This will prevent any particles from working their way back into the pump and breaking a new set of vanes.



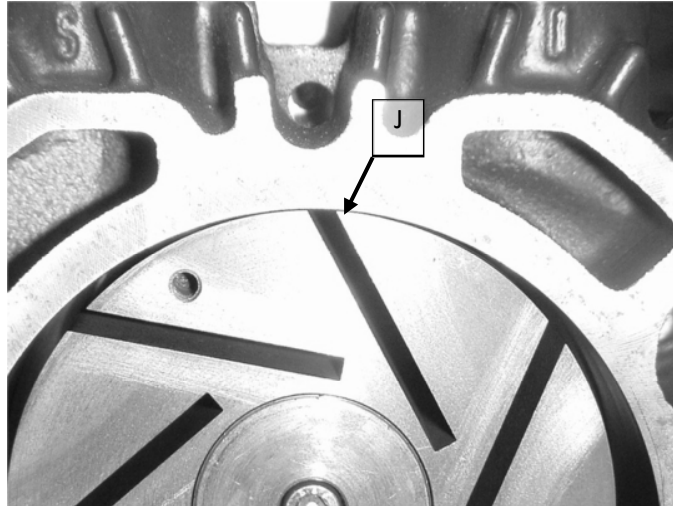
6. Bolt the pump housing back on to the pump.

**Note:** At this point the distance between the rotor and pump housing must be reset (J). The proper size feeler gauge must be inserted between rotor and housing at top dead center before tightening down the pump body.

The following chart has the clearance measurements for the various T pumps.

<b>Pump Type</b>		<b>Rotor to Housing Clearance</b>
DT, VT, T	3.10/4.10	0.03 – 0.04 mm
DT, VT, T	3.16/4.16	0.03 – 0.05 mm
DT, VT, T	3.25/4.25	0.04 – 0.06 mm
ST, VT, T	3.41/4.40	0.05 – 0.07 mm

Make sure the rotor spins freely. If the rotor makes contact with the housing, reset the



clearance from that high spot on the rotor.

7. Install new vanes. Check to be sure high point in the tapered edge, points in the direction of rotation. Ensure vanes fit freely into vane slots. Reinstall end shield. Install NEW filters and bolt filter housing back onto pump. Start pump and check rotation.



## **BROKEN VANE REPLACEMENT**

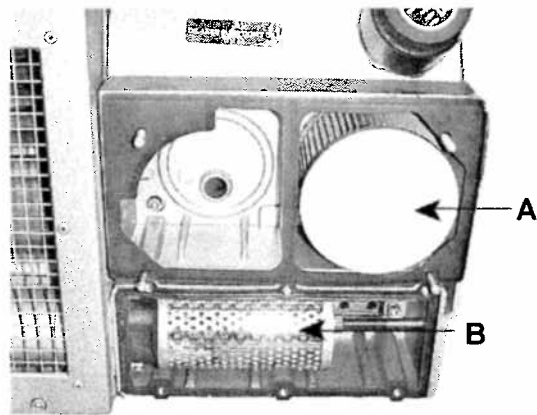


## Broken Vane Replacement Procedure

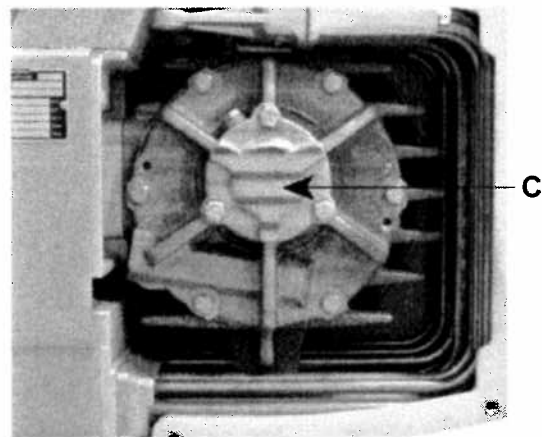
**NOTE:** Broken vanes will be easily visible during the inspection of both the inlet filter and carbon dust separator housing. The inlet filter will have a heavy coating of dust and the carbon dust separator will be clogged and there will be broken pieces inside the housing around the filter.

To ensure that the new set of vanes will not break, immediately following installation, it is necessary to use the procedure detailed below:

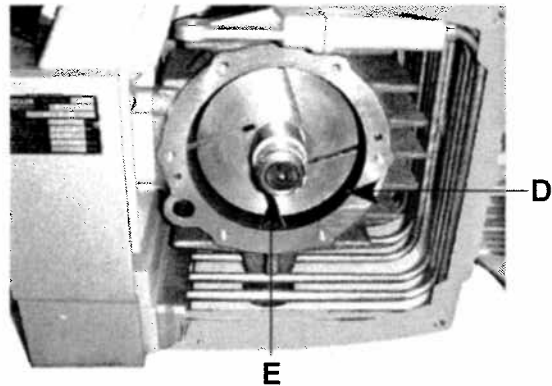
### BECKER KVT 3.60



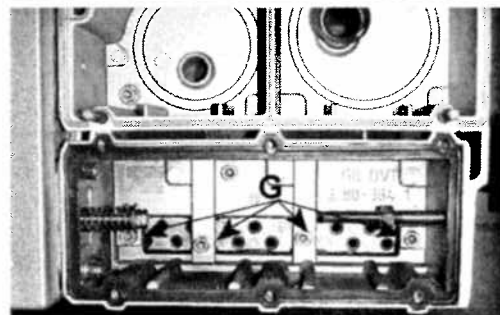
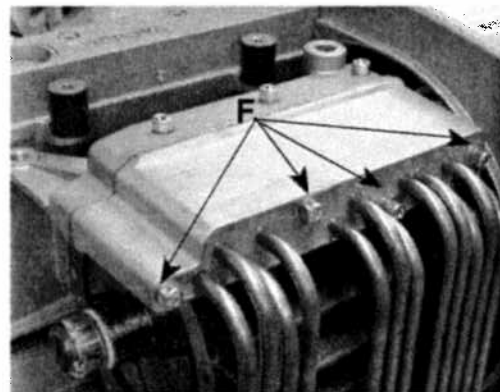
1. Remove the inlet filter (A) and carbon dust separator (B) from the pump and discard. Do not reuse these filters.



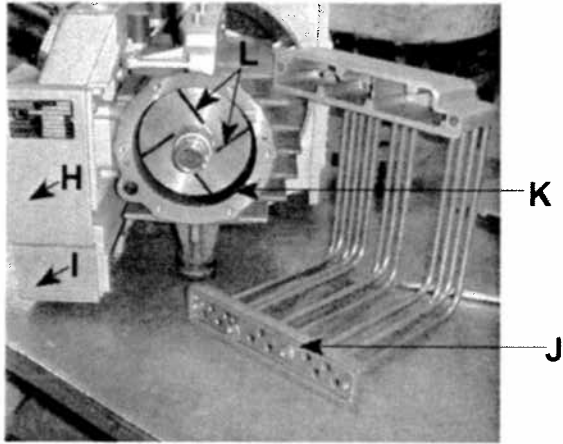
2. Remove the endshield (C) to gain access to the pump housing.



3. Remove the broken vanes from the housing (D) and rotor vane slots (E).



4. Unbolt the cooling tubes from both the top of the pump (F) and the carbon dust separator housing (G).



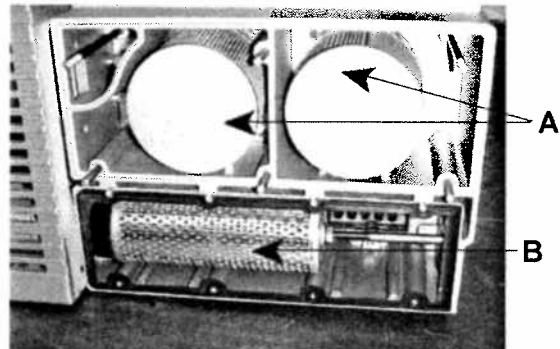
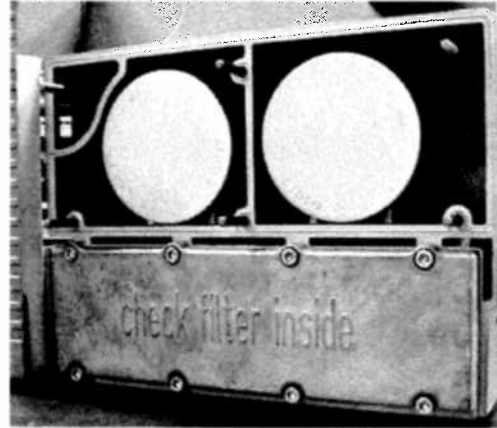
## BECKER KVT 3.100 and KVT 3.140

- Using compressed air, blow out the inlet (H) and carbon dust separator (I) housings. Blow out the cooling tubes (J). Blow out the pump housing (K) and rotor vane slots (L) be sure to spin the rotor and blow out pieces from top dead center. Use a flashlight to check for pieces.

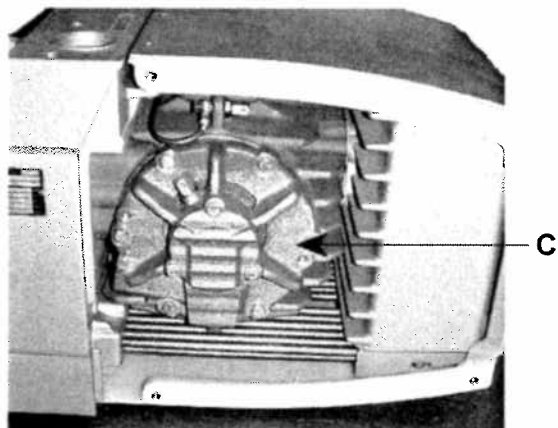
**Care should be taken during this step to remove all broken pieces. This will prevent any particles from working their way back into the pump and breaking a new set of vanes.**

- After the pump is free of broken vanes, bolt cooling tubes back onto pump housing and dust separator box.
- Install new vanes. Check to be sure high point in the tapered edge points in the direction of rotation. Ensure vanes fit freely into vane slots. Reinstall end shield ensuring no dust or debris is in the bearing chamber. Grease bearing if required. Install **new** filters. Start pump and check rotation.

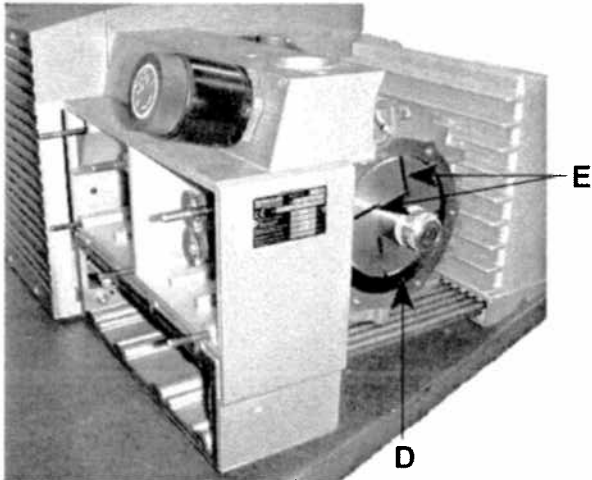
The parts required to undertake the replacement of the vanes in the KVT 3.60 Becker pump are listed on page 6.



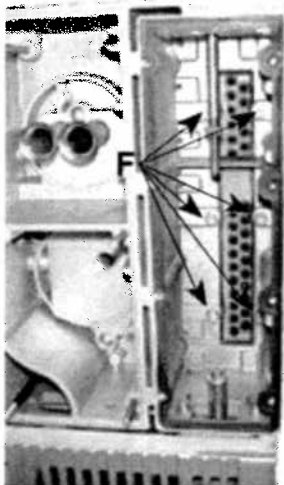
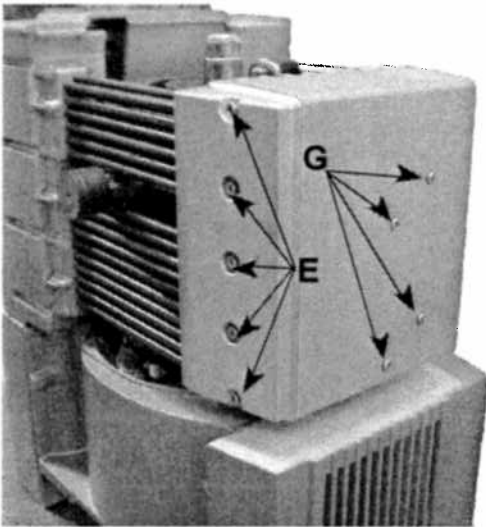
- Remove the inlet filter (A) and carbon dust separator (B) from the pump and discard. Do not reuse these filters.



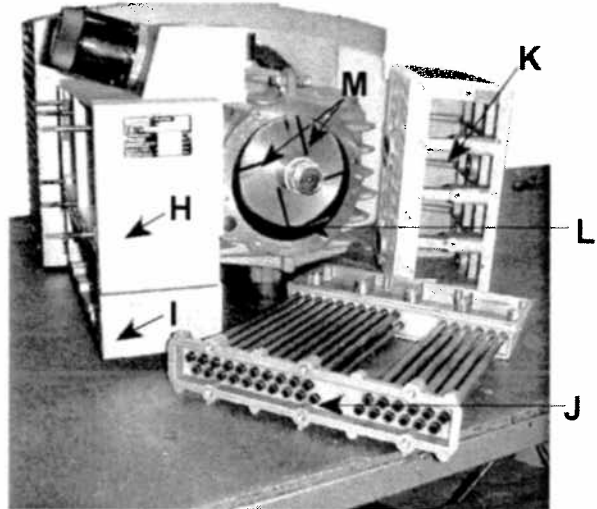
- Remove the end shield (C) to gain access to the pump housing.



3. Remove the broken vanes from the housing (D) and rotor vane slots (E).



4. Unbolt the cooling tubes from both the discharge box (E) and the carbon dust separator housing (F). Unbolt the discharge box from the pump cylinder (G).



5. Using compressed air, blow out the inlet (H) and carbon dust separator (I) housings. Blow out the cooling tubes (J). Blow out the discharge box (K). Blow out the pump housing (L) and rotor vane slots (M). Be sure to spin the rotor and blow out debris from top dead center. Use a flashlight to check for pieces.

**Care should be taken during this step to remove all broken pieces. This will prevent any particles from working their way back into the pump and breaking a new set of vanes.**

6. After the pump is free of broken vanes, bolt discharge box back to cylinder. Bolt cooling tubes back to discharge box and separator housing.
7. Install new vanes. Check to be sure high point in the tapered edge points in the direction of rotation. Ensure vanes fit freely into vane slots. Reinstall end shield ensuring no dust or debris is in the bearing chamber. Grease bearing if required. Install **new** filters. Start pump and check rotation.

The parts required to undertake the replacement of the vanes in the KVT 3.100 and KVT 3.140 Becker pumps are listed on page 6.



**BROKEN VANE REPLACEMENT  
VTLF SERIES**

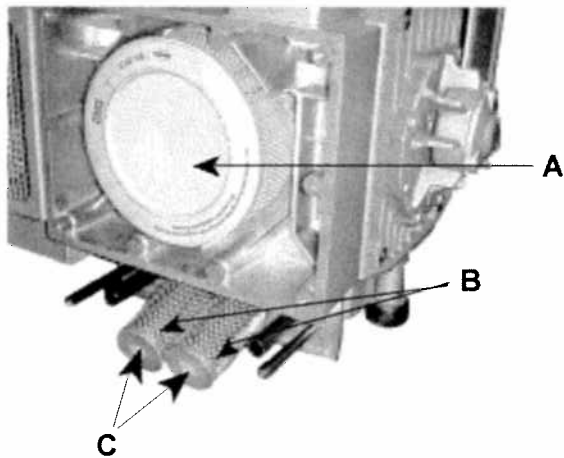


## Broken Vane Replacement Procedure

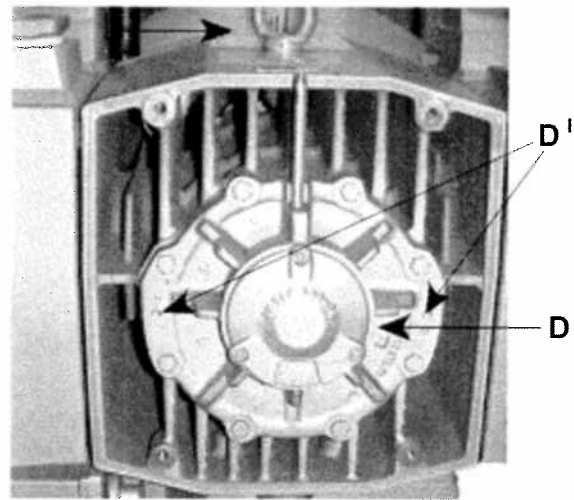
**NOTE:** Broken vanes will be easily visible during the inspection of both the inlet filter and discharge housing. The inlet filter will have a heavy coating of dust on the inside and there will be broken pieces inside the discharge box.

To ensure that the new set of vanes will not break, immediately following installation, it is necessary to use the procedure detailed below:

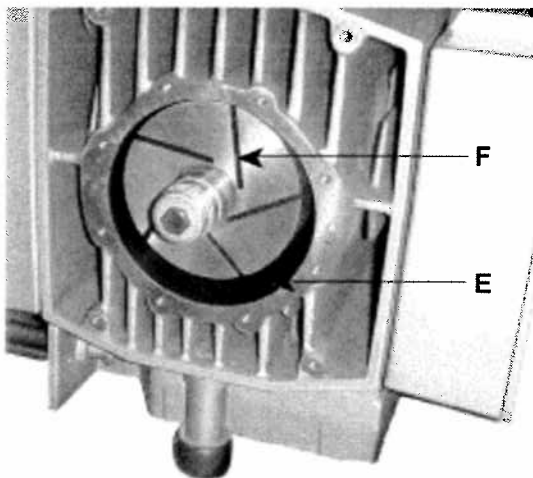
### BECKER VTLF 250



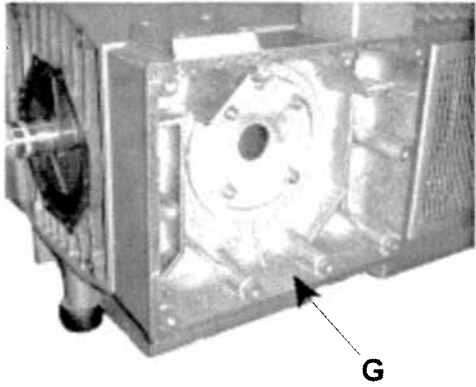
1. Remove the inlet filter (A) and secondary suction filters (B). Remove the plastic plugs (C) as they will be needed in the new filters being installed. Discard all three filters as they cannot be reused.



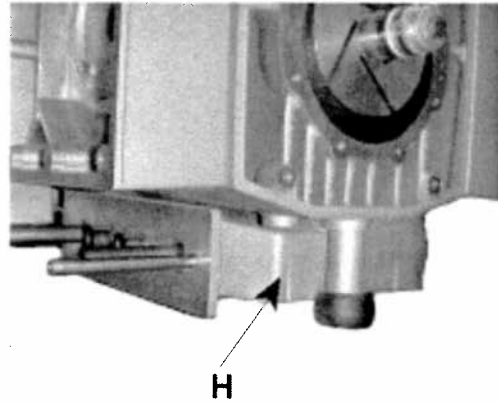
2. Remove the endshield (D) to gain access to the pump housing. Re-thread two of the bolts into holes (D'). Tighten bolts alternately, this will pull the end shield off without damage.



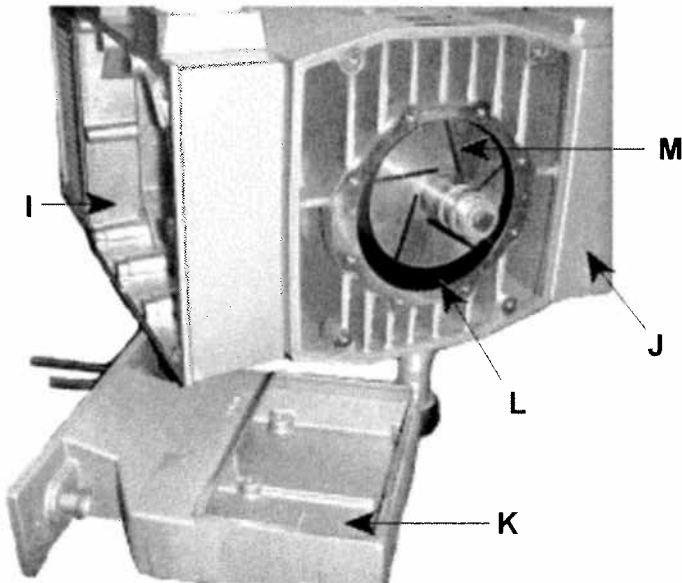
3. Remove the broken vanes from the housing (E) and rotor vane slots (F). Use a straight steel blade (ruler) to remove pieces stuck in the vane slots (F).



4. Remove the cover and clean out broken pieces from the discharge box (G).

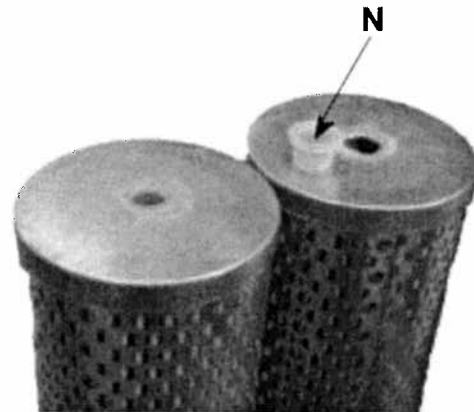


5. Unbolt the secondary suction housing (H) from the pump and remove, taking care not to tear the connecting gasket.

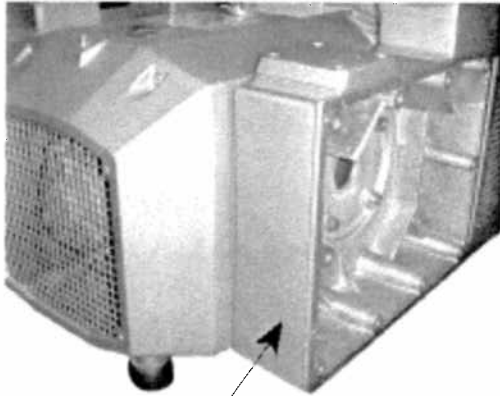


6. Using compressed air, blow out the inlet (I) and discharge (J) housings. Blow out the secondary suction housing (K). Blow out the pump housing (L) and rotor vane slots (M). Be sure to spin the rotor and blow out pieces from top dead center. Use a flashlight to check for pieces.

Care should be taken during this step to remove all broken pieces. This will prevent any particles from working their way back into the pump and damaging a new set of vanes.

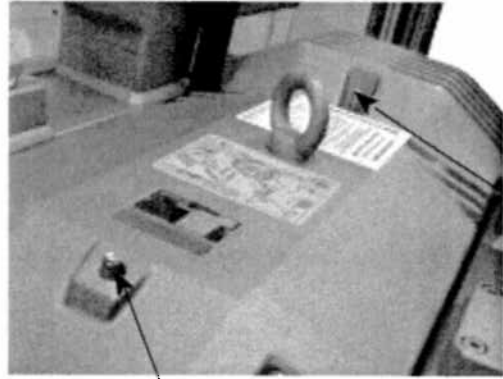


7. Install new vanes. Check to be sure high point in the tapered edge points in the direction of rotation. Ensure vanes fit freely into vane slots. Reinstall end shield ensuring no dust or debris is in the bearing chamber. Install **new** filters, remembering to reuse plastic plugs (N) in the secondary suction filters. If this is not done, dirt will bypass the filter and head directly into the pump causing unnecessary vane wear.



O

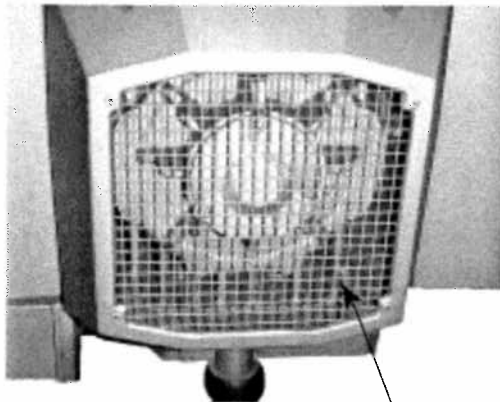
8. Install the covers except the cover on the discharge box (O). Start pump and check rotation, then switch on the pump for three seconds and then turn it off. Repeat a second time and then install the cover. This procedure will allow any missing vane pieces to be forced out of the pump.



P

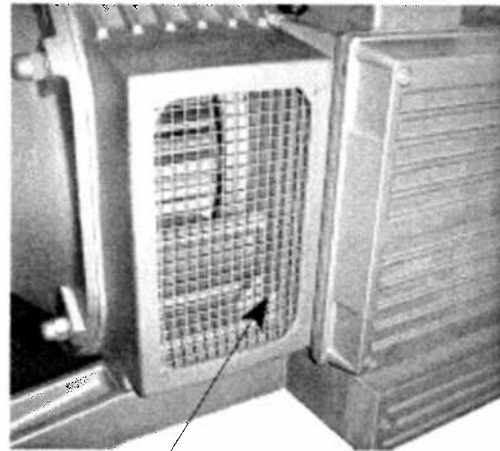
Q

9. While pump is running, use the supplied grease gun filled with Amblygon TA 15/2 to grease fittings (P) and (Q). Greasing while the pump is in operation will distribute the grease evenly throughout the bearings. **NOTE:** Between 3 and 5 pumps of the Amblygon grease gun is sufficient once the pump is primed.



R

10. Care should be taken to keep the pump free of dirt and contaminants. It should be given a compressed air bath regularly and the internal cooling fins should be kept clear

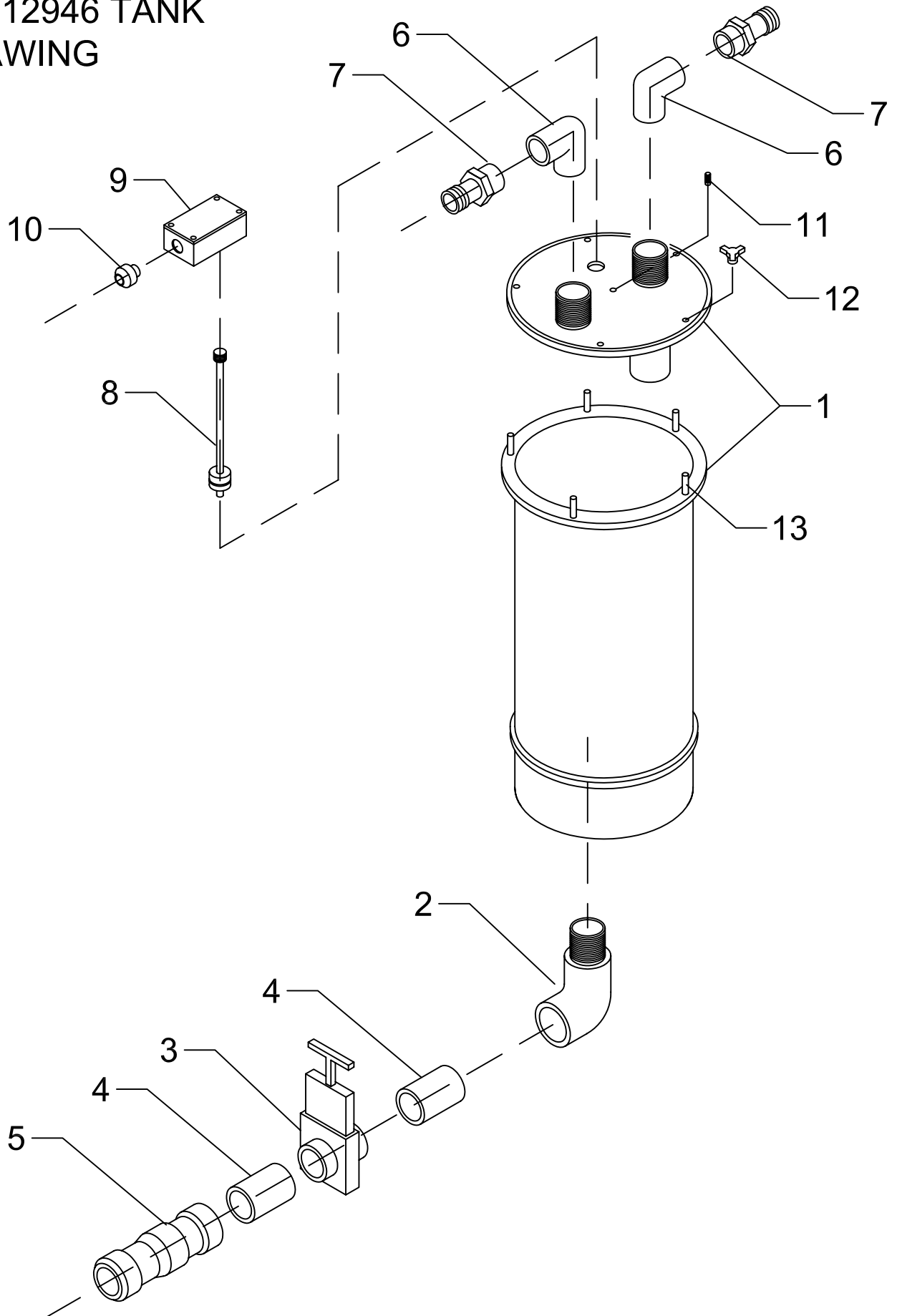


S

by blowing through the front cover (R) and the side fan covers (S). This will help to prevent the pump from overheating and causing premature bearing failure.

The parts required to undertake the replacement of the vanes in the VTLF 250 Becker pump are listed on page 6.

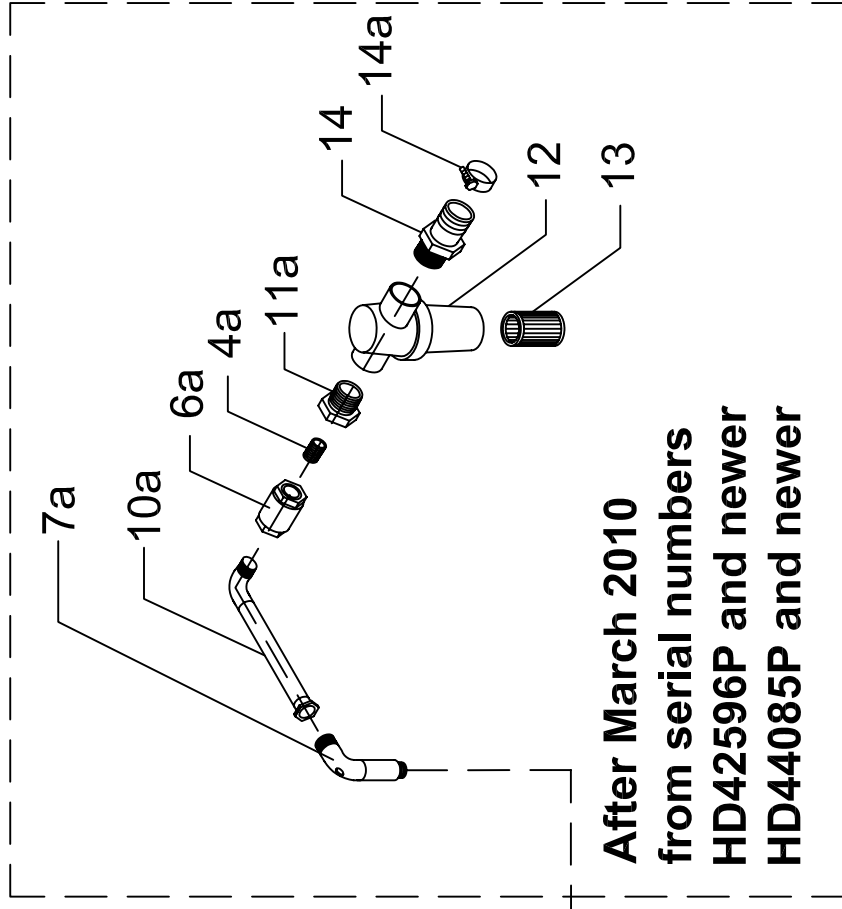
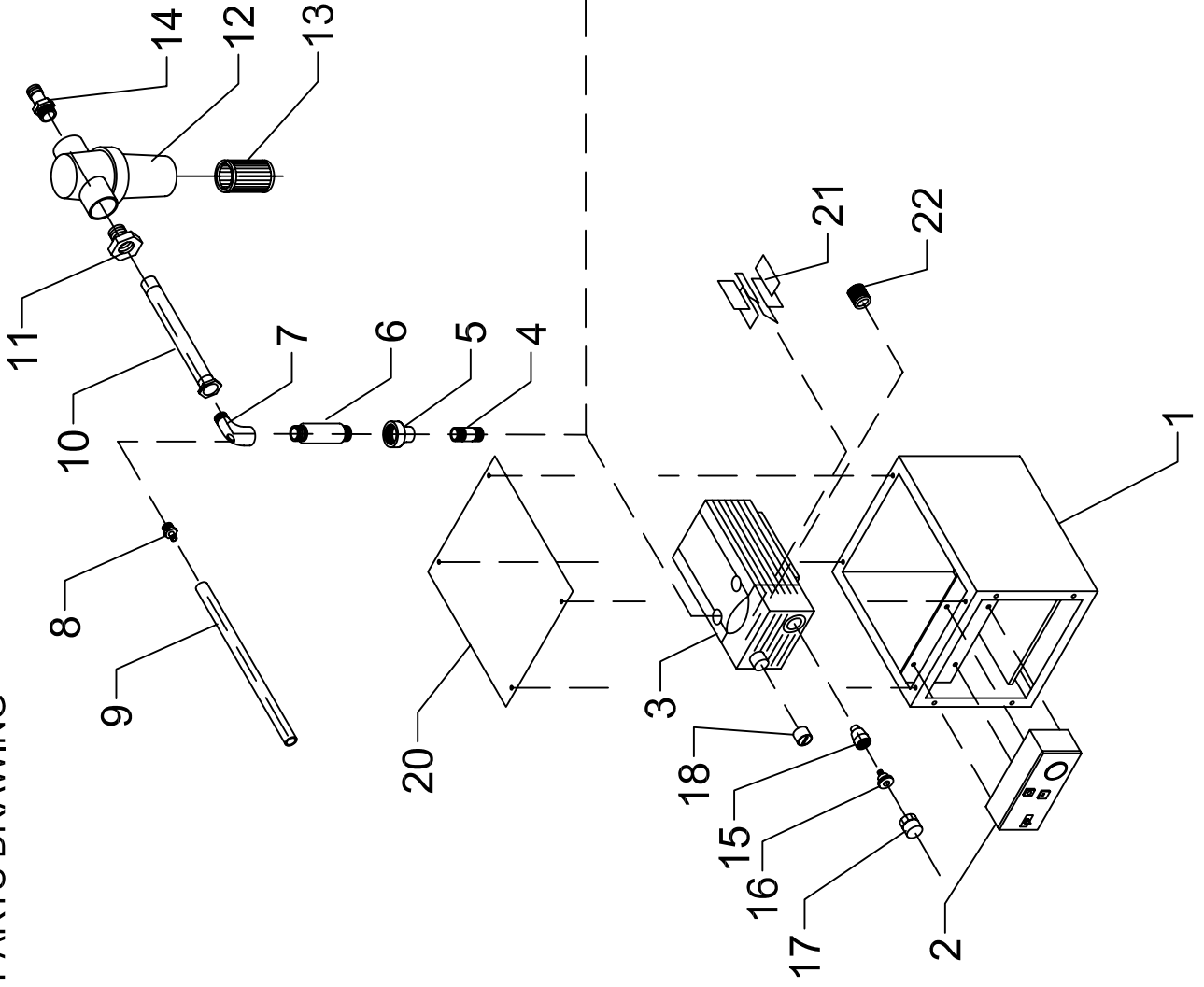
# BVD12946 TANK DRAWING



# BVD12946 TANK PARTS LIST

NO	PART NUMBER	QTY	DESCRIPTION
1	12946	1	HDPE TANK c/w PEDESTAL AND TOP
2	2283	1	1-½" 90° ELBOW (Mpt x Soc)
3	SLIDING-015	1	1-½" SLIDING GATE VALVE
4	11502-4	2	1-½" x 4" PVC WHITE TUBING
5	1500C15	1	CLEAR PVC CHECK VALVE 1-½" COMPRESSION FITTINGS
6	408-015W	2	1-½" 90° ELBOW ( SCH 40 WHITE ) FIPT x FIPT
7	HB150	2	1-½" MPT x 1-½" HOSE BARB
8	SSR25-1-4.5A-C	1	STAINLESS STEEL VERTICAL FLOAT
8	SSR25-1-4.5A-C2	1	STAINLESS STEEL VERTICAL FLOAT 2 POLE (Stacked system)
9	1591LGY	1	ELECTRICAL UTILITY BOX
10	CD13NR	1	STRAIN RELIEF CABLE CONNECTORS
11	BSL-M5	1	M5 BRASS FILTER FOR BREATHER HOLE
12	11101563	5	PLASTIC KNOB 5/16-18 x 0.5 INSERT
13	28106	5	BOLTS 5/16"-18 X 2.25 FLAT HEAD C/S

VACUUM PUMP  
PARTS DRAWING



After March 2010  
from serial numbers  
HD42596P and newer  
HD44085P and newer

# VACUUM PUMP PARTS LIST

POS. #	REM P/N	SABLE P/N	QTY	DESCRIPTION
1	543080	2800400	1	FRAME WELDMENT
2	176891//176892//176795//176893	2800401	1	CONTROL BOX 110V.1ph// 220V.1ph// Plastic// 208V.3ph
3	SEE LIST BELOW	2800402	1	VACUUM PUMPS
4	13401	2800403	1	¾" CLOSE NIPPLE
4a	1489		1	1" CLOSE NIPPLE (PVC)
5	13324	2800404	1	1" x ¾" REDUCING COUPLING
6	TECHNO1	2800405	1	CHECK VALVE
6a	MAST700-1		1	CHECK VALVE
7	13275	2800406	1	1" 90° STREET ELBOW modified with ¼" NPT hole
7a	INLPIPE1		1	INLET COPPER PIPING ASSEMBLY (PUMP SIDE)
8	125-2B	2800407	1	⅝" HOSE BARB x ¼" MPT
9	WCSPEB25	2800408	1	¼" POLY TUBING
10	PW15.5	2800409	1	15-½" LENGTH FABRICATED COPPER PIPE
10a	INLPIPE2		1	INLET COPPER PIPING ASSEMBLY
11	13363	2800410	1	1-½" x 1" HEX BUSHING
11a	2464		1	BUSHING 1- 1/2" x 1" (PVC)
12	FP1.50	2800411	1	FILTER ASSEMBLY
13	FP252RE	2800507	1	FILTER ELEMENT
14	HB150 // HB200	2800412	1	1-½"HOSE BARB x 1-½"MPT // 2"HOSE BARB x 2"MPT
14a	MIK47-51		1	HOSE CLAMP
15	567029	2800413	1	EXHAUST VALVE ADAPTOR
16	72750206	2800508	1	BLOW-OFF VALVE
17	835-015	2800414	1	FEMALE ADAPTOR FIPT x SOC.
18	73600199613	2800415	1	VACUUM REGULATING VALVE ( STAINLESS TANKS )
18	73600099613	2800416	1	VACUUM REGULATING VALVE ( PLASTIC TANKS 18"hg MAX.)
19	DNFG	2800417	1	FAN GUARD (before June 2006)
20	543080TOP	2800418	1	FRAME COVER
21	90134700	2800204 (4.16)	7	VANES (7pcs.) for VT4.16
21	901349	2800201 (4.25)	7	VANES (7pcs.) for VT4.25
21	901352	2800202 (4.40)	7	VANES (7pcs.) for VT4.40
22	C752	2800501 (4.25)	1	INTERNAL FILTER-AIR CLEANER ELEMENT (4.25 / 4.40)
22	C643	2800504 (4.16)	1	INTERNAL FILTER-AIR CLEANER ELEMENT (4.16)
3	164291D1(UL)	2800419	1	VACUUM PUMP VT4.16 230V. 1 ph.
3	164591AO	2800420	1	VACUUM PUMP VT4.25 110V. 1 ph.
3	164591D6	2800421	1	VACUUM PUMP VT4.25 210V. +/- 6% 1 ph.
3	164591DO(PB)	2800422	1	VACUUM PUMP VT4.25 230V. +/- 10% 1 ph.
3	164891AO	2800423	1	VACUUM PUMP VT4.40 110V. 1 ph.
3	164891DO	2800424	1	VACUUM PUMP VT4.40 220V. 1 ph.
3	164891WO	2800425	1	VACUUM PUMP VT4.40 WIDE RANGE 3ph.