

Hitachi Submersible Motors For Deep Well Pumps

Hot Water Application



<p>ISO 14001 EC97J1095</p>  <p>ISO 9001 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™

GENERAL FEATURES OF CANNED AND WATER TIGHT TYPE

CANNED TYPE

● Plug-in Type Lead Connection

All 6" motor leads are stranded copper, extremely flexible, 3.8m (150 inches) in length and field replaceable.

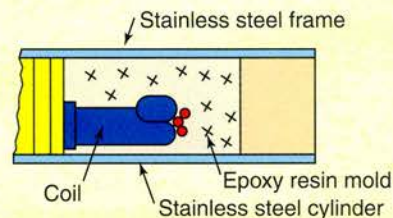


● Durable Insulation

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

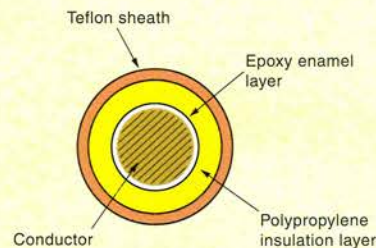
Strength against thermal fluctuation and internal mechanical stress is assured by the use of a patented "Hi-canned Resin". The space between the stator, stainless steel protective can and frame is filled with this epoxy resin, allowing faster and greater heat dissipation resulting in longer motor life.



WATER TIGHT TYPE

● Reliable Insulation Wire

The coil conductor itself is coated with insulating materials of outstanding waterproof properties. Polypropylene insulation is generally used for water tight insulated magnet wire for submersible motors. A teflon sheath is used for mechanical protection over the polypropylene insulation. Hitachi uses specially developed denatured polypropylene which offers very stable waterproof characteristics. The unique insulation structure shown right is as a result of extensive development and has proven to be of a far superior quality. Thus resulting in long insulation life under severe operating conditions.



● Slinger and Seals

All submersible motors have double rubber seals to prevent well water from entering the motor. There is also a stainless steel slinger and slinger guide with 0.5 mm (0.02 inches) fit to prevent infiltration of sand.

● High Torque Characteristics

The high quality electrical grade silicone steel laminations and proper design for allowance of voltage variation make up the high torque qualities of the Hitachi submersible motor.

● Balancing

The rotor balance ring (one on each end of the rotor) allows for excellent dynamic balance for the rotating element of the motor.

● Carbon Sleeve Bearings

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



● 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 finished with the baked epoxy coating.

● Baked Epoxy Coating

All external and internal cast iron parts and coated with epoxy resin then baked for resistance to water and rust.



● Quality Control

All Hitachi submersible motors are manufactured and tested under the most stringent quality control procedures. This assures that you receive a motor that will give long service life and trouble free operation.

● Made in Japan

All Hitachi submersible motors are manufactured in Japan.

HITACHI'S SPECIAL TECHNOLOGY

Insulaton System

TYPE	CANNED TYPE	WATER TIGHT TYPE
Construction	<p>Stainless steel frame Coil Epoxy resin mold Stainless steel cylinder</p>	<p>Baked epoxy coated carbon steel frame Water tight insulated wire</p>
Slot Insulation	<p>Coil heat-resistant enamel wire Slot insulation Wedge Stainless steel cylinder</p> <p>CLASS F</p>	<p>Water tight insulated wire Slot insulation Wedge</p> <p>CLASS E</p>

High Thrust Bearing

* HIGH-PERFORMANCE THRUST BEARING

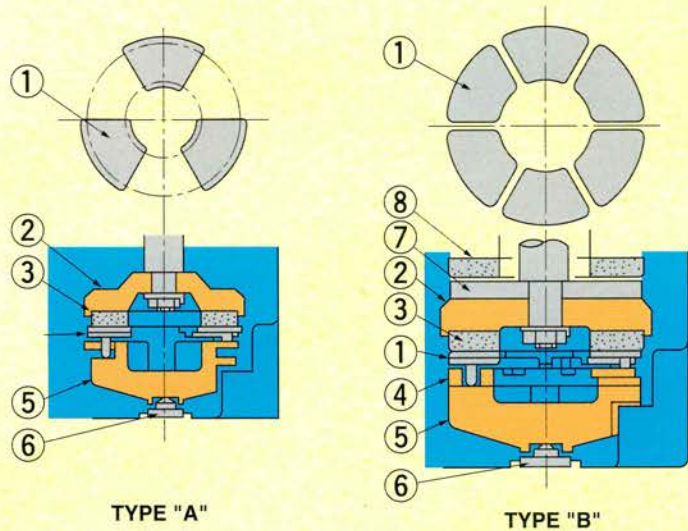
The well established KINGSBURY design thrust bearing creates a wedge of water between the pivot shoe and carbon disc. Our innovative design permits high thrust loads to be placed on the bearings while showing no measurable wear after several years of severe duty operation. This allows for long pumping life, virtual trouble free operation and low maintenance. For all 6" motors, the 930N. maximum continuous up-thrust is absorbed between the upper carbon sleeve bearing and the rotor balance ring. For all 8"-12" motors, the 3990N. maximum continuous up-thrust is carried between the upper slide plate and the separate up-thrust carbon bearing.



APPLICATION

Motor Size	Output		Bearing Type	No. of Shoes
	HP	kW		
6"	5-30	3.7-22	A	3
8"	40-125	30-90	B	6
10"-12"	150-250	110-185	B	8

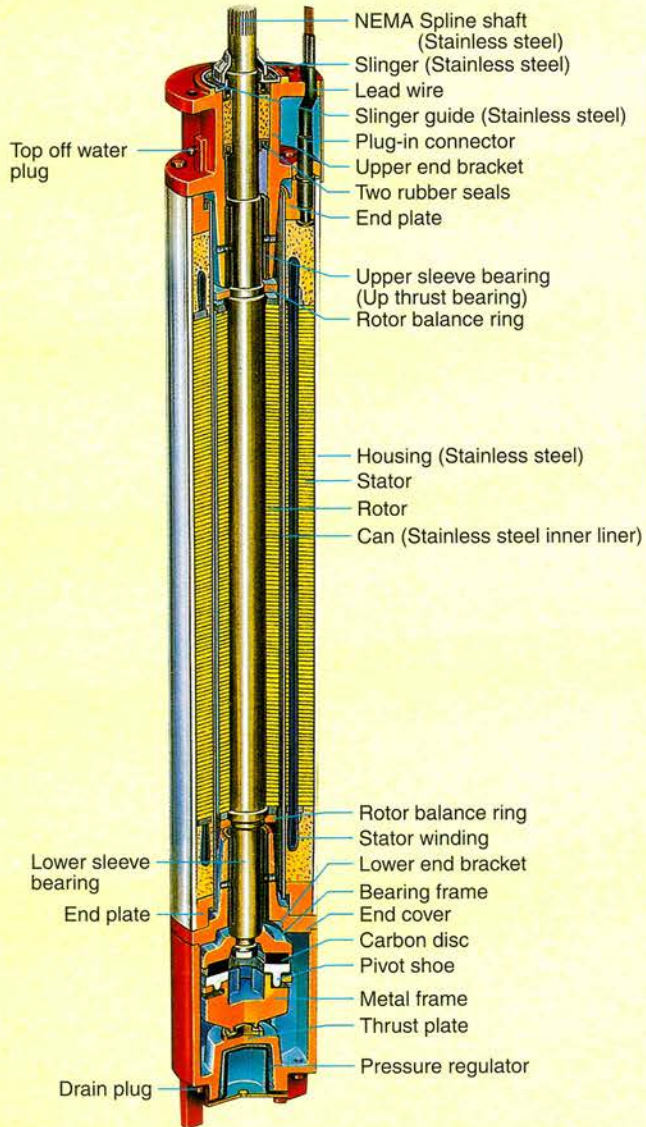
Number	Part Name
①	Pivot Shoe
②	Bearing Frame
③	Carbon Disc
④	Metal Support
⑤	Metal Frame
⑥	Thrust Plate
⑦	Slide Plate
⑧	Up Thrust Bearing



CANNED TYPE FOR DEEP WELL PUMPS

3ph 6" 5-30HP (3.7-22kW)

Internal Construction



Standard Specifications

Cable Connection	Plug-in Type
Cable Length	3.8m (150 inches)
Shaft	NEMA Splined
Flange	NEMA Standard
Voltage/ Frequency	220V50Hz, 230V50Hz, 380V50Hz 380V60Hz, 415V50Hz, 440V60Hz, 460V60Hz
Speed	3,000/3,600 min-1
Service Factor	1.0 (50Hz) / 1.15 (60Hz)

Water Environment

Flow Rate	0.15 m/sec. (0.5 ft/sec.)
pH Level	6.5-8.0
Hot Water Spec. Maximum Amb. Temp.	5-30HP 75°C (167°F)

Thrust

Motor Size	Out put	Hot Water Spec.		
		Amb.Temp.	Down Thrust	Up Thrust
6"	5-30HP	75°C (167°F)	12,000N	930N

Size and Weight



Motor Size	Output		D mm (inch)	L		Net Weight			
	HP	kW		mm	inch	Direct		Y-Δ	
						kg	lbs	kg	lbs
6"	5	3.7	140 (5.5)	583	22.95	43	95	44	97
	7.5	5.5		630	24.8	45	99	46	101
	10	7.5		685	26.97	50	110	51	112
	15	11		760	29.92	58	128	59	130
	20	15		800	31.5	62	137	63	139
	25	18.5		920	36.22	73	161	74	163
	30	22		970	38.19	80	176	82	181

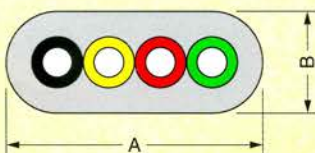
Cable Size and Type 3.8m (150 inches) Lead Wire Standard Length

Std. Water Spec. Motor Size	Start Type	Output		Lead Wire Size (mm ²)			
		HP	kW	400V Class		200V Class	
				mm ²	AxB (mm)	mm ²	AxB (mm)
6"	Direct (One Lead) 4wires	5-15	3.7-11	5.5	25.1X9.6	5.5	25.1X9.6
		20	15	5.5	25.1X9.6	8	27.7X10.4
		25-30	18.5-22	5.5	25.1X9.6	—	—
	Y-Δ (Two Leads) 4wires+3wires	5-25	3.7-18.5	5.5	25.1X9.6/19.4X9.2	5.5	25.1X9.6/19.4X9.2
		30	22	5.5	25.1X9.6/19.4X9.2	8	27.7X10.4/21.5X10

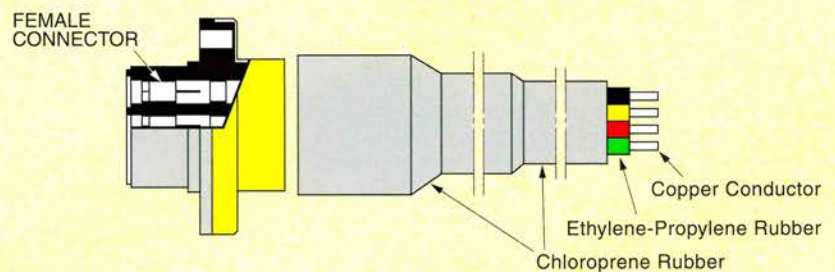
Type of Lead Wire : 600V Class

Ethylene-Propylene Rubber Insulated Chloroprene
Denatured Cabtyre Cable.
Plug-in (Field replaceable)
Color coded

4wires (Black, Yellow, Red, Green)
3wires (Black, Yellow, Red)



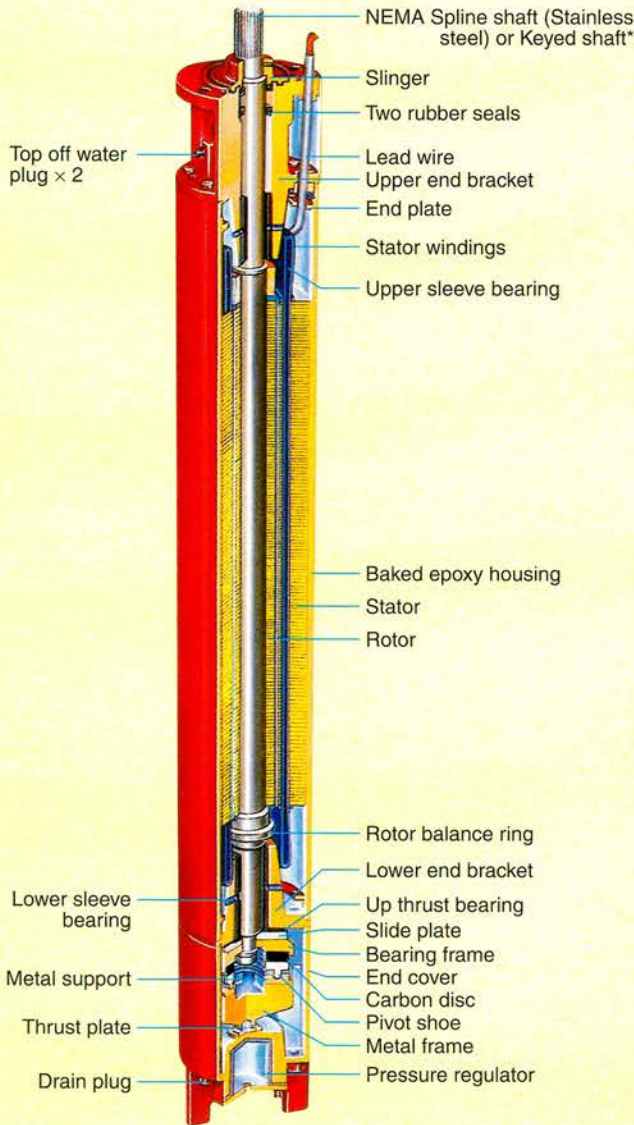
Chloroprene Cabtyre Cable



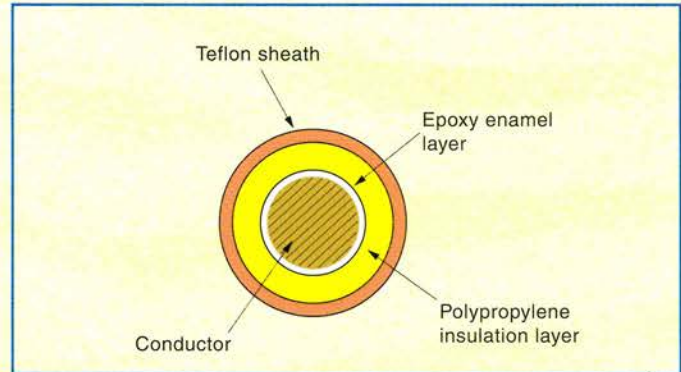
WATER TIGHT TYPE FOR DEEP WELL PUMPS

3ph 8" 40-125HP (30-90kW)
 3ph 10" 150-200HP (110-150kW)
 3ph 12" 250HP (185kW)

Internal Construction



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	NEMA Splined 8" HITACHI Standard (Keyed) 10"-12"
Flange	NEMA Standard 8" HITACHI Standard 10"-12"
Voltage/ Frequency	220V50Hz, 230V60Hz, 380V50Hz, 380V60Hz, 415V50Hz, 440V60Hz, 460V60Hz
Speed	3,000/3,600 min ⁻¹
Service Factor	1.0 (50Hz) / 1.15 (60Hz)

Water Environment

Flow Rate	0.15 m/sec. (0.5 ft/sec.)	
pH Level	6.5-8.0	
Hot Water Spec. Maximum Amb.Temp.	40-100HP	75°C (167°F) *100HP(50Hz) = 55°C (131°F)
	125-250HP	55°C (131°F)

Thrust

Motor Size	Out put	Hot Water Spec.		
		Amb.Temp.	Down Thrust	UP Thrust
8"	40-100HP	75°C (167°F)	30,300N	3,030N
	100HP(50Hz)	55°C (131°F)	30,300N	3,030N
	125HP	55°C (131°F)	39,900N	3,990N
10"	150-200HP	55°C (131°F)	39,900N	3,990N
12"	250HP	55°C (131°F)	39,900N	3,990N

Size and Weight 2POLE



Motor Size	Output		D mm (inch)	L		Net Weight			
						Direct		Y-Δ	
	HP	kW		mm	inch	kg	lbs	kg	lbs
8"	40	30	191 (7.52)	1180 (1150)	46.44 (45.28)	160 (157)	353 (346)	165 (162)	364 (357)
	50	37		1250 (1220)	49.19 (48.03)	185 (182)	408 (401)	190 (182)	419 (401)
	60	45		1350 (1320)	53.15 (54.85)	210 (207)	463 (456)	215 (212)	474 (467)
	75	55		1480	58.27	235	518	235	518
	100	75		1680	66.14	270	595	270	595
	125	90		1680	66.14	270	595	270	595
10"	150	110	216.5 (8.52)	1620	63.78	335	739	335	739
	175	132		1770	69.68	370	816	370	816
	200	150		2020	79.53	430	948	430	948
12"	250	185	267.5 (10.53)	2000	78.75	660	1455	—	—

() 6 inch Flange

Cable Size and Type

200 inch (5m) Lead Wire Standard Length (Round 1 Standed Conductor)

Start Type	Motor Size	Output		Lead Wire Size			
				400V Class		200V Class	
		HP	kW	mm ²	Dia (mm)	mm ²	Dia (mm)
Direct 3wires	8"	40	30	8	9.2	—	—
		50-60	37-45	14	11	—	—
		75-125	55-75	22	13.5	—	—
	10"	150	110	22	13.5	—	—
		175-200	132-150	38	16	—	—
12"	250	185	60	19.5	—	—	
Y-Δ 6wires	8"	40-50	30-37	8	9.2	8	9.2
		60-75	45-55	8	9.2	14	11
		100-125	75-90	14	11	—	—
	10"	150-200	110-150	14	11	—	—

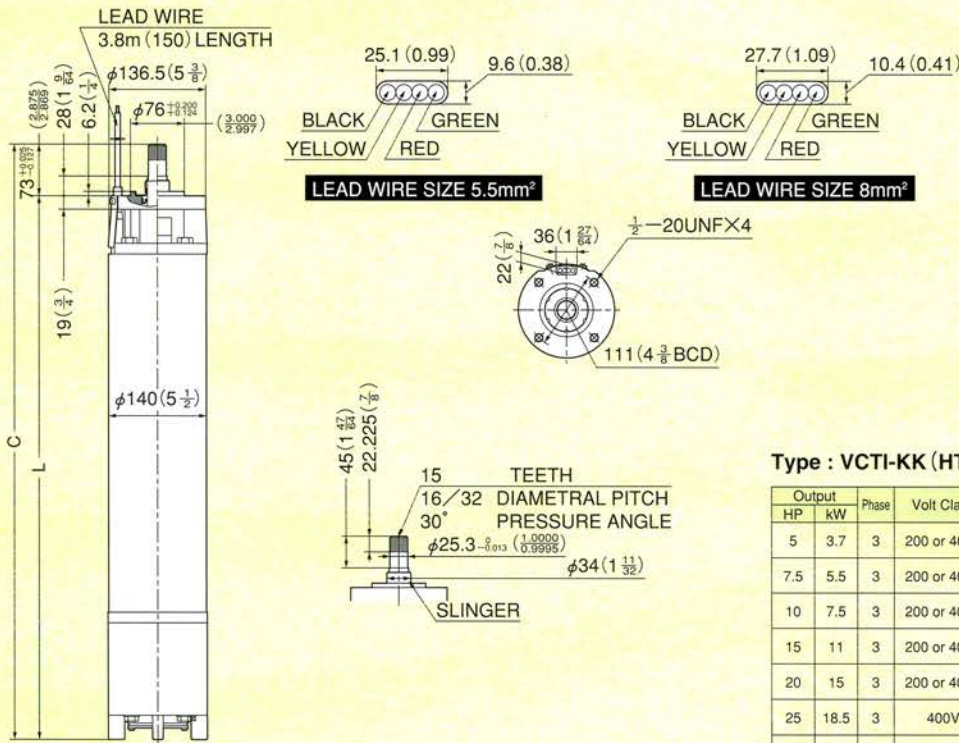
Type of Lead Wire : 600V Class

Hot Water Spec : Ethylene-Propylene Rubber Insulated Chloroprene (Denatured) Cabtyre Cable.

Color coded (Black, Yellow, Red)

DIMENSIONAL DATA

6" 2Pole Hot Water Spec. Direct Start

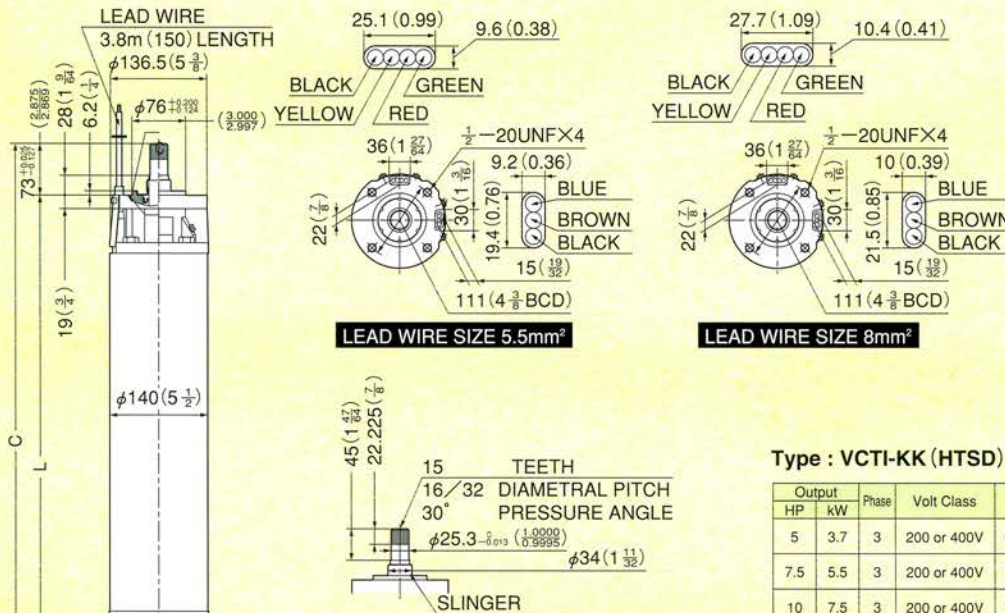


Type : VCTI-KK (HT)

Dimensions in mm (inches)

Output HP	kW	Phase	Volt Class	C	L	Thrust Cap. (N)		Lead Wire Size	
						Down	Up	mm ²	AWG
5	3.7	3	200 or 400V	656 (25.82)	583 (22.95)	15700	1330	5.5	#10
7.5	5.5	3	200 or 400V	703 (27.67)	630 (24.80)	15700	1330	5.5	#10
10	7.5	3	200 or 400V	758 (29.84)	685 (26.97)	15700	1330	5.5	#10
15	11	3	200 or 400V	833 (32.79)	760 (29.92)	15700	1330	5.5	#10
20	15	3	200 or 400V	873 (34.37)	800 (31.50)	15700	1330	8 5.5	#8 #10
25	18.5	3	400V	993 (39.09)	920 (36.22)	15700	1330	5.5	#10
30	22	3	400V	1043 (41.06)	970 (38.19)	15700	1330	5.5	#10

6" 2Pole Hot Water Spec. Y-Δ Start

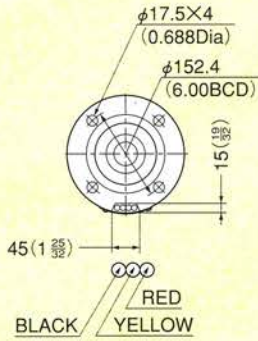
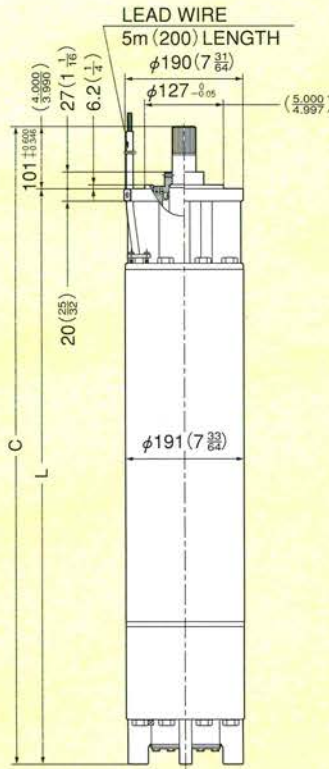


Type : VCTI-KK (HTSD)

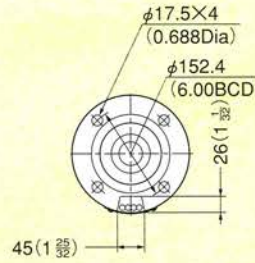
Dimensions in mm (inches)

Output HP	kW	Phase	Volt Class	C	L	Thrust Cap. (N)		Lead Wire Size	
						Down	Up	mm ²	AWG
5	3.7	3	200 or 400V	656 (25.82)	583 (22.95)	15700	1330	5.5	#10
7.5	5.5	3	200 or 400V	703 (27.67)	630 (24.80)	15700	1330	5.5	#10
10	7.5	3	200 or 400V	758 (29.84)	685 (26.97)	15700	1330	5.5	#10
15	11	3	200 or 400V	833 (32.79)	760 (29.92)	15700	1330	5.5	#10
20	15	3	200 or 400V	873 (34.37)	800 (31.50)	15700	1330	5.5	#10
25	18.5	3	200 or 400V	993 (39.09)	920 (36.22)	15700	1330	5.5	#10
30	22	3	200 or 400V	1043 (41.06)	970 (38.19)	15700	1330	8 5.5	#8 #10

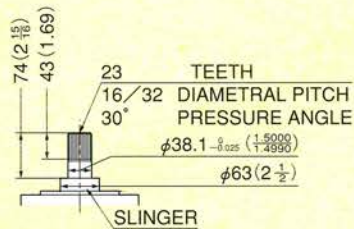
8" 2Pole Hot Water Spec. Direct Start



LEAD WIRE SIZE 8mm²



LEAD WIRE SIZE 14mm², 22mm²

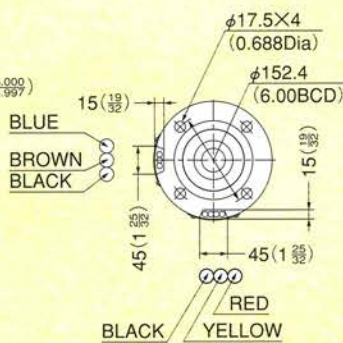
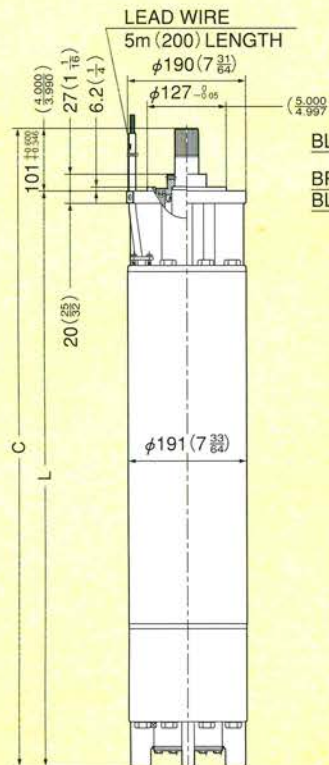


Type : VTI-KK (HT)

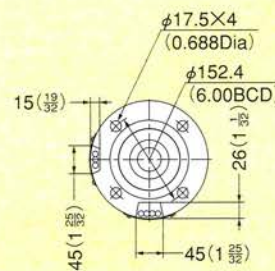
Dimensions in mm (inches)

Output HP	kW	Phase	Volt Class	C	L	Thrust Cap. (N)		Lead Wire Size	
						Down	Up	mm ²	AWG
40	30	3	400V	1281 (50.44)	1180 (46.44)	30300	3030	8	#8
50	37	3	400V	1351 (53.19)	1250 (49.19)	30300	3030	14	#6
60	45	3	400V	1451 (57.13)	1350 (53.15)	30300	3030	14	#6
75	55	3	400V	1581 (62.24)	1480 (58.27)	30300	3030	22	#4
100	75	3	400V	1781 (70.12)	1680 (66.14)	30300	3030	22	#4
125	90	3	400V	1781 (70.12)	1680 (66.14)	39900	3990	22	#4

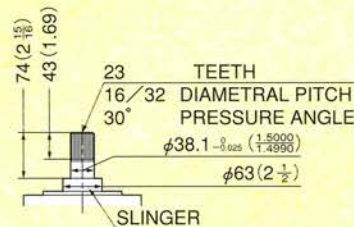
8" 2Pole Hot Water Spec. Y-Δ Start



LEAD WIRE SIZE 8mm²



LEAD WIRE SIZE 14mm²

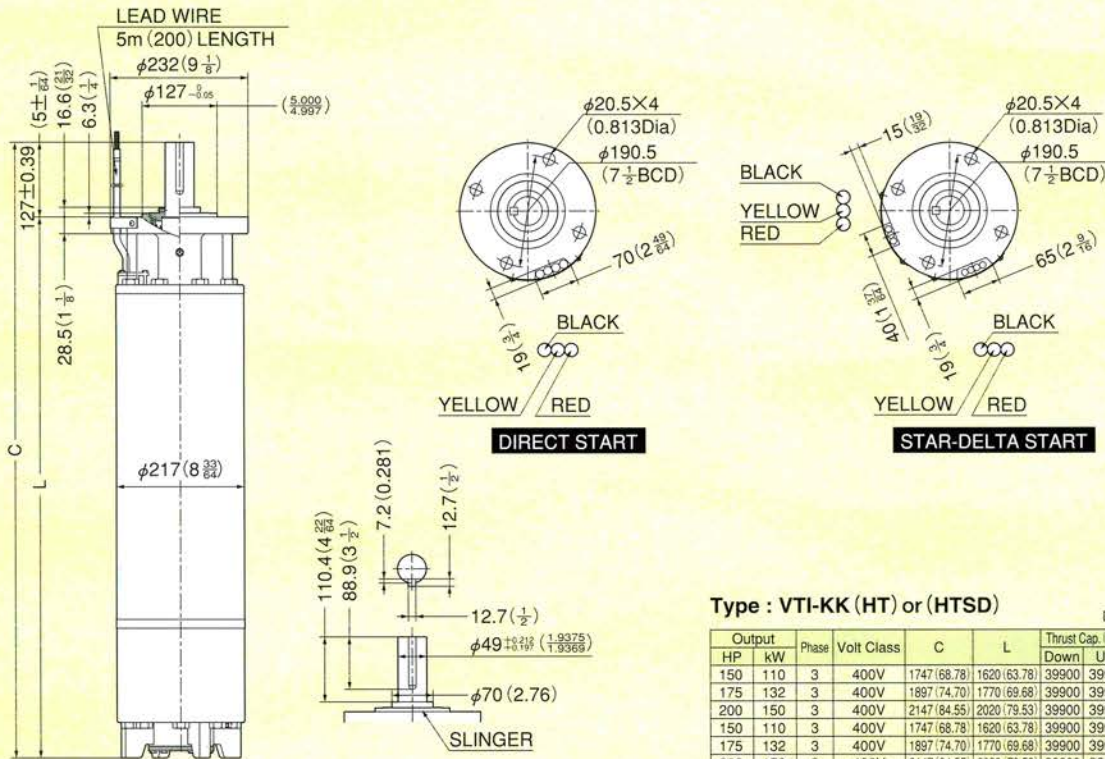


Type : VTI-KK (HTSD)

Dimensions in mm (inches)

Output HP	kW	Phase	Volt Class	C	L	Thrust Cap. (N)		Lead Wire Size	
						Down	Up	mm ²	AWG
40	30	3	200 or 400V	1281 (50.44)	1180 (46.44)	30300	3030	8	#8
50	37	3	200 or 400V	1351 (53.19)	1250 (49.19)	30300	3030	8	#8
60	45	3	200 or 400V	1451 (57.13)	1350 (53.15)	30300	3030	14	#6
75	55	3	200 or 400V	1581 (62.24)	1480 (58.27)	30300	3030	14	#6
100	75	3	400V	1781 (70.12)	1680 (66.14)	30300	3030	14	#6
125	90	3	400V	1781 (70.12)	1680 (66.14)	39900	3990	14	#6

10" 2Pole Hot Water Spec. Direct & Y-Δ Start

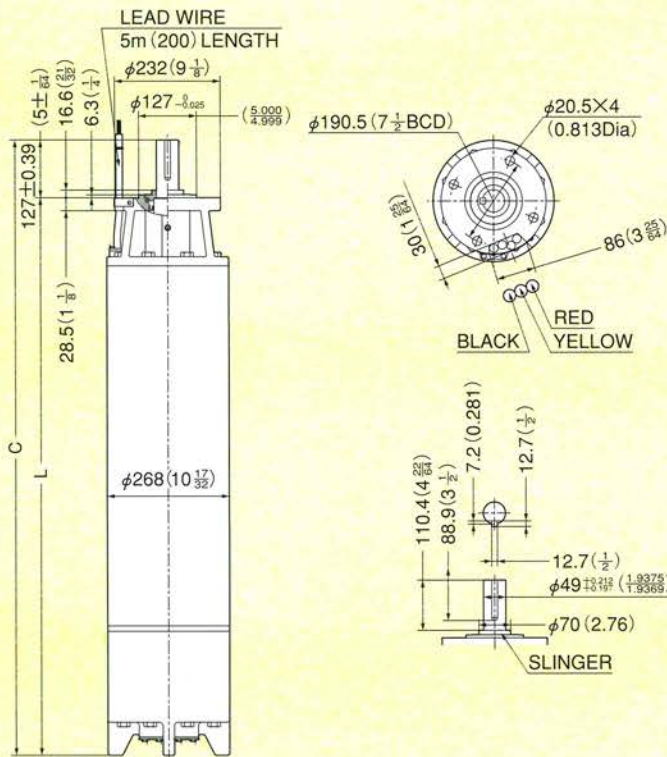


Type : VTI-KK (HT) or (HTSD)

Dimensions in mm (inches)

Output HP	kW	Phase	Volt Class	C	L	Thrust Cap. (N)		Lead Wire Size		Remarks
						Down	Up	mm ²	AWG	
150	110	3	400V	1747 (68.78)	1620 (63.78)	39900	3990	22	#4	DIRECT START
175	132	3	400V	1897 (74.70)	1770 (69.68)	39900	3990	38	#1	
200	150	3	400V	2147 (84.55)	2020 (79.53)	39900	3990	38	#1	
150	110	3	400V	1747 (68.78)	1620 (63.78)	39900	3990	14	#6	STAR-DELTA START
175	132	3	400V	1897 (74.70)	1770 (69.68)	39900	3990	14	#6	
200	150	3	400V	2147 (84.55)	2020 (79.53)	39900	3990	14	#6	

12" 2Pole Hot Water Spec. Direct Start



Type : VTI-KK (HT)

Dimensions in mm (inches)

Output HP	kW	Phase	Volt Class	C	L	Thrust Cap. (N)		Lead Wire Size	
						Down	Up	mm ²	AWG
250	185	3	400V	2127 (83.75)	2000 (78.75)	39900	3990	60	#2/0

Model List

Spec.	Inch	Motor Output		Type	Spec. Symbol	Amb.Temp.	Pole	Volt Class
		HP	kW					
Hot Water / Direct Start Specifications	6"	5HP	3.7kW	VCTI-KK	HT	75°C	2P	200V or 400V
	6"	7.5HP	5.5kW	VCTI-KK	HT	75°C	2P	200V or 400V
	6"	10HP	7.5kW	VCTI-KK	HT	75°C	2P	200V or 400V
	6"	15HP	11kW	VCTI-KK	HT	75°C	2P	200V or 400V
	6"	20HP	18.5kW	VCTI-KK	HT	75°C	2P	200V or 400V
	6"	25HP	22kW	VCTI-KK	HT	75°C	2P	400V
	6"	30HP	30kW	VCTI-KK	HT	75°C	2P	400V
	8"	40HP	30kW	VTI-KK	HT	75°C	2P	400V
	8"	50HP	37kW	VTI-KK	HT	75°C	2P	400V
	8"	60HP	45kW	VTI-KK	HT	75°C	2P	400V
	8"	75HP	55kW	VTI-KK	HT	75°C	2P	400V
	8"	100HP	75kW	VTI-KK	HT	75°C or 55°C	2P	400V
	8"	125HP	90kW	VTI-KK	HT	55°C	2P	400V
	10"	150HP	110kW	VTI-KK	HT	55°C	2P	400V
	10"	175HP	132kW	VTI-KK	HT	55°C	2P	400V
	10"	200HP	150kW	VTI-KK	HT	55°C	2P	400V
Hot Water / Star-Delta (Y-△)Start Specifications	6"	5HP	3.7kW	VCTI-KK	HTSD	75°C	2P	200V or 400V
	6"	7.5HP	5.5kW	VCTI-KK	HTSD	75°C	2P	200V or 400V
	6"	10HP	7.5kW	VCTI-KK	HTSD	75°C	2P	200V or 400V
	6"	15HP	11kW	VCTI-KK	HTSD	75°C	2P	200V or 400V
	6"	20HP	18.5kW	VCTI-KK	HTSD	75°C	2P	200V or 400V
	6"	25HP	22kW	VCTI-KK	HTSD	75°C	2P	200V or 400V
	6"	30HP	30kW	VCTI-KK	HTSD	75°C	2P	200V or 400V
	8"	40HP	30kW	VTI-KK	HTSD	75°C	2P	200V or 400V
	8"	50HP	37kW	VTI-KK	HTSD	75°C	2P	200V or 400V
	8"	60HP	45kW	VTI-KK	HTSD	75°C	2P	200V or 400V
	8"	75HP	55kW	VTI-KK	HTSD	75°C	2P	200V or 400V
	8"	100HP	75kW	VTI-KK	HTSD	75°C or 55°C	2P	400V
	8"	125HP	90kW	VTI-KK	HTSD	55°C	2P	400V
	10"	150HP	110kW	VTI-KK	HTSD	55°C	2P	400V
	10"	175HP	132kW	VTI-KK	HTSD	55°C	2P	400V
	10"	200HP	150kW	VTI-KK	HTSD	55°C	2P	400V

When you order the motors, please indicate detailed information on the model as below.

Inch + Output (HP or kW) + Type + Spec. Symbol + Pole + Voltage/Hz

Example) :

Request = 6" 5HP/3.7kW Canned Type Hi-Temp 380V 50Hz



6" 5HP or 3.7kW VCTI-KK HT 2P 380V 50Hz

Today 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 use 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.



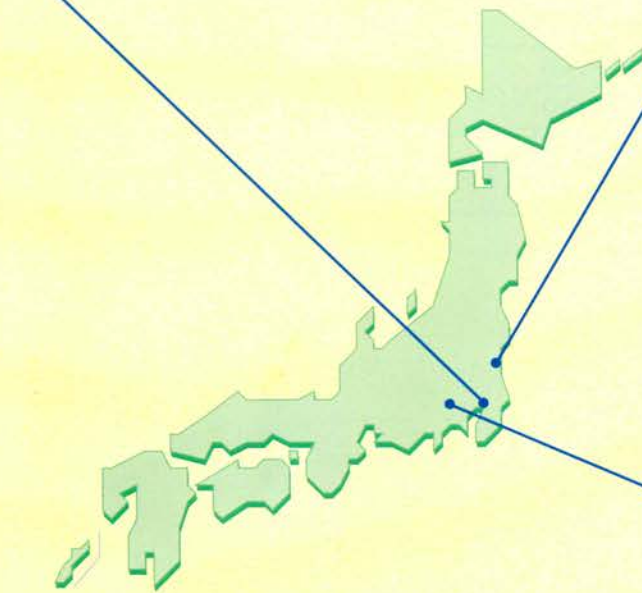
PRODUCTION PLANT (NARASHINO JAPAN)



HITACHI ADMINISTRATIVE DIVISION



HITACHI CENTRAL RESEARCH LABORATORY



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For further information, please contact your nearest sales representative.

Hitachi Industrial Equipment Systems Co., Ltd.