



FLOW



TEMPERATURE



HUMIDITY



CONDUCTIVITY

# Out of Liquid Demo Module

## Thermal Mass Flow Demo Module

Optimal for various “Out of Liquid” flow applications

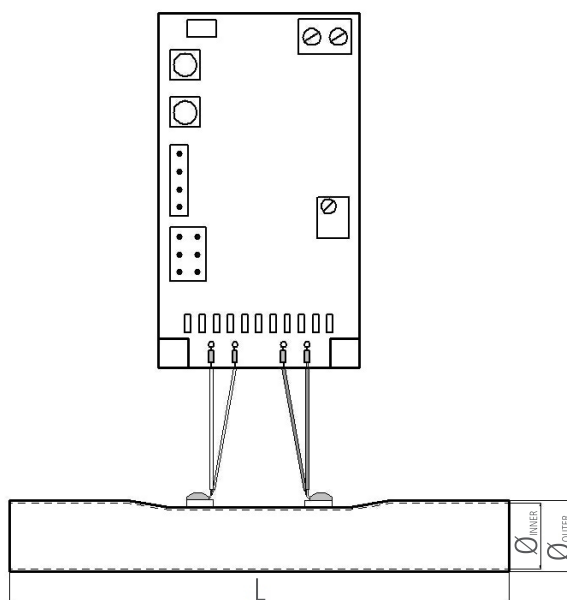


INNOVATIVE SENSOR TECHNOLOGY

### Benefits & Characteristics

- Single supply 5 V<sub>DC</sub>
- Suitable for aggressive liquids
- No contact between sensor and liquid
- Adjustable by customer

### Illustration<sup>1)</sup>



1) For actual size, see dimensions

### Technical Data

Tube dimensions (L x Ø <sub>OUTER</sub> x Ø <sub>INNER</sub> ) in mm):	40 x 4 x (3.8)
PCB dimensions (L x W x H in mm):	25 x 58 x 12
Operating measuring range:	0 ml/min to 3000 ml/min (4 m/s)
Response time (t <sub>90</sub> ):	< 300 ms (at step from 0 to 1000 ml/min)
Warm up time:	< 30 s
Connection (PCB to tube):	Cu/Ag-wire, PTFE insulated, AWG 30/19, 50 mm
Heater:	R <sub>H</sub> (0 °C) = 50 Ω ± 1 %
Temperature sensor:	R <sub>S</sub> (0 °C) = 1000 Ω ± 1 %
Connection (module):	Screw terminal
Supply voltage:	5 V <sub>DC</sub> ± 5 %
Current consumption:	1.5 A (maximal)
Analogue output, non linear	0 V <sub>DC</sub> to < 5.0 V <sub>DC</sub>
Tube material:	Stainless steel



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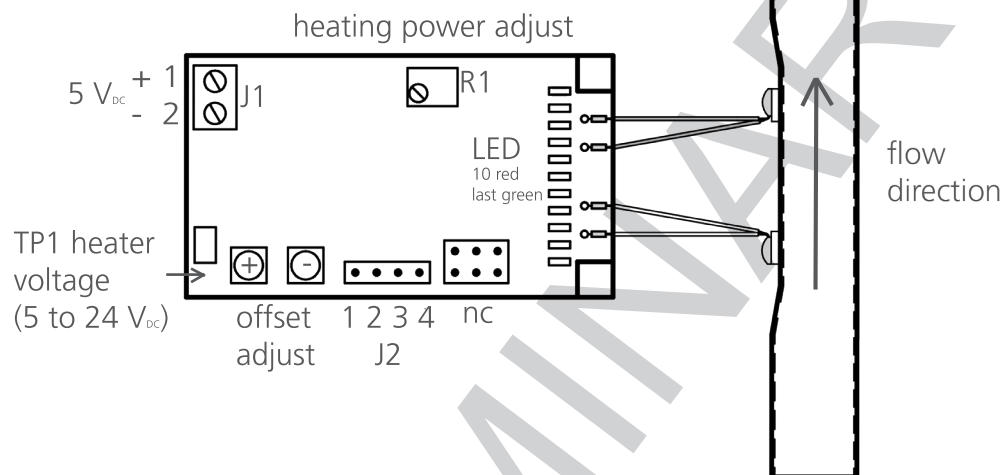
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INNOVATIVE SENSOR TECHNOLOGY

### Adjustement Procedure (if necessary)



J1

Pin 1

 $V_{DD} = 5.0 V_{DC}$  (regulated) minimum 1.5 A

Pin 2

GND

J2

Pin 1

GND

Pin 2

analog out (non-linear flow  
signal 0 to  $< 5 V_{DC}$ )

Pin 3

Pin 4

1. power up the module
2. start pump to fill up the system (tube) with liquid
3. wait until output signal is stable (about 30 s)
4. adjust potentiometer R1 to a heater voltage of about 8 to  $10 V_{DC}$  at TP1
5. apply a known flow (for example 200 ml/min)
6. measure analog output voltage at J2 Pin2 (should be in the range of 2.0 to  $2.5 V_{DC}$  at 200 ml/min)
7. adjust R1 for desired output voltage
8. stop flow
9. check if analog output voltage at J2 Pin2 is  $< 0.1 V_{DC}$
10. if not, push the offset buttons repeatedly to adjust output voltage and LED's so only the green LED is ON and voltage is below  $0.1 V_{DC}$
11. apply flow again and check output voltage
12. this output signal is the non-linearized flow signal



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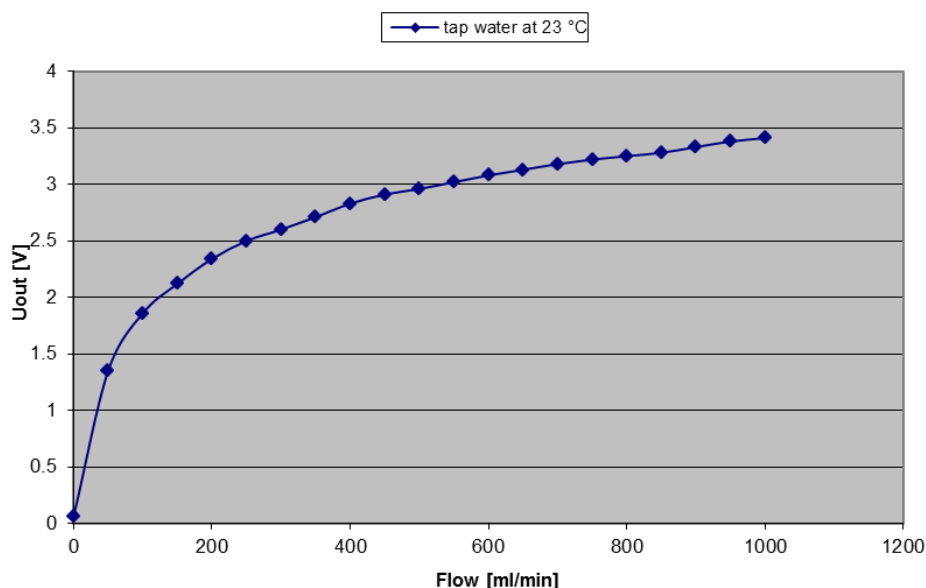
## Thermal Mass Flow Demo Module



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Typical Flow Curve (water)



### Order Information

Order code	OOL Demo Unit V2.0 160.00005
Order code	P1K0/050.232.2K.C.050.M.U.S 310.00819

### Additional Documents

Datasheet:	Document name: DFOOL_E
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INNOVATIVE SENSOR TECHNOLOGY

Innovative Sensor Technology IST AG, Stegrütistrasse 14, CH-9642 Ebnat-Kappel, Switzerland,  
Phone: +41 (0) 71 992 01 00 | Fax: +41 (0) 71 992 01 99 | E-mail: [info@ist-ag.com](mailto:info@ist-ag.com) | Web: [www.ist-ag.com](http://www.ist-ag.com)



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