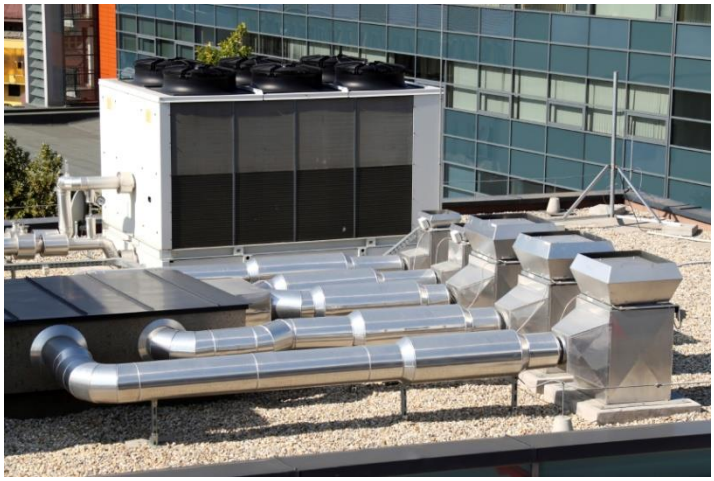
Using Optidew 501 and S8000 Remote for HVAC testing



Modern air conditioning and climate control systems are used in a wide range of environmental conditions across the world. The primary purpose of these systems is to maintain thermal comfort by regulating indoor air temperature and humidity.

To maintain air quality, fresh outside air is continuously drawn into the HVAC system and conditioned before being circulated indoors. However, due to varying local climates, outside temperatures could be anywhere between -50 & +50°C, with humidity levels between -30 and +30°C dew point.

Designing a system with satisfactory performance across such a wide range of conditions is a challenge, therefore HVAC systems need to be properly set up, and subject to a rigorous testing regime before sale. The purpose of this testing is not only to evaluate the performance of the systems temperature and humidity control, but to ensure the system energy efficient, filled with the correct level of refrigerants and is not subject to any leaks or problems with drainage.

HVAC System Testing

To ensure product quality; each system is tested in a variety of environmental conditions to ensure that the following parameters are within acceptable limits at the outlet:

- Air flow
- Temperature
- Pressure
- Humidity

The purposes of the tests are to validate the performance and efficiency of the system, and to determine the required fill level of refrigerant gas.

Each manufacturer will operate multiple test rigs, which consist of a pair of environmentally controlled chambers: one to simulate conditions outdoors, and another to simulate conditions indoors. The system under test is connected between these two chambers and run in a variety of different 'outdoor' climatic conditions, across a set range of temperatures and humidity levels (figure 1).

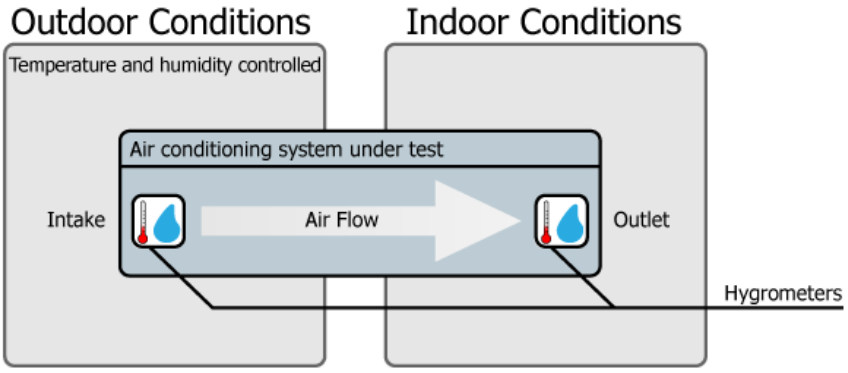


Figure 1. Arrangement of AC system under test

Typical testing procedure

Traditionally, psychrometers are installed on both the inlet and outlet of the system under test. A sequence of temperature and humidity test conditions is generated in the 'outdoor' chamber, similar to those shown below:

Temperature (°C)	Dew point(°C)
24	18
19	13
13	7
10	4
8	2

The readings of the psychrometers on the inlet and outlet are compared at each point; the difference being the effort of the ac unit. This data collected across all points of the test can then be used to determine the cooling and dehumidification efficiency of the device under test, which indicates the refrigerant pressure required for proper operation.

Why is humidity measurement important?

Accuracy of dew point measurement at the inlet and outlet of the unit under test is crucial, as the closer to the true value the measurement is; the more precisely the refrigerant fill level of the condenser can be calculated.

Improved performance and accuracy with Michell chilled mirror

A Michell Instruments Optidew 501 or S8000 Remote Climatic sensor can be installed directly into the inlet and outlet ducts, when fitted with a sintered steel guard.

Fitting a Michell Instruments Chilled Mirror sensor offers a number of benefits over the traditional psychrometers:

- Tests can be carried out at negative dew points and temperatures, as this is not limited by the physical restrictions of a psychrometer (water freezing in the wick)
- Accuracy is higher across the range with a chilled mirror sensor
- Accuracy and repeatability are much easier to achieve, and are not dependent on airflow and cleanliness

Changes in the temperature of the 'outdoor' chamber can happen very quickly, and can cause condensation issues for some chilled mirror sensors. The Michell Optidew 501 and S8000 Climatic sensors are specifically designed to respond rapidly in changes to temperature, and to quickly track humidity changes, delivering consistent performance in demanding environmental testing conditions.

Product Information

S8000 Remote

Highlights

- Fundamental, accurate and drift-free measurement
- Remote sensor
- Open design allows remote sensor to be mounted into a sample flow or simply placed in an environment to be monitored
- -40 to +90°C dew-point range with ±0.1°C accuracy
- Data logging to USB or SD card
- 'FAST' guarantees frost formation below 0°C
- Sensor operates in pressures up to 20 barg

Optidew 501

Highlights

- Precision process dew point, %RH and temperature measurement
- Measurement Range: <0.45 to 100% RH, -30 to +90°Cdp
- ±0.15°Cdp accuracy
- Fundamental drift free dew-point measurement
- Rugged industrial housing, with optional IP65 rating
- High temperature sensor option to +120°C
- Optional touch screen HMI for easy local operation
- 'FAST' guarantees frost formation below 0°C

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