

### General

The 865-3AA Series Three Phase Condenser Motor Speed Controller is factory calibrated and should not require recalibration. Recalibration is not recommended until the Controller is installed and the factory calibration performance is observed to be unacceptable.

The Controller is designed to allow full speed for all ambient temperatures until a liquid line temperature of 80°F is obtained ( $\approx 60^\circ\text{F}$  ambient). Between 80°F and 50°F liquid line temperature, the Controller will modulate the condenser fan motor(s) speed until the ambient temperature results in a liquid line temperature of 50°F ( $\approx 25^\circ\text{F}$  ambient). At 50°F, the Controller will be operating at the preset minimum RPM. Liquid line temperatures below 50°F will disconnect the condenser fan motor from the line. Condenser motor will cycle OFF and ON, over time, from 50°F to 53°F at Minimum Speed until ambient precludes liquid line Temperatures above 50°F to occur.

Controllers should not be re-calibrated to condensing pressure. The condensing pressure, once minimum speed is reached at 50°F-liquid line ( $\approx 25^\circ\text{F}$  ambient), should provide 100-psi (R22 for TX valve) plus the specific evaporator pressure for the application/refrigerant. When the Controller is unable to provide this minimum pressure limit, recalibration may be required.

Proper operating performance can only be obtained with a saturated, sub-cooled liquid at the Sensor at all times.

Verification of proper super heat control at TX valve is important ( $6\text{--}10^\circ\text{F} \approx$  super heat). Improper super heat control may cause or allow excessive liquid flooding or abnormally low evaporator pressure. Either could adversely effect head pressure control performance.

The following instructions are provided for liquid line sensing (preferred method), mA/volts DC inputs, or manual speed control.

### Field Calibration for Thermistor Sensor

1. Disconnect Thermistor Sensor.
2. Adjust the CALIBRATE pot fully counter-clockwise (CCW).
3. Place the calibration jumper (J1) tab to the CAL/MAN SPD position to enable the on-board sensor simulator.
4. Set both the MAX. and MIN. adjustment pots to mid range.

5. Adjust the CALIBRATE pot clockwise (CW) until the FULL L.E.D. light comes ON. Backoff the CALIBRATE pot until the FULL L.E.D. light just goes OFF. This places the calibration point at the top end of the modulation range.
6. Adjust the MAX. ADJ. pot to achieve the desired max speed for the top end of the modulating range.
7. Adjust the CALIBRATE pot counter-clockwise (CCW) until the OFF L.E.D. light comes ON (this will shut the motor OFF). Now, slowly adjust the CALIBRATE pot clockwise (CW) until the OFF light goes OFF (the modulate L.E.D. will come ON at this same time).



#### CAUTION

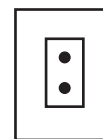
Allow the soft-start time to expire (10 seconds).

8. Adjust the MIN. ADJ. pot to achieve the desired min speed at the bottom end of the modulating range. Do not adjust below 200 RPM minimum.
9. The Minimum Adjustment pot interacts with the Maximum Adjustment pot; therefore repeat steps 5 through 8 one time.
- 10 Remove the jumper tab J1 from the CAL/MAN SPEED position and return it to its OPERATE/STORE position.
11. Adjust the CALIBRATE pot fully counter-clockwise (CCW).
12. Reconnect the Thermistor Sensor.

#### NOTE

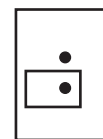
This recalibration procedure allows adjustment of the min/max fan speeds within the modulation range, but will not change the span or fan cutoff threshold (temperature) of the Controller.

CAL/MAN SPEED  
Position



J1

OPERATE/STORE  
Position



J1

## Field Calibration for Volt/mA Auxiliary Inputs

1. CAL/MAN SPEED (J1) jumper is not used, leave in the OPERATE/STORE position.
2. When VDC or mA are required, remove the liquid line Sensor.
3. Set the MAX. and MIN. adjust pots to their mid-range positions; attach appropriate VDC or mA input.
4. Apply an increasing DC or mA level to the Volts/mA INPUT until the FULL L.E.D. light comes ON. This should occur at approximately 4.875 volts, 9.75 volts or 19 mA. Lower the input level to a point where the FULL L.E.D. light just goes OFF. This sets the input signal at the top of the modulating range.
5. Adjust the MAX. ADJ. pot to achieve the desired maximum speed for the top of the modulating range.
6. Lower the input level (volts or mA) until the OFF L.E.D. light comes ON. This should occur at approximately 0.8-volts, 1.6 volts or 2 mA. Raise the input level to a point where the OFF L.E.D. light just goes OFF and the MODULATE L.E.D. just comes ON.
7. Adjust the MIN. ADJ. pot to achieve the desired min. speed at the bottom of the modulating range.
8. The Minimum Adjustment pot interacts with the Maximum Adjustment pot; therefore repeat steps 4 through 7 one time.

The Controller should now modulate from full OFF through the modulation range to full ON producing the desired speed (RPM) over the 0–5V DC, 1–10V DC or 2–20mA range.

## Field Calibration for Manual Speed Control (No Inputs)

The 865-3AA Controller may be used as a manually set three phase motor speed control. To adjust:

1. No signal inputs are required in this application.
2. Adjust the CALIBRATE pot fully counter-clockwise (CCW).
3. Place CAL (J1) jumper in the CAL/MAN SPEED position as illustrated.
4. Adjust the CALIBRATE pot clockwise (CW) until the FULL L.E.D. indicator comes ON. Back off the CALIBRATE pot until the desired motor speed is attained.
5. Ensure motor speed is 200 RPM or greater.

6. The Controller will now maintain the manually set motor speed whenever energized.

## Liquid Line Temperature Sensing

Liquid Line Temperature Sensing is directly proportional to Saturated Condensing temperature (Condensing Pressure). When ambient, air flow Temperatures of 60°F are encountered, liquid line temperature values are 80°F. At this liquid condensing Temperature, a 105°F saturated liquid line condensing liquid temperature will occur. The condenser is modulated from 80°F to 50°F± temperature. Once 50°F is reached the condenser air flow has reached Minimum Flow as determined by the Minimum Speed setting, and 100°F± saturated condensing liquid temperature will occur.

For all liquid Temperatures between 50°F and 53°F, the fan will cycle OFF and ON at Minimum Speed to maintain a 3°F differential of liquid line temperatures, as ambients continue to fall the fan will remain OFF longer until ambients preclude any fan ON function. Once fans remain OFF, all low ambient control will cease to function.

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### Hoffman|Controls