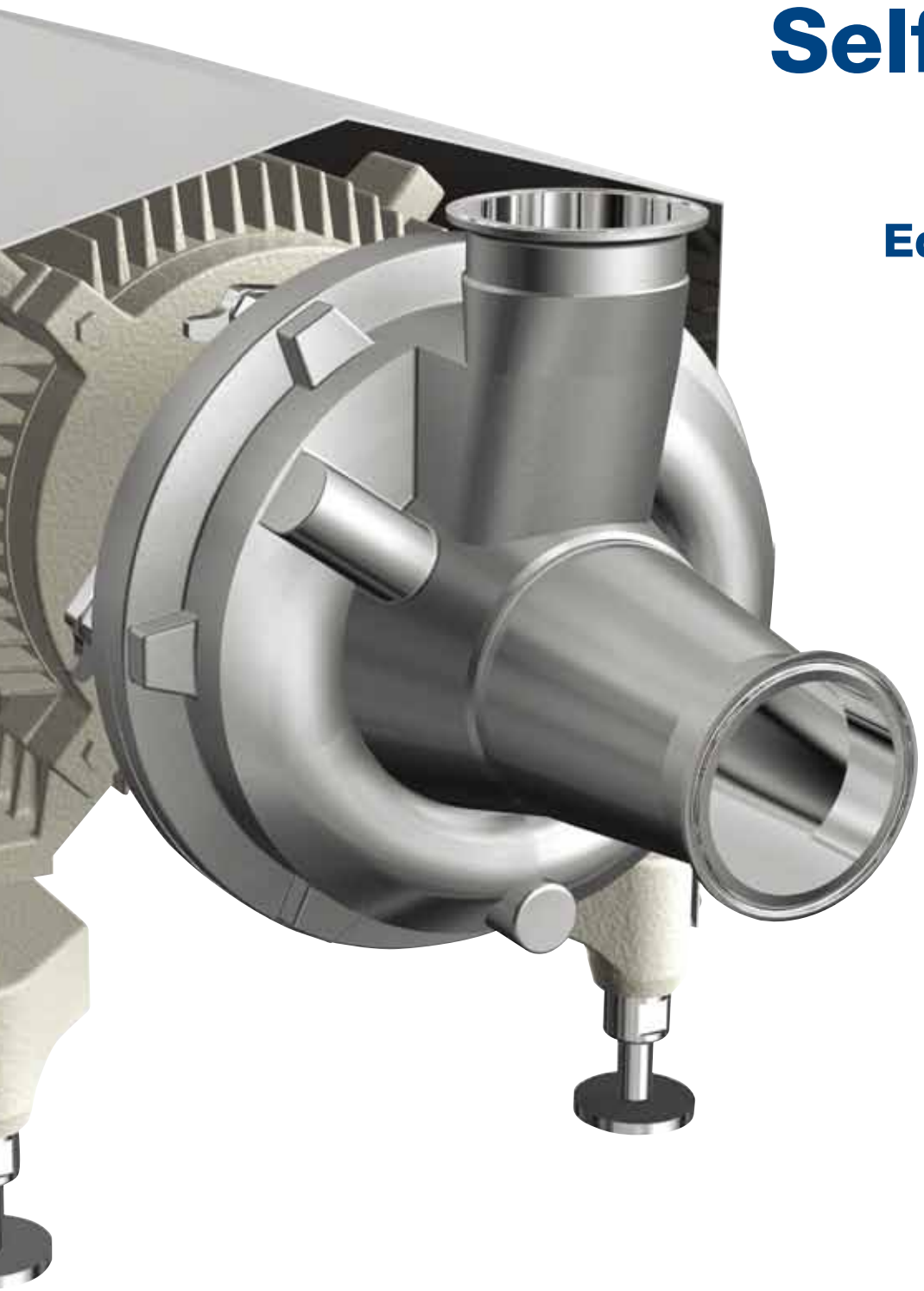
TOSTE

Hygienic

Self Priming Pumps

Equipped with Top Runner motor



23

High reliable and efficient performance

Pumps equipped with top runner motor

Material

SUS-316 (or equivalent)

Production standard

External finish	Beads shot blast
Internal finish	Pickling finish
In-between faces tolerance	±1.5mm or less
End faces parallelism	±0.5° or less
Squareness	±0.5° or less

Lubricant application specifications

Application specifications	Application range	Note
Standard specifications	Shaft axial part	—
Wetted surface lubrication prohibited area	Shaft axial part (Partial wiping with alcohol)	Be sure to lubricate the sliding seal part with fresh water, etc. before starting operation.
Lubricant	NOK Kluber PARALIQ GTE 703 *1 (NFF category H1)	

*1 Conforming to the Food Sanitation Law

► Pump selection and ordering

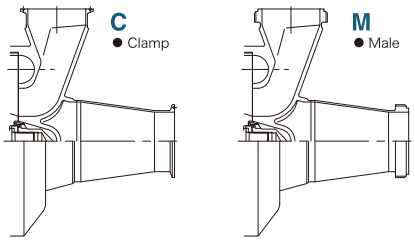
When using our pumps, be sure to use them within the respective pump specifications. If pumps will be used outside the scope of specifications, a design with higher safety taking into consideration various conditions is required. We would be pleased to offer consultation if you provide us with information.

► Ordering

○ Refer to the specifications on Page 9 and the type symbol table on Page 10 to specify your required pumps.
○ It is recommended that this pump be used together with an inverter. (Countermeasure against overload)

► Pipe end

For pipe end shape, combinations other than figures at right are available on request.

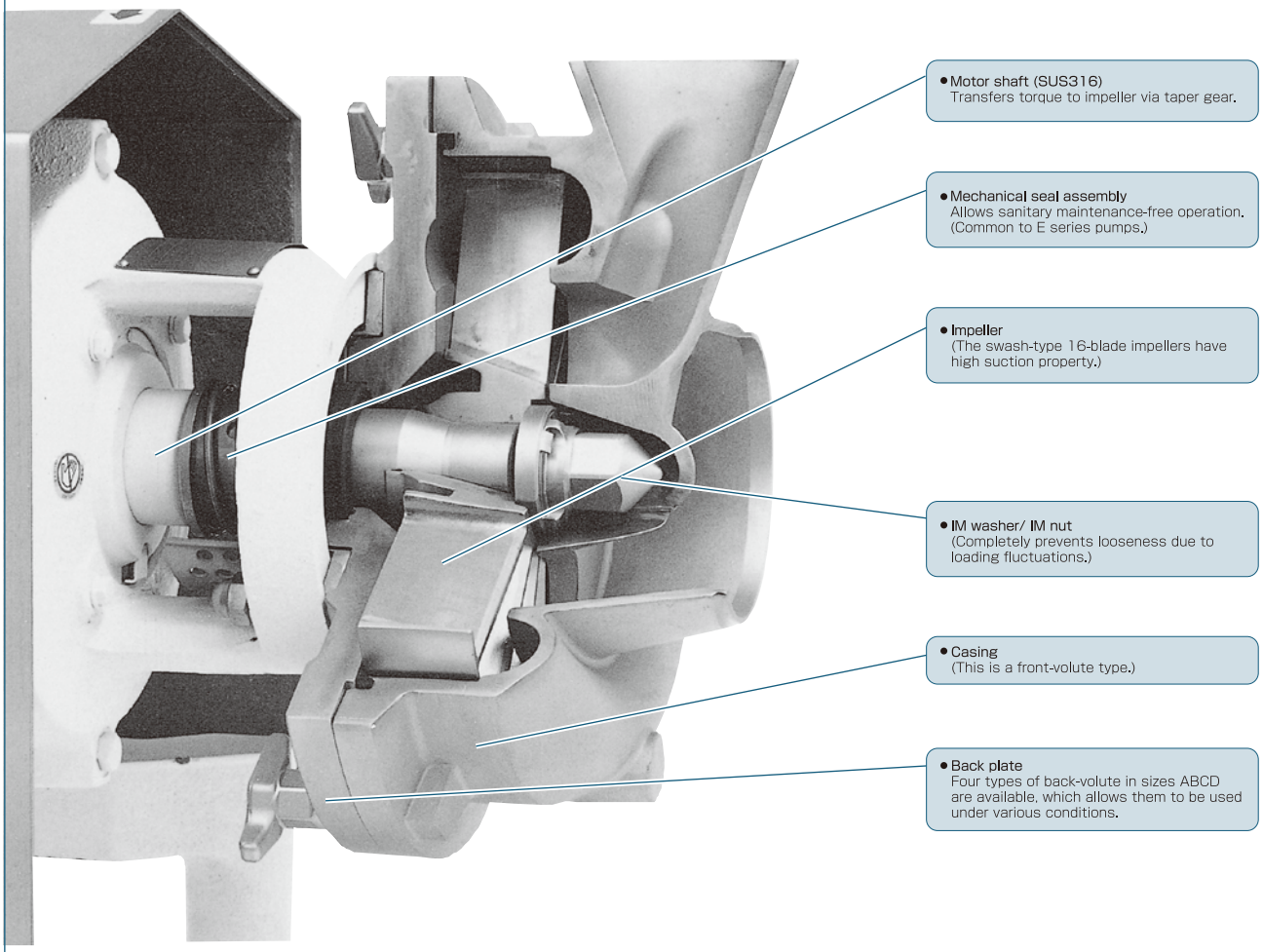


Pipe end

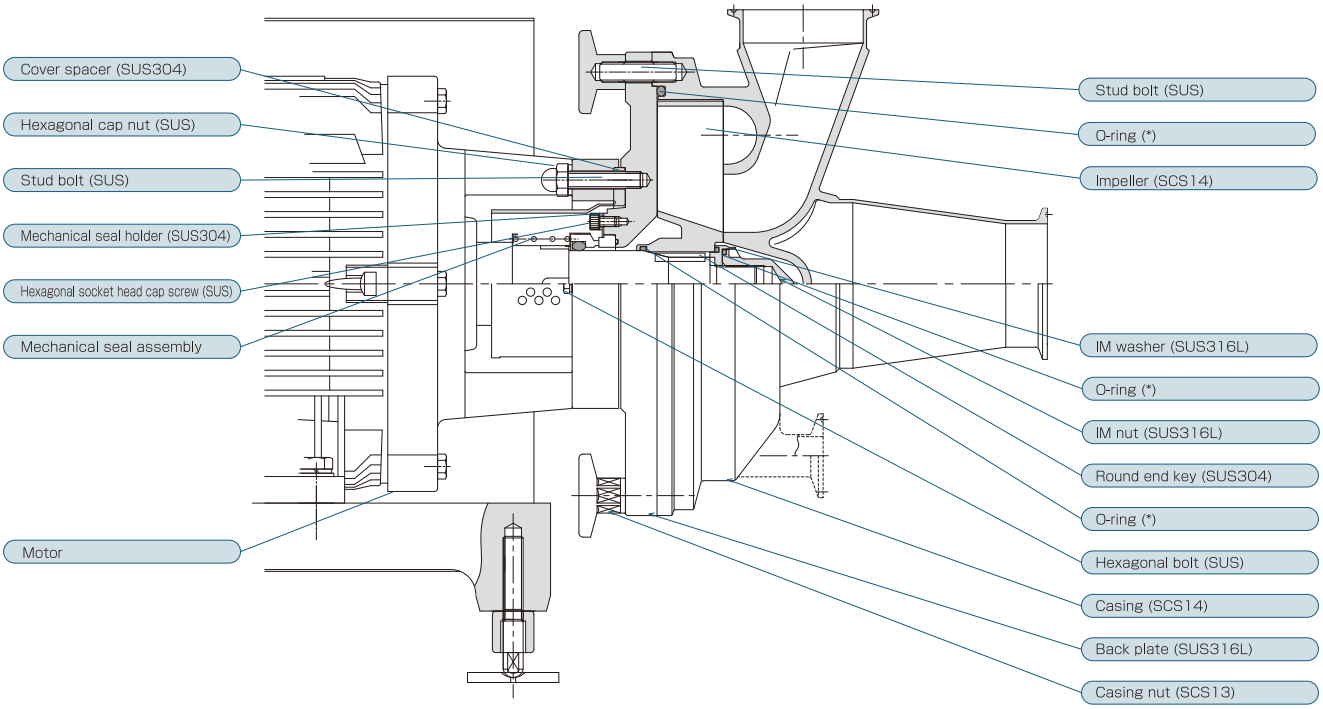
○ For lubricant application specifications other than the above standard specifications, be sure to designate them.
○ If there is no designation, the standard specifications will be applied.
○ Safety of lubricant to be applied:
○ NSF category H1
○ Conforming to the Food Sanitation Law

► Cross-section view

- The back/front-volute type can not only feed fluids which are a mixture of gas and liquid but can also suck up such fluids.
- The swash-type 16-blade impelly achieves high suction performance. (-8m at 20°C)
- Using the appropriate volute, clearance and port position achieves high efficiency. (ηp max.: 32.5%)
- The motor (4-pole) developed specifically for self-priming pumps achieves a rigid structure (load-side bearing size increased; axial thrust amount: 0).
- The soundproofing sheet attached to the inside of motor cover reduces noise due to resonance.



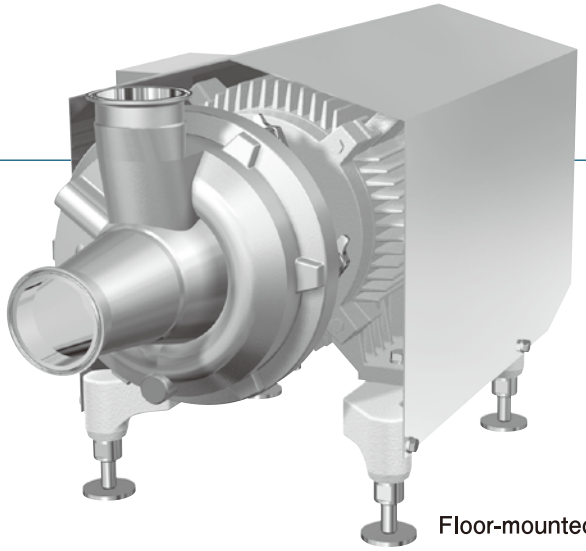
► Cross-section view



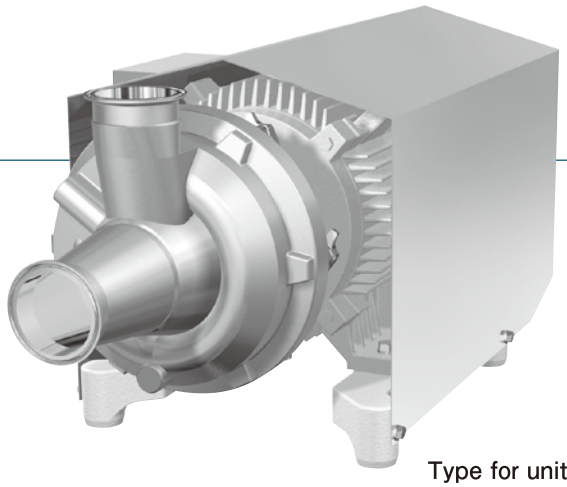
* Packings conform to food hygiene test (Ministry of Health and Welfare notification).

* Refer to "(1) Material classification" on Page 10.

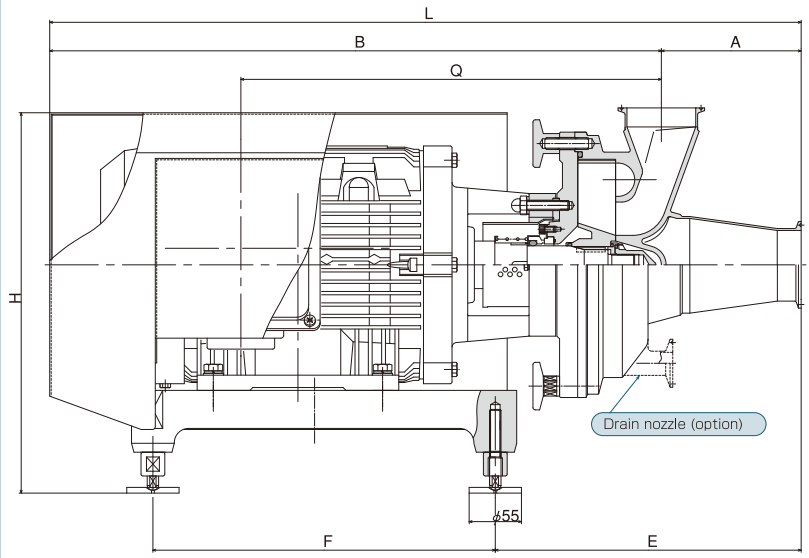
3.7 to 15kW direct-coupled type (integrated motor/shaft type)

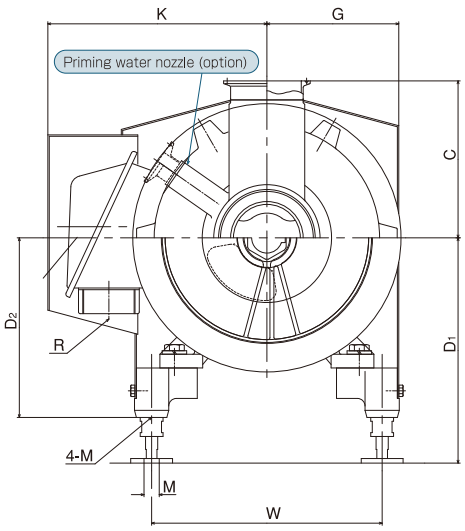


Floor-mounted type



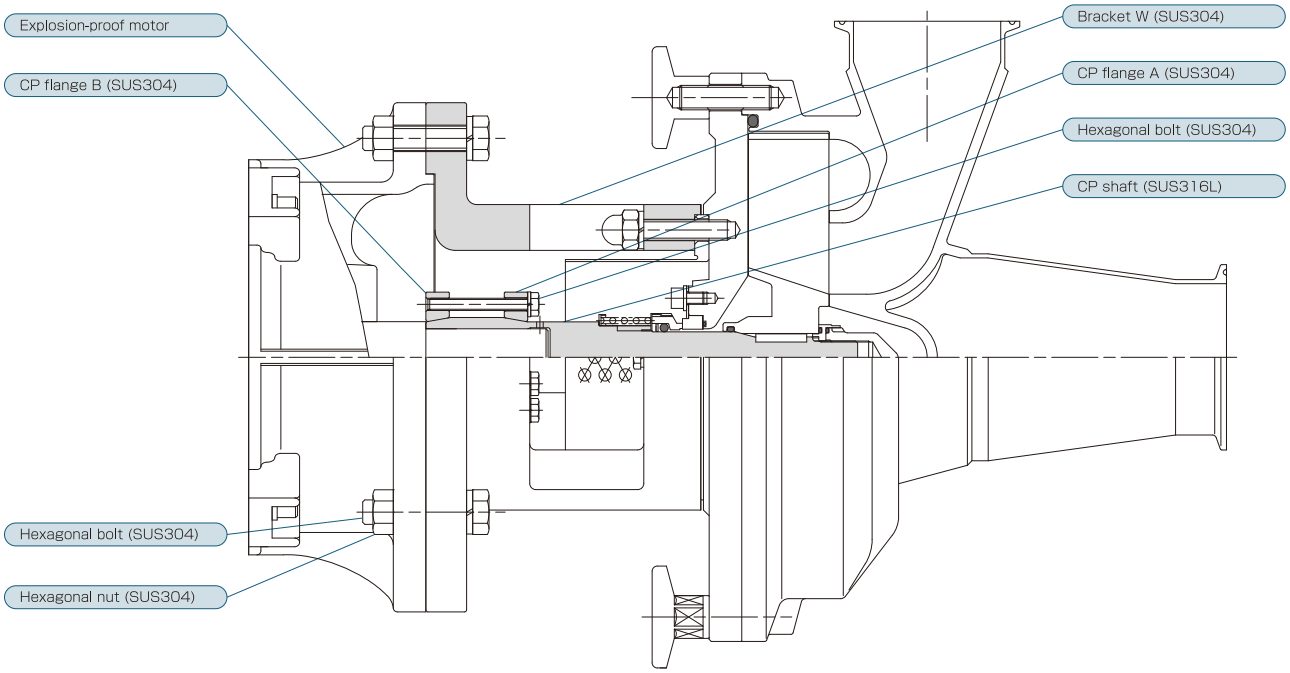
Type for unit





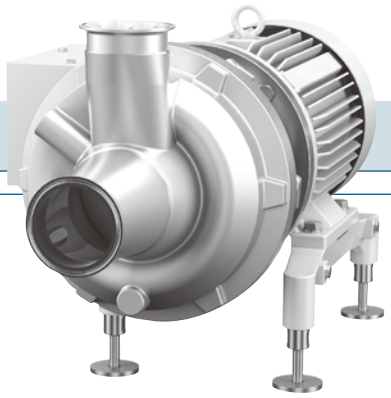
SIZE	Product type	Q	A	B	L	E	F	W	M	G	K	D1	D2	C	H	R	
																Indoor	Outdoor
30	P*L4*037*S*	363.5	147	565	712	299	345	210	M12	126	209	250	182	165	385	ϕ28	G 3/4
	P*L4*055*S*	422	147	623	770	353	260	276	M12	157	264	290	237	165	452	ϕ36	G 1 1/4
	P*L4*075*S*	460	147	653	800	332	360	271	M12	157	264	260	197	165	422	ϕ36	G 1 1/4
	P*L4*110*S*	511	147	755	902	346	360	314	M16	178.5	291	290	225	165	485	ϕ52	G 1 1/2
	P*L4*150*S*	531	147	775	922	366	360	314	M16	178.5	286	290	225	165	485	ϕ52	G 1 1/2
40	P*L4*037*S*	363.5	45	565	610	197	345	210	M12	126	209	250	182	267	385	ϕ28	G 3/4
	P*L4*055*S*	422	45	623	668	251	260	276	M12	157	264	290	237	267	452	ϕ36	G 1 1/4
	P*L4*075*S*	460	45	653	698	230	360	271	M12	157	264	260	197	267	422	ϕ36	G 1 1/4
	P*L4*110*S*	511	45	755	800	244	360	314	M16	178.5	291	290	225	267	485	ϕ52	G 1 1/2
	P*L4*150*S*	531	45	775	820	264	360	314	M16	178.5	286	290	225	267	485	ϕ52	G 1 1/2

► Cross-section view (P * C type)

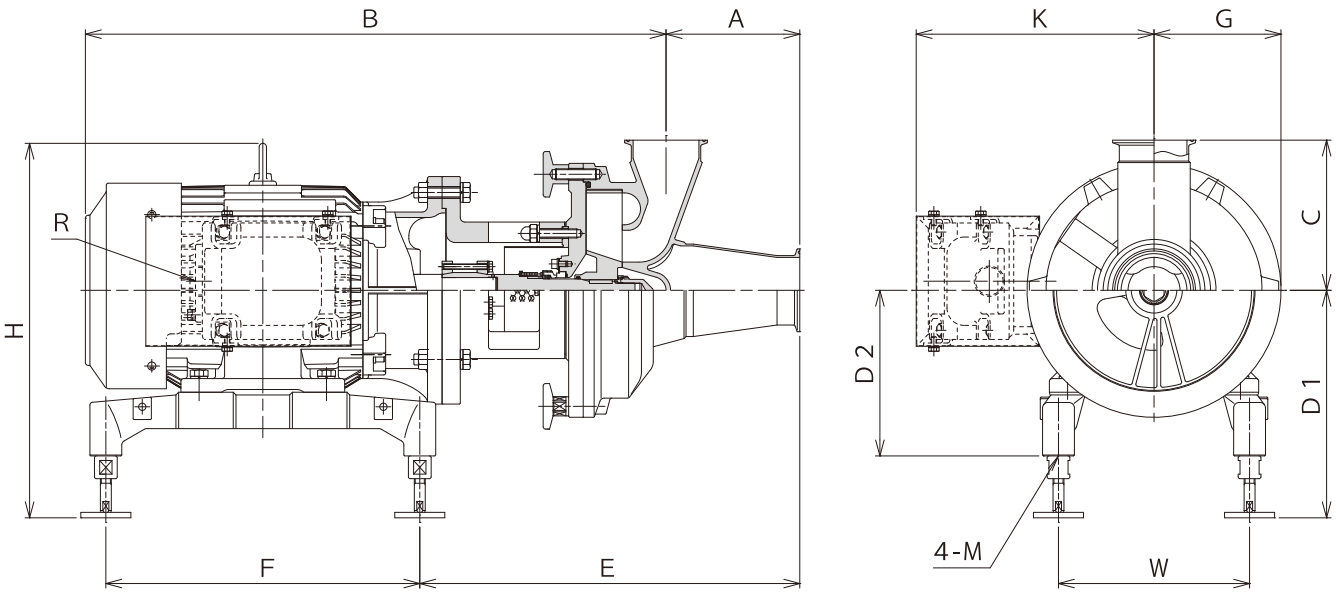


3.7 to 7.5kW Coupling type (explosion-proof motor)

P*C type



Use of explosion-proof motor (d2G4) enables not only energy-saving operation combined with an inverter but also use in Class I hazardous area.



SIZE	Product type	A	B	C	D1	D2	E	F	W	M	G	K	H	R
30	P*C4*037*S*	147	638	165	250	182	417.5	345	210	M12	139.5	261	411.5	PF 1
	P*C4*055*S*	147	710.5	165	290	237	476	260	276	M12	158	320	466.5	PF 1 1/4
	P*C4*075*S*	147	748.5	165	260	197	455	360	271	M12	158	320	436.5	PF 1 1/4
40	P*C4*037*S*	45	638	267	250	182	315.5	345	210	M12	139.5	261	411.5	PF 1
	P*C4*055*S*	45	710.5	267	290	237	374	260	276	M12	158	320	466.5	PF 1 1/4
	P*C4*075*S*	45	748.5	267	260	197	353	360	271	M12	158	320	436.5	PF 1 1/4

Sanitary pump characteristics table

Allowable error

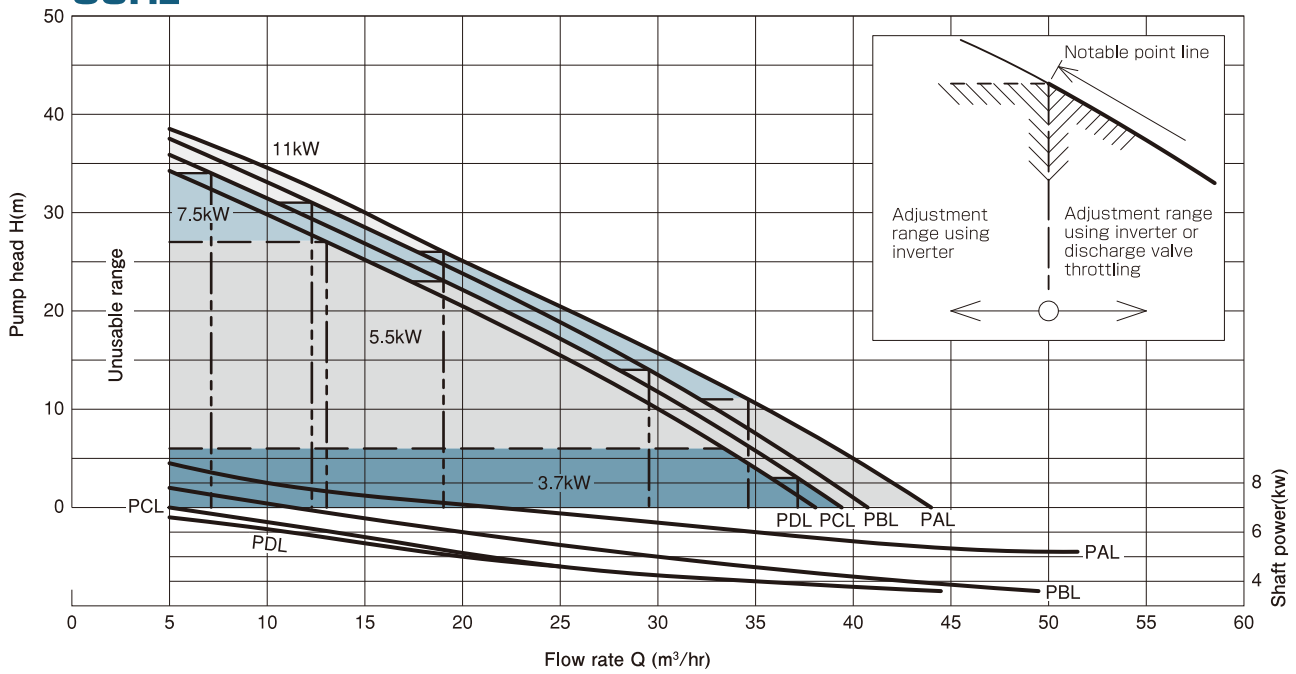
ISO 2548 Q ± 8%
ISO 2548 H ± 6%

1500rpm. synchr. 50Hz
1800rpm. synchr. 60Hz

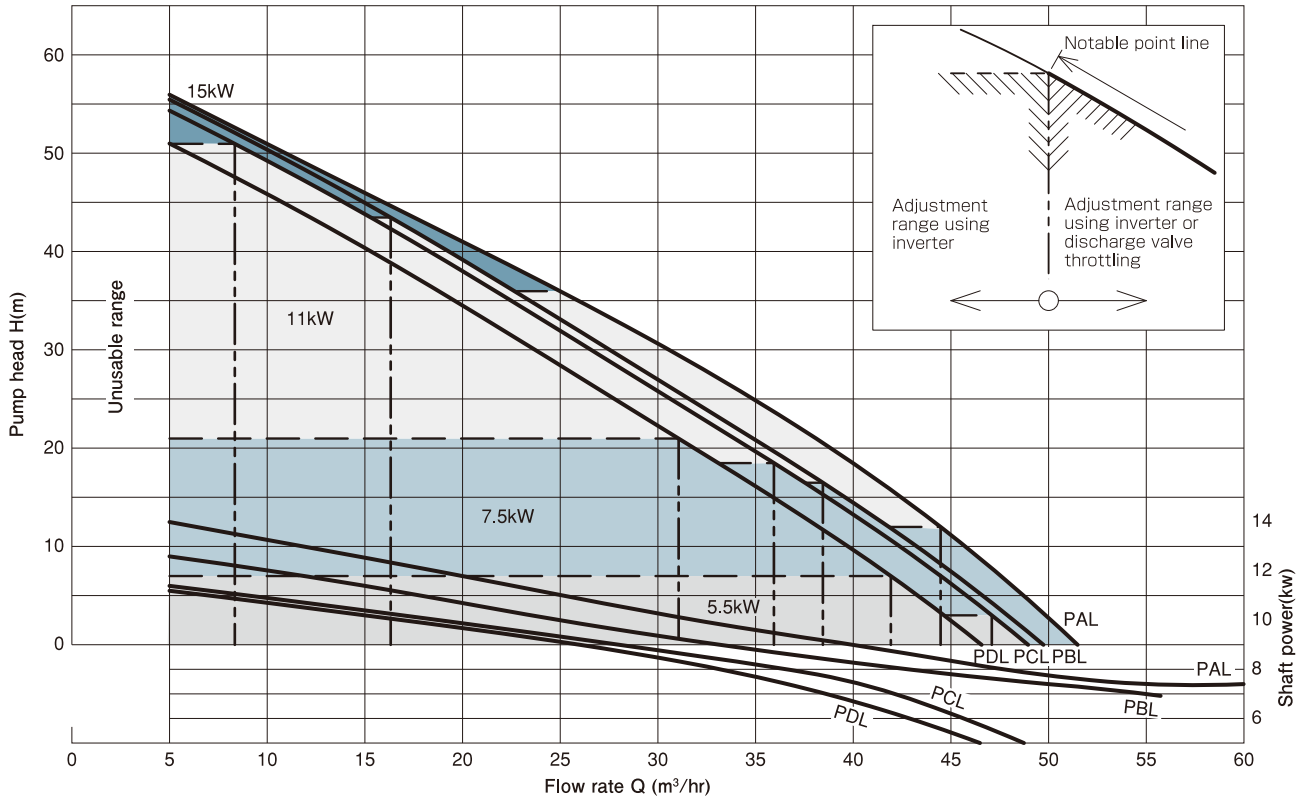
Note

The performance curve is shown based on the actual motor rotation speed.
Be sure to consider some allowance for motor power.

50Hz



60Hz



Important points for pump selection and operation

► Fluids specification

● The range of fluids that can be handled by this pump is shown below:

Specific gravity	γ	(kg/m3)	1500 or less
Viscosity	ν	(mPa·s)	100 or less
Temperature	T	(℃)	-5 to 100 (SIP at 120°C within 30 minutes is permitted)
Slurry		(w%)	Not permitted in general

► Pump head and capacity calculation

● The pump does not allow you to perform shutoff operation as a rule. However, if it is needed to control, please contact us.

● The discharge output of this pump will be a balance between the pipe resistance and the pump properties (Q-H curve).

● Please perform pump head calculation correctly for the designated flow rate. If the pump head is unclear, select the motor power with a margin applied and install an inverter.

► Suction operation

● Although this pump can not only feed fluids which are a mixture of gas and liquid but can also suck up such fluids to a certain degree, the following points should be observed.

1) Leave at least 6ℓ remaining liquid in the casing.

2) If operating for a long time, use a quenching-type mechanical seal.

Prime the pump as needed.

► Optional parts

● The following optional parts are available for this pump:

1) Motor: Outdoor type; types with different voltages

2) Mechanical seal type: Quenching type; double mechanical type

3) Mechanical seal material: Ceramic; carbide

4) Other: Priming water nozzle (with 10A ferrule)

Drain nozzle (with 1S ferrule)

► Mechanical seal selection standards

Material	Fluid properties (upper limit)				Item
		Temperature	Slurry	Viscosity	
Carbon x ceramic	(1)	−10~120℃	≦0.3%	≦300cp	——
Ceramic x ceramic	(1)	−10~60℃	0.3~1%	>300cp	——
	(2)	>60℃	0.3~1%	>300cp	Need to undergo quenching (external cooling).
Superhard x superhard	(1)	−10~60℃	0.3~0.8%	>250cp	——
	(2)	>60℃	0.3~0.8%	>250cp	Need to undergo quenching (external cooling).

► Motor rating table

Efficiency	Frame No.	Insulation	Capacity kW	Number of poles	200V/50Hz		200V/60Hz		220V/60Hz		Bearing No.	
					rpm	A	rpm	A	rpm	A	BRG.D.S	BRG.O.S
IE3	112M	F	3.7	4	1460	15.6	1750	14.4	1760	13.8	6207ZZ-C3	6306ZZ-C3
	132S		5.5	4	1460	21.6	1755	20.6	1765	19.2	6310ZZ-C3	
	132M		7.5	4	1450	29.6	1745	28	1755	26.6		
	160M		11	4	1475	45	1770	42	1775	40		6307ZZ-C3
	160L		15	4	1470	60	1765	56	1775	54		
IE1	Explosion-proof 112M	B	3.7	4	1420	14.6	1710	14.2	1730	13.4	6207ZZ	6206ZZ
	Explosion-proof 132S		5.5	4	1430	22.6	1720	21	1730	19.8	6308ZZ	6207ZZ
	Explosion-proof 132M		7.5	4	1440	29.6	1730	28	1740	26.4		

Self-priming pump specifications

Date:

Orderer name	
Client destination name	
Client destination address	

Pump type	316	P 4
Tag.no		
No. of units	units	

1 Application

- ☐ Complete liquid discharge
- ☐ Gas-liquid mixture transfer
- ☐ Vacuum pump

Remarks .....

2 Fluid

1) Liquid name		
2) Specific gravity	γ	
3) Viscosity	ν	mPa·s / mPa·s
4) Temperature	T	℃ / ℃
5) Slurry		☐ Not applicable ☐ Applicable (%) / ☐ Not applicable ☐ Applicable (%)

Remarks .....

3 Performance

1) Discharge amount	Q	～ m³/h / ～ m³/h
2) Total pump head	H	m / m
3) Discharge pump head	hd	m / m
4) Suction pump head	hs	m / m

Remarks .....

4 Power source, etc.

Voltage	V	☐200 ☐220 ☐ V
Frequency	f	☐50 ☐60 ☐ INV
Use place		☐ Indoor ☐ Outdoor
Temperature		～ ℃
Installation		☐ Installed on floor ☐ Anchor ☐ Unit ☐ Other

Remarks .....

5 Operation

Start-up Operation	Continuous (h/day) Intermittent (times/day)

Remarks .....

6 Piping

Size	☐ 3S ☐ 4S ☐ Other ( )
Joint fitting	☐ Male ☐ Clamp ☐ Other ( )

Remarks .....

7 Options

Priming water nozzle	☐ Not necessary ☐ Necessary (15A)
Drain nozzle	☐ Not necessary ☐ Necessary (1S)
Motor	☐ Totally-enclosed outdoor ☐ Totally-enclosed indoor

Selection specifications		Symbol
Material	Main body: SUS316 or equivalent Packing	316
Finish	External GBS Internal Pickling Electrolytic polishing	
Pipe end	M C	
Size	30 40	
Back plate	A B C D	
Frequency classification	E W	
Motor capacity	kW	
Motor classification		
Mechanical seal	Single Quenching	
Mechanical material	S×C S×S T×T	
Options		

Accessary

Pump head calculation, etc.

Piping diagram

Section for entry of special notes

- ○ If using nonstandard specifications for the lubricant application specifications on Page 1, be sure to designate them.
- ○ If the specification is not specified, lubricant is applied.
- ○ Safety of lubricant to be applied:
- ○ NSF category H1
- ○ Conforming to the Food Sanitation Law

Self-priming pump type symbol table

Name	JIS material classification	Finish classification ×	Pipe end classification × ×	Size classification	Product name/type
Symbol		0 P · 1 E ·	M · C · W	*1 — H	P 4

① ② ③ ④ ⑤ Basic symbol ⑥ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ No. of motor poles: 4P ⑦ Basic size: φ220

*1: H(Top runner motor)

① Material classification

Symbol	Material	
	Metal part (main body)	O-ring
316	SUS 316L (or equivalent)	Fluororubber
316-E	SUS 316L (or equivalent)	EPDM
316-S	SUS 316L (or equivalent)	Silicone rubber

② Motor base material

Symbol	Material
—	FC20
S	SUS304

③ Finish classification

Symbol	Details	Note
0P	(Internal) Pickling (External) Beads shot blasting	Standard
IE	(Internal) Electrolytic polishing finish Ra 6.3 (External) Bead shot blasting	Option

④ Pipe end classification

Symbol	Details	Note
M	ISO male	Shown in the order of suction x discharge. If both are the same, discharge will be omitted.
C	ISO clamp	
N	ISO nut	
T	Sanitary flange	
10F	JIS 10K flange	

⑤ Size classification

Symbol	Details	Note
30	Suction: 3s; discharge: 3s	~30m³/h
40	Suction: 4s; discharge: 4s	31m³/h~

⑥ Back plate classification

Symbol	Details	Note
A	Volute (large)	Select from the specifications and characteristics table. Pump head ▽ Power ▽
B	Volute (medium)	
C	Volute (small)	
D	Volute (fine)	

⑦ Shaft surface specifications

Symbol	Details
L	Direct connection type (Motor/shaft integrated type)
C	Direct coupled type (Explosion-proof motor / shaft type)

⑧ Frequency classification

Symbol	Details	Note
E	50Hz operation	1500rpm
W	60Hz operation	1800rpm

⑨ Motor capacity classification

Symbol	Details
037	3.7kW
055	5.5kW
075	7.5kW
110	11kW
150	15kW

⑩ Motor type classification

Symbol	Details	
B	200/220V 50/60Hz	Totally enclosed fan-cooled semi-outdoor
O	200/220V 50/60Hz	Totally enclosed fan-cooled outdoor
C	Various voltages	Totally enclosed fan-cooled semi-outdoor
P	Various voltages	Totally enclosed fan-cooled outdoor
X	Other	
Z	200/220V 50/60Hz	Explosion-proof outdoor
Y	400/440V 50/60Hz	Explosion-proof outdoor

Semi-outdoor means that only shaft seal on the load side has outdoor specifications.

⑪ Mechanical seal type

Symbol	Details
S	Single mechanical seal
C	Mechanical seal with quenching

⑫ Mechanical seal classification

Symbol	Details (Sliding part material)	
	Seal R	Floating S
C	Carbon M6-C	Ceramic ES-4
S	Ceramic ES-4	Ceramic ES-4
T	Tungsten carbide TC-3	Tungsten carbide TC-3

* M6-C, ES-4, TC-3 are manufacturer's own code.

⑬ Options

Symbol	Details
—	No option
D	With drain nozzle
S	With priming water nozzle
F	With drain and priming water nozzles
U	Unit type
G	Unit type with drain nozzle
H	Unit type with priming water nozzle
J	Unit type with drain and priming water nozzles

Examples

PCL4E 055 BSCD indicates:
* Back plate C is used
* 50Hz operation
* 5.5kW standard motor
* Standard mechanical seal
* With drain nozzle

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