

## Metallic Contamination Sensor MCS 1000 Serie

(MCS 1x80 and MCS 1x90, only)

### Description

The Metallic Contamination Sensor MCS 1000 is used for recording metallic wear particles in fluids. An inductive measuring method is used to detect and count the particles and classify them according to their size and metallurgical properties (ferromagnetic/non-ferromagnetic). The MCS 1000 is therefore an ideal tool for the continuous condition monitoring of large industrial gearboxes, pumps or bearing systems and provides early information on any early-stage damage.

The sensor can be used on its own or in combination with other condition monitoring devices such as vibration monitoring systems.

The MCS 1000 can therefore be easily integrated into condition-based or predictive maintenance approaches and it also helps to prevent unscheduled system downtimes.

### Fields of application

- Lubrication systems in the fields of wind power, marine, paper, steel, cement etc.
- Industrial gearboxes and drive systems
- Pumps
- Gear tooth systems, roller bearings and plain bearings

### Your benefits

- Early detection of imminent damage
- Prevention of costly and unscheduled system downtimes
- Determination of the degree of wear and localization of wear sources based on the classification of the measured wear particles with regard to their size and metallurgy
- Easy integration into systems and plants due to standardized data interfaces and a large range of hydraulic accessories
- An ideal tool for the implementation of modern maintenance strategies and as an extension for existing machine condition-based monitoring devices such as vibration monitoring systems

### Technical Data

Measured variables	MCS 15xx	MCS 14xx	MCS 13xx
ferromagnetic (Fe) particles	> 200 µm	> 100 µm	> 70 µm
non-ferromagnetic (nFe) particles	> 550 µm	> 300 µm	> 200 µm
Particle classification	(particle with volume equivalent to that of a sphere of given Ø) Size classification in accordance with ISO 16232 (6 size classes; 3 Fe, 3 nFe; class assignment depends on the sensor section)		
max. particle rate @ min ... max flow rate	8 ... 160 1/s	9 ... 180 1/s	0 ... 200 1/s
<b>Hydraulic data</b>			
Flow rate	10 ... 200 l/min	2 ... 40 l/min	0,4 ... 8 l/min
Operating pressure	maximum 20 bar		
Fluid temperature range	-40 ... 85 °C		
Permissible fluids	Hydraulic and lubrication fluids based on mineral oil as well as synthetic oils (e. g. poly- $\alpha$ -olefins – PAO)		
Inlet/outlet (flange connection according to ISO 6162-1)	<ul style="list-style-type: none"> <li>● SAE 1"</li> <li>● SAE 1 1/2"</li> <li>● SAE 2"</li> <li>● SAE 4"</li> </ul>	SAE 3/4"	SAE 1/2"
<b>Electrical data</b>			
Supply voltage	18 ... 30 V DC, residual ripple < 10 %		
Power consumption	5 W max.		
Electrical signal outputs	<ul style="list-style-type: none"> <li>● 1 x particle ferromagnetic (Fe)</li> <li>● 1 x particle non-ferromagnetic (nFe) or</li> <li>● 1 x particle ferromagnetic (Fe) + non-ferromagnetic (nFe)</li> <li>● 1 x Status signal or</li> <li>● 1 x Alarm signal</li> <li>● 1 x Status signal</li> </ul>		
Switching log	Active Low or Active High (adjustable)		
Length of switching pulse of particle signal	adjustable, 5 ... 200 ms		
Length of switching pulse of alarm output	adjustable, 30 ... 86,400 s, or continuously on to Reset		
Loading capacity of the switching outputs	1.5 A maximal		
HSI (HYDAC Sensor Interface)	<ul style="list-style-type: none"> <li>● physical: 1 wire, half duplex</li> <li>● protocol: HSI</li> </ul>		
RS485 interface	<ul style="list-style-type: none"> <li>● physical, 2 wire, half duplex</li> <li>● protocols: HSI, Modbus RTU</li> </ul>		

## Scope of delivery

- Sensor MCS 1000 series
- O-rings (NBR and FPM)
- Installation and Maintenance Instructions

## Accessories (hydraulic)

Description	Part no.
<b>Flange adapter</b>	
SAE 4" flange adapters (set) to pipe/hose connection, 42L according to ISO 8431-1 consisting of: - 2x Flange adapters - 2x O-Rings (NBR) - 8x Cheese-head screws - 8x Washers - 8x Spring washers	3435426
SAE 1/2" Flange adapters (set) to pipe/hose connection, 1/2" according to ISO 8431-1 consisting of: - 2x Flange adapters - 2x O-Rings (NBR) - 8x Cheese-head screws	3788271
SAE 3/4" Flange adapters (set) for pipe/hose connection, 1/2" according to ISO 8431-1 consisting of: - 2x Flange adapters - 2x O-Rings (NBR) - 8x Cheese-head screws	3588249
Flange adapter plate, SAE 4" - SAE 1 1/2"	3442518

## Accessories (electrical)

Description	Part no.
<b>Connection cable</b>	
ZBE42S-05 Connection cable, socket plug 8 pin with cable, open cable end, length = 5 m	3281239
ZBE44 mating connector with screw clamp, 8-pin, M12x1	3281243
<b>Connection cable</b>	
ZBE43-05 Connection cable, coupling/plug 8 pin, length = 5 m	3281240
ZBE43-10 Connection cable, coupling/plug 8 pin, length = 10 m	3519768
ZBE30-02 Connection cable, coupling/plug 5 pin, length = 2 m	6040851
ZBE30-05 Connection cable, coupling/plug 5 pin, length = 5 m	6040852
<b>Network cable (LAN)</b>	
ZBE 45-05 Network cable (patch), Socket plug 4 pin, d-coded/ male connector RJ45, length = 5 m	3346100
ZBE 45-10 Network cable (patch), Socket plug 4 pin, d-coded/ male connector RJ45, length = 10 m	4571668

## Technical Data

	MCS 15xx	MCS 14xx	MCS 13xx
<b>Electrical data</b>			
Ethernet interface	<ul style="list-style-type: none"> <li>● physical: 10Base-T / 100Base-TX</li> <li>● protocols: HSI TCP/IP, Modbus TCP</li> </ul>		
CAN interface	<ul style="list-style-type: none"> <li>● physical: CAN</li> <li>● protocol: CANopen</li> </ul>		
USB interface (only for service purposes)	<ul style="list-style-type: none"> <li>● physical: mini USB</li> <li>● protocol: proprietary</li> </ul>		
<b>General data</b>			
Self diagnostics	Continuous, with error indication via Status LED and general operational readiness via Device-Ready-LED		
Ambient temperature	-40 ... 70 °C		
Sensor section (Ø)	1" (25 mm)	1/2" (13 mm)	1/4" (6 mm)
Protection class (DIN 40050)	IP 67		
Weight	≈ 3.5 kg	≈ 2.5 kg	≈ 3 kg
<b>Conformity &amp; Certifications</b>			
CE mark	<ul style="list-style-type: none"> <li>● EN61000-6-4 / -6-2 / -6-9 (pulse magnetic field immunity) / -4-29 (voltage dips)</li> </ul>		
FCC mark	<ul style="list-style-type: none"> <li>● FCC – Title 47 CFR Part 15</li> </ul>		
Environmental tests	Vibration test/Shock test:		
	<ul style="list-style-type: none"> <li>● EN60068-2-2 / -2-64 (vibration)</li> <li>● EN60068-2-27 / -2-31 (shock)</li> </ul>		
Certifications	Climate test:		
	<ul style="list-style-type: none"> <li>● EN60068-2-52 (salt mist severity)</li> <li>● EN60068-2-1 / -2-2 / -2-14 / -2-30 / -2-38 / 2-78 (temperature and humidity)</li> </ul>		
<ul style="list-style-type: none"> <li>● Wind power: DNV – Renewables Certification</li> <li>● Marine: DNV – Type Approval</li> </ul>			

## Model code

**MCS 1 5 8 0 - 0 - 5 - 2 / -000**

<b>Typ</b>	MCS = Metallic Contamination Sensor
<b>Serie</b>	1 = 1000 Serie
<b>Detection limit / sensor cross-section</b>	3 = Fe particles > 70 µm / 1/4" 4 = Fe particles > 100 µm / 1/2" 5 = Fe particles > 200 µm / 1"
<b>Signal output / electrical interface</b>	8 = 2x switching output / RS485 (HSI, Modbus RTU) / Ethernet (HSI TCP/IP, Modbus TCP) 9 = 2x switching output / CAN (CANopen) / Ethernet (HSI TCP/IP, Modbus TCP)
<b>Signal input / electrical interface</b>	0 = Without
<b>Media / fluids</b>	0 = Mineral and synthetic oils
<b>Hydraulic connection</b>	1 = Flange connection, SAE 1/2" according to ISO 6162-1 2 = Flange connection, SAE 3/4" according to ISO 6162-1 3 = Flange connection, SAE 1" according to ISO 6162-1 4 = Flange connection, SAE 4" according to ISO 6162-1 5 = Flange connection, SAE 1/2" according to ISO 6162-1
<b>Electrical connection</b>	2 = M12x1 male connection, 8-pin / Ethernet M12x1, 4-pin, D encoded according to IEC61076-2-101 / mini USB
<b>Modification number</b>	000 = standard

## System integration

HYDAC has a large number of solutions for the hydraulic, mechanical, electrical and data processing system integration for the sensors of the MCS 1000 series, such as:

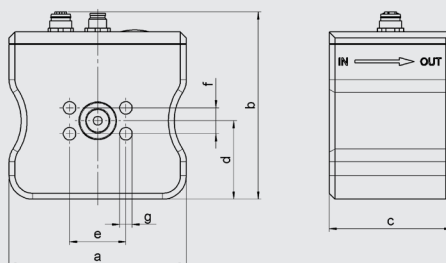
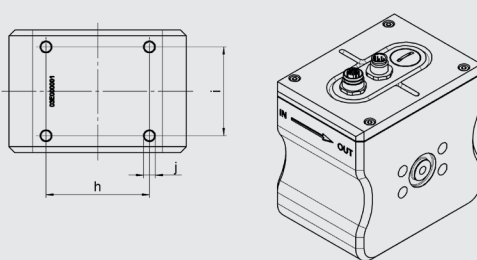
- Selected flange adapters for hydraulic system integration through piping or hoses
- System integration that is specially matched to the product and the respective application (HYDAC ConditionMonitoring Kit CMK)
- Universal complete solutions for fluid condition monitoring (HYDAC ConditionMonitoring Package CMP)

Please contact us for further detailed information.

## Preferred models

Description	Part no.
MCS1380-0-1-2/-000	4560144
MCS1580-0-5-2/-000	4560339

## Dimensions



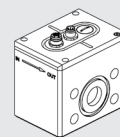
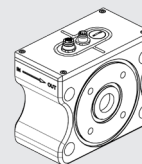
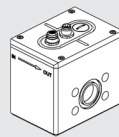
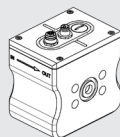
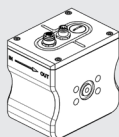
MCS13xx-x-1-x

MCS14xx-x-2-x

MCS15xx-x-3-x

MCS15xx-x-5-x

MCS15xx-x-6-x



MCS	a	b	c	d	e	f	g	h	i	j
13xx-x-1	120	113	83	53	38.1	17.5	Ø 8	70	60	M8
14xx-x-2	120	113	83	53	47.6	22.2	Ø 11.5	70	60	M8
15xx-x-3	162	106	83	38.5	52.4	26.2	Ø 11.5	80	55	M8
15xx-x-5	162	132	83	62	130	77.8	Ø 17.5	95	60	M8
15xx-x-6	120	106	83	38.5	69.9	35.7	Ø 13.5	90	35	M8

All dimensions in mm

**Note**

The information in this brochure relates to the operating conditions and applications described.

In the event of deviating applications and/or operating conditions, please contact the department concerned.

Subject to technical modifications.

**HYDAC FILTER SYSTEMS GMBH**

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