Instruction Manual

QXPUMP

HMP－0847E－B

Read this Manual before use

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——CONTENTS——

1. Before use

1)Introduction

Carefully read this operation manual and start operation after you have fully understood this manual.

a)This Operation Manual aims for effectiveness and safety in installation , operation and servicing of QX pumps.

b)Follow the issues to handle and rates in this .manual.

c)Don't fail to fallow the instructions and notes in this manual , because it may cause damage of pump or human injury.

If you use the pomp in any way other than described in this manual , any precaution necessary for the safety shall be paid by you.

In suck cases , we are not liable or your actions.

d)As a result of improvement of product , there may be difference between this manual and actual products.

e)Please ask our sales department if you have any gustier about the pumps or this manual.

2)Check the delivered pump.

Please collate the pump with your specification when you have received it.

3)Safety matters

In this manual , the is sues necessary to handle the pump correctly and safely is indicated by the following symbol.

Danger : Must be avoid as it is impending danger and it may cause human deaths or serious injuries.

Warning : Issues necessary to prevent serious personal accident before hand.

Caution : Issues necessary to prevent persons or pump from damage.

2.Attentious to be raid for safety

1)Issues necessary to handle the pump

Warning : Can firm the weight of pump (Please refer to this dimensional figure)
If the pump weighs over 20kg , don't carry this pump with hands.

Warning : Don't came near to the pump when it is carried while suspending.

2)Issues necessary to install and remove

Warning : Qualified Personal shall use the pump.

Warning : Shut down electric power of the system and drain the pressure remaining in the hydraulic like before using.
Don't touch after temperatures of the system and the pump go below 50℃.

Caution : Don't step on the pump , knock on the pump with hammers.

Caution : Tighten the bolts by specified torque when you install the pump.

Caution : Clean the mating surface.

3)During using

Danger : Cover the rotating shaft with a hood not to damage fingers.

Warning : Don't touch rotating parts during operating pump.
Operate the pump under the specified environmental temperatws , fluid temperature and viscosity . It may cause damages of pump if you use the pump out of these specified conditions.

Caution : Don't touch the pump , because the temperature of the pump may become high during operation.

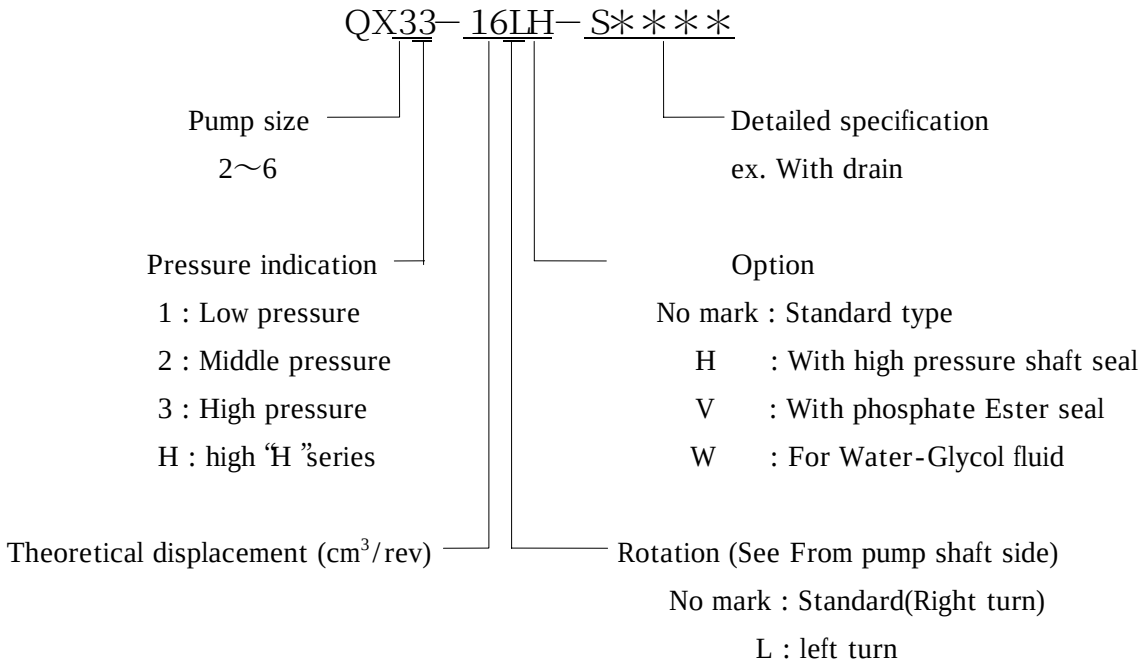
Caution : Don't disassemble , repair and re-assemble the pump without our acceptance.
We shall not be responsible for any damage , less or human injury occurred in your these working acceptance.

3.Attentions to be paid when using pumps.

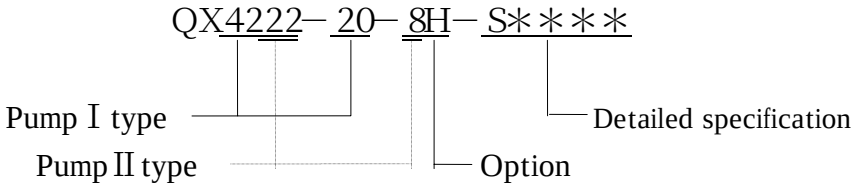
Caution : Follow the instruction stated below.

1)Pump type and its specification

a)Single pump



b)Double pump



2) Installation of Pump.

Install the pump on a rigid mount.

3) Connecting to the driving shaft.

a) The pump shaft should be aligned with the driving shaft as accurately as possible , and using a flexible coupling for the connection is recommended. Pully and Gear drive shall not used.

b) Carefully make the alignment of both shafts , and see Fig.1.

c) When making the coupling , it's mating holes and outer diameter should be carefully machined.

d) Alignment of pump shaft and driving shaft shall be as shown in Table 1.
The difference of max. and min misalignment. should be kept 0.12mm.
Alignment shall be rechecked when moving pump , repiping and the other.

e) Tolerance the coupling holes should be such that the coupling can be easily slipped onto the pump shaft by hand without using a hammer.

4) Inlet pressure

a) Suction is below -0.03to+0.03MPa.

b) When suction part pressure is over +0.03MPa "H" type shaft seal should be used .
(max. pressure is 0.2 MPa)

5) Suction filter

a) Install the suction filter in suction line.

b) Generally , it is the best to use a suction filter of about 150 mesh (100 μ)～200 mesh (75 μ).

c) Select the ample filter capacity , considering silting of filter and high viscosity in winter.

6) Line filter , Magnetic filter

NOfilter is needed in the pressure or return line provided that an appropriate suction filter is used.
However , in case of bad environmental conditions or servo system , it is desirable to install a line filter of 10 μ ～ 25 μin the pressure line or return line.

7) Piping

a) Select the suction piping in order to make the velocity of oil below 1.5m/sec in line.

b) Pump should be free from piping force.

c) Putting the air purge valve in the pressure line is recommended.

d) Using a rubber hose as the suction line is recommended.
A rubber hose will give the pump less chance to suck air , and noise of the pump unit will be reduced.
Generally , it is desirable to install the suction line in such a way that the pump is always filled with hydraulic oil when starting as shown in the schematic drawings in Fig. 3(a) , (b).

e) Carry out sufficient flushing of the pipe before installing the suction line so that almost no air will remain in the line.

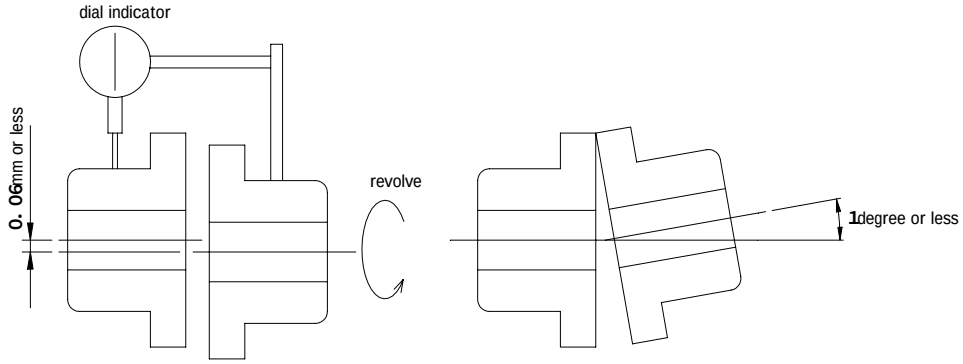
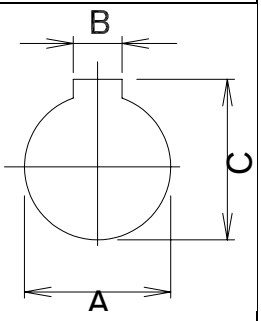


Fig-1 Alignment of pump shaft and driving shaft.

Table-1 Main dimensions of coupling hole and recommended tolerance.

Pump size	Hole dimensions		Key groove dimension				Main dimensions of coupling hole
	φA mm	Tole-rance μ	B mm	Tole-rance μ	C mm	Tole-rance μ	
2	20	+28 +9	6	+40 +10	22.6	+100 0	
3	25	+28 +9	8	+46 +10	28.3	+200 0	
4	32	+34 +11	10	+46 +10	35.2	+200 0	
5	40	+34 +11	12	+53 +10	43.2	+200 0	
6	50	+40 +11	14	+53 +10	53.7	+200 0	

8)Outlet Pressure

a)Maximum Pressure

Rated pressure : The pressure pump constantly work.

Maximum pressure : You can use the pump 1/3time of 1cycle , move over longest time you can use is 20sec

or less.

MPa(kgf/cm^2)

Type of Pump	QX* 1 Low pressure type	QX* 2 Middle pressure type	QX* 3 High pressure type	QX*H Super high pressure type
Rated Pressure	9.8 (100)	20.6 (210)	24.5 (250)	31.4 (320)
Maximum Pressure	12.3 (125)	24.5 (250)	31.4 (320)	39.2 (400)

Caution : You must not use the pump beyond this pressure.

b)Surge pressure

Caution : Surge pressure shall be lower than the above.

9)Speed of shaft

Speed is below 1000～1800rpm

10) Selection of Hydraulic Oil

a) hydraulic oil type

Petroleum type hydraulic oil whose viscosity is 46～68cSt at oil temperature 40℃ shall be resommended.

When using Phosphate Ester type oil , mark "V" after form.

Please call us when using other incombustible hydraulic oil.

b) Hydraulic oil viscosity.

The viscosity range of the hydraulic oil during operation should be 20cSt ～ 500cSt.

c) Hydraulic temperature range

The desirable temperature range of hydraulic oil in continuous operation is 20℃ to 50℃ for the hydraulic system. It should not exceed 60℃.

d) Hydraulic oil contamination

use clean hydraulic oil of NAS 1638 class 11 or finer.

11) Environment

pump can't be use in unique atmosphere , high temperature , clamped air.

circumference temperature : -15～50℃

Indoor use in standard. Call with us using in unique atmosphere.

Danger : Pump must not be used in explosional atmosphere.

4. Before starting operation.

1) Cleaning tank

Before supplying hydraulic fluid in tank , clean the inside of tanks.

2) Supplying the hydraulic fluid.

a) When Supplying the enough hydraulic fluid in tank , take into account capacity of lines , actuators , values and the like.

b) If using electric powered for supply , Oil is foamy in the tank , wait the foam disappear , and use pump.

3) Check the direction of rotation.

Check the direction of motor rotation.

Caution : If you misrelate pump shaft , the pump will break.

Normal rotation is right turn (C.W.).

"L" mark means left turn (C.W.).

4) Pump start

Before pump start , it is necessary to remove air from suction line.

a) Open the pressure port , manually rotate the pump shaft.
After confirming oil comes out from pressure port , close the pressure port and operate pump according (b).

b) After confarm fluid supplied set the relief valve to no load condition.

Operate the motor for a very short time. (0.5 ～ 1.sec)

Caution : You can't start on load condition. If you do it , pump will be broken.

Operate the motor for a very short time to purge air from the suction line and the pump.
Then begin to operate pump.
If you can't purge air , air is sucked from suction line.

5) Trial operation

Finish pump start , Take care of pump noise. When in crease the line pressure.

a) Confirm there are no air noise ,when increasing in crease pressure to set pressure gradually.
You can't go out air noise , may be there sealing trouble or oil in tank contains bubbles.
Repair seal trouble , leave it for a while try again.

b) If there are big actuators , Air come back to tank from actuators in the beginning of operation.
Then purge air from line and actuators as low pressure as possible.
Air come back to tank in large quantities , wait for a while bubbles go out , try again.

c) If you operate with mater cooling system , after completed water piping , start trial operation.
If you don't use mater cooling system , oil temperature rises soon.
Oil temperature and viscosity range is shown below.

Oil temperature : 0 ～ 60℃
Viscosity range : 20 ～ 500mm^2/s

5.Maintenance

Check point ・ Term ・ Judgment Standard

1) Cleaning Suction filter

It pump noise increase for earliest one , check the suction filter .

Filter conditions are various by hydraulic system and environment.

It ordinarily need to check about once a month or three months.

When you use the suction filter with warming , then appearing caution sign necessary to change or clean filter element. After changing or cleaning filter , operate according to 4,4).

2) Maintain fluid

Hydraulic fluid is contaminated by accumulated sludge and mixed mater.

When contamination of fluid is NAS 1638.

Class 12 or coarser , exchanged for new fluid.

MAXIMUM CONTAMINATION LIMITS (BASED ON A 100ML SAMPLE SIZE)

class / dust dire	00	0	1	2	3	4	5
5～15 μm	125	250	500	1000	2000	4000	8000
15～25 μm	22	44	89	178	356	712	1425
25～50 μm	4	8	16	32	63	126	253
50～100 μm	1	2	3	6	11	22	45
100 μm or more	0	0	1	1	2	4	8
class / dust dire	6	7	8	9	10	11	12
5～15 μm	16000	32000	64000	128000	256000	512000	1024000
15～25 μm	2850	5700	11400	22800	45600	91200	182400
25～50 μm	506	1012	2025	4050	8100	16200	32400
50～100 μm	90	180	360	720	1440	2880	5760
100 μm or more	16	32	64	128	256	512	1024

6. Trouble Shooting

All the pumps passed the operation tests before delivery to guarantee the quality.

The pump will display their performance without trouble if used in accordance with the recommended methods. Should the pump indicate the following symptoms , immediately stop the motor and check it according to Table-2.

(1) Hydraulic fluid is not discharged.
(2) Pressure does not rise.
(3) Pump creates excessive noise.
(4) Pump is over-heated.

Table-2 Check point ・ Term ・ Judgment Standard

Head	Method	Term	Judgment Standard	Mote
A)Oil Temperature	Thermometer	Every time	Viscosity 20mm^2/s or more (ISO VG46 60 ℃ or less)	Shortage of cooling water Drop cooler ability
B)Fluid 1)contamination 1)viscosity 1)interior 1)water contents	Analysis	 3～4months 6months 6months 3～4months	NAS 1638 class 11 finer consult with fluid manufacturer.	Fluid color changes remarkably or contaminated , need to change fluid.
C)Suction filter	Inspect element	1～3months	Suction filter indicator show caution , change or clean filter.	Shorten the check interval in bad condition. It suction filter is stopped pump noise increase.
D)Pump condition				
1)noise	Hearing	1months	Pump noise doesn't increase.	Check suction piping is loosen for vibration , Air mix to fluid from abrasion of shaft seal.
2)pump temperature	Thermometer	1months	Suction flow temperature +15℃ or less.	
3)pump vibration	The sense of touch	1months	There is not abnormal vibration.	Check delivery piping. Check coupling abrasion.
4)pump flow	Actuator speed	1～3months	Actuator speed doesn't drop.	
E)Disassemble and check	Send to maker	2～3years	Parts abrasion.	

Table-3 Trouble shooting

Symptom	Possible cause	Measures
Oil is not discharged.	Pump shaft is not rotating.	Turn the pump shaft by hand. If it doesn't rotate smoothly , pump assembly is defective or the inside is damaged. Disassemble and check. Check motor and coupling.
	Pump rotation is reverse.	Check the rotating direction. The normal direction is clockwise as viewed from shaft end.
	Pump shaft is broken , and gears the not operating.	Disassemble and check. Repair or replace.
	Oil level in tank is too low.	Check oil level with gauge and the necessary oil volume.
	Suction filter or piping is clogged.	Check filter and piping for impurities , sludge , and clean.
	Viscosity of hydraulic oil is too high.	Change oil , or install heater. (Viscosity : 20 cSt ～ 500 cSt)
	Air is remaining in suction line.	Re-tighten suction line coupling.
Pressure doesn't rise.	Pump is not discharging oil.	Loosen piping near pump and check oil discharged.
	Relief valve position is too low.	Adjust the position.
	Oil leakage from hydraulic circuit.	Check all couplings. Re-tighten loose couplings or replace.
	Relief valve is sticking.	Disassemble and clean.
	Inside leak is increasing. Seal is damaged. Sliding parts are worn out.	Disassemble and check. Repair parts or replace.
Pump creates excessive noise.	Suction resistance is great.	Make the suction pressure as specified.
	Suction piping is too thin , clogged.	Replace , clean the piping.
	Suction filter is clogged.	Clean the filter.
	Suction filter capacity is insufficient.	Use filter whose capacity is at least 2 times the pump discharge.
	Oil viscosity is too high.	(Aforementioned)
	Air is sucked from coupling of suction piping.	Pour oil to coupling and check sound change. Re-tighten coupling.
	Air is sucked from shaft seal of pump.	Pour oil to shaft seal and check sound change. Replace shaft seal.
	Pump shaft is not aligned with driving shaft.	Male the alignment again.
	Oil in tank contains bubbles.	Make sure the return drain piping is lower than oil level.
	Oil level is too low.	Replenish oil.
	Pump speed is too high.	Check and adjust.
	Gears are worn cut.	Disassemble and check.
Pump is overheated.	Pump is not sucking oil.	Refer to the measures for (Oil is not discharged).
	Operation is out of the rating.	Check discharge pressure and pump speed.
	Oil temperature is too high.	Check the function of cooler.

7.Disassemble and assemble

Caution : Don't reassemble or reconstruction without our consent.
If you reassemble or reconstruction , SUMITOMO can't assurance pump.

If you compelled to disassemble and assemble pump , skilled worker put in according below.

The SUMITOMO high pressure internal gear pump (QX pump) employs a multi-stage boost system as described in the catalogue , and each pump is available in 1- and 2-stage types.
In this manual , the explanation is given to 2-stage type. The disassembly and re-assembly procedure for 1-stage type is the same as for 2-stage type.
When disassembling and re-assembling the pump , please follow the instructions in 7.3 and 7.4 , referring to the structural drawing of QX pump (Fig. 4).

1) Disassembly of pump

Caution : Put the removed parts on a pallet and take care not to lose them.

a) Loosen hex-hole bolt 26 , and remove end-cover 6 ,O-ring 21.
b) Loosen hex-hole bolt 24 , and remove bolt 24 ,and washer.
c) Pull out gear housing 3.

Caution : At that time , take care not to scratch the gear as it may sometimes come along with the housing.
Also , take care not to bruise the housing as the housing and gear may be sometimes pulled out abruptly from the rear of the front gear housing.

d) Remove ring gear 8 , pinion 7 ,and pin 23 , and O-ring 22.

Caution : Pinion gear and Ring gear could not be use conversely , So keep direction of pinion Ring gear.
Caution : The orifice 11 is assembled to gear housing 3 with rock tight.
So can't disassemble it and , bearings 13 , 14 are forced into gear housing , can't disassemble.
2 , 3 type pump have expander. Can't disassemble.

e) Remove the key 10.

Caution : Removing the key is difficult , so take care injuring other parts.

f) Similarly , remove the 1st stage gear housing 4 , ring gear 8 ,pinion 7 , key 10 , and pin 23.

Caution : Build the ring gear and pinion into the gear housing when storing these parts in order to avoid their wrong combination or wrong positioning.
The gear housing should be installed in the specified order.
So , male sure of the stage of the removed gear housing.

g) Remove hex-hole bolt 25 or 26 , and shaft 1 by tapping on its end in the direction opposite to the input shaft end with seal housing 5.

h) Remove key 9 , and pull out seal housing 5 and shaft seal 19 from shaft 4.
Remove O-ring 17 from seal housing 6 , ball bearing 16 and shaft seal 19 , couldn't be disassemble.

Caution : Don't disassemble the hex-hole plug , snap ring , and flat washer is not caution.

Then the pump has been completely disassembled.

2) Re-assembly of pump

Caution : The pump parts should be completely cleaned before re-assembly , and set up with care not to allow intrusion of impurities. Foreign substances in the pump may cause damage to the pump.

Change damaged O-ring and shaft seal.Please request parts to SPP sales department.

Apply grease to O-rings.

a) Set O-ring to seal housing 5 (QX 2 ,3) , to front cover 2 (QX 4 ～ 6). And apply grease to ripple of shaft seal.

b) Assemble seal housing to shaft by assemble tool.

Caution : If you assemble seal housing without using assemble tool , it is possible that so use assemble tool , ripple of shaft seal hart and cause oil leak.

c) Insert the assembly of shaft 1 , ball bearing 16 , and seal housing 19 into front cover 2 ,and tighten with hex-hole bolt 25 or 26 . After that , install key 21.

d) Insert pin 23 into front cover 2 , and key 10 into shaft 1.

e) Build ring gear 8 and pinion 7 into gear housing 4 to make a gear assembly.

Caution : The combination of gear housing and ring gear pinion , and the positions of ring gear and pinion should be the same as those before disassembly.

f) Insert the gear assembly into front cover 1 using shaft and bearing 10 as guides. Also , install the 2^{nd} stage gear assembly.

Caution : Don't wound bearing.

g) Insert pin 23 into the back of the 2^{nd} stage gear housing 3 , and fit O-ring 22 in the O-ring groove of the 2^{nd} stage gear housing.

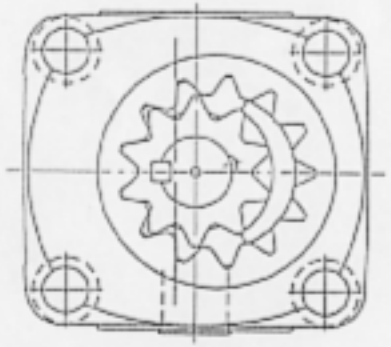
h) Fit O-ring 21 in the O-ring groove of end-cover 6 , and secure it on gear housing 3 hex-hole bolt 26.

i) Se cure gear housing assy on front cover 2 with spring washer 27and hex-hole bolt 24.

Caution : Tightening torque shows Table-4.

Caution : The 4 hex-hole bolts should be slowly and evenly tightening so that all bolts are uniformly tightened.

After completion of bolts clamping , be sure to check that the shaft can be lightly turned by hand.



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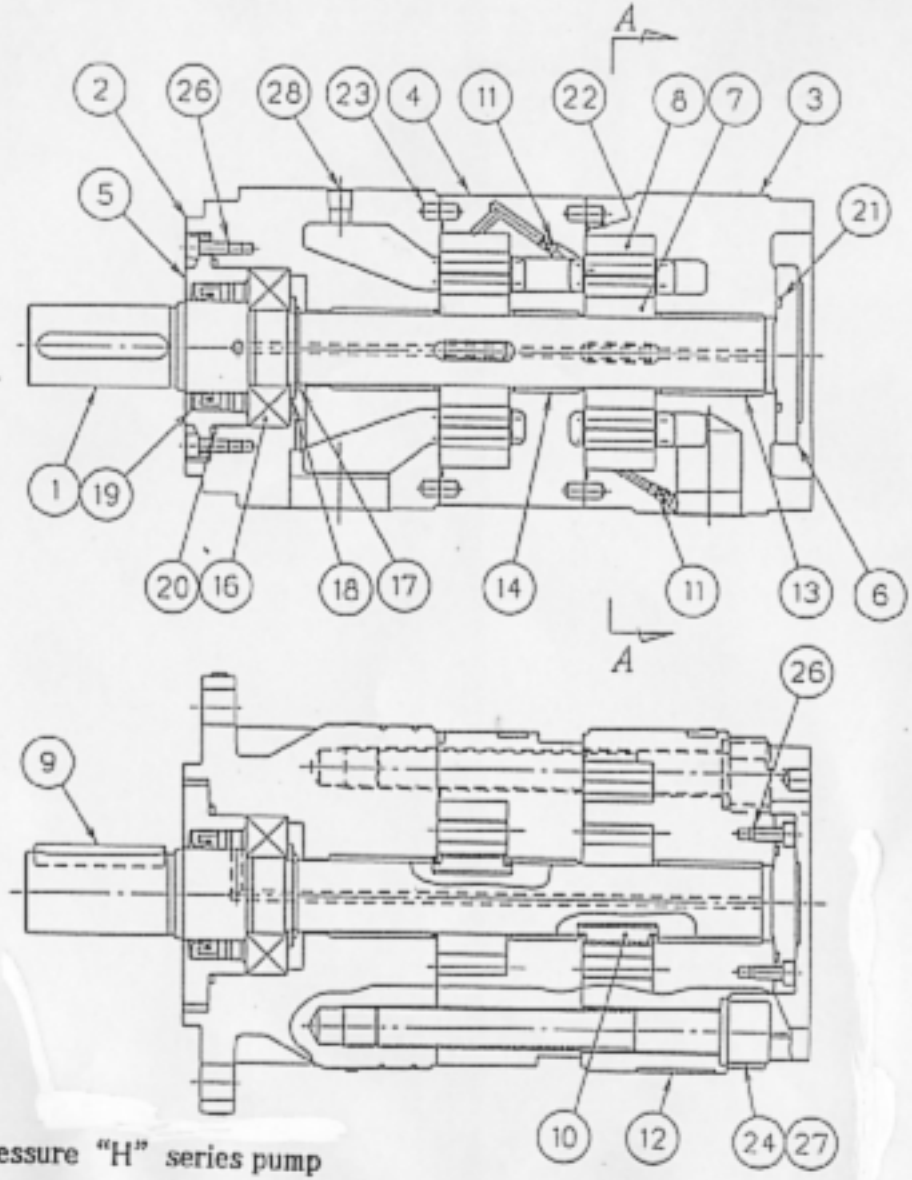
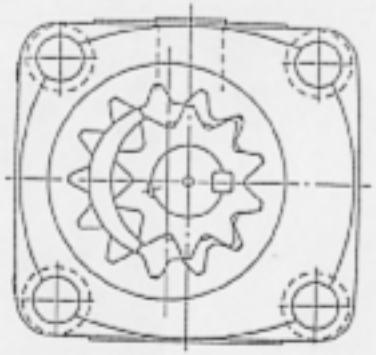


4·5·6 Type High pressure , High pressure "H" series pump
(QX＊3 , QX＊H)

Fig－2

Number	Quantity	Name
28	1	Hex hole plug
27	4	Washer
26	4	Hex hole plug
24	4	Hex hole plug
23	4	Pin
22	2	O-ring
21	1	O-ring
20	1	O-ring
19	1	Shaft seal
18	1	Flat washer
17	1	Snap ring
16	1	Ball bearing
14	1	Bearing
13	2	Bearing
12	1	Name plate
11	2	Olifice
10	2	Key
9	1	Key
8	2	Ring gear
7	2	Pinion gear
6	1	Cover
5	1	Seal housing
4	1	Gear housing
3	1	Gear housing
2	1	Front cover
1	1	Shaft



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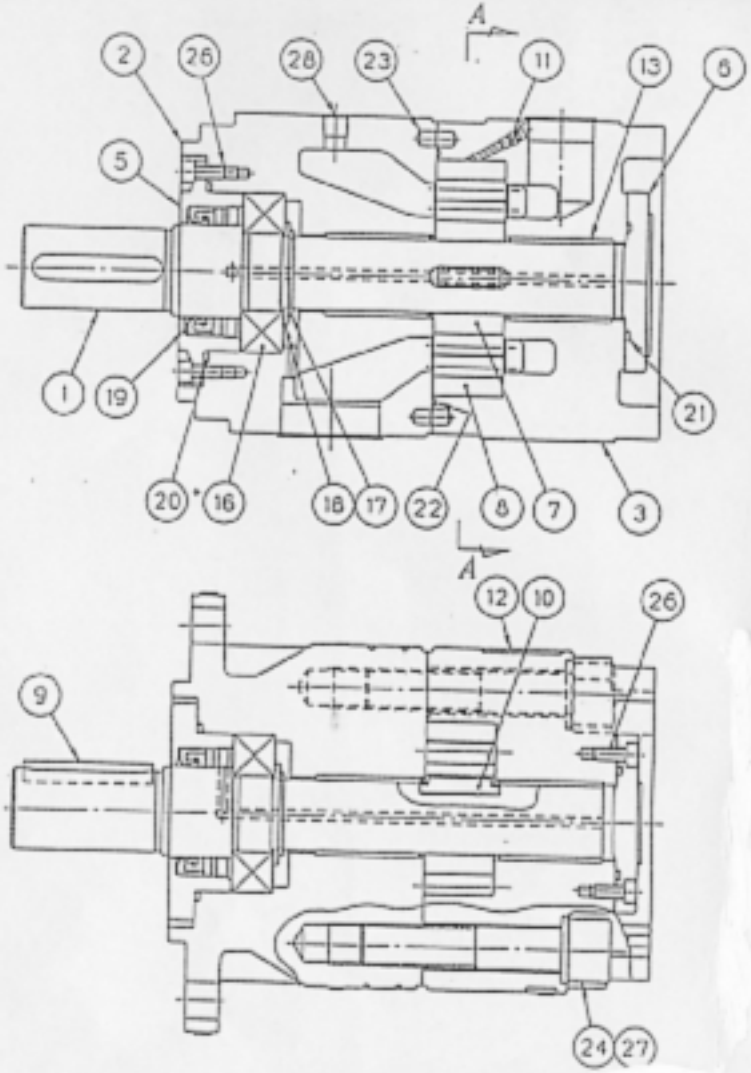
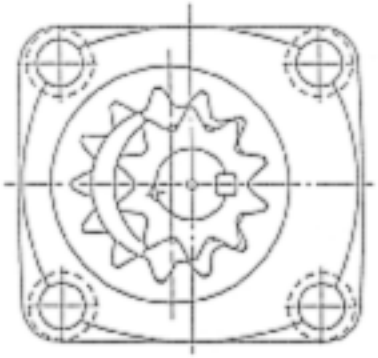


4·5·6 Type Middlle pressure pump
(QX＊2)

Number	Quantity	Name
28	1	Hex hole plug
27	4	Washer
26	4	Hex hole plug
24	4	Hex hole plug
23	4	Pin
22	1	O-ring
21	1	O-ring
20	1	O-ring
19	1	Shaft seal
18	1	Flat washer
17	1	Snap ring
16	1	Ball bearing
13	2	Bearing
12	1	Name plate
11	1	Olifice
10	1	Key
9	1	Key
8	1	Ring gear
7	1	Pinion gear
6	1	Cover
5	1	Seal housing
3	1	Gear housing
2	1	Front cover
1	1	Shaft

Fig－3



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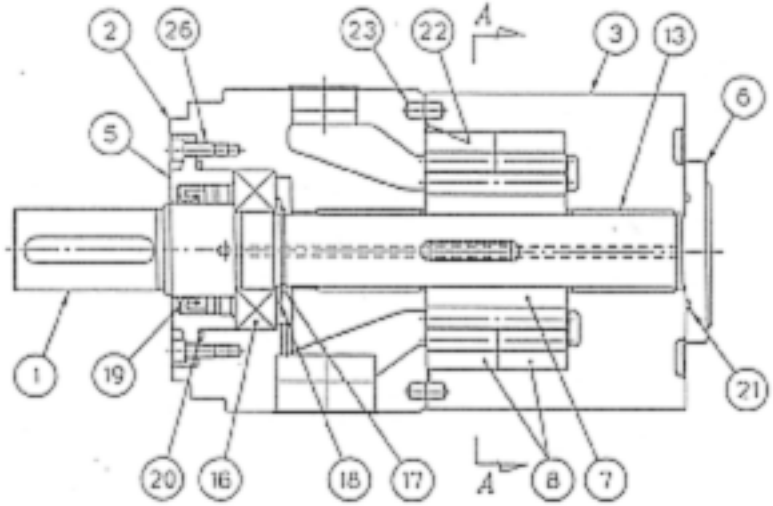
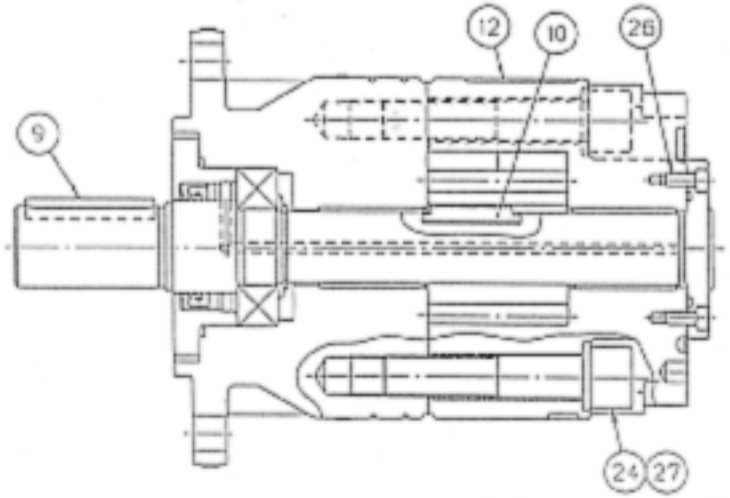
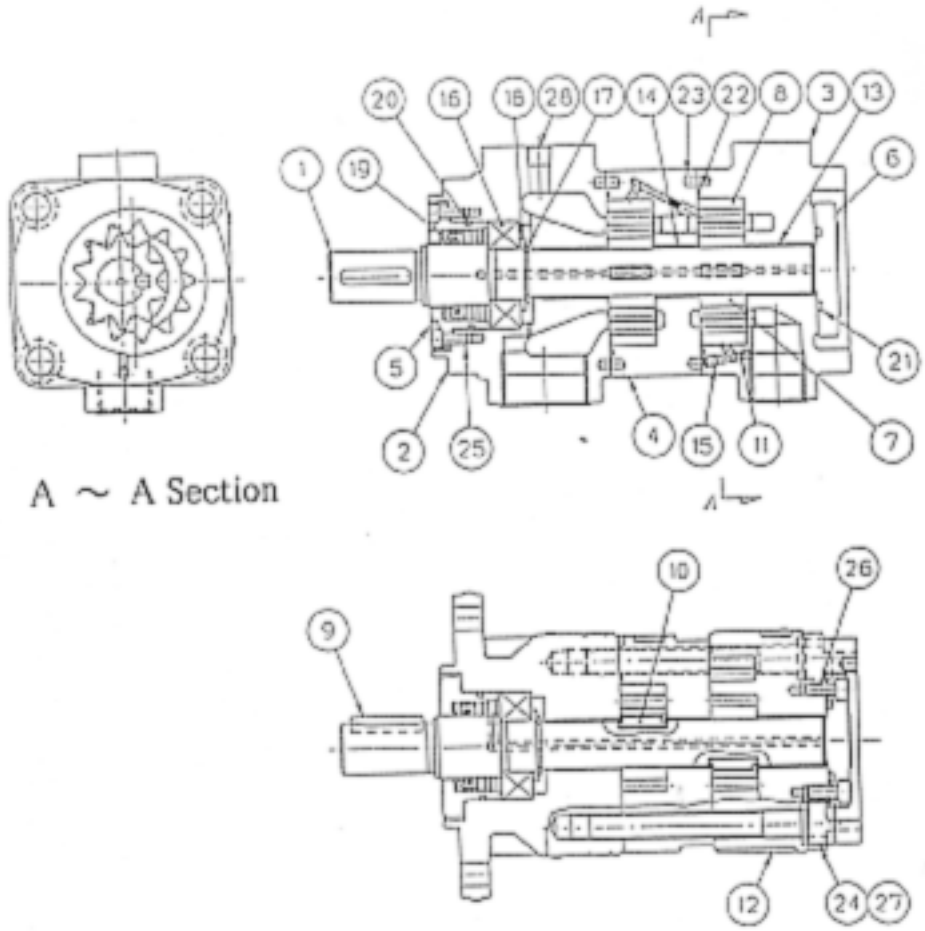




4·5·6 Type Low pressure pump
(QX＊1)

Number	Quantity	Name
27	4	Washer
26	4	Hex hole plug
24	4	Hex hole plug
23	2	Pin
22	1	O-ring
21	1	O-ring
20	1	O-ring
19	1	Shaft seal
18	1	Flat washer
17	1	Snap ring
16	1	Ball bearing
13	2	Bearing
12	1	Name plate
10	1	Key
9	1	Key
8	2	Ring gear
7	1	Pinion gear
6	1	Cover
5	1	Seal housing
3	1	Gear housing
2	1	Front cover
1	1	Shaft

Fig－4

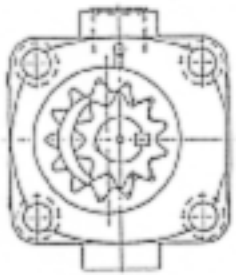


A ~ A Section

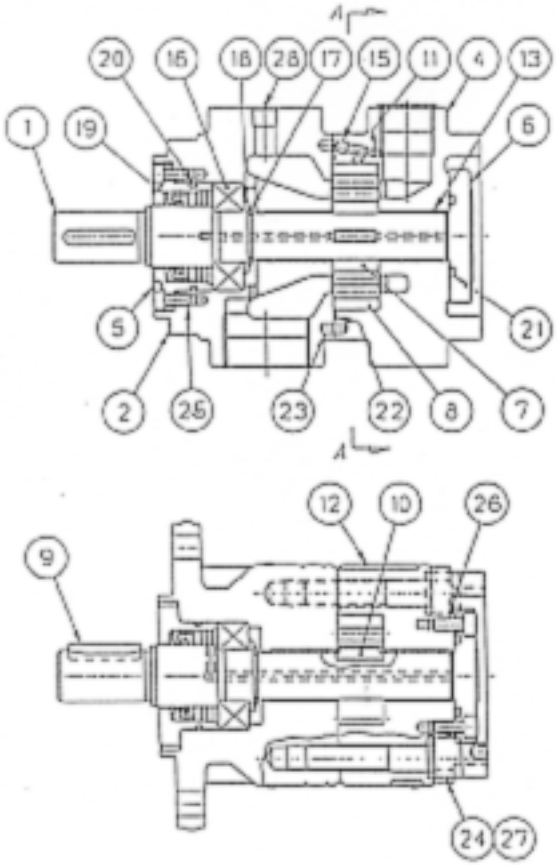
2.3 Type High pressure , High pressure "H" series pump
(QX*3 , QX*H)

Fig-5

Number	Quantity	Name
28	1	Hex hole plug
27	4	Washer
26	2	Hex hole bolt
25	2	Hex hole bolt
24	4	Hex hole bolt
23	4	Pin
22	2	O-ring
21	1	O-ring
20	1	O-ring
19	1	Shaft seal
18	1	Flat washer
17	1	Snap ring
16	1	Ball bearing
15	1	Expander
14	1	Bearing
13	2	Bearing
12	1	Name plate
11	2	Olifice
10	2	Key
9	1	Key
8	2	Ring gear
7	2	Pinion gear
6	1	Cover
5	1	Seal housing
4	1	Gear housing
3	1	Gear housing
2	1	Front cover
1	1	Shaft



A ～ A Section

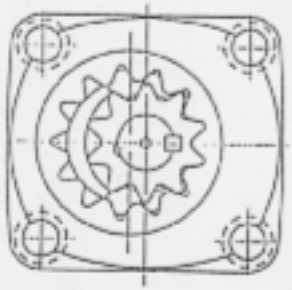


2.3 Type Middlle pressure pump

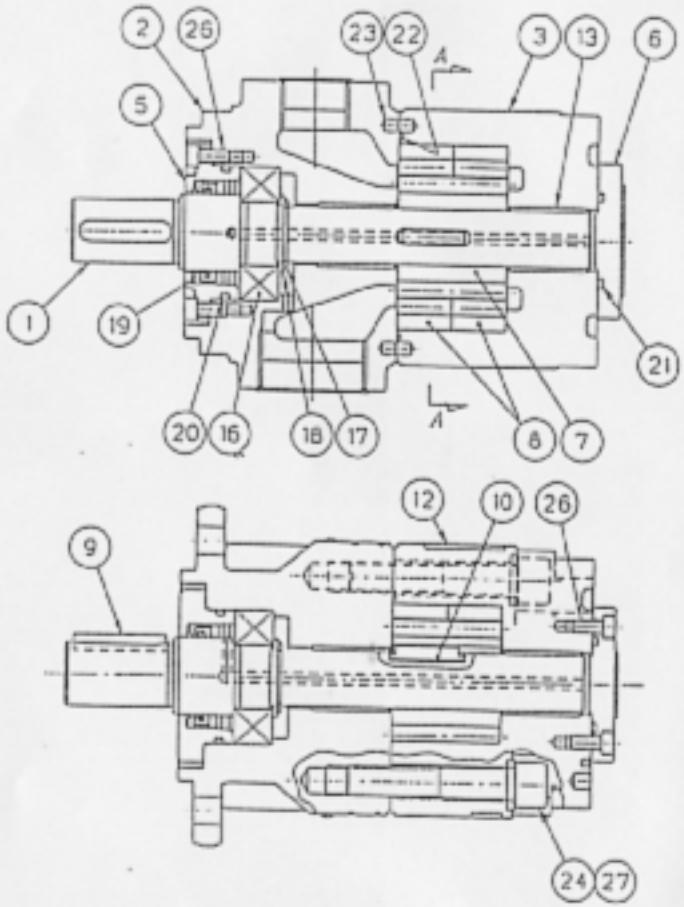
(QX＊2)

Fig－6

Number	Quantity	Name
1	1	Shaft
2	1	Front cover
4	1	Gear housing
5	1	Seal housing
6	1	Cover
7	1	Pinion gear
8	1	Ring gear
9	1	Key
10	1	Key
11	1	Olifice
12	1	Name plate
13	2	Bearing
15	1	Expander
16	1	Ball bearing
17	1	Snap ring
18	1	Flat washer
19	1	Shaft seal
20	1	O-ring
21	1	O-ring
22	1	O-ring
23	2	Pin
24	4	Hex hole bolt
25	2	Hex hole bolt
26	2	Hex hole bolt
27	4	Washer
28	1	Hex hole plug



A ～ A Section



3 Type Low pressure pump
(QX31)

Fig－7

27	4	Washer
26	4	Hex hole bolt
24	4	Hex hole bolt
23	2	Pin
22	1	O-ring
21	1	O-ring
20	1	O-ring
19	1	Shaft seal
18	1	Flat washer
17	1	Snap ring
16	1	Ball bearing
13	2	Bearing
12	1	Name plate
10	1	Key
9	1	Key
8	2	Ring gear
7	1	Pinion gear
6	1	Cover
5	1	Seal housing
3	1	Gear housing
2	1	Front cover
1	1	Shaft
Number	Quantity	Name

Table-4 Tightening torque of bolt

Pump Type	Bolt JIS B 1176	Tightening torque of bolt N・m (kgf・m)	
		Low pressure Middle pressure QX*1 , QX*2	High pressure Super high pressure QX*3 , QX*H
QX-2	M10	39.2 (4)	58.8 (6)
QX-3	M12	73.5 (7.5)	117.7 (12)
QX-4	M16	176.5 (18)	235.4 (24)
QX-5	M20	343.2 (35)	441.3 (45)
QX-6	M24	637.4 (65)	882.6 (90)

8.Spare parts

1) Shaft seal

Shaft seal in articles of consumption , Please request number below.

This number are seal housing Assy number.

Type	Normal	High pressure	Phosphate ester type	Water-glycol type
2	09-1001-2	09-1001-2H	09-1001-2	09-1001-2
3	09-1001-3	09-1001-3H	09-1001-3	09-1001-3
4	09-1001-4	09-1001-4H	09-1001-4	09-1001-4
5	09-1001-5	09-1001-5H	09-1001-5	09-1001-5
6	09-1001-6	09-1001-6H	09-1001-6	09-1001-6

2) O-ring

Type	Seal housing part		Gear housing part		Cover part	
2	S39	38.50*2.00	09-1014	60.00*1.50	AS568-121	26.64*2.62
3	AS568-133	45.69*2.62	AS568-041	75.92*1.78	AS568-124	31.42*2.62
4	AS568-145	64.77*2.62	AS568-044	94.97*1.78	AS568-129	39.34*2.62
5	AS568-236	82.14*3.53	AS568-048	120.37*1.78	AS568-225	47.22*3.53
6	AS568-239	91.67*3.53	AS568-163	152.07*2.62	AS568-229	59.92*3.53

9.Repain of pump

1) Functional parts

Below parts are very important functional parts built QX pump.

Pinion Gear , Ring Gear, Front Cover , Gear Housing ,
Slide Bearing , Shaft , Middle Frange (double pump).

Slide bearings are pushed in Front Cover , Gear Housing , Middle Frange , and process same time.
So slide bearing is a part of that parts , slide bearing can't be changed only.

2) Regarding to repair

Functional parts and disassemble , assemble cost in more than new pump cost.
So repair pump is not good method.