VarnishMitigation Unit
VMU Series

Description

The VarnishMitigation Units VMU are designed to condition mineral oils and are easy to use. They are particularly effective at removing oil ageing products (varnish) from mineral oils.

Varnish takes the form of insoluble oil ageing products which settle in the tank, in valves or in bearings. These can be non-filterable gels or solid paint-type deposits.

The VMU series units are used offline. The removal of varnish is on the basis of adsorption on an active surface.

Special features

- Removal of solid or gel-type oil ageing products
- Operating reliability of the system is increased because there are fewer deposits in hydraulic valves
- Increase in the oil service life
- Available as a complete unit for retrofitting to existing systems, as well as a modular system for new systems

Technical specifications

Hydraulic data	
MPC values achievable	< 20
Nominal flow:	VMU-1 ~ 2.2 l/min VMU-4 ~ 8.9 l/min
Permitted fluid temperature range	30 to 60 °C / 86 to 140 °F
Operating pressure max.	8 bar / 116 psi
Permitted pressure at suction port IN	-0.2 to 1 bar / 2.9 to 14.5 psi
Viscosity range	15 to 80 mm²/s / 15 to 80 cSt
Permitted operating fluids	Mineral oils Please observe application ranges of the elements
Connections IN / OUT	22L / M30x2 (male thread)
Pump type	Gear pump / without pump
Electrical data*	
Supply voltage	See model code
Electrical power consumption	0.25 to 0.6 kW
External fuse required	16 A
Protection class to DIN 40050	IP 55
Ambient conditions	
Operating temperature range	0 to 40 °C / 32 to 104 °F
Storage temperature range	0 to 60 °C / 32 to 140 °F
Relative humidity	0 to 80%, non-condensing
General data *	
Length of power cable	10 m (for versions PKZ, FA1, FA2)
Length of suction / pressure hose	5 m (for versions S5D5, SKDK)
Sealing material	FKM
Noise level at 1m	< 80 dB(A)
Weight when empty	VMU-1 ~ 70 kg VMU-4 ~ 300 kg
Required fluid cleanliness	ISO 19/17/14 (ISO 4406:1999) 9A/9B/9C (SAE AS4059) We recommend that the VMU is operated only with the pre-filter, which is available as an option, to guarantee the required fluid cleanliness.

* Others on request

Model code

VMU - 4 - M - G - A 1 - BM Z /-S5D5-PKZ /-ATEX

Basic model
VMU = VarnishMitigation Unit

Size
1 = 1 VarnishMitigation element
VME7xx ~ 2.2 l/min
4 = 4 VarnishMitigation elements
VME7xx ~ 8.9 l/min

Mechanical design
M = mobile
S = stationary

Pump type
G = gear pump with motor
Z = without pump

Voltage, frequency, power supply
A = 400 V, 50 Hz, 3 Ph
B = 415 V, 50 Hz, 3 Ph
C = 200 V, 50 Hz, 3 Ph
D = 200 V, 60 Hz, 3 Ph
E = 220 V, 60 Hz, 3 Ph
F = 230 V, 60 Hz, 3 Ph
G = 380 V, 60 Hz, 3 Ph
H = 440 V, 60 Hz, 3 Ph
I = 500 V, 50 Hz, 3 Ph
K = 480 V, 60 Hz, 3 Ph
L = 220 V, 50 Hz, 3 Ph
M = 230 V, 50 Hz, 1 Ph
N = 575 V, 60 Hz, 3 Ph
O = 460 V, 60 Hz, 3 Ph
X = other voltage (please state clearly)
Z = without

Pre-filter
1 = with pre-filter (OLF5 Toploader)
Z = without pre-filter

Clogging indicator
BM = differential pressure indicator – visual (VM2BM.1)
for protective filter and pre-filter
C = differential pressure indicator – electrical, for protective filter (VM2C.0)
pre-filter with visual differential pressure indicator (VM2BM.1)

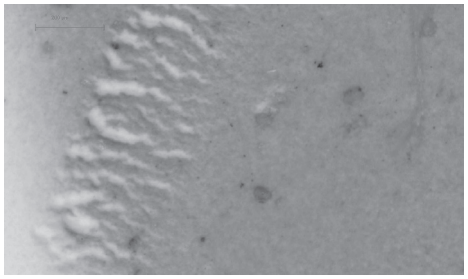
Measuring equipment
AS = AquaSensor AS1000. Hydraulic connection only.
Additional equipment such as HYDAC HMG 3000 or HMG500
is required for display and data storage.
Z = without

Supplementary details
S5D5 = suction/return hose with lance, length = 5 metres
SKDK = suction/return hose with threaded connection, length = 5 metres
PKZ = on/off switch with motor protection switch
FA1 = on/off switch with motor protection switch and switch-off when filter is clogged. Requires neutral wire. For voltages up to max. 240 V, 1 Ph, or max. 415 V, 3P h.
Clogging indicator type C is required.
FA2 = On/Off switch with motor protection switch and switch-off when filter is clogged. Does not require neutral line.
All voltages. Clogging indicator type C required.

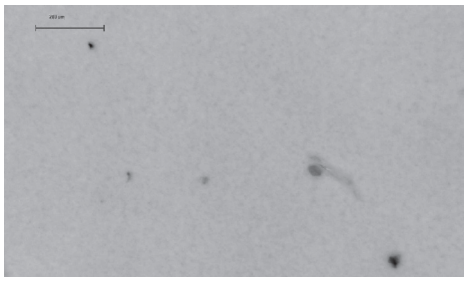
Explosion protection variants
on request

Example

Filter membrane WITHOUT VarnishMitigation Unit



Filter membrane WITH VarnishMitigation Unit



Items supplied

- VMU with protective filter and additional equipment as per model code
- Operating manual
- EC declaration of conformity

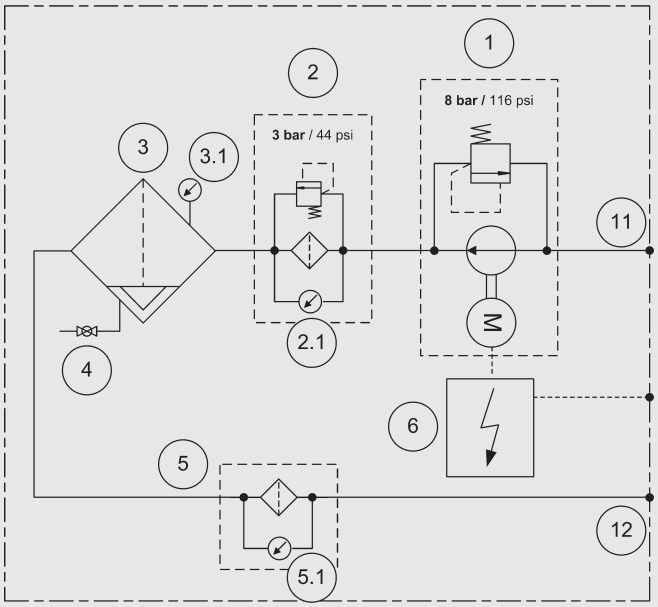
VarnishMitigation elements and filter elements for pre-filter and protective filter must be ordered separately.

Design

As a rough guide, the VMU can be sized according to the tank volume of the system.

Tank volume in litres	VMU
< 16,000	VMU-1
16,000 - 60,000	VMU-4

Hydraulic circuit diagram



Item	Designation
1	Motor/pump assembly*
2	Pre-filter* with by-pass
2.1	Clogging indicator - visual
3	Varnish removal crew
3.1	Pressure gauge
4	Drain
5	Protective filter
5.1	Clogging indicator - electrical or visual
6	On/Off switch with - motor protection*
11	Inlet
12	Outlet

*optional

VarnishMitigation Elements

VarnishMitigation elements must be ordered separately and installed before initial operation on site. The number and type of elements is based on the size of the VMU.

Part no.	Description	Application range
3940510	VME 720 D	Turbine oils Tank volume < 4.000 l
3714795	VME 730	Turbine oils Tank volume ≥ 4,000 l

Others on request

The maximum storage time for all VarnishMitigation elements is 6 months after supply.

Filter elements for pre-filter and protective filter

Filter elements must be ordered separately and installed before commissioning on site. One filter element per filter is required.

Part no.	Description	Filtration rating
3068101	N5DM005	5 µm
3102924	N5DM010	10 µm

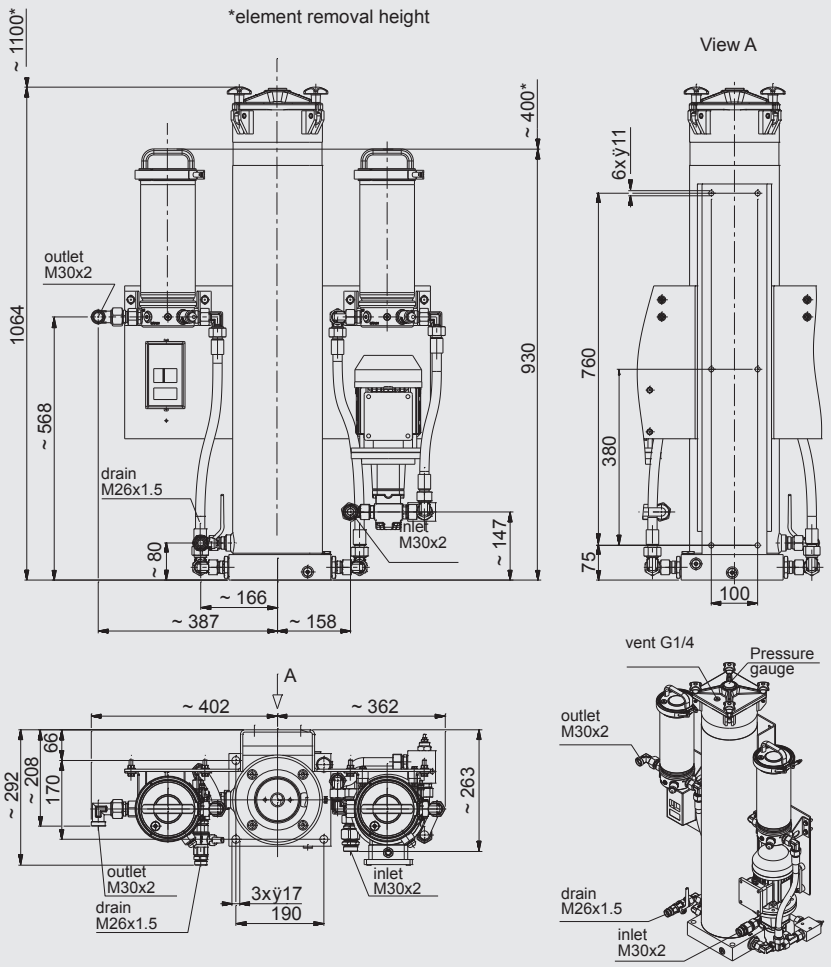
Example of required order quantity:

VMU- **4** -M-G-A -**1**-BM-Z /-S5D5-PKZ
4 x VME730 Element
2 x N5DM005
(for pre-filter and protective filter)

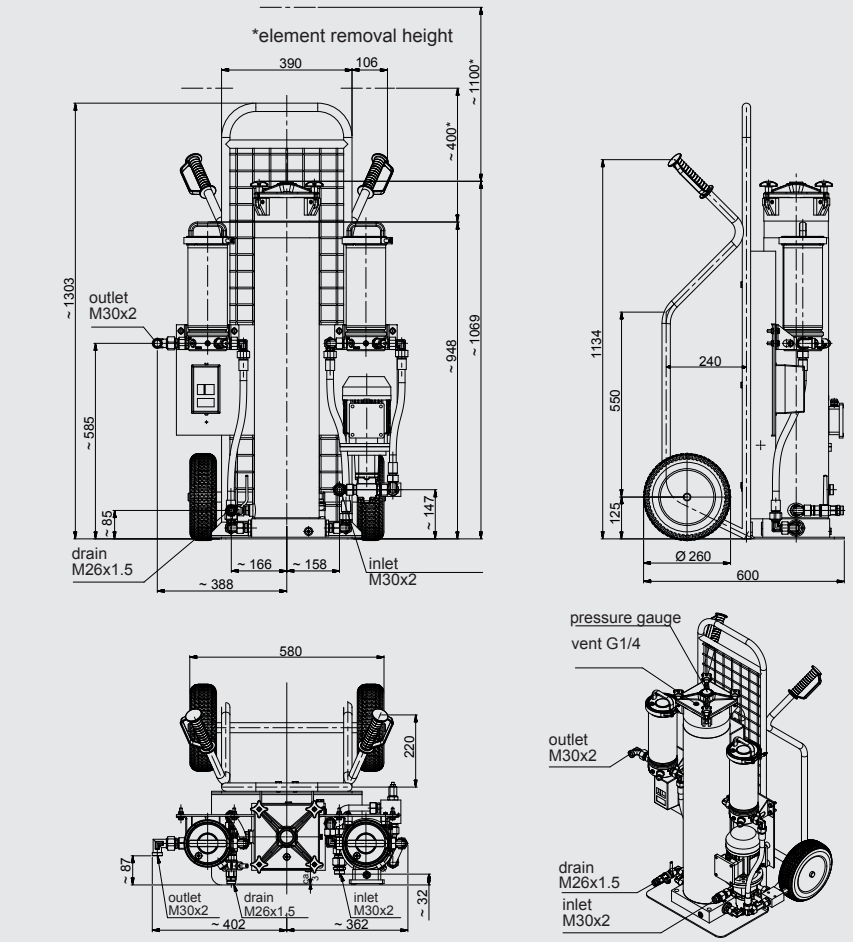
VMU - **4** -M-G-A -**Z**-BM-Z /-S5D5-PKZ
4 x VME730 Element
1 x N5DM005 (only for protective filter)

VMU- **1** -M-G-A -**1**-BM-Z /-S5D5-PKZ
1 x VME730 Element
2 x N5DM005
(for pre-filter and protective filter)

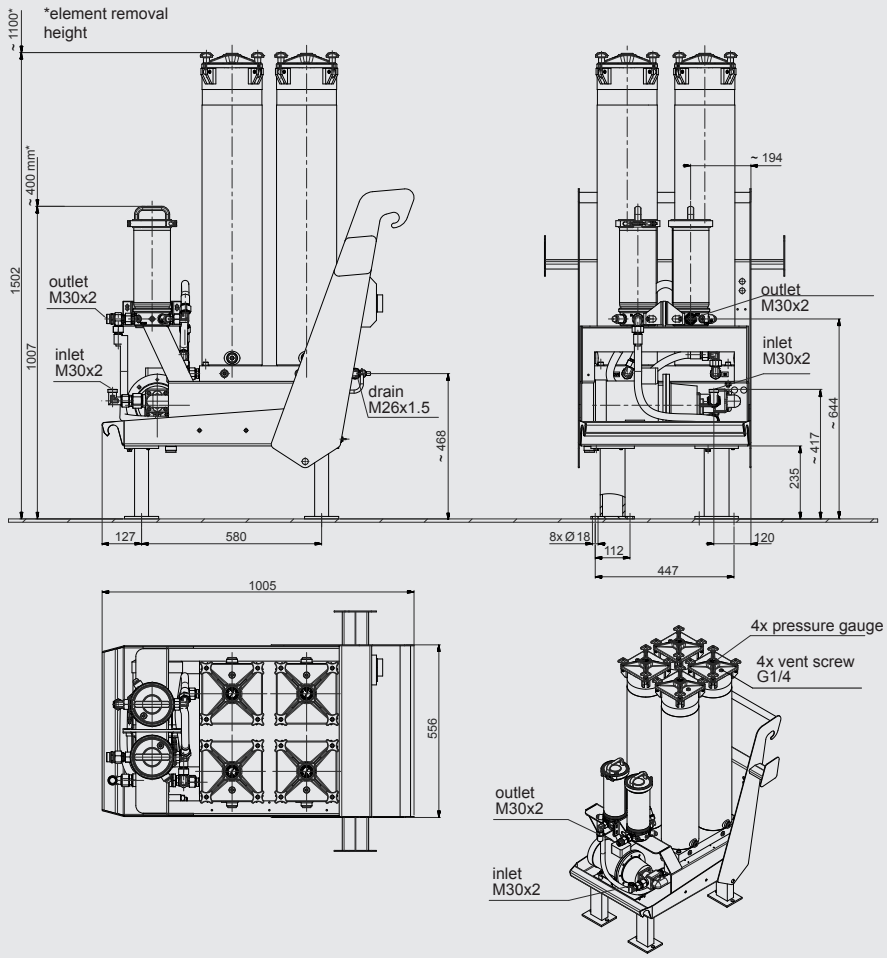
Dimensions - VMU-1 stationary



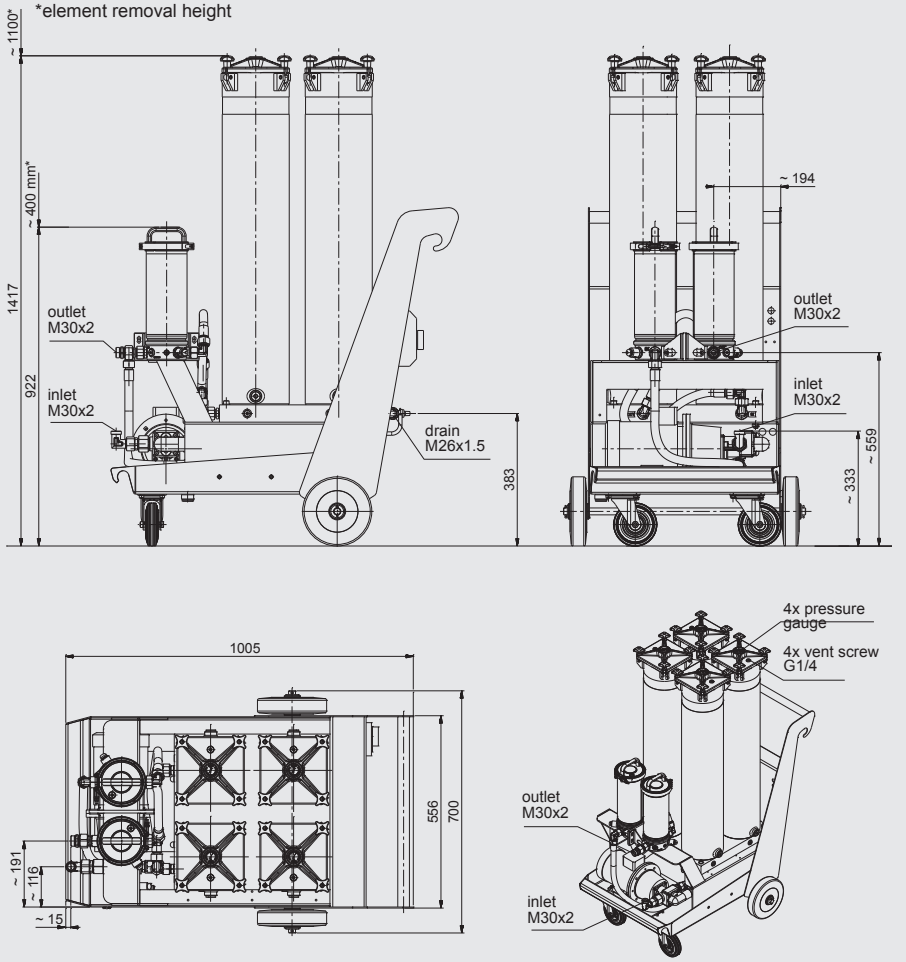
Dimensions - VMU-1 mobile



Dimensions - VMU-4 stationary



Dimensions - VMU-4 mobile



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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