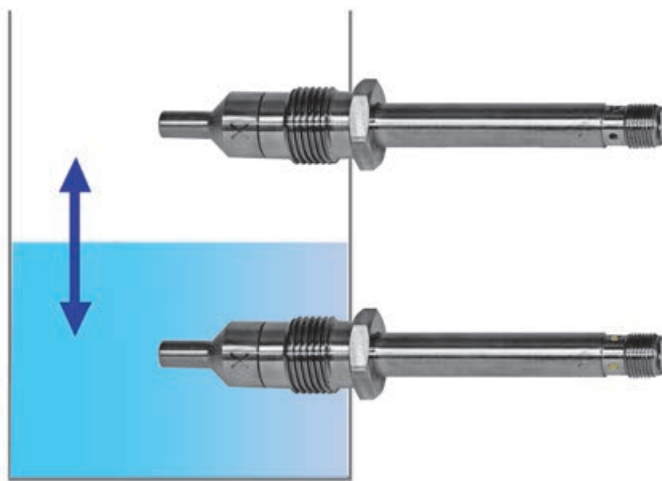


# Level, calorimetry - Hygienic Design



## Characteristics

<b>System</b>	Calorimetric level switch for foodstuffs use
<b>Evaluation</b>	Displays Switching
<b>Process connection</b>	GHMadapt G 1/2
<b>Process pressure</b>	PN 50 bar
<b>Medium temperature</b>	-20..+140 °C
<b>Materials</b>	1.4435, <b>only one material</b> in contact with the medium

## Applications

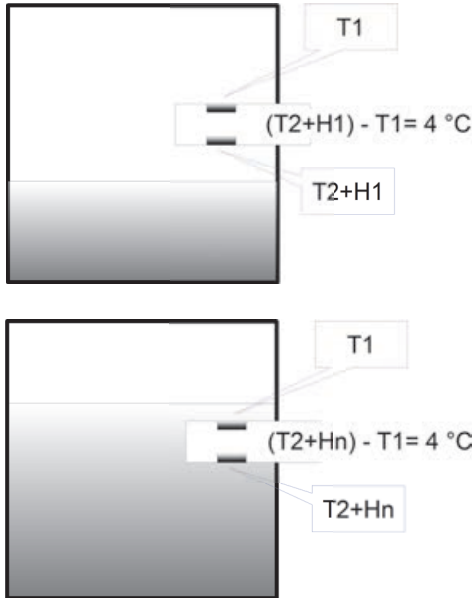
- Food and drink industries
- Pharmaceutical industry
- Level monitoring
- Dry-run protection
- Drip sensors

**Product information**

**Level, calorimetry - Hygienic Design**

**Function and benefits**

The calorimetric principle of the level switches from HONSBURG is based on two temperature sensors, both in good heat-conducting contact with the medium with simultaneously good heat insulation from one another.



**Design principle of calorimetric level switch**

One of the sensors (T2) is heated (H1) in the air environment in such a way that a constant temperature difference (4 Kelvin) arises between the heated and unheated sensors.

If the sensor tip is immersed into another medium which has better thermal conductivity than air (gas), another heat flow (Hn) must be used to re-establish the same heat difference.

The differences in the heat flows thus indicate the different thermal conductivities of the actual medium around the sensor nose, and can therefore be used to recognise the level.

The unheated temperature sensor (T1) detects the medium temperature and thereby enables a temperature compensation. The level switch is therefore able to detect the differences between gas and liquid or granulate, even if the temperature varies.

Different media influence the reaction time, because they have different heat conductivity.

In the operation of the calorimetric monitoring principle, the state of the test medium and the medium temperature in relation to the test results achieved play a crucial role. The present standard devices are designed and calibrated for the following parameters: air / aqueous solutions, temperature range 0..85 °C.

With media of higher viscosity, or granulates, or lasting temperatures of more than 85 °C or less than 0 °C, we recommend setting the device configuration according to the individual recommendation of the manufacturer.

**Explanation of terms**

**Temperature gradient** = temperature change per time unit of the medium (K/s). Where the medium temperature changes rapidly, compensation can be made only within a specific range. The range in which fault-free operation is guaranteed is specified. If this temperature is exceeded by the medium, an incorrect signal may be issued by the system for a brief time. Such a signal can, of course be suppressed by switching delays, however, the switch-on and switch-off time of the system in general will be negatively affected.

**Start-up time** is the time taken by the device to reach its specified operating mode after the operating voltage is applied. After they are switched on, the displays and outputs initially go to the maximum value of the metering range. After approximately 3..5 seconds, the actual measurement is displayed and output.

Switch-on and switch-off time is the time that the switching process lasts after the stainless steel sensor is suddenly immersed into water from the gas (medium temperature approx. 25 °C). For air / water, the switch-on and switch-off time is approx. 2s.

Please note that this time depends on the operating conditions. With media with poor thermal conductivity or poor sensor materials (teflonised), slower switching times arise.

**Temperature range of the medium** is the range in which the calorimetric sensor functions faultlessly.

**General installation instructions**

As a basic principle, any installation location and position in which the "nose" of the sensor is completely surrounded by the flowing media is suitable.

The sensor can also be used for the detection of filled or unfilled pipes.

It can also be used as a drip sensor.

The heated side (X marking) should always be turned to one side so that it is affected as little as possible by the build-up of granulate or deposits, and so that the temperature changes are detected as uniformly as possible by the reference sensor (T1).

**Programmability of parameters**

All calorimetric sensors from HONSBURG are members of the family of intelligent sensors. They have a microcontroller which enables a multitude of parameter changes.

As standard, the HLK12 sensor provides the option of determining the reference environment of the medium with poorer thermal conductivity (e.g. air); this is done by "teaching".

In addition, an interface (device configurator ECI-1) can be used to change all saved parameters of a device at any time, if desired or necessary.



Pulse programming on pin 2:  
 Apply 24 V DC for 1 second for the present value to be saved as the reference value for thermal conductivity.

If required, all parameters can be set at any time on the sensor, using the ECI-1 device configurator.

## Product information

## Level, calorimetry - Hygienic Design

### Universal switching outputs

The push-pull transistor outputs make installation extremely easy. It can be installed either as an NPN or a PNP switch, and functions accordingly without requiring additional configuration with parameter settings, wire breaks, or the like.

Resistance to short circuits and reversal polarity protection are ensured.

### Analog outputs

Although when a calorimetric sensor such as this is used, the level can be measured only as a Yes/No, it is sometimes useful to use an analog output. The threshold values are then to be taken from the PLC, for example, or other effects detected or determined more

quickly (e.g. the size of the difference in thermal conductivities of the media being detected is immediately clear). In that case, please contact HONSBERG.


### Product family

Calorimetric sensors can also be used as:

- Flow sensors
- Drip sensors
- Temperature sensors

For this purpose, see the separate product information. The same operation and the same or a similar installation type are the benefits of a product family.

## Device overview

	Measurement accuracy	Range	Pressure resistance in bar	Medium temperature	Displays	Output signal		Page
						Switching	Measuring	
<b>HLK12-S</b> 	±1mm	Air to aqueous materials / oils / granulate	PN 50	-20..+140°C	-	1 x Push-Pull	-	4
<b>Accessories</b>	<ul style="list-style-type: none"> <li>● ECI-1 (Device Configurator)</li> <li>● KH-...(Cables)</li> <li>● APH-... / AMH-...(Process adapter)</li> </ul>							6

Errors and technical modifications reserved.

**Product information**

**Level, calorimetry - Hygienic Design**

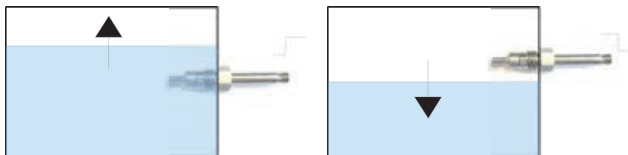
**Level Switch or Drip Sensor HLK12-S**



- Independent of conductivity, colour, ...
- Suitable for fluids and finer granulates
- Deposit must be permeable to water (e.g. sugar...)
- Programmable hysteresis
- Suitable for very variable fluids
- Programmable switching and switch-back delays
- Very simple to use

**Characteristics**


The tips of the sensors of the HLK12 family recognise a difference between fluid and air (gas). Temperature changes are compensated. The system is tolerant of contamination which lets water through (paper, mud, sugar solution...).



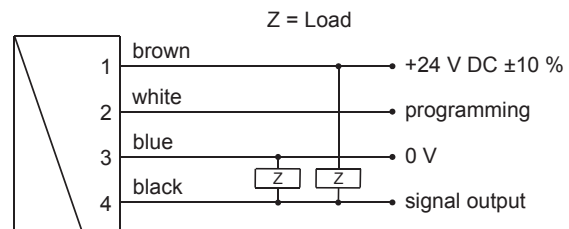
The same design can be used as a calorimetric flow sensor, or as an electronic temperature switch, or as a drip sensor for guidable leaks.

**Technical data**

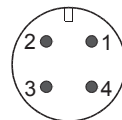
<b>Process connection</b>	GHMadapt G 1/2
<b>Medium temperature</b>	0..+70 °C
<b>Ambient temperature</b>	0..+60 °C
<b>CIP- / SIP Temperature</b>	140 °C, < 30 min.
<b>Process pressure</b>	PN 50 bar
<b>Tolerance</b>	±2 mm (dependent on contamination)
<b>Repeatability</b>	±0.5 mm (for the same fluid and the same deposit)
<b>Supply voltage</b>	24 V DC ±10 % (controlled)
<b>Power consumption</b>	< 1 W
<b>Switching output</b>	transistor output "push-pull", compatible with PNP and NPN, (resistant to short circuits and polarity reversal) I <sub>out</sub> = 100 mA max.

<b>LED</b>	yellow LED (On = Normal / Off = Alarm, flashes = programming or error)
<b>Ingress protection</b>	IP 67
<b>Electrical connection</b>	for round plug connector M12x1, 4-pole
<b>Materials medium-contact</b>	sensor tip 1.4435, FDA-compliant
<b>Non-medium-contact materials</b>	Housing 1.4571 Pressure screw 1.4404 Plug PA Contacts gold-plated
<b>Weight</b>	approx. 100 g incl. pressure screw
<b>Installation location</b>	dependent on direction of rotation (see marking) Avoid bubbles or deposits on the sensor. Best installation position therefore at the side.
<b>Conformity</b>	CE 

**Wiring**

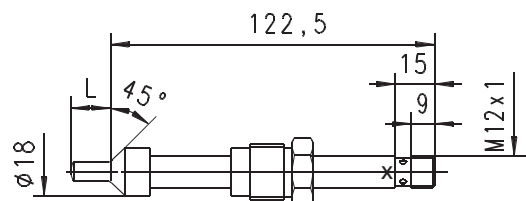


Connection example: PNP NPN



The use of shielded cabling is recommended.

**Dimensions**



For T-pieces (recommended) and weld-on sockets in the GHMadapt series, see "Accessories".

**Product information**

**Level, calorimetry - Hygienic Design**

**Handling and Operation**

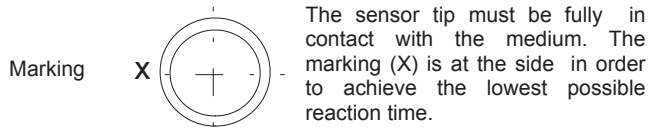
The air reference value is stored via "teaching". Any deviation (incl. programmable tolerance) from this is evaluated as a switching value.

- Keep the transmitter in air (no flow!)
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the auxiliary voltage or a pulse from the PLC), in order to accept value as the switching value.
- When the teaching is complete, pin 2 should be connected to 0 V, so as to prevent unintended programming.

**Note:** Requirement for programmability must be stated when ordering, otherwise the device cannot be programmed. A USB interface with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.

**Installation**

The sensor is inserted into the boring together with a sealing cone, oriented, and fastened in place with a pressure screw.



The torque on the pressure screw should be between 5..10 Nm.

**Ordering code**

HLK12 - 1. S 2. 015 3. 4. 5. 6.

○=Option

<b>1. Limit switch</b>	
S	transistor output "push-pull"
<b>2. Sensor tip length</b>	
015	L = 15 mm
<b>3. Programming</b>	
N	cannot be programmed (no teaching)
P	<input type="radio"/> programmable (teaching possible)
<b>4. Function</b>	
L	minimum-switch
H	maximum-switch
<b>5. Switching signal</b>	
O	standard
I	<input type="radio"/> inverted
<b>6. Optional</b>	
H	CIP- / SIP version, 140 °C, 30 minutes max.

**Options**

- Switching delay** (from Normal to Alarm)   .  s
- Switchback delay** (from Alarm to Normal)   .  s
- Power-On delay** (after connecting the supply, time during which the switching output is not activated)  s
- Special hysteresis** (standard = 2 % EW)    %

If no details are provided when ordering, the standard setting is automatically selected.

**Accessories**

- Cable/round plug connector (KH...) see additional information "Accessories"

**Product information**

**Level, calorimetry - Hygienic Design**

**Device Configurator  
 ECI-1**



- Can be used on site for:
  - parameter modification
  - firmware update
  - adjustment of inputs and outputs
- Can be connected via USB

**Characteristics**

The device configurator ECI-1 is an interface which allows the connection of microcontroller-managed HONSBERG sensors to the USB port of a computer. Together with the Windows software "HONSBERG Device Configurator" it enables

- the modification of all the sensor's configuration settings
- the reading of measured values
- the adjustment of inputs and outputs
- firmware updates

**Technical data**

<b>Supply voltage</b>	12..30 V DC (depending on the connected sensor) and via USB
<b>Power consumption</b>	< 1 W
<b>Connection</b>	
Sensor	cable bushing M12x1, 5-pole, straight length approx. 50 cm
Lead	device connector M12x1, 5-pole
USB	USB bushing type B
<b>Operating temperature</b>	0..50 °C
<b>Storage temperature</b>	-20..+80 °C
<b>Dimensions of housing</b>	98 mm (L) x 64 mm (W) x 38 mm (H)
<b>Housing material</b>	ABS
<b>Ingress protection</b>	IP 40

**Handling and operation**

**Connection**



The device configurator is intended for temporary connection to the application. It is connected between the the existing sensor lead and the sensor. Power supply is via the supply to the sensor and the computer's USB port. When inactive (no communication), the configurator behaves completely neutrally; all signals from the sensor remain available to the application. During communication between computer and sensor, the signal wirings are separated in the configurator, so that in this state the sensor's output signals are not available.

To connect 4-pole leads without a middle hole to the installed 5-pole device connector, adapter K04-05 is included. 4-pole leads with a middle hole can be used without an adapter.

**Ordering code**

<b>Device configurator</b> (for scope of delivery, see the diagram below)	<b>ECI-1</b>
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Scope of delivery

1. Device configurator ECI-1
2. USB cable
3. Adapter K04-05
4. Plug KB05G
5. Cable K05PU-02SG
6. Carrying case



Incl. software

**Accessories:**

<b>Mains connector 24 V DC</b> (with fitted round plug connector, 5-pole, incl. international plug set)	<b>EPWR24-1</b>
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**Replacement parts:**

<b>M12x1 adapter 4- / 5-pole</b>	<b>K04-05</b>
<b>PUR cable, 5-pole, shielded</b> with round plug connector M12x1	<b>K05PU-02SG</b>
<b>Round plug connector M12x1, 5-pole</b> (without cable)	<b>KB05G</b>

**Product information**

**Level, calorimetry - Hygienic Design**

**Hygienic  
 Connection Cable  
 Shielded Series KH**



- Connection M12x1
- PVC cable flexcord grey shielded
- Straight or angled model
- 4- or 5-pole, cable end made up with end sleeves for wires
- Union nut made from V4A
- IP67 as per IEC 60529
- IP 69K protected against water during high pressure and steam jet cleaning as per IEC 60529
- Resistant to heat and cold, range of use -25..+70 °C
- Vibration protection
- Colour coding as per industry standards

**Characteristics**

The connection cable is suitable for moderate mechanical stress. Good resistance to acids and alkalis. Therefore aimed mainly at food and drink industries. Restricted abrasion behaviour, and limited oil and chemical resistance. The shielding increases the shear strength, and also improves the protection from external radiation interference.

**Technical data**

<b>Connector</b>	connection M12x1
<b>Grip body</b>	plastic, PVC
<b>Union nut</b>	stainless steel 1.4404
<b>Contact block / Cable</b>	grey plastic PVC
<b>Contacts</b>	metal, CuZn, gold-plated
<b>Seal</b>	plastic, FPM, FKM
<b>Current carrying capacity</b>	4 A
<b>Rated voltage</b>	max. 250 V
<b>Insulation resistance</b>	≥ 10 <sup>9</sup> MΩ
<b>Degree of contamination</b>	3/2, as per DIN VDE 0110
<b>Ambient temperature</b>	-25..+70 °C
<b>Ingress protection</b>	IP 67 / IP 69K (only when screwed together)
<b>Mechanical working life</b>	min. 100 mating cycles

**Cable colours:**

1 = brown, 2 = white, 3 = blue, 4 = black, 5 = grey

**Ordering code**

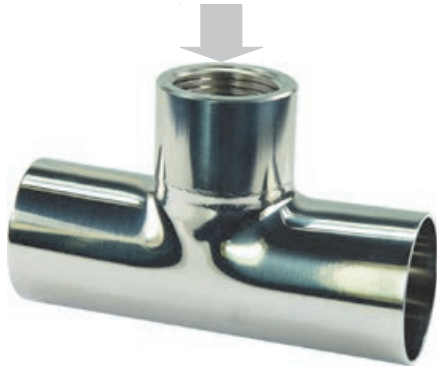
KH -   -

<b>1. Cable material</b>	PV	PVC
<b>2. Cable length</b>	002	2 metres
	005	5 metres
	010	10 metres
<b>3. Shielding</b>	1	shielding (not applied to union nut)
<b>4. Number of poles</b>	04	4-pole
	05	5-pole
<b>5. Connector output</b>	G	straight
	W	angled 90 °

**Product information**

**Level, calorimetry - Hygienic Design**

**Process adaptation for HFK, HTK, HLK..**



- Hygienically-appropriate process adaptation free of dead spaces and elastomers for wide-ranging applications in the food production industry.

**Characteristics**

The hygienically design cone of the sensor is pressed against the sealing edge of the welded sleeve when screwed on with the prescribed torque, whereby a hygienically-correct seat of the respective sensor is provided.

**Technical data**

<b>Process connection</b>	GHMadapt G 1/2
<b>Torques</b>	thread G 1/2, VA / VA, 5 - 20 Nm
<b>Material</b>	stainless steel 1.4404, AISI 316L 2.2 Certification or 3.1 Certification optional
<b>Working temperature</b>	metal-metal seal max. 250 °C see the sensors to be installed for restrictions
<b>Operating pressure</b>	metal-metal seal max. 50 bar see the sensors to be installed for restrictions

**Dimensions**

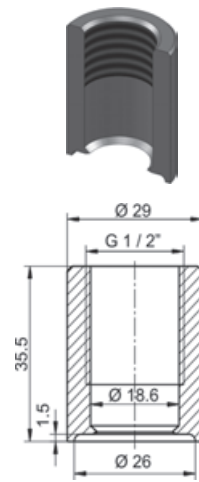
**Cylindrical sleeve**

for containers



APH-112

with welded collar for extrusion



APH-122

**Accessories for cylindrical sleeves**

Blank plug G 1/2



AMH-112

Weld-on aid G 1/2 (Material: brass)



AMH-122



**Product information**

**Level, calorimetry - Hygienic Design**

Hygienic weld-on fittings, series APH,  
 DIN 11850 series 2

**Handling and operation**

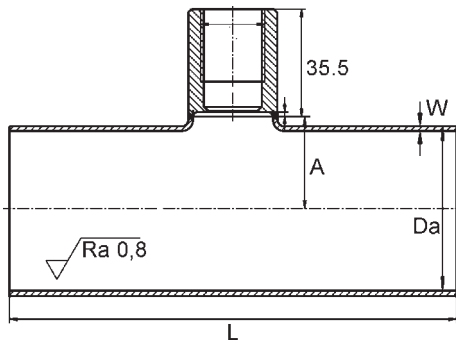


**Installation**

**Welding in tanks or large pipework**



Sections at G 1/2



1. Drill hole with outside diameter of the sleeve, max. tolerance +0.2 mm
2. Tack on sleeve at four points (observe the sequence of the tacking)
3. Screw in the weld-on aid (see AMH112, AMH122)
4. Weld the sections between the weld points.

In order to avoid the red heating or distortion of the sleeve during the welding process, it is necessary to take pauses between the individual sections so that the sleeve can cool down.

**Welding in pipework**

There are also ball sleeves in addition to the APH pipe system or sleeves with a welded collar are available for pipes with an extrusion (please request).

Process connection GHMadapt G 1/2					
	DN	L	A	Da x W	
<b>APH-532</b>	25	100	15	29 x 1.5	
<b>APH-542</b>	40	120	22	41 x 1.5	
<b>APH-552</b>	50	140	29	53 x 1.5	
<b>APH-562</b>	65	160	38	70 x 2.0	
<b>APH-572</b>	80	180	46	85 x 2.0	available on request
<b>APH-582</b>	100	200	55	104 x 2.0	available on request

**Ordering code**

**Weld-on adapter**

<b>APH-112</b>	Cylindrical sleeve for container in G 1/2
<b>APH-122</b>	Cylindrical sleeve with welded collar for extrusion (G 1/2)

**T-piece according to DIN11850 series 2**

<b>APH-532</b>	T-piece DN 25
<b>APH-542</b>	T-piece DN 40
<b>APH-552</b>	T-piece DN 50
<b>APH-562</b>	T-piece DN 65
<b>APH-572</b>	T-piece DN 80
<b>APH-582</b>	T-piece DN 100

Other standard pipe sizes on request

**Accessories for weld-on fittings**

**Blank plug G 1/2**



**AMH-112**

**Accessories**

<b>AMH-112</b>	Blank plug G 1/2
<b>AMH-122</b>	Weld-on aid G 1/2





**Product information**

**Level, calorimetry - Hygienic Design**

**Product Overview**

**„Industrial Sensors and Instrumentation“**

- Temperature
- Flow
- Level / Filling Height
- Analysis
- Humidity
- Pressure
- Weighing Instruments



**„Process Instrumentation “Hygienic Design“**

- GHMadapt
- Temperature
- Flow
- Level / Filling Height
- Analysis



**“Laboratory Instrumentation“**



**„Industrial Electronics“**

- Displays / Controller
- Transmitter / Signal conditioning
- Isolating converters
- Safety and Monitoring Devices
- Power Electronics
- Calibration and Testing



**“Measuring Data Acquisition“**

- Data Logging and Monitoring
- Test Bench Measurement Technology
- Renewable Energies

