

**HygroLog  
Humidity Temperature Data Logger  
Instruction Manual**



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### PLEASE, READ THIS FIRST

- Check the product for any physical damage that may have occurred during shipment. We carefully pack and routinely insure all shipments. If any damage has occurred, it is your responsibility to file a claim with the carrier, **prior to returning the damaged product**. Please note that our warranty does not cover damage during shipment.
- Get fully familiarized with the operating limits of the probe and instrument.
- Do not unnecessarily remove the sensor protection (dust filter) from the probe. Both sensors (humidity and temperature) can be mechanically damaged by careless removal of the protection.

Each ROTRONIC instrument and probe is carefully calibrated before shipment. No further adjustments should be required before use. If you have any question or problem, please call our service department at 631/427-3898 and press 5 (or ask for extension 21).

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## **Description**

The ROTRONIC HygroLog data logger operates with 3 x AA 1.5 V alkaline batteries and accepts a wide selection of HygroClip<sup>®</sup> probes to meet the requirements of different applications. The HygroClip digital humidity temperature probes combine advanced ASIC\* technology with the well proven Hygromer C94 capacitive humidity sensor and a precision RTD temperature sensor. These probes feature high accuracy, long term reliability and 100% interchangeability to reduce downtime during calibration or repairs. Unless otherwise specified when ordering, the HygroLog is shipped together with a HygroClip S probe (shown here).



[ \*ASIC: *Application Specific Integrated Circuit* ]

The HygroLog is available with or without LC display (HygroLog D and HygroLog). Both models can record a maximum of 5,450 data samples consisting of humidity, temperature, date and time. The log interval is programmable from 15 sec to 2 hours. To conserve battery power, the HygroLog enters a sleep mode in between samples. With a 5-minute log interval, this allows up to 1 year of data for the model without display and 6 months of data for the model with display. Log modes include continuous (loop) recording with or without initial delay, start / stop recording and many other features such as alarms (model with display).

Depending on the model of probe and by remoting the probe with a cable, the HygroLog can record conditions within the range of 0...100%RH and -50...200°C or -50...392°F. On the model with display, Fahrenheit temperature values above 200 are shown without decimal.

The probe connector of the HygroLog doubles as an RS232 port (after removing the probe). Communication with a PC or Laptop requires the Rotronic HW3 software and a connecting cable (both available under the part number HYGRODATA-HL). HW3 is compatible with Microsoft's Windows 95/98 or NT. HW3 is used to program the HygroLog, download the data, convert the humidity data to dew point or another parameter, display the original or the converted data either as a table or as a graph, and to calibrate the HygroClip probe.

The temperature unit of both the HygroLog and HW3 can be programmed either as °C or °F.

## **Operation**

The HygroLog is shipped pre-programmed, ready for use with the batteries installed. To start data recording simply plug in the HygroClip probe. Data recording stops as soon as the HygroClip probe is removed from the HygroLog.

To check on the status or to re-program the HygroLog, unplug the HygroClip probe and replace it with the PC connection cable (round connector). Connect the 9-pin connector of the cable to a free serial port of the PC.

Install and start the HW3 software (follow the instructions of the short installation paper manual shipped together with the HW3 CD ROM).

**Detailed instructions for using HW3 together with the HygroLog are included on the HW3 CD ROM. These instructions are not repeated here. A net browser – Internet Explorer or Netscape – is required to read the CD ROM manual (supplied with HW3).**

### Recording and Hold Mode

- The HygroLog records data only when a HygroClip probe is plugged in.
- Each time that the HygroClip probe is removed, the HygroLog stops recording and switches to the "Hold Mode" to economize battery power. Recording begins immediately when the HygroClip probe is plugged in again (unless the "probe acclimatization delay" feature has been activated when programming the HygroLog).

<b>Hold Mode</b>	HygroLog (standard)	battery lifetime about 10 years
	HygroLog-D (with LC display)	battery lifetime about 2.5 years
<b>Recording Mode</b>	battery lifetime depends on the log interval	

### Log Modes and Functions

Start-Stop Mode	Recording stops when the memory is full	
Loop Mode	Loop (circular) recording The oldest data is overwritten when the memory is full	
Alarm	Alarm conditions are shown either on the LC display (HygroLog-D only) or in the graphic module of the HW3 software.	
Log Interval	programmable from 15 sec to 2 hours	
Units	Selectable and visible on the LC display (HygroLog-D only) or on the PC Temperature : °C, °F Humidity : %rF, %rh, %HR	
Time, Date	Automatically adjusted to PC time and date when programming the logger	
Delayed Recording	Delayed Start	The beginning of the recording can be delayed by a maximum of 3 weeks
	Probe Acclimatization Delay	Delays the beginning of the recording - adjustable from 0 to 2 hours This delay is useful to avoid erroneous data and false alarms that could result from plugging-in the HygroClip probe (influence of the humidity and temperature of the operator's hand)
	When recording is delayed, the HygroLog-D (LC display) shows the measured values but does not record them.	

Read Status	Logger-Type Serial Number Battery Lifetime Date and Time
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**Note:** During each log interval, the HygroLog is active for only the few seconds required to measure and record the data. The rest of the time, the HygroLog is in a "sleep mode". In this mode, humidity and temperature conditions, including alarm conditions, as well as events such as removal of the probe are neither detected nor recorded.

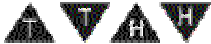
### Memory

The HygroLog can record a maximum of 5,450 data samples. Each data sample includes the following information: humidity, temperature, date and time.

Events such as the removal of the HygroClip probe, the replacement of batteries, etc., are also recorded. Limit the number of such events so as to maximize the amount of memory available for recording actual data.

### Display (HygroLog D)

Description of the Display Functions:

Humidity	0 to 100 %RH or %HR
Temperature	-50.0 to 199.9°C or °F (Fahrenheit temperature values above 200 are displayed without decimal)
Operation	Immediately after programming, the LC display does not show the measured values during the first two measuring cycles. After this initial phase, the display is updated during each log interval.
Alarm Indication	<p>Alarm conditions are indicated by one or more triangles at the bottom of the display. Several alarm conditions may be displayed simultaneously. An upward pointing triangle indicates that the maximum alarm value was reached or exceeded. A downward pointing triangle indicates that the minimum alarm value was reached or exceeded. Inside the triangle, the letter H or the letter T denotes humidity or temperature.</p> <div style="text-align: center;">  </div> <p>The alarm indication remains on the display even after conditions have returned to normal. The alarm indication can be turned off only with the HW3 software.</p>

Battery Indicator	A 3-segment battery symbol is used to indicate the following conditions:  3 segments: 66 ... 100% capacity 2 segments: 33 ... 66% capacity 1 segment : 0 ... 33% capacity  Battery - Alert (a triangle with a B) : the batteries are almost empty
Logger is <b>not</b> recording	This is indicated by a vertical segment (   ) to the left of the measured values  Examples: probe acclimatization delay, start delay, logger programmed to record alarm conditions only (when the conditions are normal)
No Probe Signal	The display shows --.- where values are normally displayed. This indicates either that there is no probe or that the probe is defective. (see note below)

**Note:** Programming requires replacing the HygroClip probe with the PC data cable. During the interval of time between removal of the cable and installation of the HygroClip probe, the HygroLog may detect that there is no probe signal. Should this happen, it is normal for the display to initially show --.- where the measured values would normally be displayed. The measured values will be shown normally at the time of the display update, which happens during the first log interval. Depending on the duration selected for the log interval, this may take up to 2 hours when the log interval is also 2 hours.

### **Battery Replacement**

Open the HygroLog (4 Philips screws on the back side). Remove the old batteries and replace with new ones. Close the HygroLog. After replacing the batteries, the logger is immediately ready for use and **does not require** new programming.

**Important:** Always replace all 3 batteries! (AA 1.5V alkaline batteries)

The HW3 software provides correct information as to the remaining battery lifetime only when all 3 batteries are replaced with fresh batteries at the same time. Remove the batteries only when you are about to replace them. Battery replacement resets the battery monitoring function to 100% capacity.

See also: Specifications – Batteries

## HygroClip Probes

The ROTRONIC HygroClip digital probes are highly accurate and are calibrated entirely by means of software (no adjustment potentiometers). Because calibration and other data are stored in the probe non-volatile memory, the probes are fully interchangeable. When a probe requires calibration or has to be repaired, it can be replaced with another probe in a few seconds.

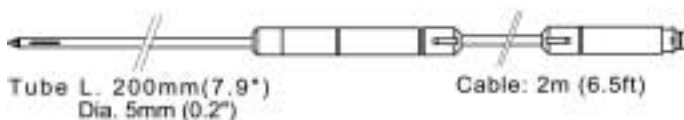
Depending on the application, The HygroLog can be used with different models of HygroClip digital probe. Since the temperature operating range of the HygroLog is limited (see specifications), measurement at temperatures below -10°C (14°F) and above 50°C (122°F) generally requires that the probe be remoted from the HygroLog with a length of cable.

The following probes have a DAT05 connector that is directly compatible with the HygroLog or with the MOK-xx-DAT05 extension cable (see accessories):



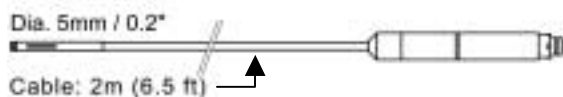
L. 100mm (3.9")  
Dia. 15mm (0.6")

HygroClip S (standard with HygroLog)  
measurement in air  
max. 85°C (185°F) – wire mesh filter



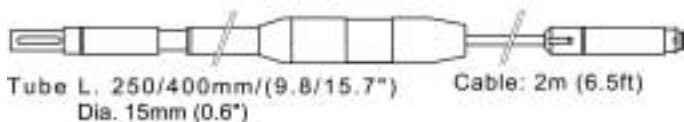
Tube L. 200mm (7.9")  
Dia. 5mm (0.2")  
Cable: 2m (6.5ft)

HygroClip SP05  
measurement in air ducts  
max. 85°C (185°F)



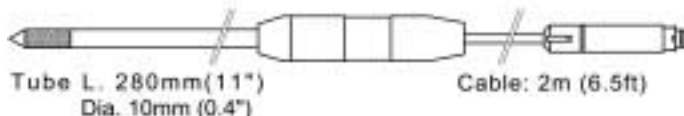
Dia. 5mm / 0.2"  
Cable: 2m (6.5 ft)

HygroClip SC05  
measurement in tight spaces  
max. 100°C (212°F)



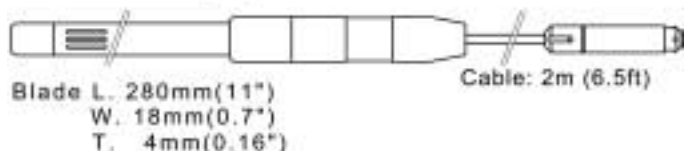
Tube L. 250/400mm/(9.8/15.7")  
Dia. 15mm (0.6")  
Cable: 2m (6.5ft)

HygroClip HK25 / HK40 air probe  
measurement at high temperature  
HK25: max. 150°C (302°F)  
HK40: max. 200°C (392°F)  
wire mesh filter



Tube L. 280mm (11")  
Dia. 10mm (0.4")  
Cable: 2m (6.5ft)

HygroClip HP28 insertion probe  
measurement of materials in bulk  
max. 85°C (185°F)  
sintered steel filter



Blade L. 280mm (11")  
W. 18mm (0.7")  
T. 4mm (0.16")  
Cable: 2m (6.5ft)

HygroClip HS28 sword probe  
measurement of paper stacks/rolls  
max. 85°C (185°F)

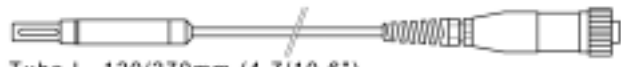
**Note:** The HygroClip S probe (this probe only), is supported by our rapid exchange program. Should this probe require calibration or to be repaired, it can be returned to Rotronic and exchanged for a HygroClip R probe. The HygroClip R is a rehabilitated HygroClip S probe, with a brand new humidity sensor and a brand new dust filter. The HygroClip R is fully calibrated by Rotronic in the same manner as a new HygroClip S probe.

The following probes have a T7 connector. To be compatible with the connector of the HygroLog, the following probes require extension cable T7-xx-DAT05 (see accessories):



Tube L. 100/250mm (3.9/9.8")  
Dia. 15mm (0.6")  
Cable: 2m (6.5ft)

HygroClip IC-1 (100mm) / IC-3 (250mm)  
for through-wall installation  
max. 200°C (392°F) - wire mesh filter



Tube L. 120/270mm (4.7/10.6")  
Dia. 15mm (0.6")  
Cable: 2m (6.5ft)

HygroClip IM-1 (120mm) / IM-3 (270mm)  
for through-wall installation in high humidity  
applications  
max. 200°C (392°F) - wire mesh filter



Cable: 2m (6.5ft)

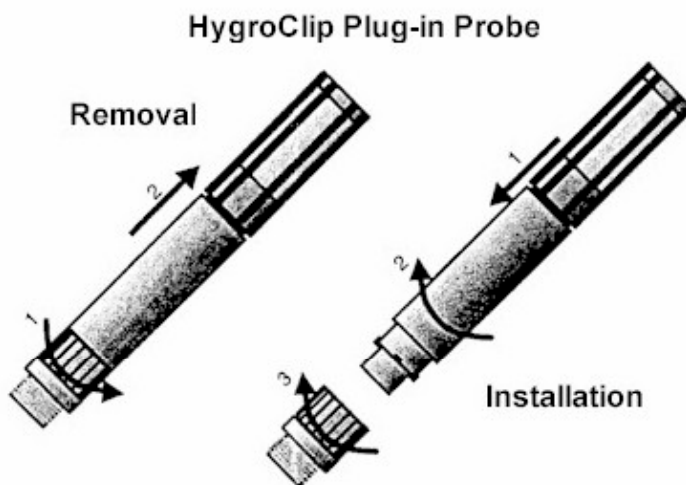
HygroClip IE-1 (G ½") / IE-2 (NPT ½")  
for compressed air (max. 50 bar / 725 PSI)  
max. 85°C (185°F) – sintered steel filter  
*to avoid errors, temperature should be the same on both sides of the mounting wall*

### **Installation / Removal (Probe or Connector)**

To install the probe (or connector), position both the probe (or connector) and the locking ring of the HygroLog so as to align all 4 dots:

- 1 dot on the probe (or connector)
- 2 dots on the HygroLog locking ring
- 1 dot on the connector base of the HygroLog

Push down the probe (or connector) and turn the locking ring clockwise to lock the probe (or connector) in place. Follow the inverse sequence to remove the probe or connector.





### **HW3 System Requirements**

PC	Pentium 133 MHz or better
Windows	95/98 or NT
Memory	32MB
Disk Space	20MB free
Drives	CD ROM drive required
Monitor	VGA or Super VGA 800 x 600 (required) or higher / set to small fonts High Color 16Bit (256 color minimum)
COM port (RS232)	one free com port required (COM1-4)

HW3 includes MSIE 4.0 browser and Adobe Acrobat Reader. For best viewing, set fonts to smallest

### **Specifications**

<b>Probe</b>	HygroClip humidity temperature plug-in probe
<b>Sensors</b>	ROTRONIC Hygromer™ C94
	Pt100 RTD (1/3 DIN)
<b>Measuring Range</b>	0 to 100 %RH
	-50...200°C or -50..392°F (depends on probe) <i>see also Operating Range of the HygroLog</i>
<b>Operating Range</b>	0...100 %RH (non condensing)
	Temperature operating range depends on Batteries Display-Version max.: -10° to 50°C (14 to 122°F)
<b>Accuracy at 23°C (probe)</b>	±1.5 %RH
	±0.3°C
<b>Repeatability (probe)</b>	<0.5 %RH
	<0.1°C
<b>Communication</b>	RS232 (requires HW3 software and connecting cable)
<b>Power</b>	3 x UM3 1.5V Alkaline Batteries
<b>Log Interval</b>	adjustable between 15 sec and 120 min.

<b>Memory</b>	about. 5400 samples (consisting of humidity, temperature, time, date)  (> 20 hours with 15 sec log interval and > 59 weeks with 120 min log interval)
<b>Batteries</b>	Use exclusively AA 1.5V alkaline batteries <b>Important:</b> do not use NI-accumulators Rechargeable alkaline batteries may be used <b>Warning</b> Prior to using the HygroLog at extreme temperatures check the maximum operating temperature of the batteries. ROTRONIC is not liable for damage caused by the batteries! Most alkaline batteries are limited to the operating range of -20°C to +54°C (-4 to 130°F)
<b>External Power</b>	8...20 VDC (requires IPH holder + 9V AC adapter) <b>Important:</b> The HygroLog will not operate without batteries ! Use of external power conserves the batteries for up a one year
<b>Case material</b>	ABS
<b>Protection Grade</b>	IP65 / NEMA 12
<b>Dimensions</b>	140x85x25 mm
<b>Weight</b>	ca. 200g

### **Appendix 1: Practical Advice for Measuring Humidity**

The most common source of error when measuring relative humidity is a difference between the temperature of the probe and the temperature of the environment. At a humidity condition of 50 %RH, a temperature difference of 1°C (1.8 °F) typically results in an error of 3 %RH on relative humidity.

To avoid temperature errors, insert as much of the probe as possible in the environment to be measured. If the probe is short, you may have to insert not only the probe itself but also some of the probe cable. Use the probe configuration that fits best for your application. Please also note that some probes such as the HygroClip IE (measurement in compressed air) are not designed to handle any significant temperature gradient between both sides of the mounting wall.

In extreme situations, condensation may occur on the sensors when the probe is colder than the environment. As long as the humidity / temperature limits of the humidity sensor are not exceeded, condensation does not alter the calibration of the sensor. However, the sensor has to dry out before it can provide a valid measurement.

Non-moving air is an excellent insulator. When there is no air movement, surprising differences in temperature and humidity can be noted over short distances. Air movement at the probe generally results in measurements that are both faster and more accurate.

## **Appendix 2: Maintenance of the ROTRONIC probes**

### **Cleaning or Replacing the Dust Filter of the Probe**

Most ROTRONIC probes come with one of the following types of dust filter: (a) protective metal base with a removable filter cartridge or (b) plastic slotted cap with built-in (not removable) filter element.

Depending on the conditions of measurement, the filter should be checked from time to time. If the probe has a removable filter cartridge, this can be easily removed for cleaning.



If the probe has a plastic slotted cap with a built-in filter element, cleaning should be done without removing the filter from the probe. In that case, do not use detergents, solvents or other strong chemicals. Either brush the filter or use a little bit of clean water.

Corroded, discolored or clogged filters should be replaced. If the probe has a removable cartridge, simply replace the cartridge (leave the metal base on the probe).

If the probe has a plastic slotted cap with built-in filter element follow these instructions:

- 1) Unscrew the filter from the probe and pull it straight away, in the alignment of the probe, so as not to catch the humidity and temperature sensors.
- 2) Before putting on a new dust filter, check the alignment of both sensors with the probe. The wires that connect the sensors to the probe are very thin and bend easily. If necessary, correct the alignment by tapping the sensor very gently with a smooth object such as a small plastic rod. Do not use sharp pliers or tweezers as this could puncture the sensor and do not pull hard on the sensor.

### **Periodic Calibration Check of the Probes**

Long term stability of the ROTRONIC Hygromer humidity sensor is typically better than 1 %RH per year. For maximum accuracy, calibration of the probe should be verified every 6 to 12 months. Applications where the probe is exposed to significant pollution may require more frequent verifications.

Both the Pt 100 RTD temperature sensor and associated electronics are very stable and should not require any calibration after the initial factory adjustment. For routine calibration checks, the probe should be verified at one or two values of humidity.

**Calibration of the probes requires a PC or laptop with the Rotronic HW3 software installed. Detailed instructions are included on the HW3 CD ROM. These instructions are not repeated here. A net browser – Internet Explorer or Netscape – is required to read the CD ROM manual (supplied with HW3).**

### **Appendix 3: Calibration Basics**

Calibration of the HygroClip probes requires the following:

- a) HW3 installed on a PC
- b) calibration cable MOKX-03-WIN or T7-03-WIN (depending on probe)
- c) adjustable temperature and humidity reference (such as a Rotronic humidity standard)

#### **Temperature Calibration**

Note: the stability of the Pt100 RTD sensor used to measure temperature is such that temperature calibration in the field is seldom required.

In order to be able to correctly evaluate the accuracy of the temperature measurements provided by the probe, you should be able to meet the following requirements:

- a) Both the probe and a reference thermometer should be ventilated with the same stream of air. Any dust filter used to protect the sensors should be carefully removed from the probe. If the probe has a protective slotted cap, this may be left on the probe.
- b) Air velocity at the sensor should be within the limits of 200 to 500 feet/minute (1 to 2.5 meters/second). Any comparison between two instruments at a velocity under 200 feet/minute may not be valid. Air velocity above 500 feet/minute may damage the unprotected humidity sensor.
- c) The temperature of the air stream should be practically constant.

If you cannot meet the above requirements, you should not attempt to calibrate temperature.

#### **Humidity Calibration**

ROTRONIC provides easy-to-use, certified humidity standards for those customer who do not have access to a humidity generator. To use these standards, you will need a calibration device that is suitable for your probe.

##### ***Calibration Device***

The calibration device is a small airtight container that fits on the probe and seals around the humidity sensor. During calibration, a known reference humidity is produced inside the calibration device by means of a humidity standard (usually an aqueous salt solution).

The following calibration devices are available from ROTRONIC:

- ER-15: for 15mm diameter probes
- ER-05: for 5 mm diameter probes
- EM-15 for probe type IE
- ERV-15 for probe type IW

### ***Certified Humidity Standards***

The ROTRONIC certified standards are available in boxes of 5 glass ampoules of the same value, which can be stored indefinitely. Standards in the range of 5 to 95 %RH are non-saturated aqueous salt solutions that are precisely titrated at our factory for the right concentration. The 0 %RH humidity standard is made of small granules of a highly porous ceramic that have been dried at a high temperature. A Material Safety Data Sheet is available for each standard. Since most standards are a salt solution, parts which have come in contact with the liquid should be cleaned after each use.

Each box of standards comes with a certificate that provides statistical information on the manufacturing batch of the standard. Information on the effect of temperature on each standard is provided on the cover of each box of standard. When calibrating either with the HygroFlex or with the HW3 software, the effect of temperature on the standards is compensated by the software and no further correction is required. The value of the standards is not affected by altitude.

### ***Instructions for using the Standards***

- Install the calibration device on the probe so that the receptacle (or solution holder) is under the probe. Check for a tight fit and remove the receptacle from the calibration device.
- Place one fiber disc (each box of standards includes 5 discs) in the receptacle of the calibration device. The purpose of this disc is to prevent accidental spilling of the solution inside the calibration device or on the humidity sensor.
- Tap the top of the ampoule so that all liquid drops to the bottom of the ampoule. Snap off top and empty contents on fiber disc. Since the ampoule is made of glass, exercise proper caution (gloves, safety glasses) when snapping off the top.
- Put the receptacle back on the calibration device and make sure that the solution does not come in contact with the sensor: The solution inside the calibration device should never be on top of the sensors.
- Allow at least 60 minutes to insure that the calibration device, the solution and the sensor are in a state of equilibrium. This is verified by monitoring the display.
- After adjusting the probe, remove the receptacle from the calibration device. Throw away the wet disc (non reusable). Thoroughly wash and wipe dry the receptacle.

### ***General Recommendations***

During calibration, temperature stability is the single most important requirement. If possible, calibrate the probe at room temperature (18 to 25°C). Room temperature should be stable to  $\pm 0.25^\circ\text{C}$  or better during the period of time required for each calibration point. Do not calibrate close to an air vent or a heater, in direct exposure to sun rays, etc.

If using a humidity generator to calibrate the probe, make sure that the probe is as fully immersed in the generator as possible to minimize temperature effects.

**Appendix 4: Accessories**

HYGROLOG - IPH	Wall mounted holder with the possibility of providing external power to the HygroLog (9 VDC A/C adapter not included)
MOK-05-DAT05	Extension cable to remote the HygroClip probes with DAT05 connector from the data logger Cable length: 5 meter (16.4 ft)
T7-03-DAT05	Conversion cable required to use the HygroClip probes with T7 connector together with the HygroLog. Cable length: 3 meter (9.8 ft), 5 meter (16.4 ft) on request
MOKX-03-WIN	Calibration cable for the HygroClip probes with DAT05 connector. Terminated with a 25-pin SUB D connector. Converter 25-pin to 9-pin is supplied. Cable length: 3 meter (9.8 ft) 9VDC A/C adapter required (included)
T7-03-WIN	Calibration cable for the HygroClip probes with T7 connector. Terminated with a 25-pin SUB D connector. Converter 25-pin to 9-pin is supplied. Cable length: 3 meter (9.8 ft) 9VDC A/C adapter required (included)
ACA-HP	115 VAC / 9VDC adapter for the MOKX-03-WIN and T7-03-WIN cables or for the HYGROLOG-IPH holder
HYGROLOG-HL	HW3 Software on CD ROM and PC data cable
EA00-SCS	0%RH humidity std, SCS cert., pack of 5
EA05-SCS	5%RH humidity std, SCS cert., pack of 5
EA10-SCS	10%RH humidity std, SCS cert., pack of 5
EA11-SCS	11%RH humidity std, SCS cert., pack of 5
EA20-SCS	20%RH humidity std, SCS cert., pack of 5
EA35-SCS	35%RH humidity std, SCS cert., pack of 5
EA50-SCS	50%RH humidity std, SCS cert., pack of 5
EA65-SCS	65%RH humidity std, SCS cert., pack of 5
EA75-SCS	75%RH humidity std, SCS cert., pack of 5
EA80-SCS	80%RH humidity std, SCS cert., pack of 5
EA95-SCS	95%RH humidity std, SCS cert., pack of 5
ER-15	calibration device for 15mm dia. Probes
ER-05	calibration device for 5mm dia. Probes
EM-15	calibration device for type 'IE' probes