


# Hitachi Submersible Motors

**For 6" and Larger  
Deep Well Pumps**



<p><b>ISO 14001</b> EC97J1095</p>  <p><b>ISO 9001</b> JQA-1153</p>	<p>Hitachi submersible motors in this brochure are produced at the factory registered under the ISO 14001 standard for environmental management system and the ISO 9001 standard for motor quality management system.</p>
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Certified By



The Public Health and Safety Company™

Ap1  
Date : 04/08  
Supersedes : NEW

# 50 years of submersible motor experience

## Classification of Submersible Motors

### For Deep Wells

For Municipal Water Service, Industrial Irrigation and Building Water Supply

#### 6" Canned Type

2P 3,600 / 3,000min<sup>-1</sup>

Model : VCTI-KK

Single Voltage Construction

Dual Voltage Construction



#### 8" and Larger Rewindable Water-Tight Type

2P 3,600 / 3,000min<sup>-1</sup>  
4P 1,800min<sup>-1</sup>

Model : VTI-KK



## 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. Located inside and at the bottom of the motor the bearing is sealed away from sand and other contaminants.



### 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 - 30°C (- 22°F). This mixture is installed at the factory. Two 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.

### High-Quality Control

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

## 6" Canned Type

### Replaceable Plug-in Type Lead

All 6" motor leads are stranded copper, extremely flexible, 3.8m (150 inches) 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.

### 35°C(95°F)Water Temperature (5 - 40HP)

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

### Dual Voltage Construction (3ϕ 5 - 30HP)

Both constructions as single volatge and dual voltage are available.

## 8" and Larger Rewindable Water-Tight Type

### Reliable Insulation Wire

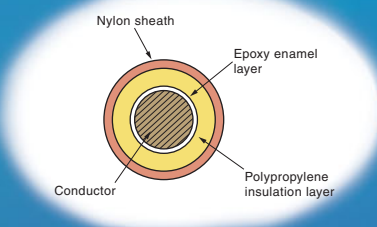
The coil conductor insulation material is a specially developed denatured polypropylene, which offers excellent leak-resistant characteristics. Three barriers are applied to the copper conductors to provide complete insulation against the cooling fluid inside the motor. This design is the result of extensive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

### Quality Construction

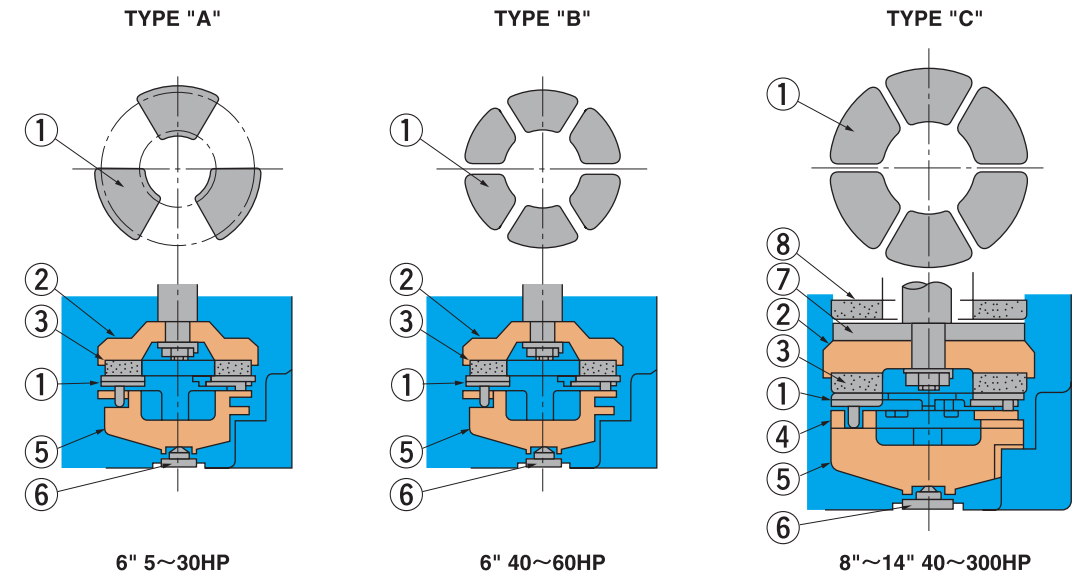
The lead wires are 5m (200 inches) long and internally connected direct to the winding. The stator is enclosed by an epoxy coated carbon steel shell, and the end bells are epoxy coated cast iron. The cooling fluid in the motor is in direct contact with the insulated windings to help keep the motor cool.

### 2P motors and 4P 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 manufacturers submersible pumps without adaption.



## High Thrust Bearing



### APPLICATION

Motor Size	Output				Bearing Type	No. of Shoes
	2P		4P			
	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

Number	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 136kg. maximum continuous up-thrust is absorbed between the upper carbon sleeve bearing and the rotor balance ring.

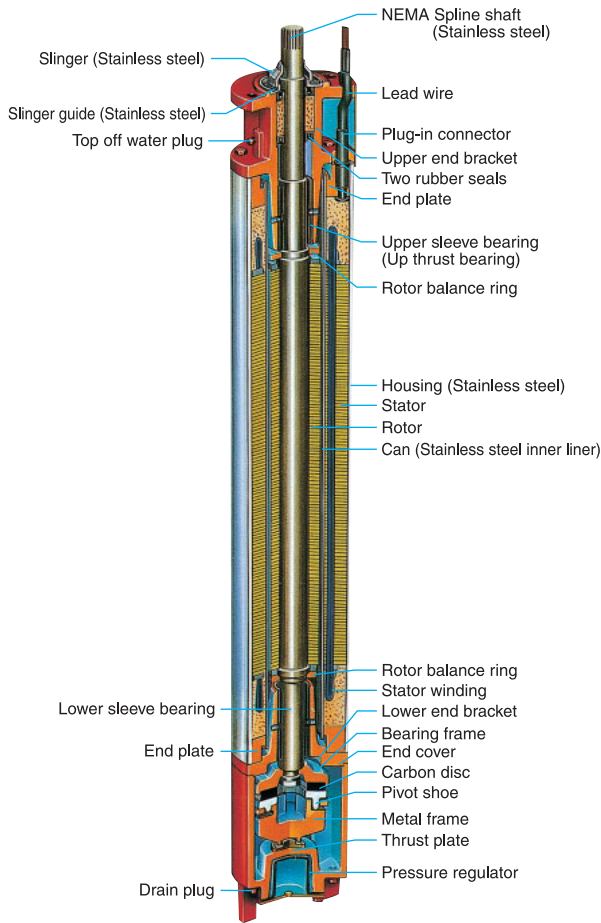
For all 8" ~ 14" motors, the 450kg. maximum continuous up-thrust is carried between the upper slide plate and the separate up-thrust carbon bearing.

Motor Size	2P				4P			
	Down Thrust		Up Thrust		Down Thrust		Up Thrust	
	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.
6" 5 - 30HP	1,590	3,500	136 *(200)	300 *(450)	—	—	—	—
6" 40 - 60HP	2,270	5,000	136 *(200)	300 *(450)	—	—	—	—
8"	4,540 **(2,270)	10,000 **(5,000)	450 **(680)	1,000 **(1,500)	4,540 **(2,270)	10,000 **(5,000)	450 **(680)	1,000 **(1,500)
10"	4,540	10,000	450	1,000	4,540	10,000	450	1,000
12"	4,540	10,000	450	1,000	4,540	10,000	450	1,000
14"	—	—	—	—	4,540	10,000	450	1,000

Note :  
 1. Thrust ratings showed are continuous except for values marked\*  
 2. \*Momentary rating (3 minutes Max).  
 3. \*\*8" Motor-6" Flange when using stainless steel bolts. has a thrust values of 2,270kg. A thrust value of 4,540kg. can be obtained using grade 8 heat treated stainless steel bolts.

# CANNED TYPE FOR DEEP WELL PUMPS

**2 Pole 3600/3000 min<sup>-1</sup>**



6" 1 $\phi$  5-15HP (3.7-11kW)  
6" 3 $\phi$  5-60HP (3.7-45kW)

## STANDARD SPECIFICATIONS

Cable Connection	Plug-in Type		
Cable Length	3.8m (150 inches)		
Shaft	NEMA Splined		
Flange	NEMA Standard		
Speed	60 Hz	2P	3600 min <sup>-1</sup>
	50 Hz	2P	3000 min <sup>-1</sup>

### Water Environment

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

### Service Factor

Motor	Service Factor	1.15	1.0
6" 5-30HP		220, 230V/60Hz 380, 440, 460V/60Hz	208V/60Hz 380, 400, 415V/50Hz
6" 40-50HP		380, 440, 460V/60Hz	380, 400, 415V/50Hz
6" 60HP		380, 440, 460V/60Hz	—

## Dual Voltage Type 3 $\phi$ 5-30HP(3.7-22kW)

With HITACHI DUAL VOLTAGE SUBMERSIBLE MOTORS IN YOUR STOCK you no longer have to worry about inventory balance between 200V class and 400V class.



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 400V class to 200V class or from 200V class to 400V class on three phase 5 through 30HP motors.

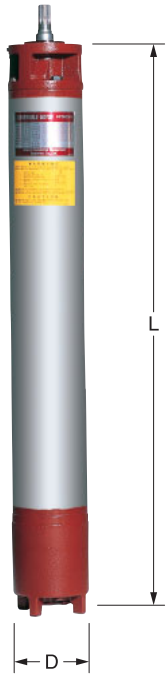


Voltage plugs are clearly and permanently marked as 200V class or 400V class. Each plug is usable on all 5 through 30HP motors.

## INSULATION

Construction	<p>Stainless steel frame Coil Epoxy resin mold Stainless steel cylinder</p>
Slot Insulation	<p>Coil heat-resistant enamel wire Slot insulation Wedge Stainless steel cylinder</p> <p>Class : E (6" 5-30HP) B (6" 40HP) F (6" 50,60HP)</p>

## Size and Weight 2 Pole $3600 \text{ min}^{-1}$ 60Hz. $3000 \text{ min}^{-1}$ 50Hz.



Motor Size	Phase	Output		D mm (inch)	L		Net Weight	
		HP	kW		mm	inch	kg	lbs.
6"	1 $\phi$	5	3.7	140 (5.5)	685	26.97	50	110
		7.5	5.5		760	29.92	58	128
		10	7.5		760	29.92	58	128
		15	11		850	33.46	67	148
	3 $\phi$	5	3.7		583	22.95	43	95
		7.5	5.5		630	24.80	45	99
		10	7.5		685	26.97	50	110
		15	11		760	29.92	58	128
		20	15		800	31.50	62	137
		25	18.5		920	36.22	73	161
		30	22		970	38.19	80	176
		40	30		1030	40.55	85	187
		50	37		1060	41.73	90	198
		60	45		1060	41.73	90	198

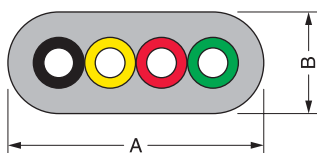
\*Gross Weight : See page 14.

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

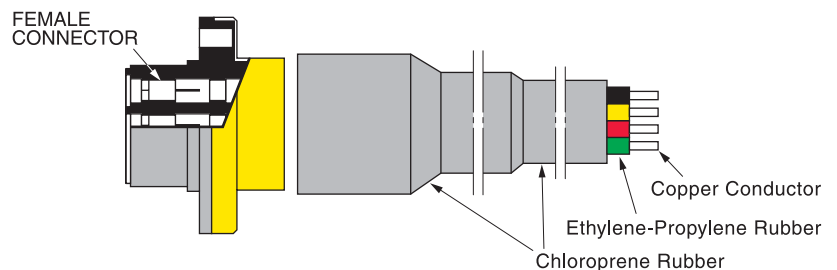
Motor Size	Phase	Output		460V, 415V, 400V, 380V			220V, 230V		
		HP	kW	Lead Wire Size		AxB mm (inch)	Lead Wire Size		AxB mm (inch)
				mm <sup>2</sup>	AWG		mm <sup>2</sup>	AWG	
6"	1 $\phi$	5-15	3.7-11	—	—	—	5.5	#10	25.1×9.6 (0.99×0.38)
	3 $\phi$	5-25	3.7-18.5	5.5	#10	25.1×9.6 (0.99×0.38)	5.5	#10	25.1×9.6 (0.99×0.38)
		30	22	8	#8	27.7×10.4 (1.09×0.41)	8	#8	27.7×10.4 (1.09×0.41)
		40	30	5.5	#10	25.1×9.6 (0.99×0.38)	—	—	—
		50-60	37-45	8	#8	27.7×10.4 (1.09×0.41)	—	—	—

### 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)

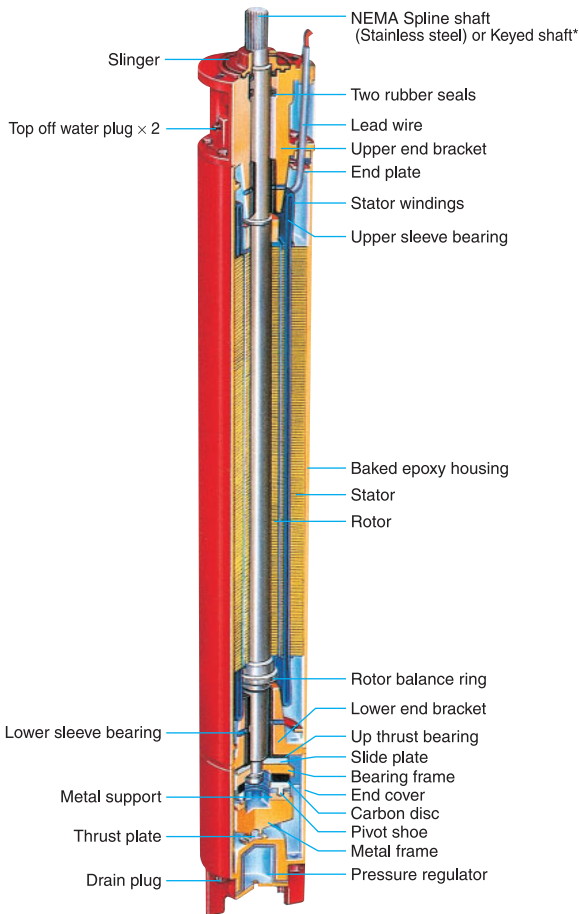


### CHLOROPRENE CABTYRE CABLE



# WATER TIGHT TYPE FOR DEEP WELL PUMPS

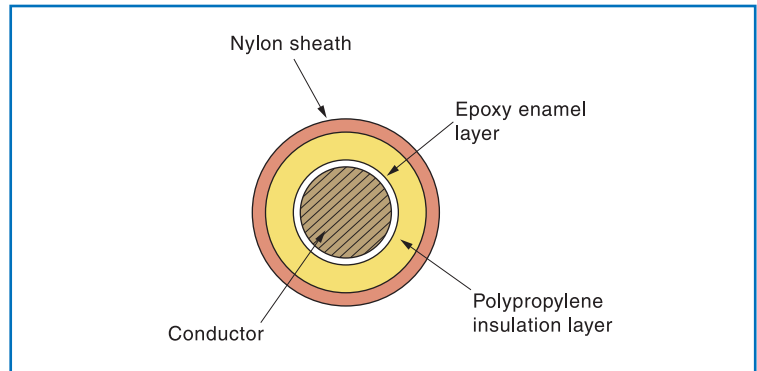
**2 Pole 3600/3000 min<sup>-1</sup>**  
**4 Pole 1800 min<sup>-1</sup>**



\* See dimensional data for correct variations.

3φ 40-300HP (30-225kW)  
 2P 3,600/3,000min<sup>-1</sup> (60/50Hz)  
 3φ 7.5-300HP (5.5-225kW)  
 4P 1,800min<sup>-1</sup> (60Hz)

## Description of Water Tight Insulation 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. A teflon 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	5m (200 inches)		
Shaft	2P	Splined 40-110HP(30-110kW) Keyed 175-300HP(132-225kW)	
	4P	Splined 7.5-30HP(5.5-22kW) Keyed 40-300HP(30-225kW)	
Flange	NEMA Standard(See dimensions P9-P14)		
Speed	60Hz	2P 3600 min <sup>-1</sup>	4P 1800 min <sup>-1</sup>
	50Hz	2P 3000 min <sup>-1</sup>	

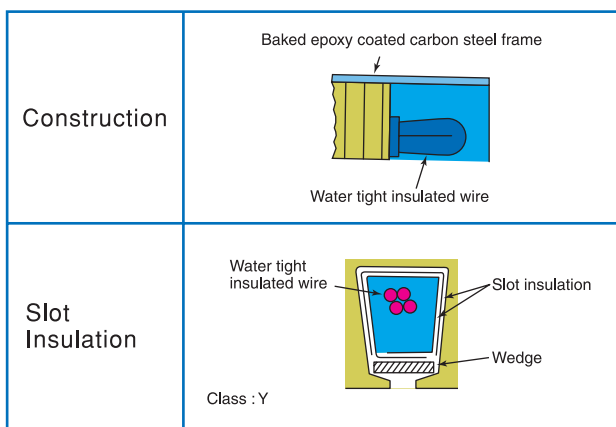
### Water Environment

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

### Service Factor

Motor	Service Factor	
	1.15	1.0
40HP-300HP 2P	380, 440, 460V/60Hz	380, 400, 415V/50Hz
7.5HP-300HP 4P	380, 440, 460V/60Hz	—

## INSULATION



# Size and Weight 2 Pole $3600 \text{ min}^{-1}$ 60Hz. $3000 \text{ min}^{-1}$ 50Hz. and 4 Pole $1800 \text{ min}^{-1}$ 60Hz.



## 2 Pole

Motor Size	Output		D mm (inch)	L		*Net Weight	
	HP	kW		mm	inch	kg	lbs.
8"	40	30	191 (7.52)	1120(1090)	44.09(42.91)	145(142)	320(313)
	50	37		1180(1150)	46.44(45.28)	160(157)	353(346)
	60	45		1250(1220)	49.19(48.03)	185(182)	408(401)
	75	55		1350	53.15	210	463
	100	75		1480	58.27	235	518
	125	90		1680	66.14	270	595
10"	150	110	216.5 (8.52)	1780	70.08	300	661
	175	132		1620	63.78	335	739
	200	150		1770	69.68	370	816
12"	250	185	267.5 (10.53)	2020	79.53	430	948
	300	225		2000	78.75	660	1455

( ) 6 inch Flange \*Gross Weight : See page 14.

## 4 Pole

Motor Size	Output		D mm (inch)	L		*Net Weight	
	HP	kW		mm	inch	kg	lbs.
8"	7.5	5.5	191 (7.52)	950(920)	37.40(36.22)	135(132)	298(291)
	10	7.5		950(920)	37.40(36.22)	135(132)	298(291)
	15	11		1050(1020)	41.34(40.16)	145(142)	320(313)
	20	15		1050(1020)	41.34(40.16)	145(142)	320(313)
	25	18.5		1120(1090)	44.09(42.91)	155(152)	342(335)
	30	22		1120(1090)	44.09(42.91)	155(152)	342(335)
10"	40	30	216.5 (8.52)	1250	49.21	230	507
	50	37		1250	49.21	230	507
	60	45		1520	59.84	290	639
	75	55		1520	59.84	290	639
	100	75		1770	69.68	360	794
	125	90		1770	69.68	360	794
12"	150	110	267.5 (10.53)	1430	56.30	435	959
	175	132		1550	61.02	485	1069
	200	150		1730	68.11	560	1235
14"	250	185	320.0 (12.60)	1735	68.31	770	1698
	300	225		1935	76.18	880	1940

( ) 6 inch Flange \*Gross Weight : See page 14.

## Cable Size and Type

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

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

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

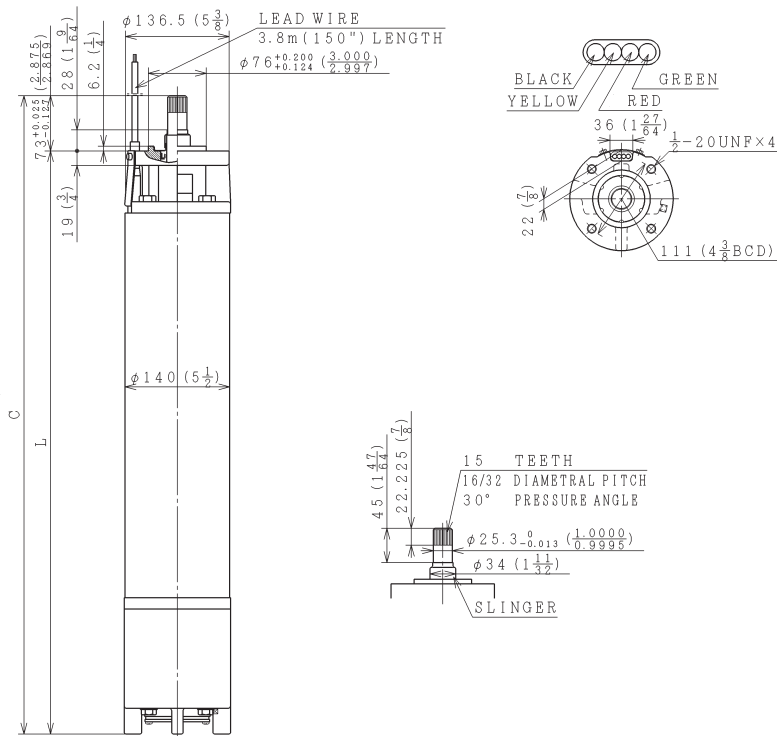
Motor Size	Output		460V			
	HP	kW	Lead Wire Size		Cable Dia	
			mm <sup>2</sup>	AWG	mm	inch
8"	7.5-30	5.5-22	8	#8	9.2	0.362
	40-50	30-37	8	#8	9.2	0.362
10"	60-75	45-55	14	#6	11.0	0.433
	100-125	75-90	30	#2	15.0	0.591
12"	150-200	110-150	30	#2	15.0	0.591
14"	250-300	185-200	60	#2/0	19.5	0.768

### TYPE OF LEAD WIRE - 600V CLASS

Ethylene-propylene rubber insulated chloroprene cable.

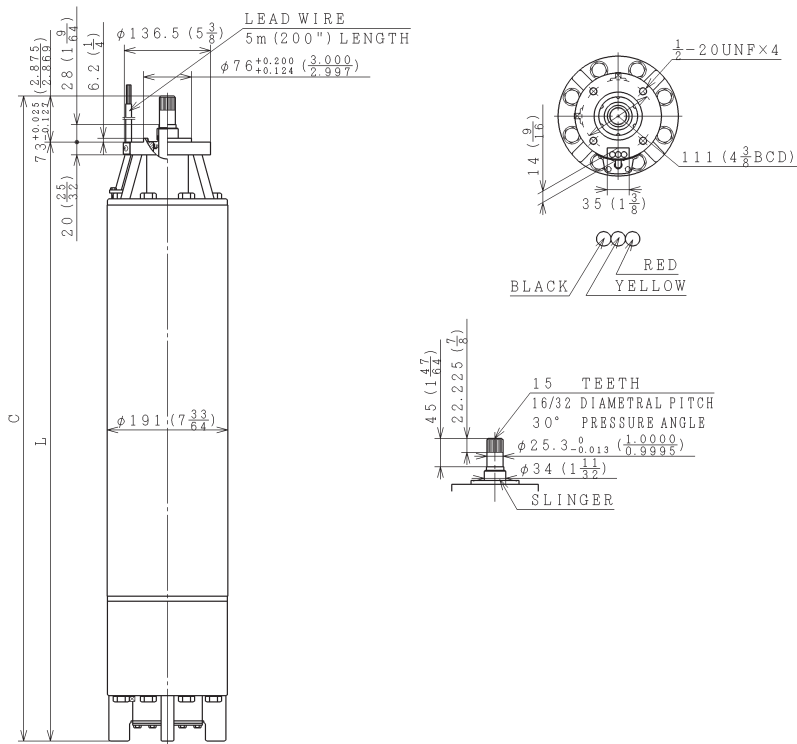
# DIMENSIONAL DATA

## 6" VCTI-KK/VCTI-KQ 2 Pole



Output		Phase	C		L	
HP	kW		mm	inch	mm	inch
5	3.7	1	758	29.84	685	26.97
7.5	5.5		833	32.79	760	29.92
10	7.5		833	32.79	760	29.92
15	11		923	36.33	850	33.46
5	3.7		656	25.82	583	22.95
7.5	5.5	3	703	27.63	630	24.80
10	7.5		758	29.84	685	26.97
15	11		833	32.79	760	29.97
20	15		873	34.37	800	31.50
25	18.5		993	39.09	920	36.22
30	22		1043	41.06	970	38.19
40	30		1103	43.42	1030	40.55
50	37		1133	44.60	1060	41.73
60	45		1133	44.60	1060	41.73

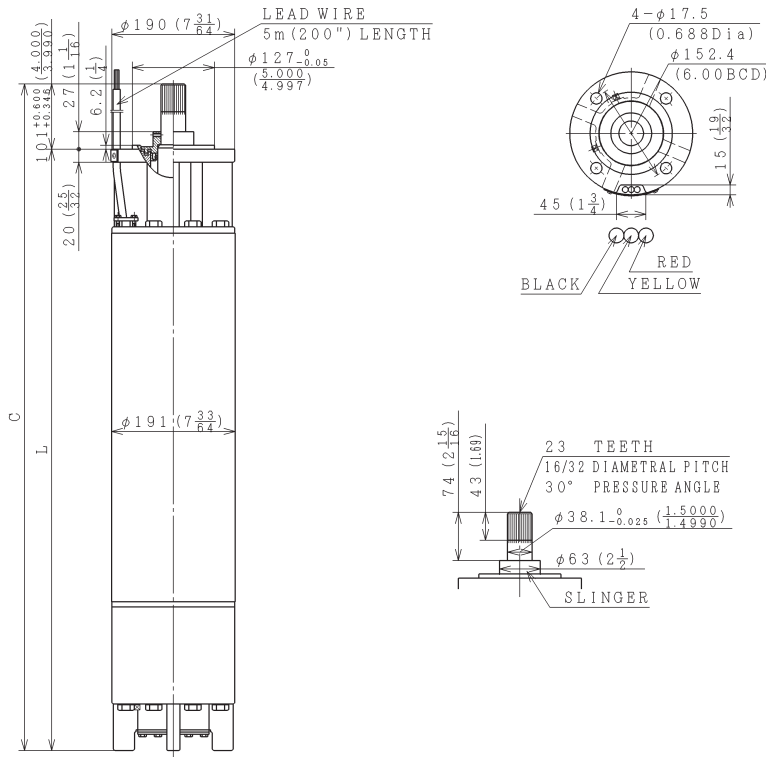
## 8" (6" Flange) VTI-KK 2 Pole



Output		Phase	C		L	
HP	kW		mm	inch	mm	inch
40	30	3	1163	45.79	1090	42.91
50	37		1223	48.15	1150	45.28
60	45		1293	50.91	1220	48.03

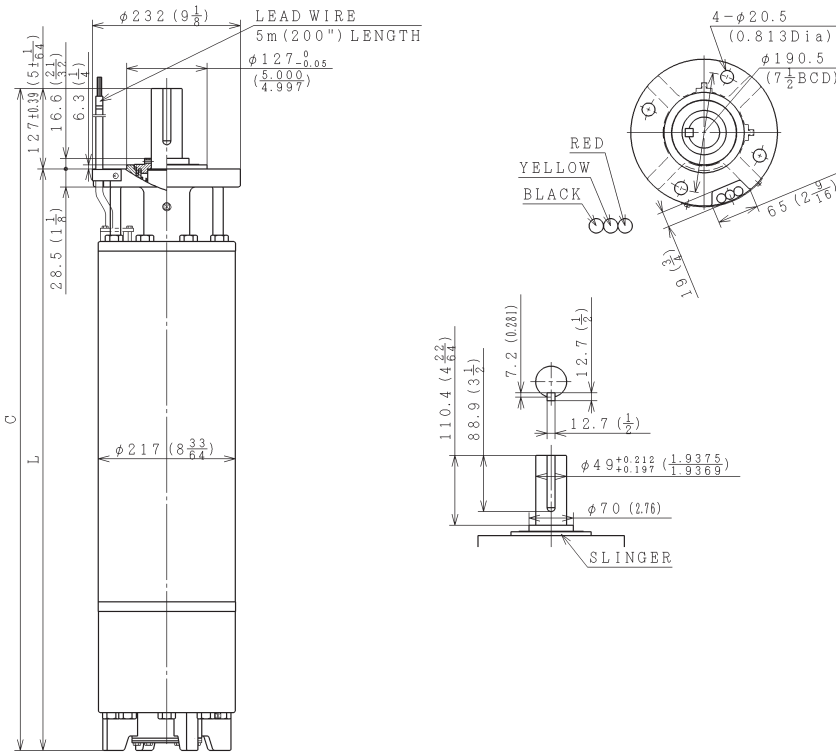


## 8" (8" Flange) VTI-KK 2 Pole



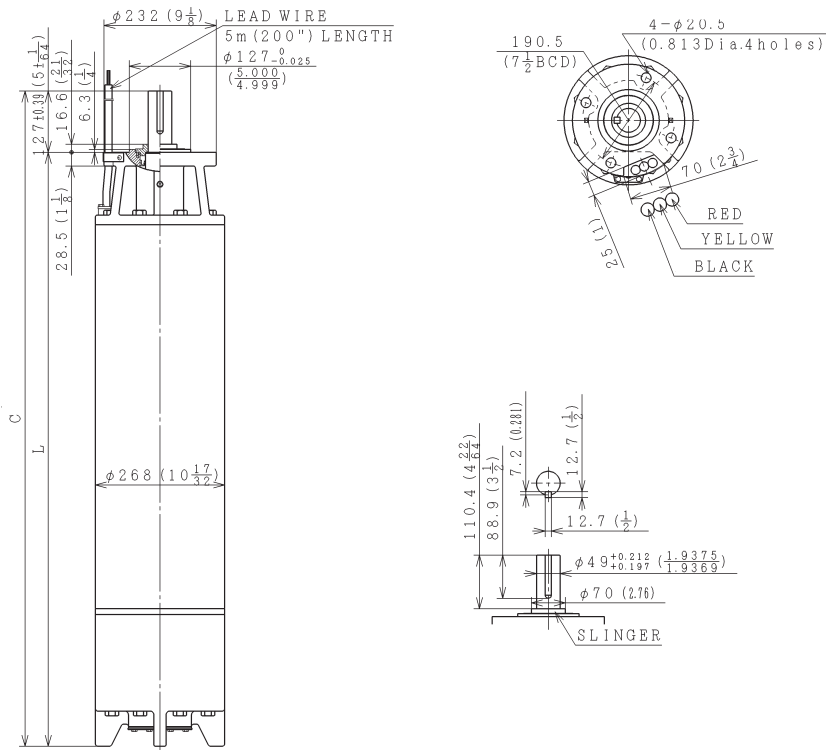
Output		Phase	C		L	
HP	kW		mm	inch	mm	inch
40	30	3	1221	48.07	1120	44.09
50	37		1281	50.44	1180	46.44
60	45		1351	53.19	1250	49.19
75	55		1451	57.13	1350	53.15
100	75		1581	62.24	1480	58.27
125	90		1781	70.12	1680	66.14
150	110		1881	74.06	1780	70.08

## 10" (10"-B Flange) VTI-KK 2 Pole



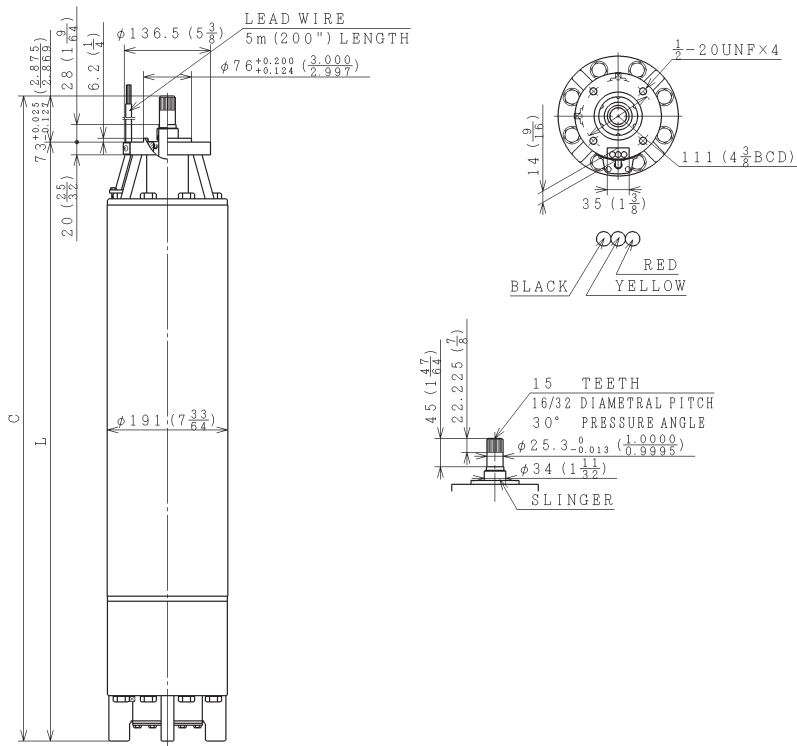
Output		Phase	C		L	
HP	kW		mm	inch	mm	inch
175	132	3	1747	68.78	1620	63.78
200	150		1897	74.70	1770	69.68
250	185		2147	84.55	2020	79.53

## 12" VTI-KK 2 Pole



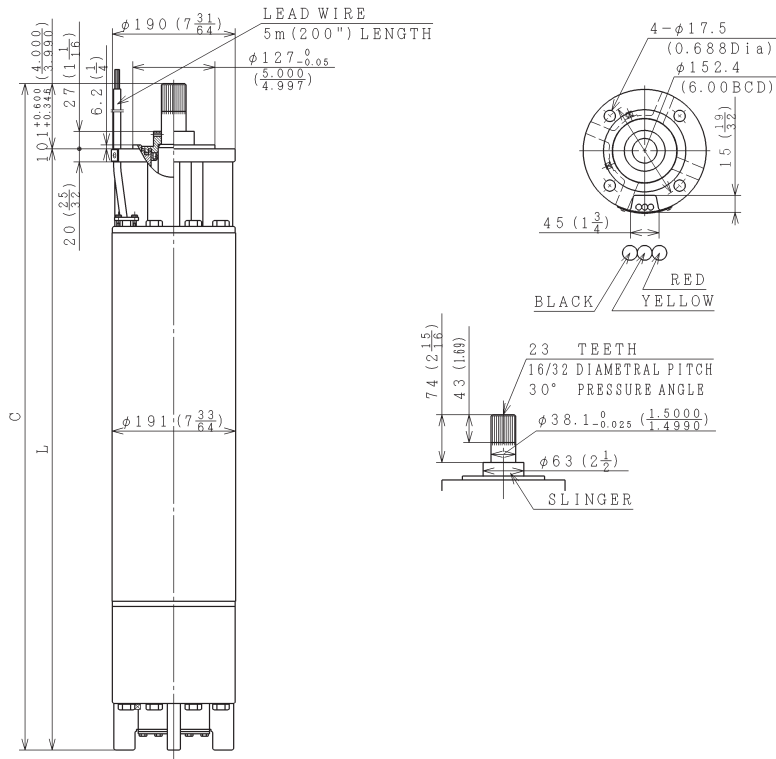
Output		Phase	C		L	
HP	kW		mm	inch	mm	inch
300	225	3	2127	83.75	2000	78.75

## 8" (6" Flange) VTI-KK 4 Pole



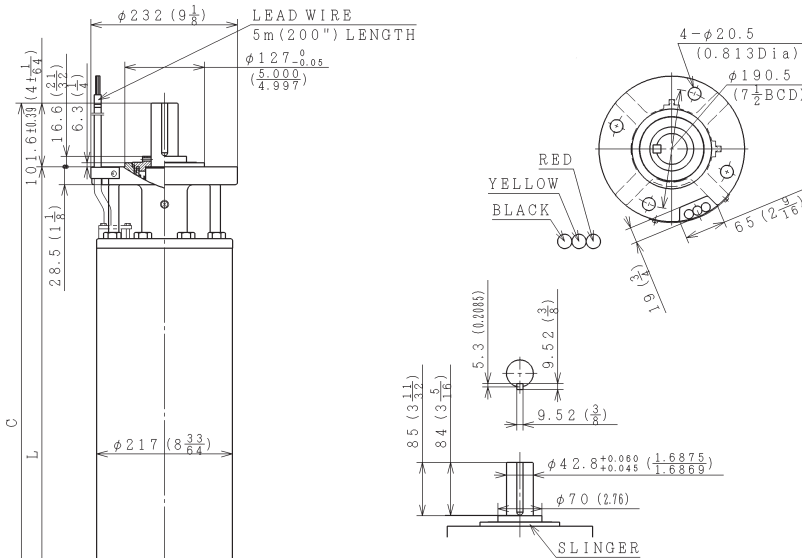
Output		Phase	C		L	
HP	kW		mm	inch	mm	inch
7.5	5.5	3	993	39.10	920	36.22
10	7.5		993	39.10	920	36.22
15	11		1093	43.03	1020	40.16
20	15		1093	43.03	1020	40.16
25	18.5		1163	45.79	1090	42.91
30	22		1163	45.79	1090	42.91

## 8" (8" Flange) VTI-KK 4 Pole



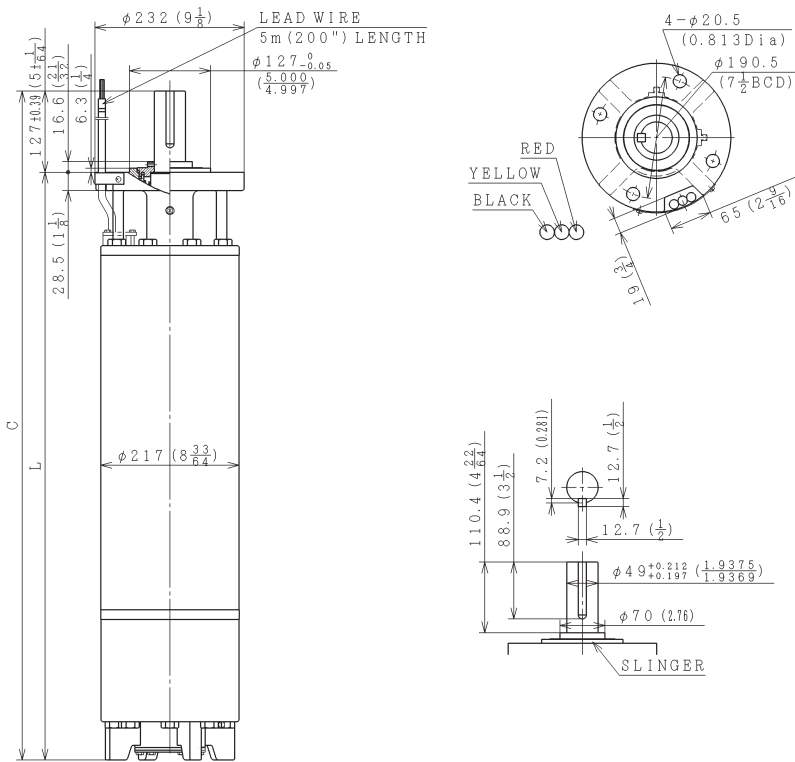
Output		Phase	C		L	
HP	kW		mm	inch	mm	inch
7.5	5.5	3	1051	41.40	950	37.04
10	7.5		1051	41.40	950	37.40
15	11		1151	45.34	1050	41.34
20	15		1151	45.34	1050	41.34
25	18.5		1221	48.09	1120	44.09
30	22		1221	48.09	1120	44.09

## 10" (10"-A Flange) VTI-KK 4 Pole



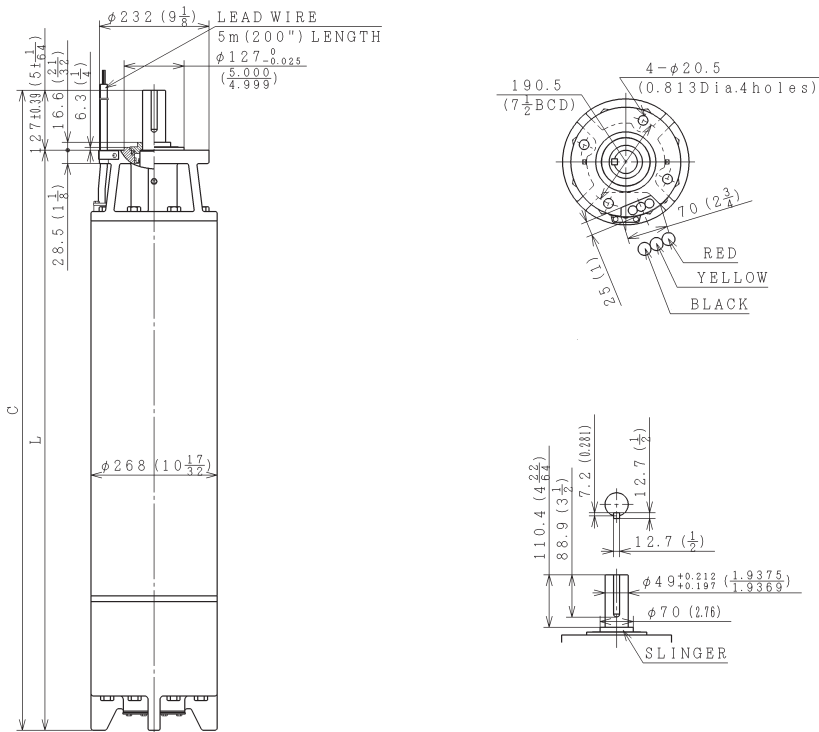
Output		Phase	C		L	
HP	kW		mm	inch	mm	inch
40	30	3	1352	53.21	1250	49.21
50	37		1352	53.21	1250	49.21
60	45		1622	63.86	1520	59.84
70	55		1622	63.86	1520	59.84

## 10" (10"-B Flange) VTI-KK 4 Pole



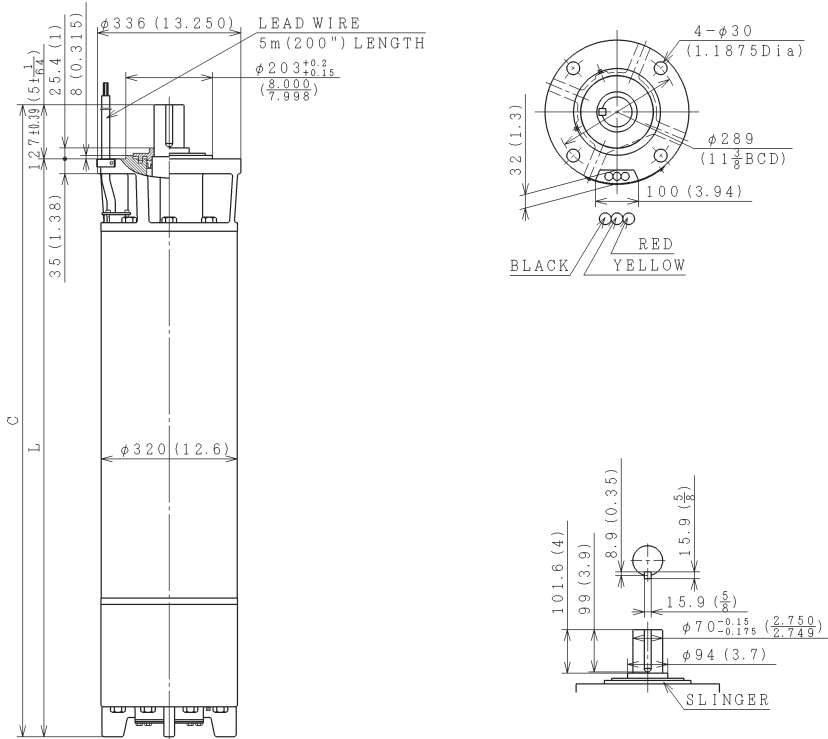
Output		Phase	C		L	
HP	kW		mm	inch	mm	inch
100	75	3	1897	74.68	1770	69.68
125	90		1897	74.68	1770	69.68

## 12" VTI-KK 4 Pole



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

# 14" VTI-KK 4 Pole



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

## GENERAL SPECIFICATIONS

### 2 POLE SUBMERSIBLE MOTORS

Motor Size	Flange Size	Motor Type	Voltage Type	Output		Phase	Shipping Weight	
				HP	kW		kg	lbs
6"	6"	C	S	5	3.7	1	65	143
6"	6"	C	S	7.5	5.5		73	161
6"	6"	C	S	10	7.5		73	161
6"	6"	C	S	15	11		82	181
6"	6"	C	D	5	3.7		53	117
6"	6"	C	D	7.5	5.5		55	121
6"	6"	C	D	10	7.5		65	143
6"	6"	C	D	15	11		73	161
6"	6"	C	D	20	15		77	170
6"	6"	C	D	25	18.5		88	194
6"	6"	C	D	30	22	95	209	
6"	6"	C	S	40	30	100	220	
6"	6"	C	S	50	37	105	231	
6"	6"	C	S	60	45	105	231	
8"	6"	W	S	40	30	3	177	390
8"	6"	W	S	50	37		192	423
8"	8"	W	S	60	45		217	478
8"	8"	W	S	40	30		180	397
8"	8"	W	S	50	37		195	430
8"	8"	W	S	60	45		220	485
8"	8"	W	S	75	55		245	540
8"	8"	W	S	100	75		270	595
8"	8"	W	S	125	90		310	683
8"	8"	W	S	150	110		340	750
10"	10"-B	W	S	175	132	380	838	
10"	10"-B	W	S	200	150	415	915	
10"	10"-B	W	S	250	185	475	1047	
12"	12"	W	S	300	225	740	1631	

### 4 POLE SUBMERSIBLE MOTORS

Motor Size	Flange Size	Motor Type	Voltage Type	Output		Phase	Shipping Weight	
				HP	kW		kg	lbs
8"	6"	W	S	7.5	5.5	3	162	357
8"	6"	W	S	10	7.5		162	357
8"	6"	W	S	15	11		172	379
8"	6"	W	S	20	15		172	379
8"	6"	W	S	25	18.5		182	401
8"	6"	W	S	30	22		182	401
8"	8"	W	S	7.5	5.5		165	364
8"	8"	W	S	10	7.5		165	364
8"	8"	W	S	15	11		175	386
8"	8"	W	S	20	15		175	386
8"	8"	W	S	25	18.5	185	408	
8"	8"	W	S	30	22	185	408	
10"	10"-A	W	S	40	30	265	584	
10"	10"-A	W	S	50	37	265	584	
10"	10"-A	W	S	60	45	325	717	
10"	10"-A	W	S	75	55	325	717	
10"	10"-B	W	S	100	75	400	882	
10"	10"-B	W	S	125	90	400	882	
12"	12"	W	S	150	110	475	1047	
12"	12"	W	S	175	132	535	1179	
12"	12"	W	S	200	150	620	1367	
14"	14"	W	S	250	185	830	1830	
14"	14"	W	S	300	225	950	2094	

MOTOR TYPE C : CANNED  
W : WATER TIGHT

VOLTAGE TYPE S : SINGLE VOLTAGE  
D : DUAL VOLTAGE

**T**oday we manufacture more than 20,000 products-from ICs to electric power generation equipment. We are now one of Japan's largest and most reputable corporations, with consolidated annual sales over 65 billion dollars. HITACHI's motor design and manufacturing capabilities have grown along with the company's other diverse activities - reliable, high-quality, high-performance motors play an important part in maximizing industrial productivity. HITACHI motors reflect HITACHI's experience and technology as both a manufacturer and user of its own electric motors, an important reason why we can offer higher efficiency and profitability for your operations - by using our product ... as we do.



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