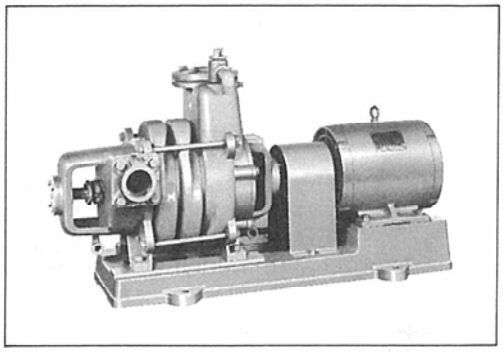
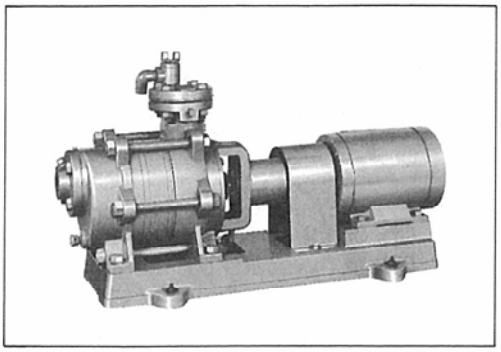
OPERATION MANUAL

Kawamoto

Self-priming multi-stage centrifugal pump

Type : TVS KS



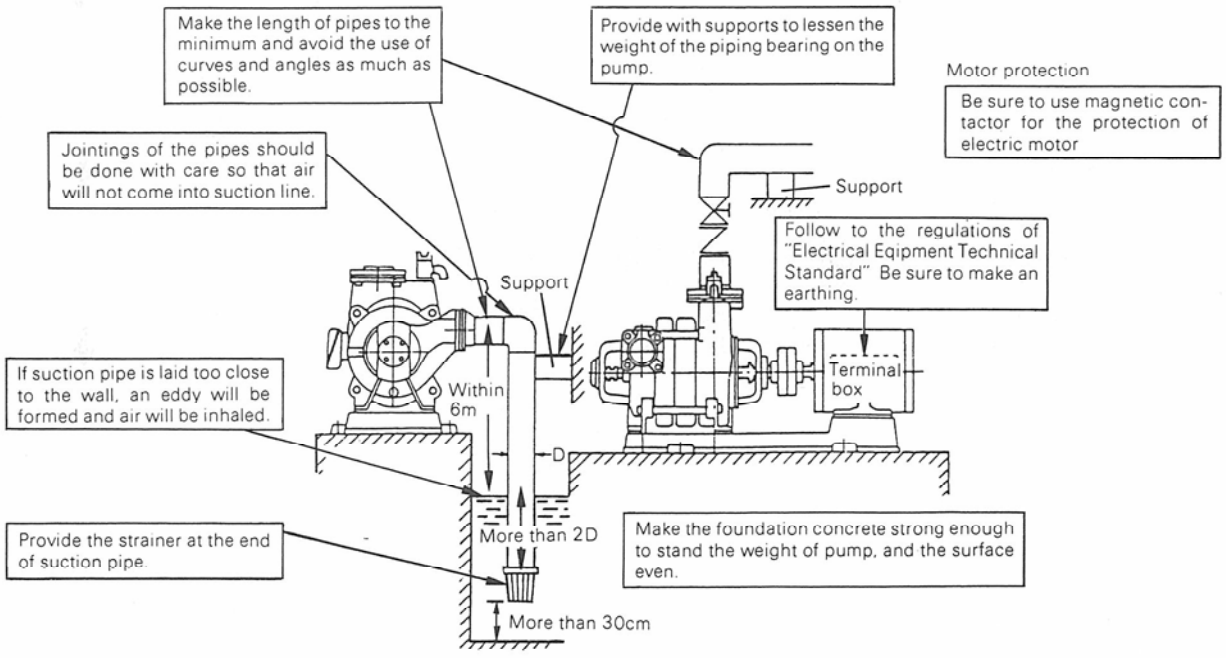


1 CHECKING

1-1. Has the model as ordered been delivered?
Check the model, bore, capacity, total head, shaft power etc., on the name plate.
1.2. Are there any damage or any loosen bolt, nuts or screw, etc., on transit?
1.3. Are all accessories supplied?
Standard accessories
1 pc. Strainer
1 set Foundation bolts with nuts.
1 pc. Operation manual

2 INSTALLATION AND PIPING

2-1. Installation site
Select the site as close to the water resource as possible, and do not expose the unit to rain.
2-2. Piping
Observe the following instructions.

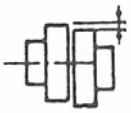


2-3. Installation of Pump proper

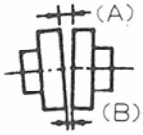
(1) Attach the anchor bolts to the base plate.
Insert all the bolts in the designated positions of the anchor holes with every nut screwed into the very top of each bolts.

(2) Place the pump evenly.
Level the base plate by using wedges.

(3) Check the shaft alignment.
Check the shaft alignment before installation as disorder alignment may have been caused in trasit.



Less than 10/100mm



(A) — (B) = Less than 20/100mm

(4) Fix the anchor bolts.
Fill the foundation holes with cement mortar.
The bolts must be fastened after the morter gets hard in several days. The bolts must be fastened evenly by checking the alignment of shaft coupling.

3 TRIAL OPERATION

(1) Remove cap of priming-exhaust valve. and fill the casing with water Slightly open the cap of priming-exhaust valve until pump begins to discharge water

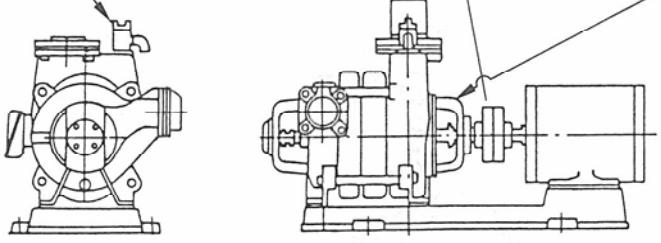
(2) Check if the pump rotates smoothly when it is turned by hand

(3) Close the sluice valve on the discharge line.

(4) Confirm the direction of rotation by switching ON-OFF once or twice.
The rotating dirction is indicated by an arrow.
When the direction is reverse, change any two of three wires in the morter terminal box.

(5) Go into continuous operation.
The pump begines to discharge water within few minutes, however, if horizontal piping is long, sometimes open the priming cap and further supply priming water to facilitate exhausting (self-priming) work.

(6) Gradually open the sluice valve on the discharge line by watching the pressure gauge, and countinue the operation with the required pressure.



The bearing portion has no problem if the temperature is higher than ambient temperature plus 40°C

* It is desirable that the gland packings tightened to such a condition that a small quantity of water leaks. (1-2 drops per second)

4 MAINTENANCE

Daily Maintenance	* The cocks of the pressure gauge and vacuum gauge are supposed to be closed when the gauges are not being read. Open their cocks only when their data are read. * Do not operate the pump for a long period time at the pressure or capacity out of standard as the life time of pump becomes shorter. * Do not operate the pump in idle or closing the sluice valve for a long period of time. If this is done, the inside of the pump will get burnt.
Under Operation	* Stop the operation after closing the sluice valve on the discharge line. * When power suspends while the pump is under operation, cut off the switch immediately and close the sluice valve on the discharge line.
Periodical Inspection	* Check the following points at least once a week. 1) Pressure gauge & Vacuum gauge Does the pointer of the gauge register the rated value? Does the pointer of the gauge move violently? 2) Does water leak from the pump or piping? 3) Is there any abnormality about the vibration, noise or heat at the bearing portion?
Long Suspention of Operation	* Drain the water inside the pump from drain nipple.
Protection Against Cold	* Pump . . . . . Cover the pump with a wooden box, and place protection materials inside the box. * Pipe . . . . . Provide with protection materials or bury the pipe under the ground. (In Tokyo or Osaka, about 30cm in depth) * Drain the water inside the pump via the drain nipple.
Gland Packing	* Always store spare gland packing. (Gland packing is consumable parts, so, replace it once a year in ordinary cases, or twice a year, if neccessary.) * Do not fix the gland packing too tight or uneven, because the sealing portion generates heat and makes the life time of gland packing shorter.

5 DISASSEMBLIND AND REASSEMBLING

5-1. Order of disassembling

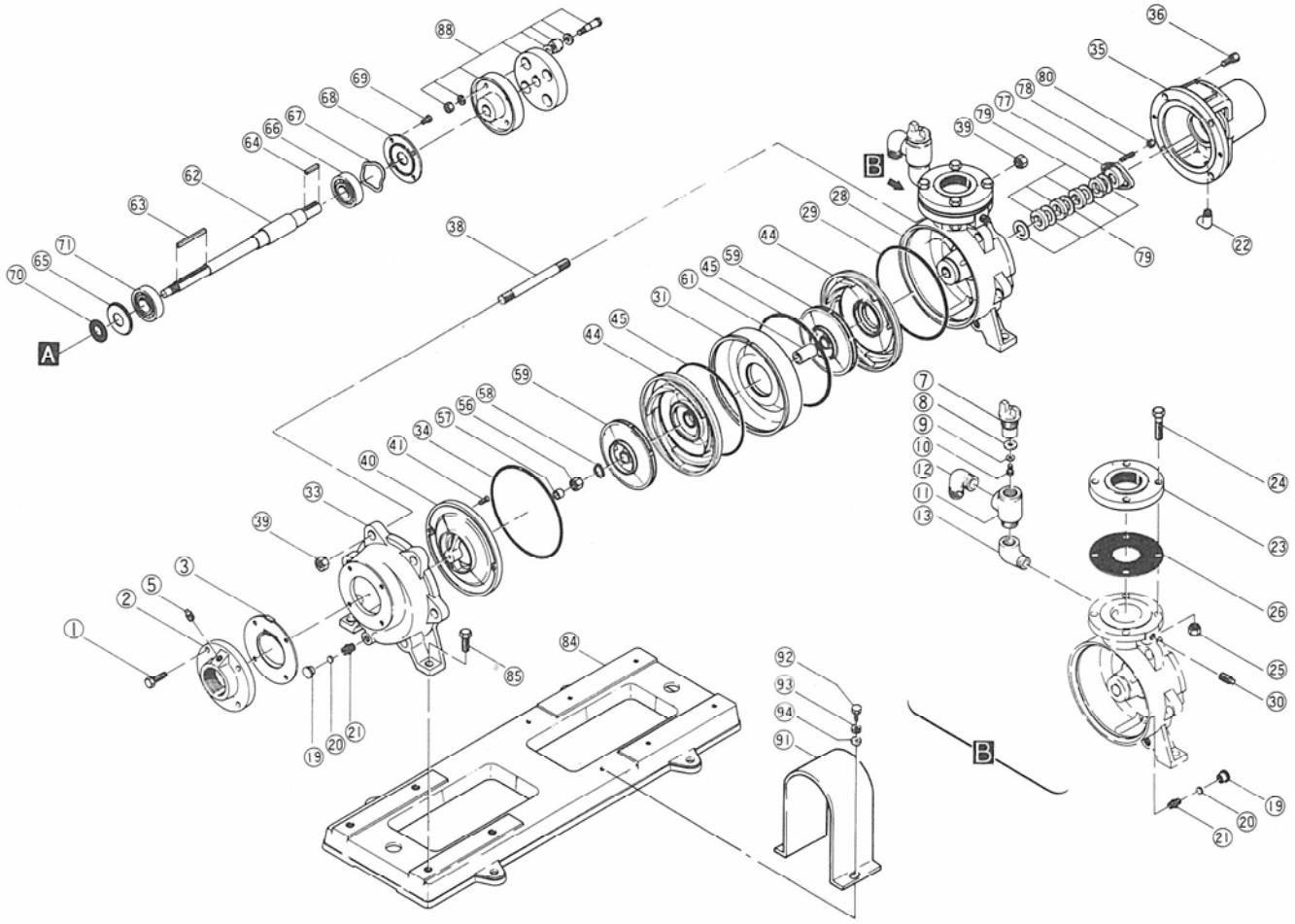
(46) Sealing pipe → (38) Stage bolt → (51) Bearing cover → (33) Suction casing →
(56) Impeller nut → (59) Impeller → (31) Stage casing → (61) Sleeve → (63) Impeller key →
(35) Bracket → (65) Bearing cover → (62) Shaft

* Order of reassembling is reverse of disassembling.

5-3. Caution

a) Be careful not to give damage to the parts when disassembling and reassembling.
b) Be careful with the tightness of gland packings.
c) Do not forget to reassemble even small parts.
d) Be sure that the pump rotates smoothly rotating the shaft coupling by hand after completion of reassembling.

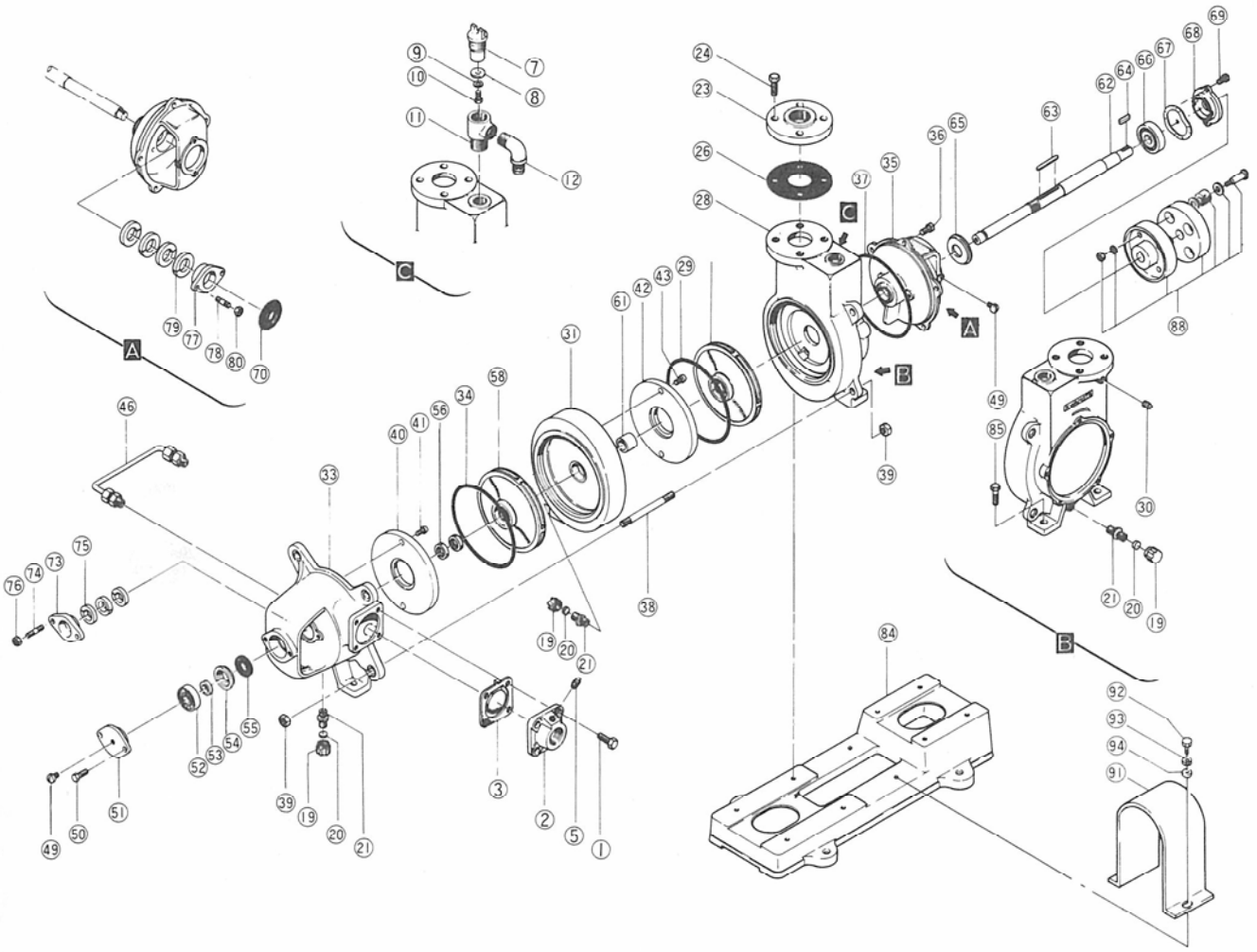
PARTS LIST: KS



KS

No.	Name of Parts	No.	Name of Parts	No.	Name of Parts
1	Suction flange bolt	29	O-ring for discharge casing	65	Bearing cover (inboard-2)
2	Suction flange	30	3/8" plug	66	Ball bearing (outboard-2)
3	Suction check valve	31	Stage casing	67	Bearing washer
5	3/8" plug	33	Suction casing	68	Bearing cover (outboard-2)
7	Priming cap	34	O-ring for suction casing	69	Bearing cover bolt-2
8	Priming cap packing	35	Bracket	70	Deflector-2
9	Washer	36	Bracket bolt	71	Ball bearing (inboard)
10	Bolt	38	Stage bolt	77	Gland-2
11	Priming body	39	Nut for stage bolt	78	Gland bolt-2
12	Exhaust elbow	40	Suction panel	79	Gland packing-2
13	Priming elbow	41	Suction panel bolt	80	Gland nut-2
19	Drain cap	44	Guide vane	84	Base
20	Drain cap packing	45	O-ring for guide vane	85	Pump bolt
21	Drain nipple	56	Impeller nut	88	Shaft coupling
22	Drain elbow	58	Impeller washer	90	Motor shim
23	Discharge flange	59	Impeller	91	Coupling guard
24	Discharge flange bolt	61	Sleeve	92	Coupling guard bolt
25	Nut for discharge flange bolt	62	Shaft	93	Corrugated washer
26	Discharge flange packing	63	Impeller key	94	Plain washer
28	Discharge casing	64	Coupling key		

PARTS LIST: TVS



TVS

No.	Name of Parts	No.	Name of Parts	No.	Name of Parts
1	Suction flange bolt	35	Bracket	65	Bearing cover (inboard-2)
2	Suction flange	36	Bracket bolt	66	Ball bearing (outboard-2)
3	Suction check valve	37	O-ring for bracket	67	Bearing washer
5	3/8" plug	38	Stage bolt	68	Bearing cover (outboard-2)
7	Priming cap	39	Nut for stage bolt	69	Bearing cover bolt-2
8	Priming cap packing	42	Stage panel	70	Deflector-2
9	Washer	43	Stage panel bolt	73	Gland-1
10	Bolt	46	Sealing pipe	74	Gland bolt-1
11	Priming body	48	Seal bush	75	Gland packing-1
12	Exhaust elbow	49	Grease thrower	76	Gland nut-1
19	Drain cap	50	Bearing cover bolt-1	77	Gland-2
20	Drain cap packing	51	Bearing cover (outboard-1)	78	Gland bolt-2
21	Drain nipple	52	Ball bearing (outboard-1)	79	Gland packing-2
23	Discharge flange	53	Collar	80	Gland nut-2
24	Discharge flange bolt	54	Bearing cover (inboard-1)	84	Base
26	Discharge flange packing	55	Deflector-1	85	Pump bolt
28	Discharge casing	56	Impeller nut	88	Shaft coupling
29	O-ring for discharge casing	59	Impeller	91	Coupling guard
30	3/8" plug	61	Sleeve	92	Coupling guard bolt
31	Stage casing	62	Shaft	93	Corrugated washer
33	Suction casing	63	Impeller key	94	Plain washer
34	O-ring for suction casing	64	Coupling key		

6 TROUBLE SHOOTING

TROUBLE	CAUSE	REMEDIES
Motor does not start	• Defective motor	• Check power source.
	• Pump is seized with impurities or rust.	• When the pump cannot be turned by hand, disassemble and clean.
No water lifts after starting	• Improper pump level	• Too high suction head or too long suction pipe. • Adjust the site or piping.
	• Insufficient priming water	• Prime water again.
	• Air accumulation is found inside the pipeline.	• Inspect the piping conditions.
	• Opposite rotation direction.	• Correct the rotation direction by changing any two of three wirings.
	• Plugged passage.	• Remove impurities from the impeller, suction piping, valves, strainer, etc.
	• Insufficient rotation speed.	• Inspect the power source or motor.
	• Closed valve.	• Inspect the valves.
	• Foot valve or the end of suction pipe does not reach water.	• Extend the length of suction pipe.

TROUBLE	CAUSE	REMEDIES
No. specified specifications is obtained.	• Air leaks	• Refasten the parts and inspect sealing portion.
	• Seized impeller or suction piping	• Clean the impeller or suction piping.
	• Insufficient rotation speed.	• Inspect the power source or motor.
	• Opposite rotation direction	• Correct the rotation direction by changing any two of three wirings.
	• Too high suction head	• Check the water level.
	• Too high discharge head	• Check the actual discharge head.
	• Worn parts.	• Replace parts.
Abnormal sound is audible	• Operation out of standard specification	• Correct operation as specified.
	• Too high suction head.	• Inspect the level of water.
	• Impurities stuck on the impeller or suction and discharge piping	• Inspect the impeller, suction piping, or discharge piping

KAWAMOTO PUMP FMG, Co., LTD.
No. 11-39, 4-Chome, Ohsu
Naka-ku, Nagoya, Japan

Printed in Japan TVS. KS-ED. 1-1988