FluidMonitoring Module
FMM

Description

The FluidMonitoring Module FMM series combines two of HYDAC's condition monitoring products, the ContaminationSensor CS 1000 and the AquaSensor AS 1000 or HydacLab 1400, in one system.

It provides the user with a robust and stationary system for online measurement of

- Solid particle contamination
- water content (e.g. to detect leakage) in hydraulic and lubrication fluids.
- Oil condition (e.g. relative change in electrical conductivity and dielectric constant)

The FMM series of blocks have all the necessary connections and are therefore easy to install in existing hydraulic circuits.

Various models are available for use in filtration & cooler/heater circuits, pressure and high pressure applications.

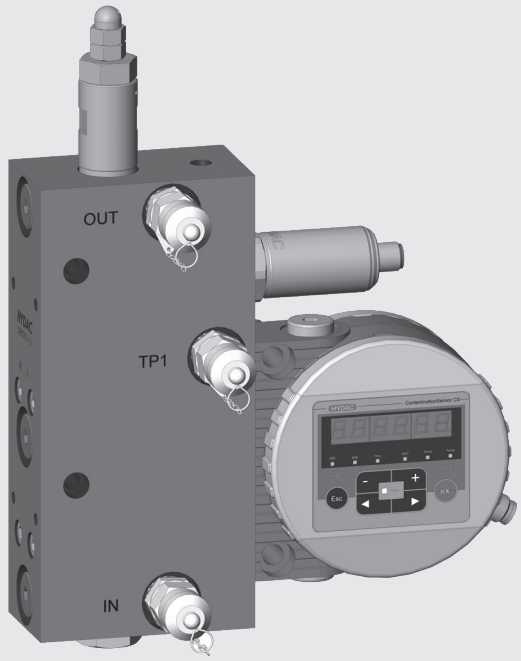
Advantages

- Cost-effective installation
- Early warning of critical machine states
- Continuous oil condition monitoring
- Condition-based maintenance planning

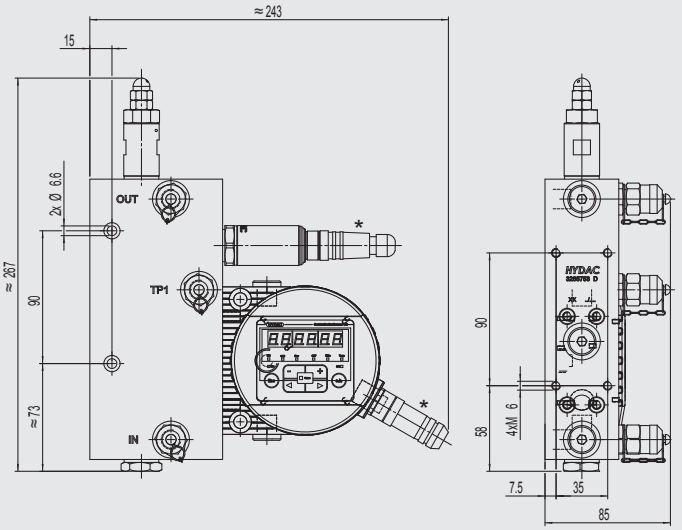
Technical data

General data	
FMM - O - M - ...	Offline circuits 6 ... 15 bar
FMM - P - S - ...	Pressure circuits 15 ... 300 bar
FMM - P - M - ...	Pressure circuits 15 ... 300 bar
FMM - P - L - ...	Pressure circuits 15 ... 250 / 300 bar
FMM - A - S - ...	Pressure circuits 15 ... 250 bar

FMM - O - M - ...
(previously known as: FMM)

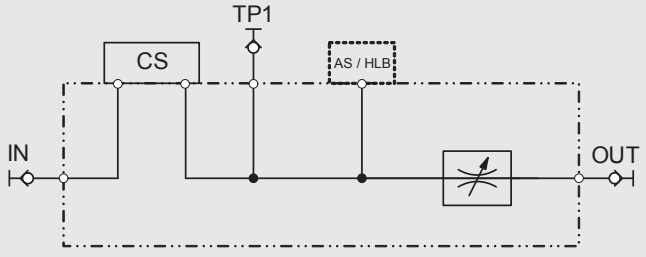


Dimensions



* not included in scope of delivery

Hydraulic circuit diagram



Technical data

Installation position	vertical (flow from bottom to top)
Max. operating pressure	6 ... 15 bar / 87 ... 217 psi
Minimum differential pressure	6 bar / 87 psi (recommended)
Permitted viscosity range	1 ... 350 mm²/s
Hydraulic connection (IN, OUT)	Test point type 1604 or G 1/4" (ISO 228)
Seal material	FKM / EPDM
Fluid temperature range	0 ... +85 °C / +32 ... +185 °F
Ambient temperature range	-30 ... +80 °C / -22 ... +176 °F
Storage temperature range	-40 ... +80 °C / -40 ... +176 °F
Relative humidity	max. 95%, non-condensing
Weight	4.3 kg

Model code

See last page

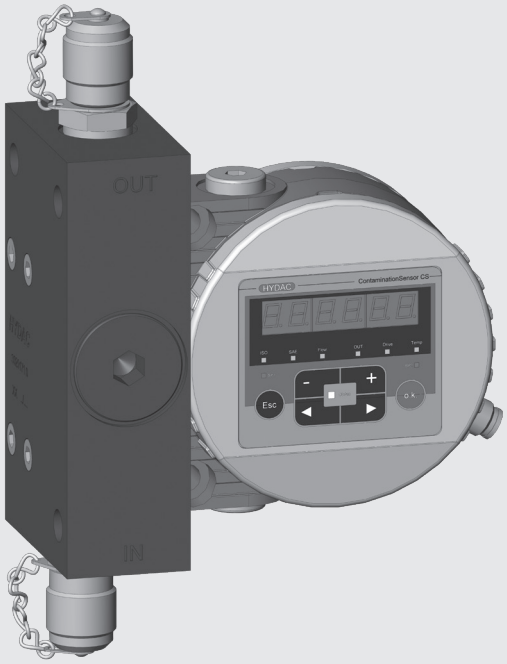
Items supplied

– 1 FMM - O - M - ...
– 1 Operating and Maintenance Manual for FMM-O-M
– 1 Manual for additional sensor (optional)
– 1 CD with Operating and Maintenance Manual for CS 1000 in different languages (PDF viewer software required)
– 1 CD with FluMoS light (fluid monitoring software to operate and parameterize the sensor)

Accessories

A wide range of accessories can be found in the brochure "Filter Systems Accessories" (E 7.623...).

FMM - P - S - ...
(previously known as: FMMP)



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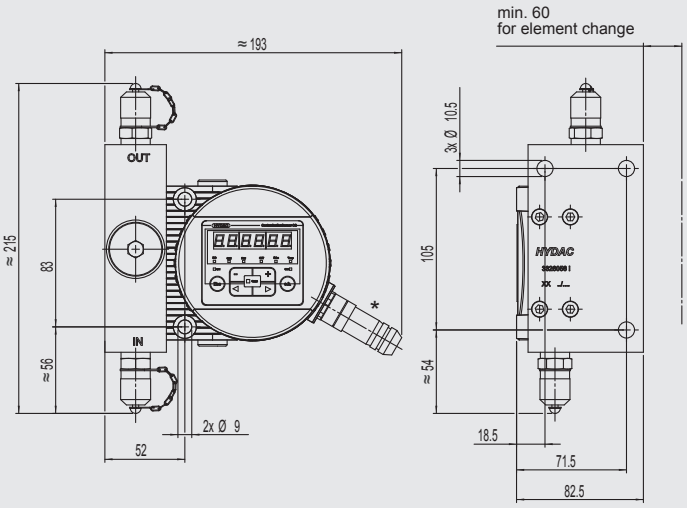

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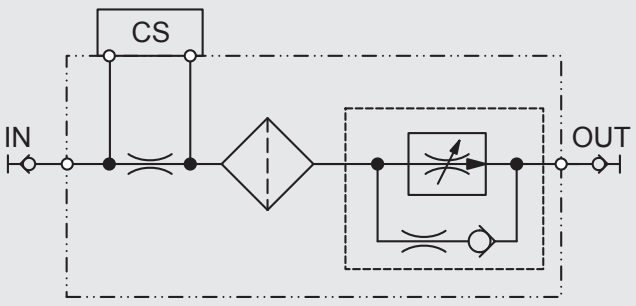
Hydraulic circuit diagram



Technical data

Installation position	vertical (flow from bottom to top)
Max. operating pressure	15 ... 300 bar / 217 ... 4350 psi
Minimum differential pressure	15 bar / 217 psi
Permitted viscosity range	1 ... 350 mm²/s
Hydraulic connection (IN, OUT)	Test point type 1604 or G 1/4" (ISO 228)
Seal material	FKM / EPDM
Fluid temperature range	0 ... +85 °C / +32 ... +185 °F
Ambient temperature range	-30 ... +80 °C / -22 ... +176 °F
Storage temperature range	-40 ... +80 °C / -40 ... +176 °F
Relative humidity	max. 95%, non-condensing
Weight	4.3 kg

Model code

See last page

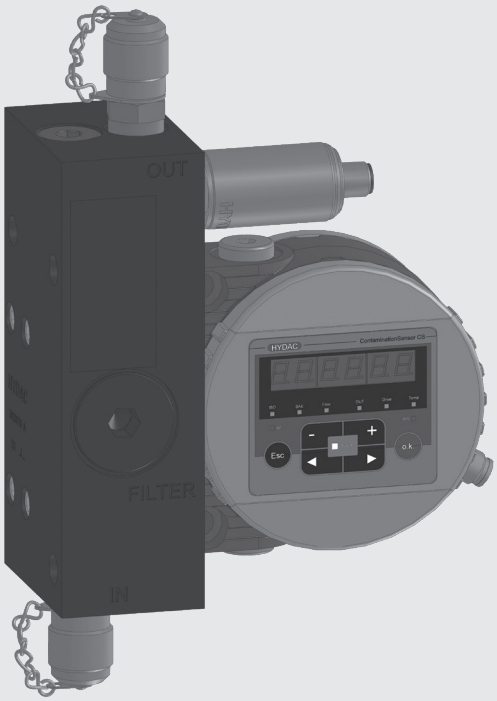
Items supplied

– 1 FMM - P - S - ...
– 1 Operating and Maintenance Manual for FMM-P-X
– 1 CD with Operating and Maintenance Manual for CS 1000 in different languages (PDF viewer software required)
– 1 CD with FluMoS light (fluid monitoring software to operate and parameterize the sensor)

Accessories

A wide range of accessories can be found in the brochure "Filter Systems Accessories" (E 7.623...).

FMM - P - M - ...



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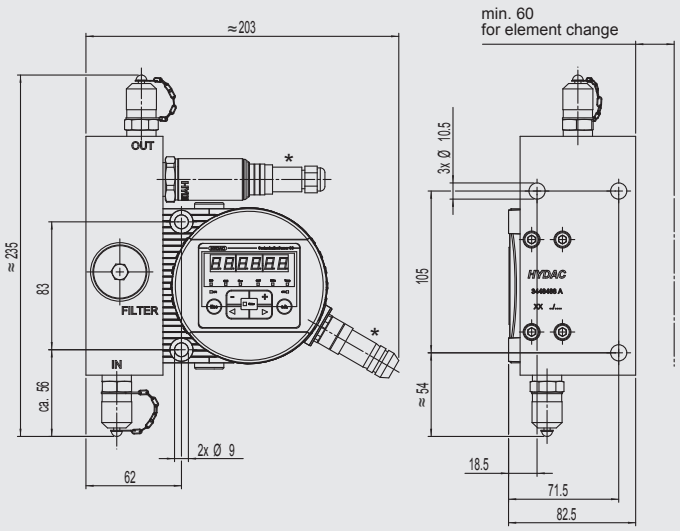
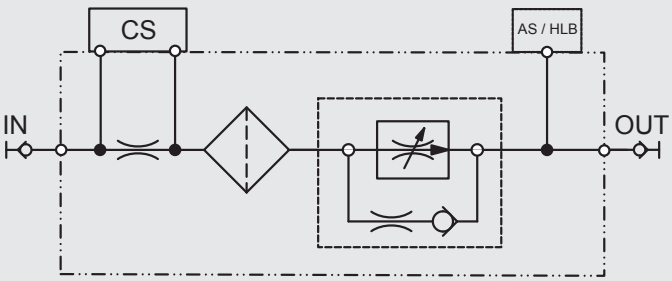


* not included in scope of delivery

Hydraulic circuit diagram



Technical data

Installation position	vertical (flow from bottom to top)
Max. operating pressure	15 ... 300 bar / 217 ... 4350 psi
Minimum differential pressure	15 bar / 217 psi
Permitted viscosity range	1 ... 350 mm²/s
Hydraulic connection (IN, OUT)	Test point type 1604 or G 1/4" (ISO 228)
Seal material	FKM / EPDM
Fluid temperature range	0 ... +85 °C / +32 ... +185 °F
Ambient temperature range	-30 ... +80 °C / -22 ... +176 °F
Storage temperature range	-40 ... +80 °C / -40 ... +176 °F
Relative humidity	max. 95%, non-condensing
Weight	6.5 kg

Model code

See last page

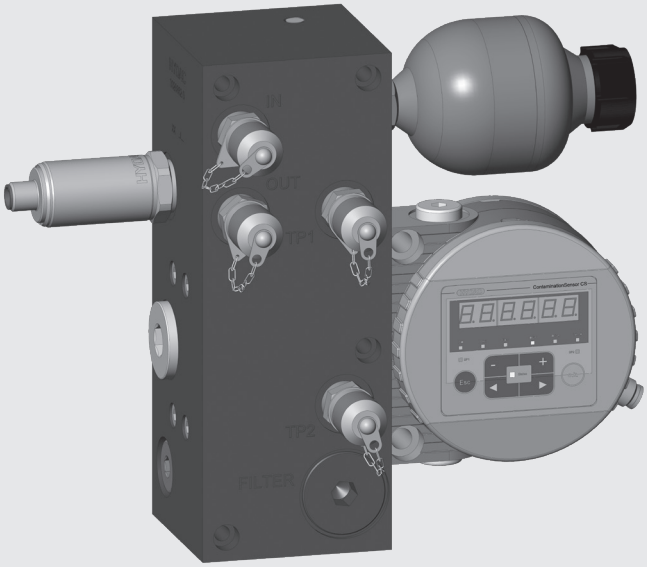
Items supplied

– 1 FMM - P - M - ...
– 1 Operating and Maintenance Manual for FMM-P-X
– 1 Manual for additional sensor (optional)
– 1 CD with Operating and Maintenance Manual for CS 1000 in different languages (PDF viewer software required)
– 1 CD with FluMoS light (fluid monitoring software to operate and parameterize the sensor)

Accessories

A wide range of accessories can be found in the brochure "Filter Systems Accessories" (E 7.623...).

FMM - P - L - ...
(previously known as: FMMHP)



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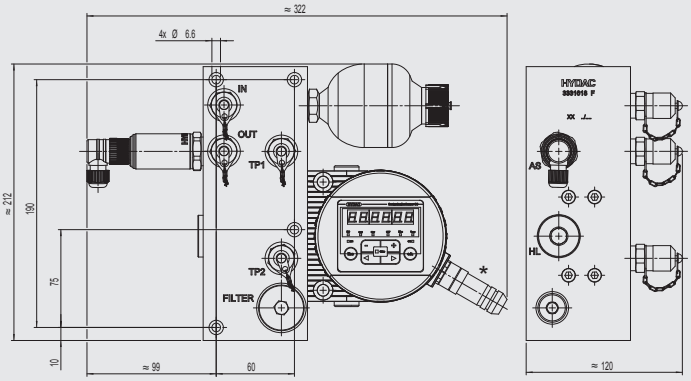
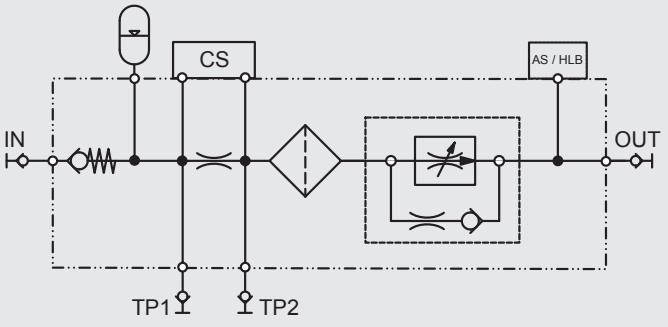


* not included in scope of delivery

Hydraulic circuit diagram



Technical data

Installation position	vertical (flow from bottom to top)
Max. operating pressure without hyd. accumulator with hydraulic accumulator	 15 ... 300 bar / 217 ... 4350 psi 15 ... 250 bar / 217 ... 3625 psi
Minimum differential pressure	15 bar / 217 psi
Permitted viscosity range	1 ... 350 mm²/s
Hydraulic connection (IN, OUT)	Test point type 1604 or G 1/4" (ISO 228)
Seal material	FKM / EPDM
Fluid temperature range	0 ... +85 °C / +32 ... +185 °F
Ambient temperature range	-30 ... +80 °C / -22 ... +176 °F
Storage temperature range	-40 ... +80 °C / -40 ... +176 °F
Relative humidity	max. 95%, non-condensing
Weight	12.5 kg

Model code

See last page

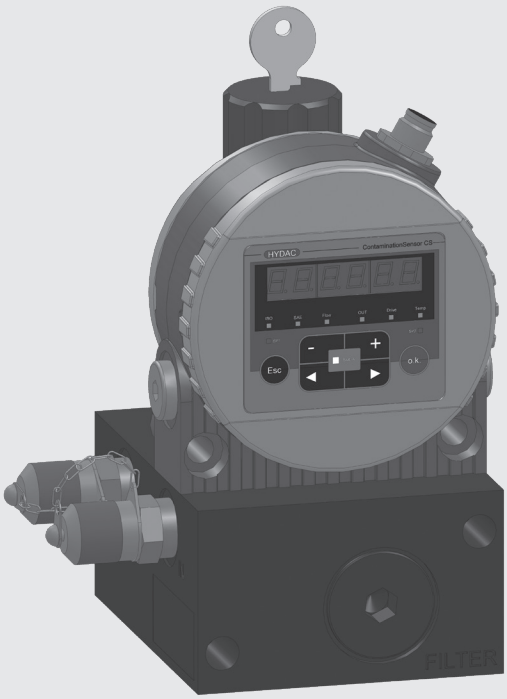
Items supplied

– 1 FMM - P - L - ...
– 1 Operating and Maintenance Manual for FMM-P-L
– 1 Manual for additional sensor (optional)
– 1 CD with Operating and Maintenance Manual for CS 1000 in different languages (PDF viewer software required)
– 1 CD with FluMoS light (fluid monitoring software to operate and parameterize the sensor)

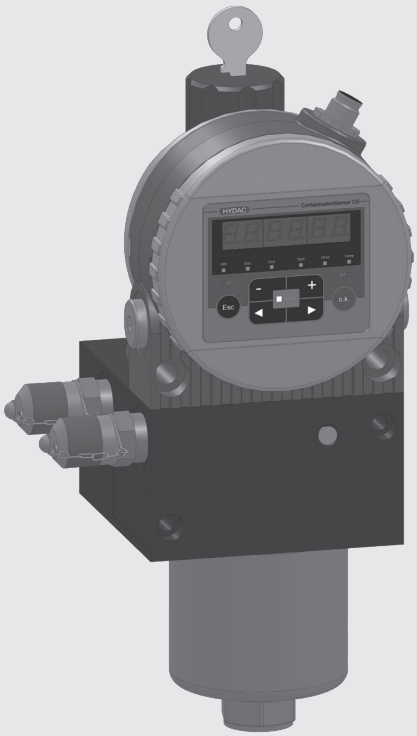
Accessories

A wide range of accessories can be found in the brochure "Filter Systems Accessories" (E 7.623...).

FMM - A - S - ... - 1 - ...



FMM - A - S - ... - 2 - ...



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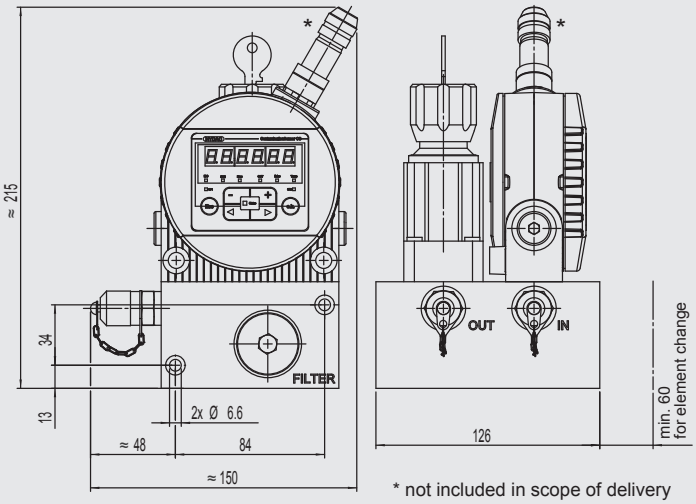

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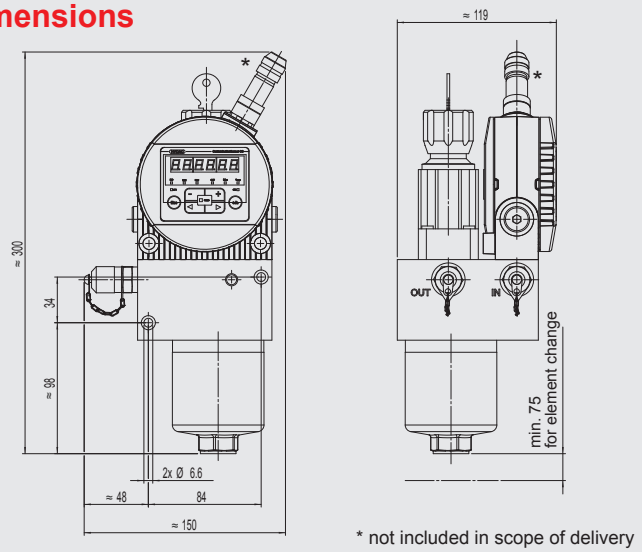
Dimensions



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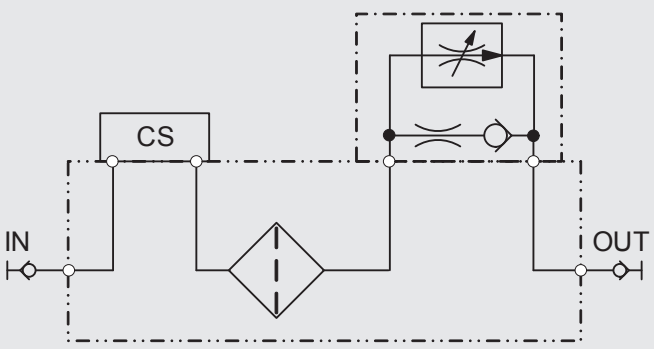
Hydraulic circuit diagram



Technical data

Installation position	horizontal
Max. operating pressure	15 ... 250 bar / 217 ... 3625 psi
Minimum differential pressure	15 bar / 217 psi
Permitted viscosity range	10 ... 800 mm²/s
Hydraulic connection (IN, OUT)	Test point type 1604 or G 1/4" (ISO 228)
Seal material	FKM / EPDM
Fluid temperature range	0 ... +85 °C / +32 ... +185 °F
Ambient temperature range	-30 ... +80 °C / -22 ... +176 °F
Storage temperature range	-40 ... +80 °C / -40 ... +176 °F
Relative humidity	max. 95%, non-condensing
Weight	8.0 kg FMM-A-S...-1-... 7.8 kg FMM-A-S...-2-...

Model code

See last page

Items supplied

– 1 FMM - A - S - ...
– 1 Operating and Maintenance Manual for FMM-A-S
– 1 CD with Operating and Maintenance Manual for CS 1000 in different languages (PDF viewer software required)
– 1 CD with FluMoS light (fluid monitoring software to operate and parameterize the sensor)

Accessories

A wide range of accessories can be found in the brochure "Filter Systems Accessories" (E 7.623...).

Model code

FMM - O - M - 0 - CS 1 2 2 0 - A - AS - 0 - 0 - 0 / -000

Type
FMM = Fluid Monitoring Module

Hydraulic application
O = offline (bypass flow circuit, < 15 bar) only sensor combination M
P = pressure line (pressure circuit, > 15 bar)
A = adjustable flow valve (pressure circuit, > 15 bar)
only sensor combination S

Sensor combination
S = CS1000
M = CS1000 + AS1000 or CS1000 + AS3000 or CS1000 + HydacLab
L = CS1000 + AS1000 + HydacLab or CS1000 + AS3000 + HydacLab

Seal
0 = FKM (FPM/Viton®)
1 = EPDM (not for hydraulic accumulator)

Contamination Sensor CS1000 Series
CS 1210 = ISO / SAE, without display (FKM)
CS 1220 = ISO / SAE, with display (FKM)
CS 1310 = ISO / SAE / NAS, without display (FKM)
CS 1320 = ISO / SAE / NAS, with display (FKM)
CS 1211 = ISO / SAE, without display (EPDM)
CS 1221 = ISO / SAE, with display (EPDM)
CS 1311 = ISO / SAE / NAS, without display (EPDM)
CS 1321 = ISO / SAE / NAS, with display (EPDM)

Analogue interface of the CS1000
A = 4 to 20 mA
B = 2 to 10 VDC

Additional sensor
Z = without
AS = AS1000
AS3 = AS3000
HL = HydacLab 1400
Z(AS) = set up for AS1000 / AS3000
Z(HL) = set up for HydacLab

Hydraulic accumulator
0 = without accumulator
1 = diaphragm accumulator SBO 250-0.075 (40 bar gas pressure) [not available in EPDM]

Filter
0 = without filter (only for FMM-O)
1 = protective filter (25µm) (for FMM-P, optional for FMM-A)
2 = DF60 (5µm) (optional for FMM-A)

Options
0 = no options

Modification number
000 = modification number

Note

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

For applications and operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

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