

HYDROLINE

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Poclain Hydraulics' Magazine

November 2013



High Performance
Poclain Hydraulics' New Technological Challenge
P.4

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POCLAIN HYDRAULICS
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◆ Poclain Driving Values for the Future

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EDITO



The world economy remains uncertain: Europe is struggling to recover, Asia is suffering after the drop in investments in infrastructure and construction, and is beginning to manufacture agricultural machinery, and the USA is on the rise due to the exploitation of shale gas.

It is in this troubled climate that Poclairn Hydraulics has worked on its new strategy and particularly on the development of its new Vision with the aim of setting out its course to all of its stakeholders: customers, shareholders, employees, suppliers and partners. This new Vision conveys "the desire to be a global industrial player close to its customers; a specialist in hydrostatic power transmissions

for series-produced machines".

All the products exhibited at the Agritechnica fair are clearly part of this new vision, and particularly the new range of "High Performance" products such as the SD-CT control unit and the heavy-duty PW pump which, in addition to our large range of radial motors and valves, enables us to develop high-performance systems for our customers.

It is always with great pleasure that we exhibit at the Agritechnica fair, where we meet up with a number of our long-time customers who have contributed to the development of Poclairn Hydraulics. We want to continue to support them in the future with our new strategy and new ranges of products and systems, which will help to establish even closer ties with our customers from the agricultural sector.

Stéphane RAKOTOARIVELO - Poclairn Hydraulics Strategy and Innovation Director

TOP 100 INNOVATIONS

The Swedish People Honor the Poclairn Excavator

In Sweden, the Bataille family are truly noticed and acknowledged for their innovation. In Stockholm, the National Museum of Science and Technology displays an exhibition named the "Top 100 Innovations". The 100 innovations exhibition showcases the most important new designs in history as rated by the Swedish people.



The National Museum of Science and Technology has put the Swedish people to the task of singling out the 100 most important innovations of all time. In statistically significant studies, adults and pupils aged 12, were asked to cast their votes for the most important inventions in history. Among these top 100 innovations we find the excavator, and George J. Bataille is mentioned as the one coming up with the idea of using hydraulics on the machine.

The first excavators came about at the beginning of the 1900s and changed road and building construction completely. The early cable excavator was a mechanical masterpiece that was controlled with levers that made cables attached to the bucket interact.

In Sweden there was a resistance to mechanization. Early in the 1930s road-building work would be carried out by hand to provide work for more people during the depression. In 1952 George J. Bataille came up with the idea of using hydraulics on machines. They then became lighter, easier to drive and could carry out precise maneuvers in a manner not previously possible.

With deep respect for the past Poclairn Hydraulics continue driving its values for the future.



HIGH PERFORMANCE

Poclair Hydraulics' New Technological Challenge

Poclair Hydraulics is proud to present, in a world preview to Agritechnica visitors, its new range of High Performance components. The performance of our products has always been a real driving force in the design of our products but this range of innovative products pushes the boundaries of what has been achieved with hydrostatic transmission systems even further.

Our High Performance offer is based on a new set of components, exclusively developed from a viewpoint of unequalled individual performance. Our new heavy-duty pump ("PW pump") is designed with five major concerns in mind: **quality, energy efficiency, compactness, power density** and **precision**.

Moreover, our latest SD-CT ECU offering contributes to the **safety** of the machines and provides our customers with software features that contribute to the comfort and efficiency of their machines.



Very soon, a new generation of hydraulic motors will complement the offer presented at Agritechnica and enable us to offer our customers a set of innovative components that will thus constitute the best-performing hydrostatic transmission systems.

It is this combination that enables us to offer our customers hydrostatic systems with high added value that meet current and future market expectations.

Performance without intelligence is pointless. Our expertise and thorough understanding of our customers and their expectations have always guided our thought processes when developing this

new range. This is why we are committed to providing the necessary power, while maximising the reliability, comfort and safety of equipment and personnel.

The intelligence of this system, a result of Poclair Hydraulics's experience and expertise in electronics control units, ensures you the best performance while minimising the environmental footprint.

Together, we are speeding up the integration of complex technologies. Thus, through our High Performance offer, we are making available to you all our know-how in hydrostatic transmission systems. You will therefore minimise your development costs, speed up the "time to market" while improving the performance levels of your machines.

Performance without intelligence is pointless. Our expertise and thorough understanding of our customers and their expectations have always guided our thought processes when developing this new range.



PW

The PW & PWe are capable of working at pressure levels up to 500 Bar

PW & PWe: A New Range of High Performance Pumps

The very cornerstone of the high performance offer, the new range of heavy-duty pumps covers a range of displacement pumps. With a high power density, these pumps are capable of working at pressure levels up to 500 Bar and reaching speeds of 3,850 rpm. By thus increasing the accessible levels of pressure and speed, the mobile machines achieve improved productivity without compromising their consumption.

In fact, the PW range is designed with the optimisation of its energy performance levels in mind. Its high efficiency contributes to the reduction in the machines' fuel consumption and makes it possible to reduce the total cost of ownership and to reduce polluting emissions. Since power is nothing without precision, the PW range has an exclusive displacement control, which confers on it a precise and dynamic behaviour.

Connected to one of Poclain Hydraulics' electronics control, the mobile machines accede to present and future market requirements in terms of comfort, safety and productivity without compromising the integration capacities on the machine. In order to respond to the coming into force of new Euro 6 or Stage IV-type anti-pollution standards, machine manufacturers use emission-control systems that reduce the space available under the thermal engine compartments.



PWe

The PW range satisfies this requirement by providing an axial compactness that is as yet unequalled. For example, in its most compact version, the PW 85 and the PW96 have an axial length of 264 mm, which makes the heavy duty pump the most compact on the market.

« The heavy duty pump the most compact on the market »

With the PWe: the “Plug & Drive™” according to Poclairn Hydraulics

In addition to the improvement in performance levels and the search for an operational safety level in line with the regulatory requirements in force, machine manufacturers are looking for solutions to speed up the cycles of developments, while minimising costs.

It is in order to meet these expectations, one by one, that Poclairn Hydraulics is introducing the PWe pump onto the market. It is the result of the combination of a PW pump and a control/on-board electronic control electronic system. So, no need to worry about integrating an electronic box in the machine, especially since its communication by CAN bus makes it fully connected to the whole machine.

This completely new electronic control system is also compatible with performance level d (PI-d according to ISO 13849-1), in order to contribute favourably to the certification of machines placed on the European market in line with Machinery Directive 2006/42/EC and associated standards.

A completely new software offer has been specially developed for the PWe. It combines the essential functions of an “on-road” drive mode (with an automotive-type drive mode) and a “work” mode. Safety functions of the type “Safety Start Management”, “Operator Presence detection” and “Hill start” are also available. Comfort functions (Speed control, anti-stall, etc.) and machine monitoring functions of the type “watch-dog” (Over temperature, Over speed and over power protections) complement the offering order to relieve drivers to hand over machine monitoring tasks and

to remain concentrated on the work to be carried out.

It is at the end of the assembly process that the control software and a series of default settings are downloaded to the electronic boxes. Then comes the wiring and finally the end of the production line test where all of the hydraulic and electronic functions are tested and guaranteed for quality and reliability. Once installed and connected, the PWe enables the first movements of the machine to be made. This is how Poclairn Hydraulics justifies the name “Plug & Drive™”. It enables machine manufacturers to reduce their development time and therefore control costs more effectively.

SD-CT 200/300 : a new range of electronic controllers

Poclairn Hydraulics is introducing a new range of CT 200 and CT 300 SmartDrive™ controllers which offer functional security and operational safety capabilities in line with the most demanding standards. Their large calculation capability and the increased number of inputs and outputs allow you to efficiently operate your machines' hydrostatic transmission.

The SD-CT offer is accompanied by a panel of software components providing you with all of the features required by your machines. You can control all of the pumps available on the market. They also allow you to manage transmission errors and their diagnosis. However, it is within a Poclairn Hydraulics transmission that they offer their maximum potential: pump management, engine control, automotive driving mode, power limitation, fuel consumption optimization, etc.

Thus, you achieve the full added value of Poclairn Hydraulics system offer.



POCLAIN HYDRAULICS ŽIRI

New Innovation Facilities Boosting Valve Products Development

In recent years Poclain Hydraulics valve competence center in Žiri, Slovenia, invested heavily in R&D to support and secure future growth in demanding markets where premium products are not just another marketing phrase but simply a must.

In May 2013 a new valve innovation center was opened to house specialists from various branches of knowledge that contribute to the development of new products and their success on the market.

New product development is a complex integration of activities such as market anticipation, product and process design and validation. That is why marketing people, design engineers, simulation specialists, project leaders and test facilities are put under one roof allowing the team working close together

The prototype test laboratory found a new space in the lower level of the new facility. Its expansion in terms of shopfloor, new test benches and available power was targeted to cover rigorous characteristic testing and lifetime validation demands of valves dedicated to high pressure and flow rating as well as for valves with high product safety demands. The new innovation facilities are integrated with the valve production plant. That supports strong culture of product and process co-development as design-to-manufacturing concerns can be easily discussed and anticipated on the spot.

It might be a new power transmission valve for closed-loop hydraulics control, open-loop valve tailored to the special needs of given market, safety-sensitive hydraulic brake valve or even a complete powerunit – it is the valve competence center in Žiri that takes the challenge and brings the product to life.



Poclain Hydraulics Slovenian subsidiary which is based in Žiri, was created in 2008 following the acquisition of Kladivar by Poclain Hydraulics.

This synergy has allowed the Poclain Hydraulics Group to complete its system offer by proposing now a wide range of hydraulic valves and taking the most of the expertise and industrial capabilities of Kladivar.



HYDROKIT

25 Years of Collaboration with Poclairn Hydraulics

Throughout its history, Hydrokit, a Vensys Post Equipment group company, has established itself as a pioneer in hydraulic customisation solutions for agricultural and, subsequently, public works machinery.

Interviewed by Poclairn Hydraulics: Mr François GOURRAUD, Marketing and Sales Director, and Mr Alexis UCKMAN, OEM (Original Equipment Manufacturer) Sales Manager at HYDROKIT.

Poclairn Hydraulics: Can you introduce your company in a few words?

François Gourraud: Established in 1983 in Poiret-sur-Vie (Vendée region), we design and sell a large range of hydraulic and electro-hydraulic kits and equipment for Public Works, Agricultural, Industrial, Mobile, Shipping and Transport equipment. Today, the company comprises 135 employees and is present in France, Germany, the UK and the Benelux countries.

PH: Who are your main customers?

FG: We work with more than 1,000 manufacturers and 7,500 European professionals in the sale and repair of agricultural, public works and handling equipment.

PH: When did your business relationship with Poclairn Hydraulics start?

FG: We have worked with Poclairn Hydraulics for 25 years. Very quickly, the human dimension and the quality of our exchanges made a difference. We are very committed to developing a relationship based on trust and mutual respect with our customers and our partners. We work with Poclairn Hydraulics primarily for motors and valves.

With regard to motors, we essentially distribute MS motors (from MS02 to MS08); less frequently, MS18 and MS35 motors. We mainly fit out small and medium tonnage self-propelled sprayers.

The motors used are mainly small motors. For example, we can fit out a shallot harvester, or indeed machines that clean beaches by collecting algae, machines linked to the airport etc. As for valves, we distribute them on a large range of machines.

PH: With regard to your aftermarket activities activity, are you Poclairn Hydraulics-approved?

Alexis Uckman: Actually, we also have a motor repair business. This business has been in existence for approximately seven years and we have been "Poclairn Hydraulics"-certified for three years.

Advanced training was conducted at Poclairn Hydraulics, which has an absolutely outstanding training centre.

This is also the mark of a relationship built on mutual trust that has continued to grow over the years.

And, last but not least, we benefit from first-rate technical support with your Research Department, which provides support for our "sizing" studies. The excellent knowledge of the range and the technical expertise of the Poclairn Hydraulics engineers represent a real plus for us. Our



"Research & Development" activity is a significant part of our business. Our Research Department therefore has a very valuable connection with Poclairn Hydraulics. The technical requirement of the hydrostatic systems and Hydrokit's absolute commitment in terms of quality make it necessary for us to have a perfect command of each component.

PH: So an entirely positive collaboration then?

FG: Absolutely, and we look forward to many more years of collaboration with Poclairn Hydraulics. Indeed, we are in a "win/win" relationship: as designer and retailer of complete hydrostatic solutions, having partners such as Poclairn Hydraulics to implement technological building blocks recognised and appreciated by our customers is a real competitive asset.



ADDIDRIVE™

A Mobility On-Demand Adapted to the Agricultural Sector

Already very known for the advantages that it provides on trucks used in construction, the AddiDrive™ of Poclairn Hydraulics, called Hydrodrive™ at MAN, Optitrack™ at RENAULT TRUCKS, X-Track at Terberg or EZ-TRAC at TDS also has strong benefits in the agricultural world.

Indeed the delivery of the harvest to processing facilities is a major stake in the value chain and needs to be optimized in terms of cost.

AddiDrive™ in a number

Major on-road vehicle manufacturers such as Renault Trucks and MAN have chosen the Poclairn Hydraulics AddiDrive™ solution de Poclairn Hydraulics for their trucks. Today, more than 10,000 trucks equipped with the AddiDrive™ system are on the road over the world.



Agricultural machines that collect or harvest are not adapted to transport on the road like trucks, which can find themselves in trouble when approaching fields to be harvested because they were not designed to drive on narrow, muddy or sandy terrain.

It is precisely in this context that AddiDrive™ brings the maximum value, by improving the traction by transferring torque to the steering axle, which is normally not powered. The system is completely transparent when the truck is driven in the "road-mode" thanks to the "free wheel" mode. Good practical examples of the use of AddiDrive™ in the agriculture market are forest trucks (log hauling) and the trucks that transport milk from dairy farms.



The advantages of a truck with AWD on-demand

The AddiDrive™ system consists in an additional hydrostatic transmission offering trucks and convoys better mobility in difficult driving conditions such as: mud, snow, sand, etc.

This hydraulic aid, installed on the front or rear axles is an ecological alternative to full-time all-wheel drive, engaging on-demand only when needed for higher torque and improved traction control.

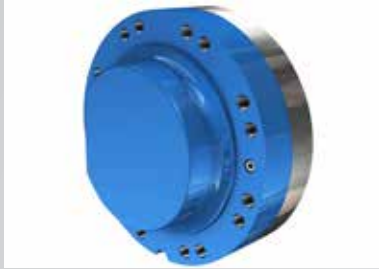
Providing dramatically reduced weight and improved center of gravity (because the cab height is identical to a non-driven front truck axle), improvements are realized in fuel consumption and additional payload while simultaneously improving vehicle stability and safety.

Main components of the AddiDrive™:

The two hydraulic motors are directly integrated onto the spindle of either a steering axle or a fixed axle. The pump is driven by the engine Power Take-Off (PTO) and provides the energy to the system. The hydraulic valve manages the activation of the system and allows operation in free-wheeling mode.

The Electronic Control Unit with embedded AddiDrive Software manages communication and operating logic between the system and the vehicle.

MF hydraulic motors



Addiflow hydraulic control block



PW hydraulique variable pump



CT 200 ECU + AddiDrive™ software



AddiDrive™ functions:

Basic function:

• Torque transfer: when activated, the system transfers in real time and instantaneously part of the torque on the front axle, according to the road conditions and vehicle behavior. Traction on front axle is available at 0 km/h.

Optional extended features:

- Creep mode: the truck is powered by the hydrostatic axle only to offer a very slow but constant drive speed with fast forward / reverse change.
- Boosted traction: torque on front axle is indexed to the throttle pedal position, in order to provide more traction at start.
- Front wheel angle compensation: front wheel speed is adjusted according to the front wheel angle information provided by truck, to ensure optimal traction in turns.

AddiDrive™ benefits:

On-road truck design and performances preserved

- No modification of the chassis (vs. standard truck)
- Turning radius & maneuverability
- Cabin and gravity center height
- On-road dynamic performances

Increased payload

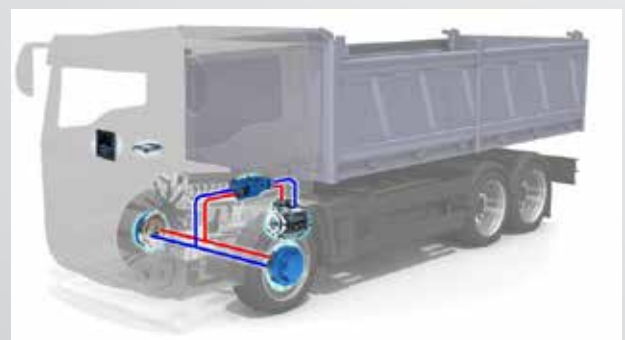
- +400kg vs. mechanical AWD truck

Fuel saving and less polluting emissions

- Fuel savings up to 10-15%
- Limited hydraulic drag torque (vs. mechanical AWD truck)
- On-demand additional torque, only when needed

Safety and comfort, versatility, optimized operation costs

- Better adherence in bad conditions
- Optimal on-road performances
- Torque available at 0 km/h



ANTICIPATE AND SATISFY

Poclairn Hydraulics Quality Excellence Plan

Requirements in respect of responsiveness, reliability and rigorous standards are ever more important among our customers. The ability of an international company such as ours to continuously improve its processes in the design and production of hydraulic components and systems is a major challenge.

In order to retain a prime position among the global leaders in hydrostatics, for a few months now Poclairn Hydraulics has been deploying an ambitious Quality Excellence Plan across all of its sites worldwide.

There are no fewer than 10 industrial sites and 20 commercial subsidiaries in Europe, in Asia and on the American continent that rally around a common goal: "Zero failure". Anticipation of potential problems is the watchword.

This Excellence plan is based on 4 key elements:

- **Sales:** Enhance our contract review process in order to ensure that customers' needs have been understood. Validate with them the proposed solutions and provide them with the support of our repair centre network.
- **Design:** Anticipate the risks during the design stages, ensure that they have been the subject of a tailored response and that a quality check has been carried out at each stage of the projects concerning new products or processes.
- **Production:** Ensure the product's compliance at each stage of its development by systematically putting in place the Seven Basic Tools of Quality.
- **Sourcing:** Anticipate problems by carefully selecting suppliers, checking new components prior to starting production and dealing with quality issues robustly.

Each of these key elements has a dedicated Quality Excellence manual, referring to the standards in force and regularly capitalising on identified good practices.

All of our employees are undergoing training, and concrete actions are deployed across all Poclairn Hydraulics' industrial sites to ensure the uniform quality of products delivered all over the world.

The results of this plan, launched during the second quarter of 2013, already show a significant reduction in customer incidents.

Poclairn Hydraulics makes every effort to be a partner of reference for its customers.



HARDI-EVRARD

Sprayers Equipped with the EcoDrive™ System



In France, HARDI-EVRARD is specialised in the development and production of trailed sprayers for France (METEOR Range) and self-propelled sprayers for the entire HARDI group (ALPHA evo and SARITOR Ranges). The company has approximately 1,050 employees worldwide, of which 575 in Denmark and 180 in France.

As a matter of interest, the history of the company started in 1957 when Mr Hartvig Jensen founded the company. He was a horticulturist and was in need of a sprayer. A few years later, after continuous expansion, the company moved to new production buildings outside Copenhagen. Soon, HARDI sprayers were no longer only sold in Denmark but throughout Europe and the company continues its global expansion to this day.

Christophe BENOIT, HARDI-EVRARD self-propelled sprayer Product Manager interviewed by Poclairn Hydraulics.

Poclairn Hydraulics: When did your cooperative ventures with Poclairn Hydraulics begin?

Christophe Benoit: The collaboration between HARDI-EVRARD and Poclairn Hydraulics started almost 10 years ago. The ties that we have forged throughout this ten-year period now enable us to have a collaboration between our respective very high-quality application engineers on new projects. We have highly valuable support in order to optimise our transmission systems.

PH: At Innov'agri 2013, the Alpha Evo self-propelled sprayer's engines were developed and it also received a new EcoDrive™ transmission system made by Poclairn: what was the added value of this solution for your machine?

CB: Regulatory obligations with regard to anti-pollution standards for engines (Stage IIIB) impose significant reductions in fuel consumption and therefore CO2 emissions. These new standards make it mandatory for all machine manufacturers to develop ever more advanced and specialised engines, which usually results in a significant increase in the price of such engines.

The Poclairn Hydraulics EcoDrive™ system makes it possible to optimise the management of the engine and transmission without this resulting in substantial additional costs.

The new performance levels provided by EcoDrive™, in conjunction with the Stage IIIB requirements, enable us to control the additional cost generated for our new engines.

So, the customer is a winner twice over: The price of the machine is still acceptable and the end customer is able to better control their fuel consumption.

With regard to our agricultural customers, the Poclairn Hydraulics solution has enabled us to enhance our offer by not only providing a new engine but also the possibility to better manage their machine's transmission.

PH: Have you had feedback from your customers who have tested this solution?

CB: The actual delivery of the first machines is starting at the end of 2013, but the feedback that we have following the numerous dynamic tests conducted by our teams shows that the drive is much smoother and at the same time much quieter in the cabin since EcoDrive™ makes it possible



According to Hardi-Evrard, the EcoDrive™ function makes it possible to optimise the engine speed according to the load and speed.
(© Hardi-Evrard)

to reduce the engine speed. So, comfort in the driving seat is considerably improved. Once again, technology for technology's sake is pointless if it is not intended to provide real benefits to customers.

PH: Have you added other Poclain Hydraulics solutions to this EcoDrive™?

CB: Actually, we have added two Poclain Hydraulics anti-skid systems that we connect to an electronic anti-skid system that we have been selling for a few years.

PH: What is the benefit of combining both these systems?

CB: It enables us to offer an inexpensive system to customers who do not really need a permanent anti-skid system on all four wheels. More specifically, this new device makes it possible to unlock the axles (separation of the front axle from the back axle) and can be activated on request by simply pressing on a pedal. Some farmers do not need to have this anti-skid system permanently, so the ability to offer a solution that is truly tailored to their need is a real "plus".

PH: Is this device used on other HARDI-EVRARD machines?

CB: EcoDrive™ is effectively implemented on other machines from our range. In particular, it is implemented on a part of the SARITOR range, which is not yet in Stage IIIB: a range of machines intended for the American and South-African markets where it has been extremely successful. This machine is also sold in Australia.

NEW HI-FLOW MOTOR

Increase Performances, Improve Efficiency

Poclain Hydraulics is now introducing its new hydraulic motor MS05/MSE05-1C "Hi-Flow", which has been designed to follow the general demand for higher performances and improved efficiency.

Indeed, this model benefits from its new distribution valve, whose design has been optimized to drastically reduce pressure drop (~50% of pressure drop have been observed - compared to standard MS05/MSE05) and offers at the same time a more robust closed cover design.

All these improvements make the MS05/MSE05- single displacement "Hi-Flow" the perfect solution for very demanding applications like forestry processing heads, where its low weight and compact design allow easier integration into the machine. These improvements have not been made at the expense of the modularity which has made the MS motors range so successful: different bearing supports and various displacements are available on the MS/MSE05-single displacement "Hi-Flow" as well as options like loop exchange valve or speed sensor which can also be integrated into the motor.

MS/MSE05-1C "Hi-Flow": Motor with Optimized Distribution

Key Drivers for "Hi-Flow" Motors

Low pressure drops,
High load capacity,
High robustness,
Reliability,
Integrated package,
Low weight

MODELS:
MS05 / MSE05

DISPLACEMENT RANGE:
260 cc to 820 cc

VALVING:
1 displacement

BRAKE:
Parking Brake

PRESSION MAX.:
400 / 450 bar



« The perfect solution for very demanding applications »

“Hi-Flow” MS Motors: Features & Benefits

Integrated Exchange Valve

- Optional
- “Plug & Play” solution

Closed Cover

- More robust
- No risks of leakage
- Low Weight



Motor Attachments

- Double centering (front/rear)

Flat Ports

- Possibility to flange valves

“Hi-Flow” Distribution

- Optimized Design
- Less loading on Bearings



"Hi-Flow"MS Motors: Higher Performances

Significant gain in performance can be observed thanks to the new "High-Flow" Distribution :

**Pressure Loss
Reduction**



↓ 50% *

**Maximum Speed
Increase**



↗ 50% *

* Compared to equivalent MS05-1C using "Standard" valving

HYDROSTATIC SYSTEMS

For Additional Mobility and fuel savings



Find all our
agricultural
applications



www.poclain-hydraulics.com

NEWS & AGENDA



PRODUCTION RECORD

Our plant based in Brno (Czech Republic), specialized in the production of motors with a range from size MS02 to size MS11, MK04, MK05, MK08 and MK09 motors and front assist drive for trucks (MAN, RENAULT TRUCKS, Volvo, Daimler Mercedes) is about to produce its 1 000 000th motor.

PRODUCT NEWS

Poclair Hydraulics introduces its new "combined brake" bearing support [Dynamic + Parking], called C18, available now on MS/MSE18 and MS35 motors.

Featuring powerful braking torque (up 25'000N.m dynamic 11'000N.m parking), the C18 is also a stage for resuming large external loads, making it the ideal solution for ever more powerful and faster machines, such as sprayers or harvesters, who need a powerful and reliable braking throughout the life of the machine.

The benefits of the new combined bearing C18, with the technology of friction in oil bath, are universally recognized, regardless of users:

- For teams machine design : the C18 allows thanks to its concept of "all in one" (dynamic brake and parking in a single step) easier integration of the brake inside the motor and more importantly of the whole wheel motor inside the customer's machine.
- For end users : the C18, which requires no maintenance and has a torque available from its first use, applied directly on the axis of the wheel for safety. Having the brake system inside the bearing also allows the C18 to be totally insensitive to external pollution (dust, chemicals), often a source of performance degradation on the brakes.

EXHIBITION AGENDA

Meet Poclair Hydraulics on its stand at:
 AGRITECHNICA from 12 to 16 november 2013 in Hanover (Germany)
 CONEXPO from 4 to 8 march 2014 in Las Vegas (USA)
 SMOPOYC from 1 to 5 april 2014 in Zaragoza (Spain)

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