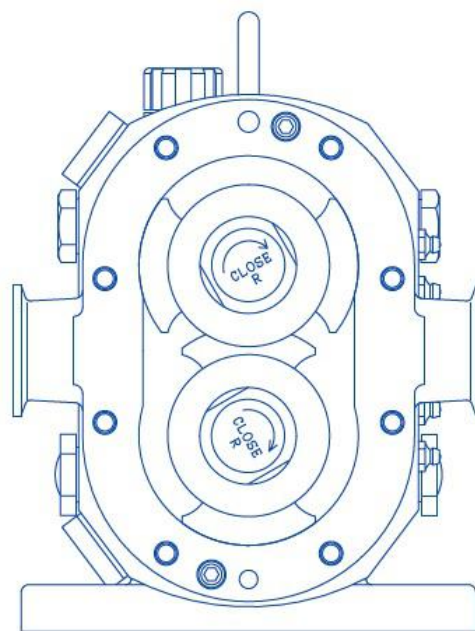
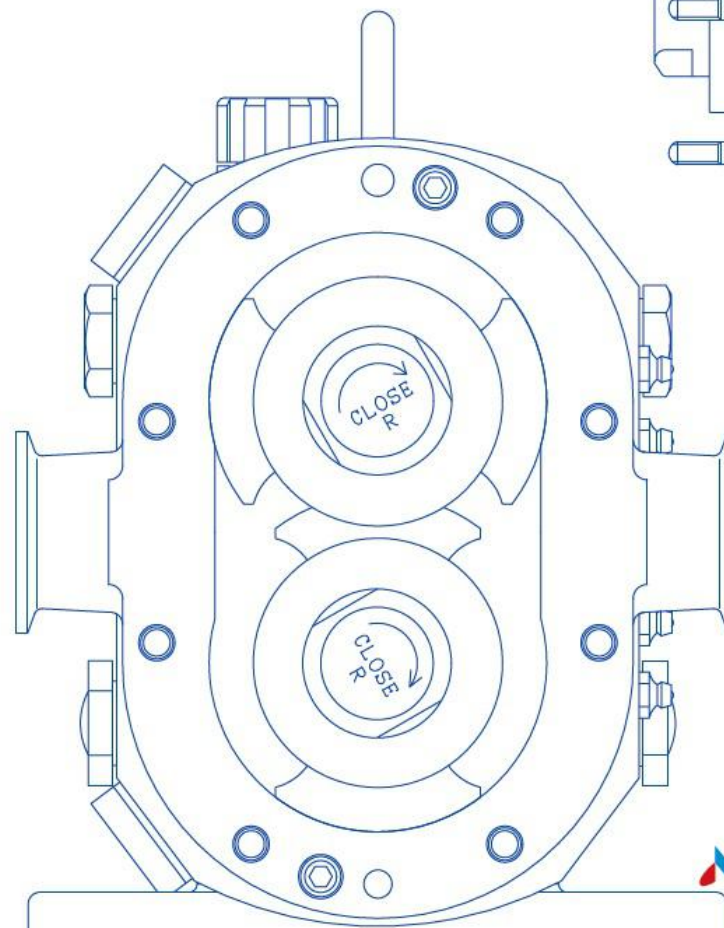


ROTARY PISTON PUMP



Manufacture:
NAKAKIN CO.,LTD.
PUMP DIVISION

2-10-5 Kasuga Kitamachi Hirakata Osaka
573-0137 Japan
E-mail: pumpinfo@nakakin.co.jp
www.nakakinpump.jp/e



 **NAKAKIN**

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may be changed without prior notice.

No.1 in Japan — One-Step Production. Nakakin expands to Europe, North America and world-wide!!

Since its founding in 1950, based on its die and casting technologies, Nakakin has worked actively in the automotive industry with firms such as Toyota and Mitsubishi Motors and so on. Nakakin supplies cast engine parts and develops and produces metal dies. Nakakin's technologies also produce quality pumps. Our unique one-step production ensures quality processing from primary raw-material cast products and parts production to pump assembly, performance testing, and direct shipping from our own factories. Valuing the suggestions and support of over 20,000 customers, Nakakin now accounts for Japan's largest rotary piston pump market share. Several hundreds of rotary piston pumps are sold in Germany and other European nations each year. Nakakin provides reliable quality products and services to customers in Europe, North America and world-wide.



Japan's No.1 Rotary Piston Pump
NAKAKIN



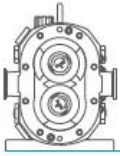
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JM/JO

JMU

SC

AMXN



Special Features

What makes Nakakin pumps special?



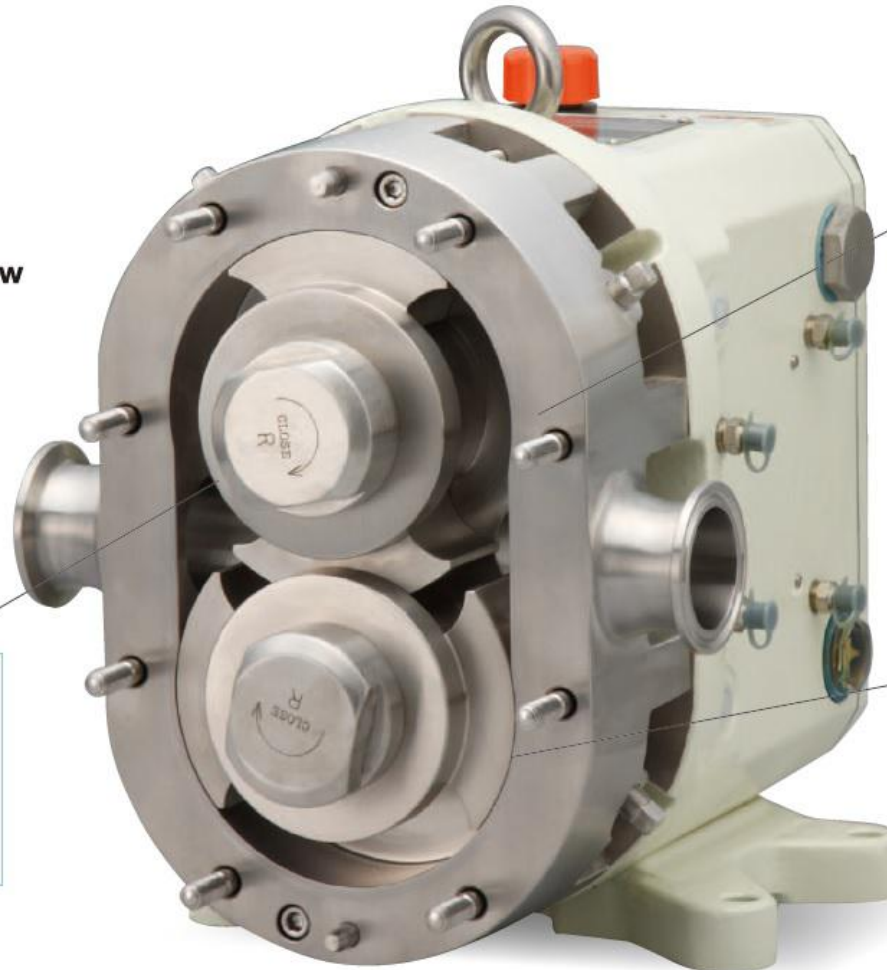
With built in safety mechanism, Nakakin pumps offer excellent discharge capacity, suction and consistent volume flow not found in non-contact structure pumps.

Nakakin covers all phases of product design, development, manufacture, and maintenance, done to produce high-quality high-performance pumps clearly incorporating customer needs. Certified by 3-A and European Hygiene Engineering and Design (EHEDG) and ensuring safety by performance-testing all pumps, Nakakin enjoys very high customer satisfaction.



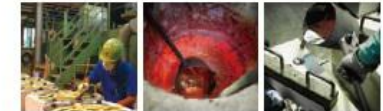
Nakamura Metal No. 3

Years of carefully cultured technology have enabled Nakakin to develop a unique proprietary alloy — Nakamura Metal No.3. An original patented stainless steel, Nakamura Metal No. 3 has less thermal expansion, achieving 70-μ clearance between the rotor and casing — the smallest in the industry. This minimum clearance contributes to high-performance discharge capacity, suction, and quantitative consistency unmatched by any competitor.



Raw Material

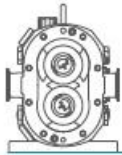
In our foundry, Nakakin manufactures the major pump parts coming into contact with liquids — a practice only Nakakin provides. Nakakin's production starts with excellent engineers and artisans melting and pouring metal into molds to make raw parts. Nakakin's high-performance high-quality pumps are the result of Nakakin's corporate policy "Starting at ground level."



Machining Accuracy and Assembly Precision

Nakakin inspects every single pump for accuracy. Undergoing approximately 100 inspection tests, including adjustment to the precision of one hundredth millimeter (10-micrometers), Nakakin pumps finish up in high-load operation testing to ensure safety. Extremely high machining accuracy and assembly precision helps reduce the number of parts needing adjustment, giving Nakakin pumps a superior, more durable life.





Product Lineup

Japan's No.1 Rotary Piston Pump
NAKAKIN

■ Vertical



■ Rectangular Inlet



■ Jacket (Casing & Cover)



■ Vented Cover



■ 3A



■ EHEDG



■ Big Pump
(6s 1470L/min)



■ Mini Pump



■ Customized Color



■ Buffing (Buff Finish)



■ Nickel Coating



■ Super Nickel Coating



■ Pump
with Flange Connection



■ Pump Unit



■ Unit
with Variable Speed Changer



■ Unit with SUS Cover



■ Unit Hopper
for High Viscosity Liquids



■ Single Blade Rotor



■ Double Blade Rotor



JM/JO

JMU

S/C

AMXN

Only Nakakin's consistent one-step production provides all customer needs.

Continuously producing pumps best meeting customer needs, Nakakin's
As this production system is flexible, please consult us

outstanding technology is widely recognized both in Japan and overseas.
about your particular needs and special requirements.



Features and Benefits

Smallest Clearance

Special alloy "Nakamura Metal No.3" can make the smallest clearance between rotors and casing.

- Convey a constant volume of liquid.
- Self-priming
- Distribution of all levels of viscosity

High Degree of Cleanability

Incredibly easy assembly /disassembly. Completely cleaned and sterilized with CIP & SIP processes.
Standard: 95°C, High Temperature: 150°C

Outside Seal

High Cleanability - A few parts in a wet area can be dismantled and reassembled easily.

Single Mechanical Seal type

Standard.

Quench Seal type

Quenching Seal by Oil Seal. Moderate price compared to Tandem. (0.03 MPa=0.3 bar)

Tandem Seal type

Quenching Seal by Mechanical Seal. Steam is available. (0.25 MPa=2.5 bar)

Maximum Discharge Pressure 1.0 MPa=10 bar
(For details see Models Condification Chart, P26)

Vertical and Horizontal

Double and Single Blade Rotors

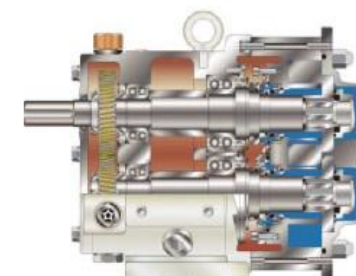


Specifications

Size	Connection	Flow Rate
4	1s	20L/min
10	1.5s	40L/min
16	1.5s	60L/min
25	1.5s	100L/min
40	2s	135L/min
55	2s	270L/min
125	2.5s	410L/min
160	4s	710L/min
200	4s	930L/min
300	6s	1470L/min



Construction Diagram

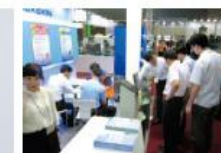


Structural Drawing p25

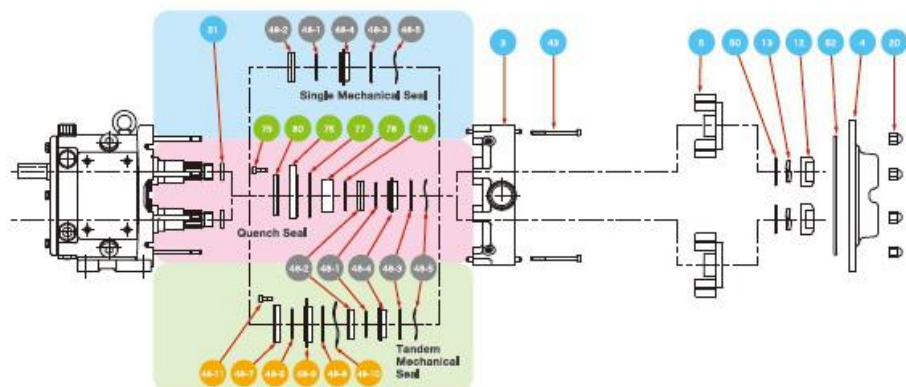
Codification Chart p26

Performance Curve p27

Dimensional Drawing p30

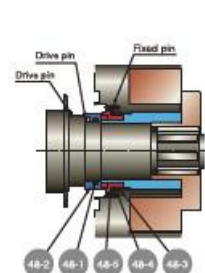


Exploded view of components in contact with liquids



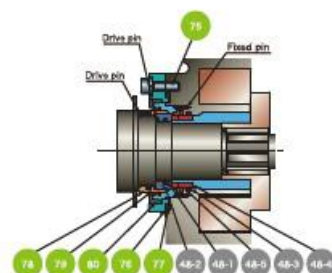
No.	Parts	No.	Parts
3	Casing	20	Hexagon cap nut
4	Casing cover	43	Cap bolt
5	Rotor	50	Nut O-ring
12	Cap nut	51	Rotor O-ring
13	Spring washer	52	Cover O-ring

Single Mechanical Seal Structure



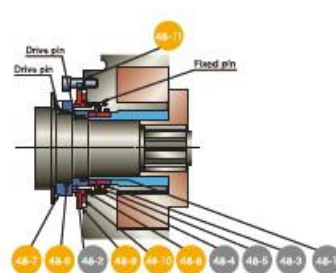
No.	Mechanical Seal Parts on Pump Side
48-1	Mating ring O-ring
48-2	Mating ring
48-3	Primary ring O-ring
48-4	Primary ring
48-5	Wave spring

Quench Seal Structure



No.	Quench Seal Parts on Atmospheric Side
75	Cap bolt
76	Oil seal retainer
77	Retainer O-ring
78	Quench sleeve
79	Sleeve O-ring
80	Oil seal

Tandem Mechanical Seal Structure



No.	Mechanical Seal Parts on Atmospheric Side
48-6	Mating ring O-ring
48-7	Mating ring
48-8	Primary ring O-ring
48-9	Primary ring
48-10	Wave spring
48-11	Cap bolt

As an example

B JMU 25 T-VT-SM-Z

① ② ③ ④ ⑤ ⑥ ⑦

- ① Kind of Option
- ② Pump Model
- ③ Pump Size
- ④ Material of Mechanical Seal
- ⑤ Material of O-ring
- ⑥ Connection
- ⑦ Installation Option

① Kind of Option

Mark	Contents
B	Vented-Cover (Relief Valve)
C	CIP JET Pump Type
D	Single Blade Rotor
F	Flushing Type
G	Jacket (Casing / Casing Cover)
HP	High Pressure Pump (Max. 15 bar) ※10~300 Only
HT	High Temperature Type (Max. 150°C)
K	Rectangular Port
KZ	Rectangular Port with S&T for O-ring ※JMU Only 10,42,155,300
N	Small Clearance
OB	Air Vented Cover
Q	Quenching
S	Vacuum Type
V	Vertical Type
W	Tandem-Seal Type ※Except JMU
T	Titanium Pump

⑤ Material of O-ring

Mark	Material
No Mark	NBR
VT	FKM
EP	EPDM
SI	Silicon
K	Kalrez
Y	PTFE

⑥ Connection

Mark	Contents
D	DIN11851
SM	SMS
DF	DIN Flange
TC	Tri-Clamp (ISO2852)
C	Clamp
F	Flange (Japanese Standard)
Z	Connection Mark Different Port Size
	... Further Connection Type on Request

② Pump Model

Model	Contents
JMU	Outside Mechanical Seal Pump

③ Pump Size

JMU Series						
Size	Port	Max Speed (rpm)	Max Capacity (L/min)	Displacement (L/rev)	Max. Pressure (Standard Pump) (bar)	Max. Pressure ("HP" Pump) (bar)
4	1"	800	20	0.055	7	—
10	1 1/2"	800	40	0.050	10	15
16	1 1/2"	600	60	0.100	10	15
25	1 1/2"	450	100	0.220	10	15
40	2"	450	135	0.500	10	15
55	2"	450	270	0.600	10	15
125	2 1/2"	450	410	0.920	10	15
160	4"	450	710	1.580	10	15
200	4"	450	930	2.060	10	15
300	6"	450	1470	3.270	10	15

④ Material of Mechanical Seal

Mark	Material
No Mark	Carbon&Ceramic
T	Tungsten Carbide & Tungsten Carbide
SS	Silicon Carbide & Silicon Carbide
SNT	Knife-Edge Silicon Carbide & Tungsten Carbide
T2	Tungsten Carbide & Tungsten Carbide for Liquid Sugar ※Except JMU
	... Further Materials on Request

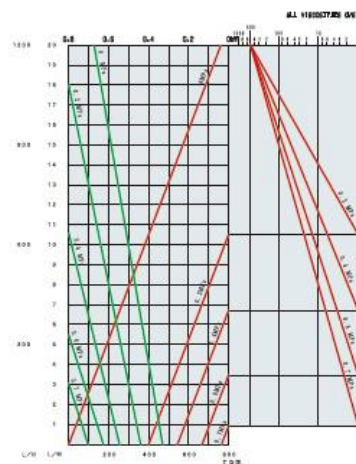
⑦ Installation Option

Mark	Contents
Z	Special Options (e.g.)
	• SUS316L/ Hastelloy (Wetted Materials)
	• SUS316/ SUS316L (Rotors)
	• Electrical Polish
	• Roughness of Surface (Ra ≤ 0.8)
	• Left Thread Shaft
	• Umbrella Rotors (e.g. Chocolate, Paste)
	• Nickel Coating for Housing
	... Further Options on Request
CW	• Churning measure (e.g. Cream)
3A	• 3A Approved
EH	• EHEDG Approved

JMU Performance Curve

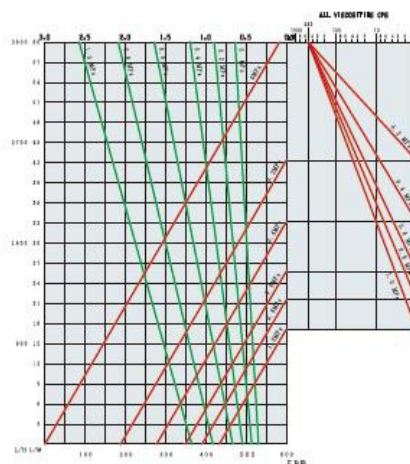
JMU4

PORT SIZE 1"
PRODUCT Water & Newtonian fluid



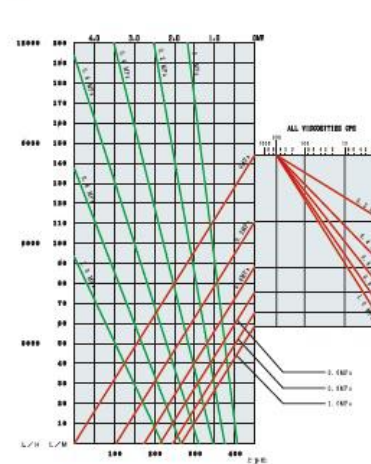
JMU16

PORT SIZE 1.5"
PRODUCT Water & Newtonian fluid



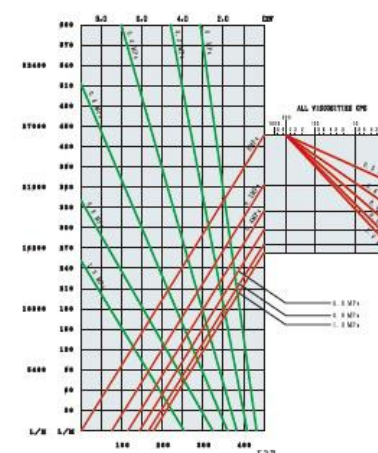
JMU40

PORT SIZE 2"
PRODUCT Water & Newtonian fluid



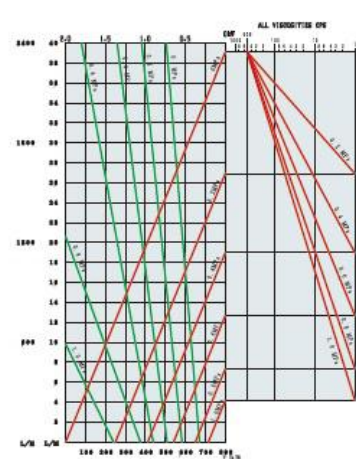
JMU125

PORT SIZE 2.5"
PRODUCT Water & Newtonian fluid



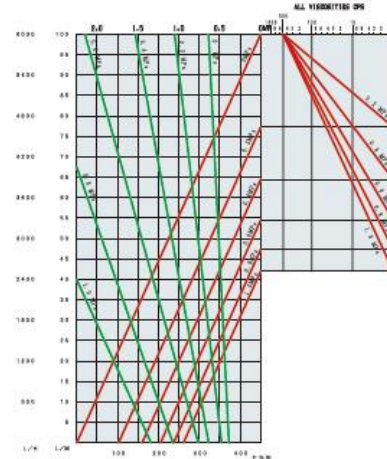
JMU10

PORT SIZE 1.5"
PRODUCT Water & Newtonian fluid



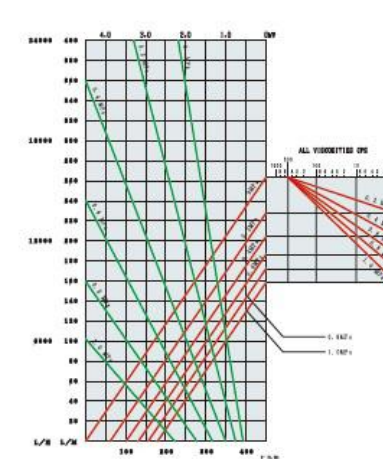
JMU25

PORT SIZE 1.5"
PRODUCT Water & Newtonian fluid



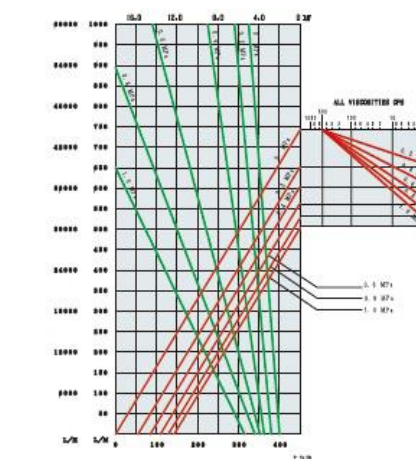
JMU55

PORT SIZE 2"
PRODUCT Water & Newtonian fluid



JMU160

PORT SIZE 4"
PRODUCT Water & Newtonian fluid



※Actual performance may vary by application or product. ※Refer to page 20 for the interpretation of the chart.

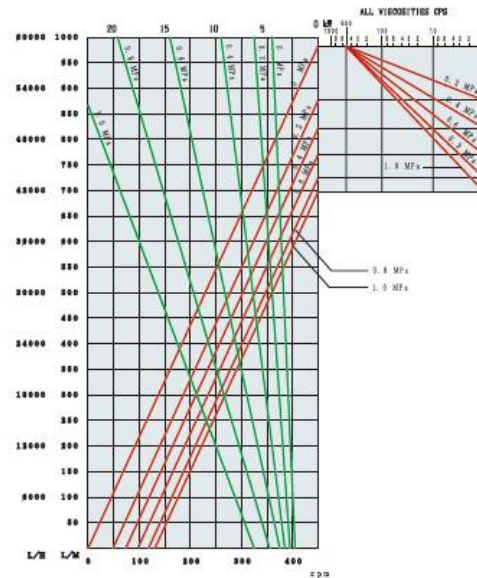
JMU Performance Curve

JMU Dimensional Drawing

JMU200

PORT SIZE
PRODUCT

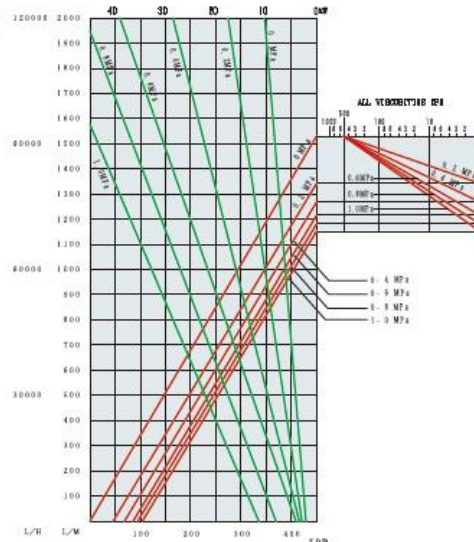
4" Water &
Newtonian fluid



JMU300

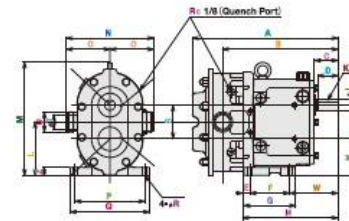
PORT SIZE
PRODUCT

6" Water &
Newtonian fluid



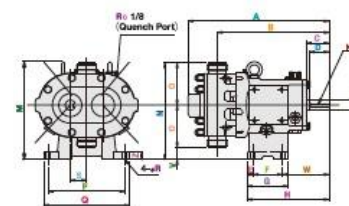
※Actual performance may vary by application or product. ※Refer to page 20 for the interpretation of the chart.

JMU Series



Type	JMU	JMU	JMU	JMU	JMU	JMU	JMU	JMU	JMU
Mark	6	10	16	25	40	55	125	160-200	300
A	254.5	328	328	362	372	432	458	613	853
B	207	271	266	267	281	347.5	364	464	695
C	34	62	60	58	58	63	63	75	110
D	30	50	50	50	50	54	54	70	100
E	23	15	15	18	18	30	30	35	55
F	75	90	90	99	99	115	115	198	285
G	95	108	108	129	129	155	155	238	335
H	183	218	218	237	237	295	295	388	617
I	100	140	140	175	175	243	243	314	400
J	18	22	22	26	26	36	36	55	70
K	6	6	6	6	6	10	10	16	22
Width	9	9	9	9	9	10	10	16	22
Depth	3.5	3.5	3.5	4	4	5	5	8	9
M	78	107.5	107.5	133	133	185.5	185.5	237	307.5
N	161	237	237	282	282	380	380	506	667
P	167	180	180	217	217	270	270	380	500
Q	83.5	90	90	108.5	108.5	135	135	190	250
R	132	150	150	174	174	230	230	280	370
S	154	174	174	198	198	280	280	320	420
T	9	11	11	11	11	14	14	18	23
U	48	65	65	84	84	115	115	154	185
V	19	24	24	36	36	47	47	60	96
W	16	1.5	1.5	1.5	1.5	2.5	2.5	4.5	6.5
X	2	7.5	7.5	9.1	9.1	12.8	12.8	19.0	24.5
Y	85	123	123	120	120	150	150	165	267
Z	11	18	18	20	20	23	23	23	30

VJMU Series



Type	VJMU	VJMU	VJMU	VJMU	VJMU	VJMU	VJMU	VJMU	VJMU
Mark	6	10	16	25	40	55	125	160-200	300
A	254.5	328	328	362	372	432	458	613	853
B	207	271	266	267	281	347.5	364	464	702
C	34	62	62	58	58	63	63	75	110
D	30	50	50	50	50	54	54	70	100
E	10	15	15	15	15	20	20	20	35
F	58	60	60	75	75	135	135	153	235
G	75	90	90	105	105	165	165	193	305
H	183	199	199	210	210	295	295	338	502
I	100	113	113	140	140	150	150	200	300
J	18	22	22	26	26	36	36	55	70
K	6	6	6	6	6	10	10	16	22
Width	3.5	3.5	3.5	4	4	5	5	8	9
Depth	3.5	3.5	3.5	4	4	5	5	8	9
M	178	220	220	252	252	291	291	380	516
N	183.5	203	203	245.5	245.5	285	285	390	550
P	83.5	90	90	108.5	108.5	135	135	190	250
Q	132	170	170	198	198	280	280	360	400
R	154	166	166	220	220	310	310	400	470
S	9	11	11	11	11	17	17	19	23
T	19	24	24	36	36	46	46	60	96
U	16	1.5	1.5	1.5	1.5	2.5	2.5	4.5	6.5
V	16.5	23	23	31.5	31.5	15	15	10	50
W	85	124	124	120	120	150	150	165	267
Z	12	18	18	20	20	23	23	23	30

※Size and weight may be changed without prior notice.

One-step Manufacturing System

Consult



Nakakin proposes semi custom made products that meet customers' specifications and requests. Nakakin offers not only the pump functions that best fit customers' products but also parts, materials and colors to suit customers' preferences.

Manufacturing



Having started as a foundry, Nakakin uses casting know-how to manage consistent manufacturing from parts production to product assembly. Nakakin is proud of its, highly skilled artisans and technicians, capable of precision adjustment and assembly. This precision can not be achieved using machinery.

Quality Control



Nakakin products undergo as many as 100 inspection items and the tests are particular to the specifications of each pump. Only those pumps passing our stringent inspection and tests are delivered to customers. This ensures high performance and customer satisfaction.

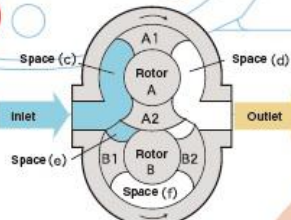
Delivery & Support



Nakakin tailors its delivery and shipping to meet individual customer requirement. Nakakin offers a complete support system, supplying customer with consumable parts, maintenance and troubleshooting.

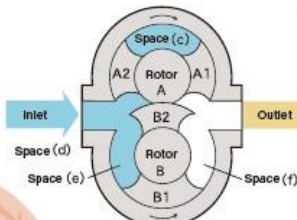
Operating Principle

1



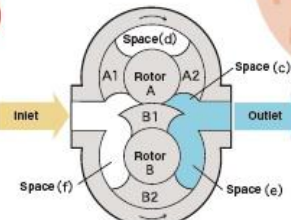
When rotor A and rotor B rotate, the capacity of space (c) between the vane A1 and vane B1 increases to generate high vacuum. This high vacuum draws the liquid into the pump casing through the inlet. At the outlet, vane B2 and vane A1 meet to decrease the capacity of the space. This creates pressure to discharge the liquid through the outlet.

2



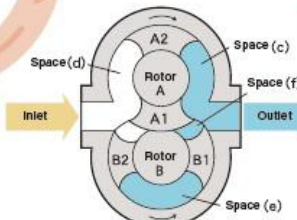
Space (c) filled with the liquid is moving towards the outlet. When the capacity of space (e) is the smallest in step ①, it increases the capacity as the two meeting vanes separate, to generate a high vacuum which in turn pulls the liquid through the inlet.

4

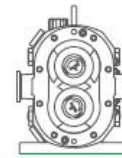


With the two rotors in this position, the capacity of space (c) becomes the smallest. The pump returns to step ① to repeat the pumping cycle again.

3



When vane B1 and vane A2 meet, the capacity of space (c) decreases to generate pressure. This causes the liquid to be pumped out through the outlet. The capacity of space (d) increases when the two rotors rotate to separate the two vanes. This creates a vacuum to pull the liquid in.



CIP JET Function

What is CIP JET function?

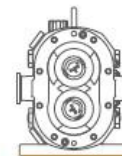
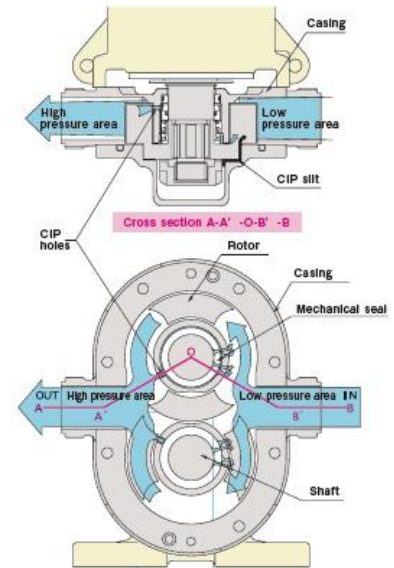
- The CIP JET function improves cleanliness inside the pump (portions in contact with liquid) during the clean-in-place (CIP) process. A sufficient amount of cleaning agent reaches inside the pump casing shafts, which are the most difficult parts to wash. This is why the CIP JET function alone cleans inside the pump without disassembling.
- Prevents liquid from changing its characteristics caused by liquid buildup. The inside profile of the pump casing shafts (portions in contact with a liquid) is designed to avoid liquid buildup. This reduces liquid degradation.

Operating Principles

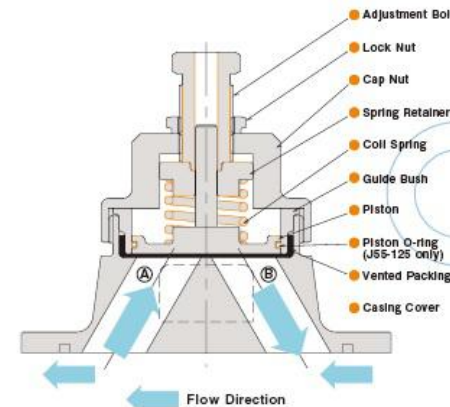
The CIP JET function uses a pressure difference that exists between the inlet and outlet of the pump. Pumps with the CIP JET function have four "CIP JET holes and "slits".

Operating sequence of CIP JET flow

- The rotors of a pump equipped with the CIP JET function turn.
 - A pressure difference is generated between the inlet (low pressure area) and the outlet (high pressure area).
 - The liquid is pushed back from the high pressure area (outlet) to the low pressure area (inlet) through the CIP JET holes and slits.
 - The suction motion of the pump generates a force that extracts the liquid at the low pressure area.
- Repeating steps (1) to (4), continues high pressure liquid flow.



Vented Cover Function



Advantages

The automatic pressure regulation protects the pump from failure and mechanical problems.

Operating Principles

The "spring" and "piston" of the vented packing normally send pressure towards the portions of the pump that are in contact with the liquid. When the pressure inside the pump (or portions in contact with the liquid) becomes higher than the pressure exerted by the spring, the pressure difference pushes the vented packing up in the opposite direction from the portions in contact with the liquid. This causes the liquid to reverse its flow through bypasses A and B, suppressing the pressure increase inside the pump (portions in contact with the liquid).