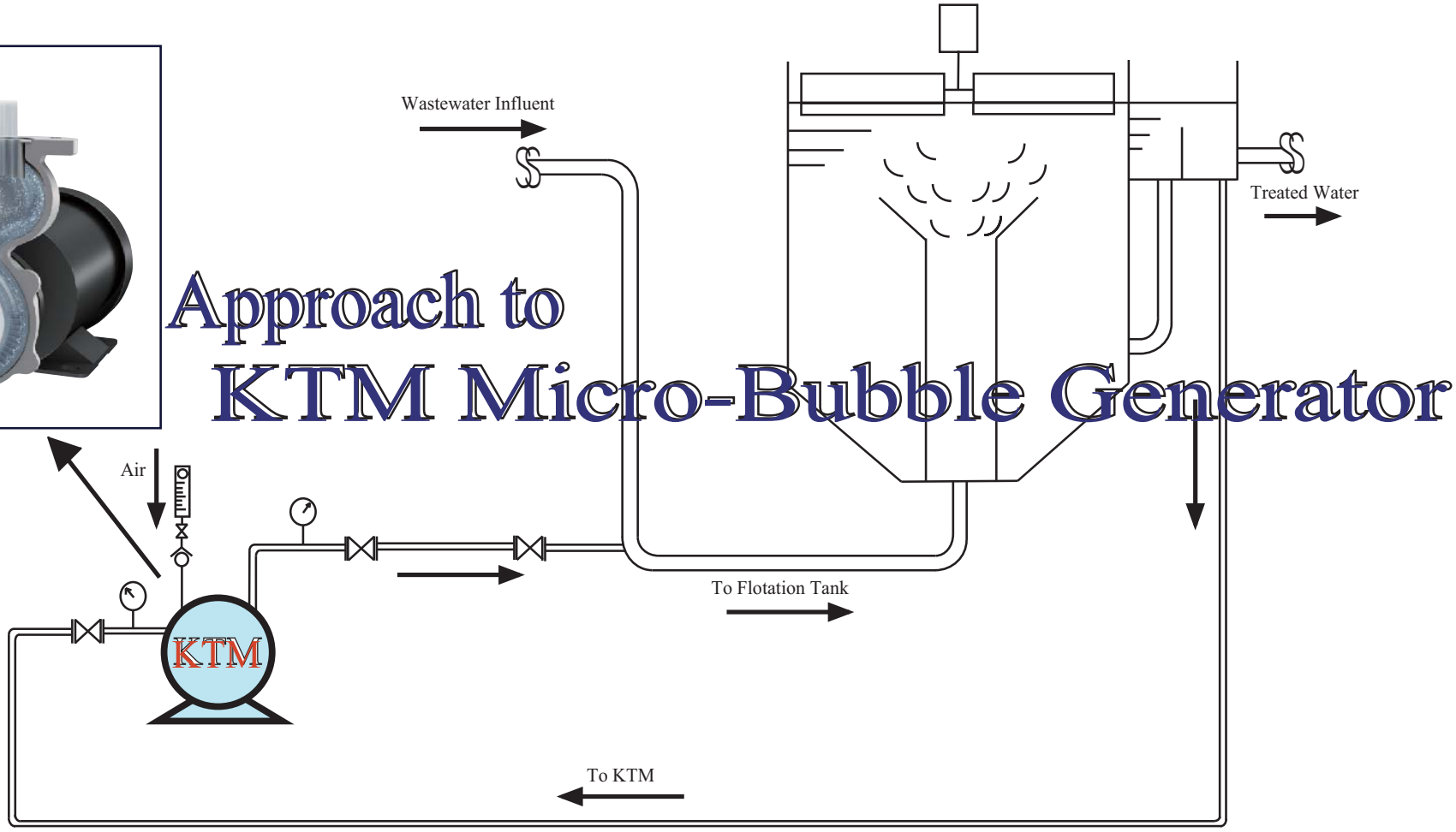
KTM Technical Booklet

Approach to KTM Micro-Bubble Generator



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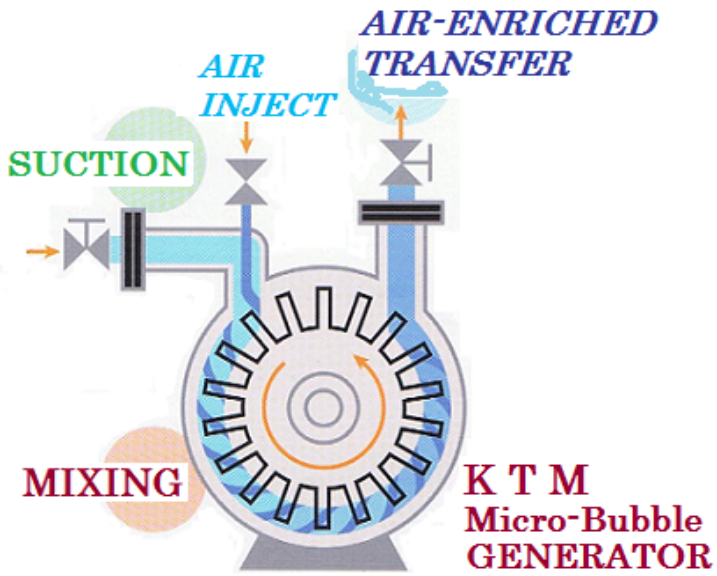
NIKUNI

Introduction

NIKUNI have supplied a unique compact micro-bubble generator, called KTM, contributing to remove contaminant particles with a small amount of chemical aid in the water purifying plant.



KTM has a highly precise and sophisticated pumping mechanism that can generates a plenty of micro-bubbles by three hydro-dynamic principles: negative pressure sucking both air and water simultaneously from each port; air effectively mixed into water; finally properly producing pressurized air-enriched discharge.

The pressurized air-enriched water is transferred into the bottom of the dissolved air flotation tank. Then it makes a bubble sparkling formation spreading and growing up to the water surface and finally form a sludge mat. It will be skimmed off.

Features of KTM

*High contaminant removal efficiency
--- supplying a highly dense micro-bubble formation
*Continuously steady dissolved air flotation
---fine adjustment not necessary during operation
*Applicable for additional installation
--- narrow space installation
*Minimum power consumption
--- power required for KTM only
*Easy maintenance and minimum operation cost
--- compact and simple in structure
*Quiet in operation
--- no compressor, controls, dissolve tank are required
*Any gas of air, oxygen, ozone, etc. available for your purpose

Applications and Industries Served

*Water clarifications for Dairies, Breweries, Fish/ Meat/ Live Stock Processing, Laundries, Pharmaceuticals, Membrane System Pre-treatment, Textile Effluent, Bakeries, Snack food Production
*Fiber Recovery in Pulp and Paper Mills
*Oil and Water Separation – Oil Recovery
*Industrial mfg. --- Removing mold release agent power-press lubricant
*Semiconductor mfg. ---Removing metallic compounds foreign matter
*Algae Biofuels / Algae Removal
*Municipalities ---Primary / Secondary Clarification for Drinking Water
*Vehicle Washers Effluent Treatment & Recycling

---- CONTENTS ----

KTM Model Selection Guide

The KTM models, available for the selection responding to various intension on the plant design stage, are roughly classified into three types; close-coupled type, bare pump and coupling type.

Material of the wetted part can be selected in Cast iron or SS304 for each model.
In addition, an assembly of check valve and air inject nozzle assembly is packed in KTM package of each model.

1. Close-coupled Type

A series of the most compact and complete set of the micro-bubble generator has been put in our arrangement, but without pump base. This model arrangement is restricted within a narrow range of KTM15 to KTM40.

2. Bare Pump

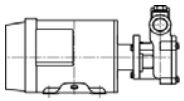
Individual KTM core, and basically original of Coupling Type. Pump base or channel base is basically not attached.

3. Coupling Type

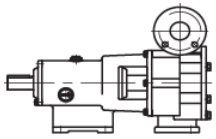
The coupling attached KTM models are most popularly in this market. Nikuni will supply bare pump, pump base (channel base) and coupling set with coupling guard only. Depending on your plant site environmental situation, the drive motor protection system can be applied.

4. Nozzle Assembly

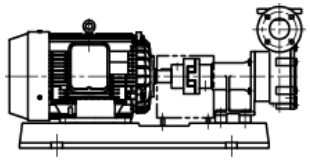
A nozzle and check valve assembled attached to every model, specified in correspondent to each model.



Closed-Couple Type



Bare Pump



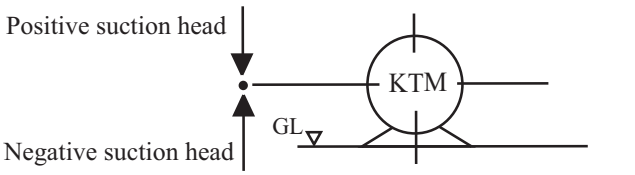
Coupling Type (Motor not included)

1. Techinical Comments on KTM and Relative Factors

Note (Important) : Suction & Discharge Valves, Compound & Pressure Gauges must be installed for initially fine adjustment

1. On motor nameplate
   - Voltage, output power of the motor & pump model are the ordered one.
   - Power source check
   - Confirm frequency, supplied voltage, kW rating & wiring works have been done well.
2. Inching test
   - Rotation smoothness & rotation direction is correct.
3. Piping
   - Those necessary valves, gauges have been installed, non-cavitation piping and suction head position.
4. Turn power OFF :
   - Prime water into KTM
   - Konb of the air parameter is shutted or close the air inject valve.
   - Suction & discharge valves are completed OPEN
5. Turn power ON :
   - Setting the dischanrge pressure into the range from 0.3MPa to 0.4Mpa (3 bar to 4 bar)
   - Setting the suction pressure into minus range from −0.02MPa to −0.03MPa. (approx. −0.2 bar to −0.3 Bar)
   - Open the knob of Airflow meter or valve as to drawn-in air automatically. (refer to page 9 for air volume adjustment)

1. Air Injection Control



Positive	Negative
Air Parameter Check Valve Air Inject Nozzle No special care required	Air Parameter Solenoid Valve Check Valve Air Inject Nozzle Solenoid valve open control : Set a delay from start of KTM 60-sec delay cover almost situation

On Air Inject Piping, “Check Valve” & “Nozzle” have been packed in “NIKUNI KTM” package

2. Micro-Bubble Keeping control

KTM - Flotation Tank [SHORT]

GATE & THROTTLE

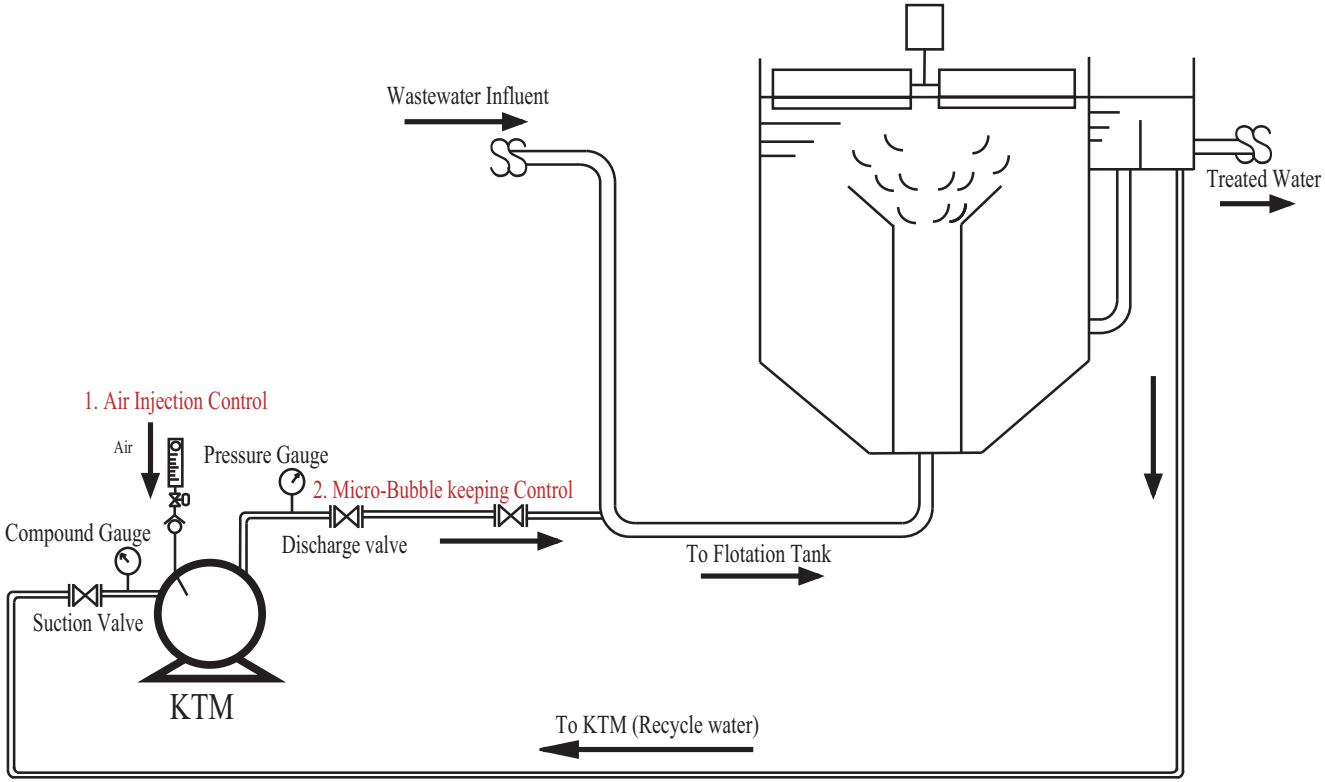
No Special consideration required

KTM - Flotation Tank [LONG / More than 2m]

GATE — THROTTLE

Fully open when operation

Gate and Throttle valves put in this order to prevent that bubbles attach to the inside wall of piping and they will grow up to lagre one. GATE is used for maintenance.



2. KTM Performace Tables

2-1. Typical Basic Data for KTM Models **(50Hz)**

Discharge Pressure : 0.4 MPa = 4kg / cm2 = 4 bar = 56 PSI Air / Water discharge Amount Ratio : 8%

1. Close-coupled Type

Motor : Three Phase TEFC indoors motor 200V to 460V, Single-phase(S) 100V to 230V AC available for 0.56kW motor only.

Model	Wetted Part Material	Motor Output (kW)				Air Flow Rate			Current (A)			
			L/min	m3/h	GPM	NL/min	Nm3/h	NGPM	200V	380V	400V	415V
KTM20FD04(S)ZM	Cast Iron / SS	**0.56**	16.6	1.00	4.4	1.3	0.08	0.4	2.50	1.30	1.30	1.20
KTM20ND04(S)ZM	SS304											
KTM25FD07ZM	Cast Iron / SS	**0.975**	25	1.50	6.6	2.0	0.12	0.5	4.10	2.20	2.10	2.10
KTM25ND07ZM	SS304											
KTM32FD15ZM	Cast Iron / SS	**1.95**	50	3.00	13.2	4.0	0.24	1.1	7.60	4.00	4.00	4.00
KTM32ND15ZM	SS304											
KTM40FD22ZM	Cast Iron / SS	**2.42**	80	4.80	21.1	6.4	0.38	1.7	10.20	5.30	5.10	5.10
KTM40ND22ZM	SS304											

2. Cloupling Type

Model	Wetted Part Material	Water Flow Rate			Air Flow Rate			Required motor power
		L/min	m3/h	GPM	NL/min	Nm3/h	NGPM	kW (HP)
KTM20F	Cast Iron / SS	16.6	1.00	4.4	1.3	0.08	0.4	0.75kW(1HP), 2-Pole
KTM20N	SS304							
KTM25F	Cast Iron / SS	25	1.50	6.6	2.0	0.12	0.5	1.5kW(2HP), 2-Pole
KTM25N	SS304							
KTM32F	Cast Iron / SS	50	3.00	13.2	4.0	0.24	1.1	2.2kW(3HP), 2-Pole
KTM32N	SS304							
KTM40F	Cast Iron / SS	80	4.80	21.1	6.4	0.38	1.7	3.7kW(5HP), 2-Pole
KTM40N	SS304							

3. Cloupling Type (Large flow rate)

Model	Wetted Part Material	Water Flow Rate			Air Flow Rate			Required motor power
		L/min	m3/h	GPM	NL/min	Nm3/h	NGPM	kW (HP)
KTM50F1	Cast Iron / SS	133	8.0	35	11	0.64	3	5.5kW(7HP), 4-Pole
KTM50S1	SS304							
KTM50F2	Cast Iron / SS	200	12.0	53	16	0.96	4	7.5kW(10HP), 4-Pole
KTM50S2	SS304							
KTM50F3	Cast Iron / SS	250	15.0	66	20	1.20	5	11kW(15HP), 4-Pole
KTM50S3	SS304							
KTM65F2	Cast Iron / SS	333	20.0	88	27	1.60	7	15kW(20HP), 4-Pole
KTM65S2	SS304							
KTM80F	Cast Iron / SS	700	42.0	184	56	3.36	15	22kW(30HP), 4-Pole
KTM80S	SS304							

2-2. Typical Basic Data for KTM Models **(60Hz)**

Discharge Pressure : 0.4 MPa = 4kg / cm2 = 4 bar = 56 PSI Air / Water discharge Amount Ratio : 8%

1. Close-coupled Type

Motor : Three Phase TEFC Indoors motor 200V to 460V

Model	Wetted Part Material	Motor Output (kW)	Water Flow Rate			Air Flow Rate			Current (A)					
			L/min	m3/h	GPM	NL/min	Nm3/h	NGPM	200V	220V	380V	400V	440V	460V
KTM20FD07ZM	Cast Iron / SS	**0.975**	21.7	1.30	5.7	1.7	0.10	0.5	2.50	2.20	1.30	1.20	1.10	1.10
KTM20ND07ZM	SS304													
KTM25FD15ZM	Cast Iron / SS	**1.95**	41.7	2.50	11.0	3.3	0.20	0.9	4.10	3.70	2.10	2.10	2.00	2.00
KTM25ND15ZM	SS304													
KTM32FD15ZM	Cast Iron / SS	**1.95**	66.7	4.00	17.5	5.3	0.32	1.4	7.60	6.80	4.00	3.80	3.60	3.60
KTM32ND15ZM	SS304													
KTM40FD22ZM	Cast Iron / SS	**2.42**	116.7	7.00	30.7	9.3	0.56	2.5	9.60	8.80	5.20	4.80	4.40	4.30
KTM40ND22ZM	SS304													

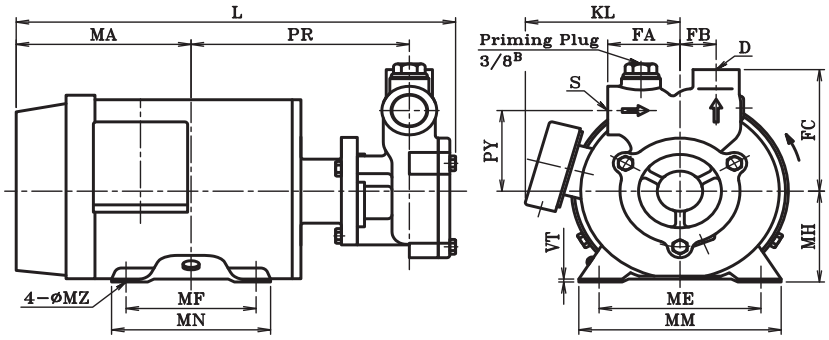
2. Cloupling Type

Model	Wetted Part Material	Water Flow Rate			Air Flow Rate			Required motor power
		L/min	m3/h	GPM	NL/min	Nm3/h	NGPM	kW (HP)
KTM20F	Cast Iron / SS	21.7	1.30	5.7	1.7	0.10	0.5	0.75kW(1HP), 2-Pole
KTM20N	SS304							
KTM25F	Cast Iron / SS	41.7	2.50	11.0	3.3	0.20	0.9	1.5kW(2HP), 2-Pole
KTM25N	SS304							
KTM32F	Cast Iron / SS	66.7	4.00	17.5	5.3	0.32	1.4	2.2kW(3HP), 2-Pole
KTM32N	SS304							
KTM40F	Cast Iron / SS	116.7	7.00	30.7	9.3	0.56	2.5	3.7kW(5HP), 2-Pole
KTM40N	SS304							

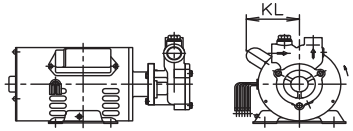
3. Cloupling Type (Large flow rate)

Model	Wetted Part Material	Water Flow Rate			Air Flow Rate			Required motor power
		L/min	m3/h	GPM	NL/min	Nm3/h	NGPM	kW (HP)
KTM50F1	Cast Iron / SS	192	11.5	50	15	0.92	4	7.5kW(10HP), 4-Pole
KTM50S1	SS304							
KTM50F2	Cast Iron / SS	250	15.0	66	20	1.20	5	11kW(15HP), 4-Pole
KTM50S2	SS304							
KTM50F3	Cast Iron / SS	300	18.0	79	24	1.44	6	15kW(20HP), 4-Pole
KTM50S3	SS304							
KTM65F2	Cast Iron / SS	467	28.0	123	37	2.24	10	18.5kW(25HP), 4-Pole
KTM65S2	SS304							
KTM80F	Cast Iron / SS	967	58.0	254	77	4.64	20	30kW(40HP), 4-Pole
KTM80S	SS304							

3-1. Close-coupled Type (KTM__ND / KTM__FD)



Single phase induction motor(*2)



Dimension & weight — Unit:mm,kg (Net weight)

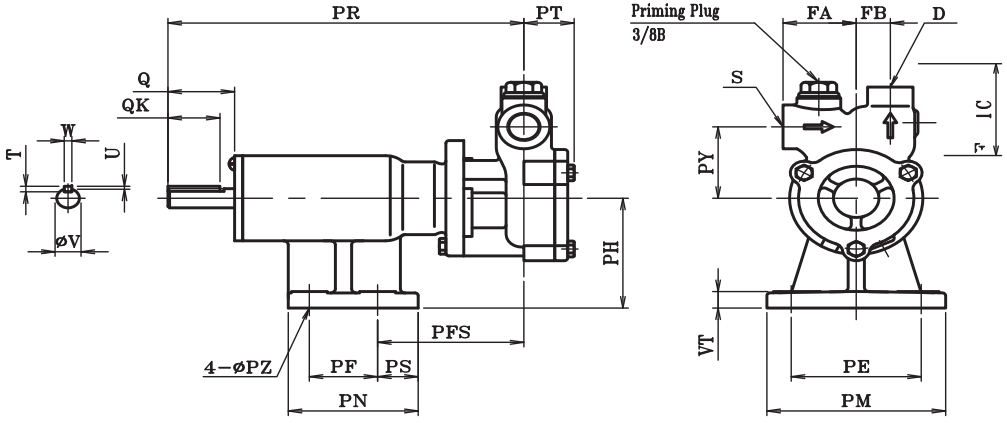
	Model	kW	S	D	PR	PY	FA	FB	FC	MH	L	MA	ME	MF	MM	MN	MZ	VT	KL	Weight
TEFC*1	KTM15ND02Z	0.31	Rc1/2	Rc3/8	152	52	45	21	81	71	304	121	112	90	140	110	7×8	2.3	107	9.5
	KTM20ND04Z	0.56	Rc3/4	Rc1/2	151	63	50	25	95	71	304	121	112	90	140	110	7×8	2.3	107	12
	KTM20ND07Z	0.975	Rc3/4	Rc1/2	144.5	63	50	25	95	80	324.5	148	125	100	165	130	10×8	4.5	146	20.5
	KTM25ND07Z	0.975	Rc1	Rc3/4	144.5	70	60	28	105	80	331	148	125	100	165	130	10×8	4.5	146	20.5
	KTM25ND15Z	1.95	Rc1	Rc3/4	167.5	70	60	28	105	90	349	143	140	125	176	150	10×12	10	147	20.5
	KTM32ND15Z	1.95	Rc1 1/4	Rc1	167.5	80	65	35	120	90	354.5	143	140	125	176	150	10×12	10	147	21.5
	KTM40ND22Z	2.42	Rc1 1/2	Rc1 1/4	171.5	85	70	40	130	90	364.5	143	140	125	176	150	10×12	10	147	22.5
SPM*2	KTM15ND02S	0.3	Rc1/2	Rc3/8	152	52	45	21	81	71	292	109	112	90	148	110	7×18	2.6	89	11
	KTM20ND04S	0.56	Rc3/4	Rc1/2	164.5	63	50	25	95	80	330.5	134	125	100	168	125	10×20	3.2	96	17

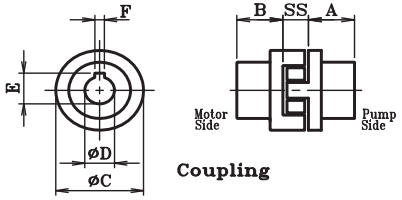
Note : Dimension is for SS304 Model.
For Cast Iron / SS, dimension is almost similar to the above. Please ask for detail.

KTM 20 F D 07 ZM

- Model Name
- Suction Port Diameter: 15 20 25 32 40 mm
- Wetted Part Material: F:Cast Iron/SS N:SS304
- Closed-coupled Type
- Motor Output: 04:0.56kW 07:0.975kW 15:1.97kW 22:2.42kW
- Motor Type: Total-Enclosed Fan-Cooled Type

3-2. Bare Pump fo Coupling Type (KTM20N/F to KTM40N/F)





Coupling

Coupling Dimension

kW	A	B	C	D	E	F	SS
0.4	22	22	51	14	16.3	5	14
0.75	22	36	51	19	21.8	5	14
1.5, 2.2	36	36	71	24	27.3	6	18
3.7	36	36	71	28	31.3	8	18

Dimension & weight — Unit:mm,kg (Net weight)

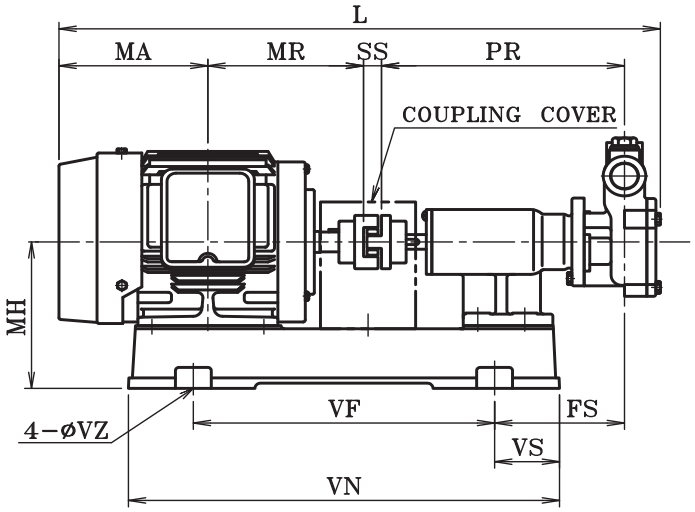
Model	S	D	PR	PY	FA	FB	PFS	FC	PH	PT	PE	PF	PM	PN	PS	VT	Q	QK	T	U	V	W	Weight
KTM15N	Rc1/2	Rc3/8	219	52	45	21	90	81	80	31	80	42	110	80	25	12	41	32	5	2	14	5	2.5
KTM20N	Rc3/4	Rc1/2	218	63	50	25	89	95	80	32	80	42	110	80	25	12	41	32	5	2	14	5	7.5
KTM25N	Rc1	Rc3/4	224	70	60	28	95	105	80	38.5	80	42	110	80	25	12	41	36	6	2.5	19	6	7.5
KTM32N	Rc1 1/4	Rc1	224	80	65	35	95	120	80	44	80	42	110	80	25	12	41	36	6	2.5	19	6	9
KTM40N	Rc1 1/2	Rc1 1/4	238	85	70	40	74	130	90	50	100	58	130	85	11	12	49	45	7	3	24	8	13

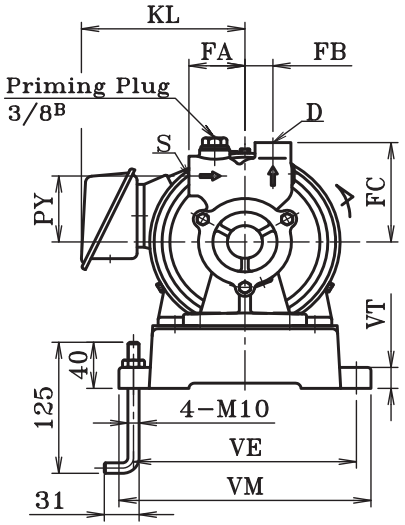
Note : Dimension is for SS304 Model.
For Cast Iron / SS, dimension is almost similar to the above. Please ask for detail.

KTM 20 N

- Model Name
- Suction Port Diameter: 15 20 25 32 40 mm
- Wetted Part Material: F:Cast Iron/SS N:SS304

3-3. Coupling Type (KTM20N/F to KTM40N/F)



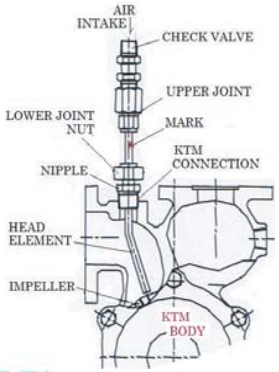


Dimension & weight

Unit:mm,kg (pump weight only)

Model	kW	S	D	PR	PY	FA	FB	FS	FC	MH	L	MA	MR	SS	VE	VF	VM	VN	VS	VT	VZ	KL	Weight
KTM15N	0.4	Rc1/2	Rc3/8	219	52	45	21	115	81	130	505	121	120	14	184	245	210	357	56	20	12	–	18
KTM20N	0.4	Rc3/4	Rc1/2	218	63	50	25	114	95	130	505	121	120	14	184	245	210	357	56	20	12	–	20
	0.75	Rc3/4	Rc1/2	218	63	50	25	116	95	140	537	133	140	14	199	269	225	385	58	20	12	146	27
KTM25N	0.75	Rc1	Rc3/4	224	70	60	28	122	105	140	549.5	133	140	14	199	269	225	385	58	20	12	146	27
	1.5	Rc1	Rc3/4	224	70	60	28	129	105	150	592	143	168.5	18	214	300	240	430	65	20	12	147	31
KTM32N	1.5	Rc1 1/4	Rc1	224	80	65	35	129	120	150	597.5	143	168.5	18	214	300	240	430	65	20	12	147	32
	2.2	Rc1 1/4	Rc1	224	80	65	35	129	120	150	597.5	143	168.5	18	214	300	240	430	65	20	12	147	34
KTM40N	2.2	Rc1 1/2	Rc1 1/4	238	85	70	40	123	130	145	617.5	143	168.5	18	230	350	260	500	75	15	12	147	37
	3.7	Rc1 1/2	Rc1 1/4	238	85	70	40	82	130	180	692	186	200	18	280	425	310	616	96	25	12	154	53

Note : Dimension is for SS304 Model.
For Cast Iron / SS, dimension is almost similar to the above. Please ask for detail.



- How to mount the Air Nozzle-

1) Ready for nozzle Head-Impeller span adjust,
   loosen Lower Joint Nut to allow Nipple freely move.
2) Put mark showing Head direction as shown in the left illustration.
3) Apply sealing tape onto the Nipple of Lower Joint.
4) Insert Head Element into KTM connection opening and tighten Nipple.
5) Direct Head to the center of Impeller by turningElement with refer to the mark.
6) Tighten Lower Joint Nut and ensure Nozzle assembly is firmly fixed.
7) Check to see that Nozzle Head connot touch with Impeller by turning the
   motor with a screw-driver at its axis end.

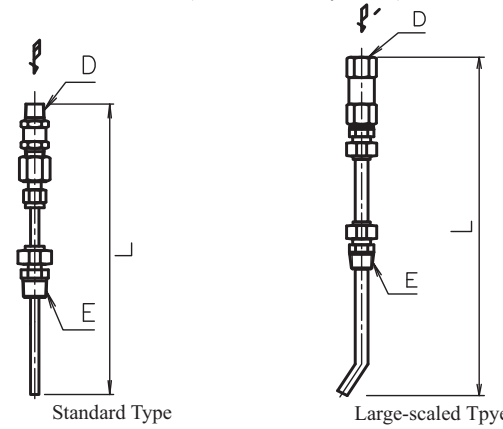
KTM 20 N 07 CE

- Model Name
- 20 — Suction Port Diameter: 15 20 25 32 40 mm
- N — Wetted Part Material: F:Cast Iron/SS N:SS304
- 07 — Motor Output: 07:0.75kW 15:1.5kW 22:2.2kW 37:3.7kW
- CE — Motor Type (Nikuni Mark)

Nikuni will supply bare pump and plate base with coupling set only.
Electric motor should be prepared by pruchaser.

3-4. Air (Gas) Nozzle Assembly

(Attached to every model)



Standard Type　　Large-scaled Tpye

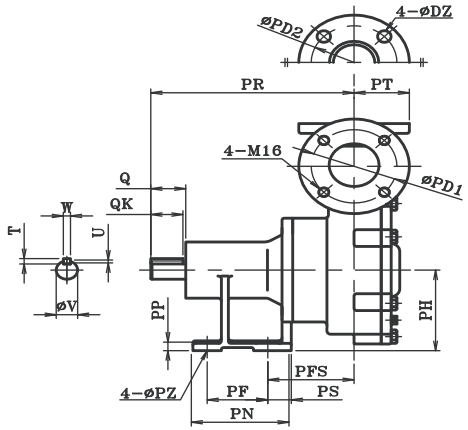
Standard Type

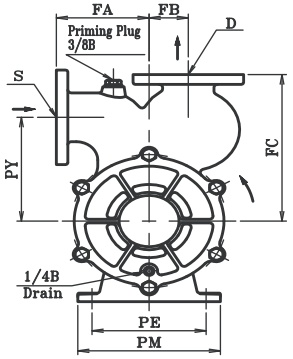
Applicable Models	KTM Joint Dia. E (nominal)	Overall Lengh L mm	Air Intake Dia. D (nominal)
KTM15 (F)(N)(D)	R 3/8B	121	R 1/4B
KTM20 (F)(N)(D)	R 3/8B	121	R 1/4B
KTM25 (F()N)(D)	R 3/8B	121	R 1/4B
KTM32 (F)(N)(D)	R 3/8B	121	R 1/4B
KTM40 (F)(N)(D)	R 3/8B	121	R 1/4B
KTM50 (F)(S) 1, 2, 3	R 3/8B	129	R 1/4B

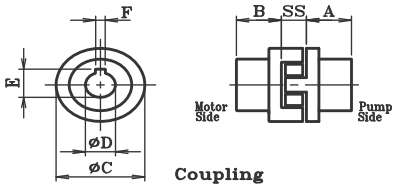
Large-scaled Type

Applicable Models	KTM Joint Dia. E (nominal)	Overall Lengh L mm	Air Intake Dia. D (nominal)
KTM65 (F)(S)	R 3/8B	304	R 3/8
KTM80 (F)(S)	R 3/8B	319	R 3/8

3.5 Bare Pump (KTM50S1/FI TO KTM50S3/F3







KTM 50 S1

Model Name

Wetted Part Material
S1 to S3: SS304
F1 to F3: Cast Iron / SS

Suction Port Diameter
50 65 80 mm

Coupling dimension

kW	A	B	C	D	E	F	SS
5.5, 7.5	45	45	90	38	41.3	10	24
11, 15	55	55	120	42	45.3	12	40

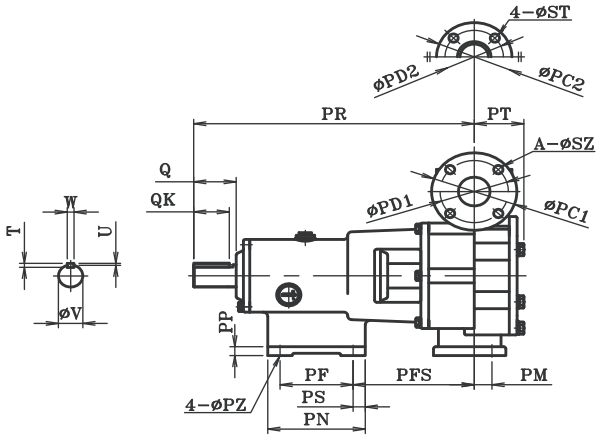
Dimension & weight

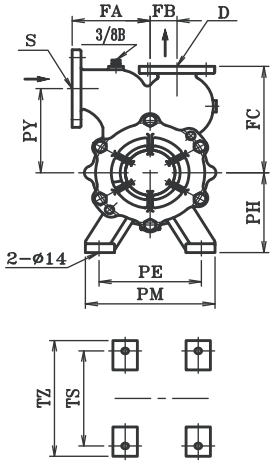
Unit:mm,kg (Net weight)

Model	S	D	PR	PY	FA	FB	FC	PE	PM	PT	PD1	PD2	PH	PFS	PS	PF	PN	PP	PZ	Q	QK	T	U	V	W	Weight
KTM50S1	50A	50A	285	160	130	55	230	160	200	77.5	120	120	132	121	33	85	138	14	14	49	45	7	3	30	8	41
KTM50S2	50A	50A	285	170	130	55	240	160	200	77.5	120	120	132	121	33	85	138	14	14	49	45	7	3	30	8	44
KTM50S3	50A	50A	285	170	130	55	240	160	200	77.5	120	120	132	121	33	85	138	14	14	49	45	7	3	30	8	44

Note : Dimension is for SS304 Model. For Cast Iron / SS, dimension is almost similar to the above. Please ask for detail.

3-6. Bare Pump (KTM65S/F TO KTM80S/F)





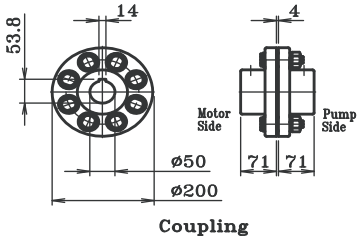
Dimension & weight

Unit:mm,kg (Net weight)

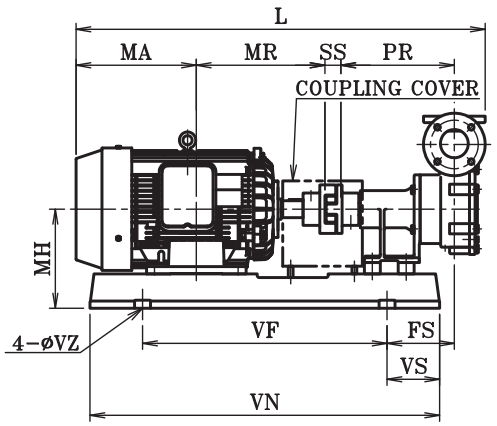
Model	S	D	PR	PY	FA	FB	FC	PH	PE	PM	PT	PD1	PD2	PC1	PC2	PM	PFS
KTM65S2	65A	50A	575.5	190	160	55	240	180	210	266	102	140	120	175	155	36.5	248.5
KTM80S	80A	65A	582	180	170	80	280	180	270	326	127	150	140	185	175	45	255

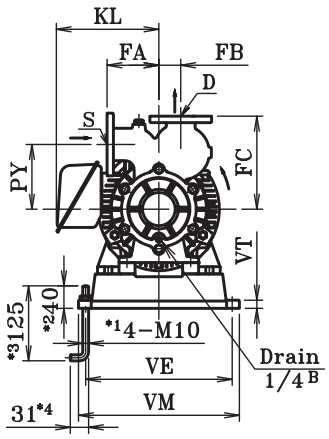
Model	PS	PF	PN	PP	PZ	SZ	ST	TS	TZ	Q	QK	T	U	V	W	Weight
KTM65S2	25	150	200	20	14	19	19	230	280	87	74	9	3.5	50	14	106
KTM80S	25	150	200	20	19	19	19	230	280	87	74	9	3.5	50	14	130

Note : Dimension is for SS304 Model. For Cast Iron / SS, dimension is almost similar to the above. Please ask for detail.

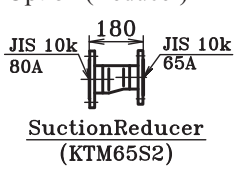


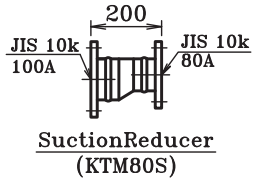
3-7. Coupling Type (KTM50S/F to KTM80S/F)





Option (Reducer)





Nikuni will supply bare pump and base with coupling set only.
Electric motor should be prepared by pruchaser.

Dimension & weight — Unit:mm,kg (Net weight)

Model	kW	S	D	PR	PY	FA	FB	FS	FC	MH	L	MA
KTM50S1	5.5	50A	50A	285	160	130	55	150	230	204	836	210.5
	7.5	50A	50A	285	160	130	55	160	230	204	874	229.5
KTM50S2 KTM50S3	7.5	50A	50A	285	170	130	55	160	240	204	874	229.5
	11	50A	50A	285	170	130	55	169	240	245	1027.5	302
	15	50A	50A	285	170	130	55	169	240	245	1027.5	280
KTM65S2	15	65A	50A	575.5	190	160	55	102.5	240	300	1276.5	250
	18.5	65A	50A	575.5	190	160	55	102.5	240	300	1353	291.5
KTM80S	22	80A	65A	582	180	170	80	109	280	300	1356	291.5
	30	80A	65A	582	180	170	80	39.5	280	360	1429	345.5

	MR	SS	VE	VF	VM	VN	VS	VT	VZ	KL	Weight
KTM50S1	239	24	324	448	352	690	121	20	12	189	105
	258	24	324	448	352	690	121	20	12	189	111
KTM50S2 KTM50S3	258	24	324	448	352	690	121	20	12	189	115
	323	40	368	614	404	878	132	20	15	257.5	162
	345	40	368	614	404	878	132	20	15	257.5	177
KTM65S2	345	4	462	835	512	1285	225	30	19	256	303
	351.5	4	462	835	512	1285	225	30	19	335	338
KTM80S	351.5	4	462	835	512	1285	225	30	19	279	372
	370.5	4	356	950	430	1250	150	17.5	19	314	498

Note : Dimension is for SS304 Model. For Cast Iron / SS, dimension is almost similar to the above. Please ask for detail.

3-8. Recommeded Accessories

Air Flow-meter Application

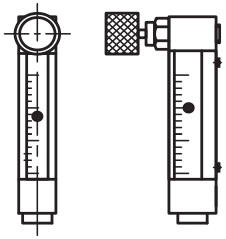
50Hz frequency

Model	Water flow rate (M^3/Hr x 4 Bar)	Operation Air Flow Rate(N·L/min)	Air Flowmeter Range (N·L/min)
KTM20N(D) / KTM20F(D)	1	1.3	0 to 5
KTM25N(D) / KTM25F(D)	1.5	2.0	0 to 5
KTM32N(D) / KTM32F(D)	3	4.0	0 to 10
KTM40N(D) / KTM40F(D)	4.8	6.4	0 to 10
KTM50S1 / KTM50F1	8	10.6	0 to 20
KTM50S2 / KTM50F2	12	16.0	0 to 20
KTM50S3 / KTM50F3	15	20.0	0 to 30
KTM65S2 / KTM65F2	20	26.6	0 to 40
KTM80S / KTM80F	42	56.0	0 to 80

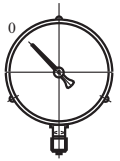
60Hz frequency

Water flow rate (M^3/Hr x 4 Bar)	Operation Air Flow Rate(N·L/min)	Air Flowmeter Range (N·L/min)
1.3	1.7	0 to 5
2.5	3.3	0 to 5
4	5.3	0 to 10
7	9.3	0 to 20
11.5	15.0	0 to 30
15	20.0	0 to 40
18	24.0	0 to 40
28	38.0	0 to 60
58	78.0	0 to 100

Air Parameter



Pressure Guages



Compound Guage

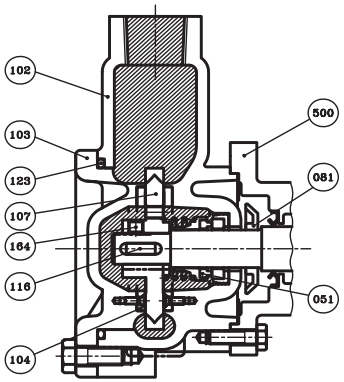
minus 0.1MPa - +0.25MPa
minus 1.0bar - +2.5bar
minus 15psi - +35psi

Pressure Guage

0MPa - 1.0MPa
0bar - 10bar
0psi - 150psi

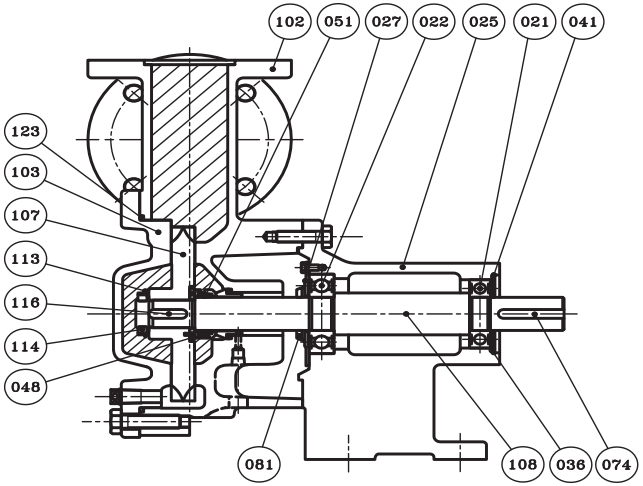
3-10. Sectional drawings for SS304 models (KTM_N/S)

Model: KTM20ND to KTM40ND



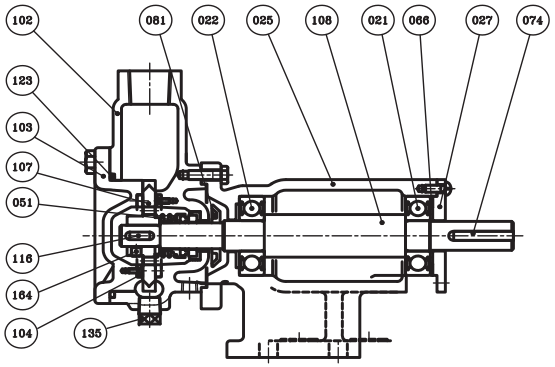
No.	NAME OF PARTS	SET	MATERIALS
032	Collar	1	SUS304
049	Mechanical Gland	1	SUS304
051	Mechanical Seal	1	SiC – SiC
081	Slinger	1	NBR
102	Casing	1	SCS13
103	Cover	1	SCS13
107	Impeller	1	SUS304
116	Key	1	SUS316
123	O-Ring	1	PTFE
151	Bolts	3	SUS304
164	Set Screws	2	SUS304
500	Motor	1	

Model: KTM50S1 to KTM50S3



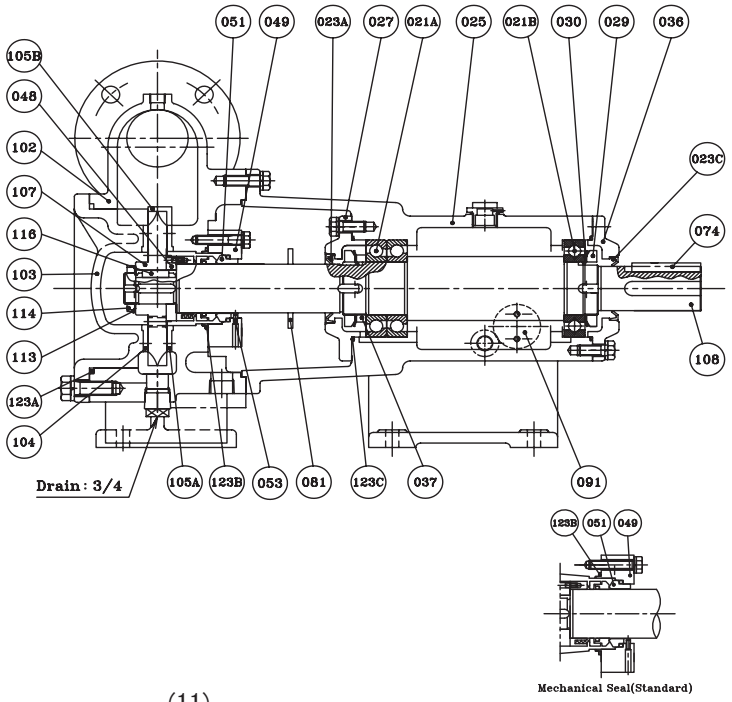
No.	NAME OF PARTS	SET	MATERIALS
021	Ball Bearing	1	SUJ
022	Ball Bearing	1	SUJ
025	Bracket	1	FC200
027	Bearing Gland	1	SPC
036	Bearing Cover	1	SPC
041	Retaining Ring	1	SUS304
048	Mechanical Seal Retainer	1	SUS304
051	Mechanical Seal	1	SiC – SiC
074	Key	1	S45C
081	Slinger	1	NBR
102	Casing	1	SCS13
103	Cover	1	SCS13
107	Impeller	1	SUS304
108	Shaft	1	SUS304
113	Impeller Washer	1	SUS304
114	Impeller Nut	1	SUS304
116	Impeller Key	1	SUS316
123	O-Ring	1	PTFE

Model: KTM20N & KTM40N



No.	NAME OF PARTS	SET	MATERIALS	No.	NAME OF PARTS	SET	MATERIALS
021	Ball Bearing	1	SUJ	081	Slinger	1	NBR
022	Ball Bearing	1	SUJ	102	Casing	1	SCS13
025	Bracket	1	FC200	103	Cover	1	SCS13
027	Bearing Gland	1	FC200	107	Impeller	1	SUS304
049	Mechanical Gland	1	SUS304	108	Shaft	1	SUS304
051	Mechanical Seal	1	SiC – SiC	116	Key	1	SUS316
066	Wave Washers	2	SK	123	O-Ring	1	PTFE
074	Key	1	S45C	164	Set Screws	2	SUS304

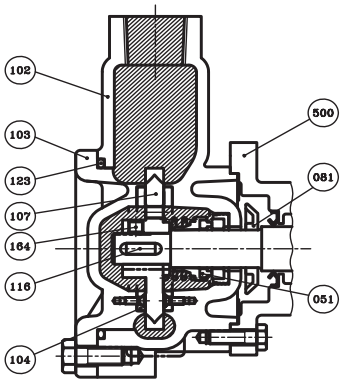
Model: KTM65S2 & KTM80S



No.	NAME OF PARTS	SET	MATERIALS	
			Standard	Stationary Seal
021A	Ball Bearing	1	SUJ	
021B	Ball Bearing	1	SUJ	
023A	Oil Seal	1	NBR	
023C	Oil Seal	1	NBR	
025	Bracket	1	FC200	
027	Bearing Gland	1	FC200	
029	Bearing Nut	2	SUJ	
030	Bearing Washer	2	SUJ	
036	Bearing Cover	1	FC200	
037	Bearing Collar	1	SS	
048	Mechanical Seal Retainer	1	SUS304	
049	Mechanical Gland	1	SUS304	–
051	Mechanical Seal	1	SiC – Carbon	
053	Pin	1	SUS304	–
074	Key	1	S45C	
081	Slinger	1	NBR	
091	Oil Pot Window	1		
102	Casing	1	SCS13	
103	Cover	1	SCS13	
104	Side Plate	1	SCS13	
105	Side Plate	1	SCS13	
107	Impeller	1	SUS304	
108	Shaft	1	SUS304	
113	Impeller Washer	1	SUS304	
114	Impeller Nut	1	SUS304	
116	Impeller Key	1	SUS316	
123A	O-Ring	1	FPM	
123B	O-Ring	1	FPM	
123C	O-Ring	2	FPM	

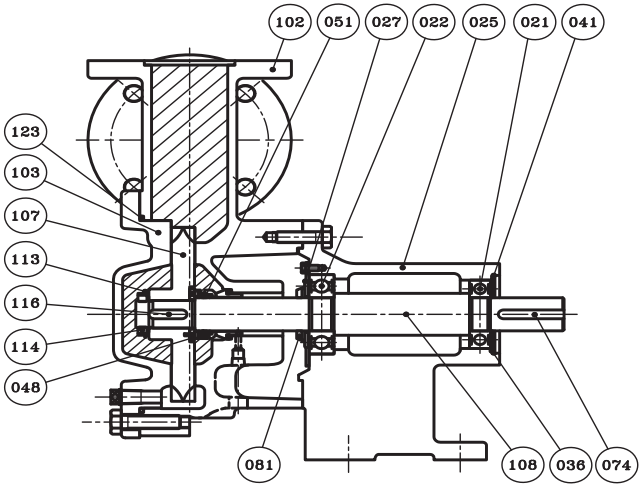
3-9 Sectional drawings for cast iron models (KTM_FD/F)

Model: KTM20FD to KTM40FD



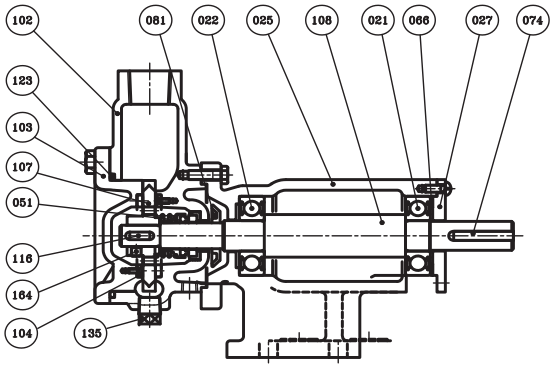
No.	NAME OF PARTS	SET	MATERIALS
051	Mechanical Seal	1	Ceramics – Carbon
081	Slinger	1	NBR
102	Casing	1	FC200
103	Cover	1	FC200
104	Side Plates	2	CAC602
107	Impeller	1	SUS403
116	Key	1	SUS316
123	O–Ring	1	NBR
135	Plug	1	FCMB
164	Set Screws	2	SUS316
500	Motor	1	

Model: KTM50F1 to KTM50F3



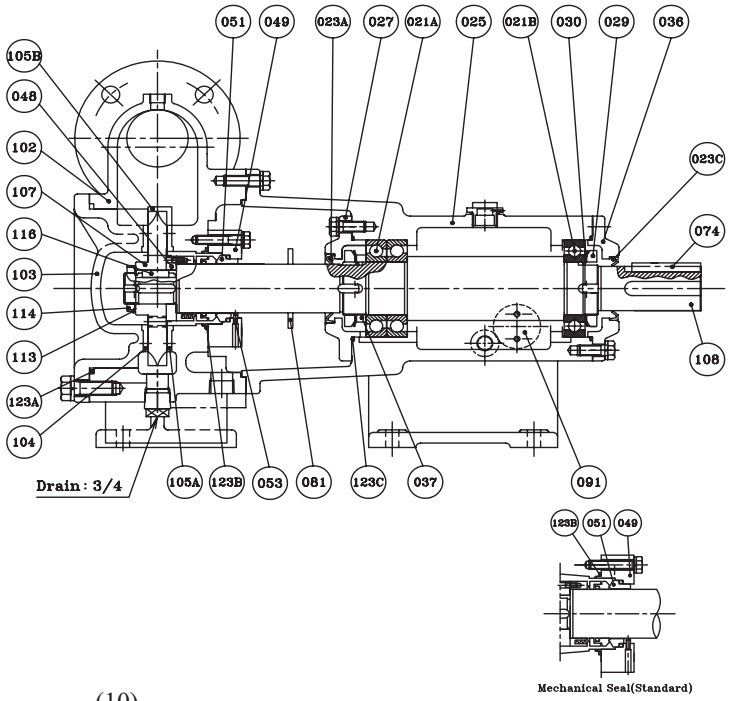
No.	NAME OF PARTS	SET	MATERIALS
021	Ball Bearing	1	SUJ
022	Ball Bearing	1	SUJ
025	Bracket	1	FC200
027	Bearing Gland	1	SPC
036	Bearing Cover	1	SPC
041	Retaining Ring	1	SUS304
048	Mechanical Seal Retainer	1	SUS304
051	Mechanical Seal	1	SiC – SiC
074	Key	1	S45C
081	Slinger	1	NBR
102	Casing	1	FC200
103	Cover	1	FC200
107	Impeller	1	SUS304
108	Shaft	1	SUS304
113	Impeller Washer	1	SUS304
114	Impeller Nut	1	SUS304
116	Impeller Key	1	SUS304
123	O–Ring	1	PTFE

Model: KTM20F & KTM40F



No.	NAME OF PARTS	SET	MATERIALS	No.	NAME OF PARTS	SET	MATERIALS
021	Ball Bearing	1	SUJ	103	Cover	1	FC200
022	Ball Bearing	1	SUJ	104	Side Plates	2	CAC602
025	Bracket	1	FC200	107	Impeller	1	SUS403
027	Bearing Gland	1	FC200	108	Shaft	1	SUS304
051	Mechanical Seal	1	Ceramics – Carbon	116	Key	1	SUS316
066	Wave Washers	2	SK	123	O–Ring	1	NBR
074	Key	1	S45C	135	Plug	1	SUS304
081	Slinger	1	NBR	164	Set Screws	2	SUS304
102	Casing	1	FC200				

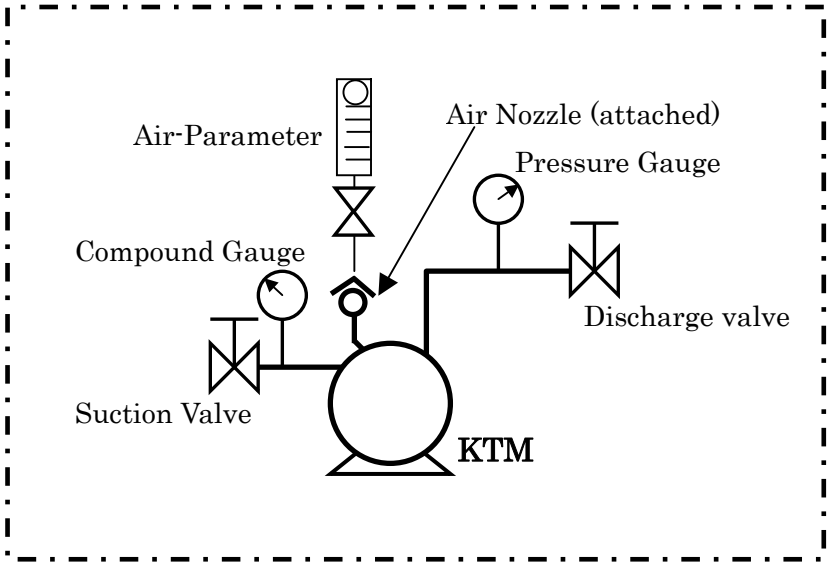
Model: KTM65F2 & KTM80F



No.	NAME OF PARTS	SET	MATERIALS	
			Standard	Stationary Seal
021A	Ball Bearing	1	SUJ	
021B	Ball Bearing	1	SUJ	
023A	Oil Seal	1	NBR	
023C	Oil Seal	1	NBR	
025	Bracket	1	FC200	
027	Bearing Gland	1	FC200	
029	Bearing Nut	2	SUJ	
030	Bearing Washer	2	SUJ	
036	Bearing Cover	1	FC200	
037	Bearing Collar	1	SS	
048	Mechanical Seal Retainer	1	SUS304	
049	Mechanical Gland	1	FC200	–
051	Mechanical Seal	1	SiC – Carbon	
053	Pin	1	SUS420J2	–
074	Key	1	S45C	
081	Slinger	1	NBR	
091	Oil Pot Window	1		
102	Casing	1	FC200	
103	Cover	1	FC200	
104	Side Plate	1	SCS13	
105	Side Plate	1	SCS13	
107	Impeller	1	SUS304	
108	Shaft	1	SUS403	
113	Impeller Washer	1	SUS304	
114	Impeller Nut	1	SUS304	
116	Impeller Key	1	SUS304	
123A	O–Ring	1	FPM	
123B	O- Ring	1	FPM	
123C	O- Ring	2	FPM	

4. KTM Initial Running Procedure

Ensure that "Installation Check" and "Note on KTM Operation" on the page of "1.Technical Comment on KTM and Relative Factors" should have already been understood and completed.



4-1. Pre-operation Check (Turn power off.)

1) Prime KTM with effluent or water.

2) Put Suction and discharge valves both in full-open.
Do not run KTM in close of these vales.

4-2. Starting KTM

1) Discharge side:

Slowly close Discharge valve so as the discharge pressure is put into a range from 0.3MPa to 0.4Mpa (3 bar to 4 bar) with reference to the pressure guage.

In case of locating Discharge valve (or KTM) too far from flotation tank, bubble trends to grow large,
in order to keep its size in micron order, an additional control valve should be provided in flotation tank side to control the discharge pressure.
While, KTM side existing valve is changed in its purpose to control the gate open-close only.

2) Suction side:

Check to see Compound gauge indicating a minus ranging from －0.02MPa to －0.03MPa. (approx. －0.2 bar to －0.3 Bar) suction pressure.
If its pressure is over the above minus range, slightly close its valve as to bring the pressure into the above range.

3) Air inject:

Open the knob of Airflow meter to check flow-rate whether around 8% or not. For your reference, see "Air Parameter Range Table".