



Aerial view of phase 1 of the factory

As a professional enterprise, Paguld has obtained for a number of national invention patents. Our products are widely used in wind power equipment, wheel flange, railway, engineering machinery, commercial vehicle, large-scale machinery in mining, ports and other fields.

Paguld has passed ISO9001, IATF 16949, IRIS (ISO/TS 22163) quality management system certification and the certification of CE,ETL,PED etc for products and obtained CNAS L16139 laboratory accreditation certificate.

Upholding the business philosophy of "dedicated research & development, lean production, excellent quality and sincere cooperation", Paguld has brought in the first-class talents and become the customer's trustworthy partner.

## COMPANY INTRODUCTION

Qingdao Paguld Intelligent Manufacturing Co., Ltd was founded in 2012, (stock code: 301456) is a joint-stock enterprise integrating R&D, manufacturing and sales. Paguld is committed to developing centralized lubrication systems and hydraulic system with independent intellectual property rights and core competitiveness, and provide competitive overall solutions for domestic and oversea customers.

**100**

The factory occupies an area of approximately 16.5 acres

**44000**

Phase 1 of the factory: 44000m<sup>2</sup>

**40000**

Phase 2 of the factory: 40000 m<sup>2</sup>



Rendering of phase 2 of the factory

## PRODUCTION CAPACITY

Lean production and continuous improvement  
is the foundation of development

First-class quality comes from first-class production equipment and super first-class inspection and testing platform, Paguld has more than 100 sets of machining centers, CNC lathes, grinding machines and other kinds of equipment, effectively ensure the manufacturing accuracy of system components; The precision of all core products is up to  $\mu\text{m}$  level, and the high-precision parts processing ensures the high reliability of products.



► Flexible Manufacturing System-5000L/6000L



- MAZAK HCH-5000L
- Takisawa XEX-108
- Doosan composite CNC lathe
- Tsugami BO205-III
- Citizen centrifuge L32-1M9/A20-3F7
- MAZAK NM415/DT400/DNM415/DT405
- Full-skill CNC
- Surface grinder, centerless grinder, cylindrical grinder, inner hole quilting equipment
- Ordinary lathes, milling machines, hexagonal lathes, etc.

### Valve block Processing Equipment



Thermal deburring machine



Automatic ultrasonic cleaning equipment



Horizontal machining centre

## PRODUCT CENTER

Exquisite quality is the basis for us to win trust and respect and it is the driving force for Paguld to work hard for it

In Paguld Intelligent, excellence and innovation never stop, series of products have been put into the market after years of accumulation of research and development.

Facing the development trend of transformation and upgrading of traditional manufacturing industry, Paguld

takes a more solid step and once again takes the lead in the industry.

## Centralized Lubrication System

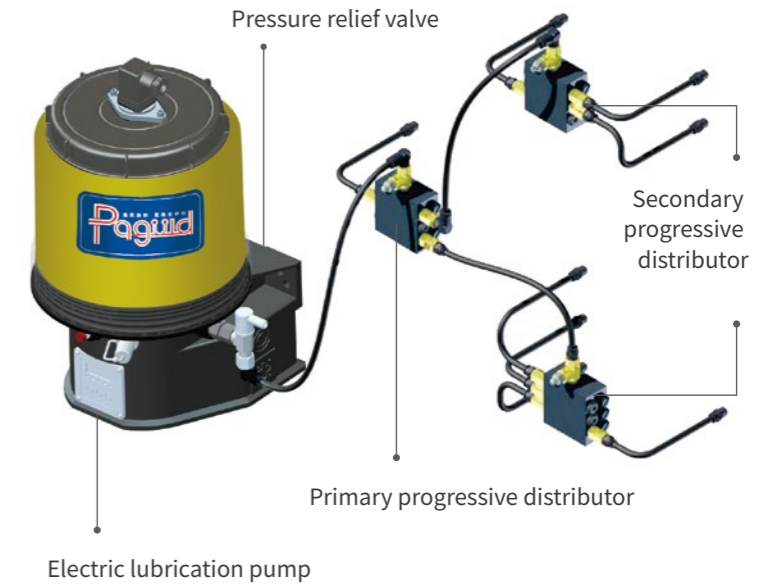


### The advantages of centralized lubrication system

- Grease or oil injection according to fixed time, position, quantity and sequence
- Missing lubrication point through artificial injection can be avoided
- Precise grease or oil injection schedule and quantity, reduced lubricant consumption and environment pollution
- High-pressure system and grease or oil species with wide range
- Compact structure, excellent performance, easy to install and easy to maintenance
- Effective lubrication for equipment components, improved equipment service life, reduced cost of maintenance
- Fault alarm function and full-time monitoring for lubrication system
- Save lubricant and protect the environment

## Progressive lubrication system

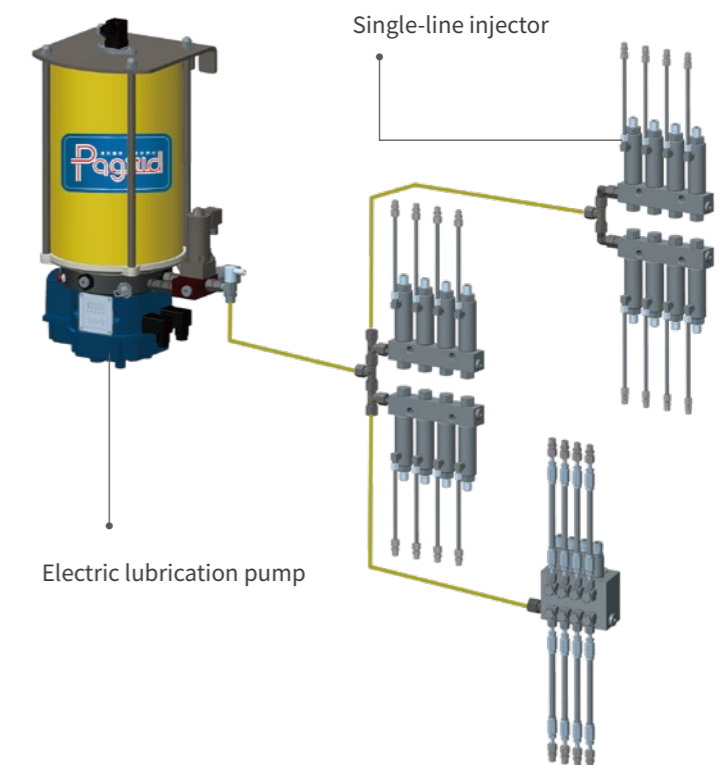
It is composed of electric lubrication pump, progressive distributor, pipeline accessories and control parts. The distributor delivers the lubricant to each lubrication point in a progressive way under the pump pressure. With an accurate amount of grease injection, the system can perform high- pressure, quantitative intermittent work under relatively large temperature difference. It is also convenient for installation, adjustment and maintenance.



## Single-line lubrication system

It is composed of electric lubrication pump, control system, single-line injector, pipeline accessories, etc.

A main line, each injector is relatively independent, local lubrication branch failure does not affect the normal operation of other branches; easy to install and operate, can be convenient for system expansion.

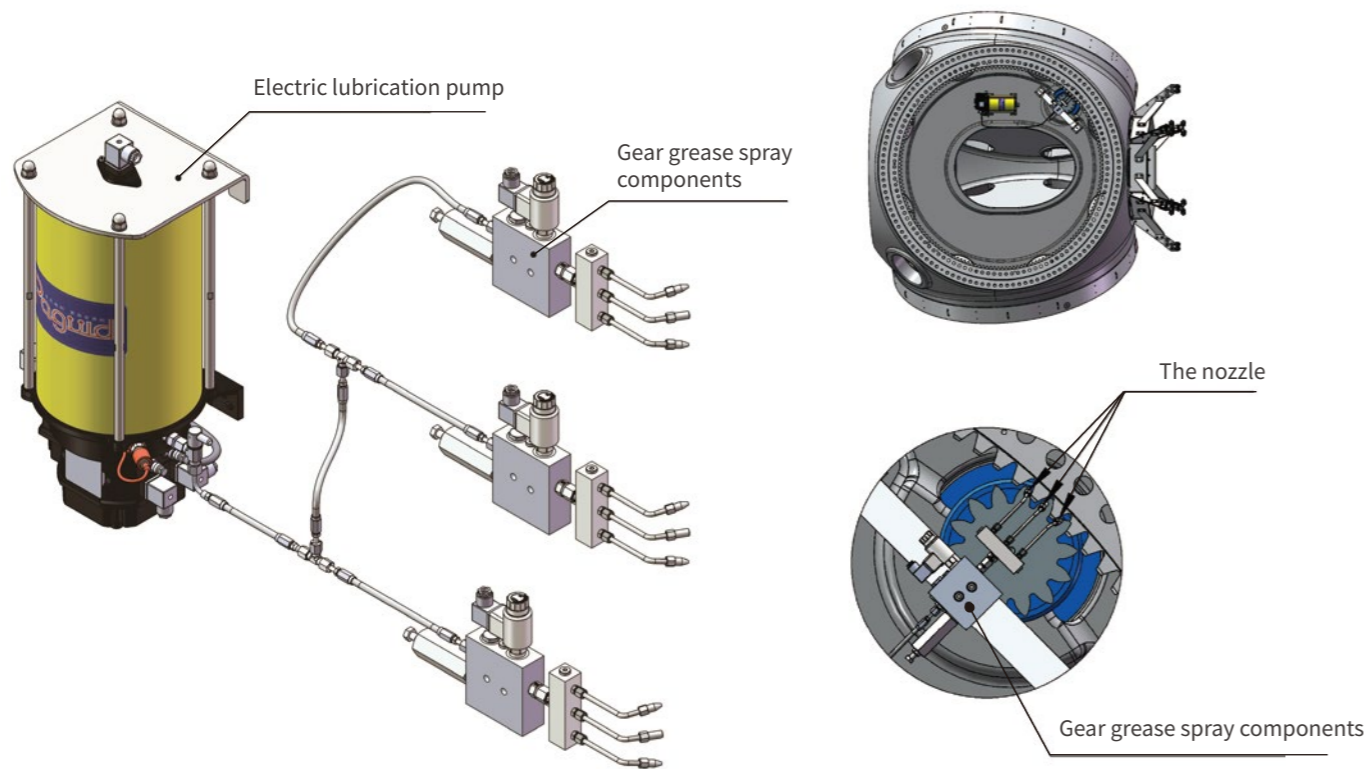


## Paguld gear grease spray system

Paguld gear grease spray system is composed of electric lubrication pump, control system, gear grease spray components, pipeline accessories, etc. Gear grease spray system is the unique spray unit design. Through the built-in accumulator to achieve active spray, compared with the traditional spray system without air source assistance, the advantage is simple structure, installation and debugging more convenient, maintain easily. It is mainly used to solve the problem of severe wear at the gear meshing point.

### Features of gear grease spray system

- Lubricant precision injection
- Small amount of lubricant consumed
- No excessive lubrication, no pollution
- No other components are required to drive
- Lubricants can also be sprayed when gears engage and stop
- Accurately detect the use of lubricants

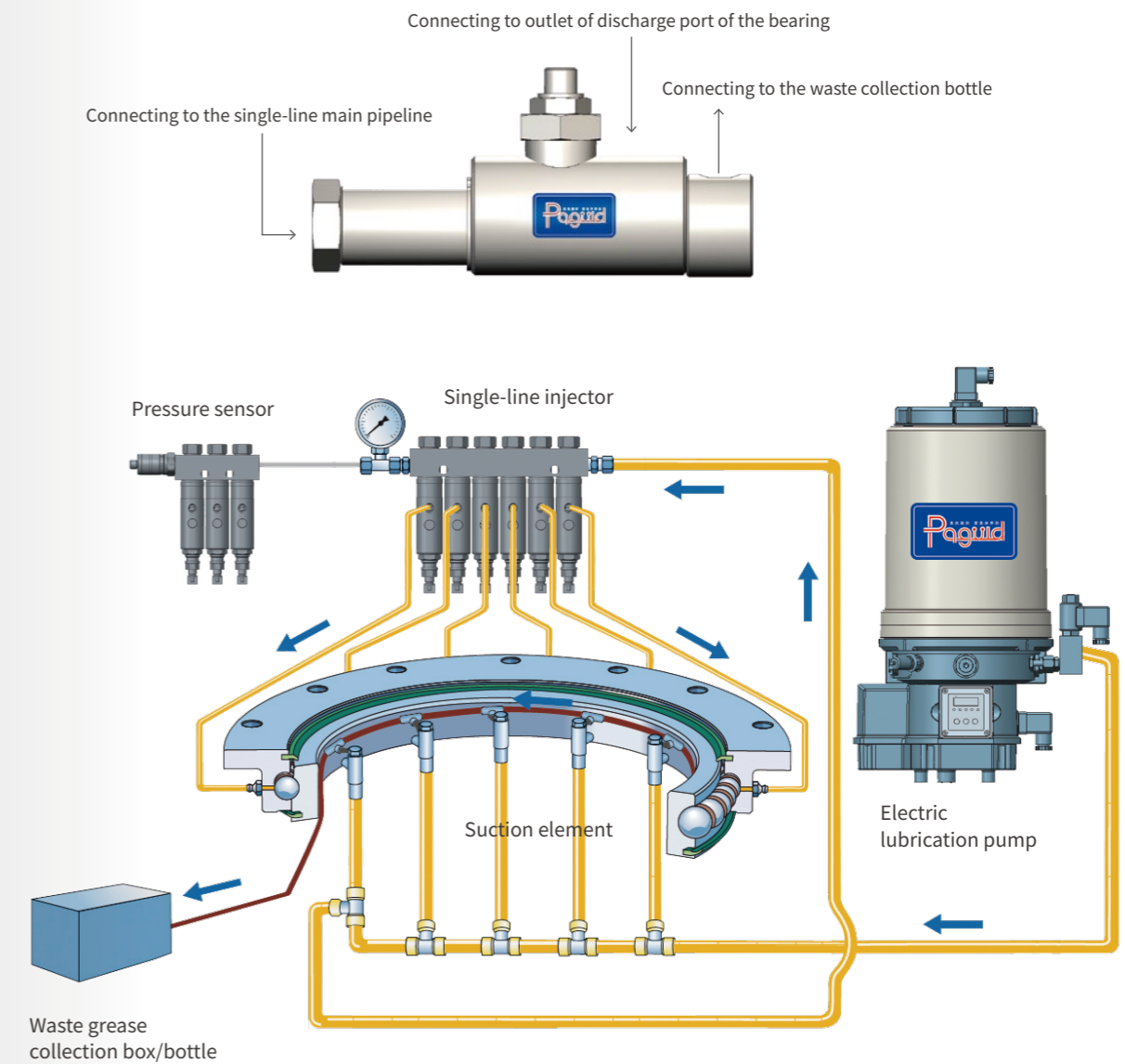


Schematic diagram of spray components

## Waste grease auxiliary recovery and single-line system

### Suction Element

ESE-01 suction element is specially developed and applied to the generator bearing of MW grade wind turbine. It absorbs the waste grease in the bearing, along with the single-line lubrication system.



Cooperative working principle of single-line system and ESE-01 suction

## PG203 Series of Electric Lubrication Pump

The PG203 electric lubrication pump is an automatic centralized lubrication pump with excellent performance that can support up to three pump elements. Suitable for centralized lubrication system of wind turbine generator.

It boasts strong versatility, a compact structure, and excellent working performance. The integrated pump base makes it highly economical and widely used. Besides, the system can be equipped with a low-level alarm, a blockage alarm, and a control unit, which greatly expands the industry application scope of the PG203 electric lubrication pump.



### Technical Parameters

System pressure	35MPa						
Volume of reservoir	1L、2L、4L、8L						
Operating voltage	12VDC、24VDC、230VAC						
Pump element mL/minute	K5	K6-2.5	K6	K7	K8	KR7	KR8
	2.0	2.5	2.8	4.0	5.0	0.7-3	1.3-5
Number of pump element	1-3 pieces						
Grease outlet thread	G1/4 inner thread						
Operating temperature	-40°C ~ +80°C						
Protection class	IP65						
Grease	Up to NLGI 2#						

## PG230 Series of Electric Lubrication Pump

The PG230 electric lubrication pump is an automatic centralized lubrication pump with excellent performance that can support up to 4 pump elements. It is suitable for progressive centralized lubrication systems and is commonly used in the centralized lubrication system of wind turbine Pitch, main bearing, yaw and other parts.

Its pump base made of high-strength lightweight metal further improves the seismic performance, Products have excellent environmental adaptability, modular design, specifications can be flexibly selected. Besides, it can be equipped with a low-level alarm, a blockage alarm, and a control unit, which greatly expand the industry application scope of the PG230 electric lubrication pump.



### Technical Parameters

System pressure	35MPa						
Volume of reservoir	4L、6L、8L、10L、12L、15L、20L、25L、30L、40L						
Operating voltage	12VDC、24VDC、230VAC						
Pump element mL/minute	K5	K6-2.5	K6	K7	K8	KR7	KR8
	2.0	2.5	2.8	4.0	5.0	0.7-3	1.3-5
Number of pump element	1-4 pieces						
Grease outlet thread	G1/4 inner thread						
Operating temperature	-40°C ~ +80°C						
Protection class	IP65						
Grease	Up to NLGI 2#						

## PG231 Series of Electric Lubrication Pump

The PG231 electric lubrication pump is an automatic centralized lubrication pump with excellent performance that can support up to 4 pump elements. It is suitable for progressive centralized lubrication systems and is commonly used in the centralized lubrication system of wind turbine Pitch, main bearing, yaw, turbine and other parts.

It boasts strong versatility, a compact structure, and excellent working performance. The pump base and housing are integrated design, making the structure more compact and compact. Besides, it can be equipped with a low-level alarm, a blockage alarm, and a control unit, which greatly expand the industry application scope of the PG231 electric lubrication pump.



### Technical Parameters

System pressure	35MPa						
Volume of reservoir	1L、2L、4L、6L、8L、10L、12L、15L						
Operating voltage	12VDC、24VDC、230VAC						
Pump element mL/minute	K5	K6-2.5	K6	K7	K8	KR7	KR8
	2.0	2.5	2.8	4.0	5.0	0.7-3	1.3-5
Number of pump element	1-4 pieces						
Grease outlet thread	G1/4 inner thread						
Operating temperature	-40°C ~ +80°C						
Protection class	IP65						
Grease	Up to NLGI 2#						

## PG230-PLUS Series of Electric Lubrication Pump

The PG230-PLUS electric lubrication pump is an automatic centralized lubrication pump with excellent performance that can support up to four pump elements. It is suitable for single-line centralized lubrication systems and is commonly used in the centralized lubrication system of wind turbine Pitch, main bearing, yaw and other parts.

PG230-PLUS electric lubrication pump adopts a segmented design and high-strength light alloy, which give the whole structure excellent working performance. The pump elements are connected with each other through an internal grease circuit in the pump base; the simple exterior layout makes it to be replaced and maintained. The outlet of the electric lubrication pump is provided with a pressure monitoring unit and a pressure relief unit for pressure control, ensuring the normal lubrication of the whole system.



### Technical Parameters

System pressure	35MPa	
Volume of reservoir	4L、6L、8L、10L、12L、15L、20L、25L、30L、40L	
Operating voltage	12VDC、24VDC、230VAC	
Pump element	3K7、3K8 (General configuration)	
	12mL/minute、15mL/minute	
Number of pump element	3-4 pieces	
Grease outlet thread	G1/4 inner thread	
Operating temperature	-40°C ~ +80°C	
Protection class	IP65	
Grease	Up to NLGI 2#	

## PG230M Series of Electric Lubrication Pump

The PG230M electric lubrication pump is an automatic centralized lubrication pump with excellent performance that can support up to 4 pump elements. It is suitable for progressive centralized lubrication systems and is commonly used in the centralized lubrication system of wind turbine Pitch, main bearing, yaw and other parts.

Its pump base made of high-strength lightweight metal further improves the seismic performance, Products have excellent environmental adaptability, modular design, specifications can be flexibly selected. Besides, it can be equipped with a low-level alarm, a blockage alarm, and a control unit, which greatly expand the industry application scope of the PG230 electric lubrication pump.



### Technical Parameters

System pressure	35MPa			
Volume of reservoir	30L、40L、50L、80L、100L			
Operating voltage	24VDC、230VAC			
Pump element mL/minute	K5	K6-2.5	K6	K7
	2.0	2.5	2.8	4.0
Number of pump element	1-4 pieces			
Grease outlet thread	G1/4 inner thread			
Operating temperature	-40°C ~ +80°C			
Protection class	IP65			
Grease	Up to NLGI 2#			

## GLP Series of Electric Lubrication Pump

GLP series of lubrication pump adopts modular design with high degree of generalization, it can not only be applied to progressive lubrication systems, but also can be applied to single-wire or double-wire lubrication systems through relatively replacement of simple piston pump module.

The main body of the GLP lubrication pump adopts an all-metal design, a screw conveyor mechanism is equipped on transmission shaft, can effectively transport high viscosity grease to the pump element. This product is specially designed for harsh operating conditions.



### Technical Parameters

System pressure	40MPa
Volume of reservoir	15L、30L、60L、80L
Operating voltage	400VAC/690VAC
Pump element mL/minute	K8:11.2mL/minute
Number of pump element	1-6↑ 1-6 pieces
Grease outlet thread	G1/4 inner thread
Operating temperature	-40°C ~ +80°C
Protection class	IP54
Grease	Up to NLGI 2#



## ELP2 Series of Electric Lubrication Pump

The ELP2 electric lubrication pump is an automatic centralized lubrication pump with excellent performance. It is suitable for single-line centralized lubrication systems and is commonly used in the centralized lubrication system of wind turbine main bearing.

ELP2 electric lubrication pump adopts modular design, integrated with electric pump, large capacity reservoir, electrical box, single line injector and other components, the product has excellent environmental adaptability. At the same time it can be equipped with low grease level alarm, blockage alarm and control unit, which greatly expands the industry application scope of ELP2 electric lubrication pump. The characteristics of large capacity and high stability make it especially suitable for equipment with high reliability requirements and difficult maintenance.



### Technical Parameters

System pressure	35MPa
Volume of reservoir	220L
Operating voltage	24VDC
Injector's displacement of each outlet	0.1-0.7cc/cycle(Customizable)
Operating temperature	-40°C ~ +80°C
Protection class	IP65
Grease	Up to NLGI2#

## EBP Series of Electric Lubrication Pump

The EBP electric lubrication pump is an automatic centralized lubrication pump with excellent performance. It is suitable for single-line centralized lubrication systems and is commonly used in the centralized lubrication system of wind turbine main bearing.

EBP electric lubrication pump adopts modular design, integrated with electric pump, electrical box, follower plate and other components, the product has excellent environmental adaptability. At the same time it can be equipped with low grease level alarm, blockage alarm and control unit, which greatly expands the industry application scope of EBP electric lubrication pump. The use of 180Kg standard grease drum greatly reduces the project cost and the operation convenience of on-site grease replenishment.



### Technical Parameters

System pressure	35MPa
Applicable drum specifications	180Kg standard oil drum
Operating voltage	24VDC
Electric pump displacement	30 ~ 300cc/min
Operating temperature	-40°C ~ +80°C
Protection class	IP65
Grease	Up to NLGI2#

## Electric Multi-point Pump MPG215 Series

MPG215 electric multi-point pump is suitable for multi-line or progressive centralized lubrication system.

This series of lubrication pumps can drive up to 15 pump cores to pump grease. It can not only transport grease directly to the lubrication point, but also be used as a pumping station for large progressive centralized lubrication systems. At the same time, it adopts an efficient worm gear reducer, exquisite eccentric drive components, excellent multi-range drive motor for the reliable operation of the lubrication pump.



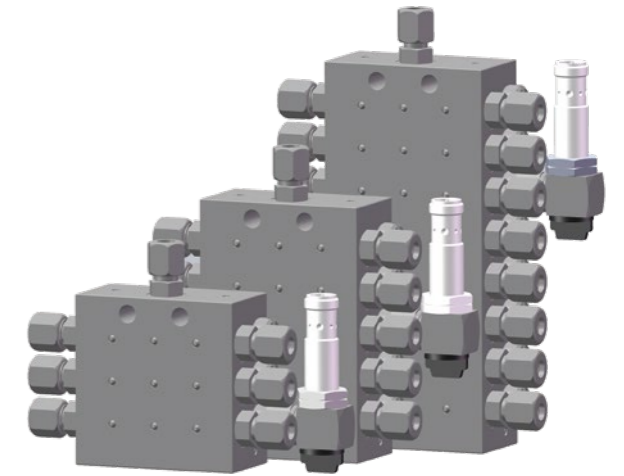
### Technical Parameters

System pressure	35MPa
Volume of reservoir	10L、30L、60L、100L
Operating voltage	380-420VAC/50Hz 440-480VAC/60Hz
Reduction ratio	40:1/60:1/100:1 300:1/500:1
Pump element	KR7: 0.1-0.34cc/cycle KR12: 0.29-1cc/cycle
Number of pump element	1-15个
Pump core outlet thread	G1/4" inner thread
Operating temperature	-40°C ~ +80°C
Protection class	IP55
Grease	Up to NLGI2#

## PG-SSV Distributor

The PG-SSV distributor is a piston valve that supplies a fixed quantity of grease each time. By blocking an outlet, it can be supplied to the following outlet, so that the next outlet grease quantity can be doubled and the different demands can be achieved.

A major feature of the PG-SSV distributor is each outlet is progressive, and the latter outlet must wait until the former outlet releases grease. Based on that, the working condition of the distributor can be checked by adding visualized monitors or electronic monitors. Each distributor has 6-24 (all even numbers) outlets and is able to deliver grease up to NLGI 2# or grease with a viscosity greater than 40cSt.



The PG-SSV distributor is made of non-fragile and non-metallic sealing materials. Its exquisite sliding valve and high pressure-resistant end sealing structure (metal contact seal) make it able to withstand high temperature, high cold, and other harsh working conditions.

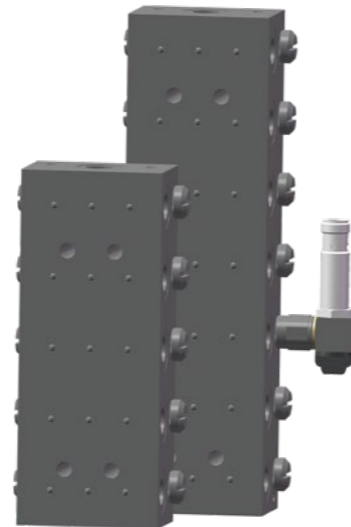
### Technical Parameters

Number of outlets	6-24 outlets
Maximum working pressure	350bar
Maximum pressure difference between outlets	100bar
Displacement of each outlet	0.2cc
Inlet thread	G1/8" inner thread
Outlet thread	M10x1 (Need to be equipped with an outlet one-way valve.)
Material	Carbon steel, galvanized nickel alloy
Working temperature	-40°C ~ +80°C

## PG-SSVL Distributor

The PG-SSV distributor is a progressive distributor valve, the last outlet must wait until the previous outlet before the grease can be discharged. According to this feature, the working state of the distributing valve can be determined by adding a visual device or an electronic monitoring device. The PG-SSV distributor is designed for complex progressive lubrication systems with larger inlet and outlet space and flexible installation of multiple types of pipelines; Each distributor has 6-14 (all even numbers) outlets and is able to deliver grease up to NLGI 2# or grease with a viscosity greater than 40cSt.

The PG-SSVL distributor is made of non-fragile and non-metallic sealing materials. Its exquisite sliding valve and high pressure-resistant end sealing structure (metal contact seal) make it able to withstand high temperature, high cold, and other harsh working conditions.

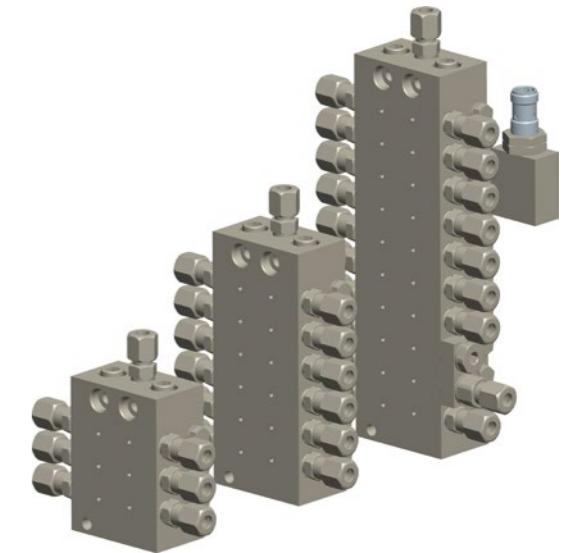


### Technical Parameters

Number of outlets	6-14 outlets
Maximum working pressure	350bar
Maximum pressure difference between outlets	100bar
Displacement of each outlet	0.2cc
Inlet thread	G1/4" inner thread
Outlet thread	M10x1 (Need to be equipped with an outlet one-way valve.)
Material	Carbon steel, galvanized nickel alloy
Working temperature	-40°C ~ +80°C

## PGMD-1000 Distributor

The PGMD-1000 distributor adopts a modular design with a high degree of generalization. It is easy to be installed and maintained; there is also a cycle indicator. Blocks can be combined based on the actual usage to form different distributors (the middle module needs at least 2 blocks and at most 11 pieces; the end module has one block). The PGMD-1000 distributor can deliver lubricant to up to 24 points.



### Technical Parameters

Number of outlets	6-24 outlets
Maximum working pressure	350bar
Maximum pressure difference between outlets	100bar
Displacement of each outlet	0.025cc/0.045c/0.075cc/0.105cc
Inlet thread	G1/8" inner thread
Outlet thread	M10x1 (Need to be equipped with an outlet one-way valve.)
Material	Carbon steel, galvanized nickel alloy
Working temperature	-40°C ~ +80°C

## PG-SL-P Single-line Injector

The Paguld PG-SL-P metering device is designed for use in high-pressure single-line lubrication systems, Modular design, compact structure, easy to install.

Each oil output is flexible and optional, each group of lubrication points work independently of each other, and the failure of individual oil points will not affect the normal work of other oil points, greatly improving the reliability of the system, extending the maintenance cycle of the system, especially for equipment requiring high reliability and difficult to maintain.



### Technical Parameters

Number of outlets	2-14□ 2-14 outlets
Maximum working pressure	350bar
Displacement of each outlet	0.1-0.7cc/ cycle (optional)
Inlet thread	G 1/4 inner thread
Outlet thread	M10*1 inner thread
Material	Carbon steel, galvanized nickel alloy
Working temperature	-40°C ~ +80°C

## Electric Grease Filling Tool

The TP-05/ TP-16 grease filling pump is driven by electric power. With the help of the DC brushless motor, it rotates to drive the plunger in the pump and transports the grease out with high pressure. It is characterized by high safety and reliability, large displacement, and simple operation; it can deliver grease up to NLGI 3#.

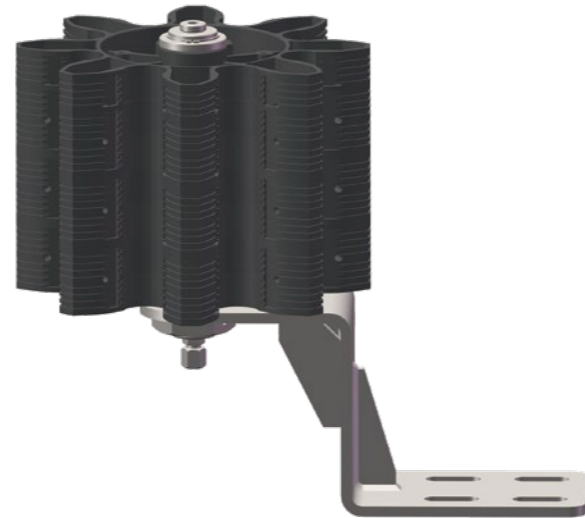


### Technical Parameters

Operating voltage	24VDC/220VAC
Motor power	500W
Grease barrels	5kg/15-20Kg standard barrel
Outlet of grease specification	G1/4 inner thread
Working temperature	-25°C ~ +80°C
Protection class	IP54
Reduction ratio	8:1/20:1
Maximum displacement	1.2L/minute@pump element *6 0.48L/minute@pump element *3

## Lubricating Pinion

Gear modular design, using laminated assembly structure, making the gear width flexible and optional; Gear through the internal structure to achieve the direction of grease, through reasonable installation can achieve continuous lubrication of the lubricating gear against the meshing surface, effectively prevent the grease dripping, increase the lubrication effect.



### Technical Parameters

Module	12/14/16/18/20/22/24/25
Gear width	40mm-240mm (Integer multiple of 20)
Pressure angle	20°
Modification coefficient	0
Number of teeth	8
Addendum coefficient	1
Working temperature	-40°C ~ +80°C

## Grease Collection Bottle

The Grease Collection Bottle is mainly used for the collection of waste grease in the bearing, and there are many types and specifications to choose according to the installation interface and installation space; Piston type grease collecting bottle greatly increases the convenience of waste grease collection and avoids environmental pollution.



### Technical Parameters

Thread specification	M10*1/M12*1.5/M14*1.5/M16*1.5/M18*1.5/M22
Volume	250mL/300mL/500mL/900mL/1000mL
Material	PE
Barometric balance	Piston, Vent valve

## PG-LC24 Intelligent Controller

The PG-LC24 intelligent controller can guarantee that the lubrication system is effectively controlled and provided with visual and auditory failure notifications. It is equipped with a digital display, which can visually identify the operating status and be used to set parameters, so as to quickly and effectively solve problems.

This controller is suitable for progressive, single-line, and double-line lubrication systems.



### Technical Parameters

Working voltage	10-30VDC
Working temperature	-15°C ~ +50°C
Maximum output current	7A
Maximum output current of alarm signal	3A
Overload protection	Available
Protection class	IP54
Communication interface	RS232/RS485

## Fitting and Accessories



Hose Fitting



Fitting



Pipe Clamp



Single Seal Type Quick Plug Fitting



Double Seal Type Quick Plug Fitting



Grease Return Device



Steel Wire Protective Sleeve

Screw Sleeve

Corrugated Pipe



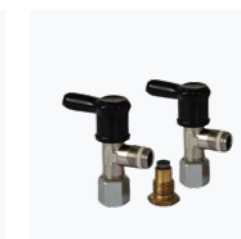
Hose



Manual Grease Guns



Pump Element



Safety Valve



Grease Filter

## Lubrication System Application in Wind Turbine

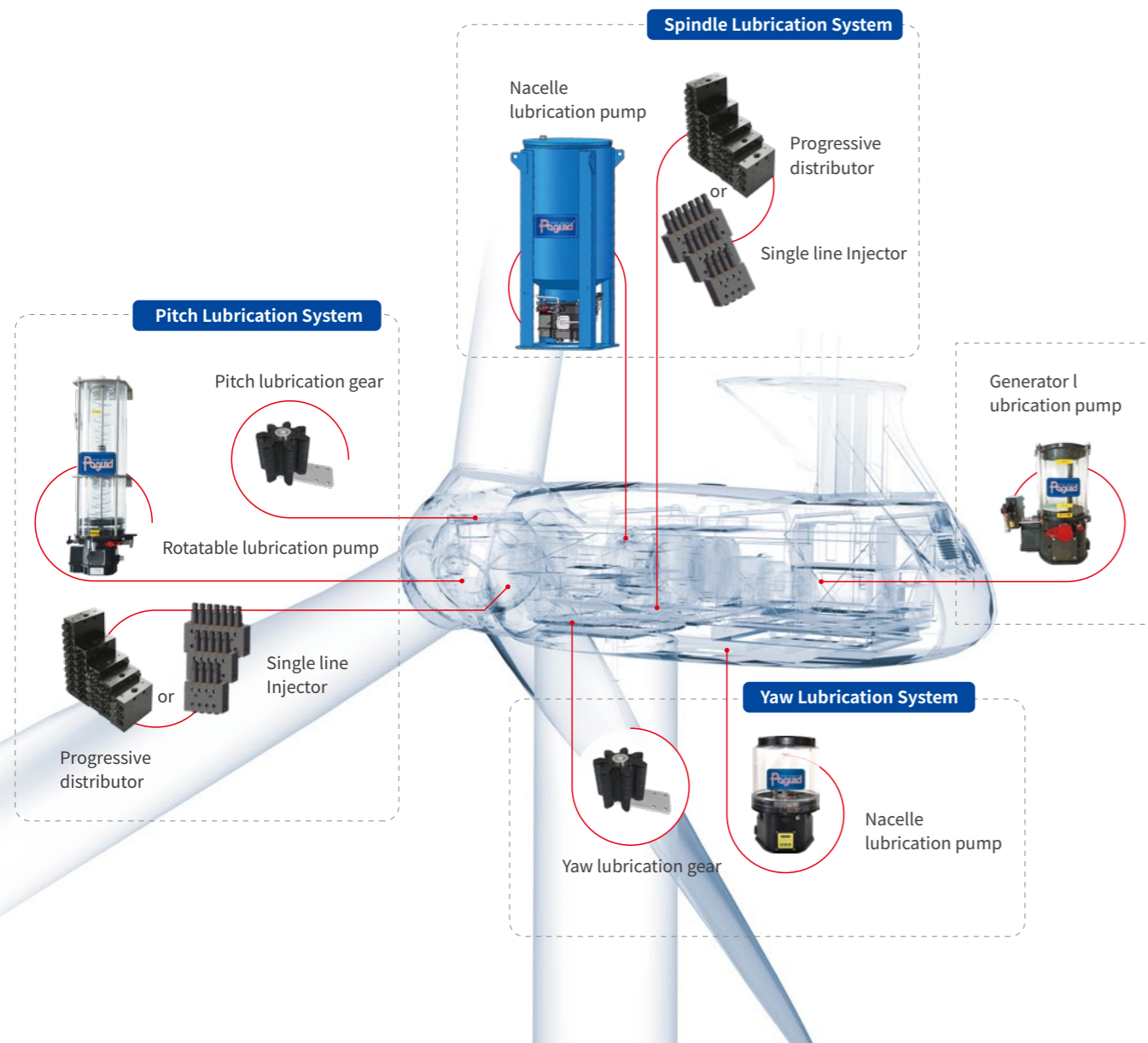
No matter how the wind turbine is designed, its bearings and gears must be properly lubricated. The correct centralized lubrication system can simplify service tasks, prolong the cycle interval of system maintenance, and protect the equipment in a variety of weather conditions. Costly, unplanned repairs and downtime are avoided and the life of the fan is extended. Studies have shown that the cost of lubrication systems can be recouped in a year.

### Application position

Bearing and gear of pitch system  
 Bearing and gear of yaw system  
 Main bearing system  
 Generator bearing system

### Lubrication system

Progressive lubrication system/single line lubrication system/lubrication pinion  
 Progressive lubrication system/single line lubrication system/lubrication pinion  
 Progressive lubrication system/single line lubrication system  
 Progressive lubrication system/single line lubrication system



**Vestas**

### Main application models

2MW/3MW/4MW/MK3E  
 Vidar 5MW/BM 15MW



### Main application models

2.5-132/3.X/5.3MW/Offshore

To be the world-class lubrication  
hydraulic system manufacturer and solution provider



**Main application models**

2.X/3.X/4.XMW Pitch Lock  
6.25MW/7MW offshore



**Main application models**

直驱Direct Drive:  
2.5MW/3.2MW/4.5MW/5MW/  
7MW/8MW/10MW

双馈Double-fed:  
2.0MW/3.6MW

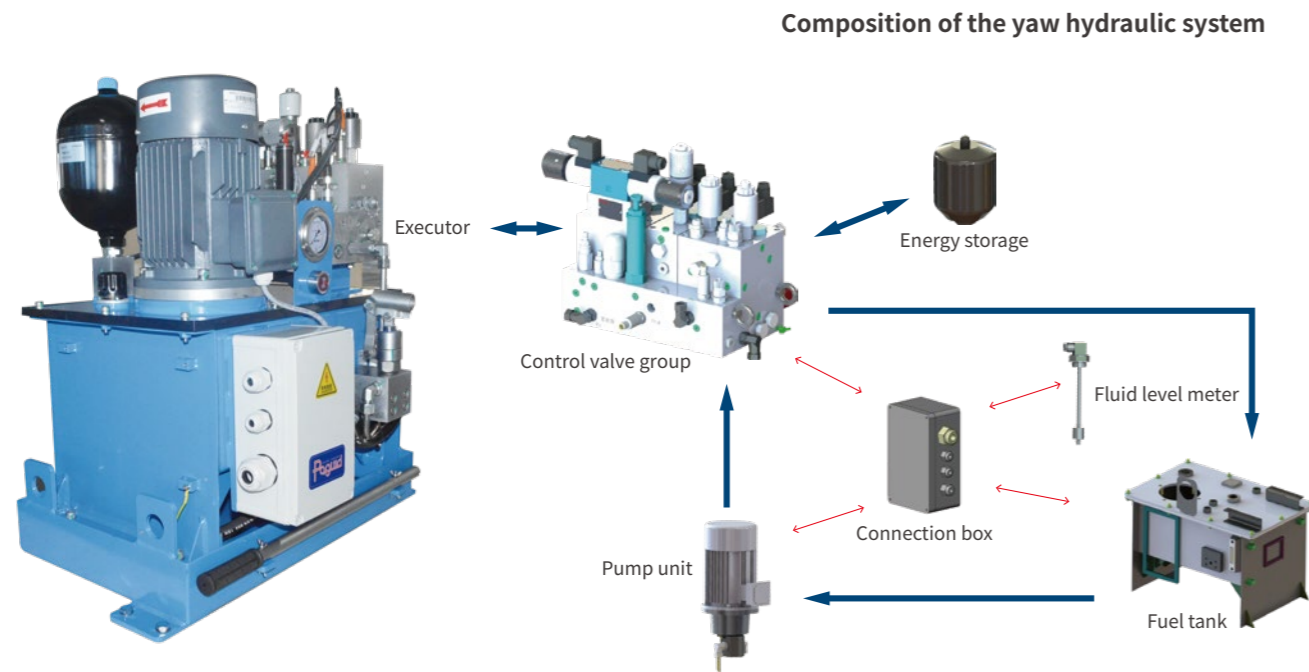
**液压产品**

**Hydraulic System and Components for Wind Turbine**





## Main Shaft + Yaw Brake Hydraulic Station



### Functional Characteristics:

Provide hydraulic power for the wind turbine set yaw brake, generator rotor brake, and impeller locking pin

- Releases the yaw brake and maintains a certain damping during the fan yaw, and achieves yaw brake braking at the end of the yaw;
- Controls the brake and release of the generator rotor brake;
- Controls the locking and release of the impeller locking pin;
- Good pressure protection performance, internal pressure drop  $\leq 5\text{bar}$  in 12h;
- Strong corrosion resistance, fuel tank reaches C4H, low temperature resistance  $-40^{\circ}\text{C}$ ;
- High reliability and compact structure;
- Long operating life, low failure rate and convenient maintenance.

## Pitch Systems in Wind Turbines

To adapt to the wind industry market, we has developed a variety of hydraulic pitch systems to provide clean, reliable and stable power sources, witch supply the power for the brake, rotorlock, and pitch cylinder. The power density is high and good pressure retention performance, and stable flow output.

### Main Advantage:

- Adapt to harsh wind power environment- good performance in high temperature and low temperature ;
- Suitable for harsh environments-offshore, desert, and high-altitude areas; strict anti-corrosion and dust-proof levels are required;
- Adapt to high-frequency periodic repetitive motion; low noise, matching with stabilized accumulator, stable operation;
- Adapt to the space requirements of the wind turbine cell, small size, compact design, and high degree of customization;
- Adapt to the characteristics of long life, high reliability and easy maintenance of wind power.



## Hydraulic Pitch Systems

Paguld manufactures a complete set of hydraulic pitch systems, which include high-efficiency, high-reliability hydraulic pump station; matching customized pitch block, Pitch cylinders with position feedback function, with an electrical systems, form a complete hydraulic pitch system. It can realize the precise angle control of the blades, so that the turbine can obtain the best performance in various working conditions.

### Product Features:

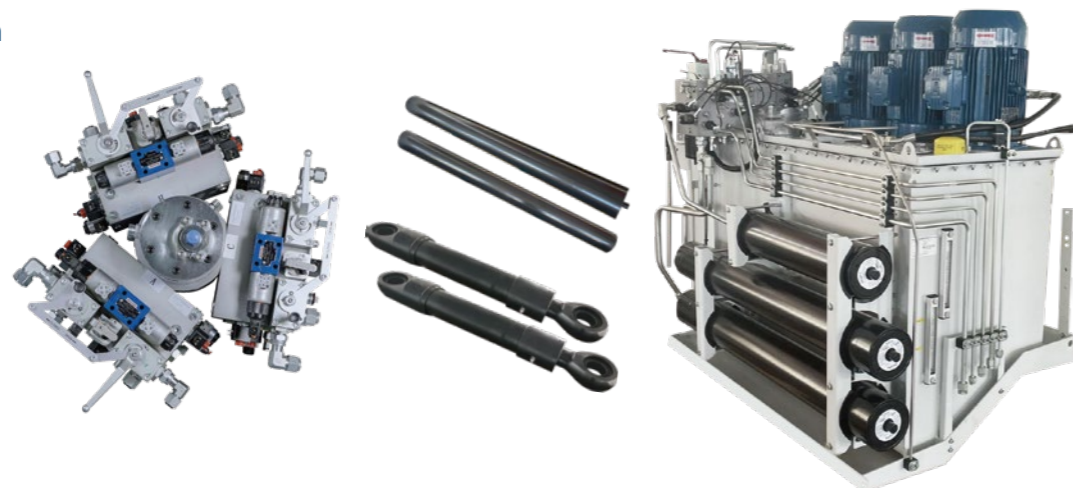
- Fast response speed and high reliability;
- The power density is large, but the smaller size design, can output more torque.  
For large-scale units, the hydraulic pitch drive capability is the best choice;
- Fewer mechanical parts, convenient for overhaul, diagnosis and maintenance;
- Hydraulic oil has better elasticity, so the cushioning performance is better;
- It can be restarted quickly after emergency shutdown;
- Various adaptation scenarios for onshore/offshore wind turbines;
- The whole life cycle cost is low, the maintenance cycle is long, and the speed change mechanism is not required.

### What is a good pitch system?

- High reliability and availability
- Fail safe emergency stop
- High power density
- Accuracy and torque
- Speed in pitch operation
- Protection against high wind
- Optimization of power production
- Curtailment of maximum power
- Performing cyclic pitch (large turbines)
- Climate challenges –high and low temperatures
- Rough conditions –offshore, sand, altitudes
- Easy to maintain and low Total Cost of Ownership (TCO)

### System composition

Hydraulic power units  
Manifolds  
Accumulators  
Cylinders  
Rotation unions  
Hoses and pipes  
Misc. equipment



## Pitch Power Package



6MW Pitch Power Package

Pressure: 280bar  
FLOW: 3X 24 L/MIN  
POWER: 3X11 KW  
Emergency power: 11KW, 200bar  
Cooling systems power: 2X5KW



8MW Pitch Power Package

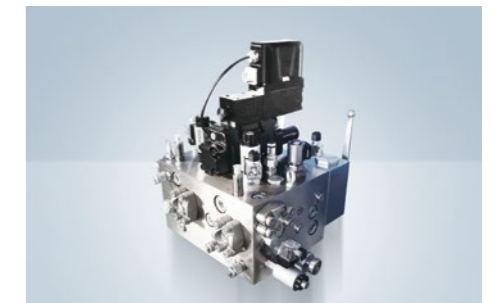
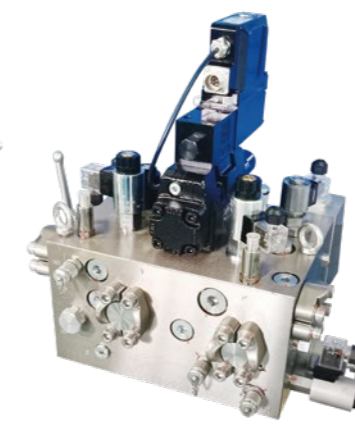
Pressure: 300bar  
FLOW: 3X 24 L/MIN  
POWER: 3X11 KW  
Cooling systems power: 2X5KW

## Pitch Manifold System

### Custom Valve Group



### Pitch Manifold Block



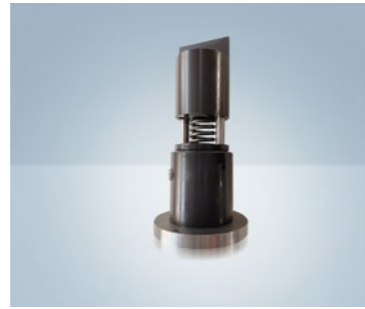
- Customized solutions according to customer requirements
- The valve block occupies a small space and it's the most economical weight design
- Neat and efficient installation plan

## Hydraulic Locking Pin

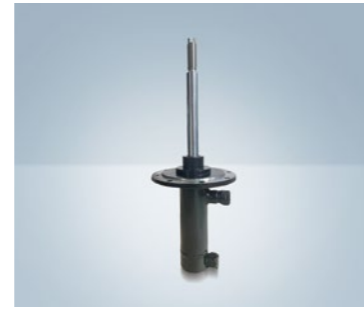
Manufacture hydraulic brake elements, which are widely used in wind turbine braking systems.



Rotorlock cylinder



Rotor lock cylinder



Pitch lock cylinder

## Hydraulic System



Gearbox lubrication system



Electro-hydraulic directional valves



Filter block



Hydraulic power unit

## Pitch Cylinder

### Use Environment:

- Design Temperature: -40~+80°C.
- Adapt to the marine environment requirements specified in IEC 61400-3-2009.



### Product Overview:

The pitch cylinder is a very critical executive element in a wind turbine. The cylinder is a double-acting cylinder, installed behind the gearbox, and used to adjust the position of the wind turbine blades to optimize the input power of the blades and reduce the rating. The output power above the wind speed acts as a pneumatic brake.

The pitch cylinder produced by our company has the characteristics of high reliability and long service life. Product design and materials are implemented in accordance with DNV specifications. The internal integrated high-precision displacement sensor and servo sealing system ensure the high frequency response and positioning accuracy of the oil cylinder, and cooperate with the pitch system produced by our company to achieve accurate control of the angle of the fan blades.

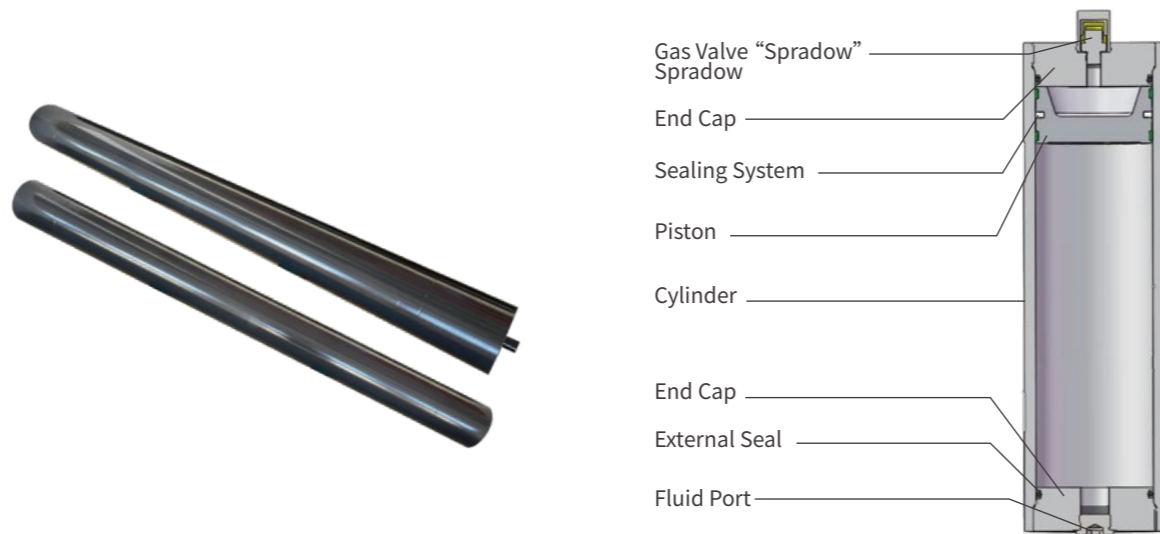
### Technical Parameters

Piston Diameter	200 mm
Rod Diameter	125 mm
Stroke	890 mm
Length when fully retracted	1401 mm
Joint bearing diameter	120 mm
Thickness of piston cavity joint	100 mm
Thickness of rod cavity joint	100 mm
Design Pressure	350bar
Allowable Speed of Cylinder	600mm/s
Hydraulic Medium	VG32

## Piston Accumulator

### Product Overview:

The Piston accumulator used in wind power equipment is widely used in the hydraulic system of wind power generator.



### Description Function:

- Fluids are practically incompressible and cannot therefore store pressure energy;
- The compressibility of a gas (nitrogen) is utilised in hydraulic accumulators for storing fluids. Paguld piston accumulators are based on this principle;
- A piston accumulator consists of a fluid section and a gas section with the piston acting as a gas-tightseparation element;
- The gas section is pre-charged with nitrogen;
- The fluid section is connected to the hydraulic circuit so that the piston accumulator draws in fluid when the pressure increases and the gas is compressed;
- When the pressure drops, the compressed gas expands and forces the stored fluid into the circuit.

### Technical Parameters:

- A cylinder with very finely machined internal surface;
- End caps on the gas side and the oil side, sealed with O-rings;
- A floating steel or aluminium piston which can easily be accelerated due to its low weight;
- A sealing system adapted to the particular field of application;
- Shell material options include alloyed steel, stainless steel, aluminium, titanium and composites;
- Accumulators operating from  $-45$  to  $+100^{\circ}\text{C}$  with pressures of up to 350 Bar and capacities of up to 200 litres;
- The accumulator is designed, manufactured and tested according to the PED (2014/68/EU) guidelines.

#### AC250-100 Series

Model	Volume(L)	Design Pressure(bar)	Working Temperature( $^{\circ}\text{C}$ )	L	D	d
AC250-100-014	1.4	250	$-40\sim 80$	312	120	100
AC250-100-028	2.8	250	$-40\sim 80$	490	120	100

#### AC350-140 Series

Model	Volume(L)	Design Pressure(bar)	Working Temperature( $^{\circ}\text{C}$ )	L	D	d
AC350-140-060	6.0	350	$-40\sim 80$	552	160	140
AC350-140-100	10	350	$-40\sim 80$	812	160	140
AC350-140-120	12	350	$-40\sim 80$	942	160	140
AC350-140-150	15	350	$-40\sim 80$	1136	160	140
AC350-140-160	16	350	$-40\sim 80$	1200	160	140
AC350-140-200	20	350	$-40\sim 80$	1460	160	140
AC350-140-250	25	350	$-40\sim 80$	1795	160	140

#### AC350-150 Series

Model	Volume(L)	Design Pressure(bar)	Working Temperature( $^{\circ}\text{C}$ )	L	D	d
AC350-150-060	6.0	350	$-40\sim 80$	510	170	150
AC350-150-100	10	350	$-40\sim 80$	740	170	150
AC350-150-120	12	350	$-40\sim 80$	850	170	150
AC350-150-150	15	350	$-40\sim 80$	1020	170	150
AC350-150-160	16	350	$-40\sim 80$	1078	170	150
AC350-150-200	20	350	$-40\sim 80$	1302	170	150
AC350-150-250	25	350	$-40\sim 80$	1585	170	150
AC350-150-299	29.9	350	$-40\sim 80$	1865	170	150

