

Hoffman Controls

Installation & Operating Instructions

812/814/816 -10D, -10E, DS and HPVD Series

Electronic Head Pressure Control

General

HCC Electronic Head Pressure Controllers are provided in three basic series.

- The “-10D” Series requires an external 24V AC power source. The primary of the 24V AC transformer secondary must be the same phase that supplies the motor.

CAUTION

24V AC secondary must never be referenced to ground.

- The “-10E” Series includes an internal transformer within the Controller and does not require an external 24V AC power source. *Both “-10D” and “-10E” Series are available in a “dual sensor” model identified by a “DS” suffix.*

- The “-10D” Series is also available in an “HPVD” suffix denoting two *NEW* features:
 - A 24V AC input used in Heat Pump applications which bypasses Controller fan speed modulation during “reverse cycle” (Heat mode) operation. Used only with Sensor input.
 - An input that allows the installer to use an external 1 – 10V DC source rather than the liquid line sensor.
- HCC recommends use of the **Adjustable Sensor Simulator**, Part No. 510-0027-000 for installation and troubleshooting.

See Table 1 for Controller model information and auxiliary functions.

Model Series	Suffix	Controller Nominal Volts	Amps	Hz	Wiring Figures	24V AC Required	Auxiliary Function
816-10D		120/208-230/460/600	10	50/60	3, 6	Yes	None
816-10D	DS	120/208-230/460/600	10	50/60	3, 6	Yes	Dual Sensor
816-10D	HPVD	120/208-230/460/600	10	50/60	5	Yes	HP or V DC
812-10E		120/208-230	10	50/60	4, 7	No	None
812-10E	DS	120/208-230	10	50/60	4, 7	No	Dual Sensor
814-10E		208-230/460	10	50/60	4, 7	No	None
814-10E	DS	208-230/460	10	50/60	4, 7	No	Dual Sensor
816-10E		347/600	10	50/60	4, 7	No	None
816-10E	DS	347/600	10	50/60	4, 7	No	Dual Sensor

Table 1

Pre-Installation Information / Instruction

- For use with Single Phase, permanent split capacitor, or shaded pole motors.
- Line Voltage Range: Available from 120V AC through 600V AC. See Table 1 for appropriate model for your application.
- Wiring must comply with Local and National Electrical Codes.
- One Controller may control more than one motor.
 - Max. running amps under all conditions not to exceed 10 Amps.
 - Locked Rotor Amps (LRA) not to exceed 30 Amps for 1 second.
- The “-10D” Series will require a 24V AC external power source with ungrounded secondary.

IMPORTANT

The primary of the 24V AC power source must be on the same lines (phases) serving the motor.

- The “-10E” Series **does not** require a 24V AC external power source. This Controller series features an internal transformed power source.

CAUTION

Do not install the 812/814/816 Series in an airtight compartment, or near heat generating sources.

7. **Application Limitation:** Speed regulation and performance characteristics will vary with motor design and motor ventilating capability. Motors used should be designed for Phase Proportioning and should be evaluated for suitability and acceptability. TEC (totally enclosed types) are not recommended or not generally suitable.

Installation for 812/814/816 -10D, -10E, DS and HPVD

- Refer to Figures 2, 3, 4, 5 or 6 for appropriate wiring diagram.

WARNING

Disconnect power from the unit and electrically disable the compressor prior to installation.

- Install the Controller in a weatherproof control panel or use HCC's **NEMA 3R Weatherproof Kit (Part Number 545-0202-007)**. **Note:** Controller must be protected from moisture and condensation.
- Disconnect all factory wiring connecting the motor to the line.
- Select the appropriate line voltage wiring diagram for the motor and "LINE" input terminals. (See Table 1 for appropriate field wiring diagram.)
- "-10D" Series only: Obtain 24V AC power for the Controller from a source whose line voltage primary input is common to the motor power input. Do not ground either leg of the 24V AC input. Control will be permanently damaged.
- See Figure 5 for Heat Pump and V DC input applications.
- Setting Minimum Speed Adj.: An adjustment is provided to accommodate the slowest allowable speed for ball bearing or sleeve bearing type motors.

Recommended Minimum Speed

Ball Bearing Motors	200 RPM	9 – 11 o'clock
Sleeve Bearing Motors	400 RPM	1 – 2 o'clock

CAUTION

Do not attempt to set Minimum Speed Adj. to obtain a desired head pressure. This adjustment is only provided to compensate for fan bearing type and must not be used otherwise. Improper operation will result.

Sensor Installation

Liquid Line Sensor

- Install Sensor(s) to the top of liquid line where the line exits the condenser coil (refer to Figure 1). If two compressors (circuits) are used, one Sensor is required for each refrigerant circuit (DS model only).

- Use the special tape provided to secure the Sensor to the liquid line. Stretch the tape slightly, as you wrap Sensor around the liquid line. Use all the tape, lapping the Sensor. Firm contact is required between the metal tab of the Sensor and the liquid line.
- Connect the Sensor(s) to the "Sensor" input terminals.

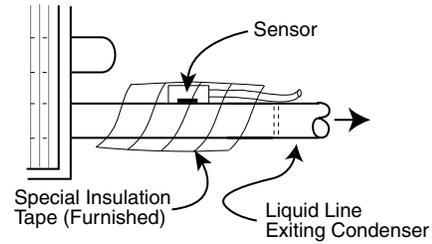


Figure 1

DC Input

- 1 – 10V DC Input applications require installer to scale speed of motor to accomplish head pressure control. See Figure 2 illustration for determining typical speed regulation requirement.

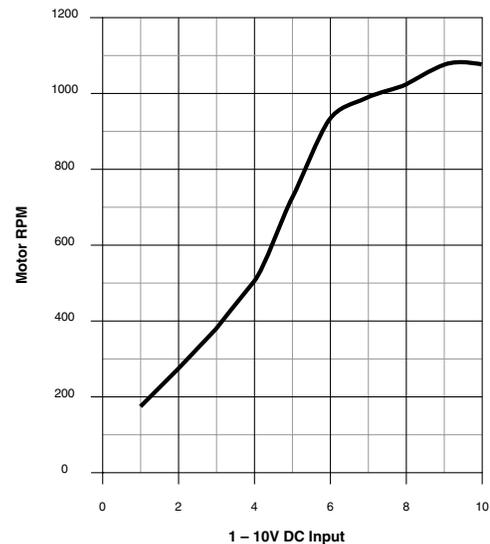


Figure 2 Typical 1075 RPM Motor Curve

Checkout Procedure

Step 1

With power disconnected and the Controller wired:

- Measure the ohms across the "MOTOR" (load) terminals using an ohm meter.
- If you read 1 ohm or less (120V AC operating voltage), or 5 ohms or less (208V AC or greater operating voltage), the Controller is improperly wired.

CAUTION

Correct wiring error(s). Do not apply power if incorrect values were measured during checkout. (The load is shorted; applying power will destroy the Controller.)

Step 2

With the compressor disabled, set thermostat for cooling demand and apply voltage to the unit. Condenser fan will start if ambient/liquid line is above 53°F.

1. Monitor sensed temperature (°F) and condenser motor voltage and current.
2. Verify that the motor is operating properly for temperature sensed. If the sensor temperature at start up is:
 - a. **Below (less than) 50°F** – the motor(s) will not start. By shorting the sensor terminals, the motor(s) will run at full speed. (Always remove short from sensor terminals for normal operation.)
 - b. **Between 53°F and 80°F** – the motor(s) will start at full speed for a few seconds and immediately modulate to a reduced speed proportional to the temperature sensed.
 - c. **Above 80°F** – the motor(s) will start and remain at full speed. Removing the Sensor lead, or both Sensor leads in the case of a “DS” dual sensor unit, will cause the motor(s) to stop. (Always re-connect the Sensor(s) for normal operation.)

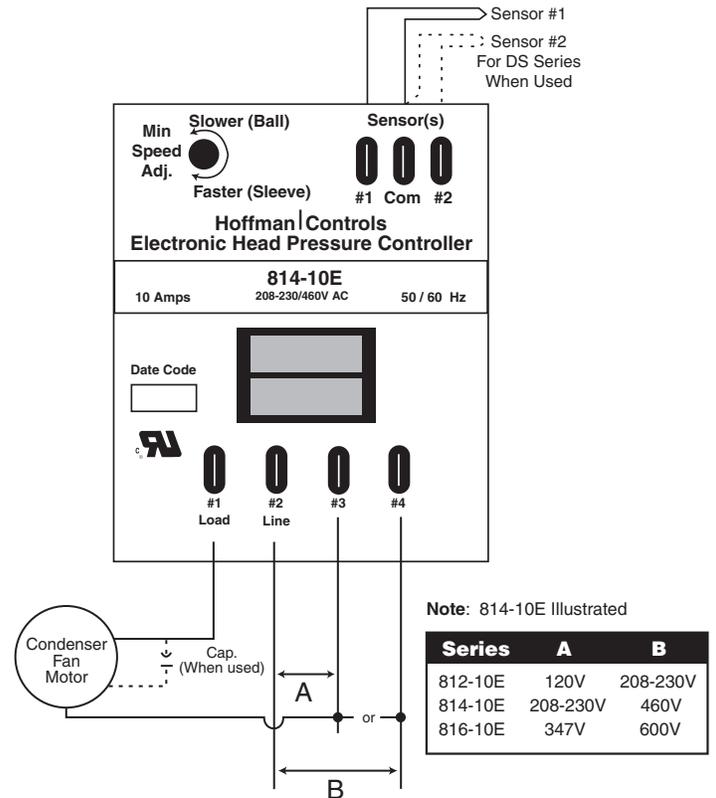


Figure 4 Wiring for 812/814/816-10E and 10EDS

Step 3

Making unit ready for normal operation.

1. Disconnect power to the unit & reconnect the disabled compressor.
2. Reconnect power to the unit & observe operation.
3. Verify operation as described above by monitoring liquid line temperature and observing motor speed.

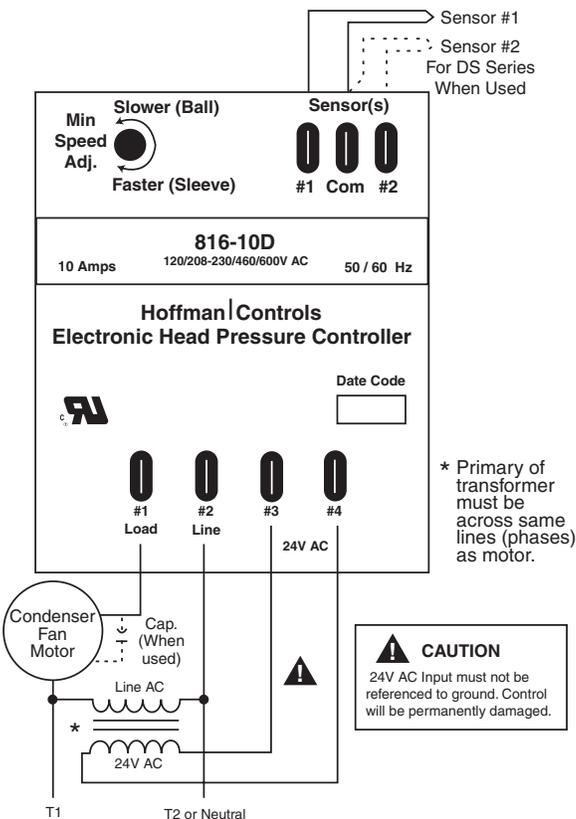


Figure 3 Wiring for 816-10D and 10DDS

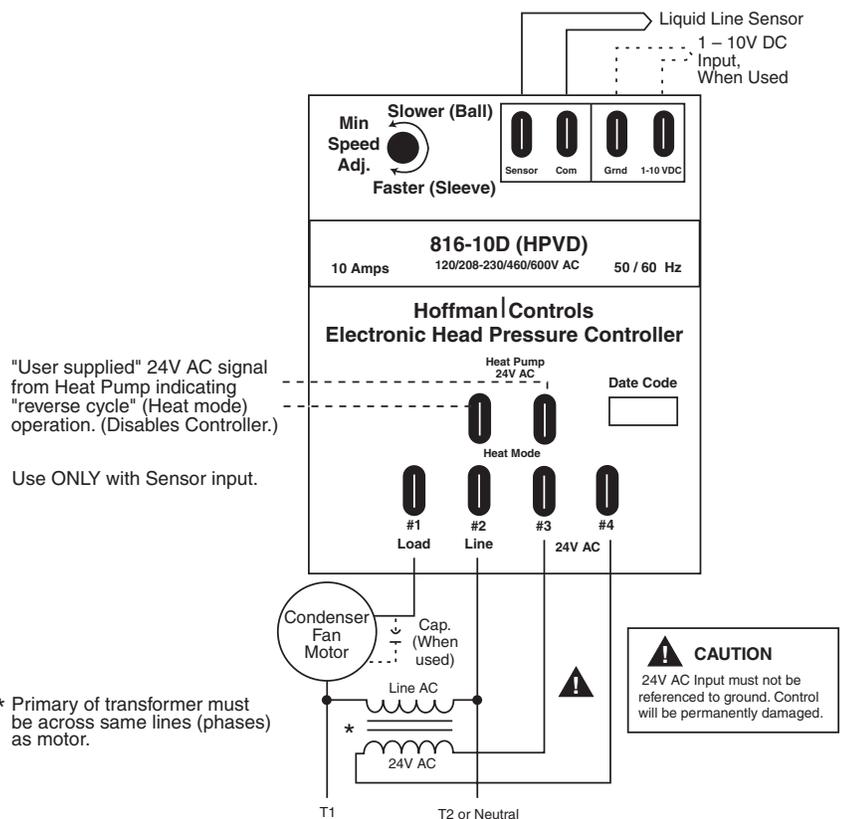


Figure 5 Wiring for 816-10D (HPVD)

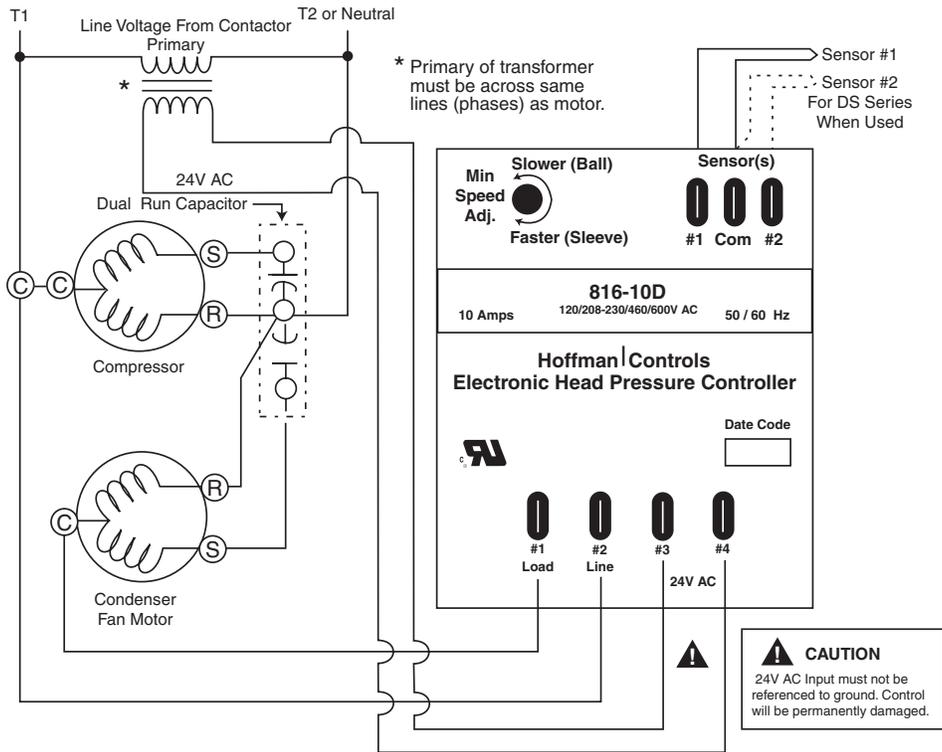


Figure 6 Dual Run Capacitor Wiring Diagram for the "10D" Series

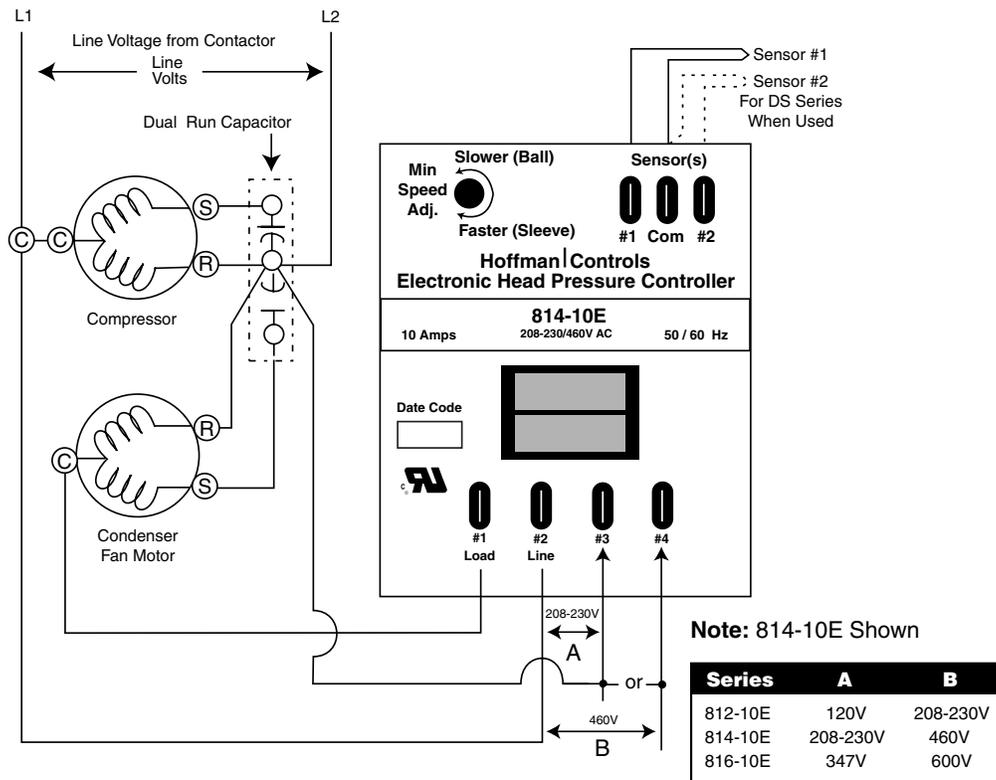


Figure 7 Dual Run Capacitor Wiring Diagram for the "10E" Series

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