

Hoffman|Controls

Installation & Operating Instructions

816-10DH(DC) Processor Based Electronic Head Pressure Control



General

CAUTION



Failure to read and understand the accompanying instructions and diagrams or failure to complete the "Checkout Procedure" prior to energizing the Control may result in permanent damage to the Control.

The 816-10DH(DC) Controller requires an external 24V AC power source. The primary of the 24V AC transformer must be powered by the same phases that supply the motor.

Pre-Installation Information/ Instruction

1. For use with Single Phase, direct drive, open frame permanent split capacitor, or shaded pole motors. Motors are to be selected or designed for variable speed drive applications.
2. Line Voltage Range: Available from 115V AC, 208-230V AC, 460V AC, or 600VAC.
3. Wiring must comply with Local and National Electrical Codes.
4. One Controller may control more than one motor.
 - a. Max. running amps under all conditions not to exceed 10 Amps.
 - b. Locked Rotor Amps (LRA) not to exceed 30 Amps for 1 second.
5. Do not mount the Controller in an airtight cabinet or compartment.
6. **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

- Select the appropriate line voltage wiring diagram for either a single capacitor (figure 2) or dual capacitor (figure 3) configuration.
- Disconnect all factory wiring connecting the motor to the line.

- 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.

WARNING



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

- Setting Minimum Speed Adjust: 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	9-7 o'clock
Sleeve Bearing Motors	400 RPM	9-11 o'clock

IMPORTANT

- Do not install the Controller in an airtight compartment, or near heat generating sources.
- Do not attempt to set Minimum Speed Adjust 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.

Heat Pump Mode Jumper

NON-Heat Pump Application

For NON-Heat Pump System applications, the jumper tab should be in the "DA" position as shown in Figure 1 for proper operation.

NOTE: If the jumper tab is in the "RA" position for NON-Heat Pump applications, the condenser fan motor will operate at full speed and will not modulate.

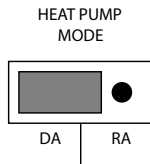
Heat Pump Applications

For Heat Pump System applications, the Heat Pump Mode jumper tab location is as follows:

Jumper position "RA" is used when the Heat Pump reversing (changeover) valve is activated (Heat Mode) by the absence of 24Vac at the Heat Pump input terminals of the Control.

Jumper position "DA" is used when the Heat Pump reversing (changeover) valve is activated (Heat Mode) by the presence of 24Vac at the Heat Pump input terminals of the Control.

Note: The Condenser Fan Motor should run at full speed when in the heating mode. The applicable RA or DA method of operation varies by manufacturer and must be verified by the Installer/Service Technician.



Mode Jumper Diagram Figure 1

Checkout Procedure

Step 1

With power disconnected and the Controller wired:

1. Measure the ohms across the MOTOR terminals "#1" and "#2" using an ohm meter.
2. If you read 1 ohm or less (115V 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

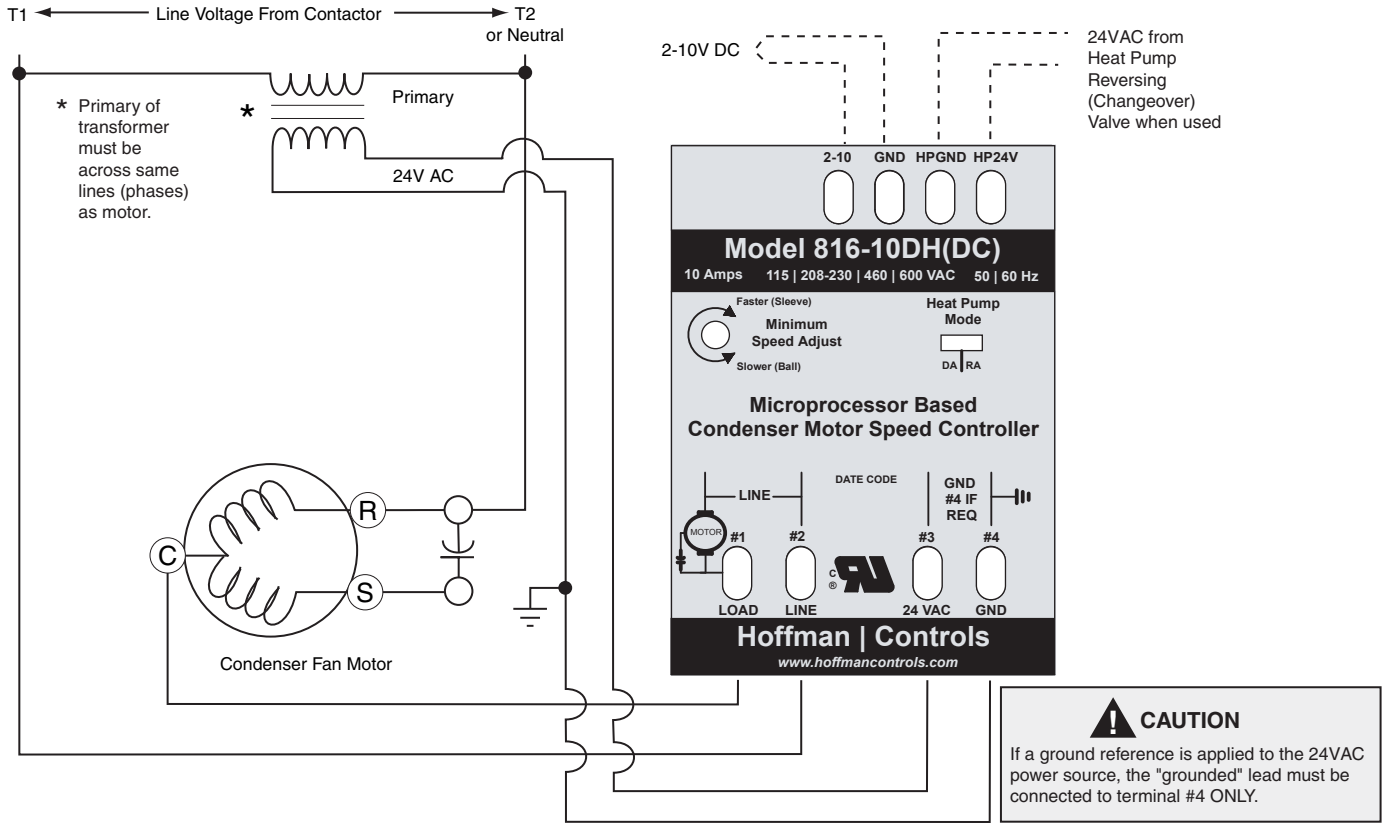
With the compressor disabled, set thermostat for cooling demand and apply voltage to the unit. Condenser fan will start if the dc control signal is above the 2.0 volt value required to turn on the motor.

1. Monitor the dc control signal and condenser motor voltage and current.
2. Verify that the motor is operating properly for the dc control signal level present.
 - a. **Below 2.0 vdc**, the motor(s) will not start.
 - b. **Above 2.0 vdc but less than 9.5 vdc**, the motor(s) will start at full speed for a few seconds and immediately modulate to a reduced speed proportional to the dc control signal level.
 - c. **Greater than 9.5 vdc**, the motor(s) will start and remain at full speed until the dc control level falls below 9.0 vdc.

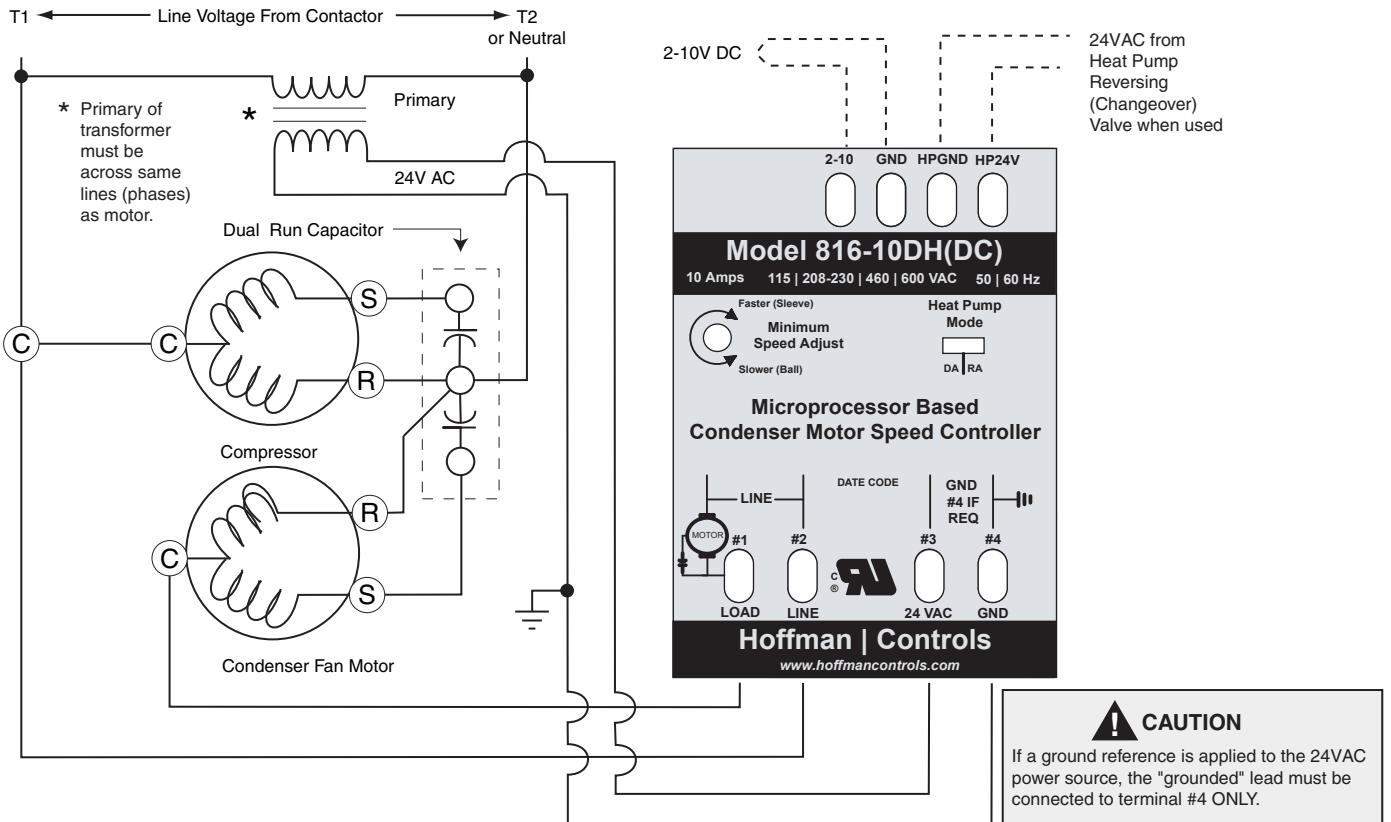
Step 3

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 the dc control signal level and observing motor speed.



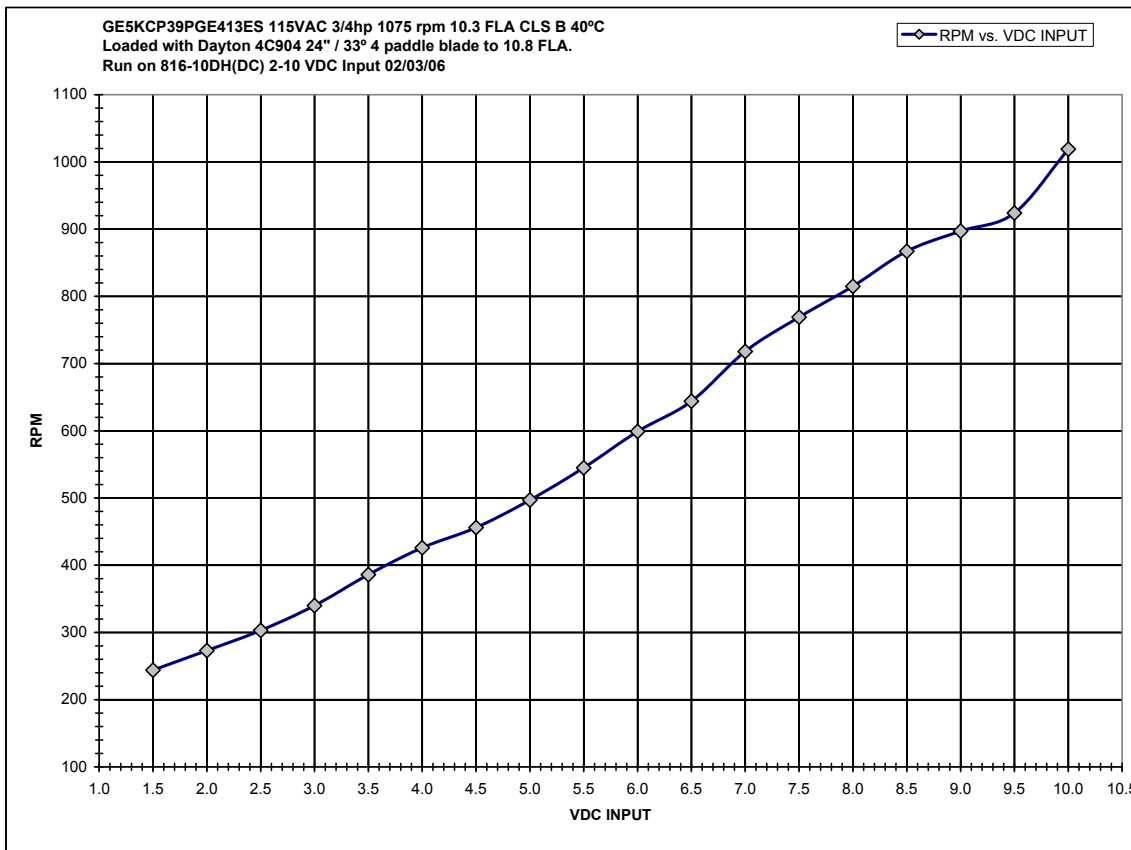
Single Run Capacitor Wiring Diagram for the 816-10DH(DC)
Figure 2



Dual Run Capacitor Wiring Diagram for the 816-10DH(DC)
Figure 3

Troubleshooting Guide

Condition	Cause	Solution
Motor Will Not Run	<ol style="list-style-type: none"> 1. Improper installation, Motor not wired correctly. 2. 24 VAC not in phase with motor line. 3. DC control signal below 2.0 vdc. 4. Motor "OFF" on internal overload. 5. Heat Pump applications; control not providing full speed during defrost cycle. 	<ol style="list-style-type: none"> 1. Check wiring, review instructions. 2. Verify 24 VAC supply phasing. 3. Normal operation. 4. Motor protected. 5. Check Heat Pump Mode Jumpers "DA" and "RA".
Motor Runs at Full Speed Only	<ol style="list-style-type: none"> 1. Motor not wired correctly. 2. Motor not wired correctly. Control damaged. 3. DC control signal above 9.5 vdc 4. Heat Pump Mode improperly programmed. 	<ol style="list-style-type: none"> 1. Check wiring, review instructions. 2. Replace control. 3. Normal operation. 4. Switch jumper.
Motor Overheats	<ol style="list-style-type: none"> 1. Minimum speed set too low. 2. Motor design not applicable for phase proportioning speed regulation. 	<ol style="list-style-type: none"> 1. Raise Min. RPM speed. 2. Replace motor.
Motor Will Not Modulate Properly	<ol style="list-style-type: none"> 1. 24 VAC not in phase with motor line. 2. Fan blade does not load motor at full RPM (speed). 3. Motor design not applicable for proper phase proportioning speed regulation. 4. Expansion valve is not properly metering refrigerant; cap tube or orifice not properly sized for low ambient operation. 	<ol style="list-style-type: none"> 1. Verify 24 VAC supply phasing. 2. Compare FLA rating to measured FLA. 3. Replace Motor. 4. Adjust or replace expansion valve, cap tube or orifice to provide proper control of lowside.



Typical Motor Speed Curve
Figure 4

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