

POCLAIN MAG

#10

October 2017



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| AGRITECHNICA | CIAME |
| – Hall 16 – | – Hall B 5 – |
| Stand A17 | Stand 124 |

11 |
MHP Motors :
Now available in 5 sizes

19 |
Double Line Braking

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EDITORIAL



JEAN HEREN
AG PLATFORM
BUSINESS MANAGER

Fifty years – that’s how long Poclain Hydraulics has been working alongside the small and global OEMs of the Ag industry. Its sales and engineering teams strive to stay ahead of their needs and technological challenges.

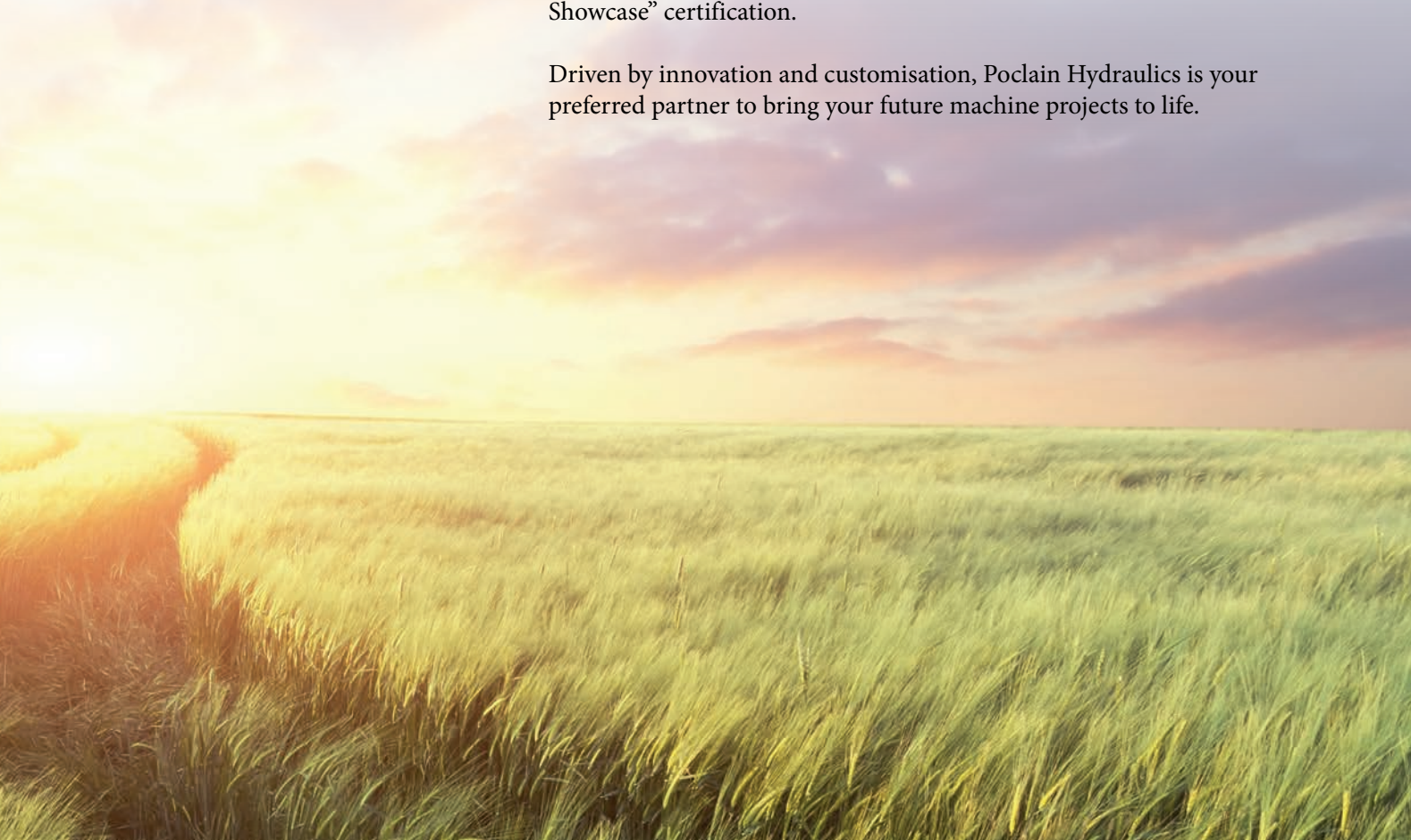
Historically prevailing in Europe, Poclain Hydraulics solutions have succeeded in converting OEMs in the vast agricultural territories of North and South America, Russia and Asia.

As 2017 approaches its last quarter, we are happy to unveil our latest innovations at the Wuhan, China CIAME show (Hall B 5 - Stand 124) and the Hannover, Germany Agritechnica show (booth A17, hall 16). This issue’s product articles will satisfy the curiosity of all those who are not attending.

We are excited to share with you an insight into the Chinese Ag market with an interview of Bertrand Gaydon, our Asia Regional Manager; as well as share with you an overview of the European wine producing industry. This edition also features many new products: the new sizes of the High-Performance series, the PW115 and 130 pumps, our double line offering for tractors and their towed equipment, and our motors dedicated to rice harvesting. We proudly announce that our French manufacturing facilities, namely Verberie and Marnaz, have received the “Industry of the Future Showcase” certification.

Driven by innovation and customisation, Poclain Hydraulics is your preferred partner to bring your future machine projects to life.

“
Poclain Hydraulics solutions have succeeded in converting OEMs to their technology in Europe, as well as in North and South America, Russia and Asia.
”



POCLAIN RECEIVES TWO “Industry Of The Future” Awards

Continuous improvement is in our DNA. Last May, the Industry of the Future Alliance awarded the “Industry of the Future Showcase” (“Vitrine Industrie du Futur”) certification to four new French companies, including POCLAIN HYDRAULICS.



Poclain Hydraulics was not awarded once, but twice for the excellence of its manufacturing facilities this year: for its Verberie facilities, dedicated to manufacturing larger motors, such as the MI250, MHP and MS125; and for the Marnaz facilities, which manufacture standard and stepped pistons. The certification reflects a commitment to transforming manufacturing. It is awarded to companies that have taken concrete actions to innovate in the field of manufacturing processes in the broader sense, and in particular through digital technology.

The implementation of continuous improvement programs aimed at optimising costs and increasing product quality has always been one of Poclain Hydraulics’ strengths. With the project put in place for this certification, the company is going even further with the implementation of a unique method of modernisation management and technology dissemination within the group.

◆ **The Marnaz, France project:** This project consisted of organizing piston production into clusters and establishing a production control system (MES Manufacturing Execution System). The implementation of this system is one of the building blocks to optimise the current value chain. It will also help to improve control over the manufacturing resources and the operator/machine relationship using connected products.

Training our staff and honing their skills to carry out the new jobs that arise from the change in our Engineering and Manufacturing processes is one of the Poclain Group’s major challenges.

This certification illustrates how strongly we feel about integrating automation and digital tools into the ten manufacturing facilities of our Group, to remain competitive and maintain our quality excellence.



◆ **The Verberie, France site project:** Named “ACOD. 3.0” (Aide au contrôle de décrochage), for the hydraulic motor check at the end of the production line (controlled by 10 cameras), before dispatch to the client.

STAGE V REGULATION: Engines Between 19 And 37 kW (25 - 50 HP) Impacted

The next stage of EU emission standards comes in force in 2019 and 2020 for off-highway diesel engines across the power spectrum. Machines for Construction, Agriculture, and Material Handling will all be in the scope of the new standard.

One of the most impacted power ranges will be the engines between 19 and 37 kW (25 – 50 HP). Many of them will require technology such as common **rail fuel systems** and **exhaust after treatment devices** such as Diesel Particles Filter or/and SCR. In short, OEMs will have to:

- ◆ Adapt to tighter space constraints to install exhaust after treatment devices.
- ◆ Manage the additional costs linked to those new devices.
- ◆ Integrate the higher Total Cost Of Ownership(TCO) due to higher maintenance costs on Stage V engines mainly for Rental.

It is apparent that the engines between 19 and 37 kW will be the most impacted since their level of particulates emission will have to go from 0.6 down to 0.015 g/kWh, implying the usage of a Diesel Particles Filter.

One of the possible ways to minimize the impact of this regulation is to downsize the diesel engine used on the machine below the 19 kW threshold. When this is possible, it has to be done without sacrificing machine performances.

To make this change possible, Poclain Hydraulics has been improving the efficiency of a great part of its hydrostatic transmission offering over the last five years. Hydraulic loss reduction opens the door for diesel engine downsizing without compromising the machine performances.

First, the higher efficiency of Cam –lob technology versus high speed motor with gearbox brings a first gap in this quest of highly efficient hydrostatic transmissions. The recent development of HighFlow™ motors, such as MS02, MS05 and MS08 HF reinforces this benefit, offering higher productivity with lower energy consumption. At constant speed, hydraulic losses of HighFlow™ motors are reduced by 50% compared to the classic MS motors.

Second, the Poclain Hydraulics pump offering provides opportunities to further reduce hydraulic losses from the transmission. As a matter of fact, the brand new PM range (PM50, PM30 and PM20) has been designed with higher volumetric and mechanical efficiency. In addition to this, the higher pressure capacity (up to 400 bar instead of 350 bar) is opening new doors to overall hydrostatic transmission downsizing.

Last, but not the least, electronic control of hydrostatic transmissions gives more possibilities to ICE downsizing without sacrificing machine performances. For example, Electronic Anti-Stall or EcoDrive™ software functionalities will help end users to get the maximal productivity out of a downsized engine machine.

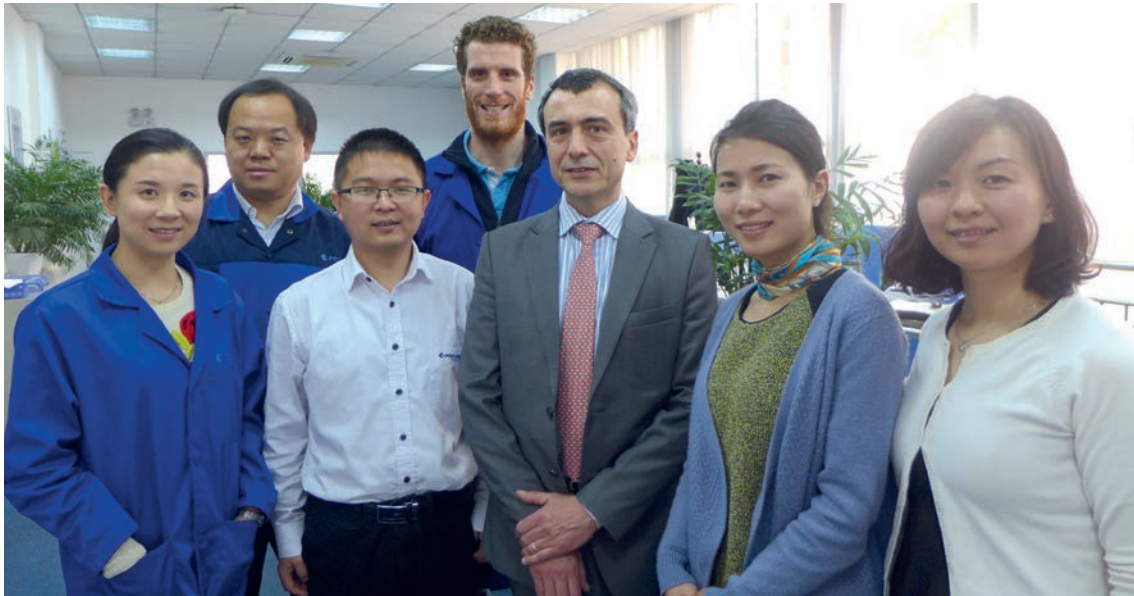
To summarize, Poclain Hydraulics is ready to help its customers to face Stage V challenges. Thanks to brand new product offer, changes will be almost unnoticeable from a performance and cost perspective.



POCLAIN

And The booming Chinese Ag Market

China captivates our imagination. The mere question “What is a Chinese farm like?” makes us wonder whether the image of the old woman wearing a cone-shaped hat bent over her rice paddy still holds true. Bertrand Gaydon, Director of Asia Pacific for Poclain since 2009, knows China well. He shares his insights on the Ag market and where it is heading.



What is the Chinese agricultural landscape?

Bertrand Gaydon: As arid climate and mountains prevail in the Western side of China, farming occupies the Eastern side, with large state-owned farms in the North and small individual farms in the South. China is the world's biggest producer of Ag products, rice coming first and wheat second. Given the variety of climates and vegetation, virtually every crop is grown in China, tea of course, but also cotton, citrus, apple, potato and bok choy.

What challenges does farming in China face?

B.G. There are water, arable land, and workforce shortages, the latter stemming from the country's rapid industrialisation. The Chinese State strives to reverse the trend and curb the importation of food products. It is investing in ag machinery to replace the farmers' manual work with more productive tools. The machines equip the state-owned farms and are made available to the individual farmers through cooperatives and purchasing subsidies.

How mature is China's ag machinery market?

B.G. If we leave aside the state-owned farms, which import large tractors, sprayers, and harvesters from the U.S. and Europe, close to 50% of the farmers still tend to their crops manually, using backpack spraying devices for instance. Ag machinery was introduced about ten years ago and is still in its infancy stage, with basic features and light frames. Given the country's size and fragmented geography, there is a total of 2,300 OEMs that design and manufacture Ag machinery to cater for the local farmers' needs.

Have onboard electronics been adopted on Chinese ag machines?

B.G. As hydraulics are already a significant technical leap ahead for the OEMs, I expect electronics to enter later on, in a few years. The speed of adoption will probably take us by surprise, as it has been the case in Western countries.

How does Poclain Hydraulics fit in the Chinese Ag machinery landscape?

B.G. When I first started developing the Chinese market for Poclain Hydraulics eight years ago, we were not present in the ag machinery market. Since then we have gained market share, starting at the high end of the market and our technology is trickling down to the more standard machines. As there is an abundance of OEMs designing new machinery and with a weak level of knowledge regarding hydraulic principles of operation, our team of application and field service engineers is larger than in our other subsidiaries. They are involved in the design of the machine early on and they advise them on auxiliary components, such as filters and oil tanks. Machines will in some instances be commissioned by our teams two or three times before they are fit for production.

Which machines does Poclain Hydraulics equip in China?

B.G. As Poclain Hydraulics is known worldwide as the leading supplier of hydrostatic transmissions for sprayers, Chinese sprayer OEMs turned to us naturally when they switched to hydraulics to drive their wheels. Harvesters are a huge market – take corn harvesting for instance; forty

thousand machines were sold in 2015. We supply rear-wheel assist drives for corn and sugar cane harvesters.

Is Poclain Hydraulics' offering in any way specific to the Chinese market?

B.G. The motors we supply to Chinese OEMs are identical to those sold everywhere else in the world. We don't have a low-cost approach. Chinese OEMs who adopt our solutions aim at positioning their machines above pure China-sourced competitors and benefit from our well established image and expertise. As the technology matures, I expect our solutions to become increasingly mainstream. Rather than our components I'd say that what is specific to Poclain Hydraulics offering for China is our services: highly committed Applications and Field Service Engineers, as well as short turnaround time for delivery. Chinese OEMs do not have much sales visibility, and they expect our products at their door within as little as seven weeks. Lastly, one of our core values as a tier one supplier is to serve every OEM, regardless of its size. This strategy has served us well in China, where OEMs start small but can potentially become a major player on the world's fastest growing ag market.



MS MOTORS Are Assembled In Shanghai

Established in 2010, Shanghai is the Poclain Group's 8th plant. It has been assembling pumps and valves for a few years already; the motor assembly line has been running since 01-June-2017, and the first **batch of MS02** was delivered to Chinese customers at the end of August. With this third line, the Shanghai plant becomes the only facility in the group that produces three lines of products: braking valves, pumps, motors.



The MS line has a capacity of 50,000 motors per year in three shifts and is expected to produce more than 200 different configurations within the next three years, ranging from MS02 to MS18 (172 through 2,812cc).

Shanghai products are manufactured to the same high quality standards as those from other Poclain plants: the equipment, the process and quality control are identical to those implemented by Poclain Hydraulics in its other facilities.

Poclain has therefore completed an industrial base in the very dynamic Asian markets, to be closer to its customers, perform better service and offer shorter lead times without compromising on quality.



POCLAIN HYDRAULICS

Transmission On Feng Mao Sprayers

FENG MAO is the leading manufacturer of high clearance self-propelled crop sprayers in China. The machines are assembled locally and integrate foreign components for the critical functions, such as the transmission drive and the controls. This positions FENG MAO in between high priced imported models and low cost China-sourced models.



In 2011 FENG MAO decided to convert their mechanical transmissions to Poclair hydraulics motors. They knew the components had an excellent track record on European sprayers. The motors are known for their high bearing capacity and their ruggedness in corrosive environments; in addition they free up space between the wheels, which is a requirement for corn and sugarcane crops.

Today Poclair Hydraulics transmission systems are applied in all of FENG MAO's product range, from 800 to 3000 liters. The transmission consists of MS motors, either standard or stepped, with parking brakes at the rear. Traction control is ensured with PM tandem pumps that drive the front and the rear motors independently.

The market size for sprayers above 800 liters is estimated at 1,000 units in China, while the total mechanization ratio for plant protection

is merely 10%. As water shortage and sustainability concerns increase, the Chinese government offers strong incentives for the farmers to switch from manually operated sprayers to self-propelled models, where the water, fertilizers and pesticides are applied precisely and evenly. The high sales forecast is driven by the government, who then offers incentives for the farmers to purchase, loan or rent the new machines.

Mr ZHAO Jinkai, CEO of Feng Mao, recognises the value that the Poclair Hydraulics transmission adds to their machinery: "The behavior of the sprayers is excellent, the power and anti-skid performance enable them to work on most of China's arable territory and climate types. The customers are reassured by the Poclair name, because it is famous in the sprayer market; in the field we have come across practically no failure".

ADDED RESISTANCE For Rice Paddy Harvesting

Rice growing is deeply rooted in the traditions of China, India, Thailand, and Vietnam. India and China's rice is mostly consumed locally, whereas Thailand and Vietnam lead in terms of exporting.



Mechanical rice harvesting requires combines with tracked drives, due to the wet and soft nature of the soil. Rubber tracks are used on the smaller models, while the larger ones integrate metal tracks.

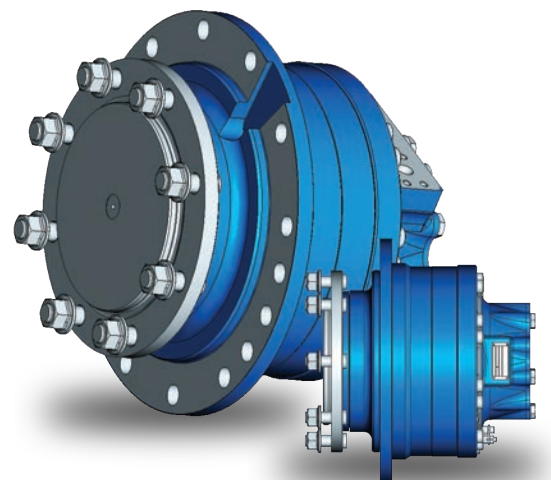
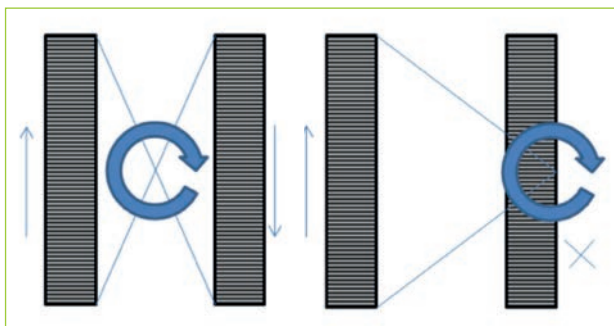
The tracks can be powered in two different ways: either using a central transmission and a braking system per track side or with a tandem hydrostatic transmission, one on each track side.

One advantage of the independent transmission per side is that maneuvering at the end of the field requires less space and time. When the vehicle turns around, the inside track works in reverse, which is impossible with the central transmission and independent brakes.

The dual transmission machines are thus more efficient and cause less damage to the crops.

Based on the tried and tested size MS18 motor, Poclain Hydraulics has developed a reinforced bearing support with suitable sealing and load bearing capacity. It also integrates a circular mount on the bearing support, which reduces the offset between sprocket and chassis, limiting the strain on the mechanical parts and the vehicle structure.

Its cassette-type seal was specifically designed to operate in rice paddies, with multiple barriers against mud and a stainless steel housing.



POCLAIN



MHP MOTORS Now Available In 5 Sizes

Whether in ag, construction, material handling, mining, marine or industrial, OEMs strive to increase productivity and quality, reduce design and ownership costs, as well as increase the value of their machinery. To address the OEMs' needs and help them advance regarding technology and differentiation, Poclain has designed the new range of High-Performance transmissions.

The MHP motor design is the result of many years of design and validation. It sets a new standard in the cam-lobe motor principle in terms of performance, reliability and fuel consumption.

The MHP series is available in five sizes : the MHP11, MHP13, MHP17, MHP20 and MHP27; their displacements range from 0.9 liters (55 cu.in) to 3.5 liters (214 cu.in) per rev. They boast unprecedented speed and power levels, two key requirements that increase machine performance. The MHP motors are qualified to operate up to 500 bar (7250 psi).

Poclain Hydraulics engineers were able to maintain the features of the cam-lobe technology, which has been the foundation of Poclain's reputation for the last thirty years.

The new modular range is made of three sub-assemblies:

- ◆ The torque module: it converts the power from hydraulic to mechanical
- ◆ The valving: it integrates the displacement selector and the boosted hydrostatic brake
- ◆ The bearing support: it bears the external loads and incorporates the range of parking and dynamic brakes



MHP sub-assemblies :

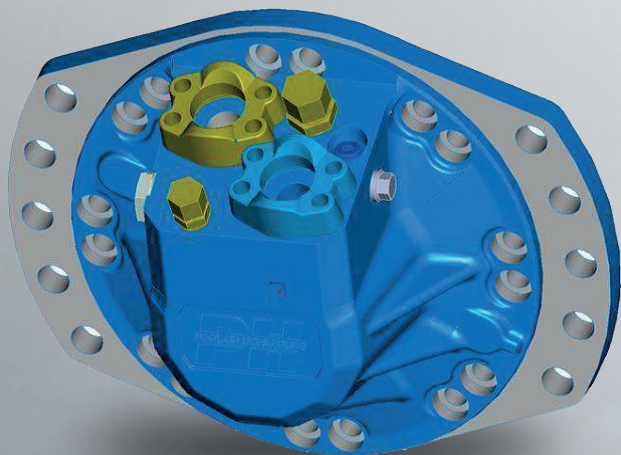
The **torque module** integrates all the design and manufacturing expertise Poclair Hydraulics has accumulated since the first generation of motors in 1958.

New design software enabled engineering to develop and characterise the module parts precisely. The validation tests confirmed the simulations, which forecasted over 50% increase of performance levels regarding speed and transmissible power. Meanwhile, the MHP motors maintain high-efficiency levels in each displacement.

The key feature associated with the Poclair Hydraulics technology is to provide near stable efficiency regardless of displacement. The MHP does just that, exceeding 90% overall efficiency over a broad operating range, in reduced as well as full displacement and at a maximum speed of 250 revolutions per minute.

Valving

In its simplest version with a fixed displacement motor, the valving cover provides large inlets and outlets on a single flat surface. Thus the pressure drops in the connectors and hoses are limited, and additional blocks are easily mounted directly onto the motor.



In the MHP series, the nominal ratio between full and smallest reduced displacement for a given motor size is either 3 or 4 depending on the models.

The cam-lobes are individually connected to the high-pressure circuit of the pump to enable multiple displacement shifts. With a motor consisting of eight lobes, each one is connected to the high-pressure circuit to obtain the maximum displacement. Only two lobes remain connected to render a quarter of the displacement. The other six lobes are fed by the low-pressure circuit of the pump.

The MHP 20 and 27 integrate eight lobes, which are grouped by two or three lobes. The sizes 11, 13 and 17 integrate six lobes grouped two by two.

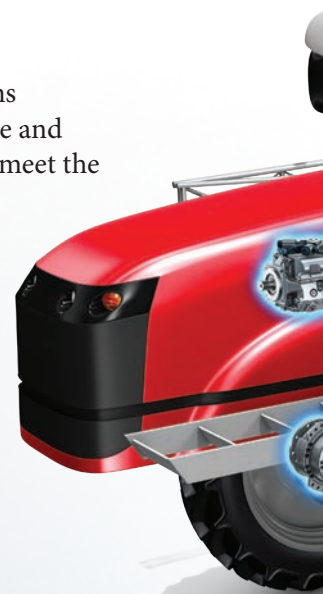
The more sophisticated valving versions feature the same flat connecting surface and provide several displacement ratios to meet the application requirements.

The valving unit is available in a number of different configurations allowing for a wide range of displacement ratios:

- ◆ Symmetrical twin displacement with a nominal ratio of 2.67 (3/8) for sizes 20 and 27 and 3 (2/6) in sizes 11, 13 and 17.
- ◆ Three displacements with two configurations for the MHP 20 and 27: 8/5/3 or 8/5/2 active cams. For sizes 11, 13 and 17, the ratios are 6/4/2.
- ◆ Four displacements with an 8/6/4/2 configuration, only available in sizes 20 and 27.

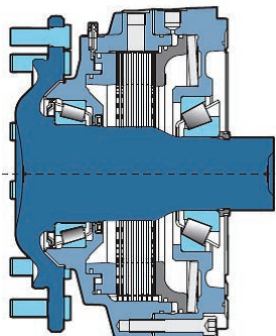
The valving unit can also integrate optional functions such as an integrated exchange valve, speed monitoring, and boosted braking.

Boosted braking is available with the two and four displacement versions. It allows for reinforced hydrostatic braking capabilities of the vehicle by using all of lobes of the cam while braking, even when the motor is operating in the smallest displacement.



The bearing support

It is designed to withstand the high external load and efforts that are associated with increasing machine speed and tire load capacity.



The bearing support can integrate a disc brake between the two rows of conical bearings. The wet brake discs are contained in a sealed housing and operate as a parking brake (negative) and/or dynamic brake (positive).



The braking capacities in terms of torque and power have been upgraded. The dynamic brakes are flushed and activated by a dual control that secures the braking system efficiently and economically.

The dynamic and parking brakes share the same interfaces and enable mounting on a four wheel drive machine using the same attachments on the chassis and the wheel rim.

The MHP's parking and dynamic brake replace the Dyna+ solution, with higher braking torques and lower weight (from 10 to 20 kilograms less depending on the motor size). They are completely interchangeable with Dyna+ for the rim and chassis mount as well as for the control pressure.

Machine validation

Poclair Hydraulics puts a high emphasis on testing its new motors and runs a fleet of vehicles to validate the performance levels and the functionalities of its products. The MHP was no exception and was tested on a self-propelled sprayer chassis with the following configuration:

- ◆ At the front: MHP11, twin displacement, boosted brake and S17 dynamic braking with dual control
- ◆ At the rear: MHP20, three displacements with an 8/5/2 ratio and a P27 parking brake
- ◆ PW96 tandem pump
- ◆ VB220 braking power unit
- ◆ CT300 controller

The vehicle weighs 12 metric tons and can reach 60 km (37 miles) per hour in travel mode and go up grades above 30%. It uses all the operator assistance functions, such as smooth and automatic speed shift, EcoDrive and electronic traction control. Several customers, as well as our sales team, have witnessed the sprayer operate on our Verberie test track.

Our latest tests focused on measuring the performance of the brakes when hot, in compliance with the new EU2015/68 regulation. The goal of the test is to measure the drop in braking efficiency when they are used intensively. The brakes are monitored in a « type 0 » test setting (very severe deceleration from max. speed to 0 speed) at the beginning and at the end of the test, then with a series of twenty « type 1 » brake actuations (at intermediate speeds).

The tests were successful and confirmed the braking capabilities of the wet disc technology used in the MHP motor design.

THE PW PUMP SERIES Grows With Two New Sizes

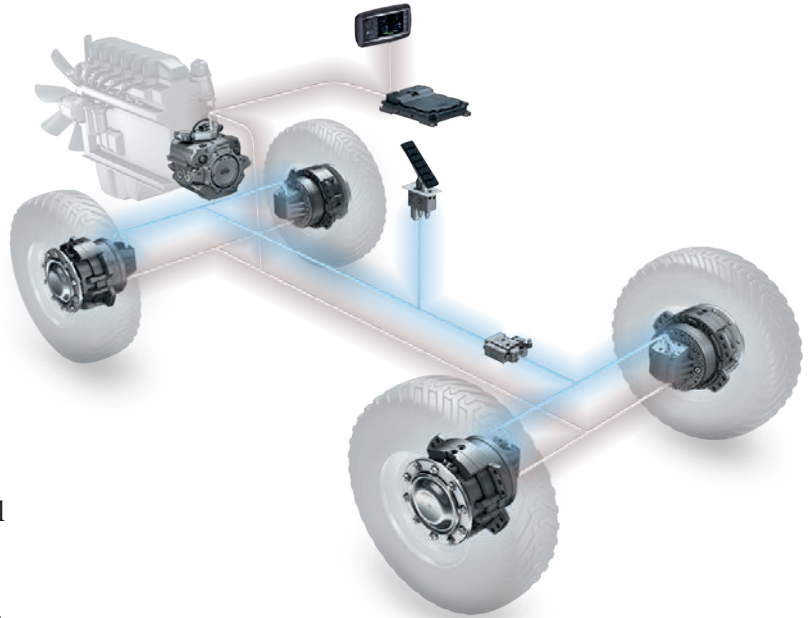
The 2015 edition of Agritechnica saw the unveiling of Poclair Hydraulics' new PW heavy duty pump. This year we will display two additional sizes on our booth, the PW115 and the PW130.

Extending the series with new displacements - 115 ccs (7 cu.in) and 130 ccs (7.9 cu.in) per rev.- the two new pumps share the DNA of the High-Performance offering: higher performance to increase machine productivity while controlling fuel consumption.

The product specifications enable to reduce design time and cost on the new machines as well as enhance driving comfort.

The features of the all new PW115 and the PW130 are in line with those of the PW85 and PW96 :

- ◆ High operating efficiency, which limits fuel consumption. OEMs and end users are keen on reducing the carbon footprint and ownership cost of machinery.
- ◆ Up to 500 bar (7250 psi) pressure and 3800 rpm rotating speed for extra productivity.



- ◆ Exclusive electronic control for precise, responsive and safe driving. End users appreciate operating machines that provide optimal levels of comfort and safety.

The PW pumps are among the shortest on the market (axial length), thus freeing space in the engine compartment and allowing OEMs to meet the new anti-pollution standards without compromising on performance.

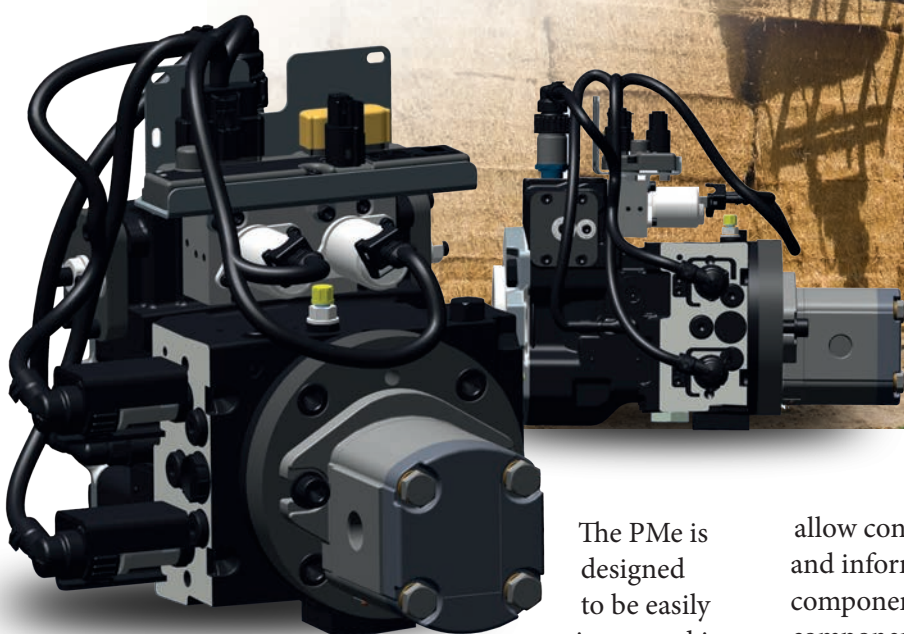


POCLAIN HYDRAULICS

Introduces The PMe Medium Duty Pump With Electronic Control

Safety, accuracy and performance: those are the features of the new PMe pump, which integrates a set of sensors and an embedded Electronic Control Unit (ECU), the SmartDrive CT 30.

It derives from the PM model and is available in two sizes, 30 and 50. The PMe is available with electro-proportional servo control with or without mechanical feedback, depending on the degree of accuracy requested.



The PMe is designed to be easily integrated into

a wide variety of machines. The PMe's

on-board ECU can withstand the harshest environments, including proximity to the combustion engine. The ECU is pre-wired and pre-programmed; after shipping, the system is ready to be connected to the driving devices (e.g. the travel pedal, joystick, brake pedal) and is ready to use. It reduces development costs and shortens time to market.

The associated electronic devices are delivered already plugged onto the pump and wired to the ECU. The factory-installed harnesses are tested at the end of the assembly line prior to delivery. The two integrated CAN Buses

allow configuring, machine diagnosing and information sharing with other machine components (e.g. engine, displays, hydraulic components).

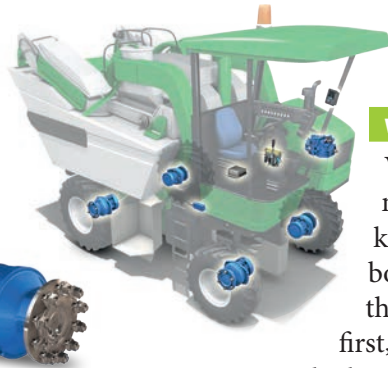
Among the many pre-defined software functionalities included in the PMe packages, the speed control loop is available for specific applications that need constant driving speed, a pre-requisite being two speed sensors in the wheels.

The PMe pump can also be used as a slave unit via CAN Bus. The CAN message redundancy ensures the safe control of the pump. The electronics performs an accurate pump control thanks to a factory pre-set calibration. The PMe can also provide the plugged sensors' physical and electrical values (temperature, pressure, speed) via CAN Bus to the master ECU.

POCLAIN HYDRAULICS

And The European Wine Industry

Europe is a major wine producer with France, Italy, and Spain occupying the top three positions worldwide in 2014. Poclain Hydraulics' work alongside vineyard machinery manufacturers started back in the 70's. As its motors are designed a few hours' drive away from some of the first and most renowned vineyard equipment manufacturers, Poclain Hydraulics has an in-depth understanding of their requirements.



**Poclain Hydraulics
has long history
with the wine industry**

Vineyard equipment manufacturers offer two kinds of machines, and both play a critical role in the quality of the grape:

first, the straddle tractor, which is out on the field every week to prune, mow, trim and treat the vine stock and remove weeds. Second the grape harvester, which must be gentle on fruit while removing a maximum amount of leaves and stems to produce high-quality wine.

Poclain Hydraulics high torque technology contributes to the performance of the vineyard machinery. The compact size of the MS range fits inside the wheel hub and protects the vine stock. The grapes typically grow on slopes that can exceed 50%. Also some terroirs, like Burgundy, impose a high density of vine stock per hectare. Thus some vine rows are only ninety centimeters (35 inches) apart, and the tractor straddles over two or three rows at a time. The efficiency of the MS range provides the gradability and precision the operator needs to drive up and down the narrow rows smoothly, as well as turn in the tight space at the end of the field.

Straddle tractors are available in three and four wheel versions, and the models are equipped with MS motors from size MS05 to MSE18, one in each wheel.

Grape harvesters are typically heavier on the rear and equipped with MSE05 to MSE18 motors according to the machine size.

The TwinLock™ system is widely used and particularly suited as it continually adjusts the torque of each wheel to the soil, even when it is on an incline, loose, soft or rocky ground. The new MHP motor design (see article page 11) combines several torque modules to provide high torque in the field and high efficiency on the road, a feature that will no doubt gain market share on these applications.

**Poclain Hydraulics offering meets
the vineyard machinery regulations**

Two regulations impact the design of vineyard machinery: the EU Directive 2015-68 (see article page 5) allows higher speed on road, assuming the proper brakes and controls are implemented on the machine. In the wake of the EN 15695-1 standard, Class IV cabs are becoming the norm and hydraulic controls are replaced by controllers, sensors, and connectors that inform the operator of the machine's behavior and environment while protecting him from external pollution.

The challenge of climate change

French vine stock has suffered this year and in 2016 from severe weather conditions, with hail and late frosts damaging the growing grapes. This year's production should be the lowest since 1945. Volumes are low, but quality will be outstanding, as the ever shining sun and absent rain have allowed the fruit to ripen to its fullest.



KAZANSELMASH INTEGRATES A Complete Poclain Hydraulics Systems

In 2007 a group of former employees of several companies founded Kazanselmash. Having started practically from scratch, the company became in a short period of time the best-selling and most acknowledged manufacturer of plant protection machinery in the Russian Federation.



In 2010 and after field testing in the Republic of Tatarstan, Kazanselmash launched the first and only CIS-made self-propelled sprayer.

In 2011 Kazanselmash decided to switch to hydraulics for their transmission. The first models were equipped with a mechanically controlled pump system and performed well on the field, although with limited functionality.

Relying on the knowledge and extensive experience of Poclain Hydraulics experts, the team of the Moscow-based Poclain branch designed a reliable and technically advanced hydrostatic transmission. In 2017 Kazanselmash upgraded its self-propelled sprayer, integrating a SmartDrive™ Easy controller, SD-CT Off-Road electronic system and a Poclain Hydraulics display.

The system manages the P90 transmission pump and four MS18 hydraulic motors incorporating hydrostatic braking and speed shifting valves, thus considerably simplifying and optimizing hydrostatic transmission operation.

The Poclain Hydraulics transmission provides operability and performance enhancing functions

- ◆ Machine speed calculation, automatic gear shifting and speed adjustment for transport and operating modes via the built-in software;
- ◆ Hydrostatic transmission control in two modes: independent transmission control at constant engine speed and simultaneous engine and transmission control by one travel pedal;
- ◆ Limitation of transmission power consumption;
- ◆ System pressure limit;
- ◆ Anti-slip control which integrates wheel steering angle monitoring;
- ◆ Hydrostatic braking control;
- ◆ Electronic control unit. It allows OEMs to integrate and to automate driving and operating equipment of the sprayer, to control the machine and to remotely obtain the system operating data. It also actuates the emergency steering mode;
- ◆ Display of the main operating parameters of the sprayer transmission state as well as the failure codes.

The tests on the new sprayer have demonstrated its superior performance compared to equivalent models on the market. The first serial machines started working in the spring of 2017 in different regions of Russia and CIS.

JOSEF ZEYER, A Sustainable Approach To Weed And Pest Control

The company Josef Zeyer GmbH is located in Neresheim in South West Germany. Originally a forge when it was founded in 1956 by Josef Zeyer, the company has developed and added ag machinery to its offering.



In the early eighties, Josef Zeyer started to develop and produce their own self-propelled agricultural tool carriers to plant, harvest and field package salads and vegetables. The vehicles are equipped **with multiple wheel drive** to provide low working speeds (40 meters per hour) while reaching 40 km per hour on the road.

The machines are used year round as they work in Northern Europe from April to November, then are transferred to Southern Europe from November to April. Annual usage adds up to several thousands of hours. Today the company is owned by Josef Zeyer's son Andreas and employs 35 people. Their continuous drive to innovate positions them as leaders in the European market.

Steam Killer

Josef Zeyer's most recent innovation is the Dämpf-Vollautomat MSDZ-1, a pest and weed steam boiler. The machine was designed in partnership with MSD GmbH, a company that has a strong expertise in steam technology. The steam boiler is towed by a tractor and dismounted when it reaches the crop. It houses a 500 m long hose which connects to a water supply to produce the steam.

A 580 kW domestic fuel oil burner heats the water to spray 5 liters per square meter. The steam boiler needs approximately 54 hours to cover a 10 000 sqm crop. The machine moves in four-meter increments with an accuracy of 50 mm and stops to inject steam into the soil.

It uses a 3D-compass, a track stability device and a sensor that measures the distance. Obstacles are detected using radars and ultrasonic monitoring devices. An onboard controller records the machine's performance. There are three side-by-side steam injection plates, each four meters long and 1.55 meters wide. They lower themselves to the ground, expel the steam and rise again. Then the machine moves four meters ahead to spray the next zone. At the end of the track, the operator winds up the hose and drives to the next track.

Drive components

The machine is powered by a 54 kW Deutz engine which drives the wheel motors and the auxiliaries, namely a hydraulic pump connecting to the electric generator and the lifting devices. In 2015 Josef Zeyer GmbH asked Poclain Hydraulics to design their drive system. The maximum speed requirements were 25 kph on the road in free-wheeling mode and 7.2 kph in the field.

Poclain put together a system comprised of a PM50 pump (52 cu per rev.) with electro proportional control, four MSE08 motors featuring parking and dynamic braking, a through shaft, a speed sensor and free-wheeling springs. A flow divider regulates the flow between the front and rear axles and thus ensures precise acceleration and step length as well as preserves the soil.

SCAN THE QR CODE TO PLAY THE VIDEO



DOUBLE LINE BRAKING FOR AG TRACTORS

And Their Towed Equipment - EU 2015/68 Regulation

Poclair Hydraulics has been supplying brake valves to the Ag market leaders for many years. In January 2018 a new regulation relating to tractors coupled to towed equipment will be in effect in Europe. As in the past, it requires a single certification for tractors throughout the European Community; from 2018 onwards the single certification will also apply to towed equipment (trailers and towed implements).

The range of braking solutions offered by Poclair Hydraulics complies with the new tractor and towed equipment regulation. Whether hydraulic or pneumatic, braking systems incorporating a supplementary line enhance the safety of tractors towing equipment. If the main line fails or the coupling with the trailer breaks, the latter maintains its braking capabilities. The regulation also sets the bar for higher braking performance, in that it defines the response time and deceleration rate.

The braking capability of the tractor is ensured by optimised valves which carry out dynamic braking, differential braking to facilitate turning in the field, emergency and parking braking with the Park Lock option (automatic activation). All these components enable to comply with every point of the new regulation, both in terms of functionalities and performance levels.

In the tractor a dedicated system manages braking on the towed equipment in accordance with the new requirements pertaining to the double hydraulic line.

Poclair Hydraulics offers a solution that reduces the impact of installation and diversification for the OEM, and increases the safety by informing the driver of any failure, while addressing each point of the new regulation.



Poclair Hydraulics offers a range of solutions to address each point of the new regulation for the towed equipment, whatever its category. A load sensing valve enables tractors to adapt the braking force of the towed vehicle according to its load, and to distribute braking appropriately between the tractor and the towed vehicle at all times.

Lastly the braking management valve of the towed vehicle enables tractors to comply with the response time requirement for vehicles with one, two or three axles. Regardless of the vehicle type, the benefits of hydraulics can be fully appreciated:

- ◆ **Compactness**, thus leaving room for the primary functions of the vehicle and optimising its efficiency
- ◆ **Comfortable with smooth** braking
- ◆ **Reliable operation even in low temperature and a humid environment**, no risk of freezing or corroding.

A consistent hydraulic connector and the ability for the tractor to distinguish between a towed vehicle with a single or double braking line ensures compatibility with the existing fleet of vehicles. There is no break in compatibility.



ECR88

*ECR88 customized
for railway use*

CEDE GROUP DESIGNS AND MANUFACTURES Special Machines For The Mining And Construction Market

A fast growing company headquartered in Malmö, Sweden, CeDe Group employs 50 people. At CeDe Group development and production are tightly integrated, with all activities located under the same roof. This contributes to a creative work climate where a new product idea is rapidly shaped into a ready-to-use machine.

Patented drive for railroad construction and maintenance

CeDe Group AB customizes construction machinery, providing, for instance, extra-wide tracks for forestry machinery, cabs that can be tilted and raised for tunneling applications, and extended booms for wheel loaders.

In 2013 CeDe Group patented a drive unit for a road-rail vehicle which works and travels with equal ease on railway tracks and the road. The weakness of the application is that the vehicle loses traction when it performs work along the side of the rail, like ditching or restoring the railway embankment, or when driving along a curve. Their patent solves the problem by powering each wheel with a motor and connecting them in parallel side-by-side.

CeDe Group had strict requirements for its railway track transmission supplier: first, understand the machine's configuration and make the appropriate recommendations, second, guarantee short delivery times, third, be priced in their bracket, and last, issue an installation approval.

CeDe Group chose Volvo's ECR compact excavator range as the base for their rail-road vehicle. For the ECR88 Poclairn Hydraulics

proposed the MS05 High Flow motor with a flange-mounted brake valve block. The MS05 motor is equipped with a reinforced bearing to withstand the high radial (and axial) forces that are at play when the machine works in rail mode.

The four wheel motors are mounted two-by-two on a heavy duty axle, in front and at the back of the vehicle tracks. When the vehicle is on the road, they are disengaged and positioned above the ground level; when it is on the rails, the wheel motors are lowered and lift the vehicle off the ground.

For the lighter ECR58, CeDe Group has designed a skateboard solution equipped with four Poclairn Hydraulics MS05 High Flow motors. In this configuration, the excavator first sets the skateboard on the rail, then crawls onto the skateboard using the lifting power of the dipper arm. After boarding, the hydraulic system of the excavator is connected to the hydraulic system of the drive units on the skateboard – and the machine is ready for railway use.

Once in rail mode, the excavator can run at the same speed in forward and reverse as the MS05 HF is equipped with a 2C (dual displacement) symmetrical valve.



ECR88

ECR88, lifting framework for railway wheels



ECR58

ECR58 on the skateboard for railway use

M540 MENZI MUCK EXCAVATOR With Harvester Head At Work In The Laos Jungle

Harvesting timber mechanically on rough terrain and in the dense jungle is challenging and hardly worthwhile financially, especially in countries like Laos where labor is cheap. The Menzi Muck walking excavator, equipped with a Poclain Hydraulics swing drive, can accomplish this feat.



With a walking chassis that adapts to the terrain like a spider, a powerful all-wheel drive and the treading function, there is nothing that can stop the Menzi Muck harvester, even on slopes of up to 100%.

Regardless of whether the Menzi Muck is used for storm-damaged timber, targeted thinning or deforestation, its range of operation is versatile. In comparison to other forestry equipment, the Menzi Muck harvester is lightweight and powerful, which reduces its environmental footprint.

The articulated chassis and low ground pressure protect the forest terrain. The agility of the Menzi Muck excavator also limits the damage done to the indigenous tribes that live in the jungle.

Poclain swing drive

An MS21 motor, tailored to meet the performance, noise and vibration requirements of the application, powers the swing drive. It provides accuracy both in the swing movement and the cab positioning, as well as the power density adapted to the tight work space of the dense jungle. Last its extended lifetime and reliability guarantee that the machine performs without fail day after day and year after year.



POCLAIN HYDRAULICS

AT Elmia Wood

Exhibition 7-10 June 2017

Elmia Wood, the world's largest forestry fair, was bigger than ever this year both in terms of surface and number of exhibitors. A total of 555 exhibitors from 28 countries presented their new products at Bratteborg, during four intensive days. This year's edition featured a new section, Load & Transport, covering logistics and timber handling.



Poclain Hydraulics participated with a booth, where our solutions were displayed. The message conveyed was that Poclain Hydraulics products and systems have what it takes to meet the demanding needs of forestry applications. They have a proven track record on steep slopes and uneven terrain and they deliver the precision and torque needed to meet productivity demands.

On our booth the MHP27, with its integrated C27 dynamic brake, caught the visitors' eye, together with AddiDrive combining an MF08 motor and a PW85 pump. End users, well-known customers and prospects came in large numbers to see these solutions and give us their feedback. End users praised our good quality and the interest from new leads was strong. This shows that the efforts taken since the last exhibition in order to enhance the Poclain Hydraulics motors as well as launching new products has paid off.

Outside our booth Poclain Hydraulics transmissions were well represented, such as the new MS08 high flow motor on the SP Maskiner 761 harvester head. The major harvester head manufacturers were at the exhibition and the forestry version of the

MS motor has now been fully introduced to the Swedish customers. These motors are reinforced to prolong their lifetime under rough forestry conditions where cavitation frequently occurs.

A new trend in brake-by-wire on forestry machines was represented by our new VBR-valve shown in our booth, an electro-proportional valve that transforms the signal from an electrical brake pedal to hydraulic force shown on Eco-Log harvester 688 E Steephunter. In brake by wire the customer avoids using high pressure hydraulic in the cabin, reducing costs as well as assembly costs.

In the Load & Transport area, both Daimler and MAN showed AddiDrive on forestry trucks further solidifying their intention to break into the Scandinavian forestry market.



ECO-LOG 688E

*Steephunter
with Logmax
6000B
harvester head*

HBM-NOBAS: New State-Of-The-Art Assist Drive

Unlike most construction machinery OEMs, HBM-NOBAS designs and manufactures only one machine type: graders. Engineering has a deep understanding of the application requirements and the machine range is broad, both in size and in variations.

The BG 120 is the successor of the existing grader models BG 110 and BG 130. The BG 120 complies with new EU stage IV requirements in Europe and is available in two versions. The BG 120 T-6 is tandem driven (6 x 4) and equipped with a mechanical transmission. The more sophisticated model, the BG 120 TA-6, is six-wheel drive. It is equipped with a microprocessor-controlled hydrostatic transmission on the front axle. It can swing at a max angle of 15 degrees and provides a steering angle of 45°, a wheel lean of +/-17° and a ground clearance of 580 mm.

HBM's BG120 integrates a number of Poclair Hydraulics front axle transmission components:

- ◆ Two MS08 motors
- ◆ One P90R075 pump
- ◆ One bespoke valve block
- ◆ One SmartDrive™ Easy Plus controller with customized software

Since 2004 Poclair Hydraulics has developed a strong partnership with HBM-NOBAS and supplies an optional front axle drive for the entire grader offering, integrating MS11 motors for the larger grader models BG 160, BG 180 and BG 190 and MSE11 motors for the BG 240.



HIGH PERFORMANCE

MHP27 Motors Boost

The Avalon AG10000 Auger

AVOLON SYSTEM CORPORATION is a construction machinery manufacturer headquartered in Kawasaki City, Japan. It specialises in foundation construction, with products such as pile hammers, earth augers and extracting machines.



The company was established in 1969 and provided at the time maintenance services for heavy duty trucks, special-purpose vehicles, construction machines and hydraulic products. In 1976, they developed vibration-free and no-noise piling machines and augers under the Avolon brand. In January 2005 they changed the company name from “Central Automotive Industry Co., Ltd.” to Avolon, to be consistent with their brand.

Based on their achievements and accumulated expertise, they continue proactive research and development to meet market demand and develop new machines which are environmentally friendly.

Avolon started working with Poclain twenty years ago. They were looking for a large two-speed displacement motor to drive a hydraulic auger. They had seen Poclain Hydraulics MS motors at a tradeshow and had decided to use a MS25 motor for the AS5000 auger. They were having issues with their current motor, whose displacement was insufficient or

required stopping the motor to shift speeds. Avolon recognized the advantages of the MS high torque technology, as well as its hollow shaft which allows material such as water, air and cement to flow through. From then on Avolon adopted the MS motor series on other machines.

In 2012, Avolon developed the AGD 7064, which combines a case rotation auger and a screw auger in one body. Two MS11 drive the case rotation auger and one MS125 drives the screw auger, which is inside the case auger. The outer case and the inner screw are fed by independent hydraulic power lines. The case rotation improves soil drainage. Even small excavators can perform like medium-sized excavators when the AGD7064 is used. The newest Avolon machine is the AG10000 auger, using two MHP27 motors. The machine boasts high performance levels: 10,000 Nm shaft torque, 280 bar (4050 psi) maximum pressure, 196 rpm maximum speed. MHP motors provide more power for the same displacement. Avolon thus offers augers with a broad range of available power.

Currently the demand for augers is expanding to smaller sizes used for solar panel installation. Other customers request upsizing to benefit from the latest innovations and increased base machine power. Avolon has succeeded in winning the customers’ trust by providing well organized after-sales service and satisfying diversified customer needs with new developments. Avolon is a leading company on the Japanese market and its market share exceeds 50% of hydraulic augers.

In the future, Avolon plans to further extend the integration of MS motors and study new auger developments with MS125 and MS83 high-flow motors to unclog the flow limitation on the base machines.

POCLAIN'S LEGENDARY CK1000 EXCAVATOR

On display In Le Plessis- Belleville, France in May 2017

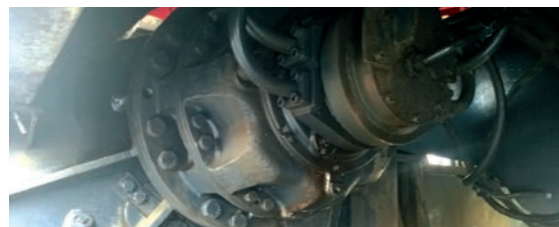
Thousands of visitors gathered to discover or recollect the iconic POCLAIN machinery for the 90 year anniversary of the brand. The event took place in Le Plessis Belleville, where the machinery was manufactured from 1930 until 1988, when the last excavator came out of the assembly line.



From the first three-wheeler designed by Georges Bataille and manufactured starting in 1938 to the first hydraulic excavators which were launched in 1949, the giant CK 1000 excavator stood out and fascinated the visitors. When it came out on the market in 1970 it was the biggest of its kind, measuring 5.75 meters (19 ft) high and 4.5 meters (17.8 ft) wide. Visitors took pictures of themselves standing next to the behemoth, while others stood inside the machine bucket.

The CK 1000 was used for earthmoving and excavating in quarries and open pit mines. It weighed 185 metric tons and featured two twelve cylinder and 445 HP engines. Each track of the CK 1000 excavator was powered by a 6700 cc (409 cu.in) G2 Poclain motor connected to a reduction gear box. Two additional G2 motors were used without gear box to directly rotate the machine cab.

The G2 motor generation replaced the G1 and was capable of reaching higher rotating speeds. It integrated two major design improvements: the cam contained six lobes instead of eight, and the steel cylinder block shaft was made in one piece.



1000 CK



| | | |
|--|---|--|
| | 2 | DEUTZ BF 12L 413 F |
| | 2 | 396 ch CV PS 390.4 HP 291,4 kW |
| | 2 | 458 ch CV PS 451.6 HP 337,1 kW |
| | | 2150 } t/mn rpm U/mn |
| | 2 | 12 |
| | | Air Aire Luft |
| | | 24 } Volts Voltios Volt |
| | 2 | 22 L 4.8 UK Gals 5.8 US Gals |
| | | 2350 L 517 UK Gals 620 US Gals |
| | 2 | 66,2 L 14.5 UK Gals 17.4 US Gals |

| | |
|--|--------------------------------------|
| | 1870 L 411 UK Gals 494 US Gals |
| | 3600 L 792 UK Gals 950 US Gals |

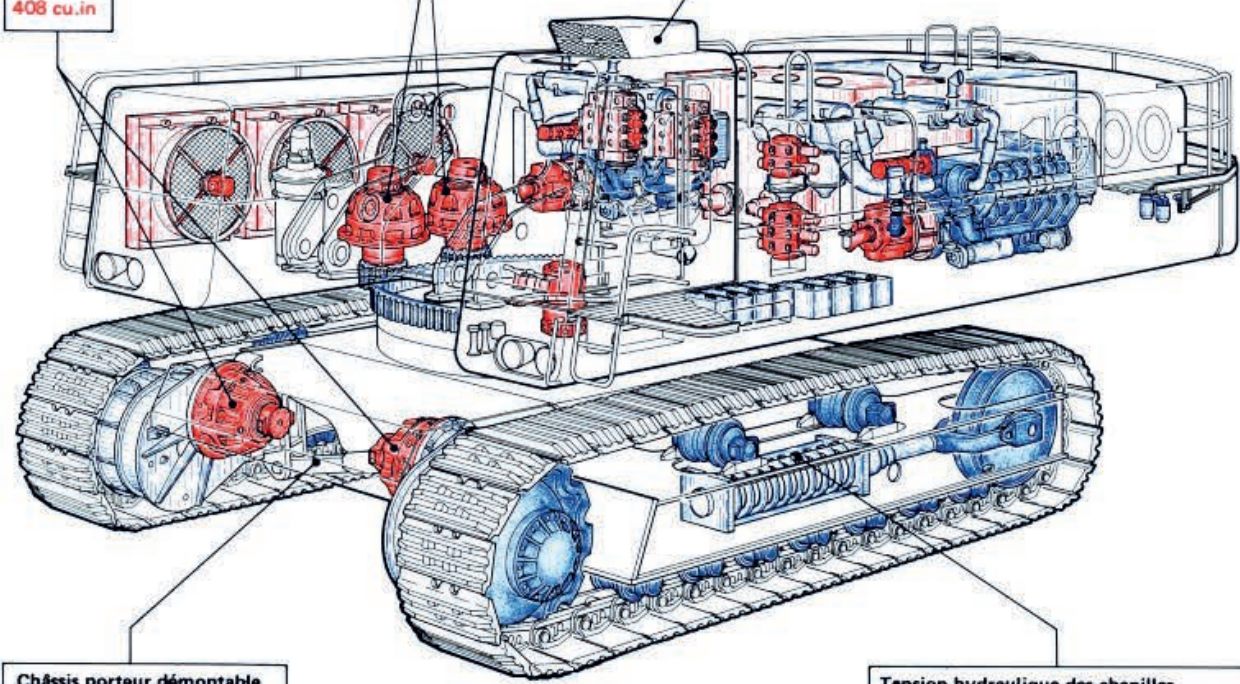
| | | |
|--|---|--|
| | 2 | H.POC 4 x 74 4 x 3P SH C |
| | | 2150 } t/mn rpm U/mn |
| | 2 | 4 x 159 L/mn 4 x 34.9 UK gpm 4 x 41.9 US gpm |
| | | 320 bar bares atü 4650 PSI 400 bar bares atü 5800 PSI |
| | | |

6700 cm³
408 cu.in

6700 cm³
408 cu.in

En option : Climatiseur
Opcional : Climatizador del aire
Wahlweise : Klimaanlage
Optional : Air conditioner

Graissage centralisé automatique
Engrase centralizado automatico
Automatische Zentralschmierung
Automatic centralized lubrication



Châssis porteur démontable
Chasis portador desmontable
Unterwagen zerlegbar
Removable carrier frame

Tension hydraulique des chenilles
Mecanismo tensor hidráulico de orugas
Hydraulische Spannung der Raupenkettens
Hydraulic track tension mechanism

Poclain se réserve le droit de modifier sans préavis les caractéristiques de ses matériels

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