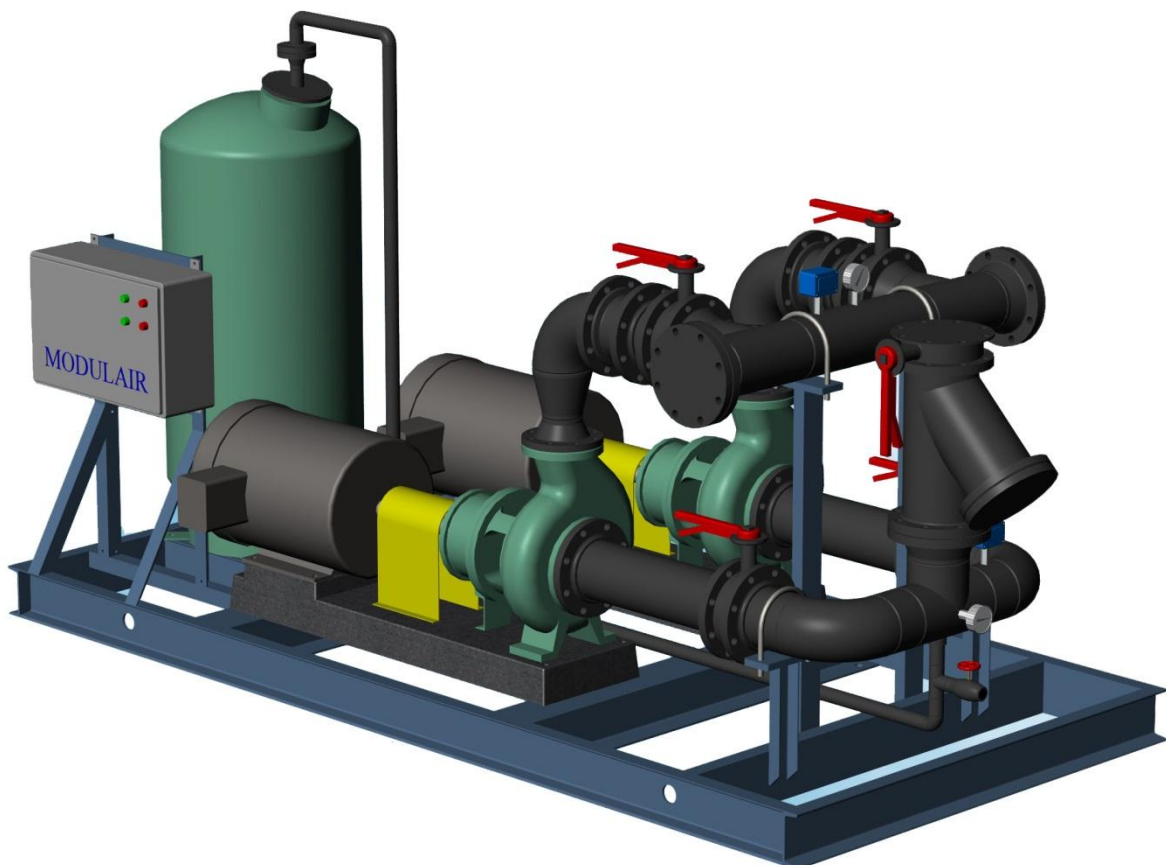


MODULAIR™ BY COLMAC COIL PUMP SKIDS

4 Models
Capacities to 2,300 gpm



“The Heat Transfer Experts”

STANDARD FEATURES:

Modulair Pump Skids are designed for closed loop cooling of water, ethylene glycol / water and propylene glycol / water solutions with air cooled fluid coolers for many power generation cooling applications.

Modulair Pump Skids are available in a series of four pre-engineered standard modules with a range of flows from 200 gpm to 2300 gpm. The pump skid performance charts are included in the data sheets in this bulletin to show the standard pump head available with the corresponding flow for each skid size for 50 and 60 HZ operation. The pump head can be increased up to the maximum head shown for 60 HZ operation by selecting a larger pump impeller and using the optional larger pump motor size shown on the charts. Optional larger pumps and motors are also available for skid sizes MOD 150 to MOD 250 to provide up to 280 feet head at 60 HZ and 195 feet head at 50 HZ operation. The optimum size of pump skid can easily be selected for most cooling applications using the information shown in these data sheets. The footing dimensions and pipe connection sizes and locations are provided to allow the preliminary installation layout required for any application.

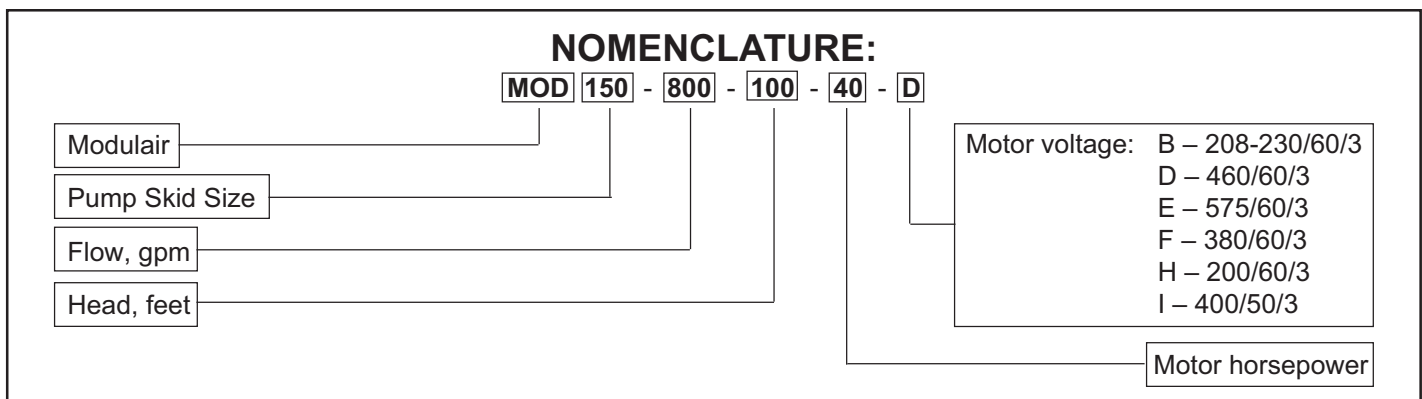
- Four basic pump skid sizes for flows from 200 gpm to 2300 gpm.
- Two 100% full rated pumps and motors rated for continuous outdoor duty.
- Bladder type expansion tank prevents air contact with the glycol/water solution.
- Design pressure 125 psig @ 200 F at inlet and 150 psig at outlet with 150# ANSI RF flanges.
- Piping fabricated to ASME B31.1.
- Dual outlet connections to simplify connections to two cooler modules.
- Heavy-duty foot mounted TEFC motors high efficiency 1.15 SF with Class F insulation.
- Motors are 1450 RPM for 50 HZ and 1780 RPM for 60 HZ operation.
- Motors and switches are factory wired to a weatherproof NEMA 4 electrical enclosure located at the expansion tank end of the skid to provide single point field wiring.
- Pressure switch on outlet for signal to pump changeover.
- Pressure switch at inlet for low liquid level alarm.
- Structural steel base and piping painted primer plus 2 coats enamel finish.
- Provision in base for grounding connections.
- Built in lifting connections to simplify lifting and installation.

PUMP FEATURES:

- Heavy duty ANSI standard end-suction centrifugal design flanged pump with ductile iron construction.
- Open impeller with external adjustment and balanced to ISO Figure 2 Level G6.3.
- Extra heavy duty shaft to ANSI B73.1M and oil lubricated bearings minimum life (L_{10}) of two years.
- Industry Standard Mechanical Shaft Seal.
- Flexible type spacer shaft coupling.
- Fully enclosed, telescoping, OSHA compliant steel coupling guard.

OPTIONS:

- Larger motors for 60 HZ operation to provide pump head above the standard head shown.
- Gravity type overhead expansion tank instead of the bladder tank.
- Extra capacity bladder tanks for very large systems.
- Larger pumps and motors and skid bases for MOD 150 to MOD 250 to provide pump head above the maximum head shown for up to 280 feet head for 60 HZ and 195 feet head for 50 HZ.



SELECTION PROCEDURE:

Modulair Pump Skid performance curves and outline dimensions are provided on data sheets for each pump skid size from MOD 100 to MOD 250. The performance curves show the standard head available with the standard motor for both 50 and 60 HZ operation and the maximum heads available for 60 HZ using the same pump but with a larger impeller and the optional larger motor.

The system flow required is usually determined by the cooling requirements of the turbine and generator or fuel cell coolers. The approach temperature will influence the flow rate as a small approach will require higher flows to minimize the cooler size. If the turbine or fuel cell cooler has already been selected use the highest pressure loss value for the total system calculation. If this pressure drop is not known allow 20 feet head for the preliminary estimate of system pressure drop. From the system layout estimate the pipe length required to make the connection to the pump skid and air cooler. Select a pipe size to keep the liquid velocity below 10 feet per second (3.0 meters/sec) and calculate the total interconnecting piping pressure drop.

Next select the number and size of Modulair air-cooled fluid coolers required and read the air cooler pressure drop from the charts provided. To calculate the total system pressure loss add the pressure losses of the air coolers, the connecting piping, the turbine or fuel cell cooler and any control valves in the system. (The pump skid head shown is after the skid piping)

Using the Pump Skid Performance Charts select the Modulair Pump Skid size to provide the system flow and pump head required. If possible select the mid range of the available flow to provide some flexibility for later system adjustments. If the head required is above the standard head that is shown in the chart the larger optional motor will be required. A larger pipe size may be considered to reduce the total head loss. A 20% margin on the pressure loss is suggested during the preliminary selection but once the final pressure losses are known the pump impeller should be sized no more than 10% above the head required for optimum performance.

Excessive pump head is not recommended, as liquid flow will be higher than required and could lead to premature failure of the components. For example if the total system pressure loss is only 70% of the head available for the pump skid selected the actual flow will be approximately 20% higher than design.

After the pump skid and pipe size have been selected calculate the total system liquid volume to check the skid expansion tank capacity required. 50% ethylene glycol-water will expand 5% and water will expand 3.4% by volume over a 150 °F temperature change. The expansion tank capacity shown on the pump skid data sheets should normally be twice the expansion volume. If necessary optional additional expansion tank capacity can be supplied.

For operating conditions that are markedly different than the conditions used for the Pump Skid Performance Curves please contact your Modulair representative or factory staff to check the selection or to prepare a custom design selection.

EXAMPLE:

A combustion turbine installation has a design cooling flow of 1600 gpm of 50% ethylene glycol-water. The turbine cooler pressure loss is 18 feet, the piping loss is 35 feet, the air cooler loss is 15 feet and a control valve at the turbine adds 11 feet for a total of 79 feet. The MOD 200 and MOD 250 will both meet this performance but the MOD 200 will be more efficient at this flow and is the preferred choice. The pump head can be increased if necessary when the total system pressure loss is calculated by specifying a larger motor size when the pump skid is ordered. The pump skid selection is a MOD 200 –1600 – 80 – 50 - D.

CONVERSIONS:

1 BHP = .746kW

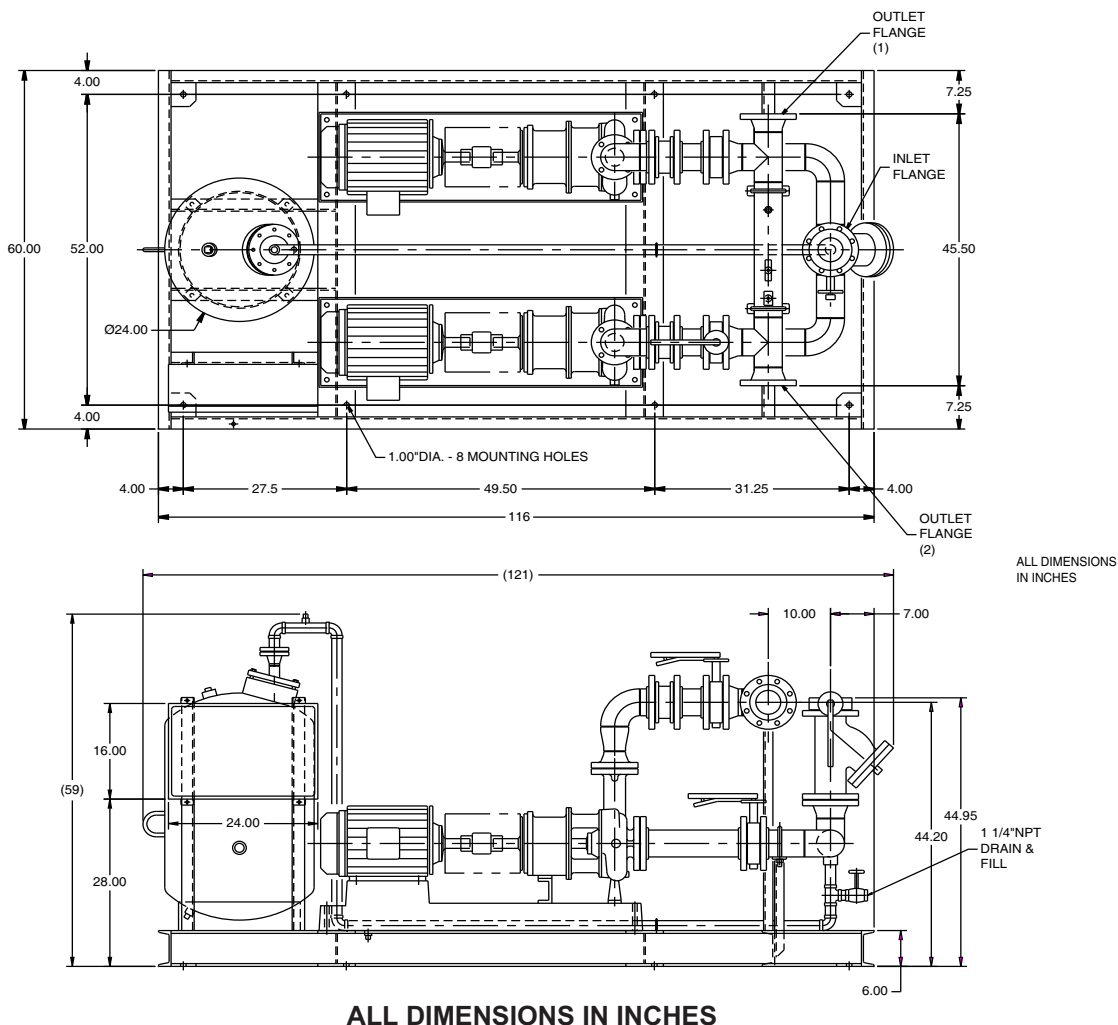
1 gpm = 3.785 L/min.

1 meter = 3.28 feet

1 psi = 2.2 feet head of 50% ethylene glycol-water

1 kg/cm² = 31.27 feet of 50% ethylene glycol-water

FIGURE 1 MODULAIR PUMP SKID-MOD 100



ALL DIMENSIONS IN INCHES

STD. PUMP MOTORS : (2) 20 HP
 NOMINAL GPM: 350 AT
 100 FEET HEAD

 PRESSURIZED, BLADDER TYPE
 EXPANSION TANK, VOLUME 53 GAL.

 DRY WEIGHT: 2275 LBS.
 FLOODED WT.: 2685 LBS.

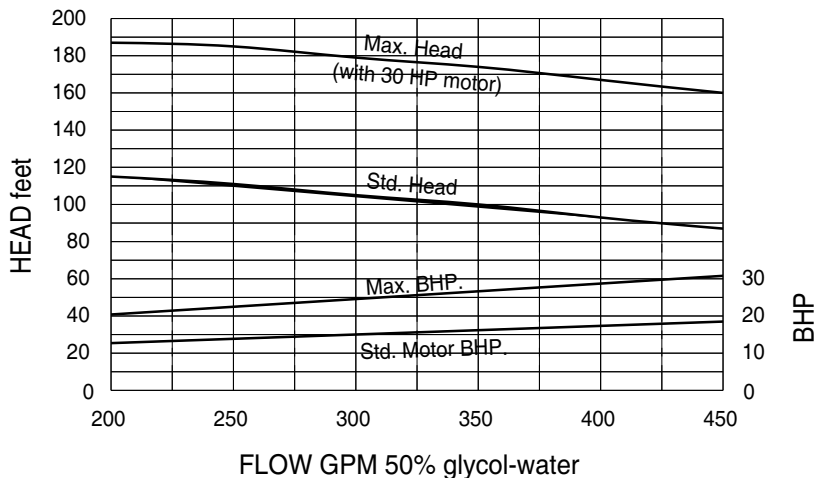
 IN/OUT CONNECTION : 4"-150#-RF

 DESIGN PRESSURE IN : 125 PSIG
 DESIGN PRESSURE OUT: 150 PSIG

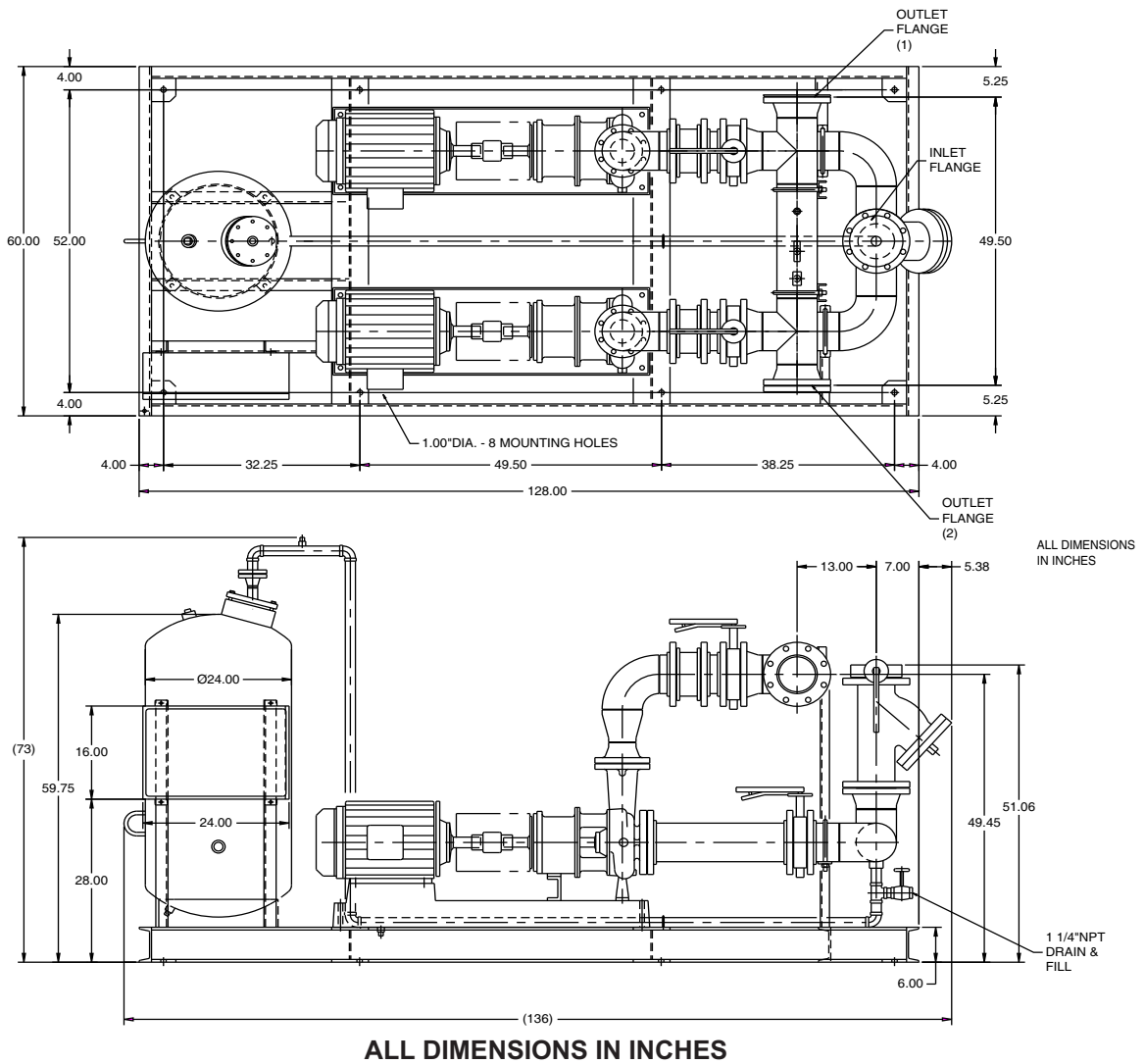
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FIGURE 2

MOD 100 PUMP SKID PERFORMANCE CURVE



**FIGURE 3
MODULAIR PUMP SKID-MOD 150**



STD. PUMP MOTORS : (2) 40 HP
 NOMINAL GPM: 800 AT
 100 FEET HEAD

PRESSURIZED, BLADDER TYPE
 EXPANSION TANK, VOLUME 79 GAL.

DRY WEIGHT: 4500 LBS.
 FLOODED WT.: 5100 LBS.

IN/OUT CONNECTION : 6"-150#-RF

DESIGN PRESSURE IN : 125 PSIG
 DESIGN PRESSURE OUT: 150 PSIG

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**FIGURE 4
MOD 150 PUMP SKID PERFORMANCE CURVE**

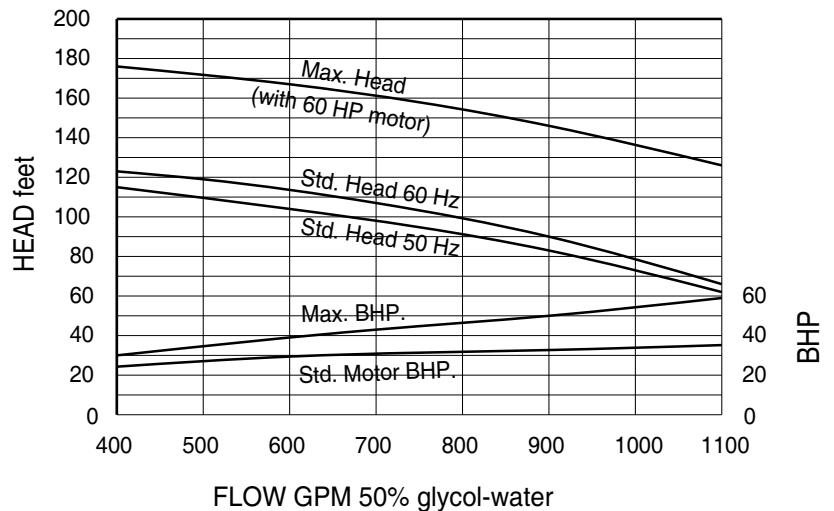
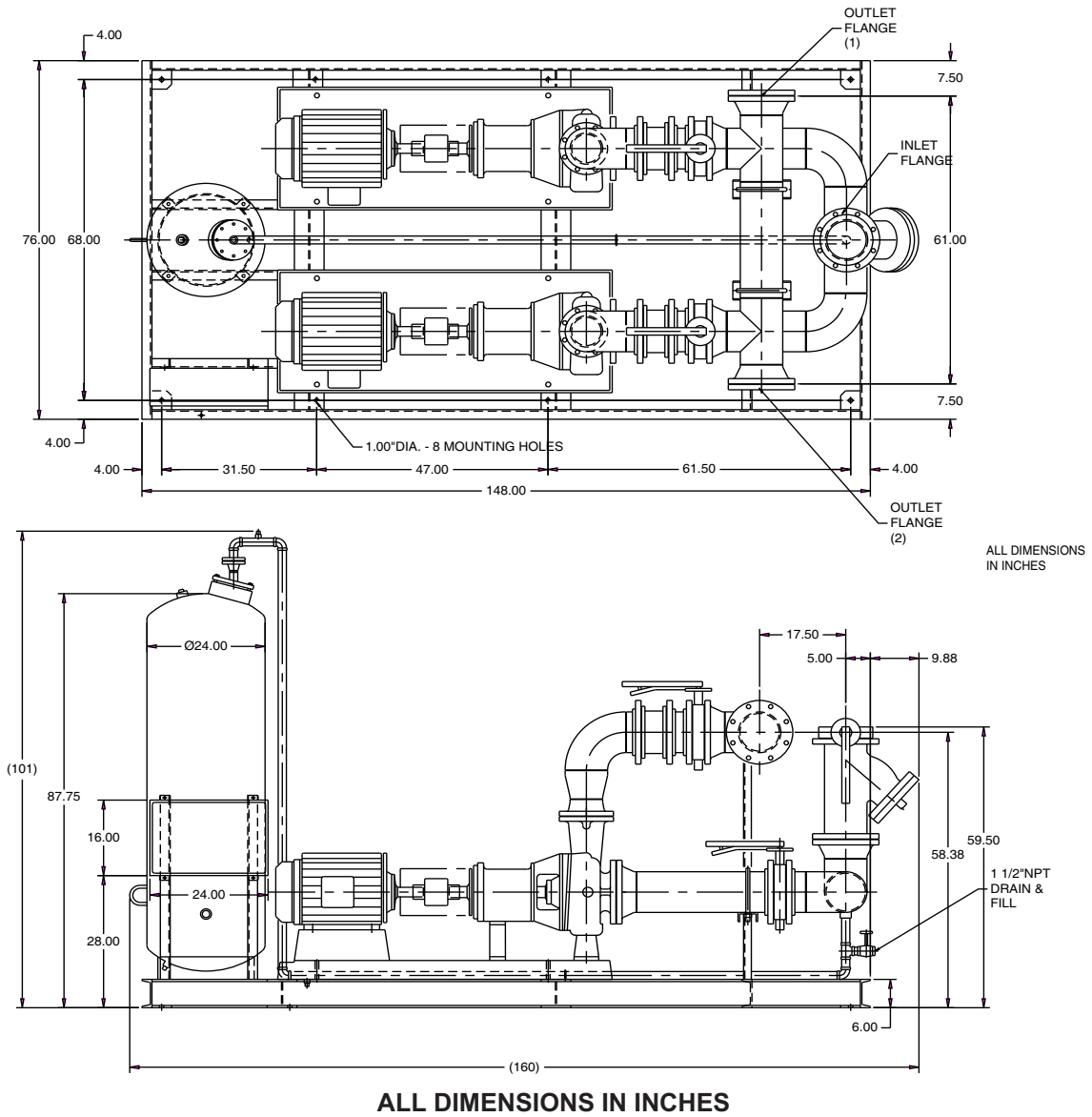


FIGURE 5 MODULAIR PUMP SKID-MOD 200



STD. PUMP MOTORS : (2) 50 HP
 NOMINAL GPM: 1200 AT
 100 FEET HEAD

PRESSURIZED, BLADDER TYPE
 EXPANSION TANK, VOL. 132 GAL.

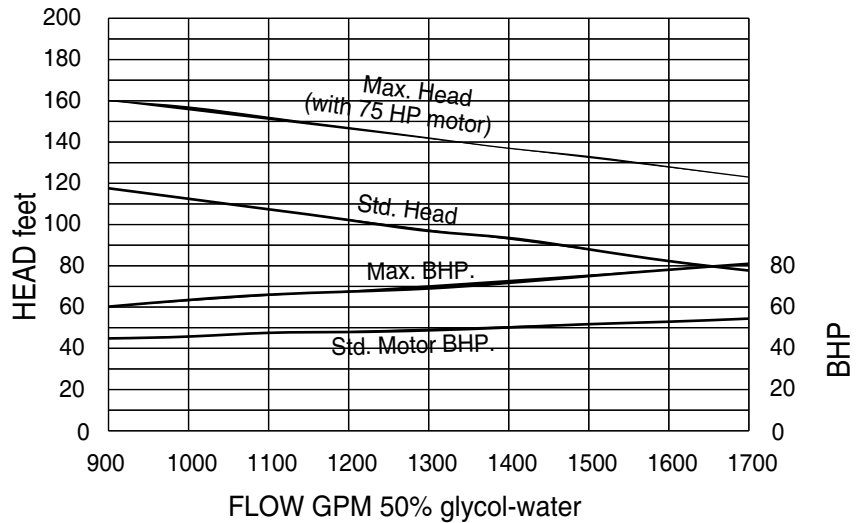
DRY WEIGHT: 4970 LBS.
 FLOODED WT.: 6080 LBS.

IN/OUT CONNECTION : 8"-150#-RF

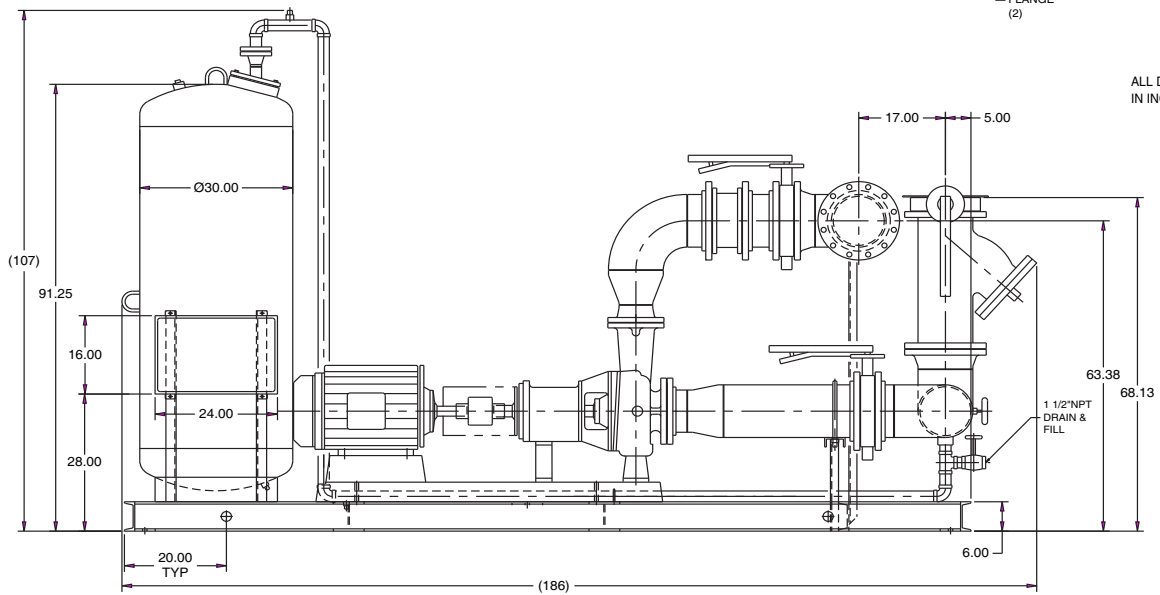
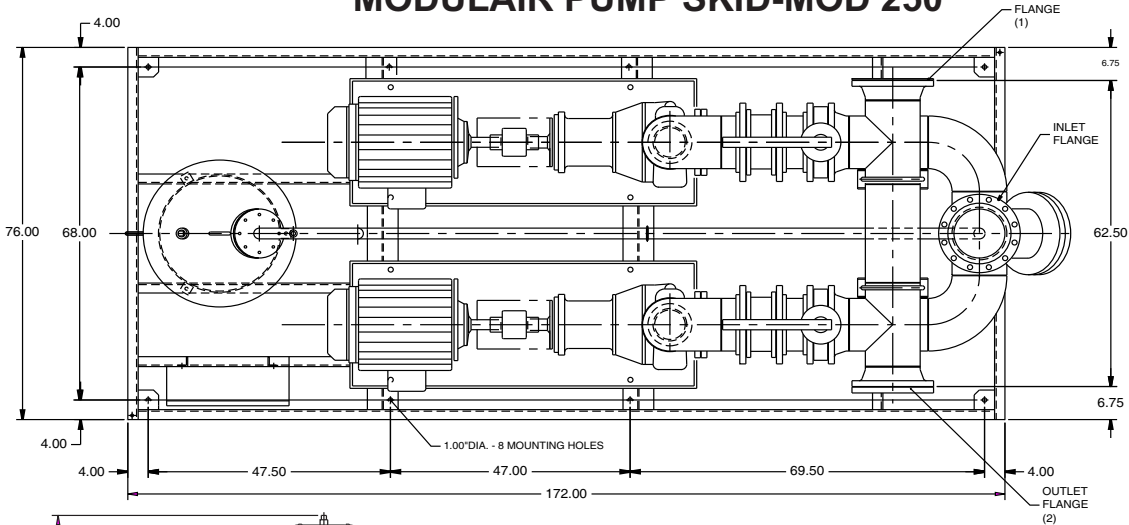
DESIGN PRESSURE IN : 125 PSIG
 DESIGN PRESSURE OUT: 150 PSIG

PAINT: ENAMEL FINISH

FIGURE 6 MOD 200 PUMP SKID PERFORMANCE CURVE



**FIGURE 7
MODULAIR PUMP SKID-MOD 250**



ALL DIMENSIONS
IN INCHES

ALL DIMENSIONS IN INCHES

STD. PUMP MOTORS : (2) 75 HP

NOMINAL GPM: 2000 AT

100 FEET HEAD

PRESSURIZED, BLADDER TYPE

EXPANSION TANK, VOL. 211 GAL.

DRY WEIGHT: 6620 LBS.

FLOODED WT.: 8445 LBS.

IN/OUT CONNECTION : 10"-150#-RF

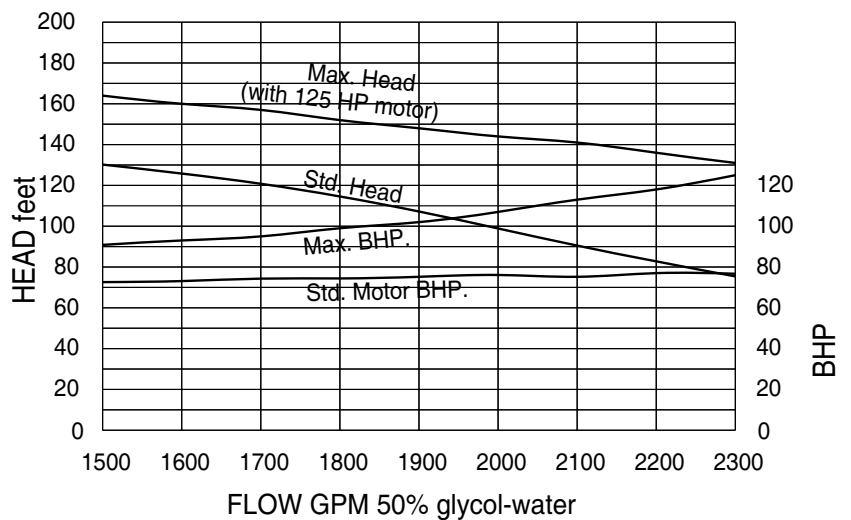
DESIGN PRESSURE IN : 125 PSIG

DESIGN PRESSURE OUT: 150 PSIG

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FIGURE 8

MOD 250 PUMP SKID PERFORMANCE CURVE





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CRN



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