

# HYGROFLEX 2&3

# HYGROCLIP®

Humidity goes Digital



Optional metal enclosure

## Networkable Industrial Transmitter Humidity, Temperature and Dew Point or other Computed Parameter

- Unique HygroClip® technology for superior performance
- Durable, field proven humidity and temperature sensors
- Interchangeable probe design eliminates maintenance downtime
- Wide range of probes to satisfy every application
- Optional display and keypad
- Available with a metal enclosure

# rotronic®

LEADING IN HUMIDITY MEASUREMENT

## HygroFlex Probe Selection Guide

### Standard Probes



L. 145mm (5.7") Dia. 15mm (0.6")

#### HygroClip IW

Area monitoring (wall mounted transmitter)  
wire mesh filter. Min. -40°C (-40°F), max. 85°C (185°F)



Tube L. 250mm (9.8") Dia. 15mm (0.6") Cable: 2m (6.5ft)

#### HygroClip IC-3

Recommended for the measurement of most processes, this probe is easily installed through a wall (see installation below). For high RH% and high temperature processes see IM-3. PPS body, wire mesh filter  
Probe and probe cable: min. -50°C (-58°F), max. 200°C (392°F)  
Probe connector: min. -40°C (-40°F), max. 85°C (185°F)



Tube L. 100mm (3.9") Dia. 15mm (0.6") Cable: 2m (6.5ft)

#### HygroClip IC-1

Similar to the IC-3, but with a short body, this probe can be installed well inside the process to be measured. The IC-1 is also used for measuring inside ducts with a small cross section. In both cases, the probe should be fully immersed in the environment to be measured (see installation below) PPS body, wire mesh filter  
Temperature limits: same as IC-3



Cable: 2m (6.5ft)

#### HygroClip IE-3

Measurement in compressed air. This probe has a 1/2" NPT thread and can be used at pressures up to 50 bar/725 PSI. Not suitable in applications where there is a temperature difference across the mounting wall. min. -40°C (-40°F), max 85°C (185°F) wire mesh filter  
Also available with 1/2"G thread (model IE-1)



#### AC1616 Probe Extension Cable

Suitable for use with all probes - built in signal booster.  
Cable length 6 to 656 ft (2 to 200m)  
min. -40°C (-40°F), max. 85°C (185°F)

### Special Probes



Tube L. 270mm (10.6") Dia. 15mm (0.6") Cable: 2m (6.5ft)

#### HygroClip IM-3

Similar to the IC-3, this probe should be selected for use in processes that combine high humidity and moderate to high temperature such as pasta dryers, environmental chambers, etc. - Stainless steel body, wire mesh filter  
Temperature limits: same as IC-3



Tube L. 120mm (4.7/10.6") Dia. 15mm (0.6") Cable: 2m (6.5ft)

#### HygroClip IM-1

Similar to IC-3, but with a short body, this probe is designed for full immersion in the process to be measured.  
Temperature limits: same as IC-3



Dia. 5mm (0.2") Cable: 2m (6.5ft)

#### HygroClip IC-05

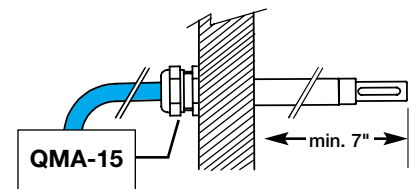
5mm (0.2") diameter for measurement in tight spaces  
min. -50°C (-58°F), max. 100°C (212°F)

Note: we also offer intrinsically safe probes for use in hazardous areas.

### Installation of probes type IC and IM

**IC-3 and IM-3 probes** (long probe body): the QMA-15 adapter is convenient both for installing and servicing the probe. The adapter is comprised of a compression fitting and a 3" flange. The probe should be immersed as much as possible in the process to be measured, especially when temperature is not the same on both sides of the wall.

**IC-1 and IM-1 probes** (short probe body): the probe and its cable should be fully immersed in the environment to be measured (leave the probe connector outside). In a duct of small cross section, install the probe axially. Attach the probe with a clip, a tie or a bracket at a well ventilated location (such as a vent). Do not install the probe through or against a wall, unless temperature is the same on both sides of the wall: insufficient probe immersion will result both in a temperature and a humidity error.





The HygroFlex® industrial humidity and temperature transmitter uses the very latest digital technology. Digital signal processing significantly benefits humidity and temperature measurement in the following key areas:

## 1. Measurement Accuracy

The digital circuits used both in the HygroFlex and associated probe are inherently more stable and consistent than conventional analog circuits. Digital processing of the sensor signals by the probe also provides more scope and greater flexibility when compensating sensor linearity and temperature coefficient. The ROTRONIC HYGROMER® capacitive humidity sensor has always been the leader both in precision and stability. With the application of digital technology, sensor performance is now further improved.

## 2. Maintenance and Calibration

Unique HygroClip® digital technology virtually eliminates downtime during maintenance. When it is time for a scheduled calibration, the interchangeable probe can be 'hot swapped' in seconds with a calibrated replacement probe. There is no need to remove the complete transmitter to a calibration laboratory and there is practically no interruption of the measurement data.

The HygroClip probe can be directly calibrated while connected to the HygroFlex (requires the optional display and keypad), or it can be calibrated separately using either a PC or the HygroPalm

## The Digital Advantage

portable calibrator. Calibration and sensor data are retained permanently within each HygroClip probe. Software-based calibration is both simple and precise; there are no hard-to-reach, hard-to-adjust potentiometers. Multiple calibration points can be selected across the full measuring range.

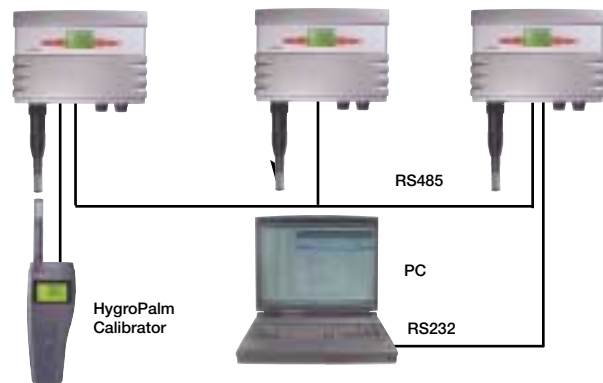
On-site performance verification is equally easy. Each HygroFlex has a test connector for use with a portable HygroPalm calibrator. The HygroPalm can display the signals from the HygroFlex without interrupting operation and a comparison can be made with the readings of the probe connected to the HygroPalm.

## 3. Measurement of Dew-Point and other Parameters

Digital technology makes it possible to obtain parameters such as dew-point or the mixing ratio with economical, versatile and easy-to-maintain instruments and probes. Comparing the HygroFlex to existing chilled mirror technology typical requirements and problems are eliminated: no sampling system is required in most applications, the uncertainty between dew and frost is eliminated, and there is no mirror that requires frequent cleaning.

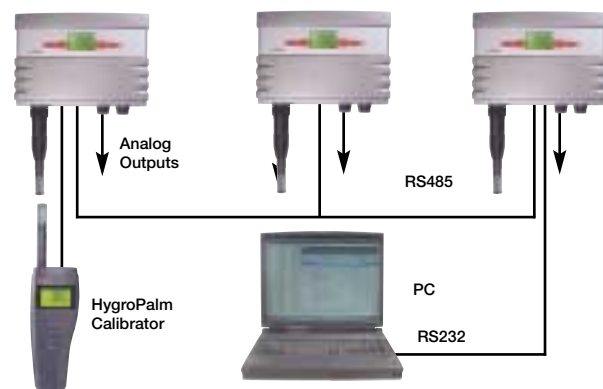
### HygroFlex 2: 100% Digital

- %RH and temperature and calculated value (dew-point, mixing ratio, etc)
- RS232 output (%RH and temperature)
- Networkable (RS232 first HygroFlex to PC / RS485 between transmitters)
- Optional 2nd probe input (digital or analog)
- Fully user programmable



### HygroFlex 3: Analog & Digital Outputs

- %RH, temperature and calculated value (dew-point, mixing ratio, etc)
- Three linear analog outputs: 4-20 mA, 0-5V, etc.
- Jumper configuration of analog outputs signal type
- Simultaneous digital output
- RS232 output (%RH and temperature)
- Networkable (RS232 first HygroFlex to PC / RS485 between transmitters)
- Optional 2nd probe input (digital or analog)
- Fully user programmable



Networking is a great alternative to using analog signals as it offers more accurate signal transmission, minimal wiring expenses and direct integration of data processing.

## HygroFlex Networking Options



Up to 32 HygroFlex 2 or 3's can be connected together to form a network with a maximum capacity of 64 measuring points, when the transmitters are equipped with the optional second probe input. Any transmitter can be used either as a slave or a master, without special configuration. Prior to networking, each transmitter must be given a unique network address with the HW3 software (0 to 31). The master is automatically the unit that is connected to the COM port of the PC by means of the RS232 port. The following options are available for the PC:

### a) Use the Rotronic HW3 software:

- on-screen display of the network
- data logging to a PC disk file
- graphic functions (both on and off-line)
- alarm functions, including alarm messages by internet e-mail (requires Microsoft Outlook 2000)
- calculation of various humidity parameters (both on and off-line)
- full access to instrument configuration (metric or English unit system, etc.)
- calibration of the ROTRONIC HygroClip digital probes with or without HygroFlex

HW3 REQUIREMENTS	
<b>PC</b>	Pentium 233MHz or better
<b>Windows®</b>	95/98, Me, XP or NT or 2000®
<b>Memory</b>	64MB
<b>Disk Space</b>	20MB free
<b>Drives</b>	CD ROM drive required
<b>Monitor</b>	VGA or Super VGA
<b>Resolution</b>	1024 x 768 or higher (set to small fonts)
	High Color 16Bit (256 Color minimum)
<b>COM Port</b>	RS232 (COM 1-4)
<b>Software</b>	HW3 (includes - MSIE 4.0 Browser - Adobe® Acrobat Reader) MS Internet Explorer: for best viewing of instruction manual, set fonts to smallest

### b) Use any communications software (not necessarily Windows based)

This alternative is available to users who do not wish to use the HW 3 software or a Windows based PC. It does, however, require a moderate amount of programming. Any transmitter on the network can be interrogated on demand by sending simple ASCII commands. For example, to read %RH, temperature and computed parameter from HygroFlex 2 with address 01:

**data request** : |{m01RDD0;}+CR

**answer** : {m01RDD 0025.90;0015.82;-003.69;0024.47;0019.88;-001.00;S

**0025.90:** humidity probe 1 (%RH)

**0015.82:** temperature probe 1 (°C as per instrument configuration)

**-003.69:** dew point probe 1 (°C as per instrument configuration) - followed by optional probe 2 data.

## Product Summary & Technical Data

SPECIFICATIONS (including probe)	HYGROFLEX 2	HYGROFLEX 3
Number of probe inputs	1 (standard) / 2nd probe input optional	
Probe type	Digital (HygroClip) 3rd party analog: 0...2.5V input (scalable), 15V DC, 10mA	
Probe calibration	requires display/keypad option (probe can also be calibrated separately)	
Probe calibration via PC	Use T7-03-WIN and HW3 software	
Calculated parameter	Dew-point, wet-bulb, enthalpy, mixing ratio, specific humidity, water vapor pressure, saturation vapor pressure.	
Pressure input for calculated values <sup>1</sup>	Fixed value (user defined)	Fixed value or automatic with analog pressure probe (requires 2nd probe input option)
User defined calculation	HygroFlex can be programmed with the HW3 software to compute and output a user defined calculation such as the difference between temperature and dew point, a difference between two dew points, etc.	
Transmitter measuring range	0...100%RH, -50...+200°C (-58...+392°F)	
Temperature limits at probe	see Probe Selection Guide	
Accuracy (at 23°C/73°F)	± 1.0%RH ± 0.2°C (0.4°F)	
Repeatability	±0.3%RH and better than 0.1°C (0.2°F)	
Sensors	Hygromer® C94 capacitive humidity sensor, Pt100 1/3 DIN RTD	
Transmitter operating limits	0...99%RH non-condensing, -40...+60°C (-40...140°F), -30...+60°C with display	
Optional display and keypad	ICD 2-line numeric, 1 line alphanumeric, 1/4" character height, membrane keypad	
Resolution of optional display	0.1%RH/°C/°F 0.001 calculated parameter or pressure (depends on parameter)	
Power	12...35VDC (300mA max.) / 12...24VAC or 90...264VAC	
Analog outputs	N/A	3 <sup>2</sup>
Analog output type	N/A	4...20mA or 0...20mA 0...1V, 0...5V, 0...10V (jumper selectable)
Load limit for analog outputs	N/A	current outputs ≤ 500 ohm voltage outputs ≥ 1000 ohm
Electrical connections (power / analog outputs)	for power cable - standard: 1 x cable grip, (7mm/0.275") optional: 1 x 1/2" conduit adapter	for power and analog signals cables - standard: 2 x cable grip, (7mm/0.275") optional: 2 x 1/2"conduit adapter
Connection terminals	18 AWG (power)	18 AWG (power, analog outputs)
RS232 and RS485 outputs	Transmitter provides data each time that a data request command is received. 5-pin receptacle common to both RS232 and RS485 – a matching 2-cable connector is provided together with the HygroFlex	
Test connector	allows reading the measurement data and probe calibration with HygroPalm 3 indicator	
Housing	Standard ABS housing: 207 x 150 x 59mm (8.15 x 5.90 x 2.32"), 310g (0.7 lb). Optional Aluminum housing: 245 x 135 x 75mm (9.65 x 5.32 x 2.95"), 1300g (2.86 lb)	
Protection grade	IP65/NEMA4	
CE Conformity	EN580081-2, EN50082-2	

### Notes

- 1) Barometric pressure is required as an input parameter for the computation of wet bulb temperature, mixing ratio, enthalpy and specific humidity. When a fixed pressure value is used, this value can be set by the user by connecting the HygroFlex to a PC with the optional HW3 software installed.
- 2) Any of the 3 analog outputs of the HygroFlex 3 can be set to correspond to humidity [probe 1 or 2] or temperature [probe 1 or 2] or calculated psychrometric parameter [probe 1 or 2] or user defined calculation, or to optional analog probe signal (such as pressure).

