



Products & Solutions

Fluid & Motion Control
Filtration & Tank Solutions
Sensors & Measurements
Fluid Management

*All Newsletters in a Booklet
Inspirations for a successful and future-oriented hydraulic engineering*

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Please contact us for technical enquiries or a quotation

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ARGO-HYTOS - A Strong Brand in Fluid Technology

As a medium-sized family business with more than 1600 employees, ARGO-HYTOS has more than 70 years' experience in Fluid & Motion Control and Filtration Technology in mobile and industrial hydraulics. Especially in the mobile hydraulics sector, ARGO-HYTOS has developed into one of the innovation leaders.

We view ourselves as an international partner, implementing innovative and individually designed system solutions together with our customers. The basis for this is a wide modular product range, which can be flexibly expanded to customized solutions. Thereby, we draw on our entire wealth of know-how and give new impetus to modern fluid power technology.

ARGO-HYTOS owns a number of patents and in many cases has set new standards in its industry.

With production companies in Germany, Czech Republic, Poland, India and China, as well as numerous own distribution and assembly companies, the ARGO-HYTOS Group is active worldwide. Furthermore, we are cooperating with a network of professional service partners.

ARGO-HYTOS aims to make a substantial contribution to improve customer products and sustainably ensure significant customer benefit.



ARGO-HYTOS new filter element plant

We are striving to become one of the leading worldwide hydraulic system suppliers while remaining a family owned business. In order to make our customer's products better, we want to achieve innovation leadership in all business segments we are and will be active in.

FILTRATION – FLUID MANAGEMENT – SENSORS & MEASUREMENT – FLUID & MOTION CONTROL



Explosion Proof Valves

This is a group of ATEX and IECEx certified valves designed for use in potentially explosive atmospheres.

There are directional control valves with housing, built-in directional control valves and poppet valves, pilot operated directional control valves and proportional valves.

Valves which are used above all in mining, chemical and petrochemical industries or, dusty environments, for example in mills, limestone or textile production.



Now also with AUSTRALIAN IECEX Certificate



Ex Proof 2/2 Directional Control Valve, Solenoid Operated, Poppet Type, Direct Acting, "SD1EX-A2/Hxxx/xxxA4-B"

$Q_{max} = 30 \text{ lpm}$; $p_{max} = 350 \text{ bar}$; 3/4-16 UNF ; Temp. Class = T4

	IECEX EP514.0064 X
	Ex mb I Mb
AC	Ex mb IIB T4, T5, T6 Gb
	Ex mb IIIC T135°C, T100°C, T85°C Db
	Ex e mb I Mb
DC	Ex e mb IIB T4, T5, T6 Gb
	Ex tb IIIC T135°C, T100°C, T85°C Db

- design prevents a surface temperature capable of igniting
- solenoid coil in acc. with directive for explosion-hazard zones
- explosion protection for gas, dust, and mining
- solenoid with encapsulated enclosure
- hardened precision parts
- high flow capacity, transmitted hydraulic power
- leak-free closing up to 3 drops/min
- both ports may be fully pressurised
- wide range of manual overrides available
- coils interchangeable within Argo-Hytos ATEX/IECEX valves
- the valve is zinc-coated for 520 h protection acc. to ISO 9227



Ex Proof 3/2 Directional Control Valve, Solenoid Operated, Poppet Type, Direct Acting, "SD1EX-A3/H2S7/xxxA4-B"

$Q_{\max} = 40 \text{ lpm}$; $p_{\max} = 350 \text{ bar}$; 3/4-16 UNF ; Temp. Class = T4

	IECEX EP514.0064 X
	Ex mb I Mb
AC	Ex mb IIB T4, T5, T6 Gb
	Ex mb IIIC T135°C, T100°C, T85°C Db
	Ex e mb I Mb
DC	Ex e mb IIB T4, T5, T6 Gb
	Ex tb IIIC T135°C, T100°C, T85°C Db

- design prevents a surface temperature capable of igniting
- solenoid coil in acc. with directive for explosion-hazard zones
- explosion protection for gas, dust, and mining
- solenoid with encapsulated enclosure
- hardened precision parts
- high flow capacity, transmitted hydraulic power
- leak-free closing up to 3 drops/min
- all ports may be fully pressurised
- wide range of manual overrides available
- coils interchangeable within Argo-Hytos ATEX/IECEX valves
- the valve is zinc-coated for 520 h protection acc. to ISO 9227

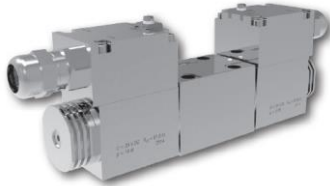


Ex Proof 4/3 Proportional Directional Control Valve, Screw-In Cartridge, "SD2PX-B4/H3Y13-xx-xxB4-B"

$Q_{\max} = 25 \text{ lpm}$; $p_{\max} = 250 \text{ bar}$; 7/8-14 UNF ; Temp. Class = T4

	IECEX EP514.0064 X
	Ex mb I Mb
AC	Ex mb IIB T4, T5, T6 Gb
	Ex mb IIIC T135°C, T100°C, T85°C Db
	Ex e mb I Mb
DC	Ex e mb IIB T4, T5, T6 Gb
	Ex tb IIIC T135°C, T100°C, T85°C Db

- design prevents a surface temperature capable of igniting
- solenoid coil in acc. with directive for explosion-hazard zones
- explosion protection for gas and dust, and mining
- solenoid with encapsulated enclosure
- coils interchangeable within Argo-Hytos ATEX/IECEX valves
- coil in 12 or 24 VDC
- the valve is zinc-coated for 520 h protection acc. to ISO 9227

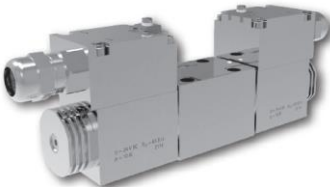


Ex Proof CETOP 3 Directional Control Valve, Solenoid Operated, Direct Acting, "RPEX3-063xx/xxA4-B"

$Q_{\max} = 60 \text{ lpm}$; $p_{\max} = 350 \text{ bar}$; Temp. Class = T4

	IECEX EPS14.0064 X
	Ex mb I Mb
AC	Ex mb IIB T4, T5, T6 Gb
	Ex mb IIIC T135°C, T100°C, T85°C Db
	Ex e mb I Mb
DC	Ex e mb IIB T4, T5, T6 Gb
	Ex tb IIIC T135°C, T100°C, T85°C Db

- design prevents a surface temperature capable of igniting
- solenoid coil in acc. with directive for explosion-hazard zones
- explosion protection for gas, dust, and mining
- solenoid with encapsulated enclosure
- high transmitted hydraulic power up to 350 bar with optimized design to minimize the flow pressure drop
- all ports may be fully pressurised
- five chambers housing design with reduced hydraulic power dependence on fluid viscosity
- wide range of manual overrides available
- coils interchangeable within Argo-Hytos ATEX/IECEX valves
- the valve is zinc-coated for 520 h protection acc. to ISO 9227



Ex Proof CETOP 3 Proportional Directional Control Valve, Direct Acting, "PRMX2-063xx/xx-xxB4-B"

$Q_{\max} = 28 \text{ lpm}$; $p_{\max} = 350 \text{ bar}$; Temp. Class = T4

	IECEX EPS14.0064 X
	Ex mb I Mb
AC	Ex mb IIB T4, T5, T6 Gb
	Ex mb IIIC T135°C, T100°C, T85°C Db
	Ex e mb I Mb
DC	Ex e mb IIB T4, T5, T6 Gb
	Ex tb IIIC T135°C, T100°C, T85°C Db

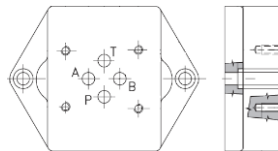
- design prevents a surface temperature capable of igniting
- solenoid coil in acc. with directive for explosion-hazard zones
- explosion protection for gas, dust, and mining
- solenoid with encapsulated enclosure
- the valve opening and resulting flow rate can be modulated continuously in proportion to the reference signal
- five chambers housing design with reduced hydraulic power dependence on fluid viscosity
- coils interchangeable within Argo-Hytos ATEX/IECEX valves
- 12 or 24 V DC coils can be rotated by 90°
- the valve is zinc-coated for 520 h protection acc. to ISO 9227

Connecting Plates & Manifolds

Manifolds connect individual sections of hydraulic circuits and ensure specific control functions via valves.

Standardised designs are characterised by connection flexibility. Specific designs for individual applications range from the economical to technically advanced solutions.

Manifolds are made of aluminium alloy, grey cast iron or steel.



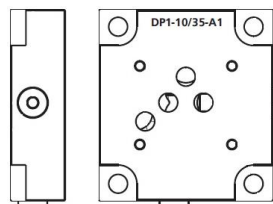
CETOP 3 Subplate, "DP3-06/35-B8"

p = 350 bar

P/T/A/B = 3/8" BSPP

please consult data sheet or contact us for other port sizes and forms

- for individual mounting of hydraulic components
- surface is phosphate
- top mounting pattern surface is protected with a transport plate



CETOP 5 Subplate, "DP1-10/35-A1"

p = 350 bar

P/T/A/B = 1/2" BSPP

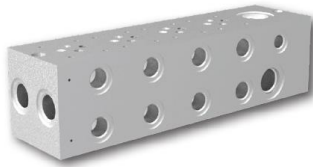
please consult data sheet or contact us for other port sizes

- for individual mounting of hydraulic components
- surface is phosphate
- top mounting pattern surface is protected with a transport plate



Adapter Plate CETOP 3 to 5, "DA-10/06-35-3-ST-N-B"

p = 350 bar



CETOP 3 Serial Plate, Side Ports, Sections 1-10, "DR2-06..."

$p_{\max} (AL) = 320 \text{ bar}$; $p_{\max} (ST) = 350 \text{ bar}$

P/T = 1/2" BSPP ; A/B = 3/8" BSPP ; M = 1/4" BSPP

- optional with unloading and pressure relief valve cavity
- compact design for production cost saving
- maximum 10 parallel modular valve sections
- work ports on the side of the sub-plate
- aluminium serial plate is without surface protection, steel plate is zinc-coated for 520 h protection



CETOP 5 Serial Plate, Side Ports, Sections 1-6, "PD10-NS..."

$p_{\max} (AL) = 250 \text{ bar}$

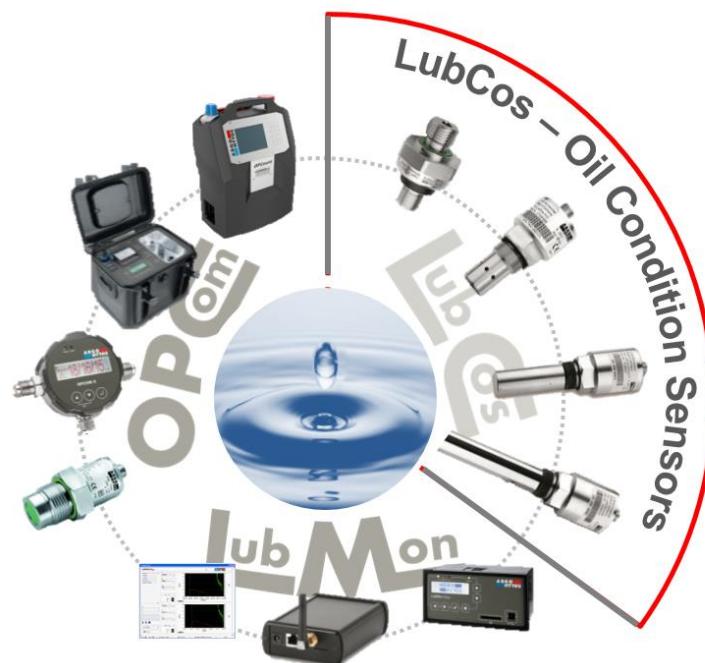
P/T = 3/4" BSPP ; A/B = 1/2" BSPP

- maximum 6 parallel modular valve sections
- work ports on the side of the sub-plate
- serial plate in aluminium, please contact us for other material
- includes mounting stud kits for plate assembly
- standard version without surface protection

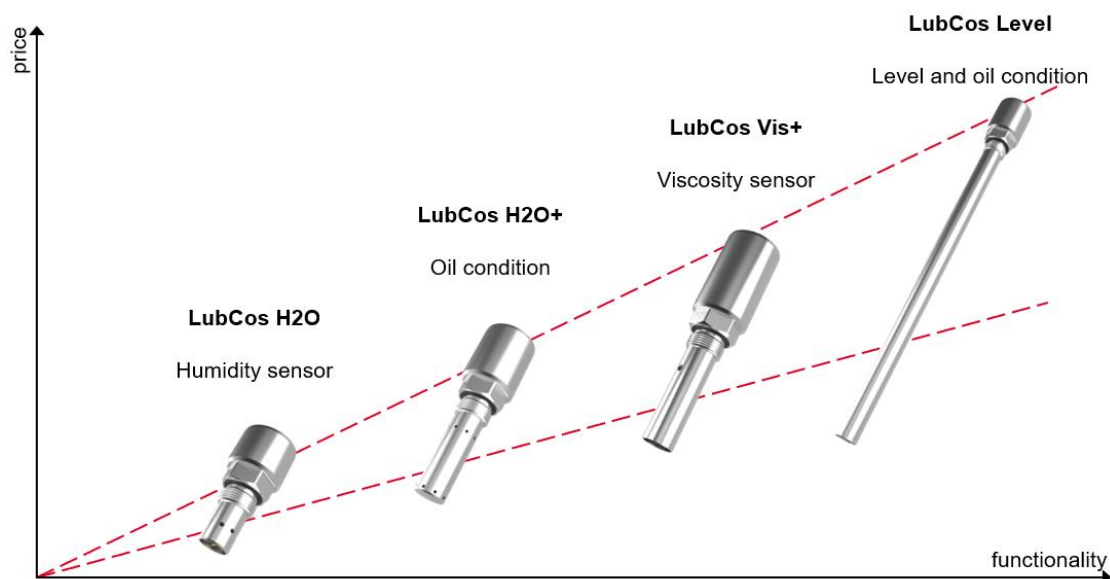
Please contact us for options, different port sizes and customised solutions.

Oil Conditioning Sensors

Classification



Product Range



LubCos H2O **Humidity & Temperature**

- Temperature -20 to 85 °C
- Relative humidity *) 0 to 100 %
- Hydraulic connection G3/4", max. 50 bar, IP67
- Electric connection 9 to 33 VDC; M12x1; 8 pin
- Interface 2x 4-20 mA, RS232

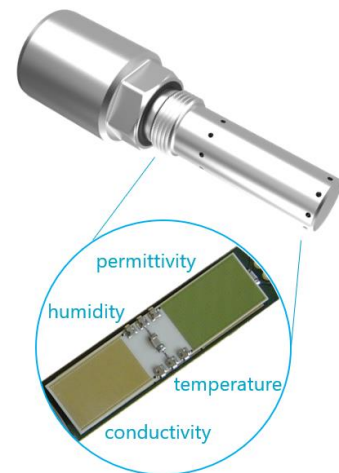
*) absolute humidity optional



⇒ Please consult data sheet "LubCos H2O ; 100.00-EN/US" for further information

LubCos H2O+II **Multi Parameter Oil Condition**

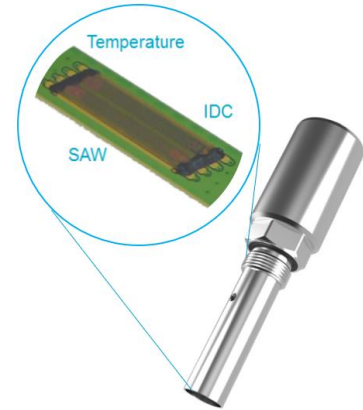
- Temperature -20 to 85 °C
- Relative humidity 0 to 100 %
- Permittivity 1 to 7
- Conductivity 0 to 8×10^5 pS/m
- Hydraulic connection G3/4", max. 50 bar, IP67
- Electric connection 9 to 33 VDC; M12x1; 8 pin
- Interface 2x 4-20 mA, RS232, CAN



⇒ Please consult data sheet "LubCos H2O+ II ; 100.05-EN/US" for further information

LubCos Vis+ **Viscosity and Oil Condition**

- Temperature -20 to 85 °C
- Viscosity 8 to 400 mm²/s
- Permittivity 1 to 7
- Hydraulic connection G3/4", max. 50 bar, IP67
- Electric connection 9 to 33 VDC; M12x1; 8 pin
- Interface 2x 4-20 mA, RS232, CAN



⇒ Please contact us for further information

LubCos Level **Multi Parameter Oil Condition & Level Sensor**

- Temperature -20 to 85 °C
- Relative humidity 0 to 100 %
- Permittivity 1 to 7
- Conductivity 0 to 8 x 10⁵ pS/m
- Level 0 to 100 %
- Hydraulic connection G3/4", max. 50 bar, IP67
- Electric connection 9 to 33 VDC; M12x1; 8 pin
- Interface 2x 4-20 mA, RS232, CAN



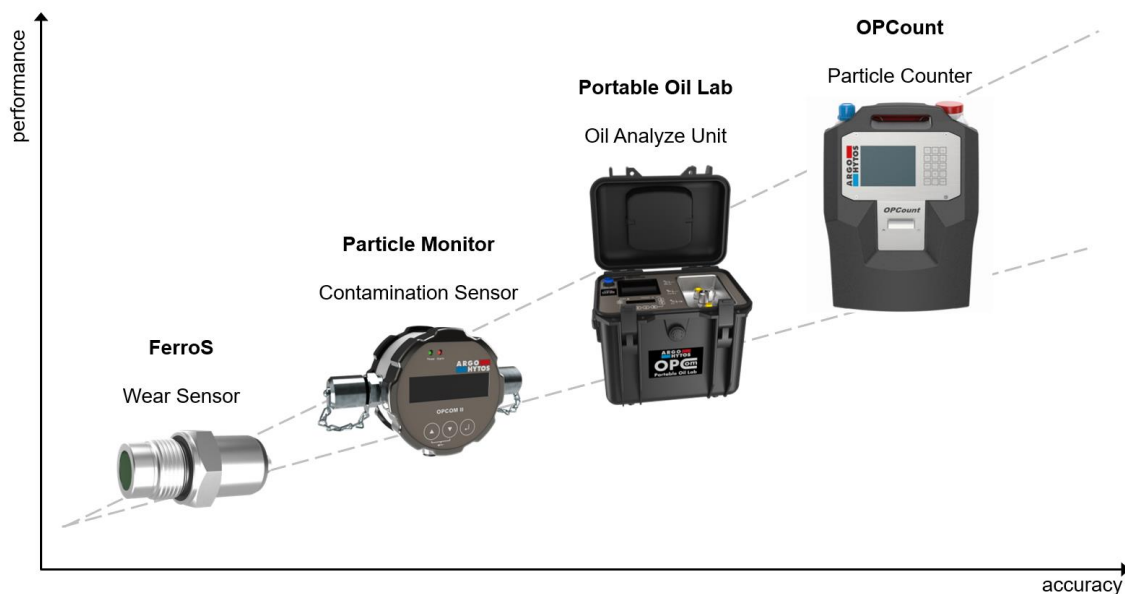
⇒ Please consult data sheet "LubCos Level ; 100.10-EN/US" for further information

Particle Measurement

Classification



Product Range



OPCom FerroS Ferromagnetic Wear Sensor

- Temperature -10 to 80 °C
- Measurement Ferro wear particles
- Hydraulic connection G1", max. 20 bar, IP67
- Electric connection 9 to 33 VDC; M12x1; 8 pin
- Interface 4 to 20 mA, RS232, CAN



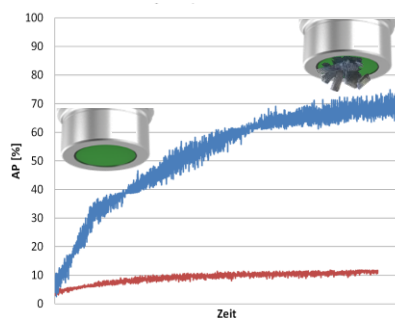
⇒ Please consult data sheet "OPCom FerroS ; 100.55-EN/US" for further information

Feature

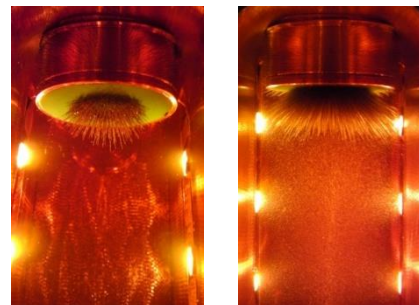
- Continuous monitoring of ferromagnetic wear particles
- Robust against disturbances (air, water, vibration, ...)
- Ideal to monitor gearboxes and heavy machineries

Advantage & Benefit

- Detects wear particles
- Early detection of component damages
- **Cost saving by avoiding breakdown**



signal with and without damage



increase of wear

OPCom II Particle Monitor

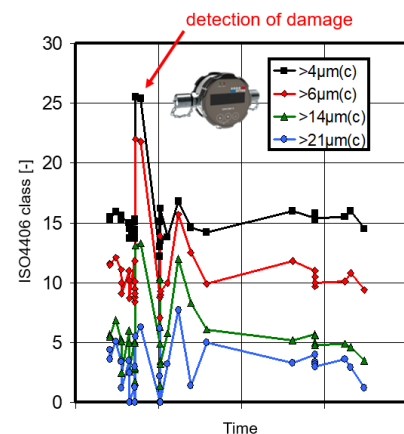
- Particle classes $\geq 4, 6, 14, 21 \mu\text{m(c)}$
- Display standards ISO 4406, SAE AS 4059, NAS 1638, GOST 17216
- Temperature -10 to 80 °C
- Hydraulic connection G1/4", max. 420 bar, IP 67
- Flow rate 50 to 400 ml/min
- Electrical connection 9 to 33 V, M12x1, 8 Pin
- Interfaces 4 to 20mA, RS232, CAN

- ⇒ Available with and without display
- ⇒ Phosphate Ester version available



⇒ Please consult data sheet "OPCom Particle Monitor ; 100.51-EN/US" for further information

Application Example



OPCom Portable Oil Lab

- Particle classes $\geq 4, 6, 14, 21 \mu\text{m(c)}$
- Display standards ISO 4406, SAE AS 4059, NAS 1638, GOST 17216
- Temperature -10 to 60 °C
- Relative Humidity 0 to 100 %
- Hydraulic connection internal pump max. 10 bar
pressure port max. 320 bar
- Electrical connection internal battery or power supply
- Interfaces USB, SD Card, Wi-Fi (opt.)
- Memory 1,500 measurements



⇒ Please consult data sheet "OPCom Portable Oil Lab ; 100.60-EN/US" for further information



OPCount

Particle Counter for Laboratory and Field Service

- Particle classes $\geq 4, 4.6, 9.8, 14, 21, 38, 68 \mu\text{m(c)}$
- Standards ISO 4406, SAE AS 4059, NAS 1638, GOST 17216, GJB 420A, EI-IP 577, DEF-STAN 91-91
- Hydraulic connection internal pump max. 7 bar
pressure port max. 420 bar
- Electrical connection internal battery or power supply
- Interfaces USB, ext. LubCos sensor



⇒ Please consult data sheet "OPCount ; 100.65-EN/US" for further information



Advantages

- Proven and widespread method with high accuracy
- Easy handling and sampling
- Standardised, easy comparability and trending of measurement results

Application

- Usable for almost all applications like hydraulics, pharmaceutical, quality control, aviation etc.
- The units can be used in a lab or on-site to measure a bottle sample, from a reservoir or on a pressure line

Stainless Steel High-Pressure Filter

Series HFL 060 ... HFL 180

The high pressure filters are suitable for applications with extreme ambient conditions thanks to their corrosion-resistant filter housings made of stainless steel. Typical applications are in the energy and disposal industry, the mining industry and offshore sector.

Three different housing lengths as well as various filter finenesses are available to provide the best possible filtration concept according to the respective requirements. The use of filter elements with star-folded filter material ensures the lowest pressure losses and high dirt absorption. This results in particularly long maintenance intervals and excellent results in terms of oil cleanliness.

The standard built-in optical clogging indicator signals the time of the filter maintenance, whereby an optimal utilization of the filter lifetime is achieved.

Characteristics

- Nominal flow rate up to 180 l/min
- Filter fineness 10 µm(c) to 60 µm(c)
- Operating pressure up to 400 bar
- Hydraulic fluid: Mineral oil and biodegradable fluids (HEES and HETG)

Application examples

- Offshore
- Mining Industry
- Environment and Waste Management
- Maritime Applications



The abbreviations represent the following β -values resp. finenesses:

For EXAPOR®MAX2 and Paper element:

5EX2 = $\bar{\beta}_{5(\mu)} = 200$	EXAPOR®MAX 2
7EX2 = $\bar{\beta}_{7(\mu)} = 200$	EXAPOR®MAX 2
10EX2 = $\bar{\beta}_{10(\mu)} = 200$	EXAPOR®MAX 2
16EX2 = $\bar{\beta}_{16(\mu)} = 200$	EXAPOR®MAX 2
30P = $\bar{\beta}_{30(\mu)} = 200$	Paper

Based on the structure of the filter media of the 30P paper elements, deviations from the printed curves are quite probable.

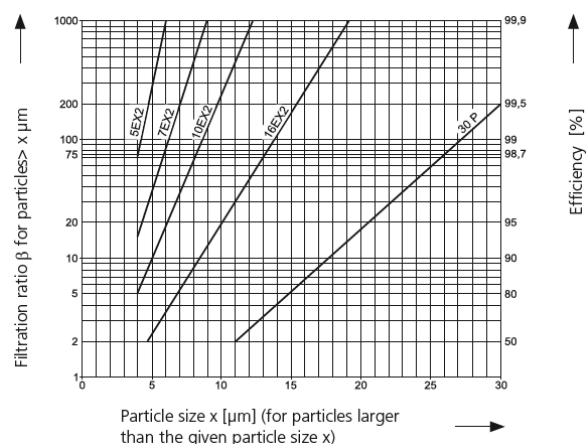
For screen elements:

40S = screen material with mesh size	40 µm
60S = screen material with mesh size	60 µm
100S = screen material with mesh size	100 µm

Tolerances for mesh size according to DIN 4189

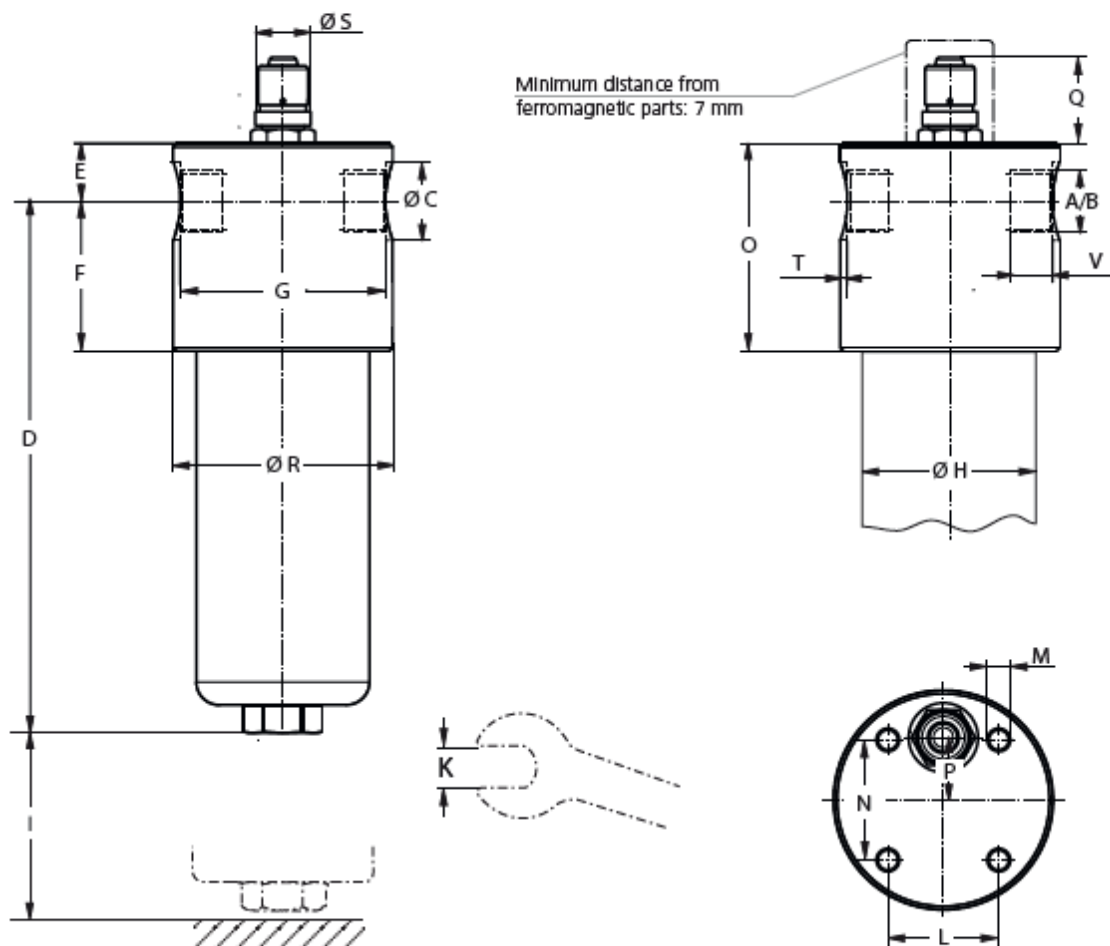
For special applications, finenesses differing from these curves are also available by using special composed filter media.

Filtration ratio β as a function of particle size x obtained by the Multi-Pass Test according to ISO 16889



Preliminary Data Sheet

Dimensions

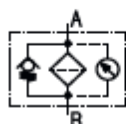


Measurements

Type	A/B	C	D	E	F	G	H	I	K	L	M Ø/depth	N	O	P	Q	R	S	T	V
HFL 060	G $\frac{1}{2}$	29	130	25	65	91	75	70	30	48	M10 / 12	52	90	27	37	95	24	2	16
HFL 110	G $\frac{3}{4}$	34	230	25	65	89	75	170	30	48	M10 / 12	52	90	27	37	95	24	3	18
HFL 180	G1	42	294	25	65	86	75	234	30	48	M10 / 12	52	90	27	37	95	24	4,5	20,5

Symbols

1



FILTRATION



Our Know-How - Your Benefit

When determining the required cleanliness in a hydraulic system, additionally to the technical requirements of the hydraulic components and to the operating pressure, the user's expectations to availability, safety and service life of a machine become increasingly important.

Did you know that ...

- fresh oil can often contain 10 times more dirt particles than are acceptable for hydraulic systems of high technical quality?
- if the operating pressure is increased by only 50 %, the number of dirt particles in the oil must be reduced by a factor of 3 to avoid a deterioration in the lifetime of the components?
- even a filtration quotient of $\beta = 200$ corresponds to filtration efficiency of 99,5 % for all dirt particles that are larger than the specified size, and a β -value of only 10 still corresponds to 90 % efficiency?
- even oil sample bottles declared as clean can contain considerably more dirt particles than the examined oil, if it comes from hydraulic systems with good filtration?
- a lifetime of 1,000 service hours for a hydraulic filter corresponds to a mileage of about 60.000 km of a passenger car?
- only an online count can determine the actual values for cleanliness classes < 10 (ISO 4406)?



At ARGO-HYTOS, the focus is consistently on the customer – and a major element of our development work is to implement customer-specific solutions for filters and systems.

Continuous improvement of our filter elements is another major goal of our development work. This includes increasing the dirt capacity while keeping the installed volume as small as possible. This optimization goal is excellently achieved by our range of standard return-suction filters – just one example of many.

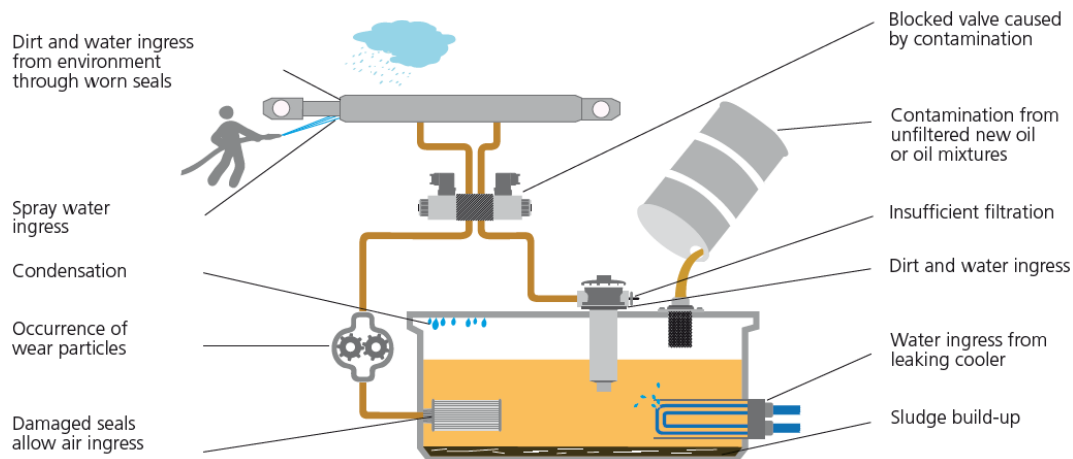
Our sales engineers are just as reliable as our filters themselves. They are trained and experienced filter specialists who speak YOUR language. We believe that before the actual sales discussion there should be the best possible technical advice and assistance with planning if requested. This is the only way to ensure that our customers make the right purchase.

To a large extent, the decision on whether to use Suction, Return, Pressure or High-Pressure Filters - or a combination of these types - depends on the following factors:



- The contamination sensitivity of the components in the existing/planned system,
- the priority given to protect the function of the component or to prevent wear,
- design or requirements of pumps, motors and valves (manufacturer specifications) and
- the way dirt is generated, the location where it occurs and the possibility of ingress from outside.

Sources of Pollution



Contaminant	Cause	Effect on systems	Detected by	Solution
Dirt	Start-up contamination, oil contamination from environment, dirt ingress during maintenance / repair, component breakdown, wear	Early breakdown, increased wear, reduced system performance / lifetime	Particle counter	Filter oil to correct target cleanliness level (TCL)
Water	Leaking cooler, damaged seals, no / insufficient filler cap, condensation	Loss of oil performance, oil life shortened, corrosion	Humidity sensor	Water removal element, vacuum unit, oil change
Air	Product design, leaks, damaged seals, low oil level	Cavitation, oxidation, oil life shortened	Dielectricity / conductivity / viscosity sensor	Seal system, add / change oil
Heat	Blocked valve, damaged cooler	Loss of oil performance, oil life shortened, component damage	Temperature sensor	Check / repair system, change oil
Mixture	Wrong fluid added to system	Damaged fluid, loss of system performance	Dielectricity / conductivity / viscosity sensor	Drain system, flush, refill with filtered oil
Shear	Overstressed fluid	Oil life shortened, damaged fluid	Dielectricity / conductivity / viscosity sensor	Check system, change oil

Filtration of a hydraulic drive system is a serious topic; it makes the difference between a reliable operation or a possible disaster.

ARGO-HYTOS, as one of the leading supplier for filtration technology, offers following product range:



Suction Filters



Return Filters



Return-Suction Filters



Filter Cooling Units



Pressure Filters



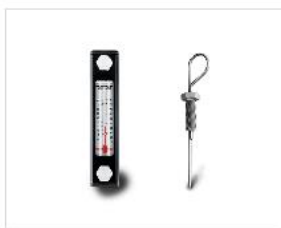
High Pressure Filters



Filling & Ventilating Filters



Clogging Indicators



Accessories for Hydraulic
Tanks



Filter-Elements



Off-line Filters

⇒ [See also our website ...](#)

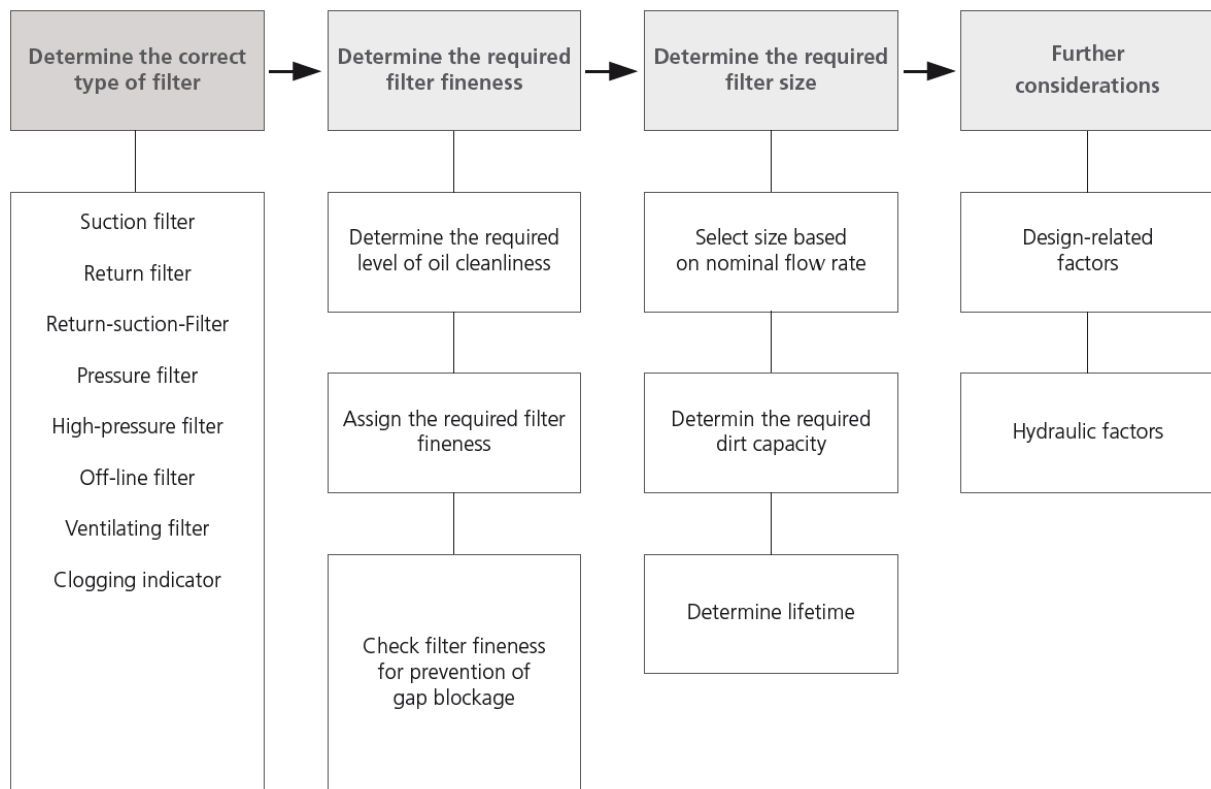
ARGO-HYTOS offers filters and components as follow:

Filter Type		Flow max. in lpm (gpm)	Pressure max. in bar (psi)
Suction		350 (92.5)	
Return		900 (237.8)	10 (145)
Return-Suction		850 (224.5)	10 (145)
Multifunctional Unit (for hydrostatic drives)		200 (52.8)	10 (145)
Filter Cooling Units		125 (33)	10 (145)
Pressure		1,450 (383)	100 (1,450)
High-Pressure		1,000 (264.2)	630 (9,137)
Off-Line Filters		650 (171.7)	12 (174)

Component		Specification	Options
Filling & Ventilating		Flow up to 850 lpm (224.5 gpm)	vandalism proof, desiccant, roll-over protection, splash guard
Clogging Indicators		Pressure up to 600 bar (8,700 psi)	screw-in, flanged, optical, electrical, temp. suppression
Accessories		oil drain valves, level gauges, dipsticks	

⇒ Please contact us if you don't find the component you are looking for or you require a tailormade solution.

The ARGO-HYTOS Procedure for Selecting a Filter



This filter selection procedure is based on many years of practical experience with countless mobile and industrial hydraulic systems that are equipped with correctly chosen ARGO-HYTOS filters.

Required Oil Cleanliness

The oil cleanliness required in the system is determined by the component which is most sensitive to dirt.

If the component manufacturer does not provide any specific information about the required oil cleanliness or filter fineness, it is advisable to determine the oil cleanliness based on this table.

The listed reference values for normal components refer to a basic pressure range of 160 to 210 bar.

Pumps	
Axial piston pumps	21 / 18 / 15
Radial piston pumps	21 / 18 / 15
Gear pumps	21 / 18 / 15
Vane pumps	20 / 17 / 14
Motors	
Axial piston motor	21 / 18 / 15
Radial piston motor	21 / 18 / 15
Gear motors	21 / 18 / 15
Vane motors	20 / 17 / 14
Valves	
Directional control valves (solenoid valves)	21 / 18 / 15
Pressure valves	21 / 18 / 15
Flow control valves	21 / 18 / 15
Check valves	21 / 18 / 15
Proportional valves	20 / 17 / 14
Servo valves	17 / 14 / 11
Cylinders	
	21 / 18 / 15

Operating pressure	Change in oil cleanliness
0 ... 100 bar	3 classes worse
100 ... 160 bar	1 class worse
160 ... 210 bar	none
210 ... 250 bar	1 class better
250 ... 315 bar	2 classes better
315 ... 420 bar	3 classes better
420 ... 500 bar	4 classes better
500 ... 630 bar	5 classes better

If the operating pressure is increased in a system, it is necessary to improve the oil cleanliness in order to achieve the same wear lifetime for the components.

This table lists the required change in oil cleanliness when the operating pressure increases in relation to the basic pressure range of 160 to 210.

⇒ [See also our Guideline on how to select the optimal hydraulic filter on our website ...](#)

Practical Tips

Recommendation	Why?
Use high-quality name brand oils	▶ Low-grade oils (secondary raffinate) tend to become resin
Filling and Refilling of fresh oil only by using an off-line filter unit with an ultra-fine filter	▶ Avoid additional dirt entry
Avoid mixtures	▶ Uncontrollable reactions are possible ▶ No traceability when monitoring oil by spectral analysis
No signal of clogging indicator	By non-observance endangering the machine by ... ▶ opened by-pass valve → decreasing the filter effect, therefore less or no protection ▶ filter material bursts ▶ with suction filters → risk of cavitation in the pump
Only use genuine spare filter elements	▶ Only these have passed the hard release tests of machine manufacturers ▶ guaranteed dirt holding capacity ▶ proven filtration efficiency / specified filter fineness ▶ proven flow fatigue characteristics ▶ proven media resistance
Exchange tank ventilating filter regularly	▶ Undue pressures in the hydraulic tank are prevented
Only use gaskets which are specified from the machine manufacturer	▶ Unsuitable sealing may lead to leakage or air intake
Clean screen filter elements of suction filters only	▶ Ultra-fine filter elements in high pressure, return and off-line filters cannot be cleaned (disposable element).

Genuine Filter Element



Low-Cost Filter in combination with low-grade oil



Example Filtration Solutions

Construction Machines

Suction Filters and Suction Strainers					
Return-Filters					
Return-Suction Filters					
Medium-Pressure, High-Pressure and High-Pressure Safety Filters					
Filling- and Ventilating Filters					

Material Handling

Suction Filters and Suction Strainers				
Return Filters				
Pressure, High-Pressure and High-Pressure Safety Filters				
Filling and Ventilating Filters				
Tanks				

Agricultural Machines

Suction Filters and Suction Strainers							
Return- and Return-Suction Filters							
Medium Pressure Filters							
High-Pressure and High-Pressure Safety Filters							
Filling- and Ventilating Filters							

Municipal Machines

Suction Filter							
Return-Suction Filter							
Pressure Filter							
High-Pressure and High-Pressure Safety Filter							
Filling and Ventilating Filter							

Injection Moulding Machines

Control Block

- ▶ High-Pressure Filter

Main Circuit

- ▶ Pressure Filters and Off-Line Filtration
- ▶ Filter-Cooler Unit

Off-Line Filter Units Stationary

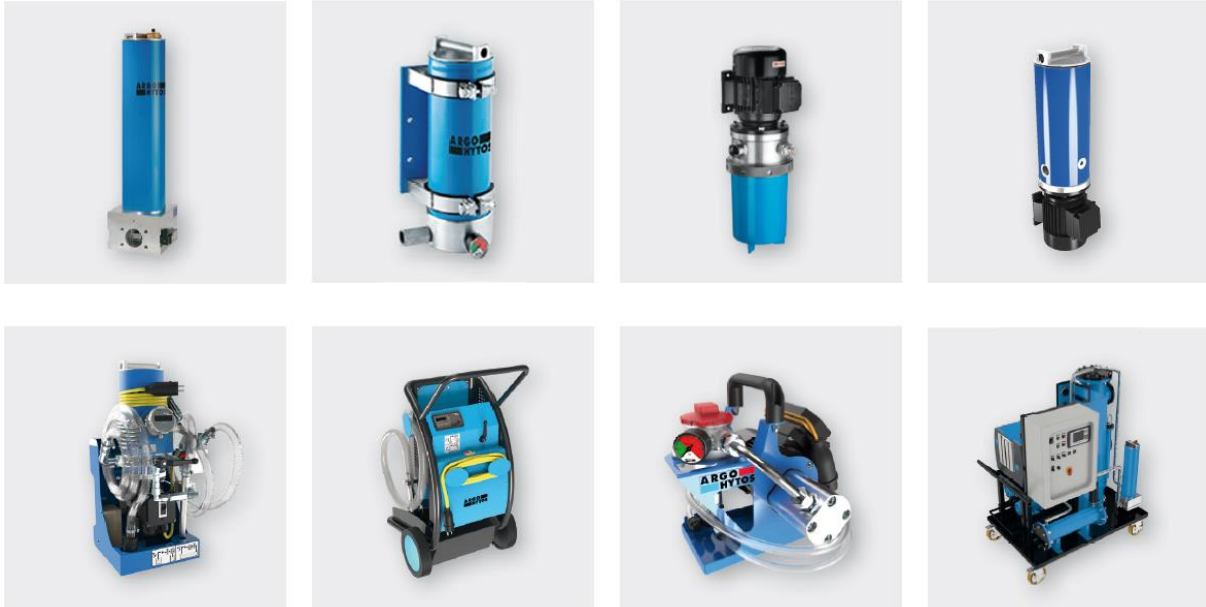
- ▶ 8 to 45 lpm

Oil Service and Sensors

- ▶ Portable Oil Service Units
- ▶ Particle Counters
- ▶ Oil Conditioning Sensors
- ▶ Dewatering System



FLUID MANAGEMENT



Beside of reducing maintenance and servicing costs, an effective fluid management is a key factor in boosting the reliability, productivity and cost-effectiveness of the operation.

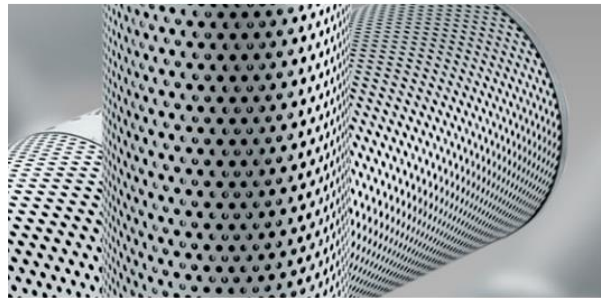
ARGO-HYTOS supplies application-oriented products for manual and automatic cleaning of hydraulic fluids, such as:

Off-Line Filters and Off-Line Filter Units
Filter Cooling Systems
Oil Service Units and Dewatering Systems

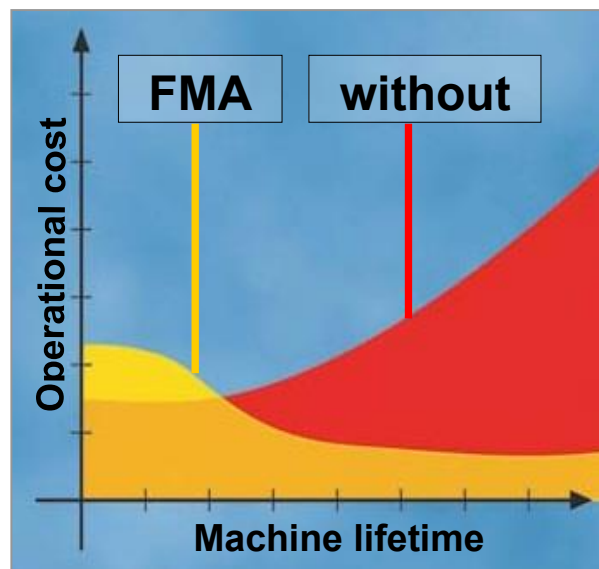
FMA ⇒ Fluid Management

We define Fluid Management (FMA) as extending the service life of the machine and reducing operating costs through preventive oil service.

- ✓ Filtration during filling
- ✓ Oil filtration during machine service
- ✓ Retrofitting of working machines with a bypass filtration system to improve the oil cleanliness class
- ✓ Dewatering of oil
- ✓ Oil condition monitoring

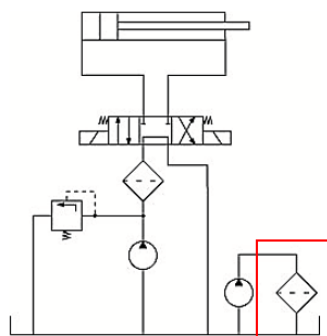


By improving the system cleanliness, the lifetime of the hydraulic or lubrication system can be extended.

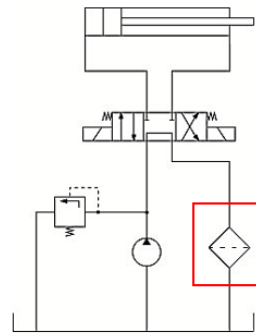


Type of system	Initial ISO Code	Target ISO Code	Lifetime extended by:
Hydraulic	-/19/17	-/14/11	x 4
Lube	-21/19	-/15/12	x 3

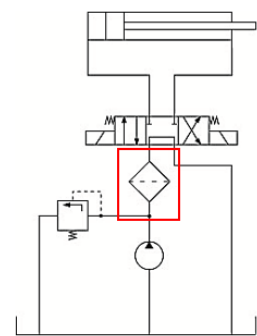
Off-Line Filters



Bypass

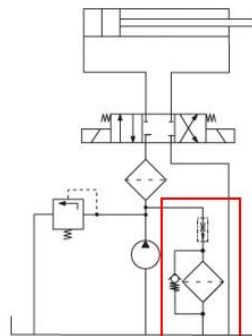


Return Line



Pressure Line
(max. 12 bar)

Off-Line Filters with Flow Control Valve

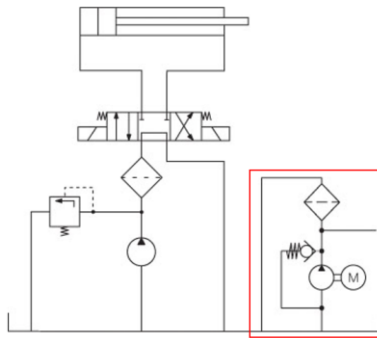


Pressure Line
(max. 320 bar)

	<i>standard</i>	<i>with flow valve</i>
Type	FN 040, FN 060, FN300	FNS 040, FNS 060
Q _{max}	650 lpm	1, 2 or 4 lpm
P _{max}	12 bar	320 bar
Filter finesses	3, 5, 10 µm, aqua	3, 5, 10 µm, aqua
Clogging indicator	optical / electrical	optical / electrical
Dirt holding capacity (ISO 16889, ISO-MTD)	up to 740 g	up to 145 g

Special versions on request

Stationary Off-Line Filter Units



Independent bypass system installed in machine to improve the oil cleanliness class.

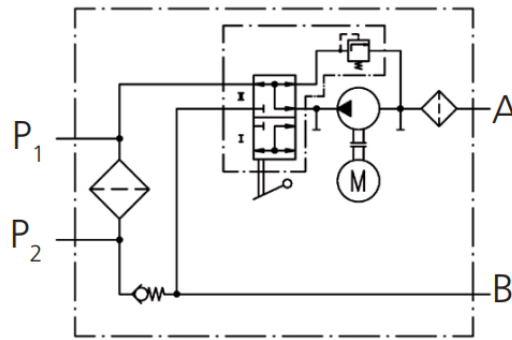
Applications

- Systems exposed to high pollution and/or complex systems with high oil purity requirements
- Test benches
- Injection moulding machines
- Presses

	<i>AC motor</i>	<i>DC motor</i>	<i>high viscosity</i>
Type	FNA 008, FNA 016	FNA 014	FNA 008
Q _{nom}	8 / 16 lpm	14 lpm	8 lpm
P _{max}	4 bar	4 bar	6 bar
Kinematic viscosity	15 - 200 mm ² /s (short term 400 mm ² /s)		1,500 mm²/s
Filter finesses	3, 5, 10 µm 3, 7 µm aqua		3, 5, 10 µm
Dirt holding capacity (ISO 16889, ISO-MTD)	270 to 490 g	280 g	270 g
V _{Motor}	3~ 400/460 V 50 Hz 1~ 230 V 50...60 Hz 1~ 110 V 50...60 Hz	12 VDC 24 VDC	3~ 400/460 V 50 Hz
Connections	IN 3/4" BSPP OUT 1/2" BSPP		IN 1" BSPP OUT 3/4" BSPP
Accessories	clogging indicator, dewatering filter element, other motor voltage, portable version		

Stationary Off-Line Filter Units

High Flow and Manual Valve to Bypass the Filter (pumping over)

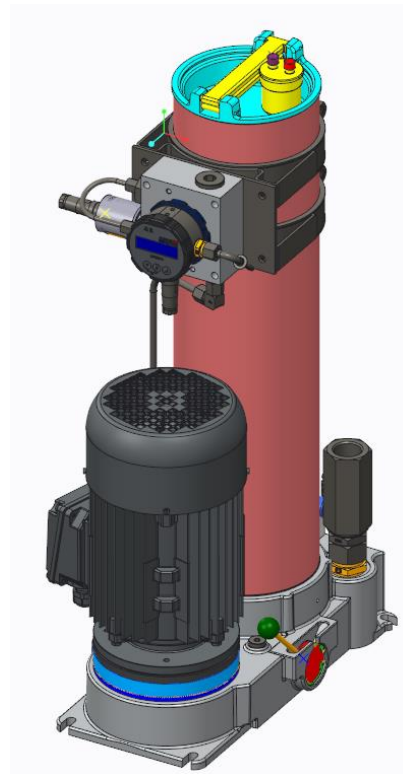


	with bypass valve
Type	FNA 045
Q_{nom}	45 lpm
P_{max}	6 bar
Kinematic viscosity	15 - 600 mm ² /s (short term 800 mm ² /s)
Filter finesses	3, 5, 10 µm
Dirt holding capacity (ISO 16889, ISO-MTD)	1,950 g
V_{Motor}	3~ 400/460 V 50 Hz 1~ 230 V 50...60 Hz 1~ 110 V 50...60 Hz
Connections	IN 1-1/4" BSPP OUT 1" BSPP
Accessories	clogging indicator, dewatering filter element

Stationary Off-Line Filter Units

With Oil Measurement

with OPCom II Particle Monitor and/or
LuBCos H2O (LuBCos H2O+II) Humidity Sensor



with oil measurement

Type	FNAPC 016 / 045
Q _{nom}	16 / 45 lpm
P _{max}	6 bar
Kinematic viscosity	300 mm ² /s
Filter finesses	3, 5, 10 µm
Dirt holding capacity (ISO 16889, ISO-MTD)	1,950 g
V _{Motor}	3~ 400/460 V 50 Hz 1~ 230 V 50...60 Hz 1~ 110 V 50...60 Hz

Portable and Mobile Oil Service Units



Permanent Off-Line Filtration
Oil Filtration during Machine Service
Filling Machine with filtered Oil



Portable and Mobile Oil Service Units

Optional with Particle Monitoring



	<i>standard</i>	<i>with particle monitoring</i>
Type	FA 008 / 016	FAPC 16
Q _{nom}	8 / 16 lpm	16 lpm
P _{max}	4 bar	
Kinematic viscosity	15 - 250 mm ² /s (short term 400 mm ² /s)	
Filter finesses	3, 5, 10 µm	3 µm
Dirt holding capacity (ISO 16889, ISO-MTD)	210 to 280 g	
Suction filter	280 µm	
V _{Motor}	1~ 230 V 50...60 Hz ; 1~ 110 V 50...60 Hz	
Suction/Return hose	DN 19 mm	
Clogging indicator	Optical (manometer)	
Particle monitor	-	OPCom II
Accessories	dewatering filter element, trolley for transportation	trolley for transportation

Mobile Oil Service Units

Optional with Oil Condition Monitoring



	<i>standard</i>	<i>with partice/ monitoring</i>
Type	UM 045	UMPC 045
Q _{nom}	45 lpm	
P _{max}	7 bar	
Kinematic viscosity	15 - 600 mm ² /s (short term 800 mm ² /s)	15 - 250 mm ² /s
Filter finesses	3, 5, 10 µm	3 µm
Dirt holding capacity (ISO 16889, ISO-MTD)	1,950 g	
Suction filter	280 µm	
V _{Motor}	3~ 400 V 50 Hz ; 1~ 230 V 50 Hz	
Suction/Return hose	DN 32 / 25 mm ; l = 2,7 m	
Clogging indicator	optical (manometer)	electrical (pressure switch)
Monitoring	-	OPCom II, LubCos H2O, LubCos H2O+II
Accessories	dewatering filter element	SD memory card, LAN cable transmisison, automatic switch off, built-in printer

UMPC (high performance) with built in printer



UMPC Lightline



<< same quality – less options – great value for a competitive price >>

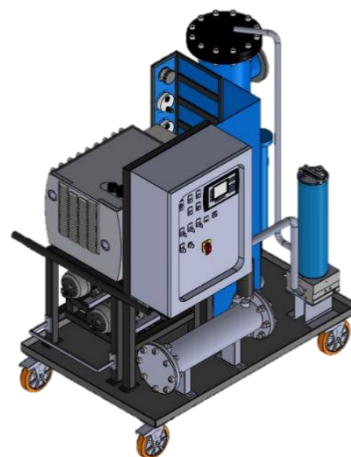
Dewatering System



- ⇒ Removing of dissolved water from hydraulic system
- ⇒ Additional off-line filtration

Applications

- large hydraulic and lubrication systems
- injection moulding machines
- presses
- mining, offshore, turbines
- paper mills
- sensitive applications



custom-built edition

	<i>standard</i>
Type	OPS 010
Q _{nom}	10 lpm
P _{max}	6 bar
Kinematic viscosity	15 - 750 mm ² /s
Filter finesses	3, 5 µm
Dewatering speed	0.9 lph ^{*)}
V _{Motor}	3~ 400 V 50/60 Hz
Clogging indicator	optical / electrical
Weight	approx. 160 kg

^{*)} for 200 l and water content of 12.000 ppm at start

Application Example



Hydraulic Power Packs



*Dewatering
Service Unit*



Wind Turbines





Retrofit Production Machine



Service & Maintenance



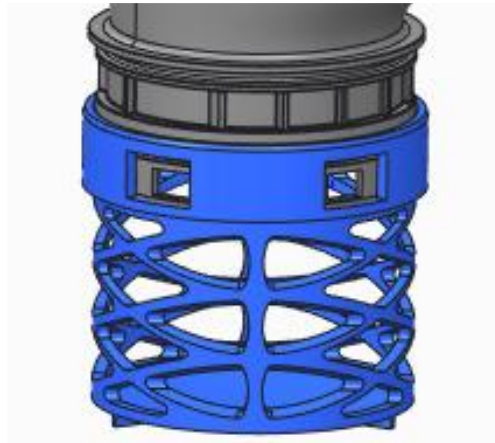
Material Handler with Dewatering Filter Element



Please contact us for customized solutions



NEW AND NOTEWORTHY



Labyrinth Deaeration for Return Filter

Free air can cause numerous problems in hydraulic systems and in hydraulic oil, as:

- Cavitation and micro-diesel effect
- Corrosion and component damage
- Oil aging
- Oil foaming
- Noise generation
- Decreased pump efficiency
- Temperature problems
- and many more...

*please also see our product video "Tanks with active Air Separation"
on our website (www.argo-hytos.com/videos/products.html)*



Features

- 70% improvement against air bubbles in hydraulic systems
- More than 90% separation efficiency
- Up to 30% reduction of hydraulic reservoirs

Advantages

- Low pressure drop
- Separation efficiency independent from flow rate and temperature
- Compact and light
- Saving of space, oil and weight

Benefit

- Cost saving by system optimisation

HYBRID INTEGRATED TANKS

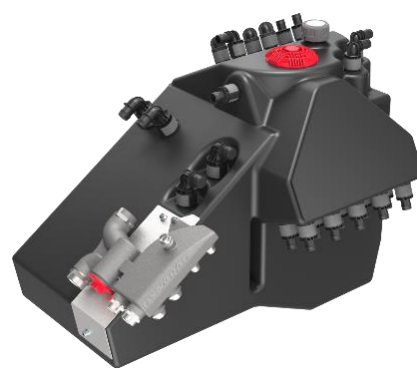


Why shall our Hybrid Integrated Tanks be Introduced in your Equipment

- We all spend a lot of time in designing hydraulic drive systems, elaborate pressure drops, heat exchanges, efficiency and cost-effective equipment but have we ever questioned the oil reservoir?
- Why not considering something else than a cubic oil tank made of steel or aluminium?

Change the way how you implement oil reservoirs and take account of the advantages!

- ✓ Integration of Functions
- ✓ Customised Geometry
- ✓ Lightweight
- ✓ Excellent Corrosion Resistance
- ✓ Easy Assembly and Handling
- ✓ Size Reduction
(together with Deaeration)
- ✓ Ready for installation
- ✓ Cost Saving



smart and innovative

Description

The *Hybrid Tank* intelligently combines the two manufacturing technologies of rotational and injection molding. The unique combination of innovative production processes with a modular kit makes the *Hybrid Tank* economically interesting even for small quantities.

Function

The *Hybrid Tank* is a ready-to-install complete module. All required tank functions are already integrated. Since the filter housing is part of the tank, there are no sealing points and therefore no risk of leakage.

The tank geometry can be adapted as required to the installation situation. Numerous components such as filter cover, Quick-Connect fitting, etc. come from an existing modular system and do not cause any tool costs to the customer.

100% replacement filter element business is ensured by a special copy protection. The high thermal strength of the Polyamide material used allows the tank to be used even at higher operating temperatures. Quick-Connect fittings allow fault-free and tool-free hose mounting on the tank and can also be dismantled at any time.

Technical Data

Specification

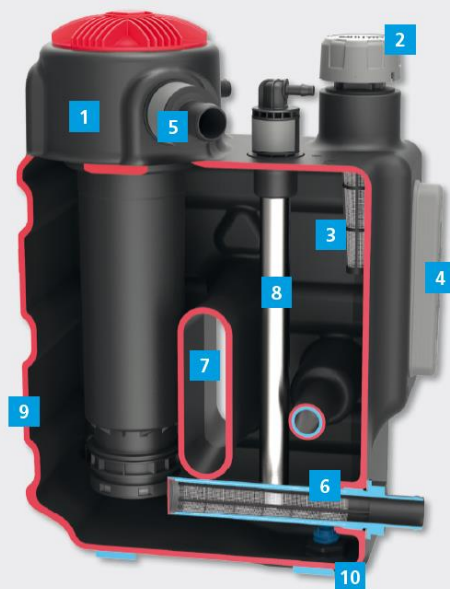
- | | |
|----------------------------|---|
| • Tank Volume | Up to 150 l |
| • Temperature (short-term) | -30° C ... +100° C (up to +120° C) |
| • Fluids | Mineral oil and environmentally friendly hydraulic fluids |

Integrated Filter Functions

- | | |
|-------------------------|------------------|
| • Return filter | • 10 ... 30 µm |
| • Return-suction filter | • 10 ... 16 µm |
| • Suction strainer | • 140 ... 280 µm |
| • Ventilating filter | • 2 µm |
| • Filling filter | • 140 ... 450 µm |

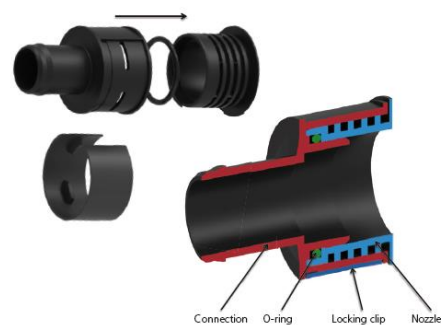
We offer one standard size tank with a volume of 28 litres.

TH028-R**-**-OMO**



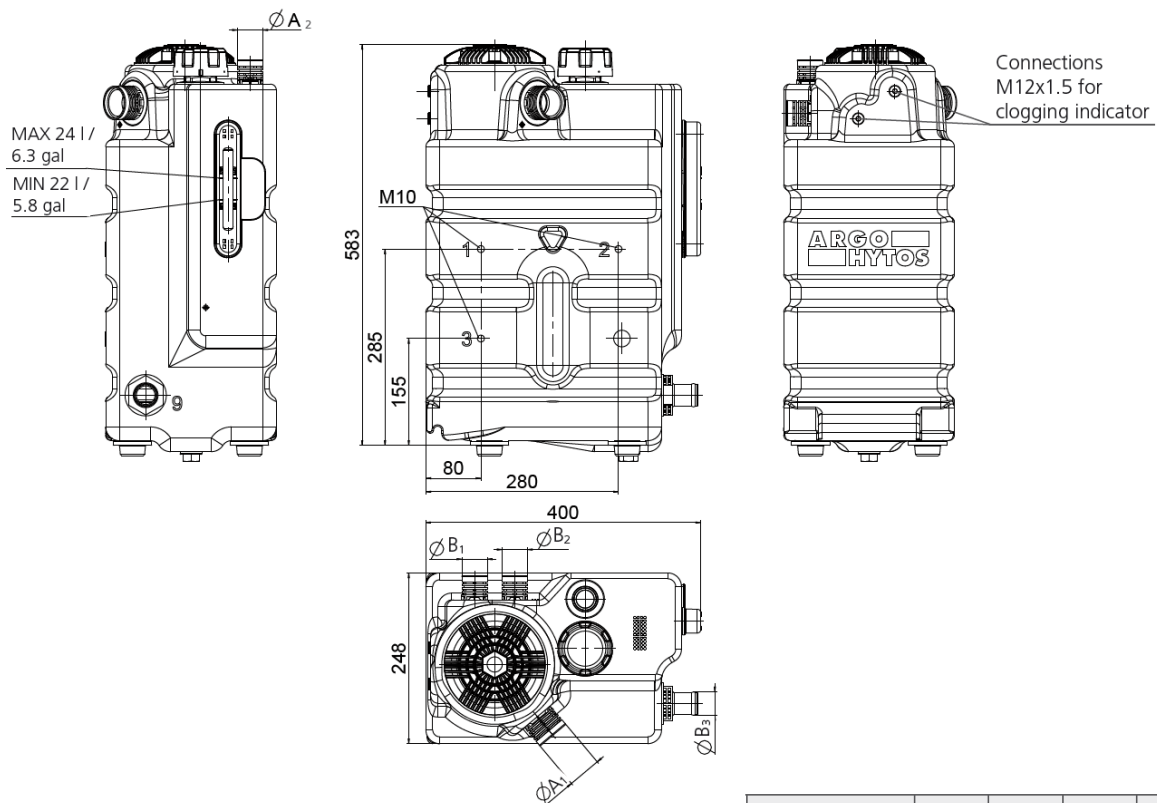
Function integration

- 1 Filter housing is integrated in the tank
- 2 Ventilating filter
- 3 Filling filter
- 4 Integrated oil level indicator
- 5 Quick-Connect fittings (see figure below)
- 6 Suction strainer
- 7 Baffle wall (in the shape of a channel)
- 8 Internal suction or return pipes
- 9 Sensor connections can be integrated
- 10 Oil drain plug



"Quick-Connect" system technology

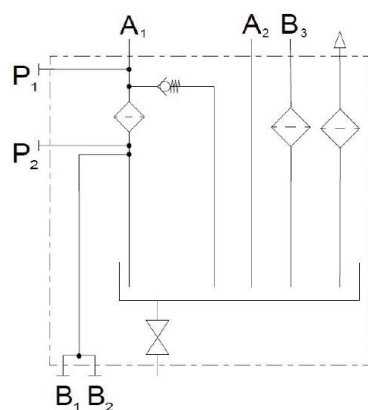
Dimensions



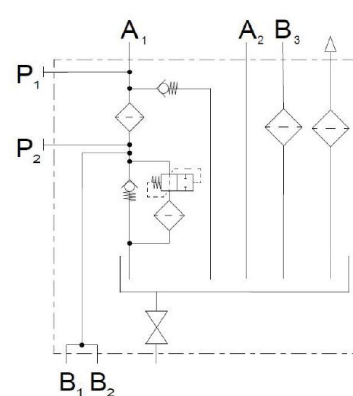
Measurements	ϕA_1	ϕA_2	$\phi B_{1,2}$	ϕB_3
mm	48.9	37.0	37.0	32.0
inch	1.93	1.46	1.46	1.26

Symbols

Return Filter



Return Suction Filter



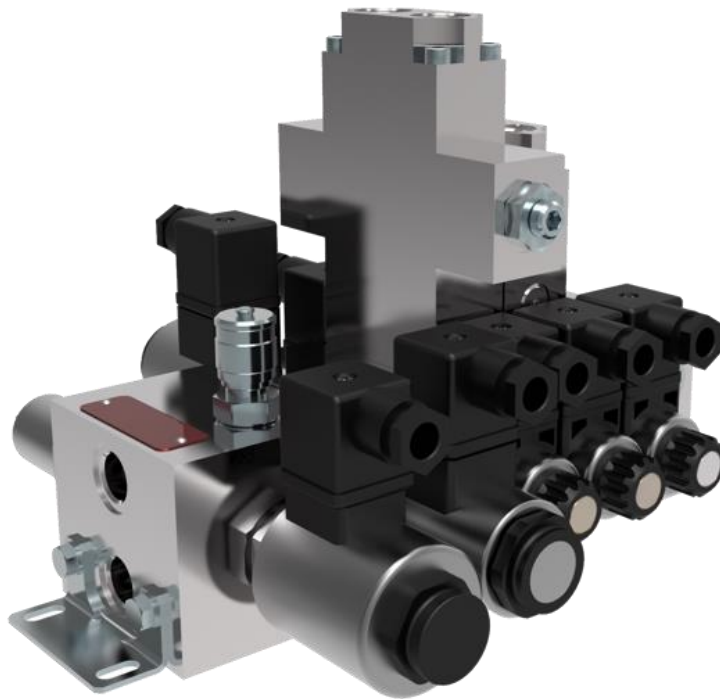
Typical Applications





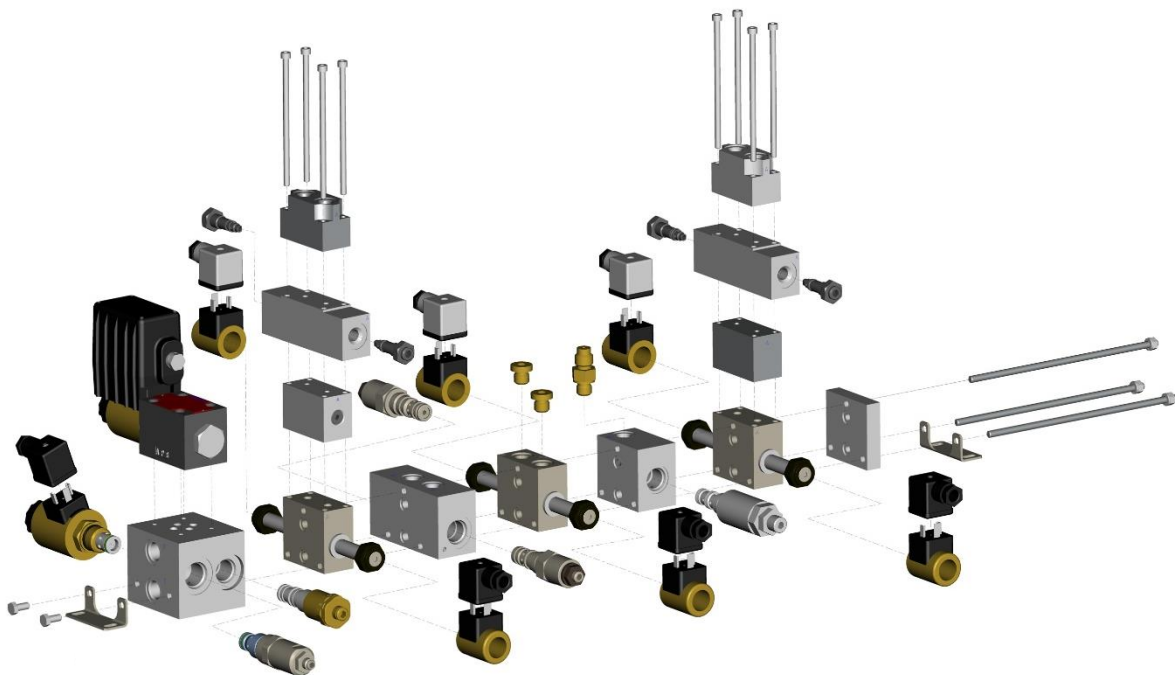
RPEK

BANKABLE MODULAR VALVE ASSEMBLY



The RPEK-03/B Modular Valve Assembly is a highly flexible assembly valve kit with a wide range of applicability in mobile and stationary applications.

Various of modular sections with screw-in valves, connected horizontally and/or vertically, are used to design most of the control systems for open centre applications.



We offer our customers the flexibility of a modular assembly while developing hydraulic systems and creating various system modifications, even so if frequently made design changes are needed.

**The fact that there is no need to commission the production for each option
saves development time and labour costs.**

Our Modular Valve Assembly is built by:

Inlet Block

Connects the control unit to the source of the hydraulic circuit. Inlet sections can be installed either side or than in the centre of the assembly group.

- Side inlet with pressure relief and optionally unloading valve
- Side inlet with proportional directional control valve, pressure relief and unloading valve
- Centre inlet plate with either P and T ports on the side or upper surface

Horizontal Sections

Integration of the RPEK1 solenoid operated directional control valves together with a wide range of control functions in port A and B, such as ...

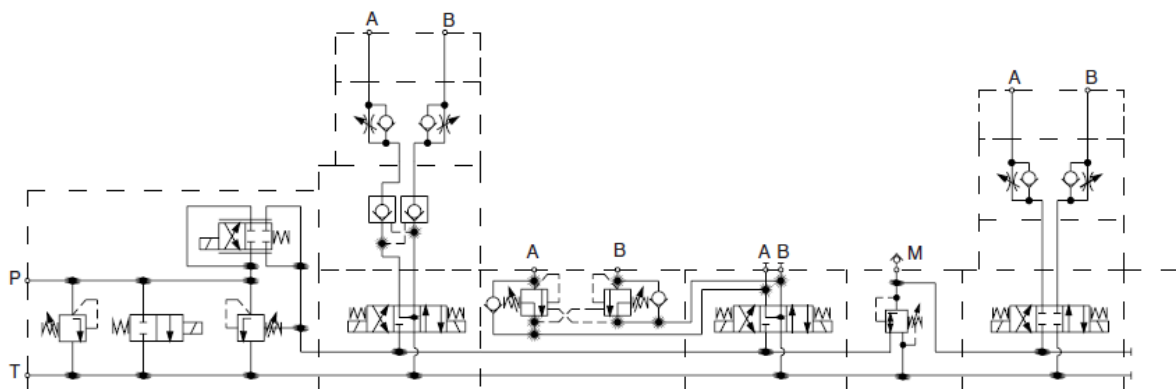
- Check valves
- Pilot operated check valves
- Pressure control valves
- Overcentre (counterbalance) valves
- Solenoid operated flow control valves

Vertical Sections

Further useful control valves with horizontal or vertical outputs, such as ...

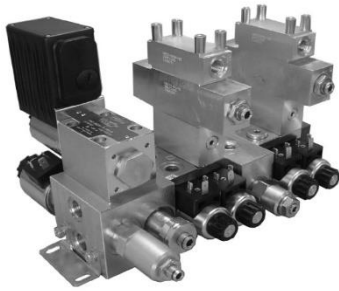
- Pressure relief valves
- Throttle valves with bypass check
- Pilot operated check valves
- Several connecting blocks

Example of a Compact Multifunctional Modular Block with three actuators



Basic manifold not required!

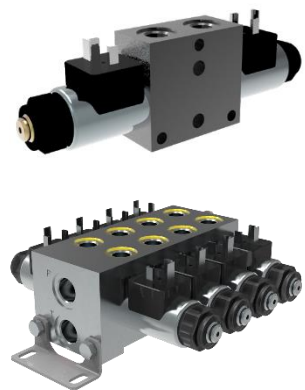
Technical Data



• Pressure max.		250 bar (3,630 psi)
• Flow max.	P & T A & B	60 lpm (15.9 GPM) 20 lpm (5.3 GPM)
• Number of Sections		8 with Side and 16 with Centre Inlet Section
• Control Voltage		12 or 24 VDC
• Port Size	P & T A & B Gauge	3/8 BSPP, 1/2 BSPP, SAE 8 (3/4-16 UNF) 1/4 BSPP, 3/8 BSPP, SAE 6 (9/16-18 UNF) 1/4 BSPP, SAE 4 (7/16-20 UNF)

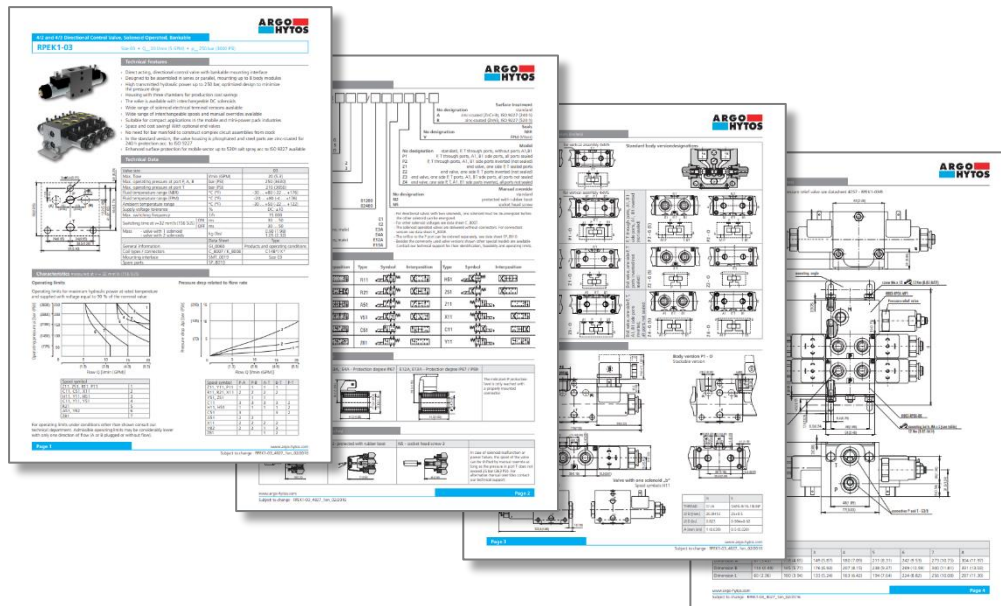
Advantages & Benefits

- No need for a basic manifold, compact design
- Used as a stand-alone control unit or with our SMA05 Power Packs
- Easy to build complex control units without tubes and hoses
- Possibility of subsequent rebuilding or extending the assembly
- Compact design for small built-in space
- **Saving of Cost and Installations Space**

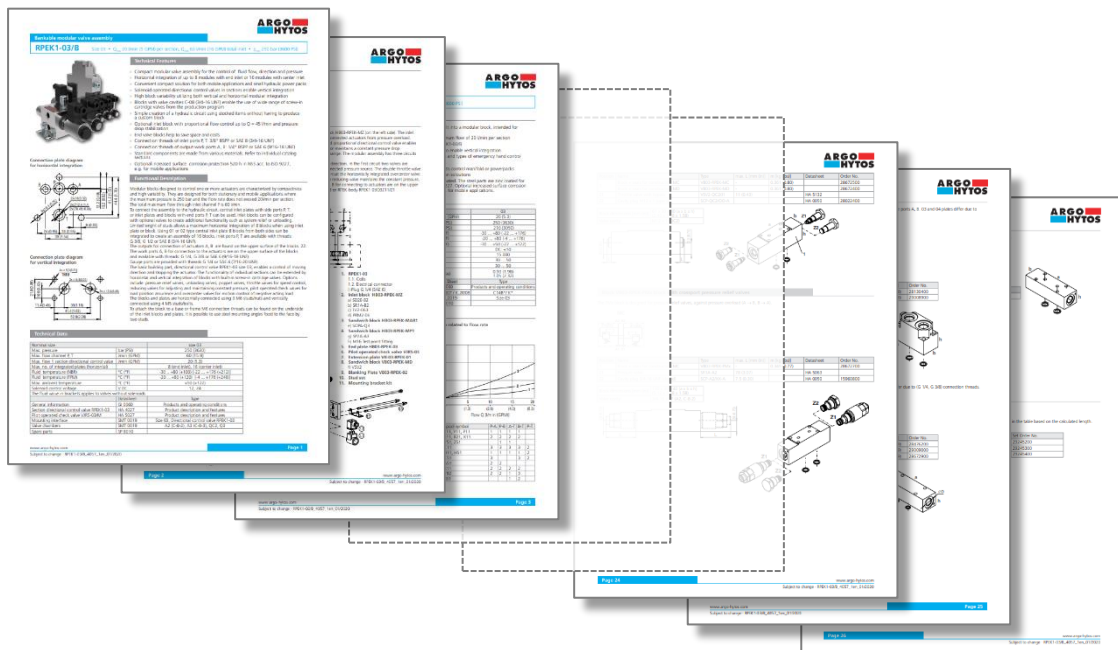


Download our Data Sheet ...

RPEK1-03 Control Valve

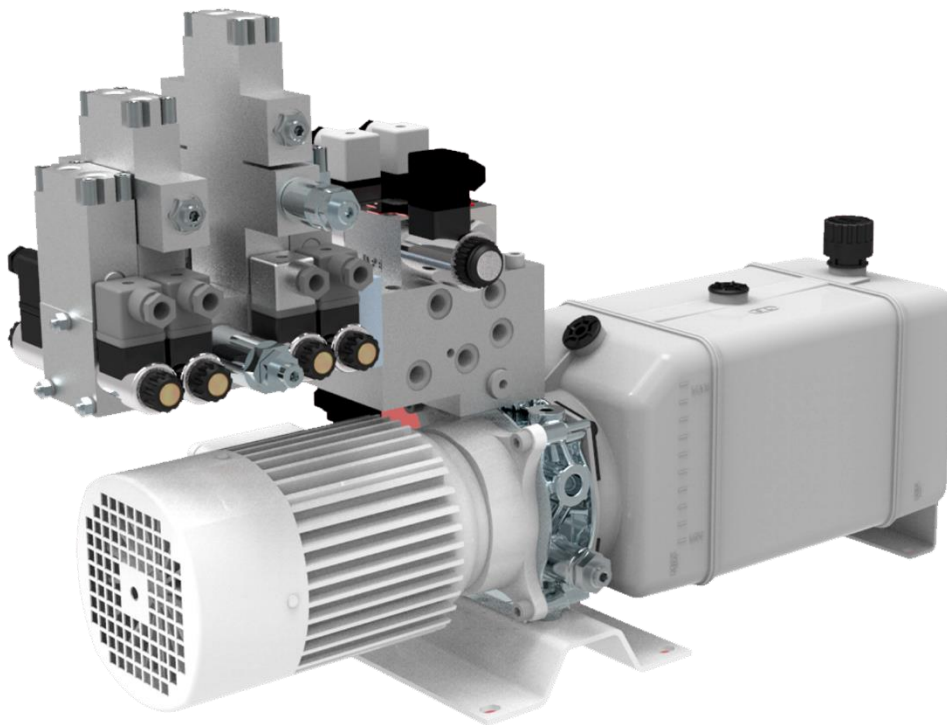


RPEK1-03/B Modular Valve Assembly



Our RPEK-03/B Modular Valve Assembly also fits on our

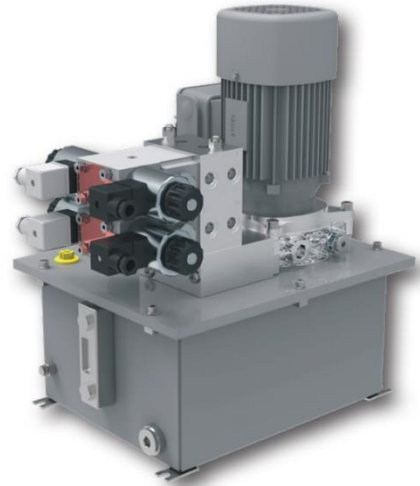
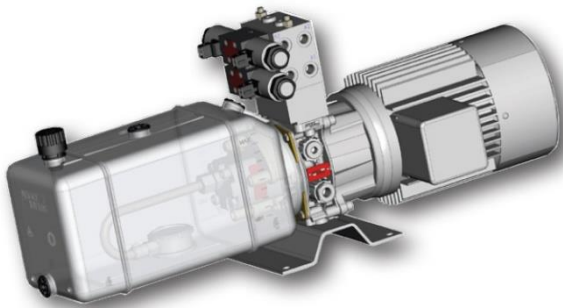
SMA 05 HYDRAULIC MINI POWER PACKS



Technical Data

- | | |
|------------------|--|
| • Pressure up to | 250 bar (3,630 psi) |
| • Flow up to | 17 lpm (4.5 GPM) |
| • Electric Motor | 12 VDC, 24 VDC, 230 VAC, 230/400 VAC |
| • Oil Tank | 1.5 to 40 litres
plastic or steel, vertical or horizontal |
| • Valve Assembly | size 3 (RPEK), CETOP 2 and 3
vertical or horizontal |

Example

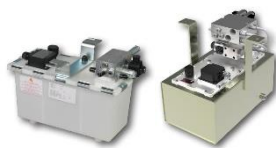


Benefit from our capability and order the complete hydraulic power pack together with our [RPEK-03/B Modular Control System](#) on board.

Download our Data Sheets ...

SPA 01

Under Oil Motor



USMA 05 / SMA 05

Compact / Mini



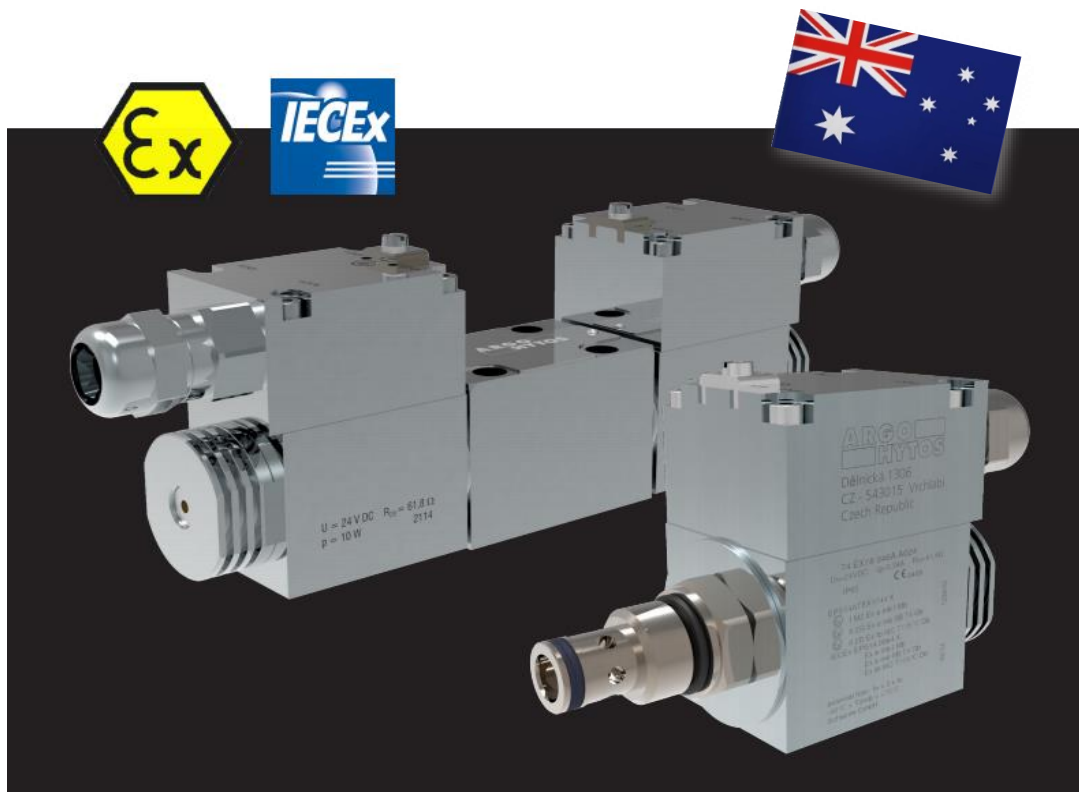
SA4

Standard



"Long awaited now finally available in Australia"

Explosion-Proof Valves with Australian Certification



Great achievement by two of the leading industry providers!

Some of the Features of our Valve Technology

robust valve and solenoid design
proven impact resistance (mining)

IP 66/68



AC and DC solenoids
10 W or 18 W

various temperature classes
T4, T5, T6



high ambient temp.
up to 70 °C

suitable for all EX areas
gas (IIC), dust (IIIC) and mining (M2)

high corrosion protection
due to ZnNi

As one of just a few companies worldwide,
ARGO-HYTOS has been awarded of all the necessary approvals.

This enables us to develop and produce explosion-proof products for all regions worldwide,
as well as to market them in their respective territories.

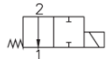


Australian Certificate
IECEx ExTC 20.0002X

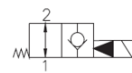
*Valid for all States and Territories
provided by CUSTOM Fluidpower*

Product Portfolio Ex-Proof Valve Range

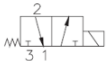
"All explosion proof Valves you need from One Source - up to 420 bar and 600 lpm"



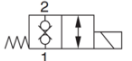
SD2EX-B2
350 bar
60 l/min



SD3EX-B2/C2
420/350 bar
60/150 l/min



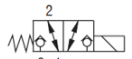
SD2EX-B3
350 bar
60 l/min



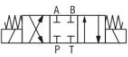
SD1EX-A2
350 bar
30 l/min



SD2EX-B4
350 bar
60 l/min



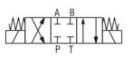
SD1EX-A3
350 bar
30 l/min



RPEX3-06
350 bar
60 l/min



RNEXH1-10
320/420 bar
150 l/min



RPERX3-06
350 bar
60 l/min



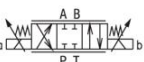
RNEXH5-16
320/420 bar
300 l/min



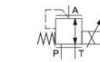
RPERX3-06
350 bar
60 l/min



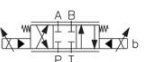
RNEXH4-25
320/420 bar
600 l/min



PRMX2-06
350 bar
28 l/min



PVRMX3-10
90 bar
40 l/min



PRMX8-06
350 bar
140 l/min



SD2PX-B4
250 bar
25 l/min

DEDICATED QUALITY FOR BEST PRICE

Lightline

Valves • Filters • Pumps



Not only **ARGO-HYTOS** offers high-end products,
but also one of the best cost-value ratio in the entire hydraulics market.

Our *Lightline* series is based on the well-known **ARGO-HYTOS High Performance** product range, uses the same quality of components and production processes, just with an optimized market required performance.

Valves have smaller coils,
but still a nominal pressure up to **250 bar**.

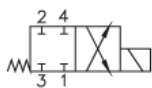
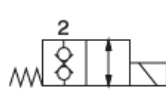
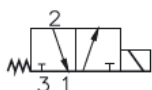
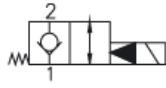
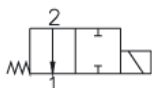
Filters have market required dirt holding capacity,
suitable for systems with a recommended service life of **500 hours**.

Pumps come in a cost-optimised design,
but still with an operating pressure of up to **300 bar**.

Lightline VALVES – CETOP and Cartridge



APPLICATIONS



Features

- Modular valves sizes CETOP 02 and 03
- Screw-in valves sizes 3/4-16 UNF and 7/8-14 UNF
- High variety of electrical terminals
- Various surface finish options

Benefits

- Saves money due to weight-optimized design
- Best value for cost

Lightline FILTERS – Return and In-Line Suction Filters



APPLICATIONS



Applications

- systems with up to 500 hrs. service life
- low and medium specified systems
- lower cold start requirements
- lower flow dynamics

Performance

- flow rate and pressure drop like EXAPOR®MAX2
- fully compatible with EXAPOR®MAX2
 - 40% less dirt holding capacity
 - 500 hrs. recommend service life

Specifications

- up to 650 lpm and 2.5 bar
- 10, 20 and 30 micron elements

Price Advantage compared with EXAPOR®MAX2

- 30% less for filter assembly
- 40% less for filter element

Lightline PUMPS – Gear Units



APPLICATIONS



Specifications

- up to 71 ccm and 300 bar
- high variety of drive shafts, flanges, and ports
- for stationary and mobile hydraulics

Features

- high operational reliability
- high volumetric efficiency
- cost optimized design

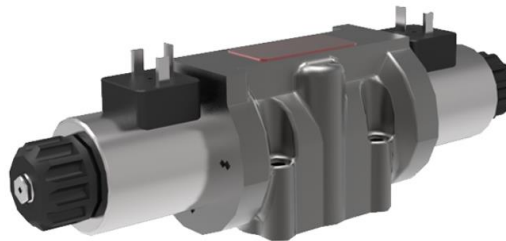
Some Highlights of our Product Range ...

CETOP and Cartridge Valves

RPEL1-10

CETOP 5 (NG 10)

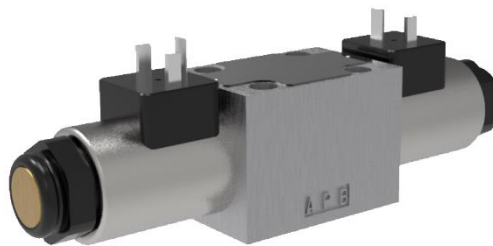
- ✓ 250 bar (3,600 psi)
- ✓ 100 lpm (26 gpm)



RPEL2-06

CETOP 3 (NG 06)

- ✓ 320 bar (4,600 psi)
- ✓ 50 lpm (13 gpm)
- ✓ 5 chamber housing design



Market Launch 2020-Q3

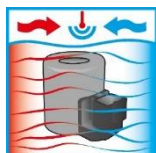
Solenoids



Solenoids interchangeable between CETOP and Screw-In Cartridges

--- We offer more than Standard! ---

Unique Values for all your Industrial and Mobile Applications



**Extended Thermal Shock
Immersion Test**



**Inorganic Dust Test
IP6x according to IEC 60529**



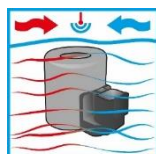
**Bumb Test
according to EN 60068-2-29**



**Vibration Test
according to EN 60068-2-6**



**High Pressure Cleaning Test IPX9K
Ref. Standard DIN 40 050, part 9**



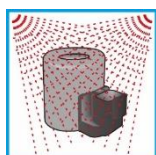
**Storage Temperature Test
according to EN 60068-2-14**



Chemical Resistance Test



Maximum Load Cycling Test

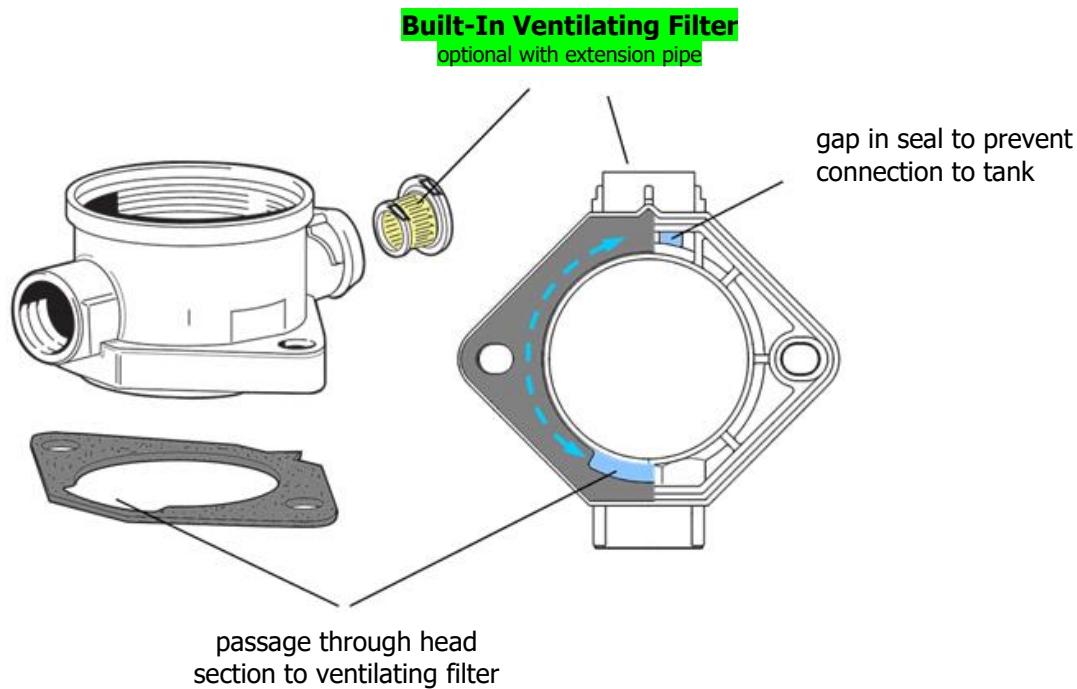


**Salt Spray Test
according to Standard ISO 9227**



**Combined Operating Voltage,
Humidity and Temperature Test**

Return Filters



- Due to the gap in the flat gasket, which is located opposite of the ventilating filter, a labyrinth is formed to prevent oil ejection in mobile applications.

Removable Bowl

- The element and the bowl are removed at the same time for maintenance, which guarantees that all captured dirt is removed during element service

Oil Separator

- A cylindrical chamber with four small openings to the tank chamber prevents the ejection of splashing oil through the ventilating filter

Gear Pumps

Long-Standing Tradition

Experience, innovation, and continuous optimization are important prerequisites for the development and production of advanced products with wide application in both stationary and mobile hydraulics.

Our product portfolio includes valves for hydraulic circuit control, manifolds and HICs, as well as complete hydraulic drives. We manufacture standard as well as tailor-made products for specific applications.

We participate in the development and production of technical projects of our customers and we achieve excellence in our quality approach regarding people, products, processes, and services.

GP0L, GP1L, GP2L, GP3L are "Lightline"

These pumps are intended for circuits with a lower operating pressure and are not designed to be combined in multiple pump units.



GP0 for outputs up to 2.3 kW with a speed range from 600 to 8,000 rpm.

These pumps are characterized by high efficiency and low noise levels through the entire rotation range.



GP1 with displacements from 0.8 to 11.8 cm³ and outputs up to 10 kW.

They are characterized by high operational reliability and durability.

A wide range of construction designs is available with different connection dimensions and port locations. Hydraulic compensation of axial clearance in our new generation of gear pumps improves the efficiency and reduces the noise level of the pumps.



GP2 with displacements from 4 to 31 cm³.

Pumps use a 12-tooth gear to ensure a low level of noise.



GP3 with displacements from 10 to 100 cm³.

Pumps use a 12-tooth gear to ensure a low level of noise.

The maximum driving moment of a multi-sectional group of pumps is 340 Nm. The maximum torque transferred by the coupling between sections is 190 Nm.



This Newsletter is about ...

THE RIGHT WAY OF CONTAMINATION MONITORING IN HYDRAULIC SYSTEMS



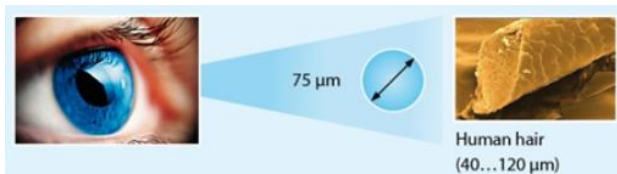
**... AND HOW TO IMPROVE THE RELIABILITY
OF YOUR HYDRAULIC SYSTEMS**

We produce fluid power *solutions*

We all know different types of oil contamination. Some are obvious, due to the appearance or change in colour, others perhaps not quite noticeable.

Some of them are ...

- gas / air (bubbles)
- other fluids (wrong oils, water, ...)
- cross-influence as water drops with air bubbles
- solid particles
 - metals
 - non-metals (dirt, plastics, soot, ...)



Contamination larger than 40 micron are visible to the human eye.

Fine particles are not noticeable and require special equipment.

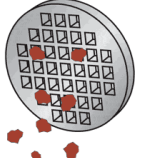
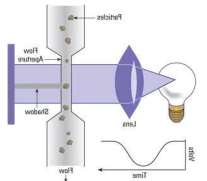
Why do we measure contamination?

- protection of components
- less service
- longer live time
- specifications of manufacturers
- detection of faults in the hydraulic system
- increase of effectiveness and value
-

Beside of supplying degasification solutions and dewatering filter systems,

ARGO-HYTOS is the market leader for oil condition monitoring and detection of contamination by solid particles.

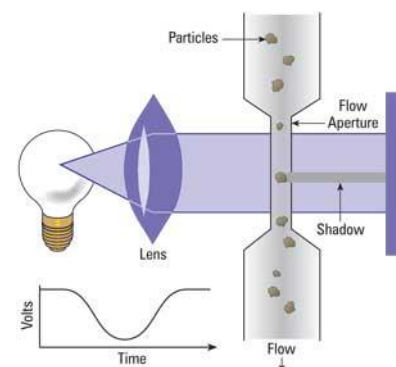
The industry implements various procedures ...

Measurement Methods		
microscopic measurement		❖ old method ❖ high effort ❖ critical sample preparation
mesh blocking principle		❖ high technical effort ❖ limited measurement range
optical measurement light extinction principle ARGO-HYTOS		❖ particles create a shadow on the photocell

The preferred measurement method by ARGO-HYTOS is the *light extinction principle* which offers the most accurate results and the output our customers rely on it.

How does it work?

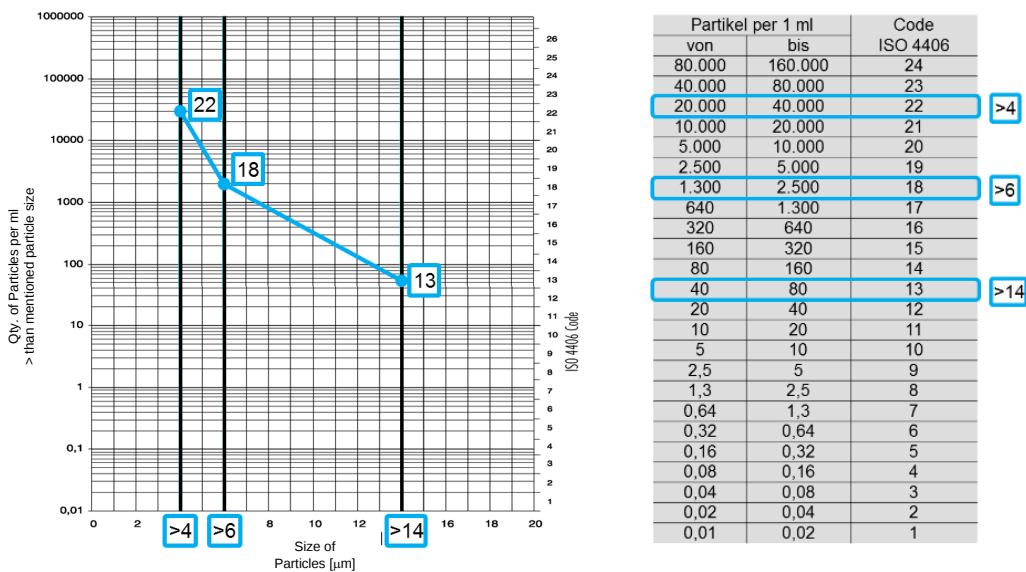
- If there is no particle in the measurement cell, all light will pass through to the photo diode
- If a particle enters the measurement cell a shadow will be created on the photo diode
- The size of the particle can be determined by the light intensity detected at the photo diode
- Measurement standard sizes are 4, 6 and 14 micron
- The flow is calculated by the speed of the particles



How do we classify the contamination?

The most common standard in our geographical market and industry is ISO 4406:1999 which indicates the number of particles per 1 ml with a code.

... for example 22/18/13



Which means particles ...

- > 4 micron between 20,000 and 40,000 particles
- > 6 micron between 1,300 and 2,500 particles
- > 14 micron between 40 and 80 particles

Typical cleanliness requirements

Pumps		
Axial piston pumps	21 / 18 / 15	
Radial piston pumps	21 / 18 / 15	
Gear pumps	21 / 18 / 15	
Vane pumps	20 / 17 / 14	
Motors		
Axial piston motors	21 / 18 / 15	
Radial piston motors	21 / 18 / 15	
Gear motors	21 / 18 / 15	
Vane motors	20 / 17 / 14	
Valves		
Directional control valves (solenoid valves)	21 / 18 / 15	
Pressure valves	21 / 18 / 15	
Flow control valves	21 / 18 / 15	
Check valves	21 / 18 / 15	
Proportional valves	20 / 17 / 14	
Servo valves	17 / 14 / 11	
Cylinders		
	21 / 18 / 15	

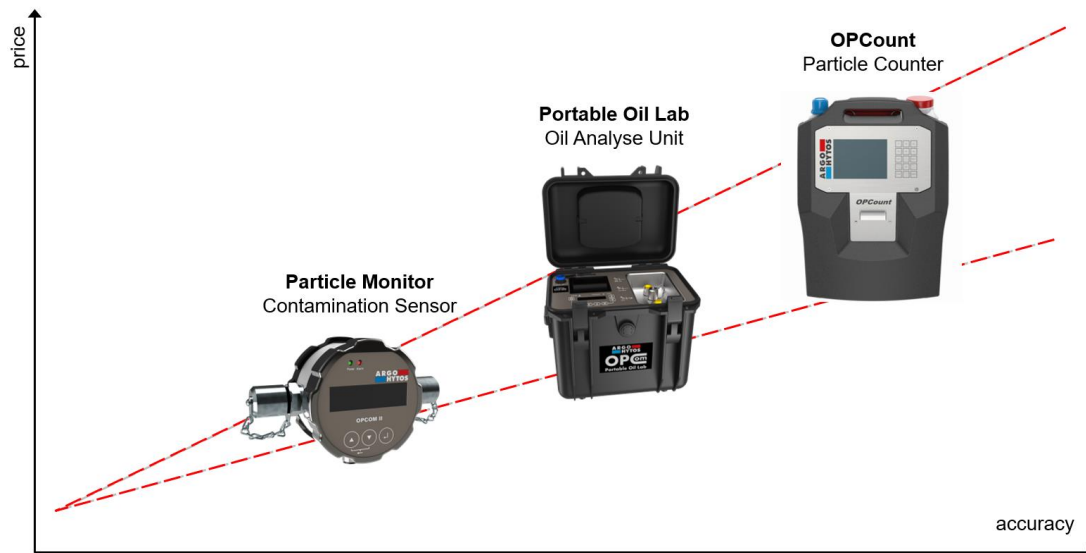
The required oil cleanliness in the system is determined by the most dirt-sensitive component.

If the operating pressure is increased in a system, it is necessary to improve the oil cleanliness to achieve the same wear lifetime for the components.

Operating pressure	Change in oil cleanliness
0 ... 100 bar	3 classes worse
100 ... 160 bar	1 class worse
160 ... 210 bar	none
210 ... 250 bar	1 classe better
250 ... 315 bar	2 classes better
315 ... 420 bar	3 classes better
420 ... 500 bar	4 classes better
500 ... 630 bar	5 classes better

Oil cleanliness levels required for hydraulic components (160...210 bar)

We offer different measuring instruments to improve the reliability of your hydraulic system.



Online Sampling

- No influence of wrong sampling
- Trends can easily be displayed
- Continuous monitoring over long periods

Bottle Sampling

- Samples can be measured at a later time
- Sample can be analysed in the lab
- Samples can be taken at several points parallel

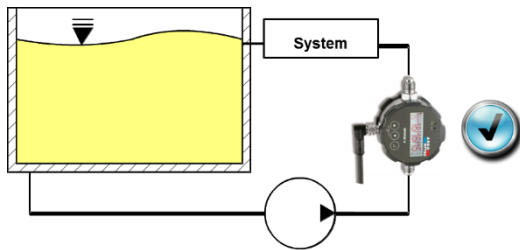


Please also see our Newsletter from December 2019

How to measure contamination online

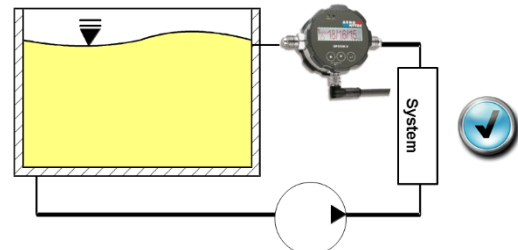
Monitoring of Inlet

*Measurement of contamination
distributed to the system*

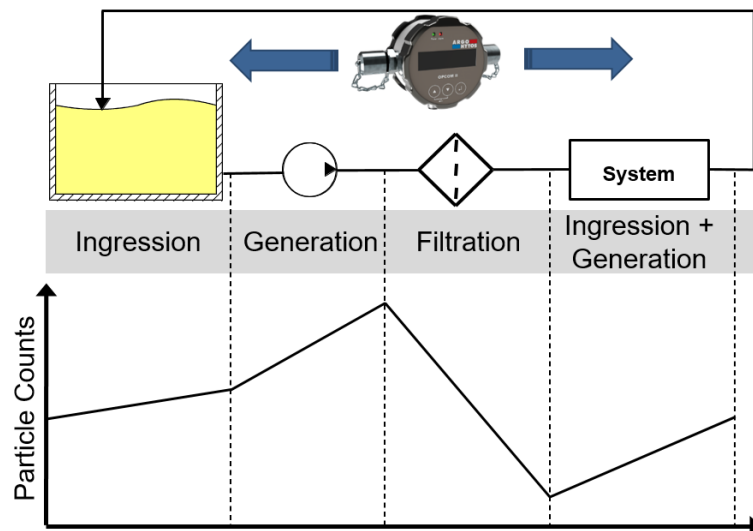


Monitoring of Return

*Measurement of contamination
from the system*

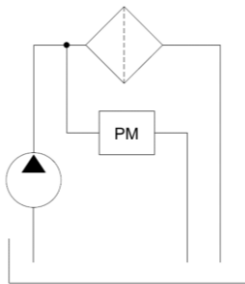


The measurement point has to be chosen according to the monitoring goal

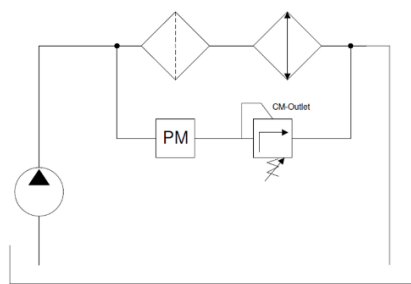


Find the correct place for system representative measurement

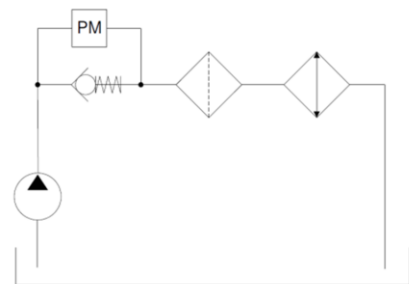
full system
pressure



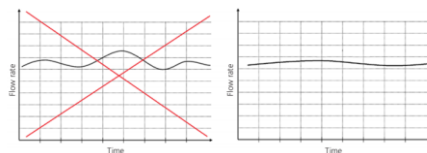
with adjustable
pressure holding valve



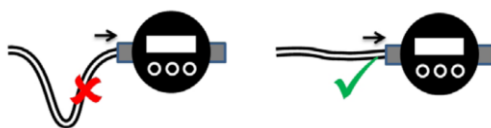
with pressure
holding valve



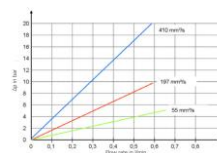
Pay attention to ...



a stable flow velocity within the limits



avoid blind holes in the supply line

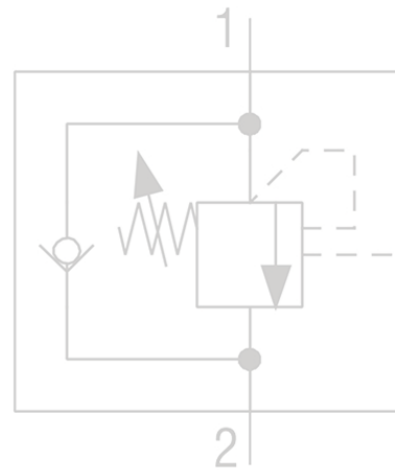


the viscosity dependent flow range

***ARGO-HYTOS is the leading company
for condition and contamination monitoring.***

MOTION CONTROL

Overcentre (Counterbalance) Valves



Load Holding * Load Control * Load Safety

We produce fluid power **solutions**

Overcentre Valves are used mainly for the following purposes:

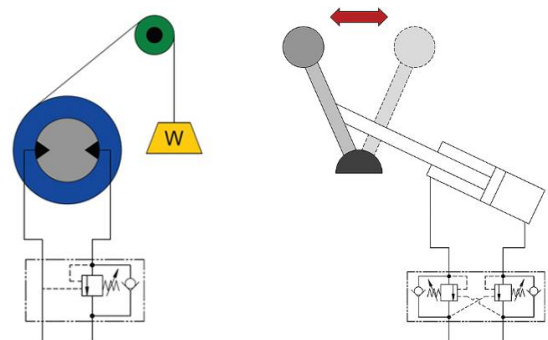
- Load Holding** prevents the movement of a load when the directional valve is in the neutral position
- Load Control** prevents the actuator running ahead of the pump due to the load-induced energy
- Load Safety** prevents uncontrolled movement of the load in case of failure

Application Example

Controlling of Negative Load

The overcenter valve prevents the actuator running ahead of the pump due to the load-induced energy.

Thereby eliminating cavitation in the actuator and loss of control.



Advantages and Benefits of our Valves

leak free load holding

**leak free adjustment,
pressure setting with load applied**

Extraordinary Lifetime
up to 10 Mio cycles for nominal pressure

smoothness operation reaction

Extraordinary Features
80 lpm (20 GPM) and 420 bar (6,000 psi)

**dual seals as standard sealing,
no need for back up ring**

**interchangeable with pilot operated
check valves in the same cavity**

standard and full balanced valve

**optional surface protection for 520 hours
salt spray according ISO 9227 (ASTM B117)**

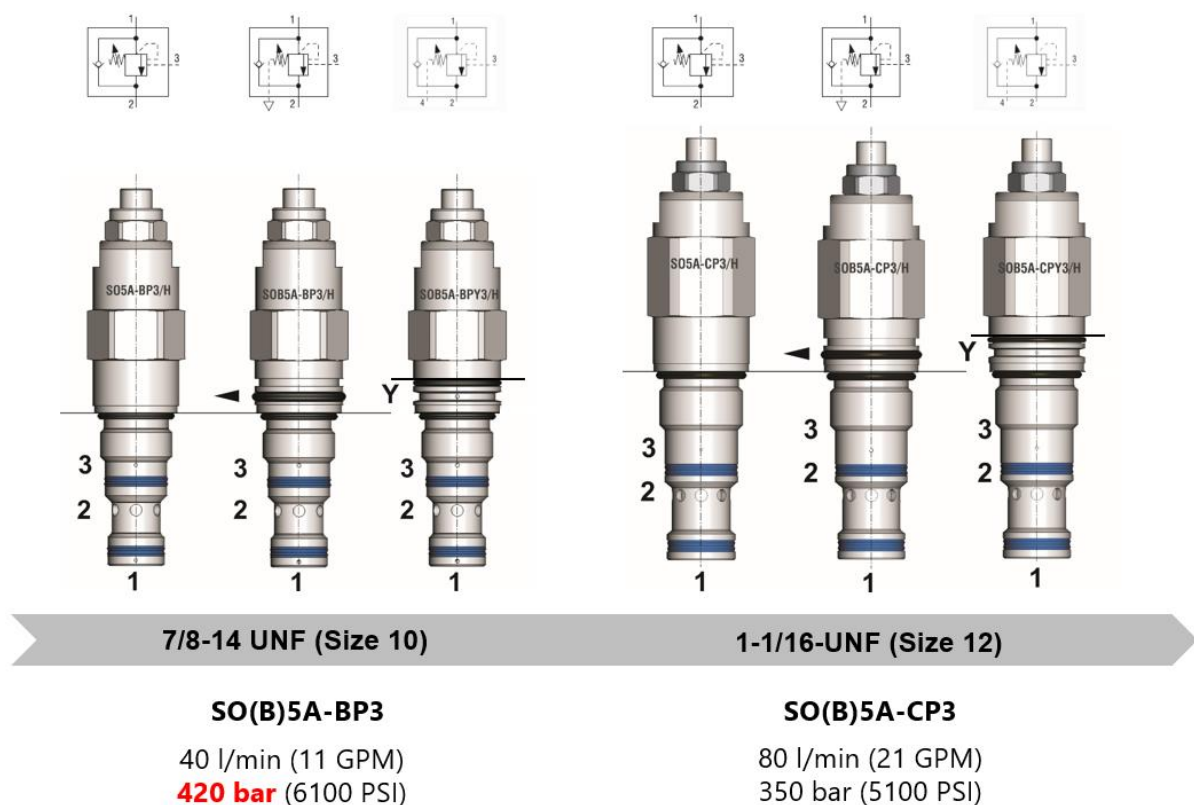
**robust valve design for
high dynamic applications**



Designed for Extraordinary Performance

Compared with other valves in the market the ARGO-HYTOS Overcentre Valve offers a lifetime of **10 Mio. cycles at 420 (350) bar.**

Product Portfolio



Fully Balanced Valves

SOB5A & SOBD5A

used if a back pressure at the secondary port (backflow) is present
atmospheric ventilation or internal drain

- ✓ no influence on the pilot pressure
- ✓ independent pressure relief function
- ✓ can be used with closed centred valves

Latest Innovation

LubCos Guard



Monitor Critical Oil Parameters and Wear with One Sensor

Beside of oil parameters and ferromagnetic particles, the **LubCos Guard** also measures permittivity and conductivity which allows the detection of oil mixtures and the degradation of additives.

Calculation of the remaining lifetime of the used oil to extend service intervals and detection of the condition of the hydro-mechanical system to avoid a major engine breakdown are only two of the benefits we offer with our sensors.

We produce fluid power **solutions**

We Made it Once Again!

New Filter Element - Standard Redefined

EXAPOR[®]
///MAX3



We produce fluid power **solutions**

As usual with ARGO-HYTOS, the variety of variants is given

It makes no difference whether the desired size is a small filter unit for a steering gear application or a large filter system for an injection-moulding machine. Standard catalogue version or individual sizes precisely matched to the installation space. A wide range of products is available at ARGO-HYTOS.

Performance

The new EXAPOR® MAX 3 filter element generation drastically improves the standards that have been set to date in the areas of pressure loss, dirt holding capacity and flow fatigue resistance.

We have also significantly increased the power density of our new filter element. It is now possible to switch far more frequently to smaller filter elements, thus saving costs and installation space.

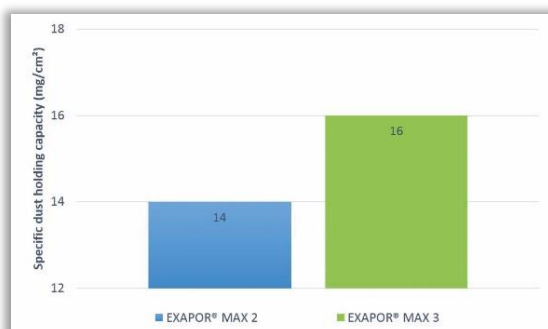
The new series will be available in the finenesses 5 µm, 10 µm and 16 µm.



Dirt holding capacity

increase of impressive 15%

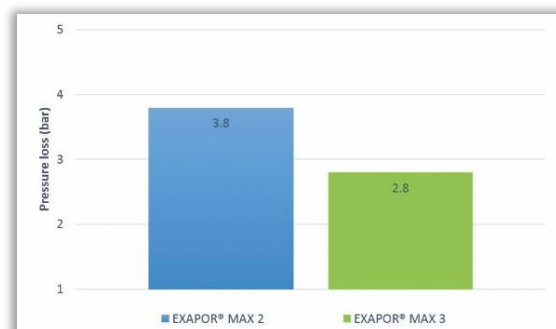
significantly improved service life and longer machine availability, saves cost and improves your system reliability



Pressure drop

significant reduction of more than 20%

less energy loss due to precise matching of the new nonwoven materials to the well-proven hybrid supporting fabric



Optical Appearance - Customer Logo



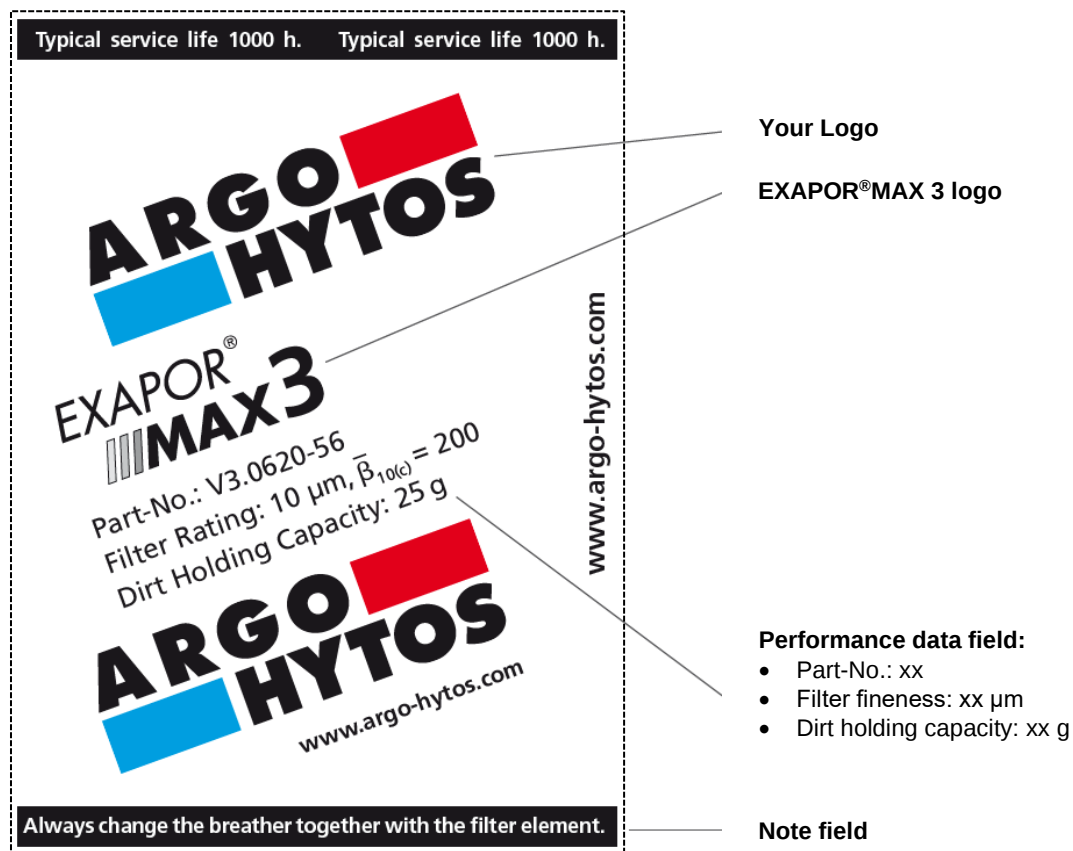
With the help of a new printing technology, full-surface, coloured imprints can now be realized at any time on customer request.

Almost anything is possible with the new technology in an exceptionally good print quality and colour strength. Operating conditions or installation instructions can also be displayed on the label surface.

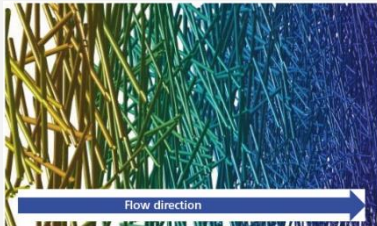
An additional great added value for the customer which in the past was frequently asked for but could unfortunately not be served at this time.

Contact us for your own layout!

Structure of the ARGO-HYTOS standard printing layout

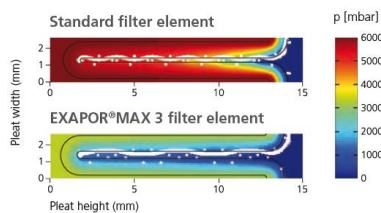


Characteristics / special features



Multiphase glass fibre filter media

For the first time, nonwovens with multiphase structure or so-called gradient structure are used. The precise adjustment of the individual filter materials results in particularly long maintenance intervals and low pressure losses.



Hybrid support or hybrid protective fabric

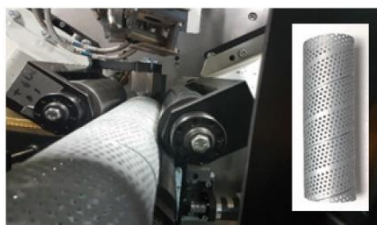
The hybrid support fabric used consists of plastic wires to improve the flow fatigue stability and stainless steel wires to support and keep open the pleats for an optimal inflow.

The special weaving technique creates an excellent pleat channel formation to reduce the pressure loss.



Longitudinal seam bonding

The complete embedding of the cut edges in the bond increases the mechanical stability and guarantees that the ends of the filter bellows are 100% tightly connected to each other. Loose threads, fibres or leaks are thus avoided.



Laser-welded perforated cores

The tubes are welded edge to edge. In contrast to wrap folded perforated cores, no dirt can be deposited on this connection.

In addition, the spiral-shaped welded seam increases the stability. This allows the sheet thickness to be reduced and the installation space to be better utilized.

**Increased machine availability, longer maintenance intervals
and lower operating costs - always on the safe side with
EXAPOR®MAX 3 Filter Elements from ARGO-HYTOS.**



Filter Finenesses

5 µm (c) $\beta_{5(c)}$	=	200
10 µm (c) $\beta_{10(c)}$	=	200
16 µm (c) $\beta_{16(c)}$	=	200

Benefit

Reliable oil cleanliness and permanent protection of sensitive components over the entire operating life.



Low Pressure Drop

Improvement of up to 15% compared to EXAPOR®MAX 2.

Benefit

Good cold start performance, even at low temperatures.

Lower energy consumption results in lower operating costs and resources.

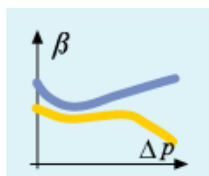


High Dirt Holding Capacity

Improvement of up to 20%.

Benefit

Longer maintenance intervals and thus improved productivity and economic efficiency.

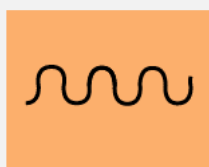


Excellent Pressure Stability

Return filters	>	10 bar
Pressure filters	>	20 bar

Benefit

Ensuring filtration stability by avoiding damage to the filter bellows.



High Flow Fatigue Strength

Withstand the flow fatigue tests (ISO 23181) without being damaged

0 ... 5 bar	>	10 ⁵ load cycles
0 ... 2 bar	>	10 ⁶ load cycles

Benefit

Guarantee of oil cleanliness even with strongly alternating flow loads.

Application examples



Did you know that ...

- if the operating pressure is increased by only 50%, the number of dirt particles in the oil must be reduced by a factor of 3 to avoid a deterioration in the lifetime of the components?
- even a filtration quotient of $\beta = 200$ corresponds to filtration efficiency of 99.5% for all dirt particles that are larger than the specified size, and an β -value of only 10 still corresponds to 90% efficiency?
- even oil sample bottles declared as "clean" can contain considerably more dirt particles than the examined oil, if it comes from hydraulic systems with good filtration?
- a lifetime of 1,000 service hours for a hydraulic filter corresponds to a mileage of about 60,000 km of a passenger car?

Summary

- ✓ Newly developed premium filter element series EXAPOR® MAX 3
- ✓ Increase of dirt capacity by up to 15%
- ✓ Increase of the service life in the customer application
- ✓ Reduction of pressure loss by up to 20%
- ✓ Excellent flow change resistance
- ✓ New optical appearance
- ✓ Individual customer labelling

Our other Filter Elements



⇒ for price-sensitive applications

**PAPER +
SCREEN**

- ⇒ paper for applications with low requirements
- ⇒ screen for applications with a need for low pressure losses



⇒ for avoiding electrical discharges in the filter element

POLYESTER

- ⇒ for applications with long service life and frequent fluctuations



⇒ for filtration combined with dewatering

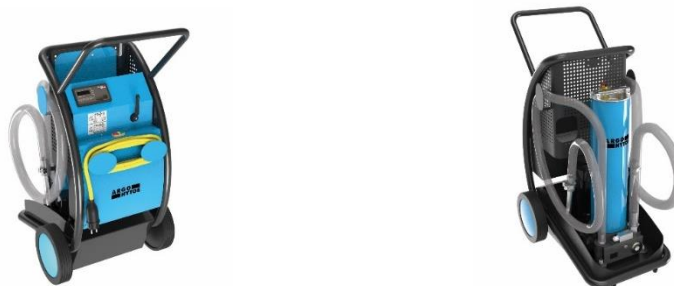
ReFit

- ⇒ simple and direct replacement
- ⇒ high-value spare parts
- ⇒ retrofit elements

Proper Customer Service



Oil Service Units



We produce fluid power **solutions**

Consider this:

Servicing your customer's hydraulic drive system, condition and check the oil, save your customer's money due to a clear statement of the system contamination and at the same time protect the environment by not executing an unnecessary oil change.

Will you not satisfy all your customer's expectations with this?!

Oil Service Units from ARGO-HYTOS offer you exactly this and much more!

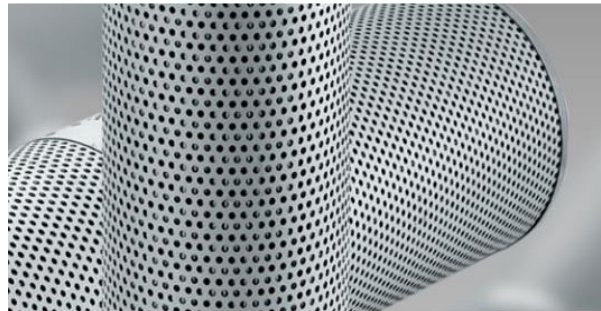


Oil filtration during service and filling with filtered oil

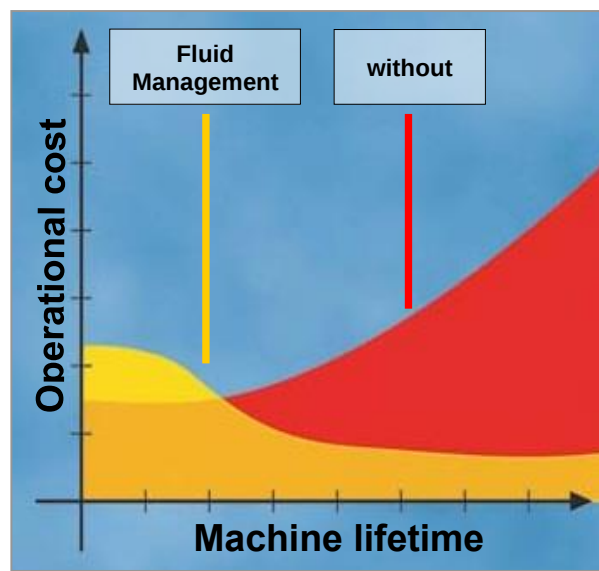
It is all about Fluid Management

We define Fluid Management as extending the service life of the machine and reducing operating costs through preventive oil service.

- ✓ Filtration during filling
- ✓ Oil filtration during machine service
- ✓ Retrofitting of working machines with a bypass filtration system to improve the oil cleanliness class
- ✓ Dewatering of oil
- ✓ Oil condition monitoring



By improving the system cleanliness, the lifetime of the hydraulic or lubrication system can be extended.



Type of system	Initial ISO Code	Target ISO Code	Lifetime extended by:
Hydraulic	-/19/17	-/14/11	x 4
Lube	-21/19	-/15/12	x 3

OVERVIEW – Compact Oil Service Unit

Click on picture for more information

	Type	Mass [kg]	Q [lpm]	P [bar]	Filter [micron]	E-Motor	Accessories, Specials
	CFP 003	7.8	3.0	3.5	5 10 16	1~ 230 VAC 0.06 kW 1~ 110 VAC 0.06 kW	manometer clogging indicator suction/return adapter
	FA 003-2341 for Gear Applications ≤ 5,000 cSt	22	3.0	6.0	5	3~ 400 VAC 0.25 kW	optical clogging indicator
	FA 008	18	8.0	4.0	3 5 10	1~ 230 VAC 0.25 kW	manometer clogging indicator
	FA 016 FAPC 016 with particle monitor	18.9 24.0	16.0	4.0	3 5 10	1~ 230 VAC 0.06 kW 1~ 110 VAC 0.06 kW	manometer clogging indicator particle monitor 
	FA 016-1160 High Pressure Edition	30	16.0	30.0	5	1~ 230 VAC 1.5 kW	optical differential pressure clogging indicator
	FA1-017	10	17.0	8.0	3 5 10	1~ 230 VAC 0.55 kW	customised design & options Please contact us for your own design!

OVERVIEW –Oil Service Unit on Trolley

Click on picture for more information

	Type	Mass [kg]	Q [lpm]	P [bar]	Filter [micron]	E-Motor	Accessories, Specials
	UMPC 045 LIGHTLINE simple, quick, and compact	85	45	7.0	3	1~ 230 VAC 1.1 kW 3~ 400 VAC 1.1 kW	particle monitor  switching valve for pre or post filtration measurement switching valve for filtration or pump over w/o filtration
	UM 045 ECOLINE Unbeatable ergonomics, comfortable handling	76.5	45	7.0	3 5	1~ 230 VAC 1.1 kW 3~ 400 VAC 1.1 kW	switching valve for filtration or pump over w/o filtration water- absorbing filter element
	UMPC 045 ECOLINE Unbeatable ergonomics, comfortable handling	97.0	45	7.0	3	1~ 230 VAC 1.1 kW 3~ 400 VAC 1.1 kW	particle monitor  humidity sensor and automatic switch-off water- absorbing filter element

Let us talk about your Oil Condition!

UMPC 045 Ecoline vs. Lightline

ECOLINE

with built in printer



LIGHTLINE



<< same quality – less options – great value for a competitive price >>

Please contact us for customized solutions



“From Pros – For Pros”

Stand-Alone
Ferromagnetic
Monitoring Unit

Customer Project Report

We produce fluid power **solutions**

ARGO-HYTOS is not only offering one of the best oil condition monitoring sensors on the market but also mind-blowing system solutions of the highest standard and for all sort of applications.

Our **OPCom FerroS** sensor is well known for its reliability and high value, used in countless applications.

OPCom FerroS - Ferromagnetic Wear Sensor

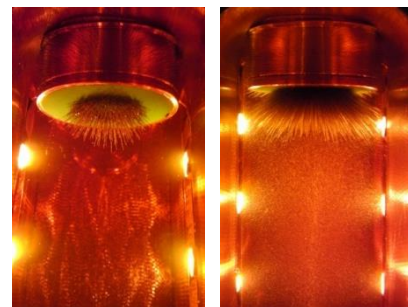


Features

- Continuous monitoring of ferromagnetic wear particles
- Robust against disturbances (air, water, vibration, ...)
- Ideal to monitor gearboxes and heavy machineries

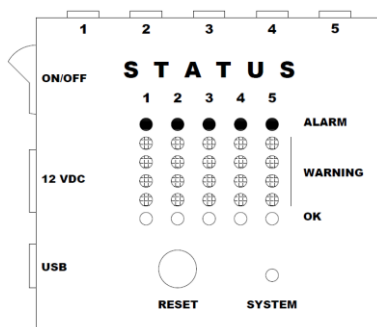
Advantages & Benefit

- Detects wear particles
- Early detection of component damages
- Cost saving by avoiding breakdown



Stand-Alone Ferromagnetic Monitoring Unit – Engineered for You!

For the **OPCom FerroS** we offer a stand-alone control box to indicate the system condition and to alert the operator of metallic wear inside the hydraulic drive system.



Design example – 5 sensors

Multiple sensors can be connected to the control box with individual indication of the status by green, yellow and red LEDs.

An acoustic alarm will additionally alert the operator if entered to a critical wear condition.

The sensitivity of the alarms is set individually according equipment and application conditions.

Due to the 12 VDC power source the monitoring system is completely independent and can be retrofit to any sort of equipment without intervention on the machine electronic.

Our control system is typically used in maintenance and cost intensive equipment as **mining, construction, offshore, wind turbine, marine and defence.**



We also offer SCADA integration (supervisory control and data acquisition) for reporting and real-time feedbacks to a superordinated or off-site control system.

⇒ Please contact us to discuss further options ...

We design and build control boxes for all our condition monitoring equipment!

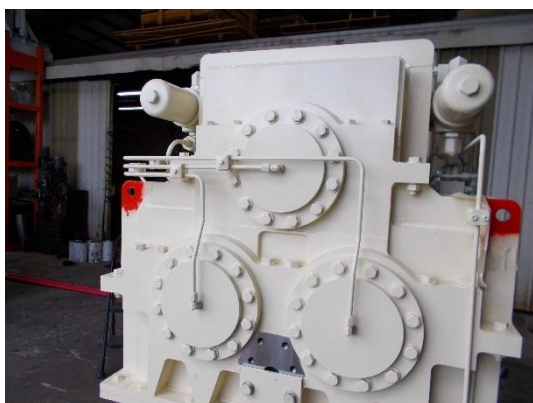
Application Example



Dredging Machine

monitoring of large radial piston motors

Our sensors monitor the mechanical condition of the motors as bearings, pistons and slip rings. The **OPCom FerroS Monitoring Unit** alerts the operator of any wear before a subsequent damage and a major loss of the drive system occurs.



Gear Box

monitoring of gears and bearings

One sensor detects mechanical wear inside the sump oil to inform the operator before a major revision is required.

It also supports the scheduling of maintenance work and to allow any downtime of the complete drive.



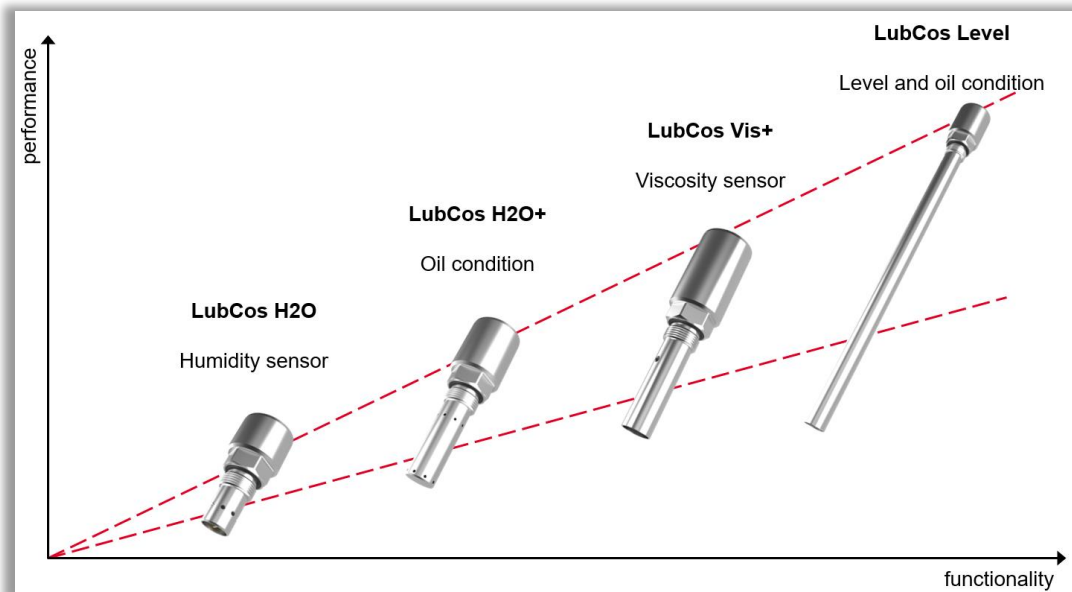
Material Handling Machines

detection of oil condition and pump damage

Together with our **OPCom Particle Monitor** and the **LubCos H2O+II** multi parameter sensor we monitor the oil condition and detect the components.

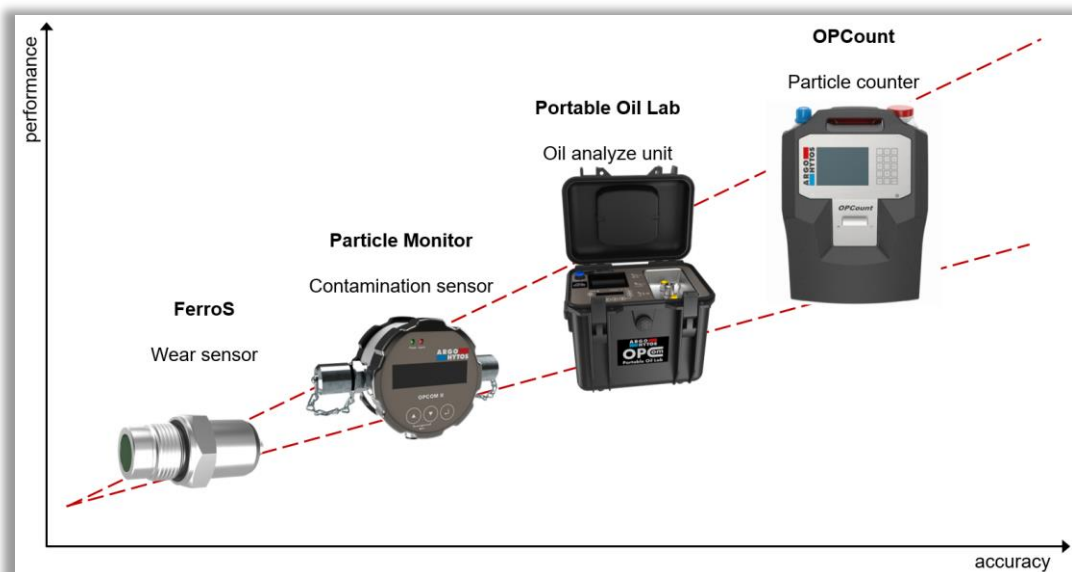
And our advanced valve and filter products complete the hydraulic drive system!

Condition Monitoring



see more on our [website](#) ...

OPCom – Particle Measurement



see more on our [website](#) ...