

# POGLAIN MAG

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## Dual line braking for tractors & trailers

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Best-in-class hydraulic  
expertise available for  
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Addrive's incredible  
journey across Japan



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Poclain News



**Guillaume BESNOUIN**  
Market Manager  
Poclain Hydraulics

*POCLAIN HYDRAULICS IS INVESTING TO DEVELOP SOLUTIONS THAT ADD VALUE TO PRECISION FARMING MACHINES. THE SYSTEMS ARE DESIGNED TO WORK IN SYNERGY WITH ELECTRIC POWER GENERATORS AND ON-BOARD INTELLIGENCE.*

Precision farming, autonomous machines – new technologies are disrupting today's deep-rooted farming practices. OEMs strive to provide farmers with more comfort, productivity and income, while reducing crop protection chemicals. Precision farming is a win-win-win deal: farmers improve their work conditions and increase the profitability of their farm, consumers have access to more wholesome food, and the environment is respected.

A historical partner of Ag OEMs, Poclain Hydraulics is investing to develop solutions that add value to precision farming machines. The systems are designed to work in synergy with electric power generators and on-board intelligence.

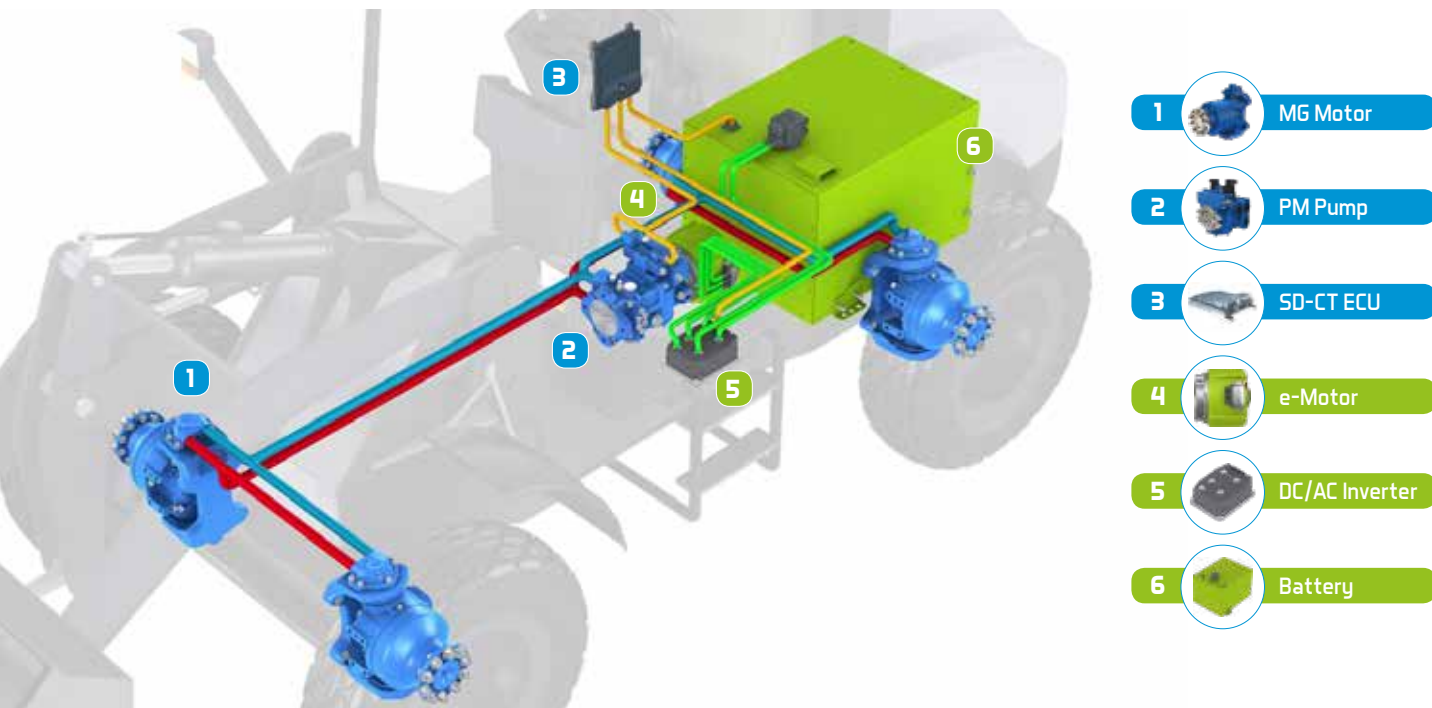
Poclain Hydraulics is featuring precision farming at our 2019 Agritechnica stand. We are presenting a new service integrating IoT (Internet of Things). Based on a remote control and the new Black Box ECU, it enables us to monitor all the hydraulic components on a machine. Using the data thus collected, the Poclain Hydraulics teams can give recommendations on system and component design.

Regarding autonomous machines, Poclain Hydraulics strives to supply high value-add solutions, with a record of success stories in North America, Europe and Asia. The Agritechnica show will give us the opportunity to illustrate the many ways Poclain's technology enhances the performance of autonomous machines. Light weight, high precision and optimal efficiency contribute to increasing the range of the machine.

This Poclain Mag issue celebrates the Ag industry and presents some of our dedicated solutions. Our new dual line braking solution addresses the recent European road regulation for tractor and trailer braking. Pairing a hydraulic brake valve and a patented electronic control, the one-size-fits-all valve gives tractor and trailer manufacturers integration freedom. In the pump line, the new PM20 tandem pump is ideal for nimble tracked vehicles working in vineyards and specialty crops. We also focus on our solutions for the forestry market, whose extreme duty cycles have enticed our engineers to push the envelope of our technology and develop options that today extend to all our other applications.

I hope you'll enjoy reading this issue. And if you're in the Hanover area, make sure you stop by the Agritechnica show; our stand number is A17, in hall 16. Our teams will be glad to greet you and share our latest products and solutions.





- 1 MG Motor
- 2 PM Pump
- 3 SD-CT ECU
- 4 e-Motor
- 5 DC/AC Inverter
- 6 Battery

## Best-in-class hydraulic expertise available for e-machine design

This past summer's record temperatures in Europe were yet another sign that global warming is real. With the batteries gaining in power density and cost, Ag OEMs are putting their innovation efforts into designing electrically powered vehicles. They are exploring new avenues for power generation and traction with a mix of diesel, electric, hydraulics, and intelligence. This profound disruption requires cutting-edge expertise, time and money from all the players in the supply chain. A strong advocate of machine co-design, Poclain Hydraulics offers a dedicated team to help OEMs invent the next generation of hydraulically driven zero-emission machines.

### Precise transmission sizing for high performance e-machines

Developing an efficient and affordable machine with a range that exceeds a few hours requires a broad array of skills. They cover hydraulic systems, mechatronics, electrical engineering, battery management systems, and more. As in the automotive industry, Ag OEMs and suppliers need to join forces to make the right technology choices in time for the market. An essential step for a successful

machine design is to collect actual duty cycles on the field and assess the energy consumption of every function. The architecture options are thus tested based on real-life conditions.

In 2018 Poclain Hydraulics made the strategic decision to support its customers in their shift towards e-machines. A dedicated team based at Poclain Hydraulics' head office designs high performance battery-powered hydraulic transmissions for the drive and auxiliary

systems. Fixed and mobile benches are available to test, evaluate and select the best machine architectures and vehicle controls to improve efficiency and range.

### Electric and hydraulic technologies work in synergy

Whether it be sprayers, combine or specialty harvesters, turf equipment or forestry machines, Poclain Hydraulics transmissions drive a considerable fleet of Ag machinery around the world. The company has a keen knowledge of component sizing and required options. Its transmission solutions have demonstrated their high performance and robustness in the toughest environments.

Since 2018, several zero-emission pilot machines using Poclain Hydraulics cam lobe motors, pumps, valves and electronics have been successfully developed. They have proven the benefit of integrating Poclain Hydraulics' expertise and offering to an OEM's e-machine project.

### Lower time-to-market and development risks

With end users environmental mindset developing fast, demand for zero emission machines is stronger day after day. OEMs must rapidly come to the market with e-machines matching their new expectations. Electro-hydraulic architectures, using proven and rugged hydraulic transmissions powered by electric motors, are a smart design to meet the time-to-market challenge without compromising on machine robustness.



### Lower impact on the machine design and production line

OEMs may offer diesel and electric variants for the same vehicle, or already integrate hydraulic transmissions on other models. In that case, pairing an electric power generator with a hydraulic drive has a lower impact on the undercarriage design and the production line.

### Energy recovery

As the electric and hydraulic technologies are four-quadrant compliant, their combination enables to recover energy and recharge the battery during deceleration and braking phases.

### Infinitely variable speed

Integrating a variable displacement hydraulic pump with electronic control enables transmissions to operate at an infinitely variable speed. Both electric and hydraulic components are used at their best working points in real-time, thus generating less heat and saving battery charge.

### Reduced safety hazards and vulnerability to pollution

The rugged design of the hydraulic components resists exposure to the water, dirt and chemicals found in the Ag environment. The electric power generator remains out of the way of pollutants and the operator, thus avoiding safety hazards.

*"Climate change will have a major impact on our lifestyles in the future. Farmers and agricultural equipment manufacturers are very sensitive to the environmental challenge ahead. They want to actively contribute to the reduction of global warming and understand the necessity to act fast. Several OEMs have called on our expertise since our division was created and were very excited by the outcome. The projects enabled us to explore new grounds and push the envelope of our technology. We strongly believe that Poclain electro-hydraulic transmissions will take part in the revolution!"* concludes Philippe Reynolds, Director of the Electro-mobility Program. ✖



## New entry-level display for the SmartDrive control unit

Intuitive real time displays are essential for optimal machine driveability. Poclain Hydraulics' 2.8" display, the CR0451, is more rugged and easy to read than its predecessor, the 1.5" model. It also boasts additional features at an affordable price.

The 2.8" display is perfect for machines whose primary function is the drive transmission. It is thus particularly suited for mini-loaders, tool carriers, snow groomers, airport vehicles, and straddle tractors. Its small size and single M12 connector make it easy to integrate into the dashboard. As for the LCD screen, it is full-color, high contrast and sunlight-readable.

Connected to Poclain Hydraulics' SD-CT control unit via a high performance CAN interface, the LCD screen displays the following data:

- Ground speed (requires wheel motor speed sensors)
- Cruise control
- Speed limit
- Engine speed
- Engaged hydraulic gear
- Parking brake status
- Limp mode indicator
- Difflock status
- Machine work and travel times
- Excess pressure or power warning
- Error status

The CR0451 is the smaller version of Poclain Hydraulics' CR0452, which measures 4.3" and targets machines with complex electronically-controlled implements such as sprayers and harvesters and is capable of providing additional data, such as implement behavior and performance. ✕

## High-resolution speed sensor for autonomous machines



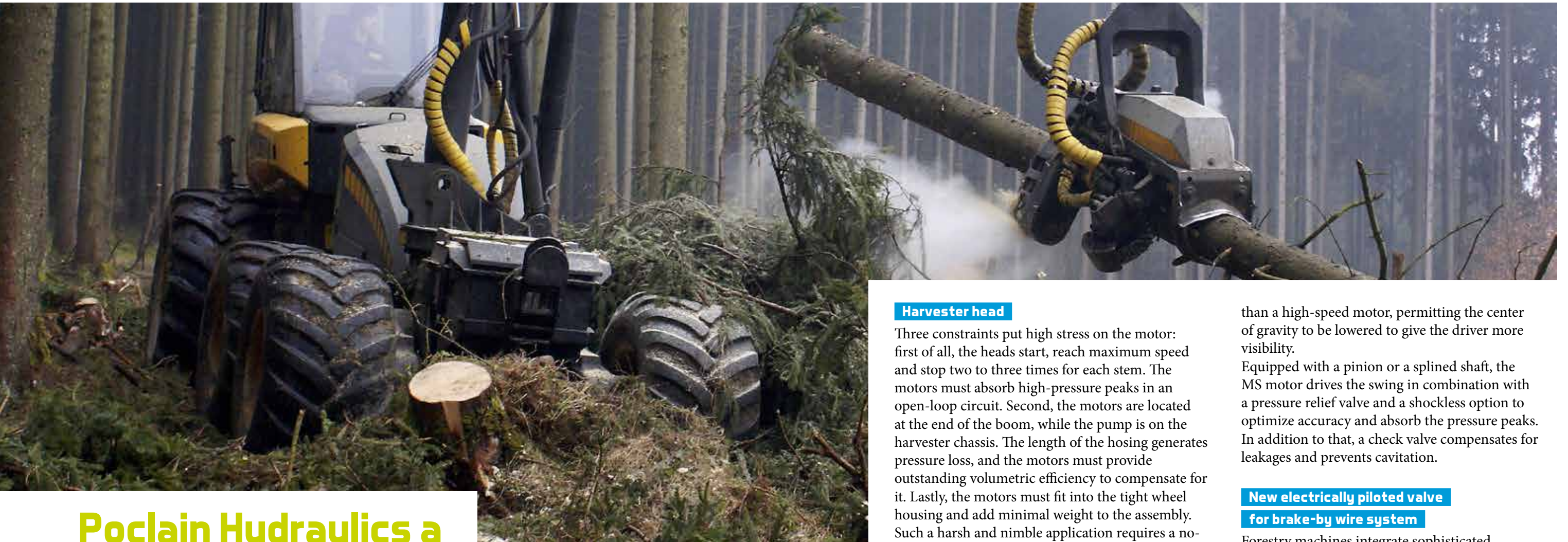
Data is the cornerstone on autonomous machines. It enables the farmer to take all the variables into account: path, obstacles, soil, weeds, water, and optimize yield. Regarding ground speed and traction control, Poclain Hydraulics' wheel motors are a direct source of data. So, to meet the requirements of fast-processing autonomous machines, the Poclain Hydraulics Engineering team has designed a high-resolution speed sensor.

Along with high resolution, compactness was a priority. The encoders on the market were too bulky for some of Poclain Hydraulics wheel motor configurations. The perfect sensor needed to be housed inside, not outside the torque module. No pollution, no changes in the motor envelope. That's how the magnetoresistive TH sensor came to be. Interchangeable with the existing sensor, it is comprised of two parts: the ring-shaped target, located on the face of the cylinder block, is made of a row of magnets that emit a magnetic field, and the sensor, which is housed inside the cover. There is no contact between them, which guarantees extended life. The sensor is also IP69K to resist to external pollution.

### 1800 speed readings per wheel revolution

What makes the TH sensor unique is its patented algorithm. The electronics inside the sensor generate not one, but 24 pulses per magnet to ensure a high-resolution speed-reading. On a large motor such as the MHP27, the sensor emits as much as 1800 impulses per revolution. The sensor is compatible with all the ECUs available on the market, including Poclain Hydraulic's SD-CT. It is currently available on the MK04, MHP27 or MS02 motors. Please contact us for other models. ✕





## Poclair Hydraulics a heavyweight in tree harvesting

Severe. Extreme. Tireless. Those adjectives all apply to tree harvesting. The machines work from dawn until dark to cut, delimb, load and transport the stems to the sawmill. Logs are heavy and bulky; space is restrained by the trees that remain standing, the ground is uneven and soft. From ice-cold Finland to tropical Brazil, extreme temperatures and humidity prevail. The operators work with incredible speed and agility, like giant dancers picking a flower. It was back in the 90s that Poclair Hydraulics started developing solutions for forestry. The high torque technology is the logical answer to the need for precision, power, and continuous stopping and starting. Today Poclair Hydraulics' solutions equip harvester heads, forwarders and skidders from Finland to New Zealand.

### Harvester head

Three constraints put high stress on the motor: first of all, the heads start, reach maximum speed and stop two to three times for each stem. The motors must absorb high-pressure peaks in an open-loop circuit. Second, the motors are located at the end of the boom, while the pump is on the harvester chassis. The length of the hosing generates pressure loss, and the motors must provide outstanding volumetric efficiency to compensate for it. Lastly, the motors must fit into the tight wheel housing and add minimal weight to the assembly. Such a harsh and nimble application requires a no-compromise motor design. The Poclair Hydraulics engineering team put together a unique set of features to guarantee high performance and lifetime while preserving the modularity of the MS motor:

- High Flow™ valving integrating an exchange valve, a reinforced cover and flat ports to flange a valve block
- Diamond™ heat treatment of the pistons
- Reinforced sealing
- Reinforced bearing stop
- Peek bushing
- Extra drainage

### Swing drive for the cab and boom

The swinging operation requires both high starting torque and responsiveness to ensure the boom movements are precise. The Poclair Hydraulics technology and its 85% volumetric efficiency provide both. In comparison to an excavator, the forestry boom measures up to 10 meters and lifts heavier loads. The high torque of the Poclair Hydraulics motor provides the swinging capacity and the required offset without vibrating or shaking. As for the cab rotation, the direct drive is shorter

than a high-speed motor, permitting the center of gravity to be lowered to give the driver more visibility.

Equipped with a pinion or a splined shaft, the MS motor drives the swing in combination with a pressure relief valve and a shockless option to optimize accuracy and absorb the pressure peaks. In addition to that, a check valve compensates for leakages and prevents cavitation.

### New electrically piloted valve for brake-by-wire system

Forestry machines integrate sophisticated electronics to facilitate the tree cutting, carry out preventive maintenance, and report behaviour metrics to the OEM. In this environment, brake-by-wire systems are a perfect match. With rotating cabs being the norm on cut-to-length harvesters, wires are also more flexible to integrate into the machine design than hydraulic hosing. Poclair Hydraulics' new electrically-piloted proportional valve, the VBT, is on display at Agritechnica 2019. With a capacity ranging from 20 to 60 liters per minute, it has been successfully tested on autonomous Ag machinery. It is the larger version of the VBR, which already equips several forestry applications and has a nominal capacity of 10-20 liters per minute. Hydraulic braking systems are also available, featuring a parking brake, service brake, and an accumulator.

Nimble and extreme, forestry has enticed Poclair Hydraulics to push the envelope of their motor technology and become a respected brand among the market leaders. As OEMs continue to add intelligence, we remain at their side to ensure that hydraulics bring the best out of their designs. ✖



## Ponsse King of the forest



“Very first” appears repeatedly in Ponsse’s timeline. Continuous innovation, customer proximity, strong human values, and steady internationalization have turned the company into one of the world’s largest manufacturers of cut-to-length forest machines, employing 1800 people worldwide. The story began in the 70s when Ponsse’s owner Einari Vidgrén opened the first factory in Central Finland. Several decades later the family-owned group integrating twelve subsidiaries exports 80% of its sales, is listed on the Helsinki stock exchange and has sold 15,000 harvesters and forwarders.

### From the small Vieremä factory to the multinational group

The first of Ponsse’s breakthroughs was the introduction of the S15 forwarder in 1983. Lighter than the competition yet providing the same tractive power, it addressed the market’s need for a machine that respected the forest topsoil. The machine’s popularity launched Ponsse on the international scene. In 1994 Ponsse is the first forestry machine OEM to receive ISO 9001 certification,

which leads to an extension of their product line. 1995 is another significant milestone, as the company is listed on the Helsinki stock exchange and invests in setting up subsidiaries overseas.

As Ponsse’s unique market is forestry, it can indulge in knowing the industry in its most intimate detail. The sales team is the eyes and ears of the company, standing up for their customers and setting the direction

for product improvement and innovation. Then the 120 R&D employees, most of which work on software development, step in, and bring their requirements to life. Another strategic activity within Ponsse is servicing and spare parts. The machines operate up to 6,000 hours per year and the OEM is strongly committed to resolving issues on the field rapidly to shorten downtime.

### Ponsse turns to Poclain Hydraulics for the slew drive

Poclain Hydraulics joins the Ponsse adventure in 2014. The OEM was looking for an alternative to the orbital hydraulic motor and planetary gearbox assembly that powered their boom swing drive; they chose MSE08 motors with an integrated pinion to equip the Ergo, Scorpion, Cobra and Fox harvesters. In order to distribute the force evenly around the one-meter diameter slew ring, two motors are mounted. “Poclain Hydraulics’ radial piston technology resolved the reliability issues, provided higher slewing power and more precise handling control. As the gearbox is removed, there are fewer components to service, so we also increased

machine uptime,” explains Anssi Pitkäranta, Ponsse’s Engineering Manager for Hydraulics and Powertrain.

Close collaboration coupled to a common drive towards continuous improvement enabled Ponsse and Poclain Hydraulics to enhance the behavior of the motors. “The Scorpion harvester was particularly challenging because the boom and the cab are mounted on the same slew ring; together with Poclain Hydraulics we found solutions to increase the comfort of the driver,” Anssi adds.

Automation is the way of the future for Ponsse. Cut-to-length harvesting machines require honed skills from the operators. Forestry training schools are hard to find outside of Finland, where three-year curriculums are offered to future loggers. “Automation can compensate for the shortage of skilled operators and make their job less demanding. Automation also enables preventive maintenance and addresses the international wood cutting companies’ need for fine process monitoring,” Anssi concludes. ✕





## Forest-Tract introduces XXL skidder

Wood transformation is labor-intensive and mandates high productivity throughout the value chain. Enhanced productivity must go hand in hand with sustainability to protect the planet's primary carbon and greenhouse gas sink, as well as the habitat of 80% of the world's biodiversity.

Sustainability and productivity were the priority in the minds of Forest-Tract's founders Faouzi Doghmi, President and CEO, and Didier Guibourt, CTO, when they designed the Skid XXL skidder in 2014. They applied their expertise in developing bespoke machinery for severe applications and partnered with the Poclair Hydraulics sales and applications team early in the project to imagine a revolutionary transmission. Branded Full Hydraulic System, it integrates two SmartDrive CT Electronic Control Units (ECUs) that control four P90 pumps and power two MS50 motors at the front and two MS83 at the rear.

### Each skidder component is optimized

The machine, with its permanent four-wheel drive, generates no skidding. The ECUs control the swashplate angle of each pump and continuously adjust the wheel motor speed according to the steering angle. Subsequently, when the machine turns, the outer wheels rotate faster than the inner wheels. The ECUs also continuously monitor the adherence of the wheel to the ground and reduce the oil flow to the motors that start losing their grip. The XXL skidder thus limits its footprint on the forest soil.

With its articulated frame (+/-45 degrees articulation and +/-15 degrees oscillation angle), the skidder can operate on adverse terrain, twisting trails, and grades up to 40 degrees, giving the operator access to spots that are hard to reach. Purpose-built and designed in-house, the ten-meter boom provides 25 kNm of lifting capacity. In other words, it can lift a 25-ton load or 2.5 tons if the load is lifted with a ten-meter offset. Superior lifting capacity and gradeability, as well as extended reach enable the operator to resort less to manually securing the stems using the cable and winch to pull an inaccessible log.

With its three-meter wide opening, the grapple can lift the log from the ground and cause less damage to the surroundings. It can also carry out loading and sorting and handle short and long logs as well as fuelwood.

Driving is smooth and precise, as the high efficiency of the motors, coupled to the ECUs, provide high starting torque and responsiveness even when the crane is at work.

In terms of speed, the machine can work at a maximum speed of 18 kph when the terrain allows it and travel at 32 kph on the road with the rear wheel motors freewheeling. The Skid XXL is certified for road use.

Lastly, operator safety is guaranteed with a Forest-Tract designed cab that complies with the ROPS, FOPS, and OPS certifications.

### A skidder with 20% higher profitability

"We've done several comparative tests on the field, alongside skidders with mechanical or semi-mechanical drives and we estimate that profitability is 20 to 30% higher with the Skid XXL", summarizes Faouzi Doghmi. The profitability gains can be primarily attributed to the Poclair Hydraulics transmission. The volumetric efficiency of the direct drive motors is greater than on a mechanical axle, so fuel consumption is reduced. In addition, since the speed of each wheel is constantly adjusted, the tires never skid and have a longer lifetime. Furthermore, as the transmission operates without the traditional gearbox, differential and axle, there is less downtime for servicing and repairs. Lastly, the ruggedness of the machine, built with fine-grained structural steel, further increases its uptime and overall lifetime.

Now that the Skid XXL has proven its performance on the field, Forest Tracts' managers are heading for the European market, and in particular Germany, where skidders are widely used. They are opening a sales office in Saarbrücken, and are displaying their machine in tradeshows in France, Belgium, and Germany. ✖





## Waratah Heads pick up speed



While chainsaw felling is still used in forests with large diameter trees, steep grades or thick mud, mechanical harvesting is the norm in both native and planted forests. Three techniques share the market: the full-tree method, where felling is the only operation carried out in the stump area; the tree-length method, where the harvester also delimits and tops the tree head. Both are widely used in North America. In Europe and Russia, the third approach, cut-to-length harvesting, prevails. The tree is delimited and cut to the sawmill's requirements at the tree stump. Harvesting heads are at the heart of the process. They're an amazing sight, as they pick up and saw through trees at lightning speed - a harvesting head can cut several thousand three-meter logs in a day. They are the core expertise of Finish Waratah OM, a joint venture company owned by John Deere Forestry and Outokummun Metalli. Pasi Volotinen, the company's Managing Director, tells us more about their business.

**Poclain Hydraulics: When was the first harvesting head launched on the market?**

**Pasi Volotinen:** Our company developed the first four-wheel harvester head in the early 80s. That head is still the base for our H400 series, the only 4WD harvester heads on the market. Naturally the technology of the heads has evolved considerably since and today's requirements are totally different.

**P.H.: After forty years, would you say that the market is mature?**

**P.V.:** The market for cut-to-length harvesting is growing and the requirements for safety, quality and efficiency are higher than ever. That suits Waratah's positioning well, as our focus has always been on those topics. The market is still mainly in Europe and Russia, but we can see new areas converting to the Nordic forestry techniques, which I believe are the most advanced, both for nature and business.

**P.H.: What kind of intelligence governs the harvesting heads?**

**P.V.:** The operator enters the tree species and the desired log length, leaving the ECU to do the rest. The harvester head measures the diameter and length of the log with a precision margin of a few centimeters. There are also several automation features to optimize the feeding speed and control the log during the process. The level of automation keeps increasing in harvester heads and we are looking forward to offering new features in the near future.

**P.H.: Poclain Hydraulics motors are on all your harvesting heads. What value-add do they bring to the application?**

**P.V.:** Our harvesting heads are best in class, and we integrate components that meet the same standards; that's why we work with Poclain Hydraulics. Our collaboration started in 2001 and has strengthened

over the years. From the design standpoint, the motors deliver an optimal performance-to-weight ratio, so the booms have less load to lift. Their high volumetric efficiency contributes to the precision of the cutting and the constant grip on the tree; the heavy-duty motor design also withstands the pressure peaks of the open-loop circuit. Beyond the product, we're delighted with their support, as we solve together the challenges we come up against and fine-tune the motors to push their performance further.

**P.H. : How does the future look for Waratah ?**

**P.V.:** I believe the future looks bright for us. Our focus continues to be on product development to better serve our customers in the future and provide solutions that meet the changing needs of the industry. ✘







## Eco Log reaps success from its agile harvester featuring a Poclain Hydraulics transmission



100 employees strong, the Swedish forestry machine OEM Eco Log boasts a long history. Back in the 60s, the facility was known as Kockums and specialized in wood processing; in the 70s the manufacturer introduced cut-to-length (CTL) machines; in the 80s and 90s Skogsjan ran the facilities producing CTL machines, followed by Caterpillar from 1997 to 2004. Since 2004, Eco Log Sweden AB occupies the premises and pursues its mission of providing unique forestry machines. Anders Gustafson, the company CEO, tells us more about their business and offering.

**P.H.:** Your organization has been a major player on the forestry market for a long time. What lies behind your on-going success?

**Anders Gustafson:** We integrate leading-edge technology in our tree harvesters. For instance, the cab and loader base rotate 350°, providing great flexibility. The 550E-590E series of harvesters also has a unique arm-levelling system that enables the machine to traverse rough terrain, meanwhile keeping the operator balanced and comfortable. In addition to the technology, we provide outstanding owner support.

**P.H.:** What is Eco Log's number one product today?

**A.G.:** Eco Log is known first and foremost for the 550E - 590E harvesters and their pendulum arm suspension. The machine can thus tilt 16 degrees front to back and 25 side to side. It can work on uneven terrain, ride on boulders and access tough spots, while the operator remains level in the cabin, ensuring optimal comfort and concentration. When it comes to handling the stems, the 590E is equipped with a crane that provides a torque of 310 kNm,

for superior lifting and swing force. As for the heads, our harvesters integrate Log Max harvester heads, which are both productive and reliable. All these factors combine to provide high up-time, productivity and profitability.

**P.H.:** Where are Eco Log's markets?

**A.G.:** Eco Log products are delivered globally. Our largest single market is at home in Sweden while the majority of our machines is shipped overseas. Our machines are sold in Germany, France, the UK, Spain, Eastern Europe, Russia, North and South America, Australia and other Scandinavian countries. We rely on independent dealers worldwide to provide sales and support to our customers.

**P.H.:** Can you tell us how your machine performance benefits from the Poclain Hydraulics technology?

**A.G.:** Our harvester models 550 E, 560 E, 580 E and 590 E are equipped with Poclain Hydraulics motors, both for the transmission and the swing drive functions. Poclain transmission motors are extremely efficient, reliable and provide powerful tractive effort. The swing drive motors have driveshafts with integral-splined teeth and are smooth and concise in operation. In 2017, we shifted over to Poclain Hydraulics brake valves – they are reliable, secure and cost-effective. Overall Poclain Hydraulics components contribute to high harvester uptime and optimal productivity.

**P.H.:** How do the Poclain Hydraulics teams take part in the design and commissioning?

**A.G.:** Eco Log has used Poclain products for many, many years now. The Poclain Hydraulics team has visited our factory innumerable times and performed repeated commissioning of our machines to ensure that they operate at an optimal level. Poclain Hydraulics and Eco Log have worked hand in hand to fine-tune its wheel motor hydrobase transmission so that it provides the desired performance and reliability.

**P.H.:** What is Eco Log's vision for the next 5 to 10 years?

**A.G.:** Eco Log's vision is to provide long-term and sustainable solutions to our customers, which means superior customer support, top-quality products, and market-leading technology – all leading to sustained growth and profitability for our users and Eco Log. ✖





# Poclain Hydraulics provides hydraulic dual line braking for the EU 2015/68 standard

The new European 2015/68 standard, which stems from the 167/2013 mother regulation, has stepped up the requirements for on-road braking. Relative to tractor and trailer set-ups, the standard enforces dual line braking to activate the trailer brakes if it uncouples from the tractor. The standard is in effect on tractors since 2018 as well as on trailers in certain European countries.

An expert in hydraulic systems for machines travelling both off and on-road, Poclain Hydraulics has upgraded its braking offering to comply with the standard. It ensures that the braking force is appropriately distributed between the tractor and the trailer. Compact and mud-resistant, it is an all-terrain alternative to

the pneumatic technology and is fit for working in the fields. It is equipped with an electronic control and available in two versions: the VBT is dedicated to the tractor, while the EMB is for the trailer or towed implement. Both are standalone and compatible with the solutions on the market.

### VBT system for tractor-mounted dual line braking

The VBT system integrates an electronically controlled valve that modulates the pressure sent to the trailer braking system based on the force applied to the brake pedal. It manages the control and supplementary lines of the trailer whatever the braking system used: single, dual-line or CUNA for Italy. One single valve body fits all tractor sizes, and the braking force is adjusted using the electronic settings. As well as standard compliance, the system offers four enhancements: ordering the shut-off of the control line in case of a leak, securing the parking brake test functionality, automatically filling the trailer accumulator, and synchronizing the tractor and trailer emergency braking.

In addition to the standard functionalities, the VBT system can be configured to enable the Hill Start feature (automatic parking brake actuation when the tractor stops on an uphill grade) and the Parklock (automatic parking brake actuation when the ignition is turned off). If the tractor runs with a CVT (Continuously Variable Transmission), the system can be set to brake the trailer when the tractor decelerates.

### EMB system for trailer-mounted dual line braking

Like the VBT, the EMB system integrates a valve with an embedded electronic control. Suitable for single, double or triple axle trailers, it adjusts the braking force according to the trailer weight and the force applied to the brake pedal. The system is easy to integrate as the weight information is given in the form of an analogic or CAN signal. The trailer manufacturer can thus choose the sensor used to transfer the load information.

If the trailer integrates brake actuators whose volume exceeds 140 cc (8.5 cu.in), the system is upgraded with a pressure amplifier that can charge the accumulator using the low pressure available on the supplementary line. Charging is automatic and transparent for the driver.

With its hydraulic dual line braking systems, Poclain Hydraulics confirms its commitment to supporting Ag OEMs in marketing machinery that complies with the current regulations and ensuring their machines are safe and future-ready. ✖

| Tractor mount- VBT   | Trailer mount- EMB  |
|--|---|
| Manage the pressure supply to the trailer brakes according to the driver's braking command.<br>For tractors equipped with a Load Sensing pump or fixed displacement pumps.   | Manage the accumulator charge and adjust the trailer braking rate according to the load/weight variation.<br>Automatically apply the brakes in case of breakaway of the trailer.  |
| Up to 100L/min to auxiliaries  |   |
| Compliant with a single line, dual line or CUNA type of trailer.   | Compliant with single, double or triple axles trailer.  |
| Electronic primary control with hydraulic back-up  |   |
| <p><b>Benefits:</b></p> <p>Fully settable through software parameters.<br/>Automatic refill of the trailer accumulator each time the tractor stops.<br/>Enhanced park brake test function.<br/>Leakage detection and leakage stop.</p> | <p><b>Benefits:</b></p> <p>Refills the trailer accumulator continuously through the supplementary line.<br/>The load information can come from any sensor type: shock absorber pressure, position sensor, CAN bus, etc.</p> |
| <p><b>Associate with:</b></p> <p>Parking &amp; emergency brake valve VB3-00E.<br/>Steering assist brake valve VB-000.</p>  | <p><b>Associate with:</b></p> <p>Load sensor.<br/>Pressure amplifier if the volume of the brake actuators exceeds 140 cc.</p>   |



## Addidrive's incredible journey across Japan



In keeping with Poclain's success in the truck industry, the new Poclain Powertrain's Addidrive solution for hydraulic all-wheel drive is out to conquer the automotive industry. With 27 million passenger cars and light commercial vehicles manufactured in 2018 worldwide, Japan is a strategic player. It also has an image of excellence and innovation, deploying groundbreaking technology such as the hybrid car on a large scale. Naturally, it was the ideal destination to demonstrate the benefits of Addidrive and get industry buy-in.

### March 9th: the Addidrive demo car heads for Japan

Organizing a roadshow in Japan was not a walk in the park. The first challenge was convincing the vehicle manufacturers to spend a day in a remote location to test a solution that had no proven track record on the market. That didn't happen overnight. Poclain Hydraulics Japan's sales team visited them often over a period of two years, to explain the benefits of a hydraulic all-wheel drive system to manufacturers who firmly believed that mechanical transmissions are irreplaceable. The next hurdle was finding off-road test tracks that would offer the right conditions – a steep grade, mud, and loose gravel - the day of the event. Then electricity and amenities had to be set up to be able to welcome the guests in a comfortable setting.

### 30 thumbs up

The tests took place over two weeks in three locations: Yokohama, Mount Fuji and Hiroshima. The turnout exceeded the Poclain team's hopes, with 30 car and utility vehicle professionals showing up at the test tracks. They overcame the challenge of driving on the left and using a stick shift (Japanese drivers sit on the right and have automatic gears), and succeeded in driving up 25% grades and on adverse terrain.

All the testers were very satisfied with the experience and organization, and some committed to meeting with the Poclain Powertrain and Japan teams for further discussions about the Addidrive all-wheel drive solution.

### Addidrive is fit for the car and utility vehicle industry

The positive feedback from the test-drive event confirms car manufacturers' interest in Addidrive. Affordable and lightweight, it enables drivers to drive confidently in bad weather and poor road conditions without paying the price of an SUV or a 4x4 van. Addidrive's high power density and low drag torque enable car manufacturers to integrate the hydraulic transmission with minimal impact on vehicle architecture and CO2 emissions.

Awarded for its innovation at the French Equipauto show, Addidrive is a breakthrough in all-terrain and all-weather drive for lightweight cars and utility vehicles. First Germany, now Japan, the solution continues its journey to convert car manufacturers to the hydraulic all-wheel drive transmission. For the next roadshows we now turn to new markets and look forward to test-driving Addidrive with local car manufacturers. The ultimate milestone will be early 2021, when the solution is launched on the market. ✕



# Tandem PM20 pump for nimble utility work in the field

Crawler Ag machines that work in narrow row crops need compactness, light weight, and agility. Integrating a tandem hydraulic pump is a smart option to get optimal performance in a small package.



## Poclain Hydraulics' closed loop tandem PM20 enhances machine design and performance

The tandem configuration provides unsurpassed benefits:

- 360° turn at the end of the field. To turn, the machine can behave like a skid steer, with the inner track rotating backwards and the inner track forward.
- Optimal driveability. The tandem configuration and the integrated functionalities make for a highly responsive pump.
- Minimal space. The assembly measures less than 360 mm and can be mounted axially
- Easy design integration and mounting. With the tandem pump, there is no need to double the circuit. There are fewer hoses and connections, and the leakage risk is reduced.

## The PM20 is ideal for medium duty specialty machines

With a displacement of 21 or 28 cc, the pump is based on a trunnion design

and is highly customizable. It features an auxiliary mounting pad that can interface with a gear pump and power an implement such as a conveyor belt. In addition, the valve plate can be modified to produce the desired driving behaviour, from responsive to comfortable.

The PM20 offers the widest range of controls on the market, as well as several options:

- Servo-mechanical with feedback
- Hydraulic servo-control
- Electric proportional servo with feedback
- Charge pump
- Flushing valve
- Auxiliary mounting pad

The automotive control and additional options, such as safety valve, filters and speed sensors, will be available by the end of 2020. ✘



## VB3-020 Double Circuit Brake Valve

When looking for a braking solution, OEMs have demanding requirements: low pressure drop, space constraints, short response time - all with the end goals of safety, reliability and top performance.

The VB3-020 meets these requirements without compromising on efficiency.

### What does it offer?

- Low pressure drop (7.5 bar)
- Narrow pressure tolerances (+/- 3 bar)
- Reduced size & weight
- Optimal response time
- High maximum input pressure (250 bar)
- Wet spring box – improved cleanliness

### Simple and interchangeable

The VB3-020 is extremely compact – much shorter than dual circuit brake valves. It uses a simple spring box and has options for larger ports on the same housing, making it a strong option for heavy machinery.

The casted body and lighter design make it easier to integrate. The VB3-020 has the same fixation points and connects to the same actuators as the other dual circuit valves in the VB range, easing interchangeability and making the benefits of the new design accessible for a wide range of machines.

### Safety by Design

All VB3 valves come standard with reinforced sealing and a wet spring box to avoid external pollution and prevent rust. A key feature for safety is the VB3-020's parallel mounted spools. Oil contamination is always a hazard, but in the event that one spool becomes stuck because of contamination, the other spool will still actuate the brake. ✘





## Global success for China-built Everun loaders

Founded in 2007 with headquarters in Qingdao on the east coast of China, Everun offers an extensive range of wheel loaders and telehandlers. The machines are sold in over 30 countries throughout Europe, Russia and the United States.

For their ERT1500 telescopic handler, Everun chose a Poclairn Hydraulics transmission in 2018 integrating a pump, four size 02 MS motors and a flow divider. The solution provides superior mechanical efficiency and gradeability compared to a high-speed motor and axle assembly. Besides higher performance, the total cost of ownership is lower. Poclairn Hydraulics' applications team supported them in sizing the components as well as prototype testing and commissioning. The test results enabled Poclairn Hydraulics to recommend improvements to the

machine and prevent risks occurring once it went into series production. Regarding after-sales, Everun appreciates Poclairn Hydraulics' densely knit global distributor network to serve users around the world.

Regarding R&D, Everun doesn't see e-motors equipping their loaders and telehandlers with the technology at hand. Their next milestone is the integration of more ecological engines that comply with the Euro-5 standard. They also expect their collaboration with Poclairn Hydraulics to expand to new applications. ✕

## Zoomlion's wheeled sugarcane harvester enhanced with PH motors

Headquartered in Changsha City, Hunan Province, China, Zoomlion is China's largest construction equipment manufacturer. In 2014 the company made a strategic move into the Ag market to profit from Beijing's drive to promote rural modernization. The acquisition of a stake in Chery Heavy Industry Co Ltd is enabling them to diversify into sugarcane harvesters and other Ag equipment. Symbridge, one of the leading distributors of European hydraulic components in China, is a good match for Zoomlion, as both have a strong culture of excellence, as well as international interests. Soon after Zoomlion enters the Ag market, Symbridge succeeds in securing the supply for the hydraulic transmission on their wheeled sugar harvester, the AC60. Their system is comprised of Poclairn Hydraulics wheel motors.



### Symbridge, a major Chinese distributor of European hydraulic components

Founded in 1985 in Taiwan, Symbridge opened a branch in mainland China in 1995. Today it totals 10 branches in China and one in Indonesia. It represents several European manufacturers including Danfoss, its number one supplier, Reggiana Riduttori, Marzocchi, and Poclairn Hydraulics. The company is 110 employees strong, with a quarter working in sales and applications. The distributor serves the construction equipment, environmental, agricultural, marine and manufacturing industries; its principal customers are XCMG Group, Sany Group, Longma and MacGregor.

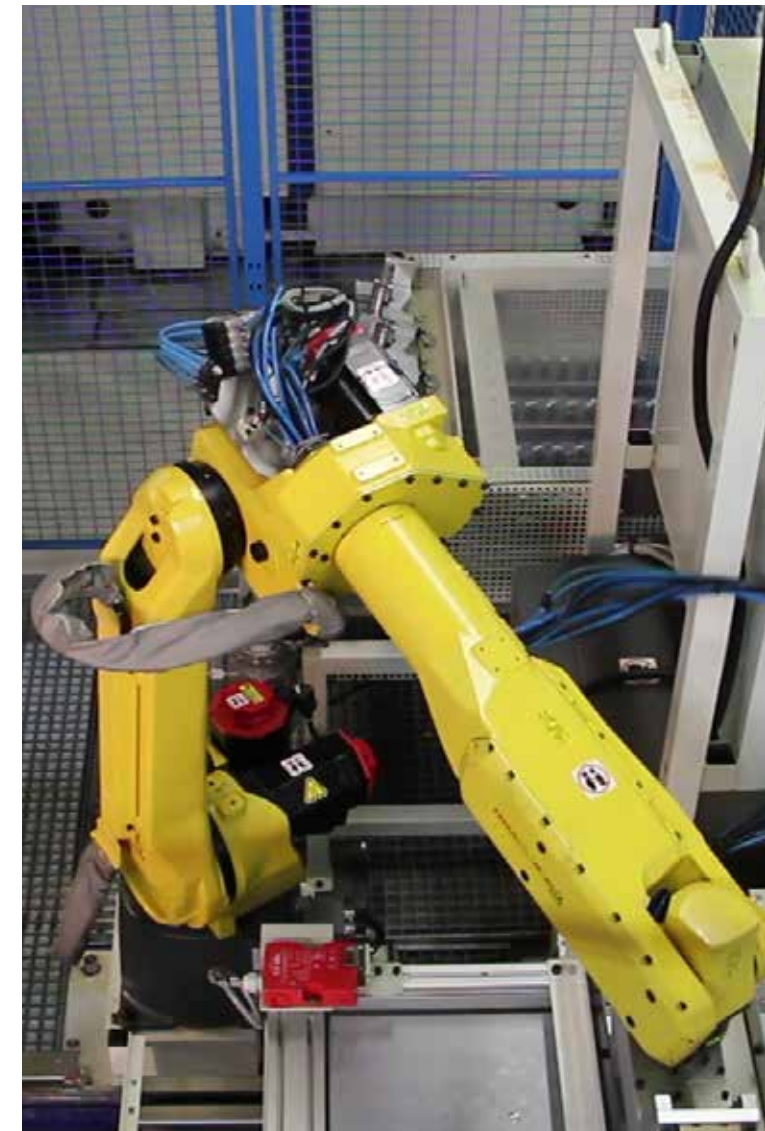
### Symbridge introduces Zoomlion to the Poclairn Hydraulics technology

Symbridge recently integrated Poclairn Hydraulics into their catalogue, when they acknowledged

that a direct drive motor would add value to their hydraulic systems. They converted Zoomlion's wheeled sugarcane harvester from a high-speed and gearbox assembly to MS motors sizes 11 or 18, depending on the harvesting speed required. Zoomlion was impressed by the performance and simple design of the motor. Beyond this, Symbridge brought along their system expertise and offering, packaging together with the motors a pump, a control system and valves. They also committed to short lead times, keeping an inventory of the motors in their warehouse.

Close to 100 sugarcane harvesters integrating Symbridge's hydraulic system are in operation today, and the OEM is very satisfied. On its side, Symbridge is looking forward to doing more business with Poclairn Hydraulics. "They are very hard-working and communicate with us all the time. We want to further our training in their offering and hope to be able to service their motors in the future" adds Mr Jian YANG, Symbridge's Sales Manager for China. ✕





## New generation robots enter the shop floor

Concepts such as autonomous driving, e-vehicles, IoT, and Industry 4.0 are all around us. They are entering the Poclairn Hydraulics shop floors, with new generation robots that improve workflow and enhance operator comfort and control. They also help us stay ahead in a fast-changing market.

### Training goes hand-in-hand with new gen robots

From the operator to the plant manager, a person working on a smart shop floor needs to have autonomy, flexibility, problem solving and leadership skills. These qualities help the team harness a machine's full potential. Operators often

change workstations or switch from one task to several tasks on the line. Team members acquire these skills on the shop floor, and technical champions create and put in place best practices. One example is the cam machining process improvements developed in Brno that we are implementing group-wide.

### 100 robots by 2025

Poclairn Hydraulics will more than double the number of robots in operation by 2025. In so doing, the Group's number of robots per 10,000 employees will exceed 300 and be on par with Japanese companies. The introduction of new robots will allow Poclairn Hydraulics to advance in a series of domains. Quality improvements come first. As the components on the production line are highly customized, the operator faces the challenge of adjusting his control checkpoints with each part number. Automated controls will facilitate and complement the manual checks. Second, the robot cameras and sensors will assist in handling the components appropriately and correcting errors on-the-fly. Third, robots will augment stability in production, especially in areas where there is a workforce shortage. Last, mobile robots transferring parts between cells will enable one-piece flow, better stock management and smaller production

batches. Overall, introducing new generation robots will make our manufacturing processes leaner and increase our agility.

### 4.0 robots

At the beginning of the decade, robots performed repetitive tasks and produced high quantities. They worked in designated areas without operator interference to avoid injuries. Today's 4.0 generation mixes machine learning and Human-Robot Collaboration.

Poclairn Hydraulics' new robots will interact with operators, using methods such as «pick and place». Pick and place uses cameras and mechanical fingers to pick up a part on a workstation and place it into a machine. This allows operators to focus on complex tasks. The Gaggio Italy plant already uses a pick-and-place robot at a machining station. With regard to machine learning, the robots will be able to diagnose internal vibrations or overheating. They will be able to signal a potential breakdown and carry out preventive maintenance to avoid line shut down.

### Automation is happening group-wide

Robots are already operational in Marnaz, France, which has many automated lines for piston machining. In Yorkville, USA, robots are working on brand-new lines, while in the Žiri, Slovenia plant, automation has been introduced on several units. The Verberie plant will shortly integrate automated guided vehicles to transfer parts from the inventory to the assembly line.

Poclairn Hydraulics' investment in new generation robots is an essential element of the Group's intelligently networked value chain. It will give the operator more comfort and control, and help us stay ahead of the fast changes emerging on our markets. ✕





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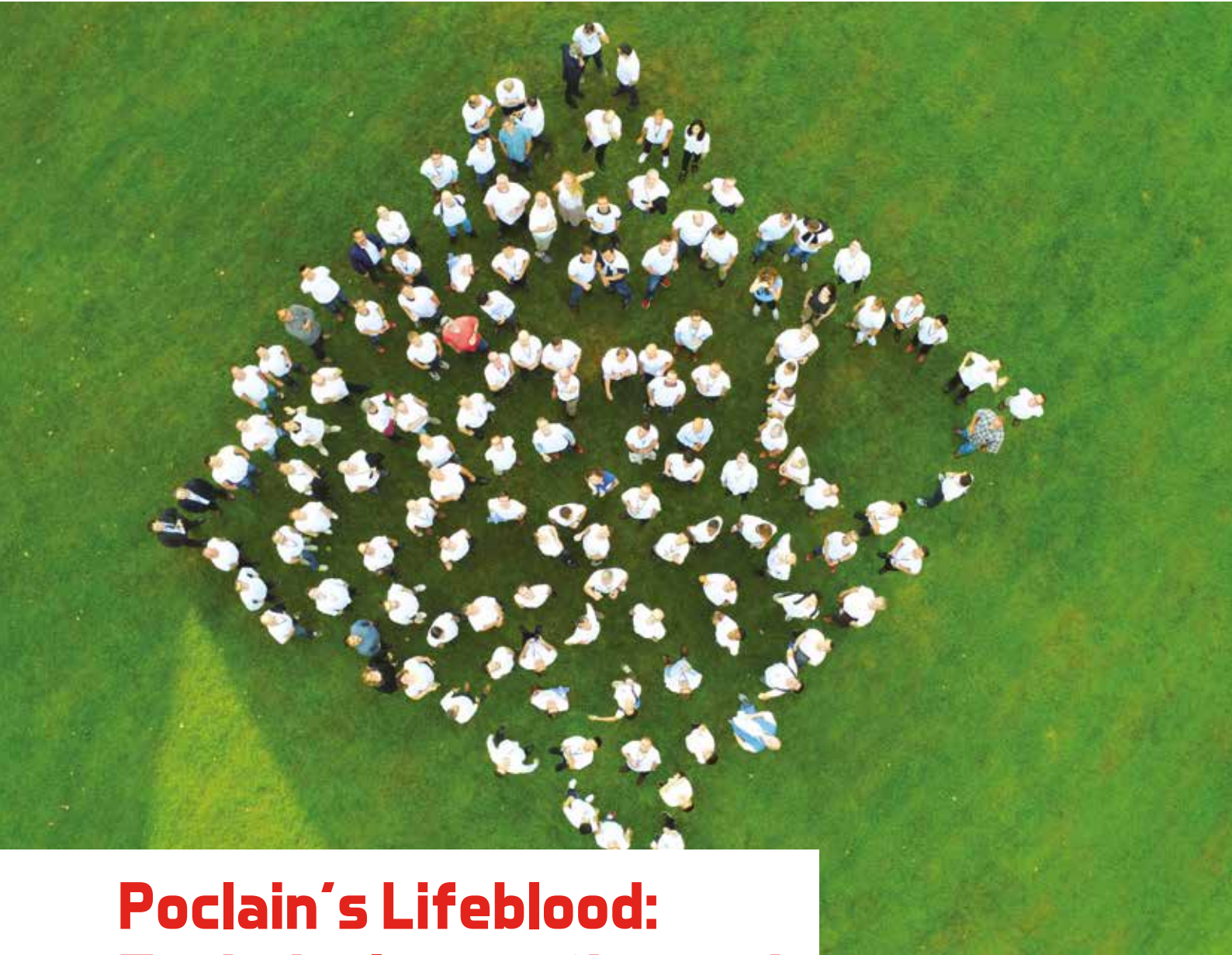
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## Poclain's Lifeblood: Technical expertise and passion for our customers

This past June, Poclain Hydraulics organized a Worldwide Sales Meeting with over 110 sales people in attendance from 25 countries. It was a great opportunity for training, sharing experience and intense networking.

Well-connected, knowledgeable, and international, the sales team is the heartbeat of Poclain, delivering the right combination of global and local expertise to each customer. Our worldwide sales meeting brought our salesteam and

experts from across the globe together to our Verberie, France headquarters for a week of multicultural experiences to help share knowledge & best practices with our global network.

Thank you to all of our Poclain Hydraulics distributors who came to Yorkville for our August training session! We appreciate connecting with each of you in person, reviewing our product lines, and touring the facility. We look forward to continuing to work with all of you!



Poclain Hydraulics, Pvt. Ltd. in India exchanged in July a 'Memorandum of Understanding' with the Government of Puducherry to officialize their participation in the "Earn While You Learn" program. Honourable Minister for Education and Agriculture Shri. Kamalakannan, Government of Puducherry, exchanged the MoU with the team.

Locally, many students drop out of school because of poverty or because they need to shoulder family responsibilities. In response to this, the Government of Puducherry runs evening courses for employed people. In keeping with our global initiative of supporting education wherever we are located, Poclain Hydraulics Pondicherry is sponsoring the "Earn While You Learn" program. Poclain Hydraulics has agreed to train about 25 students from the evening Polytechnic College for three years. The subsidiary also pays them a stipend and bears 50% of the cost of their tuition during the first year. When the government announces the evening college courses, students have the opportunity to apply to interview with Poclain for a place in the program. The training covers a number of different disciplines and topics: safety, quality, maintenance, ISO, machine and equipment operation. Students will also work on soft skills such as problem solving. The goal is that trainees will leave with the industrial knowledge and skill set they need to increase their employability.



Last June, the Pondicherry, India facility received "Best Quality Performance award" from Caterpillar India Pvt Ltd. during the "BCP India Supplier Summit". About 60 supplier representatives participated in this summit. Poclain Hydraulics is one of the suppliers to have maintained a Platinum Certificate for the last four years (2016 - 2019)!



Our Certified Repair Centers (CRC) are held to high standards in order to service our products. Poclain Hydraulics recently welcomed back for a second session Luteijn Hydraulics BV, a Dutch CRC to our training center in Verberie, France.



TDC Ukrspectekhnika is now a Poclain Hydraulics' Certified Repair Center in Ukraine.





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