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GENERAL

TORISHIMA MMO, is a high pressure centrifugal pumps are pumps of ring section type. They are suitable for clean media free from abrasive and solid particles and not liable to attack the pump mechanically (*abrasion*) or chemically (*corrosion*).

APPLICATIONS

They are used in waterworks, pressure boosting stations, sprinkling and irrigation installations, fountains, fire-fighting systems and in mechanical engineering. They handle boiler feedwater and condensate, circulate cooling water and hotwater and are used for power water generation and in carwashes.

PERFORMANCE RANGE

Capacity : up to 36 l/s (130 m³/h)
 Total Head : up to 400 m
 Operation Pressures : up to 40 bar
 Operating Temperatures : - up to +110 °C (GP)
 - up to +120 °C (MS)

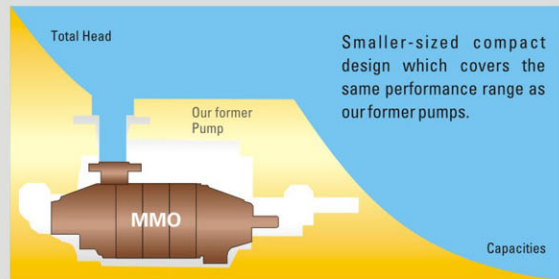
MMO pumps can also be used as circulating pumps in high pressure systems because even the suction casing is designed for 40 bar.

The only restriction is that the sum of the maximum suction pressure plus total head must not exceed 40 bar at zero capacity.

THOROUGHLY RATIONALIZED DESIGN TO MEET ANY SPECIFIED REQUIREMENTS

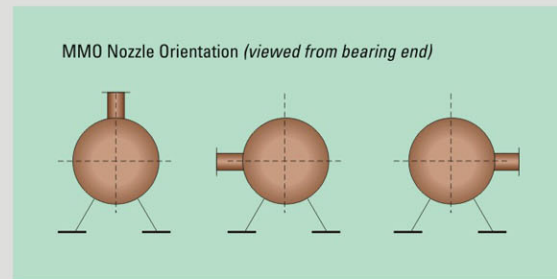
Simple and high performance design contributes to reduction of equipment cost and energy-saving

Hydrodynamically simplified pump design resulted in attractive cost reduction. Besides not only the number of stages is lower but also pump size is smaller maintaining the same performance as our former models.



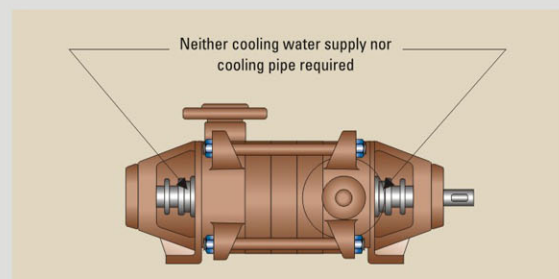
Nozzle orientation can be freely chosen

The pump feet, integrally cast onto the bearing housings, allow free orientation of both suction and discharge nozzles, as illustrated on the right.



Shaft seal requires no cooling for temperature range up to 120 °C

Elimination of cooling water feed and return piping and monitoring instruments.



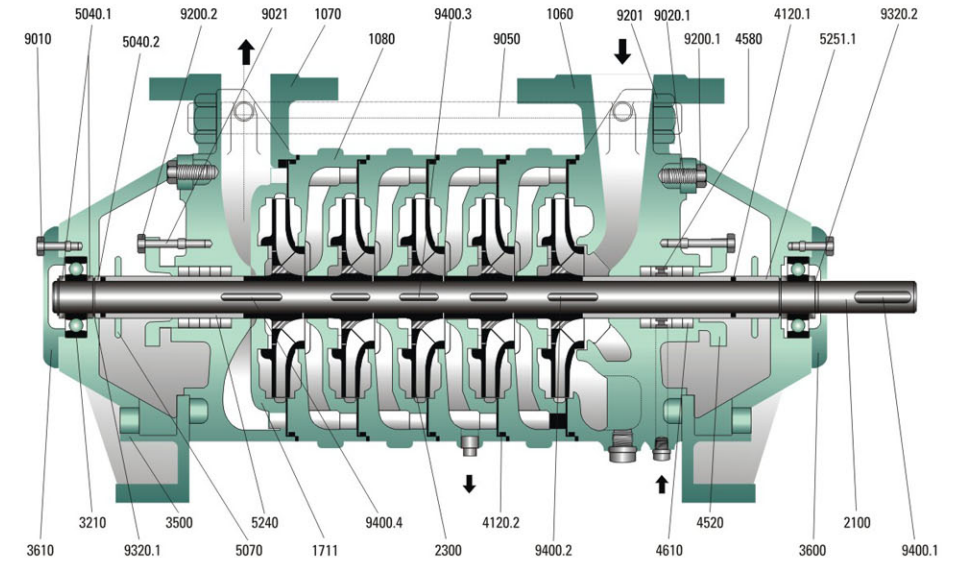
Variety of material combination

Various materials are available, so as to provide wide application range.

MATERIAL COMBINATION	
Part Designation	Materials
Suction Casing, Stage Casing	Cast Iron, Bronze
Discharge Casing	Cast Iron, Bronze, Carbon Steel, Ductile Cast Iron
Impeller	Cast Iron, Bronze
Shaft	Carbon Steel, Stainless Steel
Shaft Protecting Sleeve	Stainless Steel

SECTIONAL DRAWING & LIST COMPONENTS

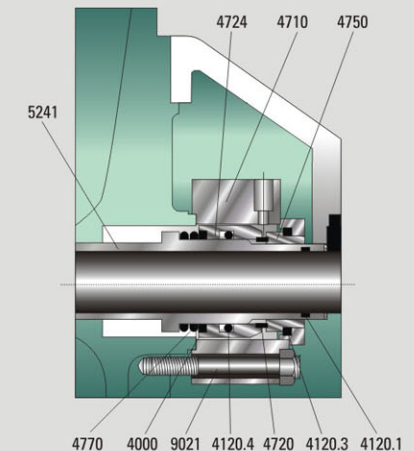
* typical drawing only



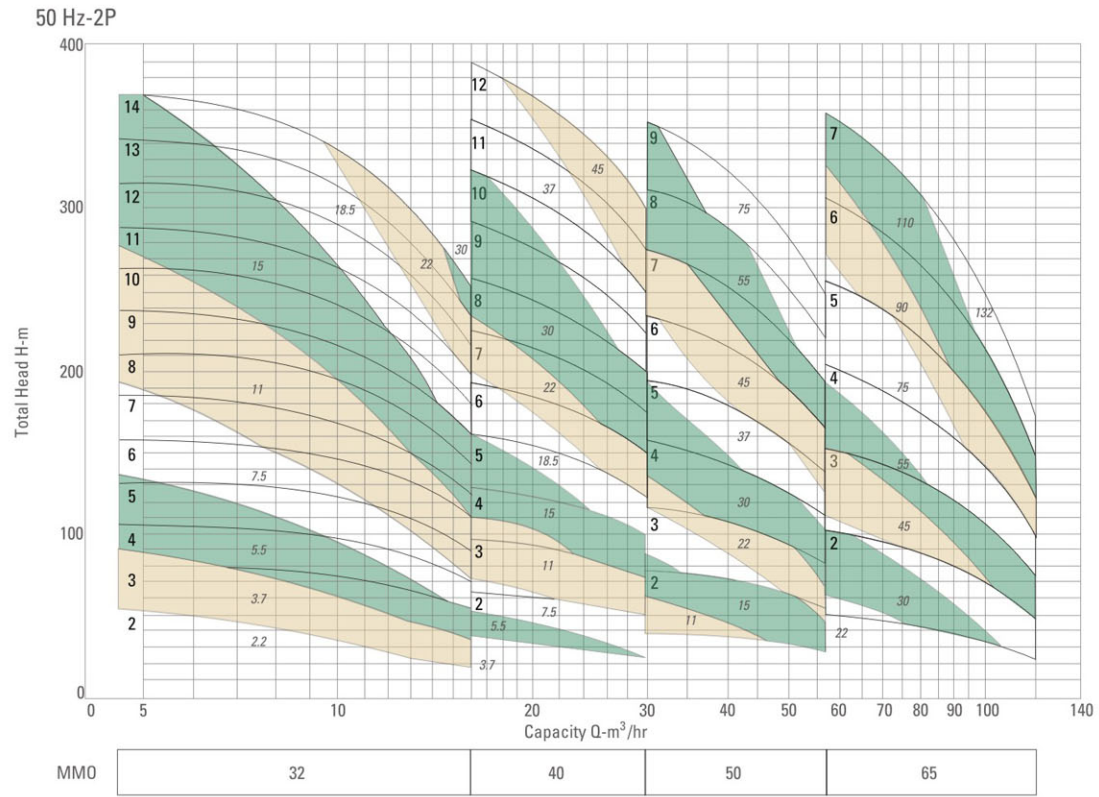
PART NO.	PART DESIGNATION	MATERIAL	PART NO.	PART DESIGNATION	MATERIAL
1060	Suction Casing	FC250	5070	Deflector	S45C
1070	Discharge Casing	FC250	5240	Packing Sleeve	SUS420J2
1080	Stage Casing	FC250	5251.1	Suction Sleeve	FC200
1711	Diffuser, Last Stage	FC200	9010	Hexagonal Bolt	SS400
2100	Shaft	SUS420J2	9020.1	Stud Bolt	S45C
2300	Impeller	FC200	9021	Gland Bolt	SUS304
3210	Ball Bearing	NO.63--DDUC3	9050	Tie Bolt	S45C
3500	Bearing Bracket	FC250	9200.1	Hexagonal Nut	SS400
3600	Bearing Cover	FC200	9200.2	Hexagonal Nut	SUS304
3610	Bearing End Cover	FC200	9201	Hexagonal Nut	SS400
4120.1	O-Ring	VITON	9320.1	Snap Ring	SK5
4120.2	O-Ring	VITON	9320.2	Snap Ring	SK5
4520	Gland	FC200	9400.1	Key	S45C
4580	Lantern Ring	BC	9400.2	Key	S45C
4610	Gland Packing	Carbon Graphite	9400.3	Key	S45C
5040.1	Spacer Ring	FC200	9400.4	Key	S45C
5040.2	Spacer Ring	FC200			

MECHANICAL SEAL

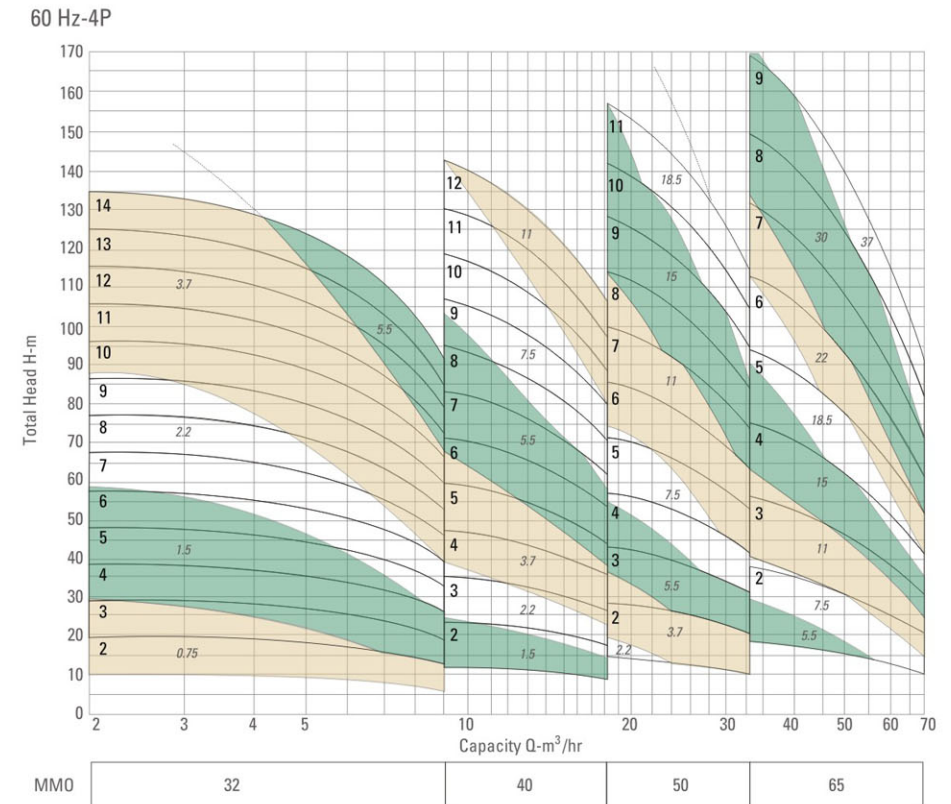
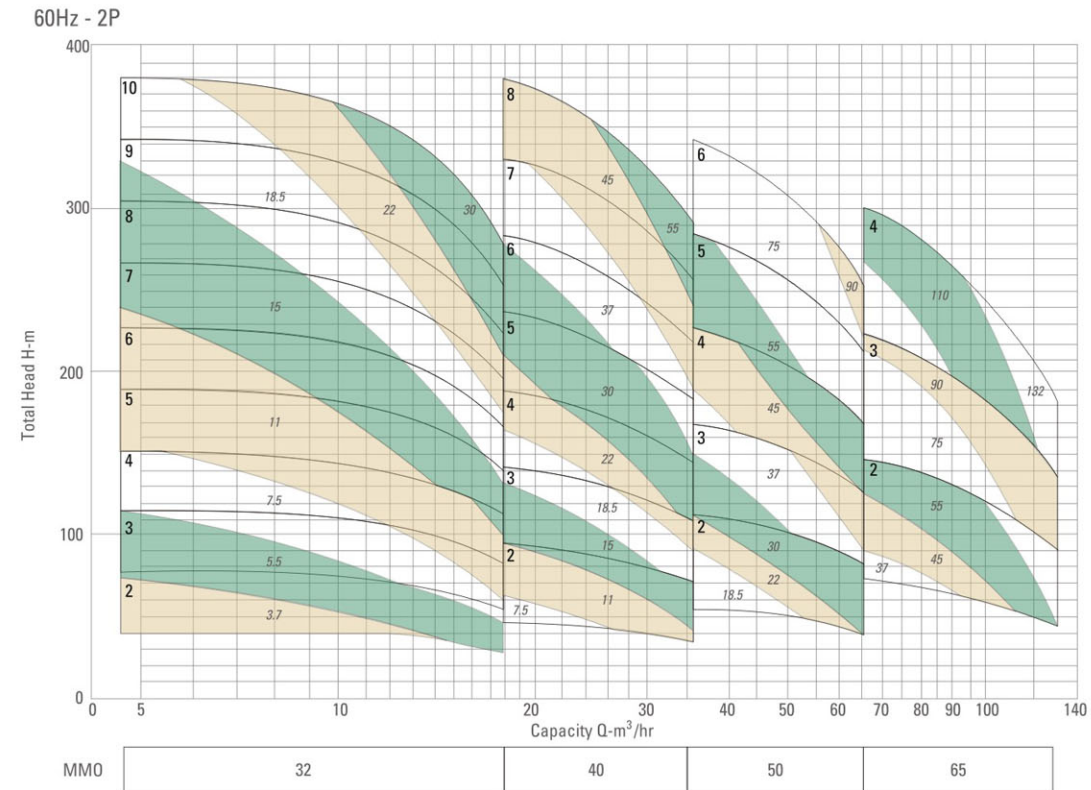
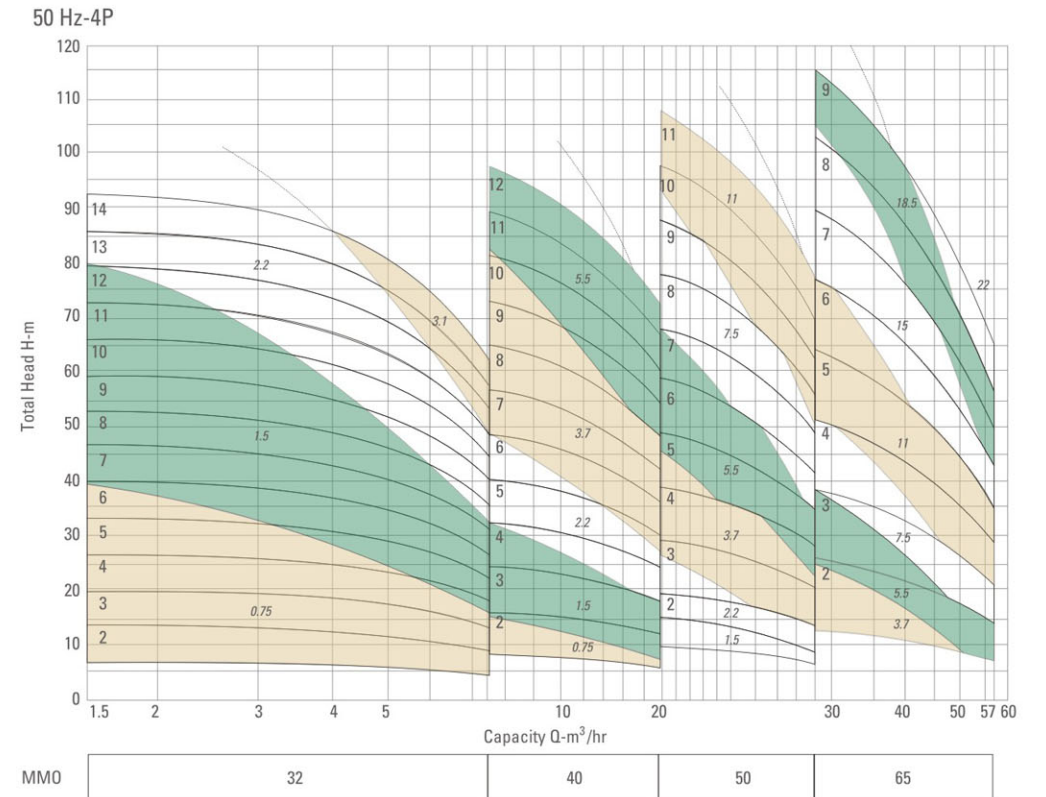
PART NO.	DESIGNATION
4000	Flat Gasket
4120.1	O-ring
4120.3	O-ring
4120.4	O-ring
4710	Cover Seal
4720	Seal Face
4724	Seal Face Housing
4750	Stationary Seat
4770	Spring
5241	Shaft Sleeve
9021	Gland Bolt



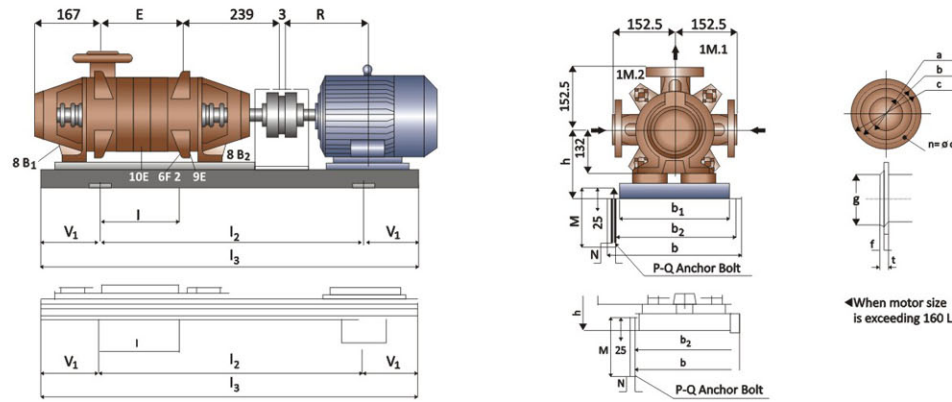
SELECTION CHARTS



SELECTION CHARTS



MMO 32



Dimensions (in mm)

NO. OF STAGE	MOTOR DIMENSIONS			PUMP SET DIMENSIONS			BASEPLATE DIMENSIONS				FOUNDATION DIMENSIONS								
	Size	R	Wt. Kgf.	E	H	Wt. Kgf.	I_3	b	b_3	Y	Wt. Kgf.	I_2	b_2	V_2	I	M	N	P	Q
2	90L	168.5	24	114	247	47	800	420	300		48	600	360	100	145	200	56	4	M12
	112M	200	36	114	247	47	850	420	300		51	650	360	100	145	200	56	4	M12
	132S	239	58	114	257	47	900	500	380		66	700	440	100	145	200	56	4	M12
3	90L	168.5	24	157	247	52	850	420	300		49	650	360	100	190	200	56	4	M12
	112M	200	36	157	247	52	1000	420	300		60	800	360	100	275	200	56	4	M12
	132S	239	58	157	257	52	1000	500	380		72	800	440	100	275	200	56	4	M12
4	160M	323	115	157	275	52	1150	500	380		87	950	440	100	275	200	56	4	M12
	112M	200	36	200	247	57	1000	420	300		60	800	360	100	275	200	56	4	M12
	132S	239	58	200	257	57	1000	500	380		72	800	440	100	275	200	56	4	M12
5	160M	323	115	200	275	57	1150	500	380		87	950	440	100	275	200	56	4	M12
	112M	200	36	243	247	62	1000	420	300		60	800	360	100	275	200	56	4	M12
	132S	239	58	243	257	62	1000	500	380		62	800	440	100	275	200	56	4	M12
6	160M	323	115	243	275	62	1150	500	380		87	950	440	100	275	200	56	4	M12
	132S	239	58	286	257	67	1150	500	380		83	950	440	100	405	200	56	4	M12
	160M	323	115	286	275	67	1250	500	380		92	1050	440	100	405	200	56	4	M12
7	160L	345	136	286	275	67	1300	500	380		94	1100	440	100	405	200	56	4	M12
	180M	351.5	175	286	295	67	1200	460		200	70	1000	420	100	320	200	56	4	M12
	132S	239	58	329	257	72	1150	500	380		83	950	440	100	405	200	56	4	M12
8	160M	323	115	329	275	72	1250	500	380		92	1050	440	100	405	200	56	4	M12
	160L	345	136	329	275	72	1300	500	380		94	1100	440	100	405	200	56	4	M12
	180M	351.5	175	329	295	72	1250	460		200	73	1050	420	100	360	200	56	4	M12
9	132S	239	58	372	257	77	1150	500	380		83	950	440	100	405	200	56	4	M12
	160M	323	115	372	275	77	1250	500	380		92	1050	440	100	405	200	56	4	M12
	160L	345	136	372	275	77	1300	500	380		94	1100	440	100	405	200	56	4	M12
10	180M	351.5	175	372	295	77	1300	460		200	75	1100	410	100	405	200	56	4	M12
	180L	370.5	210	372	295	77	1350	460		200	74	950	420	200	305	250	71	4	M16
	132S	239	58	415	257	82	1200	500	380		81	1000	440	100	445	200	56	4	M12
11	160M	323	115	415	275	82	1300	500	380		89	1100	440	100	445	200	56	4	M12
	160L	345	136	415	275	82	1350	500	380		92	950	440	200	345	250	71	4	M16
	180M	351.5	175	415	295	82	1350	460		200	72	950	420	200	345	250	71	4	M16
12	180L	370.5	210	415	295	82	1400	460		200	75	1000	420	200	345	250	71	4	M16
	132S	239	58	458	257	87	1250	500	380		87	1050	440	100	490	200	56	4	M12
	160M	323	115	458	275	87	1350	500	380		91	950	440	200	390	250	71	4	M16
13	160L	345	136	458	275	87	1400	500	380		95	1000	440	200	390	250	71	4	M16
	180M	351.5	175	458	295	87	1400	460		200	73	1000	420	200	390	250	71	4	M16
	180L	370.5	210	458	295	87	1450	460		200	76	1050	420	200	390	250	71	4	M16
14	132S	239	58	501	257	92	1250	500	380		84	1050	440	100	530	200	56	4	M12
	160M	323	115	501	275	92	1400	500	380		98	1000	440	200	430	250	71	4	M16
	160L	345	136	501	275	92	1450	500	380		101	1050	440	200	430	250	71	4	M16
15	160M	323	115	544	275	97	1450	500	380		97	1050	440	200	475	250	71	4	M16
	160L	345	136	544	275	97	1500	500	380		100	1100	440	200	475	250	71	4	M16
	180M	351.5	175	544	295	97	1450	460		200	72	1050	420	200	475	250	71	4	M16
16	160M	323	115	587	275	102	1500	500	380		103	1100	440	200	520	250	71	4	M16
	160L	345	136	587	275	102	1500	500	380		100	1100	440	200	520	250	71	4	M16
	180M	351.5	175	587	295	102	1500	460		200	74	1100	420	200	520	250	71	4	M16
17	160M	323	115	630	275	107	1500	500	380		103	1100	440	200	560	250	71	4	M16
	160L	345	136	630	275	107	1550	500	380		103	1150	440	200	560	250	71	4	M16
	180M	351.5	175	630	295	107	1550	460		200	75	1150	420	200	560	250	71	4	M16
180L	370.5	210	630	295z	107	1600	460		200	77	1200	420	200	560	250	71	4	M16	

Flange Dimensions

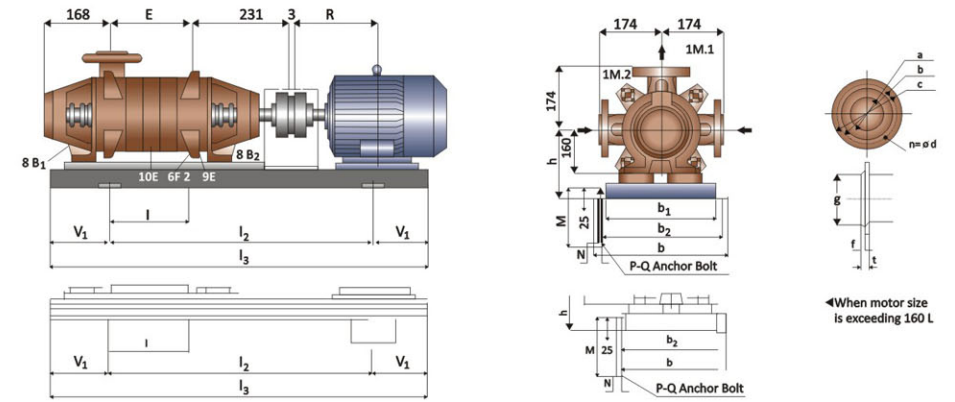
Suction Nozzle JIS10kgf/cm ² RF40A										Discharge Nozzle JIS20kgf/cm ² RF32A					
a	b	c	g	t	f	n-d	a	b	c	g	t	f	n-d		
40	105	140	85	20	2	4-19	32	100	135	80	22	2	4-19		

Motor weights vary according to manufacturers, poles or types

Auxiliary Connections, Dimensions and designations

Pressure Gauge	Priming and Draining of Liquid Pumped	Leakage Drain	Sealing Liquid Inlet	Inlet of Sealing Liquid from an Outside Source
1M.1 - 1M.2	6F.2	8B.1 - 8B.2	9E	10E
PT 3/8	PF 3/8	PF 3/8	PF 1/8	PT 1/4

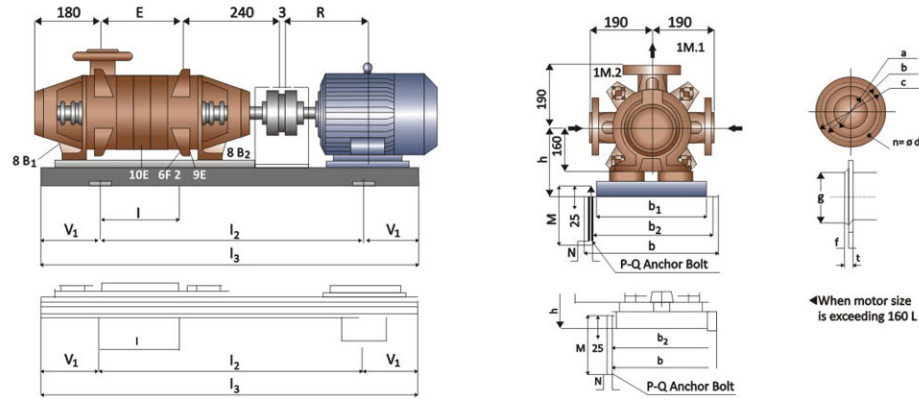
MMO 40



Dimensions (in mm)

NO. OF STAGE	MOTOR DIMENSIONS			PUMP SET DIMENSIONS			BASEPLATE DIMENSIONS				FOUNDATION DIMENSIONS								
	Size	R	Wt. Kgf.	e	h	Wt. Kgf.	I_3	b	b_3	Y	Wt. Kgf.	I_2	b_2	V_2	I	M	N	P	Q
2	112M	200	36	133	265	72	850	420	380		48	650	360	100	170	200	56	4	M12
	132S	239	58	133	275	72	900	500	380		68	700	440	100	170	200	56	4	M12
	160M	323	115	133	275	72	1000	500	380		68	800	440	100	170	200	56	4	M12
3	132S	239	58	188	275	81	950	500	380		71	750	440	100	220	200	56	4	M12
	160M	323	115	188	275	81	1200	500	380		81	1000	440	100	335	200	56	4	M12
	160L	345	136	188	275	81	1250	500	380		83	1050	440	100	335	200	56	4	M12
4	180M	351.5	175	188	295	81	1200	460		200	69	1050	420	100	345	200	56	4	M12
	160M	323	115	243	275	90	1250	500	380		81	1000	440	100	335	200	56	4	M12
	160L	345	136	243	275	90	1250	500	380		83	1050	440	100	335	200	56	4	M12
5	180M	351.5	175	243	295	90	1250	460		200	69	1050	420	100	345	200	56	4	M12
	180L	370.5	210	243	295	90	1250	460		200	70	1050	420	100	340	200	56	4	M12
	160M	323	115	298	275	99	1200												

MMO 50



Dimensions (in mm)

NO. OF STAGE	MOTOR DIMENSIONS			PUMP SET DIMENSIONS			BASEPLATE DIMENSIONS				FOUNDATION DIMENSIONS								
	Size	R	Wt. Kgf.	E	H	Wt. Kgf.	I ₃	b	b ₃	Y	Wt. Kgf.	I ₂	b ₂	V ₂	I	M	N	P	Q
2	132S	239	58	151	285	98	950	500	380	/	74	750	440	100	194	200	56	4	M12
	160M	323	115	151	285	98	1100	500	380	/	80	900	440	100	259	200	56	4	M12
	160L	345	136	151	285	98	1200	500	380	/	88	1000	440	100	319	200	56	4	M12
	180M	351.5	175	151	295	98	1200	460	/	200	67	1000	420	100	324	200	56	4	M12
	180L	370.5	210	151	295	98	1150	460	/	200	65	950	420	100	194	200	56	4	M12
3	160M	323	115	213	285	111	1100	500	380	/	80	900	440	100	259	200	56	4	M12
	160L	345	136	213	285	111	1200	500	380	/	88	1000	440	100	319	200	56	4	M12
	180M	351.5	175	213	295	111	1200	460	/	200	67	1000	420	100	324	200	56	4	M12
	180L	370.5	210	213	295	111	1200	460	/	200	65	1000	420	100	264	200	56	4	M12
	200L	395.5	310	213	320	111	1250	500	/	200	83	1050	460	100	254	200	56	4	M12
4	160L	345	136	275	285	124	1200	500	380	/	88	1000	440	100	319	200	56	4	M12
	180M	351.5	175	275	295	124	1200	460	/	200	67	1000	420	100	324	200	56	4	M12
	180L	370.5	210	275	295	124	1250	460	/	200	68	1050	420	100	329	200	56	4	M12
	200M	376.5	285	275	320	124	1250	500	/	200	76	1050	460	100	329	200	56	4	M12
	200L	395.5	310	275	320	124	1300	500	/	200	83	1100	460	100	319	200	56	4	M12
5	180M	351.5	175	337	295	137	1300	460	/	200	70	1100	420	100	389	200	56	4	M12
	180L	370.5	210	337	295	137	1350	460	/	200	70	950	420	200	389	250	71	4	M16
	200M	376.5	285	337	320	137	1300	500	/	200	81	1100	460	100	379	200	56	4	M12
	200L	395.5	310	337	320	137	1350	500	/	200	84	950	460	200	289	250	71	4	M16
	225S	402	365	337	245	137	1350	560	/	200	67	950	520	200	279	250	71	4	M16
6	180M	351.5	175	399	295	150	1350	460	/	200	68	950	520	200	354	250	71	4	M16
	180L	370.5	210	399	295	150	1400	460	/	200	71	1000	520	200	354	250	71	4	M16
	200M	376.5	285	399	320	150	1400	500	/	200	83	1000	460	200	344	250	71	4	M16
	200L	395.5	315	399	320	150	1400	500	/	200	85	1000	460	200	339	250	71	4	M16
	225S	402	365	399	345	150	1400	560	/	200	78	1000	520	200	344	250	71	4	M16
7	225M	414.5	405	399	345	150	1450	560	/	200	83	1050	520	200	344	250	71	4	M16
	180L	370.5	210	461	395	163	1450	460	/	200	72	1050	520	200	414	250	71	4	M16
	200M	376.5	285	461	320	163	1450	500	/	200	84	1050	460	200	404	250	71	4	M16
	200L	395.5	310	461	320	163	1500	500	/	200	88	1100	460	200	404	250	71	4	M16
	225S	402	365	461	345	163	1500	560	/	200	84	1100	520	200	404	250	71	4	M16
8	180L	370.5	210	523	295	176	1500	460	/	200	72	1100	520	200	479	250	71	4	M16
	200M	376.5	285	523	320	176	1500	500	/	200	85	1100	460	200	464	250	71	4	M16
	200L	395.5	310	523	320	176	1550	500	/	200	88	1150	460	200	464	250	71	4	M16
	225S	402	365	523	345	176	1550	560	/	200	87	1150	520	200	464	250	71	4	M16
	180L	370.5	310	585	295	189	1600	460	/	200	75	1200	420	200	539	250	71	4	M16
9	200M	376.5	285	585	320	189	1550	500	/	200	85	1150	460	200	529	250	71	4	M16
	200L	395.5	310	585	320	189	1600	500	/	200	88	1200	460	200	529	250	71	4	M16
	225S	402	365	585	345	189	1600	500	/	200	84	1200	520	200	529	250	71	4	M26

Flange Dimensions

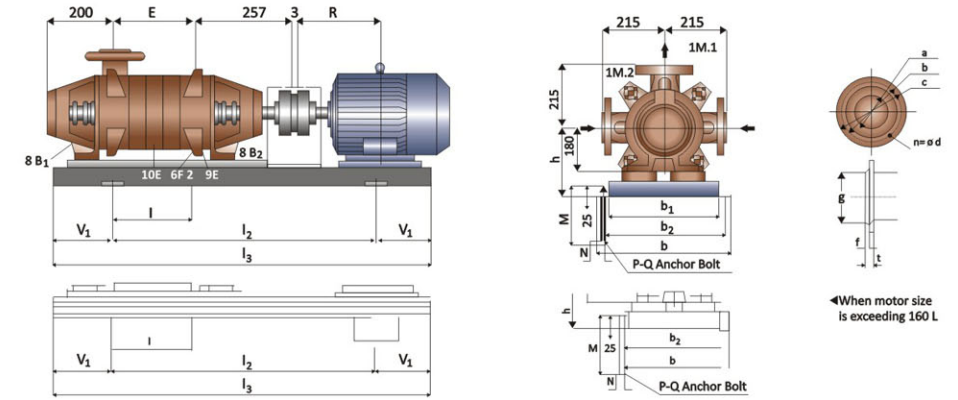
Suction Nozzle JIS10Kgf/cm ² RF65A												Discharge Nozzle JIS20kgf/cm ² RF50A			
a	b	c	g	t	f	n-d	a	b	c	g	t	f	n-d		
65	140	175	120	22	2	4-19	50	120	155	100	22	2	8-19		

Motor weights vary according to manufacturers, poles or types

Auxiliary Connections, Dimensions and designations

Pressure Gauge	Priming and Draining of Liquid Pumped	Leakage Drain	Sealing Liquid Inlet	Inlet of Sealing Liquid from an Outside Source
1M.1 - 1M.2	6F.2	8B.1 - 8B.2	9E	10E
PT 3/8	PF 3/8	PF 3/8	PF 1/8	PT 1/4

MMO 65



Dimensions (in mm)

NO. OF STAGE	MOTOR DIMENSIONS			PUMP SET DIMENSIONS			BASEPLATE DIMENSIONS				FOUNDATION DIMENSIONS								
	Size	R	Wt. Kgf.	E	H	Wt. Kgf.	I ₃	b	b ₃	Y	Wt. Kgf.	I ₂	b ₂	V ₂	I	M	N	P	Q
2	160M	323	115	180	310	132	1100	500	380	/	89	900	440	100	229	229	56	4	M12
	160L	345	136	180	310	132	1150	500	380	/	94	950	440	100	229	229	56	4	M12
	180L	351.5	175	180	310	132	1150	450	/	200	69	950	420	100	244	244	56	4	M12
	180L	370.5	210	180	310	132	1200	460	/	200	77	1000	420	100	244	244	56	4	M12
	200M	376.5	285	180	320	132	1200	500	/	200	73	1000	460	100	244	244	56	4	M12
3	200L	395.5	310	180	320	132	1250	500	/	200	75	1050	460	100	244	244	56	4	M12
	225S	402	365	180	345	132	1200	560	/	200	82	1000	520	100	229	229	56	4	M12
	180M	351.5	175	251	310	151	1250	460	/	200	71	1050	420	100	314	314	56	4	M12
	180L	370.5	210	251	310	151	1250	460	/	200	78	1050	420	100	314	314	56	4	M12
	200M	376.5	285	251	320	151	1250	500	/	200	74	1050	460	100	314	314	56	4	M12
4	200L	395.5	310	251	320	151	1300	500	/	200	77	1100	460	100	314	314	56	4	M12
	225S	402	365	251	345	151	1300	560	/	200	87	1100	520	100	304	304	56	4	M12
	225M	414.5	405	251	345	151	1300	560	/	200	87	1100	520	100	304	304	56	4	M12
	250M	425.5	405	251	375	151	1400	610	/	200	98	1000	570	200	214	214	71	4	M16
	180L	370.5	210	322	310	170	1350	460	/	200	80	950	420	200	284	284	71	4	M16
5	200M	376.5	285	322	320	170	1350	500	/	200	77	950	460	200	284	284	71	4	M16
	200L	395.5	310	322	320	170	1400	500	/	200	78	1000	460	200	284	284	71	4	M16
	225S	402	365	322	345	170	1350	560	/	200	79	950	520	200	279	279	71	4	M16
	225M	414.5	405	322	345	170	1400	560	/	200	81	1000	520	200	279	279	71	4	M16
	250S	433.5	540	322	375	170	1400	610	/	200	96	1000	570	200	279	279	71	4	M16
6	250M	452.5	405	322	375	170	1450	610	/	200	97	1050	570	200	279	279	71	4	M16
	280M	484	405	322	405	170	1500	680	/	200	112	1100	640	200	279	279	71	4	M16
	280M	509.5	405	322	405	170	1550	680	/	200	116	1150	640	200	279	279	71	4	M16
	200M	376.5	285	393	320	189	1400	500	/	200	80	1000	460	200	354	354	71	4	M16
	225S	402	365	393	345	189	1450	560	/	200	79	1050	520	200	354	354	71	4	M16
7	225M	414.5	405	393	345	189	1450	560	/	200	81	1050	520	200	354	354	71	4	M16
	250S	433.5	540	393	375	189	1450	610	/	200	96	1100	570	200	354	354	71	4	M16
	250M	452.5	405	393	375	189	1500	610	/	200	97	1100	570	200	339	339	71	4	M16
	225S	402	365	464	345	208	1500	560	/	200	81	1100	520	200	419	419	71	4	M16
	225M	414.5	405	464	345	208	1550	560	/	200	81	1150	520	200	419				