

SUBMITTAL FOR APPROVAL

PORCUPINE MOUNTAINS LIFT STATION NO. 8

PUMPS

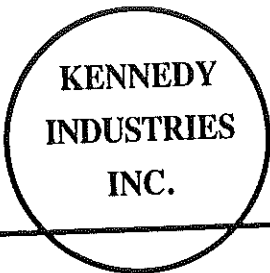
ENGINEER: ROBERTS, BARTOW & ASSOCIATES, INC.

CONTRACTOR: DEVERE CONSTRUCTION

MAY 17, 1991
KENNEDY #716-10303

EQUIPMENT FURNISHED BY

ABS PUMPS INC.
KENNEDY INDUSTRIES INC.
P.O. Box 377
Wixom, MI 48393
(313) 684-1200



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DATE MAY 17, 1991
JOB UPPER PENINSULA AREA 1A & 11A
CONSULTING ENGINEER ROBERTS, BARTOW & ASSOCIATES
CUSTOMER DEVERE CONSTRUCTION
CUST. P.O. NO. VERBAL KENNEDY NO. 716-10303
SERVICE SEWAGE
NUMBER OF UNITS ONE (1) DUPLEX UNIT REF. PORCUPINE MOUNTAIN LIFT STATION NO. 8

NUMBER OF PRINTS
1 SEPIA
7 FOR APPROVAL
 FINAL
 REVISED

TYPE SUBMERSIBLE AF-60 PUMP RPM 1750 CONSTRUCTION
SIZE 4" DISCHARGE STUFFING BOX BRZ. FITTED
GPM 100 PACKING IRON
TDH 60' DBL MECHANICAL SEAL ALL BRONZE
MFGR. ABS PUMPS, INC. CPLG. EXTENDED MOTOR SHAFT STAINLESS STEEL
BASE ---- STD. FTD.

SPECIAL REQUIREMENTS SLIDE RAIL BASES PROVIDED WITH STAINLESS STEEL LIFT CHAIN AND GUIDE RAILS.

MOTOR
MFGR. ABS PUMPS, INC. FRAME --- HP 8
PHASE THREE VOLT 230 HERTZ 60
R.P.M. 1750 FURN. BY ABS PUMPS, INC. TYPE ENCL. SUBMERSIBLE

ELECTRIC EQUIPMENT PUMPS TO HAVE 30 FT. CABLE. ONE (1) MDI, ONE (1) DUPLEX CONTROL PANEL - DRAWINGS TO FOLLOW.

CERTIFIED BY TERRY L. DUPERON



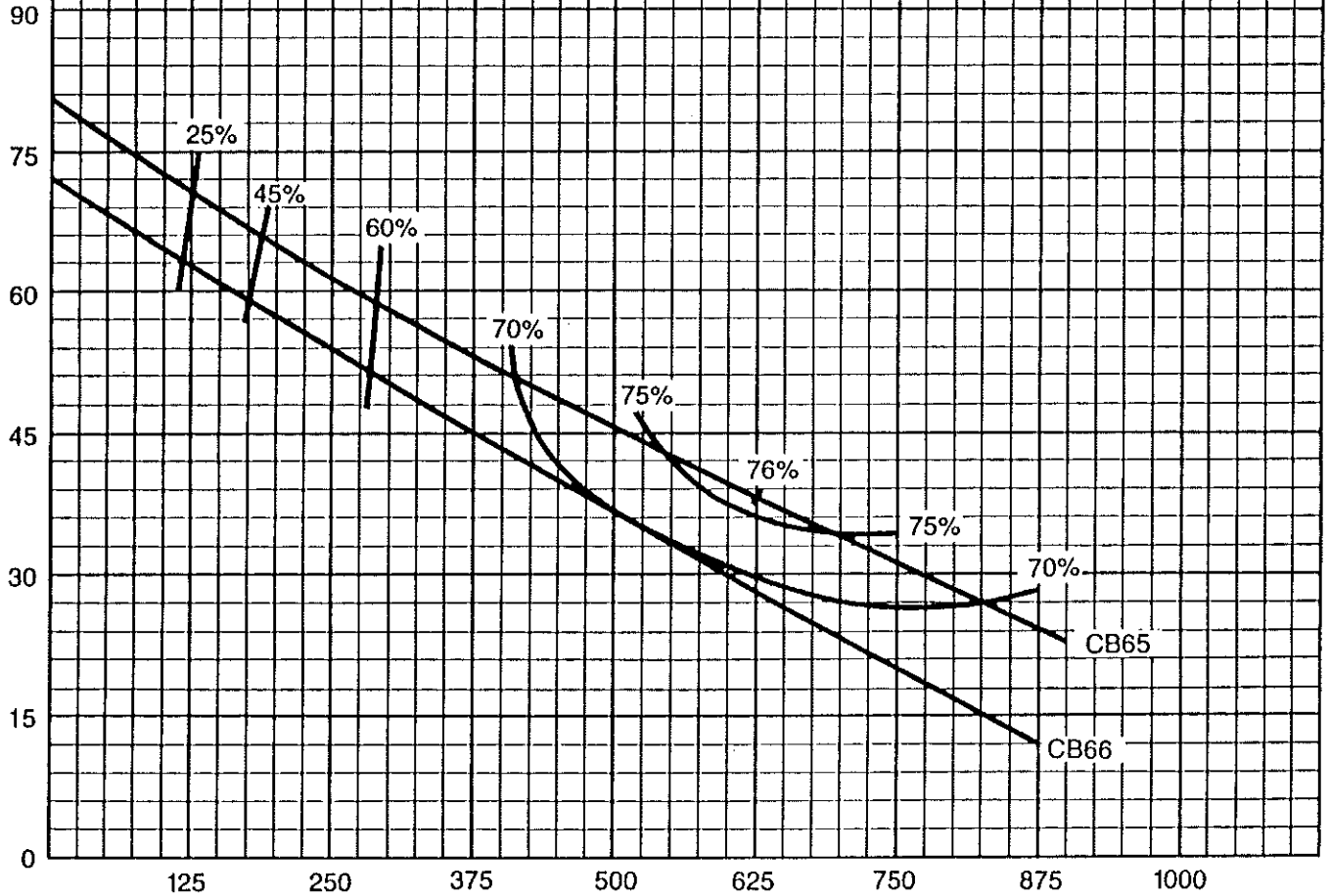
DATE March 15, 1989

MODEL
RATED HP

AF	60									4-4"
	8									

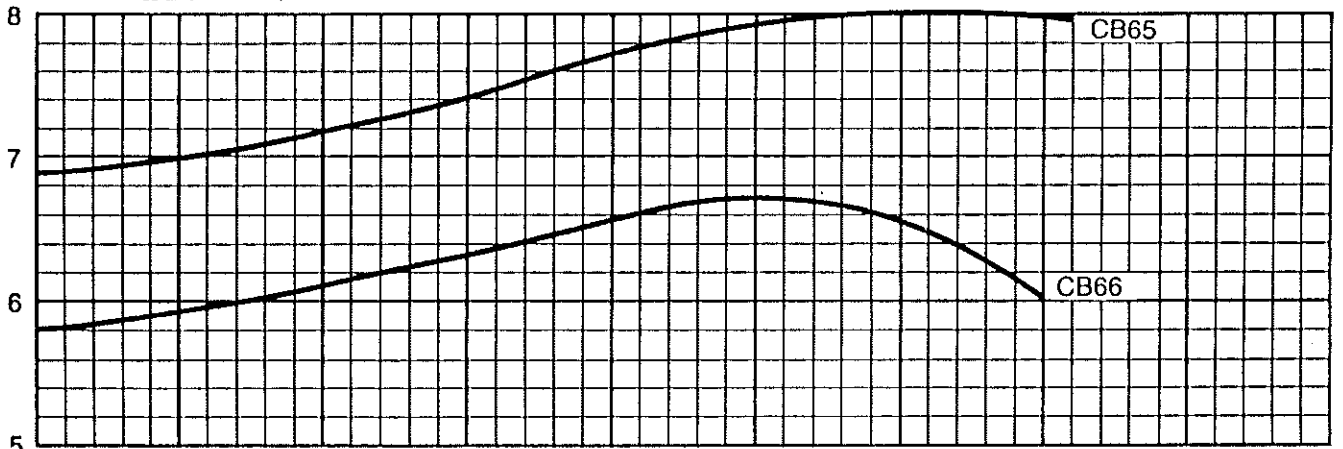
SOLID SIZE 3 BLADE 1 SPEED 1750 RPM
 DISCHARGE SIZE 4 VOLTAGE 230, ~~208, 200~~ ; 60 Hz 3 PH

TOTAL HEAD IN FEET



* 100 GPM @ 60' TDH USGPM

BHP



PUMP SPECIFICATIONS AF PUMPS

SECT. 200 TAB 4" 1750 RPM 3Ø PG. 144

MODEL: AF90, 60, 90*-4-4"

EXPLOSION PROOF

GENERAL

Furnish and install 2 model AF60 ABS Submersible Pump(s) to deliver 100 USGPM against a total head of 60 feet. The motor shall be B HP 1750 RPM connected for operation on a 230 volt 60 HZ 3 phase service. The motor shall be an integral part of the pumping unit. The pump discharge size shall be 4".

PUMP DESIGN

The pump(s) shall be capable of handling raw unscreened sewage, storm water, and other similar solids-laden fluids without clogging. The suction inlet shall have a wave form with the leading edge of the impeller overlapping the wave form. Should a textile or plastic sheet plug the inlet, the shearing action of the leading edge of the impeller against the wave form of the inlet will cut away enough of the material to clear the inlet.

There shall be no need for personnel to enter the wet well in order to remove or reinstall the pump(s). The pump(s) shall be automatically connected to the discharge piping when lowered into place on a guide rail system, requiring no bolts, nuts or fasteners to effect sealing to the discharge connection.

PUMP CONSTRUCTION

Impeller: The impeller shall be made of erosion-resistant chilled gray cast iron and shall be of the semi-open, non-clogging, dynamically balanced single vane design capable of passing a minimum of _____ diameter spherical solids. The impeller shall have a slip fit onto the motor shaft and drive key and shall be fastened to the shaft by a stainless steel bolt.

Pump Volute: The pump volute shall be made of gray cast iron with smooth internal surfaces free of rough spots or flashing. The volute shall have a centerline discharge.

Self Cleaning Front Plate: The pump shall be equipped with a gray cast iron front plate, mounted to the volute with four stainless steel adjusting screws to permit close tolerance adjustment between the front plate and impeller for maximum pump efficiency. The front plate shall be designed with a wave shaped inlet and an outward spiralling V-shaped groove on the side facing the impeller, to shred and force stringy solids outward from the impeller and through the pump discharge.

Mechanical Seals: Each pump shall be equipped with a tandem double mechanical seal. The oil chamber shall separate the pump from the motor and shall provide lubrication for the seals. Both the lower stationary seal face and rotating seal face shall be made of silicone carbide while the upper stationary seal shall be made of carbon and the rotating seal face of tool steel. Each stationary seal face shall be sealed with an O-Ring. The positively driven seal faces shall be held in place by individual independent springs. The seals shall require neither routine maintenance nor adjustment and shall not be damaged when the pump is run dry. When required, seal oil inspection shall be achieved without disassembly of the pump. The seal shall not require the pumped liquid as a lubricant.

Seal Failure Warning System: An electrical probe shall be provided in the oil chamber for detecting the presence of water. A solid-state device mounted in the pump control panel or in a separate enclosure shall send a low voltage, low amperage signal to the probe. If water enters the oil chamber, the probe shall close an electrical circuit and energize a warning light on the face of the control panel.

Shaft and Bearings: The pump shaft shall be made of stainless steel supported by a heavy duty lower double row ball bearing and an upper sealed single row ball bearing.

Motor and Cable: The pump motor shall be housed in an air filled watertight housing to provide good heat transfer. The motor shall be a NEMA design B suitable for continuous duty with moisture resistant Class F insulation rated for 155°C. Oil filled motors shall not be considered equal to the dry air filled type nor acceptable. Each phase of motor shall contain a bimetallic electromechanical temperature monitor embedded in the motor windings. The monitors shall be connected in series and coupled to the control circuit of the pump control panel so as to shut the pump down should any one of the monitors detect high temperature. The temperature setting of the temperature monitors shall be 140°C±5°C and shall automatically reset once the stator temperature returns to normal.

Power cables shall be 30 feet long of the Ozoflex or SO type construction suitable for submersion in sewage. Strain reliefs shall be provided at each cable entry into the pump.

Junction Chamber—For Standard Models Only: The cables shall enter a junction chamber. The junction chamber shall contain a terminal board with threaded posts for connecting the cable ends and motor leads. For dual voltage motors, the voltage change shall be made by relocating the leads from the motor to different post combinations. A watertight seal shall be located between the junction chamber and motor chamber.

O-Rings and Fasteners: All mating surfaces of the pump and motor shall be machined and fitted with Buna N O-Rings where watertight sealing is required. Sealing shall be accomplished by the proper fitting of the parts and not by compression or special torque requirements. All external screws and fasteners shall be made of stainless steel. All surfaces coming into contact with the liquid media, other than stainless steel, shall be protected by a corrosion resistant coating.

INSTALLATION

The pump(s) shall automatically connect to discharge connection(s) when lowered into place on a single guide rail system, requiring no bolts, nuts or fasteners to effect proper sealing. Each system shall consist of no more than one guide rail supported at the top by an upper guide bracket and at the bottom by the discharge connection. The guide rail base shall be equipped with a vertical straightening vane which properly aligns the slot in the pump bracket and centers the pump just prior to final sealing. Ease and quick removal of pumps from other than the vertical direction over the center of the pump shall be a requirement of the system.

Options: Each model shall be available with rubber coated hydraulic parts (impeller, volute, suction inlet and upper plate).

AF-EX:

1. The seal probe is contained in the motor housing.
2. NSSHOEU power cables shall be provided.
3. The motor shall be FM approved for Class I, Division I, Group C & D locations.

*AF 90 standard only



TECHNICAL DATA

EXPLOSION PROOF

SECT. 200 TAB 4" 1750 RPM 3Ø PG. 151

MODEL: AF70, 60, 90-4-4"



APPLICATION DATA

MODEL	40	60	90					
SOLID SIZE - IN.	4"	4"	4"					
MINIMUM FLOW - GPM	50	50	50					
MAXIMUM SUBMERGENCE - FT.	65	65	65					

PUMP WEIGHT - lbs.

STANDARD								
EXPLOSION PROOF	226	237	-					

PHYSICAL DATA

POWER CABLE - TYPE	AF: HO7RN Ozoflex or Type SO AF-EX: NSSHOEU	
CONTROL CABLE - TYPE	Included in Power Cable	
CABLE, STANDARD LENGTH	30'	
MATERIALS	MOTOR HOUSING	Cast Iron - ASTM A-48, Class 30
	PUMP CAP	N/A
	OIL CHAMBER	Cast Iron - ASTM A-48, Class 30*
	VOLUTE	Cast Iron - ASTM A-48, Class 30
	IMPELLER	Cast Iron - ASTM A-48, Class 30
	CUTTER DISC	Cast Iron - ASTM A-48, Class 30
	MOTOR SHAFT	420 SS
	EXTERNAL HARDWARE	304 SS
"O" RINGS	Buna N	
MECHANICAL SEAL - TYPE	Tandem Seal, Silicone Carbide, Lower; Tool Steel/ Carbon Upper	
UPPER BEARING	Single Row Ball	
LOWER BEARING	Double Row Angular Contact Ball - Heavy Duty	
DISCHARGE SIZE	4"	
IMPELLER TYPE	Open Single Vane	

*AF 90 standard only

Rev. 1-1-86

ABS Pumps Inc.
140 Pond View Drive
Meriden, Connecticut 06450
(203) 238-2700



TECHNICAL DATA
EXPLOSION PROOF

SECT. 200 TAB 4" 1750 RPM 3Ø PG. 152

MODEL: ~~AF 60, 90~~ 4-4"

ELECTRICAL DATA

MOTOR DESIGN NEMA TYPE	B
MOTOR TYPE	Enclosed Submersible
INSULATION CLASS	F
MAXIMUM STATOR TEMP.	155° C
MOTOR PROTECTION	AF Oil Chamber Moisture Detector, AF-EX Motor Housing. Bimetallic switches in each phase. Installer must conform to N.E.C. Stds., 1981 Ed. Article 430.
BI METALLIC TEMP. SETTING	140° C ± 5° C
RPM	1750
VOLTAGE TOLERANCE ±	10%

	MODEL	VOLTAGE	HP OUTPUT	FULL LOAD AMPS	LOCKED ROTOR AMPS	NEMA CODE LETTER	SERVICE FACTOR (MOTOR SUBM.)	POWER FACTOR 100% FL	75% FL	50% FL	MOTOR EFFICIENCY 100% FL	75% FL	50% FL
40	208	5.4	17.1	118	J	1.20	0.84	0.76	0.64	78.0	77.0	74.0	
	230	5.4	15.5	107	J	1.20	0.84	0.76	0.64	78.0	77.0	74.0	
	460	5.4	7.8	53.6	J	1.20	0.84	0.76	0.64	78.0	77.0	74.0	
	575	5.4	6.2	42.9	J	1.20	0.84	0.76	0.64	78.0	77.0	74.0	
60	208	8.0	23.3	164	J	1.15	0.89	0.84	0.72	81.0	82.0	80.0	
	230	8.0	21.1	148	J	1.15	0.89	0.84	0.72	81.0	82.0	80.0	
	460	8.0	10.6	74.2	J	1.15	0.89	0.84	0.72	81.0	82.0	80.0	
	575	8.0	8.5	59.4	J	1.15	0.89	0.84	0.72	81.0	82.0	80.0	
90	208	12.1	35.6	168	F	1.00	0.87	0.81	0.71	81.1	80.9	78.1	
	230	12.1	32.2	152	F	1.00	0.87	0.81	0.71	81.1	80.9	78.1	
	460	12.1	16.1	76	F	1.00	0.87	0.81	0.71	81.1	80.9	78.1	
	575	12.1	12.9	61	F	1.00	0.87	0.81	0.71	81.1	80.9	78.1	

*AF 90 standard only



Michigan Department Of Natural Resource Parks Division
 Sewage Pump Station Modifications
 Account #607-75-2450-400

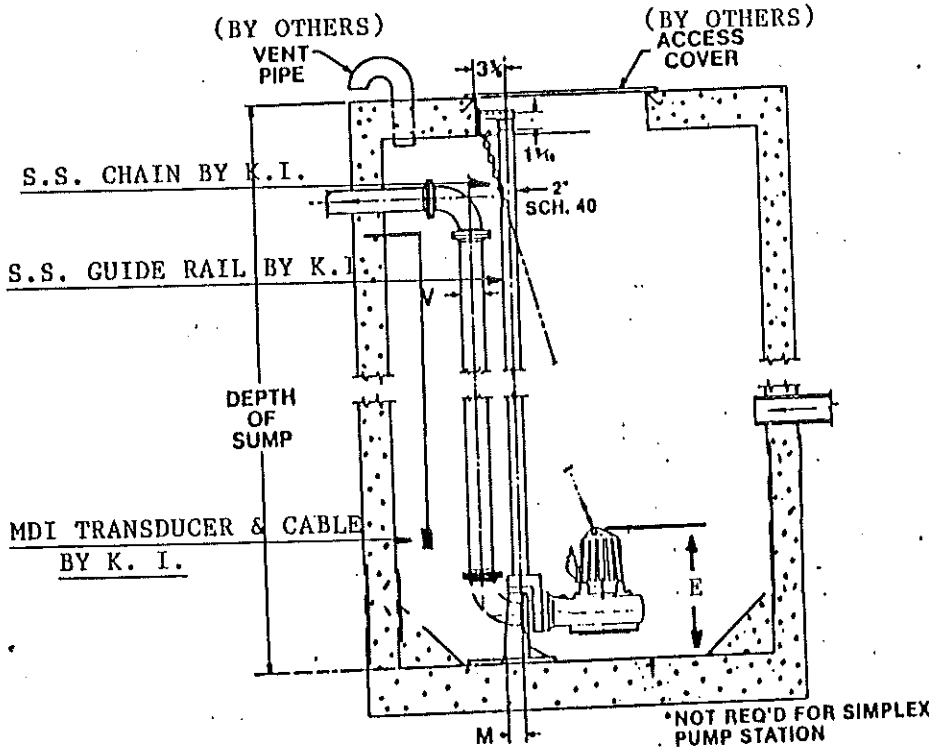
Lift Station #	Location	Sump Depth	Sump Dia.	Height of Pump (From floor to top of pump)	Pump Discharge Size
One	Baraga	16'	6'0"	30.75"	4.0"
Two	Indian Lake	19'1"	6'0"	23.38"	3.0"
Three	Lake Gogebic	12'5"	6'0"	45.00"	4.0"
Four	McClain	7'5"	6'0"	23.38"	3.0"
Five	McClain	6'68"	4'0"	20.56"	1.25"
Six	Muskallonge	13'2"	6'0"	23.38"	3.0"
Seven	Porcupine Mts. Visitors Center	12'18"	6'0"	23.56"	1.25"
Eight	Porcupine Mts. Union Bay New P.S.	11'6"	6'0"	30.75"	4.0"
Nine	Porcupine Mts. Union Bay	11'7"	4'x5.4'	23.38"	3.0"
Eleven	Tahquanemon Falls	11'7"	6'0"	23.38"	3.0"
Twelve	Van Ripper	15'1"	6'0"	23.50"	4.0"

PUMP STATION DIMENSIONS

EXPLOSION PROOF

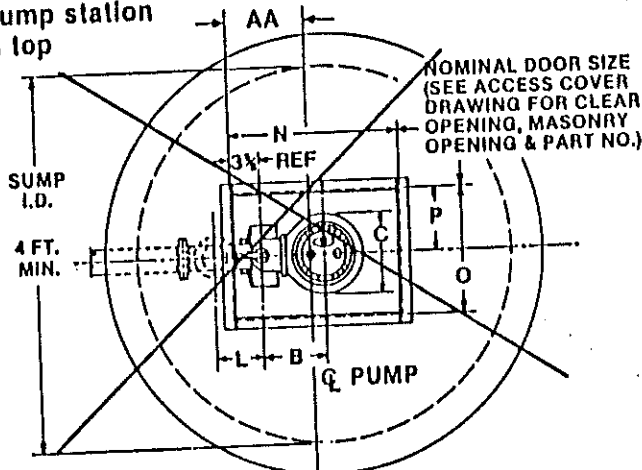
SECT. 200

MODEL:

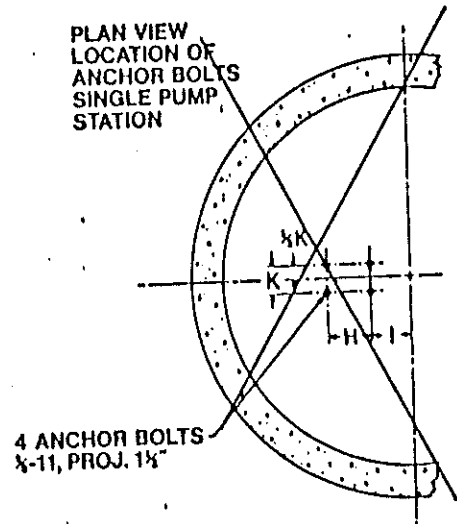


A	10.19		M	1.63
B	12.50	Simplex Pump Station	N	30.00
C	.		O	24.00
D	20.00		P	12.00
E	..		Q	3.00
F	..		R	14.50
G	8.00	Duplex Pump Station	S	24.00
H	6.50		T	48.00
I	1.00		U	30.00
J	21.25		V	4.00
K	4.75	AA	9.50	
L	7.00	BB	11.50	

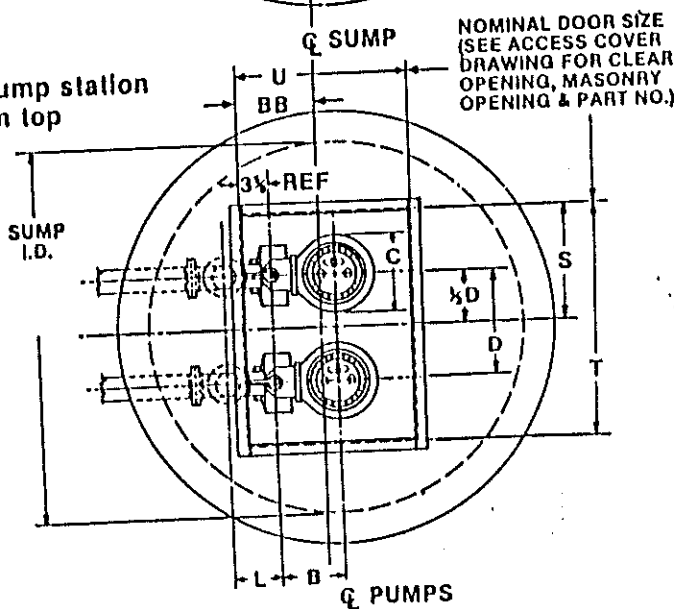
Simplex pump station
View from top



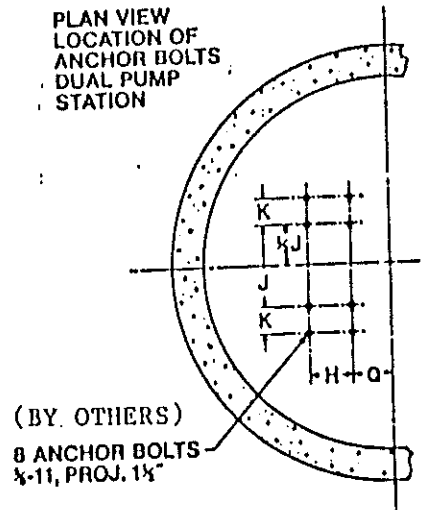
PLAN VIEW
LOCATION OF
ANCHOR BOLTS
SINGLE PUMP
STATION



Duplex pump station
View from top



PLAN VIEW
LOCATION OF
ANCHOR BOLTS
DUAL PUMP
STATION



MDI

MODEL P2DHA

DUPLEX PUMP, VALVE OR GATE CONTROL

WHAT YOU SHOULD KNOW ABOUT THE P2DHA

IT IS

FULL FUNCTION

Pump, gate, or valve control, automatic alternator and alarm actuation all in one unit from a single source.

SIMPLE and INEXPENSIVE TO INSTALL

Field adjustable high and low levels, zero and span.

FULLY AUTOMATIC

Once installed the unit independently monitors level for pump-down operation.

MAINTENANCE FREE

Solid state design allows you to install, then forget about, the P2DHA. No compressors to monitor. No moving parts to wear, break or foul.

SMALL in SIZE

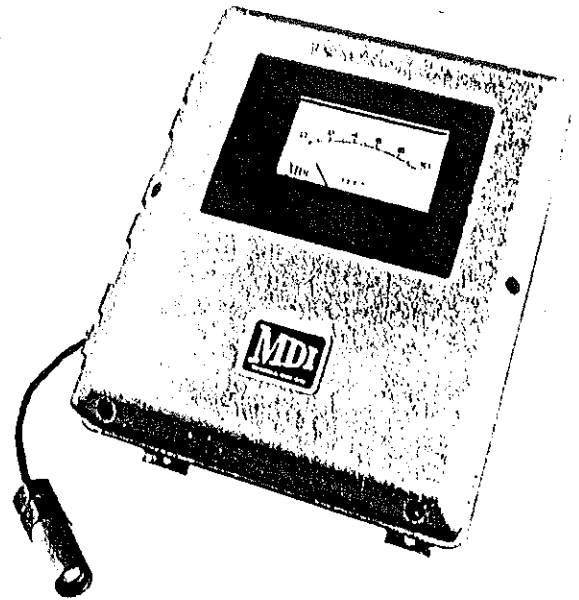
Complete unit, including enclosure, occupies less than 1/2 cubic foot.

ADVANCED in DESIGN

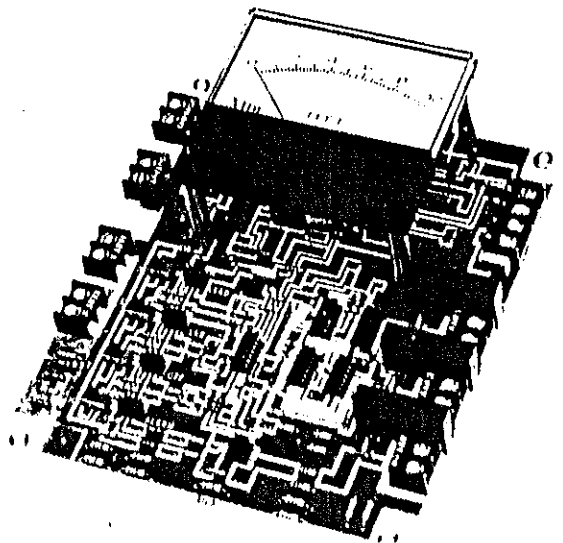
Short-circuit-proof power supply. Directly operates up to NEMA Size 4 magnetic starters.

GENERAL DESCRIPTION

MODEL P2DHA SOLID STATE, FULL FUNCTION PUMP-DOWN DUPLEX PUMP, GATE or VALVE CONTROL COMES STANDARD with HIGH LEVEL ALARM, COMMON OFF POINT, VOLTAGE OUTPUT, ALTERNATION, ALTERNATION DISCONTINUATION and ANALOG INDICATOR. OPTIONS include START-UP TIME DELAY and PUSH-to-TEST features, as well as a NON-METALLIC ENCLOSURE. It is a complete monitoring, indicating and controlling system which may be mounted on site, or remotely. Design simplicity provides straightforward operation and long term reliability resulting in the industry's best price/performance ratio.



PVC Transducer with affixed cable and enclosure option.



P2DHA solid state circuitry.