

Smoothy Metering Pumps

PKD/PKP

Pulse rate within $\pm 5\%$ · BLDC Motor of high control ability · Air Chamber Free



KEMPION



ISO 9001
Certified Company

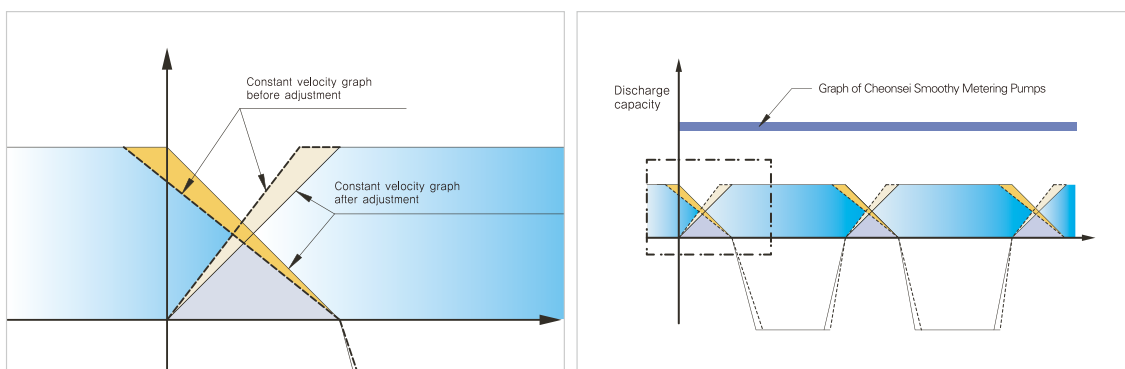
KEMPION

Smoothy metering pumps

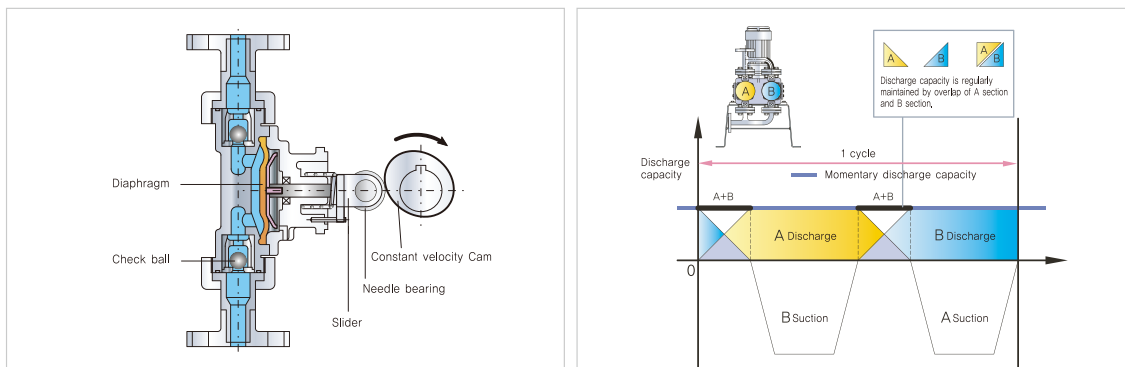
have developed with Advanced Patent Technology.

In general, metering pumps have advantages for high discharge pressure, fixed quantity and corrosion resistance, but it could be restricted for use according to the process because it has characteristic arising pulsation in injection side caused by operating principle. Cheonsei has developed constant velocity cam which removes its characteristic radically and has completed Smoothy Metering Pumps as patent technology for correction of constant velocity cam. It has acquired Certificate of New Excellent Product(NeP) and Excellent Performance Certification(EPC) by patent technology.

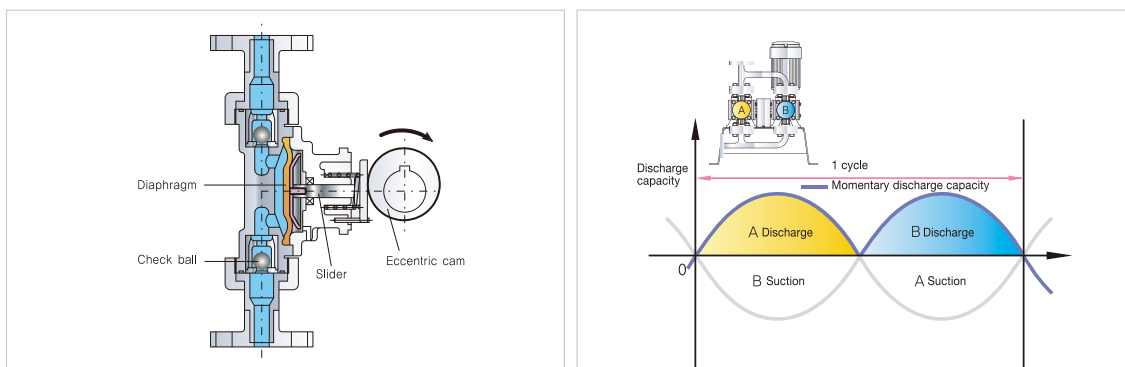
Patent Principle of adjustment for constant velocity cam



Achievement of the best pulse rate through compensation graph for distorted phenomenon caused by change of contact points between cam bearing.



Discharge waves of Cheonsei Smoothy Metering Pumps



Discharge waves of general Metering Pumps

PKD : Diaphragm type **KEMPION** Smoothy Metering Pumps

☑ Automatic proportion remote control of discharge capacity by BLDC motor

BLDC motor which has excellent speed (discharge capacity) control ability has been installed.

- Increased confidence of discharge capacity by RPM Feedback control
- Proportion remote control by 4~20mA input signal
- No need for concern about motor damage at low speed operation
- Simplified electric equipment, possible to control the discharge rate to minimum 10% operation of full scale



☑ Model Code

	①a	①b	①c	②a	②b	②c	③	④	⑤	⑥	⑦
PKD	2	1	2	S	T	S	F	W	S	1	2

① Capacity

$$a \times 10^{c+1} + b \times 10^c = 21 \times 10^2 = 2100(\text{mL/min})$$

② Liquid End Material

(a) – Pump Head P : PVC F : PVDF(PTFE)

S : STS304 6 : STS316

(b) – Diaphragm T : PTFE E : EPDM

(c) – Check Ball C : Ceramic S : STS316

③ Connection Type

F : Flange connection X : Special

④ Viscosity Limit

W : Standard V : High Viscosity

⑤ Power Supply

S : 3-phase, 380~480V A : 3-Phase, 200~230V

X : Special

⑥ Junction Pipe

1 : Attached 2 : Attached + Relief Valve 0 : Excluded

⑦ Remote Control Method

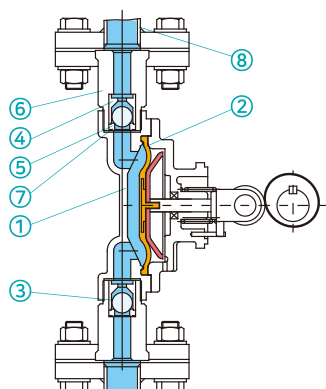
0 : Inverter Motor

2 : BLDC M/C Unit (Auto)

3 : BLDC M/C Unit (Manual)

Note) 1. 1.5kW-grade available only for 3-phase. 2.2kW-grade available only for 3-phase 380~480V.

☑ Standard Liquid End Material



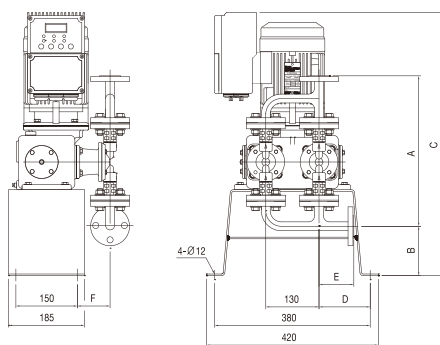
Parts	PTC (PES)		FTC		STS (6TS)	
	500~102	212~813	500~333	423~813	500~102	212~813
① Head	PP	PVC	PVDF	PTFE	SSC13(14)	
② Diaphragm	PTFE (EPDM)		PTFE		PTFE	
③ Check ball	CERAMIC(STS316)		CERAMIC		STS316	
④ Ball guide	PP	PVC	PVDF		PVDF	SSC13(14)
⑤ Ball seat	FKM(EPDM)	PVC	PTFE	PVDF	PTFE	STS304(316)
⑥ Joint	PP	PVC	PVDF		SSC13(14)	
⑦ O-ring, Packing	FKM(EPDM)	FKM	PTFE		PTFE	
⑧ Confluent pipe	PVC		PVDF		STS304(316)	

☒ Specifications

Specifications		PKD - Series																
		500	121	241	521	102	212	412	702	143	113	203	243	333	423	613	813	
Max. capacity	mL/min	50	120	240	520	1040	2100	4100	7000	14900	11200	20700	24000	33000	42000	61000	81000	
Max. discharge pressure	bar (PSI)	10						8	5	3	7	5	7	5	5	3		
Pulse Rate (F/S)	%	±5.0																
Stroke Length	mm	3	4			6			10			15	12.5	17.5		15	20	
Stroke Number	SPM	58		116	58	116	58	116	58	116	87							
Connection	FLANGE	KS 10K 15A						KS 10K 25A			KS 10K 40A			KS 10K 50A				
Max. Liquid Temp.	℃	STS, 6T6 : 0~80℃ / PTC, FTC : 0~50℃ / Ambient temperature : 0~40℃																
Weight	kg	37			38		53		60		90	95	130		140	170	175	
BLDC M/C UNIT	Driver	Power Supply	200V Class : 1Ø, 3Ø AC200~240V / 400V Class : 3Ø AC380~480V															
		Input signal	RPM : DC4~20mA RUN/STOP : CLOSE-RUN, OPEN-STOP															
		Output Signal	RPM : DC4~20mA (Isolated, Load Resistance : 500) Operating Setting : REMOTE, LOCAL, AUTO, MANU Dry Contact (1a) Operating Status : RUN, STOP Dry Contact (RUN : 1a, TRIP : 1a1b)															
		Control range	10~100% of Max. RPM															
		Display	RPM : 0~100%, Over Current : E.oC, Error of Analog Input Signal : E.or Short Circuit : E.SC, Error of Hall Sensor : E.HC, Over Heat : E.tE															
		Other functions	RATIO operation (Setting range : 0~100% of remote input signal)															
	Motor		0.55kW, FR71									0.75kW, FR80		1.5kW, FR90			2.2kW, FR90	
8 Poles Brushless DC / Max. rpm : 1750 / Insulation Class : F / IP66																		
Painting		Munsell No 0.6PB 4.8/10.6 (The color of the motor is manufacturer standard.)																
Self priming		1m/Never use this pump to transfer liquid containing slurry or solid																

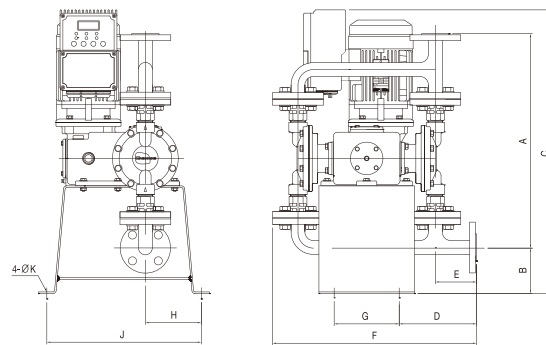
☒ **Dimension**

PKD-500~102



PKD-212-813

(Unit:mm)



Dim	A			B			C			D			E			F			G	H	J	K
	PTC	FTC	STS	PTC	FTC	STS	PTC	FTC	STS	PTC	FTC	STS	PTC	FTC	STS	PTC	FTC	STS				
500	390	380	348	119	122	131	643			125			74	70	85	77		76	—	—	—	—
121, 241	390	380	348	119	122	131										81		80				
521, 102	410	400	368	109	112	121										448		453				
212, 412	516	500	422	112	118	151	698			155		190	99	90	101	448		453	160	138	380	12
702, 143	625	596	524	70	80	116				193	185	215				510	503	502				
113	625	596	524	129	139	174				230	229	234				625	623	645				
203	637	614	567	123	130	152	754			234	233	241	99	90	101	632	630	645	200	178	465	15
243, 333	938	935	807	134	135	190				305	302	314	128	125	110	863	863	874				
423	944	937	854	131	134	166				338	335	343	128	125	110	869	869	878				
613, 813	1092	1061	926	153	164	134	1012	927		367	358	342	149	139	114	963	954	948				

PKP : Plunger type **KEMPION** Smoothy Metering Pumps

☑ Automatic proportion remote control of discharge capacity by BLDC motor

BLDC motor which has excellent speed (discharge capacity) control ability has been installed.

- Adjustment of precise injection under high pressure by double check valve type
- Increased confidence of discharge capacity by RPM Feedback control
- Proportion remote control by 4~20mA input signal
- No need for concern about motor damage at low speed operation
- Simplified electric equipment, possible to control the discharge rate to minimum 5% operation of full scale



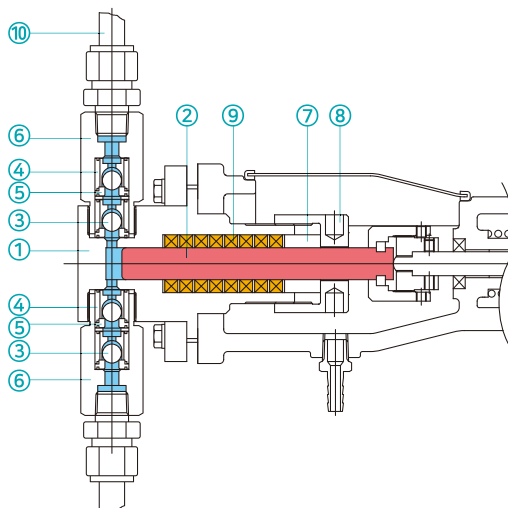
☑ Model Code

PKP	—	① 12	② 1	③ L	—	④ S	⑧ F	—	⑨ S	—	⑤ 1	⑩ 2
-----	---	---------	--------	--------	---	--------	--------	---	--------	---	--------	--------

① Plunger Diameter	12 : 12mm		
② Stroke Number	1 : 58SPM	2 : 116SPM (If the driving box size is M, 1 : 87SPM)	
③ Driving Box Size	L : 0.55kW	M : 0.75kW	
④ Liquid End Material	S : Standard(STS316)	X : Other	
⑧ Connection Type	F : Flange	X : Special	
⑨ Power Supply	S : 3-phase, 380~480V	A : 3-Phase, 200~230V	X : Special
⑤ Junction Pipe	1 : Attached	2 : Attached + Relief Valve	0 : Excluded
⑩ Remote Control Method	0 : Inverter Motor	2 : BLDC M/C Unit (Auto)	3 : BLDC M/C Unit (Manual)

[Note] 1. 1.5kW-grade available only for 3-phase. 2.2kW-grade available only for 3-phase 380~480V.

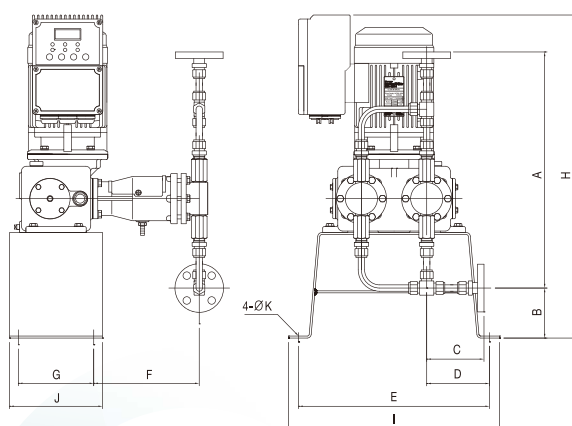
☑ Liquid End Material



Parts	Material
① Head	STS316
② Plunger	STS316+HCr
③ Checkball	STS316
④ Ball Guide	SSC14A
⑤ Ball Seat	STS316
⑥ Joint	STS316
⑦ Gland Ring	STS316
⑧ Gland Nut	STS316
⑨ Gland Packing	PTFE + ARAMID
⑩ Junction Pipe	STS316

✓ Dimensions

(Unit:mm)



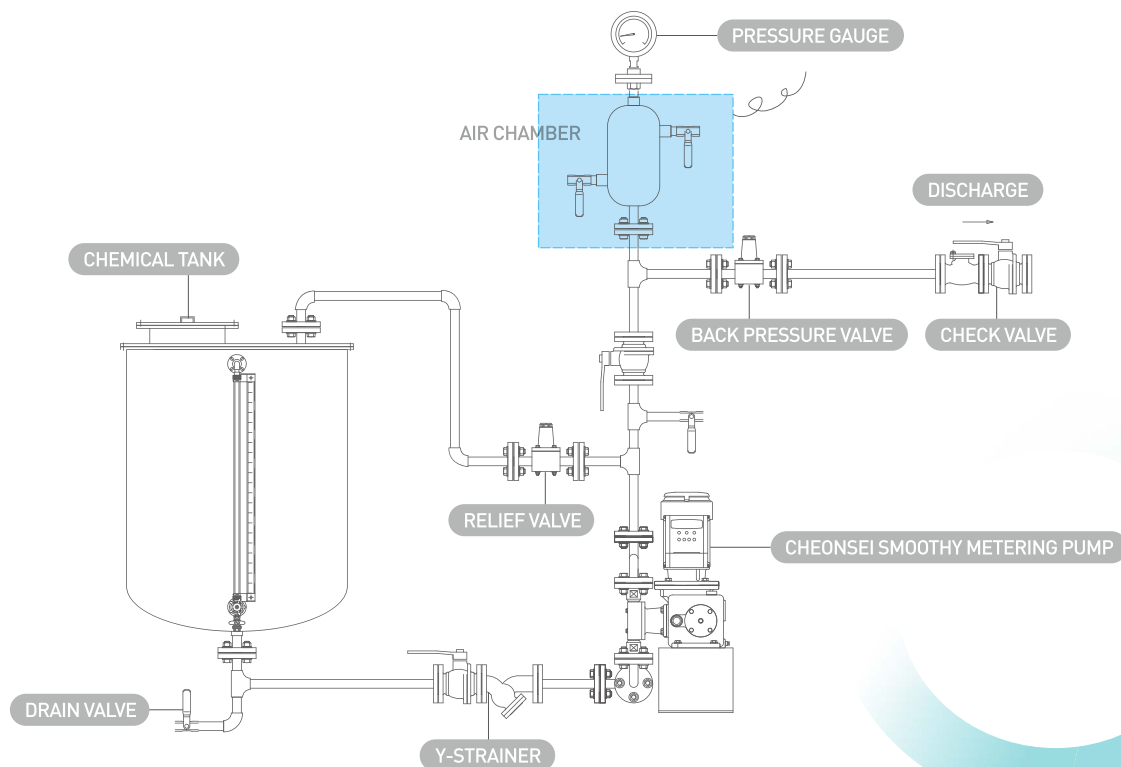
Dim	A	B	C	D	E	F	G	H	I	J	K
061L	441	114				199					
062L	441	114				199					
121L	441	114				202					
122L	441	114				202					
161L	465	102				209					
162L	465	102	117	125	380	209	150	643	420	185	12
221L	471	99				210					
222L	471	99				210					
301L	509	80	115			206					
302L	509	80				206					
061M	441	261				234					
121M	441	261				236					
161M	465	249	117			243					
221M	471	246		177	555	244	170	802	590	300	12
301M	509	227				240					
401M	547	211	121			240					
501M	581	195				241					

✓ Specifications

Specifications		PKP - Series																	
		061L	062L	121L	122L	161L	162L	221L	222L	301L	302L	061M	121M	161M	221M	301M	401M	501M	
Max. capacity	mL/min	26	52	110	220	200	410	390	800	700	1480	60	255	480	920	1660	3070	4835	
Max. discharge pressure	bar (PSI)	160					100	104	52	56	28	200	225	160	123	68	38	24	
Pulse Rate (F/S)	%	± 2.0																	
Stroke Length	mm	10										15							
Stroke Number	SPM	58	116	58	116	58	116	58	116	58	116	87							
Connection	FLANGE	KS63K15A						KS40K15A		KS20K15A		-		KS63K15A		KS40K15A	KS20K15A	KS20K20A	
	THREAD	Rc1/4"				Rc3/8"				Rc1/2"		Rc1/4"		Rc3/8"		Rc1/2"		Rc3/4"	
Max. Liquid Temp.	℃	0~100℃ / Ambient temperature : 0~40℃																	
Weight	kg	54				56				60		93		95		99	105	107	
BLDC M/C UNIT	Driver	Power Supply	200V Class : 1Ø, 3Ø AC200~240V / 400V Class : 3Ø AC380~480V																
		Input signal	RPM : DC4~20mA RUN/STOP : CLOSE-RUN, OPEN-STOP																
		Output Signal	RPM : DC4~20mA (Isolated, Load Resistance : 500) Operating Setting : REMOTE, LOCAL, AUTO, MANU Dry Contact (1a) Operating Status : RUN, STOP Dry Contact (RUN : 1a, TRIP : 1a1b)																
		Control range	5~100% of Max. RPM																
		Display	RPM : 0~100%, Over Current : E.oC, Error of Analog Input Signal : E.or Short Circuit : E.SC, Error of Hall Sensor : E.HC, Over Heat : E.tE																
		Other functions	RATIO operation (Setting range : 0~100% of remote input signal)																
	Motor	0.55kW, FR71										0.75kW, FR80							
		8 Poles Brushless DC / Max. rpm : 1750 / Insulation Class : F / IP66																	
Painting		Munsell No 0.6PB 4.8/10.6 (The color of the motor is manufacturer standard.)																	
Self priming		1m/Never use this pump to transfer liquid containing slurry or solid																	

Note) 1. Above flange standard is only for discharge side. Flange standard of suction side is KS10K

Piping Diagram of KEMPION Smoothy Metering Pumps



Possible to achieve production process with high quality

It is possible to found automatic process and defect rate can be lowered, owing to immediate discharge response when stop & start.



Cost and space can be reduced by simplified piping installation

It is economical because length of piping can be shortened and installation place can be easily secured by no need for Air Chamber and Back Pressure Valve.



No need for Air Chamber

Because it remove the origin of pulsation by operating method of constant velocity cam, Air Chamber is not necessary.



Easy Maintenance

KEMPION Smoothy Metering Pumps Using constant velocity cam provides convenience for maintenance. Because it deos not need to fill up air for the function maintenance of Air Chamber.

☑ Applications

- **Power generation plant** : Remover for desulfurization and denitrification, hydrazine injection process.
- **Display materials** : Coating process of film membrane.
- **Foods** : Metering injection of food flavoring.
- **Paints** : Supplying paints for high pressure spray equipment.
- **Medical products** : Proportional injection of raw material for manufacturing process of pharmaceutical product.
- **Water treatment · Wastewater treatment** : Injection of Acid · Alkali counteragent.

Smoothy Metering Pumps

PKD / PKP



2020. 09
CSC-S-25