Hoffman Controls

Installation & Operating Instructions

851-MS Series
Multiple Sensor Selector

Description

The 851-MS is an electronic Sensor Selector used in multiple circuit air conditioning or refrigeration applications to select the highest liquid line temperature for controlling:

- 861-ASQ Sequencers controlling multiple fans in steps, and/or
- 816-10DH(DC) modulating condenser fan Motor Speed Controllers.

Air-cooled condensers often utilize multiple refrigerant circuits within the common airflow of a single or multiple condenser fan(s). For low ambient control the heaviest loaded circuit representative of the highest liquid temperature must be selected. This liquid temperature is required to set the condenser flow rate for the level of heat rejection for the specific low ambient encountered.

Low ambient control of multiple condenser circuits may be accomplished by two methods; varying condenser airflow in incremental steps by staging multiple fans, modulating condenser fans with speed control, or both. To accomplish either, the 851-MS Multiple Sensor Selector will be required when multiple refrigerant circuit systems are encountered.

The 851-MS is available in 4 or 6 sensor input models for multiple refrigerant circuits. The Selector generates a 2–10V DC output signal for input to:

- 816-ASQ Sequencer(s) for incremental staging of multiple condenser fan motors.
- 816-10DH(DC) Condenser Motor Speed Controller(s).

Features

- Selects the highest liquid line temperature of the refrigerant circuits for control.
- 2–10V DC output for driving the 861-ASQ Series Sequencer.
- 2–10V DC output for driving up to twenty (20) 816-10DH(DC) Motor Speed Controllers.
- Totally electronic, no transducers or mechanical parts.
- Optional Sensor Simulator Kit (Part No. 510-0027-000).

Pre-Installation Instructions

The control function may be verified before or after installation by powering the control with 24V AC and observing the Ramp Output terminals. The following V DC reading should be observed.

Output Terminals	Open Sensor Terminal(s)	Shorted Sensor Terminal(s)
2–10V DC Out	+ 0.65V DC Out	+ 10.5V DC Out

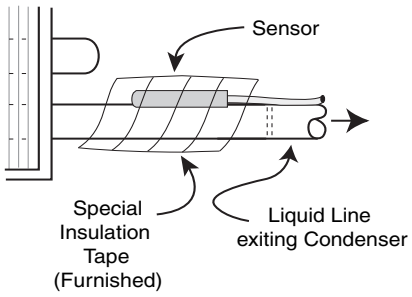
Installation Procedure

1. Mount the 851-MS, 861-ASQ and/or the 816-10DH(DC) Controller(s) in a typical weather protected control panel.

   (See Controller dimensions, Figure 3.)

2. Mount the required number of Sensors (one for each refrigerant circuit) on top of each liquid line where the liquid line exits the condenser coil. Use Sensor Kit Part Number 100-0016-001.

   a. Mount the Sensor firmly using tape provided. Make sure the metal tab heat sink on the Sensor makes firm contact with the liquid line. See Figure 1.



Sensor Mounting Diagram
Figure 1

   c. When additional cable length is required:

   - Always use 22 AWG (minimum) stranded, twisted pair wire, suitably insulated for outdoor applications.
   - Sensor cables and Ramp Out leads should not run in proximity, along side of, or attached to conduit carrying line voltage power.
   - Insulate cable connections.

3. Wire 851-MS Multiple Sensor Selector as per diagram below. When wiring (liquid line) Sensors to control, Sensors may be connected in any order. Unused terminals may be left open.
4. When installing the 816-10DH(DC) and 861-ASQ, see the respective Installation & Operating Instructions.
5. Apply power initiating operation of the air-cooled condenser. With a DC voltmeter, read the DC Volts output signal on the 851-MS. See DC Volts vs. Temperature °F, for Ramp, Figure 4.
   - Ramp Terminals. Ramp voltage should be between 2–10V DC for sensor temperatures of 50°F–80°F.

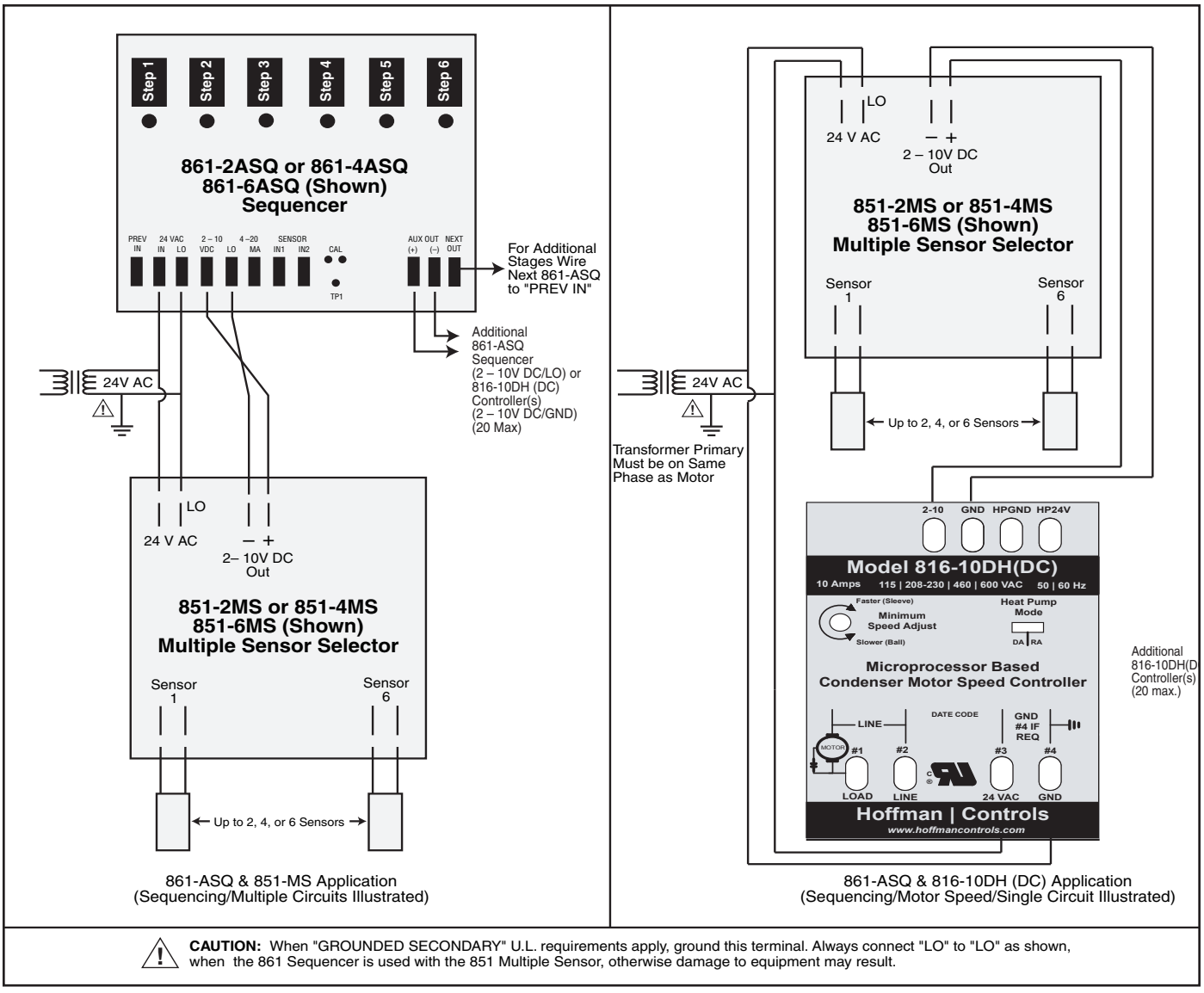
Application

Sensors of the 851-MS Series may be used in air-cooled condenser applications where condensers using different refrigerant types are monitored simultaneously. The signal generated is representative of the condenser efficiency as referenced by the excessive subcooling that occurs in each circuit for that system.

The 851-MS evaluates the highest liquid temperature (heaviest loaded circuit) regardless of size, and selects that proportional signal to set the proportional airflow (modulated fan speed or incremental steps) for the particular low ambient encountered.

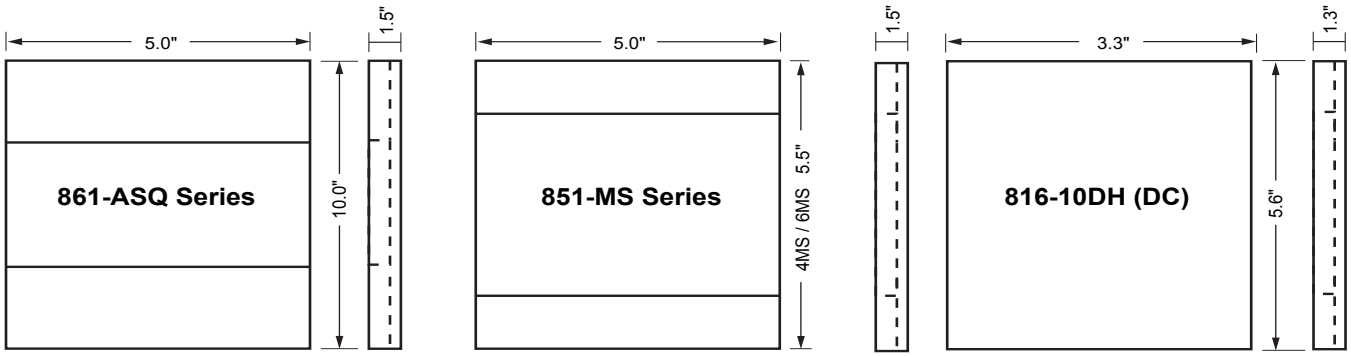
Modulated condenser fan speed, or sequencing (stepping) of multiple fans, or both, may be used depending on the degree of control required.

Fan sequencing can only be effective if sufficient fans are available to provide small incremental steps of flow. Always utilize modulating fan speed controllers where minimum design conditions cannot be obtained by sequencing fans.

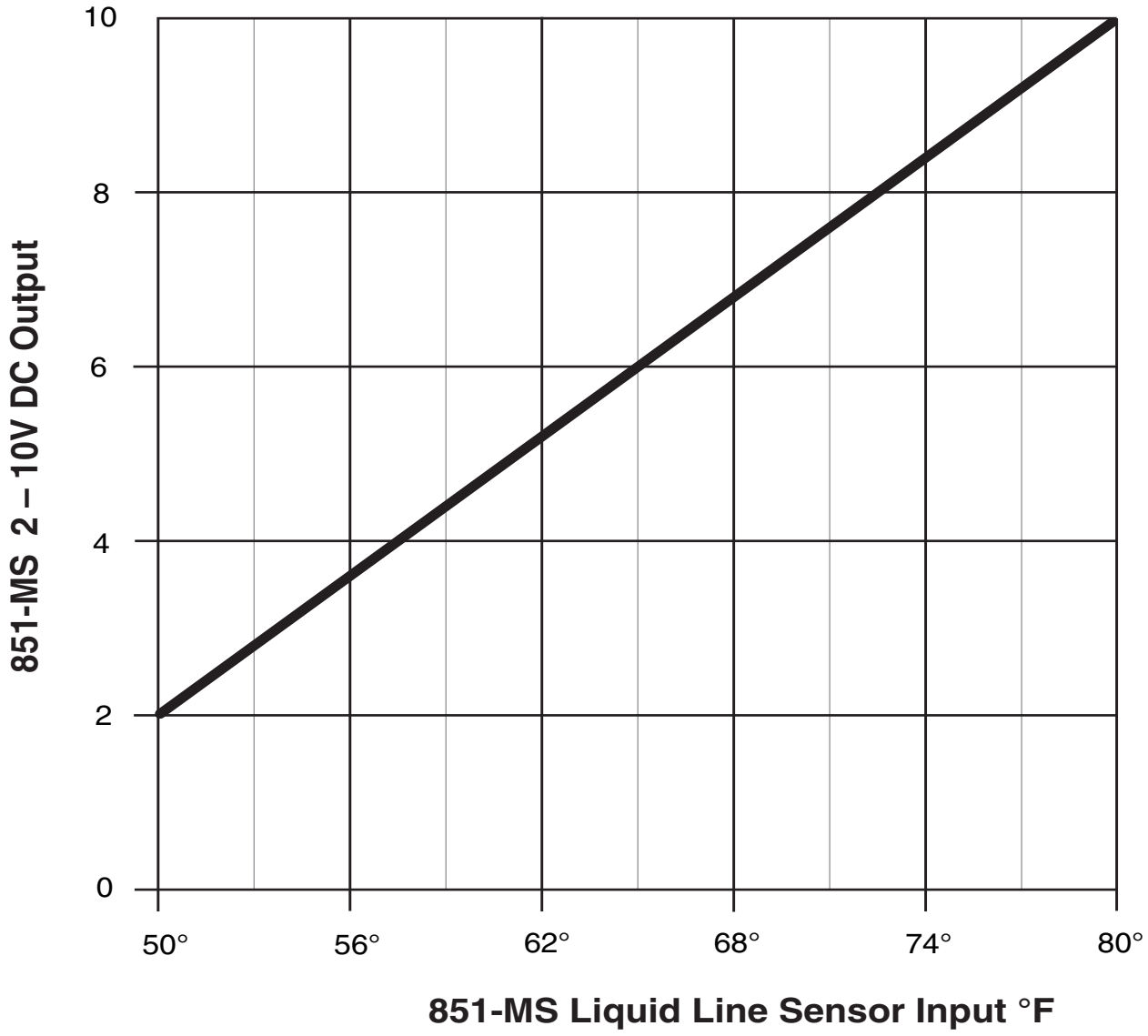


CAUTION: When "GROUNDED SECONDARY" U.L. requirements apply, ground this terminal. Always connect "LO" to "LO" as shown, when the 861 Sequencer is used with the 851 Multiple Sensor, otherwise damage to equipment may result.

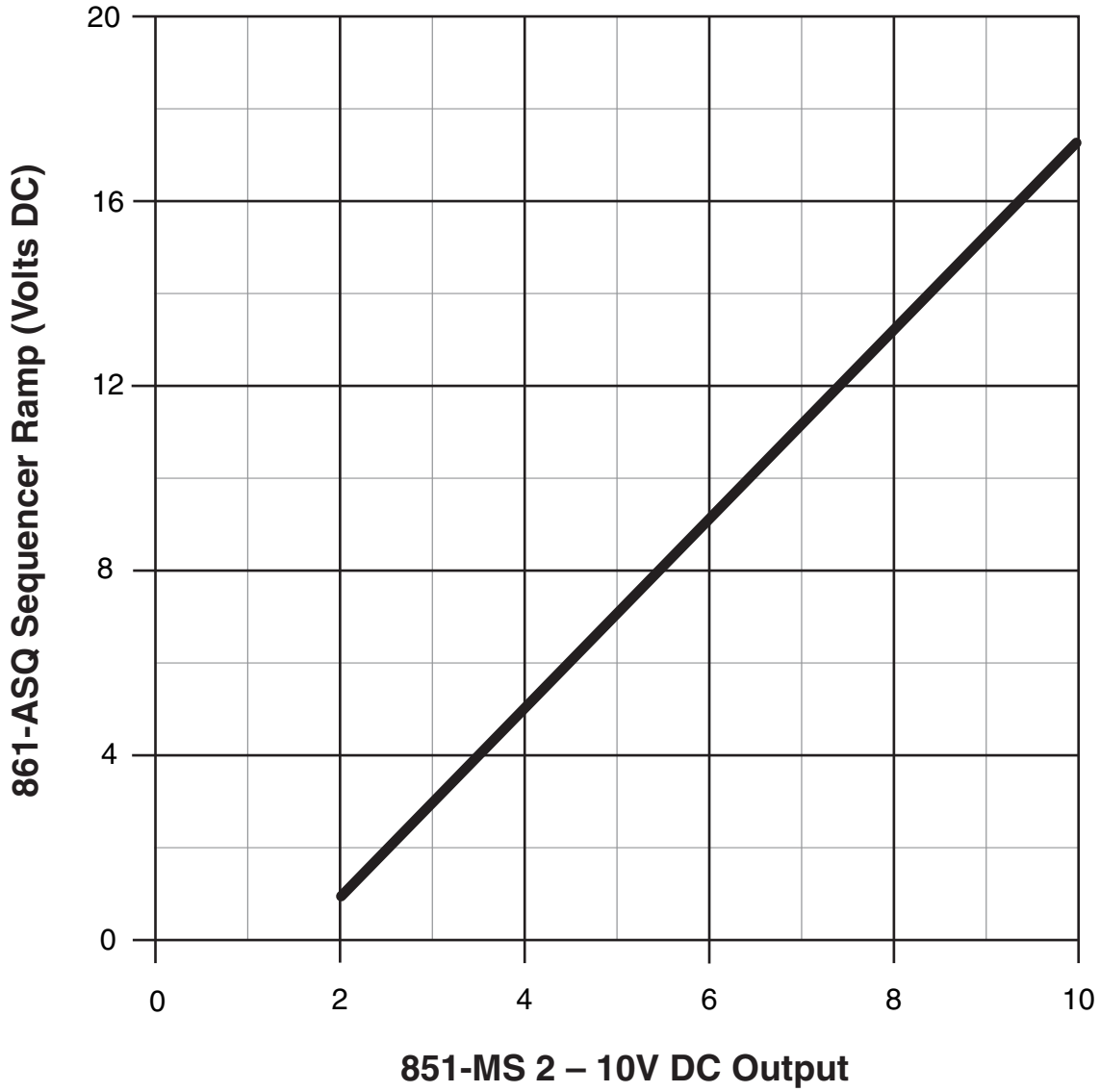
851-2MS, 861-ASQ and 816-10DH (DC) System Wiring Diagram
Figure 2



Controller Dimensions
Figure 3



851-MS Output DC Volts vs. Liquid Line Sensor Input
Figure 4



861-ASQ DC Ramp Volts vs. 851-MS Output Volts DC
Figure 5