ACUAVITAL

SOLUCIONES | AGUA | ENERGÍA

Franklin Electric

MANUAL DE INGENIERÍA

SUBMERSIBLE MOTORS

STARTING AND PROTECTION OF FRANKLIN SUBMERSIBLE MOTORS

A. SINGLE PHASE THREE-WIRE MOTORS

All Franklin Electric single phase three-wire submersible motors must be used wi
which are available from Franklin. Each control box has a capacitor or capacitors, a s
overload protection (if not in the motor itself), all matched to the rating of the moto
single phase three-wire motor without a control box or with an incorrect control box is likely
in immediate or early failure of the motor, control box or both.

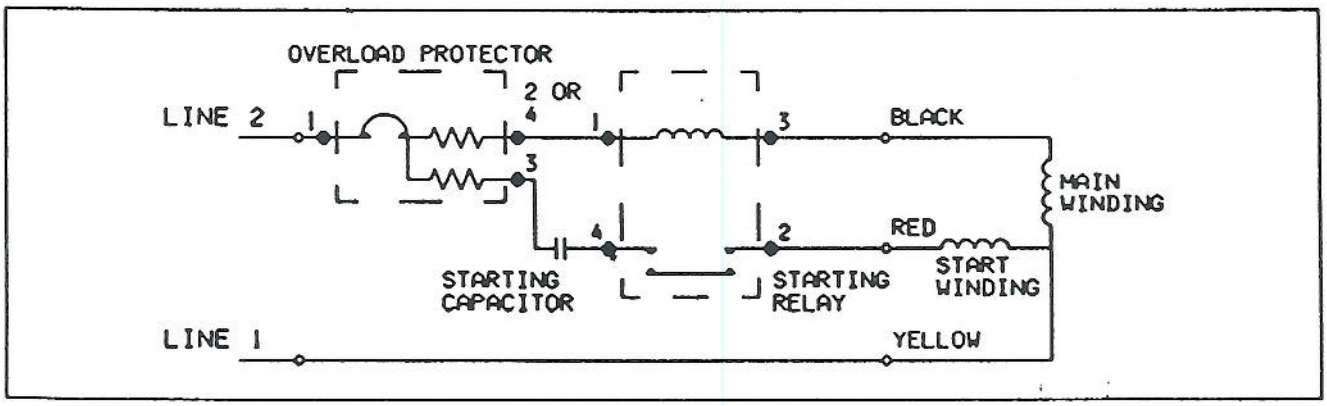
All Franklin boxes for motors from 1/3 through 1 horsepower manufactured prior to mid-1985 are equipped with automatic reset overload protectors tailored to protect both running and starting windings under all conditions. The overload protection for these motor ratings was thereafter relocated from the control box to the motor. Control boxes for 1½ HP and larger motors have manual reset overload protectors, each selected to match and protect that particular rating motor.

Control boxes for motors through 1 HP use one electrolytic starting capacitor to match the motor rating. Ratings above 1 HP, in addition to one or more electrolytic starting capacitors, also have one or more oil type running capacitors to give the higher efficiency and power factor desirable in these larger ratings.

Franklin uses two different types of starting relays in single phase submersible motor applications. Control boxes through 1 HP use a solid state relay, which senses current and phase angle to actuate. This type replaced current relays previously used. Boxes 1½ HP and larger use a starting relay called a voltage or potential relay, and it operates from the voltage sensed across the start winding. The current and solid state types both require a different relay for each motor current rating, while only one voltage type relay is needed for all 115 volt motors and one for 230 volt motors through 5 HP. A similar 230 volt relay with higher current contacts is used in 7½ through 15 HP.

The following diagrams and explanation show the components and wiring of the types of control boxes used with three-wire motors, 1/3 through 1 HP and the 1½ HP and larger motors, and describes the ·tion of the starting relays.

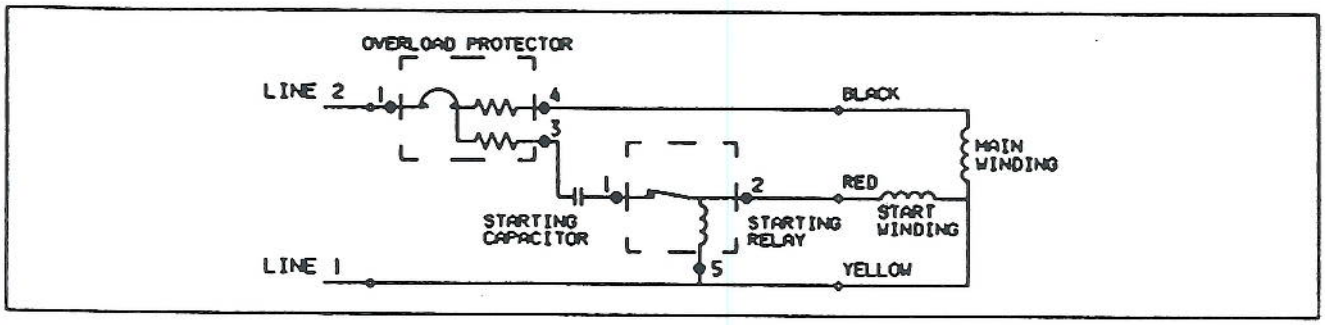
CONTROL BOX FOR 1/3 - 1 HP MOTORS USING CURRENT RELAY (1979 TO 1985)



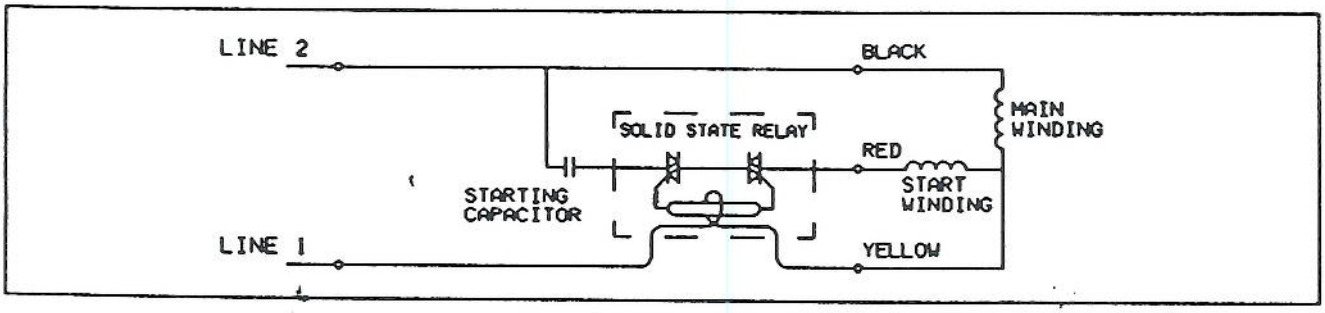
SUBMERSIBLE MOTORS

STARTING AND PROTECTION OF FRANKLIN SUBMERSIBLE MOTORS (Cont'd)

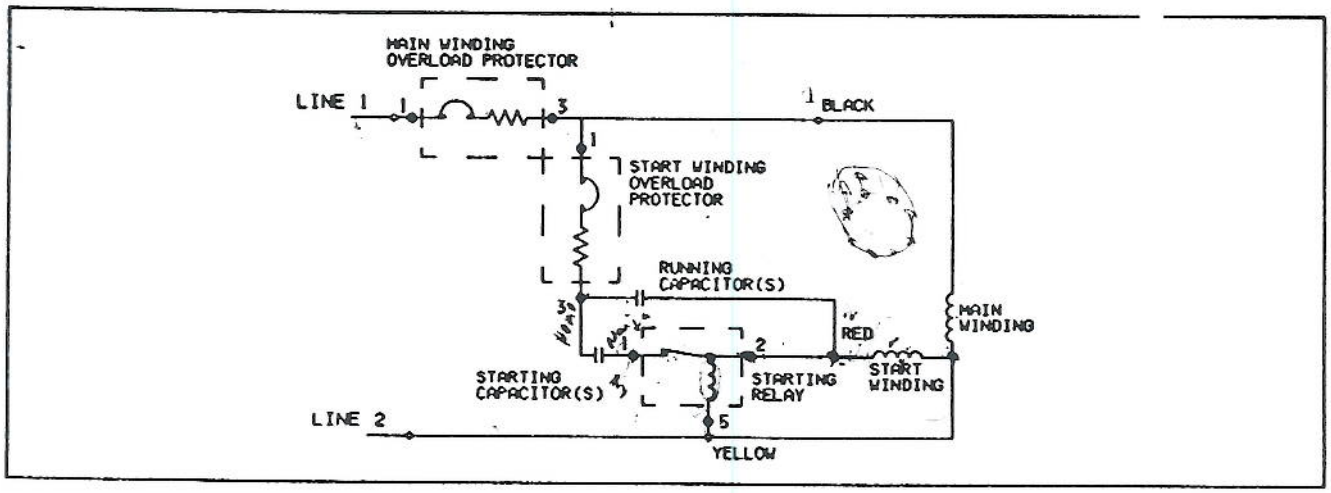
CONTROL BOX FOR 1/3 - 1 HP MOTORS USING VOLTAGE RELAY (THROUGH 1979)



CONTROL BOX FOR 1/3 - 1 HP MOTORS USING SOLID STATE RELAY (1985 AND LATER)



CONTROL BOX FOR 4" 2 HP AND LARGER MOTORS (1½ HP SAME EXCEPT SINGLE OVERLOAD PROTECTOR, TERMINAL 2 TO MAIN WINDING)



SUBMERSIBLE MOTORS

STARTING AND PROTECTION OF FRANKLIN SUBMERSIBLE MOTORS (Cont'd)

Operation of Voltage Relays:

Before the power is applied the starting relay contacts are closed. When the power is applied, both start and main motor windings are energized, and the motor starts. At this instant the voltage across the start winding is relatively low. This low value of voltage across the start winding is not enough to pick up (open the contacts of) the starting relay.

As the motor comes up to speed the voltage across the start winding (and the starting relay coil) increases. This higher voltage is enough to pick up the starting relay and open its contacts. This removes the start capacitors from the line and the motor continues to run on the main winding alone. Because of transformer action when the motor is running, voltage generated in the start winding keeps the starting relay picked up (contacts open) and keeps the start capacitor circuit open. Any running capacitors used remain in the circuit during running for improved efficiency and power factor.

IMPORTANT: Voltage relay contacts in 5HP and larger control boxes may weld and fail to open the next start if pump run time is too short. To avoid possible welding, pump run time must be at least 10 seconds using 1991 and later control boxes which have discharge resistors on start capacitors, and at least 5 minutes on earlier boxes which have no discharge resistors.

Operation of Current Relays:

Before power is on the starting relay contacts are open. When power is applied, main winding current through the relay coil closes the contacts, energizing the start winding and starting the motor. As the motor comes up to running speed, current through the relay coil gradually drops and allows the contacts to open the start winding circuit. The motor reaches full RPM and runs on the main winding.

Operation of Solid State Relays:

Before power is applied, the reed switch contacts are open. When power is applied, the reed switch contacts close (due to a magnetic field induced by a coil carrying total motor current which encircles the reed switch) and supply gate current to a triac to turn it on, energizing the start winding circuit. The triac continues to energize the start winding until the phase angle of the start winding, which changes as the motor speed increases, coincides with the phas angle of the main plus start line current. The reed switch then opens, removing current from the triac gate, and interrupts the start winding circuit. The motor then completes acceleration and runs on the main winding.

Control Box Mounting Position and Temperature:

Franklin single phase control boxes will operate in any mounting position, but are intended for mounting on a vertical surface such as a wall or pole. Operation in other mounting positions has some effect on voltage relay operation and does not maintain the box's weather resistance. The control box should never be mounted in the direct sunlight or in high temperature locations, which may cause unnecessary tripping of the overload protector and shorten capacitor life.

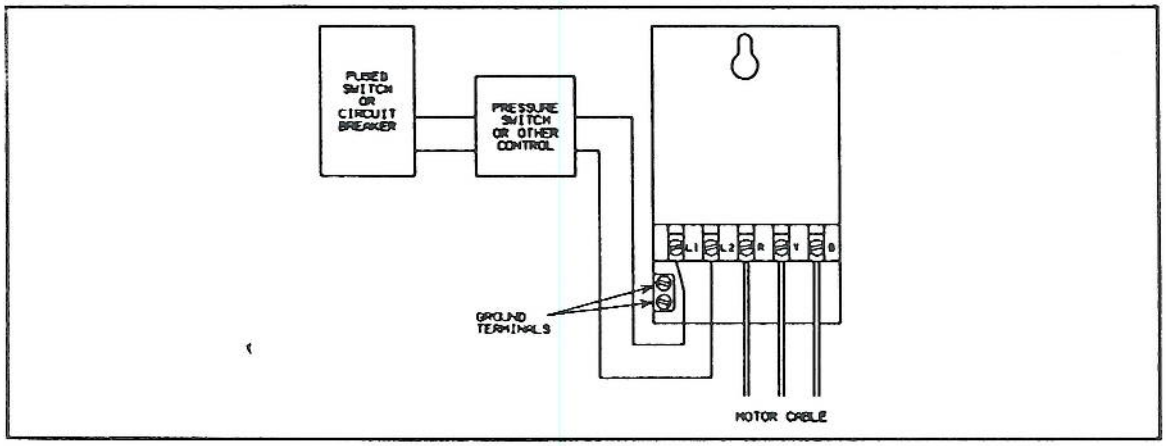
When the control box is mounted in an extremely cold location, there is a reduction in motor starting torque because of the effect on the electrolytic starting capacitor. Drop in torque is about 20% at -25°F, 65% at -40°F, and almost 100% at -80°F. It is recommended that, when the control box is mounted where the temperature may go below minus 25°F, an enclosure be built around the control box and a small light bulb or heat tape be used to warm the enclosure.

SUBMERSIBLE MOTORS

STARTING & PROTECTION OF FRANKLIN SUBMERSIBLE MOTORS (Cont'd)

Single Phase Control Boxes

The picture below shows the wiring, connections and approximate relative positions of the components of the control system for lower rated motors. Other types of control boxes for different types or ratings of motors have different components and internal arrangements, but the wiring and motor connections are essentially the same. Each type control box should be connected exactly like the diagram furnished with the control box, usually inside the cover.



On both 115 and 230 volt installations, the two incoming line leads are connected to terminals L1 and L2. It is recommended that boxes always be connected to circuits which include a grounding conductor, which should be connected to the grounding terminal on the box. If the circuit has no grounding conductor and no metal conduit from box to supply panel, use a wire at least as large as line conductors and connect the grounding terminal to a metal drop pipe, casing, water pipe, or driven ground rod. ***Failure to ground the box frame can result in a serious electrical shock hazard if a circuit fault occurs!***

IMPORTANT: When the box has a lightning arrestor, it *must* have grounding as described on page 210.465 for proper lightning protection of the motor.

B. TWO-WIRE SUBMERSIBLE MOTORS

Solid State Starting Switch

The solid state starting switch closes the start winding circuit immediately upon applying power to the motor. After the motor achieves sufficient RPM to operate on its main winding only, the start winding circuit opens. This requires about .25 seconds, depending somewhat on pump inertia and applied line voltage.

SUBMERSIBLE MOTORS

STARTING AND PROTECTION OF FRANKLIN SUBMERSIBLE MOTORS (Cont'd)

When the motor is de-energized the switch will reset and be ready for the next starting cycle. This "reset" time is the length of off time that is required before the motor can be restarted. Reset time is approximately one to three seconds to assure a positive restart of the motor.

The starting switch on and reset times have been designed to prevent the start winding from overheating in the case of an extremely fast start and stop cycling. (Due to a water-logged tank.)

Winding Protection

The thermal protector is positioned on the motor winding, and responds to current passing through it and heat received from the motor winding and ambient temperature. When the protector reaches a predetermined point corresponding to a maximum safe winding temperature, the protector opens and interrupts the circuit. When the winding temperature returns to a more reasonable safe limit, the protector will automatically reset.

Extreme Fast Cycling (Due to Water-Logged Tank)

The solid state starting switch will reset within one to three seconds after the motor is stopped. If an attempt is made to restart the motor before the starting switch has reset, the motor will not start; however, there will be current flow through the main winding until the overload protector interrupts the circuit. The time for the protector to reset is longer than the reset of the starting switch. Therefore, the start winding switch will have closed and the motor will operate. However, within a few cycles the same condition will reoccur.

When a severely water-logged condition does occur, the user will be alerted to the problem during the off time (overload reset time) since the pressure will drop drastically. When the water-logged tank condition is detected, the condition should be corrected to prevent nuisance tripping of the overload protector.

C. THREE PHASE MOTORS

Use starters and protection specified on pages 210.435-.440. Starting and running equipment and conditions are specified on pages 210.476-.480.

D. MAGNETIC CONTACTOR CONTROL CIRCUITS

Magnetic line contactors in Franklin deluxe single phase control boxes and in other single and three phase submersible controls are operated by manually or automatically switching their coil power. When these control switches connect through long cables, cable capacitance can cause ***contactor coil burnout*** or ***failure to open contacts*** when the control switch is open! To prevent problems, Franklin recommends a capacitor be added across the contactor coil when cable to the control switch exceeds 300 feet. Details are shown in Franklin Aid Vol. 6 No. 6, available by request.

SUBMERSIBLE MOTORS

TERMS AND CONDITIONS OF SALE

SUBTROL MOTORS AND CONTROLS
3-YEAR WARRANTY

LIMITED WARRANTY

Franklin Electric warrants to original equipment manufacturers and Franklin authorized motor shops that each SUBTROL unit sold will be free from defects in workmanship and materials and will perform consistent with samples previously supplied, and will conform to specifications published or mutually established with the buyer, for a period of three (3) years from the date of installation but not more than four (4) years from date of manufacture in water well applications. THE WARRANTY STATED IN THIS PARAGRAPH IS IN LIEU OF ALL OTHER WARRANTIES (EXCEPT OF TITLE), WRITTEN OR ORAL, STATUTORY, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF **MERCHANTABILITY** OR **FITNESS FOR PURPOSE.**

Any SUBTROL unit which fails to conform to the contract of sale, including the above warranty, will be repaired or replaced at the option of Franklin Electric. The remedy of repair or replacement is the sole and exclusive remedy afforded for breach of the above warranty or for breach of any express or implied warranties arising under state law. Warranty on repaired or replaced equipment will be for the time remaining under the terms of the original warranty.

Under no circumstances shall Franklin Electric be liable for any special, incidental or consequential economic damages resulting from the failure of Franklin Electric to comply with the contract of sale, breach of the above warranty or for breach of any express or implied warranties arising under state law, negligence or otherwise.

This warranty is applicable only for water well installations and applies only to Franklin Electric three phase motors equipped with and used with SUBTROL, and SUBTROL retrofit kits used in conjunction with a properly grounded lightning arrestor.

In order to validate the SUBTROL warranty, the SUBTROL warranty registration card must be completed with all requested information and mailed within 10 days of installation to:

Franklin Electric Company
400 E. Spring Street
Bluffton, Indiana 46714
Attn: Field Service Dept.

FOOTNOTE:
See page 010.101 for standard limited warranty statements.

SUBMERSIBLE MOTORS
SALES POLICY

A. FRANKLIN SUBMERSIBLE CUSTOMERS

The sale of Franklin Submersible motors and associated products is limited to manufacturers of submersible pumps and to "Class A" Franklin Authorized Service Shops.

1. To qualify as an original equipment manufacturer (OEM), the firm must:
   a) Own the design, patterns and tooling for the manufacturing of submersible pumps.
   b) Actively manufacture submersible pumps to which Franklin motors may be attached.
   c) Maintain an in-house engineering staff and effort for the development and manufacture of submersible pumps.
2. Franklin Authorized Motor Service shops (FAMS) are independent motor repair facilities appointed and contracted by Franklin Electric to provide warranty and repair service on Franklin products.

B. NET PRICES

1. Net prices for Franklin Submersible products sold to OEMs are maintained on catalog pages PL0 thru PL8.
2. Net prices for Franklin Submersible products sold to "Class A" FAMS are maintained on catalog pages 213SD thru 214SDB.

C. ORDERS

OEM volume discount prices shown on catalog pages PL0 thru PL8 apply only to orders shipped from a Franklin Electric shipping point at one time to one destination. Volume orders cannot be split and drop shipped to various locations.

D. COMBINATIONS

Four inch High Thrust and palletized Super Stainless motors ordered and shipped together may be combined to determine the applicable quantity net prices from catalog pages PL1 and PL2.

Example: If 40 palletized Super Stainless motors and 50 four inch High Thrust motors are ordered together each would be priced at the applicable net price for 90 motors.

E. TERMS AND CONDITIONS OF SALE

Refer to catalog page 010.101.

F. SHIPPING AND FREIGHT

Franklin Electric will prepay and absorb transportation charges, on shipments of 1000 lbs. or more from the factory, to common carrier points within the continental limitations of the United States, Alaska, and Hawaii excluded; provided that Franklin Electric is allowed to select the point of origin of shipment, the method of transportation and the routing of shipment. When purchaser's printed specifications require that prices be F.O.B. destination, no exception to the specifications will be taken, but additional expense incurred above normal Franklin Electric shipping practice will be paid by the purchaser.

On orders weighing less than 1000 lbs. the customer will pay freight. Customer pays freight on all shipments from warehouse regardless of quantity.

1. Typical minimum quantity shipments for which freight will be prepaid are listed below:

Motor size	Minimum Shipping Quantity Freight Prepaid
4" 300 & 650# thrust submersible motors	50 motors
4" 900# thrust submersible motors	20 motors
6" submersible motors	10 motors
8" submersible motors	2 motors

All types of motors in a given frame size can be combined on one order to reach minimum weight requirements of 1000 lbs.

2. Shipments

Shipments will be made to original equipment manufacturers, their bona fide branch operations and FAMs only, except as listed in Section F Paragraph 3 — Drop Shipments. For the purpose of this policy, bona fide branches are defined as facilities owned or leased and staffed by employees of the pump manufacturer for the purpose of making sales to independent distributors. A facility established by an OEM in cooperation with a distributor — with the objective of providing said distributor with the shipping and freight costs savings, intended for the OEM, will not be considered a bona fide OEM branch.

Shipments of submersible motors and accessories from a warehouse will be freight collect regardless of quantity. Customers desiring to pick up motors from warehouses may do so, but no freight allowance will be made.

Continued

SALES POLICY (Continued)

3. Drop Shipments
   Drop shipments will be under the following conditions:

Product	No	Yes	If Ordered With Drop Shipped Motor or Kit
Motors			
4" Super Stainless	X		
4" 900#		X	
6"		X	
8"		X	
Control Boxes			
Super Stainless Control Boxes	X		
900# Control Boxes		X	
6" Control Boxes		X	
Accessories			
Leads			X
Couplings			X
Packaged Drop Cable			X
Splice Kits			X
Termination Kits			X
Subtrol			
Kit		X	
Rating Inserts			X

Spare Parts
Spare parts can be drop shipped. Refer to parts price catalog page 915.103 for details.

4. Express, Parcel Post or Air Freight
   At the option of Franklin Electric shipments may be made express, air freight or parcel post, prepaid, in lieu of freight. Shipments will also be made by express, air freight or parcel post when requested by the purchaser, with any additional charges incurred above normal Franklin Electric shipping practices to be paid by the purchaser.

5. Customer Pick-Ups
   Customers wishing to pick-up motors from Franklin Electric may do so providing such pick-ups are scheduled in advance and made during normal Franklin Electric working hours. In such cases Franklin Electric will make a freight allowance in the form of a credit applicable to motors pick-up at the rate of 60% of the lowest published commercial rate (typically referred to as truck load rate).

6. Exceptions
   No transportation will be allowed when:
   a. Shipment is made from reseller's stock on sales made by the reseller.
   b. Shipment is accepted by purchaser at specified destination and reforwarded by him to another point.
   c. New equipment parts are shipped separately from new equipment at purchaser's request.
   d. Replacement parts or equipment are shipped as service replacements.
   e. Superseded equipment is sold at depreciated prices.

SUBMERSIBLE MOTORS

SALES POLICY

SUBMERSIBLE MOTORS EXPORT PRICING

SCOPE: The special Export pricing allowance is intended to help domestic Pump OEM's compete for International motorized pump sales. It is not intended to encourage submersible motor only sales. Export credit will be issued only for Franklin submersible motors which are exported as complete motor/pump combinations or in proportion to prior pump sales. At Franklin's request, the Pump OEM will be requested to supply supporting evidence that the Customer invoiced for the motor is buying a commensurate quantity of pumps from the Pump OEM.

1. This program is limited to Domestic Original Equipment Manufacturers (OEM's) of submersible pumps. To qualify as an OEM, the firm must meet the requirements as set forth in paragraph A of Franklin Selling Policy, Page 215.101, dated July 1, 1991.

2. Submersible Motors eligible for this program will be:
   High-Thrust: Single Phase and Three Phase
   Six Inch & Eight Inch: Three Phase

   A. The following voltages will be supplied without a price adder:
   200, 220, 380, 415, 500 volts - 50 HZ
   200, 230, 380, 460, 575 volts - 60 HZ
   for other voltages add −10% to the invoice price.

   B. Wye-Delta (6 lead) motors are available on 6" and 8" three phase ratings thru 125 HP for the additional price of the lead assembly. On 150 thru 200 HP the same price applies to both 3 lead and 6 lead motors.

3. The Export Allowance documented on the Export Price Pages, has been established for each eligible motor model. This allowance consists of two parts:

   A. Export Rebate
   Export Credits, as listed on the current Export Price Pages, will be issued when proper documentation is submitted to Franklin.

   Proper documentation consists of a "Commercial Invoice" covering the shipment and a listing of each pump/motor combination. Each motor should be clearly identified by the Franklin Model No. and Horsepower.

   Export Price lists will be issued to program participants. Export Quotations may also be obtained from Franklin and a special reference number will be assigned at that time. All future correspondence should use the reference number.

   These special prices are intended only for export to certain foreign countries. They do not apply to motors for shipment to Australia, Canada, Korea, Mexico, New Zealand, South Africa, Taiwan, U.S. Territories(*), possessions and overseas military and civilian installations. Motors will be invoiced at current standard United States OEM prices. Upon receipt of a copy of the commercial invoice covering the export shipment, export credit, as listed on the Export Price Pages, will be issued for each eligible motor.

   Net Export Pricing will not change more than once per quarter and a ninty (90) day advance notice will be given to those OEM's who have received Export Credit in the past twelve months.

   B. Export Warranty Allowance (2.0% of Invoice Price)

   Franklin feels the best Export Warranty program is to allow the Pump OEM's to handle their own warranty.

   If the OEM agrees to handle their own warranties, a credit of 2% of the Invoice Price will be provided so the OEM can accrue for handling International Warranty and Concessions.

   The OEM's may apply for this allowance for motors exported to any destination outside of North America. (i.e., USA, Canada and Mexico).

   If the OEM does not agree to handle their own warranties, an optional program is outlined in the following paragraph, No. 4, of this Selling Policy.

SUBMERSIBLE MOTORS

SALES POLICY

4. Optional International Warranty Program (OEM declines 3-B.)

   This Policy is intended to make it possible for an OEM to obtain Warranty Credit without returning the motors from International Distributors.

   It will be tightly controlled so that the Warranty Claims must be for legitimate warranty (defects in material or workmanship) and not for motors that have failed due to poor installations, incorrect applications, or mishandling. The benchmark will be warranty failure rates for domestic product from the same manufacturing periods.

   Warranty must be administered in accordance with Paragraphs, A thru D, Submersible Motor, OEM Warranty Procedures, Service Data, Page 211SD, Dated 1/4/88.

   To file for warranty credit from Franklin, the OEM must file the forms listed below, filled out completely.

   #2723 Warranty Claim — Submersible Motors, Control Boxes & Stators Only.

   SR-2 International — Submersible Motors & Stators.

   #3611 Submersible Product Warranty, For Delayed Installation (When Applicable).

   Once Franklin has reviewed the claims and found them to be complete and in accordance with Franklin installation requirements, credit will be issued to the OEM at the net export price, contingent upon:

   The motors and controls being held at the International Distributor's location for no less than one (1) year from the date that Franklin issued credit;

   The motors being kept in the same condition as they were in at the time of the claim and available for a Franklin representative to inspect, should one be in the area.

   If a Franklin representative visits the location and the motors are not available or not in accordance with the claim, Franklin reserves the right to invoice the OEM for the warranty amount.

   After the one (1) year holding period has elapsed, the motors may be field scrapped. The motors must be rendered useless at the scrap location by punching a hole thru the stator in the end turn area, and breaking the thrust bearings.

Should the number of claims being filed by an OEM for motors sold thru a particular distributor be considered in excess of domestic warranty rates on any product line, Franklin reserves the right to refuse warranty and require the OEM to inspect the installations. If the high rate of claims persist, Franklin may refuse warranty until the installations can be inspected and approved by a Franklin representative.

Other Terms and Conditions of Sale, as denoted in Franklin Selling Policy, page 010.101, dated March 6, 1989, are a part of this policy.

* The following territories and possessions are excluded from the submersible motor export pricing program.

Baker Island
Canton Island
Caroline Island
Enderbury Island
Guam
Howland Island
Jarvis Island
Johnston Island
Kingman Reef
Manua Island
Republic of the Marshall Islands
Midway Islands
Navassa Island
Commonwealth of the Northern Mariana Islands
Palau
Commonwealth of Puerto Rico
Saint Croix Island
Saint John Island
Saint Thomas Island
Samoa (American)
Sand Island
Swain's Island
Thrust Territory of the Pacific
Virgin Islands (U.S.)
Wake Island

SUBMERSIBLE MOTORS

APPLICATION INFORMATION

The following pages contain information for cable sizes, cable connections and splicing, motor protection, pump tolerances, and other application data intended for the pump manufacturer or water system designer.

Similar information intended for installation and servicing of submersible motors is available from Franklin Electric in manuals listed below, available from many pump manufacturers and distributors, and directly by request from Franklin.

Service Data 263SD - 60 Hertz Application, Installation and Maintenance Manual.

Service Data 263SDA - 50 Hertz Application, Installation and Maintenance Manual.

SUBDATA - Pocket size 60 Hertz Application Data Manual

The Franklin Electric Engineering Department will be glad to discuss with pump manufacturers and water system designers any features or characteristics of Franklin submersible motors and controls. Pump manufacturers are also invited to visit Franklin plants and see the facilities used to manufacture Franklin Electric submersible motors and controls.

WARNING!

Franklin products are built for safe and reliable operation, but like other electrical equipment can pose a safety hazard when improperly used or installed. Franklin submersible motors and controls are intended for installation by technically qualified personnel. Failure to install them in compliance with national and local electrical codes, and with Franklin Electric recommendations, may result in electrical shock or fire hazard, unsatisfactory performance, and equipment failure. Serious or fatal electrical shock hazard may result from failure to connect the motor, control enclosures, metal plumbing, and all other metal near the motor or cable, to the power supply ground terminal using wire no smaller than motor cable wires. To reduce risk of electrical shock, disconnect power before working on or around the water system. Do not use submersible motors in swimming areas.

SUBMERSIBLE MOTORS

CABLE FOR SUBMERSIBLE WATER WELL MOTORS

Several types of cable are acceptable for use with submersible motors, and the specific type to be used with each installation must be decided by the system designer, pump manufacturer, or installer. Cable used should be specifically rated for use in water, such as US types RHW, THW, XHHW, ZW or their equivalents in other countries. Submersible water well installations are generally considered permanently wired equipment as covered by U.S. National Electrical Code Article 300. Flexible cord and cable as covered by NEC Article 400, such as types SO, SJO, STO and SOO, may not be acceptable and have lower allowable ampacity than used for Franklin tables.

Cable may be twisted individual conductors, parallel conductors side-by-side in a flat jacket, or conductors in a round overall jacket. Solid or stranded conductors are usable, but stranded conductors are easier to handle and less susceptible to damage, especially in large sizes. Most electrical codes and inspectors now require a grounding conductor from the supply to the motor and pump frame.

CABLE SELECTION

Tables on the following pages list American Wire Gage (AWG) copper cable sizes acceptable for various lengths when used on Franklin submersible motors. The tables comply with US National Electrical Code Table 310-16, Column 2 for 75°C wire, with ampacity divided by 1.25 per Article 430-22 for motor branch circuits, based on motor amps at rated horsepower. Per Note 1 on each Table, sizes marked with an asterisk (*) comply with the NEC only if the cable has individual conductors in free air, per NEC Table 310-17 Column 2. IF CABLE RATED OTHER THAN 75°C IS USED, LENGTHS REMAIN UNCHANGED, BUT THE MINIMUM SIZE ACCEPTABLE FOR EACH RATING MUST BE BASED ON THE NEC TABLE COLUMN FOR THAT TEMPERATURE CABLE. Metric cable tables are shown in 50HZ Service Data 263SDA and several other 60 and 50HZ tables available by request.

Maximum cable lengths are calculated to maintain 95% of supply voltage at the motor when running at maximum nameplate amps, and to maintain adequate starting torque. C 'culations include consideration of basic cable resistance, reactance, power factor, and temperature rise. Cable larger than required may always be used, and will reduce power usage.

The portion of the total cable length which is between the supply and a three phase motor controller or single phase control box with line contactor should not exceed 25% of the total maximum allowable, to ensure reliable contactor operation. Single phase control boxes without line contactors may be connected at any point in the total cable length.

Franklin recommends copper rather than aluminum conductors for reliability of connections with common variations in temperature and corrosive conditions. If aluminum conductors are used, they must be two sizes larger than the copper size specified, such as #2 aluminum in place of #4 copper, and all exposed connections should be coated with corrosion protection.

Table Note 2 explains supply voltage conditions under which additional length cable may be used.

CAUTION! USE OF SMALLER THAN RECOMMENDED CABLE VOIDS WARRANTY, CAN CAUSE FAILURE OF THE MOTOR TO START AND OPERATE PROPERLY, AND MAY CAUSE CABLE OVERHEATING!

SUBMERSIBLE MOTORS

THREE PHASE THREE WIRE CABLE, 60 HZ, 200 AND 230 VOLTS

This table lists the maximum *feet* of copper cable from service entrance to motor for *three phase* Franklin Electric submersible motors. Refer to Note 1 and Note 2 for restrictions and added length allowable under specific conditions. Cables #14 to #0000 are AWG sizes, and 250 to 500 are MCM sizes.

200 VOLT -60 HZ- THREE PHASE - THREE WIRE CABLE

HP	#14	#12	#10	#8	#6	#4	#3	#2	#1	#0	#00	#000	#0000	250	300	350	400	500
0.5	710	1140	1800	2840	4420	6830	8480											
0.75	510	810	1280	2030	3160	4900	6090	7460	9110									
1	430	690	1080	1710	2670	4140	5140	6290	7680	9340								
1.5	310	500	790	*1260	1960	3050	3780	4630	5660	6900	8410							
2	240	390	610	970	1520	2360	2940	3610	4430	5420	6640	7980	9660					
3	180	290	470	740	1160	1810	2250	2760	3390	4130	5050	6060	7310	8260	9360			
5	*110	170	280	440	690	1080	1350	1660	2040	2490	3050	3670	4440	5030	5720	6400	6970	8080
7.5	0	0	200	310	490	770	960	1180	1450	1770	2170	2600	3150	3560	4040	4520	4910	5680
10	0	0	*150	230	370	570	720	880	1090	1330	1640	1970	2390	2720	3100	3480	3800	4420
15	0	0	0	*160	250	390	490	600	740	910	1110	1340	1630	1850	2100	2350	2570	2980
20	0	0	0	0	*190	300	380	460	570	700	860	1050	1270	1440	1650	1850	2020	2360
25	0	0	0	0	0	*240	300	370	460	570	700	840	1030	1170	1330	1500	1640	1900
30	0	0	0	0	0	*200	*250	310	380	470	580	700	850	970	1110	1250	1360	1590

230 VOLT -60 HZ- THREE PHASE - THREE WIRE CABLE

0.5	930	1490	2350	3700	5760	8910												
0.75	670	1080	1700	2680	4190	6490	8060	9860										
1	560	910	1430	2260	3520	5460	6780	8290										
1.5	420	670	1060	1670	2610	4050	5030	6160	7530	9170								
2	320	510	810	1280	2010	3130	3890	4770	5860	7170	8780							
3	240	390	620	990	1540	2400	2980	3660	4480	5470	6690	8020	9680					
5	*140	230	370	593	920	1430	1790	2190	2690	3290	4030	4850	5870	6650	7560	8460	9220	
7.5	0	*160	260	420	650	1020	1270	1560	1 0	2340	2870	3440	4160	4710	5340	5970	6500	7510
10	0	0	*190	310	490	760	950	1170	1440	1760	2160	2610	3160	3590	4100	4600	5020	5840
15	0	0	0	*210	330	520	650	800	980	1200	1470	1780	2150	2440	2780	3110	3400	3940
20	0	0	0	*160	*250	400	500	610	760	930	1140	1380	1680	1910	2180	2450	2680	3120
25	0	0	0	0	*200	320	400	500	610	750	920	1120	1360	1540	1760	1980	2160	2520
30	0	0	0	0	0	*260	330	410	510	620	760	930	1130	1280	1470	1650	1800	2110

NOTE 1: Lengths marked * meet the U.S. National Electrical Code ampacity only for ***individual*** conductor 75°C cable in free air or water. Only the lengths ***without*** * meet the code for ***jacketed***, buried or conduit enclosed 75°C cable. Local code requirements may vary.

NOTE 2: Maximum lengths shown maintain motor voltage at 95% of service entrance voltage, running at maximum nameplate amperes. If service entrance voltage will be at least motor nameplate voltage under all normal load conditions, 50% additional length is permissible for all sizes.

SUBMERSIBLE MOTORS

THREE PHASE THREE WIRE CABLE, 60 HZ, 460 VOLTS

This table lists the maximum ***feet*** of copper cable from service entrance to motor for ***three phase*** Franklin Electric submersible motors. Refer to Note 1 and Note 2 for restrictions and added length allowable under specific conditions. Cables #14 to #0000 are AWG sizes, and 250 to 500 are MCM sizes.

460 VOLT - 60 HZ- THREE PHASE - THREE WIRE CABLE

HP	#14	#12	#10	#8	#6	#4	#3	#2	#1	#0	#00	#000	#0000	250	300	350	400	500
0.5	3770	6020	9460															
0.75	2730	4350	6850															
1	2300	3670	5770	9070														
1.5	1700	2710	4270	6730														
2	*300	2070	3270	5150	8050													
3	1000	1600	2520	3970	6200	9620												
5	590	950	1500	2360	3700	5750	7160	8790										
7.5	420	680	1070	1690	2640	4100	5100	6260	7680	9380								
10	310	500	790	1250	1960	3050	3800	4680	5750	7050	8650							
15	0	*340	540	850	*340	2090	2600	3200	3930	4810	5900	7110	8610	9760				
20	0	0	410	650	*030	1610	2000	2470	3040	3730	4580	5530	6720	7640	8720	9800		
25	0	0	*330	530	830	1300	1620	1990	2450	3010	3700	4470	5430	6170	7050	7920	8660	
30	0	0	*270	430	680	1070	1330	1640	2030	2490	3060	3700	4500	5130	5860	6600	7220	8430
40	0	0	0	*320	*500	790	980	1210	1490	1830	2250	2710	3290	3730	4250	4770	5210	6060
50	0	0	0	0	*410	640	800	980	1210	1480	1810	2190	2650	3010	3420	3830	4180	4850
60	0	0	0	0	0	*540	*670	830	1020	1250	1540	1850	2240	2540	2890	3240	3540	4100
75	0	0	0	0	0	*440	*550	*680	840	1030	1260	1520	1850	2100	2400	2700	2950	3440
100	0	0	0	0	0	0	0	*500	*620	*760	940	1130	1380	1560	1790	2010	2190	2550
125	0	0	0	0	0	0	0	0	0	*600	*740	*890	1080	1220	1390	1560	1700	1960
150	0	0	0	0	0	0	0	0	0	0	*630	*760	*920	1050	1190	1340	1460	1690
175	0	0	0	0	0	0	0	0	0	0	0	*670	*810	*930	1060	1190	1300	1510
200	0	0	0	0	0	0	0	0	0	0	0	*590	*710	*810	*920	1030	1130	1310

NOTE 1: Lengths marked * meet the U.S. National Electrical Code ampacity only for ***individual*** conductor 75°C cable. Only the lengths ***without*** * meet the code for ***jacketed*** 75°C cable. Local code requirements may vary.

NOTE 2: Maximum lengths shown maintain motor voltage at 95% of service entrance voltage, running at maximum nameplate amperes. If service entrance voltage will be at least motor nameplate voltage under all normal load conditions, 50% additional length is permissible for all sizes.

SUBMERSIBLE MOTORS

THREE PHASE SIX WIRE CABLE, 60 HZ, 200, 230 AND 460 VOLTS

This table lists the maximum *feet* of copper cable from service entrance to motor for *three phase* Franklin Electric submersible motors. Refer to Note 1 and Note 2 for restrictions and added length allowable under specific conditions. Cables #14 to #0000 are AWG sizes, and 250 to 500 are MCM sizes.

DO NOT USE THESE TABLES FOR THREE WIRE CABLE!

200 VOLT -60 HZ- SIX LEAD																		
HP	#14	#12	#10	#8	#6	#4	#3	#2	#1	#0	#00	#000	#0000	250	300	350	400	500
7.5	120	190	300	480	750	1160	1440	1770	2170	2650	3250	3900	4710	5330	6050	6770	7360	8510
10	*90	140	220	350	550	860	1080	1320	1630	2000	2450	2960	3590	4070	4640	5210	5690	6620
15	0	0	150	240	380	590	740	910	1110	1360	1670	2010	2440	2770	3150	3530	3850	4470
20	0	0	*120	180	290	450	570	700	860	1060	1300	1570	1900	2160	2470	2780	3040	3540
25	0	0	0	*150	230	370	460	560	690	850	1050	1270	1540	1750	2000	2240	2450	2860
30	0	0	0	*120	*190	300	380	460	570	700	870	1050	1270	1450	1660	1870	2040	2390

230 VOLT -60 HZ- SIX LEAD																		
7.5	160	250	400	630	990	1540	1910	2340	2880	3510	4300	5160	6230	7050	8000	8950	9740	
10	*120	190	290	470	730	1140	1420	1750	2160	2640	3240	3910	4740	5380	6140	6890	7520	8750
15	0	*130	200	320	500	780	970	1200	1470	1800	2210	2660	3220	3660	4160	4670	5090	5900
20	0	0	*150	240	380	600	750	920	1140	1400	1710	2070	2520	2860	3270	3670	4020	4680
25	0	0	*120	200	310	490	610	750	920	1130	1390	1670	2030	2310	2640	2970	3240	3780
30	0	0	0	*160	260	400	500	610	760	930	1150	1390	1690	1920	2200	2470	2710	3160

460 VOLT -60 HZ- SIX LEAD																		
7.5	640	1020	1610	2540	3960	6150	7650	9380										
10	470	750	1190	1880	2940	4580	5700	7010	8620									
15	320	520	820	1290	2020	3140	3900	4800	5890	7210	8840							
20	*250	40[illegible]	620	990	1550	2410	3010	3700	4560	5590	6860	8290						
25	*200	320	500	800	1250	1950	2430	2990	3680	4510	5540	6700	8130	9250				
30	0	*260	410	650	1030	1600	2000	2460	3040	3730	4580	5550	6740	7680	8790	9890		
40	0	0	*310	490	760	1190	1480	1820	2240	2740	3370	4060	4920	5590	6370	7150	7810	9080
50	0	0	*250	390	620	960	1200	1470	1810	2220	2720	3280	3970	4500	5120	5740	6260	7270
60	0	0	0	*330	520	820	1020	1250	1530	1880	2300	2770	3360	3810	4340	4860	5300	6150
75	0	0	0	0	*420	660	830	1020	1250	1540	1890	2280	2770	3150	3600	4050	4420	5150
100	0	0	0	0	*310	*490	610	760	930	1140	1400	1700	2060	2340	2680	3010	3290	3830
125	0	0	0	0	0	*390	*490	*600	740	910	1110	1340	1620	1830	2080	2330	2540	2940
150	0	0	0	0	0	0	*420	*510	*630	770	950	1140	1380	1570	1790	2000	2180	2530
175	0	0	0	0	0	0	0	*450	*550	*680	830	1000	1220	1390	1580	1780	1950	2270
200	0	0	0	0	0	0	0	0	*480	*590	*730	880	1070	1210	1380	1550	1690	1970

NOTE 1: Lengths marked * meet the U.S. National Electrical Code ampacity only for ***individual*** conductor 75°C cable in free air or water. Only the lengths ***without*** * meet the code for ***jacketed***, buried or conduit enclosed 75°C cable. Local code requirements may vary.

NOTE 2: Maximum lengths shown maintain motor voltage at 95% of service entrance voltage, running at maximum nameplate amperes. If service entrance voltage will be at least motor nameplate voltage under all normal load conditions, 50% additional length is permissible for all sizes.

SUBMERSIBLE MOTORS

CONNECTING AND SPLICING SUBMERSIBLE CABLE

The Franklin lead connector to the motor provides a simple, leakproof connection. It is recommended that a new lead assembly be used when one is removed from the motor because rubber set and possible damage from removal may prevent effective resealing. The following tightening torques should be used:

4-Inch motors - 15 to 20 Lb. Ft.
6-Inch Motors - 60 to 70 Lb. Ft.
8-Inch Motors - 120 to 150 Lb. Ft.

If torque is rechecked later it will be much lower than original because of rubber set, but this does not indicate retightening is required.

Connections and splices in submersible cable must be completely and permanently water proof. A leak may cause failure or necessitate pulling the unit due to -

1. Electrolytic deterioration of the joint, resulting in an open circuit.

2. Blowing fuses.

3. Excessive current resulting in tripping of the overload protector.

There are several types of cable and cable joints that may be used:

1. Motor Lead Drop Cable for 4-Inch Motors

   This is a continuous length drop cable with a connector on one end that fits directly into the motor and eliminates any intermediate splicing or connections. The connector is simply inserted into the socket in the motor and the nut tightened with a wrench until the nut tightens against its shoulder. For the ratings where it can be used, it provides a positive leakproof connection, usually at lowest initial cost and with a minimum of handling and installation costs. These continuous length motor lead drop cables are available from Franklin Electric in #14 and #12 wire size with the three or two conductors parallel in one cable jacket.

2. Double Ended Motor Leads for 4-Inch Motors

   Motors can be supplied with short (48 or 100 inch) leads with an identical connector on each end. One end plugs into the motor and the other into a mating connector on the end of the drop cable. Both are polarized to insure correct connections. A foolproof watertight connection is made simply by tightening with a wrench. This short lead can be easily replaced without splicing if necessary because of damage or replacement of the motor.

   The mating connector on the drop cable is made by using the Franklin 151550 Cable Termination Kit. This kit provides all necessary mechanical and electrical parts with waterproof potting resin to make a connector on the end of the drop cable to mate with the short motor lead.

SUBMERSIBLE MOTORS

CONNECTING AND SPLICING SUBMERSIBLE CABLE (Cont'd)

These 151550 cable termination kits to make connectors on cable have been used successfully for many years. A complaint that occasionally occurs is that in cold weather the resin and hardener take too long to harden or cure. While the cure will always take longer in cold weather, there are means for speeding it up. Warming the vials before mixing by a heater, warm water, or holding next to the body will help. After pouring the small vial (Hardener) into the large vial, hold the large vial in the hand for added warmth and stir until it feels very warm before pouring into the connector tube. Shielding the connector from the cold while curing or wrapping it in something to serve as insulation will further speed the cure.

Cold weather does not affect or prevent a good potted connection - it only lengthens the cure time. In most cases, by proper planning ahead, the connector can be potted on the cable some time before the pump installation and the cure time will not be a consideration.

In a few cases, it may be found that if the resin has been stored in or subjected to cold, white crystals will form and settle in the vial. This does not affect the resin and it may be used without reservation. When mixing the resin and hardener, be sure the settled crystals are thoroughly stirred up. As it warms up with further mixing, the crystals will redissolve and it will cure in the normal manner.

3. Short Motor Leads for Splicing to Drop Cable

Franklin motors include lead assemblies already connected to the motor receptacle, with their individual leads long enough for splicing to drop cable just above the pump, or lead assemblies are separately available.

These short lead assemblies must be spliced to the drop cable with a reliable waterproof splice. These splices can be made with commercially available potting or heat shrink splicing kits, or by careful tape splicing.

Tape splicing should use the following procedure:

a. Strip individual conductor of insulation only as far as necessary to provide room for a clinch type connector or a neatly twisted joint. If a twisted joint is used, it is essential that it also be soldered. Tubular connectors of the clinched or staked type are desirable.

   If connector is not as large in diameter as cable insulation, fill space with rubber electrical tape before proceeding with Step "b".

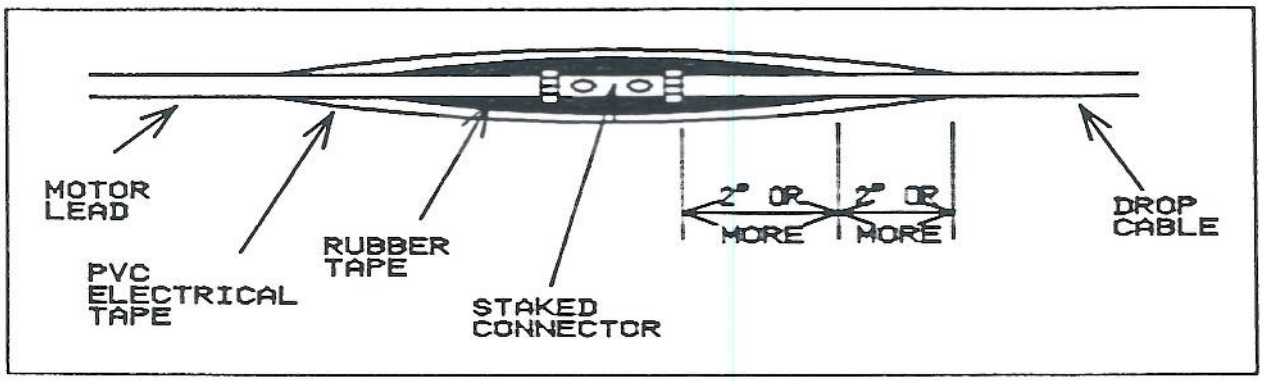
b. Tape individual joints with rubber electrical tape, using two layers; the first layer extending at least 1" beyond each side of the end of the conductor insulation, the second layer 1" beyond the ends of the first layer. Wrap tightly, eliminating air spaces as much as possible.

c. Tape over the rubber electrical tape with #33 Scotch electrical tape, Minnesota Mining Co. (or equivalent), using two layers as above and making each layer overlap the end of the preceding layer by at least 1".

SUBMERSIBLE MOTORS

CONNECTING AND SPLICING SUBMERSIBLE CABLE (Cont'd)

In the case of the cable with three conductors encased in a single outer sheath, tape individual conductor joints as above, staggering joints.



CUTAWAY VIEW OF TAPE SPLICE

Heatshrinkable tubing can make an effective and time saving splice insulation when properly used. The following recommendations should be followed:

a. Use only tubing which has the inside coated with a sealant which melts when heated and seals the tube to the conductor insulation. Uncoated tubing is likely to leak.

b. Use tubing rated to shrink at least 10% smaller than the smallest lead insulation diameter. Tubing length should be enough for at least 1" sealed length on each wire beyond the connector on #12 or #14, and at least 2" on larger wire, and shrunk thickness over the connector should be as thick as wire insulation. If wire insulations are too much different in size for the same tube to shrink on both, a smaller tube may be used first to build up the small wire.

c. Apply as recommended by the tubing manufacturer, applying heat evenly and working from the center outward to avoid trapping air. A heat gun or propane torch with a diffusing tip is recommended for shrinking.

SUBMERSIBLE MOTORS

DOWNWARD DEFLECTION OF SUBMERSIBLE MOTOR SHAFTS UNDER THRUST LOAD

The thrust bearings of Franklin Electric submersible motors are designed for high load capacity with very low losses and a minimum of shaft deflection under thrust load. Any permanent deflection is already set by the factory thrust test, but there is elastic deflection reducing shaft height as thrust is applied to the motor. All pump clearances should be designed to allow for this deflection, which is shown for each motor type in the table below:

Motor Type	Rate of Deflection	Total Deflection at Rated Thrust
4", 300 lb.	.002" per 100 lb.	.006" at 300 lb.
4", 650 lb.	.0013" per 100 lb.	.009" at 650 lb.
4" & 6", 1500 lb.	.0005" per 100 lb.	.0075" at 1500 lb.
6", 3500 lb.	.003" per 1000 lb.	.011" at 3500 lb.
6", 6000 lb.	.003" per 1000 lb.	.018" at 6000 lb.
8", 10,000 lb.	.002" per 1000 lb.	.020" at 10,000 lb.

SUBMERSIBLE MOTORS

RECOMMENDED PUMP TOLERANCES

To prevent creating stresses which may cause undue wear on motor bearings, pump bearings and coupling, the following tolerances are recommended for the end of the pump which connects to the motor:

PUMP FOR MOTOR DIAMETER:	4-Inch	6-Inch	8-Inch
Rabbet inside diameter (inches)	3.442/3.438	3.004/3.000	5.004/5.000
Rabbet runout from shaft	.004" TIR Max.	.004" TIR Max.	.005" TIR Max.
Mounting face wobble from shaft	.005" TIR Max.	.005" TIR Max.	.005" TIR Max.
Lower pump bearing clearance	.003" per inch diameter minimum.		
Shaft diameter	Within .001" under minimum coupling hole, or press fit in coupling.		
Shaft end squareness	.001" TIR Max.	.0015" TIR Max.	.0015" TIR Max.
Shaft diametral runout	.0005" TIR Max.	.001" TIR Max.	.0015" TIR Max.

Page 210.220 lists the drawings covering Franklin motor dimensions, couplings and spline data. Any other couplings used should be designed as described on page 210.239.

Pump dimensions should clear the maximum space allowed for sand slingers and lead outlet shown on Franklin outlines and NEMA MG1 part 18, pages 56 (4") 59 (6") and 61 (8"). Recommended minimum height of lead clearance above the mounting surface is 2 inches for 4" pumps and 3 inches for 6" and 8" pumps.

Internal pump clearances should be kept to a maximum consistent with pump performance. Inadequate clearance can increase noise, promote overloading and hard starting, and cause pump wear. Axial clearances should include allowance for motor shaft height tolerance and motor shaft deflection on page 210.420.

It is recommended that the design of the adaptor casting between pump and motor be made amply rigid so that rough handling during shipment or installation will not result in misalignment with consequent tightening of bearings or excessive bearing wear.

SUBMERSIBLE MOTORS

PUMP MOUNTING POSITION

Franklin submersible motors are designed primarily for operation in the vertical, shaft up position as in a typical water well. Operated vertical shaft up, the weight of the motor and pump rotating parts hold the thrust pads firmly against the thrust carbon as the motor starts and stops, which is desirable. During acceleration, the pump thrust increases as its output head builds up. In cases where the pump head stays below its normal operating range during or after acceleration, the pump may create upward thrust and lift the motor rotor as much as its end play allows, separating the thrust pads from the carbon and creating upward thrust on the motor upthrust bearing. This is acceptable operation for short periods at each start, such as in installations where it is necessary to operate without a check valve, but running continuously with upthrust may cause excessive wear of both upthrust and downthrust bearings, and is not recommended.

With certain restrictions, motors are also suitable for operation in positions from shaft up to shaft horizontal. As the mounting position becomes further from vertical and closer to horizontal, the probability of shortened thrust bearing life increases. For normal thrust bearing life expectancy with motor positions other than shaft up, follow these recommendations:

1. Minimize the frequency of starts, preferably to fewer than 10 per day.

2. Use only in systems which reach normal pump thrust toward the motor immediately as the pump comes to running speed. Do not use in systems which can run even for short periods at full speed with no thrust toward the motor, or with thrust away from the motor.

Grounding instructions on the motor should be strictly followed for any application outside of a well.

EFFECTS OF TORQUE

During starting and running of a submersible pump, the torque developed by the motor must be supported through the pump and delivery pipe or other supports. Most pumps rotate in the direction causing unscrewing torque on right hand threaded pipe or pump stages. Therefore all threaded joints, pump castings and other components in the pump support system must be capable of withstanding the maximum torque repeatedly without loosening or breaking. Unscrewing joints will break cable and may cause loss of the pump.

To safely withstand maximum torques with a minimum safety factor of 1.5, Franklin recommends threaded joint unscrewing torque and strength of support components be at least 10 lb. ft. per rated motor HP.

For example, support for motors should withstand the following torques without breaking or unscrewing:

TO 1 HP	1 x 10 = 10 lb. ft.
20 HP	20 x 10 = 200 lb. ft.
75 HP	75 x 10 = 750 lb. ft.
200 HP	200 x 10 = 2000 lb. ft.

SUBMERSIBLE MOTORS

SERVICE FACTOR AND RECOMMENDED MOTOR LOADING

All Franklin submersible motors are marked with rated output in horsepower (HP) and/or kilowatts (KW), and the rated current in amperes (AMP) which matches that output. In addition, motors are marked with a service factor (SF) and service factor max amps (SFMA) which denote additional motor loading which may be permissible under some operating conditions. Most 60 Hertz motors bear a service factor of 1.15 or higher, while most 50 Hertz motors bear a service factor of 1.0.

Service Factor is defined in National Electrical Manufacturers Association (NEMA) MG1-1.43 as follows:
"THE SERVICE FACTOR OF AN AC MOTOR IS A MULTIPLIER WHICH, WHEN APPLIED TO THE RATED HORSEPOWER, INDICATES A PERMISSIBLE HORSEPOWER LOADING WHICH MAY BE CARRIED UNDER THE CONDITIONS SPECIFIED FOR THE SERVICE FACTOR."

The conditions under which the service factor applies are, per NEMA MG1-14.36:
"WHEN THE VOLTAGE AND FREQUENCY ARE MAINTAINED AT THE VALUE SPECIFIED ON THE NAMEPLATE, THE MOTOR MAY BE OVERLOADED UP TO THE HORSEPOWER OBTAINED BY MULTIPLYING THE RATED HORSEPOWER BY THE SERVICE FACTOR SHOWN ON THE NAMEPLATE."

Franklin submersible motors are designed to operate continuously at service factor (SF) load as defined by NEMA, and will deliver SF output within nameplate SFMA at rated voltage and frequency. Because actual voltage at the motor is not usually held at exactly rated voltage, and because it is wise to maintain some safety factor in designed loading to allow for voltage and temperature ranges and other factors affecting loading, Franklin recommends the designed pump load be kept well below the service factor maximum for pumps with long operating times and continuous duty.

To avoid risk of reduced motor life and overload protection tripping, Franklin recommends that pumps with long or continuous running times be loaded so that maximum nameplate amps will not be exceeded under all normal operating conditions. To attain this, pump design loading at rated voltage should generally not exceed 90% of service factor output, to allow for voltage, pump, and temperature variation. While these same guidelines are applicable to all ratings, Franklin does recognize that pumps below 2HP are commonly designed to load to full service factor without significant problems, because these lower rating motors have more design margin for overloading and the percentage of pump on-time is normally lower than for larger motors.

SUBMERSIBLE MOTORS

SUBMERSIBLE PUMPS USED AS IN-LINE BOOSTERS

Most submersible deep-well pumps are used in wells in the vertical position. However, a significant number are used above ground as boosters to increase line pressure. Booster pumps are used in reverse osmosis systems to purify water, in water systems having a wide range of land elevation to provide required pressure at higher levels, in high rise buildings, and in other applications requiring an increase in the existing line pressure.

In-line submersible booster pumps usually consist of a conventional submersible pump mounted in a sealed tube which couples to inlet and delivery water lines, so inlet water flows over the motor and into the pump inlet, and is then pumped at increased pressure to the delivery line. Mounting positions are both vertical and horizontal. The power cable must be brought out of the booster housing through some type of seal or connector which reliably prevents leakage of the pressurized water from the pump housing into the wiring area outside the housing.

Since the in-line booster is a special application of a submersible pump, there are several considerations needed which may not be obvious from familiarity with in-well use. The following recommendations and guidelines should be observed in designing and applying submersible in-line booster pumps.

PUMP MOUNTING - Mounting the pump inside the sealed tube requires some type of support in addition to its mounting at the pump delivery end, to allow shipping and handling without damage, and to support the weight of the motor and pump in horizontal applications. The supports must be designed so they hold the motor and pump in the tube aligned with the delivery end support without creating bending forces, and without restricting free water flow past the motor. The motor should be supported on its castings rather than its stator shell.

COOLING - Motor cooling water temperature and flow described on Page 210.455 must be ensured. Controls which shut the pump off if water temperature is too high or flow too low are recommended. The booster housing should always have an air bleeder at its highest point, which should be used to vent all air from it at initial installation and during operation if dissolved air from the water accumulates in the housing. An air pocket in the housing can cause motor overheating.

INLET PRESSURE - The inlet pressure to the booster must be kept well above the pump's required Net Positive Suction Head (NPSHR) to prevent cavitation which can cause vibration and rapid wear. If the NPSHR is unknown, at least 20 PSI inlet pressure should be maintained under all conditions. When the inlet pressure is higher than 500 PSI, motors ordered with a special high-pressure leak test are recommended.

MOTOR LEADS - Franklin's lead assemblies which connect to the motor are intended for use with their full length submerged in water, and their size may not be adequate on some motor ratings to operate in air without overheating. Any portion of wiring not submerged in water must comply with the cable charts on Pages 210.406 through 210.414.

PUMP HEAD - The difference between inlet and delivery pressure of the pump must be great enough to make the pump thrust toward the motor immediately as the pump starts and while it runs. If the pump does not exert thrust toward the motor, motor bearings are likely to fail, especially if running horizontal.

DOCUMENTATION - To confirm whether normal motor warranty applies to a booster, Submersible Booster Installation Record Form 2208 must be submitted to Franklin Field Service Department for approval.

SUBMERSIBLE MOTORS

THERMAL PROTECTION OF THREE PHASE SUBMERSIBLE MOTORS

Because of the submersible motor's compact, water cooled design, thermal protection must be provided which will trip within approximately 10 seconds at locked rotor on rated voltage, as well as protect against running overload. Franklin single phase motors are provided with such protection by thermal protectors inside them or in their control boxes. Three phase motors must be protected by Franklin Subtrol or properly selected quick trip overload relays in all three lines. Standard trip heaters or relays will not protect against locked rotor burnout and two line protection can allow burnout from running current unbalance.

WARRANTY OF THREE PHASE MOTORS IS VOID UNLESS SUBTROL OR PROPER THREE-LINE QUICK TRIP PROTECTION IS USED.

Subtrol prevents motor overheating by sensing motor winding temperature and sending a signal up the power cable to turn the motor off if it exceeds a safe limit, no matter what the cause of overheating, even if currents are normal. Subtrol also trips if motor current in a sensed line is either too high or too low, protecting the motor against locked rotor, unbalance, single phasing and phase reversal damage, and the pump against pumping dry. Its restart delay time prevents damage from starting during backspin. Subtrol protects the motor and pump against several conditions not covered by sensing overcurrent alone, such as lack of water flow, and is thus the best method of protection.

When Subtrol is not used, quick trip overload protection in all three lines must be used. Such protection may consist of a relay with three separate quick trip heaters or one with built-in heaters and a range of current adjustment. Whatever the configuration, the protection must trip within 10 seconds at full voltage locked rotor and ultimately trip running within 125% of full load amps (not S.F. or max amps). Tables on the following pages list acceptable overload relays and heaters for some widely used types, and guidelines for acceptability of others. Similar data are packed with each motor. For additional information call the Franklin Submersible Engineering Department.

Since protection is mounted remote from the submerged motor and may be subject to wide temperature variation, protection recommended by Franklin is compensated or otherwise designed to give adequate motor protection with varying ambient air temperature.

PHASE FAULT PROTECTORS

There are many devices available to give warning or turn off power if three phase line unbalance exceeds a preset limit. Some sense voltage unbalance, some current unbalance, and some even compensate to reduce current unbalance, thus offering widely varying degrees of insuring a safe level of current unbalance as described on page 210.477. While these devices can be of value in detecting excessive unbalance and in preventing damage to a motor which has improper overload protection, they are not required when the recommended overload protection is used.

SUBMERSIBLE MOTORS

OVERLOAD PROTECTION OF THREE PHASE SUBMERSIBLE MOTORS

ADJUSTABLE OVERLOAD RELAYS

Overload relay heaters and amp settings approved for protection of Franklin 4", 6" and 8" submersible motors are shown on pages 210.438, 210.439 and 210.440. The adjustable relay amp settings and Note 3 apply to internal heater adjustable relays which are now widely used as an alternative to interchangeable fixed-heater types. When set as specified by the tables and Note 3, the adjustable relay types listed below are approved protection for Franklin submersible motors. Approved relay type or part numbers must start with the listed designation, which may be followed by additional numbers or letters. Other relays from these and other manufacturers may or may not provide acceptable protection, and should not be used without approval of Franklin Electric.

AEG series B17S, B27S, B27-2.

ABB type RVH40, RVH65, RVP160, T25DU, T25-CT

Allen Bradley bulletin 193.

Asco Delta types DQ, LR1-D, LR1-F, LR2-D.

Cutler-Hammer C316F-.

Fanal types K7 or K7D through K400.

Fuji types TR-0Q, TR-0QH, TR-2NQ, TR-3NQ, TR-4NQ, TR-6NQ, RCa3737-1CQ and -1CQH.

Furnas types US15, 48AG, 48BG, ESP100 Class 10 only.

General Electric CR4G-, CR7G-.

Kloc ner-Moeller types Z00, Z1, Z4, PKZM3, PKZM1, PKZ2.

Lovato RC9, RC22, RC80, RF9, RF25, RF95.

Siemens types 3UA50, -52, -55, -58, -59, -60, -61, -62, -66, -68, -70, 3VU13, 3VE.

Sprecher and Schuh types CT, CT1, CTA1, CT3K, CT3-12 through CT3-42.

Square D Class 9065 Types TD, TE, TF, TG, TJ, TK, TR, TJE.

Telemecanique type LR1-D, LR1-F, LR2-D.

Westinghouse types FT13, FT23, FT33, FT43, K7D, K27D, K67D.

Westmaster OLWROO and OLWTOO, suffix D through P.

SUBMERSIBLE MOTORS

OVERLOAD PROTECTION OF THREE PHASE SUBMERSIBLE 4" MOTORS

NOTICE: WARRANTY ON THREE PHASE SUBMERSIBLE MOTORS IS VOID UNLESS SUBTROL OR PROPER QUICK TRIP PROTECTION IN ALL 3 MOTOR LINES IS USED.

Submersible motors require overload protection to trip within about 10 seconds if stalled to prevent risk of burnout. This requires Franklin Subtrol or quick trip, ambient compensated overload relay for running and locked rotor protection over a normal range of control and water temperatures. The tables below list selections and settings for several manufacturers. Approval of other types may be requested.

60 HERTZ 4" MOTORS

			HEATERS FOR OVERLOAD RELAYS			ADJUSTABLE RELAYS SEE NOTE 3	
HP	VOLTS	NEMA STARTER SIZE	FURNAS (NOTE 1)	ALLEN BRADLEY	G. E. (NOTE 2)	SET	MAX
1/2	200	00	K31	J16	L380A	3.13	3.4
	230	00	K29	J15	L343A	2.76	3.0
	460	00		J8	L174A	1.38	1.5
	575	00		J5		1.10	1.2
3/4	200	00	K36	J19	L510A	4.23	4.6
	230	00	K33	J18	L463A	3.68	4.0
	460	00	K23	J11	L232A	1.84	2.0
	575	00	K21	J8	L193A	1.47	1.6
1	200	00	K37	J21	L618A	5.06	5.5
	230	00	K36	J19	L561A	4.42	4.8
	460	00	K26	J12	L282A	2.21	2.4
	575	00	K23	J10	L211A	1.75	1.9
1.5	200	00	K43	J24	L825A	6.81	7.4
	230	00	K41	J22	L750A	5.89	6.4
	460	00	K29	J15	L380A	2.94	3.2
	575	00	K27	J13	L310A	2.39	2.6
2	200	0	K50	J26	L111B	8.46	9.2
	230	0	K43	J25	L910A	7.36	8.0
	460	00	K33	J18	L463A	3.68	4.0
	575	00	K29	J15	L380A	2.94	3.2
3	200	0	K54	J29	L135B	11.2	12.2
	230	0	K52	J28	L122B	9.75	10.6
	460	0	K37	J20	L618A	4.88	5.3
	575	0	K33	J18	L463A	3.86	4.2
5	200	1	K61	J34	L220B	18.4	20.0
	230	1	K61	J32	L199B	16.0	17.4
	460	0	K49	J25	L100B	8.00	8.7
	575	0	K42	J23	L825A	6.44	7.0
7.5	200	1	K68	J38	L322B	27.0	29.3
	230	1	K67	J36	L293B	23.5	25.5
	460	1	K55	J29	L147B	11.8	12.8
	575	1	K52	J27	L122B	9.38	10.2
10	460	1	K61	J33	L220B	17.5	18.8
	575	1	K57	J31	L181B	14.0	15.0

50 HERTZ 4" MOTORS

			HEATERS FOR OVERLOAD RELAYS			ADJUSTABLE RELAYS SEE NOTE 3	
HP	VOLTS	NEMA STARTER SIZE	FURNAS (NOTE 1)	ALLEN BRADLEY	G. E. (NOTE 2)	SET	MAX
1/2	220	00	K23	J10	L211A	1.75	1.9
	380	00		J4		1.01	1.1
	415	00		J4		1.01	1.1
3/4	220	00	K28	J14	L310A	2.58	2.8
	380	00	K21	J8	L193A	1.47	1.6
	415	00	K21	J8	L193A	1.47	1.6
1	220	00	K32	J17	L420A	3.31	3.6
	380	00	K24	J11	L232A	1.93	2.1
	415	00	K24	J11	L232A	1.93	2.1
1.5	220	00	K37	J20	L561A	4.69	5.1
	380	00	K28	J14	L343A	2.67	2.9
	415	00	K28	J14	L343A	2.67	2.9
2	220	0	K41	J23	L750A	6.07	6.6
	380	00	K32	J17	L420A	3.50	3.8
	415	00	K32	J17	L420A	3.50	3.8
3	220	0	K52	J26	L111B	8.74	9.5
	380	0	K37	J22	L618A	5.06	5.5
	415	0	K37	J21	L618A	5.15	5.6
4	220	1	K55	J29	L147B	11.4	12.4
	380	0	K42	J23	L825A	6.62	7.2
	415	0	K43	J24	L825A	6.9	7.5
5	220	1	K57	J31	L181B	14.2	15.4
	380	0	K49	J26	L100B	8.19	8.9
	415	0	K49	J26	L100B	8.28	9.0
5.5	220	1	K60	J32	L199B	15.6	17.0
	380	1	K52	J27	L11	9.02	9.8
	415	1	K52	J27	L122B	9.57	10.4
7.5	220	1	K63	J35	L265B	21.0	22.8
	380	1	K55	J30	L147B	12.1	13.2
	415	1	K55	J30	L165B	12.3	13.4
10	380	1	K58	J32	L181B	15.0	16.3
	415	1	K57	J31	L165B	13.7	14.9

NOTE 1: Furnas intermediate sizes between NEMA starter sizes apply where (1) is shown in tables, size 1 3/4 replacing 2, 2 1/2 replacing 3, and 3 1/2 replacing 4. Heaters listed apply to NEMA and Definite Purpose Class 16 starters. Overload relay adjustment should be set no higher than 100%, unless necessary to stop nuisance tripping with measured amps in all lines below nameplate maximum.

NOTE 2: General Electric heaters are type CR123 usable only on type CR124 overload relays. Adjustment should be set no higher than 100%, unless necessary to stop nuisance tripping with measured amps in all lines below nameplate maximum.

NOTE 3: Adjustable relay amp settings apply to internal heater adjustable overload relay approved types listed on Page 210.437. Approval of other types may be requested. Relays should be set at the specified SET amps, and only if tripping occurs with amps in all lines measured to be within nameplate maximum amps should the setting be increased, not to exceed the MAX value shown. Some approved types may only be available for part of the listed motor ratings. When relays are used with current transformers, the relay setting is the specifed amps divided by the transformer ratio. For 380 volt 60 Hz motors, adjust relays to 120% of the specified 460 volt values.

SUBMERSIBLE MOTORS

OVERLOAD PROTECTION OF THREE PHASE SUBMERSIBLE 6" MOTORS

NOTICE: WARRANTY ON THREE PHASE SUBMERSIBLE MOTORS IS VOID UNLESS SUBTROL OR PROPER QUICK TRIP PROTECTION IN ALL 3 MOTOR LINES IS USED.

Submersible motors require overload protection to trip within about 10 seconds if stalled to prevent risk of burnout. This requires Franklin Subtrol or quick trip, ambient compensated overload relay for running and locked rotor protection over a normal range of control and water temperatures. The tables below list selections and settings for several manufacturers. Approval of other types may be requested.

60 HERTZ 6" MOTORS

			HEATERS FOR OVERLOAD RELAYS			ADJUSTABLE RELAYS SEE NOTE 3	
HP	VOLTS	NEMA STARTER SIZE	FURNAS (NOTE 1)	ALLEN BRADLEY	G. E. (NOTE 2)	SET	MAX.
5	200	1	K61	J34	L220B	18.4	20.0
	230	1	K61	J32	L199B	16.0	17.4
	460	0	K49	J25	L100B	8.00	8.7
	575	0	K42	J23	L825A	6.44	7.0
7.5	200	1	K68	J38	L322B	27.0	29.3
	230	1	K67	J36	L293B	23.5	25.5
	460	1	K55	J29	L147B	11.8	12.8
	575	1	K52	J27	L122B	9.38	10.2
10	200	2 (1)	K72	J40	L426B	34.0	37.0
	230	2 (1)	K70	J38	L390B	29.6	32.2
	460	1	K58	J32	L181B	14.8	16.1
	575	1	K55	J30	L147B	11.9	12.9
15	200	3 (1)	K76	J43	L622B	50.1	54.5
	230	2	K75	J42	L520B	43.6	47.4
	460	2 (1)	K64	J35	L265B	21.8	23.7
	575	2 (1)	K61	J33	L220B	17.5	19.0
20	200	3	K78	J45	L787B	64.1	69.7
	230	3 (1)	K77	J44	L710B	55.8	60.6
	460	2	K69	J38	L352B	27.9	30.3
	575	2	K64	J35	L293B	22.3	24.2
25	200	3	K86	J71	L950B	79.4	86.3
	230	3	K83	J46	L866B	69.0	75.0
	460	2	K72	J40	L426B	34.5	37.5
	575	2	K69	J37	L352B	27.6	30.0
30	200	4 (1)	K88	J72	L107C	95.7	104.0
	230	3	K87	J71	L107C	83.2	90.4
	460	3 (1)	K74	J41	L520B	41.6	45.2
	575	3 (1)	K72	J39	L390B	33.3	36.2
40	460	3	K77	J44	L710B	57.0	62.0
	575	3	K74	J42	L593B	45.6	49.6
50	460	3	K83	J46	L866B	70.8	77.0
	575	3	K77	J44	L710B	56.7	61.6
60	460	4 (1)	K87	J71	L107C	83.7	91.0
	575	4 (1)	K78	J45	L787B	67.0	72.8

50 HERTZ 6" MOTORS

			HEATERS FOR OVERLOAD RELAYS			ADJUSTABLE RELAYS SEE NOTE3	
HP	VOLTS	NEMA STARTER SIZE	FURNAS (NOTE 1)	ALLEN BRADLEY	G. E. (NOTE 2)	SET	MAX.
7.5	220	1	K63	J35	L265B	21.8	22.8
	380	1	K55	J30	L147B	12.1	13.2
	415	1	K55	J30	L165B	12.3	13.4
10	220	2 (1)	K68	J37	L322B	25.9	28.2
	380	1	K58	J32	L181B	15.0	16.3
	415	1	K57	J31	L165B	13.7	14.9
15	220	2	K73	J40	L464B	38.2	41.5
	380	2 (1)	K64	J35	L265B	22.1	24.0
	415	2 (1)	K63	J34	L265B	20.2	22.0
20	220	3 (1)	K77	J43	L622B	50.7	55.1
	380	2	K69	J38	L352B	29.4	31.9
	415	2	K69	J37	L322B	26.9	29.2
25	220	3	K78	J45	L787B	63.1	68.6
	380	2	K73	J40	L464B	36.5	39.7
	415	2	K72	J39	L426B	33.5	36.4
30	220	3	K85	J70	L950B	74.7	81.2
	380	3 (1)	K75	J41	L520B	43.2	47.0
	415	3 (1)	K74	J40	L464B	39.6	43.0
40	380	3	K77	J44	L710B	59.3	64.5
	415	3	K76	J43	L622B	54.4	59.1
50	380	3	K85	J70	L950B	73.1	79.5
	415	3	K78	J46	L866B	67.0	72.8
60	380	4 (1)	K87	J71	L107C	87.4	95.0
	415	4 (1)	K86	J70	L950B	80.0	87.0

NOTE 1: Furnas intermediate sizes between NEMA starter sizes apply where (1) is shown in tables, size 1 3/4 replacing 2, 2 1/2 replacing 3, and 3 1/2 replacing 4. Heaters listed apply to NEMA and Definite Purpose Class 16 starters. Overload relay adjustment should be set no higher than 100%, unless necessary to stop nuisance tripping with measured amps in all lines below nameplate maximum.

NOTE 2: General Electric heaters are type CR123 usable only on type CR124 overload relays. Adjustment should be set no higher than 100%, unless necessary to stop nuisance tripping with measured amps in all lines below nameplate maximum.

NOTE 3: Adjustable relay amp settings apply to internal heater adjustable overload relay approved types listed on Page 210.437. Approval of other types may be requested. Relays should be set at the specified SET amps, and only if tripping occurs with amps in all lines measured to be within nameplate maximum amps should the setting be increased, not to exceed the MAX value shown. Some approved types may only be available for part of the listed motor ratings. When relays are used with current transformers, the relay setting is the specifed amps divided by the transformer ratio. For 380 volt 60 Hz motors, adjust relays to 120% of the specified 460 volt values.

SUBMERSIBLE MOTORS

OVERLOAD PROTECTION OF THREE PHASE SUBMERSIBLE 8" MOTORS

NOTICE: WARRANTY ON THREE PHASE SUBMERSIBLE MOTORS IS VOID UNLESS SUBTROL OR PROPER QUICK TRIP PROTECTION IN ALL 3 MOTOR LINES IS USED.

Submersible motors require overload protection to trip within about 10 seconds if stalled to prevent risk of burnout. This requires Franklin Subtrol or quick trip, ambient compensated overload relay for running and locked rotor protection over a normal range of control and water temperatures. The tables below list selections and settings for several manufacturers. Approval of other types may be requested.

60 HERTZ 8" MOTORS

HP	VOLTS	NEMA STARTER SIZE	HEATERS FOR OVERLOAD RELAYS FURNAS (NOTE 1)	ALLEN BRADLEY	G. E. (NOTE 2)	ADJUSTABLE RELAYS SEE NOTE 3 SET	MAX.
40	460	3	K77	J44	L710B	57.0	62
	575	3	K74	J42	L593B	45.6	49.6
50	460	3	K83	J46	L866B	70.8	77
	575	3	K77	J44	L710B	56.7	61.6
60	460	4 (1)	K87	J71	L107C	83.7	91
	575	4 (1)	K78	J45	L787B	67.0	72.8
75	460	4 (1)	K89	J73	L126C	101	110
	575	4 (1)	K86	J70	L950B	81.0	88
100	460	4	K94	J76	L155C	136	148
	575	4	K87	J73	L142C	108	118
125	460	5	K29	J15	L111B	173	189
	575	5	K26	J13	L910A	139	151
150	460	5	K32	J17	L122B	203	221
	575	5	K28	J14	L100B	163	177
175	460	5	K33	J18	L147B	230	250
	575	5	K31	J16	L111B	184	200
200	460	5	K34	J20	L165B	263	286
	575	5	K32	J17	L135B	211	229

50 HERTZ - *FOR 50 HZ, 380, 415 OR 440 VOLTS, USE THE SAME HEATER OR SETTING AS 60 HZ 460V.*

NOTE 1: Furnas intermediate sizes between NEMA starter siz apply where (1) is shown in tables, size 1 3/4 replacing 2, 2 1/2 replacing 3, and 3 1/2 replacing 4. Heaters listed apply to NEMA and Definite Purpose Class 16 starters. Overload relay adjustment should be set no higher than 100%, unless necessary to stop nuisance tripping with measured amps in all lines below nameplate maximum.

NOTE 2: General Electric heaters are type CR123 usable only on type CR124 overload relays. Adjustment should be set no higher than 100%, unless necessary to stop nuisance tripping with measured amps in all lines below nameplate maximum.

NOTE 3: Adjustable relay amp settings apply to internal heater adjustable overload relay approved types listed on Page 210.437. Approval of other types may be requested. Relays should be set at the specified SET amps, and only if tripping occurs with amps in all lines measured to be within nameplate maximum amps should the setting be increased, not to exceed the MAX value shown. Some approved types may only be available for part of the listed motor ratings. When relays are used with current transformers, the relay setting is the specifed amps divided by the transformer ratio. For 380 volt 60 Hz motors, adjust relays to 120% of the specified 460 volt values.

SUBMERSIBLE MOTORS

POWER FACTOR CORRECTION

In some installations, power supply limitations make it necessary or desirable to raise the power factor of a submersible pump. The following table lists the capacitive KVAR required to increase power factor of large Franklin three phase submersible motors to the approximate values shown, at maximum input loading. ***Any capacitors must be connected in the circuit so their current does not pass through overload relays or Subtrol sensor coils, or protection will be lost!***

HP	Hertz	Motor P.F.	Required KVAR for P.F. of: .90	.95	1.00
5	60	.82	1.2	2.1	4.0
7.5	60	.83	1.7	3.1	6.0
10	60	.85	1.5	3.3	7.0
15	60	.85	2.2	4.7	10
20	60	.87	1.7	5.0	12
25	60	.87	2.1	6.2	15
30	60	.87	2.5	7.4	18
40	60	.86	4.5	11	24
50	60	.85	7.1	15	32
60	60	.85	8.4	18	38
75	60	.87	6.3	18	43
100	60	.86	11	27	60
125	60	.85	17	36	77
150	60	.85	20	42	90
175	60	.88	9.6	36	93
200	60	.87	16	46	110
5	50	.84	.8	1.5	3.1
7.5	50	.85	1.0	2.1	4.5
10	50	.87	.8	2.2	5.3
15	50	.87	1.1	3.3	7.8
20	50	.86	1.8	4.3	9.6
25	50	.85	3	6.5	14
30	50	.86	3	7.5	17
40	50	.85	5	10	22
50	50	.86	5	12	27
60	50	.86	5	13	30
75	50	.87	5	15	37
100	50	.88	4	18	46
125	50	.84	18	35	72
150	50	.85	18	38	82
175	50	.87	13	37	88
200	50	.88	10	37	95

SUBMERSIBLE MOTORS

STARTING AND PROTECTION OF FRANKLIN SUBMERSIBLE MOTORS

A. SINGLE PHASE THREE-WIRE MOTORS

All Franklin Electric single phase three-wire submersible motors must be used with control boxes, which are available from Franklin. Each control box has a capacitor or capacitors, a starting relay, and overload protection (if not in the motor itself), all matched to the rating of the motor. Operation of a single phase three-wire motor without a control box or with an incorrect control box is likely to result in immediate or early failure of the motor, control box or both.

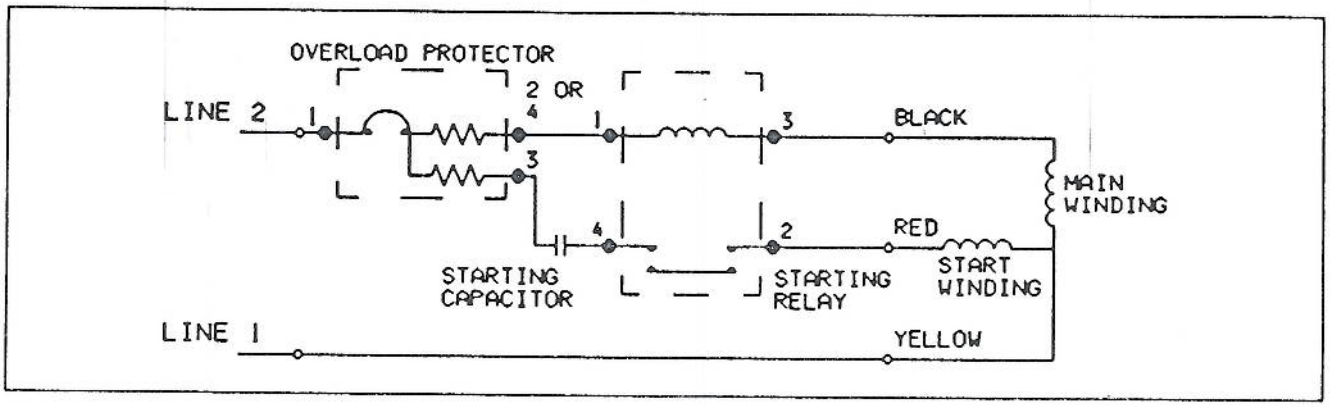
All Franklin boxes for motors from 1/3 through 1 horsepower manufactured prior to mid-1985 are equipped with automatic reset overload protectors tailored to protect both running and starting windings under all conditions. The overload protection for these motor ratings was thereafter relocated from the control box to the motor. Control boxes for 1½ HP and larger motors have manual reset overload protectors, each selected to match and protect that particular rating motor.

Control boxes for motors through 1 HP use one electrolytic starting capacitor to match the motor rating. Ratings above 1 HP, in addition to one or more electrolytic starting capacitors, also have one or more oil type running capacitors to give the higher efficiency and power factor desirable in these larger ratings.

Franklin uses two different types of starting relays in single phase submersible motor applications. Control boxes through 1 HP use a solid state relay, which senses current and phase angle to actuate. This type replaced current relays previously used. Boxes 1½ HP and larger use a starting relay called a voltage or potential relay, and it operates from the voltage sensed across the start winding. The current and solid state types both require a different relay for each motor current rating, while only one voltage type relay is needed for all 115 volt motors and one for 230 volt motors through 5 HP. A similar 230 volt relay with higher current contacts is used in 7½ through 15 HP.

The following diagrams and explanation show the components and wiring of the types of control boxes used with three-wire motors, 1/3 through 1 HP and the 1½ HP and larger motors, and describes the operation of the starting relays.

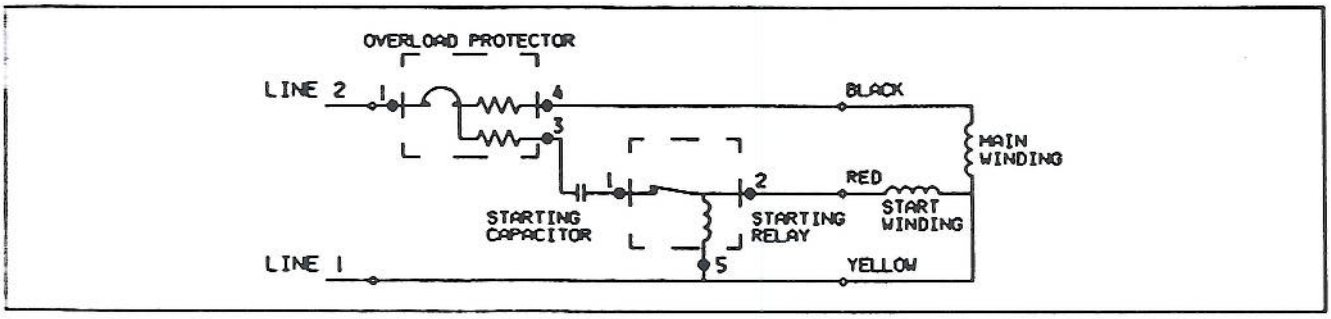
CONTROL BOX FOR 1/3 - 1 HP MOTORS USING CURRENT RELAY (1979 TO 1985)



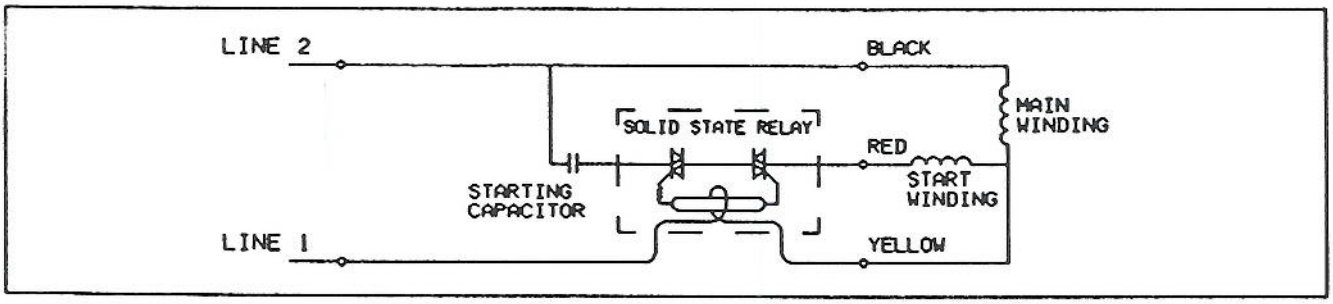
SUBMERSIBLE MOTORS

STARTING AND PROTECTION OF FRANKLIN SUBMERSIBLE MOTORS (Cont'd)

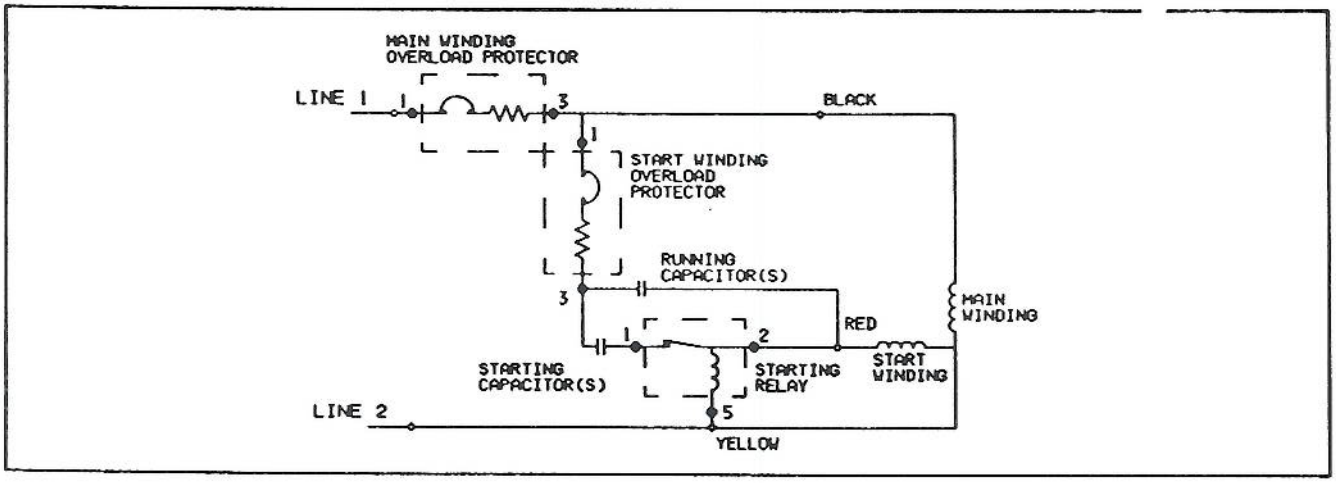
CONTROL BOX FOR 1/3 - 1 HP MOTORS USING VOLTAGE RELAY (THROUGH 1979)



CONTROL BOX FOR 1/3 - 1 HP MOTORS USING SOLID STATE RELAY (1985 AND LATER)



CONTROL BOX FOR 4" 2 HP AND LARGER MOTORS (1½ HP SAME EXCEPT SINGLE OVERLOAD PROTECTOR, TERMINAL 2 TO MAIN WINDING)



SUBMERSIBLE MOTORS

STARTING AND PROTECTION OF FRANKLIN SUBMERSIBLE MOTORS (Cont'd)

Operation of Voltage Relays:

Before the power is applied the starting relay contacts are closed. When the power is applied, both start and main motor windings are energized, and the motor starts. At this instant the voltage across the start winding is relatively low. This low value of voltage across the start winding is not enough to pick up (open the contacts of) the starting relay.

As the motor comes up to speed the voltage across the start winding (and the starting relay coil) increases. This higher voltage is enough to pick up the starting relay and open its contacts. This removes the start capacitors from the line and the motor continues to run on the main winding alone. Because of transformer action when the motor is running, voltage generated in the start winding keeps the starting relay picked up (contacts open) and keeps the start capacitor circuit open. Any running capacitors used remain in the circuit during running for improved efficiency and power factor.

IMPORTANT: Voltage relay contacts in 5HP and larger control boxes may weld and fail to open the next start if pump run time is too short. To avoid possible welding, pump run time must be at least 10 seconds using 1991 and later control boxes which have discharge resistors on start capacitors, and at least 5 minutes on earlier boxes which have no discharge resistors.

Operation of Current Relays:

Before power is on the starting relay contacts are open. When power is applied, main winding current through the relay coil closes the contacts, energizing the start winding and starting the motor. As the motor comes up to running speed, current through the relay coil gradually drops and allows the contacts to open the start winding circuit. The motor reaches full RPM and runs on the main winding.

Operation of Solid State Relays:

Before power is applied, the reed switch contacts are open. When power is applied, the reed switch contacts close (due to a magnetic field induced by a coil carrying total motor current which encircles the reed switch) and supply gate current to a triac to turn it on, energizing the start winding circuit. The triac continues to energize the start winding until the phase angle of the start winding, which changes as the motor speed increases, coincides with the phase angle of the main plus start line current. The reed switch then opens, removing current from the triac gate, and interrupts the start winding circuit. The motor then completes acceleration and runs on the main winding.

Control Box Mounting Position and Temperature:

Franklin single phase control boxes will operate in any mounting position, but are intended for mounting on a vertical surface such as a wall or pole. Operation in other mounting positions has some effect on voltage relay operation and does not maintain the box's weather resistance. The control box should never be mounted in the direct sunlight or in high temperature locations, which may cause unnecessary tripping of the overload protector and shorten capacitor life.

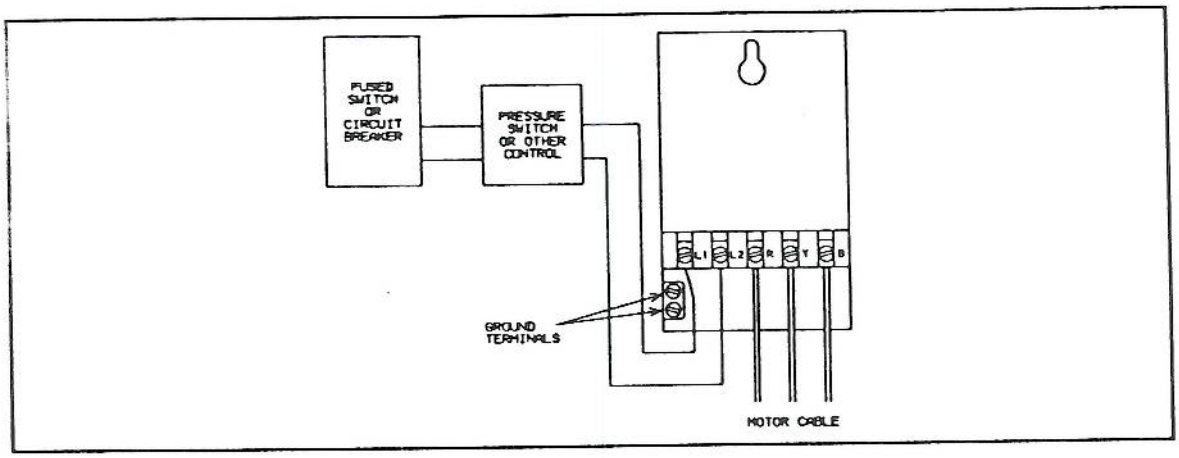
When the control box is mounted in an extremely cold location, there is a reduction in motor starting torque because of the effect on the electrolytic starting capacitor. Drop in torque is about 20% at -25°F, 65% at -40°F, and almost 100% at -80°F. It is recommended that, when the control box is mounted where the temperature may go below minus 25°F, an enclosure be built around the control box and a small light bulb or heat tape be used to warm the enclosure.

SUBMERSIBLE MOTORS

STARTING & PROTECTION OF FRANKLIN SUBMERSIBLE MOTORS (Cont'd)

Single Phase Control Boxes

The picture below shows the wiring, connections and approximate relative positions of the components of the control system for lower rated motors. Other types of control boxes for different types or ratings of motors have different components and internal arrangements, but the wiring and motor connections are essentially the same. Each type control box should be connected exactly like the diagram furnished with the control box, usually inside the cover.



On both 115 and 230 volt installations, the two incoming line leads are connected to terminals L1 and L2. It is recommended that boxes always be connected to circuits which include a grounding conductor, which should be connected to the grounding terminal on the box. If the circuit has no grounding conductor and no metal conduit from box to supply panel, use a wire at least as large as line conductors and connect the grounding terminal to a metal drop pipe, casing, water pipe, or driven ground rod. ***Failure to ground the box frame can result in a serious electrical shock hazard if a circuit fault occurs!***

IMPORTANT: When the box has a lightning arrestor, it ***must*** have grounding as described on page 210.465 for proper lightning protection of the motor.

B. TWO-WIRE SUBMERSIBLE MOTORS

Solid State Starting Switch

The solid state starting switch closes the start winding circuit immediately upon applying power to the motor. After the motor achieves sufficient RPM to operate on its main winding only, the start winding circuit opens. This requires about .25 seconds, depending somewhat on pump inertia and applied line voltage.

SUBMERSIBLE MOTORS

STARTING AND PROTECTION OF FRANKLIN SUBMERSIBLE MOTORS (Cont'd)

When the motor is de-energized the switch will reset and be ready for the next starting cycle. This "reset" time is the length of off time that is required before the motor can be restarted. Reset time is approximately one to three seconds to assure a positive restart of the motor.

The starting switch on and reset times have been designed to prevent the start winding from overheating in the case of an extremely fast start and stop cycling. (Due to a water-logged tank.)

Winding Protection

The thermal protector is positioned on the motor winding, and responds to current passing through it and heat received from the motor winding and ambient temperature. When the protector reaches a predetermined point corresponding to a maximum safe winding temperature, the protector opens and interrupts the circuit. When the winding temperature returns to a more reasonable safe limit, the protector will automatically reset.

Extreme Fast Cycling (Due to Water-Logged Tank)

The solid state starting switch will reset within one to three seconds after the motor is stopped. If an attempt is made to restart the motor before the starting switch has reset, the motor will not start; however, there will be current flow through the main winding until the overload protector interrupts the circuit. The time for the protector to reset is longer than the reset of the starting switch. Therefore, the start winding switch will have closed and the motor will operate. However, within a few cycles the same condition will reoccur.

When a severely water-logged condition does occur, the user will be alerted to the problem during the off time (overload reset time) since the pressure will drop drastically. When the water-logged tank condition is detected, the condition should be corrected to prevent nuisance tripping of the overload protector.

C. THREE PHASE MOTORS

Use starters and protection specified on pages 210.435-.440. Starting and running equipment and conditions are specified on pages 210.476-.480.

D. MAGNETIC CONTACTOR CONTROL CIRCUITS

Magnetic line contactors in Franklin deluxe single phase control boxes and in other single and three phase submersible controls are operated by manually or automatically switching their coil power. When these control switches connect through long cables, cable capacitance can cause ***contactor coil burnout*** or ***failure to open contacts*** when the control switch is open! To prevent problems, Franklin recommends a capacitor be added across the contactor coil when cable to the control switch exceeds 300 feet. Details are shown in Franklin Aid Vol. 6 No. 6, available by request.

SUBMERSIBLE MOTORS

FREQUENCY OF STARTS

The average number of starts per day over a period of months or years influences the life of the motor, and even more the life of control components such as starters, relays, and capacitors. The pump size, tank size, and controls should be selected to keep the starts per day as low as practical for maximum life. Excessive cycling accelerates motor bearing and spline wear, pump wear, and control contact erosion. The following table lists the highest number of starts per day which should be considered for reasonable life of motors, pumps and control components.

Motor Rating	Maximum Number of Starts Per Day	
	Single Phase	Three Phase
Lower than 1 HP	300	300
1 HP thru 5 HP	100	300
7½ HP thru 30 HP	50	100
40 HP and over	--	100

To avoid overheating the motor or control components from any brief periods of rapid cycling, the maximum starting frequency should be kept less than two per minute for 4" motors, one per minute for 6" motors, and one every two minutes for 8" motors.

SUBMERSIBLE MOTORS

WATER TEMPERATURE AND FLOW

Franklin Electric submersible motors are designed to operate with loading up to maximum nameplate amps in water up to 30°C (86°F) with minimum water velocity past 4" motors of 0.25 ft/sec and larger motors 0.5 ft/sec. NOTE: BECAUSE OF THEIR LOW TEMPERATURE RISE, 4" MOTORS 2HP AND LOWER DO NOT REQUIRE THE SPECIFIED FLOW. If motors are operated in water over 30°C (86°F) loading must be reduced and/or water flow must be higher to maintain safe motor temperature, as shown in the following table.

	Maximum Allowable Loading, % of SERVICE FACTOR HP								
Motor Ratings	Through 5.5 HP			7.5 Through 30 HP			Over 30 HP		
Min Flow Ft/Sec	0.25	1.0	3.0	0.5	1.0	3.0	0.5	1.0	3.0
Water Temperature									
35°C (95°F)	100	100	100	100	100	100	88	100	100
40°C (104°F)	100	100	100	88	100	100	76	88	100
45°C (113°F)	90	100	100	76	88	100	62	76	88
50°C (122°F)	80	90	100	62	76	88	48	62	76
55°C (131°F)	70	80	90	48	62	76	20	48	62
60°C (140°F)	55	70	80	20	48	62	---	20	48

Example: A pump end requiring 34 HP input will pump 270 GPM of 55°C water past the motor in an 8 casing. **What 460V, 60 Hz 6" motor can be used?**
From Table A on page 210.457, 45 GPM gives 0.5 ft/sec velocity, so 270 GPM gives (270÷45) x 0.5 = 3 ft/sec velocity. From the table above at 3 ft/sec, a 30 HP motor, which has a SFHP of 30x1.15 = 34.5HP, can only be used in 55°C water to 76% of 34.5HP, which is 26HP. A 40 HP motor can be used to 62% of 46(its SFHP), which is 28.5HP, still too low. For a 50 HP motor, 62% of 57.5(SFHP) is 35.6HP, so a 50 HP motor can be used at 34HP in 55°C water with 3 ft/sec flow.

For possible acceptability of special temperature, flow and static pressure conditions, contact Franklin Customer Service.

Allowable motor temperature is based upon having at least atmospheric pressure on the water surrounding the motor. Any increased pressure from static head above the motor gives added motor temperature safety margin, but suction conditions decrease allowable motor internal fluid temperature. "Drawdown seals" which seal the well to the pump above its intake to maximize delivery are *not* recommended for submersible motors since the suction created lowers the allowable motor temperature. Lower ratings may tolerate their use because of low normal temperature rise, but any substantial suction condition in the surrounding water is likely to cause failure in higher ratings or temperatures.

Some operating conditions do not insure adequate flow past the motor. Examples are:

1. Top-feeding (cascading) wells can feed the water directly into the pump without its flowing past the motor if the well is not cased to below the motor, or casing is perforated above the motor.

2. Flow may be inadequate when the motor is in a large body of water or a casing much larger than the motor, or if delivery is very low.

SUBMERSIBLE MOTORS

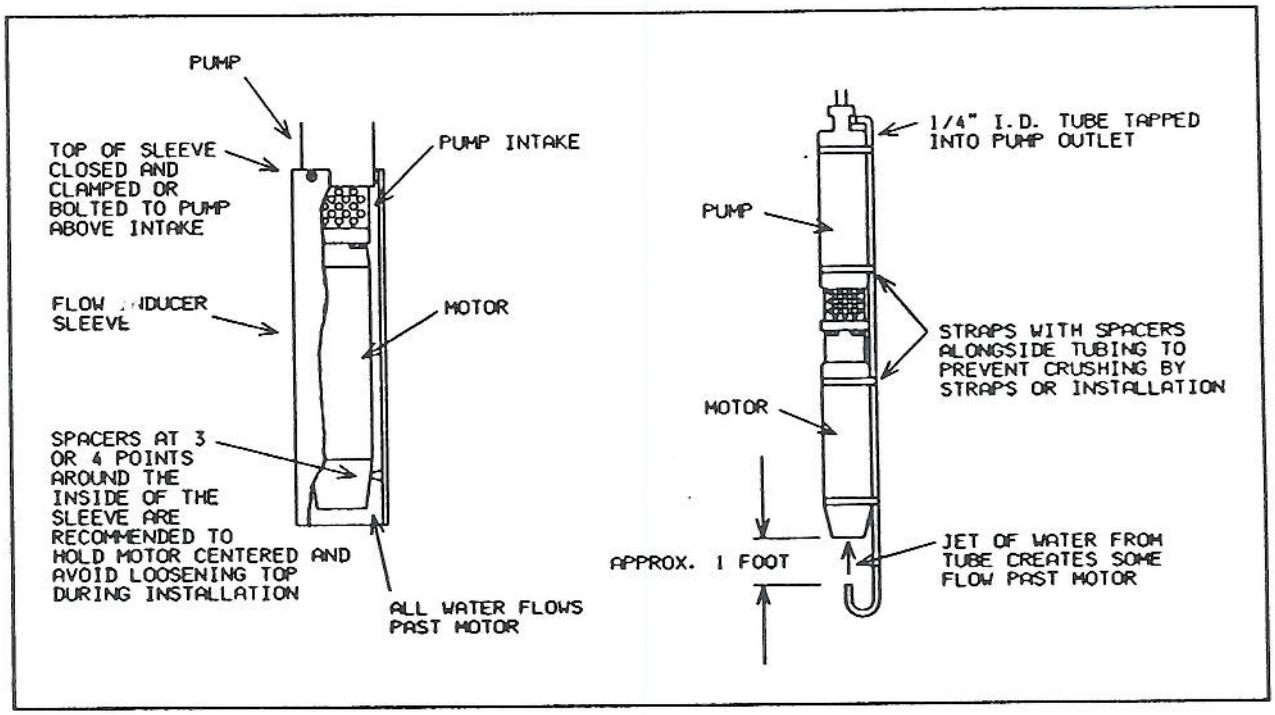
WATER TEMPERATURE AND FLOW (Cont'd)

Check whether expected delivery gives adequate flow past the motor per 210.457. If necessary, use a flow inducer sleeve on the pump to provide flow.

A flow inducer sleeve is a tube over the motor, closed off ***above*** the pump intake and extending to the bottom of the motor or lower. It must be securely fastened to the pump and its top closed to make water flow come in the bottom past the motor. The sleeve material may be heavy plastic or metal, and it should resist corrosion. (See sketch below.)

The tables on page 210.457 show the pump delivery required to provide minimum recommended 30°C or cooler water flow past the motors in different sizes of casing or flow sleeve, and approximate head loss from the flow past the motor.

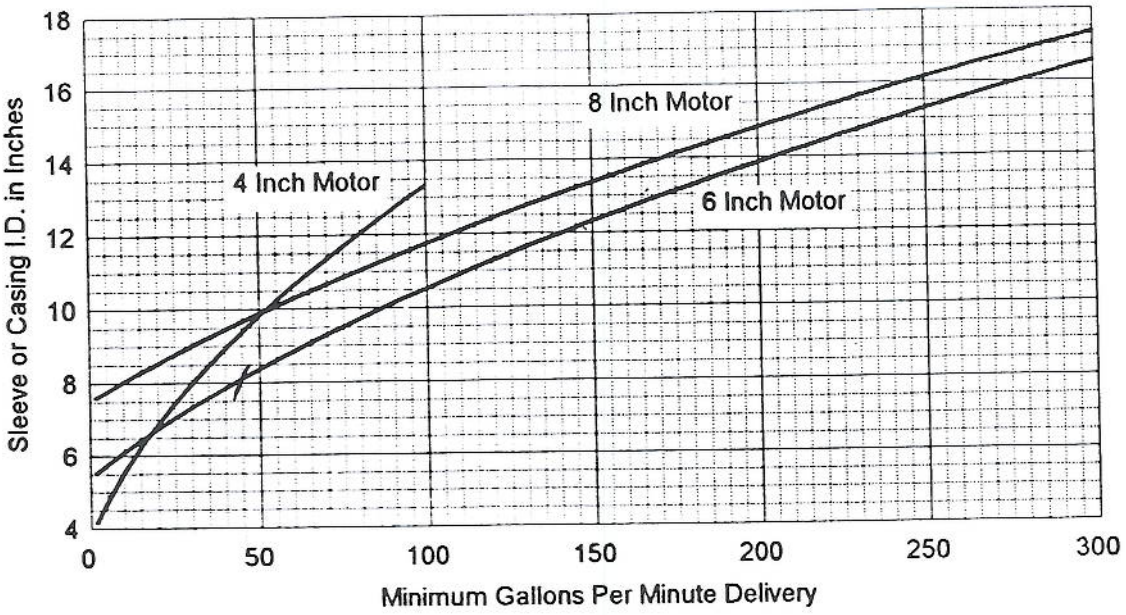
If a well feeds water above the pump, has a casing too small to allow a flow inducer sleeve on the pump, and does not have adequate level and flow to allow raising the pump above the inflow, it is difficult to properly cool the motor. When possible the casing depth should be increased so flow past come from below the motor. If this is not practical, adequate flow past the motor can usually be attained by tapping a 1/4" I.D. tube into the pump outlet, clamping it down past the pump and motor, and supporting it so that its outlet is aimed upward about a foot below the motor. The tubing should be protected against damage during installation by spacers alongside the tubing or an angle iron over it.



SUBMERSIBLE MOTORS

WATER TEMPERATURE AND FLOW (Cont'd)

A. REQUIRED FLOW FOR MOTOR COOLING



Example: A 6-inch motor in 10-inch casing requires at least 90 GPM delivery. If only 50 GPM, an 8-inch or smaller sleeve should be added.

B. HEAD LOSS FROM FLOW PAST MOTOR

The following table lists the approximate feet of head loss from flow between the two bearing maximum length motor and smooth casing or sleeve, including entry and exit loss.

Motor (Nominal)		4"	4"	4"	6"	6"	6"	8"	8"
Casing I.D.		4.25"	5"	6"	6"	7"	8"	8.1"	10"
Gallons Per Minute	25	0.3							
	50	1.2							
	100	4.7	0.3		1.7				
	150	10.2	0.6	0.2	3.7				
	200		1.1	0.4	6.3	0.5		6.8	
	250		1.8	0.7	9.6	0.8		10.4	
	300		2.5	1.0	13.6	1.2	0.2	14.6	
	400				23.7	2.0	0.4	24.6	
	500					3.1	0.7	37.3	0.6
	600					4.4	1.0	52.2	0.8
	800								1.5
	1000								2.4

SUBMERSIBLE MOTORS

USE OF CHECK VALVES IN SUBMERSIBLE PUMP INSTALLATIONS

Check valves are recommended for all submersible pumps. Most small pumps and some larger ones have check valves built in the top of the pump, and pumps which do not should have a line check valve in the discharge pipe within 25 feet of the pump. Check valves should be the spring-loaded poppet type, which close before water begins to flow back through them, to prevent water hammer and possible valve or pipe damage when the valve closes.

OPERATION OF A SUBMERSIBLE PUMP WITHOUT A CHECK VALVE WHICH HOLDS THE DELIVERY PIPE FULL OF WATER DURING OFF TIME GREATLY INCREASES RISK OF MOTOR AND SYSTEM FAILURE! While submersible motors sometimes run without problems with no check valve, or with a defective or improperly placed valve, immediate failure or short life can result, for the following reasons:

1. ***No check valve*** - Without a check valve, the column of water supported by the running pump will drain back through the pump when it stops. This causes thrust on the motor while it comes to a stop and possibly backspins, which is not the case ***with*** a check valve, and which can cause excessive thrust bearing wear and short life.

2. ***No check valve*** - With no check valve or a leaky check valve, the pump will start each time at no head. Many pumps will exert an upward thrust on the impeller stack at low heads, which can lift the rotor of the motor until the water column rises enough to create down thrust in the pump. While all Franklin submersibles have upthrust bearings which allow intermittent upthrust without motor damage, it should be avoided where practical to minimize shock loading and wear in pump and motor.

3. ***Check valve too far above pump*** - If the lowest (or only) check valve is more than approximately 30 feet above the well water level, or if the lowest of multiple check valves leaks, the weight of the water column will evacuate a void below the closed check valve when the pump stops. If the pump restarts while this void exists, severe water hammer can result when the lower column closes the void and hits the valve and upper column. This can split pipes, break joints, and break motor thrust bearings. It also promotes upthrust wear previously mentioned.

4. ***Long horizontal delive. / pipe*** - A long horizontal delivery from the well head can cause system water hammer problems from inertia of the horizontal water flow. If check valves are only in the well, water inertia after shutdown can evacuate a void space when the vertical column stops sooner than the horizontal column of water, and cause water hammer a moment later when the horizontal water reverses, closes the void and strikes the stationary vertical water column. If a check valve is added in the horizontal pipe to prevent water hammer after shutdown, it only preserves the void in the pipe until startup, and an even more severe water hammer may occur then. In some installations with horizontal or down hill piping, water hammer can be prevented only by using special control valves or air inlet valves at the well head.

When a submersible pump must be removed from a well, having a check valve keeping the delivery pipe full is undesirable because it greatly increases the weight to be lifted and also dumps a pipe full of water as each joint is uncoupled. For this reason, check valves used sometimes include a "break-off" drain plug, available from some valve manufacturers. These are conventional valves with a long, hollow, closed-end plug mounted through a tapped hole in the valve wall above poppet travel. The plug remains closed during operation, but can be broken off to drain the pipe by dropping a metal bar down the pipe before pulling the pump.

SUBMERSIBLE MOTORS

STORAGE OF PREFILLED SUBMERSIBLE MOTORS

The Franklin Electric prefilled submersible motor is designed for trouble-free operation and a minimum of attention and restrictions, in storage and installation, as well as operation. However, reasonable care should be observed in storage.

The motor is provided with a pressure equalizing diaphragm to allow for expansion and contraction of the filling solution. The filling solution is suitable for temperatures down to -40°C (-40°F) and motors should be stored in areas that do not go below this temperature. The solution will partially freeze as temperature goes below -3°C (27°F), but no damage occurs. Repeated freezing and thawing should be avoided when possible to prevent the possible loss of filling solution.

Extended storage of the motors, either with or without pumps, may also result in loss of the filling solution. This loss occurs mainly at the check valve and shaft seal, and while it may not be discernible because the rate is extremely slow and it evaporates as fast as it comes out, in time the loss can be enough to cause possible damage. When the storage temperature does not exceed 100°F, submersible motors may be stored up to two years. Where storage temperatures reach 130°F, storage time should be limited to one year.

A few drops loss of liquid will not damage the motor since an excess is provided when the motor is filled at the factory and also because after the motor is in service, the Franklin Filter-Check will allow the liquid lost to be replaced by filtered well water. If the above storage recommendations and limits are followed, there will be little or no liquid loss and no need for concern. If, however, there is evidence of considerable leakage or there is reason to believe there has been leakage, the motor should be returned to Franklin Electric or a Franklin Electric Service Shop for checking, or they should be contacted for instructions on checking.

SUBMERSIBLE MOTORS

LIGHTNING PROTECTION FOR SUBMERSIBLE MOTORS

All overhead power lines tend to draw lightning by a factor proportional to their height above ground. Fortunately these lines are isolated from most residential equipment by transformer. However, lightning strokes on power lines can induce voltage surges in the secondary lines and damage this equipment. These induced voltage surges can be protected against through the use of properly selected and applied lightning arrestors.

The high voltage surge will travel over the power lines looking for the best and closest connection to ground. If it finds it in the submersible motor, the surge will leave the power lines at the motor, jump across the motor winding insulation to the motor frame, and dissipate itself to ground. The surge will no longer exist on the power lines and things are once again normal, except that a very small hole has been punctured through the motor winding insulation. If the motor is running at the time, the current of the normal voltage supply will follow through this hole in the motor winding insulation. It is this power follow current which causes the damage. This power follow current will be high (in the nature of a short circuit) and severe burning of windings and insulation will result and the motor windings will be ruined. All motors are susceptible to this hazard - those on piston pumps, jet pumps and of course, submersible pumps. The replacement of a submersible pump motor which has been damaged by lightning is more expensive than the replacement of most other pump motors. It is for this reason alone that it is felt desirable to provide protection against these high voltage surges (commonly called lightning).

The way to provide such protection immediately suggests itself - provide the best and closest path to ground somewhere else other than the motor. Lightning arrestors are available which will provide such a path. These arrestors are capable of conducting the high voltage surge to ground (not a direct lightning stroke) and will immediately afterward extinguish the power follow current without damage to themselves. This is accomplished in a few thousandths of a second and the arrestor is then ready for the next operation.

A lightning arrestor installation is made by connecting the arrestor to the power lines and to a ***suitable ground. The suitability of the ground connection is all important.*** If the lightning arrestor ground is not the best available, inadequate protection will be provided. ***Ungrounded lightning arrestors provide no protection.*** A lightning arrestor is merely a device which will electrically connect the power lines to the ground connection. If this ground is better than the ground afforded by the submersible motor, then most of the high voltage surge will go through the lightning arrestor to ground and protection will be provided to the motor. If the arrestor ground is not as good as that of the motor, most of the high voltage surge will go to ground through the motor and damage the motor windings even though a lightning arrestor is installed.

To provide motor surge protection, the high voltage surge should be discharged through an arrestor to a ***true ground. True ground is the water strata just below the earth's surface.***

The ideal mounting of a lightning arrestor is inside the motor itself, where grounding to the motor frame and thus to ground water is inherent and requires no external grounding. Most Franklin motors have internal protectors, and when their frame is so marked, no external ground wires or above ground protectors are required. For all single phase motors which do not have internal protectors, above-ground protectors are furnished in their Franklin control boxes, and the installation should have proper ground wiring as described. Three phase or other motors without internal arrestors and using controls not furnished by Franklin should be installed with above-ground arrestors and ground wiring as described.

SUBMERSIBLE MOTORS

LIGHTNING PROTECTION (Cont'd)

Many present-day electrical codes require a ground wire from the pump to the supply grounding terminal. When this ground wire is used, the above-ground arrestor can be grounded acceptably by connecting to it.

Listed below are three other acceptable ways of grounding the above-ground lightning arrestor, which can be used when a ground wire is not otherwise required by codes.

1. The best possible protection exists when metallic well casing extends to within at most 20 feet of the motor. In this fortunate situation, the arrestor should be grounded to the well casing by means of a #12 or larger wire. (Refer to Figure 1, Page 210.468.)

2. If the well casing is plastic or terminates more than 20 feet above the motor, and metallic drop pipe is used, than the best available protection is provided by grounding the arrestor to the metallic drop pipe. (Refer to Figure 2, Page 210.468.) If the pump is electrically insulated from the motor as it would be with a plastic pump adapter bracket, than a wire should connect the drop pipe to the motor studs. (Refer to Figure 3, Page 210.468.)

3. If the well casing is plastic or terminates more than 20 feet above the motor and plastic drop pipe is used, then protection is only provided when the arrestor is grounded to a #12 or larger bare copper wire run with the power cable to the motor and connected to a motor stud. This wire should also connect to the top of the well casing. (Refer to Figure 4, Page 210.468.)

The degree of protection afforded will be in the order mentioned above. Other factors affecting the degree of protection, but over which there is little control at the time of pump installation are:

A. Distance from bottom of well casing to motor (only if casing ends above motor).

B. Distance from transformer to well casing.

The shorter these distances are, the better the degree of protection.

The ground connection at the drop pipe and well casing must be a good substantial electrical connection. Wrapping a bare wire around the water pipe or a band type connector similar to a hose clamp is not sufficient. Adequate ground connector fittings for use on water pipes from 3/4" to 12" are available at all electrical supply houses and it is strongly recommended that these be used. The connection between the lightning arrestor and the drop pipe should be made with #12 or larger copper wire. Stranded wire is preferable as it is less susceptible to breaking and a broken ground wire will render the lightning arrestor inoperative.

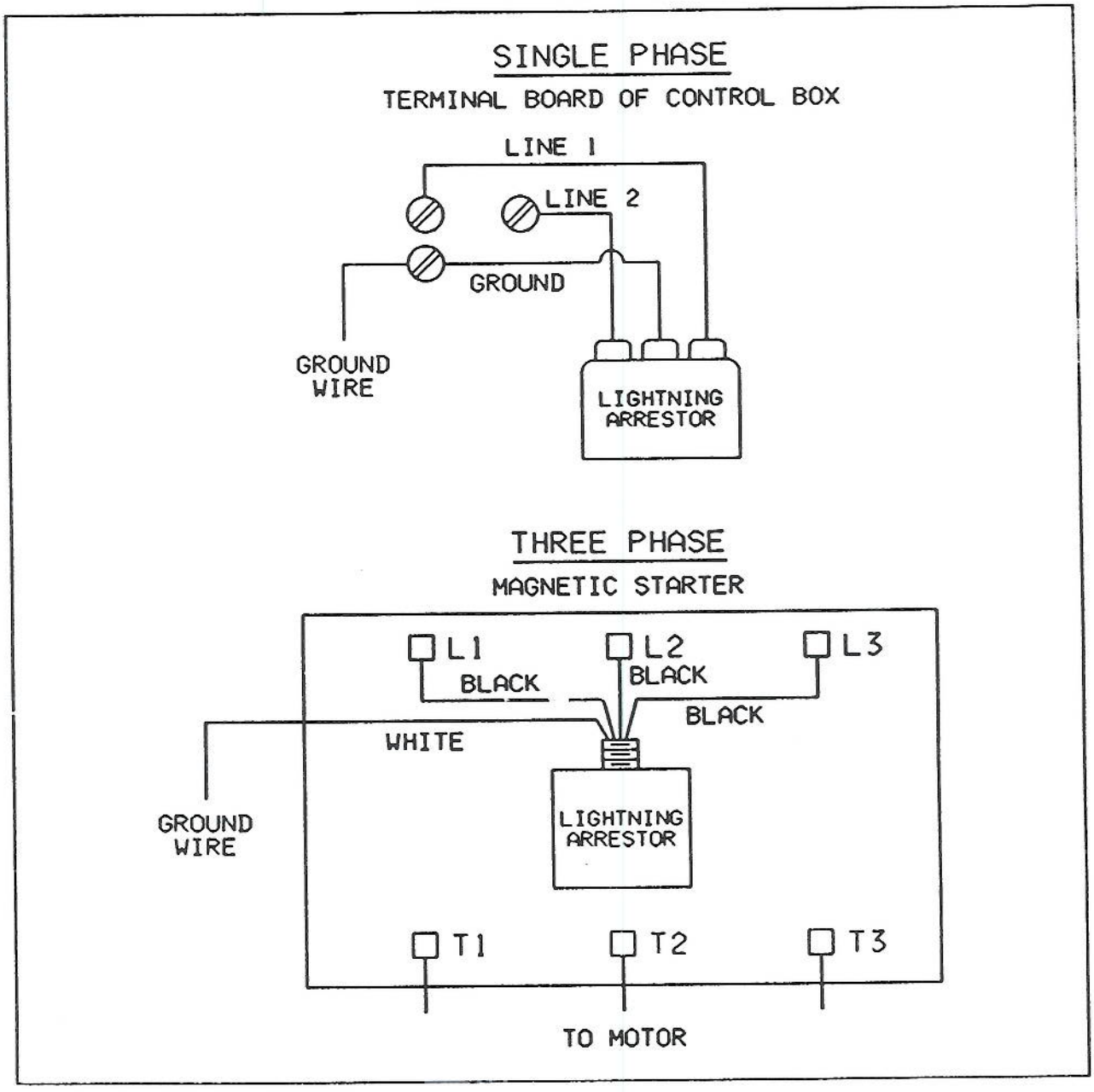
Lightning arrestors suitable for protecting submersible motors and controls are available from Franklin Electric. Two pole single phase arrestor 150814902 is usable on circuits up to 250 volts line-to-line and 125 volts line-to-ground, which includes all domestic 115 and 230 volt single phase systems. Three pole arrestor 155440901 is usable on all three phase circuits up to 650 volts line-to-line and line-to-ground.

All connections must be clean and tight for proper protection, and ground connections should use screw terminals or standard water pipe ground clamps, not hose clamps or other methods unsuitable for electrical connections.

SUBMERSIBLE MOTORS

LIGHTNING PROTECTION (Cont'd)

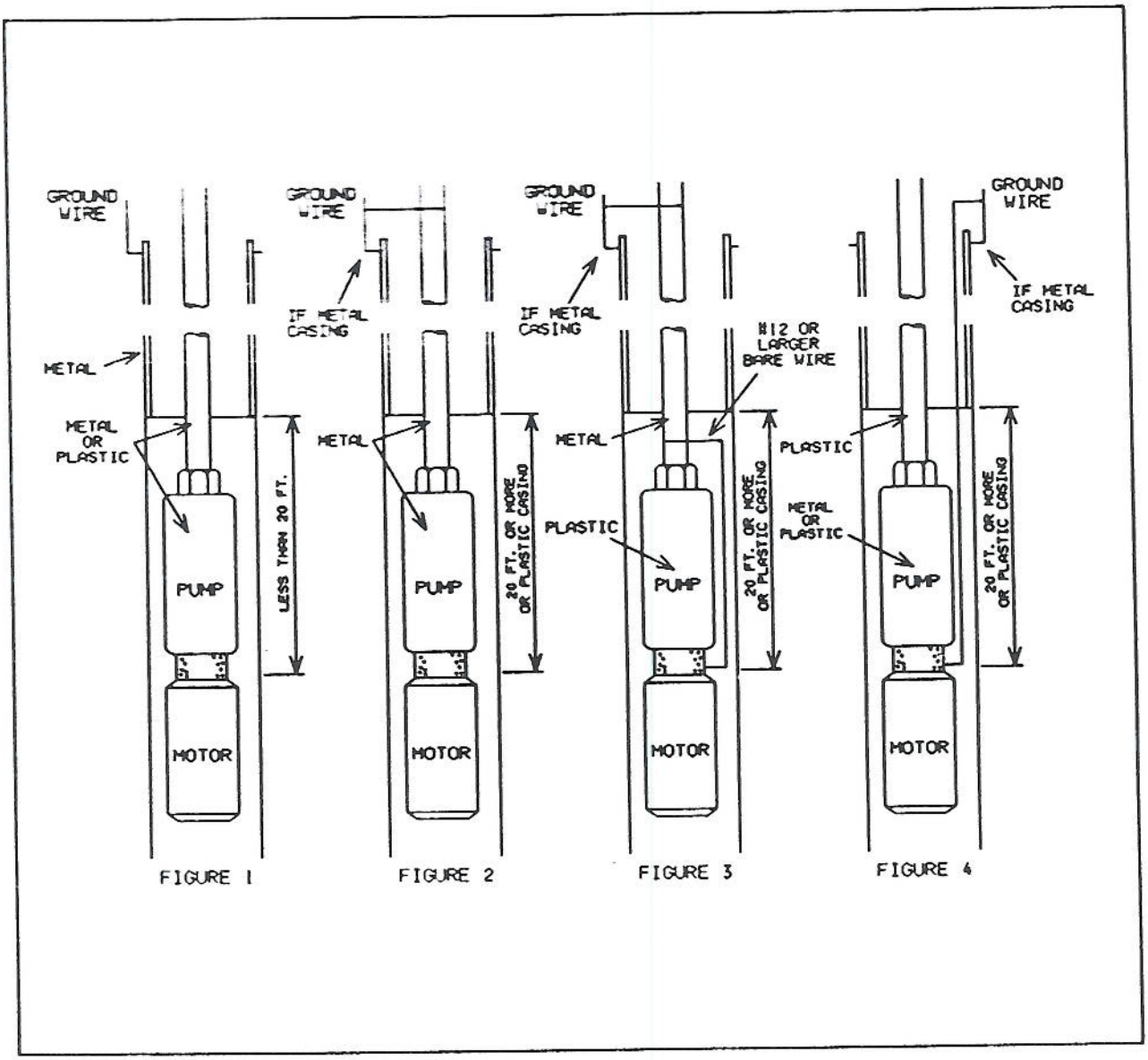
The sketches below show method of attaching lightning arrestors to the submersible motor power line.



SUBMERSIBLE MOTORS

LIGHTNING PROTECTION (Cont'd)

POSSIBLE INSTALLATION CONDITIONS, ABOVE GROUND ARRESTORS



SUBMERSIBLE MOTORS

INSULATION RESISTANCE

Insulation resistance between the electrical circuit and surrounding water is a measure of the ability of a submersible pump installation to withstand normal voltage and surge voltages without breakdown and failure. An "adequate" level of insulation resistance is not a constant value, but depends on the installation voltage and conditions, and whether the measured resistance is lowered by a specific weak point or by widely distributed conductance such as in cable insulation material itself. For this reason, values for acceptable resistance cannot be specific, but the following guidelines can be used:

1. Measure insulation resistance with a 500 volt or 1000 volt megger, from any motor lead to the motor frame, or to the metal drop pipe or casing during and after installation. If both pipe and casing are plastic, measure to a ground lead lowered into the water or a ground rod driven into damp earth. Let the reading stabilize before recording, which may take several seconds in large installations.

2. All Franklin submersibles are tested to have at least 100 megohms insulation resistance. Any new motor when tested clean and dry in the field before installation should test at least 20 megohms before splicing to cable.

3. Cable insulation resistance will vary widely depending on type of material and what length is submerged, but a new pump in a well should test at least 2 megohms with normal cable. Most motors and cables with typical submergence will test over 10 megohms.

4. Sudden or gradual drop in insulation resistance after a pump is installed usually predicts failure, indicating a progressive weakening of insulation at some point in cable or motor such as a damaged lead, leaky connector or splice, or surge damaged motor winding.

SUBMERSIBLE MOTORS

VOLTAGE REQUIREMENTS FOR SUBMERSIBLE MOTORS

Running Voltage

All Franklin submersible motors are designed to operate with the normal NEMA input voltage range of nameplate voltage ±10%. Voltages outside this range can cause reduced pump output, overload tripping, and failure to start.

In the specific case of a 200 or 208 volt supply, a 200 volt rated motor should be used if circumstances permit. If not, a 230 volt motor may be used with the following limitations and conditions:

1. The supply must be a good, stable one that will maintain ***200 volts or higher*** under running conditions.

2. Use the normal HP rated motor for the pump. Pump delivery and motor loading will be reduced slightly because the lower voltage will reduce motor speed.

3. Use motor cable two sizes larger than specified on 210.407-.414, such as #10 where #12 would normally be used.

4. For single phase motors, any 230 volt control box which uses a ***voltage*** type relay (see 210.450) 155031102 should be changed to a 200-208 volt relay 155031103. Six-inch single phase control boxes which use voltage relay(s) 155031601 should be changed to a 200-208V relay(s) 155031602.

An alternative method for raising or lowering the supply voltage to match motor needs is use of buck-boost transformers. These transformers are specifically intended for boosting or lowering single or three phase line voltage, and information on them is available from manufacturers and some power companies.

Phase Unbalance

Excessive current unbalance in three phase motors may cause low output, overload tripping, and motor failure if improperly protected. For this reason, initial installations should aim for a 5% maximum ***current*** unbalance, and unbalance should not exceed 10% over the long time range of operating conditions. This will require that the ***voltage*** be balanced within 1% to 3%, line to line. The percent unbalance is calculated as:

$$\text{Percent Unbalance} = \frac{\text{Maximum Difference From Average}}{\text{Average}} \times 100$$

Example: Currents are 80, 79, 84 amps. Average is (80 + 79 + 84) / 3 = 81 amps.

$$\text{Unbalance} = \frac{84 - 81}{81} \times 100 = 3.7\%$$

Motor cable leads can be "rolled" or matched three ways with the line leads keeping correct rotation, to minimize unbalance and determine whether it is mainly caused by the line or motor and cable. If the unbalanced currents stay with the same line leads when motor leads are rolled, unbalance is in the line. If the unbalance follows the motor leads, the unbalance is in the cable and motor, and they must be checked for defects. If unbalance stays with the line leads and is still excessive in the best of the three connections, consult the power company for correction.

SUBMERSIBLE MOTORS

VOLTAGE REQUIREMENTS FOR SUBMERSIBLE MOTORS (Cont'd)

Starting Voltage and Reduced Voltage Starters

Although starting torque is reduced at lowered voltages, motors will reliably start pumps if the supply meets running voltage limits above. With maximum recommended cable length, the cable voltage drop will reduce starting current by about 20%, and torque about 36% compared with having rated voltage at the motor. On some installations this cable drop may reduce inrush current enough that installations normally requiring reduced voltage starters will not need them.

Reduced voltage starters may be used on larger three phase motors where required to reduce the starting line current, but it is recommended that the motor be supplied with at least 55% of rated volts to ensure adequate starting torque.

When motors are supplied with six line leads, a wye-delta starter can be used, which connects windings in wye for starting and delta for running. This applies 58% of line voltage to each winding for starting, at 33% of current and 33% of torque compared to full voltage delta starting.

With standard motors having only three line leads, wye-delta type reduced voltage starters cannot be used, and resistance type or autotransformer type are the most common suitable types. Either can be used, but the autotransformer type is recommended because it draws lower line current for the same starting torque. On a 65% tap, disregarding cable drop, both the autotransformer and resistance starters will provide 42% of full voltage starting torque, but percent of full voltage line current is 65% for resistance type and only 42% for autotransformer type. If the cable length is less than 50% of the recommended maximum, either the 65% or 80% tap of a typical starter may be used, but over 50% of maximum cable only the 80% tap should be used.

The duration of the reduced voltage is not critical, and 1 to 3 seconds is recommended.

Solid State Starters ("Soft Starters")

Solid state electronic reduced voltage starters, often called "soft starters", usually offer gradual stepless increase and often decrease in voltage for starting and stopping. This is usually accomplished at rated frequency by "chopping" the voltage wave each half cycle to reduce the voltage, and these starters should not be confused with variable frequency drives described on page 210.481.

Solid state reduced voltage starters are usable with Franklin motors, but may not be usable with Subtrol protection if the SCR-generated line noise during running is high enough to cause false overheat trips. Line noise during starting is not a problem.

The seconds to reach full voltage for starting and drop to zero volts for stopping, often called ramp time, is recommended to be 1 second, and not to exceed 3 seconds. Longer ramp times normally increase heating and bearing wear without benefits in reducing amps, torque and possible water hammer. Excessive ramp times can also cause torsional resonant vibrations which can promote wear and failure.

To confirm acceptability and warrantability of a "Soft Starter", submit details of the starter and pump system to Franklin Field Service Department, 400 E. Spring Street, Bluffton IN 46714.

SUBMERSIBLE MOTORS

TRANSFORMER AND PHASE BALANCE REQUIREMENTS FOR THREE PHASE SUBMERSIBLE MOTORS

A full three phase supply is recommended for all three phase motors, consisting of three individual transformers or one three phase transformer. So-called **"open" delta or wye** connections using only two transformers can be used but are **much more likely to cause problems** with phase voltage unbalance and unequal loading. (See 210.476.)

Transformer ratings should be no smaller than listed in the table below for supplying power to the motor alone.

Submersible 3 Phase Motor HP Rating	1 or 3 phase Total Effective KVA Required	3 PHASE SMALLEST KVA RATING - EACH TRANSFORMER	
		Open WYE or DELTA 2 Transformers	WYE or DELTA 3 Transformers
1.5	3	2	1
2	4	2	1.5
3	5	3	2
5	7.5	5	3
7.5	10	7.5	5
10	15	10	5
15	20	15	7.5
20	25	15	10
25	30	20	10
30	40	25	15
40	50	30	20
50	60	35	20
60	75	40	25
75	90	50	30
100	120	65	40
125	150	85	50
150	175	100	60
175	200	115	70
200	230	130	75

SUBMERSIBLE MOTORS

ENGINE DRIVEN GENERATORS FOR SUBMERSIBLE MOTORS

Where power lines are not available and submersible motors are operated from a gasoline or diesel engine driven generator, the rating of the unit must be selected to assure adequate capacity for the rating submersible motor needed. Ratings and types of engine driven generators vary with different manufacturers, who should be consulted for best selection, especially on the larger sizes. ***NOTE: FOR SAFETY, AUTOMATIC OR MANUAL TRANSFER SWITCHES MUST BE USED WHEN THE GENERATOR IS A STANDBY OR BACKUP FOR LINE POWER. CONTACT THE POWER COMPANY FOR PROPER USE AND APPROVAL.***

Two generator types are available, externally regulated and internally regulated. Internally regulated units have greater motor starting ability for a given generator rating, and are therefore usually lower in cost because less excess running load capacity needs to be purchased to get necessary motor starting ability. For adequate motor starting torque, generators need to deliver at least 65% rated voltage to the motor circuit during starting.

The following table lists recommended generator ratings, based on typical 80°C rise continuous duty generators, with 35% maximum voltage dip during starting the specific Franklin 3-wire motors, single and three phase. This table should be used when specific generator recommendations for 35% maximum voltage dip with the starting KVA code of the Franklin motor are not available from the generator manufacturer. Manufacturer motor starting recommendations which do not specify dip and motor KVA are not adequate. ***NOTE - FOR BEST STARTING OF TWO-WIRE MOTORS MINIMUM GENERATOR RATINGS 50% HIGHER THAN SHOWN ARE RECOMMENDED.***

Submersible Motor HP Single or Three Phase	Minimum Kilowatt Rating of Generator	
	Externally Regulated	Internally Regulated
1/3	1.5	1.2
1/2	2.0	1.5
3/4	3.0	2.0
1	4.0	2.5
1-½	5.0	3.0
2	7.5	4.0
3	10.0	5.0
5	15.0	7.5
7-½	20.0	10.0
10	30.0	15.0
15	40.0	20.0
20	60.0	25.0
25	75.0	30.0
30	100.0	40.0
40	100.0	50.0
50	150.0	60.0
60	175.0	75.0
75	250.0	100.0
100	300.0	150.0
125	375.0	175.0
150	450.0	200.0
175	525.0	250.0
200	600.0	275.0

Most small generators are rated in kilowatts. If the generator rating is in KVA rather than KW, multiply the generator KW rating in the table by 1.25 to obtain the recommended generator KVA rating.

SUBMERSIBLE MOTORS

THE USE OF PHASE CONVERTERS TO OPERATE THREE PHASE MOTORS FROM SINGLE PHASE POWER LINES

There are a number of phase converters on the market which are intended to allow the use of three phase motors on single phase lines. They usually consist of a tapped winding static or rotating transformer and an adjustable bank of capacitors. Phase converters often cause the windings of a three phase motor to draw considerably higher current than they were designed to carry due to poor design, inadequate taps to balance, varying line or load, or faulty installation.

Phase converters cannot possibly be made to work equally well on all types of motors, even though the horsepower and voltage ratings are the same. Motors of different makes, and designed for different purposes, vary considerably in their electrical characteristics and it is therefore impossible to make a universally applicable converter for a given horsepower and voltage rating of motor.

Some converters are equipped with a calibrated relay to cut out some capacitance after the motor comes up to operating speed. For every different make and type of motor, even though the horsepower and voltage ratings may be the same, the relay must be adjusted to operate at proper speed. Even with factory trained technicians using proper test equipment, it is very difficult and in some cases even impossible to adjust the relay to the proper winding cut-out speed. For some types of load even the best adjustment of the relay will not give proper operation with the result that the motor may at times operate abnormally and cause damage to the motor windings.

One type of phase converter has taps for adjustment of a transformer and capacitors which enable the current in the three phases to be nearly balanced at one given load. However, as the load fluctuates either below or above this point, the current in the three phases becomes severely unbalanced. Other types can be reasonably balanced and change less with loading, but are still difficult to maintain adequately balanced over long periods of time.

One of the most recent types is a static solid state electronic circuit which rectifies line power to DC, then changes the DC to three phase AC by pulse width modulation (PWM) of power transistors. This gives balanced voltage but does affect waveshape, which can cause additional losses or inadequate motor voltage.

It should be emphasized that the troubles mentioned above do not necessarily result from poor design of the phase converter, and satisfactory applications can be made with proper equipment and careful installation. It is strongly recommended that a phase converter not be used in connection with a three phase submersible motor if it can be avoided. Faulty or improper operation is very likely to result and may cause motor failure. If three phase power is not available, use a single phase motor when possible. When a phase converter must be used, select one rated for a motor at least as large as used, and avoid putting other loads on its output.

THE WARRANTY ON ALL THREE PHASE SUBMERSIBLE MOTORS IS VOID IF OPERATED FROM SINGLE PHASE POWER THROUGH A PHASE CONVERTER UNLESS FRANKLIN SUBTROL OR 3-LEG AMBIENT-COMPENSATED QUICK TRIP OVERLOAD PROTECTORS ARE USED AND COMPLETE DETAILS ARE SENT IN WRITING TO FRANKLIN CUSTOMER SERVICE DEPARTMENT AT THE DATE OF INSTALLATION, *including operating amps and volts on all phases at all known load and line conditions, and make and type of converter, overload, and heaters. When using Subtrol with most phase converters, special line connections of the Subtrol are required as shown in its manual.*

SUBMERSIBLE MOTORS

VARIABLE SPEED PUMP OPERATION AND INVERTER DRIVES

Franklin three phase submersible motors are operable from variable frequency inverter drives when applied within guidelines shown below. These guidelines are based on present Franklin information for inverter drives, lab tests and actual installations, and must be followed for warranty to apply to inverter drive installations. Franklin two-wire and three-wire single phase submersible motors are not recommended for variable speed operation.

1. Variable speed drives should be variable frequency, constant volts per hertz type, and may have sine wave, pulse width modulated (PWM) or six-step waveshape. The base voltage should be rated voltage at rated frequency of the motor.

2. Overcurrent protection in the inverter or separately furnished must trip within 10 seconds at 5 times motor maximum nameplate amps in any line, and ultimately trip within 115% of motor maximum nameplate amps in any line.

3. Any application below 30 Hertz or above 80 Hertz must be specifically approved by Franklin Engineering. Operation at lower frequency can cause motor bearing failure, and at higher frequency can raise internal hydraulic losses to an unacceptable level.

4. The pump load must be selected so motor maximum nameplate amps are not exceeded under all running conditions.

5. Franklin-specified water temperature and flow past the motor must be maintained at speeds which load the motor to rated or maximum nameplate amps. At reduced speeds and loading, cooling flow must be adequate to maintain equivalent motor temperature. The loss of adequate cooling flow past the motor from speed being reduced too low creates a possibility of overheating which must be prevented by limiting the minimum frequency or using a minimum flow cutoff switch in the delivery line.

6. Variable speed drive electronic circuits plus the inductance of the motor generally create significant levels of voltage spikes on the motor supply lines. For normal motor life expectancy, the maximum amplitude of these repetitive spikes measured from zero should not exceed 1500 volts.

7. Franklin SUBTROL protection systems ARE NOT USABLE on inverter driven installations, because the non-sinusoidal waveship from the inverter prevents proper SUBTROL operation. The waveshape also reduces motor efficiency, typically about two percentage points.

8. To confirm whether an installation or system design is acceptable and warrantable, inverter specifications and full system details on Form 2207 should be submitted to Franklin Field Service Department, 400 E. Spring Street, Bluffton IN 46714. Franklin will advise in writing if the system is covered by warranty. Form 2207 is available from the factory or can be duplicated from the latest Field Manual center section.

SUBMERSIBLE MOTORS

NOISE IN SUBMERSIBLE PUMP INSTALLATIONS

Since submersible pumps are mounted underwater, away from the water delivery system, there is no direct airborne noise produced, making them inherently quieter than other pumps such as jet pumps and line shaft turbines. When a submersible pump system produces an unacceptable noise level, there are many possible causes and ways to reduce it. This outline discusses sources of noise, transmission by the water system, and corrective measures.

Pump - The hydraulic pump itself is normally not a source of problem noise, since at constant speed it produces a smooth flow of water without significant pulsation, and its normal noise level is effectively muffled by its submergence in water. Pumps sometimes create a snapping noise or continuous growl caused by cavitation in the water being pumped. This cavitation can result from dissolved gas and/or insufficient static head at the pump inlet, and can usually be corrected by increasing the submergence of the pump. Pump manufacturer's recommendations should be followed, since cavitation can cause rapid pump wear as well as noise.

A submersible pump-motor system can have inherent design noise problems because of critical speed, which is a function of masses and elasticity of rotating elements. Good pump designs avoid this by keeping the critical speed at least 25% below or above running speed, so such problems are rare.

Motor - A three phase motor with balanced input voltage delivers constant torque to the pump, and is not normally a potential source of noise or vibration. However, single phase motors and three phase motors operated from unbalanced voltage deliver torque which varies at twice the power frequency. The torque ***developed*** in the rotor of the motor can vary between zero and twice the average torque 120 times per second in a typical 60 Hertz single phase, induction run motor. The torque ***delivered*** to the pump is smoothed by a complex system of pump and motor masses and damping factors, but it still contains a level of "double frequency" pulsation which can cause noise in some systems. A single phase motor using a running capacitor and a three phase motor with unbalanced supply normally have lower torque pulsation than a single phase induction motor with no running capacitor. Pumps can increase the noise problems caused by motor torque pulsation if their lateral or torsional natural frequency of rotating parts is close to twice line frequency.

Noise Propagation - Double frequency motor torque pulsation can excite noise in the water delivery system through the pipe and the water itself. The varying torque creates a rotary vibration of the non-rotating pump and motor parts which hang on the delivery pipe, and this vibration along with rotating part speed varying slightly at the same frequency causes pulsation in the water pressure out of the pump.

The rotary vibration of the pump transmitted through the delivery pipe to above ground plumbing can cause noise, but it is not usually a problem because the well pipe and buried lateral pipe damp out all vibration before it reaches above ground plumbing. When humming or vibrating above ground plumbing does occur in submersible installation, it is usually excited by pressure pulsations in the water itself.

SUBMERSIBLE MOTORS

NOISE IN SUBMERSIBLE PUMP INSTALLATIONS (Cont'd)

Noise Reduction - When pump rotary vibration or pressure pulsation does cause unacceptable noise in above ground plumbing, there are several potential remedies. These include reduction at the pump source, better damping in the delivery systems, and better isolation between plumbing and building structure.

1. ***Capacitors*** - Increasing or adding running capacitors to single phase motors can substantially reduce vibration and pressure pulsation by smoothing the developed torque in the motor. Capacitors which may be added with Franklin single phase motors to reduce noise are shown on page 210.504.

2. ***Damping*** - Noise problems are most likely with rigid pipe such as steel from pump to plumbing system. Plastic pipe, a flexible rubber section in the system, or a small air bladder tank added can often reduce noise to an acceptable level.

3. ***Reflector*** - Severe noise problems in systems where rigid pipe is required have been solved by addition of a reflector pipe to cancel pulsations in the water. When the well delivery pipe is dead ended and the water to the plumbing system is tapped off a tee at the proper distance from the dead end, the pulsations will reflect from the dead end and cancel at the tee, greatly reducing noise in the plumbing. The distance recommended from tee centerline to dead end is 10 feet for 60 Hertz and 12 feet for 50 Hertz systems, plus or minus 2 inches.

4. ***Isolation*** - Audible noise problems in submersible system plumbing are usually caused by rattling of loose pipes against the building structure or transmission of pipe vibration to the structure which acts as a sounding board to amplify noise. Such noise problems can be minimized by using cushioning pads of felt, foam rubber or plastic where plumbing is attached to the structure, and making sure plumbing pipes clear each other and the structure elsewhere.

SUBMERSIBLE MOTORS

ADDING RUNNING CAPACITORS IN NOISY INSTALLATIONS

The addition of running capacitors as a method of reducing noise in submersible installations is not always effective, but in some cases does reduce the noise to an acceptable level. In some models, there is space in the control box to add the additional running capacitor or capacitors. In others, there is not room and the additional capacitor(s) should be mounted in an auxiliary box and used in conjunction with the regular control box. Added capacitors must be connected across "Red" and "Black" control box terminals, in parallel with any existing running capacitors.

Given below are the values of additional running capacitors most likely to reduce noise in cases where it may be a problem. The tabulation also gives the running capacitors originally supplied in each rating control box. Add only continuous duty capacitors rated at least the specified voltage, and DO NOT EXCEED the MFD specified for added capacitance, which could cause motor start winding overheating and/or overload tripping.

Motor Rating		Normal Running Capacitance	Added Running Capacitance For Noise Reduction		
HP	Volts	MFD.	MFD.	Min. Volts	Franklin Part
1/3	115	0	* 45	370	One 155327109
1/2	115	0	* 60	240	Two 155328108
1/3	230	0	* 10	370	One 155328102
1/2	230	0	* 15	370	One 155328101
3/4	230	0	* 20	370	One 155328103
1	230	0	* 25	370	One each 155328101 and 155328102
1.5	230	10	20	370	One 155328103
2	230	20	10	370	One 155328102
3	230	35	10	370	One 155328102
5	230	60	None		
7.5	230	45	45	370	One 155327109
10	230	75	30	370	One 155327101
15	230	135	None		

* DO NOT add running capacitors to standard production 1/3 through I HP control boxes which use solid state starting relays! Adding capacitors may cause relay failure. If the control box is converted to use a voltage relay, available from Franklin, the specified running capacitance can be added.

SUBMERSIBLE MOTORS

WEIGHT OF 60 HERTZ SUBMERSIBLE MOTORS

These are weights of motors only. If used for shipping purposes, weight of carton and packing should be added.

HP	Phase	Well Size	Thrust Rating Lb.	Weight In Lbs.
1/3	1	4"	300	15
1/2	1	4"	300	17
3/4	1	4"	300	20
1	1	4"	650	22
1.5	1	4"	650	30 (2-wire)
1.5	1	4"	650	27 (3-wire)
2	1	4"	650	29
3	1	4"	1500	49
5	1	4"	1500	66
1/2	3	4"	300	17
3/4	3	4'	300	20
1	3	4"	650	22
1.5	3	4"	650	23
2	3	4"	650	27
3	3	4"	1500	40
5	3	4"	1500	50
7.5	3	4"	1500	66
10	3	4"	1500	105
5	1	6"	1500	108
7.5	1	6"	1500	121
10	1	6"	3500	137
15	1	6"	3500	148
5	3	6"	1500	90
7.5	3	6"	1500	96
10	3	6"	3500	108
15	3	6"	3500	121
20	3	6"	3500	137
25	3	6"	3500	149
30	3	6"	3500	162
40	3	6"	3500	192
50	3	6"	3500	267
60	3	6"	3500	298
40	3	8"	10000	318
50	3	8"	10000	351
60	3	8"	10000	384
75	3	8"	10000	427
100	3	8"	10000	584
125	3	8"	10000	641
150	3	8"	10000	735
175	3	8"	10000	837
200	3	8"	10000	947

SUBMERSIBLE MOTORS

6-INCH MOTOR 60 HZ DESIGN AND PERFORMANCE DATA

Table is for three lead motors. Six lead motors have different model and winding numbers but identical data in Delta connection. Wye starting locked rotor amps are 33% of table value.

MODEL RATING				MODEL	WINDING	RATED HP INPUT		MAX 1.15 SF INPUT		MAX. THRUST	CB BREAKER OR FUSE AMP		KVA	L.R.	STACK
HP	KW	VOLTS	PH	PREFIX	NUMBER	AMPS	KW	AMPS	KW	POUNDS	STD	DELAY	CODE	AMPS	INCHES
5	3.7	230	1	226110	336652	23.0	5.0	27.5	5.7	1500	70	30	E	99	7.13
7.5	5.5	230	1	226111	336653	36.5	7.3	42.1	8.8	1500	100	45	F	165	9.69
10	7.5	230	1	226112	336654	44.0	9.8	51.0	11.3	3500	150	60	E	204	12.25
15	11.0	230	1	226113	336655	62.0	13.9	75.0	16.2	3500	200	80	E	303	14.81
5	3.7	200	3	236650	336614	17.5	4.7	19.1	5.4	1500	50	25	H	99	4.56
		230	3	236600	336552	15.0	4.7	16.6	5.4	1500	45	20	H	86	4.56
		380	3	236660	336720	9.1	4.7	10.1	5.4	1500	25	12	H	52	4.56
		460	3	236610	336327	7.5	4.7	8.3	5.4	1500	25	10	H	43	4.56
		575	3	236620	336621	6.0	4.7	6.6	5.4	1500	20	8	H	36	4.56
7.5	5.5	200	3	236651	336615	25.1	7.0	28.3	8.0	1500	70	30	H	150	5.88
		230	3	236601	336553	21.8	7.0	24.6	8.0	1500	70	30	H	130	5.88
		380	3	236661	336721	13.2	7.0	14.9	8.0	1500	40	20	H	79	5.88
		460	3	236611	336328	10.9	7.0	12.3	8.0	1500	30	15	H	65	5.88
		575	3	236621	336622	8.7	7.0	9.8	8.0	1500	25	12	H	52	5.88
10	7.5	200	3	236652	336616	32.7	9.4	37.0	10.8	3500	100	40	H	198	7.13
		230	3	236602	336554	28.4	9.4	32.2	10.8	3500	80	35	H	172	7.13
		380	3	236662	336722	17.2	9.4	19.5	10.8	3500	50	25	H	104	7.13
		460	3	236612	336329	14.2	9.4	16.1	10.8	3500	40	20	H	86	7.13
		575	3	236622	336623	11.4	9.4	12.9	10.8	3500	35	15	H	69	7.13
15	11.0	200	3	236653	336617	47.8	13.7	54.5	15.8	3500	150	60	H	306	9.69
		230	3	236603	336555	41.6	13.7	47.4	15.8	3500	125	60	H	266	9.69
		380	3	236663	336723	25.2	13.7	28.7	15.8	3500	80	35	H	161	9.69
		460	3	236613	336330	20.8	13.7	23.7	15.8	3500	60	30	H	133	9.69
		575	3	236623	336624	16.7	13.7	19.0	15.8	3500	50	25	H	106	9.69
20	15.0	200	3	236654	336618	61.9	18.1	69.7	20.9	3500	200	80	J	416	12.25
		230	3	236604	336556	53.8	18.1	60.6	20.9	3500	175	70	J	362	12.25
		380	3	236664	336724	32.6	18.1	36.7	20.9	3500	100	40	J	219	12.25
		460	3	236614	336331	26.9	18.1	30.3	20.9	3500	80	35	J	181	12.25
		575	3	236624	336625	21.5	18.1	24.4	20.9	3500	70	30	J	145	12.25
25	18.5	200	3	236655	336619	77.1	22.5	86.3	25.7	3500	225	100	J	552	14.81
		230	3	236605	336557	67.0	22.5	75.0	25.7	3500	200	90	J	480	14.81
		380	3	236665	336725	40.6	22.5	45.4	25.7	3500	125	50	J	291	14.81
		460	3	236615	336332	33.5	22.5	37.5	25.7	3500	100	45	J	240	14.81
		575	3	236625	336626	26.8	22.5	30.0	25.7	3500	80	35	J	192	14.81
30	22.0	200	3	236656	336620	90.9	26.9	104.0	31.1	3500	300	125	J	653	17.37
		230	3	236606	336558	79.0	26.9	90.4	31.1	3500	250	110	J	568	17.37
		380	3	236666	336726	47.8	26.9	54.7	31.1	3500	150	60	J	317	17.37
		460	3	236616	336333	39.5	26.9	45.2	31.1	3500	125	50	J	284	17.37
		575	3	236626	336627	31.6	26.9	36.2	31.1	3500	100	40	J	227	17.37
40	30.0	380	3	236667	336727	64.8	35.6	75.0	42.4	3500	200	90	J	481	22.5
		460	3	236617	336334	53.5	35.6	62.0	42.4	3500	150	70	J	397	22.5
		575	3	236627	336628	42.8	35.6	49.6	42.4	3500	125	60	J	318	22.5
50	37.0	380	3	236668	336728	82.0	45.1	93.2	52.2	6000	250	110	H	501	37.0
		460	3	236618	336335	67.7	45.1	77.0	52.2	6000	200	90	H	414	37.0
		575	3	236628	336629	54.2	45.1	61.6	52.2	6000	150	70	H	331	37.0
60	45.0	380	3	236669	336729	97.4	53.5	110.2	61.7	6000	300	125	H	627	43.0
		460	3	236619	336336	80.5	53.5	91.0	61.7	6000	250	100	H	518	43.0
		575	3	236629	336630	64.4	53.5	72.8	61.7	6000	200	80	H	414	43.0

SUBMERSIBLE MOTORS

8-INCH THREE PHASE MOTOR 60 HZ DESIGN AND PERFORMANCE DATA

All models rated 10,000 lb. maximum thrust.

MODEL RATING			THREE LEAD		SIX LEAD		RATED HP INPUT		MAX. 1.15 SF INPUT		C. BREAKER OR FUSE AMP		KVA	ACROSS LINE	SIX LEAD WYE L.R.	STACK
			MODEL	WINDING	MODEL	WINDING										
HP	Kw	VOLTS	PREFIX	NUMBER	PREFIX	NUMBER	AMPS	KW	AMPS	KW	STD	DELAY	CODE	L.R.AMP	AMP	INCHES
40	30	380	239160	336948	239180		64	37	73	42	200	80	H	412	137	13
40	30	460	239100	334729	239120	334980	53	37	60	42	175	70	H	340	113	13
40	30	575	239110	336177	239190		42	37	48	42	125	60	H	272	91	13
50	37	380	239161	338328	239181	337142	78	44	88	51	250	100	J	548	183	16
50	37	460	239101	334730	239121	334981	66	44	75	51	200	90	J	453	151	16
50	37	575	239111	336178	239191		53	44	60	51	150	70	J	362	121	16
60	45	380	239162	336997	239182	337143	94	53	108	61	300	125	J	696	232	19
60	45	460	239102	334731	239122	334982	77	53	89	61	225	100	J	575	192	19
60	45	575	239112	336179	239192		62	53	71	61	200	80	J	460	153	19
75	56	380	239163	337710	239183	337144	118	66	134	76	350	150	K	925	308	24
75	56	460	239103	334600	239123	334983	97	66	110	76	300	125	K	764	255	24
75	56	575	239113	336180	239193		78	66	88	76	225	100	K	611	204	24
100	75	380	239164	337181	239184	337145	155	87	180	102	450	200	K	1325	442	32
100	75	460	239104	334732	239124	334984	126	87	145	102	400	175	K	1095	365	32
100	75	575	239114	336181	239194		101	87	116	102	300	150	K	876	292	32
125	93	380	239165	337146	239185	337146	201	109	223	125	600	250	K	1595	532	42
125	93	460	239105	336053	239125	336053	165	109	189	125	500	225	K	1318	439	42
125	93	575	239115	336068	239195	337068	132	109	151	125	400	175	K	1054	351	42
150	110	380	239166	337147	239186	337147	240	128	267	146	700	300	K	1980	653	51
150	110	460	239106	336054	239126	336054	193	128	221	146	600	250	K	1620	540	51
150	110	575	239116	337069	239196	337069	154	128	177	146	450	200	K	1296	432	51
175	130	380	239167	337148	239187	337148	255	150	290	173	800	350	J	1990	663	59
175	130	460	239107	336524	239127	336524	218	150	250	173	700	300	J	1645	548	59
175	130	575	239117	337070	239197	337070	174	150	200	173	500	225	J	1316	439	59
200	150	380	239168	338082	239188	337149	297	169	340	194	900	400	J	2270	757	68
200	150	460	239108	336055	239128	336055	245	169	286	194	800	350	J	1875	625	68
200	150	575	239118	337071	239198	337071	196	169	229	194	600	300	J	1500	500	68

SUBMERSIBLE MOTORS

CODE LETTER - LOCKED ROTOR KVA

In some cases, designers or installers of submersible pump systems may need to know the code letter for Locked Rotor KVA for the particular rating motor being installed. This is sometimes required for power companies or inspectors or to determine size or type of power supply, transformers, controls or wiring. The tables on pages 210.241 through 210.253 show the locked rotor KVA per horsepower for all rating motors, and the code letter is on each motor nameplate.

This code letter tabulation can be found in the National Electrical Code or in National Electrical Manufacturers Association Standards and is reprinted below.

Code Letter	Locked Rotor KVA/HP
A	0 - 3.14
B	3.15 - 3.54
C	3.55 - 3.99
D	4.0 - 4.49
E	4.5 - 4.99
F	5.0 - 5.59
G	5.6 - 6.29
H	6.3 - 7.09
J	7.1 - 7.99

Code Letter	Locked Rotor KVA/HP
K	8.0 - 8.99
L	9.0 - 9.99
M	10.0 - 11.19
N	11.2 - 12.49
P	12.5 - 13.99
R	14.0 - 15.99
S	16.0 - 17.99
T	18.0 - 19.99
U	20.0 - 22.39
V	22.4 and Up

As an example, consider Model 2361126010, 7-1/2 HP, 460 volt. From curve 336328-200 locked rotor current is 64.6 amperes. Volts per phase (Y connected) are 460/1.73. Phases = 3. The locked rotor KVA/HP is then

$$\frac{460 \times 64.6 \times 3}{1.73 \times 1000 \times 7\text{-}1/2} = 6.87$$

From the tabulation, the code letter for 6.87 is H, as shown on Page 210.243. This code letter is shown for each rating so no calculations are needed.

SUBMERSIBLE MOTORS

PERFORMANCE CHARACTERISTICS OF SUBMERSIBLE MOTORS

One Performance Characteristics sheet ("curve") for each horsepower 60 HZ 4-Inch, 6-Inch, and 8-Inch Franklin Electric submersible motor is provided in the following pages. An index on page 210.301 shows the curve and page numbers for all ratings. For 200, 230, 380, 460, and 575 volt three phase motors, and for 115 and 230 volt single phase motors, a curve of only one voltage is included for each horsepower rating.

The watts input, speed, output, power factor and efficiency are the same for a given horsepower rating regardless of voltage rating. The only difference is the current which is inversely proportional to the voltage rating. For example, a 460 volt 60HZ curve may also be used for the same horsepower 380 volt 60HZ motor by multiplying the 460 volt amps by 460/380, or 1.21. Similarly, amps of a 115 volt motor will be 230/115 or twice the amps of the same rating 230 volt motor.

In accordance with motor industry practice, these curves show AVERAGE COLD MOTOR PERFORMANCE AT RATED VOLTAGE, NOT GUARANTEED OR HOT PERFORMANCE. Motor-to-motor performance varies slightly, and a motor with its own calibrated performance curve should be ordered if exact performance is required. If guaranteed efficiency below which no individual motor will fall must be provided, such as for a government specification, an efficiency three points lower than shown on the curve should be used.

The effect of motor heating plus supply cable voltage drop and losses should be considered in the pump design and expected system performance. A motor operating at maximum rated load and temperature on maximum length cable per page 210.406 from a rated motor voltage supply will typically run 20 to 50 RPM below the curve value. Normal load motor efficiency at operating temperature is typically 1 to 2 points below the cold motor efficiency shown on the curves. Cable losses also reduce the overall electrical efficiency of the system to some value below motor efficiency. If the operating performance of a specific motor under known operating conditions is essential, contact Franklin Submersible Engineering Department.

All Performance Characteristics tabulate the motor rating, test references, torques and locked-rotor amps, and show plotted curves of RPM, EFF, AMPS, WATTS (or KW), PF and ADDITIONAL INPUT WATTS DUE TO THRUST. A brief s mmary of information the curves provide at test volts is given below.

-All other items are plotted versus horsepower from no load through maximum running load range.
-FL and SFL lines are the rated horsepower and service factor horsepower of the motor.
-RPM is the motor speed in revolutions per minute.
-EFF is efficiency of the motor in percent = 100 x (output power / input power).
-AMPS is the running current of the motor.
-WATTS or KW (Kilowatts) is input power to the motor.
-PF is power factor of the motor in percent = 100 x input watts / (input volts x amps).
-ADDITIONAL INPUT WATTS DUE TO THRUST shows the additional motor input watts required to drive the thrust bearing at any pump thrust within the motor's thrust rating.
-BREAKDOWN TORQUE is the maximum torque developed by the motor as it comes up to speed.
-LOCKED ROTOR TORQUE is the initial torque when power is applied, or starting torque.
-LOCKED ROTOR AMPS is the initial current when power is applied, or starting current.

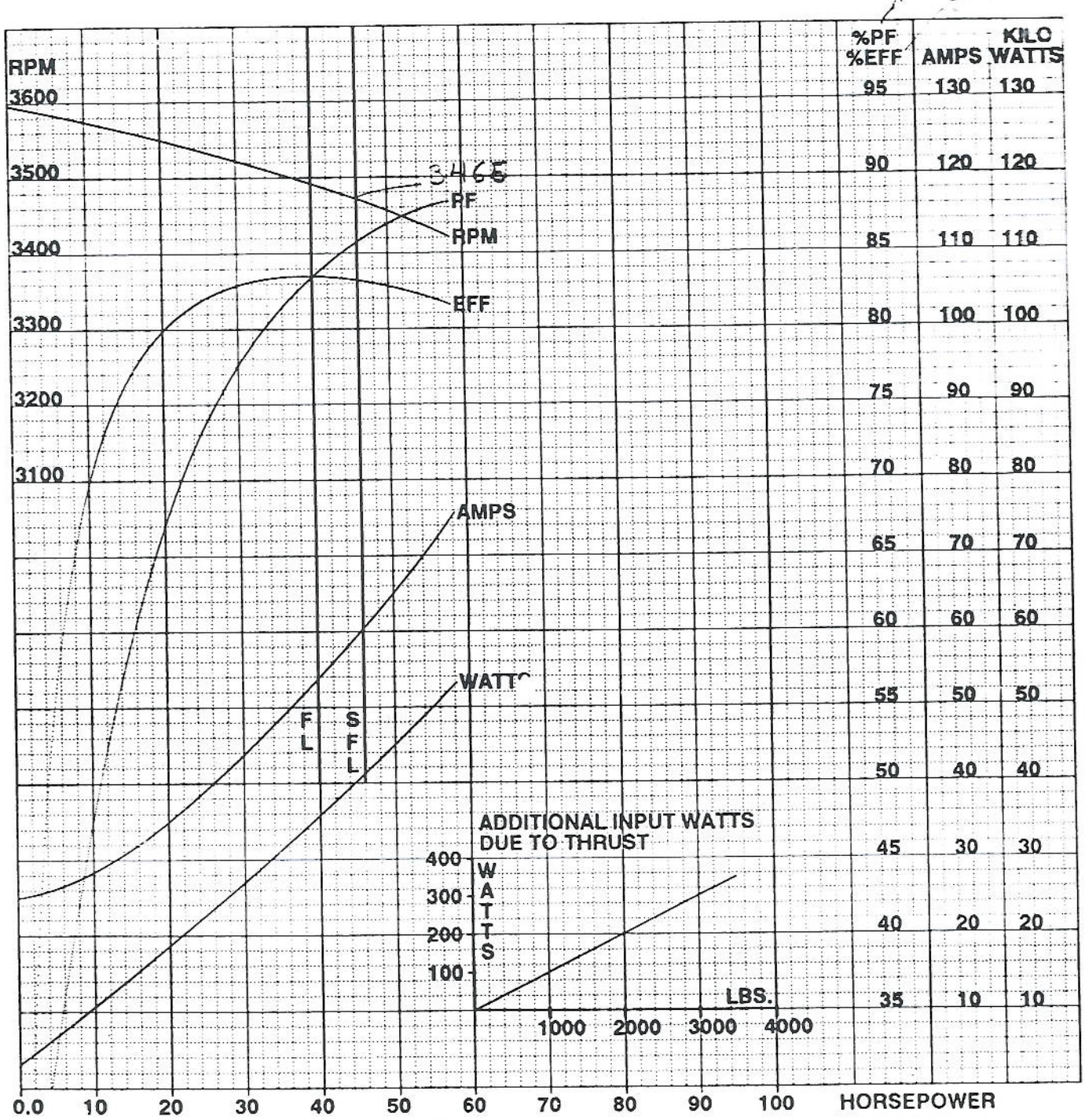
Franklin Electric

MOTOR PERFORMANCE CHARACTERISTICS

TEST				
	VOLTS	460	HERTZ	60
	ST. MFD		RUN MFD	
	TEST PR	8113	PAGE	1
	APPR BY	PC	DATE	12-10-92

RATING				
	FRAME	6 INCH SUB	HP	40
	MODEL	236617	VOLTS	460
	RPM	3450	PHASE	3
	S.F.	1.15	HERTZ	60
	TYPE	3 PHASE		

REMARKS: TESTED IN WATER, SHAFT UP, WITH NO APPLIED THRUST.
TYPICAL PERFORMANCE. NOT GUARANTEED AS MINIMUM PERFORMANCE.



FULL LOAD TORQUE	60.2 LB-FT
BREAKDOWN TORQUE	202.0 LB-FT
LOCKED ROTOR TORQUE	168.0 LB-FT
LOCKED ROTOR AMPS	397.0

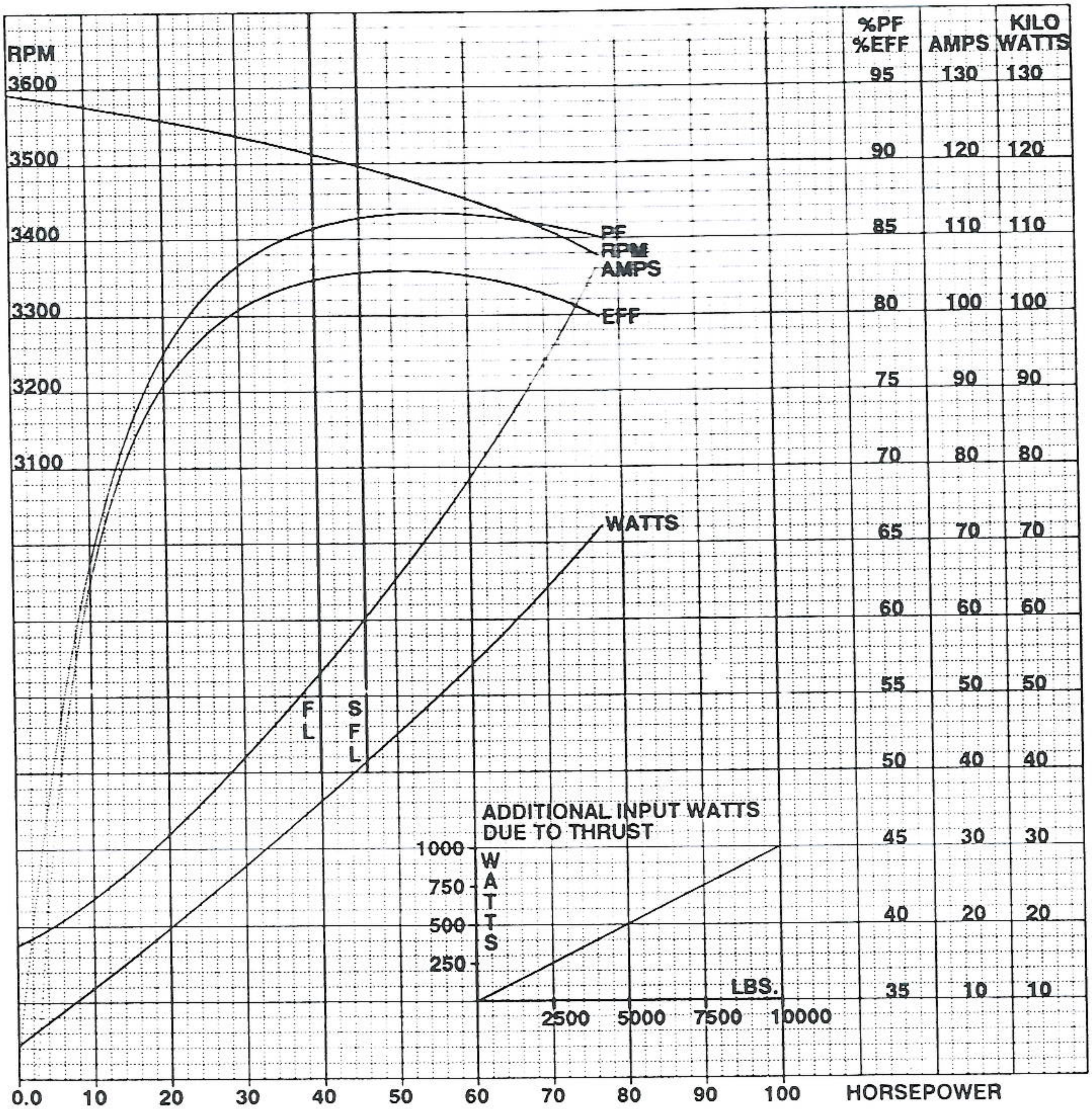
CURVE NO. 336334-200

MOTOR PERFORMANCE CHARACTERISTICS

TEST			
VOLTS	460	HERTZ	60
ST. MFD		RUN MFD	
TEST PR	8056	PAGE	82
APPR BY	[signature]	DATE	12-17-92

RATING			
FRAME	8 INCH SUB	HP	40
MODEL	239100	VOLTS	460
RPM	3525	PHASE	3
S.F.	1.15	HERTZ	60
TYPE	3 PHASE		

REMARKS: TESTED IN WATER, SHAFT UP, WITH NO APPLIED THRUST.
TYPICAL PERFORMANCE. NOT GUARANTEED AS MINIMUM PERFORMANCE.



FULL LOAD TORQUE	59.8 LB-FT
BREAKDOWN TORQUE	186.0 LB-FT
LOCKED ROTOR TORQUE	110.0 LB-FT
LOCKED ROTOR AMPS	340.0

CURVE NO. 334729-200

PAGE: SD 211.00
DATE: Sept. 1, 1996
SUPERSEDES: New

Special Tools

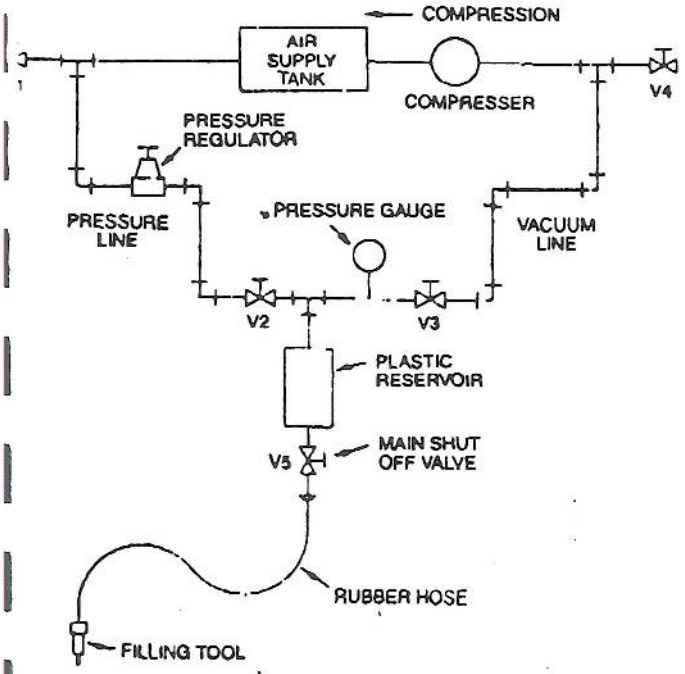
The tools listed here have been built for specific functions involved in the repair of Franklin submersible motors.

Description	Tool Number	Part Number
Vacuum Filling Tool (All motors except Super Stainless)	TY-111-31	305 079 101
Vacuum Filling Reservoir	RK-6-5	305 079 103
Hand Filling Syringe	RK-6-10	305 079 104
4" Shaft Height Gage	RK-8-3	305 079 105
4" High Thrust Diaphragm Depth Gage	RK-8-13A	305 079 111
Check Valve Insertion Tool	RK-8-14	305 079 112
6" Shaft Height Gage	RK-10-8	305 079 117
Vacuum Filling Tool (Super Stainless)	RK-11	305 079 119
6" Seal Cover Insertion Tool	AT-111-88	305 079 122
8" Shaft Height Gage - Body	GMG-111-20, DET. 1	305 079 123
8" Shaft Height Gage - Set Master	GMG-111-20, DET. 2	305 079 124
8" Diaphragm Plate Position Gage (Straight Thrust Housing)	GMM-111-17, GR. 1	305 079 127
8" Shaft Clamping Tool, GR. 1 & 2	TY-111-76	305 079 128
4" High Thrust Seal & Seal Cover Inserting Tool	RK-12-1S	305 079 132
8" Seal Cover Insertion Tool	AT-111-97	305 079 135
8" Diaphragm Depth Gage (Tapered Thrust Housing)	GMM-111-18	305 079 138

PAGE: SD 212.00
DATE: April 1, 1998
SUPERSEDES: New

Vacuum Filling Apparatus

SCHEMATIC



SUGGESTED PARTS LIST

Item	Req.	Description
1	1	Reservoir - Franklin Electric part number 305 079 103
2	1	Pressure Regulator - Norgren Air Regulator type 2-A or equivalent.
3	5	Shut Off Valves - Lunkenheimer bronze Needle Valve - Globe #908 with 1/8" Female Ends of equivalent.
4	1	Pressure Gauge - Marsh #RB Compound BM Air-Vacuum Gauge - Type 30P with 1/8" Female Ends or equivalent.
6	1	Filling Tool - Franklin Electric part number 305 079 101
6	1	Compressor - Any piston or centrifugal type compressor with pipe connection on intake.
7		Air Supply Tank - Any standard Air Pressure Tank.
8		Pipe & Fittings - All piping and fitting are 1/8" size.
9	1	Rubber Hose -1/4" ID Rubber Hose - 24" long.
10	2	Hose Clamps - Clamps for holding hose to pipe.

SEQUENCE OF OPERATION

A. Start Air Compressor.
Regulate air pressure to:
4" = 1.5-2.5 psi
6" = 20 psi max.
8" = 10 psi
Start Vacuum Pump (if separate unit).

B. Fill reservoir with prefill solution as follows:
1. Close Shut-Off Valves V2, V4 and V5.
2. Open Valves V1 and V3.
3. Insert filling tool into prefill solution supply.
4. Slowly open Valve V5 and fill reservoir 3/4 full.
5. Close Valve V5.

C. Draw vacuum on motor as follows:
Note: To insure proper evacuation motor should be in vertical shaft-up position.
1. Insert filling tool into filter check valve opening in motor.
2. Slowly open Valve V5, exhausting air from motor until pressure gauge shows a minimum of 25 inches Hg of vacuum for 15 minutes.
3. Keep filling tool tightly in place and close Valve V5.

D. Force prefill solution into motor under pressure as follows:
1. Close Valves V1 and V3.
2. Open Valves V2 and V4.
3. Slowly open Valve V5, filling motor with prefill solution until liquid ceases to drop in reservoir.
4. Close Valve V5 and remove filling tool from motor.
5. Adjust fluid fill by bleeding off excess fill through check valve. If air is released, repeat filling operation.
Diaphragm position:
4" High Thrust, 9/16" to 11/16"
6" motors, straight Thrust Housing, 1 1/4" to 1 1/2"
6" motors, tapered Thrust Housing, 2 1/4" to 2 7/16"
6" motors, straight (Clad) Thrust Housing, 1 1/8" to 1 1/4"
8" motors, straight Thrust Housing, 1 5/16" to 1 11/16"
8" motors, tapered Thrust Housing, 1 1/4" to 1 1/2"

E. Lightly tap the check valve filter into position.

F. Prefill Kit
1. 151 300 905 is used on all 4" motors.
(mix 1 part fill solution with 4 parts distilled water)

2. 305 085 901 is used on all 6" and 8" motors.
(mix 1 part fill solution with 1 part distilled water)

PAGE: SD 213.00
DATE: April 1, 1996
SUPERSEDES: New

Test Procedures - All Motors

ELECTRICAL INSPECTION OF MOTOR

INSPECTION PRIOR TO DISASSEMBLY

Submersible motors should be checked for electrical and mechanical damage prior to disassembly. Electrical tests should consist of insulation and winding resistance checks. Mechanical tests should consist of checking spline wear, shaft height, end play and for casting damage.

ELECTRICAL TESTS

INSULATION RESISTANCE

Insulation resistance varies little with motor rating. Motors of all horsepower ratings, voltages, and phases have similar values of insulation resistance. A used motor testing at 10 megohm is acceptable for re-installation. Measure resistance from all three motor pins to the stator shell. If an additional Hipot test is used, the motor should take 1000 volts, plus two times the voltage rating, plus 20%, for one second without breakdown.

Note: Motors with built-in lighting arrestors should be Hipotted at 1500 volts. Higher voltage may show breakdown even on a good motor.

WINDING RESISTANCE:

Winding resistance varies with motor rating. Motors with different horsepower ratings, voltages and phases will have different winding resistance. Main winding resistance on 3-wire single phase motors is measured between the black and yellow leads. Start winding resistance on 3-wire single phase motors is measured between the red and yellow leads. Winding resistance on 2-wire single phase motors is measured between the two motor leads (main and start winding resistance's are not measurable by themselves). Winding resistance on three phase motors is measured between any two (2) leads. All three combinations of two (2) leads should have the same resistance reading. Winding resistance values can be found in the separate *"Application Installation Maintenance"* manual.

Note: Running the motor and checking the amps or watts is the only true test of the motor windings.

PAGE: SD 213.01
DATE: April 1, 1998
SUPERSEDES: New

Test Procedures - All Motors

MECHANICAL INSPECTION OF MOTOR PRIOR TO DISASSEMBLY

SHAFT END:
End surface of shaft must not be worn or cupped more than .020".

SPLINES:
Visually inspect splines for wear. Place a new coupling over the shaft and check for rotational movement. Movement must not exceed 2 degrees.

SHAFT HEIGHT:
Use correct shaft height gage as listed on the *"Special Tools"* page of this *"Service Data"* manual. Shaft height should be within the *"go"* and *"no go"* limits. Low shaft height indicates a worn or damaged thrust bearing.

END PLAY:
End play can be checked by using a dial indicator. With the motor in a horizontal position, extend the shaft it's full amount. Measure the amount of travel taking readings from the pump mounting surface. Excessive end play indicates upthrust wear or other damage.

Motor	Nominal Shaft Height	Dimension Shaft Height	Free End Play Max.	Min.
4" Super Stainless	1 1/2"	1.508" / 1.498"	.045"	.010"
4" High Thrust	1 1/2"	1.508" / 1.498"	.045"	.010"
6"	2 7/8"	2.875" / 2.869"	.050"	.030"
8" x 6"	2 7/8"	2.875" / 2.869"	.020"	.008"
8" Straight Thrust Housing (Type 1)	4"	4.000" / 3.990"	.020"	.008"
8" Tapered Thrust Housing (Type 2)	4"	4.000" / 3.990"	.060"	.035"
8" Tapered Thrust Housing (Type 2.1)	4"	4.000" / 3.990"	.080"	.030"

OTHER MECHANICAL INSPECTION:
Check end bells and castings for evidence of rough handling. Check all seals for evidence of leaking or damage due to abrasives.

PAGE: 6D 214.00
DATE: April 1, 1996
SUPERSEDES: New

Test Procedures - All Motors

NO-LOAD AND SERVICE FACTOR LOAD

CAUTION - NEVER TEST A MOTOR OUTSIDE A WELL WITHOUT GROUNDING IT TO THE POWER SUPPLY GROUNDING TERMINAL WITH COPPER WIRE NO SMALLER THAN MOTOR CABLE WIRES OR PER NATIONAL ELECTRICAL CODE TABLE 250-95.

TEST PREPARATION:

1. Make sure the motor lead nut is tight. Proper torque settings can be found in the separate *"Application Installation Maintenance"* manual. Before a new lead is installed, make sure the lead bushing and lead hole are clean and dry. Insert the lead into the lead hole by hand force as far as possible, then tighten securely.

2. Test motors only on nameplate rated voltage with properly fused circuits. Turn power off when making connections. Always use the correctly matched Franklin Electric control box when testing single phase 3-wire motors.

NO-LOAD TEST

Measuring no-load amps will give an indication that the motor will start and run freely without excess friction or electrical faults. However, no-load amps will vary greatly due to voltage. Even motors of the same horsepower and voltage ratings will vary with line voltages. The table below displays how no-load amps can vary with line voltage.

NOTE: The only true test of motor amps is to run the motor with normal pump loads.

60 HZ Submersible Motor 1/3 HP - 115 volts - 2-Wire No-load amps Vs line voltage	
Line Voltage	No-load amps
95	4.5
105	5.4
115	7.1
125	9.2

SERVICE FACTOR LOAD TEST

When load testing on a matching pump: Mount the pump on the motor after checking to ensure the mounting surfaces are clean. Tighten pump mounting bolts or nuts. Make sure the shafts rotate freely after assembling. Support the pump with its intake submerged at least 12 inches. The plumbing should consist of a shut-off valve and a return pipe routing the discharge back to the test tank. With the valve closed to shut-off, start the pump and vary the pump flow by opening and closing the valve, check for any unusual noise or vibrations. Amp meter readings should decrease slightly as the flow is reduced from rated delivery to shut-off (deadhead). If the readings increase there is a mechanical problem in the pump or motor. The pump should not be operated at shut-off or open discharge longer than it takes to check readings. Operation at open discharge or at shut-off will cause overheating and upthrusting of the motor.

PAGE: SD 216.00
DATE: April 1, 1998
SUPERSEDES: New

Test Procedures - All Motors

MECHANICAL INSPECTION OF MOTOR

INSPECTION AFTER DISASSEMBLY

Stator:
Check inner liner for pin holes, bulging or evidence of rotor rub. If damage is found, replace, even though prior electrical tests indicate the stator can be reused.

Rotor:
1. Visually inspect rotor core for mechanical breaks in bars or joints between bars and end rings. Normally this part is seldom damaged except when the motor is struck by lightning or subject to high temperature.

2. Visually inspect journals for scoring or scratches.

3. Support rotor shaft on level surface with V-blocks placed at journal locations. Using dial indicators, measure run-out as follows:
   a) Run-out just behind shaft spline must not exceed .002" F.I.M. (T.I.R.) during full rotation.
   b) Run-out at mid-point of the rotor core must not exceed .003" F.I.M. (T.I.R.) during full rotation.
   c) Run-out of thrust bearing shaft extension must not exceed .001" F.I.M. (T.I.R.) during full rotation.
   d) Run-out on the face of the thrust bearing, measured 1/8" from outside diameter, must not exceed:
      4" High Thrust = .005"
      6 inch = .005"
      8 inch = .004"

Radial Bearings:
Visually inspect the inside diameter (ID) of bearing surfaces. If scored or deeply scratched, replace bearings or end bells.

Thrust Bearing Assembly:
Visually inspect bearing and shoes for scratches, scoring or wear. If one shoe is damaged, replace all shoes.

Seals and O-rings:
Always replace seals and O-rings because rubber parts tend to take a set and may not make a good seal when reused.

Other Mechanical Parts:
Other mechanical parts can be reused if not damaged.

Finish Machining Dimensions:

	Radial Bearings	Rotor Journals
Basic Diameter	Finish 8 microinch max.	Finish 8 microinch max.
5/8"	.6272 / .6267 Dia.	.6244 / .6239 Dia.
3/4"	.7520 / .7515 Dia.	.7494 / .7489 Dia.
1 1/8"	1.1282 / 1.1276 Dia.	1.1250 / 1.1245 Dia.
1 1/4"	1.2521 / 1.2516 Dia.	1.2486 / 1.2483 Dia.
1 5/8"	1.6292 / 1.6285 Dia.	1.6250 / 1.6245 Dia.
2"	2.0032 / 2.0025 Dia.	1.9990 / 1.9987 Dia.

Repair Procedures - 4" Super Stainless

Tools Required:
Shaft Height Gage - 305 079 105 (RK-8-3)
9mm Deep Socket
Torque Wrench - Set 6-12 lb. feet for motor studs
Torque Wrench - Set 35-45 lb. inches for bottom cover screws
Torque Wrench - Set 15-20 lb. feet for lead jam nut
Socket Drive Screw Driver
3/4" Crowfoot adapter

Torque Values are the same for Water Well & Corrosion Resistant motors. However, lubricate 316 SST threads with "Never~seez" before assembling.

Refer to Exploded View pages for part descriptions

Step 1: Upper End Bell assembly
Clamp stator in horizontal position. Use a clean rag (wet with water) and swab the stator bore to remove any dust or dirt particles. Lubricate upper stator rabbet with silicone grease. Lubricate "O" ring with silicone grease and attach to upper end bell assembly. Seat end bell assembly in stator with hand pressure and rotate end bell to seat "O" ring. Using a motor lead, align lead cavity and connector boss. Attach upper end bell to the stator using the four studs. Torque studs in a cross pattern to 6-12 lb. ft. using torque wrench and 9mm deep socket.

Step 2: Rotor Assembly & Shaft Height
Assemble rotor and thrust parts to lower end bell, wetting thrust bearing with fill solution (mixed from Prefill Kit). With rotor and lower end bell assembly setting in the vertical position, place stator over rotor, being careful not to damage upper bearing with shaft extension. Note that without lower "O" ring the stator slips together with ease. Place shaft height gage on upper end bell cover. **Note: The shaft will be low at this time.** Select the required amount of shims to fill the gap between the end of the shaft and the *"Go"* step of the *"Shaft Height Gage"*. Remove stator from rotor. Add selected shims between the thrust bearing and rotor end ring.

Step 3: Determine free end play
On 1 hp thru 2 hp motors place one upthrust shim on shaft. Place stator over rotor and re-check shaft height. The shaft should be between the *"Go"* and *"No Go"* steps of the gage. Extend the rotor shaft the full amount and measure the gap between the upper end bell cover and the bottom of the shaft height gage. This gap should be .010" to .045". If the gap exceeds .045", stack the required amount of .010" upthrust shims to reduce this gap to less than .045". Remove stator and add these shims. Lubricate lower stator rabbet with silicone grease. Lubricate lower "O" ring with silicone grease and assemble to lower end bell. Place the stator in a vise in the horizontal position. Holding the rotor and lower end bell assembly horizontally, insert assembly into stator with forward motion, by hand pressure, and rotate to seat "O" ring. Rotate end bell to align holes in end bell with holes in the stator end.

Step 4: Filling the Motor
Holding the motor in the vertical shaft-down position, slowly pour fill solution into diaphragm cavity. Rotate and pump shaft, while pouring fill solution, to allow air to escape from the motor. Fill diaphragm cavity completely full. Continue to rotate and pump shaft until air bubbles cease. Top off cavity until completely full. Install diaphragm guard into diaphragm cavity with small diameter of cup in the upper position (opposite shaft direction). Install diaphragm into cavity allowing excess filling solution to flood over.

Step 5: Final Assembly
Affix gasket around lower end bell. Assemble diaphragm cover and bottom cover. Line up holes. Attach cover assembly to stator end. Torque cover screws to 35-45 lb. in. with the torque wrench. Install washer and spline protector.

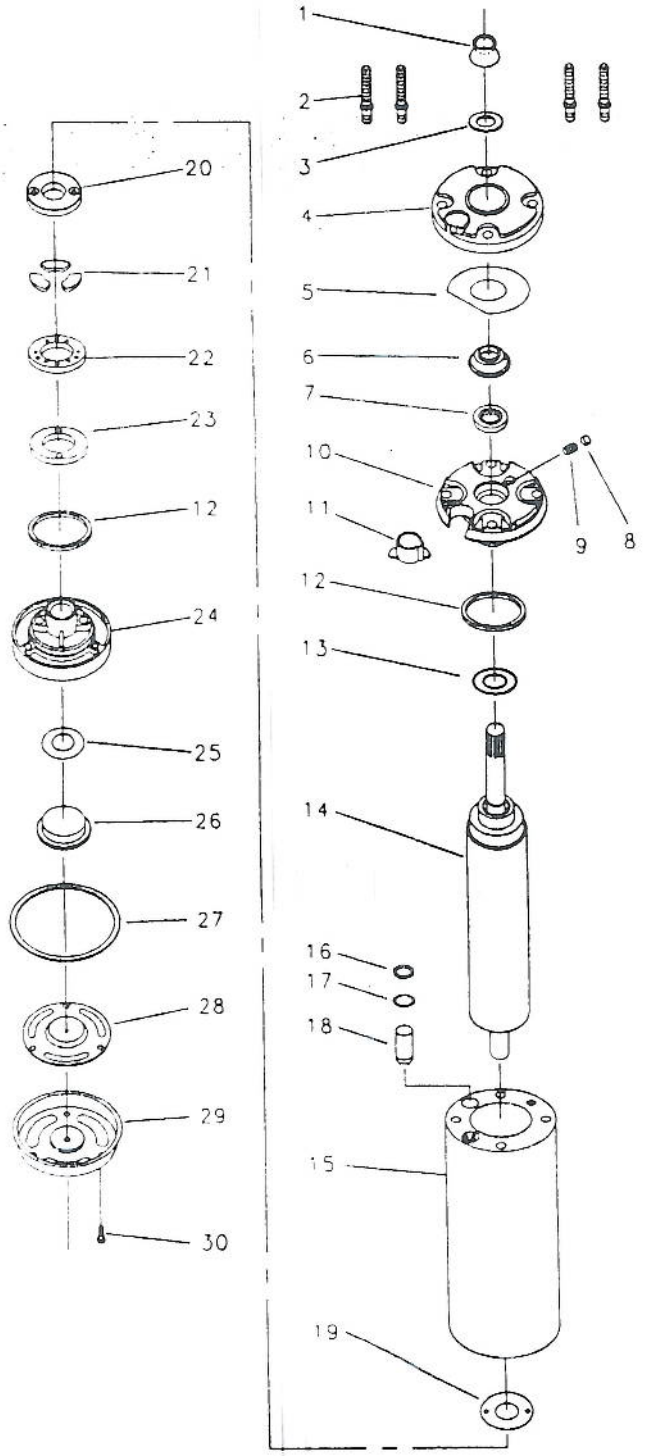
Step 6. Final Inspection
Using magnetic base dial indicator, indicate run-out just below spline on shaft extension. Maximum allowance is .004" F.I.M. (T.I.R.). Check for fluid leaks at shaft seal, "O" rings and diaphragm.

Step 7: Lead Insertion
Spray lead cavity with drying agent, denatured alcohol or equivalent, and blow out with compressed air. Install motor lead and torque jam nut to 15-20 lb. ft. using torque wrench and crowfoot adapter.

Motor is now ready for testing.

4-inch Super Stainless Motors: 4-inch dia. - Water Well

For 50 and 60 Hertz Models Ending in 0117, 1216, 1217, 1616, 1618, 1916, 1918, 3116, 4116, 4416, 9004, 9204 & 9404



Key	Description	No. Req'd	Part Number
1	Spline Protector	1	150 224 101
2	Stud	4	155 202 101
3	Washer	1	275 542 102
4	Top Cover	1	150 261 101
5	Gasket	1	152 030 101
6	Bushing	1	155 235 101
7	Shaft Seal	1	155 007 102
8	Filter	1	155 275 101
9	Check Valve	1	151 301 901
10	Upper End Bell Assy (Includes 4,5,6,7,8,9,11 & 12)	1	177 231 906(1)
11	Connector Boss	1	151 820 102
12	"O" Ring	2	275 743 133
13	Upthrust Washer		Not Req'd(1)
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Retaining Ring (2 Wire Only)	1	155 316 101
17	"O" Ring (2 Wire Only)	1	155 461 102
18	Biac Switch (2 Wire Only)	1	152 050 950
19	Thrust Shim .005" Thick	As Req'd	150 069 101
	Thrust Shim .008" Thick	As Req'd	150 069 102
	Thrust Shim .016" Thick	As Req'd	150 069 103
20	Thrust Bearing	1	179 860 102
21	Thrust Segment	2	152 004 901(1)
22	Leveling Washer	1	151 827 101(1)
23	Rocker Washer		Not Req'd(1)
24	Lower End Bell	1	177 230 901(1)
25	Diaphragm Guard	1	151 314 101
26	Diaphragm	1	150 594 101
27	Gasket	1	155 716 101
28	Diaphragm Cover	1	151 872 101
29	Bottom Cover	1	151 871 101
30	Screw & Washer Assy	3	155 548 901
	2-wire Lead Assy	1	152 552 905
	3-wire Lead Assy	1	152 553 905

Thrust Bearing Kit - 1/3 thru 3/4 HP	305 049 901
Thrust Bearing Kit - 1 thru 2 HP Kits include items 20,21,22,23 & Thrust Shims	305 094 901
Seal Kit - includes items 1,3,5,6,7,12, 25,26,27,29,30 & grease	305 045 902
End Bell Kit - 1/3 thru 3/4 HP	305 047 902
End Bell Kit - 1 thru 2 HP Kits include items in Seal Kit plus items 10,24 & 28	305 046 904

Footnotes:

(1) Parts Used on 1 thru 2 HP Models

10	Upper End Bell Assy	1	177 233 906
13	Upthrust Washer	1	151 093 101
21	Thrust Segment	3	152 004 901
22	Leveling Washer	1	155 562 901
23	Rocker Washer	1	155 563 101
24	Lower End Bell	1	177 230 907

For Models Not Shown Consult Factory

4-inch Super Stainless Motors: 4-inch dia. - Water Well

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 1/3 HP - 2 or 3 wire	1	178 187 902
	Rotor 1/2 HP - 2 or 3 wire	1	178 166 903
	Rotor 3/4 HP - 2 or 3 wire	1	178 178 903
	Rotor 1 HP - 2 or 3 wire	1	178 188 902
	Rotor 1 1/2 HP - 2 wire	1	178 193 903
	Rotor 1 1/2 HP - 3 wire	1	178 192 904
	Rotor 2 HP - 3 wire	1	178 193 903
	[illegible] - 2 wire	1	337 442 920
	[illegible] - 2 wire	1	337 443 920
	Stator 1/2 HP - 115V - 2 wire	1	337 444 920
	Stator 1/2 HP - 230V - 2 wire	1	337 445 920
	Stator 3/4 HP - 230V - 2 wire	1	337 446 920
–	Stator 1 HP - 230V - 2 wire	1	337 447 920
	Stator 1 1/2 HP - 230V - 2 wire	1	334 016 920
	Stator 1/3 HP - 115V - 3 wire	1	337 448 915
	Stator 1/3 HP - 230V - 3 wire	1	337 449 915
	Stator 1/2 HP - 115V - 3 wire	1	337 450 915
	Stator 1/2 HP - 230V - 3 wire	1	337 451 915
	Stator 3/4 HP - 230V - 3 wire	1	337 452 912
–	Stator 1 HP - 230V - 3 wire	1	337 453 915
	Stator 1 1/2 HP - 230V - 3 wire	1	336 845 911
	Stator 2 HP - 230V - 3 wire	1	334 602 931

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 1/2 HP	1	178 166 903
	Rotor 3/4 HP	1	178 178 903
	Rotor 1 HP	1	178 188 902
	Rotor 1 1/2	1	178 188 902
	Rotor 2 HP	1	178 192 904
15	Stator 1/2 HP - 200V	1	338 307 902
	Stator 1/2 HP - 230V	1	338 270 902
	Stator 1/2 HP - 460V	1	338 311 902
	Stator 3/4 HP - 200V	1	338 308 902
	Stator 3/4 HP - 230V	1	338 271 902
	Stator 3/4 HP - 460V	1	338 312 902
	Stator 1 HP - 200V	1	338 309 902
	Stator 1 HP - 230V	1	338 272 902
	Stator 1 HP - 380V	1	338 433 902
	Stator 1 HP - 460V	1	338 313 902
	Stator 1 HP - 575V	1	338 316 902
	Stator 1 1/2 HP - 200V	1	338 310 902
	Stator 1 1/2 HP - 230V	1	338 306 902
	Stator 1 1/2 HP - 380V	1	338 434 902
	Stator 1 1/2 HP - 460V	1	337 607 902
	Stator 1 1/2 HP - 575V	1	338 317 902
	Stator 2 HP - 200V	1	336 973 922
	Stator 2 HP - 230V	1	336 852 922
	Stator 2 HP - 380V	1	336 976 926
	Stator 2 HP - 460V	1	336 980 912
	Stator 2 HP - 575V	1	336 984 925

50 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 1/3 HP - 2 or 3 wire	1	178 187 902
	Rotor 1/2 HP - 2 or 3 wire	1	178 166 903
	Rotor 3/4 HP - 2 or 3 wire	1	178 178 903
	Rotor 1 HP - 2 or 3 wire	1	178 188 902
	Rotor 1 1/2 HP - 2 wire	1	178 193 903
	Rotor 1 1/2 HP - 3 wire	1	178 192 904
	Rotor 2 HP - 3 wire	1	178 193 903
15	Stator 1/2 HP - 220V - 2 wire	1	338 248 902
	Stator 3/4 HP - 220V - 2 wire	1	338 249 902
	Stator 1 HP - 220V - 2 wire	1	338 250 902
	Stator 1 1/2 HP - 220V - 2 wire	1	336 313 920
	Stator 1/3 HP - 220V - 3 wire	1	338 252 902
	Stator 1/2 HP - 220V - 3 wire	1	338 253 902
	Stator 3/4 HP - 220V - 3 wire	1	338 254 902
	Stator 1 HP - 220V - 3 wire	1	338 255 902
	Stator 1 1/2 HP - 220V - 3 wire	1	337 128 910
	Stator 2 HP - 220V - 3 wire	1	337 129 906

THREE PHASE

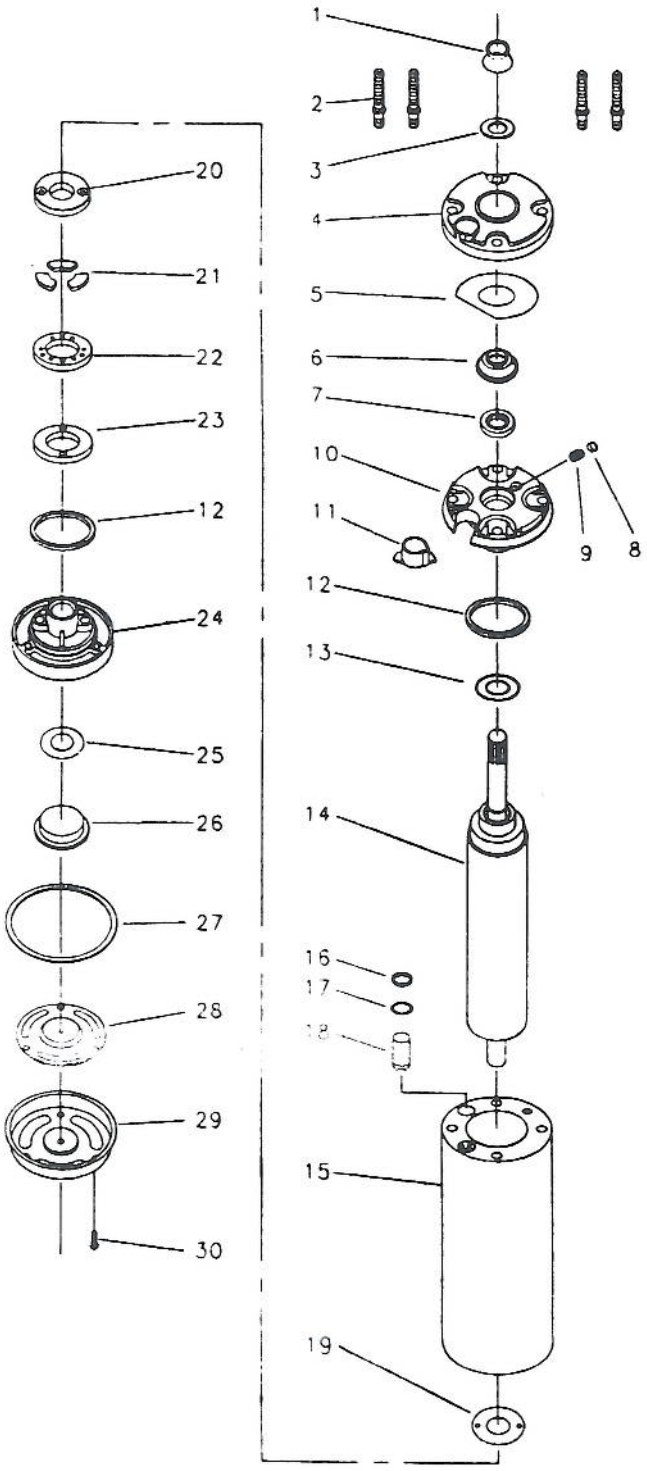
Key	Description	No. Req'd	Part Number
14	Rotor 1/2 HP	1	178 187 902
	Rotor 3/4 HP	1	178 166 903
	Rotor 1 HP	1	178 178 903
	Rotor 1 1/2	1	178 188 902
	Rotor 2 HP	1	178 192 904
15	Stator 1/2 HP - 220V	1	338 301 902
	Stator 1/2 HP - 380V	1	337 604 902
	Stator 3/4 HP - 220V	1	338 302 902
	Stator 3/4 HP - 380V	1	337 605 902
	Stator 1 HP - 220V	1	338 303 902
	Stator 1 HP - 380V	1	337 606 902
	Stator 1 1/2 HP - 220V	1	338 305 902
	Stator 1 1/2 HP - 380V	1	337 607 902
	Stator 2 HP - 220V	1	334 347 922
	Stator 2 HP - 380V	1	336 980 912

✓ 2005

PAGE: SD 217.02
DATE: April 1, 1996
SUPERSEDES: New

4-inch Super Stainless Motors: 4-inch dia. - Water Well

For 50 and 60 Hertz Models Ending in 1203, 1303, 1603, 1903, 9003, 9203, & 9403



Key	Description	No. Req'd	Part Number
1	Spline Protector	1	150 224 101
2	Stud	4	155 202 101
3	Washer	1	275 542 102
4	Top Cover	1	150 261 101
5	Gasket	1	152 030 101
6	Bushing	1	155 235 101
7	Shaft Seal	1	155 007 102
8	Filter	1	155 275 101
9	Check Valve	1	151 301 901
10	Upper End Bell Assy (Includes 4,5,6,7,8,9,11 & 12)	1	177 231 906
11	Connector Boss	1	151 820 102
12	"O" Ring	2	275 743 133
13	Upthrust Washer		Not Req'd
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Retaining Ring (2 Wire Only)	1	155 316 101
17	"O" Ring (2 Wire Only)	1	155 461 102
18	Biac Switch (2 Wire Only)	1	152 050 950
19	Thrust Shim .005" Thick	As Req'd	150 069 101
	Thrust Shim .008" Thick	As Req'd	150 069 102
	Thrust Shim .016" Thick	As Req'd	150 069 103
20	Thrust Bearing	1	179 860 102
21	Thrust Segment	3	152 004 901
22	Leveling Washer	1	155 562 901
23	Rocker Washer	1	155 563 101
24	Lower End Bell	1	177 230 907
25	Diaphragm Guard	1	151 314 101
26	Diaphragm	1	150 594 101
27	Gasket	1	155 716 101
28	Diaphragm Cover	1	151 872 101
29	Bottom Cover	1	151 871 101
30	Screw & Washer Assy	3	155 548 901
	2-wire Lead Assy	1	152 552 905
	3-wire Lead Assy	1	152 553 905

For Models Not Shown Consult Factory

Franklin Electric
Bluffton, Indiana 46714

4-inch Super Stainless Motors: 4-inch dia. - Water Well

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 1 HP - 2 or 3 wire	1	178 246 902
15	Stator 1 HP - 230V - 2 wire	1	337 447 920
	Stator 1 HP - 230V - 3 wire	1	337 453 915

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 1 HP	1	178 246 902
15	Stator 1 HP - 200V	1	338 309 902
	Stator 1 HP - 230V	1	338 272 902
	Stator 1 HP - 380V	1	338 433 902
	Stator 1 HP - 460V	1	338 313 902
	Stator 1 HP - 575V	1	338 316 902

50 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 1 HP - 2 or 3 wire	1	178 246 902
15	Stator 1 HP - 220V - 2 wire	1	338 250 902
	Stator 1 HP - 220V - 3 wire	1	338 255 902

THREE PHASE

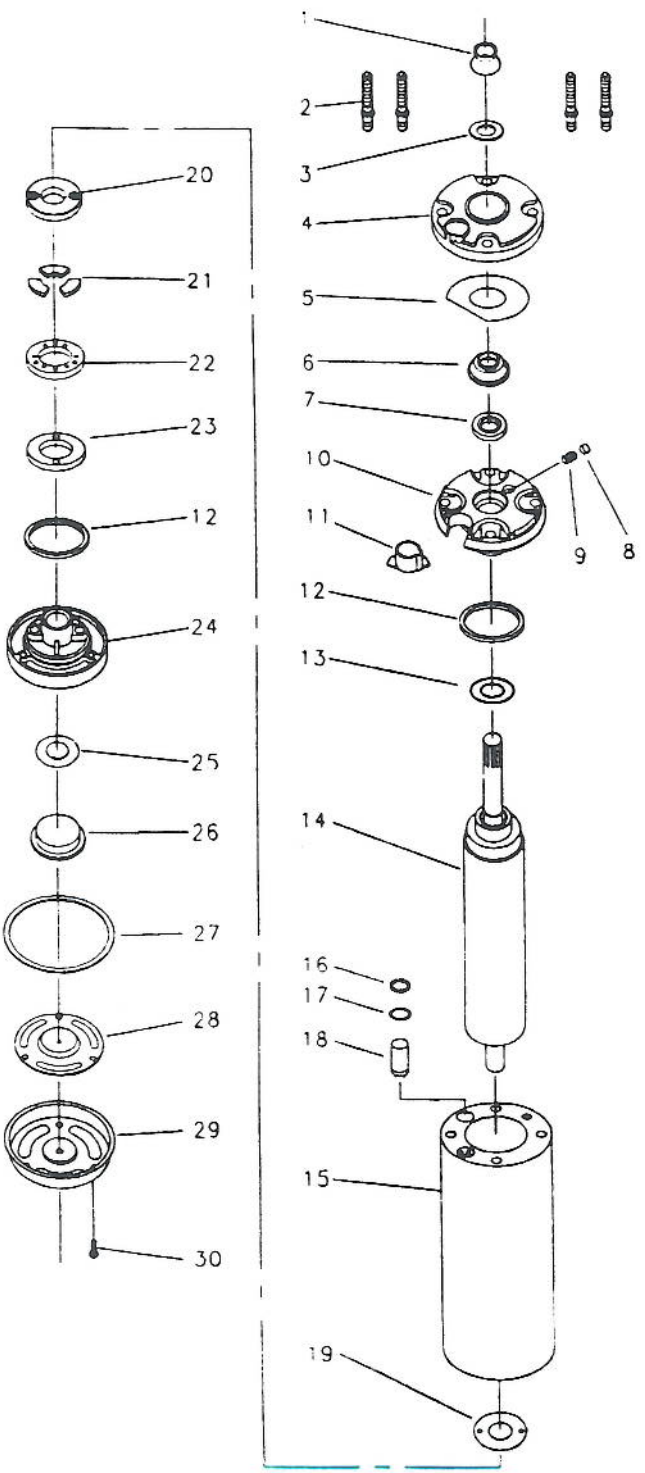
Key	Description	No. Req'd	Part Number
14	Rotor 1 HP	1	178 246 902
15	Stator 1 HP - 220V	1	338 304 902
	Stator 1 HP - 380V	1	

Franklin Electric
Bluffton, Indiana 46714

800-348-2420

4-inch Super Stainless Motors: 4-inch dia. - Pollution Recovery

For 60 Hertz Models Ending in 0917, 2316, 2317, 2318 & 4916



Key	Description	No Req'd	Part Number
1	Spline Protector	1	152 226 101
2	Stud	4	155 194 101
3	Washer	1	275 542 102
4	Top Cover	1	150 261 101
5	Gasket	1	152 030 101
6	Bushing	1	155 540 101
7	Shaft Seal	1	155 512 101
8	Filter	1	155 275 101
9	Check Valve	1	151 301 901
10	Upper End Bell Assy (Includes 4,5,6,7,8,9,11 & 12)	1	177 231 908(1)
11	Connector Boss	1	151 820 102
12	"O" Ring	2	275 866 133
13	Upthrust Washer		Not Req'd(1)
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Retaining Ring (2 Wire Only)	1	155 316 101
17	"O" Ring (2 Wire Only)	1	275 868 115
18	Biac Switch (2 Wire Only)	1	152 050 950
19	Thrust Shim .005" Thick	As Req'd	150 069 101
	Thrust Shim .008" Thick	As Req'd	150 069 102
	Thrust Shim .016" Thick	As Req'd	150 069 103
20	Thrust Bearing	1	179 860 102
21	Thrust Segment	2	152 004 901(1)
22	Leveling Washer	1	151 827 101(1)
23	Rocker Washer		Not Req'd(1)
24	Lower End Bell	1	177 230 901(1)
25	Diaphragm Guard	1	151 314 101
26	Diaphragm	1	152 229 101
27	Gasket	1	155 716 101
28	Diaphragm Cover	1	151 872 102
29	Bottom Cover	1	151 871 101
30	Screw & Washer Assy	3	155 548 901
	Lead Assy-Ordered Separately		

Footnotes:

(1) Parts Used on 1 thru 2 HP Models

10	Upper End Bell Assy	1	177 233 907
13	Upthrust Washer	1	151 093 101
21	Thrust Segment	3	152 004 901
22	Leveling Washer	1	155 562 901
23	Rocker Washer	1	155 563 101
24	Lower End Bell	1	177 230 907

For Models Not Shown Consult Factory

Franklin Electric
Bluffton, Indiana 46714

800-348-2420

4-inch Super Stainless Motors: 4-inch dia. - Pollution Recovery

60 HERTZ

SINGLE PHASE

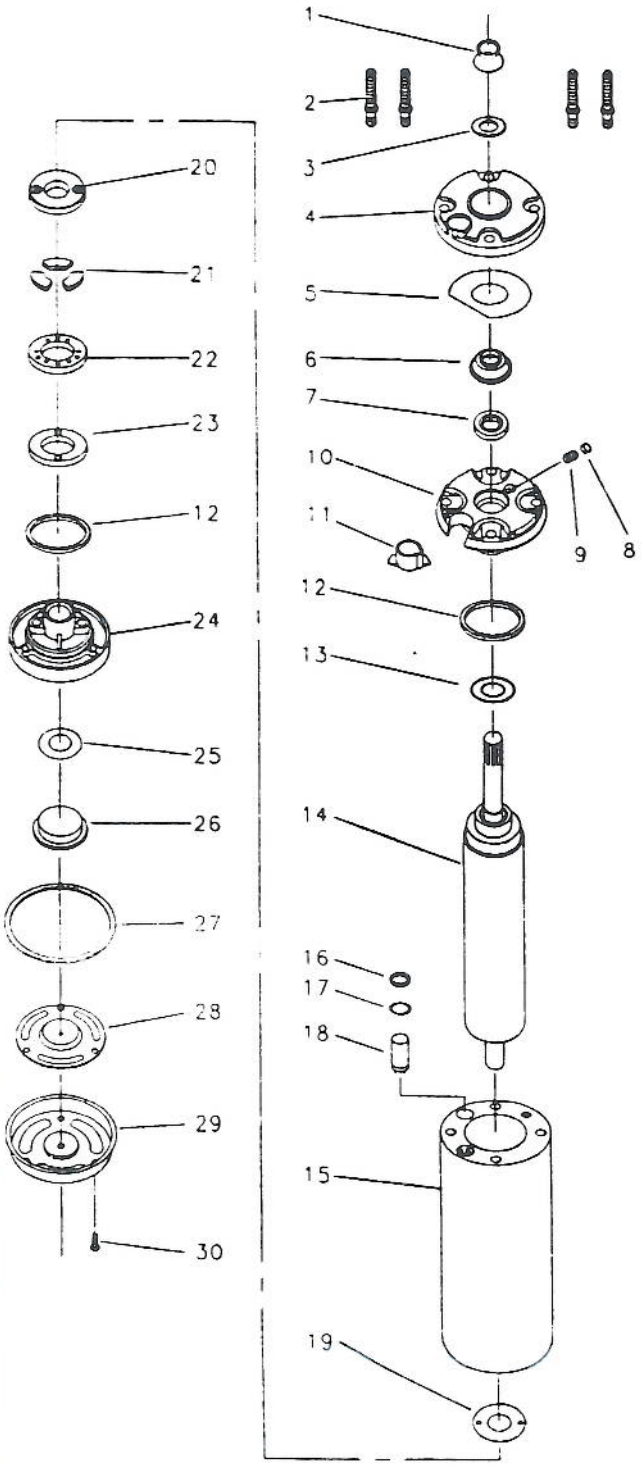
Key	Description	No. Req'd	Part Number
14	Rotor 1/3 HP - 2 or 3 wire	1	178 187 902
	Rotor 1/2 HP - 2 or 3 wire	1	178 166 903
	Rotor 3/4 HP - 2 or 3 wire	1	178 178 903
	Rotor 1 HP - 2 or 3 wire	1	178 188 902
	Rotor 1 1/2 HP - 2 wire	1	178 193 903
	Rotor 1 1/2 HP - 3 wire	1	178 192 904
	Rotor 2 HP - 3 wire	1	178 193 903
15	Stator 1/3 HP - 115V - 2 wire	1	337 442 920
	Stator 1/3 HP - 230V - 2 wire	1	337 443 920
	Stator 1/2 HP - 115V - 2 wire	1	337 444 920
	Stator 1/2 HP - 230V - 2 wire	1	337 445 920
	Stator 3/4 HP - 230V - 2 wire	1	337 446 920
	Stator 1 HP - 230V - 2 wire	1	337 447 920
	Stator 1 1/2 HP - 230V - 2 wire	1	334 016 920
	Stator 1/3 HP - 115V - 3 wire	1	337 448 915
	Stator 1/3 HP - 230V - 3 wire	1	337 449 915
	Stator 1/2 HP - 115V - 3 wire	1	337 450 915
	Stator 1/2 HP - 230V - 3 wire	1	337 451 915
	Stator 3/4 HP - 230V - 3 wire	1	337 452 912
	Stator 1 HP - 230V - 3 wire	1	337 453 915
	Stator 1 1/2 HP - 230V - 3 wire	1	336 845 911
	Stator 2 HP - 230V - 3 wire	1	334 602 931

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 1/2 HP	1	178 166 903
	Rotor 3/4 HP	1	178 178 903
	Rotor 1 HP	1	178 188 902
	Rotor 1 1/2	1	178 188 902
	Rotor 2 HP	1	178 192 904
15	Stator 1/2 HP - 200V	1	338 307 902
	Stator 1/2 HP - 230V	1	338 270 902
	Stator 1/2 HP - 460V	1	338 311 902
	Stator 3/4 HP - 200V	1	338 308 902
	Stator 3/4 HP - 230V	1	338 271 902
	Stator 3/4 HP - 460V	1	338 312 902
	Stator 1 HP - 200V	1	338 309 902
	Stator 1 HP - 230V	1	338 272 902
	Stator 1 HP - 460V	1	338 313 902
	Stator 1 1/2 HP - 200V	1	338 310 902
	Stator 1 1/2 HP - 230V	1	338 306 902
	Stator 1 1/2 HP - 460V	1	337 607 902
	Stator 1 1/2 HP - 575V	1	338 317 902
	Stator 2 HP - 200V	1	336 973 922
	Stator 2 HP - 230V	1	336 852 922
	Stator 2 HP - 460V	1	336 980 912
	Stator 2 HP - 575V	1	

4-inch Super Stainless Motors: 4-inch dia. - Pollution Recovery

For 60 Hertz Models Ending in 2303



Key	Description	No. Req'd	Part Number
1	Spline Protector	1	152 226 101
2	Stud	4	155 194 101
3	Washer	1	275 542 102
4	Top Cover	1	150 261 101
5	Gasket	1	152 030 101
6	Bushing	1	155 540 101
7	Shaft Seal	1	155 512 101
8	Filter	1	155 275 101
9	Check Valve	1	151 301 901
10	Upper End Bell Assy (Includes 4,5,6,7,8,9,11 & 12)	1	177 231 908
11	Connector Boss	1	151 820 102
12	"O" Ring	2	275 866 133
13	Upthrust Washer		Not Req'd
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Retaining Ring (2 Wire Only)	1	155 316 101
17	"O" Ring (2 Wire Only)	1	275 868 115
18	Biac Switch (2 Wire Only)	1	152 050 950
19	Thrust Shim .005" Thick	As Req'd	150 069 101
	Thrust Shim .008" Thick	As Req'd	150 069 102
	Thrust Shim .016" Thick	As Req'd	150 069 103
20	Thrust Bearing	1	179 860 102
21	Thrust Segment	3	152 004 901
22	Leveling Washer	1	155 562 901
23	Rocker Washer	1	155 563 101
24	Lower End Bell	1	177 230 907
25	Diaphragm Guard	1	151 314 101
26	Diaphragm	1	152 229 101
27	Gasket	1	155 716 101
28	Diaphragm Cover	1	151 872 102
29	Bottom Cover	1	151 871 101
30	Screw & Washer Assy	3	155 548 901
	Lead Assy-Ordered Separately		

For Models Not Shown Consult Factory

Franklin Electric
Bluffton, Indiana 46714

800-348-2420

4-inch Super Stainless Motors: 4-inch dia. - Pollution Recovery

60 HERTZ

SINGLE PHASE

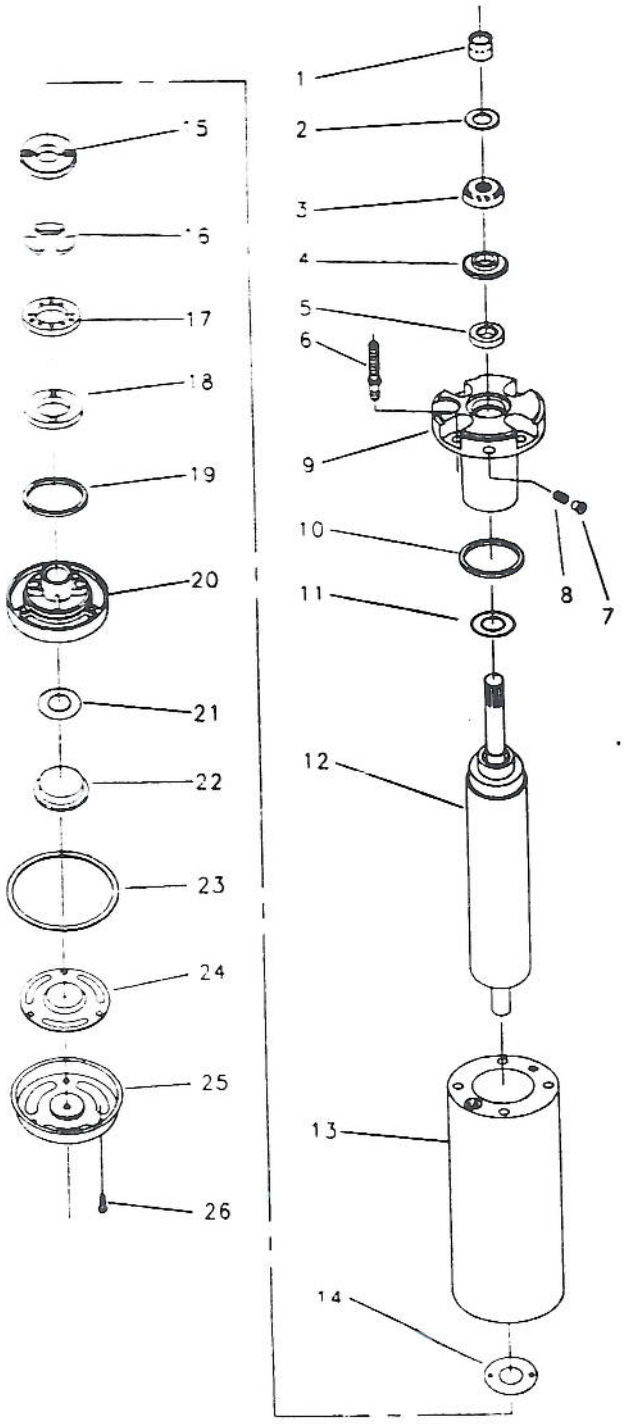
Key	Description	No. Req'd	Part Number
14	Rotor 1 HP - 2 or 3 wire	1	178 246 902
15	Stator 1 HP - 230V - 2 wire	1	337 447 920
	Stator 1 HP - 230V - 3 wire	1	337 453 915

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 1 HP	1	178 246 902
15	Stator 1 HP - 200V	1	338 309 902
	Stator 1 HP - 230V	1	338 272 902
	Stator 1 HP - 380V	1	
	Stator 1 HP - 460V	1	338 313 902
	Stator 1 HP - 575V	1	338 316 902

4-inch Super Stainless: 4-inch dia. - Potable Brackish Water (PBW)

For 60 Hertz Models Ending in 1027



Key	Description	No. Req'd	Part Number
1	Spline Protector	1	150 324 101
2	Washer	1	275 542 102
3	Slinger	1	155 353 101
4	Seal Cover	1	155 354 102
5	Shaft Seal	1	155 007 102
6	Stud	4	155 202 102
7	Filter	1	155 411 901
8	Check Valve	1	151 301 901
9	Upper End Bell Assy (Includes items 4,5 & 8)	1	177 408 901(1)
10	"O" Ring	1	275 744 125
11	Upthrust Washer		Not Req'd(1)
12	Rotor (See Opposite Side)		
13	Stator (See Opposite Side)		
14	Thrust Shim .005" Thick	As Req'd	150 069 101
	Thrust Shim .008" Thick	As Req'd	150 069 102
	Thrust Shim .016" Thick	As Req'd	150 069 103
15	Thrust Bearing	1	179 860 102
16	Thrust Segment	2	152 004 901(1)
17	Leveling Washer	1	151 827 101(1)
18	Rocker Washer		Not Req'd(1)
19	"O" Ring	2	275 743 133
20	Lower End Bell	1	177 230 901(1)
21	Diaphragm Guard	1	151 314 101
22	Diaphragm	1	150 594 101
23	Gasket	1	155 716 101
24	Diaphragm Cover	1	151 872 101
25	Bottom Cover	1	151 871 101
26	Screw & Washer Assy	3	155 548 901
	Lead Assy-Ordered Separately		

Footnotes:

(1) Parts Used on 1 thru 2 HP Models

9	Upper End Bell Assy	1	177 313 903
11	Upthrust Washer	1	151 093 101
16	Thrust Segment	3	152 004 901
17	Leveling Washer	1	155 562 901
18	Rocker Washer	1	155 563 101
20	Lower End Bell	1	177 230 907

For Models Not Shown Consult Factory

Franklin Electric
Bluffton, Indiana 46714

800-348-2420

4-inch Super Stainless: 4-inch dia. - Potable Brackish Water (PBW)

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
12	Rotor 1/2 HP - 3 wire	1	178 166 906
	Rotor 3/4 HP - 3 wire	1	178 178 905
	Rotor 1 HP - 3 wire	1	178 188 905
	Rotor 1 1/2 HP - 3 wire	1	178 192 906
	Rotor 2 HP - 3 wire	1	178 193 906
13	Stator 1/2 HP - 115V - 3 wire	1	337 450 916
	Stator 1/2 HP - 230V - 3 wire	1	337 451 916
	Stator 3/4 HP - 230V - 3 wire	1	337 452 916
	Stator 1 HP - 230V - 3 wire	1	337 453 916
	Stator 1 1/2 HP - 230V - 3 wire	1	336 845 916
	Stator 2 HP - 230V - 3 wire	1	334 602 925

Repair Procedure - 4" High Thrust

Tools Required:
Diaphragm Depth Gage - 305 079 111 (RK-8-13A)
Hand Filling Syringe - 305 079 104 (RK-6-10)
Shaft Height Gage - 305 079 105 (RK-8-3)
Seal & Seal Cover Insertion Tool - 305 079 132 (RK-12-1S)
9mm Deep Socket
3/4" Crowfoot adapter
3.1mm Drill Bit
Ball Peen Hammer
Center Punch
Flat Blade Screw Driver
Padded Vise Grips
Rubber Mallet
Socket Drive Screw Driver
Strap Wrench
Torque Wrench - Set 6-12 lb. feet for motor studs
Torque Wrench - Set 10 lb. feet to check adjusting screw staking
Torque Wrench - Set 12-14 lb. feet for lower end bell fasteners
Torque Wrench - Set 15-20 lb. feet for lead jam nut
Torque Wrench - Set 35-45 lb. inches for diaphragm cover screws

Torque Values are the same for Water Well & Corrosion Resistant motors. However, lubricate 316 SST threads with "Never-seez" before assembling.

Refer to Exploded View pages for part descriptions

Step 1: Upper End Bell assembly
Clamp stator in horizontal position. Use a clean rag (wet with water) and swab the stator bore to remove any dust or dirt particles. Lubricate upper stator rabbet with silicone grease. Lubricate "O" ring with silicone grease and attach to upper end bell assembly. Seat end bell assembly in stator with hand pressure and rotate end bell to seat "O" ring. Using a motor lead, align lead cavity in end bell with lead cavity in stator end. Attach upper end bell to the stator using the four studs. Torque studs in a cross pattern to 6-12 lb. ft. using torque wrench and 9mm deep socket.

Step 2: Rotor Assembly
Wet upper bearing with fill solution (mixed from Prefill Kit). Confirm the upthrust washer is in place on the rotor. Insert rotor into stator bore, being careful not to nick upper bearing or damage stator liner.

Step 3: Lower End Bell Assembly
Lubricate lower stator rabbet with silicone grease. Lubricate "O" ring with silicone grease and assemble to end bell. Wet bearing with fill solution. Place the end bell over the lower shaft extension with the nose of the end bell toward the stator bore. Seat end bell in stator with hand pressure and rotate end bell to seat "O" ring. Attach lower end bell to stator. Torque fasteners, in a cross pattern, to 12-14 lb. ft. with the torque wrench.

Step 4: Installing Thrust Assembly
Install the woodruff key in the rotor shaft. Slide the thrust bearing onto the shaft. Make sure the hub on the thrust bearing support is against the shaft shoulder. Using a center punch, stake the junction of the bearing hub and rotor shaft to prevent the bearing from slipping off. Rotate the motor into the vertical shaft-up position. Clamp the rotor in the upper most position with padded vise grips. Install the shaft height adjusting screw into the thrust housing. Adjust screw so two or three threads, on the slot end, of the screw remain exposed. Install the leveling disc into the thrust housing with the anti-rotation slot engaging the roll pin. Assemble rocker arms, pins and thrust segments onto the leveling disc and wet the thrust segments with fill solution. Attach the thrust housing assembly to the threaded lower end bell. Be careful not to nick or damage the thrust bearing. Using a strap wrench tighten the thrust housing so there is no gap between the stator face and the thrust housing.

Step 5: Adjusting Shaft Height
Tighten the adjusting screw until the thrust segments contact the thrust bearing and pick up the weight of the rotor. Remove vise grips and spin the motor shaft to be certain the rotor turns freely.

Continued on Back Side

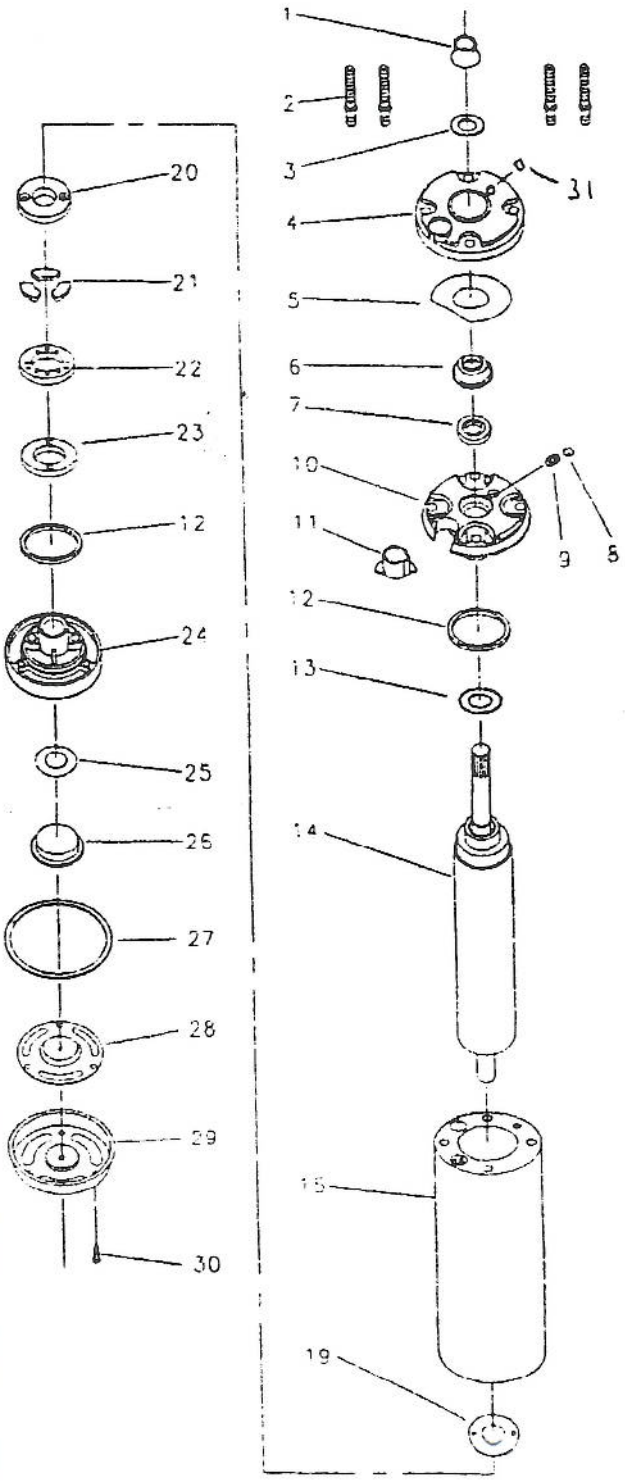
Franklin Electric
Bluffton, Indiana 46714

800-348-2420

PAGE: SD 3Hp Spl
DATE: Oct. 5, 2000
SUPERSEDES: New

4-inch 3 Hp 900# Super Stainless Motors - Water Well

For 50 and 60 Hertz Models Ending in 2504 & 2604 -



Key	Description	Req'd	Part Number
1	Spline Protector	1	150 224 101
2	Stud	4	155 202 105
3	Washer	1	275 542 102
4	Top Cover	1	150 251 101
5	Gasket	1	152 230 101
6	Bushing	1	155 235 101
7	Shaft Seal	1	155 007 102
8	Filter	1	155 275 101
9	Check Valve	1	151 301 901
10	Upper End Bell Assy (Includes 4,5,6,7,8,9,11 & 12)	1	177 459 901
11	Connector Boss	1	151 820 102
12	"O" Ring	2	275 043 133
13	Upthrust Washer		151 093 101
14	Rotor (Consult Factory)		
15	Stator (Consult Factory)		
19	Thrust Shim .005" Thick	As Req'd	150 069 101
	Thrust Shim .008" Thick	As Req'd	150 069 102
	Thrust Shim .016" Thick	As Req'd	150 069 103
20	Thrust Bearing	1	179 860 102
21	Thrust Segment	3	177 491 101
22	Leveling Washer	1	155 163 101
23	Rocker Washer	1	156 162 101
24	Lower End Bell	1	177 230 910
25	Diaphragm Guard	1	151 314 101
26	Diaphragm	1	150 594 101
27	Gasket	1	155 716 101
28	Diaphragm Cover	1	151 872 101
29	Bottom Cover	1	151 871 101
30	Screw & Washer Assy	3	155 548 901
31	Plug	1	155 811 101
	3-wire Lead Assy	1	152 553 906

For Models Not Shown Consult Factory

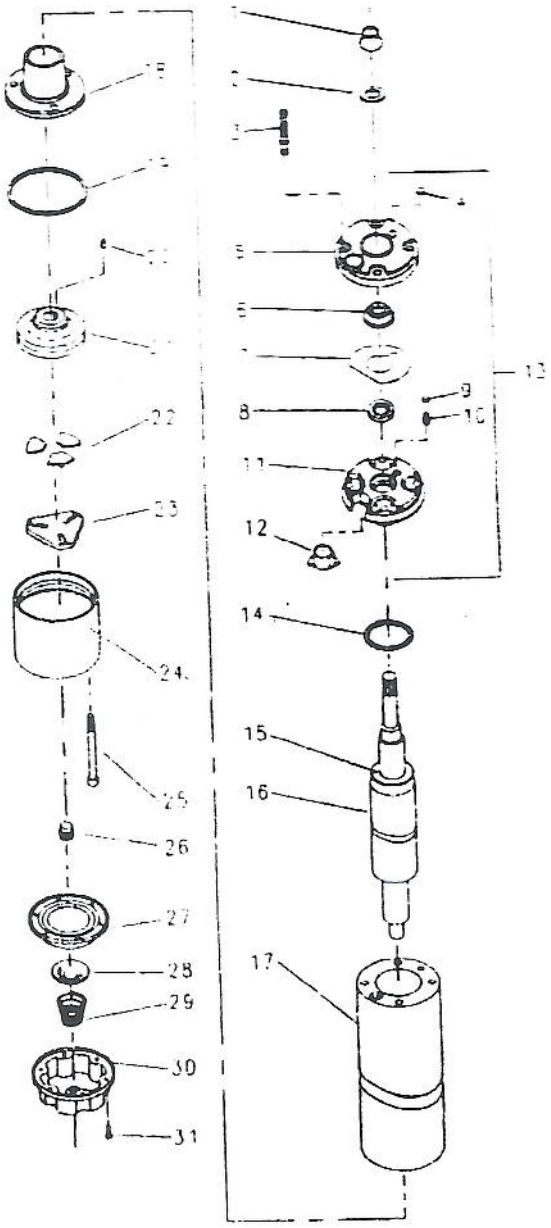
Franklin Electric
Bluffton, Indiana 46714

800-348-2420

PAGE: SD 221.02
DATE: 3-20-2000
SUPERSEDES: New

4-Inch High Thrust: (Clad) - Water Well

For 50 and 60 Hertz Models 2-4---5202, 2-4---3402, & 2-4---3403



Key	Description	No. Req'd	Part Number
1	Spline Protector	1	150 224 101
2	Washer	1	275 542 102
3	Stud	4	155 202 102
4	Plug	1	155 811 101
5	Cover	1	150 261 201
6	Bushing	1	155 235 101
7	Gasket	1	152 030 101
8	Shaft Seal	1	155 007 102
9	Filter	1	155 275 102
10	Check Valve	1	151 301 901
11	Upper End Bell - 1.125" Bore	1	
	Upper End Bell - .75" Bore	1	
12	Connector Boss	1	151 820 102
13	Upper End Bell - 1.125" Bore	1	177 434 901(1)
	Upper End Bell - .75" Bore	1	177 469 903(2)
14	"O" Ring	1	275 743 133
15	Upthrust Washer - 1.125" Bore	1	155 396 101(1)
	Upthrust Washer - .75" Bore	1	155 396 102(2)
16	Rotor (See Opposite Side)	1	
17	Stator (See Opposite Side)	1	
18	Lower End Bell - 1.125" Bore	1	177 379 901(1)
	Lower End Bell - .75" Bore	1	177 379 902(2)
19	"O" Ring	1	155 766 101
20	Woodruff Key	1	275 250 104
21	Thrust Bearing	1	155 658 901
22	Thrust Segment	3	155 692 201
23	Leveling Disc	1	155 660 101
24	Thrust Housing	1	177 378 901
25	Cap Screw	3	276 040 170
26	Adjusting Screw	1	151 048 102
27	Diaphragm	1	155 651 102
28	Diaphragm Cup	1	151 448 101
29	Diaphragm Spring	1	151 449 101
30	Diaphragm Cover	1	155 647 101
31	Rd Head Screw	6	275 154 403

Thrust Bearing Kit - includes items 19 20,21,22,23, & 26	305 321 901
Seal Kit - includes items 1,2,4,8,9,10,14, 19,27 & grease	305 320 901
End Bell Kit - Cast Iron - 1.125" Bore	305 319 901(1)
End Bell Kit - Cast Iron - .75" Bore	305 319 902(2)

* End Bell Kits - include items in Seal Kit plus items 18,24, & 26

Footnotes:
(1) Used on 3HP, 1PH and 5HP, 3PH and larger motors.
(2) Used on 2HP, 1 PH and 3HP, 3PH and smaller motors.

For Models Not Shown Consult Factory

PAGE: SD 221 03
DATE: 3-20-2000
SUPERSEDES: New

4-inch High Thrust: 4-inch dia. - Water Well

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
11	Rotor 3 HP	1	178 152 914
	Rotor 5 HP	1	178 153 915
12	Stator 3 HP - 230V	1	334 597 922
	Stator 5 HP - 230V	1	334 517 922

THREE PHASE

Key	Description	No. Req'd	Part Number
11	Rotor 3 HP	1	178 193 909
	Rotor 5 HP	1	178 152 914
	Rotor 7 1/2 HP	1	178 153 915
	Rotor 10 HP	1	178 222 904
12	Stator 3 HP - 200V	1	336 974 905
	Stator 3 HP - 230V	1	336 853 910
	Stator 3 HP - 380V	1	336 977 906
	Stator 3 HP - 460V	1	336 981 913
	Stator 3 HP - 575V	1	336 985 910
	Stator 5 HP - 200V	1	336 975 907
	Stator 5 HP - 230V	1	336 854 910
	Stator 5 HP - 380V	1	336 978 905
	Stator 5 HP - 460V	1	336 982 910
	Stator 5 HP - 575V	1	336 986 907
	Stator 7 1/2 HP - 200V	1	337 118 907
	Stator 7 1/2 HP - 230V	1	337 119 911
	Stator 7 1/2 HP - 380V	1	336 947 907
	Stator 7 1/2 HP - 460V	1	336 910 910
	Stator 7 1/2 HP - 575V	1	336 987 907
	Stator 10 HP - 380V	1	338 722 906
	Stator 10 HP - 460V	1	337 937 907
	Stator 10 HP - 575V	1	331 446 902

50 HERTZ

SINGLE PHASE

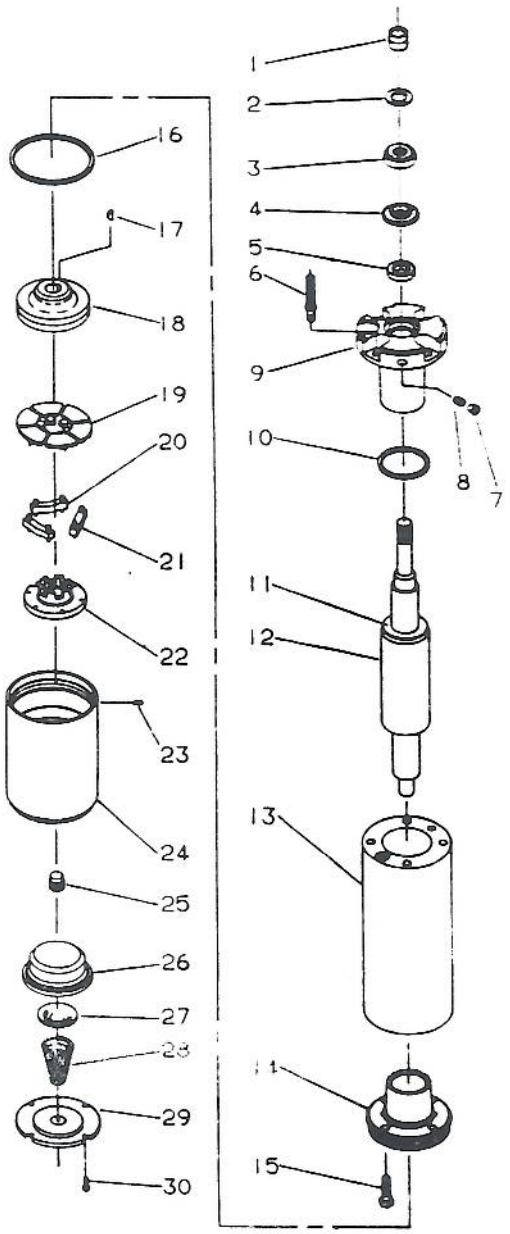
Key	Description	No. Req'd	Part Number
11	Rotor 3 HP	1	178 152 914
	Rotor 5 HP	1	178 153 915
12	Stator 3 HP – 220V	1	337 130 911
	Stator 5 HP – 220V	1	338 171 911

THREE PHASE

Key	Description	No. Req'd	Part Number
11	Rotor 3 HP	1	178 193 909
	Rotor 5 HP	1	178 152 914
	Rotor 7 1/2 HP	1	178 153 915
	Rotor 10 HP	1	178 222 904
12	Stator 3 HP - 220V	1	336 990 905
	Stator 3 HP - 380V	1	336 981 913
	Stator 5 HP - 220V	1	336 991 906
	Stator 5 HP - 380V	1	336 982 910
	Stator 7 1/2 HP - 220V	1	336 992 906
	Stator 7 1/2 HP - 380V	1	336 910 910
	Stator 10 HP - 380V	1	337 937 907

4-inch High Thrust: 4-inch dia. - Water Well

For 50 and 60 Hertz Models 2-4—7003, 2-4—7004, 2-4—7014 & 2-4—8304



Key	Description	No. Req'd	Part Number
1	Spline Protector	1	150 324 101
2	Washer	1	275 542 102
3	Slinger	1	155 353 101
4	Seal Cover	1	155 354 102
5	Shaft Seal	1	155 007 102
6	Stud	4	155 202 102
7	Filter	1	155 411 901
8	Check Valve	1	151 301 901
9	Upper End Bell - 1.125" Bore	1	177 312 902(1)
	Upper End Bell - .75" Bore (Includes items 4,5 & 8)	1	177 313 902(2)
10	"O" Ring	1	275 744 125
11	Upthrust Washer - 1.125" Bore	1	155 396 101(1)
	Upthrust Washer - .75" Bore	1	155 396 102(2)
12	Rotor (See Opposite Side)		
13	Stator (See Opposite Side)		
14	Lower End Bell - 1.125" Bore	1	177 154 902(1)
	Lower End Bell - .75" Bore	1	177 257 901(2)
	Lower End Bell - 10 HP only	1	177 154 903
15	Hex Head Screw	4	275 339 170
16	"O" Ring	1	275 744 136
17	Woodruff Key	1	275 250 104
18	Thrust Bearing	1	151 444 904
	Thrust Bearing - 10 HP only	1	150 433 901
19	Thrust Segment	6	150 492 902
20	Rocker Arm	3	150 208 101
21	Rocker Arm Pin	6	151 822 201
22	Leveling Disc	1	150 493 101
23	Pin	1	151 450 102
24	Thrust Housing	1	177 146 905
25	Adjusting Screw	1	151 048 102
26	Diaphragm	1	150 325 101
27	Diaphragm Cup	1	151 448 101
28	Diaphragm Spring	1	151 449 101
29	Diaphragm Cover	1	152 131 101
30	Rd Head Screw	4	276 000 152
	"O" Ring for Ctr Brg (10HP only)	2	275 743 132
	3-wire Lead Assy	1	152 553 906
	Thrust Bearing Kit - (for all motors except 10 HP) includes items 16, 17,18,19,20,21,22,23 & 25		305 010 901
	Seal Kit - includes items 1,2,3,4,5,7,8, 10,16,23,26,27,28,29,30 & grease		305 027 903
	End Bell Kit - Cast Iron - 1.125" Bore		305 011 904(1)
	End Bell Kit - Cast Iron - .75" Bore		305 011 905(2)
	Kits (for all motors except 10 HP) include items in Seal Kit plus items 9,14,24 & 25		

Footnotes:
(1) Used on 3HP, 1PH and 5HP, 3PH and larger motors.
(2) Used on 2HP, 1 PH and 3HP, 3PH and smaller motors.

For Models Not Shown Consult Factory

4-inch High Thrust: 4-inch dia. - Water Well

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
12	Rotor 3 HP	1	178 152 904
	Rotor 5 HP	1	178 153 906
13	Stator 3 HP - 230V	1	334 597 914
	Stator 5 HP - 230V	1	334 517 914

THREE PHASE

Key	Description	No. Req'd	Part Number
12	Rotor 3 HP	1	178 193 902
	Rotor 5 HP	1	178 152 904
	Rotor 7 1/2 HP	1	178 153 905
	Rotor 10 HP	1	178 145 902
13	Stator 3 HP - 200V	1	336 974 902
	Stator 3 HP - 230V	1	336 853 902
	Stator 3 HP - 380V	1	336 977 902
	Stator 3 HP - 460V	1	336 981 902
	Stator 3 HP - 575V	1	336 985 902
	Stator 5 HP - 200V	1	336 975 904
	Stator 5 HP - 230V	1	336 854 904
	Stator 5 HP - 380V	1	336 978 903
	Stator 5 HP - 460V	1	336 982 904
	Stator 5 HP - 575V	1	336 986 904
	Stator 7 1/2 HP - 200V	1	337 118 903
	Stator 7 1/2 HP - 230V	1	337 119 903
	Stator 7 1/2 HP - 380V	1	336 947 902
	Stator 7 1/2 HP - 460V	1	336 910 906
	Stator 7 1/2 HP - 575V	1	336 987 903
	Stator 10 HP - 380V	1	336 979 902
	Stator 10 HP - 460V	1	336 983 902
	Stator 10 HP - 575V	1	337 564 902

50 HERTZ

SINGLE PHASE

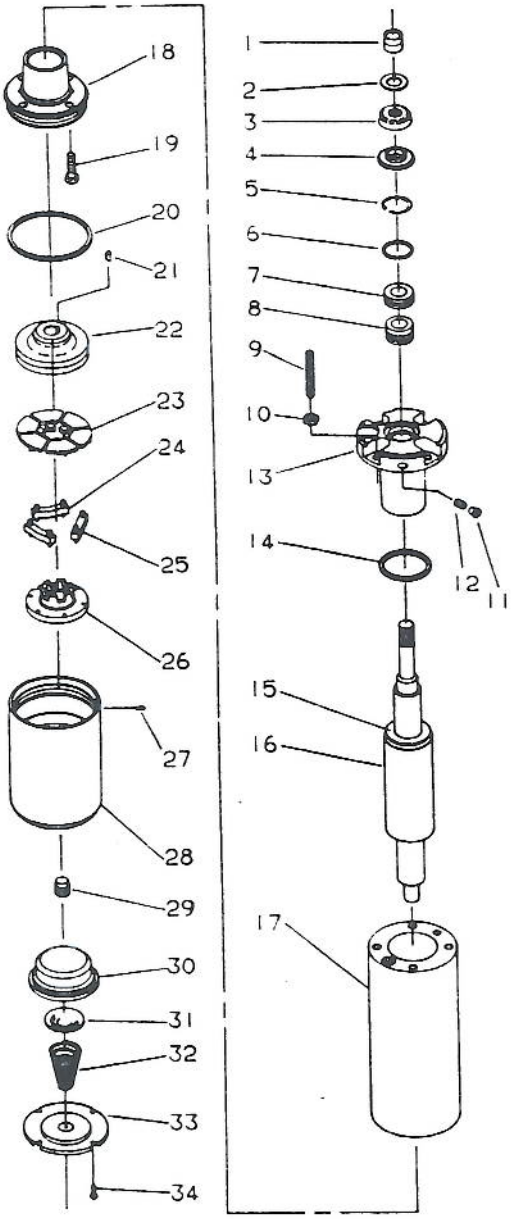
Key	Description	No. Req'd	Part Number
12	Rotor 3 HP	1	178 152 904
	Rotor 5 HP	1	178 153 906
13	Stator 3 HP - 220V	1	337 130 903
	Stator 5 HP - 220V	1	336 171 905

THREE PHASE

Key	Description	No. Req'd	Part Number
12	Rotor 3 HP	1	178 193 902
	Rotor 5 HP	1	178 152 904
	Rotor 7 1/2 HP	1	178 153 905
	Rotor 10 HP	1	178 145 902
13	Stator 3 HP - 220V	1	336 990 9[illegible]
	Stator 3 HP - 380V	1	336 981 [illegible]
	Stator 5 HP - 220V	1	336 991 9[illegible]
	Stator 5 HP - 380V	1	336 982 904
	Stator 7 1/2 HP - 220V	1	336 992 903
	Stator 7 1/2 HP - 380V	1	336 910 906
	Stator 10 HP - 380V	1	336 983 902

4-inch High Thrust: 4-inch dia. - Ni-Resist

For 60 Hertz Models 2-4—7303, 2-4—7304 & 2-4—7314



Key	Description	No. Req'd	Part Number
1	Spline Protector	1	150 324 101
2	Washer	1	275 542 102
3	Slinger	1	155 353 101
4	Seal Cover	1	155 354 101
5	Retainer Ring	1	155 369 121
6	"O" Ring	1	150 321 174
7	Stationary Seal	1	155 263 201
8	Rotating Seal	1	155 263 202
9	Stud	4	155 472 101
10	Hex Nut	4	275 563 102
11	Pipe Plug	1	275 244 102
12	Check Valve	1	151 301 901
13	Upper End Bell - 1.125" Bore	1	177 318 901(1)
	Upper End Bell - .75" Bore	1	177 324 901(2)
14	"O" Ring	1	275 744 125
15	Upthrust Washer - 1.125" Bore	1	155 396 101(1)
	Upthrust Washer - .75" Bore	1	155 396 102(2)
16	Rotor (See Opposite Side)		
17	Stator (See Opposite Side)		
18	Lower End Bell - 1.125" Bore	1	177 154 902(1)
	Lower End Bell - .75" Bore	1	177 257 901(2)
	Lower End Bell - 10 HP only	1	177 154 903
19	Hex Head Screw	4	275 339 170
20	"O" Ring	1	275 744 136
21	Woodruff Key	1	275 250 104
22	Thrust Bearing	1	151 444 904
	Thrust Bearing - 10 HP only	1	150 433 901
23	Thrust Segment	6	150 492 902
24	Rocker Arm	3	150 208 101
25	Rocker Arm Pin	6	151 82[illegible]
26	Leveling Disc	1	150 49[illegible]
27	Pin	1	151 450 103
28	Thrust Housing	1	177 299 902
29	Adjusting Screw	1	151 048 [illegible]
30	Diaphragm	1	155 27[illegible] 01
31	Diaphragm Cup	1	15[illegible] 101
32	Diaphragm Spring	1	151 449 101
33	Diaphragm Cover	1	152 131 102
34	Rd Head Screw	4	275 978 354
	"O" Ring for Ctr Brg (10HP only)	2	275 743 132
	Lead Assy-Ordered Separately		

Footnotes:
(1) Used on 3 HP, 1 PH and 5 HP, 3 PH and larger motors
(2) Used on 2 HP, 1 PH and 3 HP, 3 PH and smaller motors

For Models Not Shown Consult Factory

Franklin Electric
Bluffton, Indiana 46714

800-348-2420

4-inch High Thrust: 4-inch dia. - Ni-Resist

60 HERTZ

SINGLE PHASE

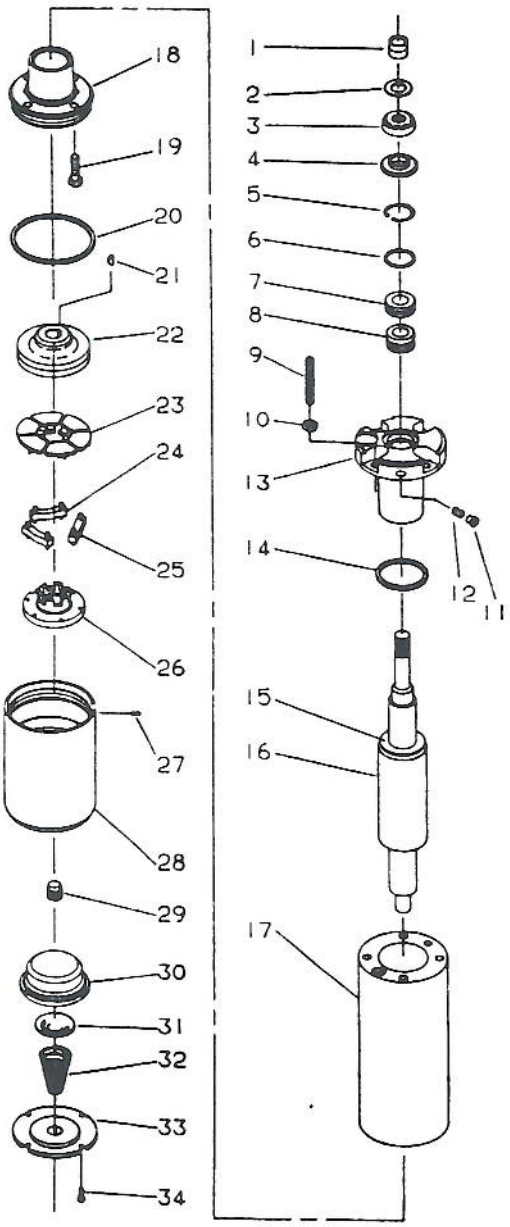
Key	Description	No. Req'd	Part Number
16	Rotor 1 1/2 HP	1	178 192 903
	Rotor 2 HP	1	178 193 904
	Rotor 3 HP	1	178 152 904
	Rotor 5 HP	1	178 153 905
17	Stator 1 1/2 HP - 230V	1	336 845 904
	Stator 2 HP - 230V	1	334 602 917
	Stator 3 HP - 230V	1	334 597 915
	Stator 5 HP - 230V	1	334 517 916

THREE PHASE

Key	Description	No. Req'd	Part Number
16	Rotor 1 1/2 HP	1	178 136 905
	Rotor 2 HP	1	178 192 903
	Rotor 3 HP	1	178 193 904
	Rotor 5 HP	1	178 152 904
	Rotor 7 1/2 HP	1	178 153 905
	Rotor 10 HP	1	178 145 902
17	Stator 1 1/2 HP - 200V	1	334 857 908
	Stator 1 1/2 HP - 230V	1	334 835 910
	Stator 1 1/2 HP - 460V	1	334 859 913
	Stator 1 1/2 HP - 575V	1	334 860 907
	Stator 2 HP - 200V	1	336 973 903
	Stator 2 HP - 230V	1	336 852 903
	Stator 2 HP - 460V	1	336 980 903
	Stator 2 HP - 575V	1	336 984 903
	Stator 3 HP - 200V	1	336 974 903
	Stator 3 HP - 230V	1	336 853 903
	Stator 3 HP - 460V	1	336 981 903
	Stator 3 HP - 575V	1	336 985 903
	Stator 5 HP - 200V	1	336 975 905
	Stator 5 HP - 230V	1	336 854 905
	Stator 5 HP - 460V	1	336 982 905
	Stator 5 HP - 575V	1	336 986 905
	Stator 7 1/2 HP - 200V	1	337 118 904
	Stator 7 1/2 HP - 230V	1	337 119 904
	Stator 7 1/2 HP - 460V	1	336 910 905
	Stator 7 1/2 HP - 575V	1	336 987 904
	Stator 10 HP - 460V	1	336 983 905

4-inch High Thrust: 4-inch dia. - 316 Stainless Steel

For 60 Hertz Models 2-4—7403, 2-4—7404 & 2-4—7414



Key	Description	No. Req'd	Part Number
1	Spline Protector	1	150 324 101
2	Washer	1	275 542 102
3	Slinger	1	155 353 101
4	Seal Cover	1	155 354 101
5	Retainer Ring	1	155 369 121
6	"O" Ring	1	150 321 174
7	Stationary Seal	1	155 263 201
8	Rotating Seal	1	155 263 202
9	Stud	4	155 472 101
10	Hex Nut	4	275 563 102
11	Pipe Plug	1	275 244 102
12	Check Valve	1	151 301 902
13	Upper End Bell - 1.125" Bore	1	177 333 931(1)
	Upper End Bell - .75" Bore	1	177 339 901(2)
14	"O" Ring	1	275 744 125
15	Upthrust Washer - 1.125" Bore	1	155 396 101(1)
	Upthrust Washer - .75" Bore	1	155 396 102(2)
16	Rotor (See Opposite Side)		
17	Stator (See Opposite Side)		
18	Lower End Bell - 1.125" Bore	1	177 154 902(1)
	Lower End Bell - .75" Bore	1	177 257 901(2)
	Lower End Bell - 10 HP only	1	177 154 903
19	Hex Head Screw	4	275 339 170
20	"O" Ring	1	275 744 136
21	Woodruff Key	1	275 250 104
22	Thrust Bearing	1	151 444 904
	Thrust Bearing - 10 HP only	1	150 433 901
23	Thrust Segment	6	150 492 902
24	Rocker Arm	3	150 208 101
25	Rocker Arm Pin	6	151 822 201
26	Leveling Disc	1	150 493 101
27	Pin	1	151 450 103
28	Thrust Housing	1	177 276 902
29	Adjusting Screw	1	151 048 102
30	Diaphragm	1	155 276 101
31	Diaphragm Cup	1	151 448 101
32	Diaphragm Spring	1	151 449 101
33	Diaphragm Cover	1	152 131 102
34	Rd Head Screw	4	275 978 354
	"O" Ring for Ctr Brg (10HP only)	2	275 743 132
	Lead Assy-Ordered Separately		

Footnotes:
(1) Used on 3 HP, 1 PH and 5 HP, 3 PH and larger motors.
(2) Used on 2 HP, 1 PH and 3 HP, 3 PH and smaller motors.

For Models Not Shown Consult Factory

Franklin Electric
Bluffton, Indiana 46714

800-348-2420

Repair Procedure - 4" High Thrust

Step 5: Adjusting Shaft Height "continued"
With a rubber mallet, strike the shaft extension squarely two or three times to seat the thrust assembly. Place the *"Go"* step of the *"Shaft Height Gage"* over the shaft extension. **Note: The shaft will be high at this time.** Back out the adjusting screw until the shaft end is between the *"Go"* and *"No Go"* steps on the gage. Make sure the bottom of the gage rests on the upper end bell. Spin the shaft and check for free rotation. Rotate the motor into the horizontal position. Using a magnetic base dial indicator, indicate the free end play of the motor shaft. Free end play should be between .010" and .045". Using a center punch and hammer, stake the threads of the adjusting screw three places 120 degrees apart to prevent movement of the adjusting screw. The adjusting screw stakes must hold a minimum of 10 lb. ft of torque. Reconfirm correct shaft height.

Step 6: Pinning the Thrust Housing
If you are using an old thrust housing, use the existing hole as a guide to drill a 3.1mm diameter hole 11/32" deep. If using a new thrust housing, center punch the housing, in line with the weld seam of the stator, 7/16" below upper edge. Then drill a 3.1mm diameter hole 11/32" deep. Fill drilled hole with Loc-tite and tap pin in place. Using center punch, stake the pin to make a positive seal between the pin and the casting.

Step 7: Seal Installation
Lubricate ID and OD of lip seal with silicone grease. Install seal into seal cavity with spring of seal upwards. Using a rubber mallet and the *"Seal & Seal Cover Insertion Tool"* seat the seal in the seal cavity. Using *"Seal Cover"* tool again install the seal cover until it bottoms in cover cavity.

Step 8: Filling the Motor
Rotate motor into shaft-down position. Slowly add fill solution until diaphragm cavity in thrust housing is full. Rotate and pump shaft until air bubbles cease.

Step 9: Installing the Diaphragm
Install diaphragm, diaphragm cup, diaphragm spring and diaphragm cover. Torque screws to 35-45 lb. in. with the torque wrench.

Step 10: Removing Air from Motor
Option 1 - Use vacuum system as shown on the *"Vacuum Filling Apparatus"* page of this *"Service Data"* manual. Option 2 - Turn motor so check valve is up and elevate shaft end approximately 30 degrees above horizontal. Using *"Hand Filling Syringe"*, inject fill solution into motor through the check valve. Depress the check valve with diaphragm depth gage and allow entrapped air to escape. Repeat as necessary to insure all air is removed from the motor. Check for correct fill level by inserting the *"Diaphragm Depth Gage"* through the hole in the diaphragm cover until it touches the diaphragm. If the gage goes in beyond the undercut graduation of the stem, add more fill solution with the *"Syringe"* and recheck. Continue process until the graduation on the gage is adjacent to the hole in the diaphragm cover.

Step 11: Final Inspection
Using a magnetic base dial indicator, indicate run-out just below spline on shaft extension. Maximum allowance is .004" F.I.M. (T.I.R.). Check for fluid leaks at shaft seal, check valve, "O" rings, diaphragm and staking pin. Install filter (water well motors) or pipe plug (corrosion resistant motors) above check valve. Lubricate labyrinth seal of slinger with silicone grease and install slinger, washer and spline protector by hand.

Step 12: Lea · Insertion
Spray lead cavity with drying agent, denatured alcohol or equivalent, and blow out with compressed air. Install motor lead and torque jam nut to 15-20 lb. ft. using torque wrench and crowfoot adapter.

Motor is now ready for testing.

4-inch High Thrust: 4-inch dia. - 316 Stainless Steel

60 HERTZ

SINGLE PHASE

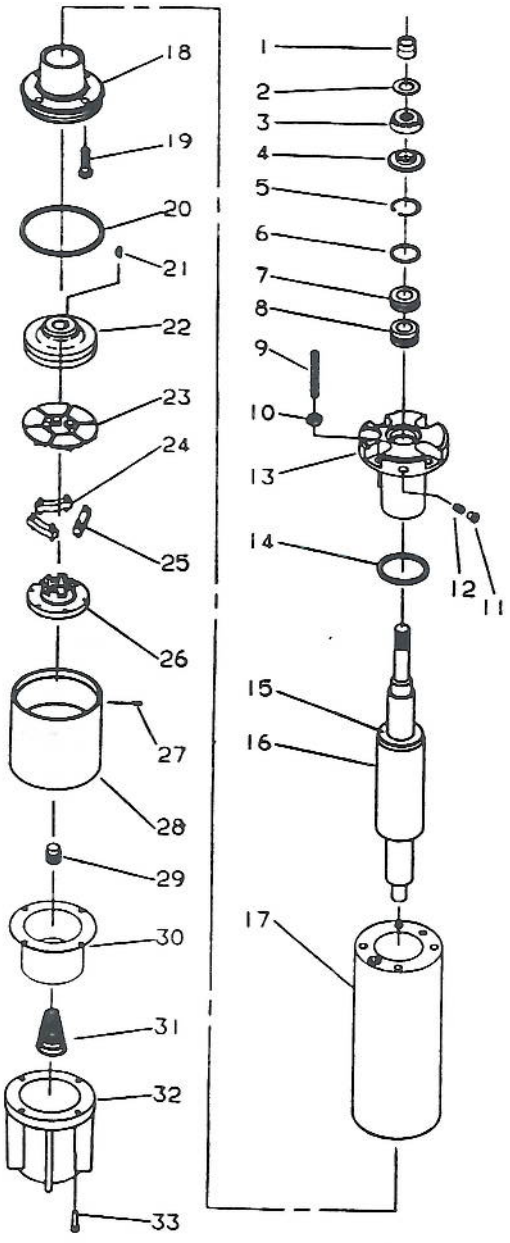
Key	Description	No. Req'd	Part Number
16	Rotor 1 1/2 HP	1	178 192 903
	Rotor 2 HP	1	178 193 904
	Rotor 3 HP	1	178 152 904
	Rotor 5 HP	1	178 153 905
17	Stator 1 1/2 HP - 230V	1	336 845 904
	Stator 2 HP - 230V	1	334 602 917
	Stator 3 HP - 230V	1	334 597 915
	Stator 5 HP - 230V	1	334 517 916

THREE PHASE

Key	Description	No. Req'd	Part Number
16	Rotor 1 1/2 HP	1	178 136 905
	Rotor 2 HP	1	178 192 903
	Rotor 3 HP	1	178 193 904
	Rotor 5 HP	1	178 152 904
	Rotor 7 1/2 HP	1	178 153 905
	Rotor 10 HP	1	178 145 902
17	Stator 1 1/2 HP - 200V	1	334 857 908
	Stator 1 1/2 HP - 230V	1	334 835 910
	Stator 1 1/2 HP - 460V	1	334 859 913
	Stator 1 1/2 HP - 575V	1	334 860 907
	Stator 2 HP - 200V	1	336 973 903
	Stator 2 HP - 230V	1	336 852 903
	Stator 2 HP - 460V	1	336 980 903
	Stator 2 HP - 575V	1	336 984 903
	Stator 3 HP - 200V	1	336 974 903
	Stator 3 HP - 230V	1	336 853 903
	Stator 3 HP - 460V	1	336 981 903
	Stator 3 HP - 575V	1	336 985 903
	Stator 5 HP - 200V	1	336 975 905
	Stator 5 HP - 230V	1	336 854 905
	Stator 5 HP - 460V	1	336 982 905
	Stator 5 HP - 575V	1	336 986 905
	Stator 7 1/2 HP - 200V	1	337 118 904
	Stator 7 1/2 HP - 230V	1	337 119 904
	Stator 7 1/2 HP - 460V	1	336 910 905
	Stator 7 1/2 HP - 575V	1	336 987 904
	Stator 10 HP - 460V	1	336 983 905

4-inch High Thrust: 4-inch dia. - Oil Stripper

For 60 Hertz Models 2-4--5004 & 2-4--5014



Key	Description	No. Req'd	Part Number
1	Spline Protector	1	150 324 101
2	Washer	1	275 542 102
3	Slinger	1	155 353 101
4	Seal Cover	1	155 354 101
5	Retainer Ring	1	155 369 121
6	"O" Ring	1	150 321 174
7	Stationary Seal	1	155 263 201
8	Rotating Seal	1	155 263 202
9	Stud	4	155 472 101
10	Hex Nut	4	275 563 102
11	Pipe Plug	1	275 244 102
12	Check Valve	1	151 301 901
13	Upper End Bell - 1.125" Bore	1	177 318 901(1)
	Upper End Bell - .75" Bore	1	177 324 901(2)
14	"O" Ring	1	275 744 125
15	Upthrust Washer - 1.125" Bore	1	155 396 101(1)
	Upthrust Washer - .75" Bore	1	155 396 102(2)
16	Rotor (See Opposite Side)		
17	Stator (See Opposite Side)		
18	Lower End Bell - 1.125" Bore	1	177 154 902(1)
	Lower End Bell - .75" Bore	1	177 257 901(2)
	Lower End Bell - 10 HP only	1	177 154 903
19	Hex Head Screw	4	275 339 170
20	"O" Ring	1	275 744 136
21	Woodruff Key	1	275 250 104
22	Thrust Bearing	1	151 444 904
	Thrust Bearing - 10 HP only	1	150 433 901
23	Thrust Segment	6	150 492 902
24	Rocker Arm	3	150 208 101
25	Rocker Arm Pin	6	151 822 201
26	Leveling Disc	1	150 493 101
27	Pin	1	151 450 103
28	Thrust Housing	1	177 315 901
29	Adjusting Screw	1	151 048 102
30	Diaphragm	1	273 434 601
31	Diaphragm Spring	1	273 454 101
32	Diaphragm Cover	1	177 316 101
33	Socket Head Screw	4	275 401 454
	"O" Ring for Ctr Brg (10HP only)	2	275 743 132
	Oil	A/R	902 823 102
	Lead Assy	1	152 255 904

Footnotes:
(1) Used on 3 HP, 1 PH and 5 HP, 3 PH and larger motors.
(2) Used on 2 HP, 1 PH and 3 HP, 3 PH and smaller motors.

For Models Not Shown Consult Factory

Franklin Electric
Bluffton, Indiana 46714

800-348-2420

4-inch High Thrust: 4-inch dia. - Oil Stripper

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
16	Rotor 2 HP	1	178 193 904
	Rotor 3 HP	1	178 152 904
	Rotor 5 HP	1	178 153 905
17	Stator 2 HP - 230V	1	334 602 917
	Stator 3 HP - 230V	1	334 597 915
	Stator 5 HP - 230V	1	334 517 916

THREE PHASE

Key	Description	No. Req'd	Part Number
16	Rotor 2 HP	1	178 192 903
	Rotor 3 HP	1	178 193 904
	Rotor 5 HP	1	178 152 904
	Rotor 7 1/2 HP	1	178 153 905
	Rotor 10 HP	1	178 145 902
17	Stator 2 HP - 200V	1	
	Stator 2 HP - 230V	1	336 852 906
	Stator 2 HP - 460V	1	336 980 907
	Stator 2 HP - 575V	1	
	Stator 3 HP - 200V	1	
	Stator 3 HP - 230V	1	336 853 905
	Stator 3 HP - 460V	1	336 981 907
	Stator 3 HP - 575V	1	
	Stator 5 HP - 200V	1	
	Stator 5 HP - 230V	1	336 854 907
	Stator 5 HP - 460V	1	336 982 907
	Stator 5 HP - 575V	1	
	Stator 7 1/2 HP - 200V	1	
	Stator 7 1/2 HP - 230V	1	337 119 907
	Stator 7 1/2 HP - 460V	1	336 910 907
	Stator 7 1/2 HP - 575V	1	
	Stator 10 HP - 460V	1	336 983 904
	Stator 10 HP - 575V	1	

Repair Procedures - 6" Straight Thrust Housing

Tools Required:
Shaft Height Gage - 305 079 117 (RK-10-8)
Seal Cover Insertion Tool -305 079 122 (AT-111-88)
1 3/16" Crowfoot adapter for Water Well Motors
1 1/4" Crowfoot adapter for Corrosion Motors
1/8" spacer for 50 & 60 HP
3.1mm Drill Bit
3/16" Allen Drive Socket
3/8" Allen Drive Socket
3/4" Socket
Ball Peen Hammer
Center Punch
Flat Blade Screw Driver
Padded Vise Grips
Rubber Mallet
Socket Drive Screw Driver
Strap Wrench
Torque Wrench - Set 10 lb. feet to check adjusting screw staking
Torque Wrench - Set 15-20 lb. inches for seal cover screws
Torque Wrench - Set 40-50 lb. feet for end bell fasteners
Torque Wrench - Set 60-70 lb. feet for lead jam nut
Torque Wrench - Set 60-70 lb. inches for diaphragm cover screws

Torque Values are the same for Water Well & Corrosion Resistant motors. However, lubricate 316 SST threads with "Never-seez" before assembling.

Refer to Exploded View pages for part descriptions

Step 1: Upper End Bell assembly
Clamp stator in horizontal position. Use a clean rag (wet with water) and swab the stator bore to remove any dust or dirt particles. Lubricate upper stator rabbet with silicone grease. Lubricate "O" ring with silicone grease and attach to upper end bell assembly.

Step 2: Rotor Assembly 5 - 40 HP
Confirm the upthrust washer is in place on the rotor. Insert rotor into stator bore, being careful not to nick or damage stator liner with shaft or rotor end ring. Wet upper bearing with fill solution (mixed from Prefill Kit). Seat end bell assembly in stator with hand pressure and rotate end bell to seat "O" ring. **Note: The shaft will need to be lifted slightly to allow the journal to enter the end bell bearing.** Using a motor lead, align lead cavity in end bell with lead cavity in stator end. Attach upper end bell to the stator. Torque fasteners, in a cross pattern, to 40-50 lb. ft. with the torque wrench.

Step 2: Rotor Assembly 50 - 60 HP
50 and 60 HP motors differ because they contain a center bearing. Seat end bell assembly into stator with hand pressure and rotate end bell to seat "O" ring. Using a motor lead, align lead cavity in end bell with lead cavity in stator end. Temporarily fasten the upper end bell in place using the fasteners with a 1/8" spacer between the end bell and the stator end. Confirm the upthrust washer is in place on the rotor. Lubricate the center bearing "O" rings with silicone grease and assemble to center bearing. Wet upper bearing and center bearing with fill solution (mixed from Prefill Kit). **Note: When assembling the center bearing into the stator bore the ridges on the bearing must align with the slots in the bore. This sometimes takes 2 or 3 attempts. Do not force it as the liner may be damaged.** Insert rotor into stator bore, being careful not to nick or damage stator liner with shaft or rotor end ring. **Note: The shaft will need to be lifted slightly to allow the journal to enter the end bell bearing.** Use the *"Shaft Height Gage"* to position the shaft height at 2.875". **Do not move the rotor from this position.** Loosen the end bell fasteners and remove the 1/8" spacer. Torque fasteners, in a cross pattern, to 40-50 lb. ft. with the torque wrench. This will position the center bearing with 1/8" space between the ends of the bearing and the ends of the rotor.

Step 3: Lower End Bell Assembly
Lubricate lower stator rabbet with silicone grease. Lubricate "O" ring with silicone grease and assemble to end bell. Wet bearing with fill solution.

Continued on Back Side

Repair Procedures - 6" Straight Thrust Housing

Step 3: Lower End Bell Assembly "continued"
Insert the nose of the end bell into the stator bore. **Note: The shaft will need to be lifted slightly to allow the journal to enter the end bell bearing.** Seat end bell in stator with hand pressure and rotate end bell to seat "O" ring. Attach lower end bell to the stator. Torque fasteners, in a cross pattern, to 40-50 lb. ft. with the torque wrench. Rotate the shaft and check for freedom of movement and axial play.

Step 4: Installing Thrust Assembly
Lubricate lower "O" ring with silicone grease and assemble into groove on lower end bell. Attach the baffle to the lower end bell. Install the woodruff key in the rotor shaft. Slide the thrust bearing onto the shaft. Make sure the hub on the thrust bearing support is against the shaft shoulder.
Using a center punch, stake the junction of the bearing hub and rotor shaft to prevent the bearing from slipping off. Clamp the rotor in the upper most position with padded vise grips. Rotate the motor into the vertical shaft-up position. Install the shaft height adjusting screw into the thrust housing. Adjust screw so two or three threads, on the slot end, of the screw remain exposed. Install the leveling disc into the thrust housing with the anti-rotation slot engaging the roll pin. Assemble rocker arms, pins and thrust segments onto the leveling disc and wet the thrust segments with fill solution. Attach the thrust housing assembly to the threaded lower end bell. Be careful not to nick or damage the thrust bearing. Using a strap wrench tighten the thrust housing so there is no gap between the stator face and the thrust housing.

Step 5: Adjusting Shaft Height
Tighten the adjusting screw until the thrust segments contact the thrust bearing and pick up the weight of the rotor. Remove vise grips and spin the motor shaft to be certain the rotor turns freely. With a rubber mallet, strike the shaft extension squarely two or three times to seat the thrust assembly. Place the *"Go"* step of the *"Shaft Height Gage"* over the shaft extension. Turn the adjusting screw until the shaft end is between the *"Go"* and *"No Go"* steps on the gage. Make sure the bottom of the gage rests on the upper end bell. Spin the shaft and check for free rotation. Rotate the motor into the horizontal position. Using a magnetic base dial indicator, indicate the free end play of the motor shaft. Free end play should be between .030" and .050". Using a center punch and hammer, stake the threads of the adjusting screw three places 120 degrees apart to prevent movement of the adjusting screw. The adjusting screw stakes must hold a minimum of 10 lb. ft. of torque. Reconfirm correct shaft height.

Step 6: Pinning the Thrust Housing
If you are using an old thrust housing, use the existing hole as a guide to drill a 3.1mm diameter hole 3/8" deep. Also, drill a second hole adjacent to the original approximately 2" away. If using a new thrust housing, center punch the housing, in line with the weld seam of the stator, 5/8" below upper edge. Then drill a 3.1mm diameter hole 3/8" deep. Fill drilled hole(s) with Loc-tite and tap pin(s) in place. Using center punch, stake the pin(s) to make a positive seal between the pin(s) and the casting.

Step 7: Seal Installation
Install cup, spring and rotating section of shaft seal in this order. Lubricate rubber of stationary seal with silicone grease. Place stationary seal over shaft with the ceramic in the down position (opposite shaft end). Push the stationary seal into the cavity and seat the top of the seal 1/8" above the end bell surface. Apply a 1/32" bead of RTV rubber sealer, or equivalent, between the seal bore and the screw circle on the face of the seal recess. Install seal cover and bushing with the flat side of the seal cover adjacent to the lead cavity. Use the *"Seal Cover Insertion Tool"* to hold the bushing concentric with the shaft. Attach seal cover to top end bell. Torque fasteners to 15-20 lb. in. with the torque wrench. Remove the alignment tool.

Step 8: Filling the Motor
Rotate motor into shaft-down position. Slowly add fill solution until diaphragm cavity in thrust housing is full. Rotate shaft until air bubbles cease.

Continued on next Page

Repair Procedures - 6" Straight Thrust Housing

Step 9: Diaphragm Installation
Apply a light coat of silicone grease to the unpainted surface of the diaphragm cover and the diaphragm seating rabbet of the thrust housing. Install the diaphragm plate into the diaphragm and reverse roll into position. Install diaphragm spring, diaphragm plate and diaphragm into the diaphragm cover. Attach assembly to the thrust housing. Torque fasteners to 60-70 lb. in. with the torque wrench.

Step 10: Removing Air from Motor
Use the vacuum system as shown on the *"Vacuum Filling Apparatus"* page of this *"Service Data"* manual. Follow those instructions to complete filling of the motor.

Step 11: Final Inspection
Using magnetic base dial indicator, indicate run-out just below spline on shaft extension. Maximum allowance is .004" F.I.M. (T.I.R.). Check for fluid leaks at shaft seal, check valve, "O" rings, diaphragm and staking pin(s). Install filter (water well motors) or pipe plug (corrosion resistant motors) above check valve. Lubricate labyrinth seal of slinger with silicone grease and install slinger by hand.

Step 12: Lead Insertion
Spray lead cavity with drying agent, denatured alcohol or equivalent, and blow out with compressed air. Install motor lead and torque jam nut to 60-70 lb. ft. using torque wrench and crowfoot adapter.

Motor is now ready for testing.

Repair Procedures - 6" Straight (Clad) Thrust Housing

Tools Required:
Shaft Height Gage - 305 079 117 (RK-10-8)
Seal Cover Insertion Tool -305 079 122 (AT-111-88)
1 3/16" Crowfoot adapter for Water Well Motors
1 1/4" Crowfoot adapter for Corrosion Motors
1/8" spacer for 50 & 60 HP
3/8" Allen Drive Socket
Ball Peen Hammer
Center Punch
Flat Blade Screw Driver
Padded Vise Grips
Rubber Mallet
Socket Drive Screw Driver
Torque Wrench - Set 10 lb. feet to check adjusting screw staking
Torque Wrench - Set 15-20 lb. inches for seal cover screws
Torque Wrench - Set 20-25 lb. inches for diaphragm cover screws
Torque Wrench - Set 40-50 lb. feet for thrust housing fasteners
Torque Wrench - Set 40-50 lb. feet for upper end bell fasteners
Torque Wrench - Set 60-70 lb. feet for lead jam nut

Torque Values are the same for Water Well & Corrosion Resistant motors. However, lubricate 316 SST threads with "Never-seez" before assembling.

Refer to Exploded View pages for part descriptions

Step 1: Upper End Bell assembly
Clamp stator in horizontal position. Use a clean rag (wet with water) and swab the stator bore to remove any dust or dirt particles. Lubricate upper stator rabbet with silicone grease. Lubricate "O" ring with silicone grease and attach to upper end bell assembly.

Step 2: Rotor Assembly 5 - 40 HP
Confirm the upthrust washer is in place on the rotor. Insert rotor into stator bore, being careful not to nick or damage stator liner with shaft or rotor end ring. Wet upper bearing with fill solution (mixed from Prefill Kit). Seat end bell assembly into stator with hand pressure and rotate end bell to seat "O" ring. **Note: The shaft will need to be lifted slightly to allow the journal to enter the end bell bearing.** Using a motor lead, align lead cavity in end bell with lead cavity in stator end. Attach upper end bell to the stator. Torque fasteners, in a cross pattern, to 40-50 lb. ft. with the torque wrench.

Step 2: Rotor Assembly 50 - 60 HP
50 and 60 HP motors differ because they contain a center bearing. Seat end bell assembly into stator with hand pressure and rotate end bell to seat "O" ring. Using a motor lead, align lead cavity in end bell with lead cavity in stator end. Temporarily fasten the upper end bell in place using the fasteners with a 1/8" spacer between the end bell and the stator end. Confirm the upthrust washer is in place on the rotor. Lubricate the center bearing "O" rings with silicone grease and assemble to center bearing. Wet upper bearing and center bearing with fill solution (mixed from Prefill Kit). **Note: When assembling the center bearing into the stator bore the ridges on the bearing must align with the slots in the bore. This sometimes takes 2 or 3 attempts. Do not force it as the liner may be damaged.** Insert rotor into stator bore, being careful not to nick or damage stator liner with shaft or rotor end ring. **Note: The shaft will need to be lifted slightly to allow the journal to enter the end bell bearing.** Use the *"Shaft Height Gage"* to position the shaft height at 2.875". **Do not move the rotor from this position.** Loosen the end bell fasteners and remove the 1/8" spacer. Torque fasteners, in a cross pattern, to 40-50 lb. ft. with the torque wrench. This will position the center bearing with 1/8" space between the ends of the bearing and the ends of the rotor.

Step 3: Lower End Bell Assembly
Lubricate lower stator rabbet with silicone grease. Wet bearing with fill solution. Insert the nose of the end bell into the stator bore. **Note: The shaft will need to be lifted slightly to allow the journal to enter the end bell bearing.**

Continued on Back Side

Repair Procedures - 6" Straight (Clad) Thrust Housing

Step 3: Lower End Bell Assembly "continued"
Seat end bell in stator with hand pressure. Align holes in the end bell with the holes in the stator.

Step 4: Installing Thrust Assembly
Install the woodruff key in the rotor shaft. Slide the thrust bearing onto the shaft. Make sure the hub on the thrust bearing support is against the shaft shoulder. Using a center punch, stake the junction of the bearing hub and rotor shaft to prevent the bearing from slipping off. Clamp the rotor in the upper most position with padded vise grips. Rotate the motor into the vertical shaft-up position. Install the shaft height adjusting screw into the thrust housing. Adjust screw so two or three threads, on the slot end, of the screw remain exposed. Install the leveling disc into the thrust housing with the anti-rotation slot engaged.
Note: 5 and 7 1/2 HP motors use a roll pin for anti-rotation while the 10 HP and larger use cast projections on the leveling disc that are placed between the ribs of the housing.
For 5 & 7 1/2 HP: Assemble the rocker arms, pins and thrust segments onto the leveling disc and wet segments with fill solution.
For 10-40 HP: Assemble the thrust segments onto the leveling disc and wet segments with fill solution.
For 50 & 60 HP: The leveling disc and thrust segments are one piece. Assemble thrust assembly and wet segments with fill solution.
Lubricate the "O" ring with silicone grease and assemble to lower end bell. Attach the thrust housing to the stator. Be careful not to nick or damage the thrust bearing. Torque fasteners, in a cross pattern, to 40-50 lb. ft. with the torque wrench. Rotate the shaft and check for freedom of movement and axial play.

Step 5: Adjusting Shaft Height
Tighten the adjusting screw until the thrust segments contact the thrust bearing and pick up the weight of the rotor. Remove vise grips and spin the motor shaft to be certain the rotor turns freely. With a rubber mallet, strike the shaft extension squarely two or three times to seat the thrust assembly. Place the *"Go"* step of the *"Shaft Height Gage"* over the shaft extension. Turn the adjusting screw until the shaft end is between the *"Go"* and *"No Go"* steps on the gage. Make sure the bottom of the gage rests on the upper end bell. Spin the shaft and check for free rotation. Rotate the motor into the horizontal position. Using a magnetic base dial indicator, indicate the free end play of the motor shaft. Free end play should be between .030" and .050". Using a center punch and hammer, stake the threads of the adjusting screw three places 120 degrees apart to prevent movement of the adjusting screw. The adjusting screw stakes must hold a minimum of 10 lb. ft. of torque. Reconfirm correct shaft height.

Step 6: Seal Installation
Install cup, spring and rotating section of shaft seal in this order. Lubricate rubber of stationary seal with silicone grease. Place stationary seal over shaft with the ceramic in the down position (opposite shaft end). Push the stationary seal into the cavity and seat the top of the seal 1/8" above the end bell surface. Apply a 1/32" bead of RTV rubber sealer, or equivalent, between the seal bore and the screw circle on the face of the seal recess. Install seal cover and bushing with the flat side of the seal cover adjacent to the lead cavity. Use the *"Seal Cover Insertion Tool"* to hold the bushing concentric with the shaft. Attach seal cover to top end bell. Torque fasteners to 15-20 lb. in. with the torque wrench. Remove the alignment tool.

Step 7: Filling the Motor
Rotate motor into shaft-down position. Slowly add fill solution until diaphragm cavity in thrust housing is full. Rotate shaft until air bubbles cease.

Step 8: Diaphragm Installation
Apply a light coat of silicone grease to the diaphragm seating rabbet of the thrust housing. Install the diaphragm, diaphragm plate and diaphragm spring. Attach diaphragm cover to the thrust housing. Torque fasteners to 20-25 lb. in. with the torque wrench.

Continued on next Page

Repair Procedures - 6" Straight (Clad) Thrust Housing

Step 9: Removing Air from Motor
Use the vacuum system as shown on the *"Vacuum Filling Apparatus"* page of this *"Service Data"* manual. Follow those instructions to complete filling of the motor.

Step 10: Final Inspection
Using magnetic base dial indicator, indicate run-out just below spline on shaft extension. Maximum allowance is .004" F.I.M. (T.I.R.). Check for fluid leaks at shaft seal, check valve, "O" rings & diaphragm. Install filter (water well motors) or pipe plug (corrosion resistant motors) above check valve. Lubricate labyrinth seal of slinger with silicone grease and install slinger by hand.

Step 11: Lead Insertion
Spray lead cavity with drying agent, denatured alcohol or equivalent, and blow out with compressed air. Install motor lead and torque jam nut to 60-70 lb. ft. using torque wrench and crowfoot adapter.

Motor is now ready for testing.

Repair Procedures - 6" Tapered Thrust Housing

Tools Required:
Shaft Height Gage - 305 079 117 (RK-10-8)
Seal Cover Insertion Tool -305 079 122 (AT-111-88)
1 3/16" Crowfoot adapter for Water Well Motors
1 1/4" Crowfoot adapter for Corrosion Motors
1/8" spacer for 50 & 60 HP
5/16" Allen Drive Socket
3/8" Allen Drive Socket
Ball Peen Hammer
Center Punch
Flat Blade Screw Driver
Padded Vise Grips
Rubber Mallet
Socket Drive Screw Driver
Torque Wrench - Set 10 lb. feet to check adjusting screw staking
Torque Wrench - Set 15-20 lb. inches for seal cover screws
Torque Wrench - Set 20-25 lb. inches for diaphragm coverplate screws
Torque Wrench - Set 20-25 lb. feet for thrust housing fasteners
Torque Wrench - Set 40-50 lb. feet for upper end bell fasteners
Torque Wrench - Set 60-70 lb. feet for lead jam nut

Torque Values are the same for Water Well & Corrosion Resistant motors. However, lubricate 316 SST threads with "Never-seez" before assembling.

Refer to Exploded View pages for part descriptions

Step 1: Upper End Bell assembly
Clamp stator in horizontal position. Use a clean rag (wet with water) and swab the stator bore to remove any dust or dirt particles. Lubricate upper stator rabbet with silicone grease. Lubricate "O" ring with silicone grease and attach to upper end bell assembly.

Step 2: Rotor Assembly 5 - 40 HP
Confirm the upthrust washer is in place on the rotor. Insert rotor into stator bore, being careful not to nick or damage stator liner with shaft or rotor end ring. Wet upper bearing with fill solution (mixed from Prefill Kit). Seat end bell assembly into stator with hand pressure and rotate end bell to seat "O" ring. **Note: The shaft will need to be lifted slightly to allow the journal to enter the end bell bearing.** Using a motor lead, align lead cavity in end bell with lead cavity in stator end. Attach upper end bell to the stator. Torque fasteners, in a cross pattern, to 40-50 lb. ft. with the torque wrench.

Step 2: Rotor Assembly 50 - 60 HP
50 and 60 HP motors differ because they contain a center bearing. Seat end bell assembly into stator with hand pressure and rotate end bell to seat "O" ring. Using a motor lead, align lead cavity in end bell with lead cavity in stator end. Temporarily fasten the upper end bell in place using the fasteners with a 1/8" spacer between the end bell and the stator end. Confirm the upthrust washer is in place on the rotor. Lubricate the center bearing "O" rings with silicone grease and assemble to center bearing. Wet upper bearing and center bearing with fill solution (mixed from Prefill Kit). **Note: When assembling the center bearing into the stator bore the ridges on the bearing must align with the slots in the bore. This sometimes takes 2 or 3 attempts. Do not force it as the liner may be damaged.** Insert rotor into stator bore, being careful not to nick or damage stator liner with shaft or rotor end ring. **Note: The shaft will need to be lifted slightly to allow the journal to enter the end bell bearing.** Use the *"Shaft Height Gage"* to position the shaft height at 2.875". **Do not move the rotor from this position.** Loosen the end bell fasteners and remove the 1/8" spacer. Torque fasteners, in a cross pattern, to 40-50 lb. ft. with the torque wrench. This will position the center bearing with 1/8" space between the ends of the bearing and the ends of the rotor.

Step 3: Lower End Bell Assembly
Lubricate lower stator rabbet with silicone grease. Lubricate "O" ring with silicone grease and assemble to end bell. Wet bearing with fill solution.

Continued on Back Side

Repair Procedures - 6" Tapered Thrust Housing

Step 3: Lower End Bell Assembly "continued"
Insert the nose of the end bell into the stator bore. **Note: The shaft will need to be lifted slightly to allow the journal to enter the end bell bearing.** Seat end bell in stator with hand pressure and rotate end bell to seat "O" ring. Align holes in the end bell with the holes in the stator.

Step 4: Installing Thrust Assembly
Lubricate lower "O" ring with silicone grease and assemble into groove on lower end bell. Install the woodruff key in the rotor shaft. Slide the thrust bearing onto the shaft. Make sure the hub on the thrust bearing support is against the shaft shoulder. Using a center punch, stake the junction of the bearing hub and rotor shaft to prevent the bearing from slipping off. Clamp the rotor in the upper most position with padded vise grips. Rotate the motor into the vertical shaft-up position. Install the shaft height adjusting screw into the thrust housing. Adjust screw so two or three threads, on the slot end, of the screw remain exposed. Install the leveling disc into the thrust housing with the anti-rotation slot engaged.
Note: 5 and 7 1/2 HP motors use a roll pin for anti-rotation while the 10 HP and larger use cast projections on the leveling disc that are placed between the ribs of the housing.
For 5 & 7 1/2 HP: Assemble the rocker arms, pins and thrust segments onto the leveling disc and wet segments with fill solution.
For 10-40 HP: Assemble the thrust segments onto the leveling disc and wet segments with fill solution.
For 50 & 60 HP: The leveling disc and thrust segments are one piece. Assemble thrust assembly and wet segments with fill solution.
Lubricate the gasket with silicone grease and assemble to lower end bell. Attach the thrust housing to the stator. Be careful not to nick or damage the thrust bearing. Torque fasteners, in a cross pattern, to 20-25 lb. ft. with the torque wrench. Rotate the shaft and check for freedom of movement and axial play.

Step 5: Adjusting Shaft Height
Tighten the adjusting screw until the thrust segments contact the thrust bearing and pick up the weight of the rotor. Remove vise grips and spin the motor shaft to be certain the rotor turns freely. With a rubber mallet, strike the shaft extension squarely two or three times to seat the thrust assembly. Place the *"Go"* step of the *"Shaft Height Gage"* over the shaft extension. Turn the adjusting screw until the shaft end is between the *"Go"* and *"No Go"* steps on the gage. Make sure the bottom of the gage rests on the upper end bell. Spin the shaft and check for free rotation. Rotate the motor into the horizontal position. Using a magnetic base dial indicator, indicate the free end play of the motor shaft. Free end play should be between .030" and .050". Using a center punch and hammer, stake the threads of the adjusting screw three places 120 degrees apart to prevent movement of the adjusting screw. The adjusting screw stakes must hold a minimum of 10 lb. ft. of torque. Reconfirm correct shaft height.

Step 6: Seal Installation
Install cup, spring and rotating section of shaft seal in this order. Lubricate rubber of stationary seal with silicone grease. Place stationary seal over shaft with the ceramic in the down position (opposite shaft end). Push the stationary seal into the cavity and seat the top of the seal 1/8" above the end bell surface. Apply a 1/32" bead of RTV rubber sealer, or equivalent, between the seal bore and the screw circle on the face of the seal recess. Install seal cover and bushing with the flat side of the seal cover adjacent to the lead cavity. Use the *"Seal Cover Insertion Tool"* to hold the bushing concentric with the shaft. Attach seal cover to top end bell. Torque fasteners to 15-20 lb. in. with the torque wrench. Remove the alignment tool.

Step 7: Filling the Motor
Rotate motor into shaft-down position. Slowly add fill solution until diaphragm cavity in thrust housing is full. Rotate shaft until air bubbles cease.

Step 8: Diaphragm Installation
Apply a light coat of silicone grease to the diaphragm seating rabbet of the thrust housing. Install the diaphragm and diaphragm spring.

Continued on next Page

Repair Procedures - 6" Tapered Thrust Housing

Step 8: Diaphragm Installation "continued"
Attach diaphragm coverplate to the thrust housing. Torque fasteners to 20-25 lb. in. with the torque wrench.

Step 9: Removing Air from Motor
Use the vacuum system as shown on the *"Vacuum Filling Apparatus"* page of this *"Service Data"* manual. Follow those instructions to complete filling of the motor.

Step 10: Final Inspection
Using magnetic base dial indicator, indicate run-out just below spline on shaft extension. Maximum allowance is .004" F.I.M. (T.I.R.). Check for fluid leaks at shaft seal, check valve, "O" rings, gasket & diaphragm. Install filter (water well motors) or pipe plug (corrosion resistant motors) above check valve. Lubricate labyrinth seal of slinger with silicone grease and install slinger by hand.

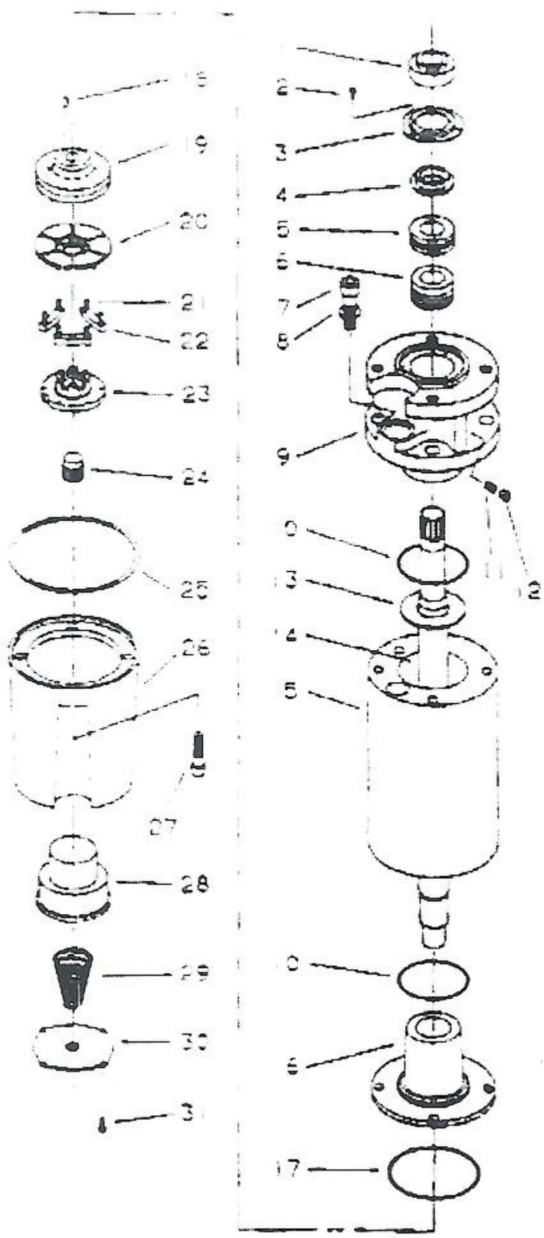
Step 11: Lead Insertion
Spray lead cavity with drying agent, denatured alcohol or equivalent, and blow out with compressed air. Install motor lead and torque jam nut to 60-70 lb. ft. using torque wrench and crowfoot adapter.

Motor is now ready for testing.

PAGE: SD 227.00
DATE: Dec 11 2002
SUPERSEDES: 9-1-96

Super 6 - Tapered Thrust Housing: 6-inch dia. - Water Well 5 & 7 1/2 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—6020 & 2-6—9020



Key	Description	No Req'd	Part Number
1	Slinger	1	155 274 101
2	Self Tap Screw	3	276 019 204
3	Seal Cover	1	152 047 101
4	Bushing	1	155 301 101
5	Seal (Stationary & Rotating)	1	305 233 902
7	Cap Screw* (1/2-20)	4	275 297 306
	Cap Screw* (1/2-13)	4	279 926 656
8	Lockwasher	4	275 546 113
9	Upper End Bell	1	177 265 906
10	"O" Ring	2	275 743 146
11	Check Valve	1	151 301 901
12	Filter	1	155 411 901
13	Upthrust Washer	1	155 270 101
14	Rotor		Call Factory
15	Stator		Call Factory
16	Lower End Bell	1	177 327 901
17	"O" Ring	1	275 743 152
18	Woodruff Key	1	275 260 104
19	Thrust Bearing	1	151 444 904
20	Thrust Segment	6	150 452 902
21	Rocker Arm Pin	6	151 522 201
22	Rocker Arm	3	150 208 101
23	Leveling Disc	1	150 493 201
24	Adjusting Screw	1	[illegible]
25	Gasket	1	[illegible]
26	Thrust Housing	1	[illegible]
27	Cap Screw	4	275 304 607
28	Diaphragm	1	[illegible]
29	Diaphragm Spring	1	[illegible]
30	Diaphragm Coverplate	1	[illegible]
31	Machine Screw	4	[illegible]
	Lead Assy - #8 AWG	1	[illegible]
	Thrust Bearing Kit - includes items 10, 17,18 19,20,21 22 23 24 & 25		305 066 901
	Seal Kit - includes items 1,2 3,4,5 10,11, 12,13,17,25,28,29 & grease		305 039 907
	Casting & Seal Kit - includes Seal Kit, items 9,16,24 26,27,30,31 & roll pin		305 025 906
	Sleeve Bearing	2	305 076 901
	Roll Pin (presses into Thrust Hsg)	1	275 523 453
	Sleeve Journals - Upper	1	[illegible]
	- Lower	1	[illegible]

*October 2001 & earlier date coded motors use ½-20 thrd
November 2001 date coded motors must verify thread
December 2001 & later date coded motors use ½-13 thrd

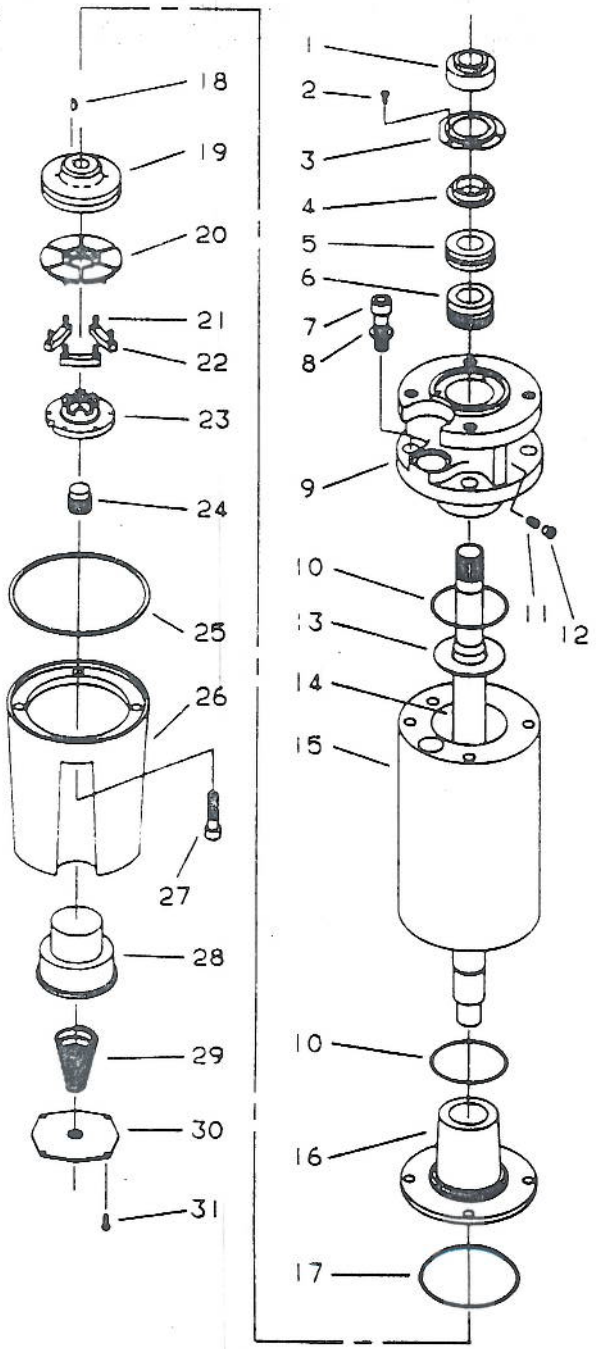
For Models Not Shown Consult Factory

Franklin Electric
Bluffton, Indiana 46714

800-346-2420

Super 6 - Tapered Thrust Housing: 6-inch dia. - Water Well 5 & 7 1/2 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—6020 & 2-6—9020



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 274 101
2	Self Tap Screw	3	276 019 204
3	Seal Cover	1	152 047 101
4	Bushing	1	155 301 101
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	275 297 306
8	Lockwasher	4	275 546 113
9	Upper End Bell	1	177 265 905
10	"O" Ring	2	275 743 146
11	Check Valve	1	151 301 901
12	Filter	1	155 411 901
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 327 901
17	"O" Ring	1	275 743 152
18	Woodruff Key	1	275 250 104
19	Thrust Bearing	1	151 444 904
20	Thrust Segment	6	150 492 902
21	Rocker Arm Pin	6	151 822 201
22	Rocker Arm	3	150 208 101
23	Leveling Disc	1	150 493 201
24	Adjusting Screw	1	155 449 101
25	Gasket	1	155 451 101
26	Thrust Housing	1	177 350 901
27	Cap Screw	4	275 304 607
28	Diaphragm	1	155 525 101
29	Diaphragm Spring	1	155 559 101
30	Diaphragm Coverplate	1	152 167 101
31	Machine Screw	4	275 157 356
	Lead Assy - #10 AWG	1	152 313 901
	Thrust Bearing Kit - includes items 10, 17,18,19,20,21,22,23,24 & 25		305 095 901
	Seal Kit - includes items 1,2,3,4,5,6,10, 11,12,13,17,25,28,29 & grease		305 029 907
	Casting & Seal Kit - includes Seal Kit and items 9,16,24,26,27,30,31 and roll pin		305 028 906
	Sleeve Bearing	2	305 075 901
	Roll Pin	1	275 623 453
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 101

For Models Not Shown Consult Factory

Super 6 - Tapered Thrust Housing: 6-inch dia. - Water Well 5 & 7 1/2 HP

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	178 119 907
	Rotor 7 1/2 HP	1	178 120 907
	WITHOUT SUBTROL		
15	Stator 5 HP - 230V	1	336 652 935
	Stator 7 1/2 HP - 230V	1	336 653 935

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	178 117 906
	Rotor 7 1/2 HP	1	178 118 906
	WITHOUT SUBTROL		
15	Stator 5 HP - 200V	1	336 614 963
	Stator 5 HP - 230V	1	336 552 963
	Stator 5 HP - 380V	1	336 720 963
	Stator 5 HP - 460V	1	336 327 963
	Stator 5 HP - 575V	1	336 621 963
	Stator 7 1/2 HP - 200V	1	336 615 963
	Stator 7 1/2 HP - 230V	1	336 553 963
	Stator 7 1/2 HP - 380V	1	336 721 963
	Stator 7 1/2 HP - 460V	1	336 328 963
	Stator 7 1/2 HP - 575V	1	336 622 963
	WITH SUBTROL		
15	Stator 5 HP - 200V	1	336 614 930
	Stator 5 HP - 230V	1	336 552 930
	Stator 5 HP - 380V	1	336 720 930
	Stator 5 HP - 460V	1	336 327 930
	Stator 5 HP - 575V	1	336 621 930
	Stator 7 1/2 HP - 200V	1	336 615 930
	Stator 7 1/2 HP - 230V	1	336 553 930
	Stator 7 1/2 HP - 380V	1	336 721 930
	Stator 7 1/2 HP - 460V	1	336 328 930
	Stator 7 1/2 HP - 575V	1	336 622 930

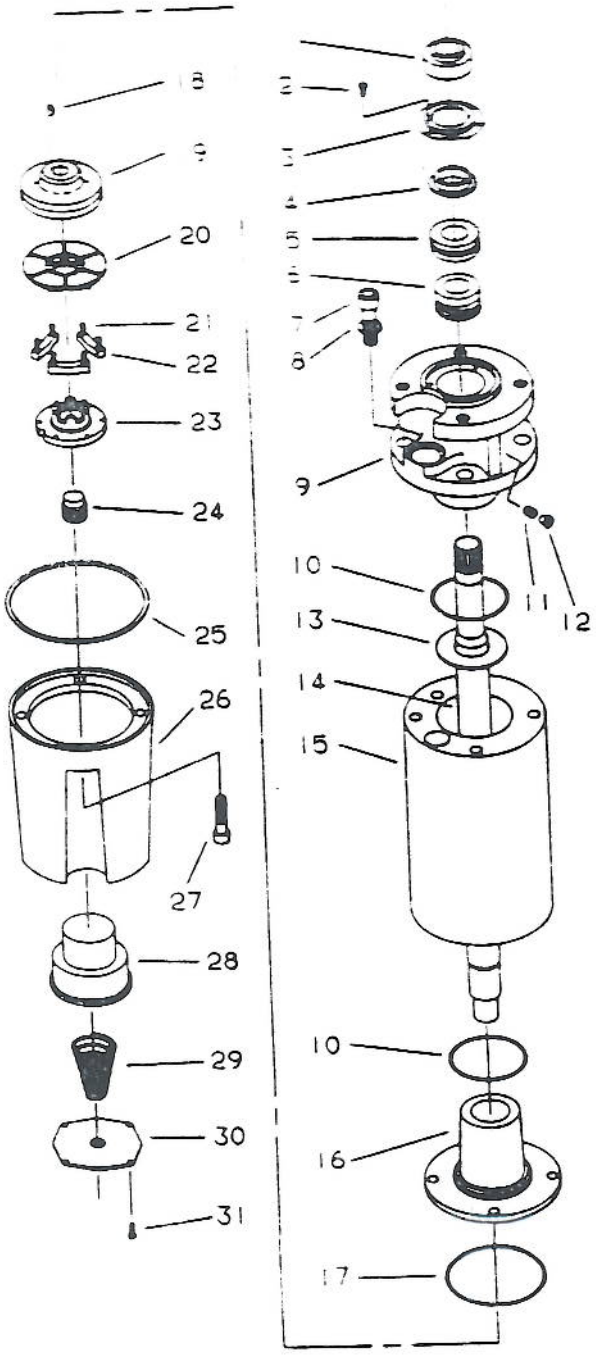
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	178 117 906
	Rotor 7 1/2 HP	1	178 118 906
	WITHOUT SUBTROL		
15	Stator 5 HP - 220V	1	
	Stator 5 HP - 380V	1	336 327 963
	Stator 5 HP - 415V	1	
	Stator 7 1/2 HP - 220V	1	336 695 963
	Stator 7 1/2 HP - 380V	1	336 328 963
	Stator 7 1/2 HP - 415V	1	336 758 963
	WITH SUBTROL		
15	Stator 5 HP - 220V	1	
	Stator 5 HP - 380V	1	336 327 930
	Stator 5 HP - 415V	1	
	Stator 7 1/2 HP - 220V	1	336 695 930
	Stator 7 1/2 HP - 380V	1	336 328 930
	Stator 7 1/2 HP - 415V	1	336 758

Super 6 - Tapered Thrust Housing: 6-inch dia. - 316 Stainless Steel 5 & 7 1/2 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—6320 & 2-6—3320



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 277 101
2	Self Tap Screw	3	278 020 202
3	Seal Cover	1	152 047 102
4	Bushing	1	155 301 103
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	275 968 306
8	Lockwasher	4	275 547 113
9	Upper End Bell	1	177 296 902
10	"O" Ring	2	275 743 146
11	Check Valve	1	151 301 901
12	Pipe Plug	1	275 244 102
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 327 901
17	"O" Ring	1	275 743 152
18	Woodruff Key	1	275 250 104
19	Thrust Bearing	1	151 444 904
20	Thrust Segment	6	150 492 902
21	Rocker Arm Pin	6	151 822 201
22	Rocker Arm	3	150 208 101
23	Leveling Disc	1	150 493 201
24	Adjusting Screw	1	155 449 101
25	Gasket	1	155 451 201
26	Thrust Housing	1	177 370 901
27	Cap Screw	4	275 306 207
28	Diaphragm	1	155 525 201
29	Diaphragm Spring	1	155 559 201
30	Diaphragm Coverplate	1	152 167 201
31	Machine Screw	4	276 020 255
	Lead Assy-Ordered Separately		
	Sleeve Bearing	2	305 075 901
	Roll Pin	1	275 623 453
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 101

For Models Not Shown Consult Factory

Franklin Electric
Bluffton, Indiana 46714

Super 6 - Tapered Thrust Housing: 6-inch dia. - 316 Stainless Steel 5 & 7 1/2 HP

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	
	Rotor 7 1/2 HP	1	
	WITHOUT SUBTROL		
15	Stator 5 HP - 230V	1	
	Stator 7 1/2 HP - 230V	1	

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	178 117 907
	Rotor 7 1/2 HP	1	178 118 907
	WITH SUBTROL		
15	Stator 5 HP - 200V	1	336 614 936
	Stator 5 HP - 230V	1	336 552 936
	Stator 5 HP - 380V	1	
	Stator 5 HP - 460V	1	336 327 936
	Stator 5 HP - 575V	1	336 621 936
	Stator 7 1/2 HP - 200V	1	336 615 936
	Stator 7 1/2 HP - 230V	1	336 553 936
	Stator 7 1/2 HP - 380V	1	
	Stator 7 1/2 HP - 460V	1	336 328 936
	Stator 7 1/2 HP - 575V	1	

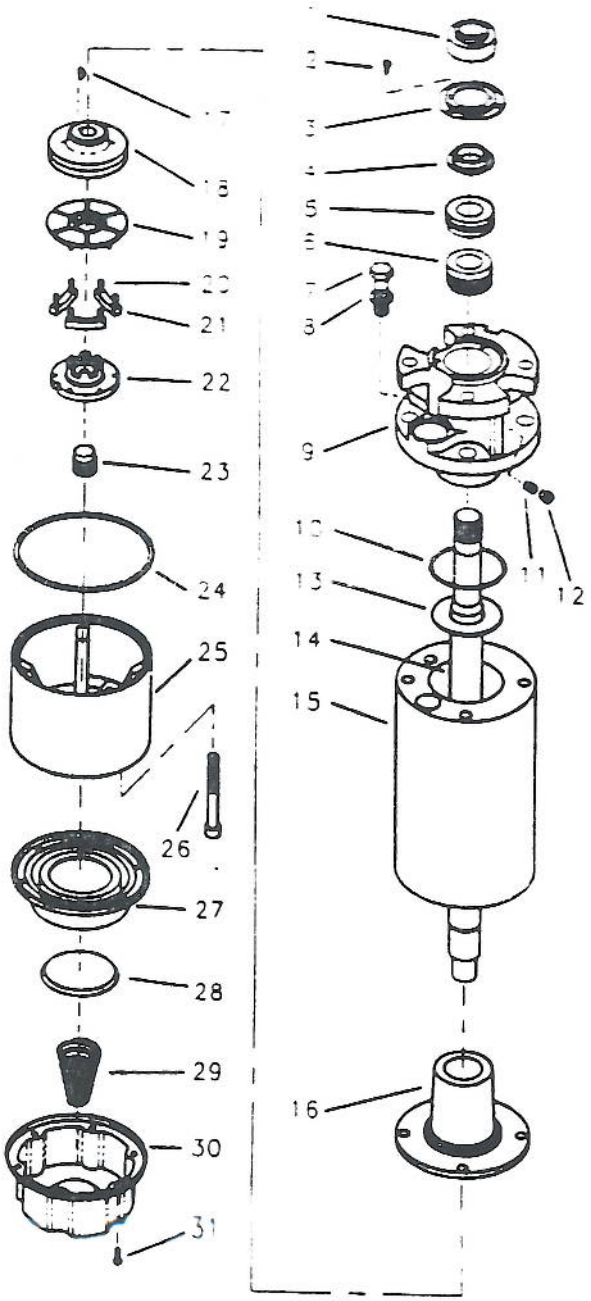
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	[illegible]
	Rotor 7 1/2 HP	1	[illegible]
	WITH SUBTROL		
15	Stator 5 HP - 220V	1	
	Stator 5 HP - 380V	1	[illegible]
	Stator 5 HP - 415V	1	
	Stator 7 1/2 HP - 220V	1	
	Stator 7 1/2 HP - 380V	1	336 328 936
	Stator 7 1/2 HP - 415V	1	336 758 936

Super 6 - Straight (Clad) Thrust Housing: 6-inch dia. - 316 Stainless Steel 5 & 7 1/2 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—3900 & 2-6—4000



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 277 101
2	Self Tap Screw	3	276 020 202
3	Seal Cover	1	152 047 102
4	Bushing	1	155 301 103
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	275 968 306
8	Lockwasher	4	275 547 113
9	Upper End Bell	1	177 296 902
10	"O" Ring	1	275 743 146
11	Check Valve	1	151 301 901
12	Pipe Plug	1	275 244 102
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 393 901
17	Woodruff Key	1	275 250 104
18	Thrust Bearing	1	151 444 904
19	Thrust Segment	6	150 492 902
20	Rocker Arm Pin	6	151 822 201
21	Rocker Arm	3	150 208 101
22	Leveling Disc	1	150 493 201
23	Adjusting Screw	1	151 049 101
24	"O" Ring	1	275 744 149
25	Thrust Housing	1	177 392 952
26	Cap Screw	4	276 040 316
27	Diaphragm	1	155 691 102
28	Diaphragm Plate	1	151 987 102
29	Diaphragm Spring	1	155 278 101
30	Diaphragm Cover	1	155 690 202
31	Machine Screw	6	155 761 101
	Lead Assy-Ordered Separately		
	Sleeve Bearing	2	305 075 901
	Roll Pin	1	275 623 453
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 101

For Models Not Shown Consult Factory

Super 6 - Straight (Clad) Thrust Housing: 6-inch dia. - 316 Stainless Steel 5 & 7 1/2 HP

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	
	Rotor 7 1/2 HP	1	
	WITHOUT SUBTROL		
15	Stator 5 HP - 230V	1	
	Stator 7 1/2 HP - 230V	1	

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	178 117 907
	Rotor 7 1/2 HP	1	178 118 907
	WITH SUBTROL		
15	Stator 5 HP - 200V	1	336 614 968
	Stator 5 HP - 230V	1	336 552 968
	Stator 5 HP - 380V	1	336 720 978
	Stator 5 HP - 460V	1	336 327 968
	Stator 5 HP - 575V	1	336 621 968
	Stator 7 1/2 HP - 200V	1	336 615 968
	Stator 7 1/2 HP - 230V	1	336 553 968
	Stator 7 1/2 HP - 380V	1	
	Stator 7 1/2 HP - 460V	1	336 328 968
	Stator 7 1/2 HP - 575V	1	

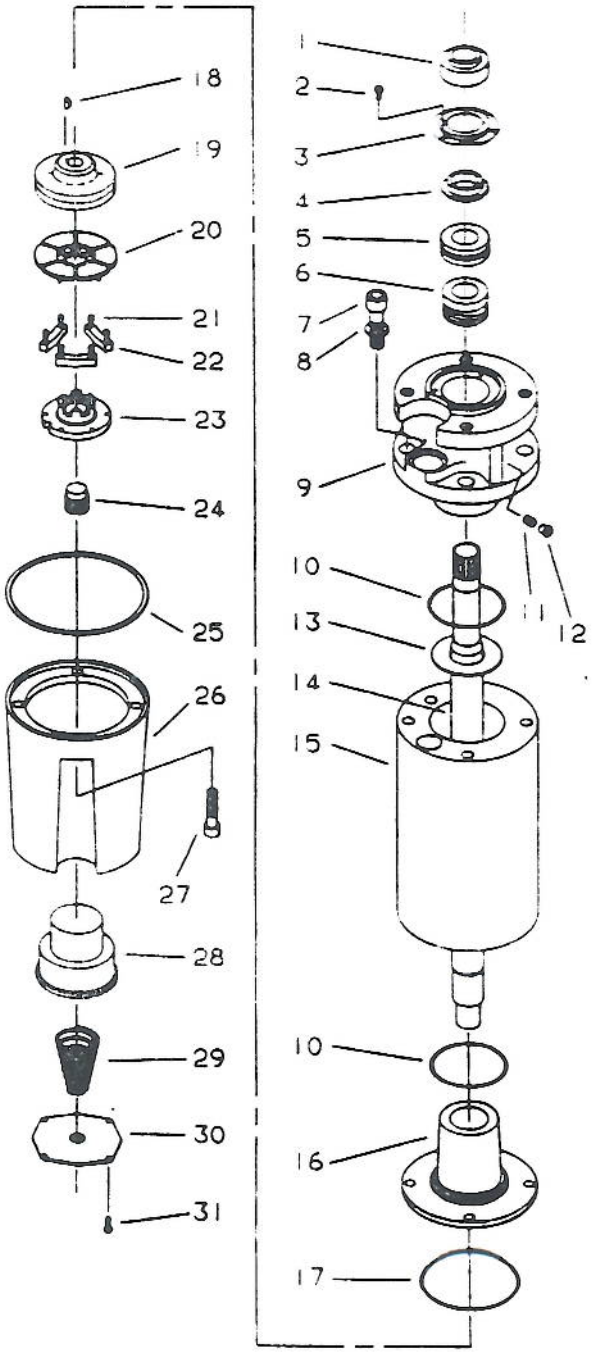
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	178 117 907
	Rotor 7 1/2 HP	1	178 118 907
	WITH SUBTROL		
15	Stator 5 HP - 220V	1	
	Stator 5 HP - 380V	1	336 327 968
	Stator 5 HP - 415V	1	
	Stator 7 1/2 HP - 220V	1	
	Stator 7 1/2 HP - 380V	1	336 328 968
	Stator 7 1/2 HP - 415V	1	

Super 6 - Tapered Thrust Housing: 6-inch dia. - Ni-Resist 5 & 7 1/2 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—6420 & 2-6—9420



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 277 101
2	Self Tap Screw	3	276 020 202
3	Seal Cover	1	152 047 102
4	Bushing	1	155 301 103
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	275 968 306
8	Lockwasher	4	275 547 113
9	Upper End Bell	1	177 281 904
10	"O" Ring	2	275 743 146
11	Check Valve	1	151 301 901
12	Pipe Plug	1	275 244 102
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 327 901
17	"O" Ring	1	275 743 152
18	Woodruff Key	1	275 250 104
19	Thrust Bearing	1	151 444 904
20	Thrust Segment	6	150 492 902
21	Rocker Arm Pin	6	151 822 201
22	Rocker Arm	3	150 208 101
23	Leveling Disc	1	150 493 201
24	Adjusting Screw	1	155 449 101
25	Gasket	1	155 451 201
26	Thrust Housing	1	177 369 901
27	Cap Screw	4	275 306 207
28	Diaphragm	1	155 525 201
29	Diaphragm Spring	1	155 559 201
30	Diaphragm Coverplate	1	152 167 201
31	Machine Screw	4	276 020 255
	Lead Assy-Ordered Separately		
	Sleeve Bearing	2	305 075 901
	Roll Pin	1	275 623 453
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 101

For Models Not Shown Consult Factory

Super 6 - Tapered Thrust Housing: 6-inch dia. - Ni-Resist 5 & 7 1/2 HP

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	178 119 910
	Rotor 7 1/2 HP	1	178 120 911
	WITHOUT SUBTROL		
15	Stator 5 HP - 230V	1	336 652 974
	Stator 7 1/2 HP - 230V	1	336 653 940

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	178 117 907
	Rotor 7 1/2 HP	1	178 118 907
	WITH SUBTROL		
15	Stator 5 HP - 200V	1	336 614 936
	Stator 5 HP - 230V	1	336 552 936
	Stator 5 HP - 380V	1	
	Stator 5 HP - 460V	1	336 327 936
	Stator 5 HP - 575V	1	
	Stator 7 1/2 HP - 200V	1	336 615 936
	Stator 7 1/2 HP - 230V	1	336 553 936
	Stator 7 1/2 HP - 380V	1	
	Stator 7 1/2 HP - 460V	1	336 328 936
	Stator 7 1/2 HP - 575V	1	336 622 936

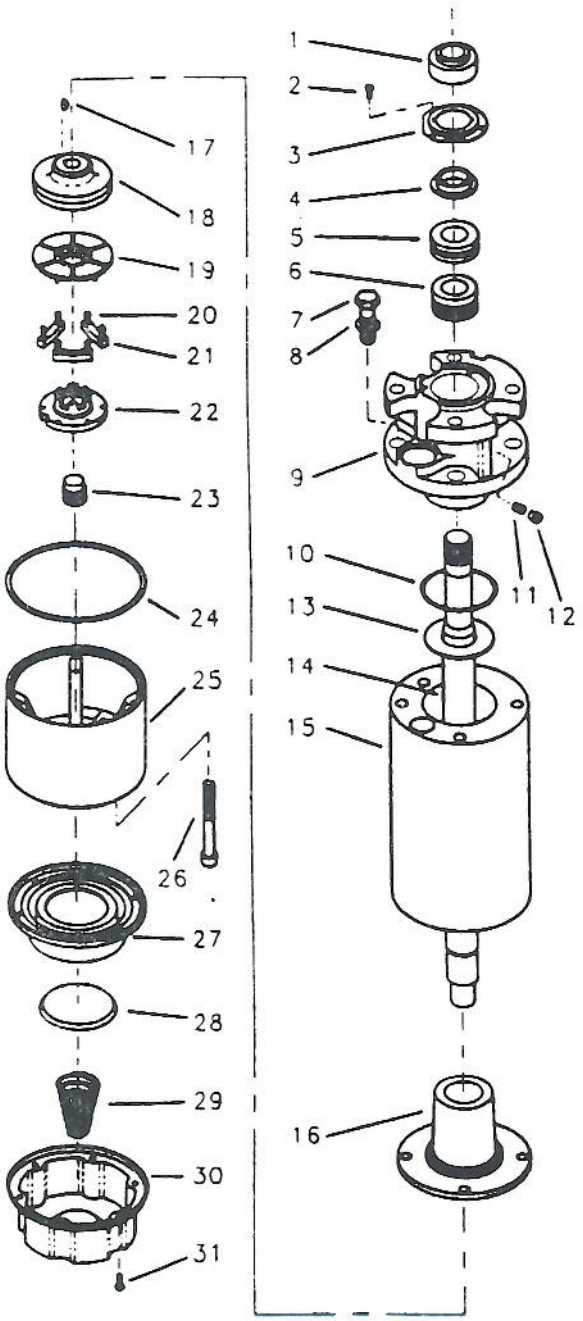
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	178 117 907
	Rotor 7 1/2 HP	1	178 118 907
	WITH SUBTROL		
15	Stator 5 HP - 220V	1	
	Stator 5 HP - 380V	1	336 327 936
	Stator 5 HP - 415V	1	
	Stator 7 1/2 HP - 220V	1	
	Stator 7 1/2 HP - 380V	1	336 328 936
	Stator 7 1/2 HP - 415V	1	

Super 6 - Straight (Clad) Thrust Housing: 6-inch dia. - Ni-Resist 5 & 7 1/2 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—4500 & 2-6—4600



Key	Description	No Req'd	Part Number
1	Slinger	1	155 277 101
2	Self Tap Screw	3	276 020 202
3	Seal Cover	1	152 047 102
4	Bushing	1	155 301 103
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	275 968 306
8	Lockwasher	4	275 547 113
9	Upper End Bell	1	177 281 904
10	"O" Ring	1	275 743 146
11	Check Valve	1	151 301 901
12	Pipe Plug	1	275 244 102
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 393 901
17	Woodruff Key	1	275 250 104
18	Thrust Bearing	1	151 444 904
19	Thrust Segment	6	150 492 902
20	Rocker Arm Pin	6	151 822 201
21	Rocker Arm	3	150 208 101
22	Leveling Disc	1	150 493 201
23	Adjusting Screw	1	151 049 101
24	"O" Ring	1	275 744 149
25	Thrust Housing	1	177 392 952
26	Cap Screw	4	276 040 316
27	Diaphragm	1	155 691 102
28	Diaphragm Plate	1	151 987 102
29	Diaphragm Spring	1	155 278 101
30	Diaphragm Cover	1	155 690 202
31	Machine Screw	6	155 761 101
	Lead Assy-Ordered Separately		
	Sleeve Bearing	2	305 075 901
	Roll Pin	1	275 623 453
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 101

For Models Not Shown Consult Factory

Super 6 Motors - Straight (Clad) Thrust Housing: 6-inch dia. - Ni-Resist 5 & 7 1/2 HP

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	
	Rotor 7 1/2 HP	1	
	WITHOUT SUBTROL		
15	Stator 5 HP - 230V	1	
	Stator 7 1/2 HP - 230V	1	

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	178 117 907
	Rotor 7 1/2 HP	1	178 118 907
	WITH SUBTROL		
15	Stator 5 HP - 200V	1	336 614 968
	Stator 5 HP - 230V	1	336 552 968
	Stator 5 HP - 380V	1	
	Stator 5 HP - 460V	1	336 327 968
	Stator 5 HP - 575V	1	336 621 968
	Stator 7 1/2 HP - 200V	1	336 615 968
	Stator 7 1/2 HP - 230V	1	336 553 968
	Stator 7 1/2 HP - 380V	1	
	Stator 7 1/2 HP - 460V	1	336 328 968
	Stator 7 1/2 HP - 575V	1	

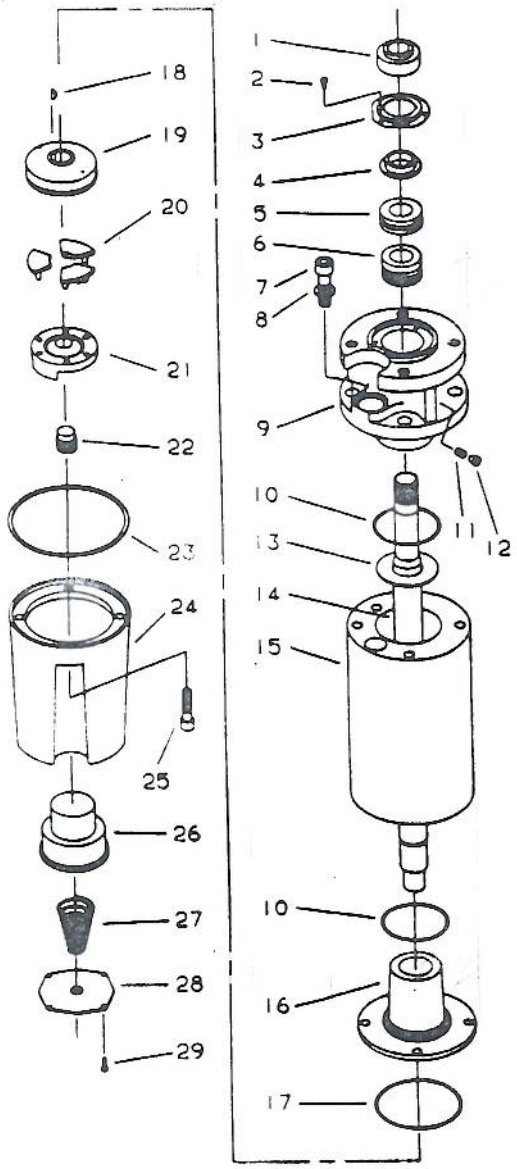
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 5 HP	1	178 117 907
	Rotor 7 1/2 HP	1	178 118 907
	WITH SUBTROL		
15	Stator 5 HP - 220V	1	
	Stator 5 HP - 380V	1	336 327 968
	Stator 5 HP - 415V	1	
	Stator 7 1/2 HP - 220V	1	
	Stator 7 1/2 HP - 380V	1	336 328 968
	Stator 7 1/2 HP - 415V	1	

Super 6 - Tapered Thrust Housing: 6-inch dia. - Water Well 10 thru 40 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—6020, 2-6—6045 & 2-6—9020



Key	Description	No. Req'd	Part Number	
1	Slinger	1	155 274 101	
2	Self Tap Screw	3	276 019 204	
3	Seal Cover	1	152 047 101	
4	Bushing	1	155 301 101	
5	Stationary Seal	1	155 330 101	
6	Rotating Seal	1	155 330 102	22,98
7	Cap Screw	4	275 297 306	
8	Lockwasher	4	275 546 113	
9	Upper End Bell	1	177 265 905	80,03
10	"O" Ring	2	275 743 146	
11	Check Valve	1	151 301 901	
12	Filter	1	155 411 901	
13	Upthrust Washer	1	155 270 101	
14	Rotor (See Opposite Side)			
15	Stator (See Opposite Side)			
16	Lower End Bell	1	177 327 901	33,93
17	"O" Ring	1	275 743 152	
18	Woodruff Key	1	275 250 110	
19	Thrust Bearing	1	305 096 901	34,88
20	Thrust Segment	3	155 412 101	10,07
21	Leveling Disc	1	177 328 101	
22	Adjusting Screw	1	155 449 101	
23	Gasket	1	155 451 101	
24	Thrust Housing	1	177 350 901	
25	Cap Screw	4	275 304 607	
26	Diaphragm	1	155 525 101	
27	Diaphragm Spring	1	155 559 101	
28	Diaphragm Coverplate	1	152 167 101	
29	Machine Screw	4	275 157 356	
	Lead Assy - #10 AWG	1	152 313 901	
	Lead Assy - # 8 AWG	1	152 314 901	
	Thrust Bearing Kit - includes items 10, 17,18,19,20,21,22 & 23		305 095 902	43,6
	Seal Kit - includes items 1,2,3,4,5,6,10, 11,12,13,17,23,26,27 & grease		305 029 907	36,7
	Casting & Seal Kit - includes Seal Kit and items 9,16,22,24,25,28 & 29		305 028 906	214,0
	Sleeve Bearing	2	305 075 901	20,0
	Sleeve Journals - Upper	1	152 173 104	5.35
	- Lower	1	152 173 101	3.68

For Models Not Shown Consult Factory

Super 6 - Tapered Thrust Housing: 6-inch dia. - Water Well 10 thru 40 HP

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	178 121 906
	Rotor 15 HP	1	178 122 906
WITHOUT SUBTROL			
15	Stator 10 HP - 230V	1	336 654 935
	Stator 15 HP - 230V	1	336 655 935

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	178 119 906
	Rotor 15 HP	1	178 120 906
	Rotor 20 HP	1	178 121 906
	Rotor 25 HP	1	178 122 906
	Rotor 30 HP	1	178 123 906
	Rotor 40 HP	1	178 115 908
WITHOUT SUBTROL			
15	Stator 10 HP - 200V	1	336 616 963
	Stator 10 HP - 230V	1	336 554 963
	Stator 10 HP - 380V	1	336 722 963
	Stator 10 HP - 460V	1	336 329 963
	Stator 10 HP - 575V	1	336 623 963
	Stator 15 HP - 200V	1	336 617 963
	Stator 15 HP - 230V	1	336 555 963
	Stator 15 HP - 380V	1	336 723 963
	Stator 15 HP - 460V	1	336 330 963
	Stator 15 HP - 575V	1	336 624 963
	Stator 20 HP - 200V	1	336 618 963
	Stator 20 HP - 230V	1	336 556 963
	Stator 20 HP - 380V	1	336 724 963
	Stator 20 HP - 460V	1	336 331 963
	Stator 20 HP - 575V	1	336 625 963
	Stator 25 HP - 200V	1	336 619 963
	Stator 25 HP - 230V	1	336 557 963
	Stator 25 HP - 380V	1	336 725 963
	Stator 25 HP - 460V	1	336 332 963
	Stator 25 HP - 575V	1	336 626 963
	Stator 30 HP - 200V	1	336 620 963
	Stator 30 HP - 230V	1	336 558 963
	Stator 30 HP - 380V	1	336 726 963
	Stator 30 HP - 460V	1	336 333 963
	Stator 30 HP - 575V	1	336 627 963
WITH SUBTROL			
15	Stator 10 HP - 200V	1	336 616 930
	Stator 10 HP - 230V	1	336 554 930
	Stator 10 HP - 380V	1	336 722 930
	Stator 10 HP - 460V	1	336 329 930
	Stator 10 HP - 575V	1	336 623 930
	Stator 15 HP - 200V	1	336 617 930
	Stator 15 HP - 230V	1	336 555 930
	Stator 15 HP - 380V	1	336 723 930
	Stator 15 HP - 460V	1	336 330 930
	Stator 15 HP - 575V	1	336 624 930
	Stator 20 HP - 200V	1	336 618 930
	Stator 20 HP - 230V	1	336 556 930
	Stator 20 HP - 380V	1	336 724 930
	Stator 20 HP - 460V	1	336 331 930
	Stator 20 HP - 575V	1	336 625 930
	Stator 25 HP - 200V	1	336 619 930
	Stator 25 HP - 230V	1	336 557 930
	Stator 25 HP - 380V	1	336 725 930
	Stator 25 HP - 460V	1	336 332 930
	Stator 25 HP - 575V	1	336 626 930
	Stator 30 HP - 200V	1	336 620 930
	Stator 30 HP - 230V	1	336 558 930
	Stator 30 HP - 380V	1	336 726 930
	Stator 30 HP - 460V	1	336 333 930
	Stator 30 HP - 575V	1	336 627 930
	Stator 40 HP - 380V	1	336 727 930
	Stator 40 HP - 460V	1	336 334 930
	Stator 40 HP - 575V	1	336 628 930

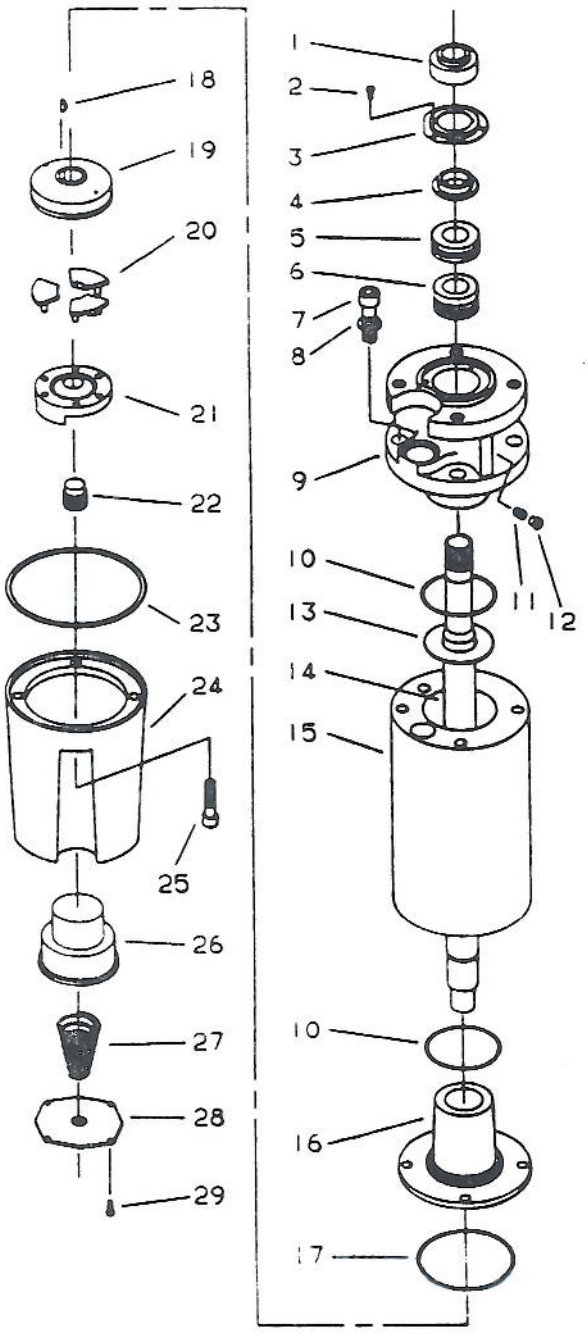
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	178 119 906
	Rotor 15 HP	1	178 120 906
	Rotor 20 HP	1	178 121 9
	Rotor 25 HP	1	178 122 9
	Rotor 30 HP	1	178 123 9
	Rotor 40 HP	1	178 115 908
WITHOUT SUBTROL			
15	Stator 10 HP - 220V	1	336 696 963
	Stator 10 HP - 380V	1	336 329 963
	Stator 10 HP - 415V	1	336 759 963
	Stator 15 HP - 220V	1	336 697 963
	Stator 15 HP - 380V	1	336 330 963
	Stator 15 HP - 415V	1	336 760 963
	Stator 20 HP - 220V	1	336 698 963
	Stator 20 HP - 380V	1	336 331 963
	Stator 20 HP - 415V	1	336 761 963
	Stator 25 HP - 220V	1	336 699 963
	Stator 25 HP - 380V	1	336 332 963
	Stator 25 HP - 415V	1	336 762 963
	Stator 30 HP - 220V	1	336 700 963
	Stator 30 HP - 380V	1	336 333 963
	Stator 30 HP - 415V	1	336 763 963
WITH SUBTROL			
15	Stator 10 HP - 220V	1	336 696 930
	Stator 10 HP - 380V	1	336 329 930
	Stator 10 HP - 415V	1	336 759 930
	Stator 15 HP - 220V	1	336 697 930
	Stator 15 HP - 380V	1	336 330 930
	Stator 15 HP - 415V	1	336 760 930
	Stator 20 HP - 220V	1	336 698 930
	Stator 20 HP - 380V	1	336 331 930
	Stator 20 HP - 415V	1	336 761 930
	Stator 25 HP - 220V	1	336 699 930
	Stator 25 HP - 380V	1	336 332 930
	Stator 25 HP - 415V	1	336 762 930
	Stator 30 HP - 220V	1	336 700 930
	Stator 30 HP - 380V	1	336 333 930
	Stator 30 HP - 415V	1	336 763
	Stator 40 HP - 380V	1	336 334
	Stator 40 HP - 415V	1	336 764

Super 6 - Tapered Thrust Housing: 6-Inch dia. - 316 Stainless Steel 10 thru 40 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—6320, 2-6—6345 & 2-6—9320



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 277 101
2	Self Tap Screw	3	276 020 202
3	Seal Cover	1	152 047 102
4	Bushing	1	155 301 103
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	275 968 306
8	Lockwasher	4	275 547 113
9	Upper End Bell	1	177 296 902
10	"O" Ring	2	275 743 146
11	Check Valve	1	155 301 901
12	Pipe Plug	1	275 244 102
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 327 901
17	"O" Ring	1	275 743 152
18	Woodruff Key	1	275 250 110
19	Thrust Bearing	1	305 096 901
20	Thrust Segment	3	155 412 101
21	Leveling Disc	1	177 328 101
22	Adjusting Screw	1	155 449 101
23	Gasket	1	155 451 201
24	Thrust Housing	1	177 370 901
25	Cap Screw	4	275 306 207
26	Diaphragm	1	155 525 201
27	Diaphragm Spring	1	155 559 201
28	Diaphragm Coverplate	1	152 167 201
29	Machine Screw	4	276 020 255
	Lead Assy-Ordered separately		
	Sleeve Bearing	2	305 075 901
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 101

For Models Not Shown Consult Factory

Super 6 - Tapered Thrust Housing: 6-inch dia. - 316 Stainless Steel 10 thru 40 HP

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	178 121 907
	Rotor 15 HP	1	
	WITHOUT SUBTROL		
15	Stator 10 HP - 230V	1	336 654 966
	Stator 15 HP - 230V	1	

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	178 119 908
	Rotor 15 HP	1	178 120 908
	Rotor 20 HP	1	178 121 907
	Rotor 25 HP	1	178 122 907
	Rotor 30 HP	1	178 123 907
	Rotor 40 HP	1	178 115 908
	WITH SUBTROL		
15	Stator 10 HP - 200V	1	336 616 936
	Stator 10 HP - 230V	1	336 554 936
	Stator 10 HP - 380V	1	
	Stator 10 HP - 460V	1	336 329 936
	Stator 10 HP - 575V	1	336 623 936
	Stator 15 HP - 200V	1	336 617 936
	Stator 15 HP - 230V	1	336 555 936
	Stator 15 HP - 380V	1	336 723 936
	Stator 15 HP - 460V	1	336 330 936
	Stator 15 HP - 575V	1	336 624 936
	Stator 20 HP - 200V	1	336 618 936
	Stator 20 HP - 230V	1	336 556 936
	Stator 20 HP - 380V	1	
	Stator 20 HP - 460V	1	336 331 936
	Stator 20 HP - 575V	1	336 625 936
	Stator 25 HP - 200V	1	336 619 936
	Stator 25 HP - 230V	1	336 557 936
	Stator 25 HP - 380V	1	
	Stator 25 HP - 460V	1	336 332 936
	Stator 25 HP - 575V	1	336 626 936
	Stator 30 HP - 200V	1	336 620 936
	Stator 30 HP - 230V	1	336 558 936
	Stator 30 HP - 380V	1	
	Stator 30 HP - 460V	1	336 333 936
	Stator 30 HP - 575V	1	336 627 936
	Stator 40 HP - 380V	1	
	Stator 40 HP - 460V	1	336 334 936
	Stator 40 HP - 575V	1	336 628 936

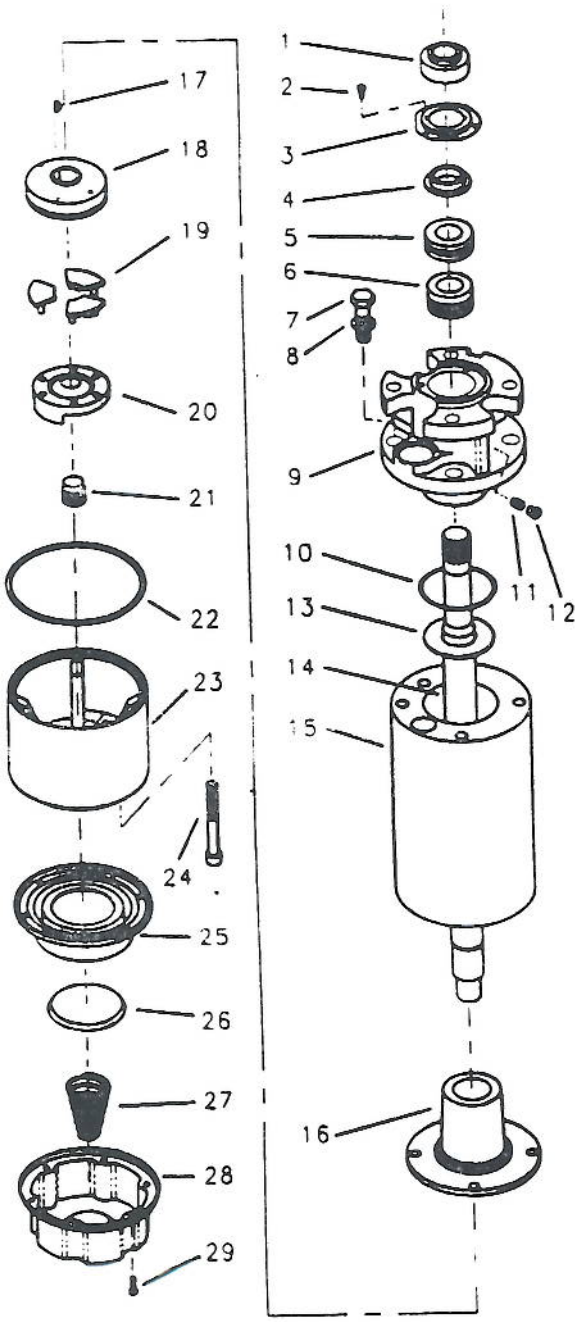
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	178 119 908
	Rotor 15 HP	1	178 120 908
	Rotor 20 HP	1	178 121 907
	Rotor 25 HP	1	178 122 907
	Rotor 30 HP	1	178 123 907
	Rotor 40 HP	1	178 115 908
	WITH SUBTROL		
15	Stator 10 HP - 220V	1	
	Stator 10 HP - 380V	1	336 329 936
	Stator 10 HP - 415V	1	336 759 936
	Stator 15 HP - 220V	1	
	Stator 15 HP - 380V	1	336 330 936
	Stator 15 HP - 415V	1	
	Stator 20 HP - 220V	1	
	Stator 20 HP - 380V	1	336 331 936
	Stator 20 HP - 415V	1	336 761 [illegible]
	Stator 25 HP - 220V	1	
	Stator 25 HP - 380V	1	336 332 936
	Stator 25 HP - 415V	1	336 762 936
	Stator 30 HP - 220V	1	
	Stator 30 HP - 380V	1	336 333 936
	Stator 30 HP - 415V	1	336 763 936
	Stator 40 HP - 380V	1	336 334 936
	Stator 40 HP - 415V	1	336 764 936

Super 6 - Straight (Clad) thrust Housing: 6-inch dia. - 316 Stainless Steel 10 thru 40 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—3900 & 2-6—4000



Key	Description	No Req'd	Part Number
1	Slinger	1	155 277 101
2	Self Tap Screw	3	276 020 302
3	Seal Cover	1	152 047 102
4	Bushing	1	155 301 103
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	276 368 306
8	Lockwasher	4	275 547 113
9	Upper End Bell	1	177 296 902
10	"O" Ring	1	275 743 146
11	Check Valve	1	151 301 901
12	Pipe Plug	1	275 244 102
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 393 901
17	Woodruff Key	1	275 250 110
18	Thrust Bearing	1	305 096 901
19	Thrust Segment	3	155 412 101
20	Leveling Disc	1	177 328 101
21	Adjusting Screw	1	151 049 101
22	"O" Ring	1	275 744 149
23	Thrust Housing	1	177 392 902
24	Cap Screw	4	276 040 316
25	Diaphragm	1	155 691 102
26	Diaphragm Plate	1	151 987 102
27	Diaphragm Spring	1	155 278 101
28	Diaphragm Cover	1	155 690 202
29	Machine Screw	6	155 761 101
	Lead Assy-Ordered Separately		
	Sleeve Bearing	2	305 075 901
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 101

For Models Not Shown Consult Factory

Super 6 - Straight (Clad) Thrust Housing: 6-inch dia. - 316 Stainless Steel 10 thru 40 HP

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	178 121 907
	Rotor 15 HP	1	
	WITHOUT SUBTROL		
15	Stator 10 HP - 230V	1	336 554 920
	Stator 15 HP - 230V	1	

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	178 119 908
	Rotor 15 HP	1	178 120 908
	Rotor 20 HP	1	178 121 907
	Rotor 25 HP	1	178 122 907
	Rotor 30 HP	1	178 123 907
	Rotor 40 HP	1	178 115 908
	WITH SUBTROL		
15	Stator 10 HP - 200V	1	336 616 968
	Stator 10 HP - 230V	1	336 554 968
	Stator 10 HP - 380V	1	336 722 936
	Stator 10 HP - 460V	1	336 329 968
	Stator 10 HP - 575V	1	336 623 968
	Stator 15 HP - 200V	1	336 617 968
	Stator 15 HP - 230V	1	336 555 968
	Stator 15 HP - 380V	1	
	Stator 15 HP - 460V	1	336 330 968
	Stator 15 HP - 575V	1	336 624 968
	Stator 20 HP - 200V	1	336 618 968
	Stator 20 HP - 230V	1	336 556 968
	Stator 20 HP - 380V	1	
	Stator 20 HP - 460V	1	336 331 968
	Stator 20 HP - 575V	1	336 625 968
	Stator 25 HP - 200V	1	336 619 968
	Stator 25 HP - 230V	1	336 557 968
	Stator 25 HP - 380V	1	
	Stator 25 HP - 460V	1	336 332 968
	Stator 25 HP - 575V	1	336 626 968
	Stator 30 HP - 200V	1	336 620 968
	Stator 30 HP - 230V	1	336 558 968
	Stator 30 HP - 380V	1	
	Stator 30 HP - 460V	1	336 333 968
	Stator 30 HP - 575V	1	336 627 968
	Stator 40 HP - 380V	1	336 727 981
	Stator 40 HP - 460V	1	336 334 981
	Stator 40 HP - 575V	1	336 628 937

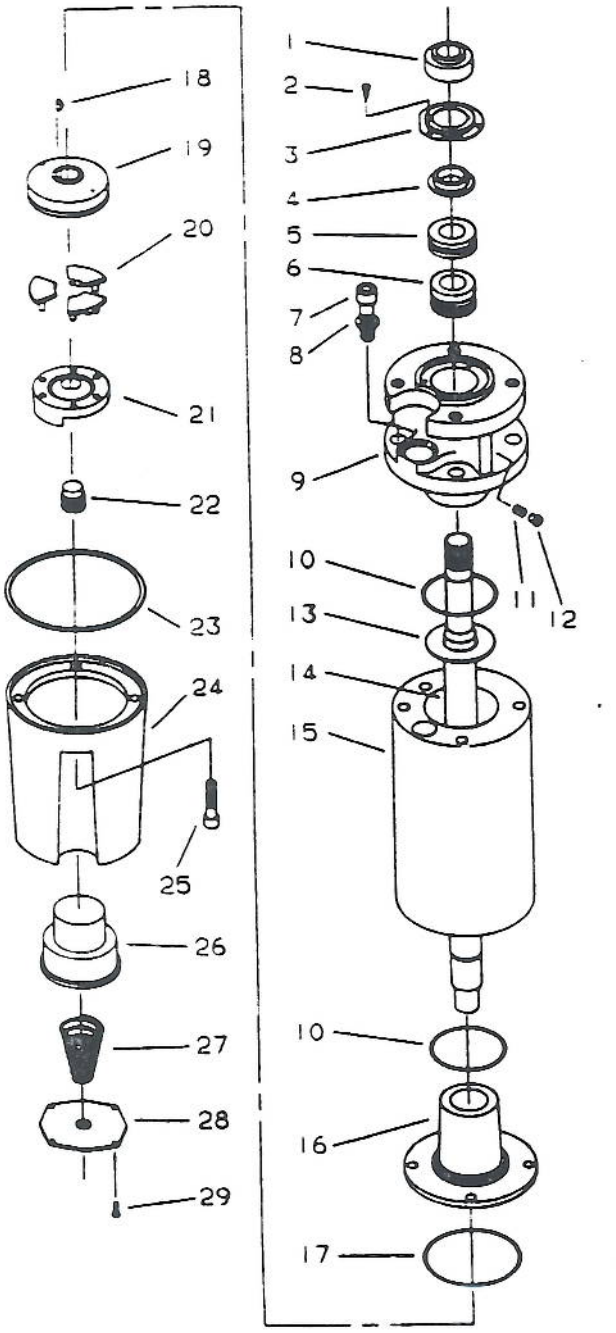
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	178 119 908
	Rotor 15 HP	1	178 120 908
	Rotor 20 HP	1	178 121 907
	Rotor 25 HP	1	178 122 907
	Rotor 30 HP	1	178 123 907
	Rotor 40 HP	1	178 115 908
	WITH SUBTROL		
15	Stator 10 HP - 220V	1	
	Stator 10 HP - 380V	1	336 329 968
	Stator 10 HP - 415V	1	
	Stator 15 HP - 220V	1	
	Stator 15 HP - 380V	1	336 330 968
	Stator 15 HP - 415V	1	
	Stator 20 HP - 220V	1	
	Stator 20 HP - 380V	1	336 331 968
	Stator 20 HP - 415V	1	
	Stator 25 HP - 220V	1	
	Stator 25 HP - 380V	1	336 332 968
	Stator 25 HP - 415V	1	
	Stator 30 HP - 220V	1	
	Stator 30 HP - 380V	1	336 333 968
	Stator 30 HP - 415V	1	
	Stator 40 HP - 380V	1	336 334 981
	Stator 40 HP - 415V	1	

Super 6 - Tapered Thrust Housing: 6-inch dia. - Ni-Resist 10 thru 40 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—6420, 2-6—6445 & 2-6—9420



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 277 101
2	Self Tap Screw	3	276 020 202
3	Seal Cover	1	152 047 102
4	Bushing	1	155 301 103
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	275 968 306
8	Lockwasher	4	275 547 113
9	Upper End Bell	1	177 281 904
10	"O" Ring	2	275 743 146
11	Check Valve	1	151 301 901
12	Pipe Plug	1	275 244 102
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 327 901
17	"O" Ring	1	275 743 152
18	Woodruff Key	1	275 250 110
19	Thrust Bearing	1	305 096 901
20	Thrust Segment	3	155 412 101
21	Leveling Disc	1	177 328 101
22	Adjusting Screw	1	155 449 101
23	Gasket	1	155 451 201
24	Thrust Housing	1	177 369 901
25	Cap Screw	4	275 306 207
26	Diaphragm	1	155 525 201
27	Diaphragm Spring	1	155 559 201
28	Diaphragm Coverplate	1	152 167 201
29	Machine Screw	4	276 020 255
	Lead Assy-Ordered Separately		
	Sleeve Bearing	2	305 075 901
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 101

For Models Not Shown Consult Factory

Super 6 - Tapered Thrust Housing: 6-inch dia. - Ni-Resist 10 thru 40 HP

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	178 121 907
	Rotor 15 HP	1	
	WITHOUT SUBTROL		
15	Stator 10 HP - 230V	1	336 554 936
	Stator 15 HP - 230V	1	

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	178 119 908
	Rotor 15 HP	1	178 120 908
	Rotor 20 HP	1	178 121 907
	Rotor 25 HP	1	178 122 907
	Rotor 30 HP	1	178 123 907
	Rotor 40 HP	1	178 115 908
	WITH SUBTROL		
15	Stator 10 HP - 200V	1	336 616 936
	Stator 10 HP - 230V	1	336 554 936
	Stator 10 HP - 380V	1	
	Stator 10 HP - 460V	1	336 329 936
	Stator 10 HP - 575V	1	336 623 936
	Stator 15 HP - 200V	1	336 617 936
	Stator 15 HP - 230V	1	336 555 936
	Stator 15 HP - 380V	1	
	Stator 15 HP - 460V	1	336 330 936
	Stator 15 HP - 575V	1	336 624 936
	Stator 20 HP - 200V	1	336 618 936
	Stator 20 HP - 230V	1	336 556 936
	Stator 20 HP - 380V	1	
	Stator 20 HP - 460V	1	336 331 936
	Stator 20 HP - 575V	1	336 625 936
	Stator 25 HP - 200V	1	336 619 936
	Stator 25 HP - 230V	1	336 557 936
	Stator 25 HP - 380V	1	
	Stator 25 HP - 460V	1	336 332 936
	Stator 25 HP - 575V	1	336 626 936
	Stator 30 HP - 200V	1	336 620 936
	Stator 30 HP - 230V	1	336 558 936
	Stator 30 HP - 380V	1	
	Stator 30 HP - 460V	1	336 333 936
	Stator 30 HP - 575V	1	336 627 936
	Stator 40 HP - 380V	1	
	Stator 40 HP - 460V	1	336 334 936
	Stator 40 HP - 575V	1	336 628 936

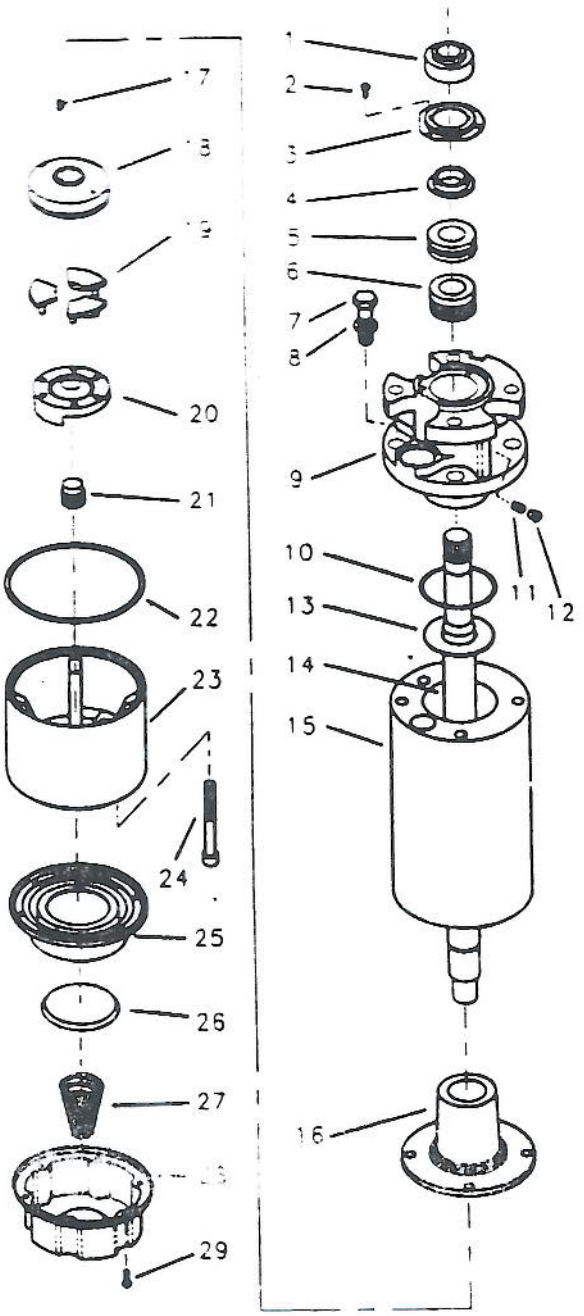
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	178 119 908
	Rotor 15 HP	1	178 120 908
	Rotor 20 HP	1	178 121 907
	Rotor 25 HP	1	178 122 907
	Rotor 30 HP	1	178 123 907
	Rotor 40 HP	1	178 115 908
	WITH SUBTROL		
15	Stator 10 HP - 220V	1	
	Stator 10 HP - 380V	1	336 329 936
	Stator 10 HP - 415V	1	
	Stator 15 HP - 220V	1	
	Stator 15 HP - 380V	1	336 330 936
	Stator 15 HP - 415V	1	
	Stator 20 HP - 220V	1	
	Stator 20 HP - 380V	1	336 331 936
	Stator 20 HP - 415V	1	336 761 [illegible]
	Stator 25 HP - 220V	1	
	Stator 25 HP - 380V	1	336 332 936
	Stator 25 HP - 415V	1	336 762 936
	Stator 30 HP - 220V	1	
	Stator 30 HP - 380V	1	336 333 936
	Stator 30 HP - 415V	1	
	Stator 40 HP - 380V	1	336 334 936
	Stator 40 HP - 415V	1	

Super 6 - Straight (Clad) Thrust Housing: 6-Inch dia. - Ni-Resist 10 thru 40 HP

For 50 and 60 hertz 3-lead construction
Models 2-6—4500 & 2-6—4600



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 277 101
2	Self Tap Screw	3	276 020 202
3	Seal Cover	1	152 047 102
4	Bushing	1	155 301 103
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	275 968 306
8	Lockwasher	4	275 547 113
9	Upper End Bell	1	177 281 904
10	"O" Ring	1	275 743 146
11	Check Valve	1	151 301 901
12	Pipe Plug	1	275 244 102
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 393 901
17	Woodruff Key	1	275 250 110
18	Thrust Bearing	1	305 096 901
19	Thrust Segment	3	155 412 101
20	Leveling Disc	1	177 328 101
21	Adjusting Screw	1	151 049 101
22	"O" Ring	1	275 744 149
23	Thrust Housing	1	177 392 902
24	Cap Screw	4	276 040 316
25	Diaphragm	1	155 691 102
26	Diaphragm Plate	1	151 987 102
27	Diaphragm Spring	1	155 278 101
28	Diaphragm Cover	1	155 690 202
29	Machine Screw	6	155 761 101
	Lead Assy-Ordered Separately		
	Sleeve Bearing	2	305 075 901
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 101

For Models Not Shown Consult Factory

Super 6 - Straight (Clad) Thrust Housing: 6-Inch dia. - Ni-Resist 10 thru 40 HP

60 HERTZ

SINGLE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	
	Rotor 15 HP	1	
	WITHOUT SUBTROL		
15	Stator 10 HP - 230V	1	
	Stator 15 HP - 230V	1	

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	178 119 908
	Rotor 15 HP	1	178 120 908
	Rotor 20 HP	1	178 121 907
	Rotor 25 HP	1	178 122 907
	Rotor 30 HP	1	178 123 907
	Rotor 40 HP	1	178 115 908
	WITH SUBTROL		
15	Stator 10 HP - 200V	1	336 616 968
	Stator 10 HP - 230V	1	336 554 968
	Stator 10 HP - 380V	1	
	Stator 10 HP - 460V	1	336 329 968
	Stator 10 HP - 575V	1	336 623 968
	Stator 15 HP - 200V	1	336 617 968
	Stator 15 HP - 230V	1	336 555 968
	Stator 15 HP - 380V	1	
	Stator 15 HP - 460V	1	336 330 968
	Stator 15 HP - 575V	1	336 624 968
	Stator 20 HP - 200V	1	336 618 968
	Stator 20 HP - 230V	1	336 556 968
	Stator 20 HP - 380V	1	
	Stator 20 HP - 460V	1	336 331 968
	Stator 20 HP - 575V	1	336 625 968
	Stator 25 HP - 200V	1	336 619 968
	Stator 25 HP - 230V	1	336 557 968
	Stator 25 HP - 380V	1	
	Stator 25 HP - 460V	1	336 332 968
	Stator 25 HP - 575V	1	336 626 968
	Stator 30 HP - 200V	1	336 620 968
	Stator 30 HP - 230V	1	336 558 968
	Stator 30 HP - 380V	1	
	Stator 30 HP - 460V	1	336 333 968
	Stator 30 HP - 575V	1	336 627 968
	Stator 40 HP - 380V	1	
	Stator 40 HP - 460V	1	336 334 981
	Stator 40 HP - 575V	1	336 628 937

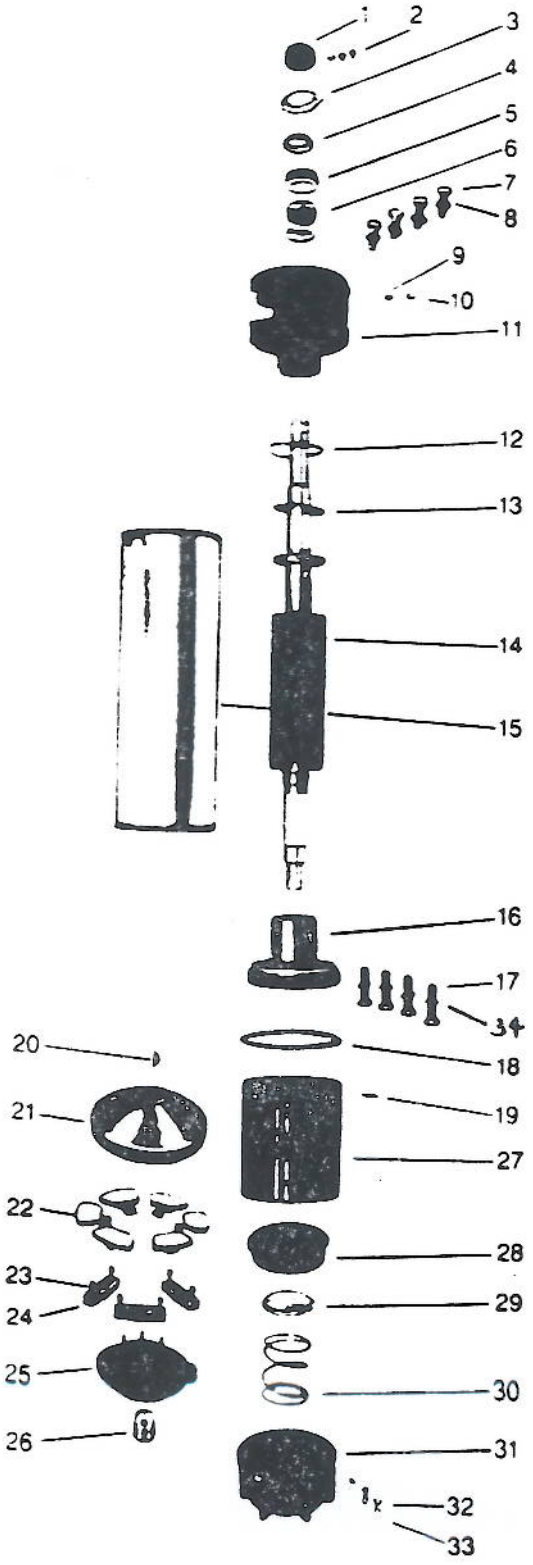
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 10 HP	1	178 119 908
	Rotor 15 HP	1	178 120 908
	Rotor 20 HP	1	178 121 907
	Rotor 25 HP	1	178 122 907
	Rotor 30 HP	1	178 123 907
	Rotor 40 HP	1	178 115 908
	WITH SUBTROL		
15	Stator 10 HP - 220V	1	
	Stator 10 HP - 380V	1	336 329 968
	Stator 10 HP - 415V	1	
	Stator 15 HP - 220V	1	
	Stator 15 HP - 380V	1	336 330 968
	Stator 15 HP - 415V	1	
	Stator 20 HP - 220V	1	
	Stator 20 HP - 380V	1	336 331 968
	Stator 20 HP - 415V	1	
	Stator 25 HP - 220V	1	
	Stator 25 HP - 380V	1	336 332 968
	Stator 25 HP - 415V	1	
	Stator 30 HP - 220V	1	
	Stator 30 HP - 380V	1	336 333 968
	Stator 30 HP - 415V	1	
	Stator 40 HP - 380V	1	336 334 981
	Stator 40 HP - 415V	1	

Super 6 - Straight Thrust Housing: 6-inch dia. - Water Well 50 & 60 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—60-15



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 274 101
2	Self Tap Screw	3	276 019 204
3	Seal Cover	1	152 047 101
4	Bushing	1	155 301 101
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	275 297 306
8	Lockwasher	8	275 546 113
9	Check Valve	1	151 301 901
10	Filter	1	155 411 901
11	Upper End Bell	1	177 265 905
12	"O" Ring	1	275 743 146
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 166 908
17	Hex Head Bolt	4	275 339 305
18	"O" Ring	1	275 746 102
19	Pin	1	151 450 102
20	Woodruff Key	1	275 250 110
21	Thrust Bearing	1	151 262 904
22	Thrust Segment	6	177 330 101
23	Rocker Arm	3	151 938 101
24	Rocker Arm Pin	6	151 939 101
25	Leveling Disc	1	177 258 901
26	Adjusting Screw	1	151 049 101
27	Thrust Housing	1	177 268 901
28	Diaphragm	1	151 986 100
29	Diaphragm Plate	1	151 987 101
30	Diaphragm Spring	1	151 988 101
31	Diaphragm Cover	1	177 267 901
32	Lockwasher	3	275 572 109
33	Cap Screw	3	275 304 504
	"O" Ring for Center Bearing	2	275 743 144
	Lead Assy - #8 AWG	1	152 314 901
	Baffle	1	155 173 101
	Self Tap Screw	2	276 019 204
	Thrust Bearing Kit - includes items 18,19,20,21,22,23,24,25 & 26		305 030 902
	Seal Kit - includes items 1,2,3,4,5,6,9, 10,12,18,19,28,29,30 & grease		305 029 906
	Casting & Seal Kit - includes Seal Kit and items 11,16,26,27,31,32 & 33		305 028 905
	Sleeve Bearing	2	305 075 901
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 102

For Models Not Shown Consult Factory

Franklin Electric

Super 6 - Straight Thrust Housing: 6-inch dia. - Water Well 50 & 60 HP

60 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 50 HP	1	178 116 902
	Rotor 60 HP	1	178 147 902
	WITH SUBTROL		
15	Stator 50 HP - 380V	1	336 728 928
	Stator 50 HP - 460V	1	336 335 928
	Stator 50 HP - 575V	1	336 629 928
	Stator 60 HP - 380V	1	336 729 928
	Stator 60 HP - 460V	1	336 336 928
	Stator 60 HP - 575V	1	337 516 928

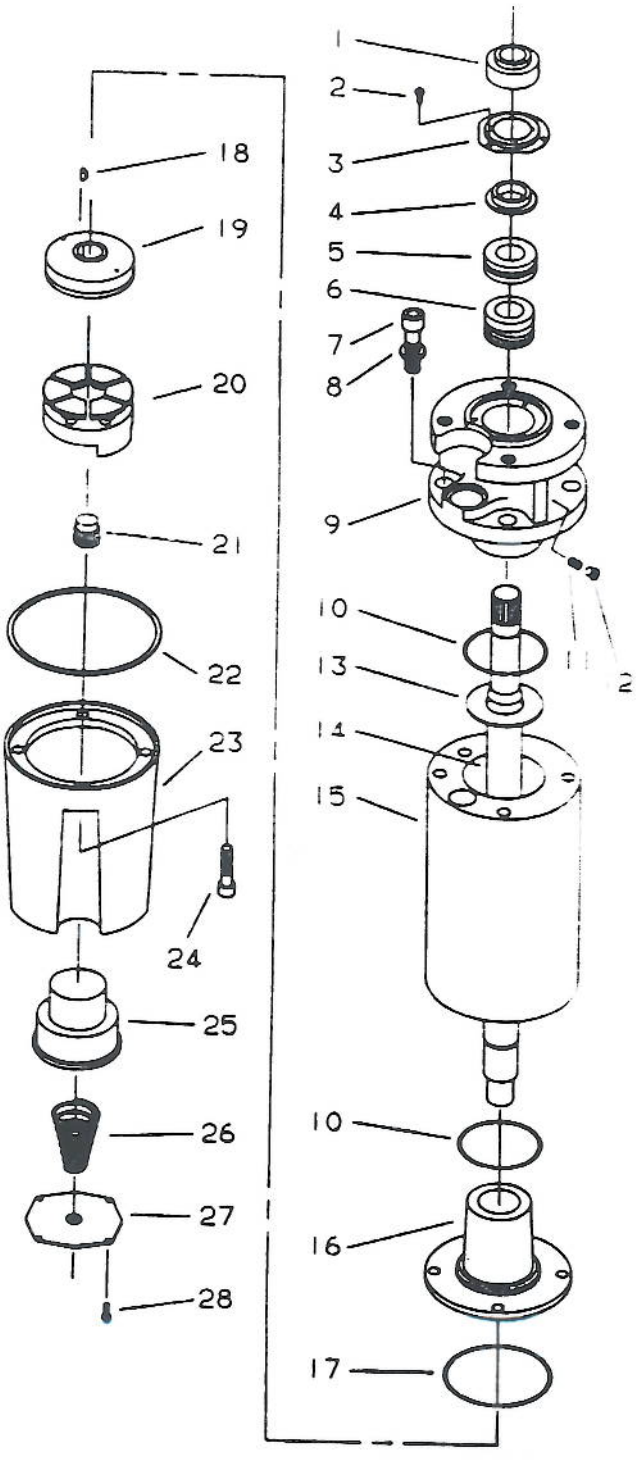
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 50 HP	1	178 116 902
	Rotor 60 HP	1	178 147 902
	WITH SUBTROL		
15	Stator 50 HP - 380V	1	336 335 928
	Stator 50 HP - 415V	1	336 [illegible] 928
	Stator 60 HP - 380V	1	336 336 928
	Stator 60 HP - 415V	1	

Super 6 - Tapered Thrust Housing: 6-inch dia. - Water Well 50 & 60 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—6025



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 274 101
2	Self Tap Screw	3	276 019 204
3	Seal Cover	1	152 047 101
4	Bushing	1	155 301 101
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	275 297 306
8	Lockwasher	4	275 546 113
9	Upper End Bell	1	177 265 905
10	"O" Ring	2	275 743 146
11	Check Valve	1	151 301 901
12	Filter	1	155 411 901
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 327 901
17	"O" Ring	1	275 743 152
18	Woodruff Key	1	275 250 110
19	Thrust Bearing	1	305 096 901
20	Thrust Assembly	1	177 336 201
21	Adjusting Screw	1	155 449 101
22	Gasket	1	155 451 101
23	Thrust Housing	1	177 350 901
24	Cap Screw	4	275 304 607
25	Diaphragm	1	155 525 101
26	Diaphragm Spring	1	155 559 101
27	Diaphragm Coverplate	1	152 167 101
28	Machine Screw	4	275 157 356
	"O" Ring for Center Bearing	2	275 743 144
	Lead Assy - #8 AWG	1	152 314 901
	Thrust Bearing Kit - includes items 10, 17,18,19,20,21 & 22		305 095 903
	Seal Kit - includes items 1,2,3,4,5,6,10, 11,12,13,17,22,25,26 & grease		305 029 907
	Casing & Seal Kit - includes Seal Kit and items 9,16,21,23,24,27 & 28		305 028 906
	Sleeve Bearing	2	305 075 901
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 101

For Models Not Shown Consult Factory

Franklin Electric
Bluffton, Indiana 46714

800 348 2420

Super 6 - Tapered Thrust Housing: 6-inch dia. - Water Well 50 & 60 HP

60 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 50 HP	1	178 116 906
	Rotor 60 HP	1	178 147 906
	WITH SUBTROL		
15	Stator 50 HP - 380V	1	336 728 932
	Stator 50 HP - 460V	1	338 710 932 ✓
	Stator 60 HP - 380V	1	336 629 932
	Stator 60 HP - 460V	1	336 729 932
	Stator 60 HP - 575V	1	336 336 932 ✓
		1	337 516 932

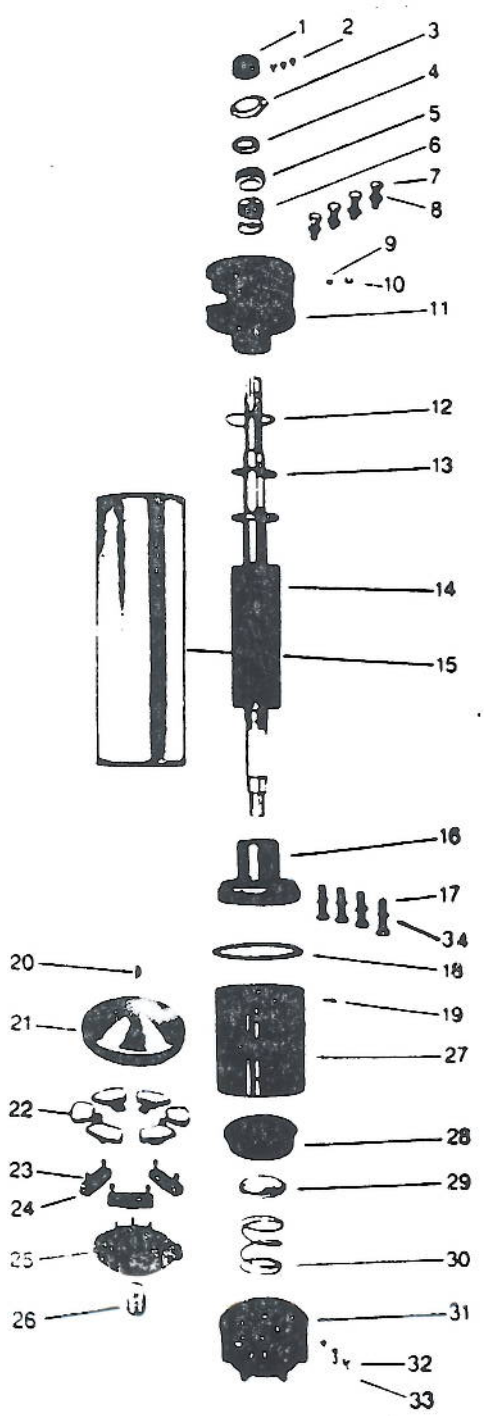
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 50 HP	1	178 116 906
	Rotor 60 HP	1	178 147 906
	WITH SUBTROL		
15	Stator 50 HP - 380V	1	338 710 932
	Stator 50 HP - 415V	1	336 765 932
	Stator 60 HP - 380V	1	336 336 932
	Stator 60 HP - 415V	1	

Super 6 - Straight Thrust Housing: 6-inch dia. - 316 Stainless Steel 50 & 60 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—6315



Key	Description	No Req'd	Part Number
1	Slinger	1	155 277 101
2	Self Tap Screw	3	276 020 202
3	Seal Cover	1	152 047 102
4	Bushing	1	155 301 103
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	275 368 306
8	Lockwasher	4	275 547 113
9	Check Valve	1	151 301 901
10	Pipe Plug	1	275 244 102
11	Upper End Bell	1	177 296 902
12	"O" Ring	1	275 743 146
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 166 908
17	Hex Head Bolt	4	275 339 305
18	"O" Ring	1	275 746 102
19	Pin	1	151 450 103
20	Woodruff Key	1	275 250 110
21	Thrust Bearing	1	151 262 904
22	Thrust Segment	6	177 330 101
23	Rocker Arm	3	151 938 101
24	Rocker Arm Pin	6	151 939 101
25	Leveling Disc	1	177 258 901
26	Adjusting Screw	1	151 049 101
27	Thrust Housing	1	177 286 901
28	Diaphragm	1	152 029 100
29	Diaphragm Plate	1	151 987 102
30	Diaphragm Spring	1	155 278 101
31	Diaphragm Cover	1	177 285 151
32	Lockwasher	3	275 547 109
33	Cap Screw	3	275 306 104
34	Lockwasher	4	275 546 113
	"O" Ring for Center Bearing	2	275 743 144
	Lead Assy-Ordered Separately		
	Baffle	1	155 173 101
	Self Tap Screw	2	276 019 204
	Sleeve Bearing	2	305 075 901
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 102

For Models Not Shown Consult Factory

Super 6 - Straight Thrust Housing: 6-inch dia. - 316 Stainless Steel 50 & 60 HP

60 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 50 HP	1	178 116 902
	Rotor 60 HP	1	178 147 902
	WITH SUBTROL		
15	Stator 50 HP - 380V	1	
	Stator 50 HP - 460V	1	338 710 933
	Stator 50 HP - 575V	1	336 629 933
	Stator 60 HP - 380V	1	336 729 933
	Stator 60 HP - 460V	1	336 336 933
	Stator 60 HP - 575V	1	337 516 933

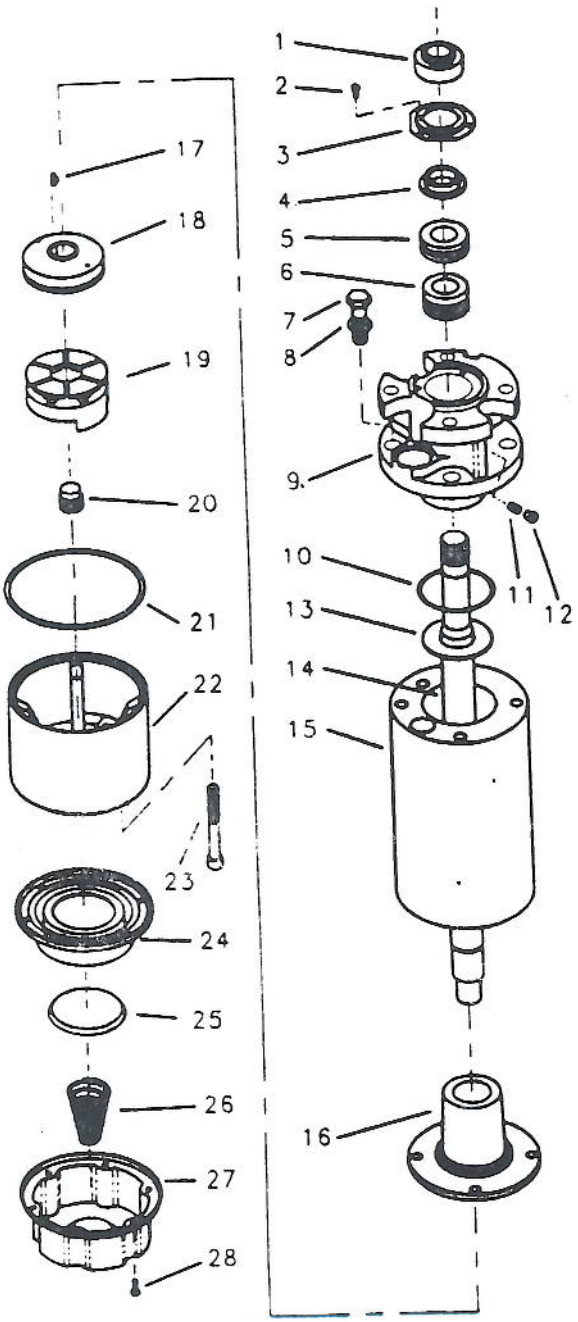
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 50 HP	1	178 116 902
	Rotor 60 HP	1	178 147 902
	WITH SUBTROL		
15	Stator 50 HP - 380V	1	338 710 933
	Stator 50 HP - 415V	1	336 765 978
	Stator 60 HP - 380V	1	336 336 933
	Stator 60 HP - 415V	1	336 540 933

Super 6 - Straight (Clad) Thrust Housing: 6-inch dia. - 316 Stainless Steel 50 & 60 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—4000



Key	Description	No Req'd	Part Number
1	Slinger	1	155 277 101
2	Self Tap Screw	3	276 020 202
3	Seal Cover	1	152 047 102
4	Bushing	1	155 301 103
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	275 968 306
8	Lockwasher	4	275 547 113
9	Upper End Bell	1	177 296 902
10	"O" Ring	1	275 743 146
11	Check Valve	1	151 301 901
12	Pipe Plug	1	275 244 102
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 393 901
17	Woodruff Key	1	275 250 110
18	Thrust Bearing	1	305 096 901
19	Thrust Assembly	1	177 336 201
20	Adjusting Screw	1	151 049 101
21	"O" Ring	1	275 744 149
22	Thrust Housing	1	177 392 902
23	Cap Screw	4	276 040 316
24	Diaphragm	1	155 691 102
25	Diaphragm Plate	1	151 987 102
26	Diaphragm Spring	1	155 278 101
27	Diaphragm Cover	1	155 690 202
28	Machine Screw	6	155 761 101
	"O" Ring for Center Bearing	2	275 743 144
	Lead Assy-Ordered Separately		
	Sleeve Bearing	2	305 075 901
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 101

For Models Not Shown Consult Factory

Super 6 - Straight (Clad) Thrust Housing: 6-inch dia. - 316 Stainless Steel 50 & 60 HP

60 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 50 HP	1	178 116 906
	Rotor 60 HP	1	178 147 906
	WITH SUBTROL		
15	Stator 50 HP - 380V	1	
	Stator 50 HP - 460V	1	338 710 945
	Stator 50 HP - 575V	1	336 829 945
	Stator 60 HP - 380V	1	
	Stator 60 HP - 460V	1	336 336 945
	Stator 60 HP - 575V	1	

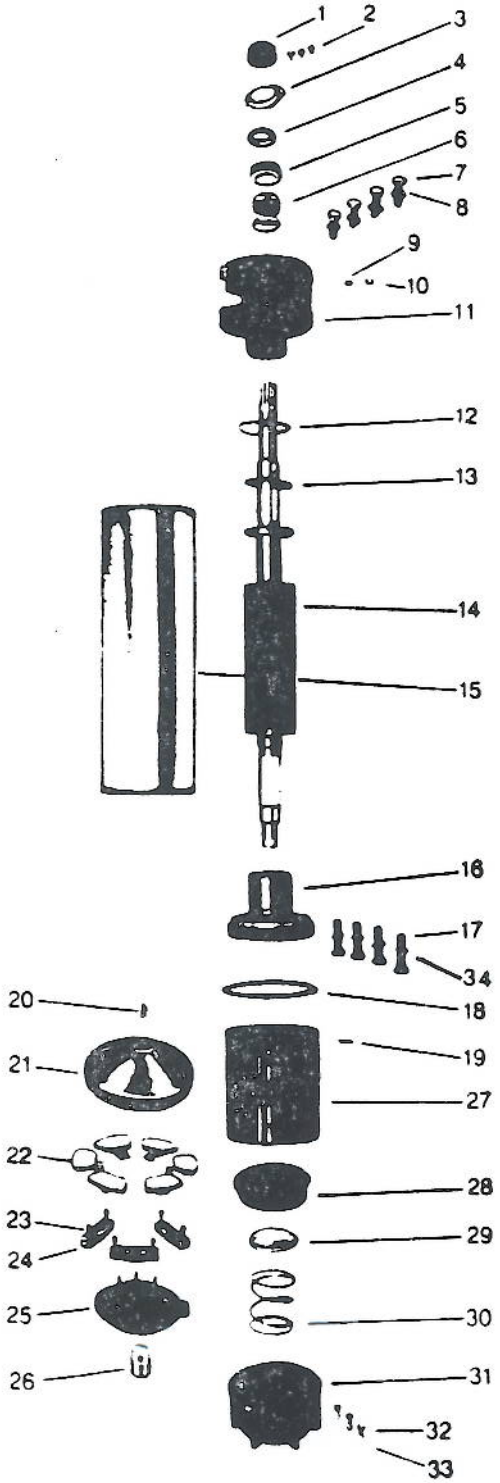
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 50 HP	1	178 116 906
	Rotor 60 HP	1	178 147 906
	WITH SUBTROL		
15	Stator 50 HP - 380V	1	338 710 945
	Stator 50 HP - 415V	1	
	Stator 60 HP - 380V	1	336 336 945
	Stator 60 HP - 415V	1	

Super 6 - Straight Thrust Housing: 6-inch dia. - Ni-Resist 50 & 60 HP

For 50 and 60 Hertz 3-lead construction
Models 2-6—6415



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 277 101
2	Self Tap Screw	3	276 020 202
3	Seal Cover	1	152 047 102
4	Bushing	1	155 301 103
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	275 968 306
8	Lockwasher	4	275 547 113
9	Check Valve	1	151 301 901
10	Pipe Plug	1	275 244 102
11	Upper End Bell	1	177 281 904
12	"O" Ring	1	275 743 148
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 166 908
17	Hex Head Bolt	4	275 339 305
18	"O" Ring	1	275 746 102
19	Pin	1	151 450 103
20	Woodruff Key	1	275 250 110
21	Thrust Bearing	1	151 262 904
22	Thrust Segment	6	177 330 101
23	Rocker Arm	3	151 938 101
24	Rocker Arm Pin	6	151 939 101
25	Leveling Disc	1	177 258 901
26	Adjusting Screw	1	151 049 101
27	Thrust Housing	1	177 282 901
28	Diaphragm	1	152 029 100
29	Diaphragm Plate	1	151 987 102
30	Diaphragm Spring	1	155 278 101
31	Diaphragm Cover	1	177 283 101
32	Lockwasher	3	275 547 109
33	Cap Screw	3	275 306 104
34	Lockwasher	4	275 546 113
	"O" Ring for Center Bearing	2	275 743 144
	Lead Assy-Ordered Separately		
	Baffle	1	155 173 101
	Self Tap Screw	2	276 019 204
	Sleeve Bearing	2	305 075 901
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 102

For Models Not Shown Consult Factory

Super 6 - Straight Thrust Housing: 6-inch dia. - Ni-Resist 50 & 60 HP

60 HERTZ

THREE PHASE

Key	Description	No Req'd	Part Number
14	Rotor 50 HP	1	178 116 902
	Rotor 60 HP	1	178 147 902
	WITH SUBTROL		
15	Stator 50 HP - 380V	1	
	Stator 50 HP - 460V	1	336 335 933
	Stator 50 HP - 575V	1	
	Stator 60 HP - 380V	1	
	Stator 60 HP - 460V	1	336 336 933
	Stator 60 HP - 575V	1	

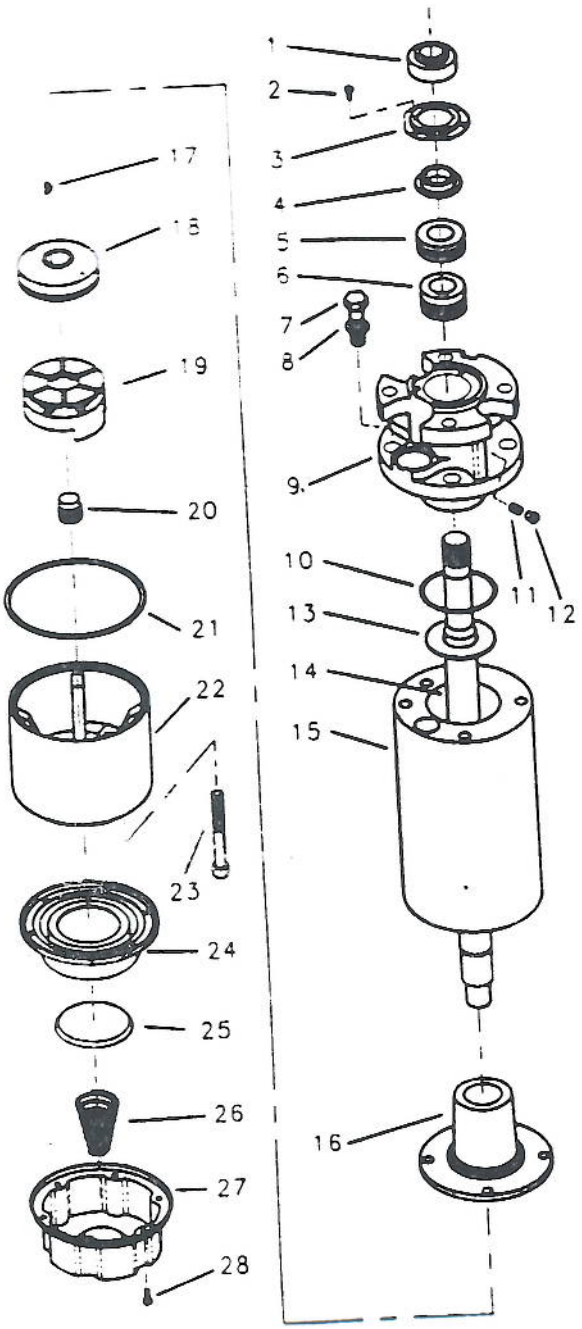
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 50 HP	1	178 116 902
	Rotor 60 HP	1	178 147 902
	WITH SUBTROL		
15	Stator 50 HP - 380V	1	336 335 933
	Stator 50 HP - 415V	1	
	Stator 60 HP - 380V	1	336 336 933
	Stator 60 HP - 415V	1	336 540 933

Super 6 - Straight (Clad) Thrust Housing: 6-inch dia. - Ni-Resist 50 & 60 HP

For 50 and 60 Hertz / Head construction
Models 2-6—4500



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 277 101
2	Self Tap Screw	3	276 020 202
3	Seal Cover	1	152 047 102
4	Bushing	1	155 301 103
5	Stationary Seal	1	155 330 101
6	Rotating Seal	1	155 330 102
7	Cap Screw	4	275 968 306
8	Lockwasher	4	275 547 113
9	Upper End Bell	1	177 281 904
10	"O" Ring	1	275 743 146
11	Check Valve	1	151 301 901
12	Pipe Plug	1	275 244 102
13	Upthrust Washer	1	155 270 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	Lower End Bell	1	177 393 901
17	Woodruff Key	1	275 250 110
18	Thrust Bearing	1	305 096 901
19	Thrust Assembly	1	177 336 201
20	Adjusting Screw	1	151 049 101
21	"O" Ring	1	275 744 149
22	Thrust Housing	1	177 392 902
23	Cap Screw	4	276 040 316
24	Diaphragm	1	155 691 102
25	Diaphragm Plate	1	151 987 102
26	Diaphragm Spring	1	155 278 101
27	Diaphragm Cover	1	155 690 202
28	Machine Screw	6	155 761 101
	"O" Ring for Center Bearing	2	275 743 144
	Lead Assy-Ordered Separately		
	Sleeve Bearing	2	305 075 901
	Sleeve Journals - Upper	1	152 173 104
	- Lower	1	152 173 101

For Models Not Shown Consult Factory

Super 6 - Straight (Clad) Thrust Housing: 6-inch dia. - Ni-Resist 50 & 60 HP

60 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 50 HP	1	178 116 906
	Rotor 60 HP	1	178 147 906
	WITH SUBTROL		
15	Stator 50 HP - 380V	1	
	Stator 50 HP - 460V	1	338 710 945
	Stator 50 HP - 575V	1	336 629 945
	Stator 60 HP - 380V	1	
	Stator 60 HP - 460V	1	336 336 945
	Stator 60 HP - 575V	1	

50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
14	Rotor 50 HP	1	178 116 906
	Rotor 60 HP	1	178 147 906
	WITH SUBTROL		
15	Stator 50 HP - 380V	1	338 710 945
	Stator 50 HP - 415V	1	
	Stator 60 HP - 380V	1	336 336 945
	Stator 60 HP - 415V	1	

Repair Procedures - 8" Straight Thrust Housing - Type 1

Tools Required:
Shaft Clamping Tool - 305 079 128 (TY-111-76)
Shaft Height Gage - 305 079 123 & 305 079 124
(GMG-111-20, Det. 1 & 2)
Seal Cover Insertion Tool -305 079 135 (AT-111-97)
1 5/8" Crowfoot adapter
1/8" spacer for 125-200 HP
3.1mm Drill Bit
3/16" Allen Drive Socket
1/2" Allen Drive Socket
9/16" Socket
15/16" Socket
Ball Peen Hammer
Center Punch
Flat Blade Screw Driver
Rubber Mallet
Small Flat Punch
Socket Drive Screw Driver
Strap Wrench
Torque Wrench - Set 15-20 lb. inches for seal cover fasteners
Torque Wrench - Set 15-20 ib. feet for diaphragm cover fasteners
Torque Wrench - Set 85-90 lb. feet for upper end bell fasteners
Torque Wrench - Set 60 lb. feet for lower end bell fasteners
Torque Wrench - Set 80-90 lb. inches for lead clamping plate fasteners on motors with 3 individual leads
Torque Wrench - Set 120-150 lb. feet for lead jam nuts on motors with 1 or 2 lead sets

Torque Values are the same for Water Well & Corrosion Resistant motors. However, lubricate 316 SST threads with "Never-seez" before assembling.

Refer to Exploded View pages for part descriptions

Step 1: Upper End Bell assembly
Clamp stator in horizontal position. Use a clean rag (wet with water) and swab the stator bore to remove any dust or dirt particles. Lubricate upper stator rabbet with silicone grease. Lubricate "O" ring with silicone grease and attach to upper end bell assembly.

Step 2: Rotor Assembly 40 - 125 HP
Insert rotor into stator bore, being careful not to nick or damage stator liner with shaft or rotor end ring. Wet upper bearing with fill solution (mixed from Prefill Kit). Seat end bell assembly into stator with hand pressure and rotate end bell to seat "O" ring. **Note: The shaft will need to be lifted slightly to allow the journal to enter the end bell bearing.** Using a motor lead, align lead cavity in end bell with lead cavity in stator end. Attach upper end bell to the stator. Torque fasteners, in a cross pattern, to 85-90 lb. ft. with the torque wrench.

Step 2: Rotor Assembly 125 - 200 HP
125 thru 200 HP motors differ because they contain a center bearing. Seat end bell assembly into stator with hand pressure and rotate end bell to seat "O" ring. Using a motor lead, align lead cavity in end bell with lead cavity in stator end. Temporarily fasten the upper end bell in place using the fasteners with a 1/8" spacer between the end bell and the stator end. Lubricate the center bearing "O" rings with silicone grease and assemble to center bearing. Wet upper bearing and center bearing with fill solution (mixed from Prefill Kit). **Note: When assembling the center bearing into the stator bore the ridges on the bearing must align with the slots in the bore. This sometimes takes 2 or 3 attempts. Do not force it as the liner may be damaged.** Insert rotor into stator bore, being careful not to nick or damage stator liner with shaft or rotor end ring. **Note: The shaft will need to be lifted slightly to allow the journal to enter the end bell bearing.** Use the Shaft Height gage to position the shaft height at 4.000". **Do not move the rotor from this position.** Loosen the end bell fasteners and remove the 1/8" spacer. Torque fasteners, in a cross pattern, to 85-90 lb. ft. with the torque wrench. This will position the center bearing with 1/8" space between the ends of the bearing and the ends of the rotor.

Continued on Back Side

Repair Procedures - 8" Straight Thrust Housing - Type 1

Step 3: Lower End Bell Assembly
Lubricate lower stator rabbet with silicone grease. Lubricate "O" ring with silicone grease and assemble to end bell. Wet bearing with fill solution. Insert the nose of the end bell into the stator bore. **Note: The shaft will need to be lifted slightly to allow the journal to enter the end bell bearing.** Attach lower end bell to the stator. Torque fasteners, in a cross pattern, to 60 lb. ft. with the torque wrench. Rotate the shaft and check for freedom of movement and axial play.

Step 4: Upthrust Assembly
Apply a spot of silicone grease on the face of the upthrust washer between any two ears. Place the washer on the lower end bell with the tabs aligned with the bolt holes. The silicone grease will hold it in place.

Step 5: Thrust Assembly and Shimming
Make a trial assembly by placing two .030" shims on the shaft shoulder and installing the thrust bearing. **Note: The woodruff key is not installed for the trail assembly.** Push the thrust and rotor assembly towards the shaft end of the motor, while pushing the shaft extension toward the thrust bearing, until the top surface of the thrust bearing is firmly seated against the upthrust bearing. Measure the shaft height. Add or remove shims until the shaft extension measures 4.010" to 4.015" (8 x 8 design) or 2.885" to 2.890" (8 x 6 design). Remove the thrust bearing and install the woodruff key. Re-install the thrust bearing and re-confirm the above shaft measurement. Add additional shims to fill the space between the thrust bearing support and the retainer ring groove. Install the retainer ring with the round edge next to the thrust support. The thrust bearing must be shimmed solidly so the retainer ring has to be driven onto its groove with no clearance between the shims and retainer ring. It will be necessary to use a small flat punch and tap the ring on its face to seat it into its groove, working from the center of the ring to its two ends. When properly seated, the distance between the ears on the ring should not exceed .090". If it is greater, the ring is not seated and may pop out upon starting. After the retainer ring is installed, there should be no axial movement between the thrust support disc and the shaft.

Step 6: Installing Thrust Assembly
Clamp the rotor in the upper most position with the Shaft Clamping tool. Rotate the motor into the vertical shaft-up position. Install the shaft height adjusting screw into the thrust housing. Adjust screw so two or three threads on the slot end of the screw remain exposed. Install the leveling disc into the thrust housing with the anti-rotation slot engaging the ribs of the thrust housing. Assemble rocker arms, pins and thrust segments onto the leveling disc and wet the thrust segments with fill solution. Attach the thrust housing assembly to the threaded lower end bell. Be careful not to nick or damage the thrust bearing. Using a strap wrench tighten the thrust housing so there is no gap between the stator face and the thrust housing.

Step 7: Adjusting Shaft Height
Tighten the adjusting screw until the thrust segments contact the thrust bearing and pick up the weight of the rotor. Loosen the Shaft Clamping tool and re-position it approximately 1" from the end bell. Spin the motor shaft to be certain the rotor turns freely. With a rubber mallet, strike the shaft extension squarely two or three times to seat the thrust assembly. Place the Shaft Height Gage Body over the shaft extension. Turn the adjusting screw until the Dial Indicator reads 4.002" to 4.004" (8 x 8 design) or 2.877" to 2.879" (8 x 6 design). Make sure the bottom of the gage rests on the upper end bell. Lift the shaft by prying under the Shaft Clamping tool and determine the shaft free end play. If the end play is less than .008", lower the shaft with the adjusting screw until minimum end play is obtained. If the end play is not between .008" and .020" while maintaining the correct shaft height of 4.002" to 4.004" (8 x 8 design) or 2.877" to 2.879 (8 x 6 design) then remove the thrust housing and re-shim the thrust support disc.

Continued on Next Page

Repair Procedures - 8" Straight Thrust Housing - Type 1

Step 7: Adjusting Shaft Height "continued"
Excessive end play is often the result of not shimming solidly between the support disc and the retainer ring. When the final check indicates both the shaft height and end play are within limits, stake the thrust adjusting screw twice, 180 degrees apart with a center punch. Drill a 3.1mm diameter hole, at one of the punched holes, 1/2" deep and install pin. Peen the metal around the pin to prevent it from working loose. **Cover the holes in the thrust housing while drilling so metal chips will not get into the motor.** Spin the shaft and check for free rotation.

Step 8: Pinning the Thrust Housing
If you are using an old thrust housing, use the existing hole as a guide to drill a 3.1mm diameter hole 3/8" deep. Also, drill a second hole adjacent to the original approximately 2" away. If using a new thrust housing, center punch the housing, in line with the weld seam of the stator, 5/8" below the upper edge. Then drill a 3.1mm diameter hole 3/8" deep. Fill drilled hole(s) with Loc-tite and tap pin(s) in place. Using center punch, stake the pin(s) to make a positive seal between the pin(s) and the casting.

Step 9: Seal Installation
Install cup, spring and rotating section of shaft seal in this order. Lubricate rubber of stationary seal with silicone grease. Place stationary seal over shaft with the ceramic in the down position (opposite shaft end). Push the stationary seal into the cavity and seat the top of the seal flush with the end bell surface. Install seal cover and bushing with the flat side of the seal cover adjacent to the lead cavity. Use the Seal Cover Insertion tool to hold the bushing concentric with the shaft. Attach seal cover to top end bell. Torque fasteners to 15-20 lb. in. with the torque wrench. Remove the alignment tool.

Step 10: Filling the Motor
Rotate motor into shaft-down position. Slowly add fill solution until diaphragm cavity in thrust housing is full. Rotate shaft until air bubbles cease.

Step 11: Diaphragm Installation
Apply a light coat of silicone grease to the unpainted surface of the diaphragm cover and the diaphragm seating rabbet of the thrust housing. Install the diaphragm plate into the diaphragm and reverse roll into position. Install diaphragm spring, diaphragm plate and diaphragm into the diaphragm cover. Attach assembly to the thrust housing. Torque fasteners to 15-20 lb. ft. with the torque wrench.

Step 12: Removing Air from Motor
Use vacuum system as shown on Vacuum Filling Apparatus page. Follow the instructions to complete filling of the motor.

Step 13: Final Inspection
Using magnetic base dial indicator, indicate run-out just below spline on shaft extension. Maximum allowance is .004" F.I.M. (T.I.R.). Check for fluid leaks at shaft seal, check valve, "O" rings, diaphragm and staking pin(s). Install filter (water well motors) or pipe plug (corrosion resistant motors) above check valve. Lubricate labyrinth seal of slinger with silicone grease and install slinger by hand.

Step 14: Lead Insertion
Spray lead cavity with drying agent, denatured alcohol or equivalent, and blow out with compressed air. On motors with one or two lead sets, install motor lead(s) and torque jam nut to 120-150 lb. ft. using torque wrench and crowfoot adapter. On motors with 3 individual leads install each lead into motor, install clamping plate and torque fasteners to 80-90 lb. in. using the torque wrench.

Motor is now ready for testing.

Repair Procedures - 8" Tapered Thrust Housing - Type 2 & 2.1

Tools Required:
Shaft Clamping Tool - 305 079 128 (TY-111-76)
Shaft Height Gage - 305 079 123 & 305 079 124 (GMG-111-20, Det. 1 & 2)
Seal Cover Insertion Tool -305 079 135 (AT-111-97)
1 3/16" Crowfoot adapter
1 5/8" Crowfoot adapter
3/16" Allen Drive Socket
5/16" Allen Drive Socket
3/4" Socket
Ball Peen Hammer
Center Punch
Flat Blade Screw Driver
Rubber Mallet
Socket Drive Screw Driver
Torque Wrench - Set 10 lb. feet to check adjusting screw staking.
Torque Wrench - Set 15-20 lb. inches for seal cover fasteners
Torque Wrench - Set 20-25 lb. feet for thrust housing fasteners
Torque Wrench - Set 40-45 lb. feet for upper end bell fasteners (Type 2 motors)
Torque Wrench - Set 85-90 lb. feet for upper end bell fasteners (Type 2.1 motors)
Torque Wrench - Set 60-70 lb. inches for diaphragm cover fasteners
Torque Wrench - Set 60-70 lb. feet for lead jam nuts on motors with 1 3/16" hex nut.
Torque Wrench - Set 120-130 lb. feet for lead jam nuts on motors with 1 5/8" hex nut.

Torque Values are the same for Water Well & Corrosion Resistant motors. However, lubricate 316 SST threads with "Never-seez" before assembling.

Refer to Exploded View pages for part descriptions

Step 1: Upper End Bell assembly
Clamp stator in horizontal position. Use a clean rag (wet with water) and swab the stator bore to remove any dust or dirt particles. Lubricate upper stator rabbet with silicone grease. Lubricate "O" ring with silicone grease and attach to upper end bell assembly.

Step 2: Rotor Assembly
Confirm the upthrust washer is in place on the rotor. Insert rotor into stator bore, being careful not to nick or damage stator liner with shaft or rotor end ring. Wet upper bearing with fill solution (mixed from Prefill Kit). Seat end bell assembly into stator with hand pressure and rotate end bell to seat "O" ring. **Note: The shaft will need to be lifted slightly to allow the journal to enter the end bell bearing.** Using a motor lead, align lead cavity in end bell with lead cavity in stator end. Attach upper end bell to the stator. Torque fasteners, in a cross pattern, to 40-45 lb. ft. with the torque wrench (Type 2 motors). Torque fasteners, in a cross pattern, to 85-90 lb. ft. with the torque wrench (Type 2.1 motors).

Step 3: Lower End Bell Assembly
Lubricate lower stator rabbet with silicone grease. Lubricate "O" ring with silicone grease and assemble to end bell. Wet bearing with fill solution. Insert the nose of the end bell into the stator bore. **Note: The shaft will need to be lifted slightly to allow the journal to enter the end bell bearing.** Seat end bell in stator with hand pressure and rotate end bell to seat "O" ring. Align holes in the end bell with the holes in the stator.

Step 4: Installing Thrust Assembly
Lubricate lower "O" ring with silicone grease and assemble into groove on lower end bell. Install the woodruff key in the rotor shaft. Slide the thrust bearing onto the shaft. Make sure the hub on the thrust bearing support is against the shaft shoulder. Using a center punch, stake the junction of the bearing hub and rotor shaft to prevent the bearing from slipping off. Clamp the rotor in the upper most position with the Shaft Clamping Tool. Rotate the motor into the vertical shaft-up position. Install the shaft height adjusting screw into the thrust housing. Adjust screw so two or three threads, on the slot end, of the screw remain exposed. Install the leveling disc into the thrust housing with the anti-rotation slot engaged. Assemble the rocker arms, pins and thrust segments onto the leveling disc and wet segments with fill solution.

Continued on Back Side

Repair Procedures - 8" Tapered Thrust Housing - Type 2 & 2.1

Step 4: Installing Thrust Assembly "continued"
Lubricate the gasket with silicone grease and assemble to lower end bell. Attach the thrust housing to the stator. Be careful not to nick or damage the thrust bearing. Torque fasteners, in a cross pattern, to 20-25 lb. ft. with the torque wrench Rotate the shaft and check for freedom of movement and axial play.

Step 5: Adjusting Shaft Height
Tighten the adjusting screw until the thrust segments contact the thrust bearing and pick up the weight of the rotor. Loosen the Shaft Clamping tool and re-position it approximately 1" from the end bell. Spin the motor shaft to be certain the rotor turns freely. With a rubber mallet, strike the shaft extension squarely two or three times to seat the thrust assembly. Place the Shaft Height Gage Body over the shaft extension. Make sure the bottom of the gage rests on the upper end bell. Turn the adjusting screw until the Dial Indicator reads 4.002" to 4.004". Lift the shaft by prying under the Shaft Clamping tool and determine the shaft free end play. Free end play should be between .035" and .060". Rotate the motor into the horizontal position. Using a center punch and hammer, stake the threads of the adjusting screw three places 120 degrees apart to prevent movement of the adjusting screw. The adjusting screw stakes must hold a minimum of 10 lb. ft. of torque. Reconfirm correct shaft height.

Step 6: Seal Installation
Install cup, spring and rotating section of shaft seal in this order. Lubricate rubber of stationary seal with silicone grease. Place stationary seal over shaft with the ceramic in the down position (opposite shaft end). Push the stationary seal into the cavity and seat the top of the seal flush with the end bell surface. Install seal cover and bushing with the flat side of the seal cover adjacent to the lead cavity. Use the Seal Cover Insertion tool to hold the bushing concentric with the shaft. Attach seal cover to top end bell. Torque fasteners to 15-20 lb. in. with the torque wrench. Remove the alignment tool.

Step 7: Filling the Motor
Rotate motor into shaft-down position. Slowly add fill solution until diaphragm cavity in thrust housing is full. Rotate shaft until air bubbles cease.

Step 8: Diaphragm Installation
Apply a light coat of silicone grease to the unpainted surface of the diaphragm cover and the diaphragm seating rabbet of the thrust housing. Install the diaphragm plate into the diaphragm and reverse roll into position. Install diaphragm spring, diaphragm plate and diaphragm into the diaphragm cover. Attach assembly to the thrust housing. Torque fasteners to 60-70 lb. in. with the torque wrench.

Step 9: Removing Air from Motor
Use vacuum system as shown on Vacuum Filling Apparatus page. Follow the instructions to complete filling of the motor.

Step 10: Final Inspection
Using magnetic base dial indicator, indicate run-out just below spline on shaft extension. Maximum allowance is .004" F.I.M. (T.I.R.). Check for fluid leaks at shaft seal, check valve, "O" rings, gasket & diaphragm. Install filter (water well motors) or pipe plug (corrosion resistant motors) above check valve. Lubricate labyrinth seal of slinger with silicone grease and install slinger by hand.

Step 11: Lead Insertion
Spray lead cavity with drying agent, denatured alcohol or equivalent, and blow out with compressed air. Install motor lead and torque jam nut to 60-70 lb. ft. (1 3/16" and 1 1/4" hex nuts) or 120-130 lb. ft. (1 5/8" hex nut) using torque wrench and crowfoot adapter.

Motor is now ready for testing.

Super 8 - Straight Thrust Housing - *6-inch Pump Flange*: 8-inch dia. - Water Well 40 thru 60 HP

For 50 and 60 Hertz 3-lead construction
Models 239—104

Key	Description	No. Req'd	Part Number
1	Slinger	1	155 274 101
2	Screw	3	276 000 101
3	Seal Cover	1	152 047 101
4	Bushing	1	155 301 101
5	Stationary Seal	1	155 069 101
6	Rotating Seal	1	155 069 102
7	Filter	1	155 411 901
8	Check Valve	1	151 301 901
9	Hex Head Screw	4	275 295 406
10	Lockwasher	4	275 546 115
11	Upper End Bell	1	177 278 907
12	"O" Ring	1	275 744 138
13	Rotor (See Opposite Side)		
14	Stator (See Opposite Side)		
15	"O" Ring	1	275 746 114
16	Lower End Bell	1	177 306 901
17	Cap Screw	4	275 898 403
18	Upthrust Washer	1	155 318 201
19	Thrust Bearing	1	151 900 902
20	Woodruff Key	1	275 250 113
21	Shim .005"	As Req'd	155 063 108
	Shim .015"	As Req'd	155 063 109
	Shim .030"	As Req'd	155 063 110
	Shim .008"	As Req'd	155 063 117
22	Retaining Ring	1	275 756 132
23	Segment	6	151 882 101
24	Rocker Arm	3	151 893 101
25	Leveling Disc	1	177 310 101
26	Adjusting Screw	1	151 879 102
27	Pin	1	151 450 103
28	Thrust Housing	1	177 307 901
29	Pin	1	151 450 102
30	Diaphragm	1	151 894 100
31	Plate	1	151 903 101
32	Spring	1	151 908 101
33	Cover	1	177 251 102
34	Lockwasher	3	276 000 201
35	Cap Screw	3	275 295 207
	Lead Assy - #4 AWG	1	165 238 901
	Thrust Bearing Kit - includes items 15, 18,19,20,21,22,23,24,25 & 26		305 087 902
	Seal Kit - includes items 1,2,3,4,5,6,7,8, 12,15,27,29,30,31,32 & grease		305 086 903
	Sleeve Bearing	2	305 075 903
	Sleeve Journals	4	151 916 101

For Models Not Shown Consult Factory

Super 8 - Straight Thrust Housing - *6-Inch Pump Flange*: 8-inch dia. - Water Well 40 thru 60 HP

60 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
13	Rotor 40 HP	1	178 113 905
	Rotor 50 HP	1	178 099 905
	Rotor 60 HP	1	178 114 905
	WITH SUBTROL		
14	Stator 40 HP - 380V	1	336 948 902
	Stator 40 HP - 460V	1	334 729 910
	Stator 40 HP - 575V	1	336 177 906
	Stator 50 HP - 380V	1	338 328 902
	Stator 50 HP - 460V	1	334 730 910
	Stator 50 HP - 575V	1	336 178 910
	Stator 60 HP - 380V	1	336 997 902
	Stator 60 HP - 460V	1	334 731 910
	Stator 60 HP - 575V	1	336 179 906

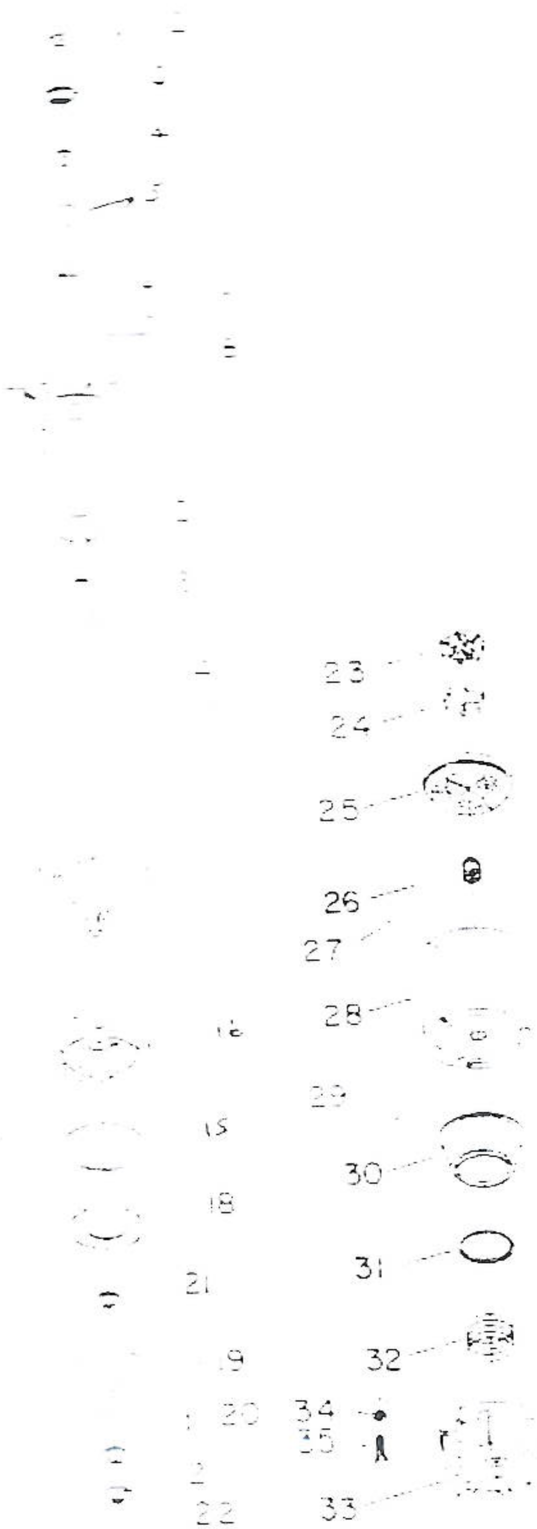
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
13	Rotor 40 HP	1	178 113 905
	Rotor 50 HP	1	178 099 905
	Rotor 60 HP	1	178 114 905
	WITH SUBTROL		
14	Stator 40 HP - 380V	1	334 729 910
	Stator 50 HP - 380V	1	334 730 910
	Stator 60 HP - 380V	1	334 731 910

8" Type 1 - Straight Thrust Housing: 8-inch dia. - Water Well 40 thru 200 HP

For 50 and 60 Hertz 3-lead construction
Models 239[illegible]4

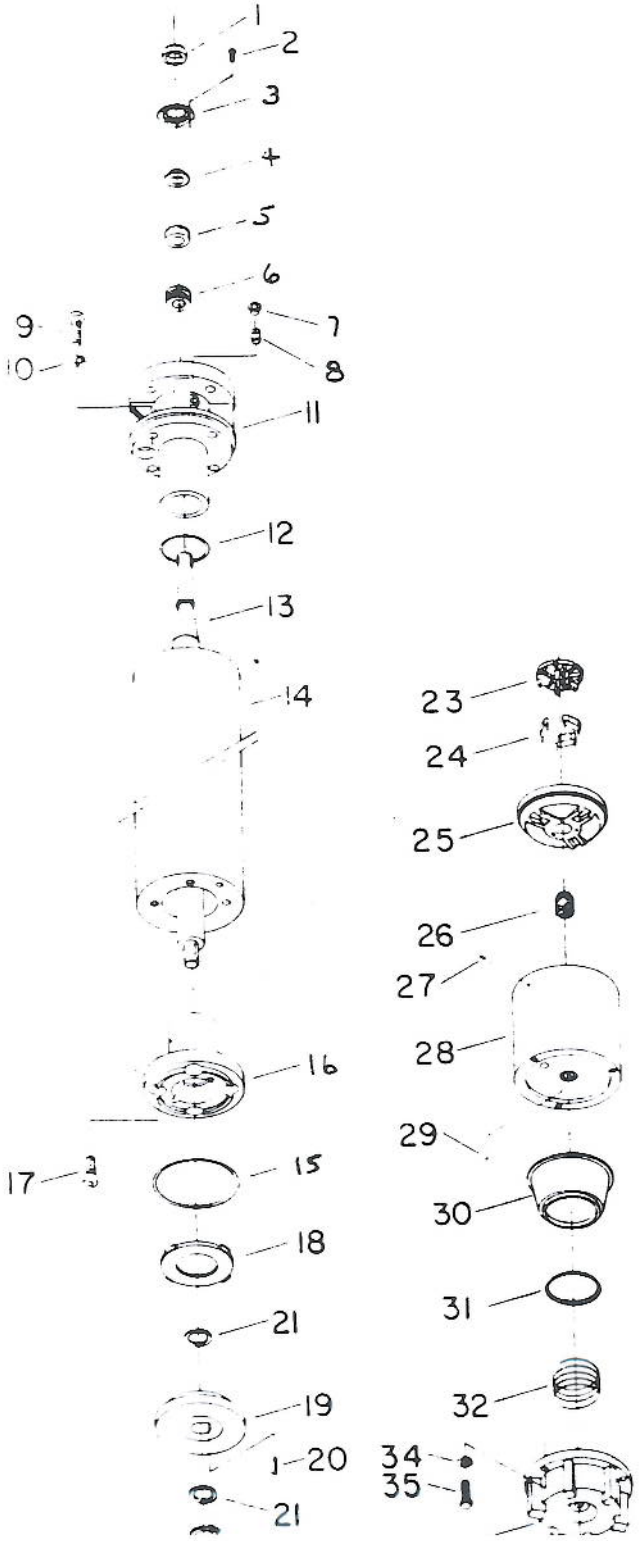


No.	Description	No. Req'd	Part Number
1	Slinger	1	[illegible]
2	Screw	3	275 [illegible] 152
3	Seal Cover	1	152 07[illegible]
4	Bushing	1	155 339 101
5	Stationary Seal	1	151 878 101
6	Rotating Seal	1	151 878 102
7	Filter	1	151 411 [illegible]
8	Check Valve	1	151 [illegible]
9	Hex Head Screw (40-125HP)	4	275 295 406
	Cap Screw (150-200HP)	4	See Back Side
10	Lockwasher (See Back Side)	4	275 [illegible]
11	Upper End Bell (40-125HP)	1	177 366 901
	Upper End Bell (150-200HP)	1	See Back Side
12	"O" Ring	1	275 744 136
13	Rotor (See Opposite Side)		
14	Stator (See Opposite Side)		
15	"O" Ring	1	275 748 114
16	Lower End Bell	1	177 308 901
17	Socket Head Screw	4	275 898 403
18	Upthrust Washer	1	155 318 201
19	Thrust Bearing	1	151 900 902
20	Woodruff Key	1	275 250 113
21	Shim .005"	As Req'd	155 063 108
	Shim .015"	As Req'd	155 063 109
	Shim .030"	As Req'd	155 063 110
	Shim .008"	As Req'd	155 063 117
22	Retaining Ring	1	275 756 132
23	Segment	6	151 882 101
24	Rocker Arm	3	151 893 101
25	Leveling Disc	1	177 310 101
26	Adjusting Screw	1	151 879 102
27	Pin	1	151 450 103
28	Thrust Housing	1	177 307 901
29	Pin	1	151 450 102
30	Diaphragm	1	151 894 100
31	Plate	1	151 903 101
32	Spring (40-100HP)	1	151 908 101
	Spring (125-200HP)	1	152 164 101
	Auxiliary Spring (150-200HP)	1	151 908 101
33	Cover	1	[illegible]
34	Lockwasher	3	275 0[illegible] 20[illegible]
35	Cap Screw	3	275 295 207
	Parts Not Shown		
	Lead Assy - #4 AWG	1	305 210 901
	Lead Assy - #2 AWG	1	305 211 901
	"O" Ring-Ctr Bearing (125-200HP)	2	275 744 137
	Thrust Bearing Kit - includes items 15, 18, 19, 20, 21, 22, 23, 24, 25 & 26		305 287 902
	Seal Kit (40-100HP)		[illegible]
	Seal Kit (125-200HP)		[illegible]
	Kits include items 1, 2, 3, 4, 5, 7, 8, 12, 15, 21 [illegible] 32 [illegible]		
	Sleeve Bearing	2	[illegible]
	Sleeve Journals	2	[illegible]

For Models Not Shown Consult Factory

8" Type 1 - Straight Thrust Housing: 8-inch dia. - Water Well 40 thru 200 HP

For 50 and 60 Hertz 3-lead construction
Models 239—004



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 295 101
2	Screw	3	276 000 152
3	Seal Cover	1	152 073 101
4	Bushing	1	155 339 101
5	Stationary Seal	1	151 878 101
6	Rotating Seal	1	151 878 102
7	Filter	1	155 411 901
8	Check Valve	1	151 001 901
9	Hex Head Screw (40-125HP)	4	275 295 406
	Cap Screw (150-200HP)	4	See Back Side
10	Lockwasher (See Back Side)	4	275 546 115
11	Upper End Bell (40-125HP)	1	177 366 901
	Upper End Bell (150-200HP)	1	See Back Side
12	"O" Ring	1	275 744 138
13	Rotor (See Opposite Side)		
14	Stator (See Opposite Side)		
15	"O" Ring	1	275 746 114
16	Lower End Bell	1	177 306 901
17	Socket Head Screw	4	275 398 403
18	Upthrust Washer	1	155 318 201
19	Thrust Bearing	1	151 900 902
20	Woodruff Key	1	275 250 113
21	Shim .005"	As Req'd	155 063 108
	Shim .015"	As Req'd	155 063 109
	Shim .030"	As Req'd	155 063 110
	Shim .008"	As Req'd	155 063 117
22	Retaining Ring	1	275 756 132
23	Segment	6	151 882 101
24	Rocker Arm	3	151 893 101
25	Leveling Disc	1	177 310 101
26	Adjusting Screw	1	151 879 102
27	Pin	1	151 450 103
28	Thrust Housing	1	177 307 901
29	Pin	1	151 450 102
30	Diaphragm	1	151 894 100
31	Plate	1	151 903 101
32	Spring (40-100HP)	1	151 908 101
	Spring (125-200HP)	1	152 164 101
	Auxiliary Spring (200HP)	1	151 988 101
33	Cover	1	177 251 102
34	Lockwasher	3	276 000 201
35	Cap Screw	3	275 295 207
	Lead Assy - #4 AWG	1	165 238 901
	Lead Assy - #2 AWG	1	165 348 901
	Thrust Bearing Kit - includes items 15, 18,19,20,21,22,23,24,25 & 26		305 087 902
	Seal Kit (40 - 100HP)		305 086 902
	Seal Kit (125 - 175HP)		305 086 906
	Seal Kit (200HP)		305 086 908
	Kits include items 1,2,3,4,5,6,7,8, 12,15,27,29,30,31,32 & grease		
	Sleeve Bearing	2	305 075 903
	Sleeve Journals	4	151 916 101

8" Type 1 - Straight Thrust Housing: 8-inch dia. - Water Well 40 thru 200 HP

60 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
13	Rotor 40 HP	1	178 113 904
	Rotor 50 HP	1	178 099 904
	Rotor 60 HP	1	178 114 904
	Rotor 75 HP	1	178 112 903
	Rotor 100 HP	1	178 098 903
	Rotor 125 HP	1	178 114 911
	Rotor 150 HP	1	178 131 902
	Rotor 175 HP	1	178 132 902
	Rotor 200 HP	1	178 098 911
	3-Lead Construction		
14	Stator 40 HP - 380V	1	336 948 902
	Stator 40 HP - 460V	1	334 729 910
	Stator 40 HP - 575V	1	336 177 906
	Stator 50 HP - 380V	1	338 328 902
	Stator 50 HP - 460V	1	334 730 910
	Stator 50 HP - 575V	1	336 178 906
	Stator 60 HP - 380V	1	336 997 902
	Stator 60 HP - 460V	1	334 731 910
	Stator 60 HP - 575V	1	336 179 906
	Stator 75 HP - 380V	1	337 710 902
	Stator 75 HP - 460V	1	334 600 910
	Stator 75 HP - 575V	1	336 180 906
	Stator 100 HP - 380V	1	337 181 902
	Stator 100 HP - 460V	1	334 732 910
	Stator 100 HP - 575V	1	336 181 908
	Stator 125 HP - 380V	1	337 146 907
	Stator 125 HP - 460V	1	336 053 905
	Stator 125 HP - 575V	1	337 068 902
	Stator 150 HP - 380V	1	337 147 904
	Stator 150 HP - 460V	1	336 054 905
	Stator 150 HP - 575V	1	337 069 904
	Stator 175 HP - 380V	1	
	Stator 175 HP - 460V	1	336 524 907
	Stator 175 HP - 575V	1	337 070 906
	Stator 200 HP - 380V	1	338 082 902
	Stator 200 HP - 460V	1	336 055 909
	Stator 200 HP - 575V	1	337 071 906

50 HERTZ

THREE PHASE

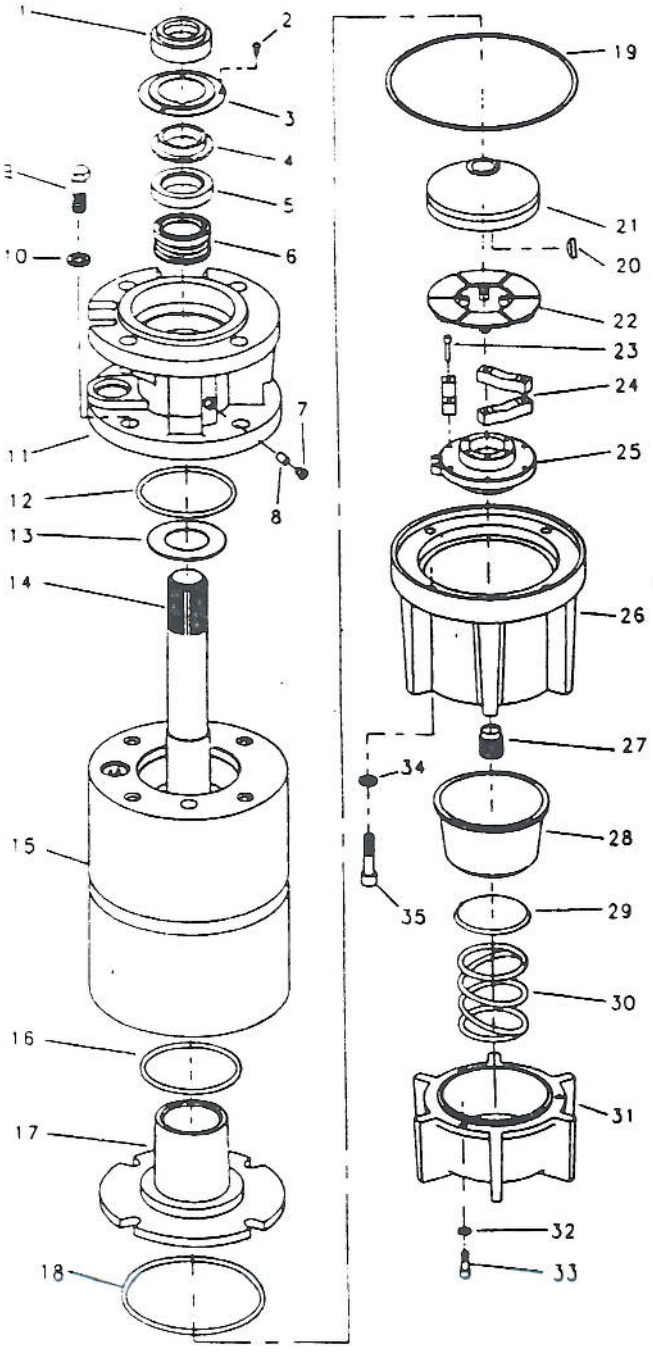
Key	Description	No. Req'd	Part Number
13	Rotor 40 HP	1	178 113 904
	Rotor 50 HP	1	178 099 904
	Rotor 60 HP	1	178 114 904
	Rotor 75 HP	1	178 112 903
	Rotor 100 HP	1	178 098 903
	Rotor 125 HP	1	178 114 911
	Rotor 150 HP	1	178 131 902
	Rotor 175 HP	1	178 132 902
	Rotor 200 HP	1	178 098 911
	3-Lead Construction		
14	Stator 40 HP - 380V	1	334 729 910
	Stator 50 HP - 380V	1	334 730 910
	Stator 60 HP - 380V	1	334 731 910
	Stator 75 HP - 380V	1	334 600 91[illegible]
	Stator 100 HP - 380V	1	334 732 91[illegible]
	Stator 125 HP - 380V	1	336 053 905
	Stator 150 HP - 380V	1	336 054 905
	Stator 175 HP - 380V	1	336 524 907
	Stator 200 HP - 380V	1	336 055 909

150 - 200 HP

Key	Description	No. Req'd	Part Number
9	Cap Screw	4	275 306 404
10	Lockwasher		Not Req'd
11	Upper End Bell (150-200HP)	1	177 366 9[illegible]
38	Clamping Plate	1	155 595 101
37	Cap Screw	4	275 306 104

8" Type 2 - Tapered Thrust Housing: 8-inch dia. - Water Well 40 thru 60 HP

For 50 and 60 Hertz 3-lead construction
Models 239—011



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 752 101
2	Screw	3	275 000 152
3	Seal Cover	1	155 755 101
4	Bushing	1	155 754 101
5	Stationary Seal	1	155 756 101
6	Rotating Seal	1	155 756 102
7	Filter	1	155 411 901
8	Check Valve	1	151 301 901
9	Cap Screw	4	275 295 308
10	Lockwasher	4	275 546 113
11	Upper End Bell (40-60HP)	1	177 413 901
12	"O" Ring	1	275 744 138
13	Upthrust Washer	1	155 739 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	"O" Ring	1	275 744 138
17	Lower End Bell	1	177 380 901
18	"O" Ring	1	275 744 151
19	Gasket	1	155 740 101
20	Woodruff Key	1	275 250 110
21	Thrust Bearing	1	151 262 904
22	Segment	6	177 330 101
23	Rocker Pin	6	151 939 101
24	Rocker Arm	3	151 938 101
25	Leveling Disc	1	177 258 901
26	Thrust Housing	1	177 429 901
27	Adjusting Screw	1	151 049 101
28	Diaphragm	1	151 986 100
29	Diaphragm Plate	1	151 987 101
30	Diaphragm Spring	1	151 988 101
31	Diaphragm Cover	1	177 382 101
32	Lockwasher	3	275 572 109
33	Cap Screw	3	275 304 504
34	Lockwasher	4	275 572 111
35	Cap Screw	4	275 304 608
	Lead Assy - #8 AWG	1	152 406 901
	Thrust Bearing Kit - includes items 16, 18,19,20,21,22,23,24,25 & 27		305 103 901
	Seal Kit - includes items 1,2,3,4,5,6,7,8, 12,16,18,19,28,29,30 & grease		305 104 901
	Sleeve Bearing	2	305 075 904

For Models Not Shown Consult Factory

8" Type 2 - Tapered Thrust Housing: 8-inch dia. - Water Well 40 thru 60 HP

60 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
13	Rotor 40 HP	1	178 211 902
	Rotor 50 HP	1	178 230 902
	Rotor 60 HP	1	178 231 902
	3-Lead Construction		
14	Stator 40 HP - 380V	1	338 649 902
	Stator 40 HP - 460V	1	338 382 902
	Stator 40 HP - 575V	1	338 445 902
	Stator 50 HP - 380V	1	338 650 902
	Stator 50 HP - 460V	1	338 383 902
	Stator 50 HP - 575V	1	338 596 902
	Stator 60 HP - 380V	1	338 651 902
	Stator 60 HP - 460V	1	338 384 902
	Stator 60 HP - 575V	1	338 597 902

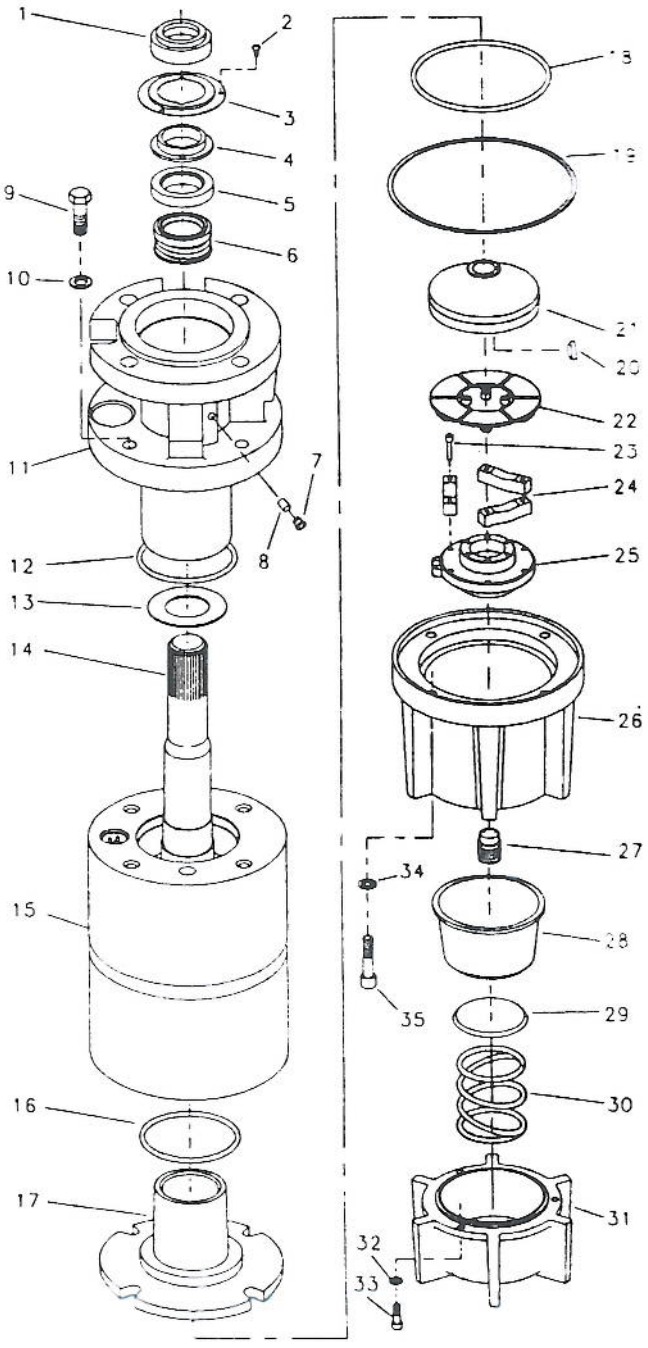
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
13	Rotor 40 HP	1	178 211 902
	Rotor 50 HP	1	178 230 902
	Rotor 60 HP	1	178 231 902
	3-Lead Construction		
14	Stator 40 HP - 380V	1	338 382 902
	Stator 50 HP - 380V	1	338 383 902
	Stator 60 HP - 380V	1	338 384 902

8" Type 2.1 - Tapered Thrust Housing: 8-inch dia. - Water Well 75 & 100 HP

For 50 and 60 Hertz 3-lead construction
Models 239—021



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 752 101
2	Screw	3	276 000 152
3	Seal Cover	1	152 073 101
4	Bushing	1	155 339 101
5	Stationary Seal	1	151 878 101
6	Rotating Seal	1	151 878 102
7	Filter	1	155 411 901
8	Check Valve	1	151 301 901
9	Cap Screw	4	275 295 310
10	Lockwasher	4	275 546 113
11	Upper End Bell (75 & 100HP)	1	177 366 909
12	"O" Ring	1	275 744 138
13	Upthrust Washer	1	155 941 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	"O" Ring	1	275 744 138
17	Lower End Bell	1	177 380 901
18	"O" Ring	1	275 744 151
19	Gasket	1	155 740 101
20	Woodruff Key	1	275 250 110
21	Thrust Bearing	1	151 262 904
22	Segment	6	177 330 101
23	Rocker Pin	6	151 939 101
24	Rocker Arm	3	151 938 101
25	Leveling Disc	1	177 258 901
26	Thrust Housing	1	177 429 901
27	Adjusting Screw	1	151 049 101
28	Diaphragm	1	151 986 100
29	Diaphragm Plate	1	151 987 101
30	Diaphragm Spring	1	151 988 101
31	Diaphragm Cover	1	177 382 101
32	Lockwasher	3	275 572 109
33	Cap Screw	3	275 304 504
34	Lockwasher	4	275 572 111
35	Cap Screw	4	275 304 608
	Lead Assy - #4 AWG	1	165 238 901
	Thrust Bearing Kit - includes items 16, 18,19,20,21,22,23,24,25 & 27		305 103 901
	Seal Kit - includes items 1,2,3,4,5,6,7,8, 12,16,18,19,28,29,30 & grease		305 104 902
	Sleeve Bearing - Upper	1	305 075 903
	- Lower	1	305 075 904
	Sleeve Journals - Upper	2	151 916 101
	- Lower		Not Req'd

For Models Not Shown Consult Factory

Franklin Electric
Bluffton, Indiana 46714

8" Type 2.1 - Tapered Thrust Housing: 8-inch dia. - Water Well 75 & 100 HP

60 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
13	Rotor 75 HP	1	178 268 902
	Rotor 100 HP	1	178 270 902
	3-Lead Construction		
14	Stator 75 HP - 380V	1	338 652 902
	Stator 75 HP - 460V	1	338 385 902
	Stator 75 HP - 575V	1	338 598 902
	Stator 100 HP - 380V	1	
	Stator 100 HP - 460V	1	338 386 902
	Stator 100 HP - 575V	1	

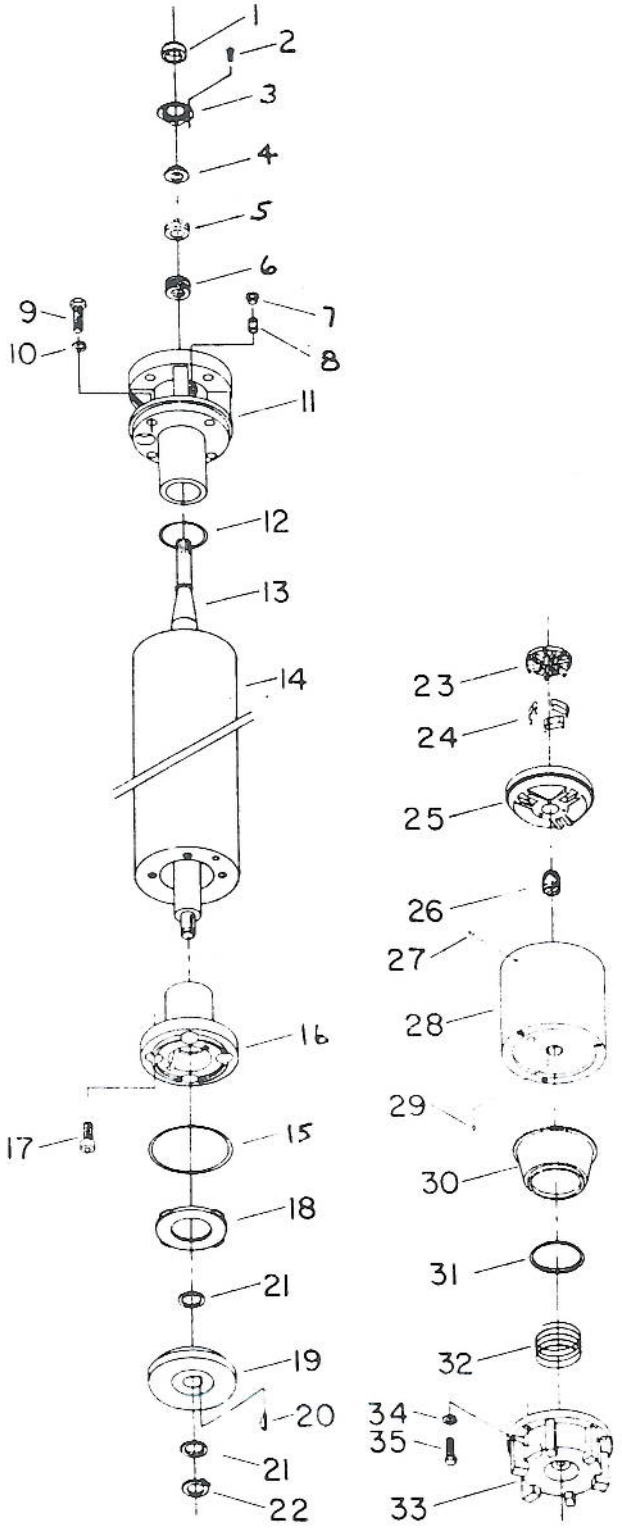
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
13	Rotor 75 HP	1	178 268 902
	Rotor 100 HP	1	178 270 902
	3-Lead Construction		
14	Stator 75 HP - 380V	1	338 385 902
	Stator 100 HP - 380V	1	338 386 902

8" Type 1 - Straight Thrust Housing: 8-inch dia. - Ni-Resist 40 thru 200 HP

For 50 and 60 Hertz 3-lead construction
Models 239—404



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 295 101
2	Screw	3	276 020 253
3	Seal Cover	1	152 273 102
4	Bushing	1	155 339 103
5	Stationary Seal	1	151 878 101
6	Rotating Seal	1	151 878 102
7	Pipe Plug	1	275 244 102
8	Check Valve	1	151 301 901
9	Hex Head Screw (40-125HP)	4	275 984 406
	Cap Screw (150-200HP)	4	See Back Side
10	Lockwasher (See Back Side)	4	275 606 115
11	Upper End Bell (40-125HP)	1	177 292 905
	Upper End Bell (150-200HP)	1	See Back Side
12	"O" Ring	1	275 744 138
13	Rotor (See Opposite Side)		
14	Stator (See Opposite Side)		
15	"O" Ring	1	275 746 114
16	Lower End Bell	1	177 306 901
17	Socket Head Screw	4	275 898 403
18	Upthrust Washer	1	155 318 201
19	Thrust Bearing	1	151 900 902
20	Woodruff Key	1	275 250 113
21	Shim .005"	As Req'd	155 063 108
	Shim .015"	As Req'd	155 063 109
	Shim .030"	As Req'd	155 063 110
	Shim .008"	As Req'd	155 063 117
22	Retaining Ring	1	275 756 132
23	Segment	6	151 882 101
24	Rocker Arm	3	151 893 101
25	Leveling Disc	1	177 310 101
26	Adjusting Screw	1	151 879 102
27	Pin	1	151 450 103
28	Thrust Housing	1	177 322 901
29	Pin	1	151 450 102
30	Diaphragm	1	151 894 100
31	Plate	1	151 903 201
32	Spring (40-100HP)	1	155 303 101
	Spring (125-200HP)	1	155 496 101
	Auxiliary Spring (200HP)	1	155 278 101
33	Cover	1	177 295 102
34	Lockwasher	3	276 606 111
35	Cap Screw	3	275 984 207
	Lead Assy - #4 AWG	1	165 238 903
	Lead Assy - #2 AWG	1	165 348 901
	Thrust Bearing Kit - includes items 15, 18,19,20,21,22,23,24,25 & 26		305 087 902
	Seal Kit (40 - 100HP)		305 086 905
	Seal Kit (125 - 175HP)		305 086 907
	Seal Kit (200HP)		305 086 909
	Kits include items 1,2,3,4,5,6,7,8, 12,15,27,29,30,31,32 & grease		
	Sleeve Bearing	2	305 075 903
	Sleeve Journals	4	151 916 101

For Models Not Shown Consult Factory

8" Type 1 - Straight Thrust Housing: 8-inch dia. - Ni-Resist 40 thru 200 HP

60 HERTZ

THREE PHASE

Key	Description	No Req'd	Part Number
13	Rotor 40 HP	1	178 113 904
	Rotor 50 HP	1	178 099 904
	Rotor 60 HP	1	178 114 904
	Rotor 75 HP	1	178 112 903
	Rotor 100 HP	1	178 098 903
	Rotor 125 HP	1	178 114 911
	Rotor 150 HP	1	178 131 902
	Rotor 175 HP	1	
	Rotor 200 HP	1	178 098 911
	3-Lead Construction		
14	Stator 40 HP - 380V	1	
	Stator 40 HP - 460V	1	334 729 912
	Stator 40 HP - 575V	1	
	Stator 50 HP - 380V	1	
	Stator 50 HP - 460V	1	334 730 912
	Stator 50 HP - 575V	1	
	Stator 60 HP - 380V	1	
	Stator 60 HP - 460V	1	334 731 912
	Stator 60 HP - 575V	1	
	Stator 75 HP - 380V	1	
	Stator 75 HP - 460V	1	334 600 912
	Stator 75 HP - 575V	1	
	Stator 100 HP - 380V	1	
	Stator 100 HP - 460V	1	334 732 912
	Stator 100 HP - 575V	1	336 181 907
	Stator 125 HP - 380V	1	
	Stator 125 HP - 460V	1	336 053 907
	Stator 125 HP - 575V	1	
	Stator 150 HP - 380V	1	
	Stator 150 HP - 460V	1	336 054 908
	Stator 150 HP - 575V	1	
	Stator 175 HP - 380V	1	
	Stator 175 HP - 460V	1	
	Stator 175 HP - 575V	1	
	Stator 200 HP - 380V	1	
	Stator 200 HP - 460V	1	336 055 913
	Stator 200 HP - 575V	1	

50 HERTZ

THREE PHASE

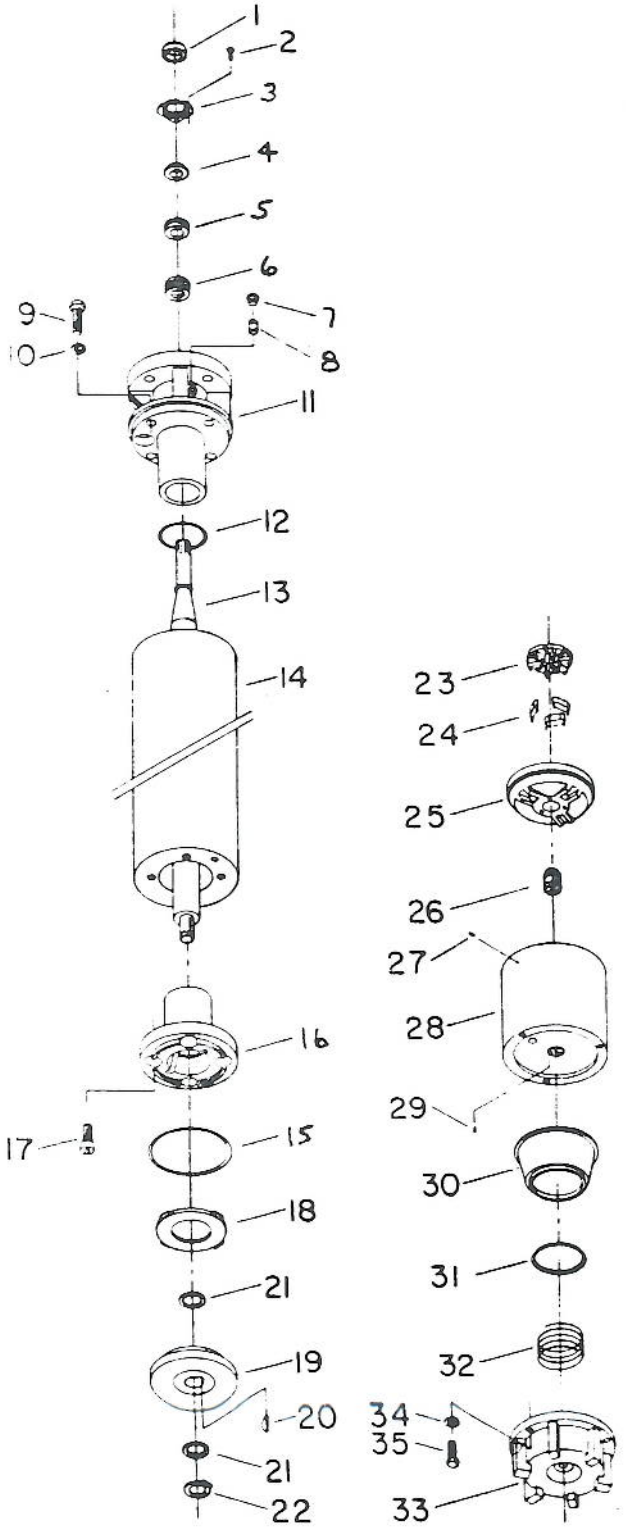
Key	Description	No. Req'd	Part Number
13	Rotor 40 HP	1	178 113 904
	Rotor 50 HP	1	178 099 904
	Rotor 60 HP	1	178 114 904
	Rotor 75 HP	1	178 112 903
	Rotor 100 HP	1	178 098 903
	Rotor 125 HP	1	178 114 911
	Rotor 150 HP	1	178 131 902
	Rotor 175 HP	1	
	Rotor 200 HP	1	178 098 911
	3-Lead Construction		
14	Stator 40 HP - 380V	1	334 729 912
	Stator 50 HP - 380V	1	334 730 912
	Stator 60 HP - 380V	1	334 731 912
	Stator 75 HP - 380V	1	334 600 912
	Stator 100 HP - 380V	1	334 732 912
	Stator 125 HP - 380V	1	336 053 9[illegible]
	Stator 150 HP - 380V	1	336 054 90[illegible]
	Stator 175 HP - 380V	1	
	Stator 200 HP - 380V	1	336 055 913

150 - 200 HP

Key	Description	No. Req'd	Part Number
9	Cap Screw	4	275 306 405
10	Lockwasher		Not Req'd
11	Upper End Bell (150-200HP)	1	177 292 907
36	Clamping Plate	1	155 595 [illegible]
37	Cap Screw	4	275 306 1[illegible]

8" Type 1 - Straight Thrust Housing: 8-inch dia. - 316 Stainless Steel 40 thru 200 HP

For 50 and 60 Hertz 3-lead construction
Models 239—204



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 295 101
2	Screw	3	276 020 253
3	Seal Cover	1	152 073 102
4	Bushing	1	155 339 103
5	Stationary Seal	1	151 878 101
6	Rotating Seal	1	151 878 102
7	Pipe Plug	1	275 244 102
8	Check Valve	1	151 301 901
9	Hex Head Screw (40-125HP)	4	275 984 406
	Cap Screw (150-200HP)	4	See Back Side
10	Lockwasher (See Back Side)	4	275 606 115
11	Upper End Bell (40-125HP)	1	177 302 905
	Upper End Bell (150-200HP)	1	See Back Side
12	"O" Ring	1	275 744 138
13	Rotor (See Opposite Side)		
14	Stator (See Opposite Side)		
15	"O" Ring	1	275 746 114
16	Lower End Bell	1	177 306 901
17	Socket Head Screw	4	275 898 403
18	Upthrust Washer	1	155 318 201
19	Thrust Bearing	1	151 900 902
20	Woodruff Key	1	275 250 113
21	Shim .005"	As Req'd	155 063 108
	Shim .015"	As Req'd	155 063 109
	Shim .030"	As Req'd	155 063 110
	Shim .008"	As Req'd	155 063 117
22	Retaining Ring	1	275 756 132
23	Segment	6	151 882 101
24	Rocker Arm	3	151 893 101
25	Leveling Disc	1	177 310 101
26	Adjusting Screw	1	151 879 102
27	Pin	1	151 450 103
28	Thrust Housing	1	177 323 901
29	Pin	1	151 450 102
30	Diaphragm	1	151 894 100
31	Plate	1	151 903 201
32	Spring (40-100HP)	1	155 303 101
	Spring (125-200HP)	1	155 496 101
	Auxiliary Spring (200HP)	1	155 278 101
33	Cover	1	177 305 102
34	Lockwasher	3	276 606 111
35	Cap Screw	3	275 984 207
	Lead Assy - #4 AWG	1	165 238 903
	Lead Assy - #2 AWG	1	165 348 901
	Thrust Bearing Kit - includes items 15, 18,19,20,21,22,23,24,25 & 26		305 087 902
	Seal Kit (40 - 100HP)		305 086 905
	Seal Kit (125 - 175HP)		305 086 907
	Seal Kit (200HP)		305 086 909
	Kits include items 1,2,3,4,5,6,7,8, 12,15,27,29,30,31,32 & grease		
	Sleeve Bearing	2	305 075 903
	Sleeve Journals	4	151 916 101

For Models Not Shown Consult Factory

8" Type 1 - Straight Thrust Housing: 8-inch dia. - 316 Stainless Steel 40 thru 200 HP

60 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
13	Rotor 40 HP	1	178 113 904
	Rotor 50 HP	1	178 099 904
	Rotor 60 HP	1	178 114 904
	Rotor 75 HP	1	178 112 903
	Rotor 100 HP	1	178 098 903
	Rotor 125 HP	1	178 114 911
	Rotor 150 HP	1	178 131 902
	Rotor 175 HP	1	178 132 902
	Rotor 200 HP	1	178 098 911
	3-Lead Construction		
14	Stator 40 HP - 380V	1	
	Stator 40 HP - 460V	1	334 729 912
	Stator 40 HP - 575V	1	
	Stator 50 HP - 380V	1	338 328 904
	Stator 50 HP - 460V	1	334 730 912
	Stator 50 HP - 575V	1	336 178 907
	Stator 60 HP - 380V	1	
	Stator 60 HP - 460V	1	334 731 912
	Stator 60 HP - 575V	1	336 179 907
	Stator 75 HP - 380V	1	
	Stator 75 HP - 460V	1	334 600 912
	Stator 75 HP - 575V	1	
	Stator 100 HP - 380V	1	337 181 903
	Stator 100 HP - 460V	1	334 732 912
	Stator 100 HP - 575V	1	336 181 907
	Stator 125 HP - 380V	1	
	Stator 125 HP - 460V	1	336 053 907
	Stator 125 HP - 575V	1	
	Stator 150 HP - 380V	1	
	Stator 150 HP - 460V	1	336 054 908
	Stator 150 HP - 575V	1	
	Stator 175 HP - 380V	1	
	Stator 175 HP - 460V	1	336 524 913
	Stator 175 HP - 575V	1	
	Stator 200 HP - 380V	1	
	Stator 200 HP - 460V	1	336 055 913
	Stator 200 HP - 575V	1	

50 HERTZ

THREE PHASE

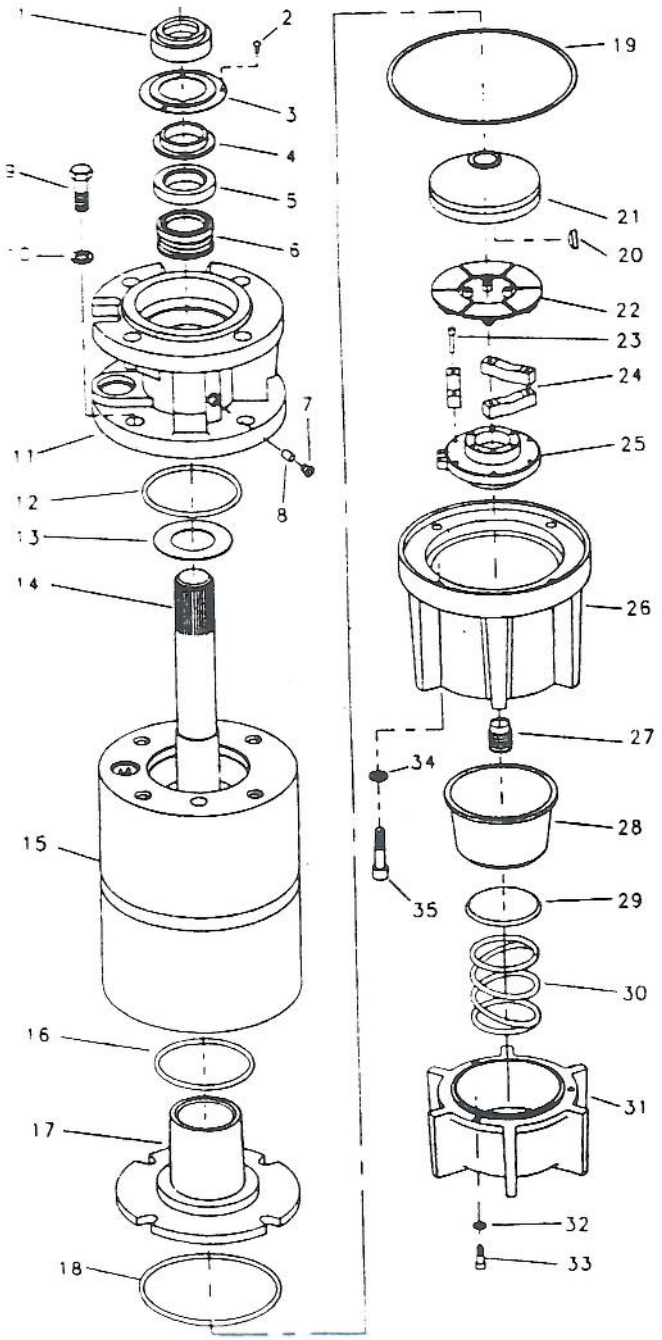
Key	Description	No. Req'd	Part Number
13	Rotor 40 HP	1	178 113 904
	Rotor 50 HP	1	178 099 904
	Rotor 60 HP	1	178 114 904
	Rotor 75 HP	1	178 112 903
	Rotor 100 HP	1	178 098 903
	Rotor 125 HP	1	178 114 911
	Rotor 150 HP	1	178 131 902
	Rotor 175 HP	1	178 132 902
	Rotor 200 HP	1	178 098 911
	3-Lead Construction		
14	Stator 40 HP - 380V	1	334 729 912
	Stator 50 HP - 380V	1	334 730 912
	Stator 60 HP - 380V	1	334 731 912
	Stator 75 HP - 380V	1	334 600 912
	Stator 100 HP - 380V	1	334 732 912
	Stator 125 HP - 380V	1	336 053 907
	Stator 150 HP - 380V	1	336 05[illegible]
	Stator 175 HP - 380V	1	336 524 [illegible]3
	Stator 200 HP - 380V	1	336 055 913

150 - 200 HP

Key	Description	No. Req'd	Part Number
9	Cap Screw	4	275 306 40[illegible]
10	Lockwasher		Not Req'd
11	Upper End Bell (150-200HP)	1	177 302 907
36	Clamping Plate	1	155 59[illegible]
37	Cap Screw	4	275 30[illegible]

8" Type 2 - Tapered Thrust Housing: 8-inch dia. - 316 Stainless Steel 40 thru 60 HP

For 50 and 60 Hertz 3-lead construction
Models 239—211



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 752 101
2	Screw	3	276 020 253
3	Seal Cover	1	155 755 102
4	Bushing	1	155 754 102
5	Stationary Seal	1	155 756 101
6	Rotating Seal	1	155 756 102
7	Pipe Plug	1	275 244 102
8	Check Valve	1	151 301 901
9	Cap Screw	4	275 984 309
10	Lockwasher	4	275 547 113
11	Upper End Bell (40-60HP)	1	177 446 901
12	"O" Ring	1	275 744 138
13	Upthrust Washer	1	155 739 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	"O" Ring	1	275 744 138
17	Lower End Bell	1	177 380 901
18	"O" Ring	1	275 744 151
19	Gasket	1	155 740 201
20	Woodruff Key	1	275 250 110
21	Thrust Bearing	1	151 262 904
22	Segment	6	177 330 101
23	Rocker Pin	6	151 939 101
24	Rocker Arm	3	151 938 101
25	Leveling Disc	1	177 258 901
26	Thrust Housing	1	177 447 901
27	Adjusting Screw	1	151 049 101
28	Diaphragm	1	152 029 100
29	Diaphragm Plate	1	151 987 102
30	Diaphragm Spring	1	155 278 101
31	Diaphragm Cover	1	177 448 101
32	Lockwasher	3	275 547 109
33	Cap Screw	3	275 306 104
34	Lockwasher	4	275 606 111
35	Cap Screw	4	275 306 208
	Lead Assy - #8 AWG	1	152 406 902

For Models Not Shown Consult Factory

Franklin Electric
Bluffton, Indiana 46714

800-348-2420

8" Type 2 - Tapered Thrust Housing: 8-inch dia. - 316 Stainless Steel 40 thru 60 HP

60 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
13	Rotor 40 HP	1	178 211 902
	Rotor 50 HP	1	178 230 902
	Rotor 60 HP	1	178 231 902
	3-Lead Construction		
14	Stator 40 HP - 380V	1	
	Stator 40 HP - 460V	1	338 382 904
	Stator 40 HP - 575V	1	
	Stator 50 HP - 380V	1	
	Stator 50 HP - 460V	1	338 383 903
	Stator 50 HP - 575V	1	
	Stator 60 HP - 380V	1	
	Stator 60 HP - 460V	1	338 384 906
	Stator 60 HP - 575V	1	338 597 903

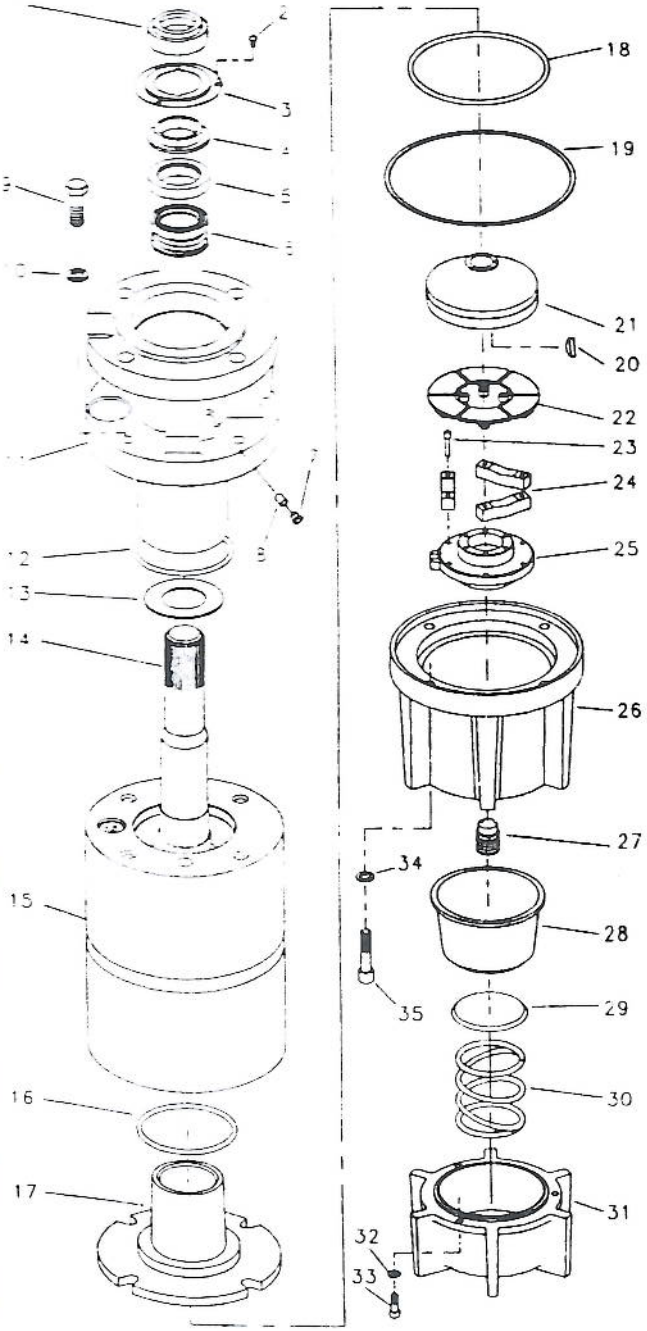
50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
13	Rotor 40 HP	1	178 211 902
	Rotor 50 HP	1	178 230 902
	Rotor 60 HP	1	178 231 902
	3-Lead Construction		
14	Stator 40 HP - 380V	1	338 382 904
	Stator 50 HP - 380V	1	338 383 903
	Stator 60 HP - 380V	1	338 384 906

8" Type 2.1 - Tapered Thrust Housing: 8-inch dia. - 316 Stainless Steel 75 & 100 HP

For 50 and 60 Hertz 3-lead construction
Models 239—221



Key	Description	No. Req'd	Part Number
1	Slinger	1	155 295 101
2	Screw	3	276 020 253
3	Seal Cover	1	152 073 102
4	Bushing	1	155 339 103
5	Stationary Seal	1	151 878 101
6	Rotating Seal	1	151 878 102
7	Pipe Plug	1	275 244 102
8	Check Valve	1	151 301 901
9	Cap Screw	4	275 984 310
10	Lockwasher	4	275 547 113
11	Upper End Bell (75 & 100HP)	1	177 405 904
12	"O" Ring	1	275 744 138
13	Upthrust Washer	1	155 941 101
14	Rotor (See Opposite Side)		
15	Stator (See Opposite Side)		
16	"O" Ring	1	275 744 138
17	Lower End Bell	1	177 380 901
18	"O" Ring	1	275 744 151
19	Gasket	1	155 740 201
20	Woodruff Key	1	275 250 110
21	Thrust Bearing	1	151 262 904
22	Segment	6	177 330 101
23	Rocker Pin	6	151 939 101
24	Rocker Arm	3	151 938 101
25	Leveling Disc	1	177 258 901
26	Thrust Housing	1	177 447 901
27	Adjusting Screw	1	151 049 101
28	Diaphragm	1	152 029 100
29	Diaphragm Plate	1	151 987 102
30	Diaphragm Spring	1	155 278 101
31	Diaphragm Cover	1	177 448 101
32	Lockwasher	3	275 547 109
33	Cap Screw	3	275 306 104
34	Lockwasher	4	275 606 111
35	Cap Screw	4	275 306 208
	Lead Assy - #4 AWG	1	165 238 903

For Models Not Shown Consult Factory

Franklin Electric
Bluffton, Indiana 46714

800-348-2420

8" Type 2.1 - Tapered Thrust Housing: 8-inch dia. - 316 Stainless Steel 75 & 100 HP

60 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
13	Rotor 75 HP	1	178 268 902
	Rotor 100 HP	1	
	3-Lead Construction		
14	Stator 75 HP - 380V	1	
	Stator 75 HP - 460V	1	338 385 904
	Stator 75 HP - 575V	1	
	Stator 100 HP - 380V	1	
	Stator 100 HP - 460V	1	
	Stator 100 HP - 575V	1	

50 HERTZ

THREE PHASE

Key	Description	No. Req'd	Part Number
13	Rotor 75 HP	1	178 268 902
	Rotor 100 HP	1	
	3-Lead Construction		
14	Stator 75 HP - 380V	1	338 385 904
	Stator 100 HP - 380V	1	

Franklin Electric
Bluffton, Indiana 46714

800-348-2420

Control Boxes - QD

Control Box - 1 Phase - 60 Hertz - 4-inch Motors
QD (quick-disconnect) 1/3 thru 1 HP - Models 280—4910

Model	Part Key	Description	No. Req'd	Part Number
280 102 4910 1/3 HP 115V	1	Start Capacitor 159-191 MFD. 110V	1	275 464 125
	2	Solid State Switch	1	152 138 905
	3	Terminal Board	1	151 343 902
280 103 4910 1/3 HP 230V	1	Start Capacitor 43-53 MFD. 220V	1	275 464 126
	2	Solid State Switch	1	152 138 904
	3	Terminal Board	1	151 343 902
280 104 4910 1/2 HP 115V	1	Start Capacitor 250-300 MFD. 110V	1	275 464 201
	2	Solid State Switch	1	152 138 906
	3	Terminal Board	1	151 343 902
280 105 4910 1/2 HP 230V	1	Start Capacitor 59-71 MFD. 220V	1	275 464 105
	2	Solid State Switch	1	152 138 902
	3	Terminal Board	1	151 343 902
280 107 4910 3/4 HP 230V	1	Start Capacitor 86-103 MFD. 220V	1	275 464 118
	2	Solid State Switch	1	152 138 903
	3	Terminal Board	1	151 343 902
280 108 4910 1 HP 230V	1	Start Capacitor 105-126 MFD. 220V	1	275 464 113
	2	Solid State Switch	1	152 138 904
	3	Terminal Board	1	151 343 902
(1)(2) Voltage Relay Kit		115 Volt		305 102 901
		230 Volt		305 102 902
		208 Volt		305 102 903
(1) QD Relay Kit		1/3 HP 115V		305 101 905
		1/3 HP 230V		305 101 901
		1/2 HP 115V		305 101 906
		1/2 HP 230V		305 101 902
		3/4 HP 230V		305 101 903
		1 HP 230V		305 101 904
(3) Overload Kit		1/3 HP 115V	305 091 901	305 100 901
		1/3 HP 230V	305 091 902	305 100 902
		1/2 HP 115V	305 091 903	305 100 903
		1/2 HP 230V	305 091 904	305 100 904
		3/4 HP 230V	305 091 905	305 100 905
		1 HP 230V	305 091 906	305 100 906
(1) Capacitor & Overload Assy		1/3 HP 115V		151 033 973
		1/3 HP 230V		151 033 974
		1/2 HP 115V		151 033 975
		1/2 HP 230V		151 033 976
		3/4 HP 230V		151 033 978
		1 HP 230V		151 033 979

(1) Voltage relay kits will replace current relays, voltage relays, QD relays and Solid State Switches. QD relay kits will replace voltage relays, QD relays and Solid State Switches. Kits include relay, mounting clamp & screw, necessary wires, replacement connection label and complete instructions. QD relays **can not** be used with capacitor/overload assemblies or in boxes containing only a single automatic reset overload kit.

(2) 230 volt relays are designed to operate on nominal 230 volt systems. For 208 volt systems or where line voltage is between 200 and 210 volts, substitute a 208 volt relay and use the next size larger cable, or use a boost transformer.

(3) Overload kits 305100 are for use with QD relays only. Use Overload kits 305091 for all others. Overload kits include overload, replacement connection label and complete instructions.

Control Boxes - QD

Control Box - 1 Phase - 60 Hertz - 4-inch Motors
QD (quick-disconnect) 1/3 thru 1 HP - Models 280—4915

Model	Part Key	Description	No. Req'd	Part Number
280 102 4915	1	Start Capacitor 159-191 MFD, 110V	1	275 464 125
1/3 HP 115V	2	QD Relay	1	223 415 905
	3	Terminal Board	1	151 343 902
280 103 4915	1	Start Capacitor 43-53 MFD, 220V	1	275 464 126
1/3 HP 230V	2	QD Relay	1	223 415 901
	3	Terminal Board	1	151 343 902
280 104 4915	1	Start Capacitor 250-300 MFD, 110V	1	275 464 201
1/2 HP 115V	2	QD Relay	1	223 415 906
	3	Terminal Board	1	151 343 902
280 105 4915	1	Start Capacitor 59-71 MFD, 220V	1	275 464 105
1/2 HP 230V	2	QD Relay	1	223 415 902
	3	Terminal Board	1	151 343 902
280 107 4915	1	Start Capacitor 86-103 MFD, 220V	1	275 464 118
3/4 HP 230V	2	QD Relay	1	223 415 903
	3	Terminal Board	1	151 343 902
280 108 4915	1	Start Capacitor 105-126 MFD, 220V	1	275 464 113
1 HP 230V	2	QD Relay	1	223 415 904
	3	Terminal Board	1	151 343 902

(1)(2) Voltage Relay Kit	115 Volt		305 102 901
	230 Volt		305 102 902
	208 Volt		305 102 903
(1) QD Relay Kit	1/3 HP 115V		305 101 905
	1/3 HP 230V		305 101 901
	1/2 HP 115V		305 101 906
	1/2 HP 230V		305 101 902
	3/4 HP 230V		305 101 903
	1 HP 230V		305 101 904
(3) Overload Kit	1/3 HP 115V	305 091 901	305 100 901
	1/3 HP 230V	305 091 902	305 100 902
	1/2 HP 115V	305 091 903	305 100 903
	1/2 HP 230V	305 091 904	305 100 904
	3/4 HP 230V	305 091 905	305 100 905
	1 HP 230V	305 091 906	305 100 906

(1) Voltage relay kits will replace current relays, voltage relays, QD relays and Solid State Switches. QD relay kits will replace voltage relays, QD relays and Solid State Switches. Kits include relay, mounting clamp & screw, necessary wires, replacement connection label and complete instructions. QD relays **can not** be used with capacitor/overload assemblies or in boxes containing only a single automatic reset overload kit.

(2) 230 volt relays are designed to operate on nominal 230 volt systems. For 208 volt systems or where line voltage is between 200 and 210 volts, substitute a 208 volt relay and use the next size larger cable, or use a boost transformer.

(3) Overload kits 305100 are for use with QD relays only. Use Overload kits 305091 for all others. Overload kits include overload, replacement connection label and complete instructions.

Control Boxes - QD

Control Box - 1 Phase - 50 Hertz - 4-inch Motors
QD (quick-disconnect) 1/3 thru 1 HP - Models 280—0101

Model	Part Key	Description	No. Req'd	Part Number
280 353 0101 1/3 HP 220V	1	Capacitor (43-53 MFD, 220V) & Overload Assy	1	151 033 957
	2	Relay	1	155 031 112
	3	Terminal Board	1	151 343 902
280 355 0101 1/2 HP 220V	1	Capacitor (43-53 MFD, 220V) & Overload Assy	1	151 033 957
	2	Relay	1	155 031 112
	3	Terminal Board	1	151 343 902
280 357 0101 3/4 HP 220V	1	Capacitor (59-71 MFD, 220V) & Overload Assy	1	151 033 906
	2	Relay	1	155 031 112
	3	Terminal Board	1	151 343 902
280 358 0101 1 HP 220V	1	Capacitor (86-103 MFD, 220V) & Overload Assy	1	151 033 918
	2	Relay	1	155 031 112
	3	Terminal Board	1	151 343 902

Control Boxes - CRC

CRC - Capacitor Run Control Box - 1 Phase - 60 Hertz - 4-inch Motors
QD (quick-disconnect) - Models 282—5010

Model	Part Key	Description	No. Req'd	Part Number
282 405 5010 1/2 HP 230V	1	Run Capacitor 15 MFD, 370V	1	155 328 101
	2	Start Capacitor 43-52 MFD, 220V	1	275 470 115
	3	Solid State Switch	1	152 138 912
	4	Inductor Coil	1	155 662 901
	5	Terminal Board	1	151 343 902
282 407 5010 3/4 HP 230V	1	Run Capacitor 23 MFD, 370V	1	155 327 108
	2	Start Capacitor 108-130 MFD, 220V	1	275 470 114
	3	Solid State Switch	1	152 138 913
	4	Inductor Coil	1	155 662 901
	5	Terminal Board	1	151 343 902
282 408 5010 1 HP 230V	1	Run Capacitor 23 MFD, 370V	1	155 327 108
	2	Start Capacitor 108-130 MFD, 220V	1	275 470 114
	3	Solid State Switch	1	152 138 914
	4	Inductor Coil	1	155 662 901
	5	Terminal Board	1	151 343 902

(1) CRC Boxes should only be used with motors containing built-in overload protection (A85 or newer).

Control Boxes - CRC

CRC - Capacitor Run Control Box - 1 Phase - 60 Hertz - 4-inch Motors
QD (quick-disconnect) - Models 282—5015

Model	Part Key	Description	No. Req'd	Part Number
282 405 5015 1/2 HP 230V	1	Run Capacitor 15 MFD, 370V	1	155 327 107
	2	Start Capacitor 59-71 MFD, 220V	1	275 464 105
	3	QD Relay	1	223 415 912
	4	Terminal Board	1	151 343 902
282 407 5015 3/4 HP 230V	1	Run Capacitor 23 MFD, 370V	1	155 327 108
	2	Start Capacitor 86-103 MFD, 220V	1	275 464 118
	3	QD Relay	1	223 415 913
	4	Terminal Board	1	151 343 902
282 408 5015 1 HP 230V	1	Run Capacitor 23 MFD, 370V	1	155 327 108
	2	Start Capacitor 108-130 MFD, 220V	1	275 470 114
	3	QD Relay	1	223 415 914
	4	Terminal Board	1	151 343 902
(2) QD Relay Kit		1/2 HP 230V		305 105 901
		3/4 HP 230V		305 105 902
		1 HP 230V		305 105 903

(1) CRC Boxes should only be used with motors containing built-in overload protection (A85 or newer).

(2) QD Relay kits include replacement relay only.

Control Boxes - Standard

Old-Style Standard Control Box (Boxes without Line Contactor)
1 Phase - 60 Hertz - 4-inch Motors

Model Prefix	Fig. No.	Part Key	Description	No. Req'd	Part Number
282 300 1 1/2 HP	1	1	Start Capacitor & O'load Assembly	1	151 033 946
		2	Run Capacitor 10 MFD, 370V	1	155 328 102
		5	Relay	1	155 031 102
		6	Terminal Block	2	155 332 102
282 301 2 HP	2	1	Start Capacitor 104-126 MFD, 220V	1	275 464 113
		2	Run Capacitor 20 MFD, 370V	1	155 328 103
		3	Start Overload	1	275 411 107
		4	Main Overload	1	275 411 112
		5	Relay	1	155 031 102
		6	Terminal Block	2	155 332 102
282 302 3 HP	2	1	Start Capacitor 208-250 MFD, 220V	1	275 463 111
		2	Run Capacitor 35 MFD, 370V	1	155 327 102
		3	Start Overload	1	275 411 108
		4	Main Overload	1	275 406 120
		5	Relay	1	155 031 102
		6	Terminal Block	2	155 332 102
282 113 5 HP	3	1	Start Capacitor 216-259 MFD, 330V	1	275 468 118
		2	Run Capacitor 30 MFD, 370V	2	155 327 101
		3	Start Overload	1	275 411 102
		4	Main Overload	1	275 406 103
		5	Relay	1	155 031 102
		6	Terminal Block	2	155 332 102

(1) Control boxes supplied with voltage relays are designed to operate on nominal 230 volt systems. For 208 volt systems or where line voltage is between 200 and 210 volts, substitute a 208 volt relay (155 031 103) and use the next size larger cable, or use a boost transformer.

Control Boxes - Standard

Old-Style Standard Control Box (Boxes without Line Contactor)
1 Phase - 60 Hertz - 6-inch Motors

Model	Part Key	Description	No. Req'd	Part Number
282 200 9202 5 HP	1	Run Capacitor 15 MFD, 370V	2	155 328 101
	2	Start Capacitor 130-154 MFD, 330V	2	275 468 117
	3	Overload	1	155 249 102
	4	Relay	1	155 031 601
	5	Lightning Arrestor	1	150 814 902
	6	Terminal Block	2	155 332 102
282 200 9203 5 HP	1	Run Capacitor 30 MFD, 370V	1	155 327 101
	2	Start Capacitor 130-154 MFD, 330V	2	275 468 117
	3	Overload	1	155 249 102
	4	Relay	1	155 031 601
	5	Lightning Arrestor	1	150 814 902
	6	Terminal Block	2	155 332 102
282 201 9202 7 1/2 HP	1	Run Capacitor 15 MFD, 370V	3	155 328 101
	2	Start Capacitor 130-154 MFD, 330V	3	275 468 117
	3	Overload	1	155 249 101
	4	Relay	1	155 031 601
	5	Lightning Arrestor	1	150 814 902
	6	Terminal Block	2	155 332 102
282 201 9203 7 1/2 HP	1	Run Capacitor 15 MFD, 370V	1	155 328 101
	1	Run Capacitor 30 MFD, 370V	1	155 327 101
	2	Start Capacitor 130-154 MFD, 330V	3	275 468 117
	3	Overload	1	155 249 101
	4	Relay	1	155 031 601
	5	Lightning Arrestor	1	150 814 902
	6	Terminal Block	2	155 332 102
282 202 9202 10 HP	1	Run Capacitor 15 MFD, 370V	5	155 328 101
	2	Start Capacitor 130-154 MFD, 330V	4	275 468 117
	3	Overload	1	155 249 103
	4	Relay	2	155 031 601
	5	Lightning Arrestor	1	150 814 902
	6	Terminal Block	2	155 332 102
282 202 9203 10 HP	1	Run Capacitor 15 MFD, 370V	1	155 328 101
	1	Run Capacitor 30 MFD, 370V	2	155 327 101
	2	Start Capacitor 130-154 MFD, 330V	4	275 468 117
	3	Overload	1	155 249 103
	4	Relay	2	155 031 601
	5	Lightning Arrestor	1	150 814 902
	6	Terminal Block	2	155 332 102

(1) Control boxes supplied with voltage relays are designed to operate on nominal 230 volt systems. For 208 volt systems or where line voltage is between 200 and 210 volts, substitute a 208 volt relay (155 031 602) and use the next size larger cable, or use a boost transformer.

Control Boxes - Standard

Standard Control Box (Boxes without Line Contactor)
1 Phase - 60 Hertz - 4 & 6-inch Motors

Model	Part Key	Description	No. Req'd	Part Number
282 300 8110 4" 1 1/2 HP	1	Run Capacitor 10 MFD, 370V	1	155 328 102
	2	Start Capacitor 105-126 MFD, 220V	1	275 464 113
	3	Relay	1	155 031 102
	4	Overload	1	275 411 107
	6	Terminal Block	2	155 332 102
282 301 8110 4" 2 HP	1	Run Capacitor 20 MFD, 370V	1	155 328 103
	2	Start Capacitor 105-126 MFD, 220V	1	275 464 113
	3	Relay	1	155 031 102
	4	Main Overload	1	275 411 113
	5	Start Overload	1	275 411 107
	6	Terminal Block	2	155 332 102
282 302 8110 4" 3 HP	1	Run Capacitor 35 MFD, 370V	1	155 327 102
	2	Start Capacitor 208-250 MFD, 220V	1	275 463 111
	3	Relay	1	155 031 102
	4	Main Overload	1	275 411 115
	5	Start Overload	1	275 411 108
	6	Terminal Block	2	155 332 102
282 113 8110 4" & 6" 5 HP	1	Run Capacitor 30 MFD, 370V	2	155 327 101
	2	Start Capacitor 216-259 MFD, 330V	1	275 468 118
	3	Relay	1	155 031 102
	4	Main Overload	1	275 406 102
	5	Start Overload	1	275 411 102
	6	Terminal Block	2	155 332 102

(1) Control boxes supplied with voltage relays are designed to operate on nominal 230 volt systems. For 208 volt systems or where line voltage is between 200 and 210 volts, substitute a 208 volt relay (155 031 103) and use the next size larger cable, or use a boost transformer.

Control Boxes - Standard

Standard Control Box (Boxes without Line Contactor)
1 Phase - 60 Hertz - 6-inch Motors

Model	Fig. No.	Part Key	Description	No. Req'd	Part Number
282 201 9210 7 1/2 HP	1	1	Run Capacitor 45 MFD, 370V	1	155 327 109
		2	Start Capacitor 130-154 MFD, 330V	1	275 468 117
		2	Start Capacitor 270-324 MFD, 330V	1	275 468 119
		3	Relay	1	155 031 601
		4	Main Overload	1	275 406 121
		5	Start Overload	1	275 411 102
		6	Lightning Arrestor	1	150 814 902
		7	Terminal Block	2	155 332 102
282 202 9210 10 HP	2	1	Run Capacitor 35 MFD, 370V	2	155 327 102
		2	Start Capacitor 270-324 MFD, 330V	2	275 468 119
		3	Relay	1	155 031 601
		4	Main Overload	1	155 409 101
		5	Start Overload	1	275 406 103
		6	Lightning Arrestor	1	150 814 902
		7	Terminal Block	2	155 332 102
All			Run Capacitor Clamp		155 649 101
All			Start Capacitor Clamp		155 649 102
All			Screw		275 943 251

(1) Control boxes supplied with voltage relays are designed to operate on nominal 230 volt systems. For 208 volt systems or where line voltage is between 200 and 210 volts, substitute a 208 volt relay (155 031 602) and use the next size larger cable, or use a boost transformer.

Control Boxes - Standard

Standard Control Box (Boxes without Line Contactor)
1 Phase - 50 Hertz - 4 & 6-inch Motors

Model	Part Key	Description	No. Req'd	Part Number
282 350 8110 4" 1 1/2 HP	1	Run Capacitor 10 MFD, 370V	1	155 328 102
	2	Start Capacitor 105-126 MFD, 220V	1	275 464 113
	3	Relay	1	155 031 112
	4	Overload	1	275 411 114
	6	Terminal Block	2	155 332 102
282 351 8110 4" 2 HP	1	Run Capacitor 20 MFD, 370V	1	155 328 103
	2	Start Capacitor 189-227 MFD, 220V	1	275 468 115
	3	Relay	1	155 031 112
	4	Main Overload	1	275 411 102
	5	Start Overload	1	275 411 106
	6	Terminal Block	2	155 332 102
282 352 8110 4" 3 HP	1	Run Capacitor 35 MFD, 370V	1	155 327 102
	2	Start Capacitor 270-324 MFD, 330V	1	275 468 119
	3	Relay	1	155 031 112
	4	Main Overload	1	275 406 107
	5	Start Overload	1	275 411 107
	6	Terminal Block	2	155 332 102
282 253 9010 4" & 6" 5 HP	1	Run Capacitor 30 MFD, 370V	1	155 327 101
	1	Run Capacitor 45 MFD, 370V	1	155 327 109
	2	Start Capacitor 189-227 MFD, 220V	2	275 468 115
	3	Relay	1	155 031 112
	4	Main Overload	1	275 406 102
	5	Start Overload	1	275 411 102
	6	Terminal Block	2	155 332 102

Control Boxes - Deluxe

Old-Style Deluxe Control Box (Boxes with Line Contactor)
1 Phase - 60 Hertz - 4 & 6-inch Motors

Model	Fig. No.	Part Key	Description	No. Req'd	Part Number
282 301 9103 4" 2 HP	1	1	Run Capacitor 20 MFD. 370V	1	155 328 103
		2	Start Capacitor 105-126 MFD. 220V	1	275 464 113
		3	Contactor	1	155 325 102
		4	Relay	1	155 031 102
		5	Main Overload	1	275 411 113
		6	Start Overload	1	275 411 107
		7	Terminal Block	2	155 332 102
282 302 9103 4" 3 HP	1	1	Run Capacitor 35 MFD. 370V	1	155 327 102
		2	Start Capacitor 208-250 MFD. 220V	1	275 463 111
		3	Contactor	1	155 325 102
		4	Relay	1	155 031 102
		5	Main Overload	1	275 406 120
		6	Start Overload	1	275 411 108
		7	Terminal Block	2	155 332 102
282 113 9303 4" 5 HP	1	1	Run Capacitor 30 MFD. 370V	2	155 327 101
		2	Start Capacitor 216-259 MFD, 330V	1	275 468 118
		3	Contactor	1	155 325 102
		4	Relay	1	155 031 102
		5	Main Overload	1	275 406 103
		6	Start Overload	1	275 411 102
		7	Terminal Block	2	155 332 102
		8	Lightning Arrestor	1	150 814 902
282 200 9303 6" 5 HP	2	1	Run Capacitor 30 MFD. 370V	1	155 327 101
		3	Start Capacitor 130-154 MFD, 330V	2	275 468 117
		4	Relay	2	155 031 601
		5	Contactor	1	155 325 102
		6	Lightning Arrestor	1	150 814 902
		7	Terminal Block	2	155 332 102
		8	Main Overload	1	155 249 102
282 201 9303 6" 7 1/2 HP	2	1	Run Capacitor 30 MFD. 370V	1	155 327 101
		2	Run Capacitor 15 MFD, 370V	1	155 328 101
		3	Start Capacitor 130-154 MFD, 330V	3	275 468 117
		4	Relay	1	155 031 601
		5	Contactor	1	155 326 101
		6	Lightning Arrestor	1	150 814 902
		7	Terminal Block	2	155 332 102
		8	Main Overload	1	155 249 101
282 202 9307 6" 10 HP	2	1	Run Capacitor 30 MFD. 370V	2	155 327 101
		2	Run Capacitor 15 MFD, 370V	1	155 328 101
		3	Start Capacitor 270-324 MFD, 330V	2	275 468 119
		4	Relay	1	155 031 102
		5	Line Contactor	1	155 326 102
		6	Lightning Arrestor	1	150 814 902
		7	Terminal Block	2	155 332 102
		8	Main Overload	1	155 409 101
		9	Start Contactor	1	155 325 102

(1) Control boxes supplied with voltage relays are designed to operate on nominal 230 volt systems. For 208 volt systems or where line voltage is between 200 and 210 volts, substitute a 208 volt relay (155 031 103 in place of 155 031 102 or substitute 155 031 602 in place of 155 031 601) and use the next size larger cable, or use a boost transformer.

Control Boxes - Deluxe

Old-Style Deluxe Control Box (Boxes with Line Contactor)
1 Phase - 60 hertz - 4 & 6-inch Motors

Model	Part Key	Description	No. Req'd	Part Number
282 203 9303 15 HP	1	Run Capacitor 15 MFD, 370V	1	155 328 101
	2	Start Capacitor 270-324 MFD, 330V	2	275 468 119
	3	Run Capacitor 30 MFD, 370V	4	155 327 101
	4	Line Contactor	1	155 429 101
	5	Lightning Arrestor	1	150 814 902
	6	Relay	1	155 031 102
	7	Overload	1	155 409 102
	8	Start Contactor	1	155 325 102
	9	Terminal Block	2	155 332 102

(1) Control boxes supplied with voltage relays are designed to operate on nominal 230 volt systems. For 208 volt systems or where line voltage is between 200 and 210 volts, substitute a 208 volt relay (155 031 103) and use the next size larger cable, or use a boost transformer.

Control Boxes - Deluxe

Deluxe Control Box (Boxes with Line Contactor)
1 Phase - 60 Hertz - 4 & 6-inch Motors

Model	Part Key	Description	No. Req'd	Part Number
282 301 8310 4" 2 HP	1	Run Capacitor 20 MFD, 370V	1	155 328 103
	2	Start Capacitor 105-126 MFD, 220V	1	275 464 113
	3	Contactor	1	155 325 102
	4	Relay	1	155 031 102
	5	Main Overload	1	275 411 113
	6	Start Overload	1	275 411 107
	7	Terminal Block	2	155 332 102
282 302 8310 4" 3 HP	1	Run Capacitor 35 MFD, 370V	1	155 327 102
	2	Start Capacitor 208-250 MFD, 220V	1	275 463 111
	3	Contactor	1	155 325 102
	4	Relay	1	155 031 102
	5	Main Overload	1	275 411 115
	6	Start Overload	1	275 411 108
	7	Terminal Block	2	155 332 102
282 113 8310 4" & 6" 5 HP	1	Run Capacitor 30 MFD, 370V	2	155 327 101
	2	Start Capacitor 216-259 MFD, 330V	1	275 468 118
	3	Contactor	1	155 325 102
	4	Relay	1	155 031 102
	5	Main Overload	1	275 406 102
	6	Start Overload	1	275 411 102
	7	Terminal Block	2	155 332 102

(1) Control boxes supplied with voltage relays are designed to operate on nominal 230 volt systems. For 208 volt systems or where line voltage is between 200 and 210 volts, substitute a 208 volt relay (155 031 103) and use the next size larger cable, or use a boost transformer.

Control Boxes - Deluxe

Deluxe Control Box (Boxes with Line Contactor)
1 Phase - 60 Hertz - 6-inch Motors

Model	Fig. No.	Part Key	Description	No. Req'd	Part Number
282 201 9310 7 1/2 HP	1	1	Run Capacitor 45 MFD, 370V	1	155 327 109
		2	Start Capacitor 130-154 MFD, 330V	1	275 468 117
		2	Start Capacitor 270-324 MFD, 330V	1	275 468 119
		3	Contactor	1	155 326 101
		4	Relay	1	155 031 601
		5	Main Overload	1	275 406 121
		6	Start Overload	1	275 411 102
		7	Terminal Block	2	155 332 102
		8	Lightning Arrestor	1	150 814 902
282 202 9310 10 HP	2	1	Run Capacitor 35 MFD, 370V	2	155 327 102
		2	Start Capacitor 270-324 MFD, 330V	2	275 468 119
		3	Contactor	1	155 326 102
		4	Relay	1	155 031 601
		5	Main Overload	1	155 409 101
		6	Start Overload	1	275 406 103
		7	Terminal Block	2	155 332 102
		8	Lightning Arrestor	1	150 814 902
282 203 9310 15 HP	2	1	Run Capacitor 45 MFD, 370V	3	155 327 109
		2	Start Capacitor 270-324 MFD, 330V	2	275 468 119
		3	Contactor	1	155 429 101
		4	Relay	1	155 031 601
		5	Main Overload	1	155 409 102
		6	Start Overload	1	275 406 103
		7	Terminal Block	2	155 332 102
		8	Lightning Arrestor	1	150 814 902
All			Run Capacitor Clamps		155 649 101
All			Start Capacitor Clamps		155 649 102
All			Screws		275 943 251

(1) Control boxes supplied with voltage relays are designed to operate on nominal 230 volt systems. For 208 volt systems or where line voltage is between 200 and 210 volts, substitute a 208 volt relay (155 031 602) and use the next size larger cable, or use a boost transformer.

SUB- PART -PL
03 January 2000
(replaces 05 January 1998)

PRICING NEWS

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Electric

SALES POLICY

1) Net Prices are applicabel to the quantity of each line released.
2) Freight is allowed on parts shipments of 1000lbs. or more, paid by the customer for less. All air freight and special shipments will be F.O.B. Franklin plant.
3) Minimum billing is $35.00 per order.
4) Only authorized OEM's or service shops may purchase submersible parts.
5) Prices are subject to change to those in effect at time of shipment.

Franklin Part No.	Replacement Number	Description	Net 1-49	Net 50+
150 069 101	150 069 101	SHIM, THRUST --4" -- SS -- .005"	0.22	0.21
150 069 102	150 069 102	SHIM, THRUST --4" -- SS -- .008"	0.22	0.21
150 069 103	150 069 103	SHIM, THRUST --4" -- SS -- .0156"	0.38	0.35
150 208 101	150 208 101	THRUST ASSEMBLY --1500# --ROCKER ARM -- 4"HT	0.86	0.76
150 224 101	150 224 101	SPLINE PROTECTOR --4" --SS	0.22	0.21
150 261 101	150 261 101	TOP COVER --4"--SS	2.18	1.96
151 321 174	152 321 174	O-RING --4" --HT	1.04	0.94
150 324 101	150 324 101	SPLINE PROTECOR --4" --HT	0.19	0.18
150 325 101	150 325 101	DIAPHRAGM --4" --HT	1.60	1.45
150 433 901	150 433 901	THRUST ASSEMBLY --1500# BEARING --4HT --10HP ONLY	61.40	55.30
150 443 101	OBSOLETE	SLINGER		
150 492 902	150 492 902	THRUST ASSEMBLY --1500# --SEGMENT --6" & 4"HT	2.15	1.90

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Part No.	Replacement Number	Description	Net 1-49	Ne 50
150 493 101	150 493 101	THRUST ASSEMBLY -- 1500# -- LEVELING DISC --6" & 4"HT	2.70	2.4
150 493 201	150 493 201	THRUST ASSEMBLY -- 1500# -- LEVELING DISC --6" & 4"HT	3.98	3.5
150 594 101	150 594 101	DIAPHRAGM --4" --SS	0.43	0.3
150 954 102	OBSOLETE	SHIM, UPTHRUST		
151 030 918	USE KIT 305 218 918	CAPACITOR/O'LOAD --1 HP; 220V; 50 HZ	9.82	8.8
151 033 906	USE KIT 305 218 906	CAPACITOR/O'LOAD --3/4 HP; 220V; 50 HZ	8.77	7.8
151 033 946	USE KIT 305 218 946	CAPACITOR/O'LOAD --1.5 HP; 230V	11.34	10.2
151 033 957	USE KIT 305 218 957	CAPACITOR/O'LOAD --1/2 HP; 220V; 50 HZ	8.35	
151 033 971	OBSOLETE	CAPACITOR/O'LOAD --1/4 HP; 115V;		
151 033 973	USE KIT 305 218 973	CAPACITOR/O'LOAD --1/3 HP; 115V;	8.42	7.5
151 033 974	USE KIT 305 218 974	CAPACITOR/O'LOAD --1/3 HP; 230V;	8.40	7.5
151 033 975	USE KIT 305 218 975	CAPACITOR/O'LOAD -- 1/2 HP, 115V;	7.27	6.5
151 033 976	USE KIT 306 218 976	CAPACITOR/O'LOAD -- 1/2 HP, 230V	8.80	7.9
151 033 978	USE KIT 305 218 978	CAPACITOR/O'LOAD -- 3/4 HP, 230V	9.87	8.8
151 033 979	USE KIT 305 218 979	CAPACITOR/O'LOAD -- 1 HP, 230V	8.46	7.6
151 033 980	USE KIT 305 218 980	CAPACITOR/O'LOAD -- 1.5 HP, 230V	11.36	10.2
151 048 102	151 048 102	SCREW, SHAFT HEIGHT ADJUSTING -- 4"HT	0.52	0.4
151 049 101	151 049 101	SCREW. SHAFT HEIGHT ADJUSTING 6" (STRAIGHT & RD2): 8" (TYPE 2 & 2.1)	4.63	4.1
151 093 101	151 193 101	NUT, JAM -- 4" -- BRASS	0.10	0.0
151 193 101	151 193 101	NUT, JAM -- 4" -- BRASS	1.34	1.2
151 262 904	USE KIT 305 030 092	THRUST ASSEMBLY -- 10000# BEARING 6" STRAIGHT); 8" (TYPE 2 & 2.1)	154.38	138.9
151 300 905	151 300 905	FILL SOLUTION -- 4" (6" & 8" FILL SOLUTION USE 305 085 901)	25.76	23.1
151 301 901	151 301 901	CHECK VALVE ASSEMBLY WITHOUT FILTER #155 411 901	0.86	0.7

SUB- PART -PL
03 January 2000
(replaces 05 January 1998)

PRICING NEWS

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Electric

Franklin art No.	Replacement Number	Description	Net 1-49	Net 50+
151 312 101	OBSOLETE	DIAPHRAGM CUP		
151 313 101	OBSOLETE	SPRING, DIAPHRAGM		
151 314 101	151 314 101	DIAPHRAGM GUARD -- 4" --SS	0.19	0.18
151 341 901	OBSOLETE	CONTROL BOX -- MALE TERMINAL STRIP -- QD BOX		
151 343 902	151 343 902	CONTROL BOX -- TERMINAL BOARD -- QD BOX	3.32	2.99
151 374 101	USE KIT 305 196 901	LEAD BUSHING -- 6"	50.76	45.68
151 376 101	151 376 101	NUT, JAM -- 6" -- BRASS	2.51	2.26
151 376 201	151 376 201	NUT, JAM -- 6" -- 316 SS	18.67	16.80
151 378 102	USE KIT 305 196 901	LEAD RECEPTACLE -- 6"	50.76	45.68
151 444 904	151 444 904	THRUST ASSEMBLY -- 1500# BEARING -- 6"	27.71	24.94
151 446 102	OBSOLETE	DIAPHARAGM COVER -- 4" --HT (MODELS WITH LAST 4 DIGITS '6314')		
151 488 101	151 488 101	SPRING, DIAPHRAGM -- 4" -- HT	0.19	0.18
151 449 101	151 449 101	SPRING, DIAPHRAGM -- 4" -- HT	0.43	0.39
151 450 102	151 450 102	PIN -- 6" (STRAIGHT) & 4"HT	0.10	0.80
151 450 103	151 450 103	STAINLESS PIN -- 6" (STRAIGHT), 8" (TYPE 1), 4"HT	1.60	1.44
151 471 102	OBSOLETE	SAND SHIELD -- 4" -- HT		
151 820 102	151 820 102	CONNECTOR BOSS -- 4" -- SS	1.56	1.40
151 822 201	151 822 201	THRUST ASSEMBLY -- 1500# ROCKER ARM PIN 6" & 4" HT	0.23	0.22
151 827 101	151 827 101	LEVELING WASHER -- 4" -- SS	1.23	1.11
151 871 101	151 871 101	BOTTOM COVER -- 4" -- SS & PR	2.18	1.96
151 872 101	151 872 101	DIAPHRAGM COVER -- 4" --SS	0.91	0.82
151 872 102	151 872 102	DIAPHRAGM COVER -- 4" --PR	2.38	2.14
151 878 101	USE KIT 151 878 104	SHAFT SEAL --8" -- CARBON-CERAMIC STATIONARY (TYPE 1 &2.1)	69.02	62.11

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Part No.	Replacement Number	Description	Net 1-49	Net 50
151 878 102	USE KIT 151 878 104	SHAFT SEAL-- 8" -- CARBON-CERAMIC ROTATING (TYPE 1 & 2.1)	69.01	62.1
151 879 102	151 879 102	SCREW, SHAFT HEIGHT ADJUSTING -- 8" (TYPE 1)	17.15	15.4
151 882 101	151 882 101	THRUST ASSEMBLY --10000# -- SEGMENT -8" -- (TYPE 1)	35.02	32.5
151 883 101	151 883 101	NUT, JAM --8" -- BRASS -- (TYPE 1 & 2.1)	14.60	13.1
151 883 201	151 883 201	NUT, JAM --8" -- 316SS -- (TYPE 1 & 2.1)	54.36	48.9
151 893 101	151 893 101	THRUST ASSEMBLY --10000# -- ROCKER ARM 8"(TYPE 1)	15.23	13.7
151 984 100	151 984 100	DIAPHRAGM --8"--TYPE(1)	13.14	11.8
151 900 901	OBSOLETE	THRUST ASSEMBLY --10000# BEARING --8" (MODELS WITH LAST 3 DIGITS '002')		
151 900 902	151 900 902	THRUST ASSEMBLY --10000# BEARING --8" --(TYPE 1)	224.46	2
151 903 101	151 903 101	DIAPHRAGM PLATE -- 8" -- WATER WELL -- (TYPE 1)	16.92	15.2
151 903 201	151 903 201	DIAPHRAGM PLATE -- 8" -- NIR & 316SS -- (TYPE 1)	41.88	37.5
151 908 101	151 908 101	SPRING, DIAPHRAGM --8"	3.98	3.5
151 916 101	SPECIAL FAMS PROCESS REQD	SLEEVE BEARING -- 8" -- CONSULT FACTORY	15.60	14.0
151 938 101	151 938 101	THRUST ASSEMBLY --10000# -- ROCKER ARM 6"(STRAIGHT); 8"(TYPE 2 & 2.1)	2.84	2.5
151 939 101	151 939 101	THRUST ASSEMBLY --10000# -- ROCKER PIN 6"(STRAIGHT); 8"(TYPE 2 & 2.1)	0.91	0.8
151 986 100	151 986 100	DIAPHRAGM --8" & 6" -- WATER WELL -- 6"(STRAIGHT); 8"(TYPE 2 & 2.1)	4.44	4.0
151 987 101	151 987 101	DIAPHRAGM PLATE -- 8" & 6" -- WATER WELL 6"(STRAIGHT); 8"(TYPE 2 & 2.1)	2.88	2.5
151 987 102	151 987 102	DIAPHRAGM PLATE -- 8" & 6" -- NIR & 316SS 6"(STRAIGHT); 8"(TYPE 2 & 2.1)	6.30	5.6
151 988 101	151 988 101	SPRING, DIAPHRAGM --8" & 6" -- WATER WELL 6"(STRAIGHT); 8"(TYPE 2 & 2.1)	4.44	4.0
152 004 901	152 004 901	THRUST ASSEMBLY -- SEGMENT -- 4"SS	1.18	1
152 029 100	152 029 100	DIAPHRAGM -- 8" & 6" -- NIR & 316SS 6"(STRAIGHT); 8"(TYPE 2 & 2.1)	9.46	8.5
152 030 101	152 030 101	GASKET -- 4" --SS -- TOP END BELL	0.04	0.0
152 047 101	152 047 101	SHAFT SEAL COVER --6"--WATER WELL	1.14	1.0

SUB- PART -PL
03 January 2000
(replaces 05 January 1998)

PRICING NEWS

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Electric

Franklin rt No.	Replacement Number	Description	Net 1-49	Net 50+
152 047 102	152 047 102	SHAFT SEAL COVER --6" --NIR & 316SS	2.38	2.14
152 050 901	152 050 901	SWITCH BIAC --4" --2-WIRE --SS &PR	8.04	7.24
152 073 101	152 073 101	SHAFT SEAL COVER --8" --WATER WELL (TYPE 1, 2 & 2.1)	7.86	7.24
150 073 102	150 073 102	SHAFT SEAL COVER --8" --NIR & 316SS (TYPE 1, 2 & 2.1)	10.54	9.48
152 131 101	152 131 101	DIAPHRAGM COVER --4" --HT --WATER WELL	1.94	1.74
152 131 102	152 131 102	DIAPHRAGM COVER --4" --HT --NIR & 316SS	2.51	2.26
152 164 101	152 164 101	SPRING, DIAPHRAGM --8" --(TYPE 1)	18.91	17.02
152 167 101	152 167 101	DIAPHRAGM COVER PLATE --6" -- WATER WELL --(RD1)	5.54	4.99
152 167 102	152 167 102	DIAPHRAGM COVER PLATE --6" -- NIR & 316SS --(RD1)	7.47	6.72
152 173 101	SPECIAL FAMS PROCESS REQ'D CONSULT FACTORY	SLEEVE BEARING --6" -- LOWER -- (RD1) S-7½-40	3.68	3.32
152 173 102	SPECIAL FAMS PROCESS REQ'D CONSULT FACTORY	SLEEVE BEARING --6" -- LOWER -- (STRAIGHT)	10.63	9.58
152 173 104	SPECIAL FAMS PROCESS REQ'D CONSULT FACTORY	SLEEVE BEARING --6" -- UPPER -- (STRAIGHT & RD1) S-7½-40	5.35	4.82
152 200 951	152 200 951	SUBTROL RECEIVER -- 230V	322.12	289.91
152 200 952	152 200 952	SUBTROL RECEIVER -- 460V	320.03	288.03
152 200 953	152 200 953	SUBTROL RECEIVER -- 575V	353.98	318.58
152 226 101	152 226 101	SLINGER --4" --VITON --PR	11.87	10.68
152 229 101	152 229 101	DIAPHRAGM --4: --PR --VITON	15.98	14.38

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Part No.	Replacement Number	Description	Net 1-49	Net 50
155 007 102	155 007 102	SHAFT SEAL --4" --SS & HT	0.71	0.64
155 009 102	155 009 102	LEAD OPENING PLUG -- 4"	0.04	0.04
155 031 101	USE KIT 305 213 901	RELAY, VOLTAGE -- 115V; 60HZ	20.47	18.43
*155 031 102	USE KIT 305 213 902	RELAY, VOLTAGE --230V; 60HZ desde 1 1/2 hasta 5HP LpH	20.47	18.43
155 031 103	USE KIT 305 213 903	RELAY, VOLTAGE -- 208V; 60HZ	20.47	18.43
155 031 112	USE KIT 305 213 912	RELAY, VOLTAGE --220V; 50HZ	20.47	18.43
155 031 601	305 213 961	RELAY, VOLTAGE --208V; 60HZ; HEAVY DUTY > 7.5HP	26.47	23.83
155 031 602	155 031 602	RELAY, VOLTAGE -- 230V; 60HZ; HEAVY DUTY > 7.5HP	26.47	[illegible]
155 063 108	155 063 108	SHIM --8" -- (TYPE 1)--.005"	1.80	[illegible]2
155 063 109	155 063 109	SHIM --8" -- (TYPE 1)--.015"	2.22	2.00
155 063 110	155 063 110	SHIM --8" -- (TYPE1) --.030"	2.64	2.38
155 063 117	155 063 117	SHIM --8" -- (TYPE1) --.008"	3.03	2.72
155 173 101	155 173 101	BAFFLE --6" --(STRAIGHT)	0.82	0.74
155 194 101	155 194 101	STUD --4" --PR	1.86	1.67
155 202 101	155 202 101	STUD --4" --SS	0.62	0.56
155 202 102	155 202 102	STUD --4" --HT	0.82	0.74
155 235 101	155 235 101	BUSHING --4" --SS	0.30	0.26
155 249 101	155 249 101	O'LOAD --7.5HP (OLD STYLE)	15.16	13.66
155 249 102	155 249 102	O'LOAD -- 5HP (OLD STYLE)	15.68	14.12
155 249 103	155 249 103	O'LOAD -- 10HP (OLD STYLE)	75.39	67[illegible]
155 250 102	OBSOLETE	O'LOAD -- 1/2HP; 230V (OLD STYLE)		
155 250 103	OBSOLETE	O'LOAD -- 3/4HP; 230V (OLD STYLE)		
155 252 101	OBSOLETE	RELAY , CURRENT -- 1/3 HP; 230V		

SUB- PART -PL
03 January 2000
(replaces 05 January 1998)

PRICING NEWS

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Electric

Franklin rt No.	Replacement Number	Description	Net 1-49	Net 50+
155 252 102	OBSOLETE	RELAY, CURRENT -- 1/2 HP; 230V		
155 252 103	OBSOLETE	RELAY, CURRENT -- 3/4 HP; 230V & 1/3HP; 115V		
155 252 104	OBSOLETE	RELAY, CURRENT -- 1 HP; 230V		
155 252 105	OBSOLETE	RELAY, CURRENT -- 1/2 HP; 115V		
155 263 201	155 263 201	SHAFT SEAL, STATIONARY SEAL -- 4" HT NIR, 316SS, & OIL STRIPPER	44.43	39.99
155 263 202	155 263 202	SHAFT SEAL, ROTATING -- 4"HT NIR, 316SS, & OIL STRIPPER	32.32	30.28
155 270 101	155 270 101	UPTHRUST WASHER --6"	0.99	0.90
155 274 101	155 274 101	SLINGER -- 6"-- WATER WELL	1.34	1.11
155 275 101	155 275 101	FILTER -- 4" --SS	0.04	0.04
155 276 101	155 276 101	DIAPHRAGM -- 4" --HT --NIR & 316SS	6.86	6.16
155 277 101	155 277 101	SLINGER-- 6" -- NIR & 316SS	17.02	15.32
155 278 101	155 278 101	SPRING -- 8" & 6" --NIR & 316SS 6" (STRAIGHT, RD1, & RD2); 8" (TYPE 1, 2, &2.1)	12.58	11.32
155 295 101	155 295 101	SLINGER -- 8" -- (TYPE 2 & 2.1)	3.32	2.99
155 301 101	155 301 101	SEAL BUSHING -- 6" -- WATER WELL	3.68	3.32
155 301 103	155 301 103	SEAL BUSHING -- 6" -- NIR & 316SS	32.15	28.92
155 303 101	155 303 101	SPRING -- 8" --NIR & 316SS (TYPE 1)	26.86	24.18
155 305 101	155 305 101	SUBTROL EQUIPPED LABEL	0.99	0.90
155 312 101	155 312 101	SUBTROL FUSE -- 2AMP	4.83	4.35
155 316 101	155 316 101	RETAINER RING --4" -- 2-WIRE	0.10	0.08
155 318 201	155 318 201	UPTHRUST WASHER -- 8" -- (TYPE 1)	19.86	17.87
155 325 102	USE KIT 305 226 901	CONTACTOR -- 2 & 5 HP, DELUXE	40.79	36.71
155 326 101	155 326 101	CONTACTOR -- 7.5HP, DELUXE	56.95	51.26
155 326 102	155 326 102	CONTACTOR -- 7.5 THU 10 HP, DELUXE	124.98	112.48

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Part No.	Replacement Number	Description	Net 1-49	Net 50
155 327 101	USE KIT 305 203 901	CAPACITOR RUN -- 30MFD, 370V	14.28	12.8
155 327 102	USE KIT 305 203 902	CAPACITOR RUN -- 35MFD, 370V	15.79	14.2
155 327 107	USE KIT 305 203 907	CAPACITOR RUN -- 15MFD, 370V	9.23	8.3
155 327 108	USE KIT 305 203 908	CAPACITOR RUN -- 23MFD, 370V	15.64	14.0
155 327 109	USE KIT 305 203 909	CAPACITOR RUN -- 45MFD, 370V	18.00	16.2
155 328 101	USE KIT 305 204 901	CAPACITOR RUN -- 15MFD, 370V	10.68	9.6
155 328 102	USE KIT 305 204 902	CAPACITOR RUN -- 10MFD, 370V	9.79	8.8
155 328 103	USE KIT 305 204 903	CAPACITOR RUN -- 20MFD, 370V	11.74	1
155 330 102	USE KIT 305 233 902	SHAFT SEAL -- 6" -- CARBON-CERAMIC -- ROTATING	22.98	
155 332 101	OBSOLETE	CONTROL BOX -- TERMINAL BLOCK 1.5 THRU 15 HP; 2 POLE		
155 332 102	155 332 102	CONTROL BOX -- TERMINAL BLOCK 1.5 THRU 15 HP; 3 POLE	8.47	7.0
155 339 101	155 339 101	SEAL BUSHING -- 8" -- WATER WELL -- (TYPE 1 & 2.1)	14.23	12.8
155 339 103	155 339 103	SEAL BUSHING -- 8" -- NIR & 316SS -- (TYPE 1 & 2.1)	68.78	61.9
155 353 101	155 353 101	SLINGER -- 4" -- HT	0.64	0.5
155 354 101	155 354 101	SHAFT SEAL COVER -- 4" -- HT -- NIR & 316SS	2.98	2.6
155 354 102	155 354 102	SHAFT SEAL COVER -- 4" -- HT --WATER WELL	2.03	1.8
155 369 121	155 369 121	RETAINER RING -- 4" --HT -- NIR, 316SS & OIL STRIPPER	5.91	5.3
155 396 101	155 396 101	UPTHRUST WASHER -- 4" -- HT -- 1.125" BORE	0.56	0.5
155 396 102	155 396 102	UPTHRUST WASHER -- 4" -- HT -- 0.750" BORE	0.62	0.5
155 409 101	155 409 101	O'LOAD MAIN -- 15 HP (CIRCUIT BREAKER STYLE) A 10 HP según	65.98	59.4
155 409 102	155 409 102	O'LOAD MAIN -- 10 HP (CIRCUIT BREAKER STYLE) 1.15 HP el Libro	65.98	59.4
155 411 901	155 411 901	FILTER ASSEMBLY -- ALL MOTORS EXCEPT 4"SS	0.52	
155 412 101	155 412 101	THRUST ASSEMBLY -- 3500# --SEGMENT -- 6'	10.07	9.0

SUB- PART -PL
03 January 2000
(replaces 05 January 1998)

PRICING NEWS

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Electric

Franklin rt No.	Replacement Number	Description	Net 1-49	Net 50+
155 429 101	155 429 101	CONTRACTOR - 15HP	224.50	201.98
155 449 101	155 449 101	SCREW, SHAFT HEIGHT ADJUSTING -- 6"	3.32	2.99
155 451 101	155 451 101	GASKET --6" -- WATER WELL -- (RD1)	1.18	1.07
155 451 201	155 451 201	GASKET --6" -- NIR & 316SS -- (RD1)	3.07	2.76
155 461 102	155 461 102	O'RING -- 4" --SS & PR -- 2-WIRE	0.14	0.12
155 465 102	155 465 102	SUBTROL FUSE HOLDER	15.08	13.58
155 466 101	155 466 101	SUBTROL SURGE SUPPRESSOR	25.76	23.19
5 472 101	155 472 101	STUD -- 4" -- HT -- NIR, 316SS & OIL STRIPPER	3.88	3.50
496 101	155 496 101	SPRING -- 8" -- NIR,& 316SS -- (TYPE 1)	58.66	52.79
155 512 101	155 512 101	SHAFT SEAL -- 4" -- VITON -- PR	10.68	9.62
155 525 101	155 525 101	DIAPHRAGM -- 6" -- WATER WELL (RD1)	2.98	2.68
155 525 201	155 525 201	DIAPHRAGM -- 6" -- NIR & 316SS	6.15	5.54
155 540 101	155 540 101	BUSHING -- 4" -- TEFZEL -- PR	6.86	6.16
155 548 901	155 548 901	SCREW & WASHER ASSEMBLY -- 4" -- SS & PR	0.30	0.26
155 559 101	155 559 101	SPRING, DIAPHRAGM -- 6" -- WATER WELL -- (RD1)	1.90	1.71
155 559 201	155 559 201	SPRING, DIAPHRAGM -- 6" -- NIR & 316SS -- (RD1)	18.62	16.76
155 562 901	155 562 901	LEVELING WASHER-- 4" -- SS -- (1 THRU 2 HP)	2.28	2.06
155 563 901	155 563 901	THRUST ASSEMBLY -- 650# -- ROCKER WASHER 4"SS 1 THRU 2 HP	1.56	1.40
155 595 101	155 595 101	LEAD CLAMPING PLATE -- 8" -- #2AWG INDIVIDUAL LEADS	10.50	9.44
155 612 103	USE KIT 305 233 901	SHAFT SEAL SET -- 6" SILICON CARBIDE	88.38	79.55
155 639 201	USE KIT 305 196 901	LEAD SLEEVE -- 6" --316SS	50.76	45.68
649 101	155 649 101	CAPACITOR CLAMP -- RUN CAP 1.5 THRU 15 HP CONTROL BOXES	0.34	0.30
155 649 102	155 649 102	CAPACITOR CLAMP -- START CUP 1.5 THRU 15 HP CONTROL BOXES	0.34	0.30

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Part No.	Replacement Number	Description	Net 1-49	Net 50+
155 690 202	155 690 202	DIAPHRAGM COVER -- 6" NIR & 316SS -- (RD2)	28.84	
155 691 102	155 691 102	DIAPHRAGM -- 6" NIR & 316SS -- (RD2)	14.71	13.
155 716 101	155 716 101	GASKET -- 4" -- SS	0.71	0.
155 739 101	155 739 101	UPTHRUST WASHER -- 8" -- (TYPE 2)	1.86	1.
155 740 101	155 740 101	GASKET -- 8" -- WATER WELL -- (TYPE 2 & 2.1)	3.79	3.
155 740 201	155 740 201	GASKET -- 8" -- 316SS -- (TYPE 2)	4.72	4.
155 752 101	155 752 101	SLINGER, SHAFT -- 8" -- WATER WELL --(TYPE 2 & 2.1)	3.88	3.
155 754 101	155 754 101	SEAL BUSHING -- 8" -- WATER WELL -- (TYPE 2)	5.63	5.
155 754 102	155 754 102	SEAL BUSHING -- 8" -- 316SS -- (TYPE 2)	17.63	1.
155 755 101	155 755 101	SHAFT SEAL COVER -- 8" -- WATER WELL -- (TYPE 2)	6.52	
155 755 102	155 755 102	SHAFT SEAL COVER -- 8" -- 316SS -- (TYPE 2)	13.80	12.
155 756 101	USE KIT 305 233 902	SHAFT SEAL -- 8" & 6" -- CARBON-CERAMIC -- STATIONARY 6";8"(TYPE 2)	22.98	20.
155 756 102	USE KIT 305 233 902	SHAFT SEAL -- 8" & 6" -- CARBON-CERAMIC -- ROTATING 6";8"(TYPE 2)	22.98	20.
155 761 101	155 761 101	SCREW -- 6" -- NIR & 316SS -- (RD2)	0.39	0.
155 762 101	155 762 101	TERMINAL BLOCK 1 1/2 - 15 HP CB 6 POLE (DELUXE)	16.31	14.
155 762 102	155 762 102	TERMINAL BLOCK 1 1/2 - 10 HP CB 6 POLE (STD)	13.02	11.
155 765 101	No Replacement Available	SHAFT SEAL- 4" STAINLESS CLAD		
155 832 101	USE KIT 305 225 901	SHAFT SEAL -- 8" -- SILICON CARBIDE STATIONARY (TYPE 1 & 2.1)	113.44	102.
155 832 102	USE KIT 305 225 901	SHAFT SEAL -- 8" -- SILICON CARBIDE ROTATING (TYPE 1 & 2.1)	113.44	102.
155 837 101	155 837 101	NUT, JAM -- 4" -- 303SS	2.55	2
155 941 101	155 941 101	UPTHRUST WASHER -- 8" -- (TYPE 2.1)	2.64	
165 214 901	165 214 901	SUBTROL, SENSOR COIL ASSEMBLY -- "4000"	43.78	39.
165 214 903	165 214 903	SUBTROL, SENSOR COIL ASSEMBLY -- "4200"	44.99	40.

SUB- PART -PL
03 January 2000
(replaces 05 January 1998)

PRICING NEWS

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Electric

Franklin rt No.	Replacement Number	Description	Net 1-49	Net 50+
165 214 904	165 214 904	SUBTROL, SENSOR COIL ASSEMBLY -- "4400"	44.39	39.95
177 146 905	177 146 905	THRUST HOUSING ASSEMBLY -- 4" --HT --WATER WELL	33.04	29.75
177 154 902	177 154 902	END BELL ASSEMBLY -- 4" -- HT -- BOTTOM -- 1.125" BORE	14.23	12.80
177 154 903	177 154 903	END BELL ASSEMBLY -- 4" -- HT -- BOTTOM -- (10HP)	14.51	13.06
177 155 902	177 155 902	END BELL -- 4" --HT -- TOP	21.36	19.23
177 166 908	177 166 908	END BELL -- 6" -- BOTTOM (STRAIGHT)	32.95	29.66
177 230 901	177 230 901	END BELL -- 4" --SS -- BOTTOM	9.50	8.55
177 230 907	177 230 907	END BELL -- 4" --SS -- BOTTOM -- (1 THRU 2 HP)	9.55	8.60
177 231 906	177 231 906	END BELL -- 4" -- SS -- TOP	18.52	16.67
177 231 908	177 231 908	END BELL -- 4" -- SS & PR -- TOP -- (1/3 THRU 3/4 HP)	36.74	33.06
177 233 906	177 233 906	END BELL -- 4" -- SS -- TOP	20.56	18.51
177 233 907	177 233 907	END BELL -- 4" -- SS & PR -- TOP -- (1THRU 2 HP)	38.76	34.89
177 248 201	OBSOLETE	UPTHRUST BEARING -- 8" --(FOR MODELS ENDING IN '002')		
177 249 101	OBSOLETE	THRUST ASSEMBLY -- 10000# -- LEVELING DISC 8" (FOR MODELS ENDING IN '002')		
177 251 102	177 251 102	DIAPHRAGM COVER -- 8" -- WATER WELL -- (TYPE 1)	91.56	84.40
177 257 901	177 257 901	END BELL ASSEMBLY - 4" -- HT -- 0.750" BORE	13.28	11.95
177 258 901	177 258 901	THRUST ASSEMBLY --3500# -- LEVELING DISC 6" (STRAIGHT); 8"(TYPE 2 & 2.1)	9.46	8.5[illegible]
177 265 905	177 265 905	END BELL --6" -- TOP -- WATER WELL	80.03	72.02
177 267 901	177 267 901	DIAPHRAGM COVER -- 6" -- WATER WELL -- (STRAIGHT)	47.23	42.52
177 268 901	177 268 901	THRUST HOUSING -- 6" -- WATER WELL -- (STRAIGHT)	150.87	135.78
177 271 906	177 271 906	END BELL -- 8" -- TOP -- WATER WELL -- 180 LEAD EXIT 40 THU 200 HP - (TYPE 1)	445.20	400.68
177 276 902	177 276 902	THRUST HOUSING -- 4" -- HT -- STAINLESS	317.30	285.57
177 278 907	177 278 907	END BELL -- 8" -- TOP -- WATER WELL 6" MOUNTING (TYPE 1)	362.44	326.19

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Part No.	Replacement Number	Description	Net 1-49	Net 50+
177 281 904	177 281 904	END BELL -- 6" -- TOP -- NIR	65.66	
177 282 901	177 282 901	THRUST HOUSTIN -- 6" NIR -- (STRAIGHT)	212.70	191.4
177 283 101	177 283 101	DIAPHRAGM COVER -- 6" -- NIR -- (STRAIGHT)	80.12	72.1
177 285 151	177 285 151	DIAPHRAGM COVER -- 6" -- 316SS -- (STRAIGHT)	188.31	169.4
177 286 901	177 286 901	177 286 901	580.32	522.2
177 292 903	No Replacement Available			
177 282 905	Use 316SS Parts			
177 292 907	Use 316SS Parts			
177 295 102	Use 316SS Parts			
177 296 902	177 296 902	END BELL ASSEMBLY-- 6" -- 316SS	860.55	7
177 299 902	177 299 902	THRUST HOUSING -- 4" -- HT -- NIR	218.84	196.9
177 302 905	177 302 905	END BELL ASSEMBLY -- 8" - TOP -- 316SS SINGLE LEAD EXIT 40 THRU 125 HP -- (TYPE 1)	1946.42	1751.7
177 302 906	177 302 906	END BELL ASSEMBLY -- 8" - TOP -- 316SS -- 180 LEAD EXIT 40 THRU 200 HP -- (TYPE 1)	2003.10	1802.7
177 302 907	177 302 907	END BELL ASSEMBLY -- 8" - TOP -- 316SS SINGLE LEAD EXIT 150 THRU 200 HP -- (TYPE 1)	1953.09	1757.8
177 305 102	177 305 102	DIAPHRAGM COVER -- 8" -- 316SS -- (TYPE 1)	768.54	691.6
177 306 901	177 306 901	END BELL ASSEMBLY -- 8" -- BOTTOM -- (TYPE 1)	208.11	187.3
177 307 901	177 307 901	THRUST HOUSING -- 8" -- WATER WELL -- (TYPE 1)	161.08	144.98
177 310 101	177 310 901	THRUST ASSEMBLY 00 10000# -- LEVELING DISC 8" (TYPE 1)	78.99	71.0
177 312 902	177 312 902	END BELL ASSEMBLY -- 4" -- HT -- TOP -- 1.123" BORE WATER WELL	27.71	24.9
177 313 902	177 313 902	END BELL ASSEMBLY -- 4" -- HT -- TOP -- 0.750" BORE WATER WELL	22.55	20.3
177 315 901	177 315 902	THRUST HOUSING -- 4" -- HT -- OIL STRIPPER	356.62	320
177 316 101	177 316 902	DIAPHRAGM COVER -- 4" -- HT -- OIL STRIPPER	254.80	22
177 318 901	177 318 901	END BELL ASSEMBLY -- 4" -- HT -- TOP --1.125" BORE NIR & OIL STRIPPER	150.74	135.6

SUB- PART -PL
03 January 2000
(replaces 05 January 1998)

RICING NEWS

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Electric

Franklin Part No.	Replacement Number	Description	Net 1-49	Net 50+
177 322 901	Use 316SS Parts	THRUST HOUSING - 8" - NIR - (TYPE 1)		
177 323 901	177 323 901	THRUST HOUSING ASSEMBLY - 8" - 316SS - (TYPE 1)	1,055.67	950.11
177 324 901	177 324 901	END BELL ASSEMBLY - 4" - HT - TOP - 0.750" BORE NIR & OIL STRIPPER	127.57	114.81
177 327 901	177 327 901	END BELL ASSEMBLY - 6" BOTTOM WATERWELL - (RD1)	33.93	30.55
177 328 101	177 328 101	THRUST ASSEMBLY - 3500# - LEVELING DISC - 6" (RD1)	3.27	2.93
177 329 901	Use Kit 305 096 901	THRUST ASSEMBLY - 3500# - 6" (RD1)	27.23	24.49
177 330 101	177 330 101	THRUST BEARING - 10000# - SEGMENT - 6" (STRAIGHT) 8" (TYPE 2 & 2.1)	12.33	11.09
177 333 931	177 333 931	END BELL ASSEMBLY - 4" HT - TOP 1.125" BORE - 316SS	331.41	298.28
177 336 201	Use Kit 305 095 903	THRUST BEARING - 6000# (MUSHROOM BEARING) 6" (RD1)	217.00	195.29
177 339 901	177 339 901	END BELL ASSEMBLY - 4" HT - TOP 0.750" BORE - 316SS	218.23	196.40
177 350 901	177 350 901	THRUST HOUSING - 6" - WATER WELL - (RD1)	50.48	45.44
177 366 901	177 366 901	END BELL ASSEMBLY - 8" - TOP - 90 LEAD EXIT	360.35	324.32
177 366 907	177 366 907	END BELL ASSEMBLY - 8" - TOP - SINGLE LEAD EXIT 150 THRU 200 HP - (TYPE 1)	360.16	324.15
177 366 909	177 366 909	END BELL ASSEMBLY - 8" - TOP WATER WELL - (TYPE 2.1)	416.55	374.89
177 369 901	177 369 901	THRUST HOUSING - 6" - NIR - (RD1)	362.80	326.52
177 370 901	177 370 901	THRUST HOUSING - 6" - 316SS - (RD1)	663.47	597.12
177 380 901	177 380 901	END BELL - 8" - BOTTOM - (TYPE 2 & 2.1)	123.79	111.41
177 382 101	177 382 101	8" DIAPHRAGM COVER, WATER WELL - 8" (TYPE 2 & 2.1)	49.44	44.49
177 392 952	177 392 952	THRUST HOUSING - 8" - NIR & 316SS - (RD2)	91.47	82.32
177 393 901	177 393 901	6" BOTTOM END, NIR & 316SS - 8" (RD2)	49.39	44.45
177 405 904	177 405 904	END BELL ASSEMBLY - 8" - TOP - 316SS - (TYPE 2.1)	1,491.59	1,342.43
177 413 901	177 413 901	END BELL ASSEMBLY - 8" - TOP WATER WELL - (TYPE 2)	304.39	273.95
177 413 902	177 413 902	END BELL ASSEMBLY - 8" - TOP - WATER WELL 90 LEAD EXIT - (TYPE 2)	336.01	282.24

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Part No.	Replacement Number	Description	Net 1-49	Net 50+
177 429 901	177 429 901	THRUST HOUSING - 8" - WATER WELL - (TYPE 2 & 2.1)	124.45	112.00
177 446 901		8" TOP END BELL, 316SS - 8" (TYPE 2)	1,197.20	1,005.65
177 448 101	177 448 101	DIAPHRAGM COVER - 8" - 316SS - (TYPE 2)	212.36	191.13
179 838 106	179 838 106	LEAD SLEEVING - 4" - NATVAR	0.91	0.81
179 860 102	179 860 102	THRUST ASSEMBLY - BEARING - 4" SS	2.41	2.17
273 434 601	273 434 601	DIAPHRAM - 4" - HT & OIL STRIPPER	26.00	23.40
273 454 101	273 454 101	SPRING - 4" - HT & OIL STRIPPER	41.17	37.05
275 157 356	275 157 356	SCREW - 6" - WATER WELL - (RD1)	0.10	0.08
275 244 102	275 244 102	PLUG PIPE - 4", 6" & 8" - 316SS & NIR	2.55	2.29
275 250 104	275 250 104	THRUST ASSEMBLY - 1500# - WOODRUFF KEY 6" & 4"	0.13	0.12
275 250 110	275 250 110	THRUST ASSEMBLY - 10000# - WOODRUFF KEY 6" (STRAIGHT) & 8" (TYPE 2 & 2.1)	0.23	0.21
275 250 113	275 250 113	THRUST ASSEMBLY - 10000# - WOODRUFF KEY 8" (TYPE 1)	0.52	0.47
275 295 207	275 295 207	SCREW, CAP - 8" - WATER WELL - (TYPE 1)	0.61	0.56
275 295 308	275 295 308	SCREW, CAP - 8" - WATER WELL - (TYPE 2)	1.37	1.23
275 295 310	275 295 310	SCREW, CAP - 8" - WATER WELL - (TYPE 2.1)	2.80	2.52
275 295 406	275 295 406	SCREW, CAP - 8" - WATER WELL 40 THRU 125 HP (TYPE 1)	2.84	2.55
275 297 306	275 297 306	SCREW, CAP - 6" - WATER WELL	1.89	1.71
275 304 504	275 304 504	SCREW, CAP - 8" & 6" - WATER WELL - 6" (STRAIGHT) 8" (TYPE 2 & 2.1)	0.29	0.25
275 304 607	275 304 607	SCREW, CAP - 6" - WATER WELL - (RD1)	0.91	0.81
275 304 608	275 304 608	SCREW, CAP - 8" - WATER WELL - (TYPE 2 & 2.1)	1.17	1.07
275 306 104	275 306 104	SCREW, CAP - 8" - 316SS - 3-LEAD - 150 THRU 200 HP (TYPE 1)	11.50	9.65
275 306 207	275 306 207	SCREW, CAP - 6" - 316SS - (RD1)	6.39	5.75
275 306 208	275 306 208	SCREW, CAP - 8" -316SS - (TYPE 2)	8.75	7.87

SUB- PART -PL
03 January 2000
(replaces 05 January 1998)

RICING NEWS

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Electric

Franklin art No.	Replacement Number	Description	Net 1-49	Net 50+
275 306 404	275 306 404	SCREW, CAP - 8" - WATERWELL - 3-LEAD 150 THRU 200 HP; (TYPE1)	21.28	19.15
275 306 405	275 306 405	SCREW, CAP - 8" - NIR & 316SS - 3-LEAD 150 THRU 200 HP; (TYPE1)	21.28	19.15
275 336 303	275 336 303	SCREW, CAP - 6" - AIR CONTIONING	4.35	3.91
275 339 170	275 339 170	SCREW, CAP - 4" - HT	0.13	0.12
275 339 305	275 339 305	SCREW, CAP - 6" - (STRAIGHT)	0.71	0.64
275 399 102	OBSOLETE	SCREW, MACH SLHD - 4" - SS		
275 401 454	275 401 454	SCREW - 4" - HT & OIL STRIPPER	1.89	1.71
275 406 102	Use Kit 305 214 902	O'LOAD MAIN - 5HP; 50HZ - (BRHOOHD) & 60Hz	11.39	10.24
275 406 103	Use Kit 305 214 903	O'LOAD START - 10 THRU 15 HP - (BROHOOHB)	11.39	10.24
275 406 107	Use Kit 305 214 907	O'LOAD MAIN - 3HP; 50 HZ - (BRH29HB)	12.43	11.19
275 406 120	275 406 120	O'LOAD MAIN - 3HP - (OLD STYLE) - (BRH25JD)	11.15	10.04
275 406 121	Use Kit 305 214 921	O'LOAD MAIN - 7.5HP - (BRH00DD)	11.39	4.60
275 411 102	Use Kit 305 215 902	O'LOAD START - 5 THRU 7.5 HP 60HZ & MAIN 2 HP; 50 HZ (CRJ31HB)	5.11	4.60
275 411 103	OBSOLETE	O'LOAD START - 1.5HP (CRJ33HB)		
275 411 106	Use Kit 305 215 906	O'LOAD START - 2 HP; 50HZ - (CRG70EB)	4.72	4.25
275 411 107	Use Kit 305 215 907	O'LOAD START - 1.5HP; 60 HZ & 2 THRU 3 HP; 50HZ (CRG67JB) & 2HP and compare	4.44	4.00
275 411 108	Use Kit 305 215 908	O'LOAD START - 3HP - (CRG50JB)	4.44	4.00
275 411 112	OBSOLETE	O'LOAD - 2HP; 208V, 60HZ - (CSJ33HD)		
275 411 113	Use Kit 305 215 913	O'LOAD MAIN - 2HP - (CSH16H)	6.36	5.72
275 411 114	Use Kit 305 215 914	O'LOAD MAIN - 1.5HP; 50HZ - (CRG71LB)	4.44	4.00
275 411 115	Use Kit 305 215 915	O'LOAD MAIN - 3HP - (CSH00HD)	4.84	4.35
275 415 119	OBSOLETE	O'LOAD MAIN - (CSJ71JX)		
275 461 101	Use Kit 305 205 901	CAPACITOR - 250-300MFD;110V	8.64	7.79

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Part No.	Replacement Number	Description	Net 1-49	Net 50+
275 461 106	Use Kit 305 205 906	CAPACITOR - 86-103MFD;220V	16.31	14.67
275 461 107	Use Kit 305 205 907	CAPACITOR - 105-126MFD;220V	13.13	11.83
275 461 108	305 205 908	CAPACITOR - 59 - 71MFD; 220V	14.04	12.64
275 461 122	Use Kit 305 205 922	CAPACITOR - 159-191MFD; 110V	8.47	7.63
275 461 123	Use Kit 305 205 923	CAPACITOR - 43-53MFD; 220V	12.48	11.23
275 463 111	Use Kit 305 206 911	CAPACITOR - 208-250MFD; 220V	17.15	15.44
275 464 105	Use Kit 305 207 905	CAPACITOR - 59 -71-MFD; 220V	9.93	8.93
275 464 113	Use Kit 305 207 913	CAPACITOR - 105-126MFD; 220V	11.87	10.68
275 464 118	Use Kit 305 207 918	CAPACITOR - 86-103MFD; 220V	11.45	10.31
275 464 125	Use Kit 305 207 925	CAPACITOR - 159-19MFD; 110V	8.84	7.95
275 464 126	Use Kit 305 207 926	CAPACITOR - 43-53MFD; 220V	9.75	8.77
275 464 201	Use Kit 305 207 951	CAPACITOR - 250-300MFD; 125V	10.07	9.07
275 468 115	Use Kit 305 208 915	CAPCCITOR - 189-227MFD; 220V	19.43	17.48
275 468 117	Use Kit 305 208 917	CAPACITOR - 130-154MFD; 330V	22.45	20.21
275 468 118	Use Kit 305 208 918	CAPACITOR - 216-259MFD; 330V	28.97	26.08
275 468 119	Use Kit 305 208 919	CAPACITOR - 270-324MFD; 330V	32.80	29.52
275 470 114	275 470 114	CAPACITOR - 108-130MFD; 220V	10.07	9.07
275 470 115	275 470 115	CAPACITOR - 43-52MFD; 220V	10.79	9.07
275 532 101	OBSOLETE	NUT, HEX		
275 542 102	275 542 102	WASHER - 4' - SS & HT	0.04	0.04
275 546 113		6" & 8" LOCKWASHER, WATER WELL 6" , 8" (TYPE 2 & 2.1)	0.19	0.17
275 546 115	275 546 115	LOCKWASHER - 8"	0.43	0.39
275 547 109	275 547 109	LOCKWASHER - 8" & 6" - 316 SS 6" (STRAIGHT), 8" (TYPE 2)	0.19	0.17

SUB- PART -PL
03 January 2000
(replaces 05 January 1998)

RICING NEWS

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Electric

Franklin rt No.	Replacement Number	Description	Net 1-49	Net 50+
275 547 111	OBSOLETE	LOCKWASHER		
275 547 113	275 547 113	LOCKWASHER - 8" & 6" - NIR & 316SS 6"; 8" (TYPE 2 & 2.1)	0.23	0.21
275 563 102	275 563 102	NUT, HEX - 4" HT - 316SS NIR & OIL STRIPPER	0.33	0.29
275 572 109	275 572 109	LOCKWASHER - 8" - WATER WELL - (TYPE 2 & 2.1)	0.04	0.04
275 572 111	275 572 111	LOCKWASHER - 8" - WATER WELL - (TYPE 2)	0.09	0.08
275 606 111	275 606 111	LOCKWASHER - 8" - 316SS - (TYPE 2)	0.23	0.21
275 606 115	275 606 115	LOCKWASHER - 8" - NIR & 316SS - (TYPE 1)	0.71	0.64
275 623 453	275 623 453	THRUST ASSEMBLY - 1500# - ROLL PIN - 6" 5-9½	0.09	0.08
275 731 115	OBSOLETE	O-RING		
275 743 132	275 743 132	O-RING - 4" - HT (10HP ONLY)	0.23	0.21
275 743 133	275 743 133	O-RING	0.19	0.17
275 743 144	275 743 144	O-RING - 6" - ROTOR CENTER BEARING	0.33	0.29
275 743 146	275 743 146	O-RING	0.23	0.21
275 743 152	275 743 152	O-RING	0.33	0.29
275 744 125	275 744 125	O-RING	0.23	0.21
275 744 131	275 744 131	O-RING - 6 - AIR CONDITIONING MOTOR	0.33	0.29
275 744 136	275 744 136	O-RING	0.39	0.04
275 744 138	275 744 138	O-RING - 8" - (TYPE 2 & 2.1)	0.76	0.68
275 744 149	275 744 149	O-RING - 6" - 316SS - (RD1)	0.95	0.85
275 744 151	275 744 151	O-RING - 8" - (TYPE 2 & 2.1)	1.08	1.28
275 746 102	275 746 102	O-RING	0.99	0.89
275 746 113	275 746 113	O-RING		
275 746 114	275 746 114	O-RING - 8"	1.76	1.57

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Part No.	Replacement Number	Description	Net 1-49	Net 50+
275 756 132	275 756 132	RETAINER RING - 8" - (TYPE 1)	5.57	5.01
275 792 101	275 792 101	SUBTROL BATERY RECHARGEABLE (9V BATTERY CAN BE PURCHASED FROM LOCAL HARDWARE STORE)	23.17	20.85
275 866 133	275 866 133	O-RING - VITON	1.85	1.67
275 868 115	275 868 115	O-RING - 4" - SS & RR - 2 WIRE	0.61	0.56
275 868 142	OBSOLETE	O-RING - VITON		
275 898 03	275 898 403	SCREW, CAP - 8" - (TYPE 1)	1.51	1.36
275 943 251	275 943 251	SCREW, CONTROL BOX - CAPACITOR CLAMP 1 1/2 HP THRU 15 HP	0.44	0.04
275 968 306	275 968 306	SCREW, CAP - 6" - NIR & 316SS - (RD1)	3.40	3.05
275 978 303	OBSOLETE	SCREW, ROUND HEAD		
275 978 354	275 978 354	SCREW, ROUND HEAD	0.29	0.25
275 984 207	275 984 207	SCREW, CAP - 8" - NIR & 316SS - (TYPE 1)	0.95	0.85
275 984 308	275 984 308	SCREW, CAP - 8" - 316SS - (TYPE 2)	1.99	1.79
275 984 310	275 984 310	SCREW, CAP - 8" - 316SS - (TYPE 2.1)	2.80	2.52
275 984 406	275 984 406	SCREW, CAP HEX - 8" - NIR & 316SS - (TYPE1)	4.20	3.79
276 000 101	276 000 101	SCREW, - 8" - WATER WELL - (TYPE 1)	0.04	0.04
276 000 112	OBSOLETE	SCREW		
276 000 152	276 000 152	SCREW - 8" - (TYPE 2 & 2.1)	0.04	0.04
276 000 201	276 000 201	LOCKWASHER - 8" & 6" - WATER WELL 6", 8" (TYPE 1)	0.13	0.01
276 019 204	276 019 204	SCREW, SELF TAPPING - 6" - WATER WELL (STRAIGHT & RD1)	0.93	0.08
276 020 202	276 020 202	SCREW - 6" - NIR & 316SS - (RD1)	0.23	0.21
276 020 253	276 020 253	SCREW - 8" - NIR & 316SS - (TYPE 1)	0.23	0.21
276 020 255	276 020 255	SCREW - 6" - NIR & 316SS - (RD1)	0.19	0.17
276 040 316	276 040 316	SCREW, CAP - 6" - 316SS - (RD2)	2.75	2.47

SUB- PART -PL
03 January 2000
(replaces 05 January 1998)

RICING NEWS

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Electric

Franklin Part No.	Replacement Number	Description	Net 1-49	Net 50+
276 066 202	276 066 202	SCREW. CONTROL BOX	0.09	0.09
276 066 204	276 066 204	SCREW, CONTROL BOX	0.04	0.04
276 850 702	OBSOLETE	TUBING - 6" LEAD		
297 144 101	297 144 101	PAINT, AERSOL TOUCH-UP PAINT (BLUE)	9.32	8.39
305 010 901	Use Kit 305 010 901	THRUST ASSEMBLY KIT - 4" HT (ALL RATINGS EXCEPT 10 HP)	49.44	44.49
305 011 901	No Replacement Available	END BELL KIT - 4" HT (FOR MODELS ENDING WITH "2003")		
305 011 904	Use Kit 305 011 904	END BELL KIT - 4" HT - TOP - 1.125" BORE	96.80	87.12
305 011 905	Use Kit 305 011 905	END BELL KIT - 4" HT - TOP - 0.750" BORE	90.65	81.59
305 027 901	OBSOLETE	MOTOR SEAL KIT - 4" HT (FOR MODELS ENDING WITH "2003")		
305 027 903	Use Kit 305 027 903	MOTOR SEAL KIT - 4" HT	16.55	14.89
305 028 905	Use Kit 305 028 905	CASTING & SEAL KIT - 6" - WATER WELL - (STRAIGHT)	341.64	307.47
305 028 906	Use Kit 305 028 906	CASTING & SEAL KIT - 6" - WATER WELL - (RD1)	214.03	192.61
305 029 907	Use Kit 305 029 907	MOTOR SEAL KIT - 6" - WATER WELL - (RD1)	36.73	33.05
305 045 902	Use Kit 305 045 902	MOTOR SEAL KIT - 4" SS	12.15	10.93
305 046 904	Use Kit 305 046 904	END BELL KIT = 4" - SS -(1 THRU 2 HP)	47.55	42.80
305 047 902	Use Kit 305 047 902	END BELL KIT - 4" - SS - (1/3 THRU 3/4 HP)	45.51	43.89
305 048 901	OBSOLETE	THRUST BEARING KIT - 650# - 4" SS (1 THRU 2 HP)		
305 049 901	Use Kit 305 049 901	THRUST BEARING KIT - 300# - 4" SS (1/3 THRU 3/4 HP)	11.53	10.39
305 068 901	OBSOLETE	THRUST BEARING KIT - 1500# - 6"		
305 075 901	Use Kit 305 075 901	SLEEVE BEARING KIT - 6"	20.08	18.08
305 075 902	OBSOLETE	BEARING KIT - 6"		
305 075 903	Use Kit 305 075 903	SLEEVE BEARING KIT - 8" -(TYPE 1 & 2.1)	64.15	57.73
305 075 904	Use Kit 305 075 904	SLEEVE BEARING KIT - 8" - (TYPE 2 & 2.1)	48.31	43.60

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Part No.	Replacement Number	Description	Net 1-49	Net 50+
305 079 101	Use Kit 305 079 101	REBUILD/SERVICE TOOL, VACUUM FILLING TOOL ALL BUT 4"SS (TY-11-31)	192.71	173.44
305 079 103	Use Kit 305 079 103	REBUILD/SERVICE TOOL, VACUUM FILLING RESERVOIR 4"SS (RK-6-5)	102.80	92.52
305 079 104	Use Kit 305 079 104	REBUILD/SERVICE TOOL, HAND FILLING SYRINGE (RK-6-10)	85.08	76.57
305 079 105	Use Kit 305 079 105	REBUILD/SERVICE TOOL, SHAFT HEIGHT GAUGE 4" (RK-8-3)	75.19	67.67
305 079 109	OBSOLETE	REBUILD/SERVICE TOOL, (RK-8-11)		
305 079 111	Use Kit 305 079 111	REBUILD/SERVICE TOOL, DIAPHRAM DEPTH GAUGE 4"HT (RK-8-13A)	39.88	35.89
305 079 112	Use Kit 305 079 112	REBUILD/SERVICE TOOL, CHECK VALVE INSERT TOOL (RK-8-14)	45.20	40.68
305 079 116	OBSOLETE	REBUILD/SERVICE TOOL, (RK-10-2)		
305 079 117	Use Kit 305 079 117	REBUILD/SERVICE TOOL, SHAFT HEIGHT GAUGE 6" (RK-10-8)	136.48	122.83
305 079 120	OBSOLETE	REBUILD/SERVICE TOOL, (RK-11-1)		
305 079 122	Use Kit 305 079 122	REBUILD/SERVICE TOOL, SEAL COVER INSERT TOOL 8" (AT-111-88)	389.95	350.95
305 079 123	Use Kit 305 079 123	REBUILD/SERVICE TOOL, SHAFT HEIGHT GAUGE 8" (GWG-111-20-DET1)	522.88	470.59
305 079 124	Use Kit 305 079 124	REBUILD/SERVICE TOOL, SHAFT HEIGHT SET MASTER 8" (GMG111-20-DET 2)	97.49	87.75
305 079 125	OBSOLETE	REBUILD/SERVICE TOOL, - (GMM-118-10-B)		
305 079 126	OBSOLETE	REBUILD/SERVICE TOOL, - (GMM-118-11-C)		
305 079 127	Use Kit 305 079 127	REBUILD/SERVICE TOOL, DIAPHRAM PLATE POSITION GAUGE 8" (GMM-111-17-GR1)	102.81	92.52
305 079 128	Use Kit 305 079 128	REBUILD/SERVICE TOOL, SHAFT CLAMPING TOOL 8" (TY-111-76)	354.49	319.04
305 079 129	OBSOLETE	REBUILD/SERVICE TOOL, - (RK-8-15)		
305 079 131	OBSOLETE	REBUILD/SERVICE TOOL, - (RK-8-8)		
305 079 132	Use Kit 305 079 132	REBUILD/SERVICE TOL, SEAL & SEAL COVER INSERT TOL 4" (RK 12-1S)	120.53	108.48
305 079 135	Use Kit 305 079 135	REBUILD/SERVICE TOOL, SEAL & SEAL COVER INSERTION TOOL 8" (AT-111-97)	650.49	585.44
305 079 138	Use Kit 305 079 138	REBUILD/SERVICE TOOL, DIAPHRAGM DEPTH GAUGE 8" TYPE 2 (GMM-111-18)	92.17	82.96
305 081 901	Use Kit 305 081 901	SUBTROL, SENSOR COIL KIT (2 COILS PER KIT) - "4000"	92.03	82.83

SUB- PART -PL
03 January 2000
(replaces 05 January 1998)

RICING NEWS

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Electric

anklin art No.	Replacement Number	Description	Net 1-49	Net 50+
305 085 901	Use Kit 305 085 901	FILL SOLUTION - 6" & 8" (4" FILL SOLUTION USE # 151 300 905)	35.27	31.73
305 086 902	Use Kit 305 086 902	MOTOR SEAL KIT - 8" WATER WELL 40 THRU 100 HP (TYPE 1)	147.17	132.47
305 086 903	Use Kit 305 086 903	MOTOR SEAL KIT - 8" - 6" MOUNTING - WATER WELL 8" - (TYPE 1)	78.13	70.32
305 086 905	Use Kit 305 086 905	MOTOR SEAL KIT - 8" - 316SS 40 THRU 100 HP (TYPE 1)	252.29	227.07
305 086 906	Use Kit 305 086 906	MOTOR SEAL KIT - 8" WATER WELL 125 THRU 175 HP - (TYPE 1)	163.07	146.76
305 086 907	Use Kit 305 086 907	MOTOR SEAL KIT - 8" - 316SS 125 THRU 175 HP - (TYPE 1)	285.05	256.55
305 086 908	Use Kit 305 086 908	MOTOR SEAL KIT - 8" WATER WELL 200 HP - (TYPE 1)	167.51	150.76
086 909	Use Kit 305 086 909	MOTOR SEAL KIT - 8" 316SS - 200 HP - (TYPE 1)	297.63	267.87
087 902	Use Kit 305 087 902	THRUST BEARING KIT - 10000# - 8" (TYPE 1)	623.24	560.92
305 089 901	OBSOLETE	THRUST HOUSING KIT - 4" - HT		
305 091 901	Use Kit 305 091 901	O'LOAD KIT - 1/3HP; 115V	5.56	5.00
305 091 902	Use Kit 305 091 902	O'LOAD KIT - 1/3HP; 230V	3.93	3.53
305 091 903	Use Kit 305 091 903	O'LOAD KIT - 1/2HP; 115V	3.72	3.36
305 091 904	Use Kit 305 091 904	O'LOAD KIT - 1/2HP; 230V	3.69	3.33
305 091 905	Use Kit 305 091 905	O'LOAD KIT - 3/4HP; 230V	3.87	3.48
305 091 906	Use Kit 305 901 906	O'LOAD KIT - 1HP; 230V	3.72	3.36
305 094 901	Use Kit 305 094 901	THRUST BEARING KIT - 650# - 4"SS - (1 THRU 2 HP)	15.64	14.07
305 095 901	Use Kit 305 095 901	THRUST BEARING KIT - 1500# - 6" 5-7½ HP	53.45	48.11
305 095 902	Use Kit 305 095 902	THRUST BEARING KIT - 3500# - 6" 10 - 40	73.64	71.01
05 095 903	Use Kit 305 095 903	THRUST BEARING KIT - 6000# - 6" (RD1) 50 y 60	218.36	196.53
096 901	Use Kit 305 096 901	THRUST BEARING KIT - 3500# - 6" (PACKED THRUST BEARING)	34.88	31.39
305 098 901	Use Kit 305 098 901	LEAD ASSEMBLY KIT - 4" (2 WIRE LEAD KIT)	31.24	28.11
305 098 902	Use Kit 305 098 902	LEAD ASSEMBLY KIT - 4" (3 WIRE LEAD KIT)	30.48	27.44

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Part No.	Replacement Number	Description	Net 1-49	Net 50+
305 100 901	Use Kit 305 100 901	O'LOAD KIT - 1/3HP; 115V (QD RELAY)	10.68	9.61
305 100 902	Use Kit 305 100 902	O'LOAD KIT - 1/3HP; 230V (QD RELAY)	10.91	9.81
305 100 903	Use Kit 305 100 903	O'LOAD KIT - 1/2HP; 115V (QD RELAY)	10.68	9.21
305 100 904	Use Kit 905 100 904	O'LOAD KIT - 1/2HP; 230V (QD RELAY)	10.68	9.21
305 100 905	Use Kit 305 100 905	O'LOAD KIT - 3/4HP; 230V (QD RELAY)	10.85	9.76
305 100 906	Use Kit 305 100 906	O'LOAD KIT - 1HP; 230V (QD RELAY)	10.69	9.63
305 101 901	Use Kit 305 101 901	RELAY KIT, QD - 1/3HP; 230V	18.87	16.99
305 101 902	Use Kit 305 101 902	RELAY KIT, QD - 1/2HP; 230V	18.87	16.99
305 101 903	Use Kit 305 101 903	RELAY KIT, QD - 3/4HP; 230V	18.87	16.99
305 101 904	Use Kit 305 101 904	RELAY KIT, QD - 1HP; 230V	18.87	16.99
305 101 905	Use Kit 305 101 905	RELAY KIT, QD - 1/3HP; 115V	16.33	14.71
305 101 906	Use Kit 305 101 906	RELAY KIT, QD - 1/2HP; 115V	16.33	14.71
305 102 901	Use Kit 305 102 901	RELAY KIT, VOLTAGE - 115V; 60 HZ	20.73	18.93
305 102 902	Use Kit 305 102 902	RELAY KIT, VOLTAGE - 230V; 60 HZ	20.73	18.93
305 102 903	Use Kit 305 102 903	RELAY KIT, VOLTAGE - 200V; 60 HZ	20.73	18.93
305 103 901	Use Kit 305 103 901	THRUST BEARING KIT - 10000# - 8"(TYPE 2 & 2.1)	199.12	181.60
305 104 901	Use Kit 305 104 901	MOTOR SEAL KIT - 8" - WATER WELL - (TYPE 2)	128.99	116.09
305 104 902	Use Kit 305 104 902	MOTOR SEAL KIT - 8" - WATER WELL - (TYPE 2.1)	125.72	113.15
305 105 901	Use Kit 305 105 901	RELAY KIT, QD CRC - 1/2HP; 230V	18.20	16.37
305 105 902	Use Kit 305 105 902	RELAY KIT, QD CRC - 3/4HP; 230V	18.20	16.37
305 105 903	Use Kit 305 105 903	RELAY KIT, QD CRC - 1 HP; 230V	18.39	16.55
305 196 901	Use Kit 305 196 901	LEAD ASSEMBLY KIT - 6"(#8AWG LEAD KIT)	50.76	45.68
305 197 901	Use Kit 305 197 901	LEAD ASSEMBLY KIT - 8"(#4AWG LEAD KIT)	137.36	123.63

RICING NEWS

SPARE PARTS FOR SUBMERSIBLE PRODUCTS

Franklin Electric

Franklin art No.	Replacement Number	Description	Net 1-49	Net 50+
305 198 901	Use Kit 305 198 901	LEAD ASSEMBLY KIT - 8" (#8AWG LEAD KIT)	49.01	44.12
305 225 901	Use Kit 305 225 901	SHAFT SEAL KIT - 8" SILICON CARBIDE - (TYPE 1 & 2.1)	0.00	0.00
305 233 901	Use Kit 305 233 901	SHAFT SEAL KIT - 6" SILICON CARBIDE	88.37	79.55
305 233 902	Use Kit 305 233 902	SHAFT SEAL KIT - 6" CARBON CERAMIC	22.97	20.68
305 234 901	Use Kit 305 234 901	SHAFT SEAL KIT - 8" - SILICON CARBIDE - (TYPE 2)	113.44	102.09
903 823 102	903 823 102	FILL OIL - 4" - HT - OIL STRIPPER	92.08	82.87

Price List

Effective March 19, 2007

Prices and products are subject to change without notice

Submersible Motor Parts

Franklin Electric

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
150 069 101		SHIM, THRUST -- 4" SS -- .005"	$0.61
150 069 102		SHIM, THRUST -- 4" SS -- .008"	$0.61
150 069 103		SHIM, THRUST -- 4" SS -- .0156"	$0.97
150 208 101		THRUST ASSEMBLY, ROCKER ARM -- 4" HT 1500#	$2.16
150 224 101		SPLINE PROTECTOR -- 4" SS	$0.61
150 261 101		COVER, TOP -- 4" SS	$5.55
150 321 174		O-RING -- 4" HT	$2.64
150 324 101		SPLINE PROTECTOR -- 4" HT	$2.21
150 325 101		DIAPHRAGM -- 4" HT	$4.08
150 433 901		THRUST ASSEMBLY, BEARING -- 4" HT(10 HP ONLY) 1500#	$156.29
150 492 902		THRUST ASSEMBLY, SEGMENT -- 4" HT & 6" 1500#	$5.39
150 493 101		THRUST ASSEMBLY, LEVELING DISC -- 4" HT & 6" 1500#	$14.06
150 493 201		THRUST ASSEMBLY, LEVELING DISC -- 4" HT & 6" 1500#	$10.11
150 594 101		DIAPHRAGM -- 4" SS	$1.07
151 033 906	305 218 906	CAPACITOR/O'LOAD -- 3/4 HP; 220V; 50 HZ	$0.00
151 033 918	305 218 918	CAPACITOR/O'LOAD -- 1 HP; 220V; 50 HZ	$0.00
151 033 946	305 218 946	CAPACITOR/O'LOAD -- 1.5 HP; 230V	$0.00
151 033 957	305 218 957	CAPACITOR/O'LOAD -- 1/2 HP; 220V; 50 HZ	$0.00
151 033 973	305 218 973	CAPACITOR/O'LOAD -- 1/3 HP; 115V	$0.00
151 033 974	305 218 974	CAPACITOR/O'LOAD -- 1/3 HP; 230V	$0.00
151 033 975	305 218 975	CAPACITOR/O'LOAD -- 1/2 HP; 115V	$0.00
151 033 976	305 218 976	CAPACITOR/O'LOAD -- 1/2 HP; 230V	$0.00
151 033 978	305 218 978	CAPACITOR/O'LOAD -- 3/4 HP; 230V	$0.00
151 033 979	305 218 979	CAPACITOR/O'LOAD -- 1 HP; 230V	$0.00
151 033 980	305 218 980	CAPACITOR/O'LOAD -- 1.5 HP; 230V	$0.00
151 048 102		SCREW, SHAFT HEIGHT ADJUSTING -- 4" HT	$1.32
151 049 101		SCREW, SHAFT HEIGHT ADJUSTING -- 6" (STRAIGHT & RD2); 8" (TYPE 2 & 2.1)	$4.48
151 300 907		FILL SOLUTION -- ALL 4", 6" & 8" MODELS	$66.15
151 301 901		CHECK VALVE ASSEMBLY (WITHOUT FILTER - SEE #155 411 901)	$2.16
151 314 101		DIAPHRAGM GUARD -- 4" SS	$0.49

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
151 343 902		CONTROL BOX -- TERMINAL BOARD -- QD BOX	$8.43
151 374 101	305 196 901	LEAD BUSHING -- 6"	$0.00
151 376 101		NUT, JAM -- 6" -- BRASS	$6.37
151 376 201		NUT, JAM -- 6" 316SS	$47.53
151 378 102	305 196 901	LEAD RECEPTACLE -- 6"	$0.00
151 444 904		THRUST ASSEMBLY, BEARING -- 6" 1500#	$70.52
151 448 101		CUP SPRING, DIAPHRAGM -- 4" HT	$0.49
151 449 101		SPRING, DIAPHRAGM -- 4" HT	$1.07
151 450 103		STAINLESS PIN -- 4" HT, 6"(STRAIGHT), 8"(TYPE 1)	$4.08
151 820 102		CONNECTOR BOSS -- 4" SS	$3.98
151 822 201		THRUST ASSEMBLY, ROCKER ARM PIN -- 4" HT & 6" 1500#	$0.61
151 827 101		LEVELING WASHER -- 4" SS	$3.14
151 871 101		COVER, BOTTOM -- 4" SS & PR	$5.55
151 872 101		DIAPHRAGM COVER -- 4" SS	$2.29
151 872 102		DIAPHRAGM COVER -- 4" PR	$6.02
151 878 101	305 104 902	SHAFT SEAL, STATIONARY -- 8"(TYPE 1 & 2.1) -- CARBON CERAMIC -- (KIT 305104902 CONTAINS BOTH)	$0.00
151 878 102	305 104 902	SHAFT SEAL, ROTATING -- 8"(TYPE 1 & 2.1) -- CARBON CERAMIC -- (KIT 305104902 CONTAINS BOTH)	
151 879 102		SCREW, SHAFT HEIGHT ADJUSTING -- 8"(TYPE 1)	$43.65
151 882 101		THRUST ASSEMBLY, SEGMENT -- 8"(TYPE 1) 10000#	$89.15
151 883 101		NUT, JAM -- 8"(TYPE 1 & 2.1) -- BRASS	$37.19
151 883 201		NUT, JAM -- 8"(TYPE 1 & 2.1) 316SS	$138.38
151 893 101		THRUST ASSEMBLY, ROCKER ARM -- 8"(TYPE 1) 10000#	$38.76
151 894 100		DIAPHRAGM -- 8"(TYPE 1)	$33.44
151 900 902		THRUST ASSEMBLY, BEARING -- 8"(TYPE 1) 10000#	$576.39
151 903 101		DIAPHRAGM PLATE -- 8"(TYPE 1) WATER WELL	$6.67
151 903 201		DIAPHRAGM PLATE -- 8"(TYPE 1) NIR & 316SS	$38.04
151 908 101		SPRING, DIAPHRAGM -- 8"	$44.10
151 916 101	**	SLEEVE BEARING -- 8"	$39.73
151 938 101		THRUST ASSEMBLY, ROCKER ARM -- 6"(STRAIGHT) & 8"(TYPE 2 & 2.1) 10000#	$7.21

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
151 939 101		THRUST ASSEMBLY, ROCKER PIN -- 6"(STRAIGHT) & 8"(TYPE 2 & 2.1) 10000#	$0.95
151 986 100		DIAPHRAGM -- 6"(STRAIGHT) & 8"(TYPE 2 & 2.1) WATER WELL	$11.30
151 987 101		DIAPHRAGM PLATE --6"(STRAIGHT) & 8"(TYPE 2 & 2.1) WATER WELL	$7.32
151 987 102		DIAPHRAGM PLATE -- 6"(STRAIGHT) & 8"(TYPE2 & 2.1) NIR & 316SS	$6.68
151 988 101		SPRING, DIAPHRAGM -- 6"(STRAIGHT) & 8"(TYPE 2 & 2.1) WATER WELL	$11.30
152 004 901		THRUST ASSEMBLY, SEGMENT -- 4" SS	$3.01
152 029 100		DIAPHRAGM -- 6"(STRAIGHT) & 8"(TYPE 2 & 2.1) NIR & 316SS	$24.07
152 030 101		GASKET, TOP END BELL -- 4" SS	$0.08
152 047 101		SHAFT SEAL COVER -- 6" WATER WELL	$2.88
152 047 102		SHAFT SEAL COVER -- 6" NIR & 316SS	$6.02
152 050 950		SWITCH BIAC -- 4" SS & PR -- 2-WIRE	$20.45
152 073 101		SHAFT SEAL COVER -- 8"(TYPE 1, 2 & 2.1) WATER WELL	$19.99
152 073 102		SHAFT SEAL COVER -- 8"(TYPE 1 & 2.0 & 2.1) NIR & 316SS	$26.84
152 131 101		DIAPHRAGM COVER -- 4" HT WATER WELL	$4.92
152 131 102		DIAPHRAGM COVER -- 4" HT, NIR & 316SS	$6.37
152 164 101		SPRING, DIAPHRAGM -- 8"(TYPE 1)	$48.13
152 167 101		DIAPHRAGM COVERPLATE -- 6"(RD1) WATER WELL	$14.09
152 167 201		DIAPHRAGM COVERPLATE -- 6"(RD1) NIR & 316SS	$19.02
152 173 101	**	SLEEVE BEARING, LOWER -- 6"(RD1)	$9.39
152 173 102	**	SLEEVE BEARING, LOWER -- 6"(STRAIGHT)	$27.05
152 173 104	**	SLEEVE BEARING, UPPER -- 6"(STRAIGHT & RD1)	$13.60
152 226 101		SLINGER -- 4" PR -- VITON	$30.19
152 229 101		DIAPHRAGM -- 4" PR -- VITON	$40.67
155 007 102		SHAFT SEAL -- 4" SS & HT	$1.82
155 009 102		LEAD OPENING PLUG -- 4"	$0.08
155 031 101	305 213 901	RELAY, VOLTAGE -- 115V; 50 HZ	$0.00
155 031 102	305 213 902	RELAY, VOLTAGE -- 230V; 60 HZ	$0.00
155 031 103	305 213 903	RELAY, VOLTAGE -- 208V; 60 HZ	$0.00
155 031 112	305 213 912	RELAY, VOLTAGE -- 220V; 50 HZ	$0.00
155 031 601	305 213 961	RELAY, VOLTAGE -- 230V; 60 HZ; HEAVY DUTY > 7.5 HP	$0.00

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
155 031 602	305 213 904	RELAY, VOLTAGE -- 208V; 60 HZ	$0.00
155 063 108		SHIM -- 8"(TYPE 1) -- .005"	$4.59
155 063 109		SHIM -- 8"(TYPE 1) -- .015"	$5.65
155 063 110		SHIM -- 8"(TYPE 1) -- .030"	$6.71
155 063 117		SHIM -- 8"(TYPE 1) -- .008"	$7.72
155 173 101		BAFFLE -- 6"(STRAIGHT)	$2.07
155 194 101		STUD -- 4" PR	$4.70
155 202 101		STUD -- 4" SS	$1.58
155 202 105		STUD -- 4" HT	$1.16
155 235 101		BUSHING -- 4" SS	$0.71
155 263 201		SHAFT SEAL, STATIONARY SEAL -- 4" HT, NIR, 316SS, & OIL STRIPPER	$113.09
155 263 202		SHAFT SEAL, ROTATING -- 4" HT, NIR, 316SS, & OIL STRIPPER	$85.63
155 270 101		UPTHRUST WASHER -- 6"	$2.51
155 274 101		SLINGER -- 6" WATER WELL	$3.14
155 275 101		FILTER -- 4" SS	$0.08
155 275 102		FILTER -- 4" HT	$0.06
155 276 101		DIAPHRAGM -- 4" HT, NIR & 316SS	$17.44
155 277 101		SLINGER -- 6" NIR & 316SS	$43.30
155 278 101		SPRING --6"(STRAIGHT,RD1, & RD2) & 8"(TYPE 1, 2, & 2.1) NIR & 316SS	$32.00
155 295 101		SLINGER -- 8"(TYPE 2 & 2.1)	$8.43
155 295 102		SLINGER, SHAFT -- 8"(TYPE 2 & 2.1) WATER WELL	$7.95
155 301 101		SEAL BUSHING -- 6" WATER WELL	$9.39
155 301 103		SEAL BUSHING -- 6"NIR & 316SS	$6.45
155 303 101		SPRING -- 8"(TYPE 1) NIR & 316SS	$68.34
155 316 101		RETAINER RING -- 4" -- 2 WIRE	$0.25
155 318 301		UPTHRUST WASHER -- 8"(TYPE 1)	$50.52
155 325 102	305 226 901	CONTACTOR -- 2 & 3 HP, DELUXE	$0.00
155 326 101	305 347 903	CONTACTOR -- 5 HP, DELUXE	$0.00
155 326 102	305 347 902	CONTACTOR -- 7.5 THRU 10 HP, DELUXE	$0.00
155 327 101	305 203 901	CAPACITOR, RUN -- 30 MFD; 370V	$0.00

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
155 327 102	305 203 902	CAPACITOR, RUN -- 35 MFD; 370V	$0.00
155 327 107	305 203 907	CAPACITOR, RUN -- 15 MFD; 370V	$0.00
155 327 108	305 203 908	CAPACITOR, RUN -- 23 MFD; 370V	$0.00
155 327 109	305 203 909	CAPACITOR, RUN -- 45 MFD; 370V	$0.00
155 327 114	305 203 914	CAPACITOR, RUN -- 40 MFD; 370V	$0.00
155 328 101	305 204 901	CAPACITOR, RUN -- 15 MFD; 370V	$0.00
155 328 102	305 204 902	CAPACITOR, RUN -- 10 MFD; 370V	$0.00
155 328 103	305 204 903	CAPACITOR, RUN -- 20 MFD; 370V	$0.00
155 330 101	305 233 902	SHAFT SEAL, STATIONARY -- 6" -- CARBON CERAMIC -- (KIT 305 233 902 CONTAINS BOTH)	$0.00
155 330 102	305 233 902	SHAFT SEAL, ROTATING -- 6" -- CARBON CERAMIC -- (KIT 305 233 902 CONTAINS BOTH)	
155 339 101		SEAL BUSHING -- 8"(TYPE 1 & 2.1) WATER WELL	$13.50
155 339 103		SEAL BUSHING -- 8"(TYPE 1 & 2.1) NIR & 316SS	$12.62
155 353 101		SLINGER -- 4" HT	$1.67
155 354 101		SHAFT SEAL COVER -- 4" HT, NIR & 316SS	$12.27
155 354 102		SHAFT SEAL COVER -- 4" HT WATER WELL	$5.15
155 369 121		RETAINER RING -- 4" HT, NIR, 316SS & OIL STRIPPER	$15.03
155 396 101		UPTHRUST WASHER -- 4" HT -- 1.125" BORE	$1.45
155 396 102		UPTHRUST WASHER -- 4" HT -- 0.750" BORE	$1.58
155 409 101		O'LOAD. RUN -- 10 HP (CIRCUIT BREAKER STYLE)	$167.94
155 409 102		O'LOAD. RUN -- 15 HP (CIRCUIT BREAKER STYLE)	$167.94
155 411 901		FILTER ASSEMBLY -- ALL MOTORS EXCEPT 4" SS	$1.82
155 412 101		THRUST ASSEMBLY, SEGMENT -- 6" 3500#	$25.64
155 429 101	305 347 901	CONTACTOR -- 15 HP	$0.00
155 449 101		SCREW, SHAFT HEIGHT ADJUSTING -- 6"	$8.43
155 451 101		GASKET -- 5"(RD1) WATER WELL	$3.01
155 451 201		GASKET -- 5"(RD1) NIR & 316SS	$7.81
155 461 102		O-RING -- 4" SS & PR -- 2-WIRE	$0.36
155 472 101		STUD -- 4" HT, NIR, 316SS & OIL STRIPPER	$9.89
155 496 101		SPRING -- 8"(TYPE 1) NIR & 316SS	$62.30

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
155 512 101		SHAFT SEAL -- 4" PR -- VITON	$27.21
155 525 101		DIAPHRAGM -- 6"(RD1) WATER WELL	$7.56
155 525 201		DIAPHRAGM -- 6" NIR & 316SS	$15.67
155 540 101		BUSHING -- 4" PR -- TEFZEL	$17.44
155 548 901		SCREW & WASHER ASSEMBLY -- 4" SS	$0.71
155 548 902		SCREW & WASHER ASSEMBLY -- 4" PR	$0.71
155 559 101		SPRING, DIAPHRAGM -- 6"(RD1) WATER WELL	$4.81
155 559 201		SPRING, DIAPHRAGM -- 6"(RD1) NIR & 316SS	$47.39
155 562 901		LEVELING WASHER -- 4" SS -- (1THRU 2 HP)	$5.78
155 563 101		THRUST ASSEMBLY, ROCKER WASHER-- 4"SS 1 THRU 2 HP 650#	$3.98
155 595 101		LEAD CLAMPING PLATE -- 8" -- #2AWG INDIVIDUAL LEADS	$26.70
155 612 103	305 233 901	SHAFT SEAL SET -- 6" -- SILICON CARBIDE	$0.00
155 639 201	305 196 901	LEAD SLEEVE -- 6" 316SS	$0.00
155 647 101		DIAPHRAGM COVER -- 4" HT	$16.21
155 649 101		CAPACITOR CLAMP, RUN CAP -- 1.5 THRU 15 HP CONTROL BOXES	$0.85
155 649 102		CAPACITOR CLAMP, START CAP -- 1.5 THRU 15 HP CONTROL BOXES	$0.85
155 658 901		THRUST ASSEMBLY, BEARING -- 4" 1500#	$40.52
155 660 101		THRUST ASSEMBLY, LEVELING DISC -- 4" 1500# BEARING	$9.82
155 690 202		DIAPHRAGM COVER -- 6"(RD2) NIR & 316SS	$73.40
155 691 102		DIAPHRAGM -- 6"(RD2) NIR & 316SS	$37.41
155 692 201		THRUST ASSEMBLY, SEGMENT -- 4" 1500# BEARING	$12.74
155 716 101		GASKET -- 4" SS	$1.82
155 739 101		UPTHRUST WASHER -- 8"(TYPE 2)	$4.70
155 740 101		GASKET -- 8"(TYPE 2 & 2.1) -- WATER WELL	$8.54
155 740 201		GASKET -- 8"(TYPE 2) 316SS	$12.02
155 752 101		SLINGER, SHAFT -- 8"(TYPE 2 & 2.1) WATER WELL	$8.86
155 754 102		SEAL BUSHING -- 8"(TYPE 2) 316SS	$44.88
155 755 102		SHAFT SEAL COVER -- 8"(TYPE 2) 316SS	$35.11
155 761 101		SCREW -- 6"(RD2) NIR & 316SS	$0.97
155 762 101		TERMINAL BLOCK 1 1/2 - 15 HP CB 6 POLE (Delux)	$41.48

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
155 762 102		TERMINAL BLOCK 1 1/2 - 10 HP CB 6 POLE (Std.)	$33.13
155 766 101		O-RING -- 4" HT	$3.48
155 811 101		PLUG -- 4" HT	$1.16
155 832 101	305 225 901	SHAFT SEAL, STATIONARY -- 8"(TYPE 1 & 2.1) -- SILICON CARBIDE -- (KIT 305 225 901 CONTAINS BOTH)	$0.00
155 832 102	305 225 901	SHAFT SEAL, ROTATING -- 8"(TYPE 1 & 2.1) SILICON CARBIDE -- (KIT 305 225 901 CONTAINS BOTH)	
155 837 101		NUT, JAM -- 4" -- 303SS	$6.49
155 941 101		UPTHRUST WASHER -- 8"(TYPE 2.1)	$6.71
156 132 101	305 203 907	CAPACITOR, RUN -- 15 MFD; 370 V	$0.00
156 132 102	305 203 908	CAPACITOR, RUN -- 23 MFD; 370 V	$0.00
156 324 101		GASKET, TOP END BELL -- 4"	$0.14
156 414 101		DIAPHRAGM COVER -- 4" SS	$5.79
177 146 905		THRUST HOUSING ASSEMBLY - 4"OLD STYLE HT WATER WELL	$125.95
177 154 902		END BELL ASSEMBLY, BOTTOM -- 4" HT OLD STYLE -- 1.125"BORE	$123.88
177 154 903		END BELL ASSEMBLY, BOTTOM -- 4" OLD STYLE HT -- (10HP)	$119.05
177 155 902		END BELL, TOP -- 4" HT	$54.38
177 230 901		END BELL, BOTTOM -- 4" SS	$24.16
177 230 907		END BELL, BOTTOM -- 4" SS -- (1THRU 2 HP)	$24.32
177 231 906	177 468 901	END BELL, TOP -- 4" SS - OBSOLETE	$0.00
177 233 906	177 469 901	END BELL, TOP -- 4" SS - OBSOLETE	$0.00
177 233 907		END BELL, TOP -- 4" SS & PR -- (1 THRU 2 HP)	$98.65
177 251 102		DIAPHRAGM COVER -- 8"(TYPE 1) WATER WELL	$233.05
177 257 901		END BELL ASSEMBLY -- 4" OLD STYLE HT -- 0.750" BORE	$83.37
177 258 901		THRUST ASSEMBLY, LEVELING DISC -- 6"(STRAIGHT) & 8"(TYPE 2 & 2.1) 3500#	$77.66
177 265 905		END BELL, TOP W/GROUND -- 6" -- WATER WELL	$203.68
177 267 901		DIAPHRAGM COVER -- 6"(STRAIGHT) WATER WELL	$120.20
177 268 901		THRUST HOUSING -- 6"(STRAIGHT) WATER WELL	$384.01
177 276 902		THRUST HOUSING -- 4" HT -- STAINLESS	$807.63
177 278 907		END BELL, TOP -- 8"(TYPE 1) 6" MOUNTING -- WATER WELL	$922.54
177 281 904		END BELL, TOP -- 6" NIR	$275.63

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
177 282 901		THRUST HOUSING -- 6"(STRAIGHT) NIR	$541.38
177 283 101		DIAPHRAGM COVER -- 6"(STRAIGHT) NIR	$203.93
177 285 151		DIAPHRAGM COVER -- 6"(STRAIGHT) 316SS	$479.29
177 296 902		END BELL ASSEMBLY -- 6" 316SS	$2,190.42
177 299 902		THRUST HOUSING -- 4" HT & NIR	$557.05
177 302 905		END BELL ASSEMBLY, TOP -- 8"(TYPE 1) 316SS -- SINGLE LEAD EXIT 40 THRU 125 HP	$4,954.33
177 302 906		END BELL, TOP -- 8"(TYPE 1) 316SS -- 180° LEAD EXIT 40 THRU 200 HP	$5,098.60
177 302 907		END BELL ASSEMBLY, TOP -- 8"(TYPE 1) 316SS -- SINGLE LEAD EXIT 150 THRU 200 HP	$4,971.31
177 305 102		DIAPHRAGM COVER -- 8"(TYPE 1) 316SS	$1,956.18
177 306 901		END BELL ASSEMBLY, BOTTOM -- 8"(TYPE 1)	$529.68
177 307 901		THRUST HOUSING -- 8"(TYPE 1) WATER WELL	$410.00
177 310 101		THRUST ASSEMBLY, LEVELING DISC -- 8"(TYPE 1) 10000#	$201.03
177 312 902		END BELL ASSEMBLY, TOP - 4" OLD STYLE HT WATER WELL -- 1.125" BORE	$165.21
177 313 902		END BELL ASSEMBLY, TOP - 4" OLD STYLE HT WATER WELL -- 0.750" BORE	$158.83
177 315 901		THRUST HOUSING -- 4" HT & OIL STRIPPER	$907.70
177 316 101		DIAPHRAGM COVER -- 4" HT & OIL STRIPPER	$648.57
177 318 901		END BELL ASSEMBLY, TOP -- 4" HT, NIR & OIL STRIPPER -- 1.125" BORE	$383.66
177 323 901		THRUST HOUSING ASSEMBLY -- 8"(TYPE 1) 316SS	$2,687.07
177 324 901		END BELL ASSEMBLY, TOP -- 4" HT, NIR & OIL STRIPPER -- 0.750" BORE	$324.73
177 327 901		END BELL ASSEMBLY, BOTTOM -- 6"(RD1) WATERWELL	$86.38
177 328 101		THRUST ASSEMBLY, LEVELING DISC -- 6"(RD1) 3500#	$8.30
177 329 901	305 096 901	THRUST ASSEMBLY -- 6"(RD1) 3500#	$0.00
177 330 101		THRUST BEARING, SEGMENT -- 6"(STRAIGHT) -- 8"(TYPE 2 & 2.1) 10000#	$31.38
177 333 931		END BELL ASSEMBLY, TOP -- 4" HT & 316 SS -- 1.125" BORE	$843.60
177 336 202		THRUST BEARING -- 6"(RD1) 6000# (MUSHROOM BEARING	$191.01
177 339 901		END BELL ASSEMBLY, TOP -- 4" HT & 316 SS -- 0.750" BORE	$555.47
177 350 901		THRUST HOUSING -- 6"(RD1) WATER WELL	$128.50
177 366 901		END BELL ASSEMBLY, TOP -- 8" -- 90 LEAD EXIT	$917.24
177 366 907		END BELL ASSEMBLY, TOP -- 8"(TYPE 1) -- SINGLE LEAD EXIT -- 150 THRU 200 HP	$916.74

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
177 366 909		END BELL ASSEMBLY, TOP -- 8"(TYPE 2.1) WATER WELL	$1,060.25
177 366 911		END BELL ASSEMBLY, TOP -- 8"(TYPE 2.1) WATER WELL	$1,061.54
177 369 901		THRUST HOUSING -- 6"(RD1) NIR	$923.49
177 378 901		THRUST HOUSING -- 4" HT	$84.50
177 379 901		END BELL, BOTTOM -- 4" HT -- 1.125" BORE	$47.46
177 379 902		END BELL, BOTTOM -- 4" HT -- 0.750" BORE	$46.31
177 380 901		END BELL, BOTTOM -- 8"(TYPE 2 & 2.1)	$315.09
177 382 101		DIAPHRAGM COVER -- 8"(TYPE 2 & 2.1) WATER WELL	$125.86
177 392 952		THRUST HOUSING -- 6"(RD2) NIR & 316SS	$232.79
177 393 901		END BELL, BOTTOM -- 6"(RD2) NIR & 316SS	$125.70
177 405 904		END BELL ASSEMBLY, TOP -- 8"(TYPE 2.1) 316SS	$3,796.63
177 413 901		END BELL ASSEMBLY, TOP -- 8"(TYPE 2) WATER WELL	$774.77
177 413 902		END BELL ASSEMBLY, TOP -- 8"(TYPE 2) WATER WELL -- 90 LEAD EXIT	$798.25
177 429 901		THRUST HOUSING -- 8"(TYPE 2 & 2.1) WATER WELL	$316.76
177 434 901		END BELL, TOP -- 4" HT -- 1.125" BORE	$55.57
177 446 901		END BELL, TOP -- 8" (TYPE 2) 316SS	$2,844.15
177 448 101		DIAPHRAGM COVER -- 8"(TYPE 2) 316SS	$540.54
177 468 901		END BELL, TOP -- 4" SS & PR -- (1/3 THRU 3/4 HP)	$93.77
177 468 902		END BELL, TOP -- 4" PR -- (1/3 THRU 3/4 HP)	$152.15
177 469 901		END BELL, TOP -- 4" SS -- (1 THRU 2 HP)	$26.63
177 469 903		END BELL, TOP -- 4" HT -- 0.750" BORE	$64.83
179 838 106		LEAD SLEEVING -- 4" -- NATVAR	$2.29
179 860 102		THRUST ASSEMBLY, BEARING -- 4" SS	$6.15
273 434 601		DIAPHRAGM -- 4" HT & OIL STRIPPER	$66.18
273 454 101		SPRING -- 4" HT & OIL STRIPPER	$104.80
275 157 356		SCREW, MACHINE -- 6"(RD1) WATER WELL	$0.25
275 244 102		PLUG, PIPE -- 4", 6" & 8" -- 316SS & NiR	$6.49
275 250 104		WOODRUFF KEY -- THRUST ASSEMBLY -- 1500# -- 4" & 6"	$0.36
275 250 110		WOODRUFF KEY -- THRUST ASSEMBLY -- 6000# & 10000# -- 6"(STRAIGHT) 6"(RD1) & 8"(TYPE 2 & 2.1)	$0.61
275 250 113		WOODRUFF KEY -- THRUST ASSEMBLY -- 10000# -- 8"(TYPE 1)	$1.32

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
275 295 207		SCREW, CAP -- 8"(TYPE 1) WATER WELL	$3.31
275 295 308		SCREW, CAP -- 8"(TYPE 2) WATER WELL	$3.49
275 295 310		SCREW, CAP -- 8"(TYPE 2.1) WATER WELL	$7.12
275 295 406		SCREW, CAP -- 8"(TYPE 1) WATER WELL -- 40 THRU 125 HP	$7.21
275 304 504		SCREW, CAP --6"(STRAIGHT) & 8" (TYPE 2 & 2.1) WATER WELL	$0.71
275 304 607		SCREW, CAP -- 6"(RD1) WATER WELL	$2.29
275 304 608		SCREW, CAP -- 8"(TYPE 2 & 2.1) WATER WELL	$3.01
275 306 104		SCREW, CAP -- 8"(TYPE 1) -- 316SS -- 3-LEAD -- 150 THRU 200 HP	$1.79
275 306 207		SCREW, CAP -- 6"(RD1) 316SS	$16.25
275 306 208		SCREW, CAP -- 8"(TYPE 2) 316SS	$7.48
275 306 404		SCREW, CAP -- 8"(TYPE 1) WATERWELL -- 3-LEAD -- 150 THRU 200 HP	$54.16
275 306 405		SCREW, CAP -- 8"(TYPE 1) NIR & 316SS -- 3-LEAD -- 150 THRU 200 HP	$54.16
275 336 303		SCREW, CAP -- 6" -- AIR CONDITIONING	$11.05
275 339 170		SCREW, CAP -- 4" HT	$1.93
275 339 305		SCREW, CAP -- 6" (STRAIGHT)	$1.82
275 401 454		SCREW -- 4" HT & OIL STRIPPER	$4.81
275 406 102	305 214 902	O'LOAD, MAIN -- 5 HP; 50 & 60 HZ -- (BRH00HD)	$0.00
275 406 103	305 214 903	O'LOAD, START -- 10 THRU 15 HP -- (BRH00HB)	$0.00
275 406 107	305 214 907	O'LOAD, MAIN -- 3 HP; 50 HZ -- (BRH29HB)	$0.00
275 406 120	305 214 920	O'LOAD, MAIN -- 3 HP -- (OLD STYLE) -- (BRH25JD)	$0.00
275 406 121	305 214 921	O'LOAD, MAIN -- 7.5 HP -- (BRH00DD)	$0.00
275 406 122	305 214 922	O'LOAD, MAIN -- 7.5 HP (BRC3935)	$0.00
275 411 102	305 215 902	O'LOAD, START -- 5 THRU 7.5 HP; 60 HZ & MAIN 2 HP; 50 HZ -- (CRJ31HB)	$0.00
275 411 106	305 215 906	O'LOAD, START -- 2 HP; 50 HZ -- (CRG70EB)	$0.00
275 411 107	305 215 907	O'LOAD, START -- 1.5 HP; 50 HZ & 2 THRU 3 HP; 50 HZ -- (CRG67JB)	$0.00
275 411 108	305 215 908	O'LOAD, START -- 3 HP -- (CRG50JB)	$0.00
275 411 113	305 215 913	O'LOAD, MAIN -- 2 HP -- (CSH16H)	$0.00
275 411 114	305 215 914	O'LOAD, MAIN -- 1.5 HP; 50 HZ -- (CRG71LB)	$0.00
275 411 115	305 215 915	O'LOAD, MAIN -- 3 HP -- (CSH00HD)	$0.00
275 461 101	305 205 901	CAPACITOR -- 250 - 300 MFD; 110V	$0.00

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
275 461 106	305 218 918	CAPACITOR -- 86 - 103 MFD; 220V	$0.00
275 461 107	305 205 907	CAPACITOR -- 105 - 126 MFD; 220V	$0.00
275 461 108	305 218 906	CAPACITOR -- 59 - 71 MFD; 220V	$0.00
275 461 122	305 205 922	CAPACITOR -- 159 - 191 MFD; 110V	$0.00
275 461 123	305 218 957	CAPACITOR -- 43 - 53 MFD; 220V	$0.00
275 463 111	305 206 911	CAPACITOR, START -- 208 - 250 MFD; 220V	$0.00
275 463 122	305 206 912	CAPACITOR, START -- 161 - 193 MFD; 330V	$0.00
275 464 105	305 207 905	CAPACITOR, START -- 59 - 71 MFD; 220V	$0.00
275 464 113	305 207 913	CAPACITOR, START -- 105 - 126 MFD; 220V	$0.00
275 464 118	305 207 918	CAPACITOR, START -- 86 - 103 MFD; 220V	$0.00
275 464 125	305 207 925	CAPACITOR. START -- 159 - 191 MFD; 110V	$0.00
275 464 126	305 207 926	CAPACITOR. START -- 43 - 53 MFD; 220V	$0.00
275 464 201	305 207 951	CAPACITOR. START -- 250 - 300 MFD; 125V	$0.00
275 468 115	305 208 915	CAPACITOR, START -- 189 - 227 MFD; 220V	$0.00
275 468 118	305 208 918	CAPACITOR, START -- 216 - 259 MFD; 330V	$0.00
275 468 119	305 208 919	CAPACITOR, START -- 270 - 324 MFD; 330V	$0.00
275 468 120	305 208 920	CAPACITOR, START -- 350 - 420 MFD; 330V	$0.00
275 470 114		CAPACITOR -- 108 - 130 MFD; 220V	$25.54
275 542 102		WASHER -- 4" SS & HT	$0.06
275 546 113		LOCKWASHER -- 6" & 8"(TYPE 2 & 2.1) WATER WELL	$0.49
275 546 115		LOCKWASHER -- 8"	$1.07
275 547 109		LOCKWASHER -- 6"(STRAIGHT) & 8"(TYPE 2) 316SS	$0.49
275 547 113		LOCKWASHER -- 6"& 8"(TYPE 2 & 2.1) NIR & 316SS	$0.61
275 563 102		NUT, HEX -- 4" HT, 316SS, NIR & OIL STRIPPER	$0.85
275 572 109		LOCKWASHER -- 8"(TYPE 2 & 2.1) WATER WELL	$0.06
275 572 111		LOCKWASHER -- 8"(TYPE 2) WATER WELL	$0.25
275 606 111		LOCKWASHER -- 8"(TYPE 2) 316SS	$0.61
275 606 115		LOCKWASHER -- 8"(TYPE 1) NIR & 316SS	$1.82
275 623 453		THRUST ASSEMBLY, ROLL PIN -- 6" 1500#	$0.25
275 743 132		O-RING -- 4" HT (10HP ONLY)	$0.61

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
275 743 133		O-RING -- 4"	$0.49
275 743 144		O-RING -- 6" -- ROTOR CENTER BEARING	$0.38
275 743 146		O-RING -- 6"	$0.61
275 743 152		O-RING -- 6"	$0.85
275 744 125		O-RING -- 4" HT	$0.61
275 744 131		O-RING -- 6" -- AIR CONDITIONING MOTOR	$0.85
275 744 136		O-RING -- 4" HT	$0.97
275 744 138		O-RING -- 8"(TYPE 2 & 2.1)	$0.67
275 744 149		O-RING -- 6"(RD1) 316SS	$2.42
275 744 151		O-RING -- 8"(TYPE 2 & 2.1)	$1.28
275 746 114		O-RING -- 8"	$4.45
275 756 132		RETAINER RING -- 8"(TYPE 1)	$0.98
275 866 133		O-RING -- 4" -- VITON	$4.70
275 868 115		O-RING -- 4" PR -- 2 WIRE	$1.58
275 898 403		SCREW, CAP -- 8"(TYPE 1)	$3.83
275 943 251		SCREW, CONTROL BOX -- CAPACITOR CLAMP -- 1.5 HP THRU 15 HP	$0.08
275 978 354		SCREW, ROUND HEAD	$0.71
275 984 207		SCREW, CAP -- 8"(TYPE 1) NIR & 316SS	$2.42
275 984 308		SCREW, CAP -- 8"(TYPE 2) 316SS	$5.05
275 984 310		SCREW, CAP -- 8"(TYPE 2.1) 316SS	$7.12
275 984 406		SCREW, CAP HEX -- 8"(TYPE 1) NIR & 316SS	$10.70
276 000 101		SCREW -- 8"(TYPE 1) WATER WELL	$0.08
276 000 152		SCREW -- 8"(TYPE 2 & 2.1)	$0.08
276 000 201		LOCKWASHER -- 6" & 8"(TYPE 1) WATER WELL	$0.36
276 019 204		SCREW, SELF TAPPING -- 6"(STRAIGHT & RD1) WATER WELL	$0.25
276 020 202		SCREW -- 6"(RD1) NIR & 316SS	$0.61
276 020 253		SCREW -- 8"(TYPE 1) NIR & 316SS	$0.61
276 020 255		SCREW -- 6"(RD1) NIR & 316SS	$0.49
276 040 316		SCREW, CAP -- 6"(RD2) 316SS	$6.97
276 066 202		SCREW, CONTROL BOX	$0.25

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
276 066 204		SCREW, CONTROL BOX	$0.08
279 874 316		SCREW, CAP -- 6"(RD2) 316SS	$7.09
279 926 656		SCREW, CAP -- 6"(RD1) WATER WELL	$5.51
279 927 656		SCREW, CAP -- 6"(RD2) 316SS	$20.21
305 010 901		THRUST ASSEMBLY KIT -- 4" HT(ALL RATINGS EXCEPT 10 HP)	$125.86
305 011 904		END BELL KIT -- 4"OLD STYLE HT -- TOP -- 1.125"BORE	$414.91
305 011 905		END BELL KIT -- 4"OLD STYLE HT -- TOP -- 0.750"BORE	$402.05
305 027 903		MOTOR SEAL KIT -- 4" HT	$42.14
305 028 905		CASTING & SEAL KIT -- 6"(STRAIGHT) WATER WELL	$869.61
305 028 906		CASTING & SEAL KIT -- 6"(RD1) WATER WELL	$544.75
305 029 907		MOTOR SEAL KIT -- 6"(RD1) WATER WELL	$93.50
305 045 902		MOTOR SEAL KIT -- 4" SS	$30.94
305 046 904		END BELL KIT -- 4" SS -- (1 THRU 2 HP)	$121.03
305 047 902		END BELL KIT -- 4" SS -- 1/3 THRU 3/4 HP	$115.84
305 049 901		THRUST BEARING KIT -- 4" SS (1/3 THRU 3/4 HP) 300#	$29.37
305 075 901		SLEEVE BEARING KIT -- 6"	$51.11
305 075 903		SLEEVE BEARING KIT, UPPER -- 8"(TYPE 1 & 2.1)	$163.25
305 075 904		SLEEVE BEARING KIT, LOWER -- 8"(TYPE 2 & 2.1)	$123.31
305 079 101		REBUILD/SERVICE TOOL, VACUUM FILLING TOOL -- ALL BUT 4" SS (TY-111-37)	$413.44
305 079 103		REBUILD/SERVICE TOOL, VACUUM FILLING RESERVOIR -- 4" SS (RK-6-5)	$261.69
305 079 104		REBUILD/SERVICE TOOL, HAND FILLING SYRINGE (RK-6-10)	$276.53
305 079 105		REBUILD/SERVICE TOOL, SHAFT HEIGHT GAUGE -- 4" (RK-8-3)	$191.38
305 079 111		REBUILD/SERVICE TOOL, DIAPHRAM DEPTH GAUGE -- 4" HT (RK-8-13A)	$110.25
305 079 112		REBUILD/SERVICE TOOL, CHECK VALVE INSERT TOOL (RK-8-14)	$347.37
305 079 117		REBUILD/SERVICE TOOL, SHAFT HEIGHT GAUGE -- 6"(RK10-8)	$295.49
305 079 122		REBUILD/SERVICE TOOL, SEAL COVER INSERT TOOL -- 6"(AT-111-88)	$992.53
305 079 123		REBUILD/SERVICE TOOL, SHAFT HEIGHT GAUGE -- 8"(GMG-111-20-DET1)	$1,330.93
305 079 124		REBUILD/SERVICE TOOL, SHAFT HEIGHT SET MASTER -- 8"(GMG111-20-DET 2)	$799.31
305 079 127		REBUILD/SERVICE TOOL, DIAPHRAM PLATE POSITION GAUGE -- 8"(GMM-111-17-GR1)	$341.10
305 079 128		REBUILD/SERVICE TOOL, SHAFT CLAMPING TOOL -- 8"(TY-111-76)	$902.30

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
305 079 132		REBUILD/SERVICE TOOL, SEAL & SEAL COVER INSERTION TOOL -- 4"(RK 12-1S)	$306.81
305 079 135		REBUILD/SERVICE TOOL, SEAL & SEAL COVER INSERTION TOOL -- 8"(AT-111-97)	$330.75
305 079 138		REBUILD/SERVICE TOOL, DIAPHRAGM DEPTH GAUGE -- 8"(TYPE 2) (GMM-111-18)	$234.61
305 085 901		FILL SOLUTION -- USE 151 300 907 - ALL MODELS	$0.00
305 086 903		MOTOR SEAL KIT -- 8"(TYPE 1) 6" MOUNTING -- WATER WELL	$198.87
305 086 905		MOTOR SEAL KIT -- 8"(TYPE 1) 316SS -- 40 THRU 100 HP	$642.21
305 086 906		MOTOR SEAL KIT -- 8"(TYPE 1) WATER WELL -- 125 THRU 175HP	$415.07
305 086 907		MOTOR SEAL KIT -- 8"(TYPE 1) 316SS -- 125 THRU 175HP	$725.58
305 086 908		MOTOR SEAL KIT -- 8"(TYPE 1) WATER WELL -- 200HP	$426.37
305 086 909		MOTOR SEAL KIT -- 8"(TYPE 1) 316SS -- 200HP	$757.59
305 087 902		THRUST BEARING KIT -- 8"(TYPE 1) 10000#	$1,586.36
305 091 901		O'LOAD KIT -- 1/3 HP; 115V	$14.14
305 091 902		O'LOAD KIT -- 1/3 HP; 230V	$10.01
305 091 903		O'LOAD KIT -- 1/2 HP; 115V	$27.56
305 091 904		O'LOAD KIT -- 1/2 HP; 230V	$9.42
305 091 905		O'LOAD KIT -- 3/4 HP; 230V	$9.82
305 091 906		O'LOAD KIT -- 1 HP; 230V	$9.48
305 094 901		THRUST BEARING KIT -- 4" SS (1THRU 2 HP) 650#	$39.83
305 095 901		THRUST BEARING KIT -- 6" 1500#	$358.31
305 095 902		THRUST BEARING KIT -- 6" 3500#	$187.43
305 095 903		THRUST BEARING KIT -- 6"(RD1) 6000#	$552.34
305 096 901		THRUST BEARING KIT -- 6" 3500# (PACKED THRUST BEARING)	$88.77
305 098 901		LEAD ASSEMBLY KIT -- 4" (2 WIRE LEAD KIT)	$79.51
305 098 902		LEAD ASSEMBLY KIT -- 4" (3 WIRE LEAD KIT)	$77.60
305 100 901		O'LOAD KIT -- 1/3 HP; 115V (QD RELAY)	$27.21
305 100 902		O'LOAD KIT -- 1/3 HP; 230V (QD RELAY)	$34.44
305 100 903		O'LOAD KIT -- 1/2 HP; 115V (QD RELAY)	$27.21
305 100 904		O'LOAD KIT -- 1/2 HP; 230V (QD RELAY)	$27.21
305 100 905		O'LOAD KIT -- 3/4 HP; 230V (QD RELAY)	$47.17
305 100 906		O'LOAD KIT -- 1 HP; 230V (QD RELAY)	$46.84

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
305 101 901		RELAY KIT, QD -- 1/3 HP; 230V	$48.01
305 101 902		RELAY KIT, QD -- 1/2 HP; 230V	$48.01
305 101 903		RELAY KIT, QD -- 3/4 HP; 230V	$48.01
305 101 904		RELAY KIT, QD -- 1 HP; 230V	$48.01
305 101 905		RELAY KIT, QD -- 1/3 HP; 115V	$41.58
305 101 906		RELAY KIT, QD -- 1/2 HP; 115V	$41.58
305 102 901		RELAY KIT, VOLTAGE -- 115V; 60 HZ	$52.77
305 102 902		RELAY KIT, VOLTAGE -- 230V; 60 HZ	$52.77
305 102 903		RELAY KIT, VOLTAGE -- 200V; 60 HZ	$52.77
305 103 901		THRUST BEARING KIT -- 8"(TYPE 2 & 2.1) 10000#	$513.59
305 104 902		MOTOR SEAL KIT -- 8"(TYPE 2.1) WATER WELL	$320.02
305 105 901		RELAY KIT, QD CRC -- 1/2 HP; 230V	$46.32
305 105 902		RELAY KIT, QD CRC -- 3/4 HP; 230V	$46.32
305 105 903		RELAY KIT, QD CRC -- 1 HP; 230V	$46.78
305 196 901		LEAD ASSEMBLY KIT -- 6" (#8AWG LEAD KIT)	$129.21
305 197 901		LEAD ASSEMBLY KIT -- 8" (#4AWG LEAD KIT)	$349.62
305 198 901		LEAD ASSEMBLY KIT -- 8" (#8AWG LEAD KIT)	$124.76
305 203 901		CAPACITOR KIT, RUN -- 30 MFD; 370V	$36.34
305 203 902		CAPACITOR KIT, RUN -- 35 MFD; 370V	$40.15
305 203 907		CAPACITOR KIT, RUN -- 15 MFD; 370V	$23.46
305 203 908		CAPACITOR KIT, RUN -- 23 MFD; 370V	$39.83
305 203 909		CAPACITOR KIT, RUN -- 45 MFD; 370V	$45.81
305 204 901		CAPACITOR KIT, RUN -- 15 MFD; 370V	$27.21
305 204 902		CAPACITOR KIT, RUN -- 10 MFD; 370V	$24.87
305 204 903		CAPACITOR KIT, RUN -- 20 MFD; 370V	$29.84
305 205 901		CAPACITOR KIT -- 250 - 300 MFD; 110V	$22.00
305 205 907		CAPACITOR KIT -- 105 - 126 MFD; 220V	$33.44
305 205 922		CAPACITOR KIT -- 159 - 191 MFD; 110V	$21.56
305 206 911		CAPACITOR KIT, START -- 208 - 250 MFD; 220V	$43.65
305 206 912		CAPACITOR KIT, START -- 161 - 193 MFD; 330V	$48.63

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
305 207 905		CAPACITOR KIT, START -- 59 - 71 MFD; 220V	$25.29
305 207 913		CAPACITOR KIT, START -- 105 - 126 MFD; 220V	$30.19
305 207 918		CAPACITOR KIT, START -- 86 - 103 MFD; 220V	$29.15
305 207 925		CAPACITOR KIT, START -- 159 - 191 MFD; 110V	$22.49
305 207 926		CAPACITOR KIT, START -- 43 - 53 MFD; 220V	$24.78
305 207 951		CAPACITOR KIT. START -- 250 - 300 MFD; 125V	$25.64
305 208 915		CAPACITOR KIT, START -- 189 - 227 MFD; 220V	$49.46
305 208 918		CAPACITOR KIT, START -- 216 - 259 MFD; 330V	$57.14
305 208 919		CAPACITOR KIT, START -- 270 - 324 MFD; 330V	$83.51
305 208 920		CAPACITOR KIT, START -- 350 - 420 MFD; 330V	$83.35
305 213 901		RELAY, VOLTAGE -- 115V; 60 HZ	$52.08
305 213 902		RELAY, VOLTAGE -- 230V; 60 HZ	$52.08
305 213 903		RELAY, VOLTAGE -- 208V; 60 HZ	$52.08
305 213 904		RELAY, VOLTAGE -- 208V; 60 HZ	$67.15
305 213 912		RELAY, VOLTAGE -- 220V; 50 HZ	$52.08
305 213 961		RELAY, VOLTAGE -- 230V; 60 HZ; HEAVY DUTY > 7.5 HP	$67.38
305 214 902		O'LOAD KIT, RUN -- 5 HP; 50 & 60 HZ -- (BRHOOHD)	$29.00
305 214 903		O'LOAD KIT, START -- 10 THRU 15 HP -- (BRH00HB)	$29.00
305 214 907		O'LOAD KIT, MAIN -- 3 HP; 50 HZ -- (BRH29HB)	$31.63
305 214 920		O'LOAD KIT, MAIN -- 3 HP -- (OLD STYLE) -- (BRH25JD)	$28.40
305 214 921		O'LOAD KIT, MAIN -- 7.5 HP -- (BRH00DD)	$29.00
305 214 922		O'LOAD KIT, RUN -- 7.5 HP -- (BRC3935)	$26.63
305 215 902		O'LOAD KIT, START -- 5 THRU 7.5 HP; 60 HZ & MAIN 2 HP; 50 HZ -- (CRJ31HB)	$13.02
305 215 906		O'LOAD KIT, START -- 2 HP; 50 HZ -- (CRG70EB)	$12.02
305 215 907		O'LOAD KIT, START -- 1.5 HP; 60 HZ & 2 THRU 3 HP; 50 HZ -- (CRG67JB)	$11.30
305 215 908		O'LOAD KIT, START -- 3 HP -- (CRG50JB)	$11.30
305 215 913		O'LOAD KIT, MAIN -- 2 HP -- (CSH16H)	$16.19
305 215 914		O'LOAD KIT, MAIN -- 1.5 HP; 50 HZ -- (CRG71LB)	$11.30
305 215 915		O'LOAD KIT, MAIN -- 3 HP -- (CSH00HD)	$12.31
305 215 917		O'LOAD KIT, START -- 2 HP	$12.13

Submersible Motor Parts

PART NO.	USE KIT NUMBER	DESCRIPTION	LIST
305 215 918		O'LOAD KIT, START -- 3 HP	$13.21
305 215 919		O'LOAD KIT, START -- 5 HP	$13.11
305 218 906		CAPACITOR/O'LOAD KIT -- 3/4 HP; 220V; 50 HZ	$31.04
305 218 918		CAPACITOR/O'LOAD KIT -- 1 HP; 220V; 50 HZ	$35.70
305 218 946		CAPACITOR/O'LOAD KIT -- 1.5 HP; 230V	$28.84
305 218 957		CAPACITOR/O'LOAD KIT -- 1/2 HP; 220V; 50 HZ	$29.09
305 218 973		CAPACITOR/O'LOAD KIT -- 1/3 HP; 115V	$21.40
305 218 974		CAPACITOR/O'LOAD KIT -- 1/3 HP; 230V	$21.37
305 218 975		CAPACITOR/O'LOAD KIT -- 1/2 HP; 115V	$33.08
305 218 976		CAPACITOR/O'LOAD KIT -- 1/2 HP; 230V	$22.39
305 218 978		CAPACITOR/O'LOAD KIT -- 3/4 HP; 230V	$25.10
305 218 979		CAPACITOR/O'LOAD KIT -- 1 HP; 230V	$21.53
305 218 980		CAPACITOR/O'LOAD KIT -- 1.5 HP; 230V	$28.90
305 225 901		SHAFT SEAL KIT, STATIONARY & ROTATING -- 6"(TYPE 1, 2 & 2.1) -- SILICON CARBIDE	$288.73
305 226 901		CONTACTOR KIT -- 2 & 3 HP, DELUXE	$103.79
305 233 901		SHAFT SEAL KIT, STATIONARY & ROTATING -- 6" -- SILICON CARBIDE	$224.95
305 233 902		SHAFT SEAL KIT, STATIONARY & ROTATING -- 6" -- CARBON CERAMIC	$58.49
305 234 901		SHAFT SEAL KIT -- 8" TYPE 2 -- SILICON CARBIDE	$288.73
305 320 901		MOTOR SEAL KIT -- 4" HT WATER WELL	$49.78
305 321 901		THRUST BEARING KIT -- 4" HT 1500# BEARING	$127.34
305 347 901		CONTACTOR KIT -- 15 HP	$571.23
305 347 902		CONTACTOR KT -- 7.5 THRU 10 HP, DELUXE	$318.11
305 347 903		CONTACTOR KIT -- 5 HP, DELUXE	$144.96

** SPECIAL FAMS PROCESS REQUIRED - PLEASE CONSULT FACTORY

Franklin Electric
400 East Spring Street • Bluffton, IN 46714
Tel: 260.824.2900 Fax: 260.824.2909
www.franklin-electric.com

M1483 02-07