

# **Kaymont Consolidated Industries**

## **M2000SPA SYSTEM DESCRIPTION**

### **M2000SP w/RS485 COMMUNICATIONS**

This is the primary system for calibration over the range of 5-95%RH and <7°C to >50°C. This system offers the high accuracy required to meet internal and regulatory calibrations. The control probe is sent to an NVLAP Accredited laboratory for calibration and adjustment of RH values to be within  $\pm 0.5\%RH$  and  $\pm 0.1^\circ C$  of an NIST traceable methodology. The readings are recorded at 10, 35, 80 and 95%RH @23°C. After installation of the control probe the system is further verified for accuracy using a working transfer standard also calibrated by an NVLAP Accredited laboratory using ISO/IEC 17025 procedures. Systems are provided with a Certificate of Calibration. The uncertainty of the instrumentation used for probe and reference calibration is  $\pm 0.5\%RH$  and  $\pm 0.05^\circ C$ .

The ultra-fast system response of <5 minutes for RH stabilization enables complete calibrations of data loggers and instruments in less than 30 minutes for a 3 point RH calibration at 23°C. The <5 minutes stabilization remains effective throughout the range and is based on temperature stabilization after temperature changes. The standard chamber door has probe fittings to accept 5 probes with diameters of 12, 15, and 18mm in combination or as same diameter. An insulated 4 port door is also provided to maintain the high accuracy and stability over the entire range of measurement.

The system chamber values (measured by an NVLAP Accredited calibrated reference instrument) are compared to the controller set point values at 10%, 35%, 80% and 95%RH @23°C. All values are verified to be within  $\pm 0.5\%RH$  and  $\pm 0.1^\circ C$  of the values displayed on the transfer standard. The chamber size is approximately 2 liters. Chamber stability and uniformity is  $\pm 0.2\%RH$  and  $\pm 0.1^\circ C$  temperature. A Certificate of Calibration for the control probe is provided. Control probe calibration is performed by NVLAP Accredited Laboratory using NIST traceable instrumentation and procedures to ISO/IEC 17025.

Optional calibrations can be requested to confirm linearity and accuracy over a wider range of temperature. Additional data, performed using secondary reference transfer standards, can be provided at 40°C/10%RH and 40°C/75%RH, and 10°C/10%RH and 10°C/50%RH. This is done comparing the chamber data to a reference transfer standard calibrated by the NVLAP Accredited laboratory.

RS-485 communications enables a technician to enter a variety of standard test and calibration procedures for automatic, unattended ramp/soak cycles. Software is provided to enter these pre-programmed procedures for linearity verification and accuracy of data loggers. Chart recorders with remote probes can be calibrated directly with the internal chamber. For testing larger battery operated chart recorders with internal sensors, or for large capacity testing of multiple data loggers at ambient temperature, an external chamber accessory is required.

Recommended operating range for the temperature, when using the external chambers, is 20°C-25°C. The highest accuracy is obtained when the system is operated at ambient  $\pm 2^\circ\text{C}$ . The reason being that the external chambers are not insulated, therefore the large mass, especially the clear front door, is subject to temperature fluctuations. These fluctuations are minimized when operating at or near ambient temperature. Temperature uniformity and stability of the external chamber is maintained.

When performing calibrations, or verifying accuracy of chart recorders or data loggers with the external chambers, the use of a reference probe is recommended. This will allow proper settings or readings to be entered for correlation to the internal procedures established. There are 2 approaches to the use of a reference probe. The first is to correlate readings of the controllers with the readings of the chamber. The technician would enter the required set point values on the controllers and compare the readings of the reference. The second would be to set the values on the controllers, compare the chamber readings to the reference and then adjust the controller set points to provide the exact values needed. For example, the controllers are set at 23°C and 50%RH. The reference inside the chamber reads 23.6°C and 48%RH. The technician resets the controller values to 22.4°C and 52%RH to provide needed conditions.

The reference probe can be an in-house instrument that has been calibrated or a Kaymont KPPRHT-1 or KPPRHT-2 can be used. These are reference instruments calibrated by the NVLAP Accredited Laboratory at specific values to cover the range of measurement. The KPPRHT-1 is adjusted to be within  $\pm 0.5\%$  RH of the readings indicated on a 2-pressure generator. The RH values are 10, 35, 80 and 95%RH at 23°C.

The control probe of the M2000SP is temperature compensated. This feature assures a very accurate over the entire range measurement. When calibrations are required at low and high temperatures the operator may require verification of accuracy to be within a specific range. For this application the use of the KPPRHT-2 is recommended. In addition to the above values of RH the reference instrument is calibrated at 10°C/10%RH, 10°C/50%RH, 40°C/20%RH and 40°C/75%RH. Certificates of calibration with "As Left" readings are included with each unit.

There is no required maintenance for the M2000SP. The control probe, or system, can be calibrated at the required calibration intervals. The control probe can be removed and sent to a laboratory already qualified and established for the calibration of this probe. The availability of a reference instrument will make calibration cycles easier. The operator would send the reference probe in for calibration, then produce or develop an internal calibration chart for setting correct values on the controllers.

The M2000SP is a closed loop system. This means that the air within the chamber is re-circulated. The M2000SP does continuously pull in outside air. A closed loop system reduces the use of the desiccant and water. When used at typical RH calibration values the desiccant should be suitable for operation for a period of 2-3 months, or more depending on the actual values. The desiccant consists of 2 materials, molecular sieve and indicating drierite. The indicating drierite will turn pink in color when not useable. A replacement kit containing 1 jar of each material is available. The saturator (wet source) operates with normal water (distilled water is recommended). A water syringe (10ml) provided with each unit

Summary. The M2000SP is a high accuracy unit, easy to maintain and has flexibility for the calibration of data loggers, chart recorders or larger instrumentation. The unit provides the fastest response and stabilization times. The M2000SP is fast and accurate. The system is portable and easily carried from point to point for on-site calibrations and does not require special preparation for shipping.