WARNING

IMPORTANT SAFEGUARDS READ AND
FOLLOW ALL SAFETY INSTRUCTIONS.

DANGER

To avoid possible equipment electric shock, special care should be taken when the pump is used as aquarium equipment. For each of the follwing situations, do not attempt to repair yourself, return the air pump to an authorized service facility for servicing, or discard the pump.

I) If the pump falls into the water, DO NOT REACH FOR IT: first unplug the pump, and then retrieve it.

If the pump's electrical components get wet, unplug the pump immediately.

II) Carefully examine the air pump after installation. It should not be plugged in if there is water on parts that are not intended to be wet.

III) Do not operate if the cord or plug is damaged, or if the pump is malfunctioning, dropped , or damaged in any way.

IV) To prevent the plug of electrical outlet getting wet, position the aquarium tank and stand to one side of a wall mounted outlet.

This should avoid water dripping onto the plug or outlet.

A drip loop shown in the figure below, should be ar ranged for each cord connection an air pump to an electrical outlet. The drip loop is that part of the cord below the level of the outlet or connector if an extension cord is used . The drip loop prevents water traveling along the cord and coming into outlet.

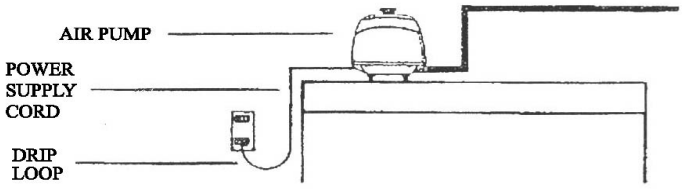


Figure 11

If the plug of outlet does get wet, DO NOT UNPLUG THE CORD: Disconnect the fuse or circuit breaker supplying power to the pump. Then unplug and examine for the presence of water in the outlet.

V) Do not use the pump near volatile liquids such as gasoline, thinners, etc, as this creates the possibility of an explosion.

CAUTIONS FOR USE

A) Close supervision is necessary when an appliance is used or near children.

B) This pump is air-operated. Do not, under any circumstances, attempt operation with water or other liquids, otherwise pump may be damaged.

C) The ambient operating temperature for this pump is between 41˚F(5˚C) and 104˚F(40˚C). operation of pump in temperature outside recommended temperature range may result in malfunction of severely shortened service life.

D) Do not block the air being discharged. Pump must have sufficient room to allow for heat dissipation.

Under the extreme operating temperature conditions which may be caused by failure to

Observe cautions C) or D), pump will automatically switch off until cool. DO NOT REMOVE PUMPGCSING UNTIL UNIT IS DISCONNECT FROM MAIN SUPPLY.

E) Always unplug pump prior to servicing. Grasp plug to remove cord from outlet. Do not remove by pulling on power cord.

F) Do not use the air pump for any other purpose which different from its original use. Use of unauthorized replacement parts may jeoparidize safety.

G) Do not install pump where it will be exposed to weather. Do not store pump under freezing condition

H) Ensure pump is securely mounted prior to operation.

I) Read and observe all important markings on pump.

J) Ensure that extension cords (if require) have the correct or higher rating (amperes or watts). Ensure cord is properly positioned to avoid tripping.

INSTRUCTIONS NOTES

1. INSTALLTION

A) When using the pump to inject air into a liquid, ensure the pump is placed higher than the surface level of the liquid, otherwise the liquid may run back into the pump when the power is turned off.

B) Do not keep the air pump in a damp and stuffy place.

C) Please ensure the air pump is placed on a strongly built place horizontally.

2. GROUNDING

This air pump should be grounded to minimize the possibility of electric shock. This air pump is equipped with an electric cord having an equipment grounding conductor and a grounding type plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all appropriate codes and ordinances.

This air pump is for use on a normal 110-130 volt circuit or 220-240 volt circuit as indicated on the sticker, and has a grounded plug which is illustrated in (Figure2 :110-130V) or (Figure5 : 220-240V). (A temporary adapter is illustrated in (Figure3). (Figure4) is used to connect the plug to a two- poles receptacle as shown in (Figure3) if a proper grounded outlet is not available.The temporary adapter should be used on until a proper grounded outlet can be installed by a qualified electrician. The green colored rigid ear(lug,etc.) extending from the adapter must be fastened to a permanent ground such as a proper grounded outlet box.

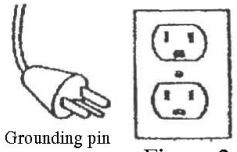


Figure 2

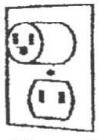


Figure 3
(Not allowed in Canada)

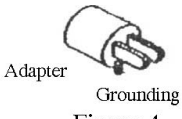


Figure 4
(Not allowed in Canada)

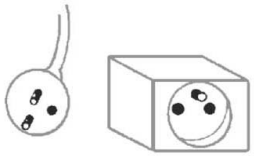


Figure 5

3. OPERATION AND MAINTENANCE

When the pump is connected to a proper receptacle, the pump will operate. The filter must be periodically cleaned or replaced. The air pump has no sliding parts and therefore no need for lubrication. Also the exhausted the air pump is always clean. This air pump has no user serviceable parts.

ASSEMBLY AND OPERATIONAL INSTRUCTIONS.

1. Inspect unit for any damage due to shipment.
2. Ensure that no parts are missing.
3. The HAKKO AIR PUMP is designed to be positioned horizontally. Ensure that the location is dry and free of excessive dust or debris. Dust protection around the entire unit may be constructed of furnace filters. Please ensure the air circulation is maintained all the time.

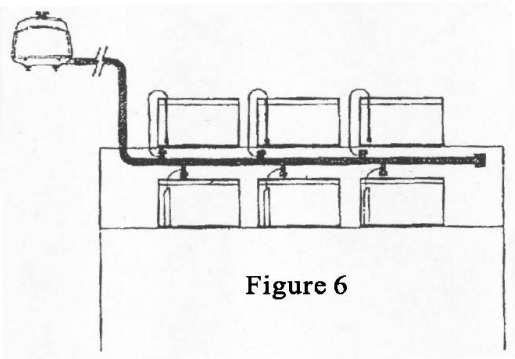


Figure 6

4. The air pump should be placed above water level to ensure no siphoning can occur if power failed (Figure6). A proper installed check valve will prevent backflow and allow placement of the pump below water surface level(Figure6A).
5. For store or fish room requirements. The air pump should be attached to a permanent pie assembly with minimum diameter of pump outlet (18mm) Rigid plastic pipe is preferable over flexible hosing for valve attachment. Air valve should be tapped into this line to supply individual aquariums with standard aquarium airline. Teflon tape on valve threads will reduce air leakage from the pipe.
6. Outside diameter of the output stem is 18mm, hose can be directly attached for straight line installation, or provided elbow can be used if a corner is required.
7. See figures outlining typical set-ups for proper installation of rigid pipe assembly. Do not block air pump's output. Excessive backpressure will prematurely damage diaphragm.
8. If the air pump produces more air than required, bleed excess into atmosphere with a valve to reduce damaging backpressure.

NOTE:
FULL LOOP PROVIDES EVEN AIR PRESSURE TO ALL AREAS OF INSTALLATION.

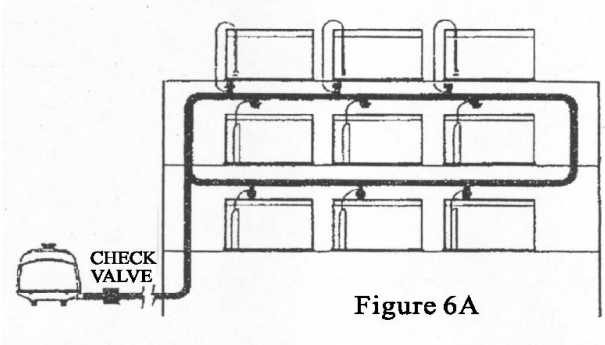
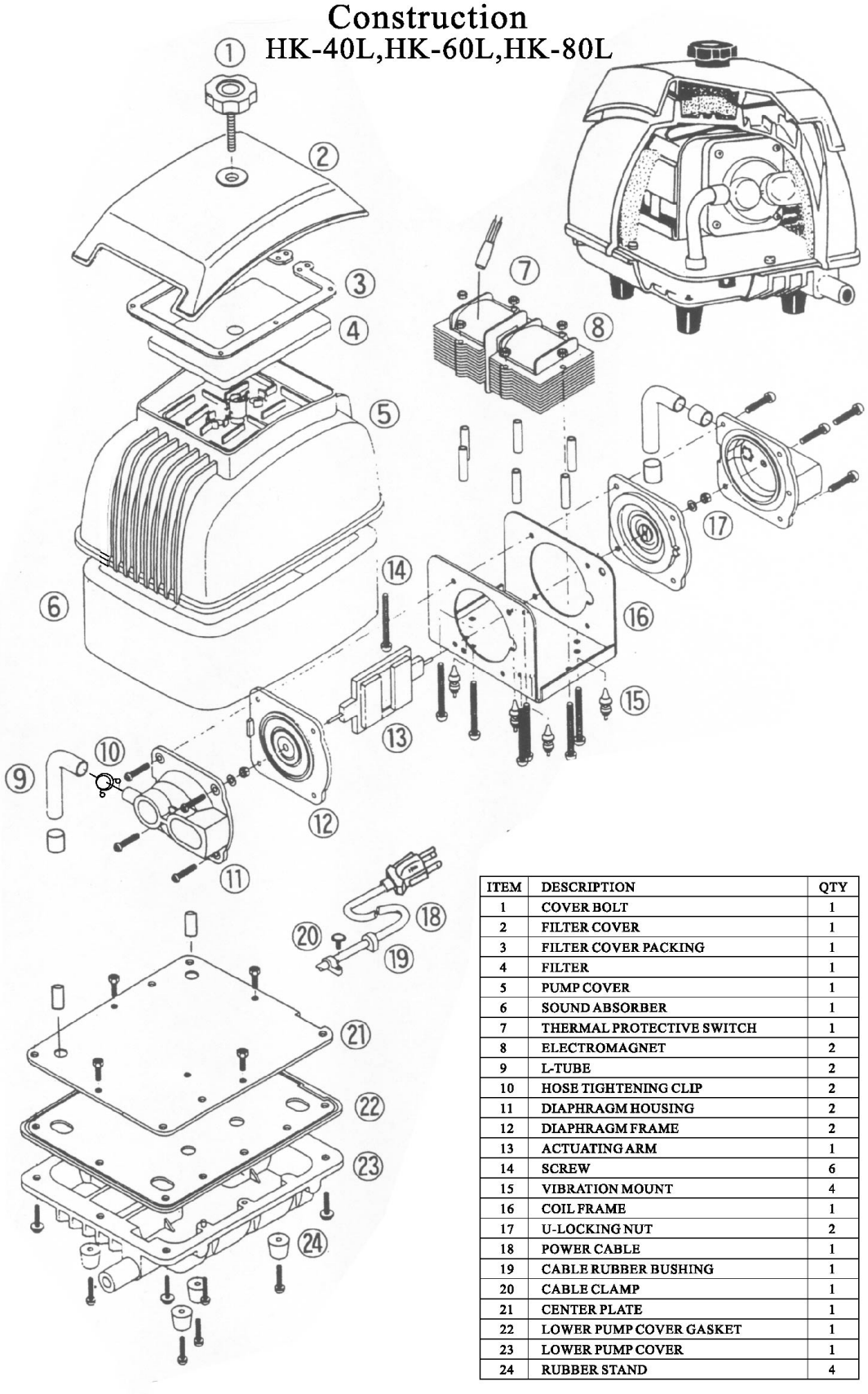


Figure 6A

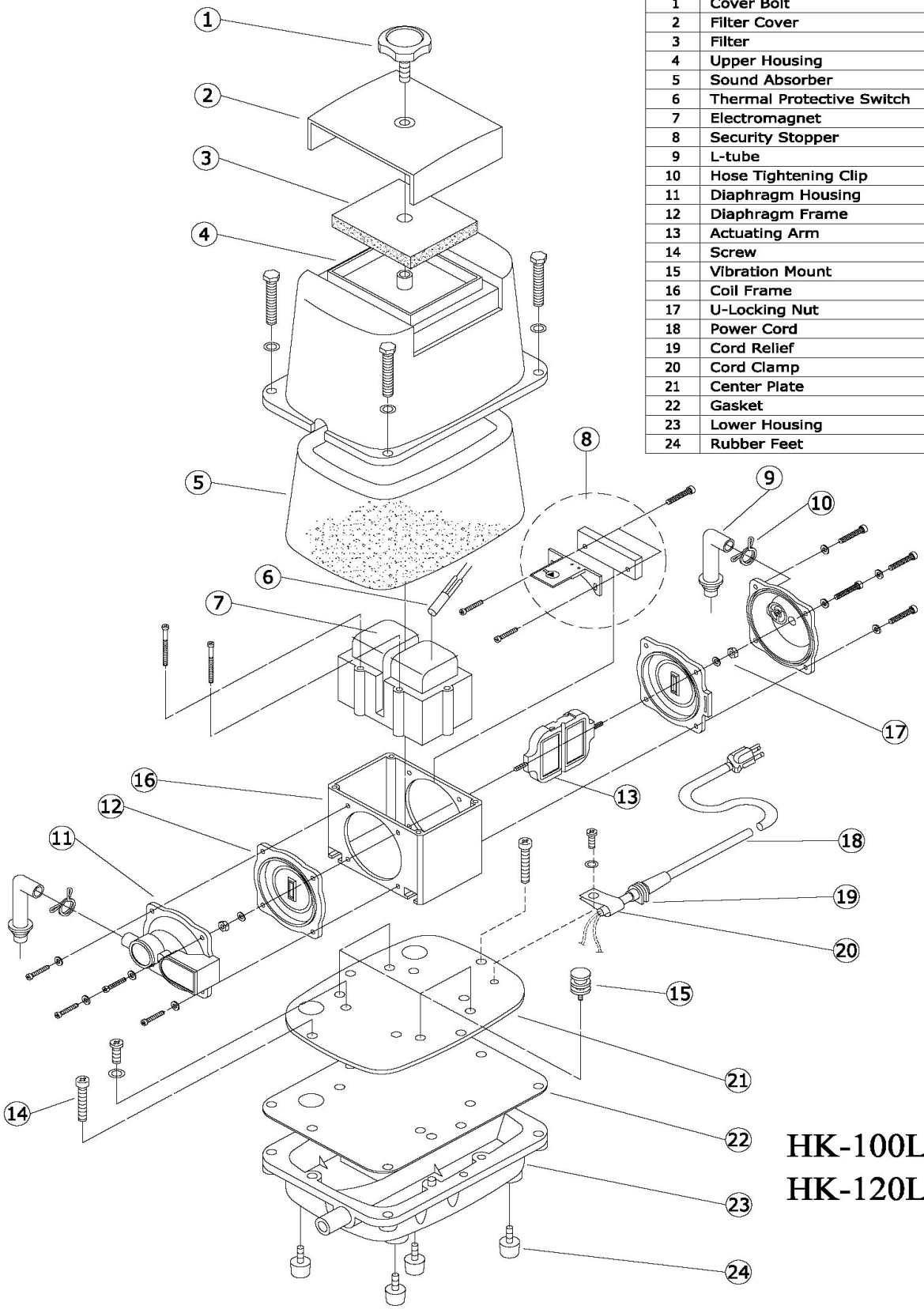
Construction

HK-40L,HK-60L,HK-80L



ITEM	DESCRIPTION	QTY
1	COVER BOLT	1
2	FILTER COVER	1
3	FILTER COVER PACKING	1
4	FILTER	1
5	PUMP COVER	1
6	SOUND ABSORBER	1
7	THERMAL PROTECTIVE SWITCH	1
8	ELECTROMAGNET	2
9	L-TUBE	2
10	HOSE TIGHTENING CLIP	2
11	DIAPHRAGM HOUSING	2
12	DIAPHRAGM FRAME	2
13	ACTUATING ARM	1
14	SCREW	6
15	VIBRATION MOUNT	4
16	COIL FRAME	1
17	U-LOCKING NUT	2
18	POWER CABLE	1
19	CABLE RUBBER BUSHING	1
20	CABLE CLAMP	1
21	CENTER PLATE	1
22	LOWER PUMP COVER GASKET	1
23	LOWER PUMP COVER	1
24	RUBBER STAND	4

IT	De	Qt
1	Cover Bolt	1
2	Filter Cover	1
3	Filter	1
4	Upper Housing	1
5	Sound Absorber	1
6	Thermal Protective Switch	1
7	Electromagnet	2
8	Security Stopper	1
9	L-tube	2
10	Hose Tightening Clip	2
11	Diaphragm Housing	2
12	Diaphragm Frame	2
13	Actuating Arm	1
14	Screw	6
15	Vibration Mount	4
16	Coil Frame	1
17	U-Locking Nut	2
18	Power Cord	1
19	Cord Relief	1
20	Cord Clamp	1
21	Center Plate	1
22	Gasket	1
23	Lower Housing	1
24	Rubber Feet	4



HK-100L
HK-120L

MAINTENANCE

Cleaning the filter: FILTER MUST BE CLEANED EVERY 6 MONTHS

I) Undo the cover bolt securing the filter cover to the pump housing, and remove the filter pad.(Figure 7)

II) Gently dust the filter pad then wash in mild, soapy water and dry.

III) Replace the filter pad and filter cover. Secure with the cover bolt.

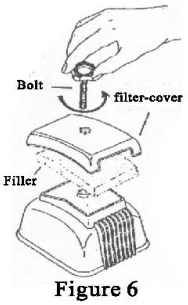


Figure 6

Connecting the Piping: IMPROPER CONNECTION WILL CAUSE LEAKAGE OF AIR.

I) Connect the pump's exhaust port and PVC(Plastic) pipe with an L-shaped rubber hose.

II) Secure place of connection with a hose tightening clip(Figure8).

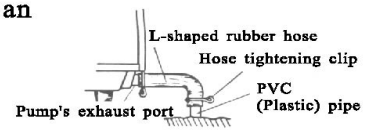


Figure 8

Removing the Pump Housing

1. Changing the casing block

I) Invert the pump and remove corner screws.(Figure 9a)

II) Insert screw driver between exhaust outlet and upper housing and try open gently.(Figure 9b)

III) Remove the assembly screws on the left and right of the diaphragm Casing. Remove the diaphragm Casing from diaphragm frame and disconnect L-tube. Replace with new casing block.

IV) Put back in place, ensure all screws are tight.(Figfure9c)

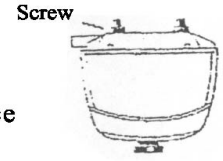


Figure 9a

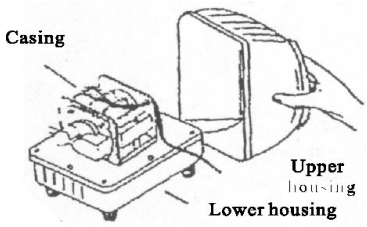


Figure 9b

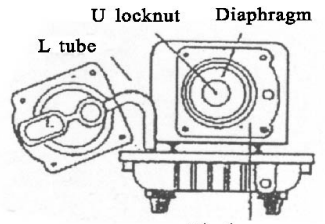


Figure 9c

Replacing the Diaphragm Mounting Block

I) Undo the six sides U-Nut in the center of the frame.

II) Remove and replace frame. (Figure 10)

III) Reassemble, ensure tightness of screws.

Inserting a new Actuating Rod.

Insert the rod into the slot on the side of the diaphragm frame and then slide into the motor unit. The rod should be positioned with the "S" at the top. (Figure 11)

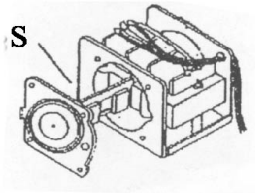


Figure 11

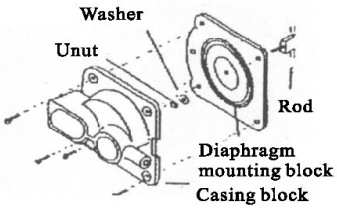
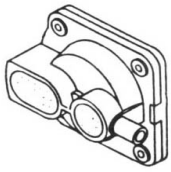
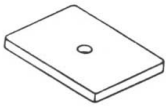


Figure 10

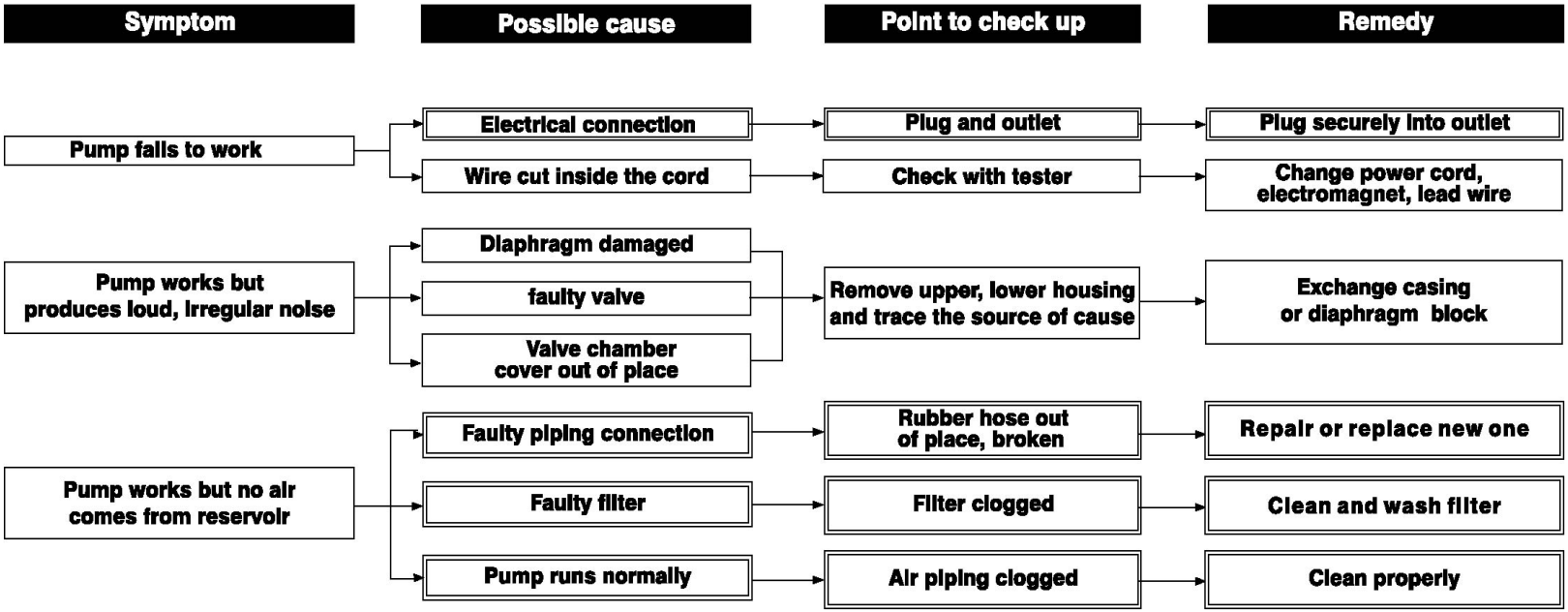
List of repair parts

Actuating Rod 1 pcs per set	HK-40L	HKAA040
	HK-60L HK-80L	HKAA06080
	HK-100L	HK-AA100
	HK-120L	HK-AA120
Chamber Block 2 pcs per set  Includes: Casing Block Diaphragm Mounting Block	HK-40L	HKCHB040
	HK-60L HK-80L	HKCHB06080
	HK-100L HK-120L	HKCHB120
Filter Pad  1 pcs per set	HK-40L HK-60L HK-80L	HKF4680
	HK-100L HK-120L	HKF120

Specifications

Model / SPECIFICATION Item		HK-40L		HK-60L		HK-80L		HK-100L		HK-120L	
Rated Voltage(V)		AC115*/AC230^									
Power supply frequency (Hz)		50	60	50	60	50	60	50	60	50	60
Normal pressure kgf/cm^2		0.13(1.85psi)		0.15(2.13psi)				0.18(2.56psi)		0.20(2.845psi)	
Exhaust quantity(1/min)		46	51	64	65	82	85	108	113	126	130
Power (W)		33	40	63	68	83	86	116	120	120	123
Noise level (dB)		32	36	37	38	38	39	41	40	42	43
Closed pressure	Psi	5.4	6.28	7.24	6.83	7.95	7.68	8.25	6.69	7.25	6.69
	Kg-f/cm^2	0.38	0.44	0.51	0.48	0.56	0.54	0.58	0.47	0.51	0.47
Weight (kg)		5.4	5.4	6.26	6.26	6.28	6.28	8.9	8.9	8.9	8.9
Article no.		HK40L230V	HK40L115V	HK60L230V	HK60L115V	HK80L230V	HK80L115V	HK100L230V	HK100L115V	HK120L230V	HK120L115V

Diagnosing malfunction -No air is discharged.



Caution:

1) Double bracketed items can be repaired by customer. For other troubles, return pump to nearest repair depot for repairs by manufacturer.
2) Change diaphragms once a year.
3) During operation, do not touch the lower housing with bare hands as the temperature will become about 70℃. (This temperature will not affect the performance of the pump.)

Model No:_____ Serial No:_____

Guarantee Period

from / / to / /

Your Name:_____

address:_____

Telephone:_____

Shop Name:_____

address:_____

Telephone:_____

Please complete all section above and mail to:

BHB ASIA TECHNOLOGY CO.,LTD

GUARANTEE PROVISIONS

1) This machine is guaranteed for one year from the date of purchase provided that:
   [a] it is operated in accordance with the instruction manual
   [b] Any repairs to the BHB, which must be accompanied by this certificate are undertaken by the dealer from whom it was purchased.
2) Though the guarantee period may not have expired, payment for repairs must be made in the following cases:
   [a] When the fault is due to improper usage or repairs have been attempted by persons other than an authorized dealer.
   [b] When the fault is due to fire, natural disaster or incorrect voltage.
   [c] If the guarantee has been lost, incorrectly completed or details fraudulently changed.

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