



Industrial Oils Mechanical Engineering

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Utilising synergies

With the merger of companies, we have greatly expanded our competence and can thus also offer optimal assistance and consultation in all matters relating to measuring, control, and closed-loop control technologies.

We are capable of offering a comprehensive product portfolio for requirements in the broadest range of segments:



Process measurement technology

Laboratory measurement technology

Industrial electronics / closed-loop control technology

Industrial measurement technology

Test stand measurement technology

Customer-specific developments

Quality from Germany

All products from GHM Messtechnik are developed and produced in Germany. Through the consolidation of companies, the product range has been expanded significantly. Renowned companies value the "Quality from Germany".

Our claim – Your benefit

As a specialist and complete measurement technology provider, we develop solutions tailored to our customers and markets which meet the highest demands in the industry.

Our locations



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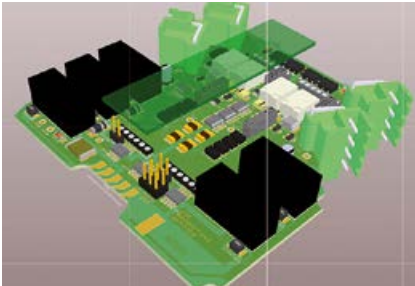
IMTRON



DeltaGHM

Flexibility and Innovation

These two terms are an inseparable part of the success of GHM Messtechnik.
In addition to the extensive standard programme, tailored solutions are developed according to customer needs.



Altium 3D circuit board layout



Pressure testing up to 1000 bar



EMC cabins

GHM stands for ...

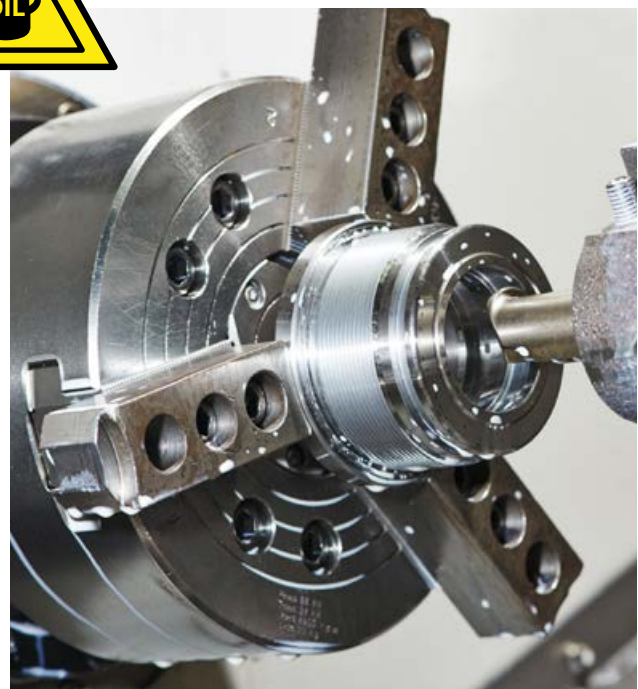
- ✓ Competence
- ✓ Quality
- ✓ Service

GHM devices for Oil Applications



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GHM devices for oil applications

Oils are an important, precious and widely used medium in the fields of technology and chemistry. Consequently there are many different requirements in the metrological detection of variables such as flow rate, temperature, pressure and fill level in existence.

The GHM Messtechnik GmbH produces sensors and transmitters for oil monitoring and measurement in various locations and advises clients with their measurement or monitoring requirements.

This brochure introduces most of our equipment for various oil applications, although other devices of the GHM portfolio can be deployed with equal success. Enquire at our offices, we advise you with pleasure.

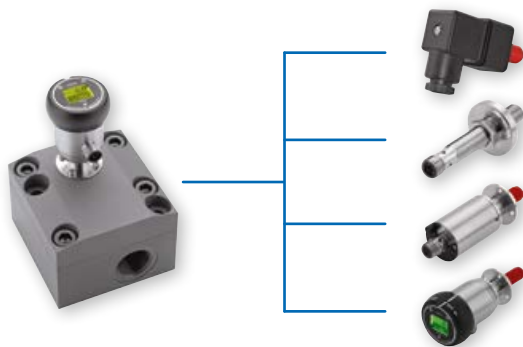
What is important for the different measured variables in regards of the medium oil?

Flow rate

With regard to oil, the viscosity of the medium must be taken into account first and foremost. When plants are operated with oils at different temperatures, the result is different viscosities of the same oil measured by the sensor. GHM offers different devices to take these variable requirements into account.

Volumetric Measuring Instruments (Gearwheel- or Screw measurement)

disperse specific incremental quantities and transport advance these quantites. It is easy to understand that these systems with different viscosities are practically independent. In this case, it is only necessary to monitor the pressure losses with different viscosities.



*Gear sensor VHZ
with different transmitter electronics*



*Screw volume meter VHS
with different transmitter electronics*

The quoted volumetric devices of GHM are very precise mechanical systems with a system accuracy from 0.25 to 3% of the measured value. These devices are among the most accurate mechanical measuring systems for oil applications. High operating pressures (up to 350 bar) and large flow ranges from 0.04 to 2000 l/min allow use in a multitude of applications like:

- Central oil lubrication systems can be found at mills, paper machines, stone mills, etc.
- Central oil-cooling systems can be found in machine tool manufacturing
- Gear lubrication for harbor cranes, wind turbines, etc.
- Hydraulic actuators or workpiece holder
- Oil circulation in hardening systems
- Test stands for transmissions, engines



*Central lubrication system with GHM Honsberg flow meter,
Pressure sensors and temperature sensors.*



Stone mill in South Africa with large bearing operated via a central lubrication system. The oil volume is measured with VHS equipment of GHM.



Armature cylinder of a dredger.
The extension path of the telescopic device is detected with a VHZ of GHM.

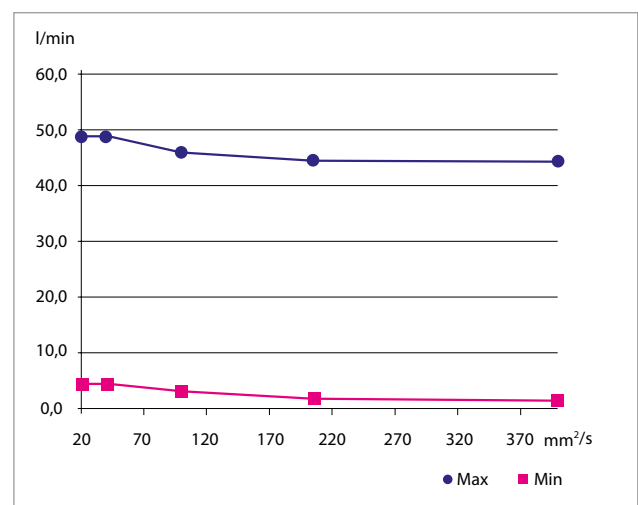
Viscosity-compensated piston devices(HD2 / HR2V / FW4V)

are part of the class of the spring-loaded float devices. These structurally modified devices are suitable for the oil monitoring. By utilising special pistons in the device, the friction effect of oil is almost completely eliminated.



Viscosity-compensated piston flow switch and piston meters, available with limit switches and microswitch heads (with ATEX approval) as well as different transmitters.

Viscosity compensation HD2K-025GM040



All of our systems are characterized by a high degree of robustness and long-term stability. The compact design allows installation in a variety of applications:

- Oil cooling of machine manufacturing tools
- Use in the agriculture area
- Flow monitoring in hydraulic systems

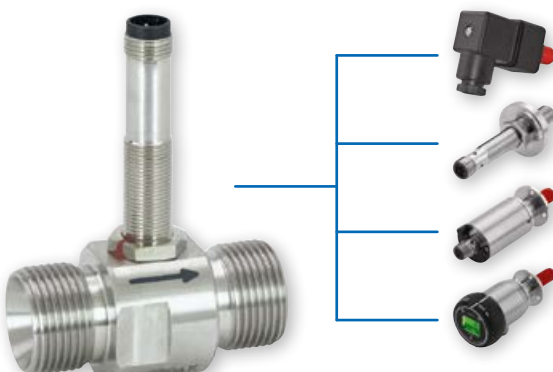


Piston flow switch FW4V for monitoring two flow direction; used in agriculture.

Turbines (RT)

can also be used for oil flow measurements if the shift frequency characteristic in the measured value recording is taken into account. In this case the operating temperatures are recorded and the corresponding frequency conversion factors (K values) for calculation are used.

Since the characteristic of the turbine in the specified measuring range at different viscosities remains linear, the factor is constant in each case. However, the shifts of the minimum measured values (starting values) in their use in different viscosities have to be taken into account.



Oil distribution systems

As examples, oil distributors offer the possibility of operating a central line, multiple lubrication points and cooling conduits. We provide the necessary possibilities for many application requirements. Our experts will advise you.



Lubricating distributor in the paper industry.

Modular distribution panels (Type DIS)

enable up to 10 distribution channels, which is not uncommon for applications such as large paper machines. The individual strands can be set up and measured individually using a multiple coaxial valve. In bypass mode, the medium is deflected around the device in order to simplify the periodic service on the machine. The measurement device can be removed and checked without interrupting the necessary oil lubrication. The service can therefore be carried out during operation and avoids the stoppage of the machine.

Most significant sources of interference in the flow measurement of oils:

Ferritic abrasions are an undesirable component in the lubrication circuit and must be filtered out in the best possible manner.

Air penetration:

Good ventilation during commissioning without sack constructions, an airtight overall system and slow filling during commissioning are some of the most important preconditions for trouble-free operation.

Oil shocks:

Slow filling at the time of commissioning or after service tasks can prevent these dynamic forces on the sensor system.

Temperature

Different temperature sensors and -transmitters called PT100 or PT1000 sensors with corresponding transmitter electronics are available. A wide range of different versions with different pipe lengths, process adaption and protection fittings are tailor-made to satisfy the customer's specific application requirements.

The fact that reaction times for oil are slower than for water have to be taken into account. Measurements in flowing media can lead to a more rapid heat transfer, requiring an improvement of response times.



Various temperature transmitter designs

Temperature sensors in hydraulic applications up to 600 bar are not uncommon and can be offered in different versions.



Pressure

Pressure switches and transmitters

are utilised in oils with various technologies.

Mechanical switch systems:
spring-assisted

Mechanical pressure switches with pistons

are in use in all applications, where a break point is to be monitored. These devices do not require a power supply. The mechanical switches are capable of directly shifting higher currents and voltages.

The switching point is adjusted by the tensioning of a screw on a spring, which acts on the pressure piston or a membrane. In some devices the hysteresis can also be adjusted with an adjustment screw.

*Mechanical pressure switch PH1.
Setting of point and hysteresis.*



Electronic switches and transmitter systems:

A thin film bridge is located on the pressure membrane or on a silicon substrate with capillary drill holes and oil reservoir to a flush stainless steel diaphragm.

The sensors can be subdivided into absolute pressure sensors, relative pressure sensors and differential pressure sensors. All of these sensors are available with a display and programmable switches.

Electronic pressure switches or transmitters

are installed where exact values are to be recorded and where a smaller hysteresis is desired, like in mechanical switches. Proportional output signals such as 4-20 mA or 0..10 V can be electronically selected.

The transducers are temperature-compensated and work very quickly because of their small mass. Thanks to their rugged construction, vibrations and rapid pressure changes do not have a significant negative influence on the sensors.



Pressure sensors in different designs

Fill levels

Different viscosities and densities of different oils must be taken into account. For level measurement of oil, in oil, and in lubrication and cooling systems, ferritic abrasion deposits often accumulate in the tanks and must be reduced with filtering systems using devices with magnets (e.g. by magnetic separator).

In bearing lubrication, temperatures of up to 100 °C or higher can be reached, which restricts the choice of the level switch or measurement systems. GHM offers various fill level switches and fill level measurement systems.

Please contact us for further information.



Level float systems in bent lever version or straight version.

Float transducers

are installed from above or from the side of the tank. They are designed as a bent lever version or straight version. Float systems are available with fixed or programmable switch points or as continuous level transmitters. Special versions can be equipped with filling pipes, or with an additional temperature sensor. Bent lever versions can also be installed to measure highly viscous media if the pivot point is not placed in the liquid.

Capacitive systems

4..20 mA or 0..10 V transmitters with a programmable switch with temperature monitoring at GDM are designed so that extremely precise fill level readings are achieved, even with changing oil qualities (capacitive absolute values change with different permeability in new and used oils).

The transducers have no moving parts. Version LCC1 is a measuring device that can be used in shallow oil pans where small losses must be detected. Large fluctuations on the oil surface are taken into account with a high, programmable mean average value, or with cushioning pipes (surge pipes).





Capacitive level System LLC

A special kind of capacitive limit detection

The MLC switch family works with a particularly high frequency method and enables absolute measurement of the dielectric constant. As a result, a distinction between air and liquid and between aggregate states is possible. The type of liquid can also be determined.

High-quality materials enable the operation in aggressive oils or emulsions. Different designs allow for special requirements with regard to mounting, wiring or signal output. These instruments are sealed directly at the top without additional sealant.

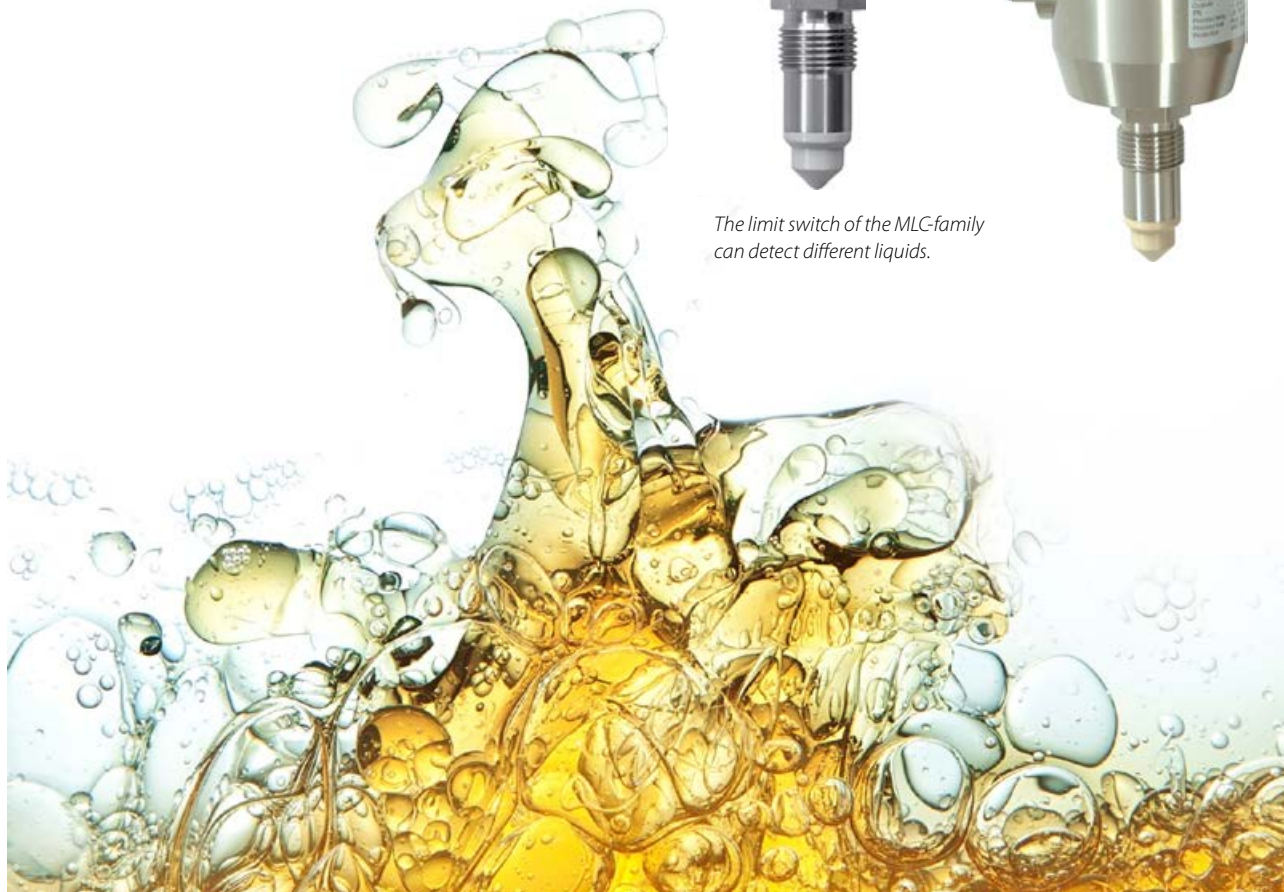
Contact our specialists for advice.

Application examples:




- Oil level measurement in compressors, motors or transmissions
- Oil pans with sharp fluctuations of oil



The limit switch of the MLC-family can detect different liquids.



Flow Measuring and Monitoring Devices for Oil Applications




			
Type	HD2	HR2V	NJV
Principle	Piston	Piston	Piston
Connection diameter	G1/4 G3/8 G1/2 G3/4 G1	G 11/4 G11/2 G2	G1/4 G3/8 G1/2 G3/4 G1
Pressure resistance	200 bar	200 bar	100 bar
Materials	Brass/stainless steel	Brass/steel on demand	Brass/steel
Area	Switching 0.5..60 l/min Measure 0.1..80 l/min	Switching 10..120 l/min Measure 5..160 l/min	Switching and display 2..60 l/min
Switches & probes	<p>Reed switch 250 VAC 1.5 A 50 VA Microswitch 250 VAC 5 A</p> <p>OMNI: Display, 2 x switching (push pull), 4-20 mA or 0-10 V, programmable parameter</p> <p>FLEX: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter</p> <p>LABO: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter</p>	<p>Reed switch 250 VAC 1.5 A 50 VA</p> <p>OMNI: Display, 2 x switching (push pull), 4-20 mA or 0-10 V, programmable parameter</p> <p>FLEX: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter</p> <p>LABO: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter</p>	<p>Reed switch 250 VAC 0.5 A 10 VA</p> <p>K1: changer with red LED display</p> <p>K2: switch without LED display</p> <p>K3: changer with red/green LED display</p>
Applications	Measurement and monitoring in mechanical engineering and plant manufacturing, e.g. cooling of machine tools.		Monitoring and display in lubrication systems.
Additional notes	All versions with analog flow indicators of type 01 or Z1 are optionally available; lower pressure drop as volumetric measurement.		Adaptable on manifold block VB









Type	VHZ	VHS
Principle	Gear	Screws
Connection diameter	G1/4 G3/8 G3/4 G1	G1 G1 1/4 G1 1/2 G2 G2 1/2
Pressure resistance	100/160/200 bar	160/350 bar
Fluid temperature	-25 °C...+80 °C	-25 °C...+80 °C (150 °C)
Materials	Steel/aluminium	Steel/aluminium
Measuring range	0.02..150 l/min	1.5..2500 l/min
Switches & probes	OMNI: Display, 2 x switching (push pull), 4-20 mA or 0-10 V, programmable parameter FLEX: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter LABO: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter	OMNI: Display, 2 x switching (push pull), 4-20 mA or 0-10 V, programmable parameter FLEX: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter LABO: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter
Applications	Tool cooling (with oil), oil lubrication, hydraulic tensioners, hydraulic position measurements, chuck monitoring, position control, lubricant monitoring	Central lubrication systems, test stands, lubricant monitoring
Additional notes	Volumetric measurement and monitoring with changing viscosity (to 10,000 mm ² /s) 3 % accuracy (of reading) instantaneous value and counter possible, lower pressure drop than gear	Volumetric measurement and monitoring with changing viscosity (to 10,000 mm ² /s) <1 % accuracy (of reading) instantaneous value and counter possible, lower pressure drop than gear

Flow Measurement and Monitoring Devices for Oil Applications

			
Type	VB	VB2	DIS
Principle	Oil distributor for piston devices with control valve	Oil / water distribution for piston devices with control valve	Oil distributor (<100 mm ² /s) with integrated flow sensor (dynamic diaphragm)
Connection diameter	Intake: Expiration: G1/4 G3/8 G1/2 G3/4 G1	Intake G2 Expiration: G1/4 G3/8 G1/2 G3/4 G1	Expiration: G3/8
Pressure resistance	25 bar	16 bar	16 bar
Fluid temperature	-20 °C..+110 °C	-20 °C..+110 °C	-20 °C..+80 °C
Materials	Aluminium & brass/stainless steel	Aluminium & brass/stainless steel	Aluminium & stainless steel
Area	Switching and displays 2..60 l/min	Switching 10..120 l/min Measuring 5..160 l/min	Switching and displays 2..60 l/min
Switches & probes	Reed switch 250 VAC, 0,5 A, 10 VA K1: changer with red LED display K2: changer without LED display K3: changer with red/green LED display	Reed switch 250 VAC, 1,5 A, 50 VA Microswitch 250 VAC, 5 A OMNI: Display, 2 x switching (push pull), 4-20 mA or 0-10 V, programmable parameter FLEX: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter LABO: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter	OMNI: Display, 2 x switching (push pull), 4-20 mA or 0-10 V, programmable parameter FLEX: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter
Applications	Monitoring and distribution used in mechanical and plant engineering e.g. of lubricant	Measurement and monitoring used in mechanical and plant engineering e.g. cooling of machine	Measurement and monitoring of highly viscous media, for example for printing machines
Additional notes	Combined with NJV and other inline piston devices, optionally 1-8 measurement points	Combined with HD2, HR2V and other inline piston devices 8 measurement points	Bypass valve allows maintenance without downtime, optionally 1-10 measurement points, no RoHS

For further information, please refer to our brochures or visit www.ghm-messtechnik.de

Level Measurement and Monitoring Equipment for Oil

				
Type	RW	RWI	NM	SB
Principle	Float lever - Articulated lever	Float lever - Articulated lever	Float lever	Float lever
Mounting	Horizontal mounting ½" 13UNC or NPT½"	Horizontal mounting M 16 x 1.5	Vertical mounting G 1/8 A or G1/4 A from above or from below	Vertical mounting G 1 A Cover mounting
Fluid temperature	-20 °C..+70 °C	-20 °C..+70 °C	-20 °C..+55 °C	-20 °C..+105 °C
Pressure resistance	5/6 bar	PP: 3 bar, PVDF: 6 bar	30/40 bar	12 bar
Materials	Stainless steel	PP or PVDF	Stainless steel	Brass NBR
Area	Normally open or normally closed contact	Normally open or normally closed contact	Normally open or normally closed contact	Normally open or normally closed contact 100..500 mm
Switches & probes	Reed switch 300 VAC 0.5 A 50 VA	Reed switch 250 VAC 0.5 A 50 VA	Reed switch 250 VAC 0.5 A 70 VA	Reed switch 250 VAC 1 A 80 VA
Applications	Lateral monitoring in reservoirs e.g. as minimum and maximum monitoring in e.g. refrigeration systems		Vessel monitoring e.g. lubrication systems	
Additional notes	Density from 0.7 g/cm ³ , no ferritic particles	Density: PP from 0.6 g/cm ³ , no ferritic particles	For low-viscosity media, density from 0.7 g/cm ³ , no ferritic particles	For low-viscosity media, density from 0.35 g/cm ³ , no ferritic particles



Level Measurement and Monitoring Equipment for Oil

			
Type	MLC422	MLC430 / MLC433 / MLC437	LCC1
Principle	Capacitive	Capacitive	Capacitive
Mounting	G1/2	G1/2	Horizontal 3-hole flange D 54
Fluid temperature	-20 °C..+100 °C	-20 °C..+100 °C	-20 °C..+85 °C
Pressure resistance	10 bar	10 bar	5 bar
Materials	Stainless steel/PEEK	Stainless steel/PEEK	Brass/FR4
Area	1..175 Dk	1..175 Dk	0..18 mm
Switches & probes	1 transistor switching output	MLC430: 2 transistor switching output MLC433: 2 transistor switching output, 4..20 mA analogous output MLC437: Display, 2 transistor switching output, 4..20 mA analogous output	
Applications	Level detection with no moving parts	Level detection with no moving parts, detecting of oil and water phases	e.g. for oil reservoir in lubrication systems, motor oil monitoring
Additional notes	Plug M12	Plug M12	For shallow containers with overheating warning, oil level check and with restless filling levels by programmable attenuation



			
Type	LCC2	Vectis	LC
Principle	Capacitive	Float - hinged lever	Float - reed chain
Mounting	Vertical 4 hole flange D 75 or thread G1A	Horizontal 3 hole flansch D54	Vertical thread G1A G11/2A G2A
Fluid temperature	-20 °C..+85 °C (100 °C)	-20 °C..+85 °C (150 °C)	-20 °C..+105 °C
Pressure resistance	5 bar	3 bar	10 bar
Materials	Brass/FR4	Brass/NBR	Brass/NBR
Area	0..600 mm	0..1000 mm	0..2000 mm
Switches & probes	FLEX: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter	FLEX: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter	OMNI: Display, 2 x switching (push pull), 4-20 mA or 0-10 V, programmable parameter FLEX: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter LABO: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency, programmable parameter
Applications	e.g. for oil tank in lubrication systems, motor monitoring		
Additional notes	Optional stillpipe	Suitable for flat containers, no ferritic particles	For low viscous, no ferritic particles



Pressure – Measurement and Monitoring Equipment for Oil



				
Type	FLEX-P/OMNI-P	PM1	PH1	PAS
Principle	Thin film sensor with transmitter	Diaphragm/piston	Diaphragm/piston	Piston
Pressure resistance	G 1/2 A	G1/8A R1/8A G1/4A NPT 1/8 M10x1 NPT1/4	G1/8A R1/4 G1/4A NPT 1/8 M10x1 NPT1/4	G1/2A R1/4 M10x1 NPT1/4" G1/4 Flansch ISO 163873
Fluid temperature	-20 °C..70 °C (120 °C)	-10 °C..+80 °C (100 °C)	-20 °C..+80 °C (100 °C)	-10 °C..+80 °C (100 °C)
Pressure resistance	4..600 bar	60/350 bar	60/350 bar	350 bar
Materials	Stainless steel	Galvanised steel or stainless steel	Galvanised steel or stainless steel	Die-cast zinc/aluminium
Messbereich	0..400 bar	-0.85..320 bar	-0.85..320 bar	10..320 bar
Switches & probes	Transmitter/switch OMNI: Display, 2 x switching (push pull), 4-20 mA or 0-10 V FLEX: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency	Mechanical changer 2A (1A) 250 VAC	Mechanical changer 4A (2A) 250 VAC	Mechanical changer 6A (2A) 250 VAC
Applications	Hydraulics, pneumatics, e.g. clamping devices	Pressure monitoring in hydraulic applications such as testing		
Additional notes	Programmable parameter plug M12 x 1	Switching point is adjustable. Sealing materials: NBR or FKM or EPDM	Switching point and hysteresis are adjustable. Sealing materials: NBR or FKM or EPDM	The switching point can be easily adjusted via a thumbscrew. Seal materials: NBR or FKM or EPDM



				
Type	EPS2	EDP1	EPS	S10 / S11
Principle	Thin film sensor with transmitter	Ceramic thick film sensor with transmitter	Thin film sensor with transmitter	Piezoresistive (< 25 bar) thin film cell (≥ 25 bar)
Pressure resistance	G 1/4 A	G 1/8	G 1/2 A	G1/2B
Fluid temperature	-40 °C...+125 °C	-20 °C...70 °C	-20 °C...70 °C	-30 °C...+100 °C
Pressure resistance	2,4...3000 bar	4...280 bar	4...600 bar	1...1500 bar
Materials	Stainless steel	Stainless steel/Al ₂ O ₃	Stainless steel flush	Stainless steel
Messbereich	0...2000 bar	0...100 bar	0...400 bar	0...1500 bar
Switches & probes	Two conductors: Output: 4...20 mA	Two conductors: Output: 4...20 mA	Two conductors: Output: 4...20 mA	Two conductors: Output: 4...20 mA
Applications	Hydraulics, pneumatics, e.g. industrial robots	Differential pressure measurement, e.g. chemical applications	Hydraulics, pneumatics, e.g. clamping devices	Hydraulics, pneumatics, e.g. machine tools
Additional notes	Plug M12x1 or DIN 43650A	Plug M12 x 1	Plug M12 x 1 or DIN 43650A	DIN EN 175301-803/A



Temperature Switches and Temperature Meters for Oil Applications

				
Type	TF1	TR	ETS	FLEX-T/ OMNI-T
Principle	Bimetal switch	Membrane	PT 1000	PT 1000
Pressure resistance	G ½ A (G3/4A)	R ½"	G ½ A	G1/4A G1/2A T-Stück Lebensmittelfl. ISO 2852
Fluid temperature	-20 °C...+140 °C	-20 °C...+145 °C	0 °C...+100 °C/200 °C	0 °C...+100 °C/200 °C
Pressure resistance	100 bar	16 bar	25/100 bar	25/100 bar
Materials	Brass	Brass (stainless steel)	Stainless steel	Stainless steel
Switches/measurement area	40 °C...120 °C in 10°-steps	50 °C...130 °C adjustable via knob	0 °C...100 °C/200 °C	0 °C...100 °C/200 °C
Switches & probes	Bimetallic thermo switch Max. 250 VAC; max. 10 A	Microswitch 24...250 VAC; max. 8 A	Platinen Widerstandsfühler Output: 4...20 mA	Transmitter/switch OMNI: Display, 2 x switching (push pull), 4-20 mA or 0-10 V FLEX: 1 x switching (push pull), 4-20 mA or 0-10 V or frequency
Applications	Temperature monitoring in machines and equipment		Temperature measurement e.g. container plant	
Additional notes	Normally open or normally closed contact Plug DIN 43650A or cable connection	Changer cable connection	Two conductors Plug M12 x 1 or DIN 43650A	programmable parameter Gooseneck design for difficult to reach places, Plug M12x1





Temperature Sensor for Oil Applications

		
Type	GTF 101	GTF 102
Principle	Pt 100 / Pt 1000	Pt 100 / Pt 1000
Pressure resistance	Durchmesser: 3, 4, 5, 6, 8 mm	1/8", 1/4", 3/8", 1/2", 3/4", M8 x 1, M10 x 1, M14 x 1
Fluid temperature	-50 °C..+400 °C	-50 °C..+400 °C
Pressure resistance	-	10 - 200
Materials	Stainless steel	Stainless steel
Switches & probes	RTF Pt 100 / Pt 1000	RZF Pt 100 / Pt 1000
Applications	Temperature measurement: e.g. machinery, facilities, container, almost all locations where exact temperature measurement is required.	
Additional notes	<ul style="list-style-type: none"> any probe diameter and length sensor 2-, 3- or 4-wire possible cable length customized Ex approval available 	<ul style="list-style-type: none"> any probe diameter and length sensor 2-, 3- or 4-wire possible cable length customized neck tube optional Ex approval available



Temperature sensor for oil applications

		
Type	GTF 103	GTMU-IF 1 / -2 / -3
Principle	Pt 100 / Pt 1000	Pt 1000
Pressure resistance	1/8", 1/4", 3/8", 1/2", 3/4", M8 x 1, M10 x 1, M14 x 1	1/2", 1/4", 3/4", 1/8", 3/8", M8 x 1, M10 x 1, M14 x 1,5
Fluid temperature	-50 °C..+400 °C	-70 °C..+400 °C
Pressure resistance	10 - 200 bar	10 - 200 bar
Materials	Stainless steel	Stainless steel
Switches & probes	RTD Pt 100 / Pt 1000 Optional: Output: 4-20 mA or 0-10 V	Pt 1000 Output: 4-20 mA
Applications	Temperature measurement: e.g. machinery, equipment, container, all locations where exact temperature measurement is required.	
Additional notes	<ul style="list-style-type: none"> various probe diameters and lengths 2-, 3- or 4-wire possible cable length freely selectable neck tube optional exchangeable measuring insert optional double PT100 optional with Ex approval 	<ul style="list-style-type: none"> various probe diameters and lengths neck tube optional electrical connection M12 optional



Our International Area Sales Management Team



Anita Renc
Direction sales international

GHM GROUP – Headquarters
Schloßstraße 6
88453 Erolzheim
GERMANY

Phone +49 7354 937233-401
Mobile +49 173 8233998
a.renc@ghm-messtechnik.de

Area:
South-East Asia, France,
Switzerland, Spain, PortugalZ

Language:
German, English, Italian, Czech



Parimal Sharma
Sales Export

GHM GROUP – Headquarters
Schloßstraße 6
88453 Erolzheim
GERMANY

Phone +49 7354 937233-403
p.sharma@ghm-messtechnik.de

Area:
Russia, India, Estonia, Lithuania,
Latvia, Romania, Hungary,
Bulgaria

Language:
English, Hindi, German



Feifan Jin
Sales Export

GHM GROUP – Headquarters
Schloßstraße 6
88453 Erolzheim
GERMANY

Phone +49 7354 937233-405
fjin@ghm-messtechnik.de

Area:
China, Japan, South Korea,
South-East Asia

Language:
Chinese, German, English



Mina Kamal
Sales Export

GHM GROUP – Headquarters
Schloßstraße 6
88453 Erolzheim
GERMANY

Phone +49 7354 937233-409
m.kamal@ghm-messtechnik.de

Area:
Africa, Arabic States, Israel,
Greece

Language:
English



Peter Wüster
Sales Export

GHM GROUP – Honsberg
Tenter Weg 2-8
42897 Remscheid
GERMANY

Phone +49 2191 96 72-35
p.wuester@ghm-messtechnik.de

Area:
Scandinavia, UK, Ireland

Language:
German, English

GHM Sales Subsidiaries



Occo Andriessen
Director



Netherlands

GHM-Meettechniek BV
Zeeltweg 30
3755 KA Eemnes
NETHERLANDS

Phone +31 35 53805-40
Fax +31 35 53805-41
info@ghm-nl.com
www.ghm-nl.com



Michal Doubek
Director



Czech Republic / Slovakia

GHM-Greisinger s.r.o.
Ovci hajek 2 / 2153
158 00 Prague 5
Nove Butovice
CZECH REPUBLIC

Phone +420 251 613-828
Fax +420 251 612-607
info@greisinger.cz
www.greisinger.cz



Erling Mathiesen
Director



Denmark

GHM Maaleteknik ApS
Maarslet Byvej 2
8320 Maarslet
DENMARK

Phone +45 6464 92-00
Fax +45 6464 92-01
info@ghm.dk
www.ghm.dk



Jan Grobler
Managing Director



South Africa

GHM Messtechnik
SA (PTY) Ltd
16 Olivier Street
Verwoerdpark, Alberton 1453
SOUTH AFRICA

Phone +27 74 4590040
j.grobler@ghm-sa.co.za
www.ghm-sa.co.za



Carlo Mei
Sales Manager



Italy

Delta OHM S.r.l.
Via Marconi 5
35030 Caselle di Selvazzano
Padova (PD)
ITALY

Phone +39 049 8977150
Fax +39 049 635596
info@deltaohm.com
www.deltaohm.com

GHM Foreign Sales



Andrea Casati
Office Italy / Delta OHM S.r.l.

Via G. Marconi 5
35030 Caselle di Selvazzano
ITALY

Phone +39 049 8977150
Fax +39 049 635596
Mobile +39 340 0063879
a.casati@ghm-messtechnik.de



Alfred Fröstl
Office Austria

Breitenseer Str. 76/1/36
A-1140 Wien
AUSTRIA

Phone +43 660 7335603
a.froestl@ghm-messtechnik.de

Sales Germany



Thomas Stumpe

Sales Director Germany / Austria

Schloßstraße 6 Phone +49 7354 937233-0
88453 Erolzheim Fax +49 7354 937233-88
GERMANY Mobile +49 172 4346882



WEST Sales area 3

40000 – 41999
45000 – 50999
52000 – 52999

Jürgen Kersten

Kamperlingweg 9
47906 Kempen
Phone +49 2152 80907-95
Fax +49 2152 80907-97
Mobile +49 172 5298587
j.kersten@ghm-messtechnik.de



NORTH Sales area 1 + 2

17000 – 19999	21451 – 21480	23000 – 23999
20000 – 20449	21481 – 21508	24000 – 25999
20450 – 20458	21509 – 21513	27000 – 27729
20459 – 21040	21514 – 21999	27778 – 27793
21041 – 21450	22000 – 22999	28000 – 28999

Hans-Joachim Petermann

Krögerstraße 30
22145 Hamburg
Phone +49 40 67998410
Fax +49 40 67998411
Mobile +49 172 4346881
h.petermann@ghm-messtechnik.de



NORTH Sales area 10

26000 – 26999
27730 – 27777
27794 – 27999

Michael Wulf

Kiebitzhörn 18
22885 Barsbüttel
Phone +49 40 67073-201
Fax +49 40 67073-238
Mobile +49 172 1474407
m.wulf@ghm-messtechnik.de



WEST Sales area 4

35000 – 36999 57000 – 59999
42000 – 42999 61000 – 61999
44000 – 44999
51000 – 51999
53000 – 53999

Stefan Müller

Ottostraße 51
42289 Wuppertal
Phone +49 202 6093374
Mobile +49 171 4108173
s.mueller@ghm-messtechnik.de



NORTH Sales area 5

29000 – 9999
30000 – 34999
37000 – 39999

Jörg Winter

Vor dem Lohholze 17
29690 Schwarmstedt
Mobile +49 172 4346880
j.winter@ghm-messtechnik.de



WEST Sales area 7

54000 – 56999
60000 – 60999
63000 – 69999

Christian Rösner

Joseph-Berberich-Str. 8
63538 Großkrotzenburg
Phone +49 7354 937233-0
Fax +49 7354 937233-88
Mobile +49 151 12098192
c.roesner@ghm-messtechnik.de



NORTH Sales area 6

00000 – 09999
10000 – 16999
98000 – 99999

Peter Taubert

Stralsunder Straße 149
04349 Leipzig
Phone +49 34298 159606
Fax +49 34298 159605
Mobile +49 171 3377475
p.taubert@ghm-messtechnik.de



SOUTH Customer support Sales area 9

70000 – 79999
88000 – 89999

Elfi Lucas

Phone +49 7354 937233-58
Fax +49 7354 937233-88
e.lucas@ghm-messtechnik.de



SOUTH Sales area 8

80000 – 87999
90000 – 97999

Joachim Höfling

Kleinhaslach 80
90599 Dietenhofen
Phone +49 9824 928682
Fax +49 9824 928681
Mobile +49 172 8460512
j.hoefling@ghm-messtechnik.de



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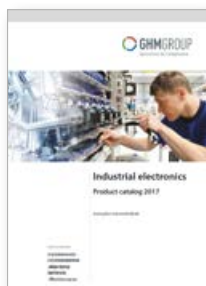
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GHM Centers of Competence

GHM GROUP - Greisinger

GHM Messtechnik GmbH
Hans-Sachs-Straße 26
93128 Regenstauf | GERMANY
Phone +49 9402 9383-0
Fax +49 9402 9383-33
www.greisinger.de
info@greisinger.de

GHM GROUP - Honsberg

GHM Messtechnik GmbH
Tenter Weg 2-8
42897 Remscheid | GERMANY

GHM GROUP - Martens

GHM Messtechnik GmbH
Kiebitzhörn 18
22885 Barsbüttel / Germany

GHM GROUP - Imtron

GHM Messtechnik GmbH
Carl-Benz-Straße 11
88696 Owingen | GERMANY

GHM GROUP - Delta OHM

Delta OHM S.r.l. a socio
Via Marconi 5
35030 Caselle di Selvazzano,
Padova (PD) | ITALY
www.deltaohm.com
info@deltaohm.com

Sales Offices

Austria

Alfred Fröstl
Breitenseer Str. 76/1/36
1140 Vienna | AUSTRIA
Phone +43 660 7335603
a.froestl@ghm-messtechnik.de

Italy

Andrea Casati
Via Marconi 5
35030 Caselle di Selvazzano
Padova (PD) | ITALY
Phone +39 049 8977150
a.casati@ghm-messtechnik.de



Sales Subsidiaries

Netherlands

GHM Meettechnik BV
Zeeltweg 30
3755 KA Eemnes | NETHERLANDS
Phone +31 35 53805-80
Fax +31 35 53805-41
www.ghm-nl.com
info@ghm-nl.com

Czech Republic / Slovakia

GHM Greisinger s.r.o.
Ovci hajek 2 / 2153
158 00 Prague 5
Nove Butovice | CZECH REPUBLIC
Phone +420 251 613828
Fax +420 251 612607
www.greisinger.cz
info@greisinger.cz

Denmark

GHM Maaletchnik ApS
Maarslet Byvej 2
8320 Maarslet | DENMARK
Phone +45 646492-00
Fax +45 646492-01
www.ghm.dk
info@ghm.dk

South Africa

GHM Messtechnik SA (Pty) Ltd
16 Olivier Street
Verwoerdpark, Alberton 1453 |
SOUTH AFRICA
Phone +27 74 4590040
j.grobler@ghm-sa.co.za

Italy

Delta OHM S.r.l.
Via Marconi 5
35030 Caselle di Selvazzano
Padova (PD) | ITALY
Phone +39 049 8977150
www.deltaohm.com
info@deltaohm.com

Worldwide Sales

Europe:

Austria
Belgium
Bulgaria
Denmark
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Taiwan
Thailand
USA
United Arab
Emirates
Vietnam

GHM GROUP CORPORATE

GHM Messtechnik GmbH | Schloßstraße 6 | 88453 Erolzheim | GERMANY
Phone +49 7354 937233-0 | info@ghm-messtechnik.de | www.ghm-group.de