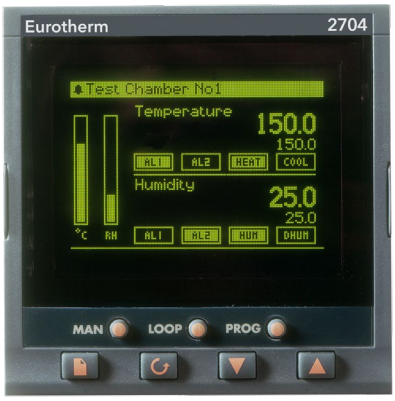
Eurotherm®

2704/2604 Humidity Control Supplement



What is Humity Control

Environmental Chamber Control

The 2704/2604 is ideal for use in applications where it is necessary to simulate the environmental conditions of temperature, humidity and sometimes altitude. Control of these conditions require certain unique features from a controller. Firstly, the controller needs to be able to generate a setpoint profile. This feature allows the user to predefine a series of setpoint changes. Secondly the controller needs to be able to measure humidity using either the traditional Wet/Dry bulb method or by interfacing to solid state sensors. The controller may also be required to turn a refrigeration compressor on and off, operate a bypass valve, and possibly operate two stages of heating and/or cooling (see diagram below).

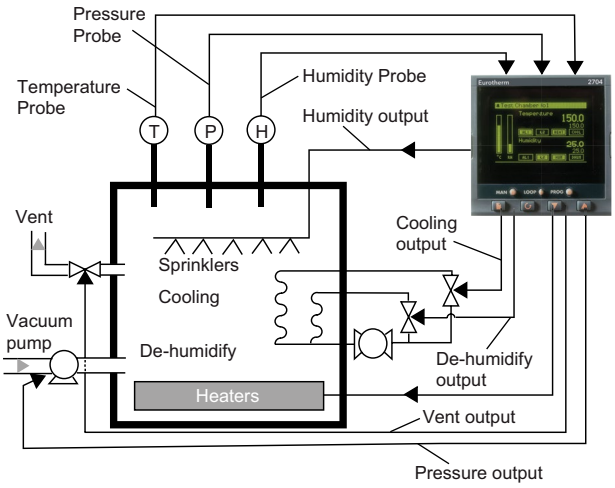
The 2704/2604 is able to provide these functions.

Ideal for

- Reliability testing
- Climatic simulation
- Culture & plant growth
- Simulated altitude control

Features

- Synchronized setpoint profiles
- %RH & dewpoint measurement
- Altitude compensation



Environmental Chamber

WATLOW®
Powered by Possibility

2704/2604
Humidity Control Supplement

Temperature Control

The temperature of the environmental chamber is controlled via a single loop with two control outputs. The heating output time proportions electric heaters, usually via a solid-state relay. The cooling output normally operates a refrigerant valve which introduces cooling agents into the chamber. The 2704/2604 has an advanced PID control algorithm which automatically calculates when heating or cooling is required. Additional stages of both heating and cooling can also be implemented if required.

Humidity Control

Humidity in a chamber is controlled by adding or removing Water vapor. As with the temperature control loop, two control outputs are required (i.e, Humidify and Dehumidify). The humidity output regulates the amount of steam allowed into the chamber, adding steam increases the humidity level. Water vapor is added by either a boiler, evaporating pan or by direct injection of atomized water.

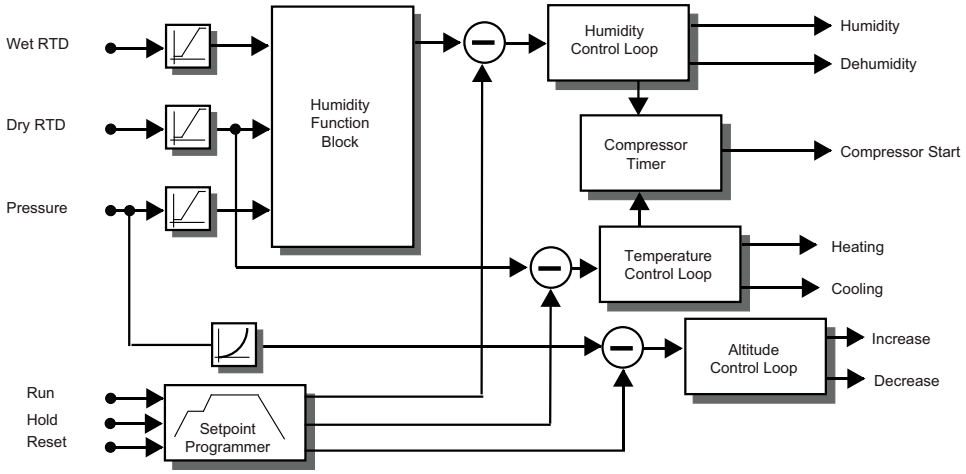
- Evaporating pan of water warmed by a heater regulates the humidity level by controlling the temperature of the water.
- Atomization system uses compressed air to spray water vapor directly into the chamber. The same compressor used for cooling the chamber accomplishes dehumidification. Different sets of ‘heat’ exchanger coils are used along with a different control valve.

Altitude Control

Altitude is simulated by controlling the pressure inside the chamber. Usually a vacuum is drawn to simulate high altitudes. If the application requires simulating altitude at sea level and the chamber is located at an altitude higher than sea level, then the chamber must also be pressurized. Again, a two-channel output controller is required. Pressure varies nonlinearly with altitude so the pressure signal must have a special linearization applied to it.

Compressor Control

Another requirement of the controller is to be able to start and stop the cooling compressor. To alleviate wear and tear caused by cycling the compressor, the chamber controller will turn the compressor on and leave it on whenever cooling or dehumidification is required. The compressor will usually be kept running for 5 to 15 minutes after cooling has stopped. If the controller starts to call for cooling again the “compressor timeout” timer deactivates until cooling is called for again.



Typical environmental chamber controller

Eurotherm
Faraday Close, Worthing,
West Sussex, BN13 3PL
United Kingdom
Phone: + 44 (0)1903 268500

www.eurotherm.com

Contact your local sales representative

Document No. HA026748 Issue 3

Published April 2023