

Metering pumps LK series



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Applicable to the many diverse needs of chemical

Iwaki's systematic LK series metering pump consists of the worm gear type dual-cam driving section, which is compact yet rigid and reliable, and wet-end materials of which there are seven types for various applications. With long and market-proven experience, Iwaki has employed state-of-the-art pump technologies in the development of an ideal type of chemical feeding pump which has advantages such as quality, performance, ease of operation and cost efficiency. The LK series is suitable for many chemical liquid feeding processes used in a wide range of fields, including water treatment, chemicals, fabrics, paper mill, food processing, and medicine.

Various types and materials

Nine types (IWAKI original motor) and eight general purpose motor types are available to suit each user's needs in accordance with feeding rate from small to large capacity. Also, material variation has been improved. Selection of the pump material most suitable for the applied liquid is possible with seven different types available.

High performance and application-oriented versatile design

Discharge accuracy (stability) is within $\pm 2\%$ FS. Reliability is considerably enhanced through efforts to improve the linearity of the stroke / discharge ratio as well as the dispersion between stroke.

Three types of joints flange, hose and union joints are standardized for the connections. The optimum piping system can be selected. (Only with 0.2kW IWAKI original motor type)

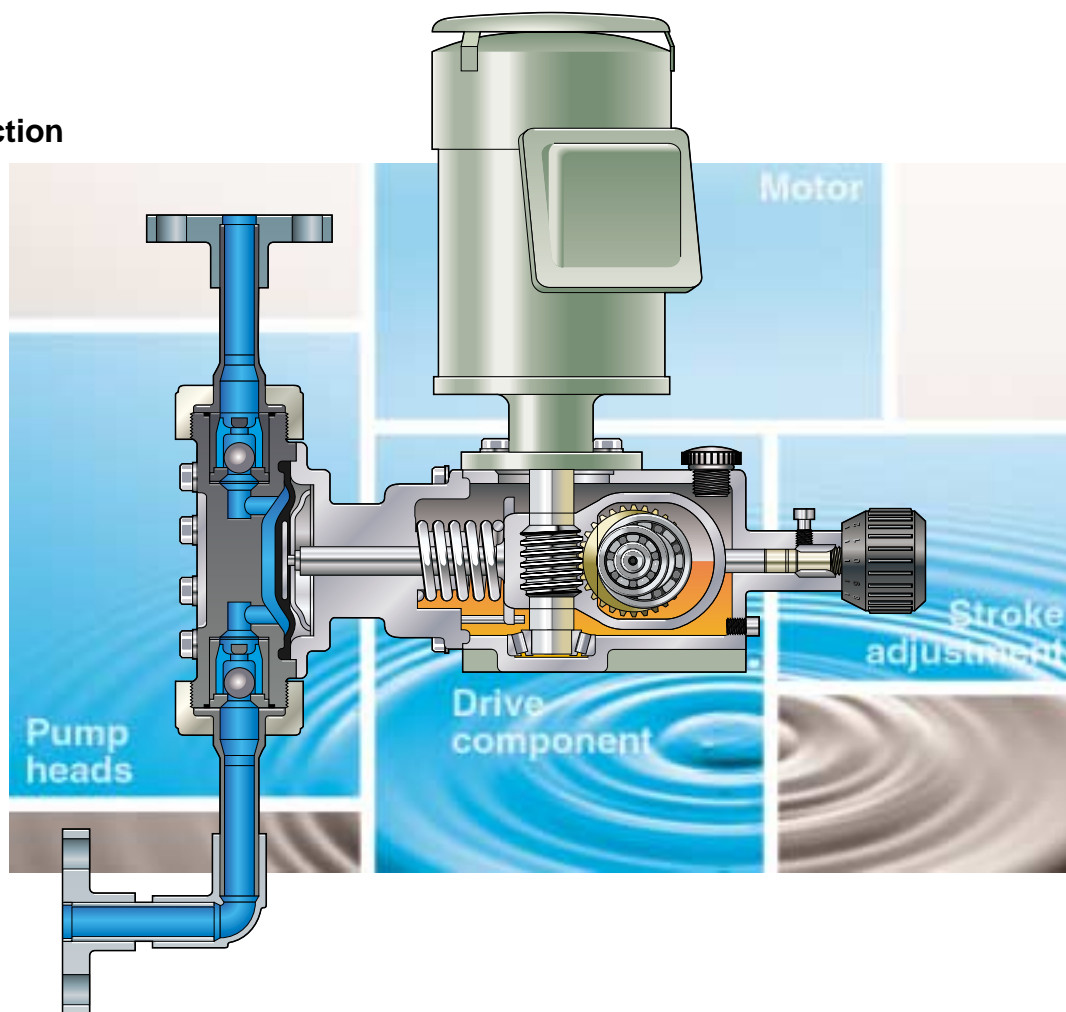


feeding

- Accurate transfer of strong acid
- Proportional feeding of additive
- Automatic dilution of chemical liquid
- Chemical liquid concentration control
- Automatic process control related to pH
- Replenishing of chemicals
- Accurate quantity coating of coating material
- Liquid sampling
- Accurate quantity spraying
- Metering set-up
- Pressurized transfer or filtering of various types of slurries



Construction



Pump heads

Drive from the gear reduction unit is directly transmitted to the diaphragm. This type of metering pump is economical and simple with a high degree of versatility. With the employment of moulded PVC pump-head, and with the new standardisation of three types of connections using flanges, hose, or union joints (0.2kW type), not only a saving in parts cost but also improved flexibility of installation has been realized. The three main pump head materials are PVC, stainless steel, or fluororesin. The most suitable type for the application can be selected from a total of seven different materials. A wide range of chemicals, such as acid, alkaline, organic solvent, slurry, and high-temperature liquids, is covered by the series.

Drive component

The head of the LK series is the dual-cam system driving section with a highly reliable, built-in worm gear type speed reducer. The compact and rigid mechanism is a result of the design goal to achieve maximum wear resistance in continuous operation. In addition to the worm gear which is designed with a considerably large module ratio, the material is aluminium bronze, and a taper roller bearing is used at the end of the worm gear for the efficient transmission of motor power to the pump section. A fully enclosed oil bath lubrication system is employed to permit outdoor installation. The durability in continuous operation over a long period of time is also excellent.



Motor

All of the standard models employ totally enclosed outdoor-use motors which are vertically mounted to save space. The 0.2kW type is an IWAKI original motor, which is installed in the small models of the LK series. Besides the standard 200V, other voltages are available. The LK series pumps of LK-F, LK-A, LK-B, and LK-C can be installed with general-purpose motors, including those for different voltage levels and explosion-proof specifications. Body configurations of the LK series are available in five types. They are an IWAKI original motor type frame and the general-purpose motor type frames, F, A, B and C.

Stroke adjustment

Accurate and reliable stroke setting is possible with the micrometer type dial of the springback type stroke adjustment mechanism. An electric servo unit for automatic process control, such as flow, pressure, pH, temperature, and concentration can be arranged according to the user's needs.

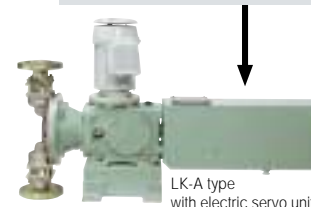
Electric servo system Specifications

- **Input signal :**
DC4 - 20mA (or 1 - 5V)
- **Power source :**
AC100V 50/60Hz: other voltage types available
Voltage fluctuation $\pm 10\%$
- **Motor output :**
LK (0.2kW) 15W
LK-A, B, C 40W

Detection terminal
pH, Temperature, Humidity, Flow,
Density, Pressure Liquid quantity, etc.

Adjustment meter

Positioner



Specifications

Model	Capacity L/min		Max. Pressure MPa		Stroke speed spm		Effective diaphragm dia. mm	Max. stroke length mm	Connection			Motor output kW	Approx net weight kg						
	Note 1		Note 2		Note 3				Note 5										
	50Hz	60Hz	PVC	SUS	50Hz	60Hz			Flange (JIS10K) mm	Union	Hose mm		PVC	SUS					
LK-11	0.020	0.024	1.0	1.5	48	58	ø22	1.5	15A (PVC) JIS16K (SUS)	VP16 (PVC)	ø4 x ø9 (PVC) ø12 x ø18 (PVC)	0.2 (Three phase) or 0.25 (Single phase)	12	14					
21	0.050	0.060			96	116	ø30	2.0					12	14					
22	0.10	0.12			48	58	ø60	2.5					12	17					
31	0.25	0.30			96	116							14	21					
32	0.50	0.60			48	58	ø72	6.0					16	26					
45	0.85	1.00			96	116							16	26					
47	1.7	2.0			0.8	48	58	ø100					10	25A	-	-	0.4	63	80
55	2.8	3.3			0.5	96	116											70	73
57	6.0	7.2	0.3	48	58	ø138	17.5	40A	-	-	0.75	100	100						
LK-A55	2.8	3.3	1.0	48	58	ø138	17.5	40A				105	105						
A57	6.0	7.2	0.7	48	58	ø150	20	50A	-	-	1.5	120	120						
A65	9.0	10.8	0.3	72	86	ø150	20	50A				140	155						
B65	9.0	10.8	0.5	0.7	48	58	ø205	20	65A	-	-	1.5	140	155					
B75	13.3	16.0	0.5	96									116	140	155				
C76	20	24	0.5	0.3	72	86	ø205	20	65A	-	-	1.5	140	155					
C86	33	40	0.3										96	116	140	155			
C87	45	54													140	155			

Note 1: The capacity is the value when maximum discharge pressure is applied (with pure water at room temperature). The value may be larger than indicated in the table if the discharge pressure is lower.

As for the liquid conditions pumped and performance, refer to the technical information of this catalogue.

Note 2: The maximum discharge pressure of LK-A models are restricted to 0.7MPa for A55, 0.5MPa for A57 and 0.2MPa for A65 when IEC standard 0.37kW motor is adopted.

Note 3: PVDF-made TC hose connection is available only with 11 to 22 type (Order-based production). VS type connection is different in some models from standard.

Note 4: The LK type is equipped with Iwaki original flange motor. The standard is 200V 3-phase, totally enclosed fan-cooled outdoor type.

Other motors for different voltages, explosion-proof motors, or single-phase motors are available.

LK-F, LK-A, B and C are to be installed with general purpose flange motors.

Note 5: The weight is the value when installed with a totally enclosed fan-cooled outdoor motor.

• Standard accessory : A siphon preventing valve, strainer and 4m PVC tube are furnished to hose connection type of simplex LK-11 to LK-45 VH or VC A base is furnished to all LK-A, LK-B and LK-C models.

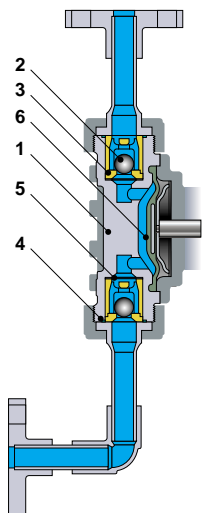
For LK-(F) 11 to LK-(F) 57 models, the base may be supplied optionally.

• Coating color : A39-60D (JPMA) (However, the motors for LK-F/A/B/C use the maker's standard color.)

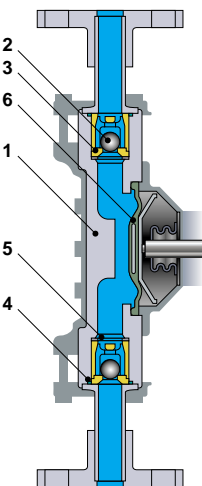
• Duplex type : LK-11 to 47 type include duplex types with a special-use integrated drive section.

Materials

LK-11 to LK-57 (Flange type)



LK-A55 to LK-C87 (Flange type)



Type	VC	VH	VS4	VS	TC	S6	S4
Application	Acids	Alkalines		Viscosity and Slurry	Strong acids	Solvents	
Applicable type	11 to 87	11 to A57	A65 to C87	11 to C87	11 to B65	11 to A57	A65 to C87
1: Pump head	PVC				PVDF	SUS316	SCS13
2: Valve ball	CE	HC	SUS304	HC / SUS304	Alumina ceramic	HC	SUS304
3: Valve seat	Type11 to 32	FKM	EPDM	PVC	SUS304	FKM	SUS316
	Type41 to 84	PVC		SUS304	PVDF	SUS316	SUS304
4: O ring	FKM	EPDM			FKM	-	
5: Valve gasket	PTFE					PTFE	
6: Diaphragm	PTFE + EPDM						

Typical chemical

VC: Sulfuric acid, Hydrochloric acid, Sodium hypochlorite
VH, VS4: Caustic soda, Coagulant. Calcium hydroxide (low density)
VS: Calcium hydroxide, Highmolecular coagulant
TC: Concentrated sulfuric acid, Hydrofluoric acid, Mixed acid
S6, S4: Organic solvent, Paper making chemicals

Material symbols

PVDF: Poly vinylidene fluoride resin
SCS13: Stainless-cast steel equivalent to SUS304
CE: Ceramic
FKM: Fluoro rubber
EPDM: Ethylene propylene rubber
HC: Hastelloy C276

Note 1: Materials of the VS type valve balls are HC for 11 to A57 type and SUS304 for B65 to C87 type.

As for the connection, which is different in some models from standard,

Note 2: A stainless steel pump SE type for latex emulsion is available (LK-31 to 57 type)

Pump identification

2 LK-A 65 VC H-04 F E S

1 2 3 4 5 6 7 8 9 10

Item	LK (IWAKI original motor type)	LK-F / A / B / C (JEM or IEC motor type)
1 Simplex / Duplex	None : Simplex, 2 : Duplex (special drive section:LK-11 to 47)	None : Simplex
2 Series name	L series : Mechanical driven diaphragm type	
3 Drive section	None : IWAKI original motor type 0.2kW / 0.25kW	F : 0.25 or 0.37 kW (for IEC), 0.4kW, A : 0.4kW, B : 0.75kW, C : 1.5kW
4 Type No.	First digit : Diaphragm (pump head size) Second digit : Speed-reducing gear ratio 1 • 5 : 1/30, 2 • 7 : 1/15, 6 : 1/20	
5 Material symbol	Refer to the material table (Ex. VC, VH, VS4, VS, TC, S6, S4)	
6 Joint	None : Flange, U : union (LK-11 to LK-47), H : hose (LK-11 to LK-47)	
7 Motor output	O2 : 0.2kW, O3 : 0.25kW (single phase)	O4 : 0.4kW, O7 : 0.75kW, 15 : 1.5kW
8 Special motor	-	F : Inverter motor (Note : General-purpose motors have no explosion-proof symbol.)
9 Servo unit	E : With electric servo unit	
10 Special symbol	S : Special specification other than standard.	

Note 1 : This table dose not introduce the standard combination. Please contact us for details.

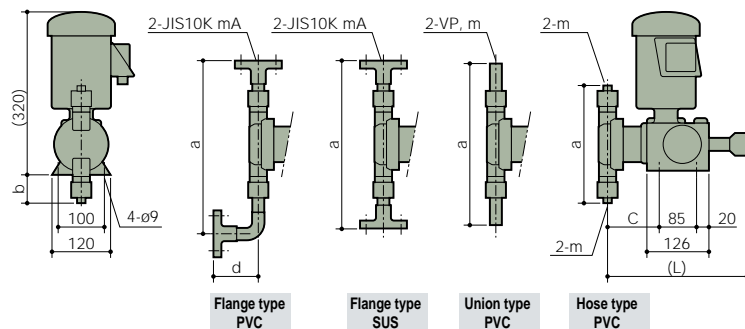
Note 2 : In case of pump without motor installation, the above item 7 and 8 are not indicated.

Dimensions (in mm)

Dimensions may be changed without prior notice for the purpose of product improvement.

Be sure to carry out installation work with the most recent and detailed drawings. which are available upon request

LK-11 to LK-57 (Original motor type)

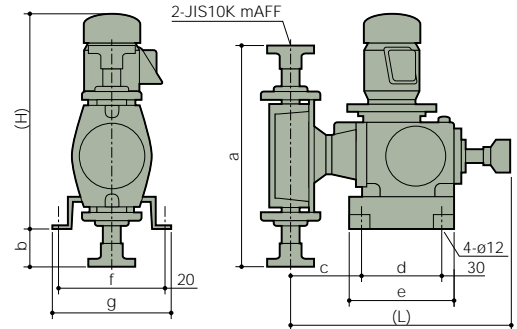


Model	Hose type PVC					m	Union type PVC					m	Flange type PVC					m	Flange type SUS					m
	L	a	b	c			L	a	b	c	m		L	a	b	c	d		m	L	a	b	c	
LK-1	274	146	23	95		274	240	70	95	16	274	264	86	95	89	15	272	141	20	92	15			
2	274	164	32	95		274	258	79	95	16	274	282	95	95	89	15	272	151	25	92	15			
3	277	224	62	97	Note 1	277	318	109	97	16	277	342	117	97	89	15	277	184	42	97	15			
4	281	244	62	99		281	338	119	99	16	281	362	135	99	89	15	283	261	80	101	15			
5	-	-	-	-		298	314	107	114	25	298	338	125	114	97	25	295	320	109	111	25			
47VS	-	-	-	-		291	272	86	99	25	281	308	104	99	97	25	-	-	-	-	-			

Note 1: Connection size LK-1 and LK-2 ø4mm x ø9mm, LK-3, LK-4 and LK-1 to LK-4 VS type ø12mm x ø18mm.

For information of TC type, please contact IWAKI or nearest distributor.

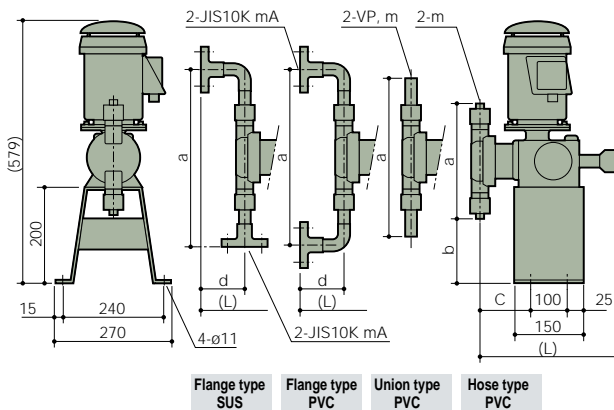
LK-A55 to LK-C87 (General purpose motor type)



Model	PVC				m	SUS				m	Note 2							
	L	a	b	c		L	a	b	c		H	d	e	f	g	m		
LK-A5	476	325	-29	119		473	320	-32	108		547	180	240	260	300	25		
A6	532	599	108	154		533	431	24	164		547	180	240	260	300	40		
B6	595	599	90	164		605	431	6	174		594	240	300	310	350	40		
B7	599	600	90	167		610	465	23	178		594	240	300	310	350	50		
C7	599	600	90	167		610	465	23	178		601	240	300	310	350	50		
C8	605	647	114	173		609	633	107	177		601	240	300	310	350	65		

Note 2: These dimensions are common between PVC pump head and SUS pump head.

LK-F1 to F5 (General purpose motor type)



Model	Hose type PVC					Union type PVC					Flange type PVC					Flange type SUS						
	L	a	b	c	m	L	a	b	c	m	L	a	b	c	d	m	L	a	b	c	d	m
LK-F1	274	146	177	87	Note 1	274	240	130	87	16	363	272	114	87	89	15	332	156	180	85	60	15
	2	274	164	168		87	274	258	121	87	16	363	290	105	87	89	15	332	166	175	85	60
3	277	224	138	89		277	318	91	89	16	366	350	75	89	89	15	337	201	158	90	60	15
4	281	243	128	92		281	337	81	92	16	370	369	65	92	89	15	343	270	120	94	60	15
5	-	-	-	-		298	314	93	107	25	395	350	75	107	97	25	399	368	90	104	104	25
47VS	-	-	-	-		281	272	114	92	25	378	308	96	92	97	25	-	-	-	-	-	-

Note 1: Connection size LK-1 and LK-2 ø4mm x ø9mm, LK-3, LK-4 and LK-1 to LK-4 VS type ø12mm x ø18mm.

For information of TC type, please contact IWAKI or nearest distributor.

Optional accessories

Siphon preventing valve



Model	BVC-1P□-L-□H	BVC-1P□-□H
Applicable capacity	Up to 1L/min	
Setting pressure	0.05 - 0.3MPa	0.3 - 0.8MPa
Material	PVC, FKM (EPDM)	
Connection mm (Applicable tube diameter)	Inlet Outlet	4 x 9, 12 x 18 PT3/8 and PT1/2

□ : Symbol for material of O-ring ("V" for FKM, "E" for EPDM)

Air chamber



PVC, A type



PVC, N type



SUS, A type



SUS, A type

Body	Model	Applicable capacity L	Setting pressure MPa	Connection Nominal size JIS10K flange	Weight kg
PVC	A-1V□	1.0	0.5	Common for 15A - 25A	2
	A-2V□	2.0			2.5
	A-5V□	5.0			4.5
	N40A-10V(2)-F *	10			16
	N50A-20V(2)-F *	20			26
SUS 316	A-05S6-()	0.5	0.9	10, 15, 20A	3
	A-1S6-()	1.5		15, 20, 25A	5
	A-5S6-()	5.0		25, 40A	12
	A-10S6-()	10		40, 50A	15
	A-20S6-()	20		50, 65A	29
	A-30S6-()	36		65A	55

* : Material for O-ring 10V / 20V for CR, 10V2 / 20V2 for FKM

□ : Symbol for material of O-ring ("V" for FKM, "E" for EPDM)

() : Symbol for connection (10, 15, 20, 25, 40, 50 or 65)

Note1 : The weight is the value of the product only. (The weight of liquid applied is not included)
Note2 : Rigid PVC chamber may deteriorate with ultraviolet ray or the applied chemical liquid long period of time. The chamber should be replaced every three years to guarantee

Relief valve and back pressure valve



3-25 PVC type



2-25 SUS type

List of relief valve

Body	Model	Max. capacity L/min	Setting pressure MPa	Connection Nominal size JIS10K flange	Weight kg
PVC	RV-1P□-4H	1.0	0.3 - 0.8	ø4 x ø9 PVC Hose	0.2
	RV-1P□-12H	1.0	0.3 - 0.8	ø12 x ø18 PVC Hose	0.2
	RV-1P□-15	1.0	0.3 - 0.8	15A	0.5
	RV-1P□-20	1.0	0.3 - 0.8	20A	0.5
	RV-1P□B-15	1.0	0.8 - 1.0	15A	0.5
	RV-3P-15	3.0	0.3 - 1.0	15A	0.6
	RV-3P-20	3.0	0.3 - 1.0	20A	0.6
	RV-3P-25	3.0	0.3 - 1.0	25A	0.9
	RV-3P□-12H	3.0	0.3 - 1.0	ø12 x ø18 PVC Hose	0.4
	RV-3P□-12P	3.0	0.3 - 1.0	ø12 x ø16 PE Hose	0.4
	RV-3P□-13E	3.0	0.3 - 1.0	ø13 x ø20 PE Hose	0.4
	RV-7V-20	7.5	0.3 - 0.8	20A	3.0
	RV-7V-25	7.5	0.3 - 0.8	25A	3.5
	RV-7VB-20	7.5	0.8 - 1.0	20A	3.0
	RV-7VB-25	7.5	0.8 - 1.0	25A	3.5
	RV-25V-25	25	0.3 - 0.8	25A	4.0
	RV-25V-40	25	0.3 - 0.8	40A	4.0
	N50RV-5V-F	50	0.15 - 0.5	50A	18
	N50RV-5V2-F	50	0.15 - 0.5	50A	18
	N65-50RV-5V-F	70	0.15 - 0.5	65A	18
	N65-50RV-5V2-F	70	0.15 - 0.5	65A	18
SUS	RV-2S6-15	2.0	0.3 - 0.8	15A	3.5
	RV-2S6B-15	2.0	0.8 - 1.5	15A	3.5
	RV-7S6-25	7.5	0.3 - 0.8	25A	6
	RV-7S6B-25	7.5	0.8 - 1.5	25A	6
	RV-25S6-25	25	0.3 - 0.8	25A	7.5
	RV-25S6B-25	25	0.8 - 1.0	25A	7.5
	RV-25S6-40	25	0.3 - 0.8	40A	7.5
	RV-25S6B-40	25	0.8 - 1.0	40A	7.5
	N50RV-5S6-F	80	0.15 - 0.5	50A	29
	N65RV-5S6-F	120	0.15 - 0.5	65A	42
PVDF	RV-1T□-15	1.0	0.3 - 0.8	15A	0.5
	RV-7T□-15	7.0	0.3 - 0.8	15A	5
	RV-7T□-25	7.0	0.3 - 0.8	25A	5
	RV-25T□-25	25	0.3 - 0.8	25A	5
	RV-25T□-40	25	0.3 - 0.8	40A	5.5

□ : Symbol for material of O-ring ("V" for FKM, "E" for EPDM)

O-ring material of N type is "5V2" for FKM.

Note : Material for diaphragm is PTFE except RV-1P and N type.

Material of diaphragm is same as O-ring material at RV-1P and N type.

List of back pressure valve

Body	Model	Max. capacity L/min	Setting pressure MPa	Connection Noeminal size JIS10K flange	Weight kg
PVC	BV-1P□-4H	0.005 - 1.0	0.3 - 0.8	ø4 x ø9 PVC Hose	0.2
	BV-1P□-12H	0.005 - 1.0	0.3 - 0.8	ø12 x ø18 PVC Hose	0.2
	BV-1P□-15	0.005 - 1.0	0.3 - 0.8	15A	0.5
	BV-1P□-20	0.005 - 1.0	0.3 - 0.8	20A	0.5
	BV-1P□L-4H	0.005 - 1.0	0.05 - 0.3	ø4 x ø9 PVC Hose	0.2
	BV-1P□L-12H	0.005 - 1.0	0.05 - 0.3	ø12 x ø18 PVC Hose	0.2
	BV-1P□L-15	0.005 - 1.0	0.05 - 0.3	15A	0.5
	BV-1P□L-20	0.005 - 1.0	0.05 - 0.3	20A	0.5
	BV-3P□-12H	0.005 - 1.0	0.1 - 0.8	ø12 x ø18 PVC Hose	0.4
	BV-3P□-12P	0.005 - 1.0	0.1 - 0.8	ø12 x ø16 PE Hose	0.4
	BV-3P□-13E	0.005 - 1.0	0.1 - 0.8	ø13 x ø20 PE Hose	0.4
	BV-3N□-12H	0.03 - 3.0	0.1 - 0.3	ø12 x ø18 PVC Hose	0.4
	BV-3N□-15	0.03 - 3.0	0.1 - 0.3	15A	0.6
	BV-3N□-20	0.03 - 3.0	0.1 - 0.3	20A	0.6
	BV-3N□-25	0.03 - 3.0	0.1 - 0.3	25A	0.9
	BV-7V-20	0.2 - 7.5	0.05 - 0.8	20A	3.0
	BV-7V-25	0.2 - 7.5	0.05 - 0.8	25A	3.5
	BV-25V-25	2 - 25	0.1 - 0.8	25A	4.0
	BV-25V-40	2 - 25	0.1 - 0.8	40A	4.0
	N50BV-5V-F	2.5 - 50	0.15 - 0.5	50A	18
	N50BV-5V2-F	2.5 - 50	0.15 - 0.5	50A	18
SUS	N65-50BV-5V-F	5 - 70	0.15 - 0.5	65A	18
	N65-50BV-5V2-F	5 - 70	0.15 - 0.5	65A	18
	BV-2S6-15	0.02 - 2.0	0.05 - 0.8	15A	3.5
	BV-7S6-25	0.2 - 7.5	0.15 - 0.5	25A	6
	BV-25S6-25	2 - 25	0.1 - 0.8	25A	7.5
	BV-25S6-40	2 - 25	0.1 - 0.8	40A	7.5
	N50BV-5S6-F	2.5 - 80	0.15 - 0.5	50A	29
	N65BV-5S6-F	5 - 120	0.15 - 0.5	65A	42
PVDF	BV-1T□-15	0.005 - 1.0	0.05 - 0.8	15A	0.5
	BV-7T□-15	0.2 - 7.0	0.05 - 0.8	15A	5
	BV-7T□-25	0.2 - 7.0	0.05 - 0.8	25A	5
	BV-25T□-25	2 - 25	0.1 - 0.8	25A	5
	BV-25T□-40	2 - 25	0.1 - 0.8	40A	5.5

□ : Symbol for material of O-ring ("V" for FKM, "E" for EPDM)

O-ring material of N type is "5V" for CR, or "5V2" for FKM.

Note : Material for diaphragm is PTFE except BV-1P and N type.

Material of diaphragm is same as O-ring material at BV-1P and N type.

Points to be observed in pump installation and piping

Iwaki metering pump LK series are reciprocating pumps employing the eccentric cam system. Reciprocating pumps generate pulsation in the suction and discharge piping. Special consideration, (different from the ordinary centrifugal pumps), should be given to this point when planning the pump installation and piping.

• Prevention of pipe vibration

Discharge side inertial resistance $P_{id} < 0.1\text{MPa}$

- P_{id} : Inertial resistance on discharge side

Inertial resistance means the pulsated impact force generated by the flow just upon entering discharge stroke. It is a phenomenon particular to a reciprocating pump which is generated as a result of the sudden application of acceleration to the liquid in the discharge piping. The condition " $P_{id} < 0.1\text{MPa}$ " is given above as an approximate standard. If P_{id} becomes 0.1MPa or higher, vibration on the pipe is generated. So measures should be taken to cope with the influence of vibration on the pump, too.

Measures

1. Install pulsation prevention device (air chamber).
2. Enlarge the diameter and shorten the length of the discharge piping.

• Prevention of overfeeding

Pump differential pressure > Inertial resistance P_i

- The larger one of the suction side or the discharge side

Overfeeding means excessive flow of the liquid due to abnormal functioning of the check valve caused by pulsation of the liquid in the piping. Check carefully in case the differential pressure is low and in case the piping is too long even with the differential pressure value at 0.03MPa.

Measures

1. Install air chamber.
2. Install back pressure valve

• Prevention of suction failure

$NPSH_a > NPSH_r$

$$NPSH_a = P_a - P_v \pm P_{hs} - P_{is} \text{ * MPa}$$

*Or P_{fs} : whichever is the larger.

(NPSH : Net positive suction head)

If $NPSH_a$ is not sufficient, the pump may be damaged by the flow-break or cavitation generated under such conditions.

- $NPSH_a$: Absolute NPSH (MPa)
- $NPSH_r$: Required NPSH (value particular to the pump) (MPa)
- P_a : Absolute pressure onto the tank liquid surface (MPa)
- P_v : Liquid vapour pressure (MPa)
- P_{hs} : Pressure caused by the height of the suction side (MPa)
(Flooded suction : +, Negative suction : -)
- P_{is} : Inertial resistance on the suction side (MPa)
- P_{fs} : Piping resistance on the suction side (MPa)



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()Country codes



Caution for safety use: Before use of pump, read instruction manual carefully to use the product correctly.

Actual pumps may differ from the photos. Specifications and dimensions are subject to change without prior notice. For further details please contact us.