

HYGROGEN

HygroGen is a generator of controlled percentage relative humidity (%rh) and temperature environments, primarily for the calibration of humidity instrumentation. It is completely self-contained, requiring no external resources except mains power, and is light enough to be portable for use on-site.

The HygroGen uses a mixed flow method for generating the %rh required by the user; a desiccant cell provides low humidity, a saturator high humidity, and a control system mixes these together to create a constant environment within a well insulated chamber. Temperature is controlled using a Peltier thermoelectric heat pump. Set-points are easily adjusted using the front panel mounted controller keypad, or via a PC using the standard RS232 interface and optional software.

Chamber control measurements are made using a HygroClip S1 interchangeable humidity/temperature probe. Within the chamber there are two further probe connection points; these are connected to the rear panel of the HygroGen, where the output of all three probes is available. This feature allows the user to confirm chamber temperature stability and uniformity.

The key advantage of the HygroGen is the speed in which it reaches equilibrium of the set %rh values, typically within two minutes. This means that multiple point calibration checks can be performed in minutes, rather than hours. Of course, temperature changes require longer times to reach equilibrium, as an example the change from 25 °C to 45 °C takes around ten minutes.

With fully integrated temperature control, calibration can be performed at a defined and constant temperature, irrespective of the ambient conditions. This makes the HygroGen ideally suited for use on-site, where calibrations using salts can be inconvenient and time consuming. A typical use would be to check the performance of transmitters whilst they are still connected to the control or measurement system, therefore validating the whole 'loop'.

The HygroGen also makes it possible to calibrate instruments over a wide range of temperature and humidity conditions, which validates that correct measurements will be achieved over an instrument's likely range of use. Again, these checks can be performed in a short time, with minimal cost and inconvenience when compared to removing the transmitter to a workshop or external laboratory.

Calibration traceability can be achieved in a number of ways; a calibrated control probe, a calibrated handheld instrument, or an external reference, such as a condensation hygrometer can be connected. The optimum choice will depend on the user's requirements, and ROTRONIC engineers are available to advise on the most cost effective option.

Internal Desiccant Cell

The desiccant cell is mounted internally to make movement of the HygroGen easier, and to avoid damage to connecting tubes. The cell can be easily refilled by the user with molecular sieve, Silica Gel or other types of desiccant.

Stainless Steel Enclosure

The HygroGen may often be used on-site in pharmaceutical, medical or food industries where ease of cleaning can be critical. The HygroGen enclosure is designed to be suitable in these situations, as well as providing a secure enclosure for complex electronic and pneumatic components.



Water Reservoir

Very little water is required by the HygroGen because of the high levels of sealing employed throughout the system. The control system features a low water level indicator on the display, and a safety cut-out system to prevent humidifier damage if the water level is too low. Refilling is very simple, using the dosing syringe supplied.

Industrial Controller

The HygroGen features a highly specified multi-loop industrial process controller, that has been specially configured and tuned by ROTRONIC and the controller manufacturer. The benefit of using a standard controller, rather than developing one, is to make best use of the many years of experience that controls manufacturers have in this field. The controller is also a plug-in type, so in the unlikely event of a fault, it can easily be replaced on site.



Intelligent Chamber Design

The internal chamber of the HygroGen is the critical space where humidity and temperature conditions are maintained. The most important factor for best performance is the internal temperature gradients, that have been minimised by innovative design features, and high levels of insulation. The specifications defined are based on actual measurements in real situations (data available on request).



Chamber Door and Bungs

To complement the careful design of the chamber, the front panel is highly insulated to minimise thermal loss. The probe ports include O-ring seals to ensure a tight fit. In addition, the bungs that seal the ports when not in use are also insulated.

RS232 and Controller Upgrades

The rear panel of the HygroGen includes an RS232 interface for the controller that allows the user PC based features such as on-screen display of control and set-points, graphing and data acquisition. Controller programming can also be upgraded. In the unlikely event of controller failure/replacement, or when upgrades become available, settings can be easily uploaded by the user.



Probe options

The HygroGen chamber includes three internal connection sockets for the control and optional monitoring probes. As standard, a HygroClip S1 probe is used for %rh measurement and control, and a special Pt100 direct HygroClip for temperature. Depending on the application, a variety of different configurations are possible, the most common being to add a second HygroClip monitoring probe into the spare connection socket. When any standard HygroClip is connected, the DIO digital signal is available on the rear panel of the HygroGen for connection to HygroLab or HygroPalm display instruments using a B5-02-B5 cable.

Simple Maintenance

User maintenance is limited to refilling the water reservoir and replacing or regenerating the desiccant cell. Both are front panel mounted for ease of access, especially if the HygroGen is rack mounted.

Validation and Calibration

As an instrument for calibration, the HygroGen must have means by which it can be validated or calibrated. There are several ways in which this can be achieved:

- Certified calibration of the control probe.
- Certified calibration of reference probe(s).
- Use of a certified hand-held instrument.
- Connection of a condensation hygrometer through an external sample loop (available on HygroGen 2)

Consult your local ROTRONIC representative for further recommendations to suit your validation and budgetary requirements.



Technical Specification and Ordering Information



SPECIFICATION	
Control Range:	5...95 %rh and 5...50 °C
Control Stability:	≤ ±0.2 %rh, 0.1 °C (at 23 °C) 0.02 °C (20 milli Kelvin)
Temperature Gradient:	≤ 0.1 °C (20...50 °C), ≤ 0.2 °C (5...20 °C)
Typical Time to Set-point:	2 minutes (35 to 80 %rh change at 23 °C), 10 minutes (23 to 45 °C change)
Standard Control Probe:	HygroClip S1, calibrated at 5, 23 & 50 °C / 10, 35, 65 & 95 %rh (SCS traceable, UKAS for UK)
Control Probe Accuracy:	≤ ±1 %rh (10...95 %rh) ±0.2 K at 23 °C (HygroClip S1)
External Interface:	RS232 control interface, ROTRONIC DIO (three probe connections fitted)
Desiccant:	Indicating type, user refillable
Saturator:	Front panel fill/empty. Level warning on controller display
Chamber Volume:	Approximately 2 litres
Enclosure Dimensions:	455 x 420 x 212 mm (Maximum)
Weight:	17 kg
Power:	110/230 VAC
Approvals:	EN61326: 1998, EN61000-3-2: 2000, EN61000-3-3: 1995, EN61010-1: 2001

ORDER CODE:	DESCRIPTION:
HygroGen 1	Humidity and Temperature Calibrator. Includes 1x HG-DC, 1x HG-FILL, 1x HG-D5-UNV with bungs
HygroGen 2	Humidity and Temperature Calibrator with rear panel sampling points and pump for connection of reference hygrometer. Includes 1x HG-DC, 1x HG-FILL, 1x HG-D5-UNV with bungs
Accessories & Spares	
HG-D5-UNV	Chamber door, for five probes, 25, 20, 15, 15 and 10 mm (excludes bungs)
HG-D5-15	Chamber door, for five 15 mm diameter probes (excludes bungs)
HG-CUS	Chamber door, configured to customer's requirements, e.g. 12, 14, 15, 18, 20, 21 & 22 mm diameter probes. (excludes bungs) Maximum 5 probe ports
HG-B10	10 mm bung for door (insulated)
HG-B15	15 mm bung for door (insulated)
HG-B20	20 mm bung for door (insulated)
HG-B25	25 mm bung for door (insulated)
HG-Bxx	Customer specified bung where xx = probe diameter
HG-DC	Additional desiccant cell, pre-filled
HG-DES	Pack of Silica Gel desiccant
HG-FILL	Fill tube and syringe
HG-CON	Spare/replacement controller, supplied pre-configured and with backup disk
HG-TC	HygroGen heavy duty transit case
HG-ITTOOLS	PC software for controller; enables PC view of controller set-points, graphing of set points & process variables and loading of controller upgrades
HG-RS232	RS232 cable, HygroGen control to PC
B5-02-B5	Interface cable, control or reference probes to HygroLab or HygroPalm
Probe & Display Options	
HygroClip-S	Standard control or reference probe
HygroClip-S1	Control or reference probe with Swiss Calibration Service calibration certificate (one included as standard)
HygroLab 2	Bench-top display unit for control/reference probes (needs 1x B5-02-B5 per probe)
AC1207	Power adapter for HygroLab (required)
HygroPalm 2	Hand-held display unit for control/reference probes (needs 1x B5-02-B5 per probe)