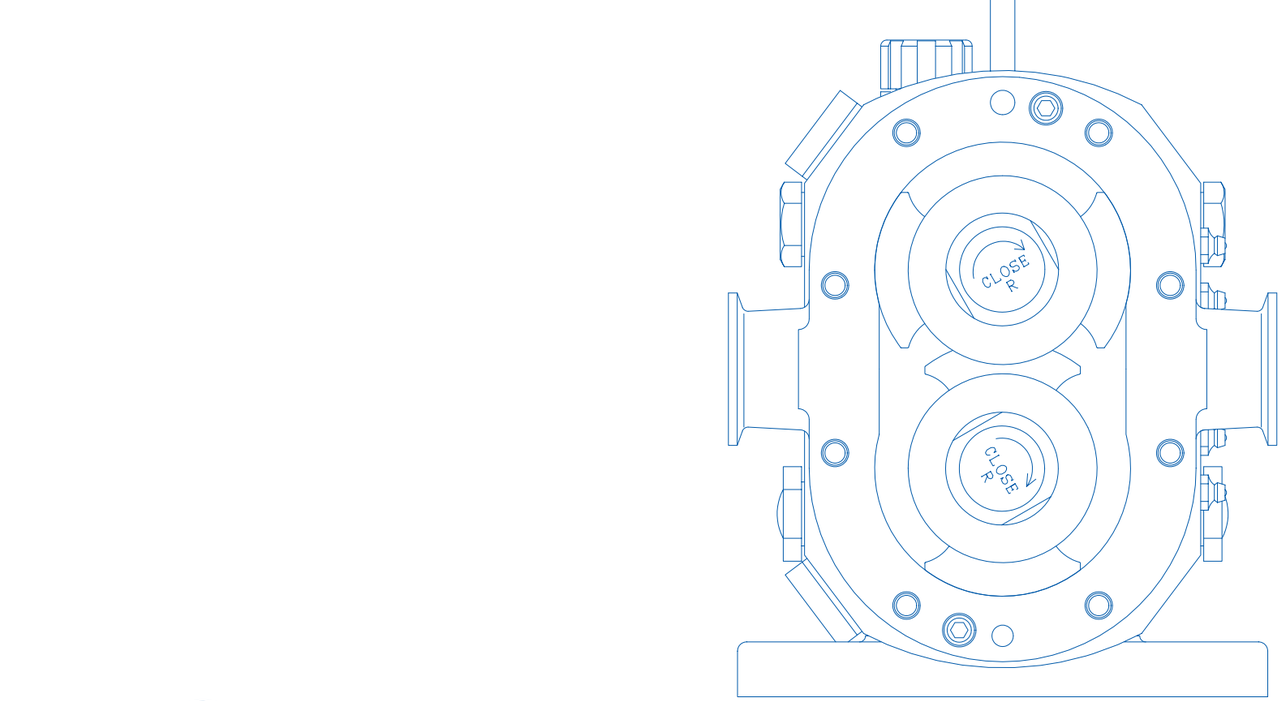
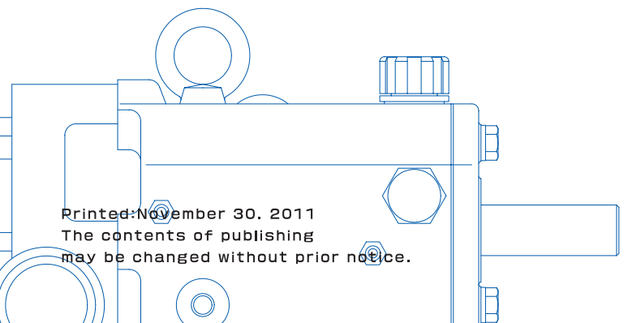
ROTARY PISTON PUMP





Printed:November 30. 2011
The contents of publishing
may be changed without prior notice.

Manufacture:
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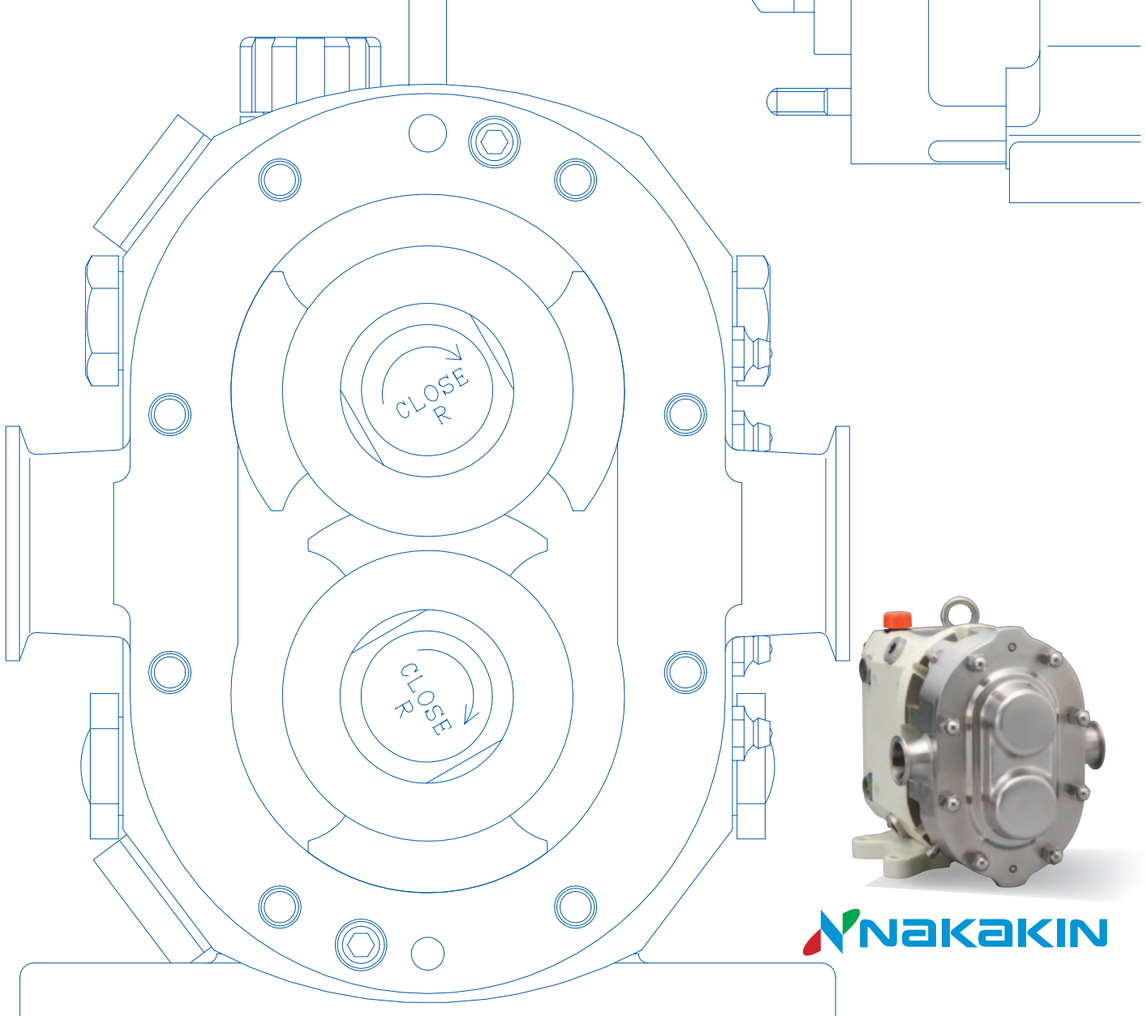
www.nakakinpump.jp/e



NAKAKIN

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-stop 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

CONTENTS

JM/JO
JMU
SC
AMXN

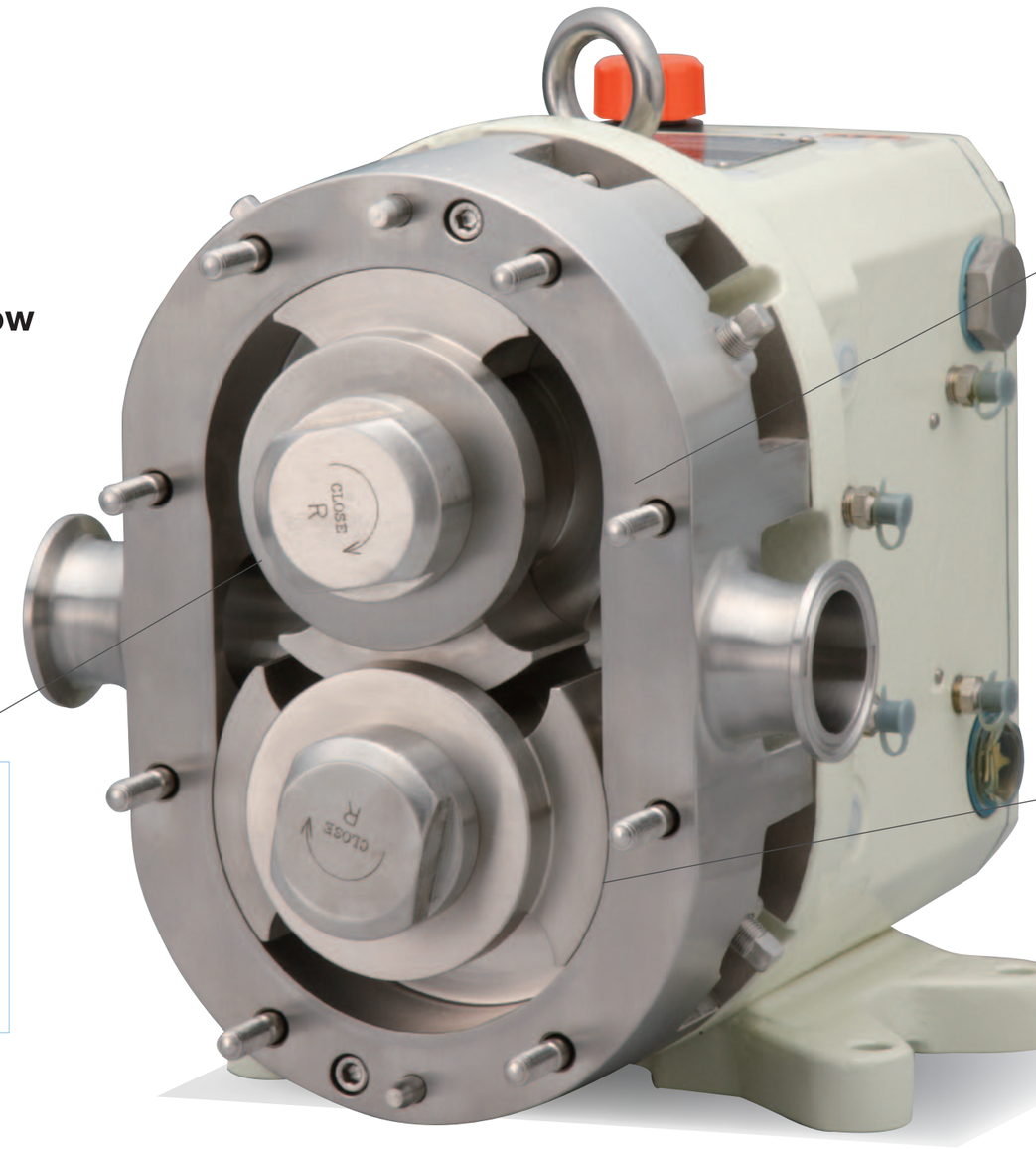
What makes Nakakin pumps special?

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.

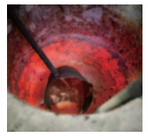
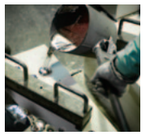
Nakamura Metal No. 3

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."

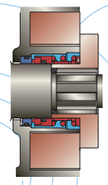
Machining Accuracy and Assembly Precision

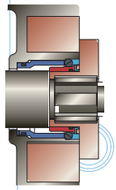
Nakakin inspects every single pump for accuracy. Undergoing approximately 100 inspection tests, including adjustment to the precision of one hundredth millimeter (10-micrometers), Nakakin pumps finish up in high-load operation testing to ensure safety. Extremely high machining accuracy and assembly precision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

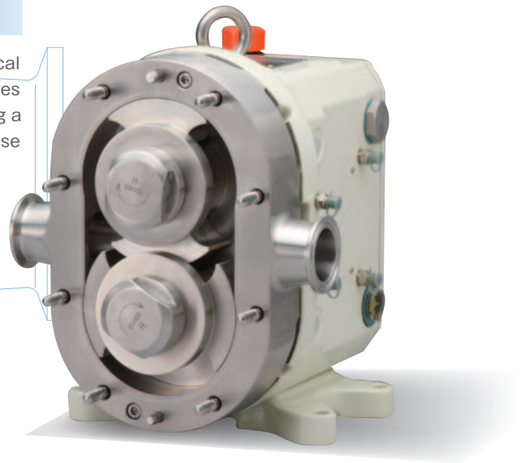

Series

JM/JO

These models use inner seals , JM for mechanical sealing and JO for O-ring sealing. Simple structures making dismantling and reassembly easy and providing a long effective life with high performance make these models the most popular.

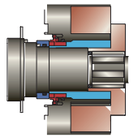

Mechanical Seal

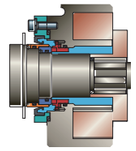

O-ring Seal

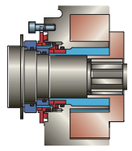


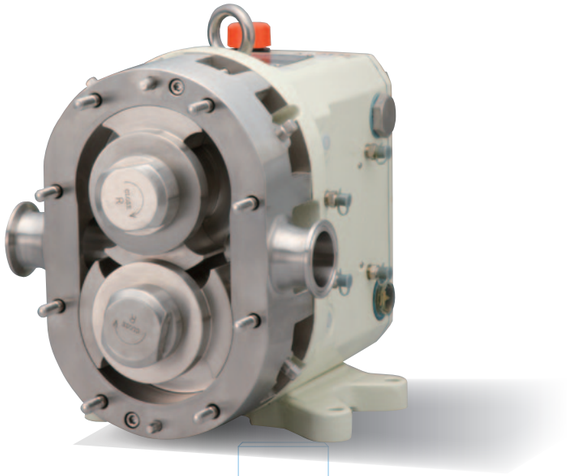
JMU

These models use outer mechanical sealing. Their simple structure makes dismantling and reassembly easy. Clients can select from single, quench, and tandem mechanisms. Designed to handle a wide variety of liquids, these models work especially well with corrosive and fiber-containing liquids.


Single Mechanical Seal


Quenching Mechanical Seal


Tandem Mechanical Seal

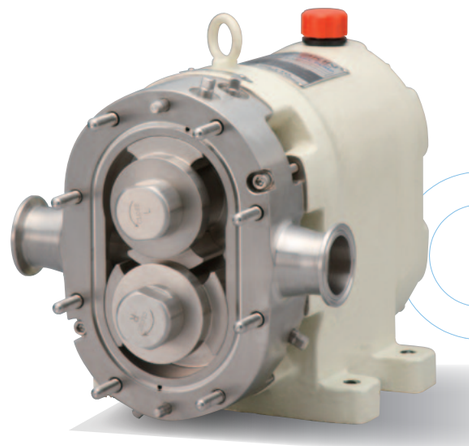


Supported by high quality and high performance, each of Nakakin's four pump types is unique.

A casting foundry combining Japan's technologies and excellence in the art of design and production with our own casting foundry.
Nakakin produces high quality and high performance rotary piston pumps.
Our wide range of approaches to sealing includes using inside and outside mechanical seals to meet individual applications.
Nakakin pumps are easy to clean, easy to dismantle, and easy to reassemble.

SC

The SC type is specifically designed for cleaning and washing ease. Using a flat cover and eliminating bosses allows these pumps to provide effective washing and cleaning while leaving less liquid residue. The simple structure makes dismantling and reassembly easy.



AMXN

Designed for completely aseptic liquid distribution, these pumps isolate liquids completely from the atmosphere to ensure aseptic conditions. Distributing mediums such as sterilized water and steam, these models are suited to aseptic production lines of products requiring long-term preservation such as dairy products and medications.

Industries

With the motto “Suitable for all liquids”, Nakakin leads the world market!!

Heeding customer comments and advice since 1950, Nakakin now has over 20,000 pump-using clients in industries including dairy products, food, beverages, and cosmetics.
Due to our outstanding technology , Nakakin has secured an unrivalled market share.

- Ice cream
- Cream
- Butter
- Margarine
- Cheese
- Evaporated milk
- Condensed milk
- Yoghurt

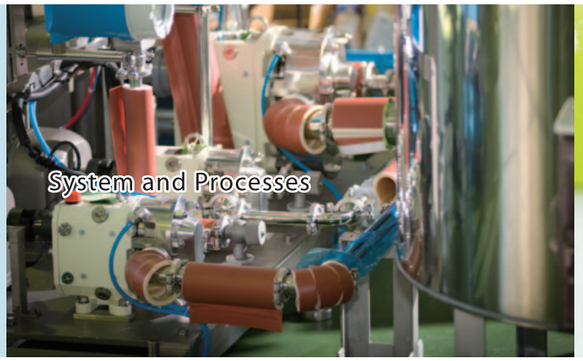
- Tomato paste
- Ketchup
- Sauce
- Yeast
- Bread dough
- Tofu
- Mayonnaise
- Baby food

- Sugar
- Honey
- Molasses
- Caramel syrup
- Bean paste
- Jam
- Marmalade
- Candy

- Juice with pulp
- Concentrated juice
- Vegetable extracts
- Wine
- Coffee
- Green tea
- Sports drinks

- Lotion
- Shampoo
- Conditioner
- Skin cream
- Soap
- Emulsion
- Hair dye
- Toothpaste

- Artificial blood
- Artificial protein
- Liver oil
- Vitamin oil
- Pure water
- Essence
- Disinfectant
- Bottle



- Crystallisation
- Emulsifying
- Homogenising
- Metering
- Filling/Emptying
- Concentrating
- Drying
- Bottling

- Paint
- Ink
- Petroleum
- Glue
- Emulsion
- Adhesives
- Detergents

Product Lineup

Japan's No.1 Rotary Piston Pump
NAKAKIN

■ Vertical

■ Rectangular Inlet

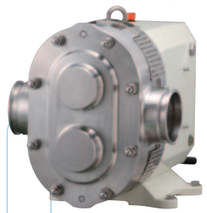
■ Jacket（Casing & Cover）

■ Vented Cover

■ 3A

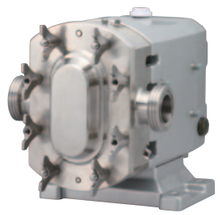
■ EHEDG

■ Big Pump
（6s 1470L/min）



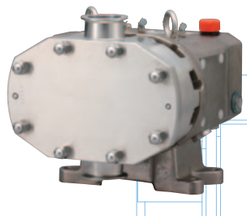
■ Mini Pump

■ Customized Color

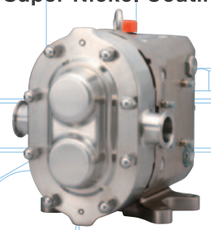


■ Buffing（Buff Finish）

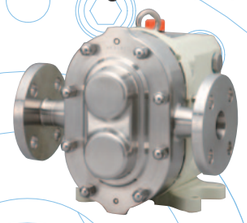
■ Nickel Coating



■ Super Nickel Coating

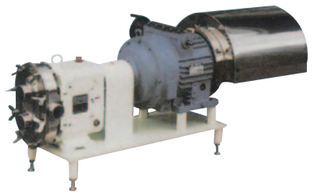


■ Pump
with Flange Connection



■ Pump Unit

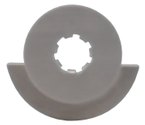
■ Unit
with Variable Speed Changer



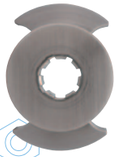
■ Unit with SUS Cover

■ Unit Hopper
for High Viscosity Liquids

■ Single Blade Rotor



■ Double Blade Rotor

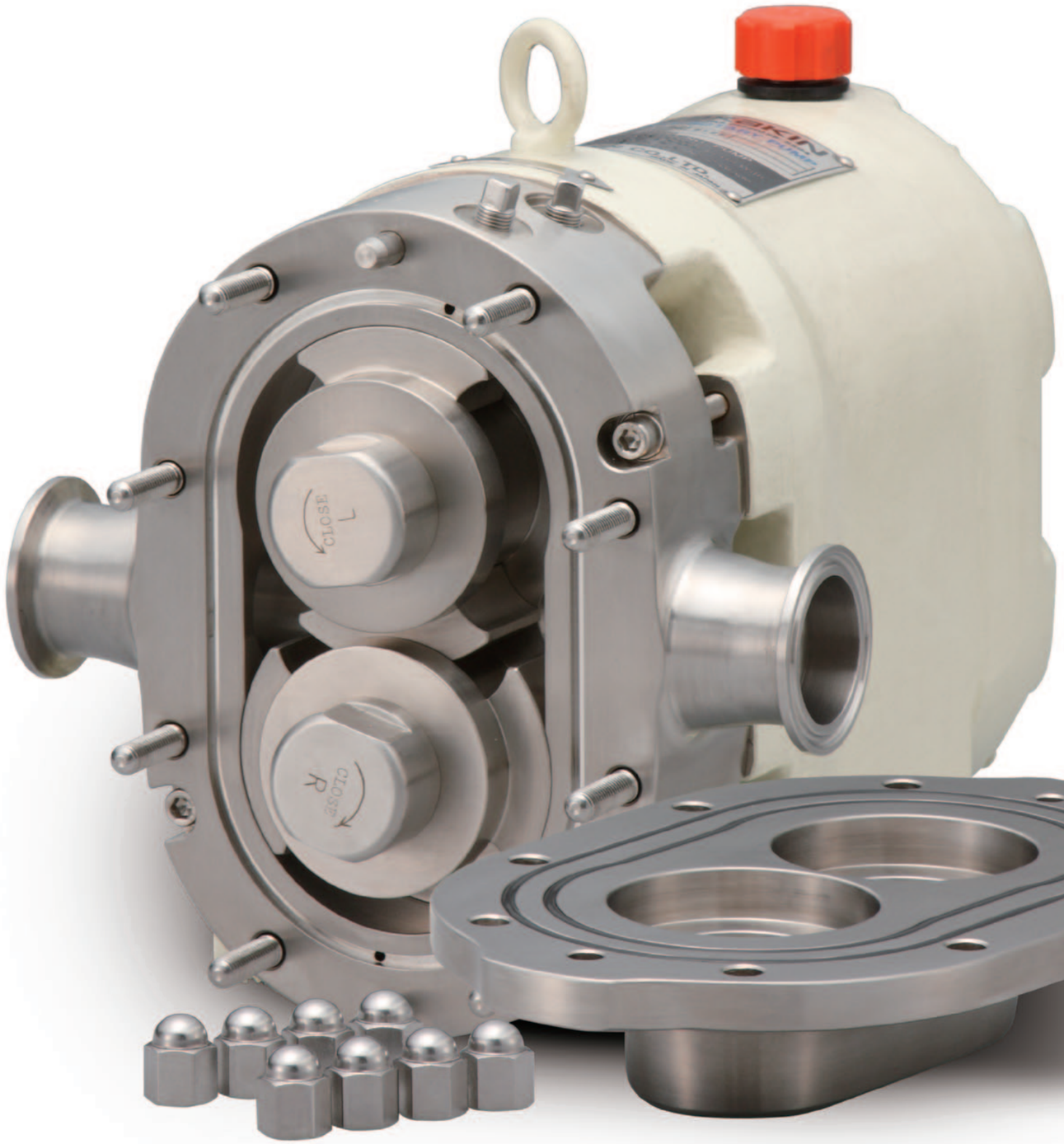


Only Nakakin's consistent one-step production provides all customer needs.

Continuously producing pumps best meeting customer needs, Nakakin's outstanding technology is widely recognized both in Japan and overseas.
As this production system is flexible, please consult us about your particular needs and special requirements.

AMXN

ASEPTIC



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℃, High Temperature: 150℃

Special Features for AMXN

- The aseptic rotary pumps completely isolate the products from the atmosphere to maintain the products free from germs.
- Double layered Seal + Steam Barrier

The seal mechanism in the pump is double-layered with a steam barrier on the interior of the two steam pathways inside the pump. This prevents any contamination of the pump interior by airborne bacteria or the like.
Medium solution: Sterile water and steam

CIP JET

Halls and Channels in casing and cover allow self-cleaning without disassembly, creating a very efficient cleaning process.(P44)

Maximum Discharge Pressure 0.7 MPa=7 bar (For details see Models Condification Chart,P40)

Vertical and Horizontal

Double and Single Blade Rotors

Specifications

Size	Connection	Flow Rate
2400	1.5s	41L/min
3400	1.5s	57L/min
7000	2s	110L/min
10000	2s	176L/min
14000	2s	270L/min
24000	3s	430L/min

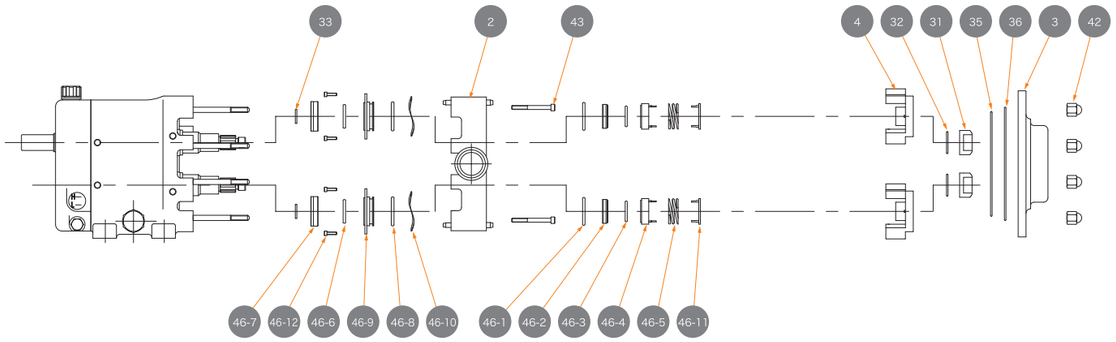
Structural Drawing P39 | Codification Chart P40 | Performance Curve P41 | Dimensional Drawing P42




AMXN

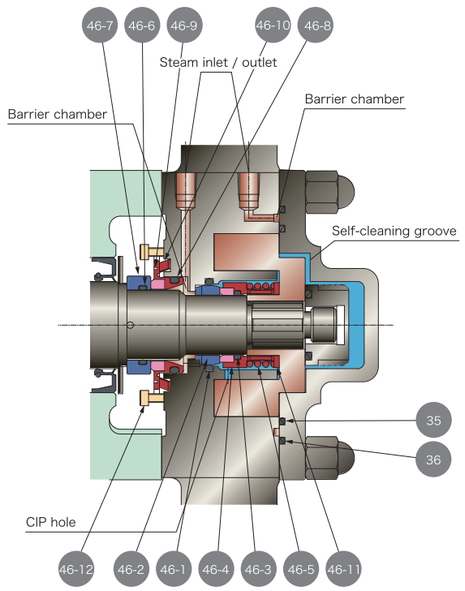
Structural Drawing

Exploded view of components in contact with liquids



No.	Parts	No.	Parts
2	Casing	33	Rotor O-ring
3	Casing cover	35	Cover O-ring(in)
4	Rotor	36	Cover O-ring(out)
31	Cap nut	42	Hexagon cap nut
32	Nut O-ring	43	Cap bolt

Structure in contact with liquids and structure of mechanical seal



No.	Mechanical Seal Parts on Pump Side
46-1	Mating ring O-ring
46-2	Mating ring
48-3	Primary ring O-ring
46-4	Primary ring
46-5	Coil spring
46-11	Spring holder

No.	Mechanical Seal Parts on Atmospheric Side
46-6	Mating ring O-ring
46-7	Mating ring
46-8	Primary ring O-ring
46-9	Primary ring
46-10	Wave spring
46-12	Cap bolt for mechanical seal

AMXN

Codification Chart

As an example

AV MXN 2400 T – VT – SM – Z

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

①Kind of Option

Mark	Contents
D	Single Blade Rotor
G	Jacket (Casing / Casing Cover)
V	Vertical Type
T	Titanium Pump

②Pump Model

Model	Contents
AMXN	Aseptic Pump

③Pump Size

AMXN Series

Size	Port	Max Speed (rpm)	Max Capacity (L/min)	Displacement (L/rev)	Max Pressure (bar)
2400	1 1/2"	800	40	0.050	7
3400	1 1/2"	600	60	0.100	7
7000	2"	450	99	0.220	7
10000	2"	450	189	0.420	7
14000	2"	450	279	0.620	7
24000	3"	450	450	1.000	7

④Material of Mechanical Seal

Mark	Material
T	Tungsten Carbide & Tungsten Carbide
SS	Silicon Carbide & Silicon Carbide
... Further Materials on Request	

⑤Material of O-ring

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

⑥Connection

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

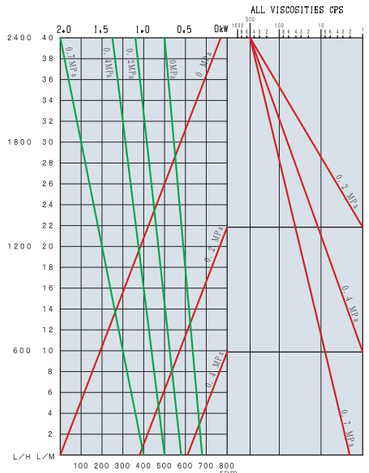
⑦Installation Option

Mark	Contents
Z	Special Options (e.g.)
	- SUS316L/ Hastelloy (Wetted Materials)
	- SUS316/ SUS316L (Rotors)
	- Electrical Polish
	- Roughness of Surface (Ra≦0.8)
	- Umbrella Rotors (e.g. Chocolate, Paste)
	- Nickel Coating for Housing
	... Further Options on Request
CW	- Churning measure (e.g. Cream)

Performance Curve

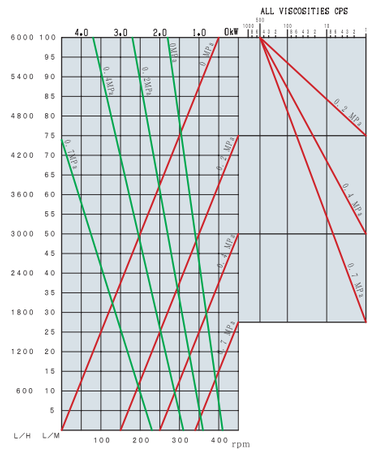
AMXN2400

PORT SIZE 1.5”
PRODUCT Water & Newtonian fluid



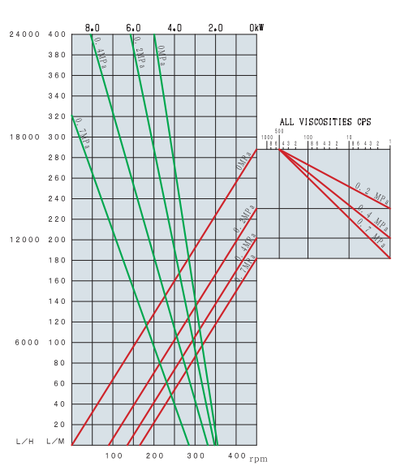
AMXN7000

PORT SIZE 2”
PRODUCT Water & Newtonian fluid



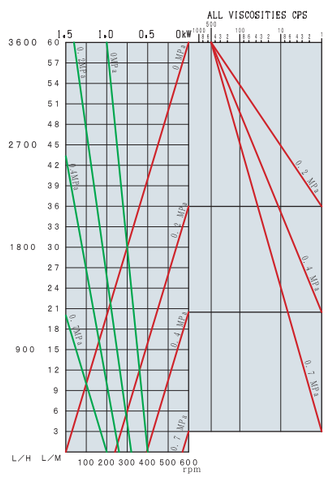
AMXN14000

PORT SIZE 2”
PRODUCT Water & Newtonian fluid



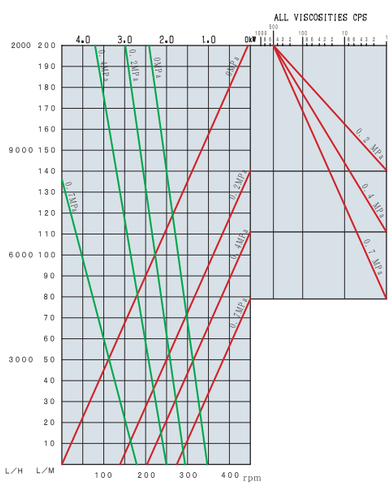
AMXN3400

PORT SIZE 1.5”
PRODUCT Water & Newtonian fluid



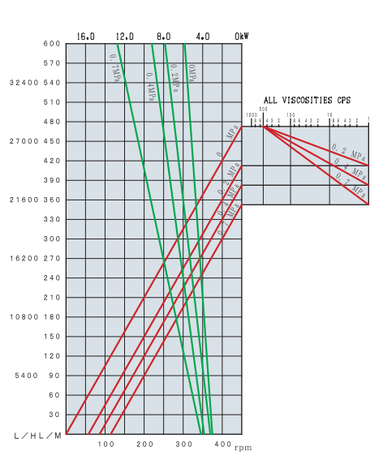
AMXN10000

PORT SIZE 2”
PRODUCT Water & Newtonian fluid



AMXN24000

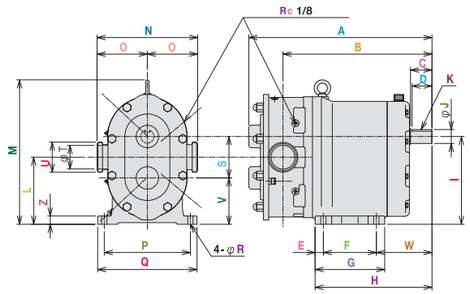
PORT SIZE 3”
PRODUCT Water & Newtonian fluid



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

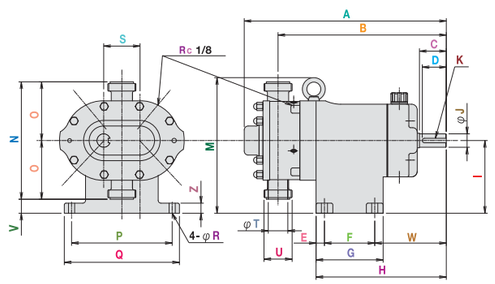
Dimensional Drawing

AMXN Series



Type Mark	2400	3400	7000	10000	14000	24000
A	361.5	361.5	420	477	535	535
B	301	293	341	382	443	440
C	48	48	58	65	65	65
D	48	48	50	62	60	60
E	18	18	20	20	25	25
F	90	90	104	130	160	160
G	126	126	144	170	210	210
H	236	236	277	312	353	353
I	146	146	185	220	265	265
J	24	24	35	38	42	42
K Width	8	8	8	10	12	12
K Depth	4	4	4	5	5	5
L	113.5	113.5	140	169.7	202.5	202.5
M	225	225	323	366	436	436
N	210	210	240	260	304	304
O	105	105	120	130	152	152
P	160	160	184	210	260	260
Q	190	190	214	240	300	300
R	11	11	12	13	18	18
S	65	65	90	100.6	125	125
T	22	34	47	47	47	73
U	1.5s	1.5s	2s	2s	2s	3s
V	81	81	95	119.4	140	140
W	128	128	153	166	168	168
Z	22	22	25	25	25	25

AVMXN Series



Type Mark	2400	3400	7000	10000	14000	24000
A	361.5	361.5	420	477	535	553
B	301	293	341	382	443	450
C	48	48	58	65	65	65
D	48	48	50	62	60	60
E	15	15	21	22	25	25
F	90	90	100	106	135	160
G	120	120	142	150	185	185
H	233	233	271	303	341	341
I	130	130	140	160	180	180
J	24	24	35	38	42	42
K Width	8	8	8	10	12	12
K Depth	4	4	4	5	5	5
M	243	243	278	307	351	351
N	210	210	240	260	304	304
O	105	105	120	130	152	152
P	180	180	225	220	260	260
Q	206	206	214	256	300	300
R	11	11	13	14	18	18
S	65	65	90	100.6	125	125
T	22	34	47	47	47	73
U	1.5s	1.5s	2s	2s	2s	3s
V	25	25	20	30	140	140
W	128	128	153	175	181	181
Z	18	18	25	25	25	25

※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.

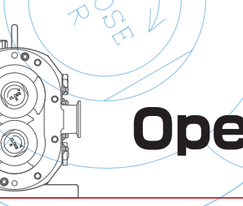
Quality Control

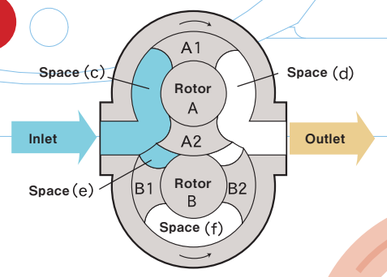
Nakakin products undergo as many as 100 inspection items and the tests are particular to the specifications of each pump. Only those pumps passing our stringent inspection and tests are delivered to customers. This ensures high performance and customer satisfaction.

Delivery & Support

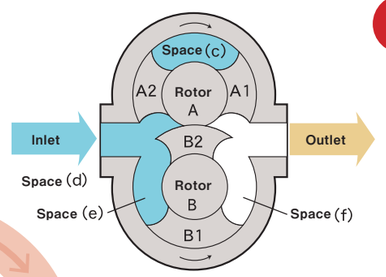
Nakakin tailors its delivery and shipping to meet individual customer requirement. Nakakin offers a complete support system, supplying customer with consumable parts, maintenance and troubleshooting.

Operating Principle

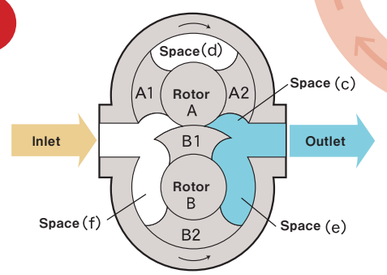




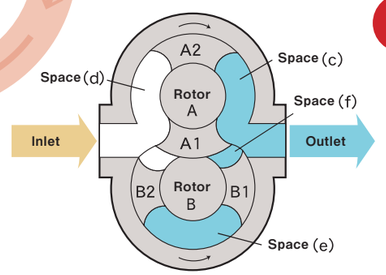
When rotor A and rotor B rotate, the capacity of space (c) between the vane A1 and vane B1 increases to generate high vacuum. This high vacuum draws the liquid into the pump casing through the inlet.
At the outlet, vane B2 and vane A1 meet to decrease the capacity of the space. This creates pressure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



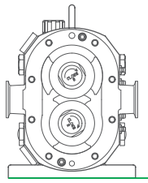
Space (c) filled with the liquid is moving towards the outlet.
When the capacity of space (e) is the smallest in step ①, it increases the capacity as the two meeting vanes separate, to generate a high vacuum which in turn pulls the liquid through the inlet.



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.



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.

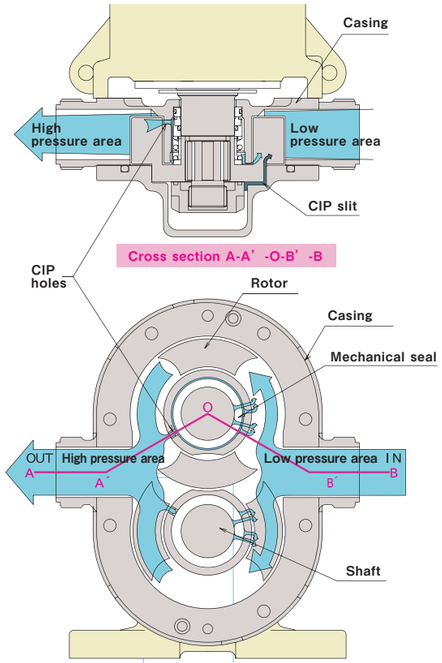


CIP JET Function

What is CIP JET function?

1. 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.

2. 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.

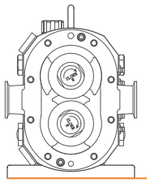


Operating Principles

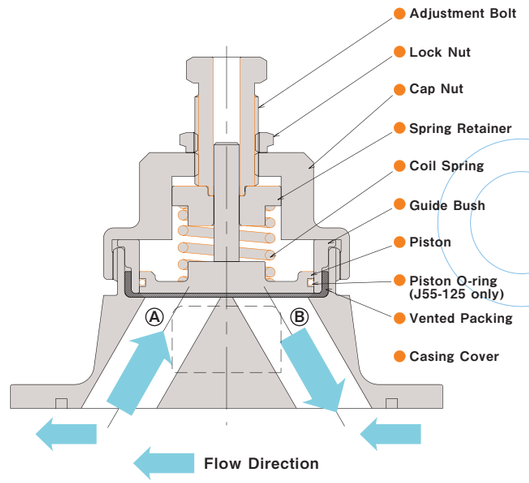
The CIP JET function uses a pressure difference that exists between the inlet and outlet of the pump. Pumps with the CIP JET function have four "CIP JET holes and "slits" .

Operating sequence of CIP JET flow

(1) The rotors of a pump equipped with the CIP JET function turn.
(2) A pressure difference is generated between the inlet (low pressure area) and the outlet (high pressure area).
(3) The liquid is pushed back from the high pressure area (outlet) to the low pressure area (inlet) through the CIP JET holes and slits.
(4) 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).

Company Profile

Overview

Company Name NAKAKIN CO., LTD
President Takuji Enomoto
Established March 1964 (Founded in 1950)
Capital 84 million yen
Employees 450

History

Sept.1950 Nakamura Metals & Casting Co. was founded by Shigezo Nakamura, the father of Mitsuo Nakamura, the chairman. There were then two departments: pattern and metal mold making, and aluminum and copper alloy casting.

Nov.1970 The Metal Mold Division was moved to its newly built premises, Torikai Plant (Metal Mold Division)at Higashihitotsuya in Settsu City, Osaka Prefecture.

Dec.1972 The business of Nakamura Metal Co., Ltd. was merged with the Yodogawa plant (Valve Division) of the Nakamura Metallic Industry Co., Ltd. and renamed.

April1973 Rotary piston pumps were manufactured and sold at the Hirakata Plant for the first time under our own brand name. The Industrial Precision Machinery Division (Pump Division) was established.

May1982 The Tokyo pump Office (Industrial Precision Machinery Division) was opened.

Sept.1986 Nakamura Seiko was established in Nangoku City, Kochi Prefecture.

May1989 The Head Office Building was constructed in Yodogawa-ku, Osaka City.

April1992 The new Kasuga Plant was constructed in Kasuga-kitamachi, Hirakata City.

April1993 The company name was revised to Nakakin Co., Ltd.

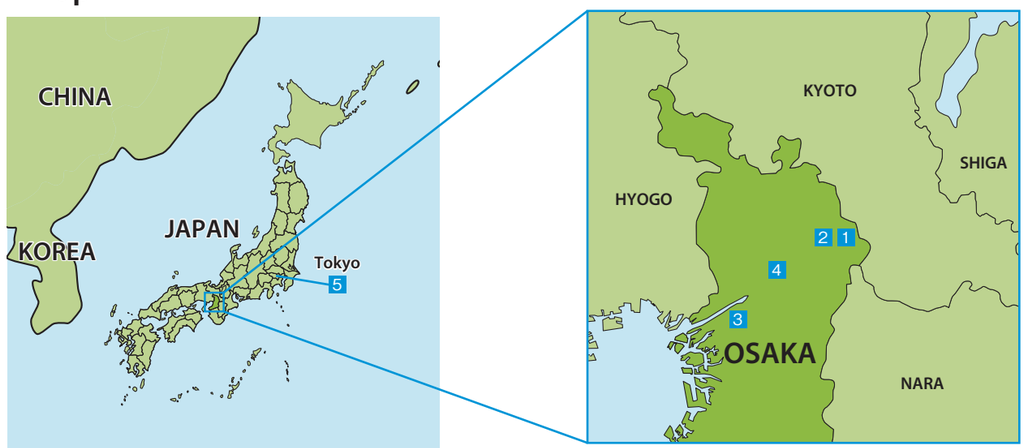
May1995 Our overseas affiliated company, P.T.Nakakin Indonesia was established in Jakarta, Republic of Indonesia, as the first overseas production base. Its capital was 100% provided by Nakakin Co., Ltd.

Nov.2002 Hirakata Plant and Kasuga Plant received ISO9001 certification.

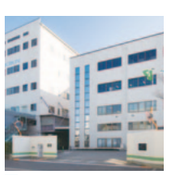
March 2005 Head Office and Hirakata Plant and Kasuga Plant received ISO14001 certification.

Jan.2012 The Europe office was opened in Germany.

Map




1 Hirakata Plant


2 Kasuga Plant


3 Head Office


4 Torigai Plant


5 Tokyo Office


Europe Office

Technical Information

Performance

- Flow rate up to 90,000 l/h
- Screw-type mounting foot for horizontal and vertical installation
- Flow Direction: Left⟷Right : Up⟷Down

Design

- Easy stock-keeping and spares inventory due to standardized sizes
- Operation pressure up to 15 bar
- Suction head up to 9 mWS

Temperature Resistance

- Up to 95˚C (Standard Model)
- Optional up to 150˚C (High Temperature Model)

Product Viscosity

- Up to 300,000 mPas

Colors

- Munsell 7.5 GY 9/2
- RAL-lacquer coatings on request

Connections

- Male parts (DN), DIN 11851 (Standard)
- SMS
- Aseptic flanges DIN 11864-2
- Aseptic Screwed Connection DIN 11864-1
- Tri-clamp, ISO 2852
- Further connection types on request

Materials

- Pump housing and cover: stainless steel (1.4571/AISI 316)
- Double blade rotors : Patented alloy

Mechanical Shaft Seal

- Carbon/Ceramics
- Tungsten Carbide
- Silicon Carbide
- Further materials on request

Sealing Material of O-Rings

- Viton
- EPDM
- Further materials on request

JM・JO・JMU Series

Sizes	4	10	16	25	40	55	125	160	200	300
Max. rpm[min-1]	800	800	600	450	450	450	450	450	450	450
Max. Pressure[bar]	7 7 7	15 10 10	15 10 10	15 10 10	15 10 10	15 10 10	15 10 10	15 10 10	15 10 10	15 — 10
HP※1 Max. Pressure[bar]	— — —	— — 15	— — 15	20 — 15	— — 15	20 — 15	— — 15	— — 15	— — 15	— — 15
Size of Connection [Inch/DN]	1/25	1.5/40	1.5/40	1.5/40	2/50	2/50	2.5/65	4/100	4/100	6/150
Max Feeding Capacity※2 [liter/minute]	20	40	60	100	135	270	410	710	930	1470
Max Feeding Capacity※2 [liter/hour]	1200	2400	3600	6000	8100	16200	24600	42600	55800	88200

※1：HP = High Pressure Version ※2:Based on water without counter pressre,i.e. approx. 1 mPas/0 bar

JM JO JMU

SC Series

Sizes	15	30	60	130
Max. rpm[min-1]	700	450	450	450
Max. Pressure[bar]	10	10	10	10
Size of Connection [Inch/DN]	1.5/40	2/50	2/50	3/6.5
Max Feeding Capacity※2 [liter/minute]	70	125	240	480
Max Feeding Capacity※2 [liter/hour]	4200	7500	14400	28800

※2:Based on water without counter pressre,i.e. approx. 1 mPas/0 bar

AMXN Series

Sizes	2400	3400	7000	10000	14000	24000
Max. rpm[min-1]	800	600	450	450	450	450
Max. Pressure[bar]	7	7	7	7	7	7
Size of Connection [Inch/DN]	1.5/40	1.5/40	2/50	2/50	2/50	3/65
Max Feeding Capacity※2 [liter/minute]	41	57	110	176	270	430
Max Feeding Capacity※2 [liter/hour]	2460	3420	6600	10560	16200	25800

※2:Based on water without counter pressre,i.e. approx. 1 mPas/0 bar