

# Hoffman Controls

## Product Data

816-10D (HPVD) Series

## Electronic Head Pressure Controllers



**816-10D (HPVD)  
Electronic Head Pressure Controller**

### Description

The 816-10D (HPVD) is a NEW Series Head Pressure Controller designed specifically for Heat Pumps, or non Heat Pump applications that provide a 1 – 10V DC signal input for control. This model can be used in either application and modulates (varies) the condenser fan speed in low ambient temperatures. In either case, head pressure is regulated by varying the air volume through the condenser in the cooling cycle.

**Heat Pump Applications** – When used with Heat Pumps, the Controller accepts a “user supplied” 24VAC input which identifies Heat Pump “reverse cycle” (Heat mode) operation. When this occurs, the Controller disregards the liquid line sensor input (temperature) and allows full speed operation of the condenser fan.

**1 – 10V DC Input Applications** – When it is desired to control the 816-10D (HPVD) with an external signal input source, the DC input terminals are used in place of the liquid line sensor. The 1 – 10V DC input is not used in Heat Pump applications.

In either case, the “-10D” Series requires an external 24VAC power source. The primary of 24VAC transformer source must be derived from the same phase(s) that powers the motor(s).

The Controller senses the decreasing liquid line temperature (excessive sub-cooling) which is directly proportional to head pressure. Speed regulation (modulation) begins at 80°F liquid line ( $\approx 65^\circ\text{F}$  ambient/ $\approx 105^\circ\text{F}$  condensing temperature) and proportionally reduces the fan speed until liquid line temperature reaches 50°F ( $\approx 0^\circ\text{F} \pm$  ambient/ $\approx 85^\circ\text{F}$  condensing temperature). Power to the motor is removed at 50°F. At 53°F (liquid line temperature) the fan starts at full speed for a few seconds, then modulates near minimum RPM.

The operation of the Controller maintains a controlled pressure differential across the expansion device. This allows control of superheat as ambient temperature falls.

*Minimum ambient control regulation is dependent upon the minimum speed at which a specific motor will effectively operate/function.*

### Application

The Controller is typically utilized on air cooled condenser fan motors found in Air Conditioning and Refrigeration systems and are used on the following motor types:

- Single Phase, single speed
- Sleeve or ball bearing direct drive
- Open frame — PSC or Shaded Pole
- Some Totally Enclosed Motors (TEC) with 60°C ambient ratings may be applicable.

Minimum speed should be limited to approximately 400 RPM for sleeve bearing motors and 200 RPM for ball bearing motors.

*Motors used should be designed for and applicable to Phase Proportioning, and should be evaluated for suitability and acceptability. TEC (totally enclosed motor types) are not generally suitable or recommended.*

Typical Air Conditioning and Refrigeration applications requiring continuous operation in low ambients:

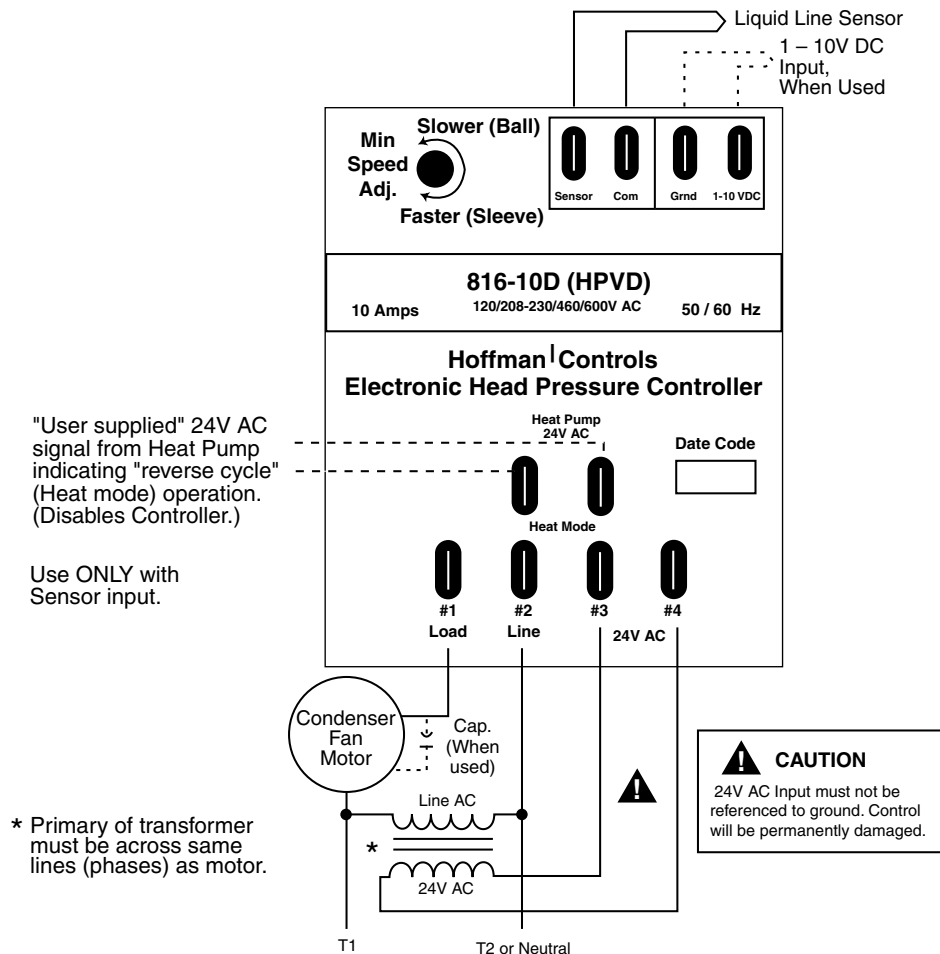
- Commercial air conditioning
- Humidity control
- Supermarkets
- Cooling tower fans
- Computer rooms
- Glycol coolers
- Cold storage
- Liquid heat exchangers

# Specifications

Voltages	120 / 208 – 230 / 460 / 600
Current	10 Amps
Frequency	50 / 60 Hz
Voltage, Input (Nominal)	24V AC
Power @ 24VAC	4 VA
Inputs	Sensor or 1 – 10V DC Heat Pump 24VAC
Sensor (Tape-on)	10K Thermistor
Control Range	
Liquid Line Temp.	80°F – 50°F
Ambient Temp.	65°F – 0°F
Minimum Motor Speed	
Ball Bearing	200 RPM
Sleeve Bearing	400 RPM
Operating Ambient	– 30°F – +160°F
Dimensions (L x W x H)	5.56" x 3.32" x 1.25"

# Features and Benefits

- Multi voltage Controller.
- Heat Pump (Heat mode) Controller bypass input.
- Optional control inputs/methods.
- Applicable for all refrigerant types.
- Eliminates system penetration.
- Simple field calibration.
- Monitors liquid line temperature (liquid refrigerant).
- Full voltage start to ensure proper fan rotation.
- Cycles fan "OFF" when minimum speed is achieved.
- Eliminates liquid "slugging".
- Eliminates fan cycling controls.
- Optional **Weatherproof Kit** (NEMA 3R)  
Part Number: 545-0202-007.
- Accessory: **Adjustable Sensor Simulator**, recommended by HCC, Part No. 510-0027-000.



**816-10D (HPVD) Wiring Diagram**

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