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FLASH

ARGO-HYTOS: Creative and Innovative Solutions
Wide Range of Modular and Screw-in Cartridge Valves
Industrial Hydraulics: High Pressure Stainless Steel Filter
Industry 4.0 - Condition Monitoring

Content

Dear Reader,

According to a customer's survey, ARGO-HYTOS is known as a producer of filters and CETOP valves, mostly for mobile applications. Since many years we have been serving the mobile market with modular Screw-In Cartridge (SIC) that nearly make half of our yearly turnover in our valve business. We will focus on this achievement and will increase our marketing activities into this direction.

A couple of years ago we realized that we are also able to find new customers in the industrial sector for stationary hydraulics mainly through distributors and system integrators with all our product line including Screw-In Cartridge Valves. These activities have led to a product innovation that we want to introduce to you in this flash magazine!

But we also open the discussion about new trends in hydraulic filtration, introduce a new generation of stainless steel filters and demonstrate an innovative development of ARGO-HYTOS filter elements for the wind power industry.

Don't forget to read about Industry 4.0 in hydraulics, leading you directly to our products for predictive maintenance, in which our customers are more and more interested. This is the reason, why VDMA and Hannover Messe created new space at the Hannover Messe 2017, only for this topic!

Don't forget to read about Industry 4.0 in hydraulics

Please also find in this flash our new proportional valve generation, our modular Ex-Proof Valves and the full line of Lightline and High Performance Modular CETOP Valves for industrial applications.
Of course you can touch and feel these new products at the Hannover Fair 2017 as the lighthouse trade show for hydraulics worldwide. ARGO-HYTOS will be worldwide present on more than 10 trade shows this year!
Many chances to contact us in person!

Also read about the generation change in management at our company in Italy that celebrated its 25th birthday. We are happy to experience a well-organized hand-over from Marco Bottura to Mario Meloni at ARGO-HYTOS Italy. We enjoyed a great party together with all our employees, friends and customers!
In Sweden we were celebrating 10 years of ARGO-HYTOS Nordic also with our employees from Sweden, Denmark and Finland and customers from these countries.
We enjoyed a great party with great food and a lot of beer! Congratulation!

I hope you will enjoy this issue of our house magazine, connecting personal and company news together with deep information on our products!
Maybe we will meet during one of the exhibitions in person!

Best regards

Christian H. Kienzle
CEO ARGO-HYTOS Group

10 Years ARGO-HYTOS Nordic

Lars Ögren,
General Manager
ARGO-HYTOS Nordic

"We do some assembling of manifolds with valves and we also assemble smaller quantities of SMA power units."

Last year ARGO-HYTOS Nordic celebrated its 10 years anniversary.

We would like to use this opportunity to literally open the doors for you and to give you an insight into our location and team in Scandinavia.

Mr. Ögren, would you please describe us your company? Where is it located, how many people work there? Is everyone located in Malmö?

We are located in Malmö, Southern Sweden. Totally, we are today 11 employees. Seven people are located in Malmö (including myself sometimes). The others are located in Norway, Finland and Denmark according to our company's strategy to follow our customers.

When you started 10 years ago, what was the company structure like? What were the beginnings of the company?

In early 2006, we started the company in a small office space in Malmö.
We also had a small warehouse. In total we maybe had 200 m².
We were then four people. Two in Malmö, one in Finland and myself in Stockholm.
After some months we were six people.
In the first years, Kalervo Olkkonen and I made customer visits every week to promote ARGO-HYTOS that was an unknown supplier in the Nordic countries.
The turnover of the company increased in a nice way.

In 2009 you moved to a new building. How many square meters do you have now?

We built a new house during 2008 and in January 2009 this building was ready and we moved into 1500 m² of office and warehouse space. I remember that I thought this was too big and we will never need so much warehouse space. I was wrong. Today it is almost too small.

Do you produce products in Malmö or how do you guarantee fast deliveries to customers?

We do some assembling of manifolds with valves and we also assemble smaller quantities of SMA power units.
We also carry a big stock for our customers so that we will have the best service level of deliveries as possible.

Can you describe us one of your recent customer success stories?

Maybe six to seven years ago we were contacted by a company making systems for the wind mill industry.
The technical and commercial demand this customer has on its suppliers was much higher than what we were used to.
We started with some prototype long time tests and after contract preparation of 1.5 years we finally signed this contract and sales started to increase.
We have spent a lot of time and effort to support this customer and now in 2017 the turnover will be around 1 Million Euros.

ARGO-HYTOS Nordic building

25 Years
ARGO-HYTOS Italy

Marco Bottura,
Former Managing Director
ARGO-HYTOS Italy

"It was a very great pleasure to spend the last 25 years at ARGO-HYTOS and to see the company grow and become more and more international."

Marco Bottura leaves ARGO-HYTOS Italy after 25 years as Managing Director. We sincerely thank him for his excellent work and wish him all the very best for his future.

Mario Meloni, who joined ARGO-HYTOS in 2014, is now Managing Director of ARGO-HYTOS.

Mr. Meloni, would you please describe your company to us? Where is it located, how many people work there?

ARGO-HYTOS Italy is located in Modena, in the middle of the Pianura Padana, in a strategic position to support most of the industrial area of Italy. Today, we are in total 15 staff members.

Do you produce products in Modena or how do you guarantee fast deliveries to customers?

Currently, we have an important stock of components and a little workshop to support customers with prototypes and urgencies.

Can you describe us one of your customer success stories?

Since 1996 we have been partner of CESAB-TOYOTA, a worldwide manufacturing leader in forklifts. After many years of cooperation with CESAB, supplying some "standard series" products, and immediately after the merging of CESAB with TOYOTA, we launched a big project in the "co-design" of a plastic tank to be fitted in the new TOYOTA forklift, following the internal shape of the machine, supposed to be supplied all over the world. After many design reviews and discussions with TOYOTA Japanese design engineers, the tank was finally born in 2008: it includes pipes, plastic ports, breather and naturally a very performing new return filter! The start-up was really very difficult due to the strong recession of 2009 (just one year later) but, step by step, we increased the quantities every year and are now part of a series production of about 8000 forklifts per year with our tank. The rest of their production, about 6000 different models, are almost totally equipped with ARGO-HYTOS filters. High-tech, high quality and just-in-time delivery are requested and respected.

Can you describe us your approach to support our distributors in Italy?

During 2014 we created a dealer network to support small OEMs, EUs and competitor dealers, to enable us to focus our sales in activities which support big and medium OEMs and important system integrators.
Their activities on the market are very important to promote our brand deeper in the market and install our components in systems / power units that we currently do not produce. Moreover, we support them with joint visits where important customers need to understand and be reassured that we support them every day.

What are your specific plans to push and promote ARGO-HYTOS' position in the Italian market?

ARGO-HYTOS Italy would like to increase sales in components and systems with high-tech technologies. We are preparing our company for that.

Mario Meloni,
Managing Director
ARGO-HYTOS Italy

"We would like to increase sales in components and systems with high-tech technologies."

Modular Valves for Industrial Use

Jiří Vrhel,
Product Management
Valves

"ARGO-HYTOS is a leading company in the industrial hydraulics which is proven by a long-term cooperation with TOP machine tool producers."

The sector "industry" is significantly represented by machine tools which are needed for any production. Tool clamping, tool exchange, work piece clamping, axis braking and working head clamping belong to typical functions of these machines with high influence on the machining precision and these functions are mainly secured by hydraulic power. Therefore, there is a high demand on the hydraulic components regarding reliability, life time, working performance and efficiency. ARGO-HYTOS is a leading company in the industrial hydraulics which is proven by a long-term cooperation with TOP machine tool producers.

Lightline High Performance – It's your choice

Focus on technology and quality

ARGO-HYTOS is boosted by high experience in machining and production process control. CETOP valve bodies are machined on robotized production working units and finished on CNC honing machines with automatic feedback. The spools are turned on lathes with SPC (statistical process control), then heat-treated and finished on CNC centerless grinding machines with automatic feedback. All related processes are optimized regarding quality and production times, which make us very competitive all over the world. ARGO-HYTOS cooperates only with selected suppliers who have a high impact on the quality control. From this point of view: the lower the waste piece rate at the beginning of the process, the lower the possibility of a waste piece to appear on the customer side. This attitude makes ARGO-HYTOS extraordinary and it is recognized by many long-term customers worldwide who place their trust in us again and again. Besides, the most important processes are concentrated under one roof.

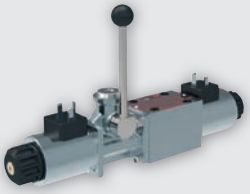
High Performance Variants
- Wiring box
- CSA Certificate
- GOST TR Certificate
- Soft shift
- 8 Watt

size 04 CETOP02	size 04 CETOP02	size 06 CETOP03	size 06 CETOP03	size 10 CETOP05	size 10 CETOP05	size 16 CETOP07	size 16 CETOP08
RPEL1-04	**RPE3-04**	**RPEL1-06**	**RPE3-06**	**RPE4-10**	**RNEH1-10**	**RNEH5-16**	**RNEH5-25**
250 bar	320 bar	250 bar	350 bar	350 bar	350/**420 bar**	350/**420 bar**	350/**420 bar**
30 l/min	30 l/min	50 l/min	80 l/min	140 l/min	150 l/min	300 l/min	600 l/min

Flange pattern as:
- Wandfluh Mini „size 4"
- Bosch NG5

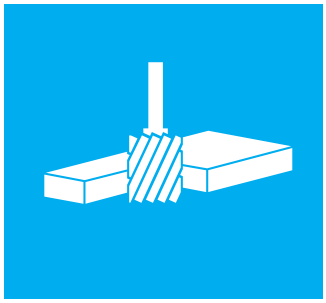
size 04
RPE2-04
250 bar
30 l/min

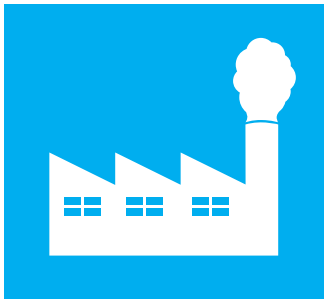
Auxiliary lever override

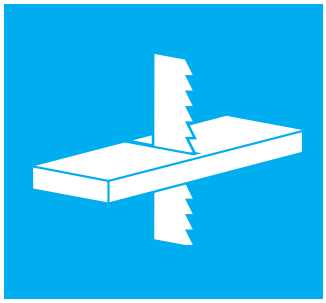


size 06 CETOP03
RPER3-06
350 bar
80 l/min

ARGO-HYTOS product range of Modular Directional Valves (CETOP) – solenoid operated







Features

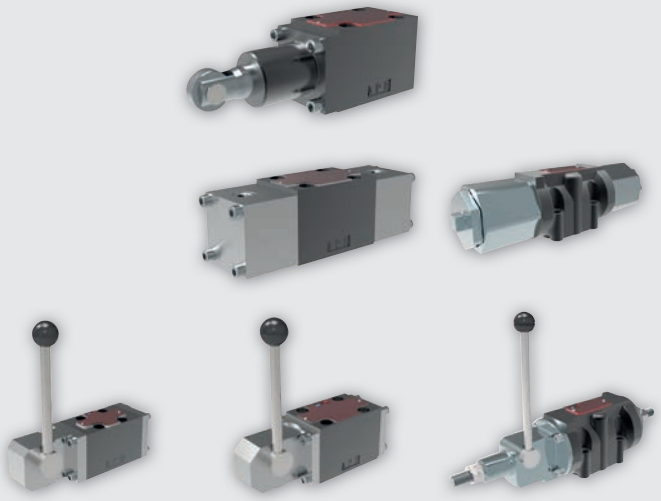
Main features of ARGO-HYTOS CETOP valves are:

- Powerful solenoids
- 5 or 3 chamber design, "Lightline choice" as per requirement
- Exceptional high power limits for size 10 (D05) > **140 l/min at 350 bar**
- Low-cost soft-shift option for size 10 (D05)
- Low internal leakage for spool versions
- About 20 - 30 standard spool type configurations in each size
- Standard bodies are phosphate coated
- High surface treatment option 520 h Salt Spray DIN 9227
  > **Meeting demands of dedicated mobile applications**

Focus on performance

ARGO-HYTOS offers two kinds of valves regarding the performance. The standard valve series is known as "High Performance" and it is characterized by high transmitted hydraulic power; on the other side there is the "Lightline" series, dedicated for customers who need lower power regarding their application. The "just enough power philosophy" allows the customers to benefit from lower price and space reduction.
Most important: the quality remains the same for both performances.

There is a wide choice of interchangeable solenoids with different connectors such as DIN or DEUTSCH standard, which are very often used in mobile applications, and APM terminals. The Directional Valves size 06 and size 10 are optionally equipped with an inductive contactless normally open and normally closed spool position sensor which is needed for machines where a risk might appear. The operating fluid temperatures from -30 °C to + 90 °C and the kinematic viscosity of the operating fluid from 10 to 500 mm^2s^{-1} are covered as standard.



size 04	size 06	size 10
CETOP04	CETOP06	CETOP10
RPR3-04	RPR(H)3-06	RPR(H)1-10
320 bar	350 bar	350 bar
30 l/min	80 l/min	140 l/min

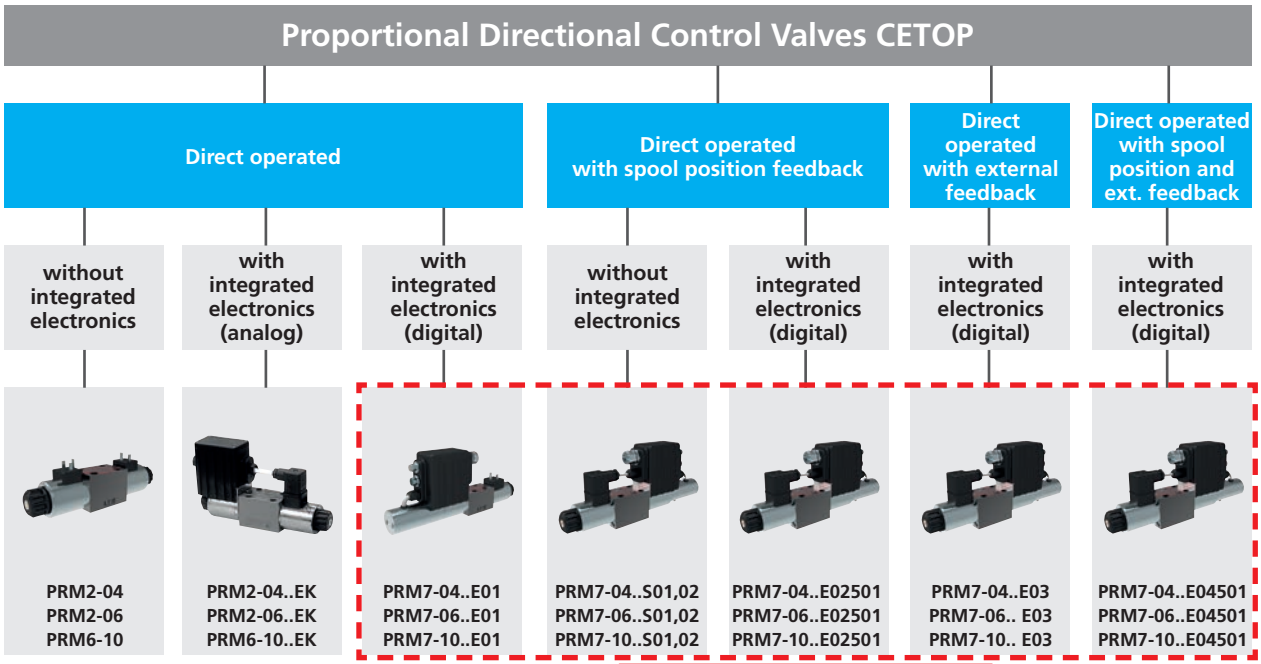
NEW size 10 (CETOP05)

Piloting options
- Hydraulic piloting
- Pneumatic piloting

New size 10
- Proportional spools
- Stroke limiters
- Proximity sensors
- Option: surface treatment for marine applications

ARGO-HYTOS product range of Modular Directional Valves (CETOP) – operated in a different way

Modular Proportional Valves
The Modular Proportional Valves are used for continuous flow rate control and also for changing the flow direction in case of using a valve with two solenoids. The solenoid shifts the control spool to the required position, proportionally to the control current. Modular Proportional Valves are typically used in applications such as material feeders and holders, smooth positioning of platforms etc.
These valves are characterized by a pioneering design, high reliability and stability, coupled with good dynamics.



EL6
Digital electronics
in the connector

NEW PRM9

ARGO-HYTOS product range of Modular Proportional Directional Control Valves (CETOP)
(REDESIGN: *Concerning proportional valves with integrated electronics PRM7-06* and PRM7-10*.)

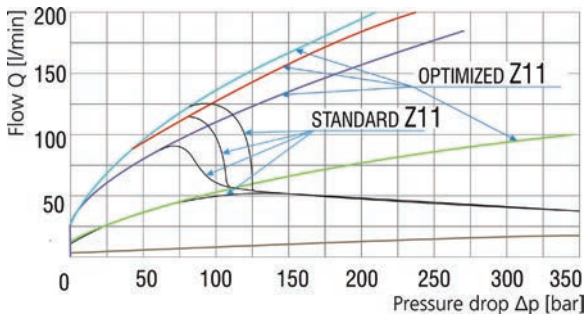
PRM2 series
Valve control without integrated electronics: can be equipped with electronics EL6 in the form of a DIN cable socket, which is placed directly onto the valve. The miniature electronics provide a modern compact solution for valve control and enable a simple parameter setting with two knobs and a built-in display, e.g. with ramp functions.

Features

- Compact design with integrated electronics
- High reliability
- Simple replacement of the exciting coils including electronics without opening the hydraulic circuits
- Continuous flow control in both directions
- Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H

PRM9 series

The latest development of the Proportional Valves PRM9 are sophisticated valves, optimized according to Computational Fluid Dynamics simulation, characterized by an intelligent control unit in a robust metal housing.



Example of the PRM9, based on spool design optimization, optimization of the valve housing machining and an increased solenoid force

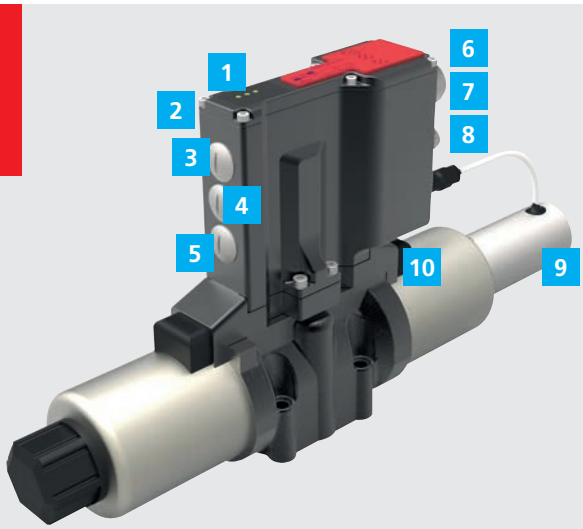
Features

- Available in two sizes 06 (D03) and 10 (D05)
- Vibration resistant ECU
- Fieldbus access / communication

Performance:

- Power limit increase
- Steady performance over different working conditions
- One solution for several command signals
- "Slim" design, suitable for mobile and industrial installations
- User-friendly interfaces (LED / software)

NEW PRM9

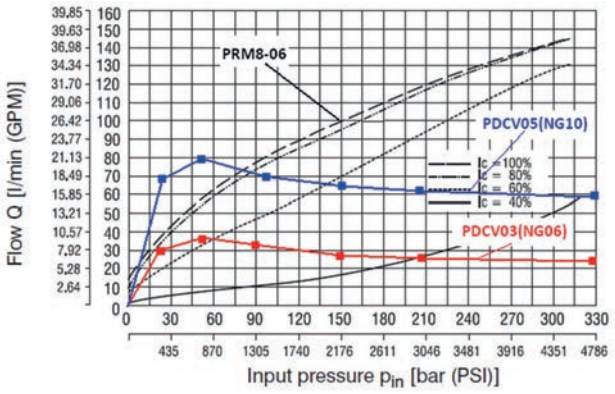


PRM9 design features, basic configuration

1 Optical feedback (LEDs) (Power, CANopen, Error)
2 Metal housing for ECU IP67
3 µ-USB vs. USB Interface
4 CAN - Address
5 CAN - Baud Rate
6 Standard MIL Connector
7 M12 Connector: ext. sensor
8 M12 Connector: CANopen
9 Internal position sensor
10 Solenoid connection with inside wiring

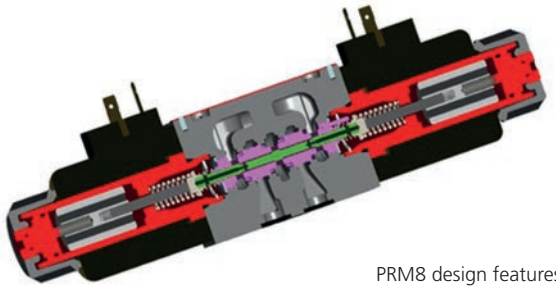
PRM8 series

Pilot Operated Directional Valve size 06. The pilot spool is controlled by solenoids and the main spool is controlled by hydraulic power. The selected concept increases the achieved output parameters of the proportional valve in comparison to a direct controlled proportional valve. Transmitted hydraulic power 350 bar at 130 l/min.



Features

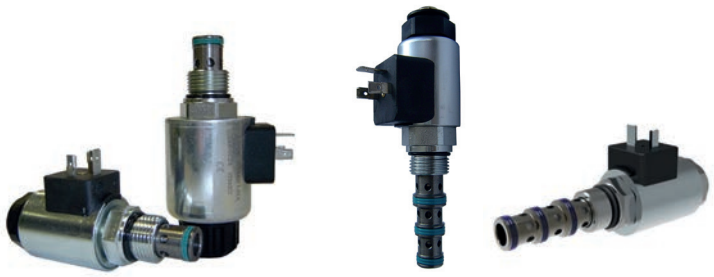
- Pilot Operated Proportional Valve size 06 (D03)
- Floating spool principle
- High transmitted hydraulic power by small electric power
- Transmitted hydraulic power is equal to size 10 (D05) Directional Valve
- Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H



PRM8 design features

Screw-in Cartridge (SIC) Valves for Mobile & Industrial Use

The ARGO-HYTOS Screw-in Cartridge program offers a wide function range for mobile and industrial hydraulics. Typical functions are the flow direction control and pressure control in the hydraulic circuit. The most common applications are for example agricultural machines, construction equipment, municipal vehicles, machine tools and wind power plants etc. Beside the technical specification, there are other aspects on our focus. Reliability, coupled with increased operating comfort, define today's development trends while simultaneously reducing TCO - Total Costs of Ownership. This means that high application knowledge is needed when designing the hydraulic circuit or particular valves. The lifetime of the valves is extended due to a surface protection 520 h according to ISO 9224 as standard. The robust design withstands a 10 million cycle lifetime test which is also applied for the seals. Resistance to high oil / ambient temperature is recognized as ARGO-HYTOS today's standard.



¾-16 UNF	7/8-14 UNF	¾-16 UNF	7/8-14 UNF
SD2E-A*/L	SD2E-B*/S(L)	SD2E-A*/H	SD2E-B*/H
250 bar	250 bar	350 bar	350 bar
30 l/min	60 l/min	30 l/min	60 l/min
Lightline		High Performance Line	

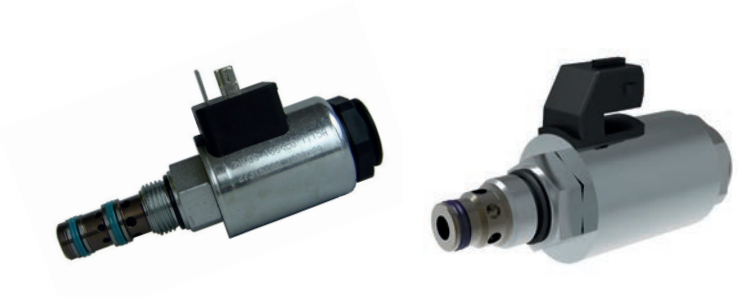
Directional Valves Screw-in Cartridge (SIC) – spool version

Screw-in Cartridge spool version

These valves are designed to control the flow direction. The connection sizes are executed by two different threads 3/4-16 UNF and 7/8-14 UNF. The operating pressure is up to 350 bar. The flow rate is limited up to 60 lpm for connection size 7/8-14 UNF and 30 lpm for connection size 3/4-16 UNF. Two performance product families are available in order to choose just enough transmitted hydraulic power for the required application and make the valves attractive in price. The "High Performance" version is designed for valves up to 350 bar, the "Lightline" version is up to 250 bar.

Screw-in Cartridge poppet version

A poppet version is available up to 75 l/min and 420 bar which is applicable for all ports. Precision machined parts secure a leak-free closing up to 3 drops/min. A complex production program range includes different possibilities such as normally open and normally closed versions, pilot operated or solenoid operated variants, a wide range of solenoids and connectors. The standard surface treatment of the valve and solenoid is a ZnCr3 coating to secure 240 h in salt spray according to DIN 9227, however, a surface treatment up to 520 h is possible. A very favorable ratio pressure drop / transmitted hydraulic power / leakage makes the ARGO-HYTOS cartridge valves extraordinary. The functionality in case of system malfunction is boosted by different manual overrides.



¾-16 UNF			7/8-14 UNF	
SD1E-A2	SD1E-A3	SD3E-A2/H	SD3E-B2/S(L)	SD3E-B2/H
350 bar	350 bar	420 bar	250 bar	420 bar
30 l/min	30 l/min	30 l/min	75 l/min	75 l/min

Directional Valves SIC – poppet version

Advantages

- Excellent price / quality ratio
- Low pressure drop
- Leakage free
- High hydraulic transmitted power

Electrically switchable SR4E-B2/H

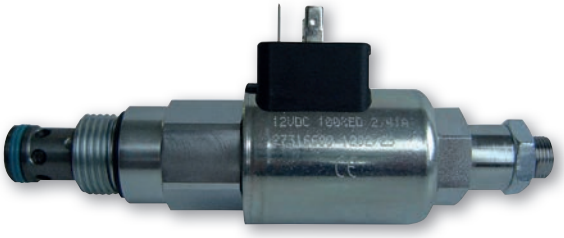
Pressure Relief Valve, Solenoid-Operated, Spool Type, Piloted

Features

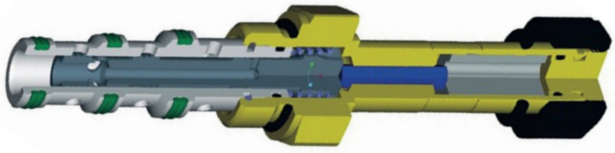
- Designed for cost-efficient and compact installation, typically used for motor control circuit
- Combines the functionality of a normally open solenoid valve with a pressure relief valve
- Two-stage pressure valve for ON/OFF function
- Excellent stability throughout the entire flow range with rapid response to dynamic pressure changes
- Pump unloading
- Operating pressure 350 bar
- Rated flow = 60 l/min
- Low hysteresis, accurate pressure control and low pressure drop through CFD optimized flow paths
- Coils interchangeable

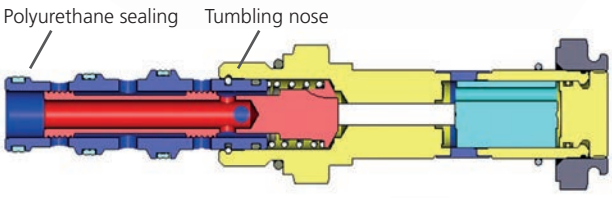
This 7/8-14 UNF valve is used as an integrated two-stage pressure valve for unloading the flow passage. It supports the setting of two pressure values, p_{min} and p_{max}. While energized, the valve blocks the low-pressure passage and allows the pressure to rise up to the adjusted value of the relief pressure. Both p_{min} and p_{max} are manually adjustable.

"Tumbling nose" design
Screw-in Spool Valves with the feature of a "tumbling nose" to compensate the cartridge misalignments in the cavity. Another benefit is the compensation of too high torques during assembly. This feature always secures the right valve position in the cavity, therefore the spool never gets blocked.
In connection with a precision CNC machining of the cartridge housing, a low leakage performance is reached, which is similar to the performance of the poppet valves available on the market.
The housing machining is done on a CNC turning machine with SPC (Statistical Process Control), then the hardened housing is machined on a CNC centerless grinding machine and honed. Both machining processes, grinding and honing, are supported by automatic feedback.
Another important part on the cartridge is the Polyurethane sealing which allows easy assembly through a high resistance to twisting and a long life time.



The SR4E-B2/H - Multitasking Pressure Relief Valve is a valve dedicated for demanding customers who call for comfort functionality and simultaneously for space and price reduction.





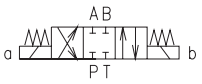
Precise parts of the spool valves in combination with the smart design of the "tumbling nose" is the main prerequisite for achieving similar leakage results as some of the "Poppet Valves" in the market.

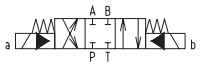
Jiří Vrhel,
Product Management
Valves

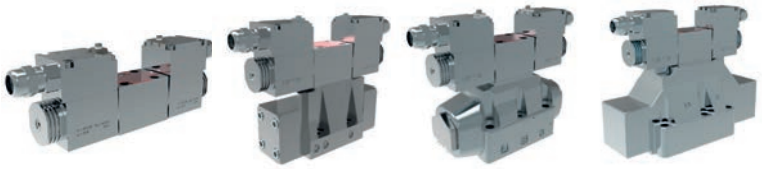
"A complex program range includes different possibilities such as normally open and normally closed versions, pilot operated or solenoid operated variants, a wide range of solenoids and connectors."

Hydraulic Valves Intended for Use in Potentially Explosive Atmospheres

There are potentially explosive mixtures in the form of gas, vapor, mist or dust in various segments of the chemical and petrochemical industries or for example in mines. It is necessary to ensure a high level of protection against explosion on each part of the equipment used in these industries. When using hydraulic elements, a common method is to prevent the accumulation of energy, which would be sufficient for the ignition of an explosive mixture. Specifically it means, that the development of these elements will focus on preventing explosive mixtures from entering a space where they can cause sparks. We used two types of protection on the electrical parts of our valves: Type „Ex e" - increased safety for the connection terminal on DC coils and type „Ex mb" - encapsulation on our AC coils with a rectifier bridge.
It is also important to limit the maximum surface temperature of the individual parts of the valve.







Size 06 (CETOP03)	Size 10 (CETOP05)	Size 16 (CETOP07)	Size 25 (CETOP08)
RNEXH1-06	**RNEXH1-10**	**RNEXH5-16**	**RNEXH1-25**
350 bar	350 bar/420 bar	350 bar/420 bar	320 bar/420 bar
60 l/min	150 l/min	300 l/min	600 l/min

NEW sizes 10, 16, 25

- Piloted distributors
- Working pressure 320 and 420 bar
- Flows up to 600 l/min

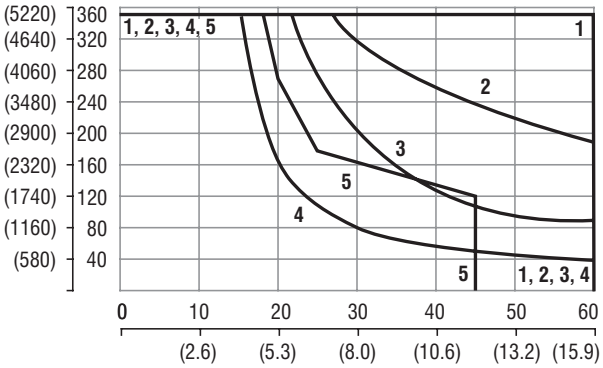
Martin Čadan,
Head of Product Management FMC

"ARGO-HYTOS has launched a new Directional Modular and Screw-in Valve range on the explosion proof market to overcome this typically low hydraulic power phenomenon."

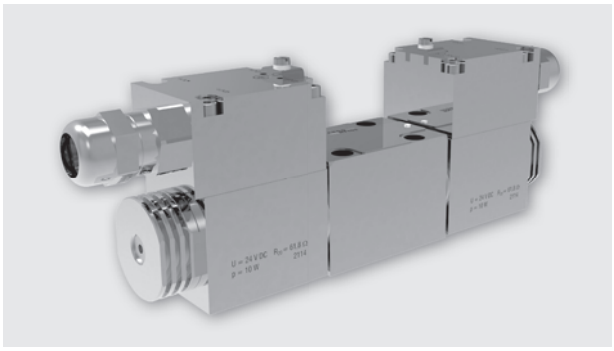
Hydraulic fluids in this of applications usually reach operating temperatures of about 55 °C.
This temperature is much lower than the maximum allowed temperature of the individual parts. Therefore the hydraulic part of the valve cools the whole assembly. The only part on which the surface temperature has to be reduced, is the solenoid. A significant reduction of the surface temperature is achieved by means of a solenoid design that allows better heat radiation from the solenoid to the surroundings and also a reduction of the power consumption of the solenoid.
This reduced power consumption normally results in a lower hydraulic performance of the valve. Therefore, valves designed for explosive environments, typically transmit lower hydraulic power than conventional valves.
ARGO-HYTOS, being in valves development and production for more than 60 years, has launched a new Directional Modular and Screw-in Valve range on the explosion proof market to overcome this typically low hydraulic power phenomenon.
The new One4All explosion solenoids are designed for all explosion risk areas and temperature classes in combination with modern CFD design methods, resulting in a unique hydraulic power performance of explosion proof valves. We offer two basic ranges of Modular Valves and Screw-in Cartridge versions.

Size 10 (7/8-14 UNF)			Size 8 (¾-16 UNF)	
SD2EX-B2	**SD2EX-B3**	**SD2EX-B4**	**SD3EX-B2**	**SD1EX-A3**
350 bar	350 bar	350 bar	420 bar	350 bar
60 l/min	60 l/min	60 l/min	60 l/min	30 l/min

Our One4All 10W solenoids, intended for use in potentially explosive atmospheres in combination with the valve design, reach similar results as conventional 30 W solenoids. The unique design also allows to open the electrical terminal box cable installation without losing the ATEX / IECEx certificate's validity.



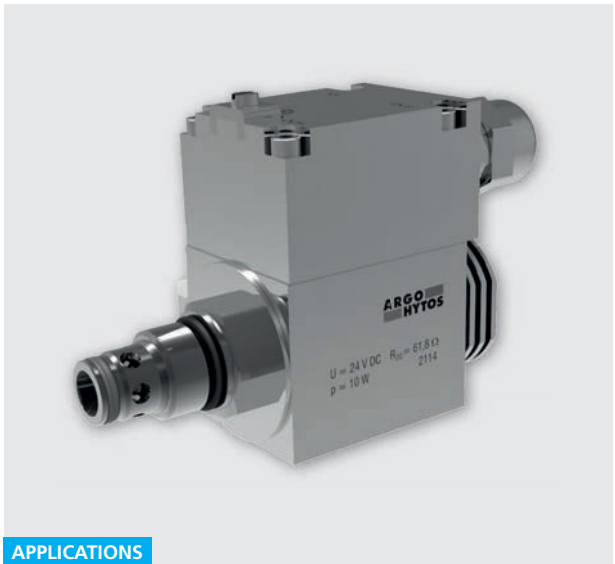
Typical operating limits of size 06, CETOP03 versions. Ambient temperature 70 °C (158 °F), Voltage Un -10 % (24 VDC), Power Pn 10 W



Features

Additionally, our Explosion Proof Valves bear all unique features applied for the standard ARGO-HYTOS valve range as

- Robust design for 10 Mio. life cycles, also applied for sealings
- Screw-in Cartridge Poppet Valves with 0 drop leaks and a pressure rating of 420 bar
- Screw-in Spool Valves with a "tumbling nose" to compensate misalignments of the valve cavity = spool never blocks
- High oil / ambient temperatures as standard
- Surface protection 500 h ISO 9224 as standard
- Special spool versions on request as detent
- GOST TR (Russia Federation) Certification for all explosion proof ranges
- Bayonet manual override – mining, mechanical impact, proved for all CETOP and SIC
- Solenoid interchangeability between CETOP and SIC explosion proof range



APPLICATIONS

Cleanliness and Wear Monitoring by Modern Particle Measurement Technology

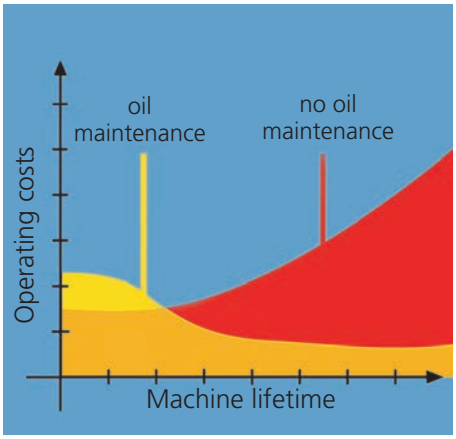
In fluid power systems, the oil is regarded as a structural element that satisfies the most diverse tasks. It transmits power, takes over the lubrication, the heat balance and transports dirt to the filters. Although there are many causes for failure in fluid power systems, besides mechanical fatigue or overload of individual components especially the condition of the oil comes into focus. Here, in particular, particles are the major cause of wear and damage to components.

The undesired particles can enter the system from the outside, e.g. by ventilators or seals, or they are generated by wear in the system itself. Consequences of particle contamination are increased wear, failure of components and reduction in system performance and lifetime.
The particle contamination of the oil thus causes high costs for the owner, this is why different high-quality filters should be used to keep fluid power systems clean.

To further reduce costs, there is moreover a great interest to detect increased wear at an early stage and to prevent damage or standstill. For this purpose, there are different sensors and instruments for particle measurement available, enabling an effective and inexpensive monitoring of almost all applications.

In addition to the wear monitoring, a growing field of application for the particle measurement is the control of the cleaning or rinsing processes. Here, more and more often it must be proved that the rinsed parts or systems satisfy the specified purity requirement. Producers and users of cleaning equipment take account of this demand by integrating particle measurement technology in their facilities, allowing them to document each cleaning process.

Visible damage through Condition Monitoring



Added value of Oil Condition Monitoring and Maintenance

Roman C. Krähling,
Head of Condition Monitoring

"To further reduce costs, there is a great interest to detect increased wear at an early stage and to prevent damage or standstill."

Manufacturers can monitor the proper use and service of their equipment by regular measurement of particles and thus reduce warranty costs. From the information obtained, optimization potentials in the system design may be identified in reverse, in order to improve the own products. Furthermore, the use of particle measurement technology has proven itself as a development tool for the evaluation of wear on pumps, gears, bearings etc. Here, both, the necessary purity of the test medium, as well as any wear of the component itself, are measured.

When considering which method is best suited for monitoring, economic considerations are in the foreground. Here not only the costs of analysis of the single sample play a role, but also how high the risk of failure and the costs for any damage or standstill are.

In fluid power systems, the oil is regarded as a structural element that satisfies the most diverse tasks.

Particle Measurement

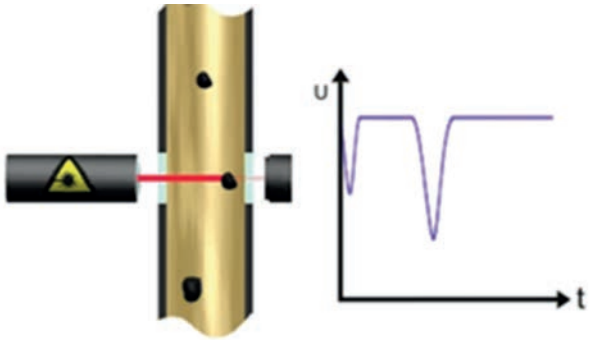
Automatic particle sensors indicate the best price-performance ratio, allowing measurement of the size and number of particles in real time online. Alternative manual procedures such as microscopy or gravimetry are complex, error-prone and inefficient, compared to online measuring.

The advantages of online measurement to conventional laboratory analysis do not only lie in the simpler handling and the lower total costs, but especially in the gapless measurement. The measured data do not reflect an arbitrary snapshot but detect the continuous change. Thus, a state-dependent predictive maintenance can be realized.

Furthermore, the accuracy of the oil analysis itself is largely determined by the care taken in the sampling and analysis. Particularly with regard to the particle concentration, improper sampling and analysis can lead to a significant distortion of the measurement results. Automatic particle measuring instruments guarantee optimum repeatability and only thereby the comparability of measurement results.

Optical Particle Measurement

As standard for online particle measurement, the optical method by light blockage principle according to ISO 11500 has prevailed, because it is inexpensive and very reliable.



Optical Particle Measurement by light blockage principle

Here, the particles to be counted are separately optically measured in a capillary. If there are no particles in the measurement cell, the light shines unhindered on the photodiode. If a particle passes the measurement cell, the light beam is blocked, whereby a shadow is generated on the opposite photodiode. The size of the shadow is proportional to the size of the particle and thus enables to characterize the particles.

Subsequently, the measured number of particles is related to the measurement volume and reported as concentration. This allows a representation according to different standards, which can be selected in the measuring instrument. In addition to the common standard ISO 4406:1999, the devices of ARGO-HYTOS also offer SAE AS 4059, GOST 17216 and NAS 1638.

Particle Counters are suitable for extremely accurate measurement of oil contamination

Particle Counters

Particle Counters are particularly suitable for extremely accurate measurement of oil contamination in the laboratory or in the field. With the OPCount, ARGO-HYTOS offers a Particle Counter of the latest generation, which has been designed for use in hydraulic machines. The integrated volumetric particle measuring cell guarantees, in conjunction with first-class components, that each particle flowing though the sensor is accurately measured.

OPCount Particle Counter

The internal pump allows online, bottle and tank measurements. The device can thereby intuitively be operated via a touch display and convenient measurement profiles. Measuring data and additional information about the sample, such as e.g. temperature, viscosity or oil type can be stored and printed directly. Any accessories required for measurement can be neatly stowed away at the device, which greatly facilitates handling.

The Particle Counter OPCount is often used for routine monitoring, for quality control or failure analysis. It enables the creation of databases, with the help of which the history of the oil of a machine can be understood. From this, valuable information on the cleanliness and condition of the equipment can be obtained.

Optionally, it is also possible to connect an ARGO-HYTOS Condition Sensor from the LubCos range to the OPCount. This allows the inclusion of other parameters such as temperature, humidity and oil quality.

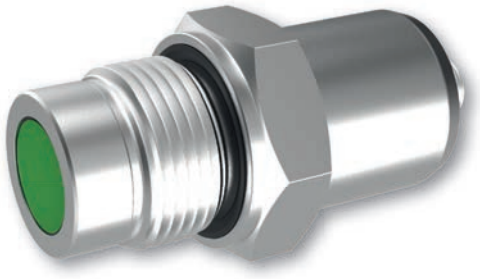
Particle Monitor

For systems where the particle measurement is to take place not only automatically but also durably, a device is needed that can permanently be installed. Here, compact and robust Particle Monitors are recommended that can easily be integrated into a hydraulic system.

OPCom Particle Monitor

Inductive Particle Measurement

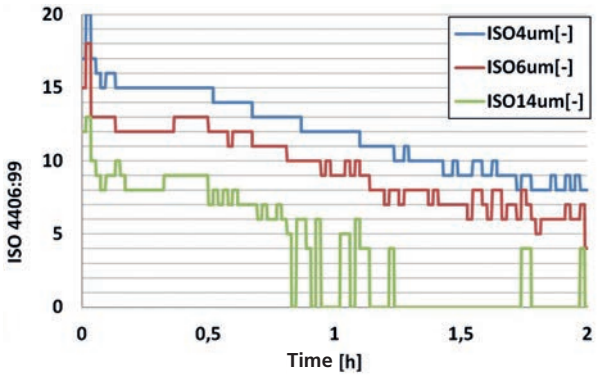
For selective detection of ferromagnetic wear particles, inductively measuring metal particle detectors are used. A specifically for gears designed economical alternative for conventional metal particle detectors, is the Wear Sensor OPCom FerroS.



OPCom FerroS Wear Sensor

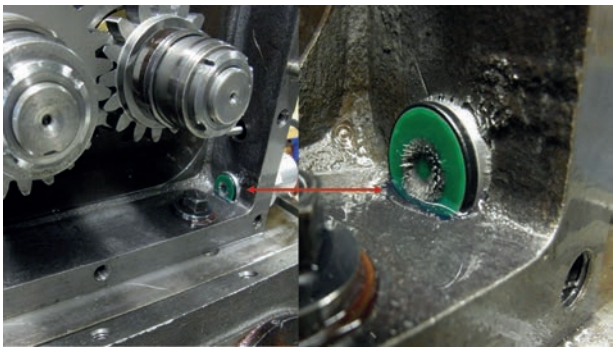
The demands to a stationary or mobile measurement can be high. Amongst others, attention has to be drawn to high pressures and temperatures, dirt, humidity and vibrations. Therefore, a robust design of the measurement equipment is essential to its long-term operation. That is why all components, such as e.g. light source, detector or housing, have to meet high technical requirements. With an IP67 protection class and corresponding shock and noise immunity, the ARGO-HYTOS Particle Monitor OPCom is also suitable for demanding applications.

A proven area of application for the online particle measurement is the monitoring of oil cleanliness in heavily loaded industrial applications such as presses or injection molding machines. The figure below shows an example of a particle measurement during the cleaning of an injection molding machine. Here, the machine was cleaned with a mobile off-line filter unit and the particle concentration was recorded.



Particle Monitoring

The Wear Sensor OPCom FerroS works on the principle of a magnetic plug and accumulates ferromagnetic particles by means of a permanent magnet. A coil in the sensor head detects the accumulated particles and generates a measurement signal proportional to the accumulated amount. For continuous measurement, the sensor can be cleaned automatically.



Gear with integrated Wear Sensor OPCom FerroS and accumulated particles

The proven measuring principle enables easy integration of the sensor directly in the system. In contrast to comparable sensors, no flow must be generated.

Summary

The use of modern particle measurement technology makes new service and maintenance concepts possible by which oil change intervals can be extended, problems can early be identified and downtime can be reduced. Today's sensors detect changes early and make it possible to detect wear and damage in time. The ease of use and the high added value therefore make particle sensors a proven means for reducing operating costs of machinery and equipment.

High Pressure Stainless Steel Filter HFL 060 ... HFL 180

High Pressure Filter HFL 060

The high pressure filters of the HFL series 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, among others, in the 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 life time is achieved.

Characteristics

- Nominal flow rate up to 180 l/min
- Filter fineness 10 µm(c)...60 µm(c)
- Operating pressure up to 400 bar
- Hydraulic fluid: Mineral oil and biodegredable fluids (HEES and HETG, see info-sheet 00.20)

Andreas Halbach,
Customized Solutions & Product Support

"Three different housing lengths as well as various filter finenesses are available to provide the best possible filtration concept according to the respective requirements."

Application examples

- Offshore
- Mining industry
- Environment and waste management
- Maritime applications

Trends in Hydraulic Filtration

Proper filtration, without a doubt, plays an important role in ensuring that hydraulic systems operate trouble-free. High performance filters ensure the cleanliness of the hydraulic fluid over its entire service life. In addition, customers are faced with ever-changing application requirements that require longer filter change intervals, higher operating safety, increased separation efficiencies and increased compatibility with the new generation of hydraulic oils. Below you will find an overview of some important technologies and trends in the industry and their impact on users of hydraulic systems.

Filter performance data

At first sight, one could gain the impression that standard filter elements would have changed little over the years. But even if today's filters are similar to those of the past filter generation, the performance has changed a lot. The essential parameters are dirt-holding capacity and pressure loss. In the year 2000, a typical ARGO-HYTOS filter element with the fineness 10 µm(c) had a specific dirt-holding capacity of about 6 mg/cm^2. Today, this capacity has increased by more than 130 % to about 14 mg/cm^2 while the pressure loss has been reduced by about 50 %.

There are several reasons for these remarkable improvements. On the one hand, research into materials technology has led to improved filter media. Increasing the dirt-holding capacity of glass fiber media at the same pressure drop was an important factor for the improved performance. The pore volume is a major parameter.
Finer fibers ensure the greatest possible pore volume and create more capacity for greater dirt absorption.
Such improved filter materials also resulted in a lower pressure drop, enabling the installation of additional layers. In the past, filters typically had a single glass fiber layer to capture and hold contaminant particles. Today, most high-performance filters are double-layered. These layers consist of a coarser pre-filter layer to capture the larger particles and a main layer to trap smaller particles. The combination of the pre-filter and the fine filter layer increases the dirt-holding capacity and improves the oil cleanliness.
The significantly lower pressure drop is, in addition to better filter media, due to an improved design of the supporting and protective fabric. Glass fiber filter media are soft and break under pressure. Wire mesh – typically of steel or stainless steel – provides protection against damage to the internal and external surfaces of the media.
Changes in the tissue structure were also of great importance. In the past, the wires were typically woven in a linen weave. However, there was the risk that, in this type of weave, the wires would become interlocked under pressure and the fold would thus be completely closed. Today, twill bindings ensure that the filter element folds cannot be completely interlaced. Even under load, the element always maintains a minimum clearance in the fold, thus ensuring efficient filtration with low pressure drop.

Suction Filter

Return Suction Filter

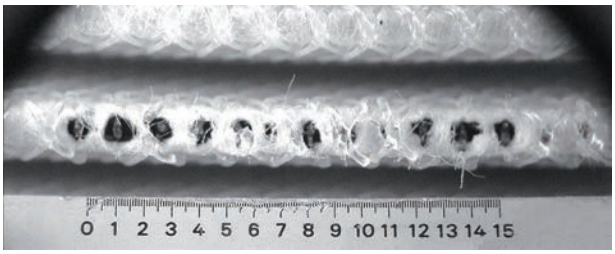
Ulrich Seeger
Head of Product Management
System Filtration

"Even if today's filters are similar to those of the past filter generations, the performance data have changed a lot."

This optimized filter material structure of the **ARGO-HYTOS EXAPOR®MAX 2** element design reduces the pressure loss in the filter element folds by up to 50 % and up to 40 % in the filter element. Conversely, the filter elements can achieve a flow rate up to 65 % with constant pressure loss.
The customer benefits in several respects: through improved dirt-holding capacity and lower pressure loss with constant filter fineness. Filters of the same size thus have longer filter change intervals, and a higher nominal volume flow. At constant filter change intervals, customers can use smaller and more cost-effective filters. This protects the environment and the resources.

Environmentally friendly hydraulic fluids

For some years now, the trend has been toward using environmentally friendly fluids in hydraulic systems, e.g. higher refined base oils because of their improved technical properties, such as aging resistance. However, these oils have a lower conductivity. Newer additive packages also significantly influence the conductivity.
In the past, conventional hydraulic oils often contained zinc dithiophosphate (ZDDP) protecting them from wear and corrosion and acting as an antioxidant. Since this component has now been classified as harmful, users have turned to zinc-free oils. The reduction in the amount of organometallic additives such as ZDDP lowers the conductivity of oil. Therefore, the elimination of this additive, e.g. in environment-friendly oil, reduces the conductivity and increases the risk of electrostatic charging.
If a non- or low-conductive hydraulic oil flows through a system, an **electrostatic charge** can be generated at the interfaces between oil and non-conductive surfaces such as filter fleece and hoses. This charge is generated by the rapid separation of two non-conductive surfaces. Filter elements have a large non-conductive surface, and charge build-up increases with increasing flow velocity of the oil. As soon as the charge quantity is large enough, discharges occur in the form of sparkovers.
Conventional filter material could be locally destroyed by discharge flashes and associated high temperatures.
This results in holes through which dirt particles can pass unfiltered. This leads to increased wear of hydraulic components and later to malfunctions and to the failure of the machine.
However, the high temperatures of the discharge flashes also contribute to an accelerated oil aging, thus to a deterioration of oil properties and to the shortening of the oil life. Oil aging-related byproducts additionally reduce the service life of the filter elements. Also adjacent electronic components can be damaged due to electrical discharges.
To avoid such problems, the charges must be balanced. For this purpose, a special filter element design was developed, which ensures charge balancing and prevents destructive discharge flashes.
Glass fibers in a filter element are themselves not conductive, but, as already mentioned, the inner supporting meshes and the outer protective mesh are made of metal.



Fire holes due to discharge flashes

ARGO-HYTOS Exapor®Spark Protect filter elements connect the two mesh fabrics with a pleated metal film. Thus, electrostatic charge can pass through the conductor without a sudden, violent discharge build-up through the material. Exapor®Spark Protect completely eliminates destructive discharge flashes. The filter elements are compatible with the standard filter elements such as EXAPOR®MAX 2 and therefore do not require any conversion or additional measures on the hydraulic system. Contrary to a retrofitted electrostatic discharge protection, all other filter characteristics remain the same.
Exapor®Spark Protect filter elements are problem solvers. We recommend their application whenever the electrical conductivity of the hydraulic oil in a system is >500 pS/m.

Copy filter elements

While renowned filter manufacturers undoubtedly have made significant product improvements, this does not mean that the better products are in the hands of the users. The proliferation of filter element copies is becoming an increasingly worrying trend in the industry. Suppliers of copy filter elements refer to well-known manufacturers and claim that their products are original production elements with the same performance. In reality, they are usually only dimensional copy filter elements, have inferior filter media and often have poor quality control. Unfortunately, many users buy such replacement filters because of price and fit, and do not worry about the impact on their machines and equipment.
It is important to note that many filter elements look similar, but in fact represent complex hydraulic components. In addition to parameters such as dirt-holding capacity, filter fineness and pressure loss, the user should consider other decisive features:

The **filtration efficiency** of a filter element, which is characterized by the filter fineness, is decisive for the oil cleanliness in a system over the entire service life.
The **flow fatigue strength** of the filter material ensures the oil cleanliness also with changing flow load.
A **high dirt-holding capacity** provides long filter change intervals, provided that the filter unit has the required flow fatigue strength and is compatible with the hydraulic fluid.
An **excellent differential pressure stability** ensures that the filter elements remain intact and functional during frequent cold starts, which strongly stress the material due to the high viscosity of the hydraulic oil.

The filtration performance of copy filter elements does not withstand any comparison with original filter elements at any of these points. To be able to compare original and copy filter elements, one would have to test them on a laboratory test bench under standard conditions. Users often learn the hard way, that copy filter elements have only a fraction of the life span of the original filter elements.
This means more frequent changes, a greater risk of equipment damage and, ultimately, a higher total cost for the user.
To solve this problem, the current trend is moving away from standard filters to customer-specific filters. In this case, by means of clever functional integration into the filters or by system integration of the filters, e.g. in hydraulic tanks, an entry barrier has been created which makes the copying difficult because of the very high technical complexity or prevents it due to protective rights. This ensures that original replacement filter elements are always used and the required oil cleanliness is achieved over the entire service life. This makes it possible to extend guarantees and ensure a superior performance of the devices.

System solutions

Another continuing trend is that hydraulic-filtration manufacturers no longer just supply individual components, but are developing into suppliers of complete system solutions. Today's customers want more than a filter housing, they want everything around the filter, from mounting accessories and connection adapters to pressure switches and oil condition sensors.
With the increasing importance of a supply chain management among OEMs, there is an ever-growing demand for more-complex integrated solutions from fewer and fewer main suppliers. This includes the integration of functions and systems with a particular focus on the reduction of the interfaces as well as on the production of preassembled and tested functional units.
To name just one example, ARGO-HYTOS has supplied a customer-specific suction filter, including a pressure control valve for the lubrication circuit, a pressure switch, a temperature sensor and a modular, patented connection system, adapted to the customer's installation space situation. This significantly reduced installation time, effort and costs.

Today's customers want more than a filter housing, they want everything around the filter, from mounting accessories and connection adapters to pressure switches and oil condition sensors.

Industry 4.0

The Industrial Internet of Things (IIoT) and Industry 4.0 are not major drivers for filtration technology right now. But the potential to network equipment plants such as filters, digitally with the cloud, offers exciting possibilities. Take the example of a clogging indicator of a filter. Today, an on/off indicator in a tractor can determine whether the filter element is operating normally, or if it is clogged. However, an "intelligent" display could be connected to the electronic control of a machine to monitor parameters such as temperature, flow and motor speed, and possibly track the filter behavior, e.g. during cold start. With a simple algorithm, the user can gain information about whether the system is operating within specified limits; or whether the operation is running outside the specifications, e.g. whether the volume flow is lower or higher than expected.
Through these signals, users can gain more complex information and tackle flexible service concepts such as preventive maintenance. Similar to the technology of some new cars, sensors can monitor operating hours, engine speed, oil temperature range, number of cold starts etc., and use this data to develop service life software models. Ultimately, the user receives a service indication for the oil or filter change only if it is actually required, instead of changing the filters at regular intervals regardless of the operating cycle.

This technology will be adapted to future filtration systems. The trend to improve machine reliability will continue, and will be supported by the need for information and sophisticated monitoring and control algorithms. Even machines at remote locations are warned of imminent machine damage to prevent unscheduled downtime and reduce operating costs.

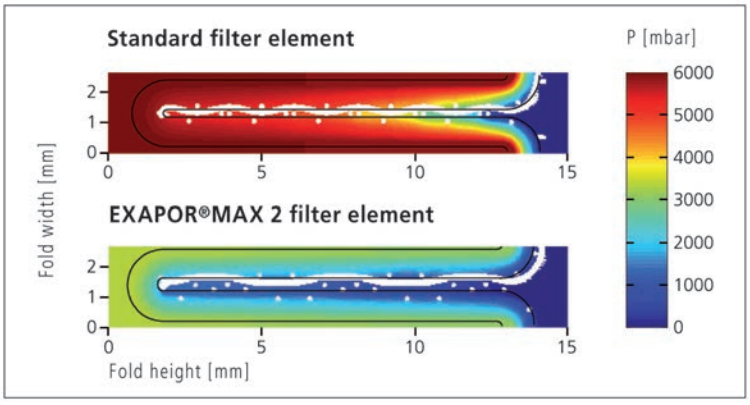
ARGO-HYTOS Sets Standards in the Wind Power Sector with EXAPOR®MAX 2

Competitive advantages for manufacturers and operators of wind power systems thanks to an innovative development from ARGO-HYTOS

As one of the world's leading manufacturers of innovative solutions for the hydraulics industry, ARGO-HYTOS has opened a new chapter in the history of hydraulic filtration with the introduction of EXAPOR®MAX 2.
The requirements of machine operators in the area of mobile and industrial hydraulics for ever-greater machine availability, longer service intervals, lower-cost spare parts and lower operating costs were both the motivation and the objective for the development of the EXAPOR®MAX 2 filter element.

Significantly reduced pressure loss, improved clogging capacity

To improve the performance density of the filters, in addition to increase the clogging capacity, it is also necessary to reduce the pressure loss. Using flow simulations, ARGO-HYTOS has succeeded in gaining knowledge about the conditions in the fold channel. ARGO-HYTOS has been able to identify the key influence factors responsible for the pressure loss in the folded material. The result is a special web technology for production of the new hybrid fabric that ensures that optimal opening of the fold channels is maintained. Thus, the pressure loss in the fold is reduced by as much as 50 %.
It was possible to impressively implement the findings obtained in the simulation in practical application, and confirm them in numerous trials.



Simulation graphic of the pressure relationships in the fold of a filter element (sectional view). The perimeter of the fold is shown in black and the support fabric is shown in white.

Hans-Martin Waiblinger,
Head of Wind Power Systems

"This new material mix of the EXAPOR®MAX 2 filter elements allows longer change intervals in existing wind turbines and more compact filter systems for new developments."

A reduction of the pressure loss in the filter element by as much as 40 % at constant flow rate inversely means, that using a EXAPOR®MAX 2 filter element at specified pressure loss can realize a flow rate that is up to 65 % higher. When configuring hydraulic systems, depending on the application, a smaller filter size can be used, and thus weight, resources and costs can be saved.
Due to the reduction of the pressure loss in existing systems, the bypass valve opens less often and for a shorter period to protect the filter elements. Consequently, fewer particles get through the bypass to the pure oil side and the danger of malfunction due to non-filtered oil is significantly reduced.
The performance-optimized structure of the new 3-layer filter material consists of various fine glass and polyester fibers. This new type of material matrix in the pre-filter and ultra-fine filter materials of the EXAPOR®MAX 2 filter elements significantly contributes to to an improvement of the clogging capacity; for example the clogging capacity could be increased by as much as 60 % in filter fineness 5 µm(c).
The unusually low differential pressure and the high clogging capacity of the EXAPOR®MAX 2 filter elements enable long service intervals and outstanding cold start characteristics.

Filter elements that satisfy the most rigorous requirements at varying flow rates

Depending on the application, filter elements are subject to strong flexural fatigue stress induced by volume flow and pressure fluctuations, for example in hydraulic pitch adjustment systems.
Due to the flow rate fluctuations, differential pressure changes occur on the filter element, which results in the flexural fatigue stresses referred to above. The fabric that has been developed and patented by ARGO-HYTOS consists of a mix of stainless steel and polyester fibers; in this combination all the advantages of metal and plastic fabrics are exploited and the disadvantages of pure metal or plastic fabrics are effectively avoided. The longitudinally arranged stainless steel threads ensure dissipation of electrostatic charges, which effectively prevents damage to the filter material and the associated worsening of the oil purity. The polyester fibers arranged transverse to the metal threads ensure optimal flexural fatigue strength and avoidance of fatigue failure.
Improved flow fatigue characteristics, differential pressure stability, as well as safe dissipation of electrostatic charges, significantly contribute to the long service life of the filter elements.

ARGO-HYTOS originality seal:
introduction of copy protection

Summary

Summary of a successful step in innovation

Benefits from the use of EXAPOR®MAX 2 filter element technology:

- Increased operational reliability: the risk of sudden machine failure and downtime of wind energy plants can be significantly reduced. Maintenance intervals can be extended, resulting in significant cost and time savings.
- Because of the significantly higher dirt holding capacity, the filter element changeover period can be extended. For wind power plants with time-based maintenance intervals, the service life reserve and operating reliability is increased.
- Improved oil cleanliness extends the wear service life of components and of the hydraulic and lubricating oils.
- Significant reduction in pressure loss combined with improved dirt holding capacity results in a higher performance density that enables the use of smaller filters, depending on the application.
- In the fight against product pirates, the increased copy protection thanks to customized geometries of EXAPOR®MAX 2 filter elements is an important feature for expanding and assuring the strategic spare part business.

Overall, the EXAPOR®MAX 2 filter element technology can be an important factor for an increased productivity and profitability of wind power plants.

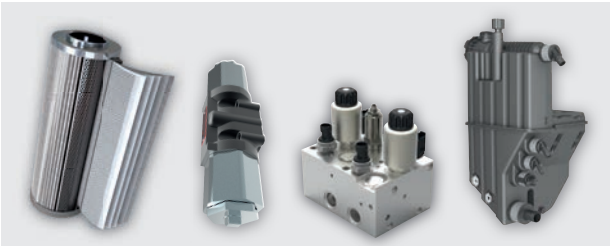
The unusually low differential pressure and the high clogging capacity of the EXAPOR®MAX 2 filter elements enable long service intervals and outstanding cold start characteristics.

EXAPOR®
MAX2

TOP INNOVATOR TOP 100

Excellent Customer Orientation is Our Goal

The orientation of the ARGO-HYTOS Group with regard to customer and market requirements follows a clear maxim: a strict orientation towards the needs of national and international customers. It is always important to listen to our business partners and work together with them on the following issues:
What are the needs, what are the requirements for a long-term oriented business relationship. This is how we create outstanding solutions whether in the product itself or in the way of cooperation. Growth – together with our partners – that is our goal.
In recent years, we have been consistently working on our product portfolio.



From left: filter element, CETOP valve, system control block, hydraulic tank solution

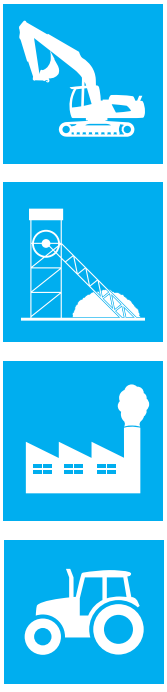
Standard components and the standard ARGO-HYTOS system solutions offer a broad spectrum for our distributors and system integrators, a portfolio that meets both the traditional markets in Europe and the market requirements in Americas and Asia. With our distinctive production facilities in Germany, the Czech Republic, India and China as well as other ALMA (Assembly & Light Manufacturing) locations, including the USA and in Brazil, we offer the best possible local support, not only for distributors / system integrators but also for local and international customers. The latter in particular appreciate our capacities "on the spot", and this is not only the customer proximity in the sense of the "Supply Chain". Rather, these are also the local competencies in technical sales and application engineering. Here, we support with our consulting services: together with our customers we develop "exciting solutions" for their sales markets: we want our customers to be successful! This can only be achieved with clear, precise responses to the local requirements of the often very different markets. It is one of the strengths of ARGO-HYTOS to be there for the customers with a profound know-how in the fields of application of agricultural machinery, construction machinery, municipal utility vehicles, machine tools, mining, oil & gas and power generation.

With concepts for training our own employees, as well as our sales partners and customers, we create an understanding for our products, from their application to the service requirements of the OEM customers.
Here, predictive maintenance is the keyword, in the sense of "customer satisfaction" regarding the service life of the machines – a significant contribution on our part for the branding of our customers.
ARGO-HYTOS stands for future-oriented solutions, in the sense of all the changes that the megatrends demand – not least also through the developments in connection with Industry 4.0.
We face these challenges – and not just since today.

At the upcoming trade fairs 2017 we will present you our performance.

- **SIMA & Agritechnica:**
  Innovative products in agricultural technology
- **Conexpo:**
  Standard components to specific system solutions for construction machines
- **Hannover Messe:**
  Technology and performance show

Come and see us. We look forward to welcoming you at our booth.



Matthias Vorbeck,
Head of Global
Sales & Marketing of the
ARGO-HYTOS Group

"ARGO-HYTOS stands for future-oriented solutions, in the sense of all the changes the megatrends demand."

Industry 4.0

Christian Kienzle,
CEO ARGO-HYTOS Group

"With our intelligent components we achieve a boost to innovation."

What predestines the Fluid Technology for Industry 4.0?

Fluid Technology uses fluids as operating medium and these are differently used in our components and systems. This also changes the state of the operating media depending on the application of, for example, air and oil, which indeed calls for the detection of this change of the operating state and its effect on the overall system. In my view, the Fluid Technology is a more sophisticated technology such as the electrics. Intelligent fluid and motion control technology, implemented sensor technology for data collection, automated commissioning possibilities and communication possibilities among each other are already "state of the art" in our industry.
The Fluid Technology can thus actually be described as a pioneer of the Industry 4.0 philosophy.

Are there any components that are particularly suitable for Industry 4.0?

Manufacturers of hydraulic and pneumatic components and systems have long been implementing decentralized drive solutions with integrated intelligence, for example in hydropumps, valves and cylinders with integrated fluid and motion control technology and the technological ability to communicate with one another: servo pneumatics and proportional hydraulics are the best examples.

The Fluid Technology can thus actually be described as a pioneer of the Industry 4.0 philosophy.

What opportunities does Industry 4.0 offer for the Fluid Technology?

With our intelligent components we achieve a boost to innovation. Every manufacturer puts its products to the test and has to define the "DNA" of its components. In the simplest case, each component can specify its state in the system. These data provide the possibility to calculate algorithms for self-optimization, diagnosis and status description. User-friendly systems are created for customers who want to optimize costs and benefits. We want to maintain and expand our competitive edge in the Fluid Technology.

Does the user really want to have 4.0 applications?

The internet has radically changed our life and the younger generation is growing up in a digital world. Do you think that this generation wants to say farewell to touch screen, joy stick or voice control? And this is how machines will be operated in the future! Machine and plant construction plays a decisive role. A smart production for our factories and new business models for the end products of our customers will be made possible through Industry 4.0 and are already emerging. But the development path is and remains challenging. Only in close contact with society and politics, the high requirements for research and development, training and qualification, norms and standards, legal and data security can be met. It is simply a question of moving the industrial location Germany to the future.
The machine and plant construction sees a great opportunity in Industry 4.0. According to the VDMA Impulse Study (2015), almost 60 % of the companies are concerned with Industry 4.0. But Industry 4.0 is not an end in itself. Every company has to ask about the benefits and the added value for its products and production. The aim is not to achieve complete integration but to increase sales through new product innovations or business models or to reduce costs through improved production processes. Every company has to develop its own vision of Industry 4.0 and its own strategy, selecting the concepts and technologies of Industry 4.0. Industry 4.0 is no walk in the park.

What do designers have to consider who want to design Industry 4.0 capable fluid components?

Industry 4.0 stands for networking the physical and digital world, communication, data acquisition with processing and storage. Design engineers of the drive and fluid technology as important supplier industries must take account of the aforementioned technical criteria of the Industry 4.0 ability of the products - already in the development of ideas and project planning, in the design and engineering. The interdisciplinary cooperation of all technical disciplines, involved in the development process, is a pre-requisite. But innovative companies provide their employees with these modern tools. Working with these tools is fun!
For the implementation of Industry 4.0, the supplier industries need cross-vendor-specific definitions and standardizations, which the designer must consider and implement. Existing standards such as, for example, features, reference architecture, interfaces, data logs and implementation guidelines must be observed.
Industry 4.0 capability presupposes standardized identification, semantics (vocabulary and syntax) and communication. A lot of hard work is still to be done here.

Especially in Fluid Technology – which status data can already be recorded today and which reasonable data can be drawn by sensors in the future?

Industry 4.0 will not change the boundaries of physics, that is, by means of sensors, physical parameters will continue to be the focus of the acquisition of operating data. Pressure, temperature, flow, vibration and noise measurement are only given as an example. Our company, ARGO-HYTOS, deals in particular with sensors for the oil state and the prediction for the use of the medium (predictive maintenance).

Industry 4.0 stands for networking the physical and digital world, communication, data acquisition with processing and storage.

If you think about 20 years ahead – what will the Fluid Technology look like in the future (does it still exist or will it be replaced by electrical engineering)?

Without doubt, the Fluid Technology – hydraulics and pneumatics – will still exist in 20 years. The fluid sector is an innovative and important supplier sector for a wide range of applications. Of course, the Fluid Technology is in competition with other technologies and faces these challenges. Increasing demand in automation for pneumatic solutions proves success. The hydraulics is characterized by a high and flexible power density. The operator's expectations on a machine are high productivity, high reliability, low TCO, high availability and energy efficiency. Drives of hydraulics and electrical engineering are respectively used for specific processes. And in the middle, hybrid drives do meet.

Will Industry 4.0 open new fields of application for the Fluid Technology?

Also the Fluid Technology is growing according to its tasks and challenges – new fields of application will open up, engineers are creative!
New applications and business models are opened up by consistently implementing and using the new functionalities resulting from 4.0 - examples: automated commissioning, autonomous working machines, self-controlling and monitoring systems. But here, the user of our customers as a component and system manufacturer is required and not primarily the engineer. It could be an extension and intensification of the shift of the demand situation in the direction of service. Here, in fact, the digital society may describe the way to us. Uber sends its greetings!

Who is ... Uli?

Uli Seeger is Product Manager for Filtration Products, located at ARGO-HYTOS Germany.

We would like to use this opportunity to introduce Uli a bit more and ask him a few questions:

Uli, since when have you been working at ARGO-HYTOS and what exactly are your tasks?
I joined ARGO in 1993 and went through project management and export sales to my current job as "Head of Product Management FCO". With my team we define the future product range, lead customer projects and provide the support for the filtration products.

What was the most incredible moment in your life?
The birth of my 2 children.

Which dream has not yet been fulfilled?
The invention of a brand new filtration solution like a biological filter, eating up the particles. Outside of business: to participate once the rally from Peking to Paris.

What do you like to do outside of the business?
I am a real tennis maniac … also outside the court :-) Furthermore I like skiing during winter time and hiking in summertime. Other passions are old-timer cars, especially servicing and driving my 2 Alfa Romeos.

What is your motto in life?
Enjoy the little things in life.

Thank you very much Uli, have a great time, fun and enjoy life the most – in your private life as well as at work.

Our Participation in Exhibitions 2017 at a Glance

SIMA
26.02.-02.03.2017
Paris,
France

IFPE/Conexpo
07.03.-11.03.2017
Las Vegas,
USA

maintenance
29.03.-30.03.2017
Dortmund,
Germany

Hannover Messe
24.04.-28.04.2017
Hanover,
Germany

Windergy
25.04.-27.04.2017
Neu Delhi,
India

ElmiaWood
07.06.-10.06.2017
Jönköpping,
Sweden

CIAME
19.07.-21.07.2017
Wuhan,
China

Agro Show
18.09.-21.09.2017
Bednary,
Poland

Agritechnica
12.11.-18.11.2017
Hanover,
Germany

Excon India
12.12.-16.12.2017
Bangalore,
India

Come to visit us at our exhibition booths.

We are looking forward to seeing you.

Imprint

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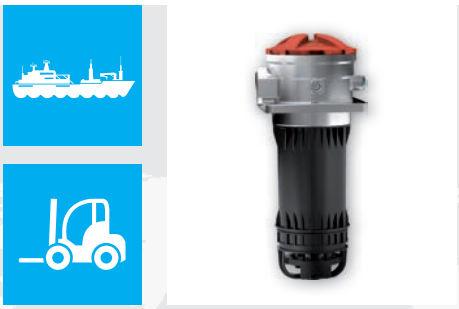

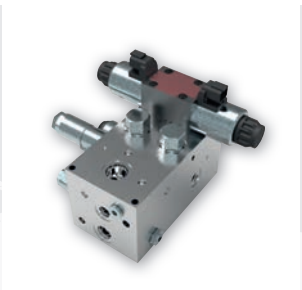


Valves
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Hydraulic Drives
Filtration
Fluid Management
Sensors Measurement

Fluid power technology for success

Innovations and intelligent system solutions combined with flexibility and productivity – ARGO-HYTOS sets new standards in all areas of fluid power technology.

We make your products better. **Worldwide.**

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