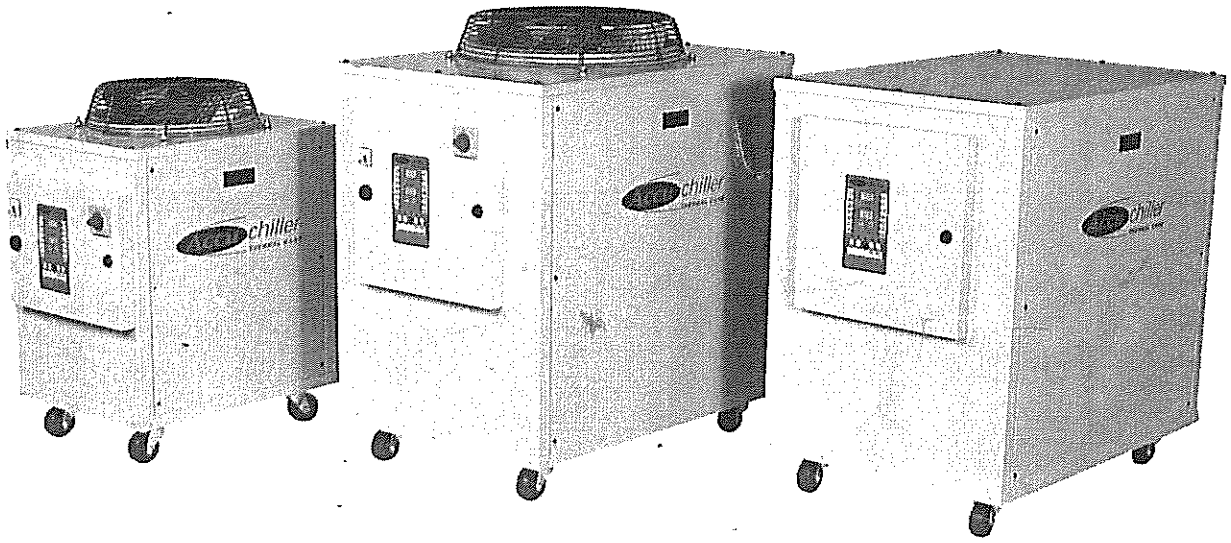
C3-003 Line #29.

Accu chiller
THERMAL CARE

# EQ Series Portable Chillers



## Installation, Operation and Maintenance Manual

# Charts and Drawings

*Table 8 - EQ Air Cooled Chiller Electrical Specifications*

| Model | Voltage | Compressor | Pump | | Condenser Fan | | Control Circuit | Unit MCA[2] |
|---|---|---|---|---|---|---|---|---|
| | | RLA[1] | Power (HP) | FLA | Power (HP) | FLA | FLA | |
| EQ3A01 | 208/1/60 | 5.9 | ¾ (.186 kW) | 2.7 | 1/4 (.186 kW) | 1.7 | 0.24 | 12.8 |
| | 230/1/60 | 5.4 | | 2.4 | | 1.6 | 0.22 | 11.8 |
| EQ2A02 | 208/3/60 | 9.5 | 1 (.745 kW) | 3.9 | 1/4 (.186 kW) (single phase) | 1.7 | 0.24 | 18.5 |
| | 230/3/60 | 8.6 | | 3.6 | | 1.6 | 0.22 | 17.0 |
| | 460/3/60 | 4.3 | | 1.8 | | 0.8 | 0.11 | 9.0 |
| | 208/3/60 | 9.5 | 2 (1.49 kW) | 7.5 | | 1.7 | 0.24 | 22.1 |
| | 230/3/60 | 8.6 | | 6.8 | | 1.6 | 0.22 | 20.2 |
| | 460/3/60 | 4.3 | | 3.4 | | 0.8 | 0.11 | 10.6 |
| | 208/3/60 | 9.5 | 3 (2.24 kW) | 10.6 | | 1.7 | 0.24 | 25.2 |
| | 230/3/60 | 8.6 | | 9.6 | | 1.6 | 0.22 | 23.0 |
| | 460/3/60 | 4.3 | | 4.8 | | 0.8 | 0.11 | 12.0 |
| | 208/3/60 | 9.5 | 2 (1.49 kW) 2-stg | 8.8 | | 1.7 | 0.24 | 23.4 |
| | 230/3/60 | 8.6 | | 8.0 | | 1.6 | 0.22 | 21.4 |
| | 460/3/60 | 4.3 | | 3.7 | | 0.8 | 0.11 | 10.9 |
| EQ2A03 | 208/3/60 | 12.6 | 1 (.745 kW) | 3.9 | ½ (.372 kW) (single phase) | 3.0 | 0.24 | 23.6 |
| | 230/3/60 | 11.4 | | 3.6 | | 2.9 | 0.22 | 21.5 |
| | 460/3/60 | 6.2 | | 1.8 | | 1.5 | 0.11 | 11.9 |
| | 208/3/60 | 12.6 | 2 (1.49 kW) | 7.5 | | 3.0 | 0.24 | 27.3 |
| | 230/3/60 | 11.4 | | 6.8 | | 2.9 | 0.22 | 25.0 |
| | 460/3/60 | 6.2 | | 3.4 | | 1.5 | 0.11 | 13.7 |
| | 208/3/60 | 12.6 | 3 (2.24 kW) | 10.6 | | 3.0 | 0.24 | 30.4 |
| | 230/3/60 | 11.4 | | 9.6 | | 2.9 | 0.22 | 27.8 |
| | 460/3/60 | 6.2 | | 4.8 | | 1.5 | 0.11 | 15.1 |
| | 208/3/60 | 12.6 | 2 (1.49 kW) 2-stg | 8.8 | | 3.0 | 0.24 | 28.6 |
| | 230/3/60 | 11.4 | | 8.0 | | 2.9 | 0.22 | 26.2 |
| | 460/3/60 | 6.2 | | 3.7 | | 1.5 | 0.11 | 14.0 |

Notes:
RLA (Rated Load Amps) based on a percentage of the MMTC (Maximum Must Trip Current) as established by the manufacturer in accordance with UL Standard 465.
MCA (Minimum Circuit Ampacity) based on 125% of the compressor RLA plus 100% of remaining components FLA in accordance with NEC 440-33. MCA shown also include 1 amp value for the control circuit.
Voltage Utilization range is: 208 (187 to 229), 230 (187 to 254), and 460 (414 to 506).

THERMAL CARE CHILLER

MODEL # : EQ3A0102

SERIAL # : 166630110084

THERMAL CARE

9720 N. LEHIGH AVE

NILE IL 60714-3491

SERVICE HELP: STEVE

847 966 2636

## Water Cooled Condenser Lines (Water Cooled Units Only)

The performance of the condenser is dependent on maintaining the proper flow and temperature of water through the heat exchanger. Insufficient water flow or high condenser water supply temperatures will result in the reduction of cooling capacity of the chiller. Extreme conditions will eventually result in the chiller shutting down due to high refrigerant pressure. Performance can be adversely affected if the condenser is allowed to plug up from contaminants in the condenser water stream. In order to reduce maintenance costs and chiller downtime, a water treatment program is highly recommended for the condenser cooling water. If any condenser does become plugged, contact our Customer Service Department for assistance in the proper procedure for cleaning out the condenser.

The standard cooling capacity is based upon 85°F (29°C) condenser cooling water supply. Under normal operating conditions there will be a 10°F (6°C) rise through the condenser resulting in 95°F (35°C) exiting water temperature from the condenser. To ensure proper water flow through the condenser, the condenser water pump should be able to handle up to 25 PSI (172 kPa) pressure drop through the condenser. While the design pressure loss is much lower than 25 PSI (172 kPa), we recommend the pumping system be sized for this loss to ensure there will be sufficient supply pressure to the condensers. To prevent damage to the condenser or regulating valve, the condenser water pressure should not exceed 150 PSIG (1034 kPa). The condenser water regulating valve controls the condenser water flow. The chiller loading and condenser water inlet temperature will determine the actual flow. Table 2 shows minimum condenser water flow requirements for the different size chillers at different supply temperatures under fully loaded conditions.

*Table 2 - Condenser Water Flow Requirements*

| | EQ2W02 | EQ2W03 |
|---|---|---|
| GPM (L/min) @ or below 70°F (21°C) | 2.2 (8.3) | 3 (11.3) |
| GPM (L/min) @ 75°F (24°C) | 3 (11.3) | 3.8 (14.3) |
| GPM (L/min) @ 80°F (27°C) | 4.2 (15.9) | 5.4 (20.4) |
| GPM (L/min) @ 85°F (29°C) | -6.4 (24.2) | 8.2 (31) |
| GPM (L/min) @ 90°F (32°C) | Call factory | Call factory |

The minimum flows are determined using the condenser water regulating valve setting of 210 PSI (1.45 Mpa) for a given supply temperature. The supply temperature range is from 40°F (4.4°C) to 90°F (32°C). Supply temperatures beyond this range are not recommended and may lead to improper chiller operation.

## Air Cooled Chillers Condenser Air (Air Cooled Units Only)

In order to accommodate the air-cooled condenser, the chiller must be located in a well-ventilated area. A minimum of three feet of clearance is recommended at both the condenser air inlet and condenser air discharge. The air cooled chillers were not designed to have the condenser air discharge ducted. Improper clearance or poor ventilation will reduce the cooling capacity of the chiller and may cause high refrigerant pressure problems. The condenser air inlet temperature should be maintained above 50°F (15°C) in order to avoid possible low refrigerant pressure safety trips during start-up.

## Chilled Water Lines

All chilled water piping should be adequately insulated to prevent condensation. If water is allowed to condense on the piping, the state change of the water from gas to liquid will result in a substantial heat load that becomes an additional burden for the chiller. Standard portable chillers have been designed to provide 50°F (10°C) coolant to the process. Under normal operating conditions there will be a 10°F (6°C) rise through the process resulting in 60°F (16°C) return coolant temperature to the chiller.

*Table 3 - EQ Series Chilled Water Flow Requirements*

| Model | Nominal Flow GPM (L/min) | Pressure Drop PSI (kPa) |
|---|---|---|
| EQ3A01 | 2.4 (9) | 1 (6.89) |
| EQ2A02 | 4.8 (18.1) | 3 (20.68) |
| EQ2A03 | 7.2 (27.2) | 5 (34.47) |
| EQ2W02 | 4.8 (18.1) | 3 (20.68) |
| EQ2W03 | 7.2 (27.2) | 5 (34.47) |

The importance of properly sized piping between the chiller and process cannot be overemphasized. See the ASHRAE Handbook or other suitable design guide for proper pipe sizing. In general, run full size piping out to the process and then reduce the pipe size to match the connections on the process equipment. One of the most common causes of

*Figure 2 - 60 Hz Pump Curves (water)*

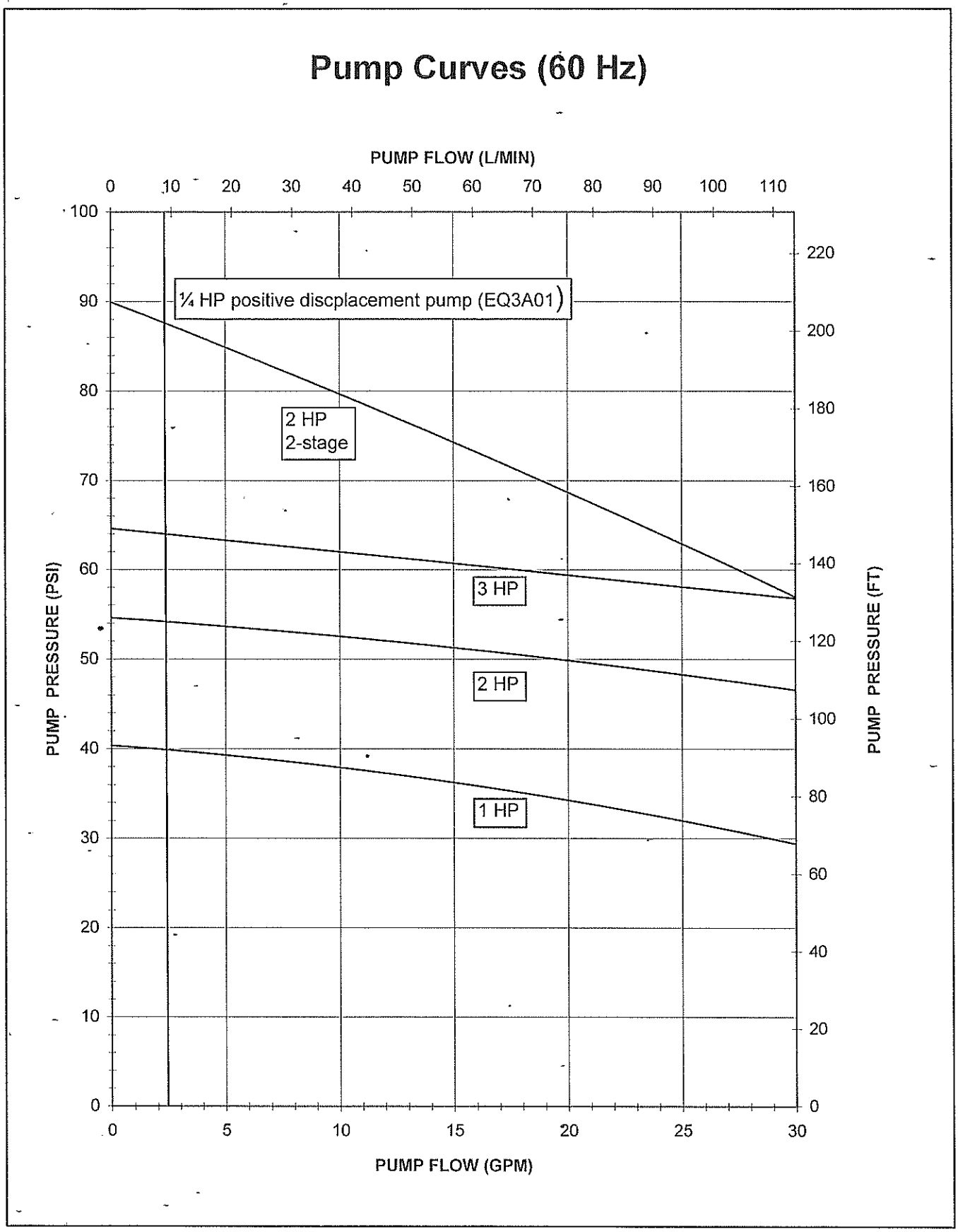
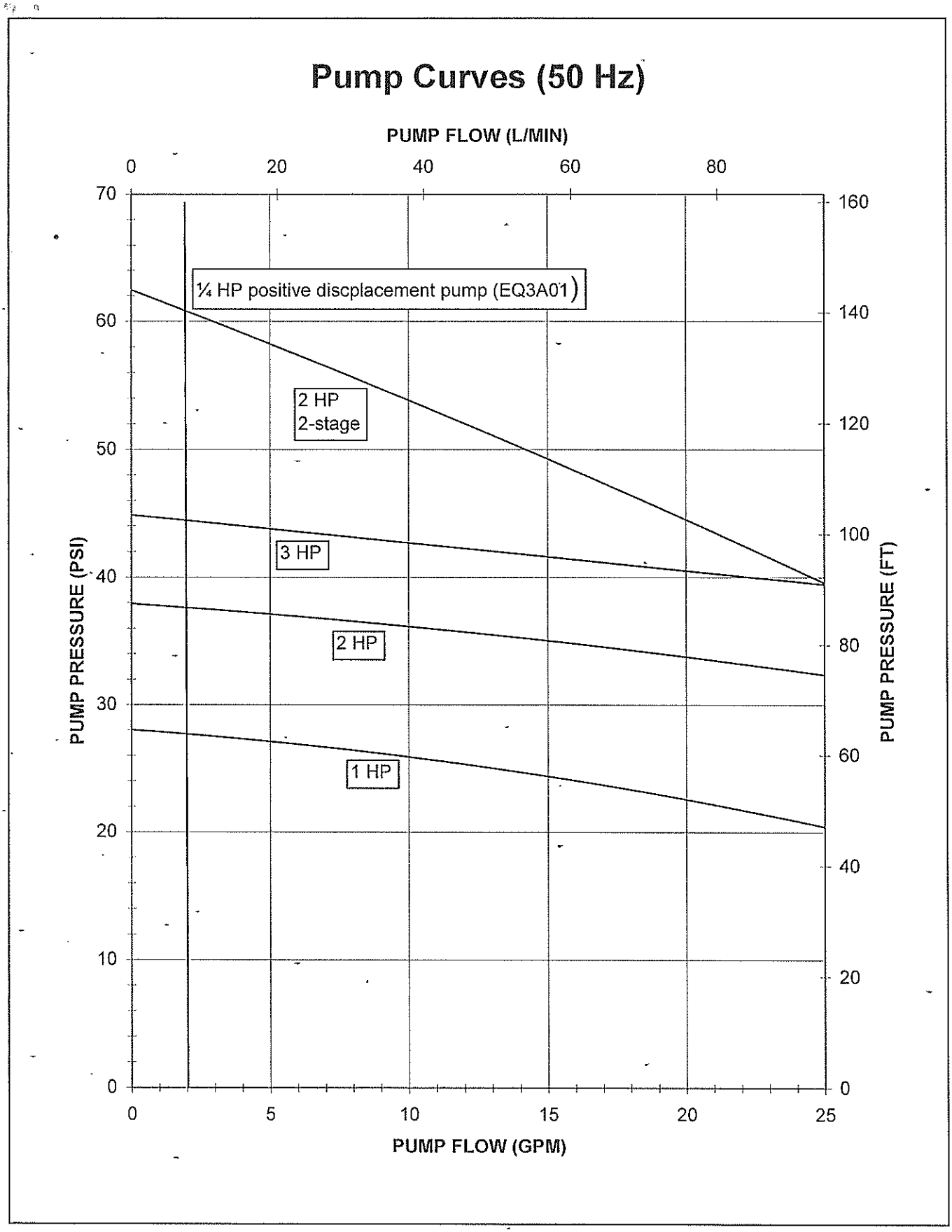


*Figure 3 - 50 Hz Pump Curves (water)*



## 3. Specifications

| | |
|---|---|
| Input voltage | 90-132/180-264 VAC (selectable range) |
| Input frequency | 47-63 Hz |
| Maximum input current | 2.0 A |
| Output voltage | 24 VDC |
| Maximum output current | 2.5 A |
| Operating temperature range | 0-50 °C (32-122 °F) |

## 4. Installation

The following information provides the different installation applications of the PS40 power supply.

### Wall or Machine Mounting (Use with PC40/44 Only)

The "S" mounting bracket provided with the PS40 offers the capability to mount the PS40 side by side with a PC 40/44 Pattern Control so that their front panels are flush. The bracket is symmetrical. If you wish to mount the PS40 on the left, simply rotate the bracket so that the recess is on the left side.

1. Position the "S" bracket at the mounting location. Make sure to allow for a mounting area height of 229 mm (9 in.), and a width of 208 mm (8.2 in.).
2. Mark the centers of the two bracket holes on the mounting surface. Ensure that the center of the marks are 152 mm (6 in.) apart from center to center.
3. Drill two 5 mm ($^{7}/_{32}$ in.) holes in the mounting surface at the location of the two marks for the M4 screws provided.
4. Loosen the six screws that secure the PS40 front assembly to the back enclosure.
5. Carefully pull the PS40 back enclosure away from the front assembly and unplug the power supply connector. Set the front assembly aside.