

# MAHLE

Industry

## Particle Monitor

### PiC 1500

Nominal pressure 420 bar (600 psi)

## 1. Features

### MAHLE PiC 1500 Particle Monitor for continuous monitoring of the particle contamination of hydraulic fluids

- Use as a mobile and stationary system for quick and simple determination of the cleanliness of fluids
- Simple menu-prompted operation at the unit
- Laser sensor for precise and reproducible results
- Variable measurement mode (single and cyclic measurements) through internal programmable timer control, manual control or remote control via an electrical connection
- Output of the cleanliness classes via the illuminated, 180° swivelling display
- Evaluation to ISO 4406: 1999 and SAE AS 4059 E
- Measurement range 4  $\mu\text{m}(c)$ , 6  $\mu\text{m}(c)$ , 14  $\mu\text{m}(c)$ , 21  $\mu\text{m}(c)$
- Programmable alarm (exceeding or underrunning of the cleanliness classes) for control of external units
- Internal operating hourmeter and measurement value memory with capacity for 3000 measurement cycles each with 6 measured values for trend tracking of historical measurement data
- Includes "Count&Log 1500" measurement and evaluation software for evaluation and display of the measurement results on PC or notebook
- Data polling and control of the PiC 1500 via RS232 or CANopen
- Extensive accessories available

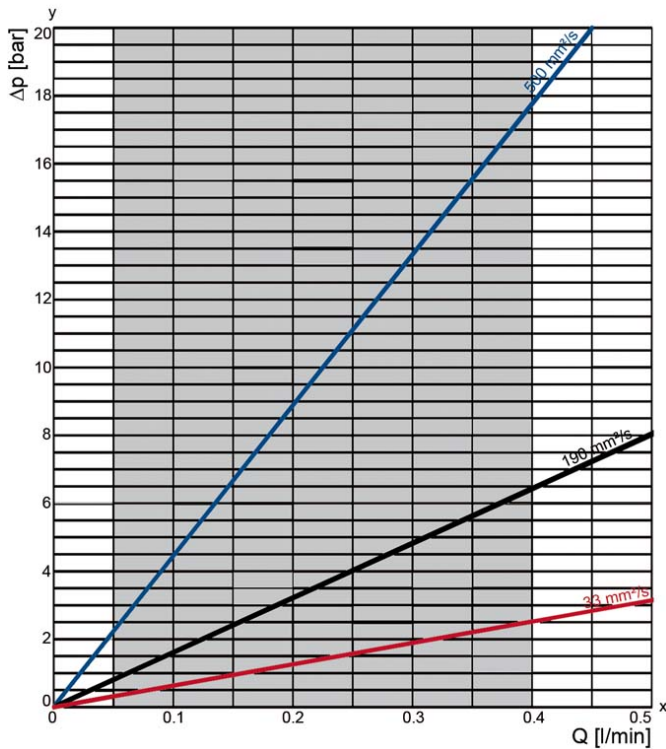


## 2. Technical data

Pressure connection:	2x G¼, Minimes M16x2
Nominal pressure:	420 bar (600 psi)
Operating temperature:	-20 to +80 °C
Relative humidity:	0 to 95 %
Wetted materials:	stainless steel, sapphire glass, NBR
Seal material:	NBR
Monitored media:	mineral and ester fluids, polyal- phaolefins
Permissible flow rate:	50 to 400 ml/min
Measurement range to ISO 4406: 1999:	0 to 24
Calibrated measurement range to ISO 4406: 1999:	10 to 22
Measurement precision:	± 1
Electrical connection:	8-pin plug M12x1
Power supply:	9 to 36 V DC
Power consumption max.:	300 mA
Power outputs:	4 to 20 mA
Protection class:	IP67 in plugged and secured state
Interfaces:	RS 232, CANopen
Weight:	approx. 850 g

Subject to technical alteration without prior notice.

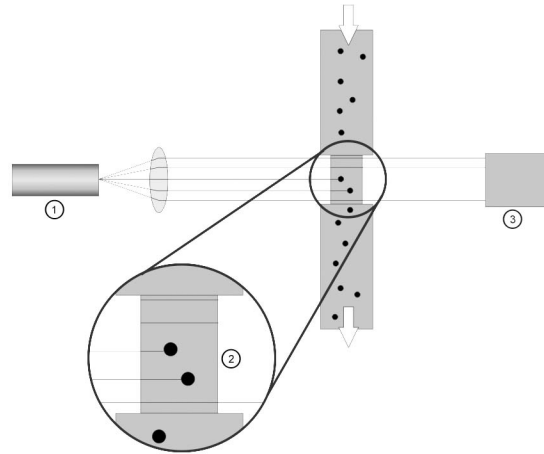
## 4. Characteristics curve



y = Differential pressure  $\Delta p$  [bar]

x = Volume flow Q [l/min]

## 3. Configuration

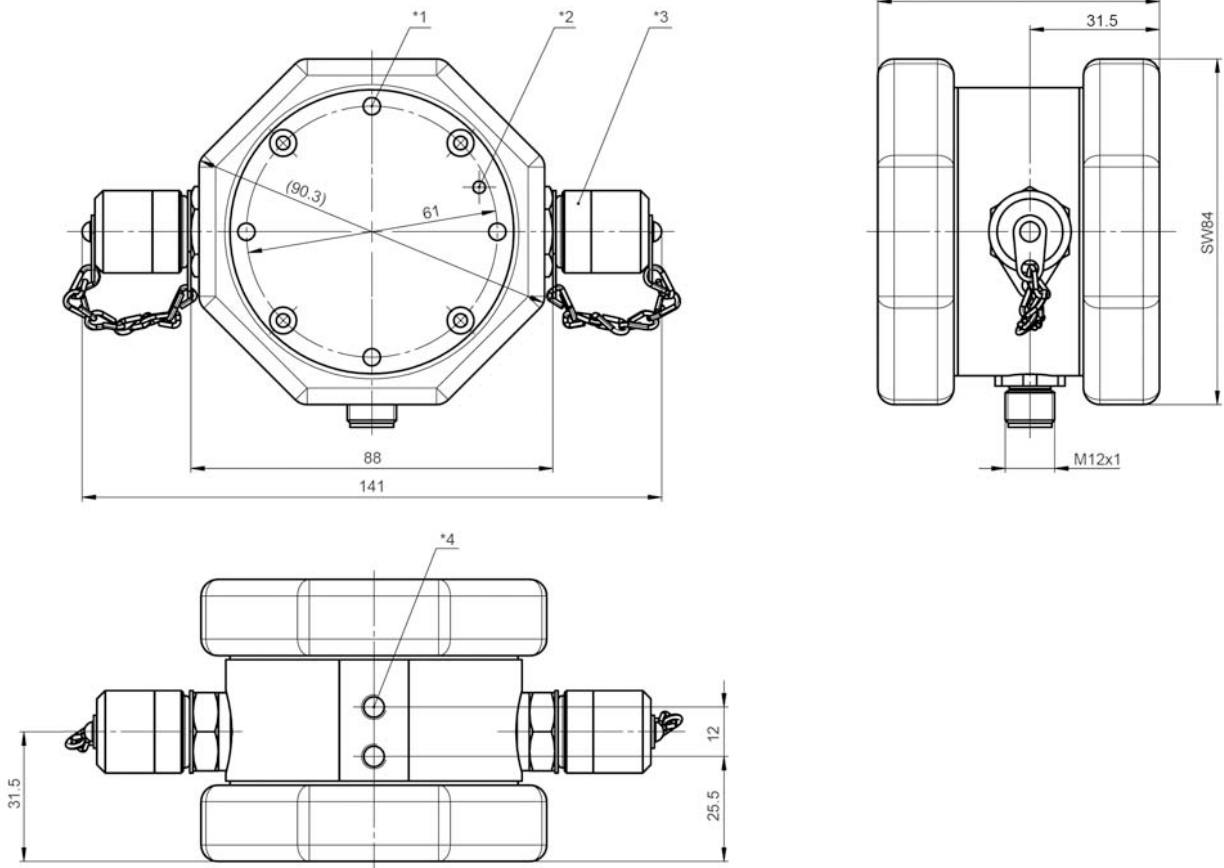


The unit is an optical particle monitor that operates on the principle of light extinction. It consists of a measurement cell (2) through which the fluid flows, a laser (1) and a photodiode (3). The particle monitor continuously measures the number of particles in a system and can trigger an alarm if the oil contamination exceeds a preset cleanliness class. The system operator is warned and can initiate corrective measures before faults or serious damage are caused by the contamination of the fluid. The PiC 1500 Particle Monitor allows condition-oriented maintenance and continuous monitoring of hydraulic oils.

The menu-prompted operation of the unit is via 4 sensor buttons. The cleanliness classes (ordinal numbers)  $> 4 \mu\text{m(c)}$ ,  $> 6 \mu\text{m(c)}$ ,  $> 14 \mu\text{m(c)}$ ,  $> 21 \mu\text{m(c)}$  to ISO 4406:99 or SAE AS 4059 E are displayed on the unit. The measurement mode of the PiC 1500 can be set to single or cyclic measurements. The measurement and pause times can be set for the cyclic measurements. The single measurements can be started manually or by remote control. The compact PiC 1500 Particle Monitor is normally connected to the fluid circuit via two MINIMESS® connections. The flow direction can be freely selected. The volume flow rate can be regulated between 50 and 400 ml/min by means of 3 separately available orifices. The flow rate can be read off at the display of the sensor. The particle monitor can be used as a stand-alone sensor or as a permanently installed detector for monitoring a machine or system. The PiC 1500 can be easily installed to suit the operating situation thanks to the different mounting points and the pivoting display.

An 8-pin M12 plug is provided on the PiC 1500 for the electrical connection and communication. A selected cleanliness class can be transmitted continuously or all the cleanliness classes sequentially thanks to the integrated power outlet port (4 to 20 mA). The electric alarm contact allows external units to be activated if the fluid infringes set limits. Via the serial interface it is possible to upload the data from the memory of the PiC 1500 or to transmit commands via the RS 232 interface or the CANopen protocol. The Count&Log 1500 software included in the scope of supply allows the particle monitor to be controlled and monitored online from notebook or PC and the measurement values to be read out from the internal memory. The recorded data can be evaluated and presented in various forms, e.g. as tables and curves.

## 5. Dimensions



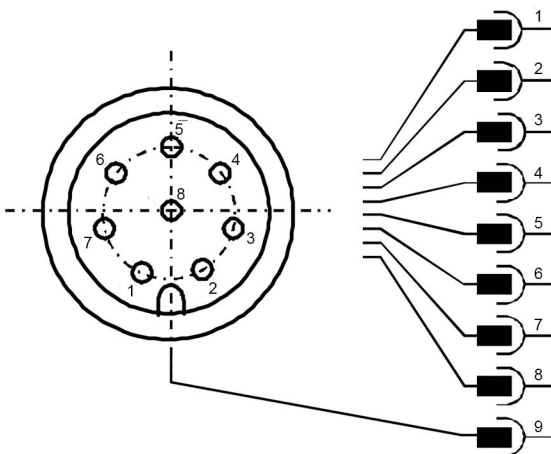
\*1 = 4x mounting points M5x5.5

\*2 = Vent opening with pressure balance element (fixed from the inside)

\*3 = 2x G $\frac{1}{4}$ , Minimes M16x2

\*4 = 2x mounting points M6x8

## 6. Electrical connections



Pin	Assignment	Standard cable colour
1	L+	white
2	L-	brown
3	TxD, CANL	green
4	RxD, CANH	yellow
5	Digital input	grey
6	IOut1	pink
7	Open collector alarm out	blue
8	SGND	red
9	Housing/screen	-

## 7. Scope of supply

PiC Particle Monitor, power pack, calibration protocol, Count&Log 1500 software (on CD-ROM), operating manual

## 8. Software

- Operation of the PiC 1500 Particle Monitor via PC or laptop computer
- Presentation of the current measurement values to ISO 4406: 1999 and SAE AS 4059 E on the notebook/PC
- Readout of the internal memory and creation of a data backup on PC/laptop
- Quick creation of diagrams and measurement tables
- Printout of measurement protocols
- Clear presentation of the technical parameters of the laser, measurement cell and volumetric flow rate

## 9. Options/accessories/spare parts

Designation	Description	Order number
Power pack	AC/DC adapter, input 100~240 V AC, output 24 V DC, 625mA, IP41	70570292
Measurement cable	Measurement cable L = 5 m, M12 jack - open end 8-pin	70570294
USB/Can adapter cable	CAN/USB adapter, 8-pin M12 jack - USB Type A	70573094
Y adapter	Distributor 3 connections M12 - 8-pin jack - jack - plug	70573114
0.18 orifice	Minimes screw-in coupling 1620 - G1/4" NBR with orifice diameter 0.18 for reducing the volume flow	70570295
0.22 orifice	Minimes screw-in coupling 1620 - G1/4" NBR with orifice diameter 0.22 for reducing the volume flow	70570296
0.30 orifice	Minimes screw-in coupling 1620 - G1/4" NBR with orifice diameter 0.30 for reducing the volume flow	70570297

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