



Billy

ITT Flygt Corporation

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SUBMITTAL

Lift Station / Equipment

Project: Promenade Harbor
Rockwall, Texas

Engineer: Douphrate & Associates
Rockwall, Texas

Contractor: 4D Construction
Balch Springs, Texas

Supplier: ITT Flygt Corporation
Carrollton, TX 75006-2407
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Date: January 2002.

*Chuck Smith
3-19-2002
Approved except
as noted on last
sheet.*



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Project: Promenade Harbor Rockwall, Texas

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ITT Flygt Corporation

2400 Tarpley Road

Carrollton, Texas 75006-2407

Tel: (972) 418-2400

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GENERAL



Flygt Regional & Branch Offices



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Western Branch Office

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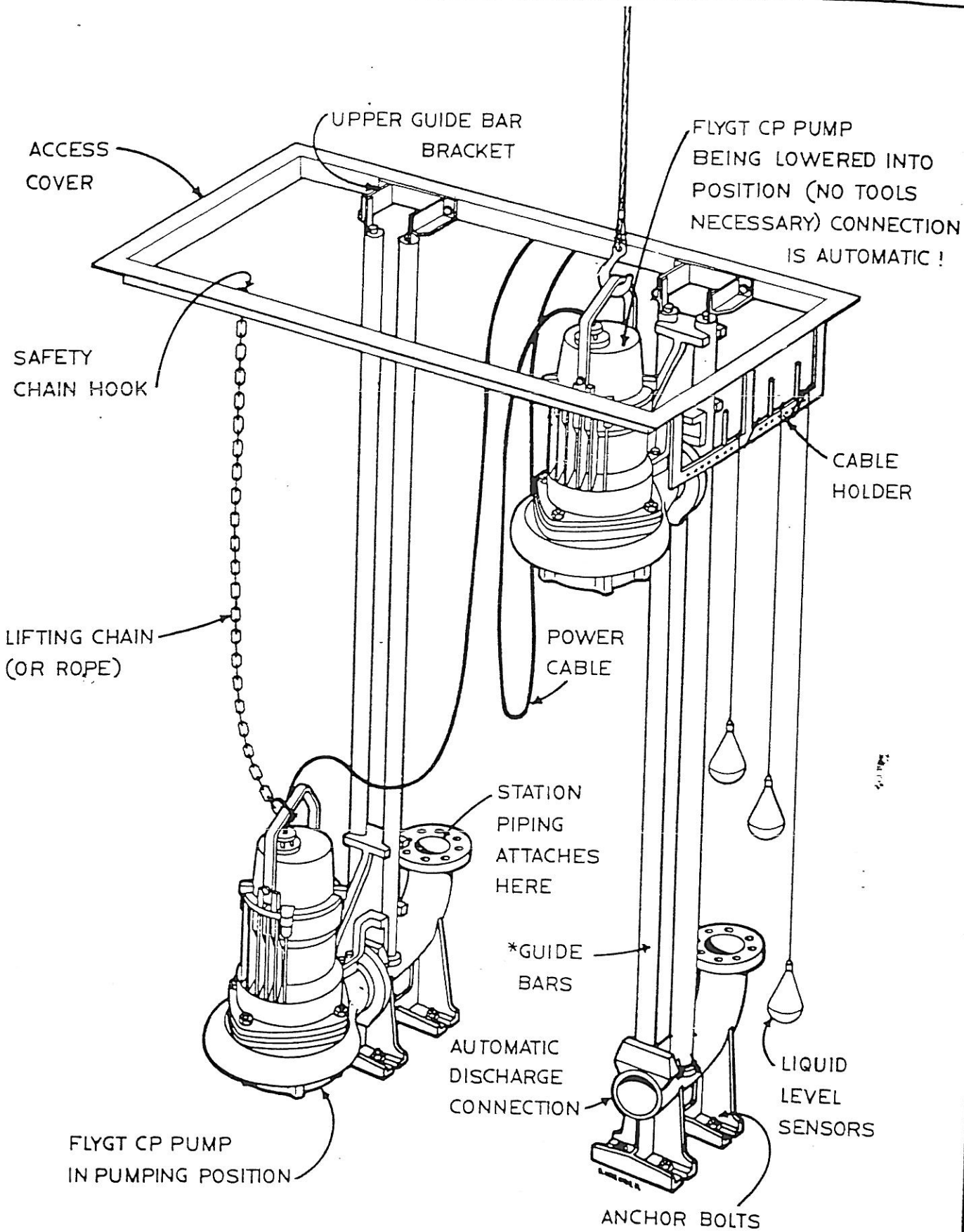
***Requests for additional Catalogs
 must be directed to
 Flygt Regional Offices.**

*Catalogs stocked at Regional Offices only

R - REGIONAL OFFICE
 B - BRANCH OFFICE

A FLYGT DUPLEX "CP" PUMPING STATION

	PAGE
C	40
SUPERSEDES	ISSUED
	JAN 75

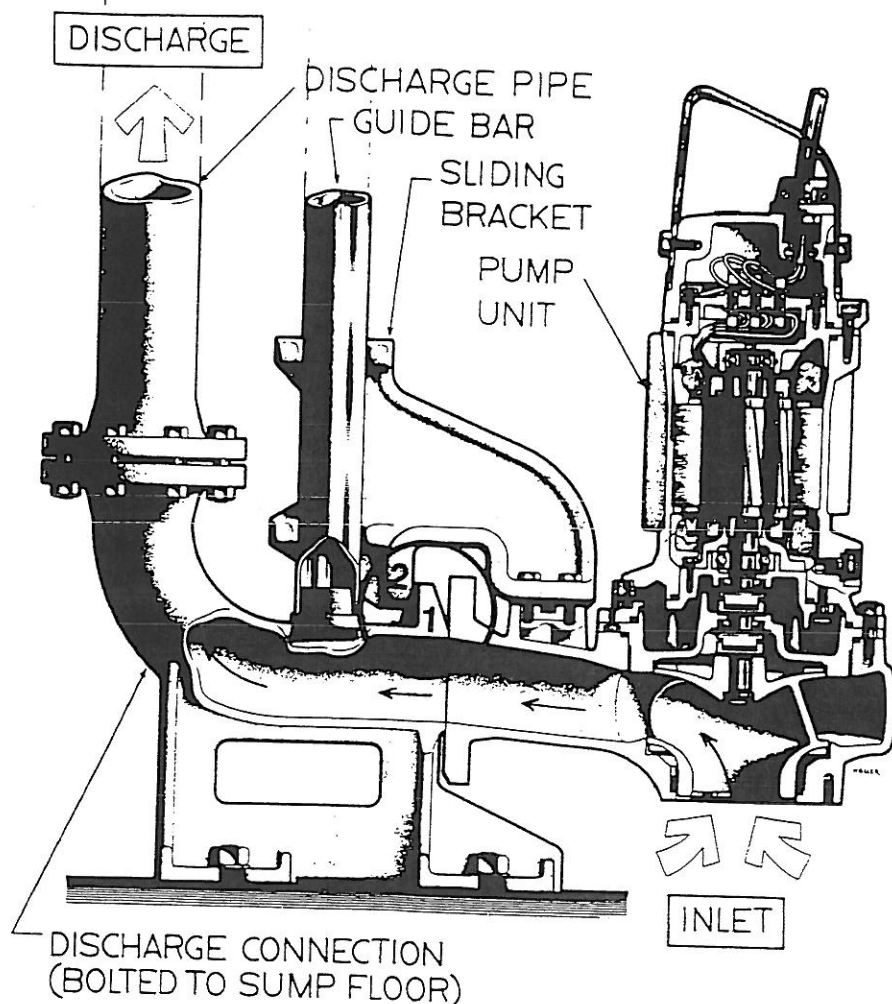


*GUIDE BARS ARE STD PIPE (NOT SUPPLIED)

FLYGT FLYGT CORPORATION
A SUMMARY OF '77
 129 GLOVER AVE., NORWALK, CT. 06856

CF PUMP WITH AUTOMATIC DISCHARGE CONNECTION

Flygt was the first to develop the basic principles of automatic pump connection. The pump is designed to accommodate this method of connection right from the start. The offset distance, total pump weight etc. (total downward forces) are fully calculated to exceed the upward forces created during maximum pressure conditions for all impellers offered. The connection of the pump to the discharge connection is fully automatic by way of an angle on the backside of the discharge flange (1) and the matching angles on the sliding bracket(2). The guidebars do not support any weight as the lifting point is always placed at the pumps center of gravity.



The mating surfaces between pump outlet and discharge inlet are machined for a fully leakproof fit, and as a result never require rubber gaskets which may cause troublesome problems during hook-up or operation. As the metal edges and faces cross and rub each other during hook-up, they will self shear any fibrous materials which may be in the way.

The sliding bracket and discharge connection are designed to fully support the weight of the pump. This design feature eliminates the need for legs or other supports under the pump which could catch rags etc. or prevent hook-up in the event foreign materials have built up on the floor under the pump. As a result, the area under the pump inlet offers unobstructed passage to the flow of liquids and solids.

Factory Mutual approved Flygt pumps ("X" Models) may come with an optional "Safe-slide" assembly. This two part assembly replaces the normal cast iron sliding bracket and flange face with one constructed of brass.

FLYGT "CP" WETWELL DESIGN BASICS

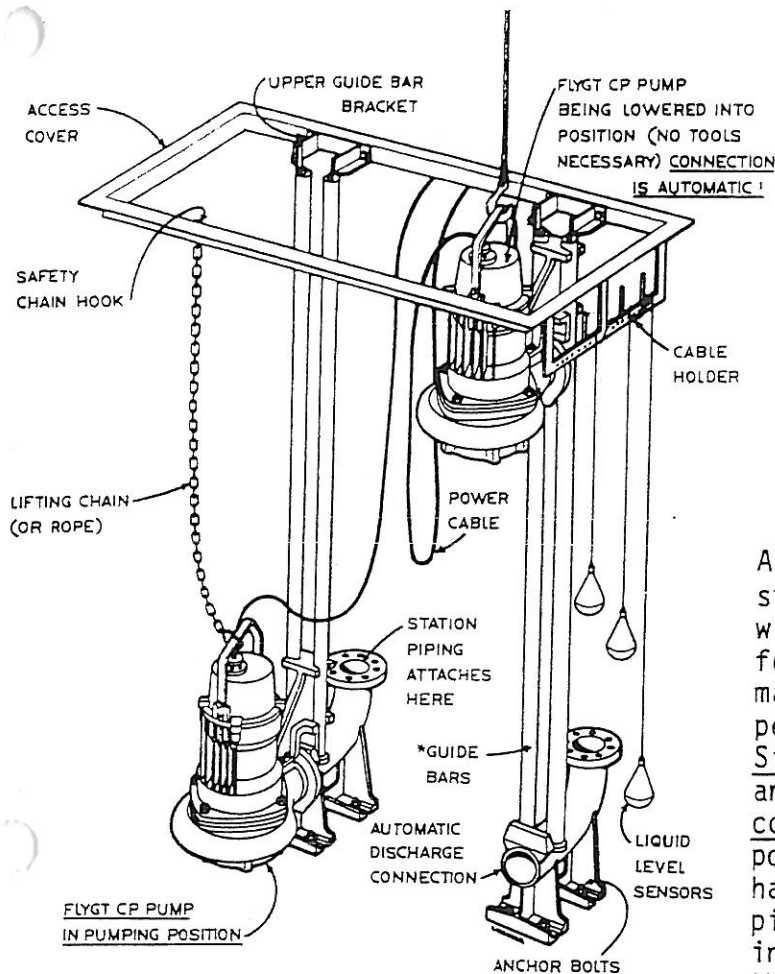


FIG. #1 - TYPICAL "CP" PUMP STATION

Figure 1 shows a typical Flygt duplex "CP" lift station showing most of the parts required for normal operation. Complete plans are available from Flygt, showing suggested installation requirements, dimensions etc. for many of the Flygt models available. Specific plans should of course be followed during the construction phases. This is important as the station must be properly constructed from the start in order to give the long term service expected.

INSTALLATION SAFETY

All Flygt submersible stations are designed with safety in mind for service and maintenance personnel. Simplicity of design and use of heavy duty components reduce the possibility of anyone having to enter the pit where risks of injury are certainly the highest.



Equipment should never be lowered into the well while personnel are stationed within it. Keep the area around the access covers free of cables or other objects which may cause someone to lose their footing or balance at the top. Frequently inspect chain hooks and other brackets attached to the access frame for deterioration from the effects of corrosion. Never use lifting devices which are unapproved, under-rated or faulty in any manner.

ELECTRICAL POWER CABLE CONSIDERATIONS

The electrical power cables are connected to the control panel usually through an electrical conduit. In some situations an explosion proof, water tight disconnect such as a plug type connector or sealed terminal board, may be specified to make removal/installation easier. Electrical disconnects placed in the well are often difficult to obtain or specify due to corrosion, possible explosive nature of the environment, applicable local codes or design practice, possibility of water intrusion as well as electrical demands which affect size, cost and availability of such connectors. If possible the equipment should be shipped to the service station intact with cable attached as this will be helpful to the serviceworker in the over-all repair and checkout. If this is not possible, carefully disconnect the cable from the equipment terminal board, loosen the cable entry and pull the cable out of the unit reinstalling the pump top prior to return for service.

CAUTION: NO ONE SHOULD BE IN PIT WHEN PUMPS ARE BEING HOISTED UP OR DOWN.

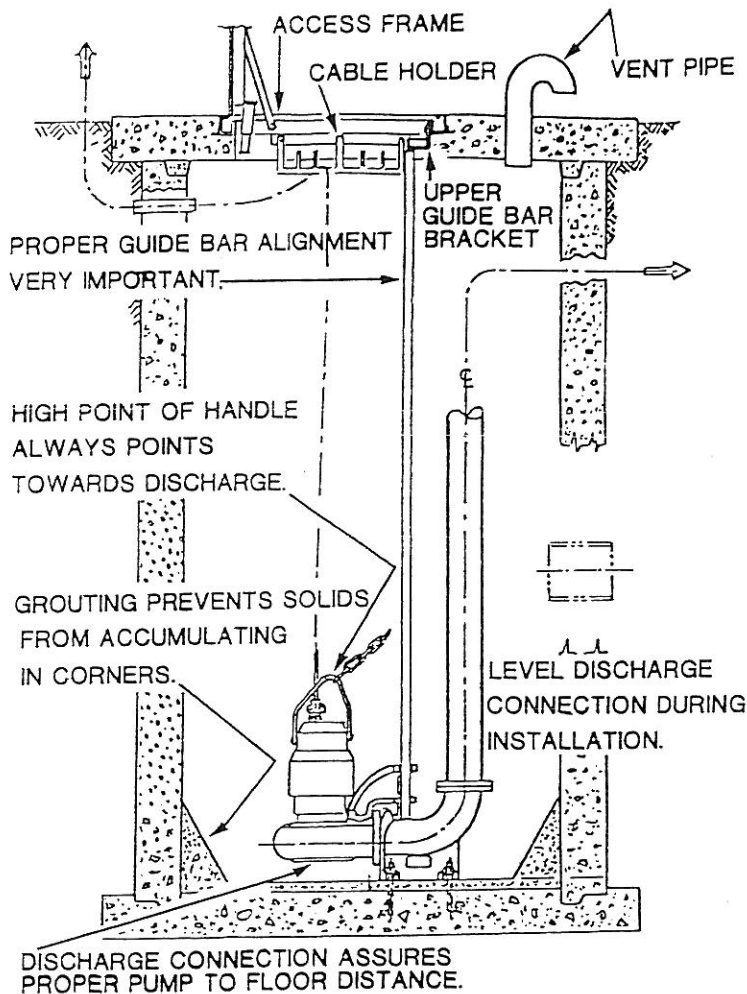


FIG. #4 - IMPORTANT INSTALLATION POINTS - FLYGT "CP" WETWELL

corrosion and submergence found in the bottom of the well. Never use wood for this purpose as it will soon rot, leaving the discharge connection loose and free to vibrate etc. Anchor bolts should be properly sized for the full weight including that of the pump properly installed and tightened.

The guidebars only purpose is to guide the pump to the proper position to "catch" the angular hang point on the top of the discharge connection. After this occurs, the pump must be free to move under its own weight, slightly downward until the pump and discharge connection flanges are fully mated. Slanted guidebars may restrict the pump from moving to the point of full face to face contact. This of course, will result in leakage across the mating surfaces with a reduction in operating efficiency. Be aware that continued operation with leakage across the mating surfaces often results in wear to both machined faces making future leakproof connections impossible.

Along with possible leakage problems, slanted guidebars can also cause the pump to "lock-up" on the guidebars during removal. Improper installation of the pump top or lift handle can cause the same problems. All Flygt pumps are designed to be lifted from their center of gravity. Some models have a "high-point" on their lifting handles which should always be mounted pointing toward the pump discharge.

Guidebars are not normally provided by Flygt and must be purchased locally. Galvanized steel is usually suitable however, stainless steel may provide a longer life under certain corrosive conditions such as wells with higher than usual amounts of salt. Intermediate guidebar brackets are available to provide extra support for longer than usual guidebar lengths.

Practical Limitations

SECTION	PAGE
2	15
SUPERSEDES	ISSUED
12/91	6/94

Your ITT Flygt Pump is designed to provide long and dependable service under adverse conditions. In addition, observation of certain rules and limitations will further improve performance, reduce maintenance costs and extend useful service life. This is a brief description of the most important factors to be taken into consideration. For more detailed information or if in doubt, consult your local ITT Flygt representative.

These limitations generally apply to standard cast iron wastewater pumps (CP, CT, CS) only. Stainless Steel, Warm Liquid, etc. versions require special consideration.

Environmental Temperature Limits

The upper limit for both the pumped liquid and the general surroundings of the pump is 115°F except for Warm Liquid Pumps. For more information contact ITT Flygt Application Engineering.

Volatile Liquids

Volatile liquids vaporize rapidly even at normal (ambient) temperatures and pressures, causing the impeller to become "vapor bound". To prevent vaporizing (flashing), either the inlet pressure (submergence) has to be increased or the temperature reduced. Pumping of volatile liquids which are corrosive or hazardous is neither recommended nor covered by warranty.

Corrosion and Chemical Attack

A ITT Flygt Sewage Pump, while not specifically a chemical pump, can provide reasonable service in mildly corrosive liquids within an approximate pH range of 6.0 to 9.0 (cast iron parts, stainless steel fasteners and synthetic rubber O-ring). It must be noted that although the pH value is a useful guide, it is non-conclusive. If the standard cast iron version does not meet your requirements, refer to Section 8.

Excessive operation or large underwater steel structures nearby (galvanic action) may also accelerate corrosion. Special consideration must be given to industrial contaminants, for example, moderate or localized concentrations of some hydrocarbons, oxidizers, chlorinated compounds, and solvents (aromatics, aliphatics, etc.) will damage cable (oil resistant chloroprene), grommets (neoprene), and o-ring (nitrile rubber). For more information, contact ITT Flygt's Application Engineering department.

Abrasion

When pumping liquids containing abrasive particles, inspect the pump (liquid end and seal) more often. Low pumping rates may result in sedimentation and accumulation of particles in the volute, causing abnormal wear or even clogging. The higher the pumping rate, the higher the friction wear.

Viscosity

Viscosity, or internal resistance of the liquid to flow, is an inherent characteristic of a liquid which may change as a result of foreign material in suspension. Either way viscosities higher than that of water adversely affect performance (head and flow) and may increase power requirement (kW input) beyond the capacity of the motor.

Submergence

In general, a ITT Flygt Wastewater Pump will operate with a minimum of submergence (flooded impeller). Deeper submergence will improve motor cooling for non-jacketed motors and reduce aeration. Depth limitation (submergence) is 65 ft. Deeper submergence is possible, depending on the pump model involved but must have approval of ITT Flygt Application Engineering in order to protect warranty. Avoid submerging pumps in heavy concentrations of sludges.

Voltage

Voltage at the pump terminal board must be within the following ranges:

- 200 volt motor = 180 to 220 volts
- 230 volt motor = 207 to 253 volts
- 460 volt motor = 414 to 506 volts
- 575 volt motor = 518 to 633 volts

Watch for undersized wiring systems or overlong cables which may cause excessive voltage drops. Measurement at the control box under full load is satisfactory if voltage drop in the pump cable is taken into consideration.

Voltage Balance

Proper balance among the three supply-voltage phases applied to the pump motor is vital. A voltage imbalance of only 1% between phases may result in a 6-10% amperage imbalance. This can be in the form of circulating currents internally in the stator which may not appear as line-current differences but will cause excessive stator temperature rise thus substantially shortening motor life or causing a dry burnout. These high temperatures can also affect rotor, bearing and shaft seals.

Motor

The combined effect of voltage, frequency and specific gravity variation may equal (but not exceed) 1.10. To obtain maximum efficiency and avoid undue heat-rise in the motor and consequent reduction of stator, seals and bearing life, the pump should not be subjected to more than 12 to 15 starts per hour, evenly spaced, on a continuous basis. The limitation is based on a nominal in-rush current at peak power input, nominal ambient temperature,

Practical Limitations

depth of submergence, impeller loading, viscosity and specific gravity. The ITT Flygt Engineering Department must be consulted if a greater number of starts per hour is required.

Solids Content

A liquid (usually water) when containing suspended solids in various quantities becomes a "slurry". There are no definite rules governing the pumping of slurries, some combinations are too stiff or viscous to be pumped at relatively low concentrations (clay, bentonite, paper stock)

while others can be pumped with considerable ease at much higher concentrations (coal, silt, sand, dust). In general, maintain a minimum flow velocity necessary to keep the solids in suspension.

Specific Gravity

The power requirement (kW input) of a centrifugal pump increases proportionally with the specific gravity (S.G.) of the liquid. The S.G. may be increased also by the solids content.

Installation Procedures

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SUPERSEDES	ISSUED
2/88	6/90

The faultless functioning of a ITT Flygt Pumping Station will depend upon the correct selection of the pump to suit system requirements and proper installation. A great majority of ITT Flygt Electric Submersible Wastewater Pumps are installed in underground wet pits with Automatic Discharge Connections, Guide Bars and Access Covers as shown in the station drawings. Wet Pits constructed of precast concrete rings offer significant savings in labor costs over poured-in-place concrete, masonry or brick and are universally accepted for use in sanitary or storm sewer systems. Precast concrete sections are available up to 120 inch inside diameter (sometimes up to 144 inch inside diameter) throughout the U.S. and are generally manufactured in accordance with the provisions of ASTM Specification C478.

Because of this, ITT Flygt Corporation's official engineering documentation is based on stations designed in precast concrete circular man-holes. Each individual station drawing shows a suggested Simplex and a suggested Duplex Pumping Station built of precast concrete sections installed between a Bottom Slab and a Top Slab (the Top Slab, usually at ground level, contains the cast-in Access Cover). The configurations and dimensions shown on these Proposed Layouts are suggested minimum requirements only, all details, including sizing of pit, type, size, location and arrangement of valves and piping, etc. are to be specified by the Consulting Engineer and are subject to his approval.

The following is a partial list of useful suggestions for construction and installation. (Please always observe local regulations applicable).

A. Excavation:

Excavate a large enough hole to provide sufficient working room around the station. The outside diameter of the Bottom Slab should be at least one foot larger than that of the concrete sections used.

B. Connecting Pipes:

Provide connecting holes for the Influent Pipe, Effluent Pipe(s) and Cable Thrulets in accordance with the Engineer's specification. Flexible joints outside of concrete wall will reduce the danger of dislocation due to settlement.

C. Backfill:

Backfill gradually and evenly around station after concrete and joints have hardened. Compact backfill to minimize post-installation settlement.

D. Top Slab with Access Cover:

Diameter of Top Slab shall be at least two feet larger than O.D. of ring sections. The Access Cover must be installed and properly oriented in the Top Slab.

1. See Station Drawings for Pump Model and Access Cover location in relation to the centerline of the station.
2. Positioning of the Hinge Side of the Cover (See Accessories Section).
3. The Top Slab and Access Cover must be level.
4. For Heavy Duty Covers (See Accessories Section).

E. Automatic Discharge Connection:

The Automatic Discharge Connection must be attached to the Bottom Slab at the exact location required relative to the Access Cover.

SUGGESTED PROCEDURES:

1. Attach the Upper Guide Bar Bracket(s) to the Access Frame (See Accessories Section). Also, the centerline of the Bracket(s) will determine the centerline of the installed pump(s).
2. Place the pump Discharge Connection(s) on the Bottom Slab and line up as shown in the Accessories Section.
3. Cut to length and install the Guide Bars between the Upper Guide Bar Bracket(s) and Discharge Connection(s).
4. Before securing anchor bolt nuts, check across the Discharge Connection(s) Outlet Flange(s) face with level and shim if necessary. Guide Bars should be Parallel and Vertical.

F. Internal Piping and Manifold:

Use proper gaskets, tighten bolts gradually and evenly. In deep stations, install Discharge pipe Brackets to relieve Discharge Connections from overload and intermediate Guide Bar Brackets to prevent Guide Bars from bending.

Storage

SECTION	PAGE
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SUPERSEDES	ISSUED
6/90	2/96

Each ITT Flygt pump leaves the factory properly assembled and prepared to perform even after a reasonable idle time in storage. However, as prolonged idle time can be detrimental to any rotating machinery, the procedures outlined below should be followed in order to insure that the equipment is in top condition to operate when finally installed. Whenever possible, store pumping units in a dry environment free of extreme temperatures and strong direct sunlight.

NEW pumps:

Storage 6 to 12 months:

In general, rotating machinery left idle for extended periods of time, tends to establish a "set" position due to inaction of the moving parts. Some of these areas may be damaged (especially seals) from the sudden fast breakaway of start-up after a prolonged idle time. To insure that all rotating parts are free for final installation and start-up, it is good practice to rotate the impeller by hand once a month. It is also good practice to relieve the tension on the cable entry sealing grommet by backing off the cable entry compression screws slightly. If this is done, it is most important that a clear note be attached as a reminder to:

Re-Tighten Cable Entry Compression Screws Before Installation.

Storage 12 to 24 months:

In addition to the above, apply a protective spray coating of silicone or rust inhibiting oil to the impeller and inside of the volute by spraying in through the volute outlet and up through the volute inlet. Also coat the volute outlet flange face.

USED pumps:

Before storing a used pump for an extended period of time, the unit should be dismantled, checked for any defects, repaired where necessary and reassembled. At reassembly, follow instructions in the **Service Manual**, especially regarding seal assemblies. Protect the impeller and volute as mentioned in the paragraph above.

In all cases, it is good practice to check all external bolts, nuts and screws for tightness before final installation after extended storage.

CONTROLS:

It is most important to make sure that Electrical Controls, when subjected to extended storage, be stored in a protected dry environment free from any corrosive atmosphere. Moisture in any form, including condensation, can cause serious corrosion problems to the contact point surfaces as well as terminal connections.

Even though all terminal connections have been made tight on initial assembly at the factory, they may not remain 100% tight over an extended storage period due to the compressibility of the copper wire and possible movement due to variations in ambient temperature. The problem will vary in degree depending on wire size and whether the terminal connection is of solid or stranded wire. To insure proper operation, recheck all terminal connection screws for tightness prior to placing the control on line.

Service Policy



General Information

Issued: —

Supersedes: —

The Flygt concept of quality does not end at the factory.

Flygt's ambitions extend much further than the mere delivery of high quality products. The company has built up a nationwide qualified service network to be on hand quickly if an Flygt product should break down.

The sale of the product does not end Flygt's obligation. The Flygt customer needs reliability and operating economy throughout the service life of the product.

Preventive maintenance is of great importance for reliability and economic performance. Instead of running the equipment until it breaks down, with all the inherent high cost of such an occurrence, the equipment should be shut down periodically for a few hours for scheduled maintenance. This should be planned long in advance so as not to interrupt the operation of the plant. The high quality built into the product at the factory is maintained. Performance will also remain at the factory specifications resulting in savings in energy costs.

The quality that the customer has purchased with the product may only stay with the product until the first repair. During every overhaul someone could completely alter the quality of the product. There is only one way to insure that Flygt quality stays with the product, that is to engage Flygt Authorized Service Facilities to perform your maintenance. There are approximately 150 Authorized Service

Facilities throughout the United States. These facilities have met strict Flygt requirements and are inspected annually to assure that they are using the right equipment and techniques. Their key service personnel have attended factory training seminars. These facilities are constantly in touch with the Flygt information system and the Flygt Regional Service Organization for updating and assistance in troubleshooting of products.

Comprehensive Technical Manuals, Parts Lists and Workshop Manuals have been issued for all Flygt products. The Authorized Service Facilities utilize these, along with a Shop Service Manual, for the most up to date repair procedures. These repair facilities will generally supply a field service man within 24 hours to your installation within 100 miles of their service facility. They generally have a 24 hour answering service and are equipped with a sufficient stock of spare parts.

In addition, Flygt Corporation also has highly trained Regional Service Managers from whom you may seek additional guidance regarding troubleshooting and repair of Flygt products.

See the following pages for locations of Authorized Service Facilities and Flygt Regional Service Offices.

Flygt



ITT Industries

Engineered for life

Warranty



General Information

Issued: 6/94

Supersedes: 12/91

1

ITT FLYGT 5 YEAR (10,000 HOUR) PUMP WARRANTY MUNICIPAL: PERMANENT INSTALLATIONS

For the period defined below, ITT FLYGT offers a Commercial Warranty to the original End Purchaser against defects in workmanship and material covering Parts and Labor on its pumps when used in permanent installations, in compliance with the requirements of the ITT FLYGT Catalog and Technical Manual specifications, for use in Sewage Collection Systems or for intermittent (40% duty cycle or less) pumping of Raw Sewage, Municipal Wastewater, Potable or Raw Water, Storm Water or similar, abrasive free non-corrosive liquids ("Qualified Liquids").

ITT FLYGT Pumps used with Qualified Liquids in Sewage Lift Stations are Warranted for 5 years. ITT FLYGT pumps used for Sewage Treatment Processing or for more continuous (41% duty cycle or more) pumping of Qualified Liquids are Warranted for 10,000 hours of operation. Warranty begins on the date of shipment from ITT FLYGT. ITT FLYGT will pay the following share of the cost of replacement parts and labor provided the Pump, with Cable attached, is returned prepaid to an Authorized ITT FLYGT Service Facility for repairs. Cutting Plates and Impellers for FP Pumps are not included in this warranty.

	<u>TIME AFTER SHIPMENT</u>		
Months:	0-18	19-39	40-60
Hours:	0-3000	3000-6500	6500-10,000
Warranty:	100%	50%	25%

Unless otherwise specified by ITT FLYGT Corporate Headquarters, time after shipment shall be determined from shipping date, to date of receipt of defective product (or Warranty Claim) by ITT FLYGT or any of ITT FLYGT's Authorized Service Facilities.

Start-up report and electrical System Schematics (including Bills of Material) will be required to support any Warranty Claims. This Warranty shall not apply to any Product or Part of Product which has been subjected to misuse, accident, negligence, used in a manner contrary to ITT FLYGT's printed instructions or damaged due to a defective power supply, improper electrical protection or faulty installation or repair. The 5 year (or 10,000 hour) Warranty applies to the following Accessories if originally purchased with the pumps: Discharge Connection, Access Cover, HDL Valve, Guide Bar Bracket(s), Starting Control & Power Cable(s).

IMPORTANT: For warranty purposes, Monitoring devices supplied with specific pumps for protection must be connected and utilized. Failure to do so will invalidate the warranty.

ITT FLYGT's sole obligation under this Warranty shall be to Repair, Replace or Grant a Credit Reimbursement at its discretion, through its Warranty Processing Procedures for defective products when returned prepaid to ITT FLYGT and upon ITT FLYGT's exclusive examination found to be defective. Products repaired or replaced under this warranty will be returned freight prepaid.

ITT FLYGT neither assumes, nor authorizes any person or company to assume for it, any other obligation in connection with the sale of its equipment. Any enlargement or modification of this Warranty by a Representative, or other Selling Agent shall become his exclusive responsibility.

ITT Flygt will not be held responsible for travel expenses, rented equipment, outside contractor's fees, unauthorized repair shop expenses, or for pumps purchased or used without ITT Flygt supplied cable or controls unless suitable for the purpose and equal to ITT Flygt cables or controls. The warranties made herein by ITT Flygt are in lieu of any and all other warranties, expressed or implied and the implied warranties of merchantability and fitness for a particular purpose are hereby expressly disclaimed. ITT Flygt assumes no liability for loss of use or for any direct, indirect or consequential damages of any kind in respect to the use or operation of ITT Flygt products, or any equipment or accessories in connection therewith.

THE ITT FLYGT CORPORATION
FUS 6-1994

FLYGT CORPORATION

Pump Start-Up Report Form

This report is designed to insure the customer that customer service and a quality product are the number one priority.

1. Pump Owner's Name: _____
Address: _____
Phone Number: _____
Location of Installation: _____
Person in Charge: _____
Purchased From: _____

2. Model Number: _____ Serial Number: _____
Model Number: _____ Serial Number: _____
Model Number: _____ Serial Number: _____
Model Number: _____ Serial Number: _____

Voltage: _____ Phase: _____ Horsepower: _____
Rotation: Direction of impeller rotation (use C/W for clockwise, CC/W for counter clockwise direction) _____ Note: Observe starting rotation before submergence.
Does impeller turn freely by hand? _____ Yes _____ No

3. Condition of Equipment: _____ Good _____ Fair _____ Poor
Condition of Cable Jacket: _____ Good _____ Fair _____ Poor
Resistance of cable and pump motor (measured at pump control)
Red/Black: _____ ohms Red/White: _____ ohms White/Black: _____ ohms
Resistance of ground circuit between control panel and outside of pump: _____
Meg ohm check of cable and motor insulation:
Red to Ground: _____ White to Ground: _____ Black to Ground: _____

4. Liquid being pumped: _____
Debris in bottom of tank / station? _____ Yes _____ No
Was debris removed in your presence? _____ Yes _____ No
Is guide rail system installed properly and secure? _____ Yes _____ No

5. Control Panel Manufacture: _____
Model / Serial Number: _____
Short Circuit Protection: _____ Type: _____
Number and size of short circuit device(s): _____ Amp rating: _____
Overload type: _____

Do protection devices comply with pump motor amp rating? _____ Yes _____ No
Are all connections tight? _____ Yes _____ No
Is the interior of the panel dry? _____ Yes _____ No (if no, correct the problem.)

6. Electrical Readings:

Single Phase:

Voltage supply at panel line connection (Pump off) L1-- L2: _____
Voltage supply at panel line connection (Pump on) L1-- L2: _____
Amperage: Load connection(Pump on) L1: _____ L2: _____

Three Phase:

Voltage supply at panel line connection (Pump off) L1-- L2: _____
L1 - L2: _____ L2 - L3: _____ L3 - L1: _____
Voltage supply at panel line connection (Pump on)
L1 - L2: _____ L2 - L3: _____ L3 - L1: _____
Amperage at load connection: L1: _____ L2: _____ L3: _____
Is amperage within name plate amperage rating? _____ Yes _____ No

7. Pump Sensor(s) Readings: (Readings should be taken disconnected from control panel)

Motor thermal sensor resistance (bi-metallic) _____ ohms (max 1 ohms)
Lower bearing sensor resistance (PT- 100) _____ ohms (80 to 100 ohms)
Stator leakage sensor (Float) _____ ohms (1500 ohms max)
Motor leakage sensor resistance (FLS) _____ ohms (1500 ohms max)
(Leakage float is 1500 ohms in safe mode / 330 ohms in the fail mode)

8. Liquid Level Controls

Are controls installed away from turbulence? _____ Yes _____ No

9. Final Check

Is the pump seated on discharge connection properly? _____ Yes _____ No
Was the pump discharge checked for leaks while pumping? _____ Yes _____ No
Do check valves operate properly? _____ Yes _____ No
Are pump(s) noisy while operating under load? _____ Yes _____ No

Comments: _____

Has operator received pump instructions & C&M manuals: _____ Yes _____ No

Name / Address of local Flygt repair Center: _____

I have received the above information: _____ Yes _____ No

Name of operator: _____

Name of company: _____

I certify that this report to be accurate (signed by): _____

Employed by: _____

Date and time of start-up: _____



ITT Flygt Corporation

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Carrollton, Texas 75006-2407

Tel: (972) 418-2400

Fax: (972) 416-9570

PUMPS





PERFORMANCE CURVE

PRODUCT
CP3127.180

TYPE
HT

DATE
2002-01-24

PROJECT

CURVE NO
63-483-00-3755

ISSUE
3

	1/1-LOAD	3/4-LOAD	1/2-LOAD
POWER FACTOR	0.89	0.87	0.81
EFFICIENCY	83.5 %	85.0 %	84.5 %
MOTOR DATA	---	---	---

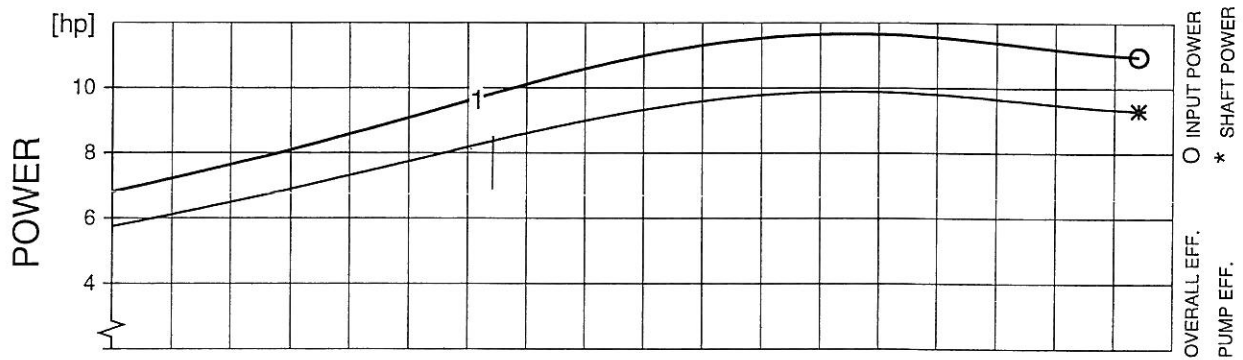
RATED POWER	10	hp
STARTING CURRENT ...	64	A
RATED CURRENT ...	13	A
RATED SPEED	1735	rpm
TOT.MOM.OF INERTIA ...	0.12	kgm2
NO. OF BLADES	1	

IMPELLER DIAMETER 228 mm		
MOTOR #	STATOR	REV
21-12-4AL	12YSER	10
FREQ.	PHASES	VOLTAGE
60 Hz	3	
GEARTYPE		RATIO
---		---

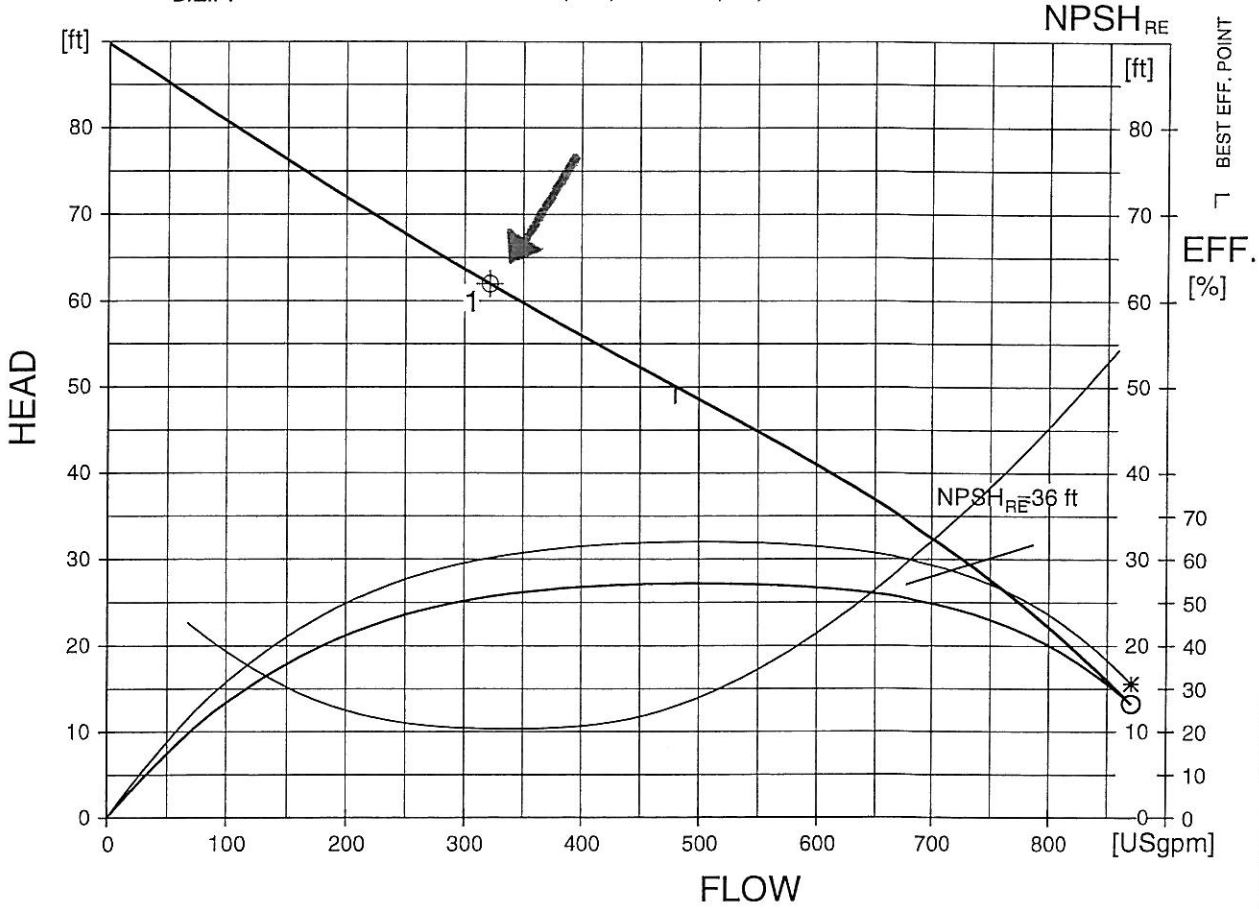
COMMENTS

INLET/OUTLET
- /100 mm

IMP. THROUGHLET
76 mm



DUTY-POINT	FLOW[USgpm]	HEAD[ft]	POWER [hp]	EFF. [%]	NPSH[ft]
1	321	62.0	9.83 (8.38)	51.3 (60.2)	10.4
B.E.P. 2	480	50.0	11.2 (9.5)	54.3 (64.0)	13.0



FLYPS2.1 (20010611)

Performance with clear water and ambient temp 40 °C



CURVE



ITT Flygt Corporation
2400 Tarpley Road
Carrollton, Texas 75006-2407
Tel: (972) 418-2400
Fax: (972) 416-9570

BILL OF MATERIALS

Project: Promenade Harbor
Rockwall, Texas

Contractor: 4D Construction
Balch Springs, Texas

Attention: Jason

Qty Description

2	ITT Flygt Model CP3127.180 / 483 HT Impeller, Submersible, Non-Clog Pump. 200GPM @ 62'TDH - 1750RPM - 10HP/230V/3PH, 40' Cable
2	4" Cast Iron Discharge Elbows
4	ENM - 10 Liquid level Sensors
2	Safety Chain Hook - Stainless Steel
2	3/16" x 11' - Stainless Steel Chain
2	2" Upper Guide Bar Brackets
2	FLE-O-6 30 x 48
1	Cable Holder - Stainless Steel
1	Duplex Control Panel
1	Start-up Assistance
1	Freight



C-3127

Section 3



Impeller/Motor/Nominal Sizes

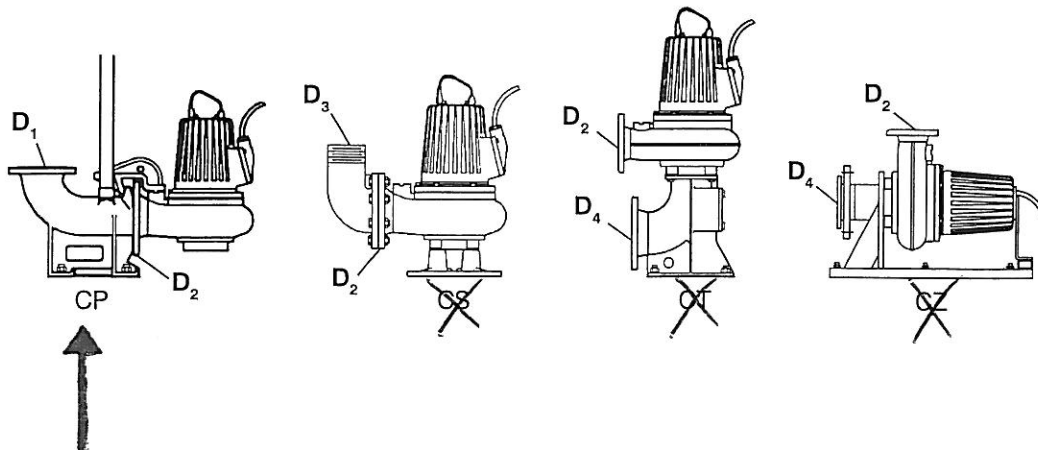
Issued: 8/00

Supersedes: 7/96

PUMP MODEL	IMPELLER CODE	HP RATING				VAC	D1	D2	D3	D4
		CP	CS	CT	CZ					
3127 3Ø	411 LT	10.0	10.0	--	--	200 230/460 575	8"	6"	6"	--
	412 LT	7.5	7.5	7.4	7.4		8"	6"	8"	8"
	432 MT	10.0	10.0	--	--		4"	4"	4"	--
	433 MT	7.5,10	7.5,10	7.4	7.4		6"	6"	6"	6"
	434 MT	7.5,10	7.5,10	6.4	6.4		8"	6"	6"	--
	436 MT	7.5,10	7.5,10	6.4	6.4		8"	6"	6,8"	--
	442 LT	10.0	10.0	--	--		4"	4"	4"	--
	481 HT	10.0	10.0	--	--		4"	4"	4"	--
	483 HT	10.0	10.0	--	--		4"	4"	4"	--
	484 HT	10.0	10.0	--	--		4"	4"	4"	--
485 HT	7.5	7.5	7.4	7.4	4"	4"	4"	4"		

PUMP MODEL	IMPELLER CODE	HP RATING		VAC	D1	D2	D3	D4
		CP	CS					
3127 1Ø	412 LT	7.4	7.4	230	8"	6"	6,8"	--
	433 MT	7.4	7.4		4"	4"	4"	--
	434 MT				6"	6"	6"	--
	462 HT	7.4	7.4		4"	4"	4"	--
	463 HT				4"	4"	4"	--
	484 HT				4"	4"	4"	--
485 HT	4"			4"	4"	--		

LT= High Volume MT= Standard HT= High Head



C/N-3127

Section 6



Electrical Data

Issued: 4/00

Supersedes: 5/97

Motor Data

RATED OUTPUT POWER		Ø	VOLTS NOM.	FULL LOAD AMPS	LOCKED ROTOR AMPS	LOCKED ROTOR KVA	LOCKED ROTOR CODE LETTER	RATED INPUT POWER kW	POLES/RPM
HP	(kW)								
6.4	(4.8)	3	200	21.0	138	48	G	5.7	4/1750
			230	18.0	120				
			460	9.0	60				
			575	7.2	48				
7.4	(5.5)	3	200	22.0	173	60	G	6.5	4/1750
			230	19.0	150				
			460	9.6	75				
			575	7.7	60				
7.4	(5.5)	1	230	30.0	58	13	A	6.6	4/1750
7.5	(5.6)	3	200	23.0	138	48	G	6.7	4/1740
			230	20.0	120				
			460	10.0	60				
			575	8.0	48				
10.0	(7.5)	3	200	29.0	173	60	G	8.9	4/1745
			230	26.0	150				
			460	13.0	75				
			575	10.0	60				

PUMP MOTOR HP	EFFICIENCY			POWER FACTOR		
	100% LOAD	75% LOAD	50% LOAD	100% LOAD	75% LOAD	50% LOAD
6.4	84.0	83.0	80.0	0.82	0.77	0.66
7.4 3Ø	85.0	84.0	81.0	0.84	0.77	0.71
7.4 1Ø	83.0	84.5	83.0	0.96	0.99	0.99
7.5	84.0	84.0	80.0	0.84	0.80	0.72
10.0	84.0	85.0	84.0	0.87	0.85	0.77

Cable Data

HP	VOLTS	MAX. LENGTH FT.	CABLE SIZE/ NOMINAL DIA.	CONDUCTORS (IN ONE CABLE)	PART NUMBER
6.4	200	150	10/3-2-1-GC 21.3mm (0.84")	(3) 10 AWG (PWR) (2) 12 AWG (CTRL) (1) 10 AWG (GND) (1) 12 AWG (GC)	94 21 06
	230	205			
	460	815			
	575	1275			
7.4 or 7.5 3Ø	200	135	8/3-2-1-GC 28.2mm (1.11")	(3) 8 AWG (PWR) (2) 10 AWG (CTRL) (1) 8 AWG (GND) (1) 10 AWG (GC)	94 21 08
	230	170			
	460	710			
	575	1110			
7.4 1Ø	230	140	8/3-2-1-GC 28.2mm (1.11")	(3) 8 AWG (PWR) (2) 10 AWG (CTRL) (1) 8 AWG (GND) (1) 10 AWG (GC)	94 21 08
10.0	200	165			
10.0	230	135	10/3-2-1-GC 21.3mm (0.84")	(3) 10 AWG (PWR) (2) 12 AWG (CTRL) (1) 10 AWG (GND) (1) 12 AWG (GC)	94 21 06
	460	535			
	575	870			

CP/NP-3127

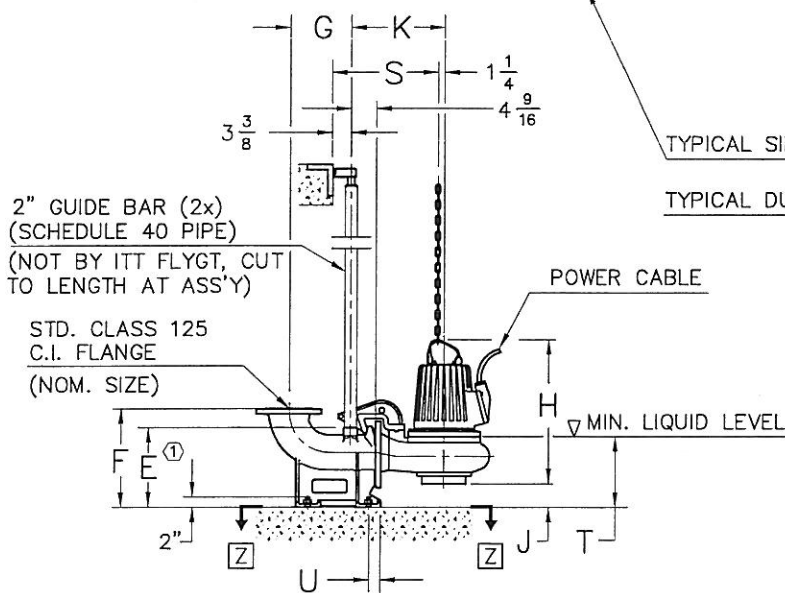
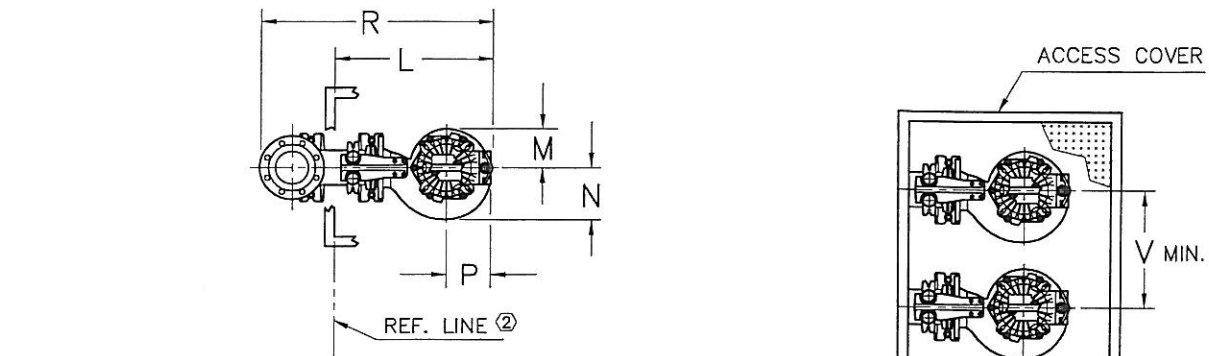
Section 4



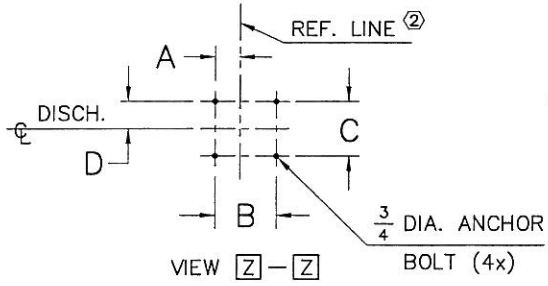
Outline Dimensions

Issued: 11/00

Supersedes:



- NOTES:
1. DIM. TO ENDS OF GUIDE BARS.
 2. REPRESENTS CLEAR INSIDE EDGE OF ACCESS FRAME OR OPENING.
 3. SEE STATION DWG. FOR COMPLETE INSTALLATION DIMENSIONS.



NOM. SIZE	TYPE	VERSION	WEIGHT(LBS)	
			PUMP	DISCH
4"	CP	HT	285	80
4"	CP/NP	MT	315	80
* 6"	NP	MT	315	120
** 6"	CP/NP	MT	315	120
8"	CP/NP	LT	340	145
8"	CP/NP	MT	315	145

* WITH 4" DIA. INLET
 ** WITH 6" DIA. INLET

ALL DIMENSIONS IN INCHES

TYPE	NOM. SIZE	VERSION	DIMENSIONAL CHART																		
			A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V
CP	4"	HT	2 3/4	9 7/8	8	4	10 1/4	15 3/4	10	25	3 1/4	16 3/4	28 1/2	7 3/4	9 1/4	8 1/4	39 1/4	19	11	2 3/4	20
CP/NP	4"	MT	2 3/4	9 7/8	8	4	10 1/4	15 3/4	10	26	3	16 3/4	28 1/2	7 1/4	8 1/2	8 1/4	39 1/4	19	12	2 3/4	20
* NP	6"	MT	4 1/2	11	10	5	14 1/2	17 3/4	11	26	5 3/4	16 3/4	28 1/2	8 1/2	8 1/2	8	41 3/4	19	15	2 1/4	21 3/4
** CP/NP	6"	MT	4 1/2	11	10	5	14 1/2	17 3/4	11	26	4 1/4	16 3/4	28 1/2	7 1/4	8 1/2	8 1/4	41 3/4	19	13	2 1/4	21 3/4
CP/NP	8"	LT	5 1/2	11	10	5	15	17 3/4	12 1/4	26 3/4	4 1/4	18 1/2	30 1/4	7 1/4	10	8 1/2	45 3/4	20 1/2	14	2 1/4	21 3/4
CP/NP	8"	MT	5 1/2	11	10	5	15	17 3/4	12 1/4	26	4 1/4	16 3/4	28 1/2	7 1/4	8 1/2	8 1/4	44	19	13	2 1/4	21 3/4

CP/NP-3127

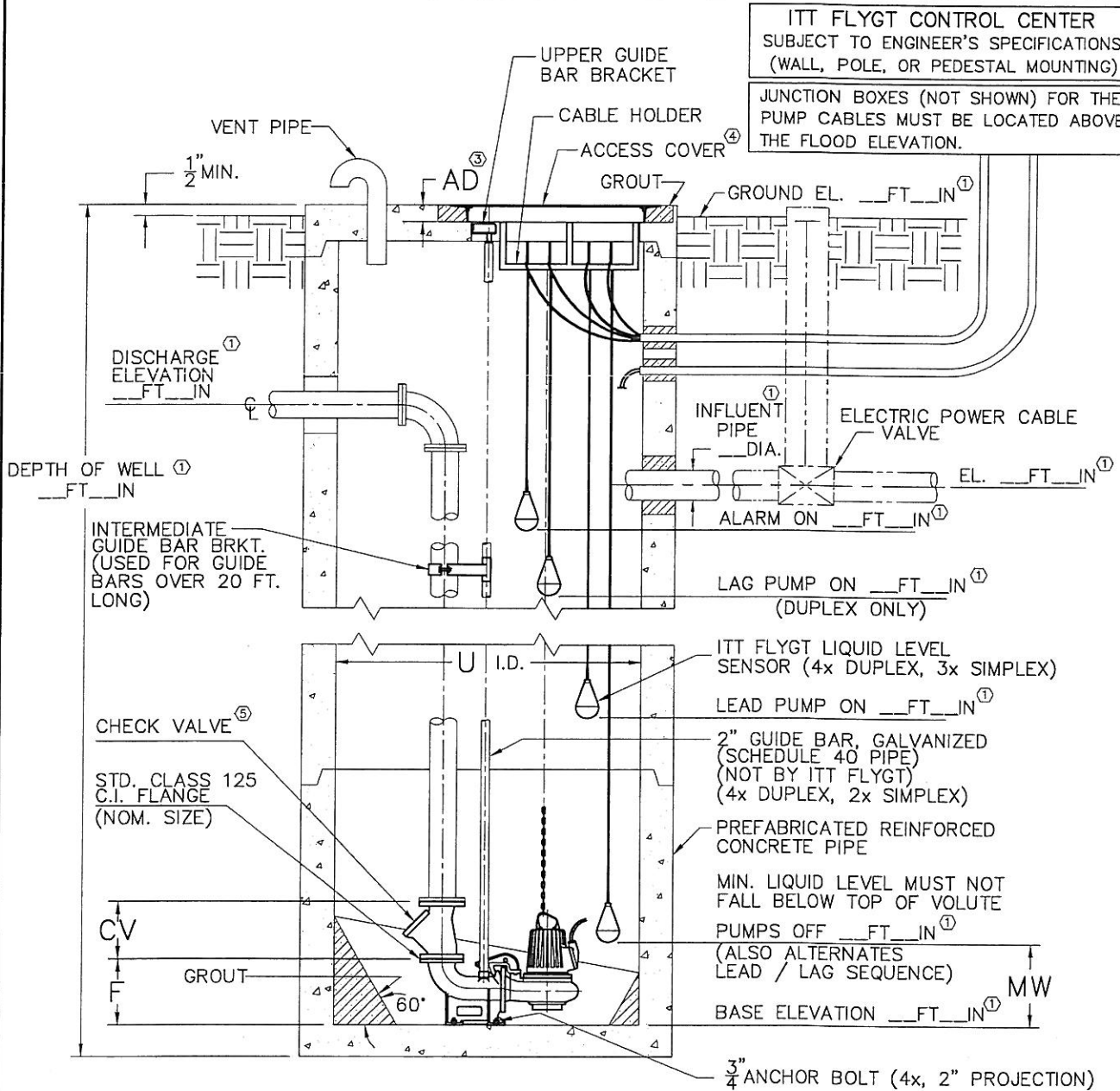
e-Catalog



Lift Station Dimensions

Issued: 02/01

Supersedes: 04/96



○ NOTES:

1. INDICATES INFORMATION TO BE DETERMINED BY OTHERS.
2. LOCATE ANCHOR BOLTS USING CLEAR INSIDE EDGE OF ACCESS FRAME AND CENTER LINE OF PUMP AS REF. POINT. BOLT LOCATIONS MUST BE HELD TO MAINTAIN EXACT POSITION OF PUMP RELATIVE TO ACCESS FRAME.
3. GROUT OPENING FOR ACCESS FRAME.
4. COVER SHOWN IS FOR STANDARD DUTY ANGLE FRAME. FOR ADDITIONAL DIMENSIONS ON STANDARD DUTY TROUGH FRAME, HEAVY DUTY ANGLE FRAME AND HEAVY DUTY TROUGH FRAME, CONSULT ITT FLYGT CORP. ENGINEERING DEPT.
5. CONFIGURATION AND DIMS. SHOWN ARE SUGGESTED REQUIREMENTS ONLY. ALL DETAILS, INCLUDING SIZING OF PIT, TYPE, LOCATION AND ARRANGEMENT OF VALVES AND PIPING, ETC. ARE TO BE SPECIFIED BY THE CONSULTING ENGINEER AND ARE SUBJECT TO HIS APPROVAL.
6. FOR PUMP DIMENSIONS REFER TO DIMENSIONAL DRAWING.

CP/NP-3127

e-Catalog

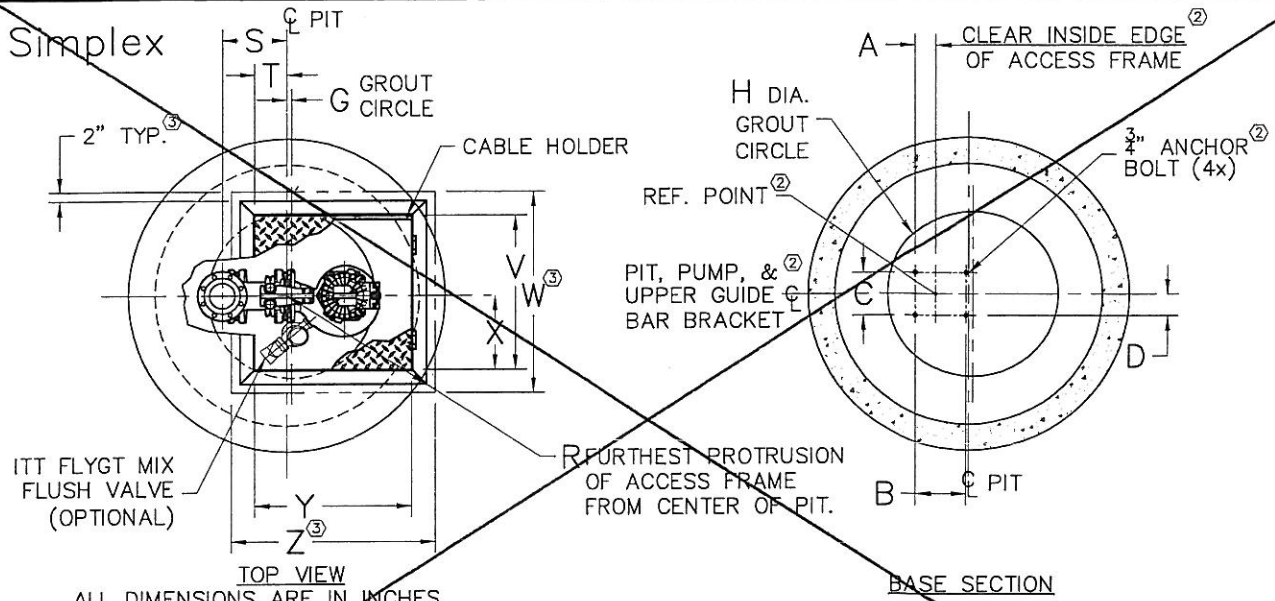
FLYGT

Lift Station Dimensions

Issued: 02/01

Supersedes: 04/96

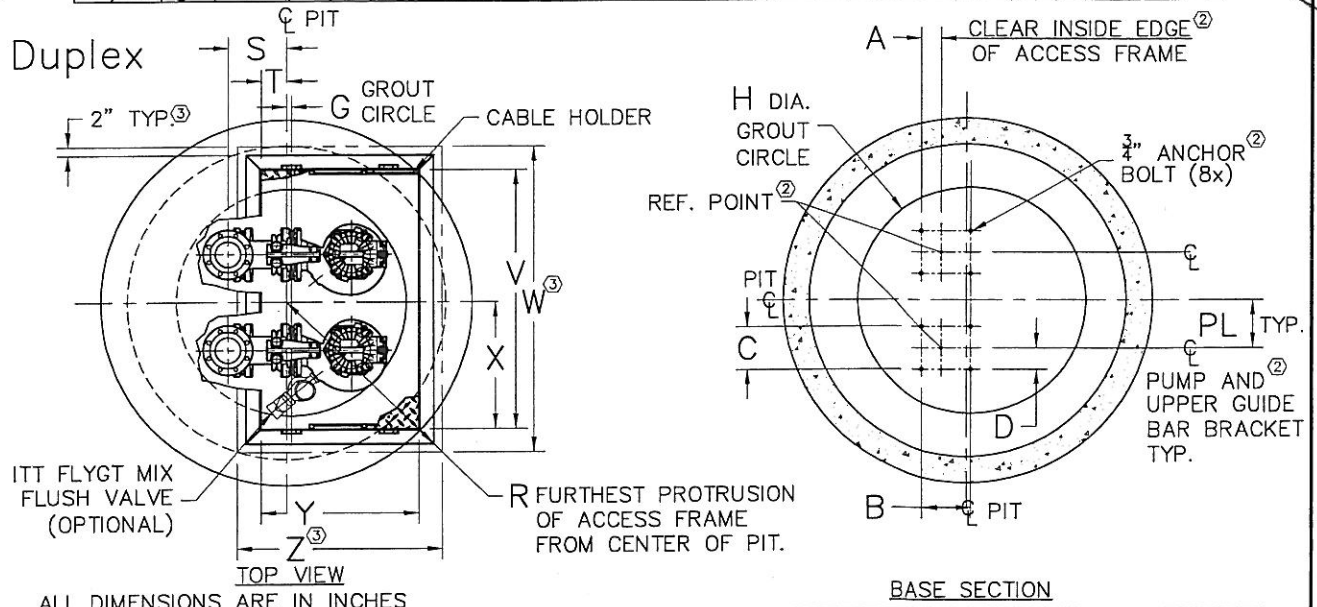
Simplex



ALL DIMENSIONS ARE IN INCHES

MODEL	NOM. SIZE	VERSION	STATION													COVER						
			A	B	C	D	F	G	H	R	S	T	U	C	V	M	W	SIZE	V	W	X	Y
CP	4"	HT	2 1/4	9/8	8	4	15 1/2	1	38	35 1/2	16 1/2	10	60	11 1/2	11	FLE-7 36 x 36	33 1/2	47	17	33 1/2	47	4
CP/NP	4"	MT	2 1/4	9/8	8	4	15 1/2	1	38	35 1/2	16 1/2	10	60	11 1/2	12	FLE-7 36 x 36	33 1/2	47	17	33 1/2	47	4
NP	6"	MT	4 1/4	11	10	5	17 1/2	1	38	37 1/2	14 1/2	7 1/2	60	14	15	FLE-7 36 x 36	33 1/2	47	17	33 1/2	47	4
CP/NP	6"	MT	4 1/4	11	10	5	17 1/2	1	38	37 1/2	14 1/2	7 1/2	60	14	13	FLE-7 36 x 36	33 1/2	47	17	33 1/2	47	4
CP/NP	8"	LT	5 1/2	11	10	5	17 1/2	1	42	37 1/2	16	7 1/2	72	19 1/8	14	FLE-7 36 x 36	33 1/2	47	17	33 1/2	47	4
CP/NP	8"	MT	5 1/2	11	10	5	17 1/2	1	42	37 1/2	16	7 1/2	72	19 1/8	13	FLE-7 36 x 36	33 1/2	47	17	33 1/2	47	4

Duplex



ALL DIMENSIONS ARE IN INCHES

MODEL	NOM. SIZE	VERSION	STATION													COVER							
			A	B	C	D	F	G	H	R	S	T	U	C	V	M	W	PL	SIZE	V	W	X	Y
CP	4"	HT	2 1/4	9/8	8	4	15 1/2	1	47	41 1/2	15 1/2	8 1/2	60	11 1/2	11	10	FLE-8 36 x 48	45 1/2	59	25	33 1/2	47	4
CP/NP	4"	MT	2 1/4	9/8	8	4	15 1/2	1	47	41 1/2	15 1/2	8 1/2	60	11 1/2	12	10	FLE-8 36 x 48	45 1/2	59	25	33 1/2	47	4
NP	6"	MT	4 1/4	11	10	5	17 1/2	1	52	46 1/2	13 1/2	5 1/2	72	14	15	11	FLED-13 36 x 60	57	71	29	32	47	4
CP/NP	6"	MT	4 1/4	11	10	5	17 1/2	1	52	46 1/2	13 1/2	5 1/2	72	14	13	11	FLED-13 36 x 60	57	71	29	32	47	4
CP/NP	8"	LT	5 1/2	11	10	5	17 1/2	1	55	44 1/2	17 1/2	8 1/2	72	19 1/8	14	11	FLED-13 36 x 60	57	71	29	32	47	4
CP/NP	8"	MT	5 1/2	11	10	5	17 1/2	1	55	44 1/2	17 1/2	8 1/2	72	19 1/8	13	11	FLED-13 36 x 60	57	71	29	32	47	4

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Section 7



Performance Specifications

Issued: 9/00

Supersedes: 5/97

REQUIREMENTS

Furnish and install 2 submersible non-clog wastewater pump(s). Each pump shall be equipped with an 10 HP submersible electric motor connected for operation on 230 volts, 1 phase, 60 hertz, 4 wire service, with 40 feet of submersible cable (SUBCAB) suitable for submersible pump applications. The power cable shall be sized according to NEC and ICEA standards and have P-MSHA Approval. The pump shall be supplied with a mating cast iron 4 inch discharge connection and be capable of delivering 200 GPM at 67 TDH. An additional point on the same curve shall be 410 GPM at 55 feet total head. Shut off head shall be 90 feet (minimum). Each pump shall be fitted with 11 feet of 3/16 lifting chain or ~~stainless steel cable~~. The working load of the lifting system shall be 50% greater than the pump unit weight.

PUMP DESIGN

The pump(s) shall be automatically and firmly connected to the discharge connection, guided by no less than two guide bars extending from the top of the station to the discharge connection. There shall be no need for personnel to enter the wet-well. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. **Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable.** No portion of the pump shall bear directly on the sump floor.

PUMP CONSTRUCTION

Major pump components shall be of grey cast iron, ASTM-A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. All exposed nuts or bolts shall be AISI type 304 stainless steel construction. All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.

Sealing design shall incorporate **metal-to-metal contact** between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit.

Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be

considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.

COOLING SYSTEM

Motors are sufficiently cooled by the surrounding environment or pumped media. A water jacket is not required.

CABLE ENTRY SEAL

The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of a single cylindrical elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the body containing a strain relief function, separate from the function of sealing the cable. The assembly shall provide ease of changing the cable when necessary using the same entry seal. **The cable entry junction chamber and motor shall be separated by a stator lead sealing gland or terminal board, which shall isolate the interior from foreign material gaining access through the pump top. Epoxies, silicones, or other secondary sealing systems shall not be considered acceptable.**

MOTOR

The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable. The motor shall be designed for continuous duty handling pumped media of 40°C (104°F) and capable of up to 15 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum. Thermal switches set to open at 125°C (260°F) shall be embedded in the stator lead coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The junction chamber containing the terminal board, shall be hermetically sealed from the

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Section 7



Performance Specifications

Issued: 9/00

Supersedes: 5/97

motor by an elastomer compression seal. Connection between the cable conductors and stator leads shall be made with threaded compression type binding posts permanently affixed to a terminal board. The motor and the pump shall be produced by the same manufacturer.

The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15. The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation up to 40°C (104°F) ambient and with a temperature rise not to exceed 80°C. A performance chart shall be provided upon request showing curves for torque, current, power factor, input/output kW and efficiency. This chart shall also include data on starting and no-load characteristics.

The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chloroprene rubber. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet.

The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve from shut-off through run-out.

BEARINGS

The pump shaft shall rotate on two bearings. Motor bearings shall be permanently grease lubricated. The upper bearing shall be a single deep groove ball bearing. The lower bearing shall be a two row angular contact bearing to compensate for axial thrust and radial forces. **Single row lower bearings are not acceptable.**

MECHANICAL SEAL

Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The seals shall operate in an lubricant reservoir that hydrodynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and the lubricant chamber, shall contain one stationary and one positively driven rotating, corrosion resistant **tungsten-carbide** ring. The upper, secondary seal unit, located between the lubricant chamber and the motor housing, shall contain one stationary and one positively driven rotating, corrosion resistant **tungsten-carbide** seal ring. Each seal interface shall be held in contact by its own spring

system. The seals shall require neither maintenance nor adjustment nor **depend on direction of rotation for sealing**. The position of both mechanical seals shall depend on the shaft. Mounting of the lower mechanical seal on the impeller hub will not be acceptable. For special applications, other seal face materials shall be available.

The following seal types shall not be considered acceptable nor equal to the dual independent seal specified: shaft seals without positively driven rotating members, or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces. No system requiring a pressure differential to offset pressure and to effect sealing shall be used.

Each pump shall be provided with an lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and inspection plug, with positive anti-leak seal shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for lubrication. **The motor shall be able to operate dry without damage while pumping under load.**

Seal lubricant shall be FDA Approved, nontoxic.

PUMP SHAFT

Pump and motor shaft shall be the same unit. The pump shaft is an extension of the motor shaft. Couplings shall not be acceptable. The shaft shall be AISI type 431 stainless steel.

If a shaft material of lower quality than 431 stainless steel is used, a shaft sleeve of 431 stainless steel is used to protect the shaft material. However, shaft sleeves only protect the shaft around the lower mechanical seal. No protection is provided in the oil housing and above. Therefore, the use of stainless steel sleeves will not be considered equal to stainless steel shafts.

IMPELLER (for C - pumps)

The impeller(s) shall be of gray cast iron, Class 35B, dynamically balanced, double shrouded non-clogging design having a long throughlet without acute turns. The impeller(s) shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in wastewater. Whenever possible, a full vaned, not vortex, impeller shall be used for maximum hydraulic efficiency; thus, reducing operating costs. Mass

C/N-3127

Section 7



Performance Specifications

Issued: 9/00

Supersedes: 5/97

moment of inertia calculations shall be provided by the pump manufacturer upon request. Impeller(s) shall be keyed to the shaft, retained with an Allen head bolt and shall be capable of passing a minimum ____ inch diameter solid. All impellers shall be coated with an acrylic dispersion zinc phosphate primer.

WEAR RINGS (for C - pumps)

A wear ring system shall be used to provide efficient sealing between the volute and suction inlet of the impeller. Each pump shall be equipped with a brass, or nitrile rubber coated steel ring insert that is drive fitted to the volute inlet.

VOLUTE (for C - pumps)

Pump volute(s) shall be single-piece grey cast iron, Class 35B, non-concentric design with smooth passages large enough to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as specified.

IMPELLER (for N - pumps)

The impeller(s) shall be of gray cast iron, Class 35B, dynamically balanced, semi-open, multi-vane, back-swept, non-clog design. The impeller vane leading edges shall be mechanically self-cleaned upon each rotation as they pass across a spiral groove located on the volute suction which shall keep them clear of debris, maintaining an unobstructed leading edge. The impeller(s) vanes shall have screw-shaped leading edges that are hardened to Rc 45 and shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in waste water. The screw shape of the impeller inlet shall provide an inducing effect for the handling of sludge and rag-laden wastewater. Impellers shall be locked to the shaft and shall be coated with alkyd resin primer.

VOLUTE BOTTOM/INSERT RING (for N - pumps)

The pump volute shall be of A48 Class 35B gray cast iron and shall have (an) integral spiral shaped cast groove(s) at the suction of the volute. The internal volute bottom or insert ring shall provide effective sealing between the pump volute and the multi-vane, semi-open impeller. The sharp spiral groove(s) shall provide the shearing edge(s) across which each impeller vane leading edge shall cross during its rotation in order to remain unobstructed. The clearance between the internal volute bottom and the impeller leading edges shall be adjustable.

PROTECTION

All stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. The thermal switches shall open at 125°C (260°F), stop the motor and activate an alarm.

A leakage sensor shall be available as an option to detect water in the stator chamber. The Float Leakage Sensor (FLS) is a small float switch used to detect the presence of water in the stator chamber. When activated, the FLS will stop the motor and send an alarm both local and/or remote. **USE OF VOLTAGE SENSITIVE SOLID STATE SENSORS AND TRIP TEMPERATURE ABOVE 125°C (260°F) SHALL NOT BE ALLOWED.**

The thermal switches and FLS shall be connected to a Mini CAS (Control and Status) monitoring unit. The Mini CAS shall be designed to be mounted in any control panel.

Note: FLS not available in CZ/NZ Configuration.

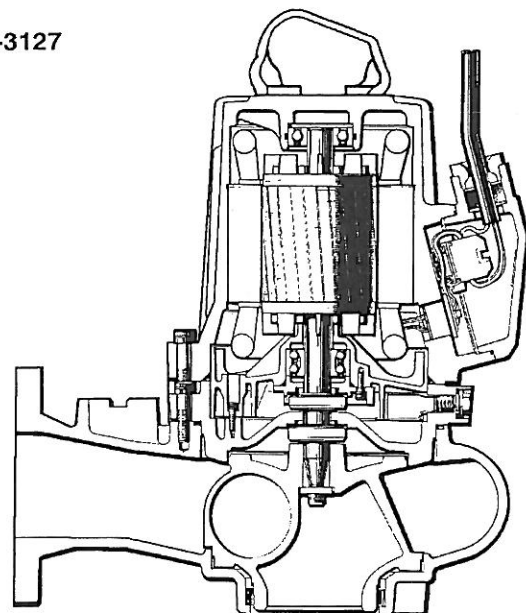
MODIFICATIONS

1. ~~Explosion-proof Pumps (X).~~
2. ~~Warms Liquid Applications (WL).~~
3. ~~Dry Pit Installations (CP).~~

N/A

Refer to the General Guide Specifications for additional information.

C-3127





ITT Industries

ITT Flygt Corporation

2400 Tarpley Road

Carrollton, Texas 75006-2407

Tel: (972) 418-2400

Fax: (972) 416-9570

ACCESSORIES



Standard CP/NP Discharge Connections (Cast Iron)

Dimensions

Section 10



Accessories

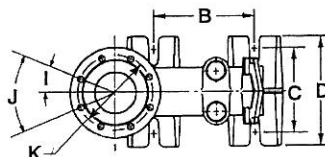
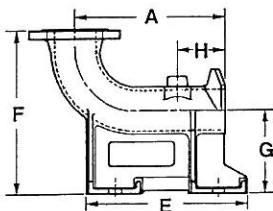
Issued: 8/00

Supersedes: 3/96

All dimensions (inches)

Pump Model	Part Number	Disch. Inlet	Disch. Outlet	A	B	C	D	E	F	G	H	I	J	K
2" - 3045, 3057, 3067	486 55 01	2"	2"-11 1/2 NPT	3 13/16	4	4 1/2	5 1/2	7 1/4	6 3/4	3 15/16	7/8	---	---	---
3" - 3057	555 48 01	2"	3-8 NPT	6 3/4	5 1/2	4 1/8	5 1/2	10 3/4	6 3/4	3 15/16	7/8	---	---	---
2 1/2" - 3067	493 17 06	2 1/2"	2 1/2"	11 5/8	7 7/8	6 1/2	7 7/8	11 7/16	9 7/8	6 1/2	4 9/16	45°	90° x 4	5 5/8
3" - 3067	555 48 01	2"	3-8 NPT	6 11/16	5 1/2	4 1/4	5 1/2	10 3/4	6 3/4	3 13/16	7/8	---	---	---
3" - 3075, 3080, 3085, 3085/82	444 68 05	3"	3"	14	9 7/8	8	10 5/8	15 3/8	15 3/4	7 7/8	4 9/16	45°	90° x 4	6
4" - 3080, 3085, 3085/82, 3102, 3127, 3140, 3152, 3153, 3170	540 13 05	4"	4"	14 3/8	9 7/8	8	10 5/8	15 3/8	15 3/4	7 7/8	4 9/16	22.5°	45° x 8	7 1/2
6" - 3102, 3127, 3140, 3152, 3153, 3170, 3201.	444 70 06	5 1/2"	6"	15 9/16	11	10	12 3/16	15 3/8	17 3/4	9 7/8	4 9/16	22.5°	45° x 8	9 1/2
6" - R3231	388 25 06	6"	6"	20 11/16	19 3/4	15 3/4	19 3/4	23 5/8	15 3/4	7 7/8	6 7/8	22.5°	45° x 8	9 7/16
8" - 3102, 3127, 3152, 3170, 3201, 3300.	444 71 06	6"	8"	16 3/4	11	10	12 3/16	15	17 3/4	10 1/8	4 9/16	22.5°	45° x 8	11 3/4
8" - 3201, (*3140, *3153, *3300).	374 76 06	8"	8"	16 3/4	11	9 1/2	12 3/16	15 3/8	17 3/4	10 1/4	4 9/16	22.5°	45° x 8	11 3/4
8" - 3231	388 24 06	8"	8"	21 5/8	19 3/4	15 3/4	19 3/4	23 5/8	17 3/4	8 7/8	6 7/8	22.5°	45° x 8	11 3/4
10" - 3140, 3201.	444 73 05	8"	10"	18 3/4	19 3/4	10	12 3/16	24	17 3/4	8 7/8	4 9/16	15°	30° x 12	14 1/4
10" - 3152, 3170.	481 76 05	10"	10"	18 3/4	19 3/4	10	12 3/16	24	17 3/4	8 7/8	4 9/16	15°	30° x 12	14 1/4
12" - 3152, 3170, 3300.	481 75 05	10"	12"	21 3/4	19 3/4	19 3/4	24 7/16	25 5/8	31 1/2	19 11/16	4 9/16	15°	30° x 12	17
12" - 3201	481 77 05	12"	12"	21 5/8	19 3/4	19 3/4	24 7/16	25 9/16	31 1/2	19 11/16	4 9/16	15°	30° x 12	17
12" - 3306, 3312.	373 92 05	12"	12"	24 5/8	25 5/8	23 3/4	27 9/16	29 1/2	23 3/4	10 13/16	6 7/8	15°	30° x 12	17
14" - 3201, 3300.	320 15 05	12"	14"	22 5/8	19 3/4	19 3/4	24 7/16	25 5/8	33 1/2	19 11/16	4 9/16	15°	30° x 12	18 3/4
14" - 3306, 3312	442 16 05	12"	14"	25 5/8	25 5/8	23 3/4	27 9/16	29 1/2	23 3/4	11 13/16	6 7/8	15°	30° x 12	18 3/4
14" - 3351	557 00 05	14"	14"	27 9/16	31 1/2	27 3/4	31 1/2	35 7/16	23 3/4	11 13/16	8 7/8	15°	30° x 12	18 3/4
14" - 3356	388 27 05	14"	14"	25 5/8	25 5/8	23 3/4	27 9/16	29 1/2	23 3/4	11 13/16	6 7/8	15°	30° x 12	18 3/4
16" - 3400	581 98 05	16"	16"	29 9/16	31 1/2	31 1/2	35 7/16	31 1/2	29	13 3/4	8 13/16	11.25°	22.5° x 16	21 1/4
20" - 3501, 3531.	387 90 05	20"	20"	30 5/8	31 1/2	27 3/4	31 1/2	35 1/2	33	15 3/8	8 7/8	9°	18° x 20	25
24" - 3602	388 65 05	24"	24"	33	35 1/2	31 1/2	35 7/16	39 3/8	37 1/2	17 3/4	8 7/8	9°	18° x 20	29 1/2
32" - 3800	586 03 05	32"	32"	40 1/4	26 5/8	47 1/4	51 1/4	57 1/4	47 1/2	21 3/4	9 3/4	6.43°	12.86° x 28	38 1/2

*Special Order



Note:
The discharge connection shown here is typical in appearance for most pumps.

Safety Hooks

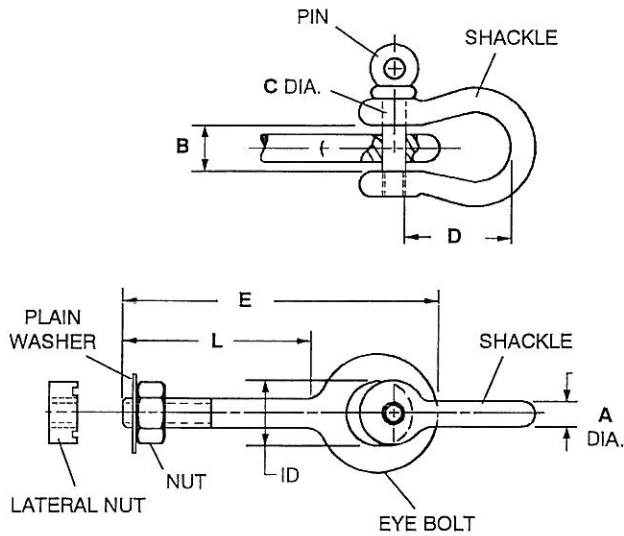
Section 10



Accessories

Issued: 10/00

Supersedes: 12/94



PUMP MODELS	KIT No.	MATERIAL	A	B	C	D	E	L	ID	LATERAL NUT	EYE BOLT	SHACKLE
3045 thru 3201	14 58 91 05	Galvanized Steel	5/16"	9/16"	3/8"	1-1/4"	4"	2-1/2"	3/4"	3/8-16 UNC	3/8-16 UNC	5/16"
	14 58 91 06	Stainless Steel	3/8"	11/16"	7/16"	1-7/16"	4"	2-1/2"	3/4"	3/8-16 UNC	3/8-16 UNC	3/8"
3231 thru 3602	14 58 91 10	Galvanized Steel	5/8"	1-1/16"	3/4"	2-1/2"	6-1/2"	4"	1-1/4"	5/8-11 UNC	5/8-11 UNC	5/8"
	14 58 91 11	Stainless Steel	5/8"	1-1/16"	3/4"	2-7/16"	6-1/2"	4"	1-1/4"	5/8-11 UNC	5/8-11 UNC	5/8"

Flygt Monitoring Devices

ENM-10 Liquid Level Sensors



Controls

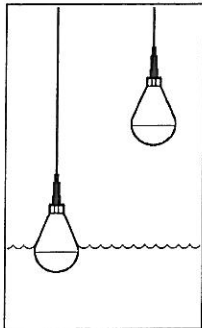
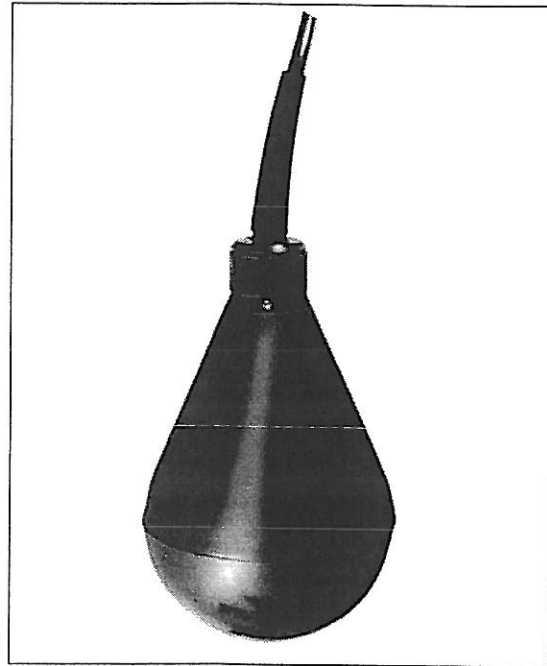
Issued: 6/94

Supersedes: 6/90

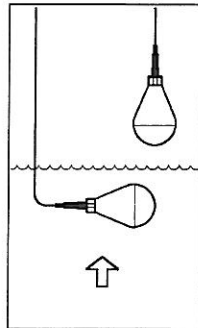
The simplest possible method for level control!
A mechanical micro switch in a plastic casing, freely suspended at the desired height from its own cable. When the liquid level reaches the regulator, the casing will tilt and the mechanical switch will close or break the circuit, thereby starting or stopping a pump or actuating an alarm device. No wear, no maintenance! Use in sewage pumping stations, for ground water and drainage pumping - in fact, for most level control applications - the ENM-10 is the ideal solution.

The regulator casing is made of polypropylene and the cable is sheathed with a special PVC compound. The plastic components are welded and screwed together - adhesive is never used. Impurities and deposits will not adhere to the smooth casing.

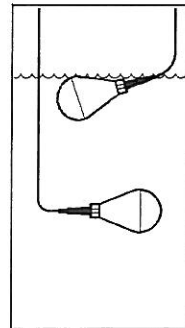
This level regulator is available in different versions, depending upon the medium in which it is to be used. The standard model can be obtained with 20, 43 or 66 feet of cable for liquids with specific gravities between 0.95 and 1.10. For other specific gravities, the regulator is only available with 66 feet of cable. The regulator can withstand temperatures of 32°F to 140°F.



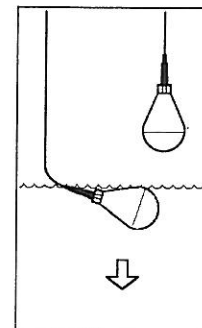
When the level drops, the micro switch is activated....



pumping stops and the level begins to rise....



When it reaches the highest permissible point, the second regulator reacts....



and pumping resumes.

Specific Gravity of Liquid	Cable Length	ENM-10 Part Number	ENM-10 Sensor Specifications	
0.65 - 0.80	66'	582 88 27	Min. oper. temp.	32°F (0°C)
0.80 - 0.95	66'	582 88 28	Max. oper. temp.	140°F (60°C)
0.95 - 1.10	20'	582 88 29	Max. applied voltage	250VAC/30VDC
0.95 - 1.10	43'	582 88 30	Elec. cable size	AWG 19/3
0.95 - 1.10	66'	582 88 31	Max. amperage -	16A @ 250VAC
1.05 - 1.20	66'	582 88 32	Resistive load -	16A @ 250VAC
1.20 - 1.30	66'	582 88 33	Inductive load -	5A @ 30VDC
1.40	66'	582 88 34	Operating point - rising	4A @ 250VAC
1.50	66'	582 88 35	Max. angular displacement	60°
			Operating point - descending	37°
				17°

Flygt Monitoring Devices

ENM-10 Liquid Level Sensors



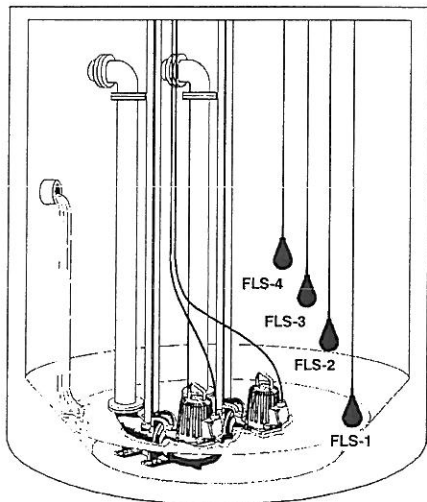
Controls

Issued: 6/94

Supersedes: 6/90

In Figure 1, liquid level is below the lowest level sensor (FLS 1). All sensors are hanging straight in the wet well, therefore, the circuits in the sensor are not complete and no signal is being sent to the control. Both pumps are OFF.

Fig. 1

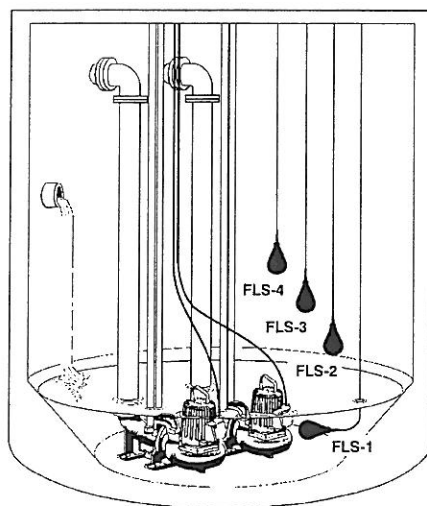


In Figure 3, the liquid level has risen to a level that tilts level sensor #2, completing its circuit.

- a) This signal to the control activates the contactor in the control which, in turn, starts the lead pump.
- b) Level sensor #2 also at this time activates the alternator in the control which automatically selects the other pump to become the lead pump on the next start-up cycle. The alternation of the pumps as the "lead" pump serves two purposes:
 - 1) The two pumps will accumulate approximately equal amounts of wear thus maximizing their useful life.
 - 2) Allows for many more starts per hour as the starting frequency is divided between the two pumps.

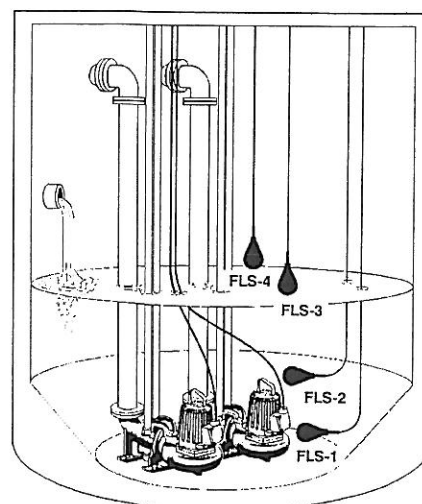
In Figure 2, as the liquid level rises, FLS-1 tilts and the sensor's mechanical micro-switch completes the circuit sending a signal to energize the control. At this point both pumps are still in the OFF mode.

Fig. 2



If the capacity of the lead pump is **greater than** the inflow to the station, the liquid level will start to drop. The pump will continue to run (due to a holding circuit in the control) until the level drops below sensor #1. Sensor #1, on drawdown, acts as the low level shut-off. Pump OFF.

Fig. 3



Flygt Monitoring Devices

ENM-10 Liquid Level Sensors



Controls

Issued: 6/94

Supersedes: 6/90

Figure 4 shows the sequence when the capacity of the lead pump is **less than** the inflow to the station. In this case, the liquid level will gain on the pump and rise to sensor #3 which will then send a signal to the main control starting the second or lag pump. If their combined capacity is **greater than** the inflow, **both pumps** will continue to operate (due to the holding circuit in the control) until the liquid level drops below the low level shut off sensor #1.

There are other options for alarm conditions such as alert by telephone, etc. The alarm system issues a warning that something has happened in the station that could result in an overflow condition. This could be a control problem, one or both pumps not operating, pumps not operating up to capacity, etc. Regardless of the cause, an alarm calls for immediate action.

For most installations, the low level shut-off sensor should be located approximately at the top of the pump volute. However, there are certain situations where maximum cooling may be required such as when pumping warm liquids; in certain cases with pumps that do not have cooling jackets; some large horsepower units, etc. Also in situations where the NPSH requires a liquid level that is above the pump volute. When in doubt, contact Flygt Application Engineering.

Fig. 4

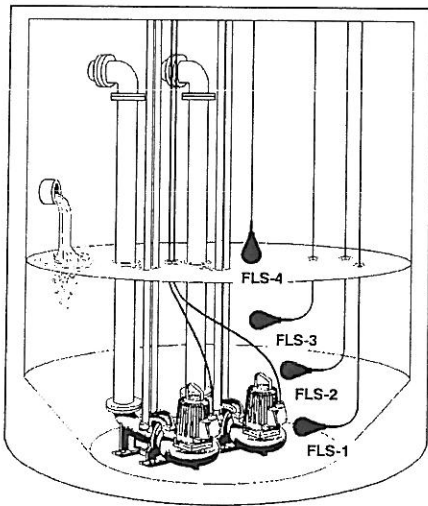
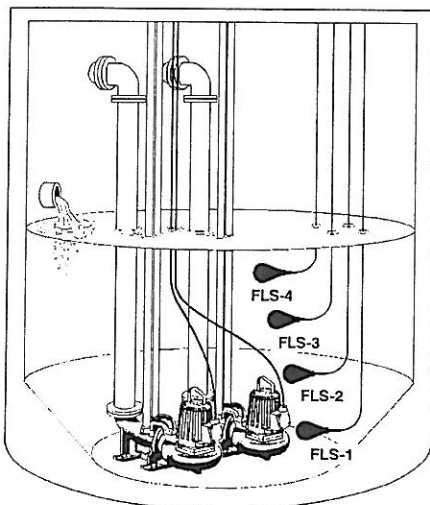


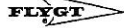
Figure 5 indicates a condition where the inflow to the station is **greater than** the combined capacity of both pumps. The liquid level will rise to the high level sensor #4. When sensor #4 tilts, it will send a signal to an alarm system, normally an alarm bell or red alarm light.

Fig. 5



Flygt Monitoring Devices

ENM-10 Liquid Level Sensors



Controls

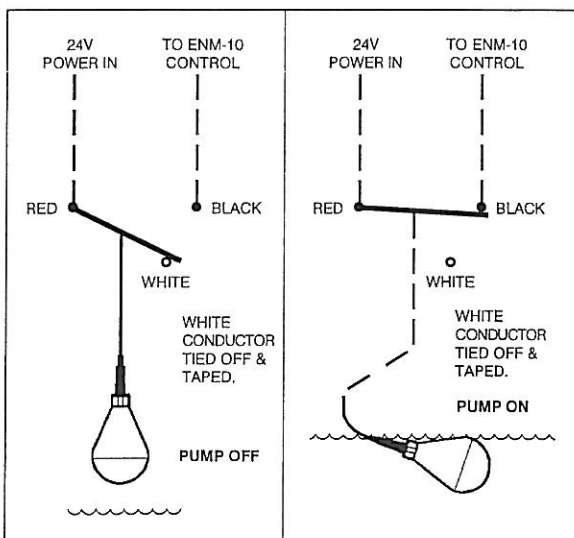
Issued: 6/94

Supersedes: 6/90

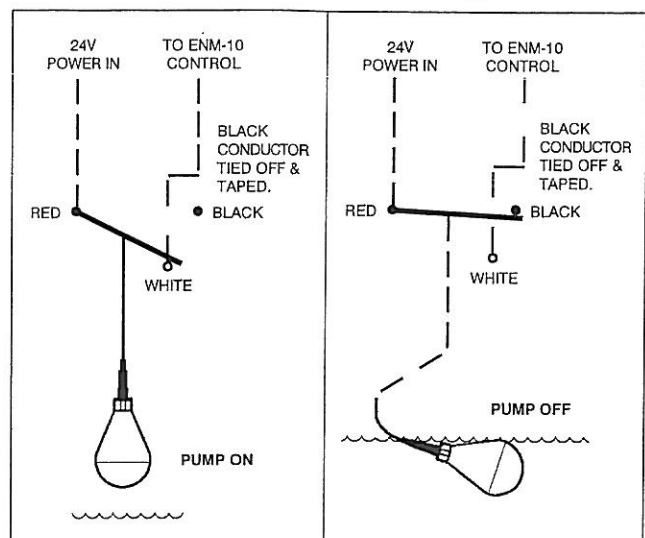
The Flygt ENM-10 Liquid Level Sensor can be utilized to monitor a "Pump Down" operation (as in a lift station application) or a "Pump UP" (filling) operation as may be required in certain industrial applications. The ENM-10 sensor cable contains three wires; Red, Black and White. The Red wire is common to both sequences. Using the Red and Black wires as the liquid level pilot circuit, the

ENM-10 will operate in the "Pump Down" mode, activating the pumps at a selected high liquid level and shut off at a selected low liquid level. Using the Red and White wires as the pilot circuit will activate the pumps in a "Pump UP" mode controlling the filling of a sump, tank etc. In this case the pumps are activated at a selected low level and shut off at a selected high level.

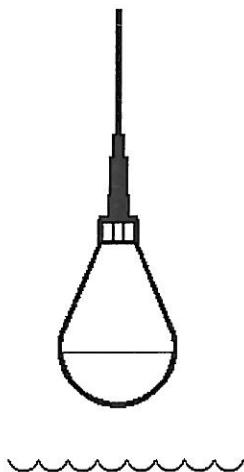
**ENM-10 Level Sensor
Connected for Pump-Down**



**ENM-10 Level Sensor
Connected for Filling**

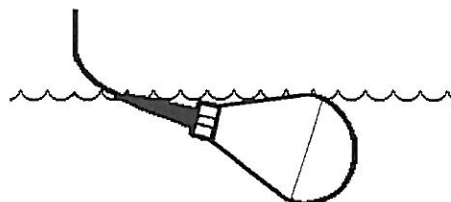


POSITION 1

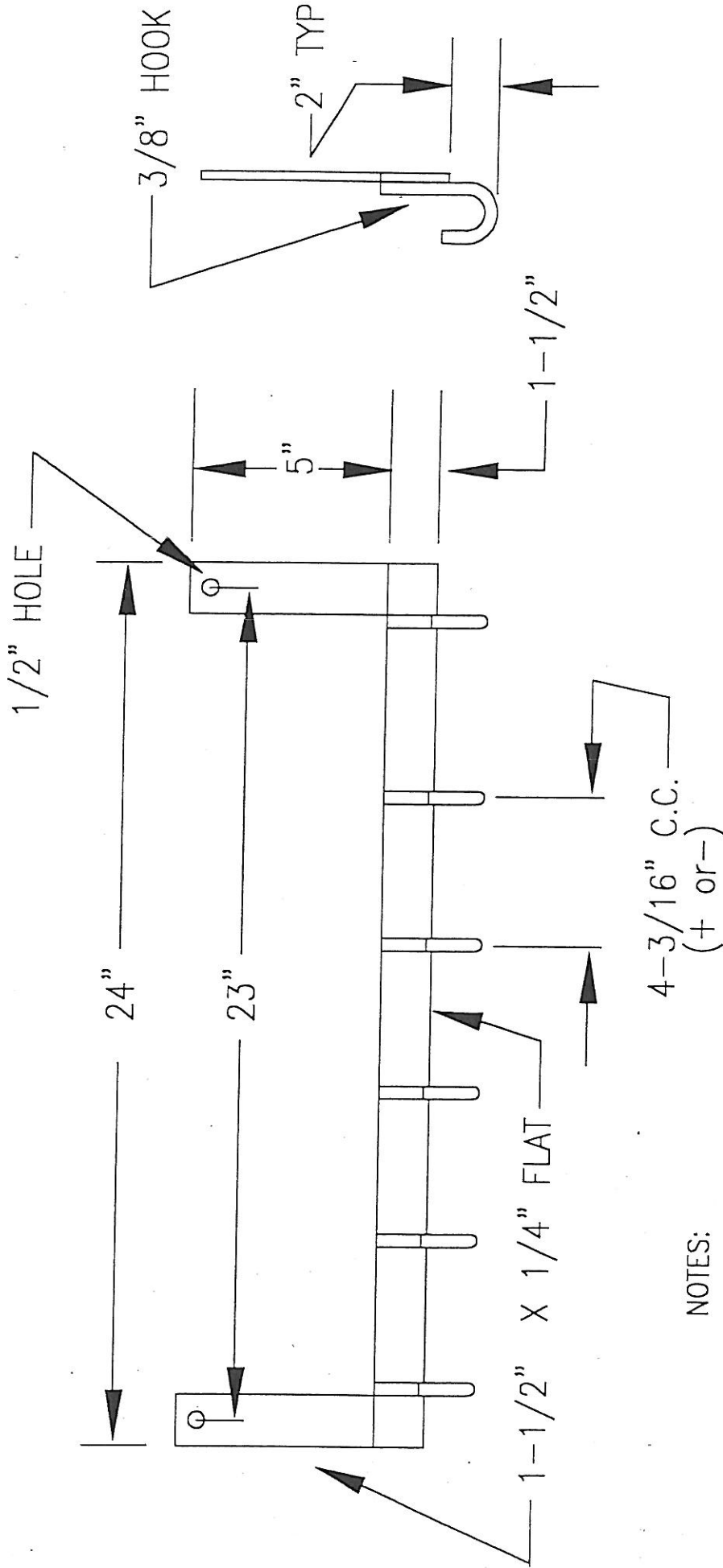


The ITT Flygt ENM-10 Liquid Level Sensor is **not** a "floating" device.

The On/Off pump operating sequence is performed by its submerged **tilting** action.




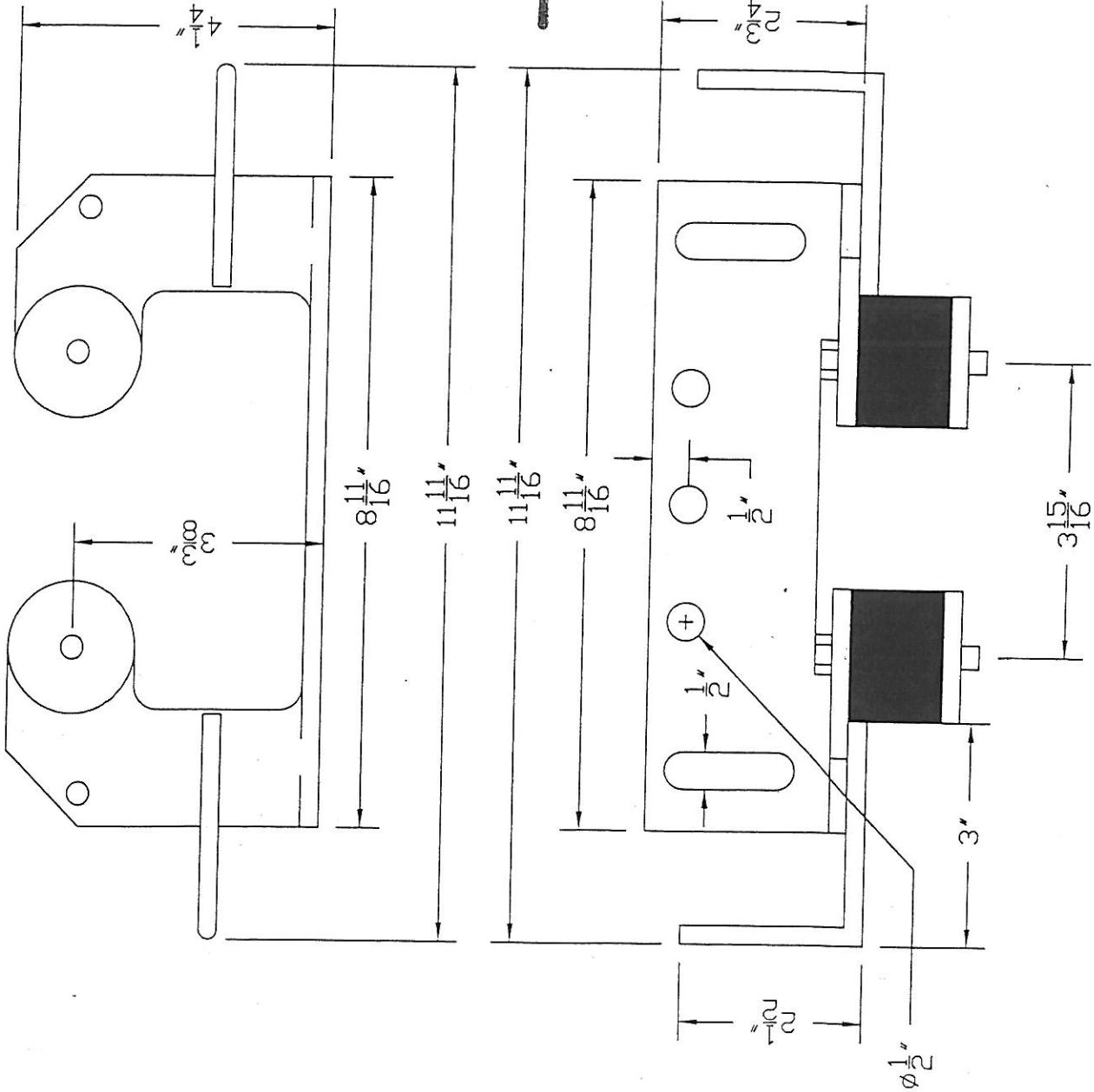
POSITION 2



NOTES:

- 1.) MODEL # "FCHSS" STAINLESS STEEL CABLE HOLDER, AS MANUFACTURED FOR ITT/FLYGT.
- 2.) MATERIAL SHALL BE TYPE 316 STAINLESS STEEL.
- 3.) UNIT SUPPLIED WITH (6) HOOKS.

TYPE 316 STAINLESS STEEL CABLE HOLDER	
DRAWN BY: C.M.A.	DATE: 05/11/98
DRAWING # FCH	
 ITT - FLYGT	
P.O. Box 1004 / 35 Nutmeg Drive Trumbull, CT. 06611-0943 Tel: 203/380-4700 Fax: 203/380-4705	



NOTES:

- 1.) STAINLESS STEEL UNITS SHALL BE GRADE 304 OR GRADE 316 STAINLESS STEEL, PER NOTE 5.
- 2.) FOR GALVANIZED UNITS, ALL OTHER MATERIAL SHALL BE HOT ROLLED STEEL CONFORMING TO A.S.T.M. A-36.
- 3.) GALVANIZED UNITS SHALL BE HOT DIP GALVANIZED PER A.S.T.M. 123.
- 4.) PLEASE SPECIFY REQUIRED MATERIAL:
 - GALVANIZED (F-IGRB-GALV-2')
 - 304 STAINLESS STEEL (F-IGRB-304SS-2')
 - **316 STAINLESS STEEL (F-IGRB-316SS-2')**

PROJECT:

2" UPPER GUIDERAIL BRACKET
FABRICATED

DRAWING # **FUGRB-2**

Drawn By: ARO	DATE: 04/25/00	Revised By: ARO	Revised: 08/22/00
---------------	----------------	-----------------	-------------------

ITT Flygt Corporation
P.O. Box 1004
Trumbull, Connecticut 06611



Phone (203) 380-4700 Fax (203) 380-4705

FLYGT DRAWING # 613 68 00

Style "FLE-O" access hatch, as manufactured for ITT Flygt Corp., Trumbull, Ct. 203-380-4870.

Material shall be 6061-T6 aluminum for bars, angles, and extrusions. 1/4" diamond plate shall be 5086 aluminum.

Design of each access hatch shall conform to O.S.H.A. standard 1910.23.

Unit designed light duty, for a minimum live load of 300 lbs./sq.ft. Deflection shall not exceed 1/150th of the span. Each hatch shall be designed using a maximum stress of 17,300 psi as per the Aluminum Association, Inc. "Specifications for Aluminum Structures."

Each door shall be supplied with a heavy duty, stainless steel pneu-spring, for ease of operation when opening cover. Cover shall be counterbalanced, so one person can easily open the hatch door. Spring design shall accommodate ease of maintenance.

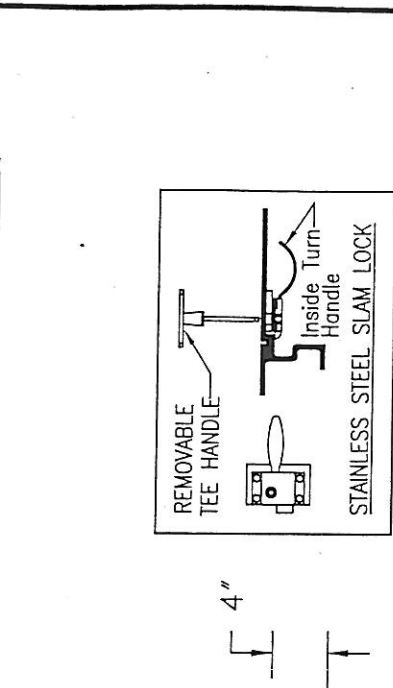
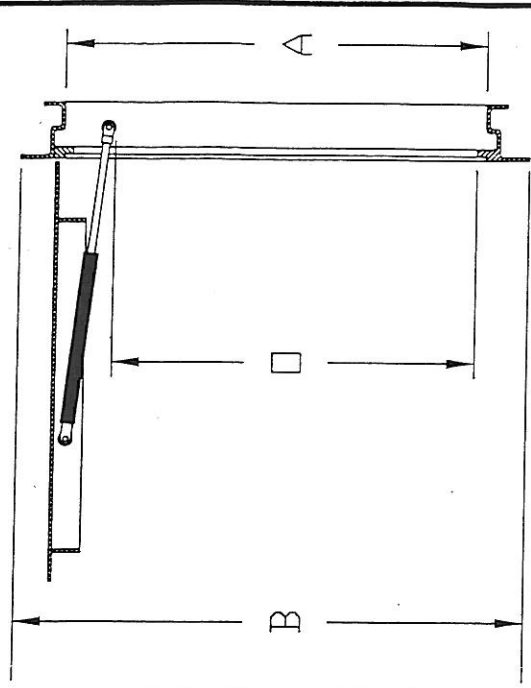
Each door shall be equipped with an aluminum hold open arm. Door shall lock open in the 90 degree position. Each hold open arm shall have a red vinyl grip handle. Hold open arm shall be fastened to the frame with a 1/2" grade 316 stainless steel bolt.

Angle frame shall be of extruded aluminum, with a continuous 1-1/2" anchor flange. Angle frame shall be a minimum of 1/4" thick.

All hardware shall be stainless steel.

Each hatch shall be supplied with a grade 316 stainless steel slam lock, with keyway protected by a threaded aluminum plug. Plug shall be flush with the top of the 1/4" diamond plate. Slam lock shall be fastened with four grade 316 stainless steel bolts and washers.

Each hatch shall be equipped with an aluminum lift handle. The lift handle shall be flush with the top of the 1/4" diamond plate.



PROJECT: "FLE-O-6" LIGHT DUTY ALUMINUM HATCH

DRAWING # FLE-O-6

Drawn By: ARO DATE: 11/06/98 Revised By: ARO Revised: 10/27/00

ITT Flygt Corporation
P.O. Box 1004
Trumbull, Connecticut 06611

Phone (203) 380-4700 Fax (203) 380-4705

PATTERN NO.	DIMENSIONS IN INCHES		UNOBSTRUCTED CLEAR OPENING
ALUMINUM	A x A1	B x B1	0 x 01
FLE-O-6	30" x 48"	36-1/4" x 54-1/4"	27-1/2" x 45-1/2"



ITT Industries

ITT Flygt Corporation

2400 Tarpley Road

Carrollton, Texas 75006-2407

Tel: (972) 418-2400

Fax: (972) 416-9570

CONTROL PANEL (Bill of Materials)



Control Panel Material List

11/15/01

Tel. (407) 298-5940
Fax (407) 298-2227

TO: ITT FLYGT - TX ATTN: DAVID DOROTIK PE QUOTE NO.: 53673AA PUMP MODEL: _____

HP: 10 VOLTAGE: 230 PHASE: 3 WIRE: _____ NO PUMPS/MOTORS: DUPLEX PUMP FLA: _____

JOB NAME: ROCKWALL PROMENADE

- ENCLOSURE** 35X30 APPROX.
- NEMA 1
 - NEMA 3R
 - NEMA 4
 - NEMA 4X
 - NEMA 7
 - NEMA 9
 - NEMA 12
 - BOX IN BOX
 - MCC

- BREAKERS** D
- AUX CONTACTS
 - CONTROL
 - EMERGENCY
 - EXTRA SINGLE POLE
 - FUSIBLE DISCONNECT
 - GEN RECEPTACLE
 - HANDLES
 - HEAVY DUTY
 - LIGHTING PANEL
 - MAIN
 - MCP
 - MOTOR
 - POWER TERMINALS
 - Q FRAME
 - RECEPTACLE
 - TRANSFORMER
 - WALKING BEAM SYSTEM

- FLOAT TEST SWITCH
- GRD. FAULT RECEPT.
- GRD. FAULT SYSTEM
- GRD. MONITOR RELAYS
- HEATER/THERMOSTAT
- INDUSTRIAL RELAYS
- INSULATION
- INTRINSIC BARRIER
- INTRINSIC RELAYS
- JUNCTION BOX
- LEVEL GAUGE
- LEVEL LIGHTS
- MINI CAS
- MODULE (1PH)
- MOISTURE PL
- NEMA 4 H-A, SPRING RET.
- NEMA 4 HOA
- NEMA 4 LIGHTS
- O & M MANUAL
- ON/OFF SWITCH
- OVERLOAD PL
- OVERLOAD RESETS
- PHASE MONITOR
- POWER ON LIGHT
- PUMP FAIL PL
- PUSH TO TEST
- REMOTE ALARM TERM
- RESETS
- RUN LIGHTS
- SERVICE ENT. LABEL
- SUB-MEGS
- SURGE ARRESTOR
- SURGE CAPACITOR
- THERMAL PL
- THERMAL TERMINALS
- TIME CLOCK
- TIME DELAY RELAYS
- TIMER, REPEAT CYCLE
- TOGGLE HOA
- TRANS. LIGHTS
- TRANSFORMER
- TRANSFORMER 24 VAC
- TROUBLE LIGHT/SWITCH
- TVSS
- UL
- VOLTMETER

- MATERIAL**
- ALUMINUM
 - FIBERGLASS
 - 304 STAINLESS
 - 316 STAINLESS
 - STEEL *
 - SPECIAL PAINT

- CONTROL SYSTEM**
- BUBBLER
 - DIGITAL PUMP CONT.
 - FLOAT SYSTEM (4) NO FLOATS INCL
 - PLC (MODICON)
 - SCI
 - SIMPLEXOR
 - START/STOP PB'S
 - TRANSDUCER
 - TRANSDUCER-ADDIT CABLE
 - ULTRASONIC
 - I.S. WARRICK CONTROLLER

- MODIFICATIONS**
- AIR VENTS
 - ALARM CAGE
 - CAST ALUM. HANDLE/3 PT LATCH
 - COPPER GROUND BUS
 - DEAD FRONT
 - DRAINS
 - DRIP SHIELD
 - LATCH (3 PT)
 - LEGS
 - PARTITION
 - SKIRTS
 - ST STEEL LEGEND SCREWS
 - SUN SHIELD
 - WINDOW
 - AIR CONDITIONER

- OPTIONS**
- AC/W/TANK
 - ACCUMULATOR
 - AIR COMPRESSOR
 - ALARM HORN
 - ALARM PILOT LIGHT
 - ALARM SILENCE
 - ALARM TEST
 - ALTERNATOR IN CONTROLLER
 - AMMETER W/CTS
 - AWG #14 WIRING
 - BEARING PL
 - BREAKER TRIP PL
 - COUNTERS
 - DC ALARM/BAT BACK UP
 - DIALER
 - DIM GLOW LIGHTS
 - ELAPSED TIME METERS
 - ETM SIMULTANEOUS

- MOTOR STARTERS**
- AMBIENT OVERLOADS
 - AUX CONTACTS
 - IEC STARTERS
 - NEMA FVNR
 - RVAT
 - SOLID STATE
 - SOLID STATE OVERLOADS *
 - TWO SPEED
 - VFD
 - VFD - LINE FUSES
 - VFD - LINE REACTORS
 - Y-DELTA

- OTHER**
- STARTUP
 - Add \$ 728.00 for N4X 304 Stainless Steel Enclosure.

ITT Flygt

* Revision

	Schedule:	Weeks:
Estimated Production Time from release of order	Drawings:	
	Shipment:	

Generally excluded from the above quoted prices are the following: Motors - Internal motor sensing devices - Mounting hardware - Field disconnects and junctions boxes - remote operator devices - Field installation or wiring - Any field devices unless explicitly listed

Quotes are valid for 90 days from the date of the quote

3 Copies of submittals included in quote

Engineering time for submittal drawings will be billed if the job is cancelled after submittals

Quote is based on the information supplied at the time of the quote. Incorrect or incomplete information may void the quote.

Please refer to the above quote number on all inquiries.