

Sensor Equipment for Production and Quality Control



QMS 70U - 172-3

Operation Manual

Advantages

- measure the mass of materials
- detect objects, defects, structures
- evaluate weight quantities
- are independent of light, color, transparency, contrast
- measure materials and objects contacting them or not
- detect objects, also on carriers or enclosed
- have unique evaluation electronics
- are very sensitive and fast (QMS70U-172-3 covers sensitivity range of QMS70U-172 and 172-2)
- output either switching or analog signals
- easily connectable to external control units
- play the sensor part within Hossbach operation, control and visualisation systems

Delivery Extent

1 piece sensor QMS70U-172-3

1 piece sensor cable

1 piece operation manual



QMS 70U-172 -3



Features :

- U-shaped sensor for non-contact operation
- detection of intermittently aligned or sporadically occurring objects made of thin or voluminous materials
- three sensitivity steps (See table page 6)
- auto-adjust functionality
- deep gap, wider sensing area, high sensitivity
- high measuring rate, 1000/sec
- switching output 24V
- +24V +/- 10% operation voltage
- robust aluminium housing 173x80x50mm

Description :

The QMS 70U-172-3 is a compact and robust sensor using an unique capacitive sensor technique as well as high sophisticated electronics.

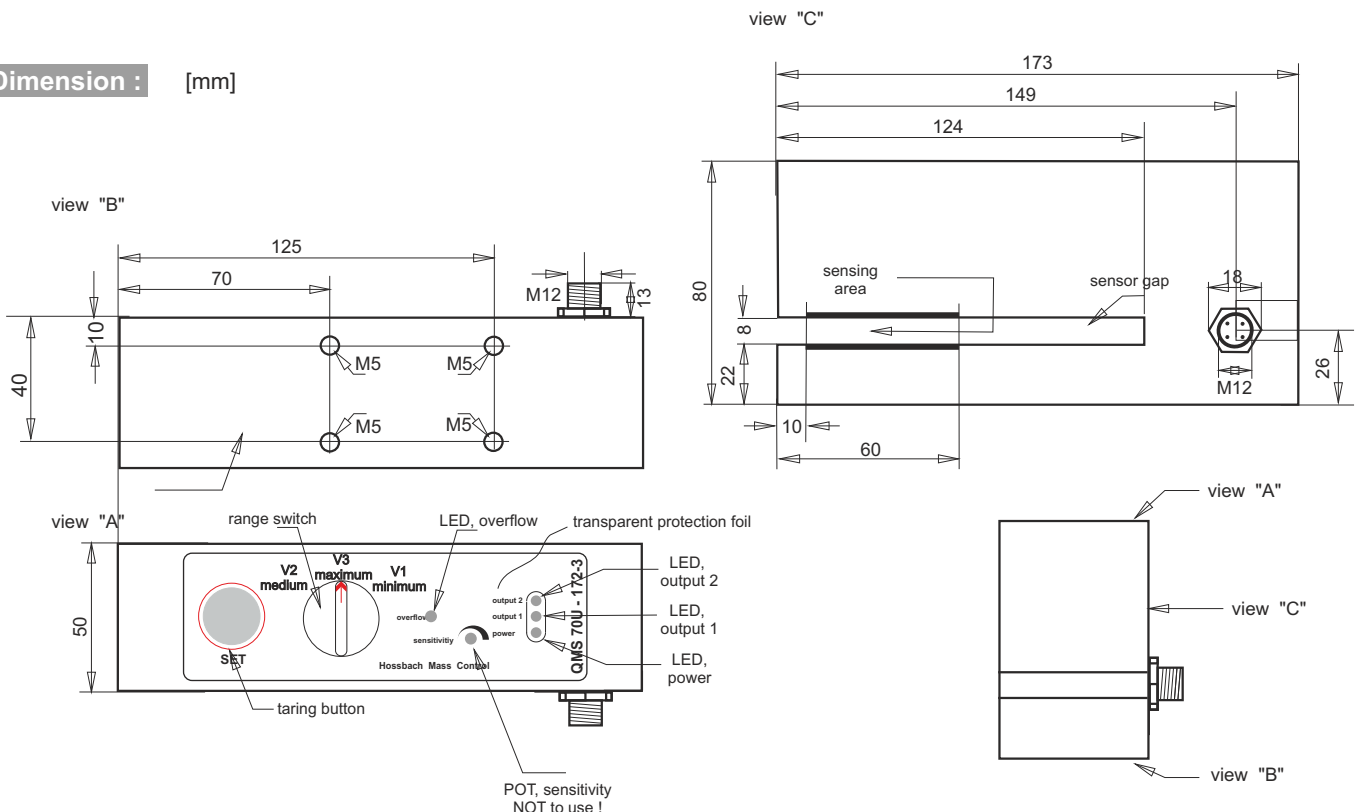
Operation may be performed by controlling the material itself or by detecting objects e.g. splices on carriers like fleece or foil webs without contact. Sensor gap and sensing area are designed higher and wider to allow measurement and detection of thicker and wider materials and objects.

Because the QMS 70U-172-3 measures intermittently aligned or sporadically occurring objects or mass changes the sensor uses the interval measurement mode and concentrates only to the objects or material changes.

The QMS 70U-172-3 covers solutions of a wide range of applications and especially of objects and materials. Adjustment is performed only by choosing range with the three-step switch.

Pushing the set button or applying a 24V signal at the sensor connector's taring input brings the sensor into operation immediately. Otherwise the sensor takes appr. 1 min. for auto-adjustment.

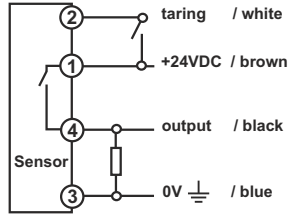
Dimension : [mm]



Connections :

Sensor version : switching output, PNP

sensor version switching output	4 pin	female connector		cable
	pin 1	power supply	+24V	brown
	pin 2	taring input	+24V	white
	pin 3	power supply	0V/GND	blue
	pin 4	switching output	"0V/24V"	black



PNP



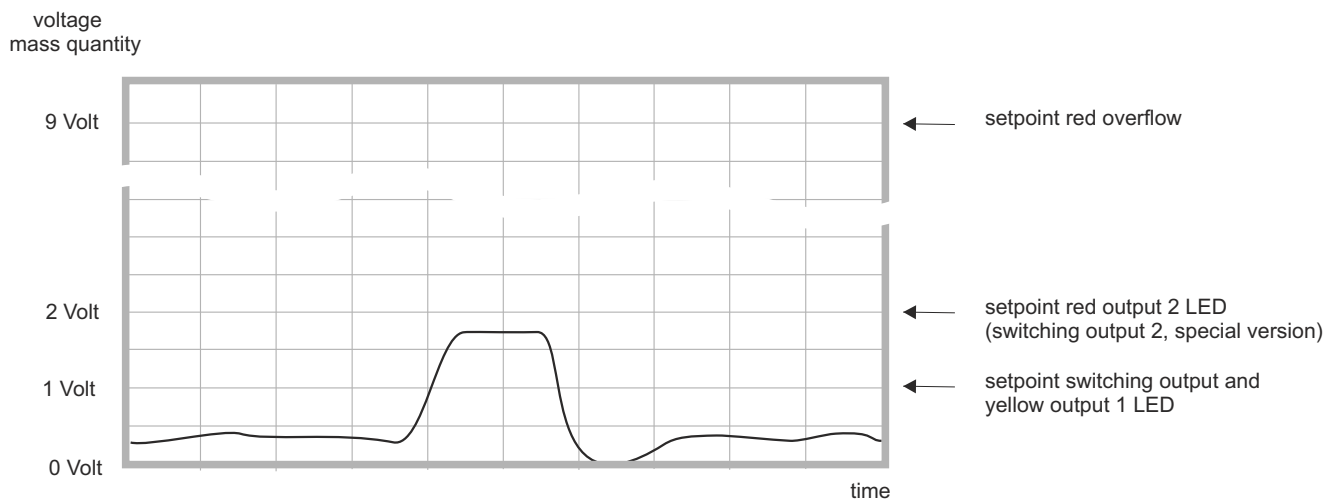
Adjustment of the Measurement Range :

See the following table to select the sensitivity of the sensor by the three-way switch. The table gives an selection of material. Most important factors are the basis weight of the product (gsm) and the kind of material.

Selection of non-Wovens, CPM, airlaid, Pantex and cotton topsheets:

	switch position	V 1 min. sensitivity	V 2 med. sensitivity	V 3 max. sensitivity
1	Non-Woven Topsheet GCAS 99421847; 25 gsm		X	
2	CPM Topsheet GCAS 85001404; 24,5 gsm		X	
3	Cotton Topsheet GCAS 91851634; 35 gsm	X		
4	Airlaid Topsheet GCAS 96641550; 77 gsm	X		
5	Non-Woven Topsheet GCAS 96370940; 18 gsm		X	X
6	Non-Woven Topsheet GCAS 95010479; 24,5 gsm		X	X

Setpoints :



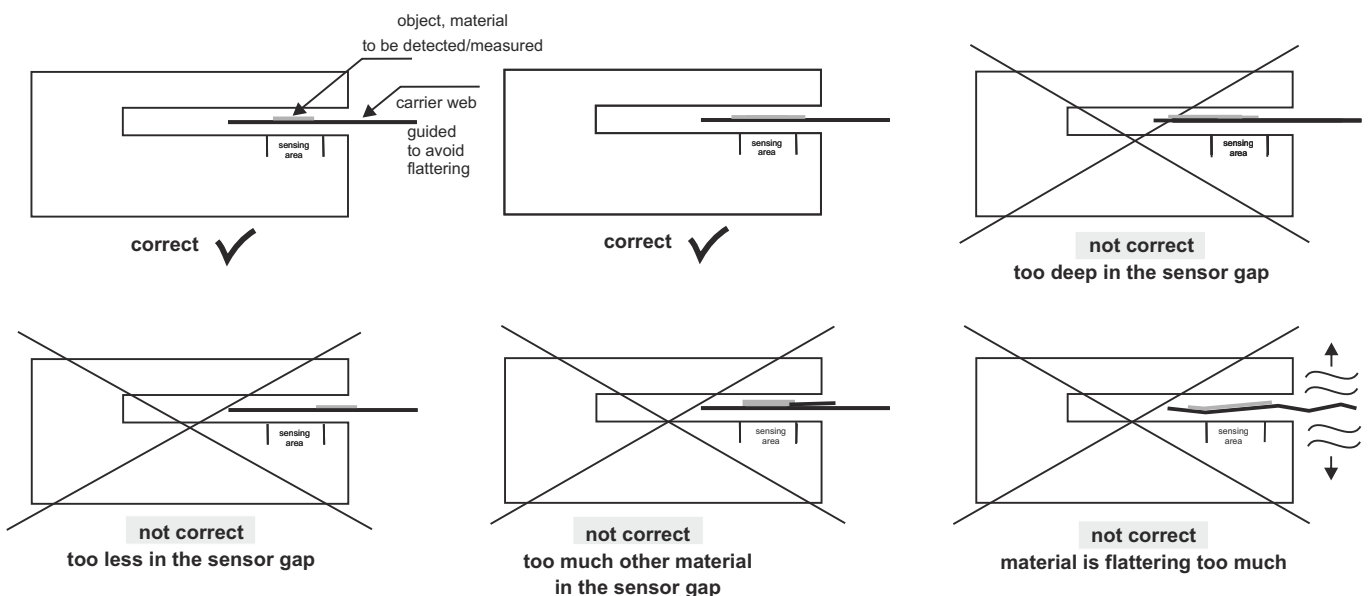
Bringing into operation :

0. Select measuring range : (see page 6)
1. mount the sensor's sensing area not too near to moving machine parts
2. choose location for the sensor, where material or objects do not vibrate too much
3. connect switching output to external PLC
4. connect external power supply 24VDC, +- 10%, stabilized
5. power LED gets on
6. let the material or objects to be measured pass the sensor area
7. the material or objects should pass trough sensor gap without contact in the sensor area

to avoid lateral dis-alignment motion effects, where objects or material come out of the sensor field, sensor has mounted the way, that objects or material are always inside the sensing area !
 Or, if not all the width has be controlled, the sensing area must always inside the material or objects !

8. the sensor will work 1 min. after power on/adjustment by auto-taring or at once, if set button is pressed or a 24 V (>0.1 s) signal is applied to the tarring input
9. switching output is activated by each object, output 1 LED blinks
10. ... if not please push set button
11. ... if detection is not reliable, check if the correct measuring range
12. ... if the overflow LED must not be on or blink, when only the carrier material is measured. Otherwise the carrier material has to much weight for this sensor version.
12. ready
- A. correct object, material, web guiding will optimize results and avoid incorrect detection

Object positioning : QMS70U... Sensors



Technical Data :

sensitivity :	medium/high/very high	sensor gap :	124 x 50 x 10 mm	operation temperature range :	0...40° C
measurement mode :	intervall	external taring :	by ext. signal, 24V or push button	storage temperature range :	0...50°C
measuring ranges:	foil and fleece (~10...100 gsm)	output :	one switching output, 24V/50mA	meets or exceeds standard and requirements :	EN 55011:2007 class A EN 61326-1:2006
lowest detectable weight quantity :	< 1 mg	operation voltage :	+24VDC +- 10% 30mA typ.	protection type :	IP 42
accuracy :	2...10% depending on material quantity and material characteristics	mounting :	4 predrilled bolt holes, M4 on bottom side		
evaluation time :	< 1ms	dimension :	173 x 80 x 50 mm		
active sensor area :	appr. 20 x 50 mm	weight :	typ. 650 gr.		CE

Order Data :

sensor version	order no.
QMS 70U-172-3 for interval measurement with switching output, pnp	QMS70U-172-3-INT-PNP
QMS 70U-172-3 for interval measurement with analog output 0...10V	QMS70U-172-3-INT-ANA
QMS 70U-172-3 for permanent measurement with analog output 0...10V	QMS70U-172-3-PERM-ANA
sensor including 5m connection cable plus adapter box for sensor versions with analog output	

Safety precautions :

It is very important, that during operation test initial incorrect signals emitted from the QMS70... sensors do not damage or harm persons or production equipment. Be advised that caution should be used when activating devices, which use the output signals of the QMS 70... sensors. Activate any and all devices step by step and with caution. PLCs or signal processing devices should be programmed so, that in the event of production faults - such as power outs or runaway machine speeds - signals from the QMS 70... sensors do not damage or harm persons or production equipment.

Responsibility :

Hossbach Sensor Technologie is not responsible for damages against persons or equipment, which arise during starting or running operation.

Service and repair :

Due to the robust construction of the QMS 70... sensors and the absence of parts, which can wear and tear, the QMS 70... sensors need little or no maintenance.

Cleaning:

Use only a damp cloth to clean the QMS 70... sensors. Water or solvents which intrude into the sensor could cause irreparable damage.

Repairs:

Other than verifying proper installation, i.e. electrical hook-up and adjustment, any and all repairs to QMS 70... sensors must be performed through Hossbach Sensor Technologie in Germany or through your closest representative. Before sending QMS 70... sensors for repair, call our service hotline.

Hossbach Sensor Technologie, D- 90765 Fuerth, Heinrich-Stranka-Str. 3-5 Germany

Service Hotline: Phone xx49 911 37677529 Fax. xx49 911 37677528

info@hst-hossbach.de

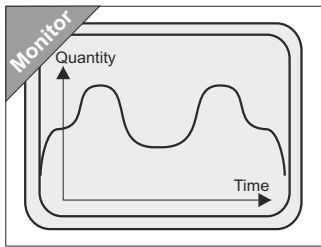
www.hst-hossbach.de

Appendix A

general sensor

information

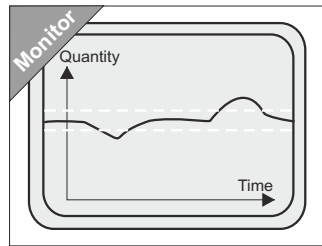
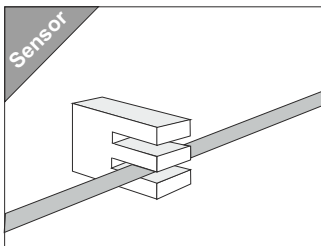
Applications



What could we see...

if we would make the measuring signals of the QMS sensors visible on a monitor of an oscilloscope ?

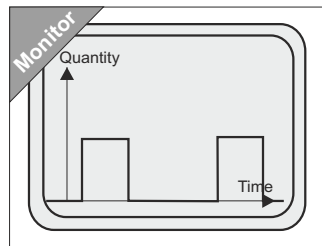
We would see a signal curve, which is more or less varying with time. The sensor evaluates at any time an analog signal, which is proportional to the mass of the material or object just being in the sensor field.



Endless material - permanent measurement

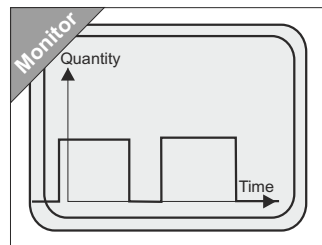
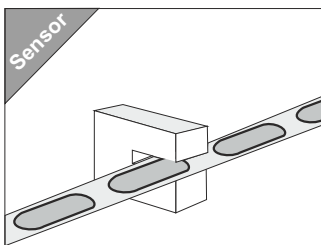
Analog sensor output

using a QMS 70 xxx sensor with analog output the sensor outputs a voltage, which is proportional to the mass quantity of the material, which is just in the sensing area.



Switching sensor output

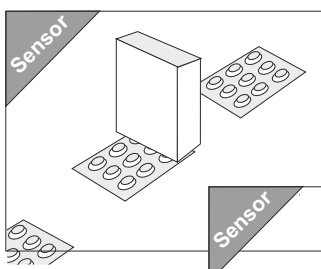
a QMS 70 xxx sensor with switching outputs activates its outputs as soon as the mass quantity just being in the sensing area undergoes or exceeds preset limits.



intermittently aligned objects interval measurement

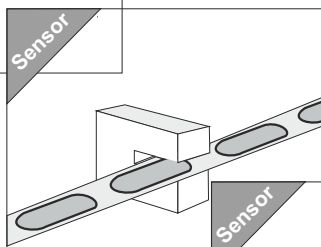
Switching sensor output

QMS 70 xxx sensors, as version for detection of intermittently aligned objects output signals as long as a discrete object is in the sensing area.



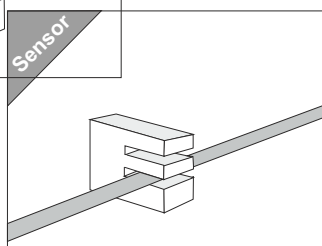
QMS 70 xxx

This sensor has a single sided sensor area. Material or objects pass the sensor front in close contact or at constant distance.



QMS 70U xxx

This sensor is U-shaped and has a gap, through which the material or the objects run.



QMS 70E xxx

This sensor is E-shaped and has two gaps, through one of them the material or the objects run. The second gap is for drift compensation and rises long term accuracy.

Objects and Materials

The QMS 70 xxx sensors are designed for many measuring and detection applications, and especially for many kinds of objects and materials. Thanks to their unique capacitive measuring technique and to their sophisticated electronics also demands are covered, which weren't up to now. The following list should give an overview of the objects and materials to be measured.

- **objects :**
 - made of voluminous and thin non-metallic materials**
 - intermittently aligned objects**
 - enclosed, invisible objects**
 - objects on carrier**
 - presence of objects**
 - defectives**
 - thin, thick spots**
 - overlaps**
 - outline, size, position**

- **materials :**
 - paper, coated paper**
 - watery glue**
 - wetness**
 - powder**
 - cardboard**
 - foils**
 - nonwovens**
 - cotton wool**
 - cellulose**
 - adhesive tapes**
 - labels**

Sensor Selection I

intermittently aligned objects : interval measurement

no contact
object detection

intermittently aligned objects : interval measurement

contact
object detection

intermittently aligned objects : interval measurement

no contact
object detection
quantity control

endless material : permanent measurement

contact
no contact
quantity control

Sensor Selection II

interval measurement		- object detection -	
	little material *) <100g/m ²	middle material *) 100...200g/m ²	much material *) >200 g/m ²
QMS 70 ...		x	x
QMS 70U ...	x	x	x
QMS 70E ...	x	x	
*) thin or voluminous measurement, dielectricity constant $\epsilon_o = 1,5 \dots 3$ water or water based fluids $\epsilon_o = 20\dots80$ are categorized to "much material"			

interval measurement		- mass quantity control -	
	little material *) <100g/m ²	middle material *) 100...200g/m ²	much material *) >200 g/m ²
QMS 70 ...		x	x
QMS 70U ...	x	x	x
QMS 70E ...	x	x	
*) thin or voluminous measurement, dielectricity constant $\epsilon_o = 1,5 \dots 3$ water or water based fluids, $\epsilon_o = 20\dots80$ are categorized to "much material"			

permanent measurement		- mass quantity control -	
	little material *) <100g/m ²	middle material *) 100...200g/m ²	much material *) >200 g/m ²
QMS 70 ...			x
QMS 70U ...			
QMS 70E ...	x	x	x
*) thin or voluminous measurement, dielectricity constant $\epsilon_o = 1,5 \dots 3$ water or water based fluids, $\epsilon_o = 20\dots80$ are categorized to "much material"			

Sensor Overview



single sided sensor
 foil detection
 fleece detection
 glue control
 defect detection
 overlap detection
 shape control

Dimension : 60 x 20 x 100 mm

sensor version	order no.
QMS 70 for interval measurement with switching output, pnp	QMS70-INT-PNP
QMS 70 for interval measurement with analog output 0...10V	QMS70-INT-ANA
QMS 70 for permanent measurement with analog output 0...10V	QMS70-PERM-ANA
sensor including 5m connection cable	€€



single sided sensor
 foil detection
 object detection
 glue control
 defect detection

Dimension : 200 x 20 x 100 mm

sensor version	order no.
QMS 70-180 for interval measurement with switching output, pnp	QMS70-180-INT-PNP
QMS 70-180 for interval measurement with analog output 0...10V	QMS70-180-INT-ANA
QMS 70-180 for permanent measurement with analog output 0...10V	QMS70-180-PERM-ANA
sensor including 5m connection cable	€€



U-shaped sensor
 adhesive tape detection
 foil detection
 material control
 fleece detection
 defect detection

Dimension : 173 x 50 x 80 mm
 gap height : 10mm / 8mm

sensor version	order no.
QMS 70U-170 for interval measurement with switching output, pnp	QMS70U-170-INT-PNP
QMS 70U-170 for interval measurement with analog output 0...10V	QMS70U-170-INT-ANA
QMS 70U-170 for permanent measurement with analog output 0...10V	QMS70U-170-PERM-ANA
sensor including 5m connection cable	€€



single sided, round sensor
 non-woven web control
 textile web control

Dimension : ø 120 x 60 mm

sensor version	order no.
QMS 70-120R for interval measurement with analog output 0...10V	QMS70-120R-INT-ANA
QMS 70-120R for permanent measurement with analog output 0...10V	QMS70-120R-PERM-ANA
sensor including 5m connection cable	€€



single sided sensor
 granulate flow control
 SAP flow control
 powder flow control

Dimension : 160 x 90 x 100 mm

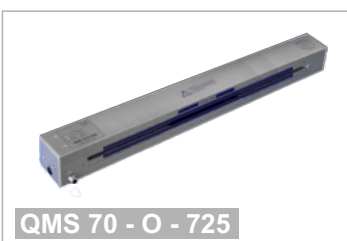
sensor version	order no.
QMS 70-SAP for permanent measurement with analog output 0...10V	QMS70-SAP-PERM-ANA
sensor including 5m connection cable	€€



O-shaped sensor
 total product control
 diaper control
 feminine napkin control
 sensor of the HMC Profiler system

Dimension : 540 x 80 x 80 mm
 gap height : 20mm

sensor version	order no.
QMS 70-O-540 for interval measurement with analog output 0...10V	QMS70-O-540-INT-ANA
sensor including 5m connection cable	€€



O-shaped sensor
 non-woven web control
 cellulose web control
 textile web control

Dimension : 725 x 60 x 80 mm
 gap height : 8 mm

sensor version	order no.
QMS 70-O-725 for permanent measurement with analog output 0...10V	QMS70-O-725-PERM-ANA
sensor including 5m connection cable	€€

Sensor Overview

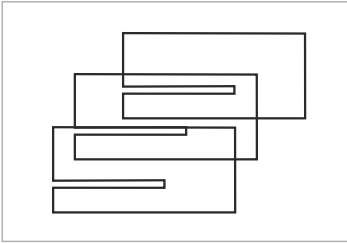


E-shaped sensor

adhesive tape detection
foil detection
material control
fleece detection
defect detection

Dimension : 173 x 50 x 80 mm
gap height : 10mm / 8mm

sensor version	order no.
QMS 70E-170 for interval measurement with switching output, pnp	QMS70E-170-INT-PNP
QMS 70E-170 for interval measurement with analog output 0...10V	QMS70E-170-INT-ANA
QMS 70E-170 for permanent measurement with analog output 0...10V	QMS70E-170-PERM-ANA
sensor including 5m connection cable	€€



Custom Designed Sensor Versions

sensors made according special customer's needs

QMS Sensors from Hossbach

..." a good choice "