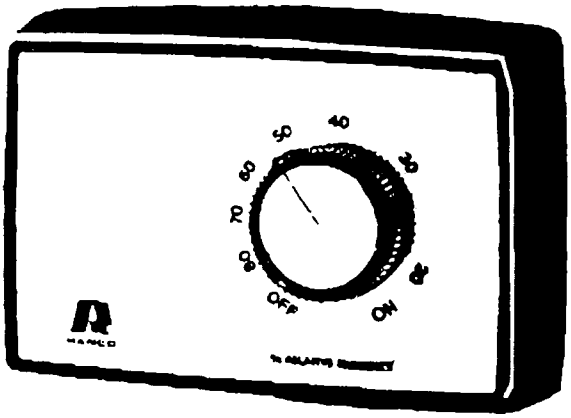
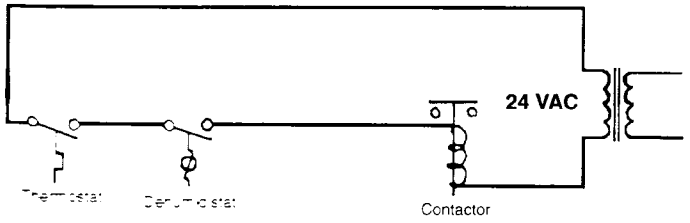
# GENERAL WIRING INFORMATION

FORM NO. 1529013-000 REV. A

**J10-809 WALL MOUNT DEHUMIDISTAT FOR LOW VOLTAGE (24 VAC or less)**
**AIR CONDITIONING APPLICATIONS**



SERIES CIRCUIT SCHEMATIC




In the series circuit, both the temperature and relative humidity need to be at or above the the settings of the controls to activate the air conditioner.

## INTRODUCTION

Dehumidistats, for residential and small office central air conditioning systems, may be wired in parallel or series with the indoor thermostat. This bulletin examines each arrangement.

The dehumidistat completes a circuit on the rise of relative humidity; the thermostat, on the rise of temperature.

The schematics in this article have been intentionally simplified to show the relationship of the dehumidistat to the thermostat. Refer to the equipment manufacturer's wiring diagram for the complete circuit of related components.

## SERIES CIRCUIT CONSIDERATIONS

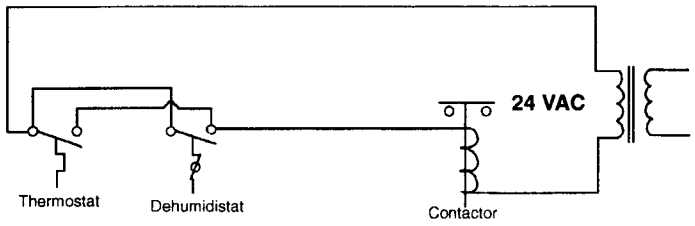
A series circuit is frequently used in residences and buildings which are unoccupied. When unoccupied, the thermostat is set higher than when occupied and the dehumidistat is used to maintain a maximum relative humidity. In occupied buildings, the series arrangement takes advantage of the fact that if the indoor relative humidity is low, a higher temperature is comfortable. The higher thermostat setting saves cooling energy.

The series arrangement is fine as long as the space heat gain is such that the thermostat contacts remain closed. However, the dehumidistat cannot activate the system once the thermostat is satisfied and interrupts the circuit.

## SERIES WIRED:

**1) SET A/C THERMOSTAT 80° F TO 85° F**
**2) SET DEHUMIDISTAT 50% TO 60%**

**PARALLEL CIRCUIT SCHEMATIC**




In the parallel circuit, the air conditioning can be activated by either temperature or relative humidity.

# PARALLEL CIRCUIT CONSIDERATIONS

A parallel circuit is advantageous when the indoor temperature can fall below the thermostat setting and the relative humidity rises. This condition can occur in the early morning when the indoor temperature has dropped due to the cool night, yet the relative humidity is high and a "clammy" feeling exists.

An important consideration with the parallel arrangement is the dehumidistat can operate the system regardless of indoor or outdoor temperature. Such operation can cause compressor damage if low ambient precautions are not taken.

Also, a condition can exist where the sysyem will go into a continuous run. Moisture is removed as the return air contacts the evaporator (which is below the air's dew point). While this process removes moisture, it also causes the air to leave the coil surface in a saturated condition (100% relative humidity). Normally, this cooled, high relative humidity air is warmed when it is mixed with the conditioned space and a lower overall relative humidity results. But when a low sensible cooling load (relating to dry-bulb temperature) exists, the space does not sufficiently warm the supply air; the supply air then lowers the space (dry-bulb) temperature and this increases the relative humidity. Thus, the humidistat will call for continued cooling. In short, the dry-bulb temperature drops faster than the relative humidity.

This situation relates to the sensible heat factor of the evaporator coil. The sensible heat factor is the ratio of the sensible load to the total cooling load. In many air conditioning applications, the sensible heat factor is such that the dry-bulb temperature will be reduced at a faster rate than the dew-point. As these two temperatures move closer together, the relative humidity increases.

One way to decrease the sensible heat factor is to reduce the air flow over the evaporator. This allows the air to remain in contact with the coil longer and more moisture is condensed out. This, although simply done by fan speed, can affect the heat transfer and at the evaporator and result in coil icing and negative effects on the compressor. It can also affect the distribution patterns resulting from reduced air velocity in the air ducts.

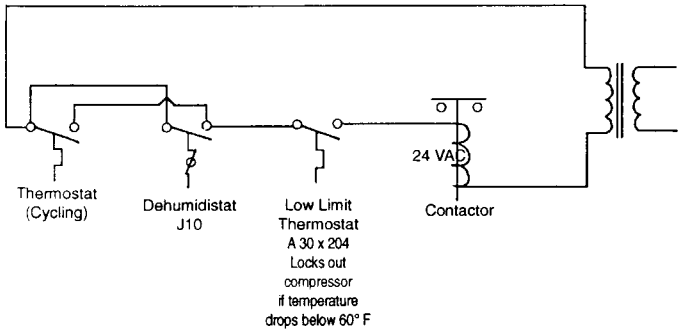
# PARALLEL WIRED:

**1) SET DEHUMIDISTAT 50% TO 60%**

# NOTICE:

Should it be desirable to wire the dehumidistat in parallel with the space thermostat, it may be wise to include a second space thermostat as a low limit. Also, a low ambient, compressor cut-out may be advisable.

**PARALLEL CIRCUIT SCHEMATIC**




RANCO

Ranco North America
8115 U.S. Rt. 42 North
Plain City, Ohio 43064

Invensys
An Invensys Company