AURORA PUMP A member of PENTAIR PUMP GROUP

AURORA PUMP

BULLETIN 750/760A/REV. B

750-760 SERIES

"APCO-PM"
"AURORA-PC"
CONSTANT PRESSURE BOOSTER SYSTEMS

MODEL 763

INTRODUCTION CONSTANT PRESSURE PUMPING

Ever increasing public demands and uses for water causes reductions in pressure in MUNICIPAL & INDUSTRIAL PARK supply systems. With each additional new building unit that is constructed there may be a permanent or temporary water pressure problem created. Where these situations exist, they must be corrected for health and safety reasons. Aurora Pump "The Liquid Tamer" company, offers TWO alternatives. 1-CONSTANT SPEED — Constant pressure systems are economically desirable for applications up to and including 20 horsepower. Please read this bulletin and see how Aurora can solve your immediate water pressure problem. 2-VARIABLE SPEED — Constant pressure systems for applications to 60 H.P. utilize "Apco-Matic," the all electrical concept which has been specified and installed by several thousand domestic and foreign users. Apco-Matic is the ideal solution for controlling variations in liquid pressure and a number of important features are described in Bulletin 700. Duplex constant speed constant pressure systems are provided normally as standard for most variable flow selections. For larger capacities triplex is provided.

CURRENT SENSING PUMPING SYSTEMS

Each pump has a check valve or combination pressure reducing and check valve in its discharge line. The lead pump has a current sensor on its power lead. The lead pump is the first to run and will develop pressure which in turn is reduced to a constant pressure, preset at the pressure reducing valve by the factory. The lag pumps are in the "Auto" mode at this time of operation. When the lead pump reaches its design flow the current sensor causes the 2nd pump to start up. A current sensor on the number two pump will cause a third pump to start should the demand continue to increase. Reduced demand will reverse the sequence logic until ultimately only the lead pump is left in operation. The system simply starts up pumps, or else shuts them off sequentially to assure that the required system pressure is constantly maintained with best efficiency.

PRESSURE SENSING PUMPING SYSTEMS

The Control Panel incorporates pressure-sensing logic. Each pump has a check valve or combination pressure reducing and check valve in its discharge line. The lead pump will energize when system pressure drops to lower setpoint on lead pump switch. If pressure continues to stay low, the lag pump will also start. Both pumps will run on a minimum run timer and then shut down sequentially.

QUICK REFERENCE 750/760 SERIES FEATURE SELECTOR

STANDARD - 750/760
- Bronze fitted pump construction
- Back pullout casings
- Bronze shaft sleeves
- Dynamically balanced vacuum cast enclosed impellers
- Casing wearing rings
- 303 Stainless mechanical seals with Buna-N, Ni-Resist and carbon parts
- Pressure regulating valves
- Pilot operated
- Flanged suction and discharge
- Galvanized piping
- Pressure gauges
- Factory assembled and prewired
- System performance tested

STANDARD - 750 ONLY
- High Efficiency JM motors
- 30" Doorway clearance installation
- 37" Doorway clearance for units with tanks
- Vibration dampening suction bases
- Model 342 Vertical Pumps

STANDARD - 760 ONLY
- High Efficiency JM Motors
- Model 341 Horizontal Pumps

STANDARD - CURRENT SENSING
- UL listed panel
- High temperature cut-out

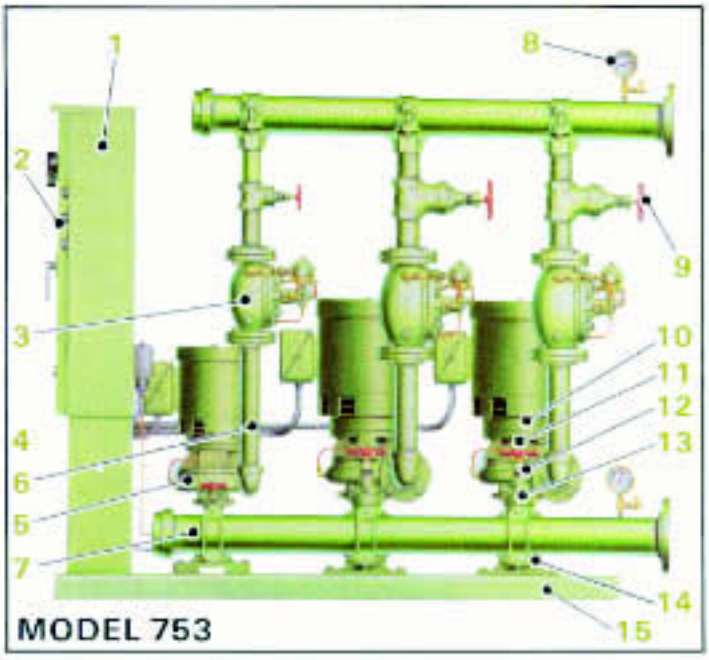
STANDARD - PRESSURE SENSING
- Low Suction Pressure Shutdown & Alarm
- Automatic Pump Alternation
- Lead Pump Failure Circuit & Alarm
- Alarm Test Circuit
- Alarm Sequence with Alarm Horn & Silence Reset
- U.L. listed Panel

OPTIONAL - 750/760
- Aurora Power Management
- Control panel enclosures
- Power on pilot light
- Phase reversal/failure relay
- Lightning arrestors
- Circuit breakers (in lieu of fuse clips)
- Alternating 24 hour time clock
- Flow meter
- "Lead-lag" selector switch
- Space heaters
- Non-ferrous (copper) piping
- "Kit" construction
- Special units (Apco-Matic)
- Gauge panel
- Vibration dampers
- High temperature purge
- High suction pressure shutdown
- No flow shutdown
- High system pressure alarm
- Low system pressure alarm
- Remote alarm auxiliary contacts
- Hi-suction pressure or no flow shut-down switch

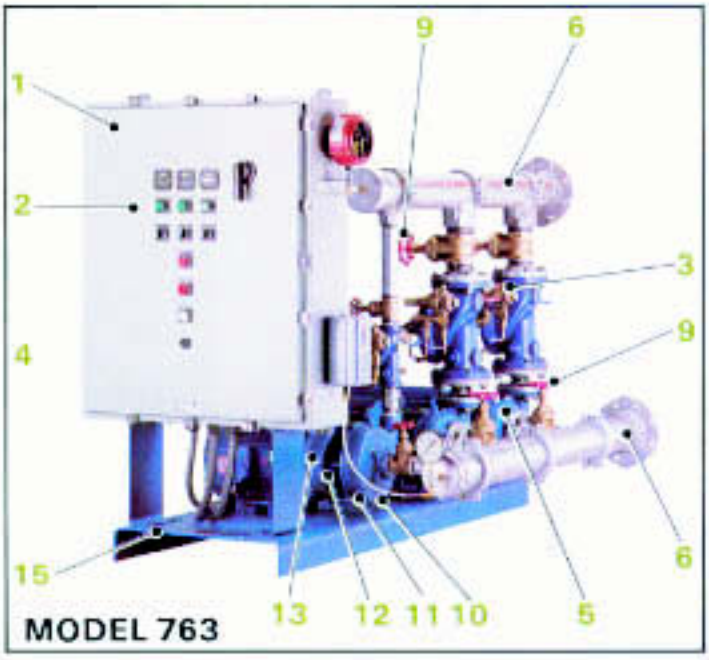
OPTIONAL - CURRENT SENSING
- Low suction pressure alarm & shut down

OPTIONAL - PRESSURE SENSING
- Lag pump sequencing by flow switches

SYSTEM FEATURES AND ENGINEERING DETAILS



MODEL 753



MODEL 763

1 COMPLETELY ASSEMBLED and pre-wired for easy installation. Compact design allows unit to be moved thru standard 30" doorways for most systems and 37" for largest "APCO-PM" System and 48" for largest "Aurora PC" units during initial pump unit installation.

2 PRESSURE SENSING CONTROL PANEL has been specifically designed by Aurora Pump for pressure boosting applications and incorporates the following features as STANDARD:

- Low Suction Pressure Shutdown
- Automatic Pump Alternation
- Lead Pump Failure Circuit
- Alarm Test Circuit
- Alarm Sequence with Alarm Horn & Silence Reset.

The Programmable Controller incorporated into the UL listed NEMA I Control Panel readily allows for the addition of optional control functions and alarm features.

2 CURRENT SENSING CONTROL PANEL in NEMA-1 enclosure is UL listed.

PRESSURE SWITCH (optional) low pressure shutdown and other pressure switches available.

3 PRESSURE REDUCING valves automatically reduce higher inlet pressure to a constant downstream pressure regardless of changing flow rate or inlet pressure. Pilot control settings are made easily. Return flow is prevented when line pressure may be reversed due to system variations. For some applications where discharge pressure is not critical or where suction pressure is relatively constant as with a reservoir, silent check valves may be substituted for pressure reducing valves.

4 TWO FACTORY TESTS provided as standard assure system reliability.

5 760 SYSTEMS feature Aurora Pump Model 341A horizontal centrifugal end-suction pumps in bronze-fitted construction.

5 760 SYSTEMS feature Aurora Pump Model 342A vertical centrifugal end-suction pumps in bronze fitted construction.

6 GALVANIZED PIPING for corrosion resistance and to meet various local codes is schedule 40. Flanged connections Provide Easy Installation.

7 THERMOSTAT senses heat build up in system under certain no-flow conditions and shuts down lead pump until the temperature returns to an acceptable limit. There is no bypass and/or cooling water recirculated or wasted down the drain.

8 PRESSURE GAUGES located on suction and discharge manifold.

9 GATE VALVES provided on each pump suction and discharge branch which allow individual pumps to be serviced without interrupted operation.

10 BRONZE SHAFT SLEEVE prevents shaft wear and extends the entire length of the seal box. Sleeve and impeller screw are sealed by "O" ring gaskets to eliminate corrosion of the shaft by the liquid being pumped.

11 MECHANICAL SEAL has carbon against Ni-Resist face for optimum water performance. Long life is also assured with 303 stainless steel metal parts — "Buna-N" elastomers.

12 BACK PULL-OUT design simplifies disassembly. Suction and discharge piping is not disturbed and/or misaligned when servicing pumps. Standard motor approved by a joint NEMA and the HYDRAULIC INSTITUTE provides low noise level pump operation. A carbon steel motor shaft is designed for minimum deflection not to exceed .002" at seal faces when at maximum load. Bearings are selected for a long service life under severe operating conditions.

13 DYNAMICALLY BALANCED IMPELLER is keyed to the shaft. Quality controlled manufacturing process assures consistently high performance. Enclosed design provides highest efficiency and is vacuum cast. A case wearing ring prevents wear on the pump casing and is easily and inexpensively replaced as necessary.

14 "APCO-PM" units feature flanged inlet cast vertical base which supports each pump to provide system vibration dampening qualities.

15 GROUTABLE FORMED STEEL BASE provides complete support, while still allowing the unit to be readily maneuvered for installation.

HYDROPNEUMATIC PRESSURE TANK (not illustrated) can be optionally provided to maintain system pressure during periods of low demand. Depending on specific application, the tank can be located adjacent to the system in the equipment room, remotely located, or mounted in common with the system on the baseplate.

SYSTEM FEATURES AND MATERIAL OF CONSTRUCTION

1 SYSTEM CAPACITY IN GPM: The required system capacity is based on the type of units illustrated in Figure 1. Add the total values for each type of fixture selected, based on the required number of individual fixtures. Once the total flow units have been tabulated, the required system capacity can be determined from Figure 2.

2 PUMP SELECTION: Several factors must be taken into consideration that will have an effect on the ideal determination of the actual pump size required.

A) Most normal or average apartment and office building water requirements are significantly less than the maximum required. Most of the time the demand will not exceed 30% of the peak demand. As a result of this, it is both practical and economical to size the lead pump for low demand applications. The lag pumps would, in addition to the lead pump, handle extra capacity demands.

B) Duplex pump systems normally are sized based on a 25% lead pump, 75% lag pump capacity split.

C) Triplex pump systems normally are sized on a 20% lead pump with 40% for each of the lag pumps. For some applications it may be desirable to proportionately increase the percentage capacities to assure a greater standby capacity should any other pump in the system fail or should the building capacity increase.

D) The type of installation and horsepower requirements will effect the selection process decision; duplex or triplex. Normally the capacity range between 350 and 450 GPM is the area where the crossover will occur in making the decision, duplex vs. triplex.

E) When capacity requirements are about equal, a duplex system can be selected with each pump in the duplex system rated at approximately 60% of system capacity.

3 SYSTEM HEAD IN FEET: The required system head is based on the following facts:

A) Calculate the maximum elevation or the facility height in feet to which the water is to be pumped.

B) At the system capacity point in G.P.M. from Figure 2, add the system friction losses.

C) Calculate the pressure in P.S.I. that is to remain constant at the greatest distance.

D) Subtract the average suction head in feet that will be available to the pumps. If the minimum suction head is far below the average suction head, select a working suction head somewhere between the two.

TOTALLY DYNAMIC HEAD COMPUTATION
(In Feet or Meters)

A. Static Head (Distance From Pump to Highest Fixture): _____

B. Friction Loss Thru Piping: + _____

C. Pressure Required At Highest Fixture: + _____

D. Suction Head At Pump: (Average Suction Pressure at Pump)

T.D.H. = _____

Note: 1 M = 3.2808 Ft.
1 Ft. = .3048 M.

4 COMBINATION PRESSURE REDUCING AND CHECK VALVE SELECTION: The recommended valve sizes are based on GPM requirements.

5 DUPLEX & TRIPLEX PUMP SELECTION: Once the system head and individual pump capacity has been determined, the pumps can be selected from the range charts and individual performance curves.

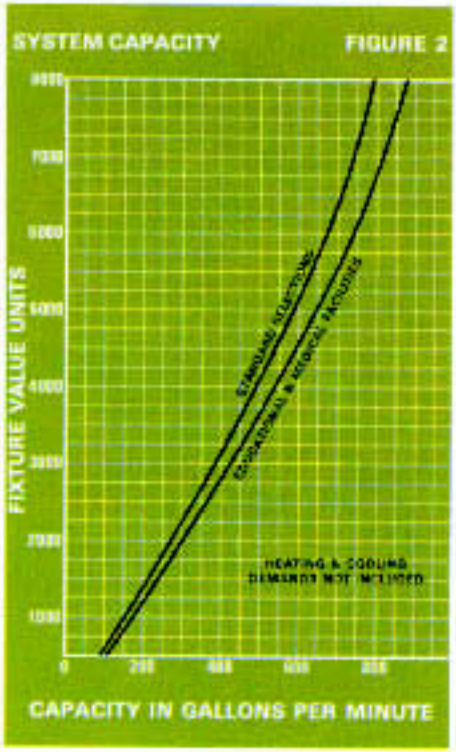
MATERIAL OF CONSTRUCTION

SYSTEM PART		MATERIAL
PUMP CASING		CAST IRON ASTM A48
PUMP WEAR RING		BRONZE ASTM B62
PUMP IMPELLER		BRONZE ASTM B62
PUMP BRACKET		CAST IRON ASTM A48
PUMP SHAFT		STEEL AISI C1045
PUMP SLEEVE		BRONZE ASTM B62
PUMP MECHANICAL SEAL		303 ST. STL. W. METAL PARTS, BUNA-N ELAST. PARTS, NI-RESIST SEAT & CARBON WASHER
BASE		STRUCT. STEEL A36
PIPING		GALV. STEEL COMMERCIAL
CHECK VALVE		CAST IRON OR BRONZE ASTM B584
TANK	BODY	CARBON STEEL ASME 125#
	BAG	HEAVY DUTY RUBBER OR PVC FDA APP.
PILOT OPERATED PRESS. REGUL. VALVE	BODY	CAST IRON ASTM A48
	TRIM	BRASS QQ-B-626
	PILOT VALVE	BRONZE ASTM B62 W/ AISI 303 S.S. TRIM
	DIAPH.	NYLON REINF. BUNA-N
	STEM	STAIN. STL. AISI 303
GATE VALVES	BODY	BRASS QQ-B-626
	TRIM	BRASS QQ-B-626
	STEM	BRASS QQ-B-626
CONTROLLER		UL LISTED COMMERCIAL
GAUGE BODY		STEEL COMMERCIAL

FIXTURE VALUE UNITS — FIGURE 1

Type of Fixture	Home Private (1)	Semi-Public (2)	Commercial Public (3)
BATHROOM			
Flush Valves	8	—	—
Flush Tanks	6	—	—
BATHTUB			
Emergency	—	—	4
Immersion	—	—	20
Standard	2	3	4
DOMESTIC			
Dishwasher			
General	2	4	6
Pan & Pot	—	3	3
Drinking Fountain	—	1	2
Garbage Disposal (Sink)	2	3	—
Hose ½"	4	4	—
Ice Cube Machine	1	1	—
Laundry Tub	2	3	—
Steam Tables	—	1	1
Washing Machine	4	6	—
LAVATORY	1	1	2
SHOWER			
Emergency	—	5	8
Standard	2	3	4
SINK			
Bar	2	3	—
General	—	3	3
Kitchen	2	3	4
Laboratory	—	2	—
Service	2	3	4
TOILET			
Flush Tank	3	4	5
Flush Valve	6	8	10
URINAL			
Flush Tank	—	3	5
Flush Valve — Pedestal	—	8	10
Flush Valve — Stall or Wall	3	4	5

NOTES: (1) Apartments, Homes & Private Offices
(2) Clubs, Commercial Offices and Motels
(3) Factories, Hospitals, Hotels, Public Buildings, Restaurants, Stores and Theaters



APCO-MATIC DDC

VARIABLE SPEED SYSTEMS 700 Series, Apco-Matic is a solid-state, variable-speed, pumping system available in simplex, duplex and triplex models. A complete and perfectly matched system of sensor, controller, motor(s) and pump(s), provides an all-electrical means of sensing and maintaining constant pressure by infinite, stepless, pump speed variation to meet the immediate demand. System response is measured in fractions of a second. Each Apco-Matic is

custom-tailored to the application, and industry acceptance has made it the overwhelming choice in variable speed systems. Capacities to 10,000 G.P.M.; Heads to 500 feet; Temperatures to 275°F.; up to 60 H.P. See Bulletin 700. Aurora Pump produces many pumps designed and sized to suit almost all pumping requirements. Additional information is available thru your local Aurora Pump Distributor or Branch Sales Office, or write to Aurora Pump for details.

Series 900
Fire Pump Systems
Diesel Engine Driven

See Bulletin 900 for additional details on electric motor and diesel driven fire pump systems.

Schools

Office Buildings

Industrial Parks
Municipalities

Condominiums
Sub-Divisions

Hotels
Hospitals

ENGINEERING DETAILS AND DIMENSIONS

3500 R.P.M. PUMPS

PUMP SIZE	P1	P2	P3	MOTOR H.P.	O.D.P. WGT. LBS.	HD (1) 750	HD (1) 760	M 750	M 760
1-1/4 x 1-1/2 x 7 CODE A				2	123	6-3/4	10-1/4	4-1/4	REFER TO INDIVIDUAL DIMENSION SHEETS
				3	144				
				5	167				
				7-1/2	199				
1-1/2 x 2 x 7 CODE B				5	172	7-1/8	10-1/4	4-1/4	
				7-1/2	204				
				10	205				
2 x 2-1/2 x 7A CODE C				5	178	7-1/2	10-1/4	4-1/4	
				7-1/2	210				
				10	211				
				15	301				
				20	337				
2-1/2 x 3 x 7B CODE D				10	214	8	11-1/4	4-1/4	
				15	300				
				20	342				
1-1/2 x 2 x 9C CODE E				7-1/2	224	7-1/8	11-1/4	4-1/4	
				10	225				
				15	315				
				20	351				
2 x 2-1/2 x 9 CODE F				15	316	7-1/2	11-3/4	4-1/4	
				20	352				

(1) ALWAYS USE "HD" DIMENSION FOR LARGEST PUMP SIZE SPECIFIED.

1750 R.P.M. PUMPS

PUMP SIZE	P1	P2	P3	MOTOR H.P.	O.D.P. WGT. LBS.	HD (1) 750	HD (1) 760	M DUPLEX/TRIPLEX WITHOUT TANK 750	M DUPLEX/TRIPLEX WITHOUT TANK 760	M DUPLEX/TRIPLEX WITH TANK 750	M DUPLEX/TRIPLEX WITH TANK 760
1-1/2 x 2 x 9C CODE E				1	167	8-1/8	11-1/4	4-1/4	REFER TO INDIVIDUAL DIMENSION SHEETS	7-1/4	REFER TO INDIVIDUAL DIMENSION SHEETS
				1-1/2	177						
				2	177						
				3	188						
2 x 2-1/2 x 9 CODE F				2	186	8-1/2	11-3/4	4-1/4		7-1/4	
				3	207						
				5	230						
2-1/2 x 3 x 9 CODE G				3	230	9	11-3/4	4-1/4		7-1/4	
				5	259						
				7-1/2	291						
1-1/2 x 2 x 12 CODE L				7-1/2	301	8-1/8	13	6		5	
				10	302						
2-1/2 x 3 x 12 CODE M				7-1/2	337	9	13-1/4	6		5	
				10	338						
				15	428						
				20	464						
2 x 3 x 11 CODE P				7-1/2	311	9	12-1/4	6		5	
				10	312						

(1) ALWAYS USE "HD" DIMENSION FOR LARGEST PUMP SIZE SPECIFIED.

VERTICAL PUMPS

SYSTEM MODEL	CAP G.P.M.	FLANGED MANIFOLDS SUCT	FLANGED MANIFOLDS DSCH	WEIGHT IN LBS. MANIFOLD	WEIGHT IN LBS. CONTROL
752 DUPLEX	0-200	4	3	690	120
	201-400	4	4	720	
	401-600	5	5	890	
	601-800	6	6	920	

VERTICAL PUMPS

SYSTEM MODEL	CAP G.P.M.	FLANGED MANIFOLDS SUCT	FLANGED MANIFOLDS DSCH	WEIGHT IN LBS. MANIFOLD	WEIGHT IN LBS. CONTROL
753 TRIPLEX	0-200	4	3	950	140
	201-400	4	4	1010	
	401-600	5	5	1220	
	OVER 600	6	6	1435	

HORIZONTAL PUMPS

SYSTEM MODEL	CAP G.P.M.	FLANGED MANIFOLDS SUCT	FLANGED MANIFOLDS DSCH	WEIGHT IN LBS. MANIFOLD	WEIGHT IN LBS. CONTROL
762 DUPLEX	0-450	4	4	575	91
	0-450	4	4	600	
	451-600	5	5	625	
	451-600	5	5	650	
	601-800	6	6	700	
	601-800	6	6	725	

HORIZONTAL PUMPS

SYSTEM MODEL	CAP G.P.M.	FLANGED MANIFOLDS SUCT	FLANGED MANIFOLDS DSCH	WEIGHT IN LBS. MANIFOLD	WEIGHT IN LBS. CONTROL
763 TRIPLEX	0-450	4	4	800	91
	0-450	4	4	825	
	451-600	5	5	875	
	451-600	5	5	900	
	601-1200	6	6	950	
	601-1200	6	6	1025	

MODEL 752 - 753

	BASE WGT. IN LBS. WITHOUT TANK	BASE WGT. IN LBS. WHEN TANK IS USED	GROUT HOLES IN BASE
DUPLEX	286	582	1
TRIPLEX	352	673	2

MODEL 762 - 763

	BASE WGT. IN LBS. WITHOUT TANK	BASE WGT. IN LBS. WHEN TANK IS USED	GROUT HOLES IN BASE
DUPLEX	196	357	1
TRIPLEX	272	433	1

DIRECT ACTING VALVE

CODE	A	B	C
SIZE	1-1/2	2	2-1/2
WGT.	20	25	30

CHECK VALVE

CODE	AC	BC	CD	DC	EC	FC
SIZE	1-1/4	1-1/2	2	2-1/2	3	4
WGT.	4	4	5	7	11	18

PILOT OPERATED VALVE

CODE	AP	BP	CP	DP	EP	FP
SIZE	1-1/4	1-1/2	2	2-1/2	3	4
WGT.	40	40	50	70	90	125

NOTES:
(1) Dimensions and weights are approximate.
(2) All dimensions are in inches and may vary +- 1/2".
(3) Add pumps, base, manifolds, pressure regulating valves, or check valves, tank, if required, and controller weight for unit weight.

(4) Not for construction purposes unless certified.
(5) Aurora Pump reserves the right to make revisions to its products and their specifications, and to this bulletin and related information, without notice.

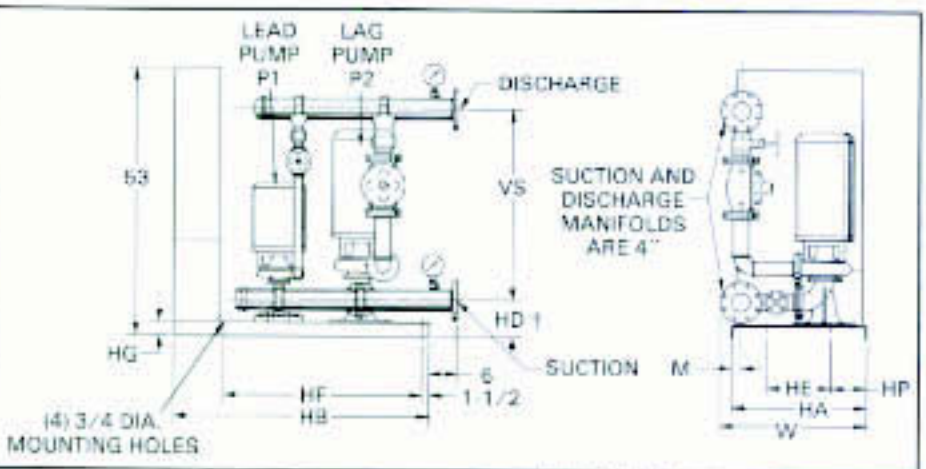
(6) When making pump selections, do not mix 1750 R.P.M. and 3500 R.P.M. pumps in 7" and 9" pumps.
(7) Refer to individual dimension sheets for complete dimensions on all units.

750 SERIES ENGINEERING DETAILS AND DIMENSIONS

DUPLEX

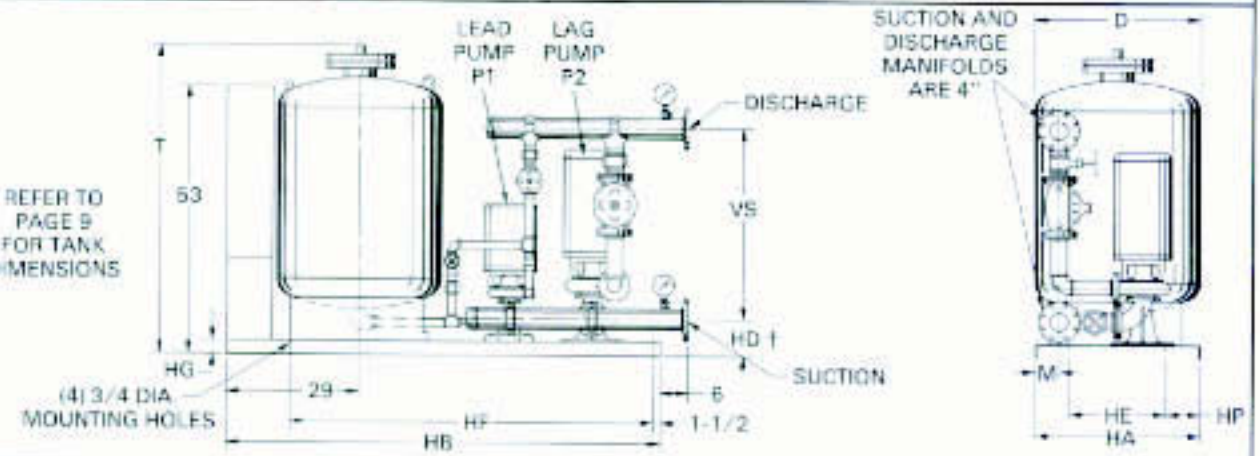
750 SERIES - DIMENSIONS			
	DUPLEX		
DIM	WITHOUT TANK		WITH
	3500	1750	TANK
HA	29-1/2	29-1/2	36
HB	56	74	95
HE	14	21	21
HF	43-1/2	61-1/2	79-1/2
HG	3	3	4
HP	7-3/4	7-1/2	7-1/2
VS	42*	42*	48**

*48" when 4" PRV is used. **54" when 4" PRV is used.



DUPLEX WITH TANK

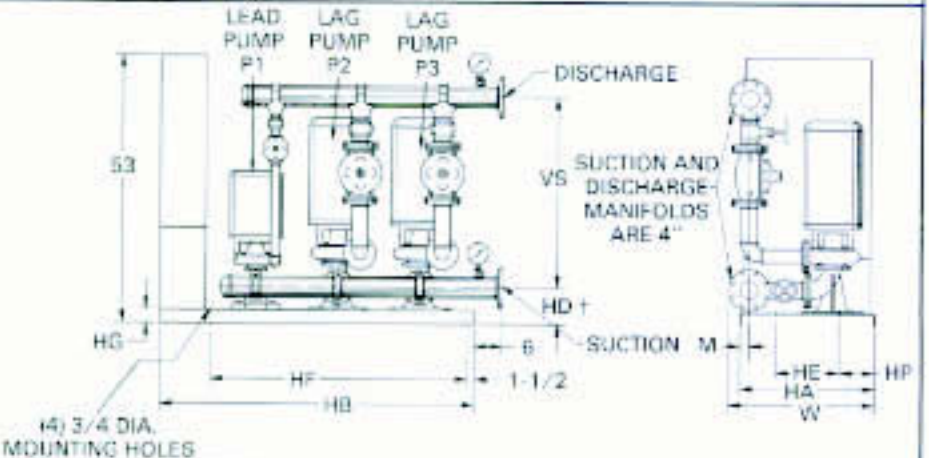
REFER TO PAGE 9 FOR TANK DIMENSIONS



TRIPLEX

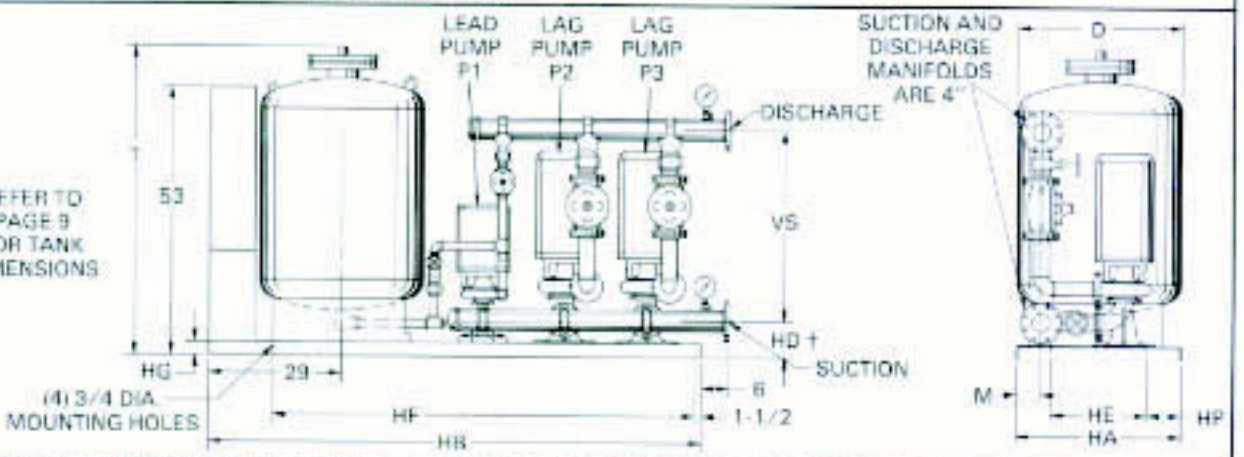
750 SERIES - DIMENSIONS			
	TRIPLEX		
DIM.	WITHOUT TANK		WITH
	3500	1750	TANK
HA	29-1/2	29-1/2	36
HB	69	95	108
HE	14	21	21
HF	56-1/2	79-1/2	92-1/2
HG	3	3	4
HP	7-3/4	7-1/2	7-1/2
VS	42*	42*	48**

*48" when 4" PRV is used. **54" when 4" PRV is used.



TRIPLEX WITH TANK

REFER TO PAGE 9 FOR TANK DIMENSIONS

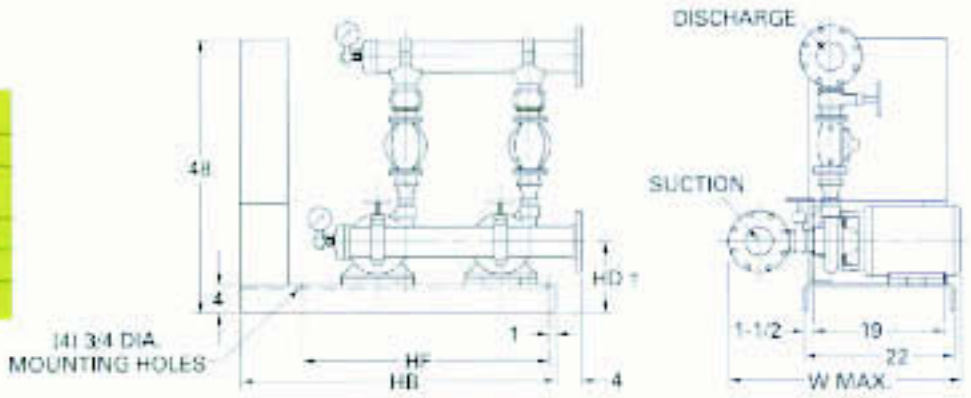


NOTE: ALL 750 SERIES UNITS REQUIRE 19" DOOR FRONT CLEARANCE

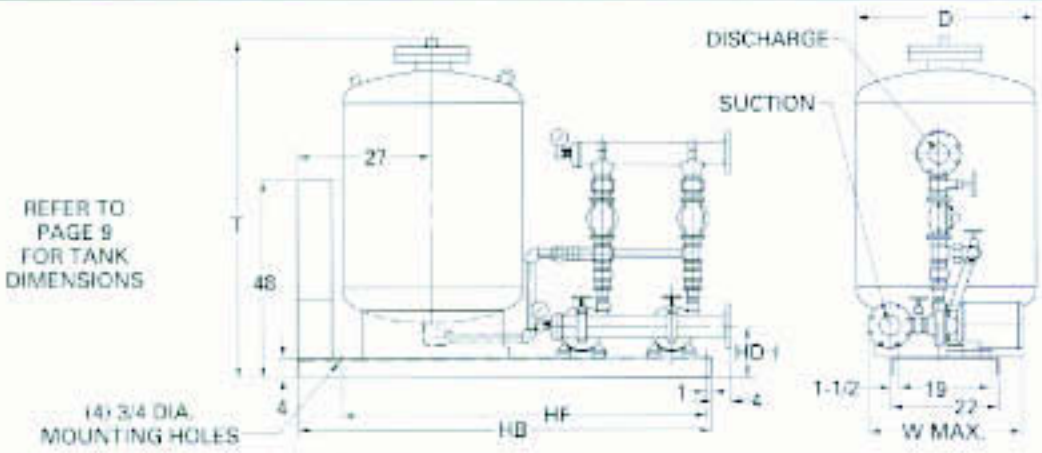
† ALWAYS USE "HD" DIMENSION FOR LARGEST PUMP SIZE SPECIFIED

DUPLEX

760 SERIES - DIMENSIONS		
	DUPLEX	
DIM	WITHOUT TANK	WITH TANK
HB	46	84
HF	36	74
W MAX	48	48

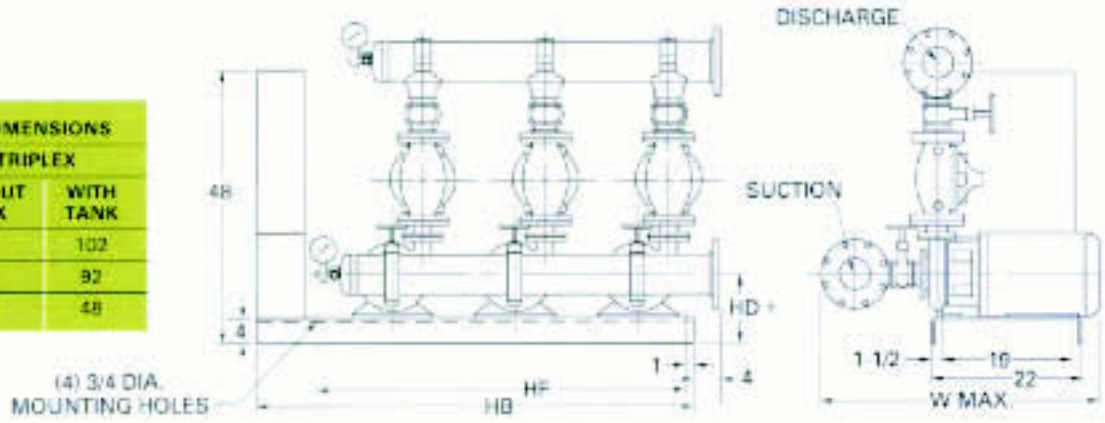


DUPLEX WITH TANK

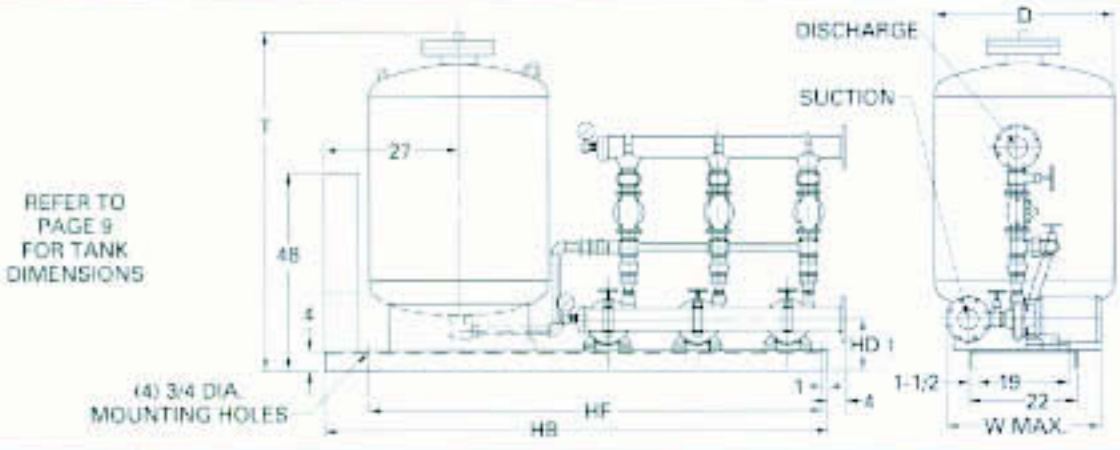


TRIPLEX

760 SERIES - DIMENSIONS		
	TRIPLEX	
DIM.	WITHOUT TANK	WITH TANK
HB	64	102
HF	54	92
W MAX.	48	48



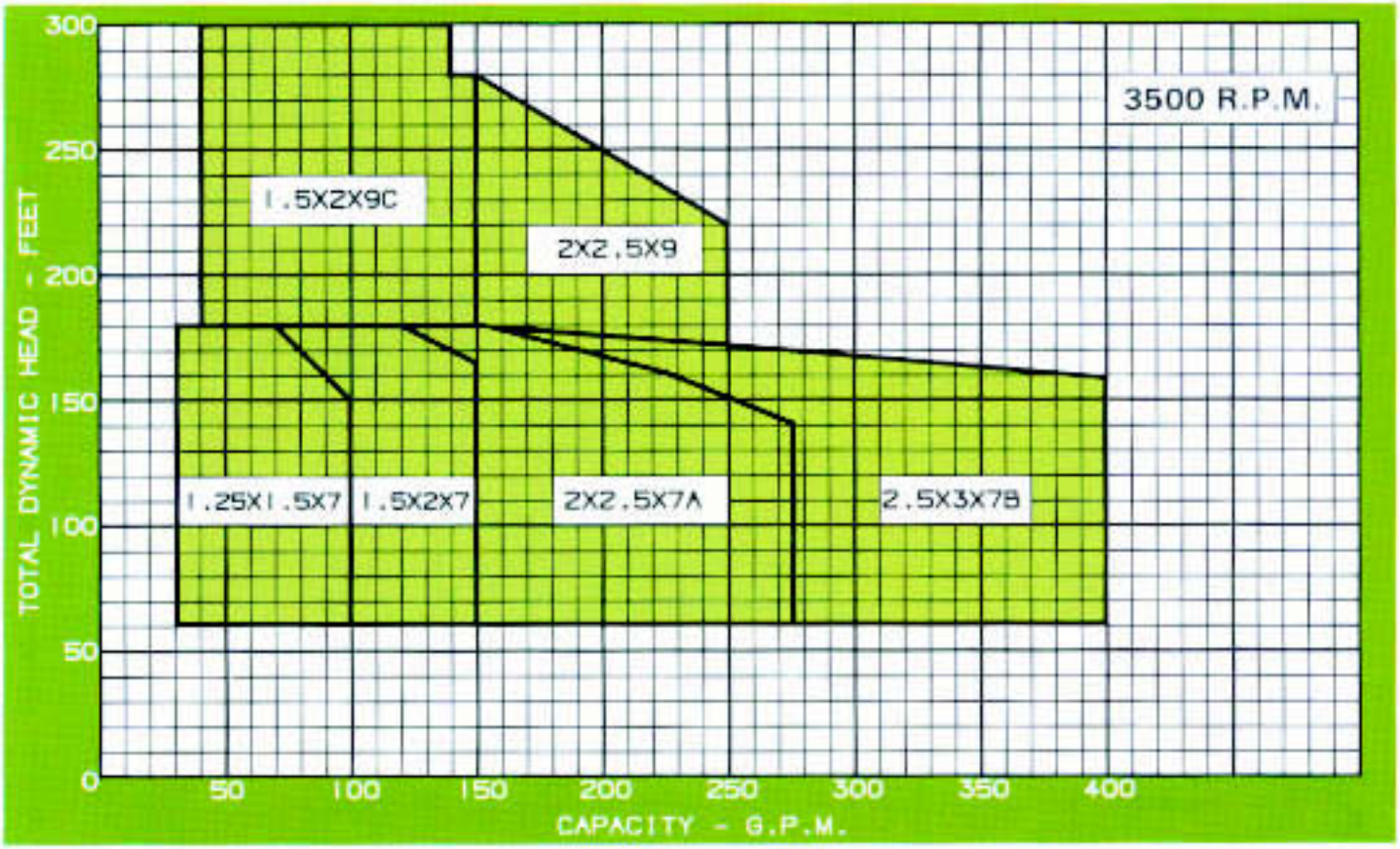
TRIPLEX WITH TANK

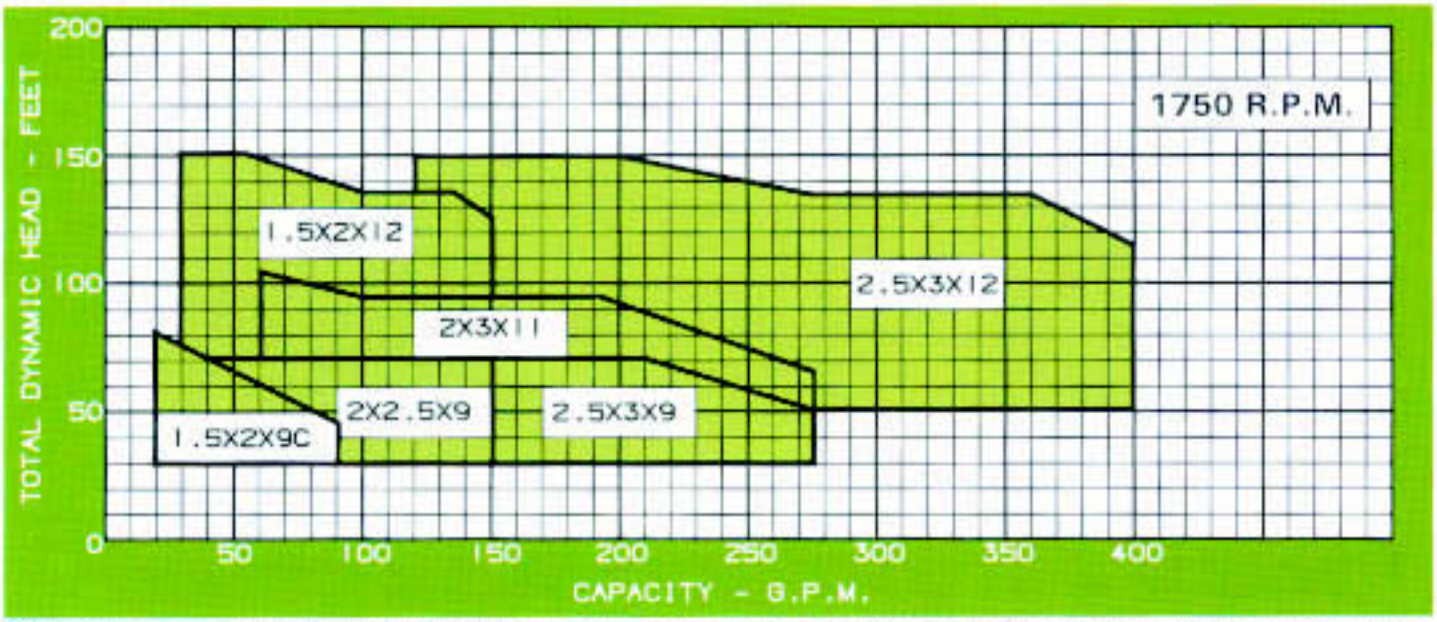


NOTE: ALL 760 SERIES UNITS REQUIRE 20" BODY FRONT CLEARANCE

† ALWAYS USE "HD" DIMENSION FOR LARGEST PUMP SIZE SPECIFIED

RANGE CHARTS
3500 AND 1750 R.P.M.





NOTES: (1) When making selections, do not combine 7" and 9" pumps. (2) When making selections, do not combine 3500 R.P.M. and 1750 R.P.M. Pumps. (3) When making selections, do not combine horizontal and vertical pumps.

HYDROPNEUMATIC TANKS						
TANK SIZE (GALLONS)	T	D	WEIGHT			
			125 PSI	175 PSI	200 PSI	250 PSI
79	68	24	271	325	—	400
106	68	30	284	343	—	435
132	61	30	299	359	—	465
158	70	30	350	430	—	500
170	80	30	—	—	473	—
211	69	36	513	626	—	813

ENGINEERING SPECIFICATIONS

The contractor shall furnish and install an Aurora Variable Flow (Duplex or Triplex) Constant Pressure Booster System as manufactured by Aurora Pump. The unit shall have a total system capacity of . . . . . GPM at a discharge head of . . . . . feet when supplied with a working suction head of . . . . . feet. Each pump shall be sized as indicated for a % of the total flow.

Duplex System
Pump P1 = ... GPM . . . . % System
Pump P2 = ... GPM . . . . % System
Triplex System
Pump P1 = ... GPM . . . . % System
Pump P2 = ... GPM . . . . % System
Pump P3 = ... GPM . . . . % System

PIPING AND VALVES

Each system shall be skid mounted, completely assembled and wired on a groutable formed steel base ready for installation. All piping shall be (Galvanized Schedule 40 pipe). (Type K Copper). Each system shall include suction and discharge gate valves for each pump, combination pressure regulating/non-slam check valves for each pump, flanged connections for easy disassembly and pipe supports for the upper manifold. Each system utilizing a current sensing control panel shall have a thermostat set to shut down the system during prolonged no-flow conditions; no water is to be wasted. Suction and discharge gauges shall be provided. Gauges shall have 3-1/2" faces with large scale numerals and individual air bleed type valves.

PUMPS - 750 SERIES

The pumps shall be Aurora vertical close-coupled end suction centrifugal pumps with back pullout design. The pump shall be constructed of cast iron casing, vacuum-cast bronze dynamically balanced impeller, bronze shaft sleeves, and bronze case wear rings. Shaft sealing shall be accomplished by means of a stainless steel mechanical seal. Pumps shall be mounted on vibration dampening, cast iron suction base support elbow.

PUMPS - 760 SERIES

The pumps shall be Aurora horizontal close-coupled end suction centrifugal pumps with back pullout design. The pump shall be constructed of cast iron casing, vacuum-cast bronze dynamically balanced impeller, bronze shaft sleeves, and bronze case wear rings. Shaft sealing shall be accomplished by means of a stainless steel mechanical seal.

MOTORS

The motors shall be NEMA type JM, closed coupled, ... HP, 3 phase, 60 Hertz, ... volt, Totally Enclosed Fan Cooled, High-Efficiency, 3 phase, ... Hertz. . . . . HP, ... Voltage. Motors shall be selected so that they do not exceed their nameplate HP rating through their sequence of operation. The entire system shall be tested at the factory to assure proper sequencing to meet the design flows and pressure, and the system components shall be adjusted at the factory.

CONTROL PANEL - PRESSURE SENSING

Each system shall have mounted and wired a single Control Panel in a NEMA 1 enclosure with individual magnetic motor starters, ambient compensated overload relays on each phase, individual motor fusablocks with 100 KAIC fuses, main circuit disconnect switch with door interlock, 110 volt control transformer with primary and secondary fuses. The panel shall be suitable for the horsepower and voltage of the motors. The Control Panel will incorporate pressure-sensing logic and have the following features:

- On and Off delays factory set to system operating characteristics to prevent short cycling of pumps.
- Individual pump run lights and selector switches.
- Failure logic and indicating light to activate second pump if lead pump malfunctions.
- Automatic Lead/Lag pump alternation.
- Low suction pressure shutdown with alarm light, horn and reset button.
- Automatic restart after alarm condition has returned to normal, with alarm indicating light remaining lit until manually reset.
- Manually operated "Press-Test" circuit to verify alarm light and horn are operational.

The Control Panel shall also include the following indicated functions/features:

. . . . . High System Pressure Indication and shutdown logic.
. . . . . Low system pressure indication.
. . . . . No flow indication and shutdown logic by temperature switch.
. . . . . No flow indication and shutdown logic by flow switch.
. . . . . Power on light.
. . . . . Low Suction Pressure Remote Alarm contacts.
. . . . . Low System Pressure Remote Alarm contacts.
. . . . . High System Pressure Remote Alarm contacts.
. . . . . Lead Pump Fail Remote Alarm contacts.
. . . . . Elapsed time hour meter for each pump.
. . . . . Gauge panel.

CONTROL PANEL - CURRENT SENSING

Each system shall have a single panel completely wired in a NEMA-1 enclosure with individual magnetic motor starters and overload protection on each phase, individual fuse blocks, main circuit disconnect switch with door interlock, individual running pilot lights and selector switches, 110V control transformer with fuses, minimum run timer on the lag pump(s), overload relay for malfunction of the lead pump (P1). The panel shall have internal reset buttons and shall be mounted on support legs fixed directly to the base. The panel shall be UL Listed and also labeled accordingly.

POWER MANAGEMENT

The contractor shall furnish an Aurora Power Management Mode control in order to maximize efficient horsepower loading and minimize energy consumption, in cases where the pumps on the system are not equally sized, as follows. When the lead pump is operating at full load, the control will automatically bring the larger lag pump on the line. If the lag pump is not operating at full demand, the controller will take the lead pump off the line automatically. If the demand continues to increase past the capacity of the lag pump, the Power Management Mode will automatically bring the lead pump back on line. When system demand decreases to the point that the lead pump can again handle the system requirement, the control shall automatically sequence to the lead pump and shut down the lag pump. In instances where a three pump system is being used, the sequencing shall be the same except that an additional mode shall be incorporated.

TESTING

Pumps shall be hydrostatically tested, followed by a test of all components as a system approximating field conditions.

SERVICES

The pump manufacturer shall assume unit responsibility and shall provide a factory trained engineer to supervise initial start-up to insure proper operation and to instruct the operating personnel in the operation and maintenance of the system.

NOTE: Aurora Pump reserves the right to make revisions to its products and their specifications, and to this bulletin and related information without notice.

WWEMA

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