MMO
MMOV (Vertical)

High Pressure Centrifugal Pumps

TORISHIMA PUMP

Updated Pumps to Meet New Needs

Torishima MMO, MMOV 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

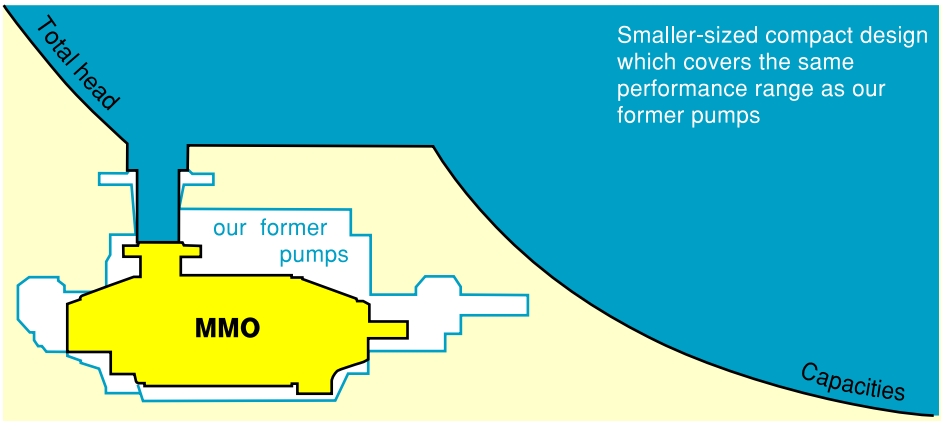
Capacity up to 36 l/s (130 m^3/h)
Total head up to 400m
Operating pressures up to 4 MPa
Operating temperatures up to +110/140°C

MMO, MMOV pumps can also be used as circulating pumps in high pressure systems because even the suction casing is designed for 4 MPa.
The only restriction is that the sum of the maximum suction pressure plus total head must not exceed 4 MPa at zero capacity.

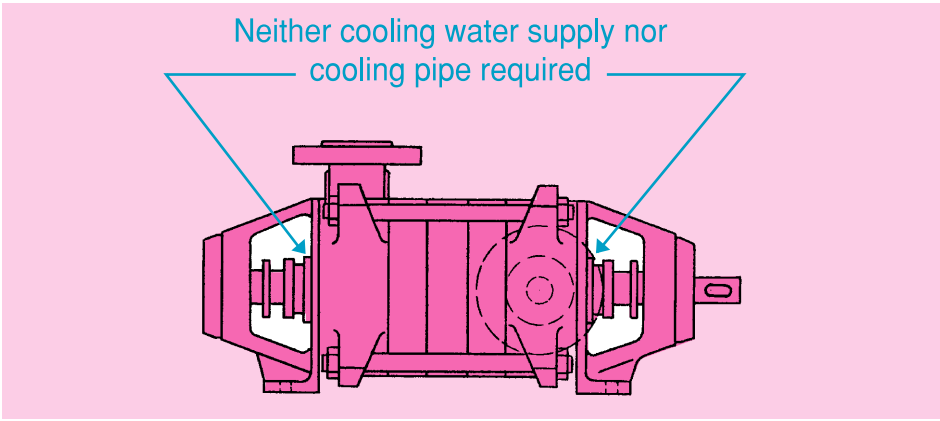
Horizontal version	MMO
Vertical version	MMOV

Thoroughly Rationalized Design to Meet Any Specified Requirements

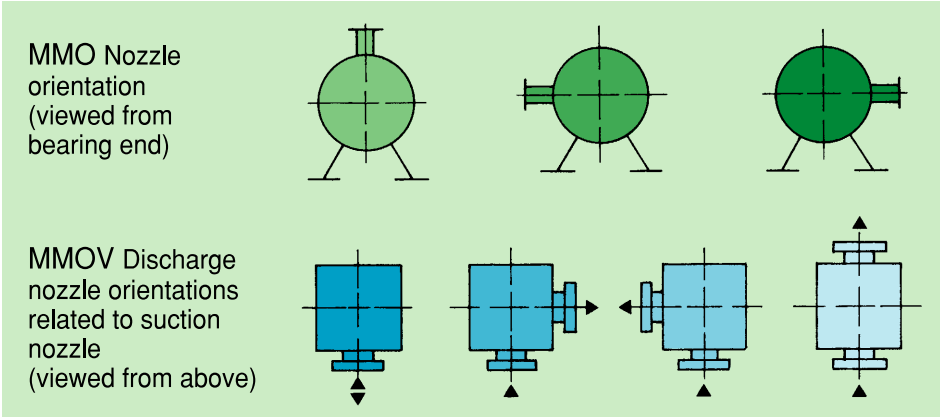
Simple and high performance design contributes to reduction of equipment cost and energy-saving.
Hydrodynamically simplified pump design resulted in attractive cost reduction. Besides not only the number of stages is lower but also pump size is smaller maintaining the same performance as our former models.



Shaft seal requires no cooling for temperature range up to 140°C.
Elimination of cooling water feed and return piping and monitoring instruments.



Nozzle orientation can be freely chosen.
MMO
The pump feet, integrally cast onto the bearing housings, allow free orientation of both suction and discharge nozzles, as illustrated on the right.
MMOV
Variable nozzle orientations are available, as illustrated on the right.

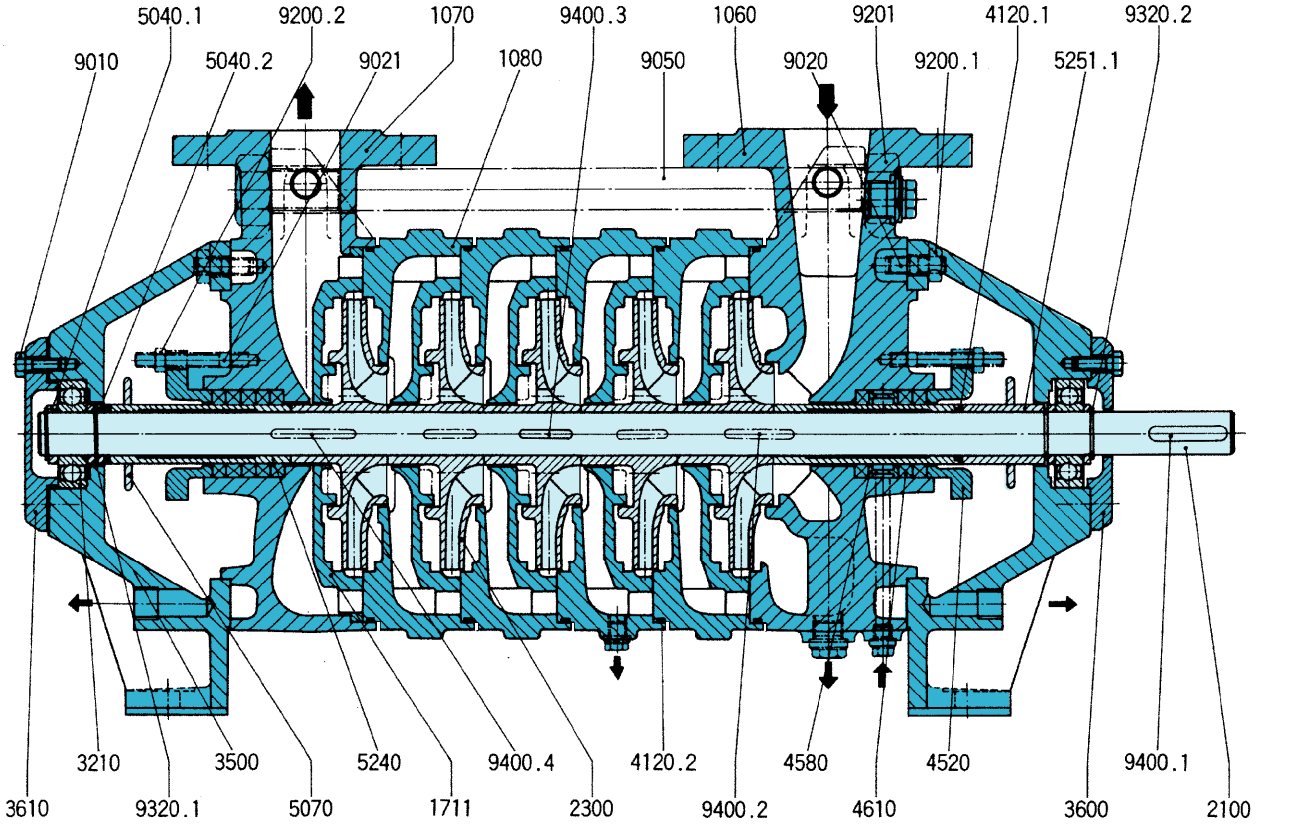


Variety of material combination.
Various materials are available, so as to provide wide application range.

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, Chromium steel
Shaft protecting sleeve	Cast iron, Bronze, Chromium steel

Design



(MMO)

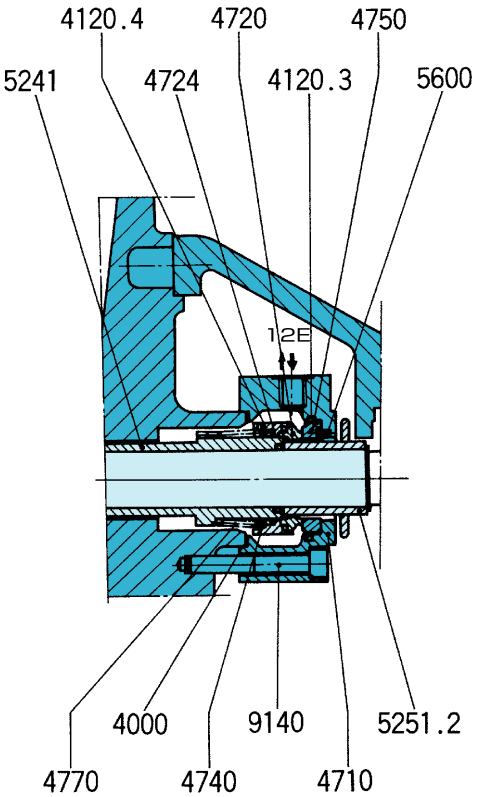
1060	Suction casing
1070	Discharge casing
1080	Stage casing
1711	Final stage diffuser
1810	Support stand
2100	Shaft
2300	Impeller
3210	Deep groove ball bearing
3410	Drive stand
3500	Bearing housing
3600	Bearing cover
3610	Bearing end cover
4120.1	O-ring
4120.2	O-ring
4520	Stuffing box gland
4580	Lantern ring
4610	Stuffing box packing
5040.1	Spacer ring
5040.2	Spacer ring
5070	Thrower
5240	Shaft protecting sleeve
5251.1	Spacer sleeve
5290	Bearing sleeve
5450.½	Bearing bush
8610.½	Half coupling
9010	Hex. head bolt
9020	Stud
9021	Gland bolt
9050	Tie bolt

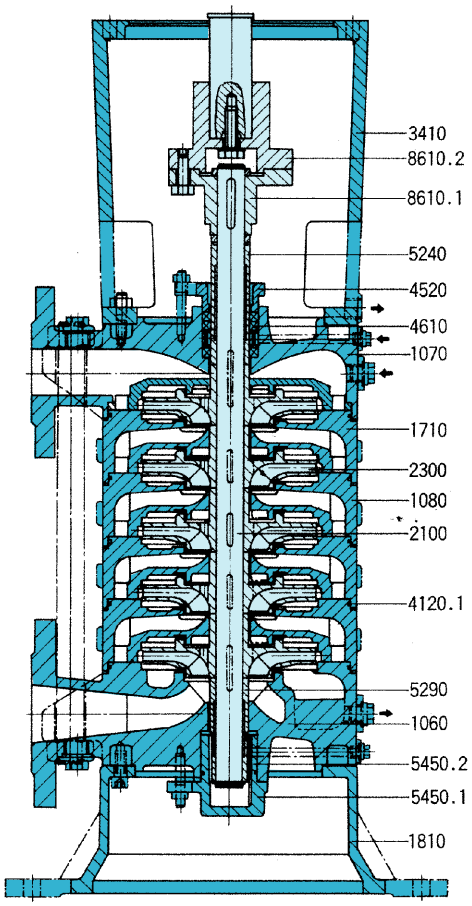
Part No.	Part Designation
9200.1	Hex. nut
9200.2	Hex. nut
9201	Threaded plug
9320.1	Circlip
9320.2	Circlip
9400.1	Key
9400.2	Key
9400.3	Key
9400.4	Key

Mechanical Seal

4000	Flat gasket
4120.3	O-ring
4120.4	O-ring
4710	Seal cover
4720	Washer
4724	Back up ring
4740	Stopper
4750	Seat
4770	Spring
5241	Seal sleeve
5251.2	Spacer sleeve
5600	Pin
9140	Hex. bolt

Mechanical Seal





(MMOV)

Horizontal or vertical ring section pumps with radial flow impellers, single flow, single or multi-stage, with radially split casings.
Pump sizes: DN32, 40, 50 and 65
Both horizontal and vertical pump sizes DN32 to 65 to a large extent use the same parts.
This means a small, and therefore economical, stock of spares.

Pump Casing

The suction, discharge and stage casings plus integral diffusers (DN 32 to 65) are made of high grade FC 250 cast iron (or FCD 400 ductile cast iron and bronze). O-rings between the individual casing components ensure the casing assembly is tightly sealed.
The orientations of the suction and discharge nozzles can easily be adapted to suit existing piping arrangements. Pumps with three or more stages can have both nozzles pointing the same way, if desired.

Impellers

Established impeller combinations ensure there is a carefully graduated performance grid.

Shaft

The pump shaft runs in two bearings which are virtually maintenance-free.
It is protected against abrasion along its full length within the pump by the shaft sleeves, spacer sleeves and impeller nuts (DN 32 to 65).
On the vertical MMOV the pump and motor are direct coupled, which means the shaft is supported by the motor bearing and the bearing bush on the pump support stand.

Axial Thrust

The thrust is accommodated by sealing clearance gaps and balance bores.

Shaft Seal

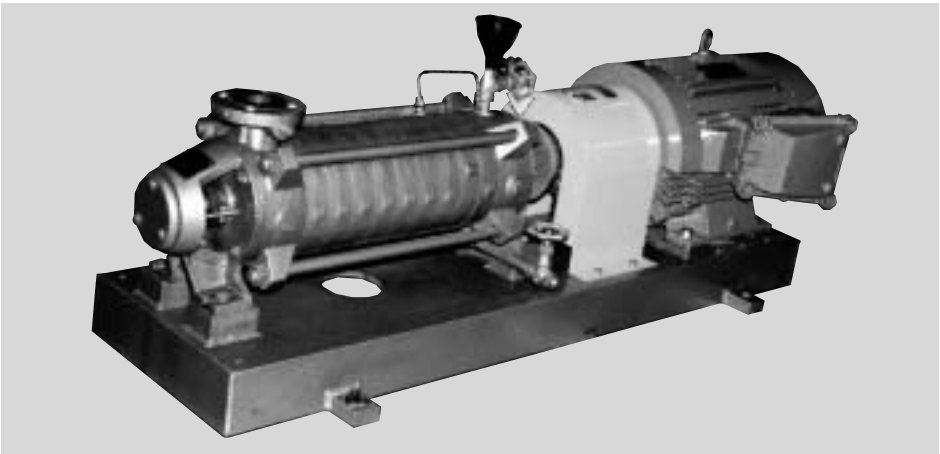
Pump sizes 32 to 65 have packed glands for operation at pressures up to 30 bar and temperatures up to +110°C.
With suction lift or vacuum operation the packed glands incorporate lantern rings which are supplied with sealing liquid either from the discharge side of the pump or from an external source.
For operating pressures up to 40 bar and temperatures up to +140°C the MMO, MMOV sizes 32 to 65 are supplied with maintenance-free mechanical seals.

Cooling

No cooling is required throughout the temperature range covered by these pumps. This eliminates the need for cooling water, feed and return piping or monitoring instruments.

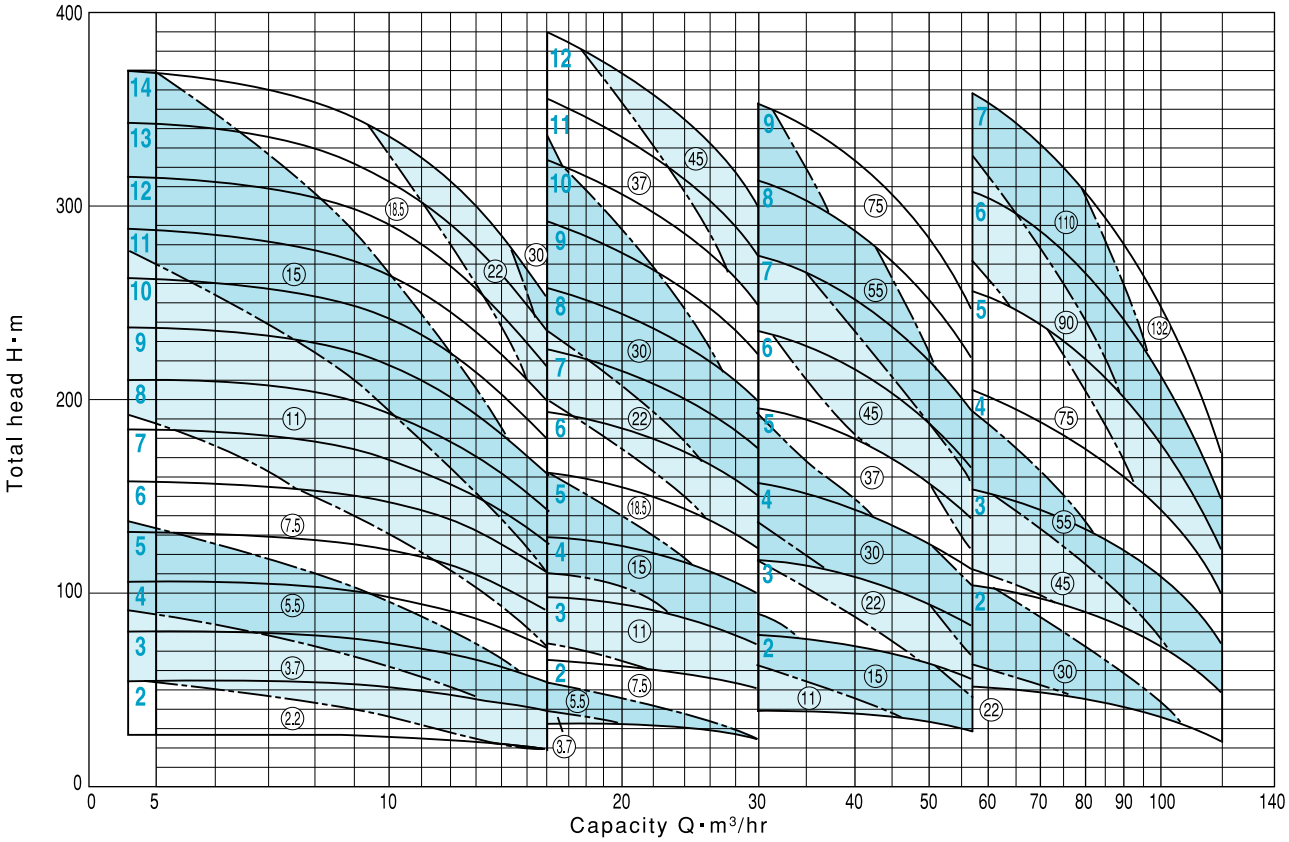
Installation

On the horizontal MMO, the pump feet are integrally cast on the bearing housing. The pump and flexibly coupled drive motor are mounted on a common baseplate.
The vertical MMOV rests on a support stand which is bolted to the suction casing; the motot sits on a drive stand.



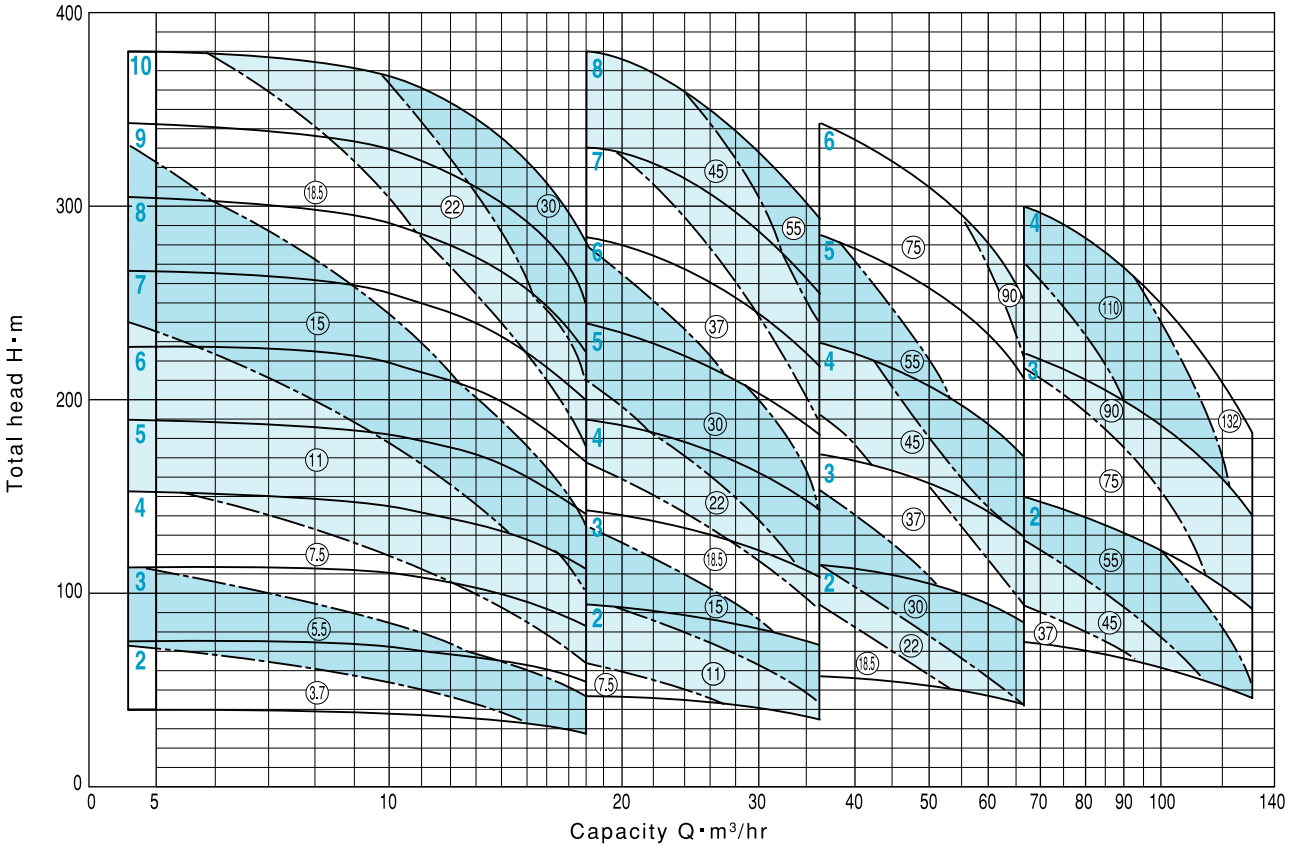
Selection Charts

50Hz-2P



MMO MMOV				
	32	40	50	65

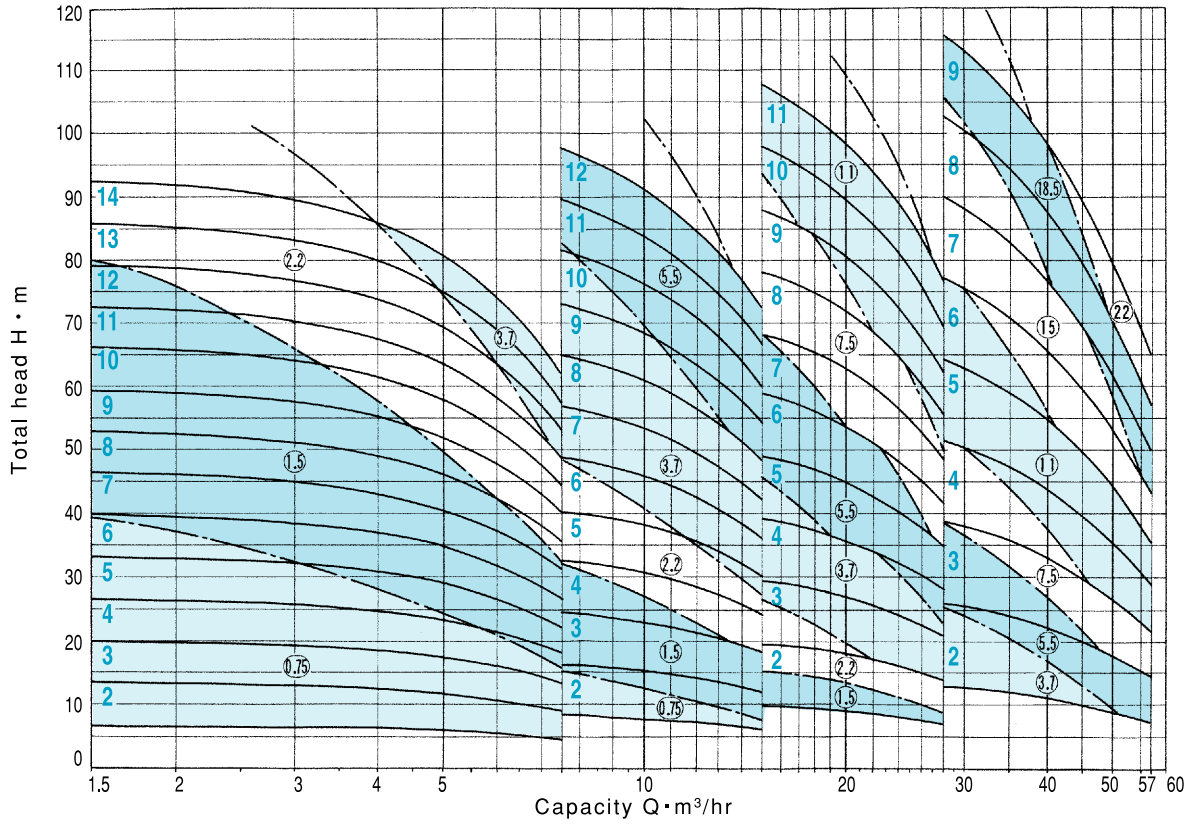
60Hz-2P



MMO MMOV				
	32	40	50	65

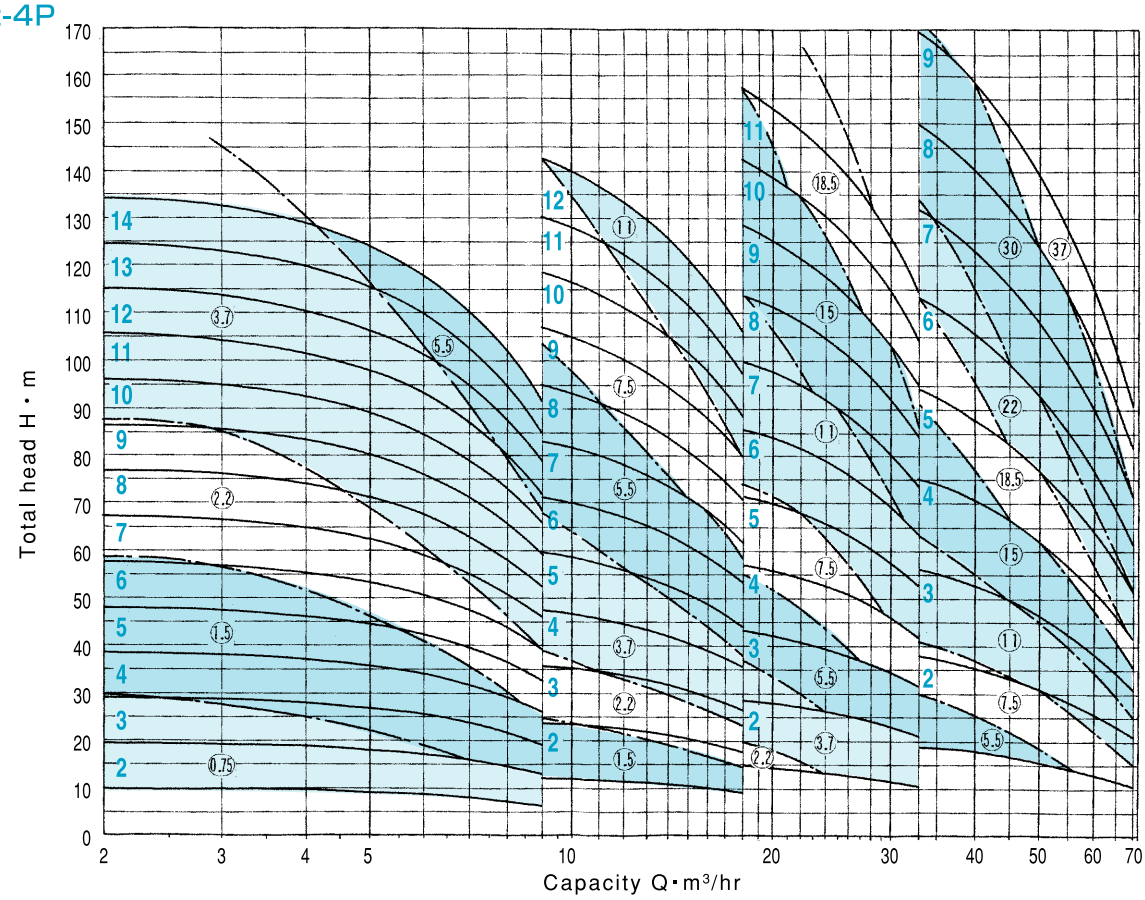
Encircled number=Motor rating in kW

50Hz-4P



MMO MMOV	32	40	50	65

60Hz-4P

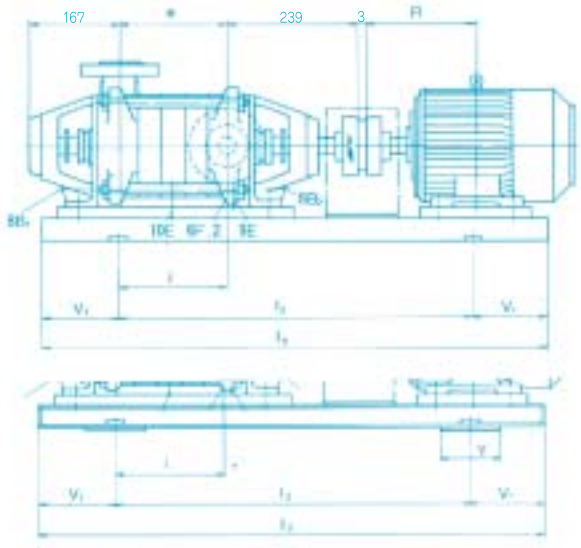


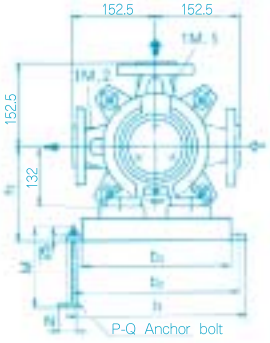
MMO MMOV	32	40	50	65

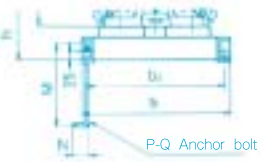
Encircled number=Motor rating in kW

Dimension Charts

MMO 32







◀When motor size is exceeding 160L

Dimensions (in mm)

No. of stage.	Motor dimensions			Pump set dimensions			Baseplate dimensions					Foundation dimensions							
	Size	R	Mass. kgf	e	h	Mass. kgf	l_3	b	b_3	Y	Mass. kgf	l_2	b_2	V_1	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
	160M	323	115	157	275	52	1150	500	380		87	950	440	100	275	200	56	4	M12
4	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
	160M	323	115	200	275	57	1150	500	380		87	950	440	100	275	200	56	4	M12
5	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		72	800	440	100	275	200	56	4	M12
	160M	323	115	243	275	62	1150	500	380		87	950	440	100	275	200	56	4	M12
6	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
	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
7	132S	239	58	329	257	72	1150	500	380		83	950	440	100	405	200	56	4	M12
	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
8	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
	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
9	132S	239	58	415	257	82	1200	500	380		81	1000	440	100	445	200	56	4	M12
	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
	180L	370.5	210	415	295	82	1400	460		200	75	1000	420	200	345	250	71	4	M16
10	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
	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
11	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
12	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
13	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
14	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	295	107	1600	460		200	77	1200	420	200	560	250	71	4	M16

Flange dimensions

Dimensions (in mm)

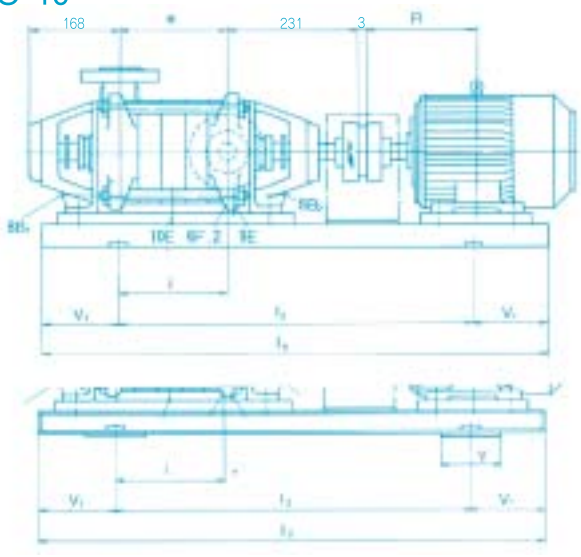
Suction nozzle JIS10kgf/cm² RF40A							Discharge nozzle JIS20kgf/cm² RF32A						
a	b	c	g	t	f	n-d	a	b	c	g	t	f	n-d
40	105	140	85	20	2	4 -19	32	100	135	80	22	2	4 -19

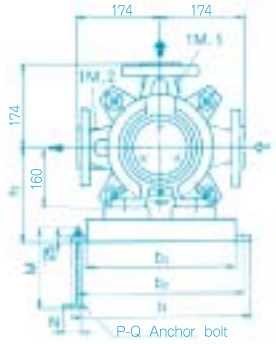
Motor weights vary according to manufacturers, poles or types.

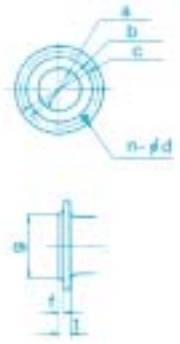
Auxiliary connections, dimensions and designations

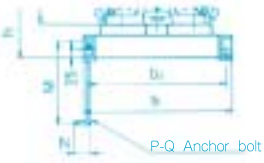
pressure gauge	priming and draining of liquid pumped	Leakage drain	Sealing liquid inlet	Inlet of sealing liquid from an outside source
1M.1·1M.2	6F .2	8B.1·8B.2	9E	10E
PT 3/8	PF 3/8	PF 3/8	PF 1/8	PT 1/4

MMO 40









◀When motor size is exceeding 160L

Dimensions (in mm)

No. of stage.	Motor dimensions			Pump set dimensions			Baseplate dimensions					Foundation dimensions							
	Size	R	Mass. kgf	e	h	Mass. kgf	l_3	b	b_3	Y	Mass. kgf	l_2	b_2	V_1	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
	180M	351.5	175	188	295	81	1250	460		200	69	1050	420	100	345	200	56	4	M12
4	160M	323	115	243	275	90	1200	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
	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
5	160M	323	115	298	275	99	1200	500	380		81	1000	440	100	335	200	56	4	M12
	160L	345	136	298	275	99	1250	500	380		83	1050	440	100	335	200	56	4	M12
	180M	351.5	175	298	295	99	1250	460		200	69	1050	420	100	345	200	56	4	M12
	180L	370.5	210	298	295	99	1250	460		200	70	1050	420	100	340	200	56	4	M12
	200L	395.5	310	298	320	99	1400	500		200	91	1000	460	200	345	250	71	4	M16
6	160M	323	115	353	275	108	1250	500	380		76	1050	440	100	390	250	71	4	M16
	160L	345	136	353	275	108	1350	500	380		88	950	440	200	345	250	71	4	M16
	180M	351.5	175	353	295	108	1350	460		200	72	950	420	200	355	250	71	4	M16
	180L	370.5	210	353	295	108	1400	460		200	75	1000	420	200	355	250	71	4	M16
	200L	395.5	310	353	320	108	1400	500		200	91	1000	460	200	345	250	71	4	M16
7	160L	345	136	408	275	117	1350	500	380		88	950	440	200	345	250	71	4	M16
	180M	351.5	175	408	295	117	1350	460		200	72	950	420	200	355	250	71	4	M16
	180L	370.5	210	408	295	117	1400	460		200	75	1000	420	200	355	250	71	4	M16
	200M	376.5	285	408	320	117	1400	500		200	91	1000	460	200	345	250	71	4	M16
	200L	395.5	310	408	320	117	1400	500		200	85	1000	460	200	355	250	71	4	M16
	225S	402	365	408	345	117	1450	560		200	82	1050	520	200	355	250	71	4	M16
8	160L	345	136	463	275	126	1400	500	380		90	1000	440	200	400	250	71	4	M16
	180M	351.5	175	463	295	126	1400	460		200	62	1000	420	200	410	250	71	4	M16
	180L	370.5	210	463	295	126	1450	460		200	71	1050	420	200	410	250	71	4	M16
	200M	376.5	285	463	320	126	1450	500		200	82	1050	460	200	400	250	71	4	M16
	200L	395.5	310	463	320	126	1450	500		200	82	1050	460	200	400	250	71	4	M16
	225S	402	365	463	345	126	1450	560		200	83	1050	520	200	400	250	71	4	M16
9	180M	351.5	175	518	295	135	1450	460		200	70	1050	420	200	465	250	71	4	M16
	180L	370.5	210	518	295	135	1500	460		200	73	1100	420	200	465	250	71	4	M16
	200L	395.5	310	518	320	135	1500	500		200	86	1100	460	200	455	250	71	4	M16
10	180M	351.5	175	573	295	144	1500	460		200	70	1100	420	200	520	250	71	4	M16
	180L	370.5	210	573	295	144	1550	460		200	72	1150	420	200	520	250	71	4	M16
	200L	395.5	310	573	320	144	1600	500		200	75	1200	460	200	510	250	71	4	M16
11	180M	351.5	175	628	295	153	1550	460		200	70	1150	420	200	575	250	71	4	M16
	180L	370.5	210	628	295	153	1600	460		200	74	1200	420	200	575	250	71	4	M16
	200L	395.5	310	628	320	153	1650	500		200	90	1250	460	200	565	250	71	4	M16
12	180M	351.5	175	683	295	162	1600	460		200	69	1200	420	200	630	250	71	4	M16
	180L	370.5	210	683	295	162	1650	460		200	75	1250	420	200	630	250	71	4	M16
	200M	376.5	285	683	320	162	1650	500		200	86	1250	460	200	630	250	71	4	M16
	200L	395.5	310	683	320	162	1700	500		200	91	1300	460	200	620	250	71	4	M16
	225S	402	365	683	345	162	1700	560		200	89	1300	520	200	630	250	71	4	M16

Flange dimensions

Dimensions (in mm)

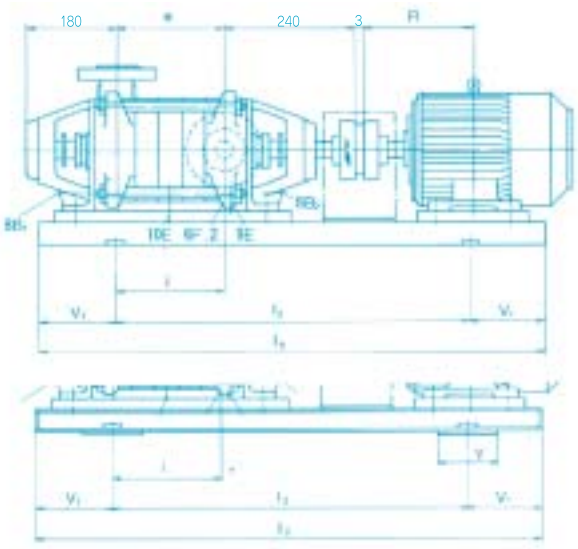
Suction nozzle JIS10kgf/cm² RF50A							Discharge nozzle JIS20kgf/cm² RF40A						
a	b	c	g	t	f	n-d	a	b	c	g	t	f	n-d
50	120	155	100	20	2	4-19	40	105	140	85	22	2	4-19

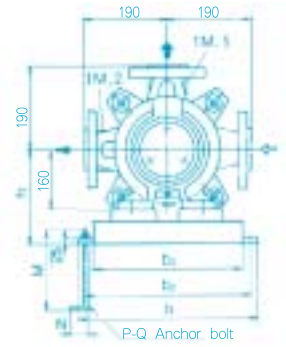
Motor weights vary according to manufacturers, poles or types.

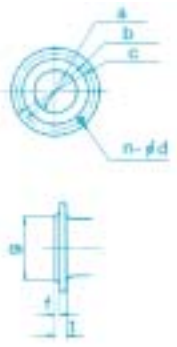
Auxiliary connections, dimensions and designations

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 50







◀When motor size is exceeding 160L

Dimensions (in mm)

No. of stage.	Motor dimensions			Pump set dimensions			Baseplate dimensions					Foundation dimensions							
	Size	R	Mass. kgf	e	h	Mass. kgf	l_3	b	b_3	Y	Mass. kgf	l_2	b_2	V_1	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	82	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	289	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	345	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	420	200	354	250	71	4	M16
	180L	370.5	210	399	295	150	1400	460		200	71	1000	420	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
	225M	414.5	405	399	345	150	1450	560		200	83	1050	520	200	344	250	71	4	M16
7	180L	370.5	210	461	295	163	1450	460		200	72	1050	420	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	420	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
9	180L	370.5	210	585	295	189	1600	460		200	75	1200	420	200	539	250	71	4	M16
	200M	376.5	285	585	320	189	1550	500		200	84	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	M16

Flange dimensions

Dimensions (in mm)

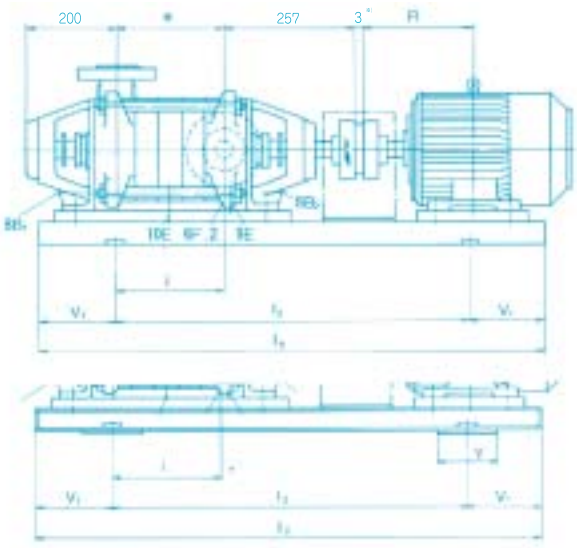
Suction nozzle JIS10kgf/cm² RF65A							Discharge nozzle JIS20kgf/cm² RF50A						
a	b	c	g	t	f	n-d	a	b	c	g	t	f	n-d
65	140	175	120	22	2	4-19	50	120	155	100	22	2	8-19

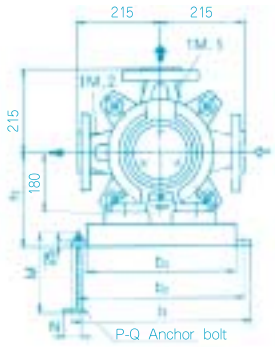
Motor weights vary according to manufacturers, poles or types.

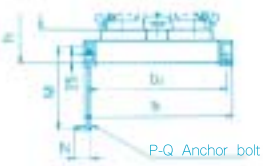
Auxiliary connections, dimensions and designations

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







◀When motor size is exceeding 160L

Dimensions (in mm)

No. of stage.	Motor dimensions			Pump set dimensions			Baseplate dimensions					Foundation dimensions							
	Size	R	Mass. kgf	e	h	Mass. kgf	l_3	b	b_3	Y	Mass. kgf	l_2	b_2	V_1	i	M	N	P	Q
2	160M	323	115	180	310	132	1100	500	380		89	900	440	100	229	200	56	4	M12
	160L	345	136	180	310	132	1150	500	380		94	950	440	100	229	200	56	4	M12
	180M	351.5	175	180	310	132	1150	460		200	69	950	420	100	244	200	56	4	M12
	180L	370.5	210	180	310	132	1200	460		200	77	1000	420	100	244	200	56	4	M12
	200M	376.5	285	180	320	132	1200	500		200	73	1000	460	100	244	200	56	4	M12
	200L	395.5	310	180	320	132	1250	500		200	75	1050	460	100	244	200	56	4	M12
	225S	402	365	180	345	132	1200	560		200	82	1000	520	100	229	200	56	4	M12
3	180M	351.5	175	251	310	151	1250	460		200	71	1050	420	100	314	200	56	4	M12
	180L	370.5	210	251	310	151	1250	460		200	78	1050	420	100	314	200	56	4	M12
	200M	376.5	285	251	320	151	1250	500		200	74	1050	460	100	314	200	56	4	M12
	200L	395.5	310	251	320	151	1300	500		200	77	1100	460	100	314	200	56	4	M12
	225S	402	365	251	345	151	1300	560		200	87	1100	520	100	304	200	56	4	M12
	225M	414.5	405	251	345	151	1300	560		200	87	1100	520	100	304	200	56	4	M12
	250M	452.5		251	375	151	1400	610		200	98	1000	570	200	214	250	71	4	M16
4	180L	370.5	210	322	310	170	1350	460		200	80	950	420	200	284	200	71	4	M16
	200M	376.5	285	322	320	170	1350	500		200	77	950	460	200	284	250	71	4	M16
	200L	395.5	310	322	320	170	1400	500		200	78	1000	460	200	284	250	71	4	M16
	225S	402	365	322	345	170	1350	560		200	79	950	520	200	279	250	71	4	M16
	225M	414.5	405	322	345	170	1400	560		200	81	1000	520	200	279	250	71	4	M16
	250S	433.5	540	322	375	170	1400	610		200	96	1000	570	200	279	250	71	4	M16
	250M	452.5		322	375	170	1450	610		200	.97	1050	570	200	279	250	71	4	M16
	280S	484		322	405	170	1500	680		200	112	1100	640	200	279	250	71	4	M16
	280M	509.5		322	405	170	1550	680		200	116	1150	640	200	279	250	71	4	M16
5	200M	376.5	285	393	320	189	1400	500		200	80	1000	460	200	354	250	71	4	M16
	225S	402	365	393	345	189	1450	560		200	79	1050	520	200	354	250	71	4	M16
	225M	414.5	405	393	345	189	1450	560		200	81	1050	520	200	354	250	71	4	M16
	250S	433.5	540	393	375	189	1500	610		200	96	1100	570	200	354	250	71	4	M16
	250M	452.5		393	375	189	1500	610		200	97	1100	570	200	339	250	71	4	M16
6	225S	402	365	464	345	208	1500	560		200	81	1100	520	200	419	250	71	4	M16
	225M	414.5	405	464	345	208	1550	560		200	81	1150	520	200	419	250	71	4	M16
	250S	433.5	540	464	375	208	1550	610		200	96	1150	570	200	419	250	71	4	M16
	250M	452.5		464	375	208	1600	610		200	99	1200	570	200	419	250	71	4	M16
	280S	484		464	405	208	1650	680		200	112	1250	640	200	419	250	71	4	M16
7	225S	402	365	535	345	227	1550	560		200	82	1150	520	200	479	250	71	4	M16
	225M	414.5	405	535	345	227	1600	560		200	84	1200	520	200	479	250	71	4	M16
	250S	433.5	540	535	375	227	1600	610		200	100	1200	570	200	479	250	71	4	M16
	250M	452.5		535	375	227	1650	610		200	102	1250	570	200	479	250	71	4	M16
	280S	484		535	405	227	1700	680		200	112	1300	640	200	479	250	71	4	M16
	280M	509.5		535	430	227	1750	680		300	150	1350	630	200	479	315	90	6	M20

Flange dimensions

Dimensions (in mm)

Suction nozzle JIS10kgf/cm² RF80A							Discharge nozzle JIS20kgf/cm² RF65A						
a	b	c	g	t	f	n-d	a	b	c	g	t	f	n-d
80	150	185	130	22	2	8-19	65	140	175	120	24	2	8-19

Motor weights vary according to manufacturers, poles or types.
※) 4 exceeding motor size 225S

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

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