



ITT

Irrigation

CentriPro™ Submersible Motors For 6" and Larger Deep Well Pumps



CentriPro is a brand of ITT Residential and Commercial Water.

www.centripro.com

Engineered for life

Classification of Submersible Motors



For Deep Wells

6" CANNED MOTORS

For Municipal Water Service,
Industrial Irrigation and
Building Water Supply.

Single
Voltage

Dual
Voltage



8-10"
REWINDABLE
WATER-TIGHT
MOTORS



General Features of Canned and Rewindable Water-Tight Motors

6" Canned Design Motor Features

- **Replaceable Plug-in Motor Lead** – All 6" motor leads are stranded copper for flexibility and strength. Leads are 150" long and field replaceable.
- **Insulation** – The canned motor's stator coil is mounted in a stainless steel frame and is completely sealed in a stainless steel cylinder. The coil wire features moisture resistant insulation which is completely water-proofed for long life.
- **Heat Resistant** – The space between the stator's stainless steel protective can and its frame is filled with a specially formulated patented resin that protects the motor against thermal fluctuation and internal stress.
- **95° F (35° C) Water Temperature (CANNED TYPE: 6", 5 – 50 HP)** – The motors operate with a minimum flow rate of 0.5 ft./sec. (0.15 m/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.

8-10" Rewindable Water-Tight Motor Features

- **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 motor's cooling fluid. This design is the result of extensive research and is of superior quality. It insures that CentriPro motors will have an extremely long service life.

Motor Features - Both Designs

- **Sand Resistant Slinger and Lip Seals** – CentriPro submersible motors feature double-row, grease packed, lip seals to prevent sand from entering the motor. A carbon steel slinger with a baked on epoxy coating prevents sand from entering the lip seal area. Additional protection against sand intrusion is

provided by the close tolerance slinger guide with a .02" fit. This design is field-proven in West Texas wells which are considered to be some of the worst sandy well applications. Best of all, these features are standard for a CentriPro motor, so there is no need to stock one motor for clean wells and another more expensive motor for the more abrasive, sandy jobs.

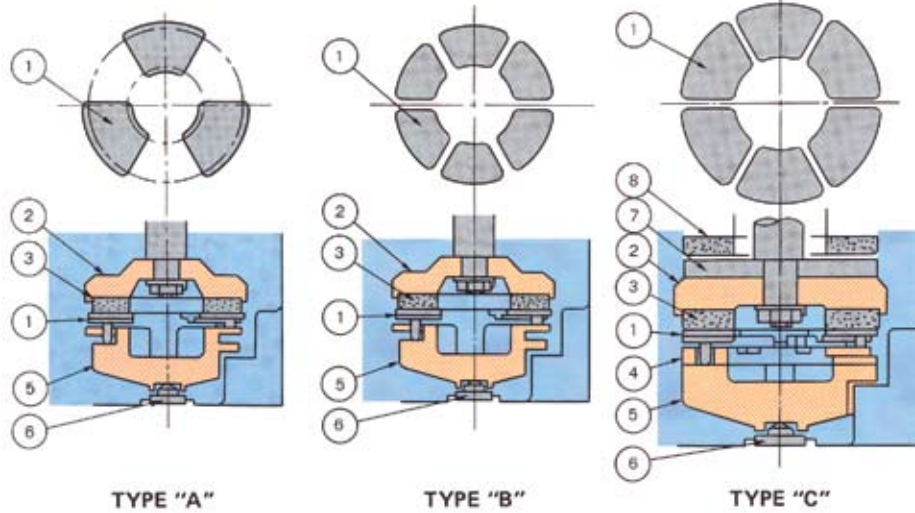
- **High Torque Characteristics** – The stator laminations are constructed of high quality, electrical grade, silicon steel which provide high torque even when the motor is subjected to nominal voltage variations.
- **Balancing** – The rotor balance rings (one on each end of the rotor) allow for excellent dynamic balance for the rotating element of the motor.
- **Carbon Sleeve Bearings** – Two carbon, water-lubricated, guide bearings are used to properly align the shaft. The bearings have a large surface area to better support the shaft, reducing whipping, while acting as a steady bushing.
- **Water-Filled Design** – The internal cooling water is mixed with antifreeze and antirust liquid to allow the motor to be stored at -22° F (-30° C). Two water plugs are provided for filling or draining the antifreeze fluid during maintenance. These plugs are also used to top off and to check the water level.
- **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 are coated with a baked epoxy resin that provides excellent resistance to water and corrosion.
- **Quality Control** – All CentriPro submersible motors are manufactured and tested under the most stringent quality control procedures, providing long service life and trouble-free operation.

Construction and Insulation Details

TYPE	6" CANNED DESIGN	8-10" REWINDABLE WATER-TIGHT DESIGN
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 E, B, F</p>	<p>Water tight insulated wire Slot insulation Wedge</p> <p>CLASS Y</p>

SPECIAL TECHNOLOGY

High Performance Thrust Bearing



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

APPLICATION

Motor Size	Output		Bearing Type	Number of Shoes
	HP	kW		
6"	5 – 30	3.7 – 22	A	3
6"	40 – 50	30 – 45	B	6
8" – 10"	40 – 150	30 – 110	C	6
10"	200	150	C	8

HIGH PERFORMANCE THRUST BEARING

The field proven 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 300 lbs. maximum continuous up thrust is absorbed between the upper carbon sleeve bearing and the rotor balance ring. For all 8" – 10" motors, the 1000 lbs. maximum continuous up thrust is carried between the upper slide plate and the separate up thrust carbon bearing.

Motor Size	2P			
	Down Thrust		Up Thrust	
	lbs.	kg	lbs.	kg
6" 5-30 HP	3,500	1,590	300 *(450)	136 *(200)
6" 40-50 HP	5,000	2,270	300 *(450)	136 *(200)
8"	10,000 ** (5,000)	4,540 ** (2,270)	1,000 ** (1,500)	450 ** (680)
10"	10,000	4,540	1,000	450

Note:

1. Thrust ratings showed are continuous except for values marked *.
2. * Momentary rating (3 minutes maximum).
3. ** 8" motor - 6" Flange when using standard stainless steel bolts (B&M), has a thrust value of 5,000 lbs. A thrust value of 10,000 lbs. can be obtained by using high tensile stainless steel bolts (ASTM F593G).

6" CANNED DESIGN

Dual Voltage Motors

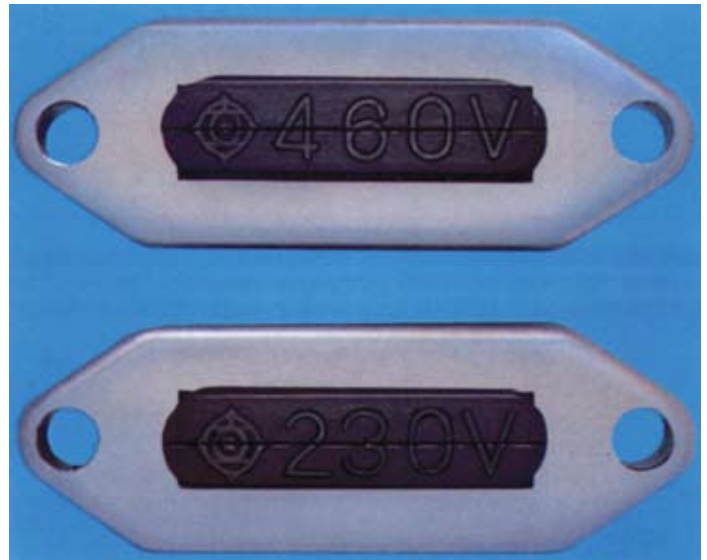


With **DUAL VOLTAGE SUBMERSIBLE MOTORS IN YOUR STOCK**, you no longer have to worry about inventory balance between 230V and 460V.

DUAL VOLTAGE SUBMERSIBLE MOTORS have all the same specifications of canned type motors 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 30 HP motors.

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



5 – 30 HP (3.7kW – 22kW), 3Ø

STANDARD SPECIFICATIONS

Cable Connection : Plug-In Type
Cable Length : 150 inch (3.8 m)
Shaft : NEMA Splined
Flange : NEMA Standard
Speed : 2P 3600/3000 RPM (60/50 Hz)

Water Environment

Flow Rate : 0.5 ft./sec. minimum
pH Level : 6.5 – 8
Maximum Temperature : 95° F (35° C)

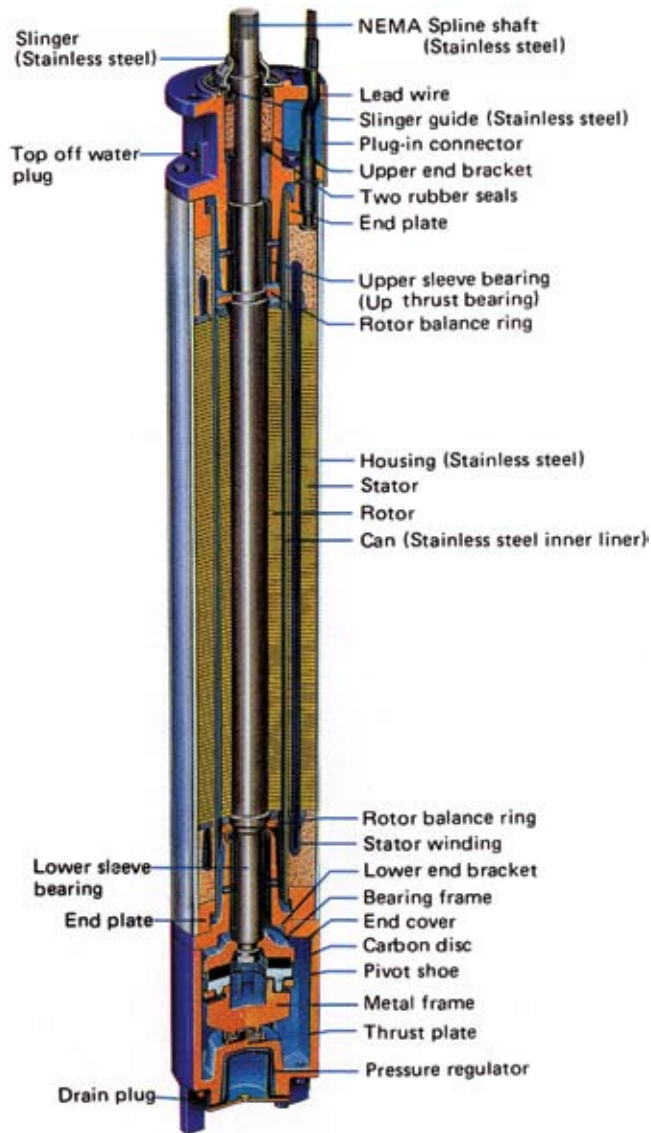
Service Factor

1.15 : at 230, 460V/60Hz
1.0 : at 208, 380V/60 Hz
and 380, 400, 415V/50 Hz

6" CANNED DESIGN MOTORS

2 Pole 3600/3000 RPM

Standard Specifications



Cable Connection		Plug-In Type	
Cable Length		150 inch (3.8 m)	
Shaft		NEMA Splined	
Flange		NEMA Standard	
Speed	60 Hz	2P	3600 RPM
	50 Hz	2P	3000 RPM

Water Environment

Minimum Flow Rate	0.5 ft./sec. (0.15 m/sec.)	
pH Level	6.5 – 8	
Maximum Temperature	5-40 HP	95° F (35° C)
	50 HP	77° F (25° C)

Service Factor

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

6" 5-15 HP (3.7 kW - 11 kW) 1Ø
6" 5-50 HP (3.7 kW - 38 kW) 3Ø

6" CANNED DESIGN MOTORS

Size and Weight - 2 Pole 3600 RPM 60 Hz — 3000 RPM 50 Hz



Motor Size	Phase	Output		D inch (mm)	L		Net Weight	
		HP	kW		inch	mm	lbs.	kg
6"	1Ø	5	3.7	5.5 (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
	3Ø	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		40.55	1030	187	85
		50	37		41.73	1060	198	90

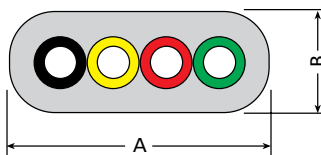
*Gross Weight: See page 12.

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

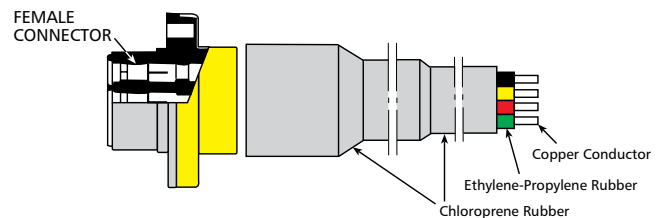
Motor Size	Phase	Output		460V, 415V, 400V, 380V			230V, 208V		
		HP	kW	Lead Wire Size		A x B inch (mm)	Lead Wire Size		A x B inch (mm)
				mm ²	AWG		mm ²	AWG	
6"	1Ø	5-15	3.7-11	—	—	—	3.5	#12	0.82x0.33 (20.8x8.2)
	3Ø	5-25	3.7-18.5	3.5	#12	0.82x0.33 (20.8x8.2)	3.5	#12	0.82x0.33 (20.8x8.2)
		30	22	5.5	#10	0.99x0.38 (25.1x9.6)	5.5	#10	0.99x0.38 (25.1x9.6)
		40	30	3.5	#12	0.82x0.33 (20.8x8.2)	—	—	—
		50	37	5.5	#10	0.99x0.38 (25.1x9.6)	—	—	—

TYPE OF LEAD WIRE - 600V CLASS

Ethylene-Propylene Rubber Insulated Chloroprene
Cabtyre Cable
Plug-In (Field replaceable.)
Color Coded
USA Standard
(Black, Yellow, Red, Green)

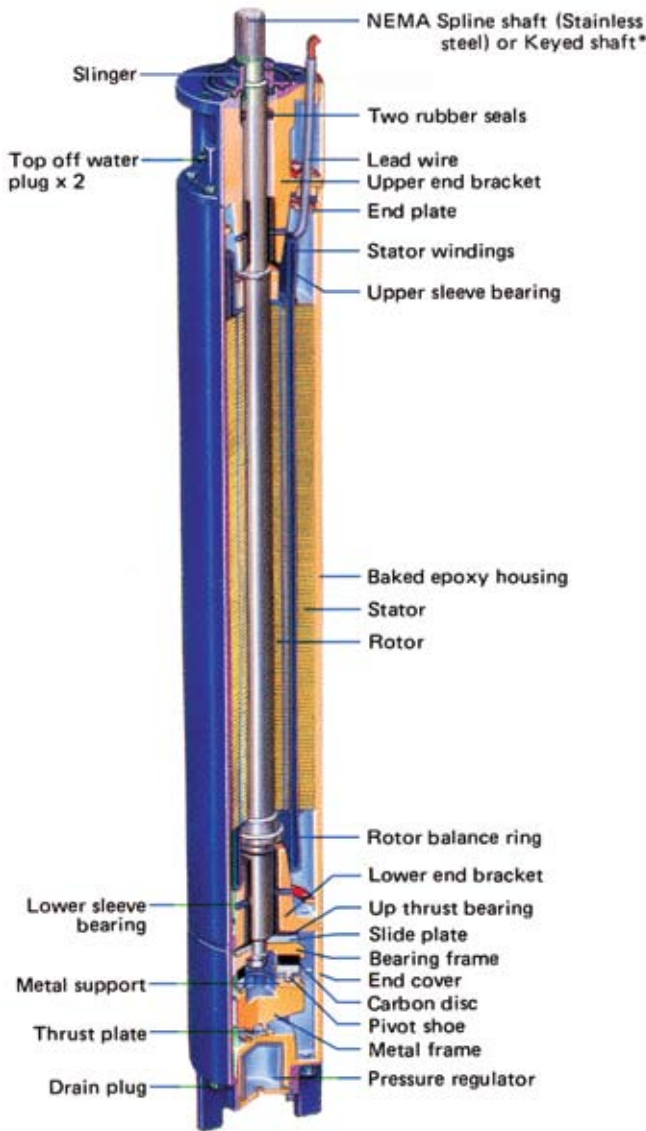


CHLOROPRENE CABTYRE CABLE

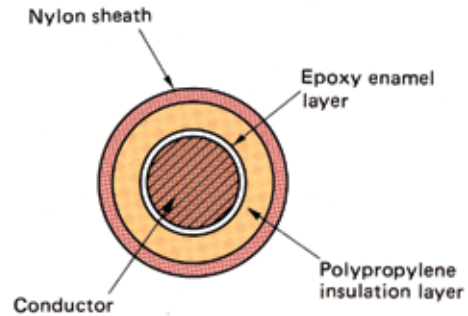


REWINDABLE WATER-TIGHT DESIGN MOTORS

2 Pole 3600/3000 RPM



Description of Water Tight Insulation Wire



The reliability of submersible motors depends on their insulation characteristics. CentriPro 8-10" motors are the result of years of continuous research and development. Our rewindable water-tight motors feature excellent insulation characteristics thanks to their new patented, water-tight, insulated magnet wire.

The insulation material is a specially developed denatured polypropylene applied over a special enamel layer. An external nylon sheath is applied over this polypropylene layer for extra mechanical protection. These three barriers are applied to copper conductors for complete insulation from the motor's cooling fluid. This insures that CentriPro motors will have an extremely long service life.

Standard Specifications

Cable Connection		Direct to Stator
Cable Length		200 inch (5 m)
Shaft	2P	Splined 40-150 HP (30-110 kW) Keyed 200 HP (150 kW)
Flange		NEMA Standard
Speed	60 Hz	2P 3600 RPM
	50 Hz	2P 3000 RPM

Water Environment

Minimum 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	1.15	1.0
Motor		
40-200 HP 2P	460V / 60 Hz	380, 400, 415V / 50 Hz

*See dimensional data for correct variations.

40-200 HP (30 kW - 150 kW) 3Ø
2P 3,600/3,000 RPM (60/50 Hz)

REWINDABLE WATER-TIGHT DESIGN MOTORS

Size and Weight - 2 Pole 3600 RPM 60 Hz — 3000 RPM 50 Hz



Motor Size	Output		D inch (mm)	L		Net Weight	
	HP	kW		inch	mm	lbs.	kg
8"	50*	37	7.52 (191)	46.44 (45.28)	1180 (1150)	353 (346)	160 (157)
	60*	45		49.19 (48.03)	1250 (1220)	408 (401)	185 (182)
	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"	200	150	8.52 (216.5)	69.68	1770	816	370

(*) 6 inch flange. **Gross Weight: See page 12.

Cable Size and Type - 2 Pole 3600 RPM 60 Hz — 3000 RPM 50 Hz

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

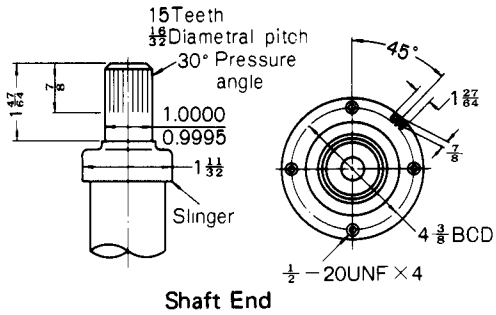
Motor Size	Output		460V, 415V, 400V, 380V			
	HP	kW	Lead Wire Size		Cable Diameter	
			mm ²	AWG	inch	mm
8"	40-75	30-55	8	#8	0.362	9.2
	100-125	75-90	14	#6	0.433	11.0
	150	110	22	#4	0.531	13.5
10"	200	150	30	#2	0.591	15.0

Type of Lead Wire – 600V Class

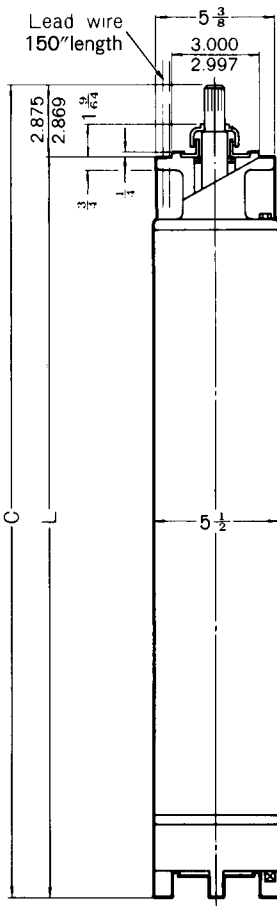
Ethylene Propylene rubber insulated chloroprene cable.

DIMENSIONAL DATA

6", 3600 RPM, 2 Pole

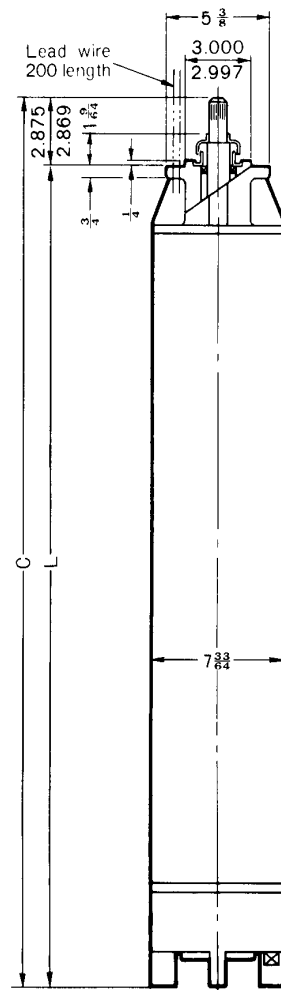
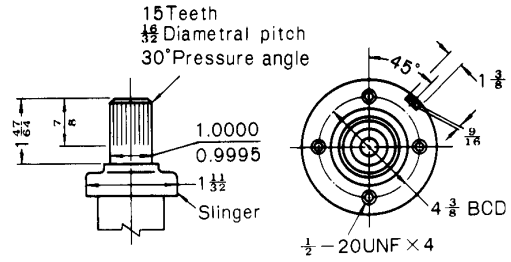


Shaft End



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		43.42	1103	40.55	1030
50	37		44.60	1133	41.73	1060

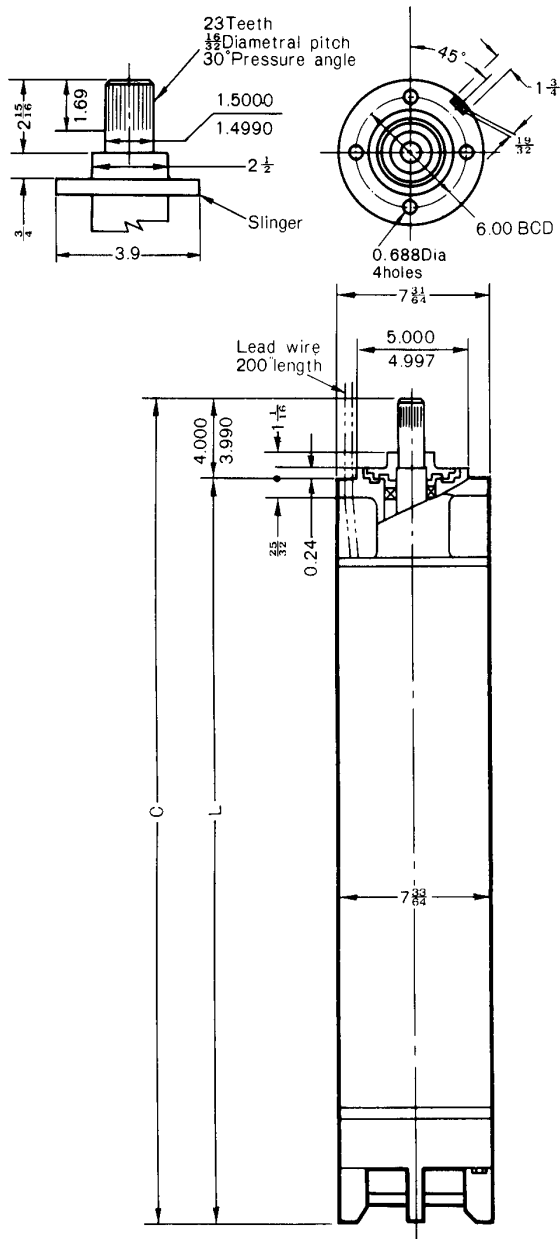
8", 3600 RPM, 2 Pole (6" Flange)



Output		Phase	C		L	
HP	kW		inch	mm	inch	mm
50	37	3	48.15	1223	45.28	1150
60	45		50.91	1293	48.03	1220

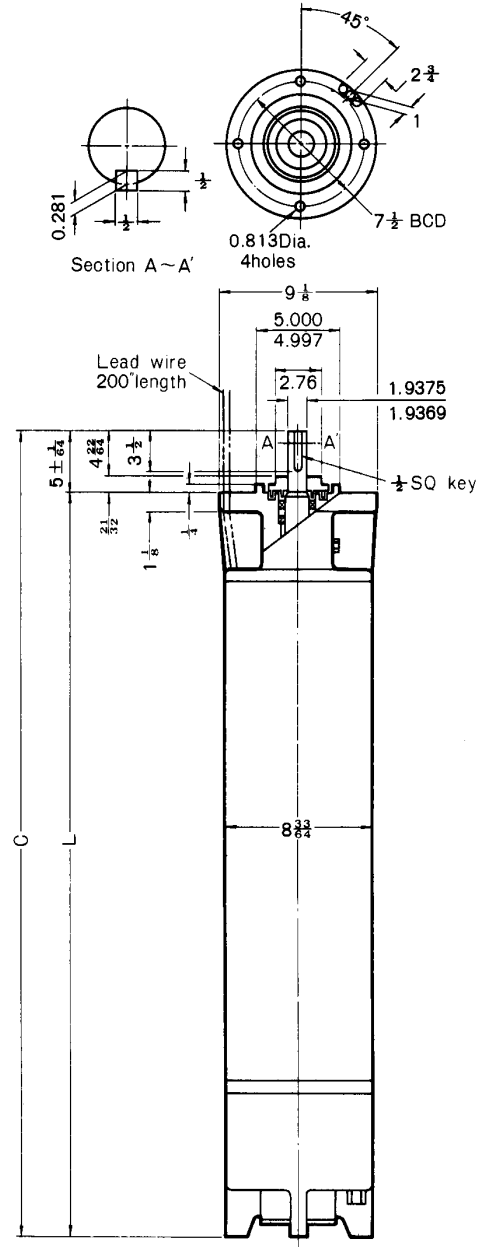
DIMENSIONAL DATA

8", 3600 RPM, 2 Pole (8" Flange)



Output		Phase	C		L	
HP	kW		inch	mm	inch	mm
75	55	3	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", 3600 RPM, 2 Pole (10" - B Flange)



Output		Phase	C		L	
HP	kW		inch	mm	inch	mm
200	150	3	74.70	1897	69.68	1770



ITT

Irrigation

GENERAL SPECIFICATIONS

3600 RPM, 2 Pole Submersible Motors

Order No.	Output		Voltage	Phase	Motor Size	Flange Size	Motor Type	Voltage Type	Shipping Weight	
	HP	kW							lbs.	kg
6M051	5	3.7	230	1	6"	6"	C	Single	143	65
6M071	7½	5.5							161	73
6M101	10	7.5							161	73
6M151	15	11							181	82
6M052	5	3.7	230	3	6"	6"	C	Dual	117	53
6M054			460							
6M072	7½	5.5	230						121	55
6M074			460							
6M102	10	7.5	230						143	65
6M104			460							
6M152	15	11	230						161	73
6M154			460							
6M202	20	15	230						170	77
6M204			460							
6M252	25	18.5	230						194	88
6M254			460							
6M302	30	22	230	209	95					
6M304			460							
6M404	40	30	460	3	6"	6"	C	Single	220	100
66M504	50	37			6"				231	105
86M504	50	37			8"	423	192			
86M604	60	45							478	217
8M754	75	55				8"	540		245	
8M1004	100	75								595
8M1254	125	90			8"	683	310			
8M1504	150	110							915	415
10M2004	200	150			10"	10" - B				

NOTE: Voltage change plugs, 230V and 460V, are available for purchase. They allow you to change the voltage on dual voltage motors.



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SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

BRCP6SM June, 2006

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Engineered for life



CentriPro™

Standard and Dual Voltage Motors

Installation, Operation and Maintenance Instructions



Owner's Information

Pump Model Number: _____

Pump Serial Number: _____

Control Model Number: _____

Dealer: _____

Dealer Phone No.: _____

Date of Purchase: _____ Installation: _____

Current Readings at Startup:

1 Ø	3 Ø	L1-2	L2-3	L3-1
Amps: _____	Amps: _____	_____	_____	_____
Volts: _____	Volts: _____	_____	_____	_____

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CentriPro



ITT Industries

SAFETY INSTRUCTIONS

TO AVOID SERIOUS OR FATAL PERSONAL INJURY OR MAJOR PROPERTY DAMAGE, READ AND FOLLOW ALL SAFETY INSTRUCTIONS IN MANUAL AND ON PUMP.

THIS MANUAL IS INTENDED TO ASSIST IN THE INSTALLATION AND OPERATION OF THIS UNIT AND MUST BE KEPT WITH THE PUMP.



This is a **SAFETY ALERT SYMBOL**. When you see this symbol on the pump or in the manual, look for one of the following signal words and be alert to the potential for personal injury or property damage.



DANGER Warns of hazards that **WILL** cause serious personal injury, death or major property damage.



WARNING Warns of hazards that **CAN** cause serious personal injury, death or major property damage.



CAUTION Warns of hazards that **CAN** cause personal injury or property damage.

NOTICE: INDICATES SPECIAL INSTRUCTIONS WHICH ARE VERY IMPORTANT AND MUST BE FOLLOWED.

THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP.

MAINTAIN ALL SAFETY DECALS.

HANDLING AND INSTALLATION

1. Do not use lead wires to pull, lift or handle the motor. The lead wires should be protected during storage, handling, moving and installation of the motor.
2. Inspect the motor to determine that it is the correct HP, voltage and size for the job and that there is no shipping damage.
3. The factory-installed water in the motor is supplied with antifreeze capable of temperatures to -30°C (-22°F). Do not install, transport or store below these temperatures. If storage is necessary below these temperatures, drain the water from the motor.
4. After long periods of idleness and on all new installations, check the electrical resistance and megger the motor with lead wires connected. The insulation resistance should have a value of at least 5 megohms at installation and at least 1 megohm at running.
5. Verify motor is filled with clean water before installing. The warranty is void if this is not done. Also check the tightness of all water filling and drain plugs, mounting bolts and cable connections.
6. Do not hammer the shaft, coupling or slinger since this may damage the thrust bearing. Check the rotation of the motor by hand to insure that it turns freely.
7. Do not drop the bottom end of the motor in the dirt or mud since this may plug up the diaphragm opening.

8. If motor is to be installed horizontally, make sure that the lead wires are at the 12 o'clock position when facing the motor shaft (in horizontal position).
9. Before installation, verify that the motor is the correct required voltage. (If not, refer to step 12 below; **CHANGING MOTOR VOLTAGE**.)
Check that coil resistance in each two phases is equal to values in Table 1.
10. Select the proper overload relay or heaters per Table 4.
11. Check that the insulation has a resistance of at least 5 megohms prior to installation and at least 1 megohm at running.

12. CHANGING MOTOR VOLTAGE

Motor voltage can be changed from 460V to 230V or from 230V to 460V by changing the voltage plug as follows:

- A. Remove the existing voltage sticker from the voltage plug.
 - B. Remove the two Allen screws and carefully pull the voltage plug up and out using two screwdrivers as shown in Figure 1.
 - C. Check to be sure the new plug is not damaged and that it is the correct required voltage.
 - D. Verify that the plug and the socket in the motor housing are clean and dry.
 - E. Coat the sealing surface of the voltage plug with Dow Corning 732-3 as shown in Figure 2.
 - F. Insert the new voltage plug as shown in Figure 3. Note that the top of the numerals are toward the shaft and the bottom is near the outer side of the motor.
 - G. Secure the new voltage plug into the motor with the two Allen screws. Tighten the screws until the outer stainless steel portion of the plug contacts the motor housing.
 - H. Mount the new voltage sticker furnished with the new plug on the motor control panel or starter.
13. **CAUTION** Always verify that the voltage of the plug installed in the motor is the correct required voltage even if you made no change. Improper installation of the voltage plug voids all warranties.

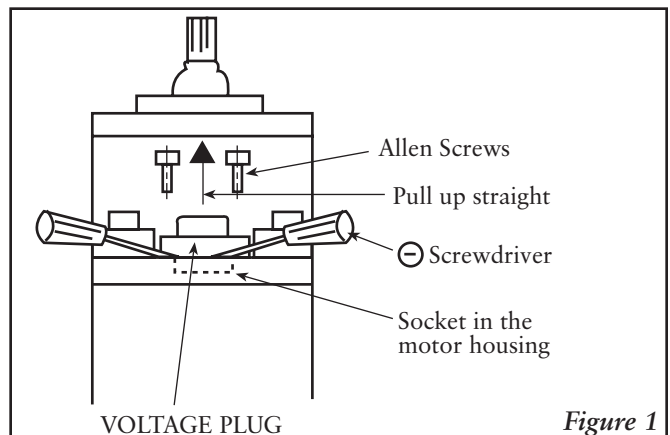


Figure 1

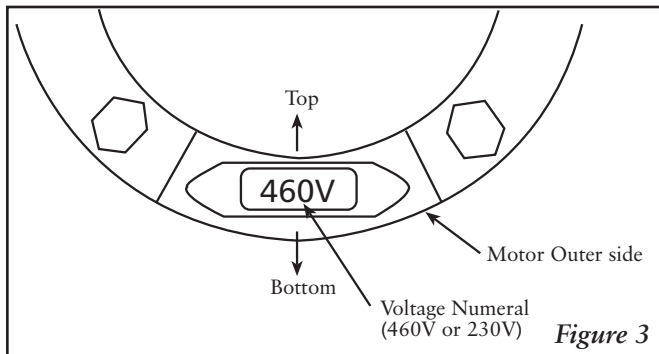
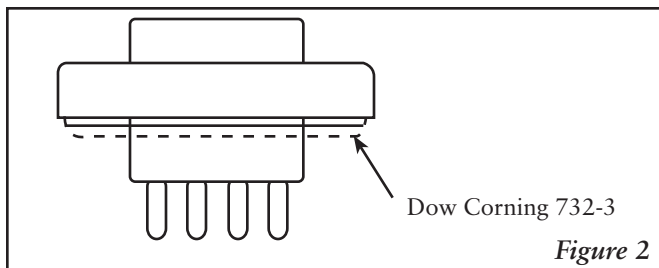


TABLE 1 — RESISTANCE DATA

HP	PHASE	Hz	*Resistance in each two phases of 460 VOLTS	*Resistance in each two phases of 230 VOLTS
5	3	60	3.050	0.806
7½			2.430	0.651
10			1.619	0.448
15			1.074	0.312
20			0.861	0.258
25			0.666	0.210
30			0.554	0.166

* Values are for normal temperature 68° F (20° C) and with motor lead wire resistance.

PRE-INSTALLATION

- Maximum Water Temperature:
 - 35° C (95° F): 6" (5 – 40 HP) motors.
 - 25° C (77° F): 6" (50 HP), 8" and 10" motors.
- PH content of the water between: 6.5–8
- Maximum Chlorine Content: 500 PPM
 Maximum Sulfuric Acid Iron Content: 15 PPM
 Maximum Flourine Content: 0.8 PPM
 Maximum Electric Conductivity: 118 μMHO/ INCH
- Maximum Sand Content: 50 PPM
- Proper approved three phase overload protection. See Table 4.
- Proper fusing for motor circuit protection. See Table 4.
- Proper Line Voltage During Running Conditions:

460V ±10%, i.e. 506 to 414 volts

230V ±10%, i.e. 253 to 207 volts at 60 cycle system at motor lead wire terminal. (Voltage drop of cable should be considered by user.)

Combination of Voltage and Frequency Variation: ±10% (sum of absolute values of voltage and frequency).

Phase Unbalance: ±5% (3 phase)

- Proper sizing of motor (current, thrust, voltage, etc.) and a 10 ft. clearance from the bottom of the well are required.
- In the case of horizontal installation, the motor is to be rigidly aligned with the pump and firmly mounted to prevent any load on the shaft and bearings and to avoid any damaging vibrations to the motor.
- The motor must always be immersed in water so that a flow velocity of cooling water at a rate of 0.5 feet per second flows past any and all parts of the motor. The motor will not operate in mud or sand.
- The power cables shall be sized large enough so that at rated current there will be less than a 5% voltage drop. See Table 5 or 6. Cables must be waterproof submersible type.
- For 3Ø motors a balanced and properly sized transformer bank shall be provided. Improper electrical supply (for example, phase converter, V-connection transformer, etc.) or connections will void the warranty.
- Single phase protection is recommended for protection of the installation. Any failure due to single phasing of the incoming voltage causing the motor to fail will void the warranty.
- Lightning arrestors are recommended in the interest of protecting the control panel, as well as the insulation system of the motor. Any motor failure due to lightning or other Acts of God will void the warranty.
- Provide waterproof insulation splices between all lead wires and well cables.
- In the event that a reduced voltage starter is used to start the motor, the following should be verified:
 - Correct quick trip ambient compensated overloads are incorporated.
 - Proper short circuit protection is utilized.
 - The torque required by the motor and pump package is attainable by this type starter.
 - The lead arrangement of the motor is acceptable with the proposed starter load connections.
 - Verify that if any time delay relays are used in switching contactors in and out, that the time settings are not too long; this could damage the motor.
 - If a manual auto transformer starter is used, don't wait too long to go into the "Run" condition and don't "tease" the contacts. Double check Table 4 for correct protection.
- Single Phase Motors (5-15 HP)

Proper connections and correct capacitors and relays are necessary for single phase motor starting and running.

Connection Diagram: See Figure 1.

See recommended capacitors in Table 3.
- Do not expose motor leads to air. Leads must be submerged for cooling.

MAINTENANCE

There are no bearings that need oil or grease. The motor, being inaccessible, should be monitored through its electrical connections.

1. Measure and record operating current and voltage.
2. Measure and record the motor insulation resistance. Any resistance of less than 5 megohm (5,000,000) for a new motor should be evaluated or checked further by a qualified service shop.
3. Lightning arrestors and/or surge capacitors will help prevent damage to the control box, cables and motor.
4. Single phase protection will help in preventing motor failure due to adverse incoming primary power.
5. Based on the values obtained in 1 and 2 above and the output flow rates and pressures of the pump, a complete picture of total performance can be obtained. This can be used to determine any pump and motor maintenance and overhauling which might be required.
6. If the motor is to be stored, protect the unit from freezing by storing in an area with a temperature higher than -30° C (-22° F).

OPERATION

1. After energizing the motor, check the flow and pressure of the pump to make sure that the motor is rotating in the correct direction. To correct a wrong rotation, switch any two of the three cable connections. (Three phase motor only.)
2. When starting the pump for the first time, inspect the water for sand. If sand appears, then continue to pump until the water clears up; otherwise, sand will accumulate in the pump stages and will bind or freeze the moving parts if water is allowed to flow back down the well.
3. During testing or checking rotation (such as "bumping" or "inching") the number of "starts" should be limited to 3, followed by a full 15 minute cooling-off period before any additional "starts" are attempted. Depending on the depth of the well and/or method of checking, these rotational checks or "starts" may actually be full-fledged starts. If this is the case, then a full cooling-off period of 15 minutes is required between this type of start.
4. For automatic (pilot device) operation, the motor should be allowed to cool for 15 minutes between starts.
5. Input voltage, current and insulation resistance values should be recorded throughout the life of the installation and should be used as a form of preventive maintenance.

TABLE 2 — RESISTANCE DATA

SINGLE PHASE - 3600 RPM - 2 POLE - 230V/60 HZ

MOTOR SIZE AND TYPE	HP	RESISTANCE (Ω)		
		R — Y	B — Y	R — B
6", C	5	2.172	0.512	2.627
	7½	1.401	0.400	1.774
	10	1.052	0.316	1.310
	15	0.678	0.230	0.850

THREE PHASE - 3600 RPM - 2 POLE - 60 HZ

MOTOR SIZE AND TYPE	HP	VOLT	RESISTANCE (Ω)
6", C	5	230	0.806
	5	460	3.050
	7½	230	0.651
	7½	460	2.430
	10	230	0.448
	10	460	1.619
	15	230	0.312
	15	460	1.074
	20	230	0.258
	20	460	0.861
	25	230	0.210
	25	460	0.666
	30	230	0.166
	30	460	0.554
8", W	40	460	0.446
	50	460	0.388
	40	460	0.372
	50	460	0.331
	60	460	0.278
	75	460	0.218
	100	460	0.164
10", W	125	460	0.132
	150	460	0.115
	200	460	0.0929

LEAD WIRE COLOR:

- R: Red
- Y: Yellow
- B: Black
- G: Green (6" only)

MOTOR TYPE:

- C: Canned
- W: Water-Tight Rewindable

CONNECTION DIAGRAM FOR SINGLE PHASE MOTORS

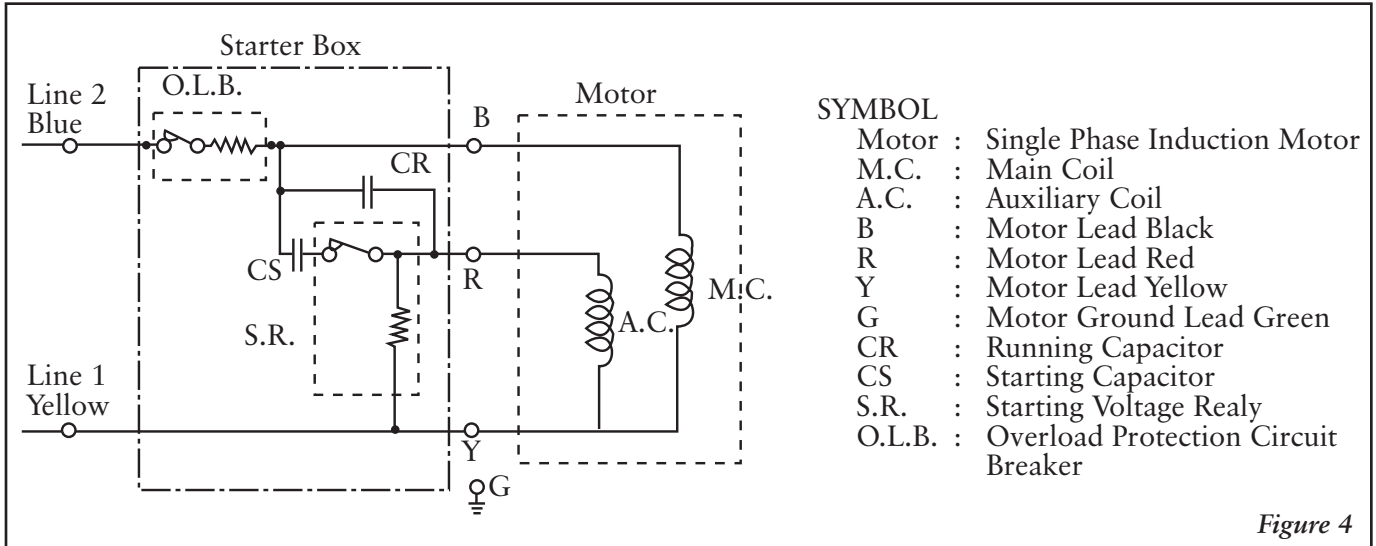


TABLE 3 — PERFORMANCE DATA OF SINGLE PHASE SUBMERSIBLE MOTORS

6" MOTOR, 3600 RPM																	
Output (HP)		5				7½				10				15			
Voltage-Frequency		230V / 60 Hz				230V / 60 Hz				230V / 60 Hz				230V / 60 Hz			
No Load Current (A)		8.8				8.3				12.0				16.1			
No Load Loss (W)		1184				1428				1544				2050			
Load Characteristics	Load (%)	50	75	100	115	50	75	100	115	50	75	100	115	50	75	100	115
	Current (A)	14.6	18.9	24	27.5	19.5	26.7	36	41	25.5	35.5	50	58	38.1	52.7	72	85
	Efficiency (%)	66.2	72.2	74.8	74.8	67.6	72.5	72.9	71.5	67.8	73.1	73.6	72.0	70.8	74.7	73.7	71.3
	Power Factor (%)	84.0	89.0	91.2	92.0	92.5	94.5	94.9	94.3	88.9	91.8	93.2	93.5	90.2	92.7	93.2	92.4
	Slip (%)	1.5	2.2	3.0	3.6	1.8	2.9	4.2	5.5	1.7	2.8	4.1	5.2	2.1	3.3	4.9	6.2
Full Load Torque (ft•lbs)		7.53				11.42				15.23				23			
Breakdown Torque (ft•lbs)		15.5				22.0				27.4				45			
Locked Rotor Torque (ft•lbs)		12.5				18.3				21.3				34			
Locked Rotor Current (A)		124				167				202				275			
Locked Rotor Code		G				F				E				D			
Rated Input (W)		4987				7675				10135				15180			
Current at SF 1.15 (A)		27.5				41				58				85			
Input at SF 1.15 (W)		5735				8950				11830				18050			
Specifications of Running Capacitor		440 VAC 30µFD				440 VAC 40µFD				440 VAC 50µFD				440 VAC 70µFD			
Specifications of Starting Capacitor		330 VAC 200µFD				330 VAC 250µFD				370 VAC 350µFD				370 VAC 450µFD			

TROUBLESHOOTING OF SUBMERSIBLE MOTORS

1. Motor does not start but does not blow fuses or relay.
 - No Power Supply → Replace fuses, breakers or check for loose or corroded connections and motor lead terminals.
 - Defective Connections → Correct connections.
2. Fuses or relay blow when motor starts.
 - Incorrect Voltage → Apply correct voltage. Voltage must be $\pm 10\%$ of rated (Nameplate).
 - Incorrect Fuses or Relay → Replace with proper fuses and relay.
 - Defective Capacitors → Replace with proper capacitors.
 - Wrong Connections → Correct wrong connections or short circuit.
 - Locked Rotor Conditions → Correct pump or well conditions.
 - Insulation Resistance Down → Check the line and correct.
3. Motor runs for a while and then blows fuses or relay.
 - Low Voltage or High Voltage → Apply rated voltage.
 - Defective Capacitors → Replace with proper capacitors.
 - Different Control Box for the Motor → Replace with proper control box.
 - Defective Starting Voltage Relay → Replace with proper relay.
 - Pump is Sand Clogged → Pull pump and clean well.
 - Overheated Protector → Shield the control box from heat source.

The following conditions are stated to provide the owner with a list of criteria for maximum motor life and to assure motor warranty.

TABLE 4 — SELECTION TABLE OF OVERLOAD PROTECTION

Phase	Motor Size and Type (Pole)	HP	Volt	Hz	Amps		Overload Protection		Time Delay Fuse	
					Rated Amps	S.F. = 1.15 Amps	Starter Size	Heater Code (Furnas Amb. Comp.)	Std. Size	Dual Element Size
Three	6", C (2 Pole)	5	230	60	15	17	1	K58	45	20
			460	60	7.5	8.5	0	K43	25	10
		7½	230	60	22	26	1	K64	70	30
			460	60	11	13	1	K54	35	15
		10	230	60	29	33	1¾	K68	90	40
			460	60	14.5	16.5	1	K58	45	20
		15	230	60	42	46	2	K74	150	60
			460	60	21	23	1¾	K63	70	30
		20	230	60	54	60	2½	K77	175	70
			460	60	27	30	2	K67	90	35
	25	230	60	68	76	3	K83	225	90	
		460	60	34	37	2	K72	110	45	
	30	230	60	82	94	3	K86	250	100	
		460	60	41	47	2½	K74	125	50	
	40	460	60	53	60	3	K76	175	70	
		460	60	70	79	3	K83	225	90	
	8", W (2 Pole)	50	460	60	65	73	3	K78	200	90
		60	460	60	80	90	3½	K86	250	110
		75	460	60	96	109	3½	K88	300	125
		100	460	60	127	145	4	K92	400	175
125		460	60	160	180	5	K27	500	225	
10", W (2 Pole)	150	460	60	195	220	5	K31	600	250	
	200	460	60	235	270	5	K33	800	350	
Single Phase	6", C (2 Pole)	5	230	60	24	27.5	—	—	80	30
		7½			36	41	—	—	110	50
		10			50	58	—	—	175	60
		15			72	85	—	—	225	90

Recommended Adjustable Overload Relays → Siemens: Class/Type 3UA5, 3UA6, 3UA7 Furnas: Class/Type US/15 48AG, UA/15 48BG

**TABLE 5 — THREE PHASE 60° C CABLE, 60 HZ (SERVICE ENTRANCE TO MOTOR)
MAXIMUM LENGTH IN FEET**

Motor Rating		60° C Insulation - AWG Copper Wire Size														
Volts	HP	14	12	10	8	6	4	2	1	1/0	2/0	3/0	4/0	250	350	500
230V 60 Hz. Three Phase 3 Lead	5	140	230	370	590	920	1430	2190	2690	3290	4030	4850	5870	6650	8460	
	7.5	0	150	250	410	640	1010	1540	1900	2310	2840	3400	4120	4660	5910	7440
	10	0	0	180	300	470	740	1140	1410	1720	2110	2550	3090	3510	4500	5710
	15	0	0	0	200	320	510	790	970	1180	1450	1760	2120	2410	3080	3900
	20	0	0	0	0	240	390	600	750	920	1130	1370	1670	1900	2440	3100
	25	0	0	0	0	0	310	490	600	730	900	1100	1330	1510	1950	2480
460V 60 Hz. Three Phase 3 Lead	30	0	0	0	0	0	250	390	490	590	730	890	1080	1230	1580	2030
	5	590	950	1500	2360	3700	5750									
	7.5	410	670	1060	1670	2610	4060	6200	7610							
	10	300	480	770	1220	1910	2980	4580	5630	6900						
	15	0	330	530	840	1320	2070	3160	3890	4760	5840	7040				
	20	0	0	400	640	1020	1600	2460	3020	3710	4560	5500				
	25	0	0	0	520	810	1280	1960	2410	2960	3640	4400	5350			
	30	0	0	0	410	650	1030	1570	1950	2390	2940	3560	4330	4940		
	40	0	0	0	0	500	790	1220	1500	1840	2270	2730	3320	3760		
	50	0	0	0	0	0	610	940	1170	1430	1750	2110	2560	2910	3700	4690
	60	0	0	0	0	0	540	830	1020	1250	1540	1860	2250	2550	3260	4120
	230V 60 Hz. Single Phase	75	0	0	0	0	0	0	660	820	1000	1230	1480	1810	2050	2640
100		0	0	0	0	0	0	0	610	750	930	1120	1360	1540	1990	2520
125		0	0	0	0	0	0	0	0	0	770	920	1040	1270	1620	2040
150		0	0	0	0	0	0	0	0	0	0	750	910	1040	1330	1680
200		0	0	0	0	0	0	0	0	0	0	0	0	840	1070	1370
5		0	0	170	260	430	680	1060	1330	1660	2070	2560				
7.5		0	0	0	200	310	490	760	940	1150	1420	1740				
10		0	0	0	0	220	340	520	660	810	1020	1250	1540			
15	0	0	0	0	0	230	370	450	560	700	870	1080				

Lengths NOT IN BOLD TYPE meet the U.S. National Electrical Code ampacity for either individual conductors or jacketed 60° C cable.

Lengths IN BOLD TYPE meet the National Electric Code ampacity only for individual conductor 60° C cable, in free air or water. If other cable is used, the National Electric Code as well as the local codes should be observed.

**TABLE 6 — THREE PHASE 75° C CABLE, 60 HZ (SERVICE ENTRANCE TO MOTOR)
MAXIMUM LENGTH IN FEET**

Motor Rating		75° C Insulation - AWG Copper Wire Size														
Volts	HP	14	12	10	8	6	4	2	1	1/0	2/0	3/0	4/0	250	350	500
230V 60 Hz. Three Phase 3 Lead	5	140	230	370	590	920	1430	2190	2690	3290	4030	4850	5870	6650	8460	
	7.5	0	150	250	410	640	1010	1540	1900	2310	2840	3400	4120	4660	5910	7440
	10	0	0	180	300	470	740	1140	1410	1720	2110	2550	3090	3510	4500	5710
	15	0	0	0	200	320	510	790	970	1180	1450	1760	2120	2410	3080	3900
	20	0	0	0	150	240	390	600	750	920	1130	1370	1670	1900	2440	3100
	25	0	0	0	0	190	310	490	600	730	900	1100	1330	1510	1950	2480
460V 60 Hz. Three Phase 3 Lead	30	0	0	0	0	0	250	390	490	590	730	890	1080	1230	1580	2030
	5	590	950	1500	2360	3700	5750									
	7.5	410	670	1060	1670	2610	4060	6200	7610							
	10	300	480	770	1220	1910	2980	4580	5630	6900						
	15	0	330	530	840	1320	2070	3160	3890	4760	5840	7040				
	20	0	0	400	640	1020	1600	2460	3020	3710	4560	5500				
	25	0	0	320	520	810	1280	1960	2410	2960	3640	4400	5350			
	30	0	0	0	410	650	1030	1570	1950	2390	2940	3560	4330	4940		
	40	0	0	0	320	500	790	1220	1500	1840	2270	2730	3320	3760		
	50	0	0	0	0	390	610	940	1170	1430	1750	2110	2560	2910	3700	4690
	60	0	0	0	0	0	540	830	1020	1250	1540	1860	2250	2550	3260	4120
	230V 60 Hz. Single Phase	75	0	0	0	0	0	430	660	820	1000	1230	1480	1810	2050	2640
100		0	0	0	0	0	0	490	610	750	930	1120	1360	1540	1990	2520
125		0	0	0	0	0	0	0	0	620	770	920	1040	1270	1620	2040
150		0	0	0	0	0	0	0	0	0	620	750	910	1040	1330	1680
200		0	0	0	0	0	0	0	0	0	0	610	740	840	1070	1370
5		0	100	170	260	430	680	1060	1330	1660	2070	2560	3190			
7.5		0	0	120	200	310	490	760	940	1150	1420	1740	2120			
10		0	0	0	140	220	340	520	660	810	1020	1250	1540			
15	0	0	0	0	140	230	370	450	560	700	870	1080				

Lengths NOT IN BOLD TYPE meet the U.S. National Electrical Code ampacity for either individual conductors or jacketed 75° C cable.

Lengths IN BOLD TYPE meet the National Electric Code ampacity only for individual conductor 75° C cable, in free air or water. If other cable is used, the National Electric Code as well as the local codes should be observed.



CentriPro™

Standard and Dual Voltage Motors

CentriPro LIMITED WARRANTY

This warranty applies to all water systems pumps manufactured by CentriPro.

Any part or parts found to be defective within the warranty period shall be replaced at no charge to the dealer during the warranty period. The warranty period shall exist for a period of twelve (12) months from date of installation or eighteen (18) months from date of manufacture, whichever period is shorter.

A dealer who believes that a warranty claim exists must contact the authorized CentriPro distributor from whom the pump was purchased and furnish complete details regarding the claim. The distributor is authorized to adjust any warranty claims utilizing the CentriPro Customer Service Department.

The warranty excludes:

- (a) Labor, transportation and related costs incurred by the dealer;
- (b) Reinstallation costs of repaired equipment;
- (c) Reinstallation costs of replacement equipment;
- (d) Consequential damages of any kind; and,
- (e) Reimbursement for loss caused by interruption of service.

For purposes of this warranty, the following terms have these definitions:

- (1) "Distributor" means any individual, partnership, corporation, association, or other legal relationship that stands between CentriPro and the dealer in purchases, consignments or contracts for sale of the subject pumps.
- (2) "Dealer" means any individual, partnership, corporation, association, or other legal relationship which engages in the business of selling or leasing pumps to customers.
- (3) "Customer" means any entity who buys or leases the subject pumps from a dealer. The "customer" may mean an individual, partnership, corporation, limited liability company, association or other legal entity which may engage in any type of business.

THIS WARRANTY EXTENDS TO THE DEALER ONLY.

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