



Description of the sensor

The exchangeable digital sensor „PMU_G“ is equipped with our tried and tested humidity sensor element FE09/4. Protected by a PTFE pocket filter, the measuring element measures the air humidity. The pocket filter consists of porous vapour-permeable material and protects the sensor element from most dirt, dust and pollutants.

The electronics and the plug contacts on the back are extrusion-coated with plastic to make them watertight. The plug contacts comply with protection category IP40.

The capacitive humidity measuring element, produced using thin-film technology, consists of a base plate, on which the electrodes are housed, and a hygroscopic polymer layer above it. The hygroscopic polymer layer absorbs water molecules from the medium to be measured (air) or releases them, thereby altering the capacity of the condenser.

The electronics set off the humidity values measured in this way against the calibration values it has stored and emits them via the plug contacts in the form of calibrated, digital ASCII protocol. The sensor head is also equipped with a temperature probe Pt1000 1/3DIN which is used for both acquiring the air temperature and also for temperature compensation in the humidity measurement by the PMU_G.

Through this calibration in the sensor head and output as a digital signal, the PMU_G sensor heads can be exchanged at any time and do not require an expert to do so. This does not disrupt the system functioning.

Please consult the **application instructions** for the sensing elements (product info sheet no. A 1) or check with the manufacturer for further information which you need to bear in mind when using humidity sensors with capacitive sensing elements.

Digital Humidity-Temperature Sensor PMU_G

with asynchronous ASCII transmission protocol, calibrated model for relative humidity and temperature in exchangeable, plug-in design.

Humidity

measuring range	0..100%rh
measuring accuracy 10...90%rh	±1,5%rh ¹⁾²⁾
at <10%rh >90%rh	±0,8%rh/%rh additional
at <10°C >40°C	±0,0075%rh/K additional
resolution	0,01%rh (readout)
hysteresis	< 1,0%rh
response time t ₆₃ (v=2m/s with filter)	< 15 sec
protection against dust	PTFE pocket filter

Temperature

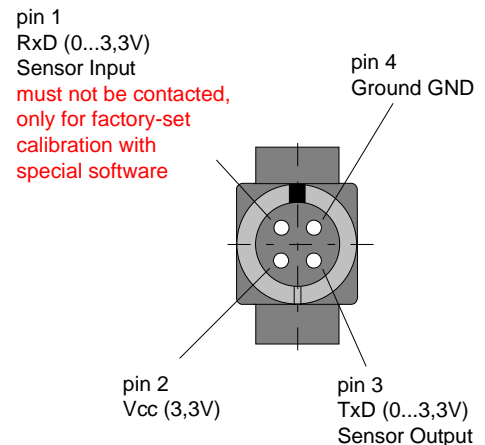
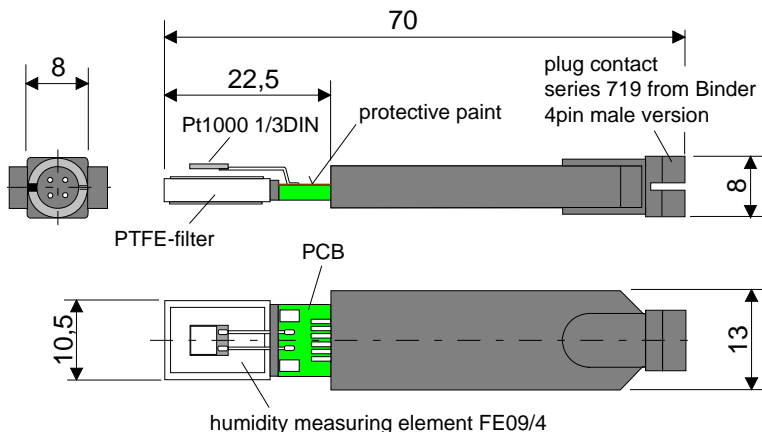
measuring range	-25...70°C
measuring accuracy	±0,2K @ 25°C
.....	±0,3K (<15°C > 30°C)
response time t ₆₃ at 2m/s	15 s
measuring element	(Pt1000 1/3DIN)
resolution	0,01°C (readout)

General

ambient temperature	-25...70°C
measuring medium	air, pressureless, non-aggressive
output	ASCII (Galltec-protocol)
housing	plastic
electromagnetic compatibility	to EN61326
minimum air speed across the measuring head	0,3 m/s
protective system sensor	IP64
protective system plug	IP40
mounting position	optional
contacting	4Pin flange plug series 719 from Binder
Power input	max 15 mW
Further information	product info sheet no. A0;no. A1;no. B1.1
	Relative humidity - Definitions - Physical laws

¹⁾ Depending on the respective conditions of use, the sensor head (PMU) will require regular recalibration.

²⁾ greater precision on request
 "subject to technical modifications"



This information is based on current knowledge and is intended to provide details of our products and their possible applications. It does not, therefore, act as a guarantee of specific properties of the products described or of their suitability for a particular application. It is our experience that the equipment may be used across a broad spectrum of applications under the most varied conditions and loads. We cannot appraise every individual case. Purchasers and/or users are responsible for checking the equipment for suitability for any particular application. Any existing industrial rights of protection must be observed. The perfect quality of our products is guaranteed under our General Conditions of Sale. Issue : March 2008 valid until 31.12.2009 PMU_G_E. Subject to modifications, current version available at www.galltec.de. This issue supersedes all previous technical leaflets.

Function and implementation of the digital humidity temperature sensor PMU_G

The exchangeable digital sensor head measures the current temperature and the relative humidity in the direct surroundings.

Output

After contacting and supply via Vcc & GND, the sensor head automatically transmits the measurement protocol via the TxD pin. Every 3-4 seconds the respective current measurement value is re-issued at 9600 Baud. Between the individual measurement protocols (ASCII output), the TxD pin is at 3.3VDC (High Level).

Symbol	Parameter	Min	Max	Unit
Vcc	Supply Voltage	3,2	3,4	V
Vss	Supply Voltage GND	0	0	V
Vol	Output low voltage	Vss	Vss + 0,6V (I _{OL} = 6mA)	V
Voh	Output high voltage	Vcc - 0,6V (I _{OH} = -3,4mA)	Vcc	V
Ioh	Output source current		2mA @ Vcc = 3V	
Iol	Output sink current		2mA @ Vcc = 3V	

The above table shows the electrical signals of the digital sensor head PMU-G. The customer must provide a stable, regulated distribution voltage of +3.3VDC.

ASCII output protocol:

The sensor continuously transmits the measurement data on the TxD pin (3) as ASCII protocol. It starts with @, has got a "; " as a separation sign and ends with "CR" and "LF".

@T;<sign><temperature>;<alarm code>;F;<humidity>;<alarm code>;<serial number>;<check sum><CR><LF>

Example: @T;+021.37;A00;F;038.92;A00;12345678;38<CR><LF>

Check sum:

The check sum is calculated as follows:

255 - (Sum (dec) Modulo256) = Check sum (dec) = Check sum (hex) → ASCII

Example: Check sum = 255-(1991 Modulo256) = 255-199 = 56 = 38(hex)
Check sum = 38(hex) → ASCII output "3" u. "8"

Alarm codes:

Temperature channel:

- A00 = no alarm, the temperature value is within the limits
- A01 = temperature range exceeded
(the ASCII output range output value is limited to "+70.00°C ")
- A02 = below temperature range
(the ASCII output range output value is limited to "-25.00°C ")
- A03 = sensor breakage or no sensor available
- A04 = short circuit at PT1000 (resistance < 500?)

Humidity channel:

- A00 = no alarm, the humidity value is within the limits
- A01 = humidity range exceeded (=100% RH)
- A02 = below humidity range (=0% RH)
- A03 = sensor breakage or no sensor available
- A04 = humidity sensor defective

Please note:

- > Short leads (max. 1m) between PMU_G and the analysis electronics (provided by customer;
- > PMU_G must be contacted, powered and analysed via hardware and software by customer;
- > The PMU_G is not a „stand alone“ device and must be checked together with the analysis electronics in accordance with the EMC guidelines;
- > The PMU_G does not have an internal polarity reversal protection. Please ensure that the plug contact is only connected to the correct voltage level;
- > When exchanging the PMU_G, standard precautions must be taken to ensure that electrostatic damage is avoided.

Output via the Hyper Terminal

In connection with a separate signal level converter (RS232), the PMU-G can be read via the Hyper Terminal programme in Windows. The picture opposite shows the character string of the data issued by the PMU.





Output via Visual PMU

For recording data and for online display purposes, the visualisation programme „Visual PMU“ by Galltec+Mela is available.

Connector versions for contacting the PMU-G

Manufacturer: Firma Binder (<http://binder-connector.de>)

Binder No.	Version	Model	
09-9766-20-04	female	Soldered connection for printed-circuit boards	
09-9766-30-04	female	soldered pins	
09-9764-70-04	female	for cable connection with mains lead cleat	
09-9764-00-04	female	for cable connection	