FILE FOLDER

DESCRIPTION ON TAB:

R.R. Well 227

☑ **Outside/inside of actual folder did not contain hand written information**

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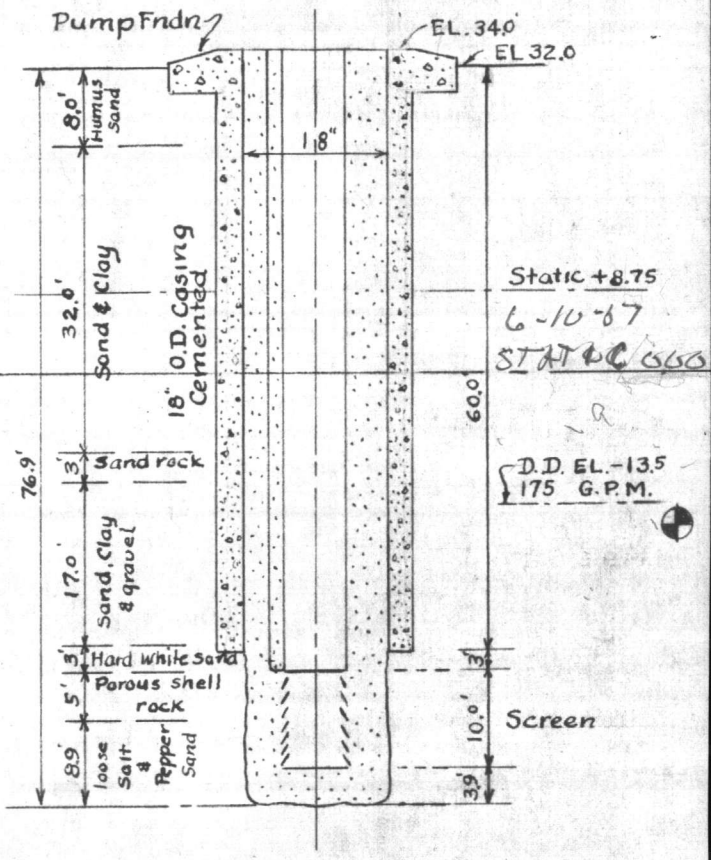
***Scanned as next image**

Confidential Records Management, Inc.
New Bern, NC
1-888-622-4425
9/08

150 G.P.M. DUAL DRIVE - 10 H.P.



EXISTING PUMP OPERATION
TEST NOV. 1944

RIFLE RANGE WELL T-1

Pulled Cleaned & RR225
Repaired
installed blow off

6/1/77

4/5/79

ES-200

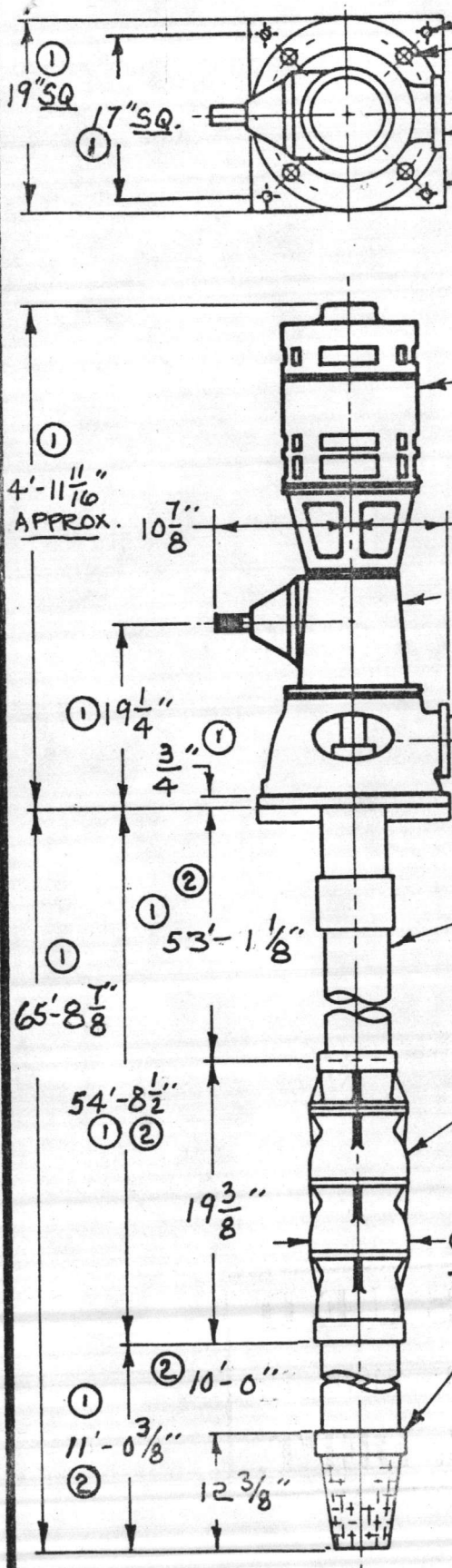
MEASURED STATIC 30'

WHEN PUMP WAS PULLED LAST

RR227

installed at Bldg 1167

JOHNSTON VERTICAL TURBINE PUMP



4 5/8" DIA. HOLES ①

4— 5/8 " DIA. HOLES ON 17 3/4" B.C.

① 6 " x 125# ANSI DISCHARGE FLANGE

SUB-BASE - C.I.

CONDITIONS:

U.S. GALLONS PER MINUTE— 150

TOTAL DYNAMIC HEAD IN FT.— 130

LIQUID— WATER

SPEC. GRAV. 1.0 @ AMB. °F. TEMP.

GENERAL ELECTRIC

VERTICAL HOLLOW SHAFT MOTOR

HP— 10 PHASE— 3 CYCLE— 60

① VOLTAGE— 230/460 RPM— 1800

ENCLOSURE— W. P. - 1

③ W/ 1 F RIGID FLG'D. CPLG.

AMARILLO RIGHT ANGLE COMBINATION

GEAR DRIVE MODEL—G-20 RATIO—

DRIVER RPM—1800 PUMP RPM—3600

SHAFT DIA.— 1 1/4" KEYWAY 5/16" x 5/32"

(GEAR MAY BE ROTATED 90°)

① TYPE "JTA" DISCHARGE HEAD— 12" x 6"

COLUMN ASSEMBLY— 5" x 1"

① BOWL ASSEMBLY— 3 STAGE 6BS

W/5" N.P.T. SUCTION CASE

① SUCTION PIPE & CONE STRAINER— 5" N.P.T.

CONE STRAINER 304 S.S.

CUSTOMER BASE DISBURSING OFFICER

PO# M67001-77-M-5691

DEALER

PO#

JOHNSTON SERIAL NO. TK 2248

JOHNSTON QUOTATION NO.

NOTE: DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED

THIS PRINT CERTIFIED CORRECT BY JOHNSTON PUMP COMPANY

Original Signed by H. A. J. GREUTINK

JOHNSTON PUMP CO.
GLENDORA, CALIFORNIA

H-1868-A

① REV. FCL 1-4-78 ② REV. 3-6-78 FCL ③ REV. 3-31-78 FCL

CERTIFIED BY: _____

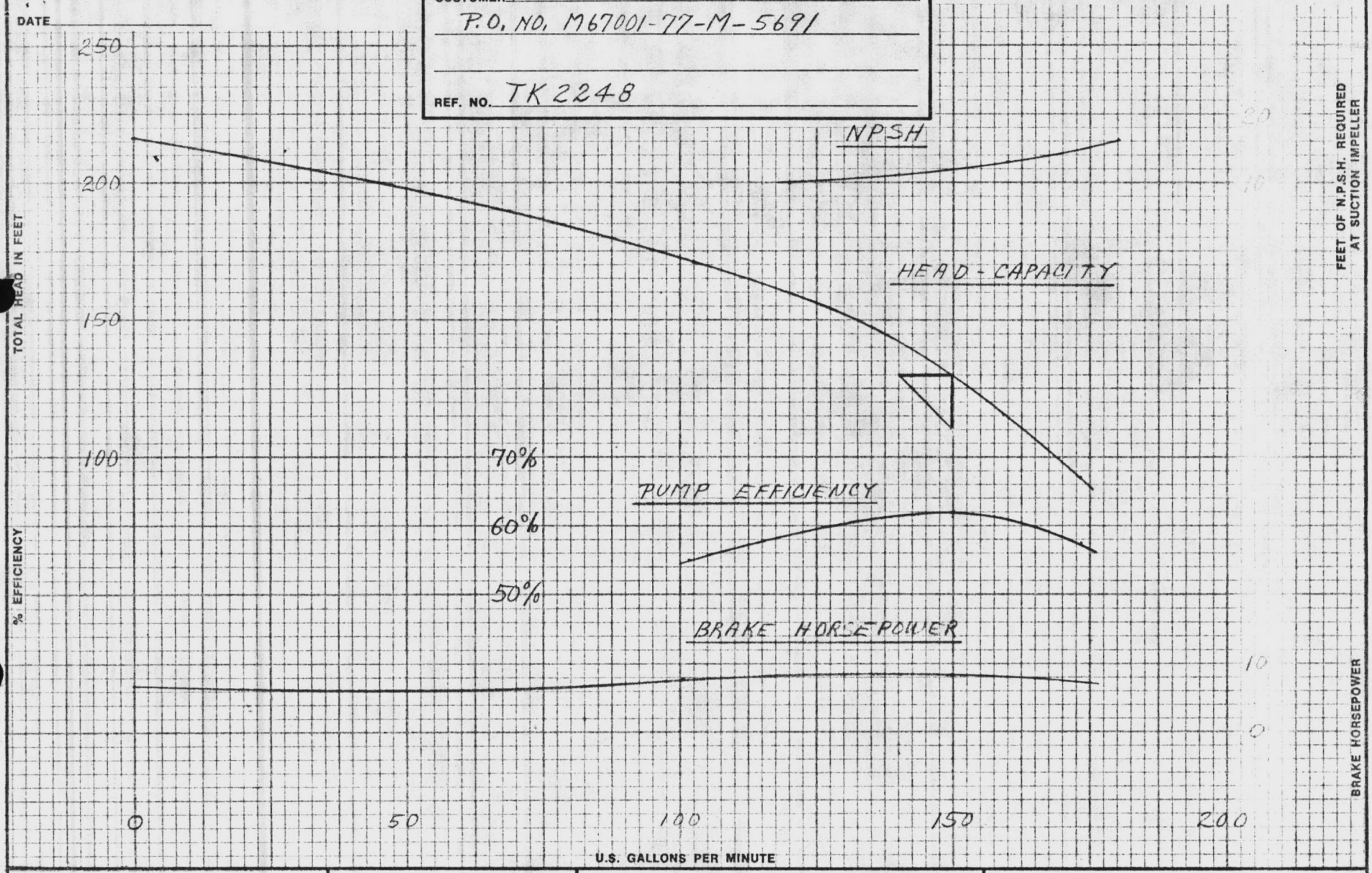
DATE _____

CUSTOMER MCB CAMP LE JEUNE

P.O. NO. M67001-77-M-5691

REF. NO. TK 2248

7" SUBMERGENCE REQ'D OVER BELL TO PREVENT VORTEXES BASED ON SUMP DESIGN PER HYDRAULIC INSTITUTE STDS.



THE CAPACITY, HEAD AND EFFICIENCY GUARANTEE IS FOR THE DESIGNATED POINT ONLY: IT IS BASED ON SHOP TESTS. WHEN HANDLING CLEAR, FRESH WATER AT A TEMPERATURE OF NOT OVER 85° F. AND UNDER SUCTION CONDITIONS AS SPECIFIED IN THE CONTRACT.

IMPELLER BRZ DIA. _____

BOWLS C. I. - VIT.

LIQUID WATER

SP. GR. 1.0

DATE 10-24-77 BY T.C.

Johnston Pump Company
Glendora, California 91740
ESTABLISHED 1909

TURBINE PUMP PERFORMANCE

3 STAGE 6 BS PUMP

3500 R.P.M.

INCLUDES 3% GEAR LOSS

JP-157A

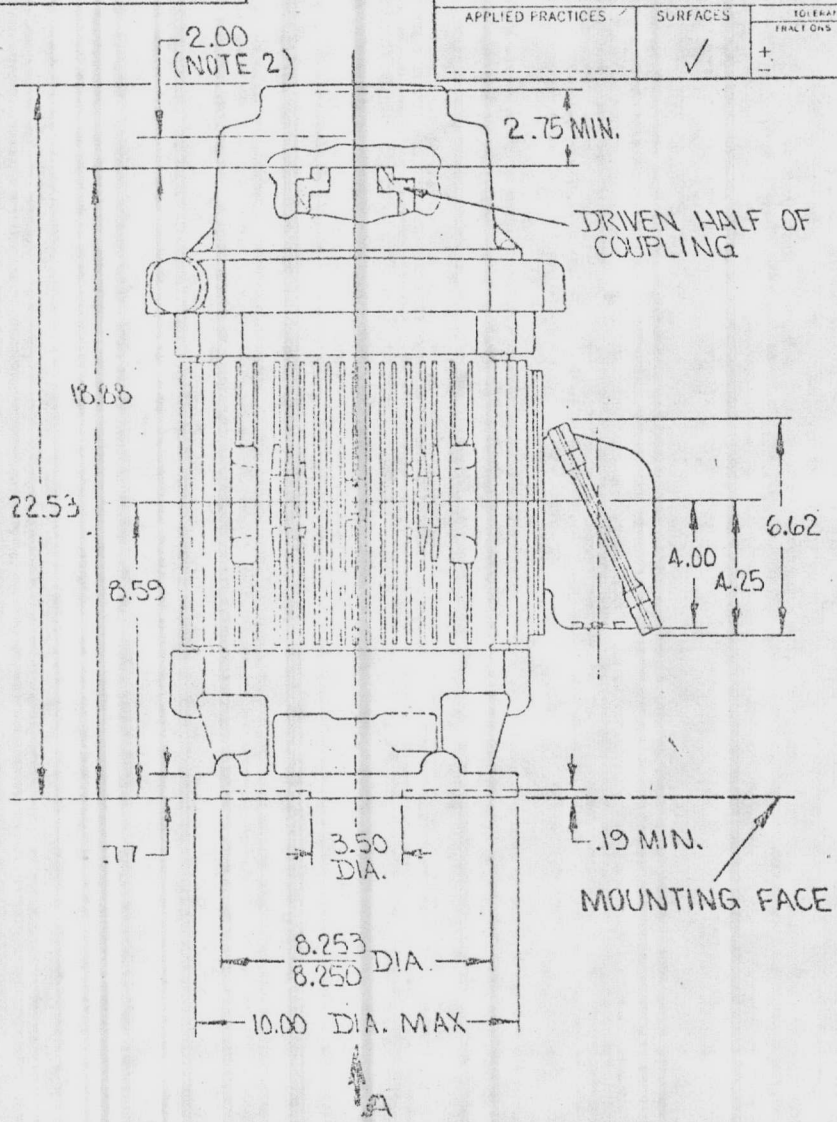
GENERAL ELECTRIC

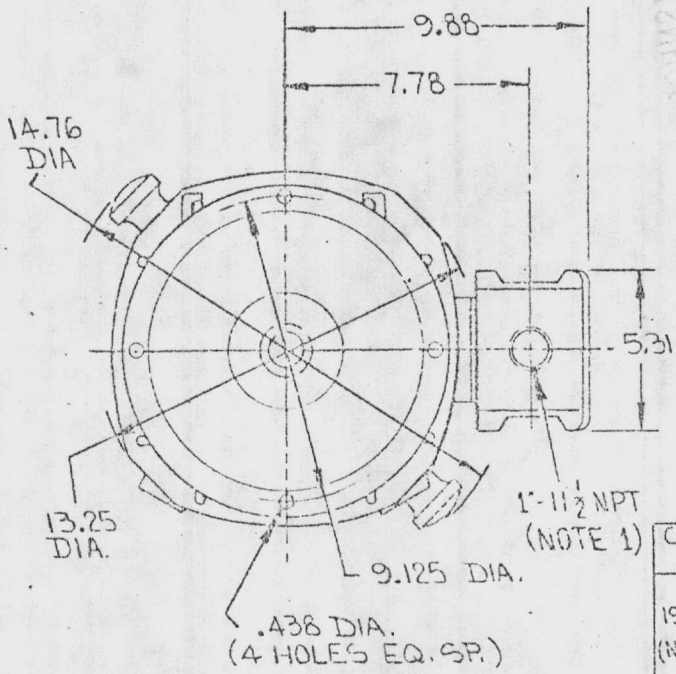
193B2601AA

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —
APPLIED PRACTICES | SURFACES ✓ | TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± | DECIMALS ± | ANGLES ±

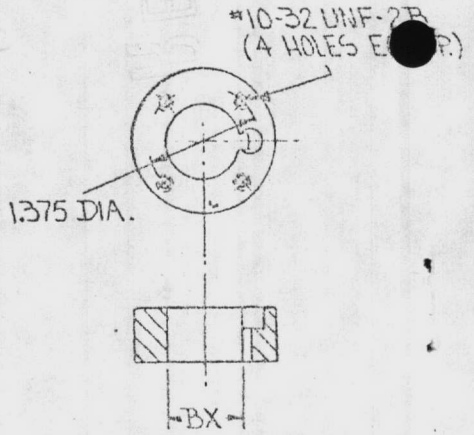
REV NO 193B2601AA

TITLE OUTLINE — HOLLOW SHAFT
FIRST MADE FOR 210 FR · VERT. · OPEN · 'P' BASE





VIEW AT ARROW "A"



DRIVEN HALF OF COUPLING

COUPLING KIT	GR	BORE DIA BX	KEYWAY W	KEYWAY D
192B9950AA (NON-REVERSE)	1	1.002 / 1.001	.250	.125
	2	.939 / .938		
	3	.877 / .876		
	4	.752 / .751	.188	.094
192B9950AC SELF-RELEASE & BOLTED	1	1.002 / 1.001	.250	.125
	2	.939 / .938		
	3	.877 / .876		
	4	.752 / .751	.188	.094

NOTE 1- CONDUIT BOX MAY BE ASSEMBLED WITH ENTRANCE UP, DOWN, OR TO EITHER SIDE.

NOTE 2- THE TOTAL HEIGHT OF PUMP SHAFT & LOCKING NUT ABOVE TOP OF COUPLING, MUST NOT EXCEED THIS DIMENSION.

REVISIONS

1	C. FIELD	REVISED PER 12-13-76 XX-76-413
2	M. SINCLAIR 2-7-77	MM77-101-E

PRINTS TO

DRAWN C. Field Sept 11, 1976	APPROVED	S.A.C.M & G	193B2601AA
ISSUED Sept. 13, 1976	D.W.	NASHVILLE	

FORM A-4
(JUNE '66)

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
OFFICE OF WATER DATA COORDINATION
INVENTORY OF HYDROLOGIC DATA STATIONS
QUALITY OF WATER

APPROVED.
Budget Bureau No. 42-R1485
Approval Expires June 30, 1968

1. AGENCY CODE	2. TYPE	3. LATITUDE	4. LONGITUDE	5.
MC	Q	° ' " N: 34 35 16	° ' " W: 77 26 40	

6. AGENCY STATION NO.	7. STATION NAME
RR227	RR85-T1

8. DRAINAGE BASIN CODE No.	Letter	9. STATE CODE	10. COUNTY CODE	11. COUNTY NAME
6	N	32	133	ONSLOW

12. PERIOD OF RECORD Began	Discontinued	Y	Continuous / Interruption Exceeds 1 Year	13.	14.
1943					

15. SITE

- [ ] 101 Stream
- [ ] 102 Canal
- [ ] 103 Lake
- [ ] 104 Reservoir
- [ ] 105 Estuary
- [ ] 106 Spring
- [X] 107 Well
- [ ] 110 Other

16. FREQUENCY OF MEASUREMENT

- [ ] 201 Continuous Recorder
- [ ] 202 Telemetered
- [ ] 203 Daily
- [ ] 204 Weekly
- [ ] 205 Monthly
- [ ] 206 Quarterly
- [ ] 207 Seasonal
- [ ] 208 Annual
- [ ] 209 Other Periodic
- [X] 210 Occasional

17. TYPES OF DATA AVAILABLE

Physical
- [ ] 311 Temperature
- [ ] 312 Specific Conductance
- [ ] 313 Turbidity
- [ ] 314 Color
- [ ] 315 Odor
- [ ] 316 Radioactivity
- [ ] 317 pH (field)
- [X] 818 pH (lab)
- [ ] 319 Eh
- [ ] 320 Other

Chemical
- [ ] 331 Dissolved solids
- [X] 332 Chlorides Only
- [ ] 333 Nutrients (Nitrogen and phosphorus compounds)
- [ ] 334 Common ions
- [X] 335 Hardness
- [ ] 336 Radiochemical
- [ ] 337 Dissolved oxygen
- [ ] 338 Other Gases
- [ ] 339 Other

Organic
- [ ] 351 Pesticides (insecticides, herbicides, etc.)
- [ ] 352 Synthetic detergents
- [ ] 353 Other

Biologic
- [ ] 361 Coliforms
- [ ] 362 Other Micro-organisms
- [ ] 363 BOD
- [ ] 364 Other

Sediment
- [ ] 371 Concentration
- [ ] 372 Particle size
- [ ] 373 Other

18. SUPPLEMENTARY DATA FOR SITE

- [ ] 421 Surface Water Station
- [ ] 422 Ground Water Station
- [ ] 423 Water Stage or Level
- [X] 424 Water discharge
- [ ] 425 Time of Travel
- [ ] 426 Drainage Area

19. STORAGE OF DATA

- [ ] 501 Periodic Report
- [ ] 502 Areal Report
- [X] 503 Not Published
- [ ] 504 Data on Punchcard
- [ ] 505 Data on Magnetic Tape
- [ ] 506 Other

20. OFFICE AT WHICH DATA AVAILABLE

Office: BASE MAINTENANCE DEPARTMENT

Street No.: MARINE CORPS BASE

City, State, Zip: CAMP LEJEUNE, N. C. 28542

City Code: 0735

21. OFFICE COMPLETING FORM

BASE MAINTENANCE DEPARTMENT

22. COMPILER'S NAME

23. DATE Month: 09 Year: 1966

INSTRUCTIONS

TRI/CLAD® VERTICAL INDUCTION MOTORS HIGH THRUST, HOLLOW AND SOLID SHAFT, "P" BASE

FRAMES C254-C286, D254-D286, K254-K286, L213-L215 OPEN ENCLOSURES

Well 227 RR

INTRODUCTION

General Electric vertical motors covered by these instructions are carefully constructed of high-quality materials and are designed to give long periods of trouble-free service when properly installed and maintained.

Standard high-thrust motors (see Fig. 1) are generally used to drive pumps, and, as their name implies, have provisions for accepting the axial thrust load imposed by the driven machine. They may be of either hollow or solid-shaft construction. Figure 2 shows a typical hollow-shaft motor. The solid-shaft construction is similar except that the top half coupling is omitted, and the motor shaft extends out the bottom of the motor. This standard construction is for high continuous down-thrust and is good for momentary up-thrust only in the magnitude of 30 percent of the rated down-thrust.

These motors may be supplied with bearing arrangements for various external thrust conditions imposed by the pump, such as different magnitudes of down-thrust and either momentary or continuous up-thrust.

Figure 3 shows a typical solid-shaft construction where continuous up-and-down thrust is required. This construction utilizes a double-row bearing.

Since overloading greatly reduces bearing life, the amount of thrust applied should not exceed the recommended values.

General mechanical construction for wound-rotor motors is the same as for other types with the addition of rings, brushes, rotor windings, etc. (see Fig. 4).

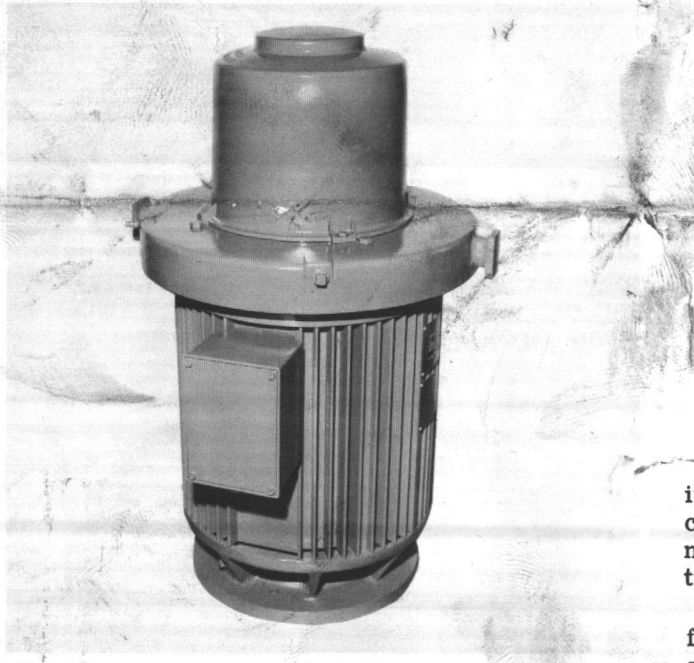


Fig. 1. Typical vertical motor

RECEIVING, HANDLING AND STORAGE

Each motor should be carefully examined upon arrival, and any damage reported promptly to the carrier and to the nearest office of the General Electric Company.

WARNING: *LIFTING DEVICES ARE NORMALLY INTENDED TO BE USED IN HANDLING THE MOTOR ONLY, AND ARE NOT INTENDED TO LIFT THE COMBINED WEIGHT OF THE MOTOR AND ITS CONNECTED LOAD. HOWEVER, IF A SPREADER BAR IS USED TO PROVIDE PARALLEL LIFTING FORCES IN LINE WITH THE AXIS OF THE MOTOR AND PRECAUTION IS USED TO AVOID SHOCK LOADING, CONNECTED LOADS NOT EXCEEDING 200 PERCENT OF THE MOTOR WEIGHT CAN NORMALLY BE SAFELY HANDLED WITH THE MOTOR LIFTING DEVICES.*

If the motor is not to be installed immediately, it should be stored in a clean, dry location. Precautions should be taken to prevent the entrance of moisture, dust, or dirt during storage and installation.

During storage, windings should be protected from excessive moisture absorption by some safe and reliable method of heating. Space heaters, if supplied, may be used for this purpose. The tem-

SAFETY PRECAUTIONS

WARNING

High voltage and rotating parts can cause serious or fatal injury. The use of electric machinery, like all other utilization of concentrated power and rotating equipment, can be hazardous. Installation, operation, and maintenance of electric machinery should be performed by qualified personnel. Familiarization with NEMA Publication MG2, *Safety Standard for Construction and Guide for Selection, Installation and Use of Electric Motors and Generators,* the National Electrical Code, and sound local practices is recommended.

For equipment covered by this instruction book, it is important to observe safety precautions to protect personnel from possible injury. Among the many considerations, personnel should be instructed to:

- avoid contact with energized circuits or rotating parts,
- avoid by-passing or rendering inoperative any safeguards or protective devices,
- avoid extended exposure in close proximity to machinery with high noise levels, and
- use proper care and procedures in handling, lifting, installing, operating and maintaining the equipment.

Safe maintenance practices with qualified personnel are imperative. Before initiating maintenance procedures, be sure that *all* power sources are disconnected from the machine and accessories to avoid electric shock. High potential insulation test for this equipment is not recommended; however, should it be required, procedures and precautions outlined in NEMA Standards MG-1 should be followed.

Failure to properly ground the frame of this machine may cause serious injury to personnel. Grounding should be in accordance with the National Electrical Code and consistent with sound local practice.

perature of the windings should always be maintained a few degrees above the temperature of the surrounding air. It is recommended that motors in storage be inspected, the windings meggered, and a log of insulation resistance and temperature kept. Any significant decrease in insulation resistance should be investigated.

See page 7 of the Relubrication Section for motors in storage.

If motor is to be in storage for over one year, it is recommended that competent technical inspection service be contracted for, such as General Electric Installation and Service Engineering Department, to ensure that the storage has been adequate and that the motor is suitable for service.

INSTALLATION

LOCATION AND MOUNTING

Motors should be located in a suitable enclosure to prevent access to the motor by children or other unauthorized personnel in order to prevent possible accidents. This is especially important for motors that are remotely or automatically controlled or have automatic resetting overload relays, since such motors may start unexpectedly.

Allow enough space around the motor to permit free flow of ventilating air and to maintain an ambient temperature of not over 40 C. Where a choice of locations is possible, install the motor so it will be subjected to the least amount of dirt, dust, liquid, and other harmful materials. Mount the motor securely on a level, firm foundation, align accurately with the driven equipment, and tighten mounting bolts securely.

Some precautions are necessary to assure satisfactory operation of motors in pumping service. The packing gland in the pump head should be kept in good condition so that the liquid being pumped will not be forced out along the shaft and enter the motor through the lower bearing housing. Motors driving pumps in pressure systems, where the pressure is maintained after shutdown, should be protected from overspeeding by check valves.

COUPLINGS FOR HOLLOW-SHAFT MOTORS

To ensure proper functioning, coupling bolts must be tightened to torque values indicated below:

Bolt Size	Torque (lb-ft)	Bolt Size	Torque (lb-ft)
5/16	20	5/8	180
3/8	37	3/4	320
1/2	90	1"	710

CAUTION: *IT SHALL BE THE INSTALLER'S RESPONSIBILITY IN ALL CASES TO ASCERTAIN THAT THESE TORQUE VALUES HAVE BEEN ADHERED TO. THIS SHALL INCLUDE THOSE INSTANCES WHEN THE COUPLING COMES MOUNTED IN THE MOTOR. FAILURE TO COMPLY MAY RESULT IN COUPLING BOLTS SHEARING AND EXTENSIVE DAMAGE TO EQUIPMENT.*

Vertical hollow-shaft motors are designed for driving deep-well, turbine-type pumps and can be equipped with either self-release, bolted, or non-reverse couplings. The type of coupling is specified by the pump manufacturer. Remove the drip cover or the top cap to gain access to the coupling.

Self-release Coupling

Should the motor accidentally operate in the reverse direction, the pump line-shaft joints may unscrew. The self-release coupling (see Fig. 2 inset) acts to limit the amount of this unscrewing. In normal operation, torque from the motor is transmitted by the lower-half coupling through the driving pins to the top-half coupling and thus to the pump shaft. When reversal occurs and the pump shaft starts to unscrew, the top-half coupling disengages from the driving pins, thus uncoupling the pump and motor.

Proper functioning of the self-release coupling depends upon several factors. The pump shaft adjusting nut must be securely attached to the top-half coupling, and the top-half coupling must not bind on the lower half. Otherwise the adjusting nut lockscrew may break instead of the coupling halves separating. As a result, the motor would continue to drive the pump line shaft, and the joints would continue to unscrew. Serious damage may result to both the motor and line shaft. To check the clearance between the coupling halves, place the top-half coupling in position prior to installing the motor. It should drop into place and rest solidly on the lower-half coupling without forcing.

Proper alignment of the pump head shaft within the motor hollow shaft is also important. After the coupling releases, it no longer holds the pump shaft centered. If the alignment is not good, the motor shaft which is still rotating may rub the pump shaft which has stopped, and damage will result.

A third requirement is that the distance between the top of the pump shaft and the inside of the motor cover be at least enough to allow the top-half coupling, when it releases, to clear the pins before the shaft hits the cover. Check this clearance after the adjusting nut has been drawn up to its final position. To facilitate making this check, refer to Fig. 2 which shows a maximum dimension "XH" from the top of the coupling to the top of the shaft. Adhering to this design limit will allow the shaft and coupling to fit to clear the pins and still leave a small clearance between the shaft and cover. For standard motors, dimension "XH" is 3 1/8 inches for C, D, and K-254-286. L-213-215 dimension "XH" is 2 inches.

Depending upon the circumstances causing reversal and upon which line shaft joint unscrews, there may be enough energy stored in the rotating parts, at the time the coupling clears the pins, to cause the pump shaft to continue to rise and strike the motor cover. However, if the above conditions are met, damage even in the most severe cases should be limited to a broken top cap.

It is expected that the self-release coupling will be called upon to operate only at infrequent intervals. Operation from the usual cause, i.e., application of single-phase power after an interruption, can be minimized by proper selection of control. When power is removed from the motor, the reverse flow of water through the pump tends to cause reverse rotation or "back spin." If single-phase power is applied during the back spin, the motor will continue to run in the reverse direction. It will drive the pump and tend to unscrew the line shaft joints. The selection of control which prevents automatic restarting after a power interruption, or which employs a backspin timer to delay restarting until the motor comes to rest, will reduce the frequency of such occurrences.

Bolted Coupling

The bolted coupling allows up-thrust from the pump to be taken by the motor bearings (see END-PLAY ADJUSTMENT under MAINTENANCE). It is similar to a self-release coupling except that the driving pins are replaced by bolts, which should be securely tightened to hold the two halves of the coupling solidly together. (See Torque Requirements on page 2.) This type of coupling does not have the self-release feature.

Non-reverse Coupling

The non-reverse coupling (see Fig. 2) is also a bolted type, and it keeps the pump and motor from rotating in the reverse direction. Thus, it not only prevents the pump shaft from unscrewing, but it also prevents damage from over-speeding and damage to water-lubricated pump shaft bearings which might occur during back spin. In normal operation, motor torque is transmitted to the pump shaft through the two halves of the coupling which are bolted together. The ratchet pins are lifted by the ratchet teeth, and are held clear by centrifugal force and friction as the motor comes up to speed. When power is removed, the speed decreases, and the pins fall. At the instant of reversal, a pin will catch in a ratchet tooth and prevent backward rotation. The number of pins dif-

fers from the number of teeth to multiply the number of stopping positions.

Too rapid a decrease in speed can result in inertia forces great enough to prevent the pins from dropping. This condition is further aggravated when the pins become dirty, and their action becomes sluggish. To permit operation when the time from shutdown (the instant the stop button is pressed) to zero speed is less than two seconds, the pins are spring-loaded. For those cases involving cycling (frequent starting and stopping) and stopping times greater than two seconds, the springs should be removed to decrease wear on the ratchet plate.

A complete non-reverse top coupling is shown in Fig. 2. This coupling includes a ratchet plate, pin carrier, pins, springs, pin retaining plate, and cap screws. Pins and springs are made of heat-treated stainless steel. The pin carrier is one piece and fits in place of the self-release coupling.

Motors shipped from stock may have their top couplings and non-reverse assemblies packaged separately.

When installing the non-reverse coupling, use no lubricant. Lubrication will interfere with proper operation. The top half of the coupling should seat solidly on the lower half and the pins should touch the bottom of the pockets between the teeth in the ratchet plate. The clearance between the top-half coupling and the top of the ratchet teeth should be between 1/32 and 1/8 inch.

Two slots are provided in the outside rim of couplings so that a bar can be inserted to keep the assembly from turning while the adjustment of pump impeller clearance is being made.

ELECTRICAL CONNECTIONS

Select and install control equipment and wiring according to National Electrical Code and sound local practice. Check the voltage and frequency with nameplate values. The motor will operate successfully, but with somewhat modified characteristics, when the line voltage is within plus or minus ten percent of nameplate value, the frequency within plus or minus five percent, or the combined variation within plus or minus ten percent (provided the frequency variation does not exceed five percent).

Motors rated 200 volts are designed for use on 208-volt systems.

Operation of a motor rated 230 volts on a 208-volt system is not recommended because utilization voltages are commonly encountered below the minus 10 percent tolerance on the voltage rating for which the motor is designed. Such operation will generally result in excessive overheating and serious reduction in torques (National Electrical Manufacturers Association).

LUBRICATION

All grease-lubricated bearing housings are packed with the proper amount of GE grease before leaving the factory and will not require regreasing until they have been in service for a time.

See instructions under MAINTENANCE for relubrication recommendations.

OPERATION

Check the electrical connections.

When possible, leave the motor disconnected from the load for the initial start. First make sure that the rotor turns freely, then operate the motor without load for about an hour to test for excessive vibration and for any unusual, localized heating in the bearings and winding.

To reverse the direction of rotation of a three-phase motor, interchange any two line leads; to reverse direction of a two-phase motor, interchange T_1 and T_3.

Operate the motor under load and check the current. Do not exceed the steady value of nameplate amperes times service factor.

MAINTENANCE

WARNING: *BEFORE INITITATING MAINTENANCE PROCEDURES, DISCONNECT ALL POWER SOURCES TO THE MACHINES AND ACCESSORIES AND COMPLETELY DISCHARGE ALL PARTS AND ACCESSORIES WHICH MAY RETAIN ELECTRIC CHARGE. FAILURE TO DO SO CAN RESULT IN SEVERE PERSONAL INJURY.*

INSPECTION AND CLEANING

A systematic inspection should be made at regular intervals, depending on service and operating conditions.

Keep both the interior and exterior of the motor free from dirt, oil, and grease. Open motors should be kept as dry as possible; if operating in dirty places, they should be disassembled periodically and thoroughly cleaned.

Motors may be blown out with dry compressed air of moderate pressure, but cleaning by suction is preferred due to the possibility of water in the compressed air lines and the danger of blowing metal chips into the insulation with compressed air.

WARNING: *SCREENS AND COVERS ARE PROVIDED AS NECESSARY FOR PROTECTION OF THE EQUIPMENT AND PERSONNEL. ALL SCREENS MUST BE KEPT FREE OF DIRT AND DEBRIS TO ENSURE PROPER VENTILATION, AND MAINTAINED IN PLACE FOR PROTECTION OF PERSONNEL.*

The condition of the non-reverse coupling should be checked periodically by removing the drip cover or top cap. If dirt has caused the action of the pins to become sluggish, the pin carrier should be removed, disassembled, and thoroughly cleaned with a suitable solvent. The parts should then be dried and reassembled in accordance with the instructions given under INSTALLATION – COUPLINGS. Sometimes after a long period involving frequent starts and stops, the surface of the holes in the pin carrier becomes polished so that friction forces will no longer hold the pins clear of the ratchet teeth when the motor is running. This condition can be remedied by roughing these surfaces with a piece of emery paper wrapped around a rod.

Whenever the dismantling of couplings is necessary, the use of witness marks will assure a balanced condition when reassembly is complete.

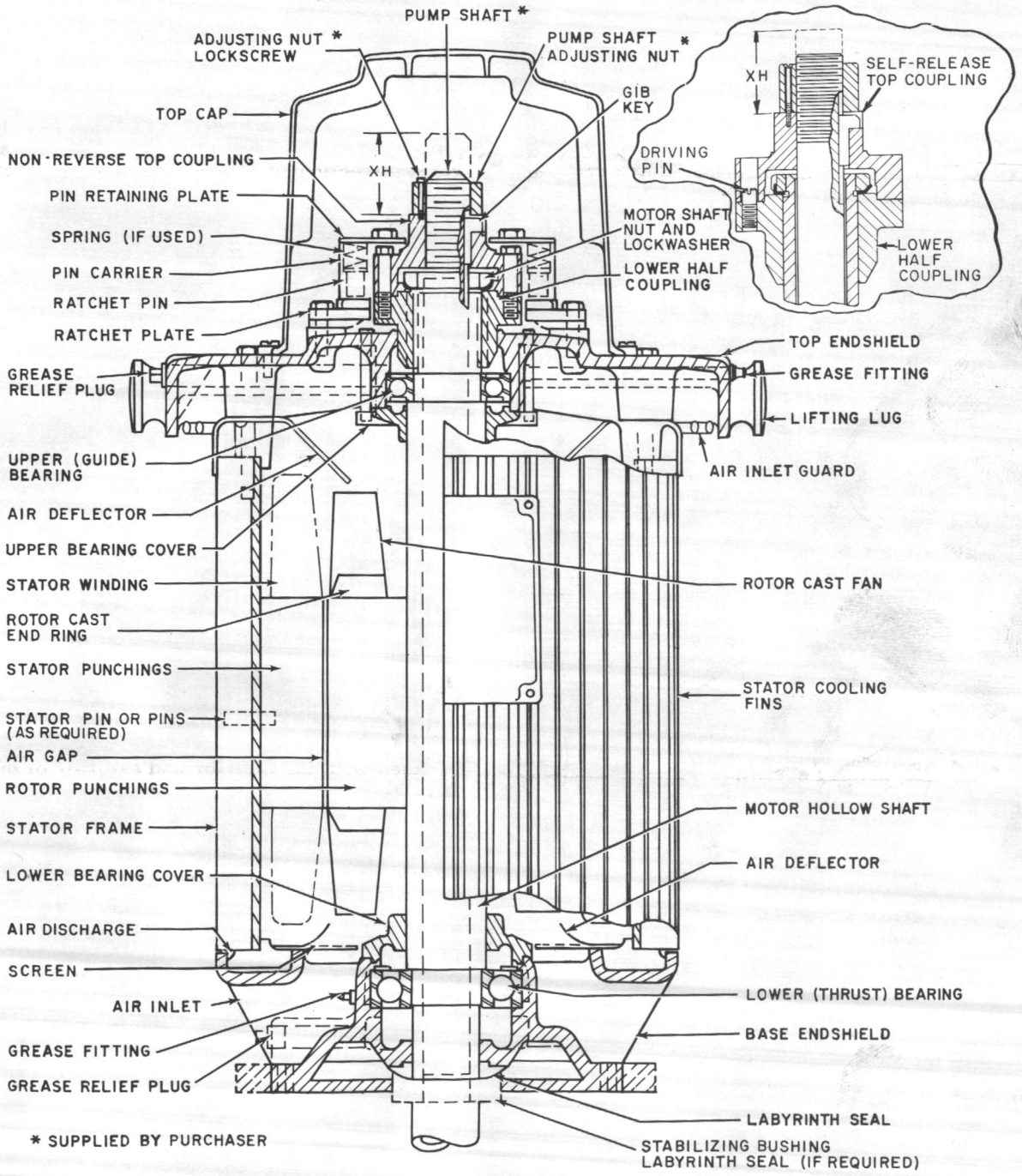


Fig. 2. Typical high-thrust, hollow-shaft motor with non-reverse coupling. Self-release type shown in inset.

RELUBRICATION

Motors covered by these instructions employ grease lubrication for both the upper (guide) bearing and the lower (thrust) bearing.

The bearing housings are packed at the factory with sufficient long-life grease for an initial operating period. Since the oil in the grease will ultimately become depleted, it is necessary to regrease at intervals consistent with the service. The following recommendations are offered as a guide in determining the relubrication period.

Guide bearings in vertical motors carry relatively light loads, and, under normal conditions of operation, can be regreased every three to five years. When conditions are more severe (high tem-

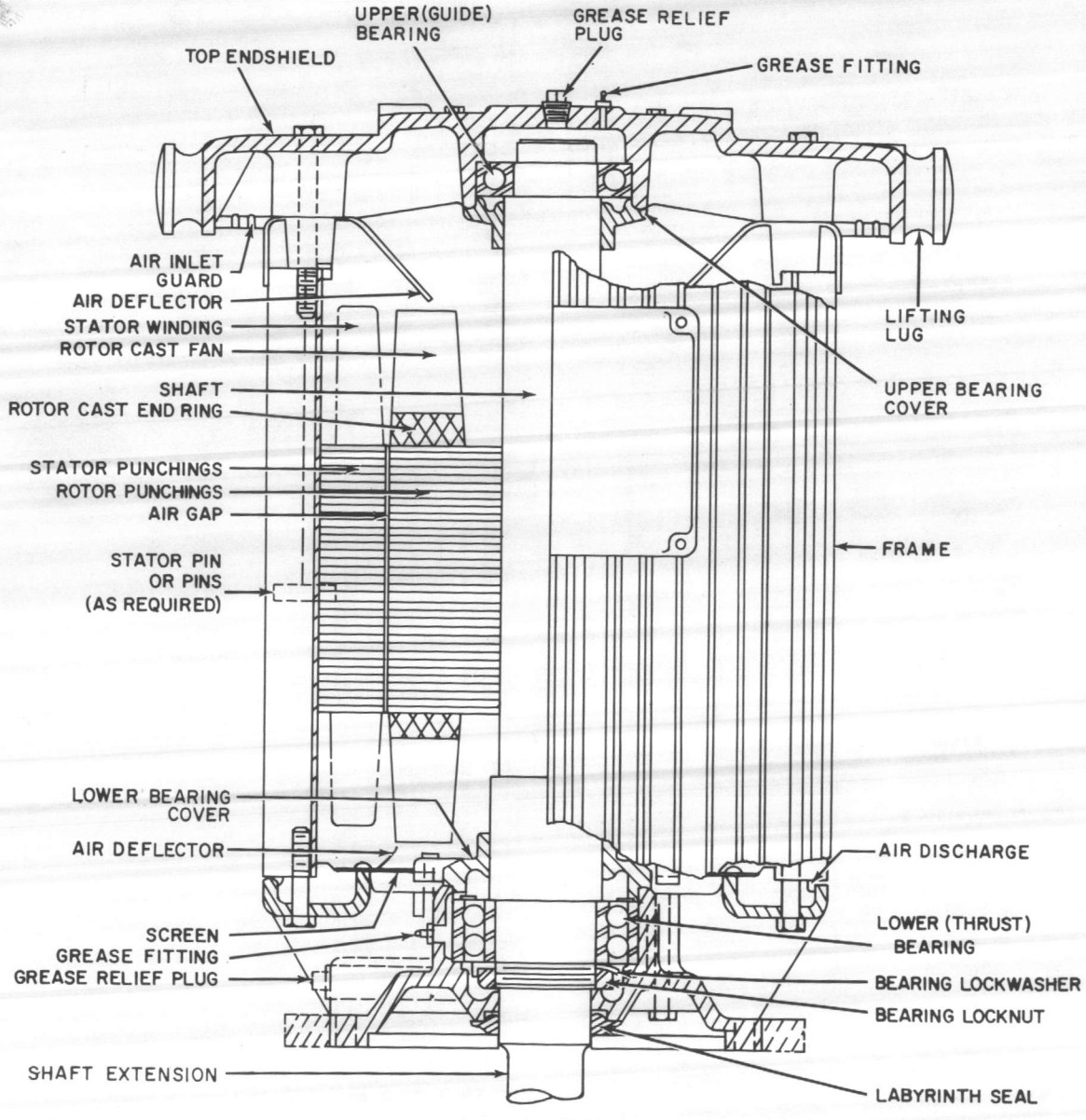


Fig. 3. Typical solid-shaft motor for continuous up-and-down thrust. (For standard down-thrust only, see bottom bearing arrangement in Fig. 2.)

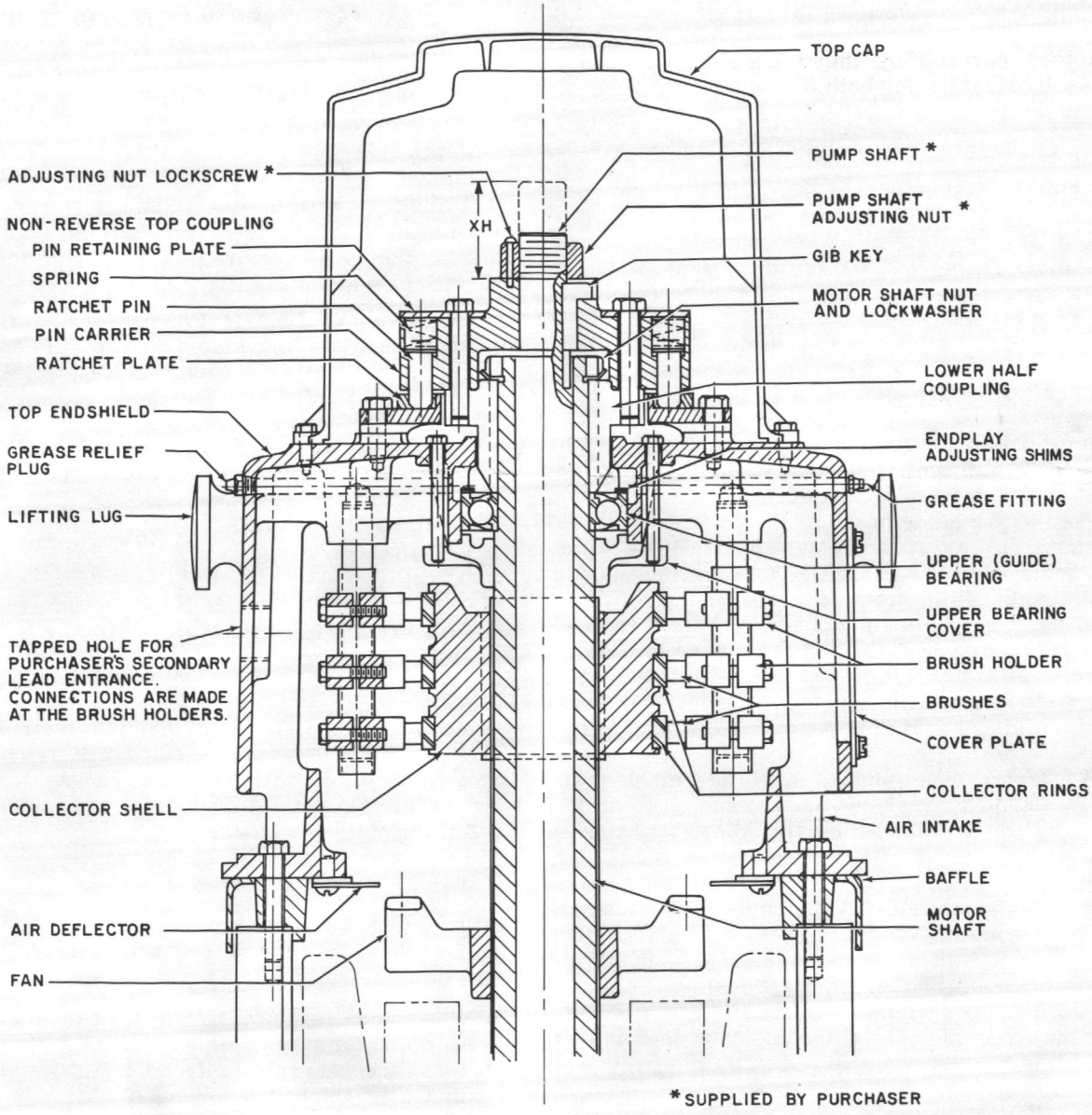


Fig. 4. Typical wound-rotor type motor, showing rings, brushes, etc.

peratures, dirty locations, motor running continuously, etc.), regrease every one to three years.

Regrease the thrust bearings of motors with speeds above 1800 rpm every 1000 hours of operation with the interval not to exceed three months. For motors with speeds 1800 rpm and below, regrease every 2000 hours of operation with the inerval not to exceed six months.

Relubrication procedure is as follows. Remove the grease relief plug and free the relief passage of hardened grease. Wipe the grease fitting clean. Or, if no fitting is supplied, replace the 1/8-inch pipe plug with a standard fitting.

For best results, use GE long-life grease (No. D6A2C5). Take care to exclude dirt from the bearing housing and lubricant. With the motor at standstill, add grease, using a hand-operated gun until the grease begins to move in the relief passage. Allow the motor to run about ten minutes before replacing the relief plug.

For motors in storage and motors that are to stand idle for a prolonged period and be subject to moisture from condensation, the thrust bearing housing should be filled with grease to minimize corrosion. Add grease until it comes all the way out the relief passage. When the motor is again started, run it with the relief plug removed for about ten minutes to expel excess grease.

Since the above method tends to purge the bearing housing of used grease, complete removal of all grease should be required only at infrequent intervals. Whenever the motor is disassembled for gen-

eral cleaning and reconditioning, the housing should be cleaned of old grease with a suitable cleaning solvent and dried thoroughly. Refer to mixture described under insulation care. Pack the cavity above the bearing with new grease until approximately two-thirds full before reassembling.

END-SHIELD ASSEMBLY

Add a thin coating of a non-conducting grease on end-shield rabbet and to threads of end-shield cap screws when assembling end shields to the aluminum frame. (GE Grease D6A2C5 is excellent for this purpose.)

END-PLAY ADJUSTMENT

Standard high-thrust motors are designed to withstand only momentary up-thrust. This up-thrust, which can exist for a few seconds during starting, is taken by the guide bearing. To prevent the thrust bearing from losing radial stability during this time, the motor end play is limited to a few thousandths of an inch by shims inserted in the housing above the upper bearing. This adjustment is made at the factory and need not be disturbed on a new motor. However, should the motor be disassembled for any reason, the adjustment must be made upon reassembly to avoid damaging the bearings.

Whenever these motors are reassembled, the shims should be replaced and the end play checked to see that it falls within the allowable 0.005 to 0.007 inch.

Motors which must withstand continuous up-thrust have a somewhat different construction. The thrust bearing is arranged to take this up-thrust and is clamped in the bearing housing. No shims are used in these motors since the lower bearing is of the type which can withstand axial load in both directions.

INSULATION CARE

Whenever the motor is disassembled for general cleaning, the windings should be brushed free of dust and washed with a cloth or brush wet with a suitable cleaning solvent.

The cleaning fluid used to clean the coils must have grease-dissolving properties, but must not affect the electric insulation or varnish. Many cleaning fluids in common use, which are suitable with respect to the foregoing, may be extremely hazardous because of their toxicity, inflammability, or both. The following mixture is a suitable solvent for cleaning windings, bearings, and the bearing housing:

25 percent methylene-chloride (if unavailable, trichlorethylene may be substituted)
70 percent Stoddard solvent (petroleum spirits)
5 percent perchlorethylene

WARNING: *WHEN USING THE ABOVE CLEANING FLUID, THE AREA MUST BE WELL VENTILATED AND SMOKING OR OPEN FLAMES PROHIBITED. FAILURE TO COMPLY CAN RESULT IN PERSONAL INJURY OR DEATH.*

For best results, the windings should then be varnished with an air-drying varnish. More than one coat may be required, depending on the condition of the winding.

The General Electric Company can furnish insulating varnish best suited for definite operating conditions. Consult the nearest General Electric Sales Office.

REWINDING CAUTION: *TO AVOID DAMAGE, THE TEMPERATURE OF THE ALUMINUM FRAME MUST NOT EXCEED 200C DURING THE STRIPPING OR BAKING PROCESS. AN OPEN FLAME SHOULD NOT BE USED.*

WOUND-ROTOR MOTORS

COLLECTOR RINGS

Keep the rings clean and maintain their polished surfaces. Ordinarily, the rings will require only occasional wiping with a piece of canvas or nonlinting cloth. Do not let dust or dirt accumulate between the collector rings.

BRUSHES

The brushes should move freely in the holders, and at the same time make firm, even contact with the collector rings.

When installing new brushes, fit them carefully to the collector rings. Be sure that the pigtail conductors are securely fastened to, and make good contact with, the brush holders.

CAUTION: *DURING STARTING, EXTERNAL RESISTANCE MUST BE PROVIDED IN THE SECONDARY CIRCUIT TO PREVENT HIGH IN-RUSH CURRENT WHICH WOULD DAMAGE THE COLLECTOR RINGS AND BRUSHES.*

RENEWAL PARTS

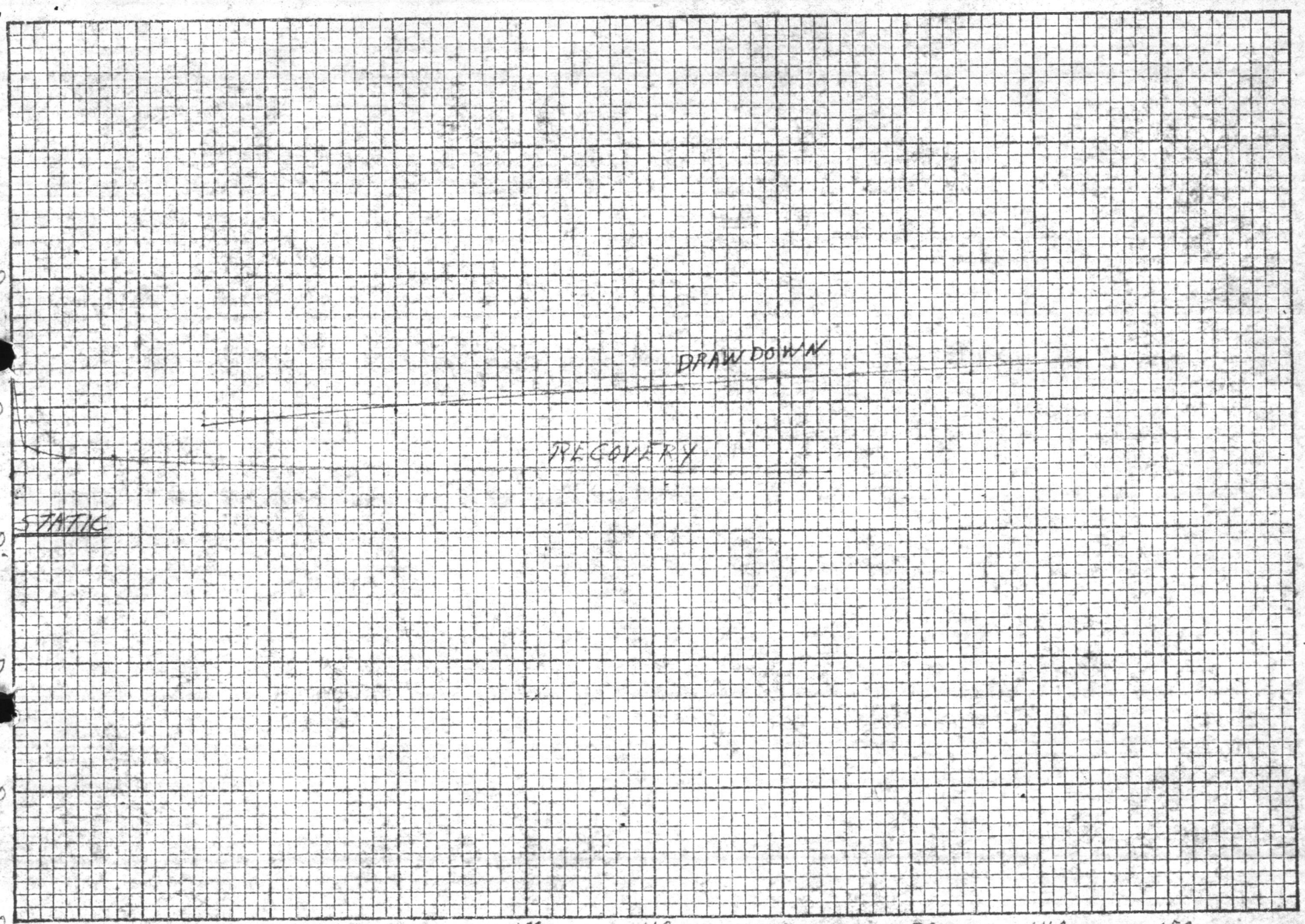
When ordering parts, give description and state quantity of parts desired, together with the nameplate rating, and model and serial number of the motor. For couplings, also specify the type, bore and keyway size.

Requests for additional copies of these instructions or inquiries for specific information should be addressed to the nearest office of the General Electric Company.

GENERAL ELECTRIC COMPANY • VERTICAL MOTOR PRODUCTS SECTION • SAN JOSE MOTOR PLANT
SAN JOSE, CALIFORNIA 95114

9–77 (2M)

PRINTED IN U.S.A.



CAMP LEJEUNE
SPEC #3885

WELL T-1
RIFLE RANGE

HYDRA[illegible]C PERFORMANCE IS CONTINGENT ON WELL [illegible]ISHING PUMP WITH CLEAR, FRESH NON-AERATED OR NON-GASEOUS WATER FREE FROM DETRITUS WITH NO SUCTION LIFT AT [illegible] TEMPERATURE NOT TO EXCEED 85 DEGREES FAHRENHEIT

NOTE: ALL COLUMN LOSSES ARE INCLUDED

CUSTOMER: _____

P.O.#

DEALER: Heater Well Co.

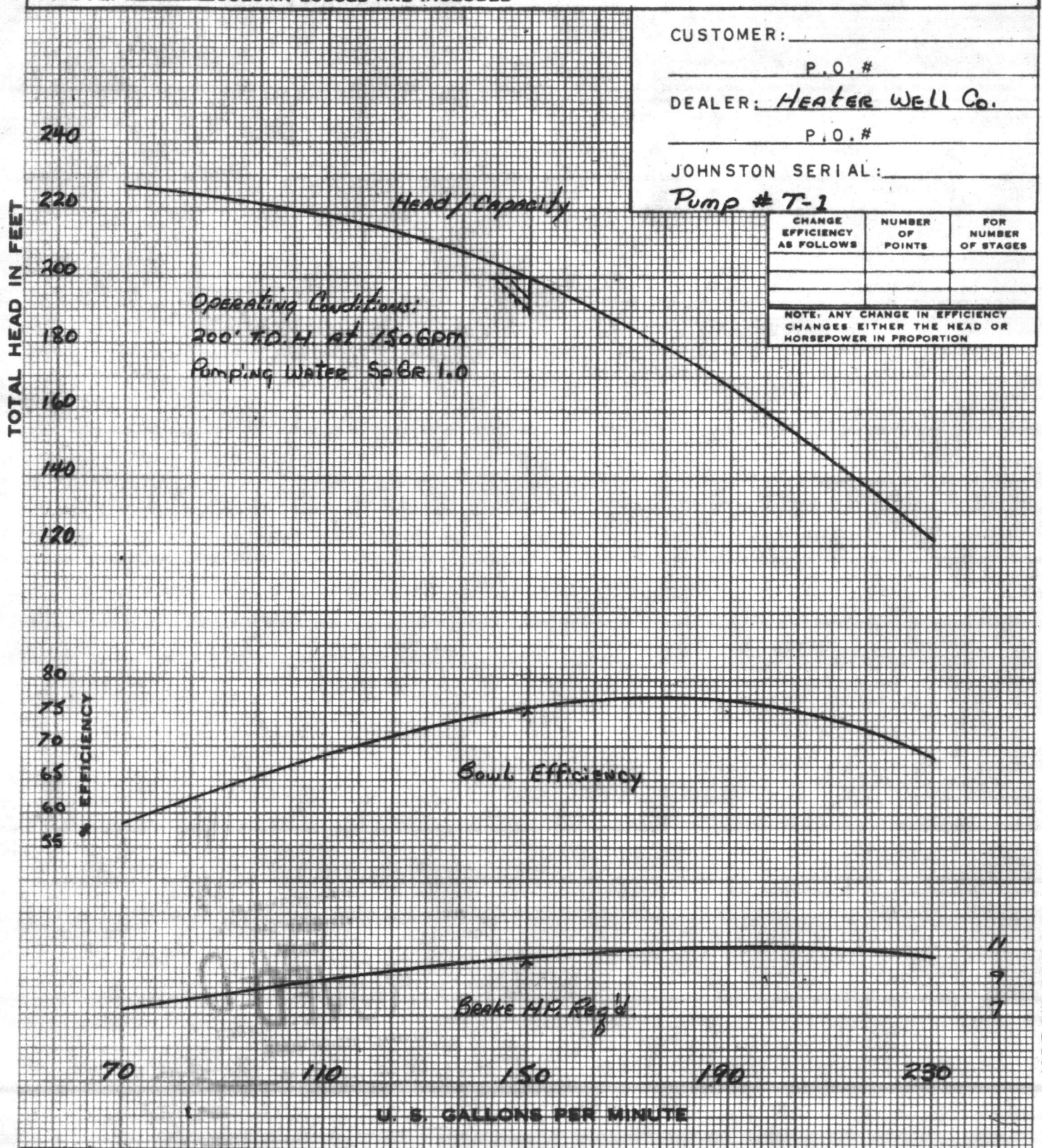
P.O.#

JOHNSTON SERIAL: _____

Pump # T-1

CHANGE EFFICIENCY AS FOLLOWS	NUMBER OF POINTS	FOR NUMBER OF STAGES

NOTE: ANY CHANGE IN EFFICIENCY CHANGES EITHER THE HEAD OR HORSEPOWER IN PROPORTION



IMPELLER Brz.
5 9/32" DIA.

DATE: 3-18-57 BY: JOM

JOHNSTON PUMP CO.

JOHNSTON

PASADENA · CALIFORNIA · USA

VERTICAL PUMPS

PERFORMANCE 10 STAGE

7CC DEEP WELL TURBINE PUMP

1800 R. P. M.

CURVE SHEET No.

PUBLIC WORKS DEPARTMENT
CAMP LEJEUNE, NORTH CAROLINA

APPROVED

SUBJECT TO CONTRACT REQUIREMENTS

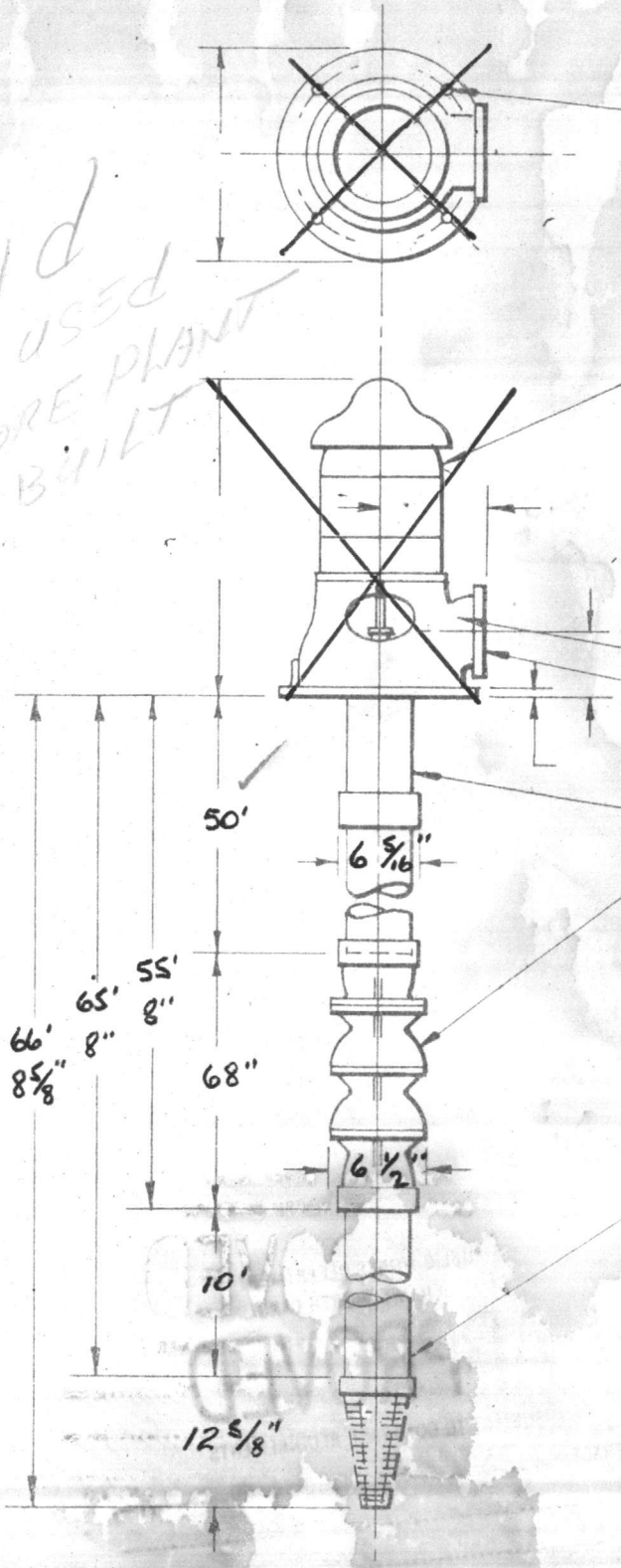
CONTRACT NO. 3885 SPEC. NO. 3885-L

TITLE: Repairs to Well Pumps

DATE: 3-27-52 W. J. Loan Jr.

BY DIRECTION OF OFFICER IN CHARGE OF CONSTRUCTION

JOHNSTON VERTICAL TURBINE PUMP



VOID
WAS USED
BEFORE PLANT
WAS BUILT

Furnished By Others
VERTICAL HOLLOW SHAFT MOTOR

HP	PHASE	CYCLE
	VOLT.	RPM
		ENCLOSURE

Furnished By Others
→ TYPE "A" DISCHARGE HEAD
" X 125# FLANGE

GWI
5" x 2" x 1 3/16" COLUMN ASSEMBLY

10 STAGE 7CC BOWL ASSEMBLY

CONDITIONS:
150 USGPM
200 FT. TOTAL HEAD
LIQUID water
SPEC. GRAV 1.0 @ °F PUMPING TEMP.

5" SUCTION PIPE 5" CONE STRAINER

CUSTOMER
PO#
DEALER Heater Well Co.
PO#
JOHNSTON SERIAL #
JOHNSTON QUOTATION #

NOTE: DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED

Pump # T-1

JOHNSTON PUMP COMPANY
PASADENA, CALIFORNIA

H-1253-A

PUBLIC WORKS DEPARTMENT
CAMP LEJEUNE, NORTH CAROLINA

APPROVED

SUBJECT TO CONTRACT REQUIREMENTS

CONTRACT NO. 3185 SPEC. NO. 3185/56

TITLE Retaining to Well Pumps

DATE: 3-27-57

BY DIRECTION OF OFFICER
IN CHARGE OF CONSTRUCTION

WELL # T-1

PLACE - Rifle Range DATE - 18 Feb 1957

ORIGINAL WELL CAPACITY G.P.M. 150

ORIGINAL WELL		TESTING	
Depth of Well	76.9	Depth after Cleaning	71.2
Pump Size		Test Pump Setting	50
Pump Setting	50	Measured Static Water Level	30
Static Water Level	8.75	Depth of Air Line	50

Static on gauge 31' 0"

CONDITION OF WELL - Cleaned sand and stone out of well. Botton of well 71'.2"

STATIC LEVEL ON GAUGE

Inches of water in dizometer tube	G.P.M.	30 Min.	45 Min.	60 Min.	1 Hour
	75	PL	PL	PL	PL 38.5
	90	PL	PL	PL	PL 39.5
	105	PL	PL	PL	PL 39.5
	120	PL	PL	PL	PL 41
	135	PL	PL	PL	PL 42
	150	PL	PL	PL	PL 43
		PL	PL	PL	PL
		PL	PL	PL	PL
		PL	PL	PL	PL
		PL	PL	PL	PL
		PL	PL	PL	PL

RECOVERY	
10 Sec.	42
20	PL 38
30	PL 37
40	PL 37
50	PL 37
60	PL 36.5
2 Min.	PL 36
4	PL 35
8	PL 35
16	PL 35
32	PL 34.5

Well # RR-227

Date	Line Ft.	G.P.M.	D.D. El.	Static El.	Shut off Head	D.D. Ft.	LINE
6-1-53	56 ?	250	-19.5	-5.5	201.	14.5	
"	115	185	-15.	—	—	9.5	
"	138	150	-13.5	—	—	8.	
new Johnston pump installed by Heater well co. 6-6.57. Pump setting 50 ft air line 50 ft.							
			by Gage	by Gage.			
6.6-57	—	—	6 ft	16 ft.	—	10 ft.	
6-7-57.	—	—	3 ft	—	—	13 ft.	
6-10-57	—	—	4 ft.	16 ft.	—	12 ft.	
4/15/63		162		22 ft		15 ft	52 lb.

Air Line 50 ft. LOWERED. -16 — 6-6-57.

WATER ANALYSIS

BY _____

DATE 8-3-44

Sample from WELL T-1

Total Solids _____ PPM Dissolved Solids _____ PPM

Suspended Solids _____ PPM Volatile Solids _____ PPM

Phenol. Alk. as $CaCo_3$	0 PPM	Silica as SiO_2	_____ PPM
Total Alk. " "	184 "	Ferrous Iron as Fe	_____ "
Bicarbonates " "	_____ "	Aluminum as Al.	_____ "
CARBONATES " "	_____ "	Total Iron as Fe	8.0 "
Chlorides as Cl.	12 "	Calcium as Ca.	_____ "
Sulphates as SO_4	_____ "	Magnesium as Mg.	_____ "
Nitrites as No_2	_____ "	Sodium as Na.	_____ "
CARBON DIOXIDE AS CO_2	_____ "		

pH 7.3 Soap Hardness as $CaCO_3$ 178 PPM

Odor Slight Trace H_2S Turbidity _____

Remarks _____

T1 Rifle Range
#227 or 51

Date	P Alk	M.O. Alk.	Cl_2	pH	Fe	Hardness
4-28-43	0	200	15	—	12.0	178
5-5-43	0	210	23	—	0.8	174
5-21-43	0	178	14	7.5	6.0	160
5-27-43	0	184	15	7.3	1.3	174
5-28-43	0	182	12	7.3	1.7	162
8-2-44	0	184	11	7.2	7.0	132
8-3-44	0	184	12	7.3	8.0	178
9-7-44	0	181	16	7.1	4.5	178
9-29-44	0	178	13	7.1	6.5	170
total	0	1701	131	508	47.8	1506
average	0	189	14.5	7.2	5.3	167.5

WELL "T-1" - RIFLE RANGE

29 July, 1944

Elev. pump base + 33.9

Elev. ground 31.9

Static water level + 8.7

Draw down

____ G.P.M. against ____ ft. head

Air line 71' Elev. D.D. gauge 34.5

Shut-off head - 247'

110 G.P.M. 77 lbs. pressure D.D. 43' to Elev. - 8.5 T.H. 220'

135 G.P.M. 70 lbs. pressure D.D. 46' to Elev. - 11.5 T.H. 207'

155 G.P.M. 65 lbs. pressure D.D. 49' to Elev. -14.5 T.H. 198'

170 G.P.M. 60 lbs. pressure D.D. 51' to Elev. -16.5 T.H. 189'

Recovers to Elev. + 0.5 inst.

WELL "T-1" - RIFLE RANGE

29 July, 1944

Elev. pump base	+ 33.9
Elev. ground	31.9
Static water level	+ 8.7

Draw down

____ G.P.M. against ____ ft. head

Air line 71' Elev. D.D. gauge 34.5

Shut-off head - 247'

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170 G.P.M. 60 lbs. pressure D.D. 51' to Elev. -16.5 T.H. 189'

Recovers to Elev. + 0.5 inst.

Well #1 12/14/44

Shut off 92 #

Static 20.5' from Graze 2' from floor

60 H pres 160 GPM D.D. 44.3' from Graze

55 H " 175 " " 48 " "

50 H " 187 " " 51' " "

45 H " 200 " " 55' " "

40 H " 212 " " 56' " "

Recovers 32' from Grz in 5 min.