Hitachi Industrial Equipment Systems

HITACHI SUBMERSIBLE MOTORS

For Deep Well Pumps



HITACHI

ISO 9001
ISO 14001
JQA-1153
JQA-EM6974

Hitachi Industrial Equipment Systems Co., Ltd. NARASHINO division is certified for ISO 14001 (standard of environmental management system) and ISO 9001 (standard of quality assurance management system).

Certified to NSF/ANSI/CAN 61-G

70 years of submersible motor experience

Classification of Submersible Motors

For Deep Wells

For Municipal Water Service, Industrial Irrigation and Building Water Supply

Canned Type

2P 3,600 / 3,000rpm

Model : VCTI-KK

- Single Voltage Construction
- Dual Voltage Construction



Rewindable Water-Tight Type

2P 3,600 / 3,000rpm
4P 1,800rpm

Model : VTI-KK



Type	Size/Hz		HP(kW)	5 (3.7)	7.5 (5.5)	10 (7.5)	15 (11)	20 (15)	25 (18.5)	30 (22)	40 (30)	50 (37)	60 (45)	75 (55)	100 (75)	125 (90)	150 (110)	175 (132)	200 (150)	250 (185)	300 (225)
Canned Type	6″		50Hz	●	●	●	●	●	●	●	●	●									
			60Hz	●	●	●	●	●	●	●	●	●	●								
	8″x 6″		50Hz								●	●	●								
			60Hz								●	●	●								
Rewindable Type	8″and Larger	2 Pole	50Hz								●	●	●	●	●	●	●	●	●	●	●
			60Hz								●	●	●	●	●	●	●	●	●	●	●
		4 Pole	50Hz		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
			60Hz		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

* Consult availability to appropriate sales channel.

Hitachi's General Features

High Quality Thrust Bearings



The thrust bearing is of the kingsbury type lubricated by the internal fluid.
During operation a wedge of water is drawn between the stainless steel pivot shoes and carbon disc to carry the thrust load generated by the pump.
The bearing has achieved long motor life because of our quality materials of construction, based on our experience and field results.

Sand Resistant Slinger and Lip Seals

A stainless steel slinger and slinger guide are also closely fit to help prevent sand entry. Double rubber seals are installed to prevent well water and contaminants from entering the motor.

Rotor Core with Baked Epoxy Coating



A baked epoxy coating prevents rusting of the rotor core. All external and internal cast iron parts are coated with epoxy resin then baked for resistance to water and rust.

Highly Reliable Carbon Bearing



Two water lubricated carbon bearings are used as guide bearings.
These have extremely large surface area and result in extra alignment support - less whipping and acts as a steady bushing.

Balancing

The rotor balance rings allow for excellent dynamic balance for the rotating element of the motor.

Water-Filled Design

The motor lubrication is provided by the internal cooling water consisting of a water, antifreeze, and antirust mixture good to – 22˚F(– 30˚C).
This mixture is installed at the factory. Water plugs are located near the top of the motor and are used by the installer to check the water level or to top off if needed before installation.

Complete Corrosion and Water-Tight Protection

All main motor components are made of stainless steel: including the can housing (water tight type motors have baked epoxy coated carbon steel housings), shaft and bolts. All other motor parts are coated with the baked epoxy coating.

Japan Made

All Hitachi submersible motors are manufactured and tested under the most stringent quality control procedures in Japan, providing long service life and trouble-free operation.

Hitachi's Special Technology

Canned Type

Replaceable Plug-in Type Lead



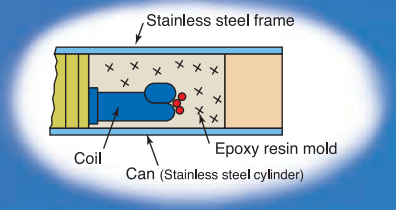
The motor leads are stranded copper, extremely flexible, 150 inches (3.8m) in length and field replaceable.

Durable Insulation



The motor stator coil of the canned type is mounted in a stainless steel frame and is completely sealed in a protective stainless steel cylinder. Complete water proofing insures long life for the moisture resistant insulation.

Excellent Heat Resistance



Strength against thermal fluctuation and internal mechanical stress is assured by the use of a patented "Hi-canned Resin". The space between the stator, stainless steel protective can and frame is filled with this epoxy resin, allowing faster and greater heat dissipation resulting in longer motor life.

95˚F(35˚C)Water Temperature (6˝ 5 – 40HP)

The motors operate with a flow rate 0.5ft/sec. (0.15m/sec.) in water temperature up to 95˚F (35˚C) without any derating of horsepower. This 95˚F(35˚C) temperature is 18˚F(10˚C) higher than NEMA standards.

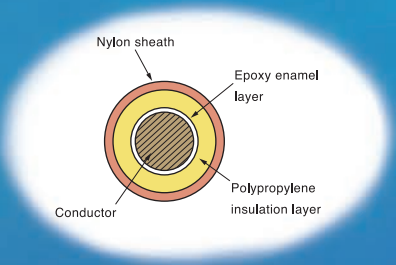
Dual Voltage Construction (3 phase 5 – 30HP)



Both constructions as single voltage and dual voltage are available.

Rewindable Water-Tight Type

Reliable Insulation Wire



The coil conductor insulation material is a specially developed denatured polypropylene, which offers excellent leak-resistant characteristics. Three barriers are applied to the copper conductors to provide complete insulation against the cooling fluid inside the motor. This design is the result of extensive research and in long insulation life under severe operating conditions.

Quality Construction

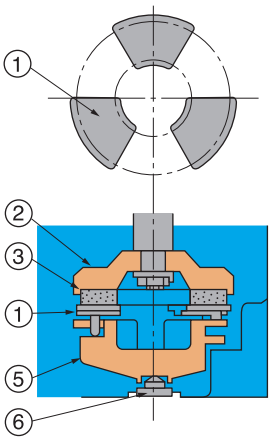
The lead wires are 200 inches (5m) long and internally connected direct to the winding. The stator is enclosed by an epoxy coated carbon steel shell, and the end bells are epoxy coated cast iron. The cooling fluid in the motor is in direct contact with the insulated windings to help keep the motor cool.

2 Pole motors and 4 Pole motors

The Hitachi submersible motor is available up to 300HP in both 2 pole and 4 pole speeds. The Hitachi motor mounts to most major pump manufactuers submersible pumps without adaption.

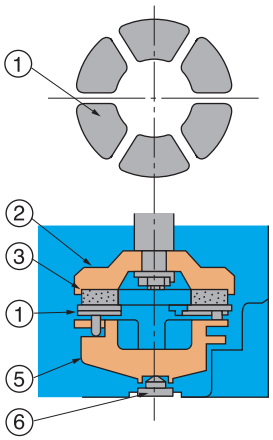
High Thrust Bearing

TYPE "A"



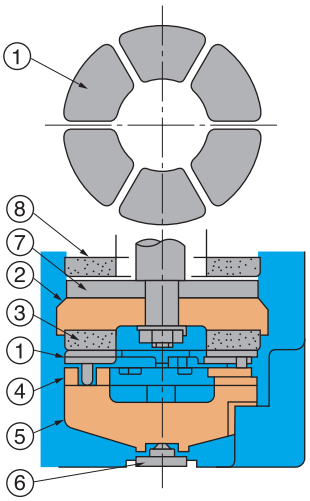
6″ 5~30HP

TYPE "B"



6″ 40~60HP

TYPE "C"



8″~14″ 40~300HP

APPLICATION

Motor Size	Output				Bearing Type	Number of Shoes
	2 Pole		4 Pole			
	HP	kW	HP	kW		
6″	5~30	3.7~22	–	–	A	3
6″	40~60	30~90	–	–	B	6
8″~10″	40~150	30~110	7.5~125	5.5~90	C	6
10″~14″	175~300	132~225	150~300	110~225	C	8

No.	Part Name
1	Pivot Shoe
2	Bearing Frame
3	Carbon Disc
4	Metal Support
5	Metal Frame
6	Thrust Plate
7	Slide Plate
8	Up Thrust Bearing

HIGH-PERFORMANCE THRUST BEARING

The well established KINGSBURY design thrust bearing creates a wedge of water between the pivot shoe and carbon disc. Our innovative design permits high thrust loads to be placed on the bearings while showing no measurable wear after several years of severe duty operation.

This allows for long pumping life, virtual trouble free operation and low maintenance.

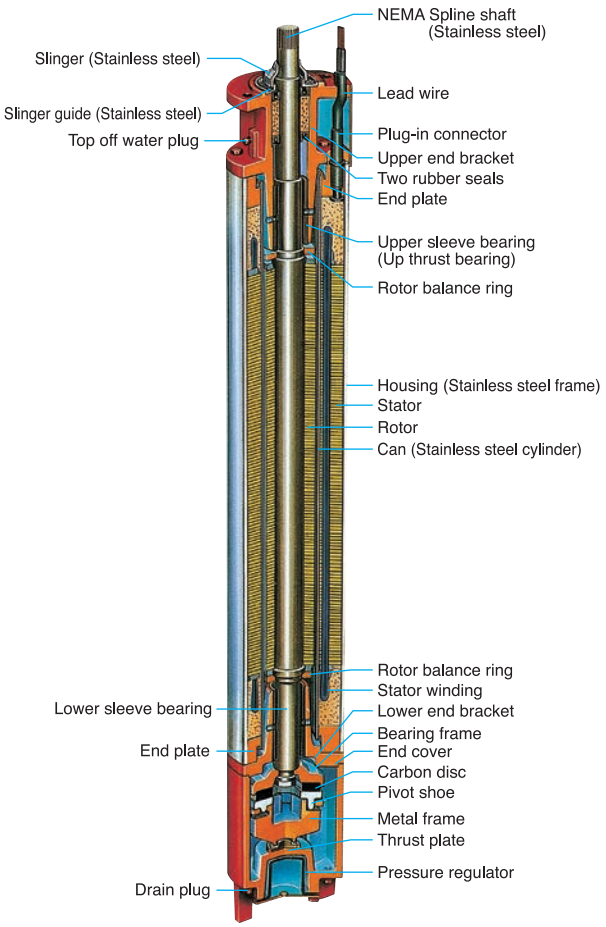
For all 6″ motors, the 300lbs. maximum continuous up-thrust is absorbed between the upper carbon sleeve bearing and the rotor balance ring. For all 8″ ~ 14″ motors, the 1000lbs. maximum continuous up-thrust is carried between the upper slide plate and the separate up-thrust carbon bearing.

Moter Size	2 Pole				4 Pole			
	Down Thrust		Up Thrust		Down Thrust		Up Thrust	
	lbs.	kN	lbs.	kN	lbs.	kN	lbs.	kN
6″ 5–30HP	3,500	15.5	300 *(450)	1.3 *(2.0)	–	–	–	–
6″ 40–60HP	5,000	22.2	300 *(450)	1.3 *(2.0)	–	–	–	–
8″ Motor–6″ Flange	6,000	26.7	300	1.3	–	–	–	–
8″	10,000	45.0	1,000	4.5	10,000	45.0	1,000	4.5
10″	10,000	45.0	1,000	4.5	10,000	45.0	1,000	4.5
12″	10,000	45.0	1,000	4.5	10,000	45.0	1,000	4.5
14″	–	–	–	–	10,000	45.0	1,000	4.5

Note :
1. Thrust ratings showed are continuous except for values marked*
2. *Momentary rating (3 minutes Max).

CANNED TYPE FOR DEEP WELL PUMPS

2 Pole 3600/3000rpm



Single-phase

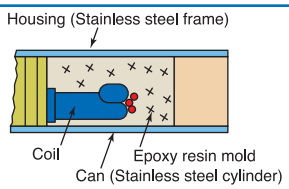
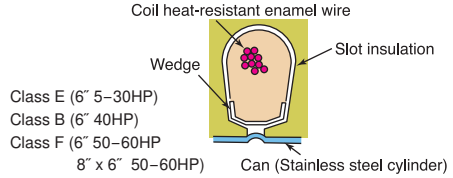
6″ 5–15HP (3.7–11kW)

Three-phase

6″ 5–60HP (3.7–45kW)

8″ x 6″ 50–60HP (37–45kW)

INSULATION

Construction	
Slot Insulation	

STANDARD SPECIFICATIONS

Cable Connection		Plug-in Type
Cable Length		150 inches (3.8m)
Shaft		NEMA Splined
Flange		NEMA Standard
Speed	60Hz	2 Pole 3600 rpm
	50Hz	2 Pole 3000 rpm

Water Environment

Flow Rate		0.5 ft/sec. (0.15 m/sec.)
pH Level		6.5-8.0
Maximum Temperature	5–40HP	95°F (35°C)
	50–60HP	77°F (25°C)

Service Factor

Motor \ Service Factor	1.15	1.0
6″ 5–30HP	230, 460V/60Hz	208V, 380V/60Hz 380, 400, 415V/50Hz
6″ 40–50HP 8″ x 6″ 50–60HP	460V/60Hz	380, 400, 415V/50Hz
6″ 60HP	460V/60Hz	——

Dual Voltage Type 3 phase 5-30HP(3.7-22kW)

With HITACHI DUAL VOLTAGE SUBMERSIBLE MOTORS IN YOUR STOCK you no longer have to worry about inventory balance between 230V and 460V.



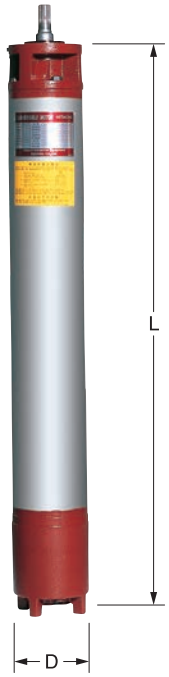
HITACHI DUAL VOLTAGE SUBMERSIBLE MOTORS have all the same specifications of canned type motor plus the unique feature of dual voltage.

Motor voltage can be changed from 460V to 230V or from 230V to 460V on three phase 5 through 30HP motors.



Voltage plugs are clearly and permanently marked as 230V or 460V . Each plug is usable on all 5 through 30HP motors.

Size and Weight 2 Pole 3600 rpm 60Hz. 3000 rpm 50Hz.



Motor Size	Phase	Output		D	L		Net Weight	
		HP	kW	inch (mm)	inch	mm	lbs.	kg
6″	1	5	3.7	5.51 (140)	26.97	685	110	50
		7.5	5.5		29.92	760	128	58
		10	7.5		29.92	760	128	58
		15	11		33.46	850	148	67
	3	5	3.7		22.95	583	95	43
		7.5	5.5		24.80	630	99	45
		10	7.5		26.97	685	110	50
		15	11		29.92	760	128	58
		20	15		31.50	800	137	62
		25	18.5		36.22	920	161	73
		30	22		38.19	970	176	80
		40	30		41.73	1060	198	90
		50	37		41.73	1060	198	90
		60	45		41.73	1060	198	90
8″ (6″ flange)		50	37	6.89 (175)	41.61	1057	298	135
		60	45		41.61	1057	309	140

*Gross Weight : See page 14.

Cable Size and Type 150 inches (3.8m) Lead Wire Standard Length

Motor Size	Phase	Output		460V, 415V, 400V, 380V			230V, 208V		
		HP	kW	Lead Wire Size		A x B inch (mm)	Lead Wire Size		A x B inch (mm)
				AWG	mm²		AWG	mm²	
6″	1	5–15	3.7–11	–	–	–	#10	5.5	0.99 x 0.38 (25.1 x 9.6)
	3	5–25	3.7–18.5	#10	5.5	0.99 x 0.38 (25.1 x 9.6)	#10	5.5	0.99 x 0.38 (25.1 x 9.6)
		30	22	#8	8	1.09 x 0.41 (27.7 x 10.4)	#8	8	1.09 x 0.41 (27.7 x 10.4)
		40	30	#10	5.5	0.99 x 0.38 (25.1 x 9.6)	–	–	–
		50–60	37–45	#8	8	1.09 x 0.41 (27.7 x 10.4)	–	–	–
8″ (6″ flange)		50–60	37–45	#8	8	1.09 x 0.41 (27.7 x 10.4)	–	–	–

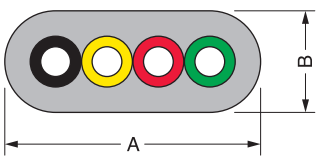
TYPE OF LEAD WIRE-600V CLASS

Ethylene-Propylene Rubber Insulated Chloroprene Denatured Cabtyre Cable.

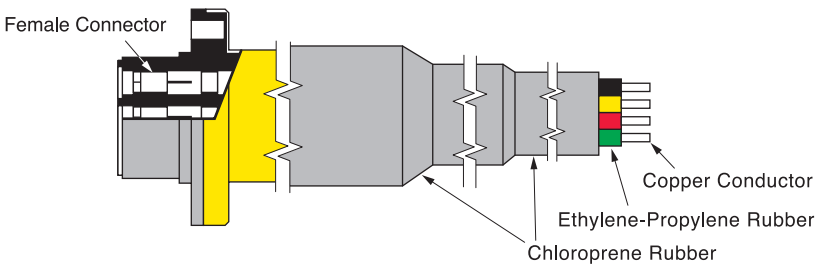
Plug-in (Field replaceable)

Color coded

USA Standard (Black, Yellow, Red, Green)

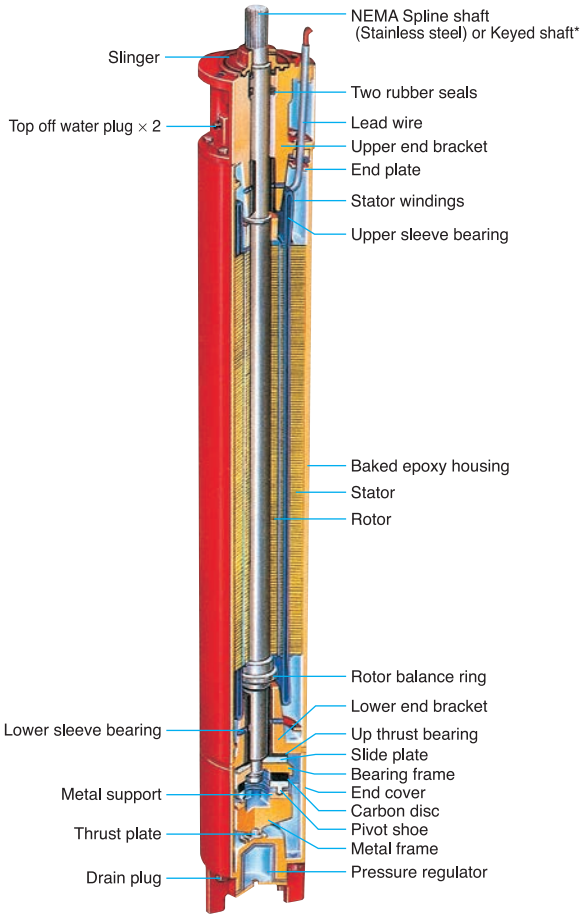


CHLOROPRENE CABTYRE CABLE



WATER TIGHT TYPE FOR DEEP WELL PUMPS

2 Pole 3600/3000rpm
4 Pole 1800rpm

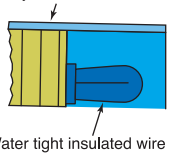
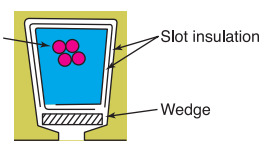


* See dimensional data for correct variations.

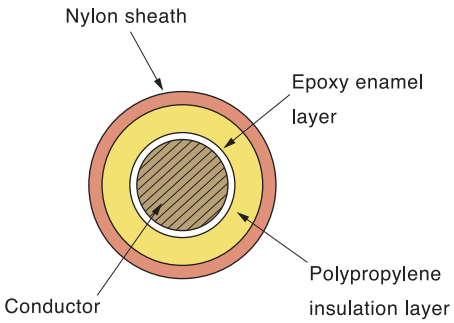
3 ϕ 40-300HP (30-225kW)
2P 3,600/3,000rpm (60/50Hz)

3 ϕ 7.5-300HP (5.5-225kW)
4P 1,800rpm (60Hz)

INSULATION

Construction	Baked epoxy coated carbon steel frame  Water tight insulated wire
Slot Insulation	Water tight insulated wire  Class Y

Description of Water Tight Insulated Wire



The reliability of submersible motors depends upon their insulation characteristics. Hitachi has carried out continuous research and development of submersible motors for many years, drawing upon its total corporate technology. These efforts have resulted in new patented water tight insulated magnet wire having excellent insulation characteristics. This patented technology is being applied to all Hitachi water tight submersible motors. For the insulation material, specially developed denatured polypropylene is applied over a special enamel layer. An external nylon sheath is applied over this polypropylene layer for extra mechanical protection. These three insulation barriers are applied to copper conductors for complete insulation from the cooling fluid. This guarantees that Hitachi submersible motors will have an extremely long service life.

STANDARD SPECIFICATIONS

Cable Connection		Direct to Stator	
Cable Length		200 inches (5m)	
Shaft	2 Pole	Splined 40–150HP (30–110kW) Keyed 175–300HP (132–225kW)	
	4 Pole	Splined 7.5–30HP (5.5–22kW) Keyed 40–300HP (30–225kW)	
Flange		NEMA Standard (See dimensions P9–P14)	
Speed	60Hz	2 Pole 3600 rpm	4 Pole 1800 rpm
	50Hz	2 Pole 3000 rpm	——

Water Environment

Flow Rate	0.5 ft/sec. (0.15 m/sec.)
pH Level	6.5–8
Maximum-Temperature	77˚F (25˚C)

Service Factor

Service Factor / Motor	1.15	1.0
40HP–300HP 2 Pole	460V/60Hz	380, 400, 415V/50Hz
7.5HP–300HP 4 Pole	460V/60Hz	——

Size and Weight 2 Pole 3600 rpm 60Hz. 3000 rpm 50Hz. and 4 Pole 1800 rpm 60Hz.



2 Pole

Motor Size	Output		D	L		*Net Weight	
	HP	kW	inch (mm)	inch	mm	lbs.	kg
8″	40	30	7.52 (191)	44.09	1120	320	145
	50	37		46.44	1180	353	160
	60	45		49.19	1250	408	185
	75	55		53.15	1350	463	210
	100	75		58.27	1480	518	235
	125	90		66.14	1680	595	270
	150	110		70.08	1780	661	300
10″	175	132	8.54 (217)	63.78	1620	739	335
	200	150		69.68	1770	816	370
	250	185		79.53	2020	948	430
12″	300	225	10.55 (268)	78.75	2000	1455	660

*Gross Weight : See page 14.

4 Pole

Motor Size	Output		D	L		*Net Weight	
	HP	kW	inch (mm)	inch	mm	lbs.	kg
8″	7.5	5.5	7.52 (191)	37.40	950	298	135
	10	7.5		37.40	950	298	135
	15	11		41.34	1050	320	145
	20	15		41.34	1050	320	145
	25	18.5		44.09	1120	342	155
	30	22		44.09	1120	342	155
10″	40	30	8.54 (217)	49.21	1250	507	230
	50	37		49.21	1250	507	230
	60	45		59.84	1520	639	290
	75	55		59.84	1520	639	290
	100	75		69.68	1770	794	360
	125	90		69.68	1770	794	360
12″	150	110	10.55 (268)	56.30	1430	959	435
	175	132		61.02	1550	1069	485
	200	150		68.11	1730	1235	560
14″	250	185	12.60 (320)	68.31	1735	1698	770
	300	225		76.18	1935	1940	880

*Gross Weight : See page 14.

Cable Size and Type

2 Pole 200 inches (5m) Lead Wire Standard Length (Round 1 Stranded Conductor)

Motor Size	Output		460V, 415V, 400V, 380V			
	HP	kW	Lead Wire Size		Cable Dia	
			AWG	mm²	inch	mm
8″	40—75	30–55	#8	8	0.362	9.2
	100—125	75–90	#6	14	0.433	11.0
	150	110	#4	22	0.531	13.5
10″	175—250	132–185	#2	30	0.591	15.0
12″	300	225	#2/0	60	0.768	19.5

4 Pole 200 inches (5m) Lead Wire Standard Length (Round 1 Stranded Conductor)

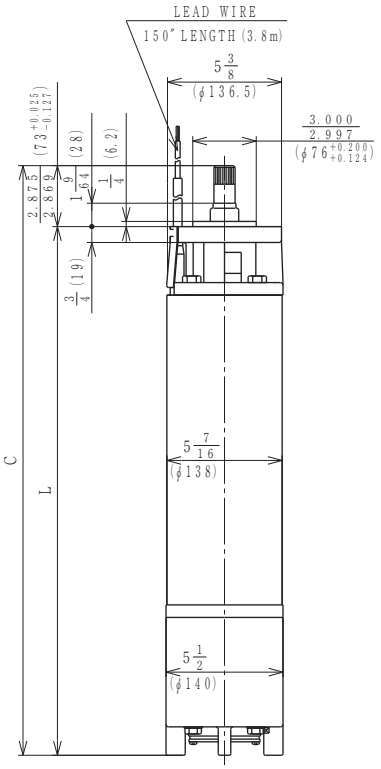
Motor Size	Output		460V			
	HP	kW	Lead Wire Size		Cable Dia	
			AWG	mm²	inch	mm
8″	7.5–30	5.5—22	#8	8	0.362	9.2
10″	40–50	30—37	#8	8	0.362	9.2
	60–75	45—55	#6	14	0.433	11.0
	100–125	75—90	#2	30	0.591	15.0
12″	150–200	110—150	#2	30	0.591	15.0
14″	250–300	185—225	#2/0	60	0.768	19.5

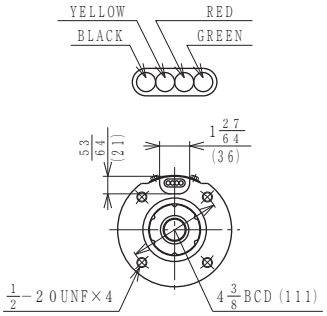
TYPE OF LEAD WIRE - 600V CLASS

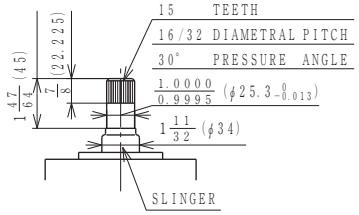
Ethylene-propylene rubber insulated chloroprene cabtyre cable.

DIMENSIONAL DATA

6″ VCTI-KK/ VCTI-KQ 2 Pole CANNED TYPE

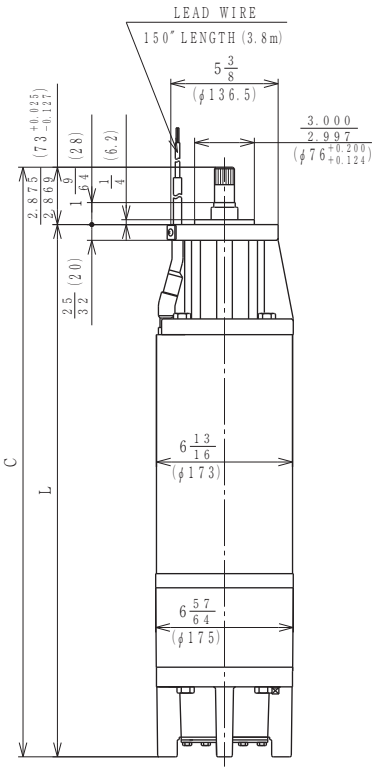


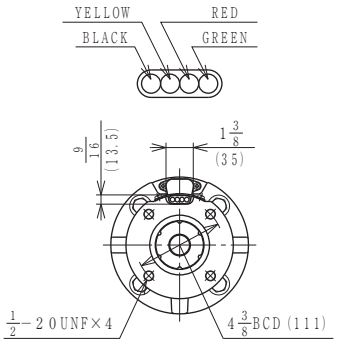


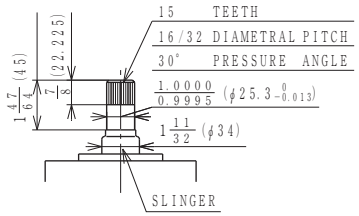


Output		Phase	C		L	
HP	kW		inch	mm	inch	mm
5	3.7	1	29.84	758	26.97	685
7.5	5.5		32.79	833	29.92	760
10	7.5		32.79	833	29.92	760
15	11		36.33	923	33.46	850
5	3.7	3	25.82	656	22.95	583
7.5	5.5		27.67	703	24.80	630
10	7.5		29.84	758	26.97	685
15	11		32.79	833	29.92	760
20	15		34.37	873	31.50	800
25	18.5		39.09	993	36.22	920
30	22		41.06	1043	38.19	970
40	30		44.60	1133	41.73	1060
50	37		44.60	1133	41.73	1060
60	45		44.60	1133	41.73	1060

8″ (6″ Flange) VCTI-KK 2 Pole CANNED TYPE

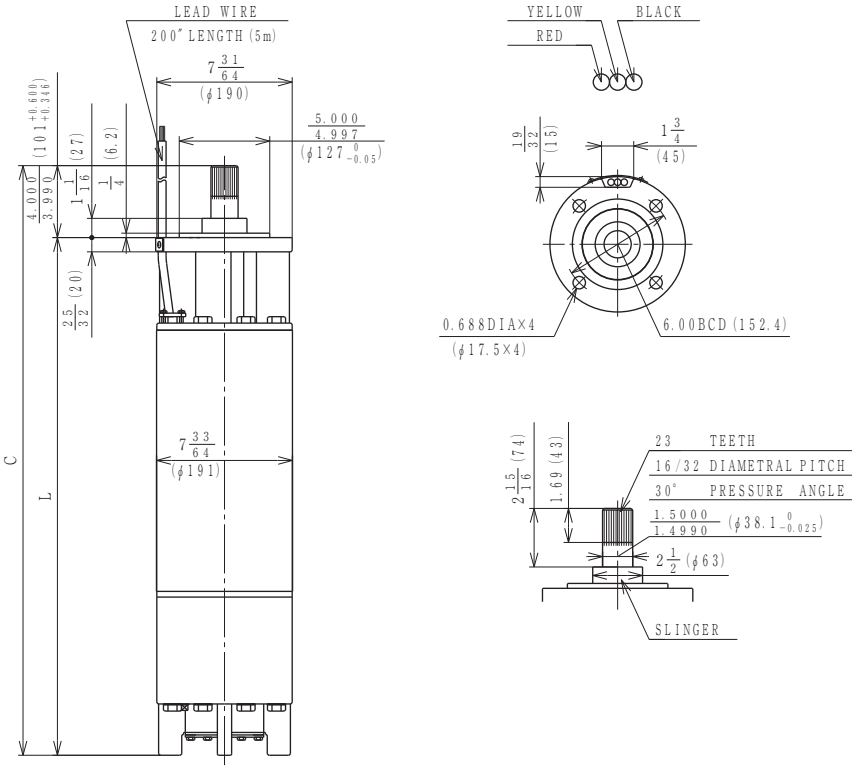






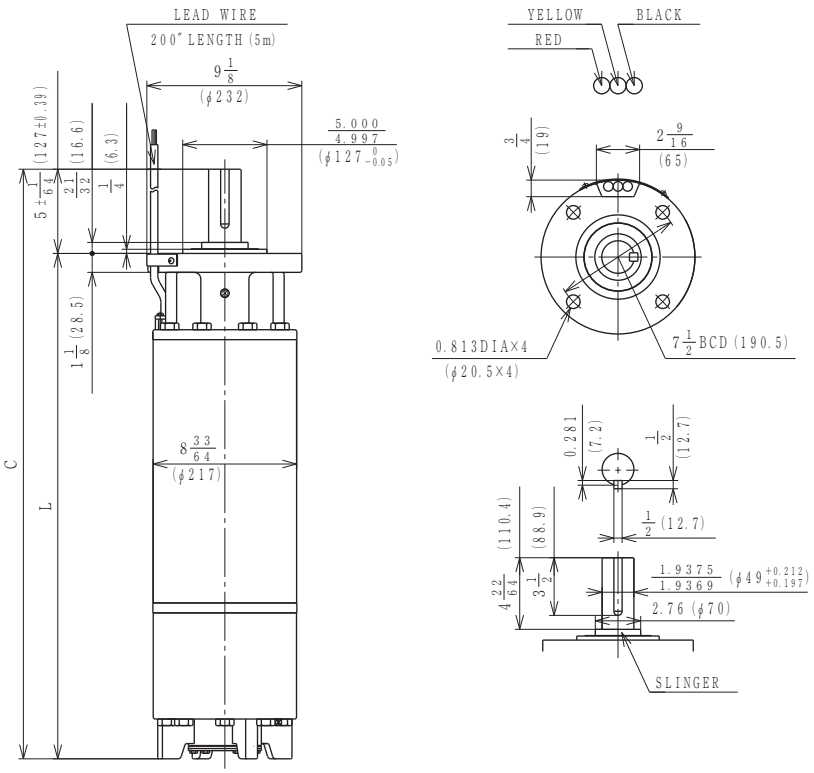
Output		Phase	C		L	
HP	kW		inch	mm	inch	mm
50	37	3	44.48	1130	41.61	1057
60	45					

8″ (8″ Flange) VTI-KK 2 Pole WATER TIGHT TYPE



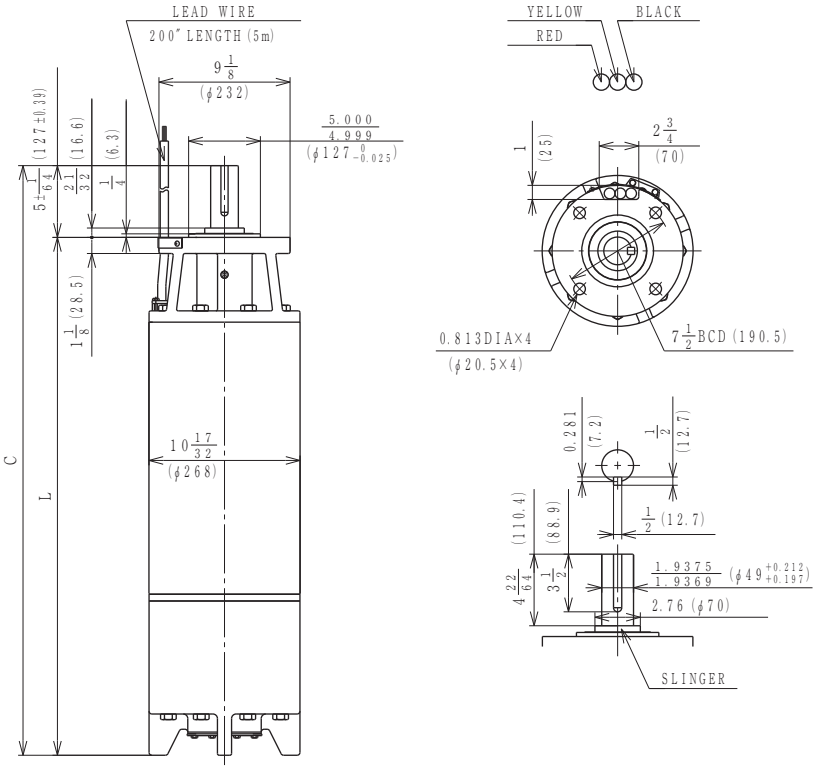
Output		Phase	C		L	
HP	kW		inch	mm	inch	mm
40	30	3	48.07	1221	44.09	1120
50	37		50.44	1281	46.44	1180
60	45		53.19	1351	49.19	1250
75	55		57.13	1451	53.15	1350
100	75		62.24	1581	58.27	1480
125	90		70.12	1781	66.14	1680
150	110		74.06	1881	70.08	1780

10″ (10″ -B Flange) VTI-KK 2 Pole WATER TIGHT TYPE



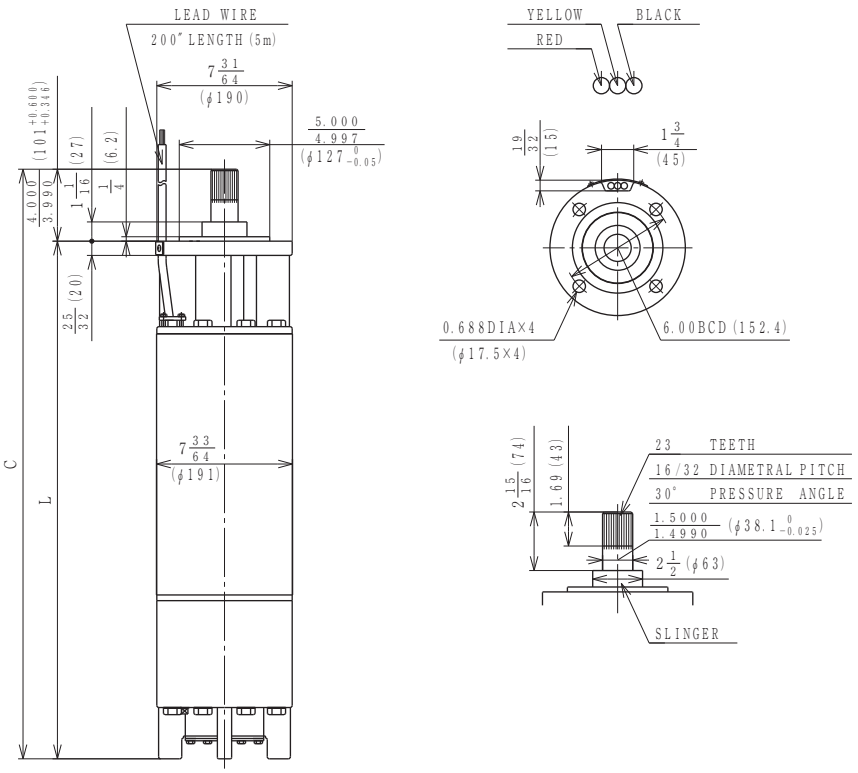
Output		Phase	C		L	
HP	kW		inch	mm	inch	mm
175	132	3	68.78	1747	63.78	1620
200	150		74.70	1897	69.68	1770
250	185		84.55	2147	79.53	2020

12″ VTI-KK 2 Pole WATER TIGHT TYPE



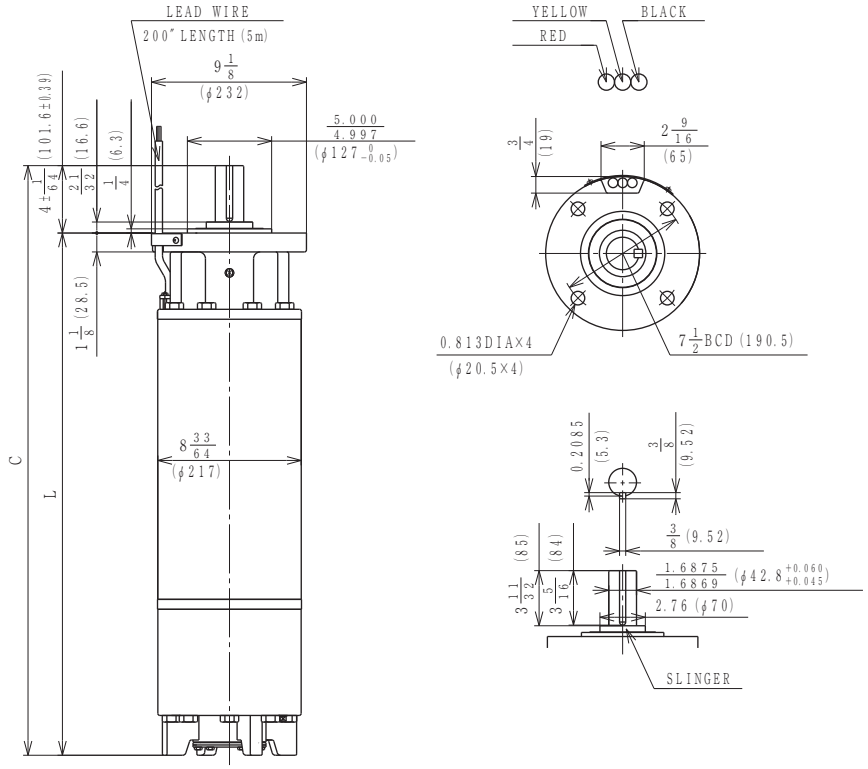
Output		Phase	C		L	
HP	kW		inch	mm	inch	mm
300	225	3	83.75	2127	78.75	2000

8″ (8″ Flange) VTI-KK 4 Pole WATER TIGHT TYPE



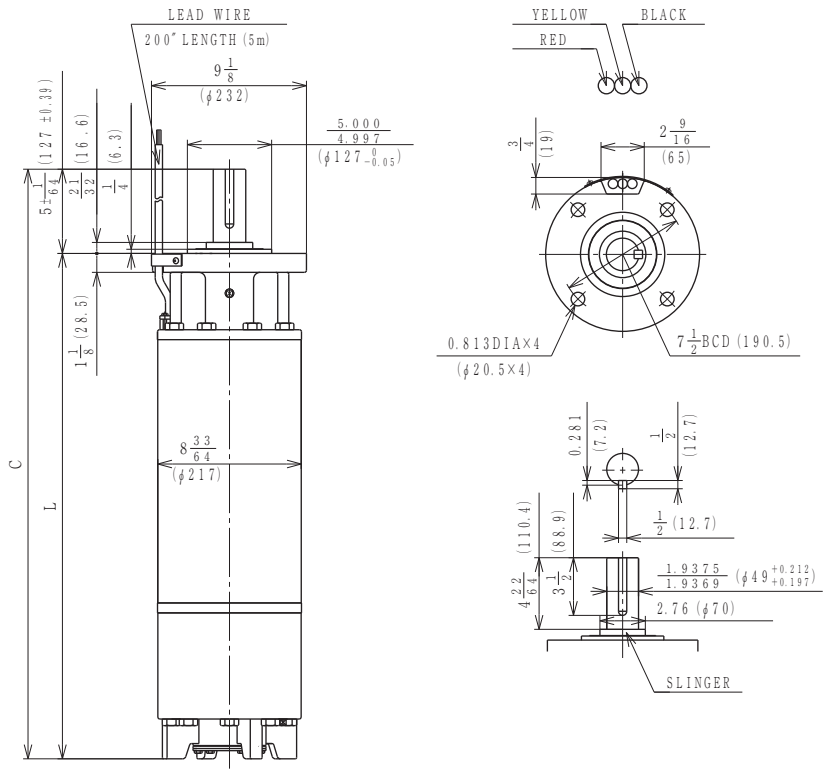
Output		Phase	C		L	
HP	kW		inch	mm	inch	mm
7.5	5.5	3	41.40	1051	37.40	950
10	7.5		41.40	1051	37.40	950
15	11		45.34	1151	41.34	1050
20	15		45.34	1151	41.34	1050
25	18.5		48.09	1221	44.09	1120
30	22		48.09	1221	44.09	1120

10″ (10″ -A Flange) VTI-KK 4 Pole WATER TIGHT TYPE



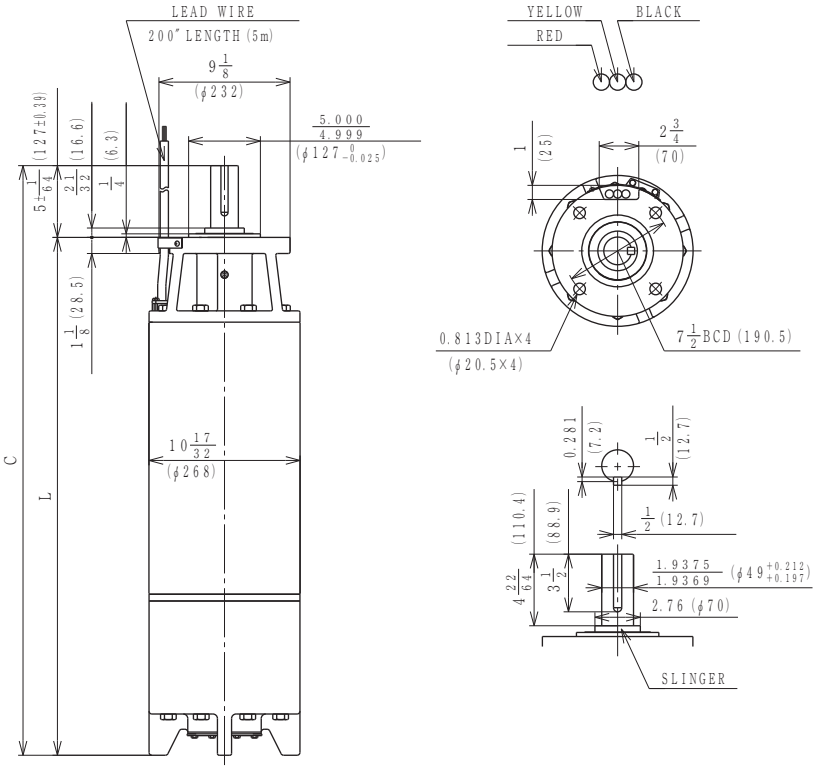
Output		Phase	C		L	
HP	kW		inch	mm	inch	mm
40	30	3	53.21	1352	49.21	1250
50	37		53.21	1352	49.21	1250
60	45		63.86	1622	59.84	1520
75	55		63.86	1622	59.84	1520

10″ (10″ -B Flange) VTI-KK 4 Pole WATER TIGHT TYPE



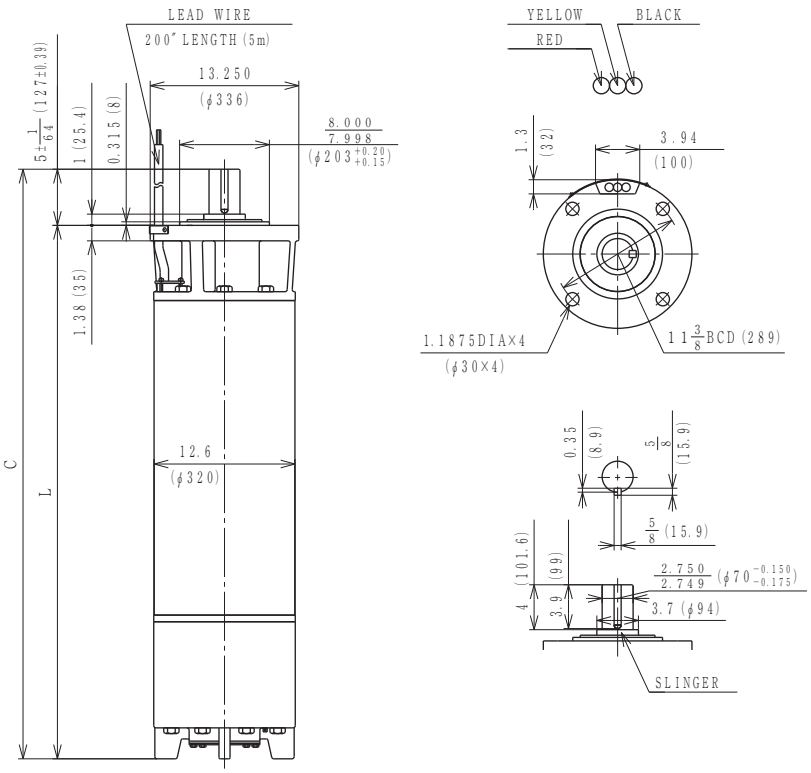
Output		Phase	C		L	
HP	kW		inch	mm	inch	mm
100	75	3	74.68	1897	69.68	1770
125	90		74.68	1897	69.68	1770

12″ VTI-KK 4 Pole WATER TIGHT TYPE



Output		Phase	C		L	
HP	kW		inch	mm	inch	mm
150	110	3	61.30	1557	56.30	1430
175	132		66.02	1677	61.02	1550
200	150		73.11	1857	68.11	1730

14″ VTI-KK 4 Pole WATER TIGHT TYPE



Output		Phase	C		L	
HP	kW		inch	mm	inch	mm
250	185	3	73.31	1862	68.31	1735
300	225		81.18	2062	76.18	1935

GENERAL SPECIFICATIONS

2 POLE SUBMERSIBLE MOTORS

Motor Size	Flange Size	Moter Type	Voltage Type	Output		Phase	Shipping Weight	
				HP	kW		lbs	kg
6″	6″	C	S	5	3.7		143	65
6″	6″	C	S	7.5	5.5	1	161	73
6″	6″	C	S	10	7.5		161	73
6″	6″	C	S	15	11		181	82
6″	6″	C	D	5	3.7		117	53
6″	6″	C	D	7.5	5.5		121	55
6″	6″	C	D	10	7.5		143	65
6″	6″	C	D	15	11		161	73
6″	6″	C	D	20	15		170	77
6″	6″	C	D	25	18.5		194	88
6″	6″	C	D	30	22		209	95
6″	6″	C	S	40	30		231	105
6″	6″	C	S	50	37		231	105
6″	6″	C	S	60	45		231	105
8″	6″	C	S	50	37		353	160
8″	6″	C	S	60	45	3	364	165
8″	8″	W	S	40	30		397	180
8″	8″	W	S	50	37		430	195
8″	8″	W	S	60	45		485	220
8″	8″	W	S	75	55		540	245
8″	8″	W	S	100	75		595	270
8″	8″	W	S	125	90		683	310
8″	8″	W	S	150	110		750	340
10″	10″–B	W	S	175	132		838	380
10″	10″–B	W	S	200	150		915	415
10″	10″–B	W	S	250	185		1047	475
12″	12″	W	S	300	225		1631	740

4 POLE SUBMERSIBLE MOTORS

Motor Size	Flange Size	Moter Type	Voltage Type	Output		Phase	Shipping Weight	
				HP	kW		lbs	kg
8″	8″	W	S	7.5	5.5		364	165
8″	8″	W	S	10	7.5		364	165
8″	8″	W	S	15	11		386	175
8″	8″	W	S	20	15		386	175
8″	8″	W	S	25	18.5		408	185
8″	8″	W	S	30	22		408	185
10″	10″–A	W	S	40	30		584	265
10″	10″–A	W	S	50	37		584	265
10″	10″–A	W	S	60	45	3	717	325
10″	10″–A	W	S	75	55		717	325
10″	10″–B	W	S	100	75		882	400
10″	10″–B	W	S	125	90		882	400
12″	12″	W	S	150	110		1047	475
12″	12″	W	S	175	132		1179	535
12″	12″	W	S	200	150		1367	620
14″	14″	W	S	250	185		1830	830
14″	14″	W	S	300	225		2094	950

MOTOR TYPE C : CANNED
W : WATER TIGHT

VOLTAGE TYPE S : SINGLE VOLTAGE
D : DUAL VOLTAGE

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