

oil hydraulics
for defence industry

PONAR Wadowice is:

- the largest Polish producer of oil hydraulics elements and systems
- a supplier of a complete range of oil hydraulics
- the owner of modern machinery park
- a trusted company offering reliable solutions for all branches of industry
- a leader in oil hydraulic elements and systems
- a company with 50-years of market experience
- a team of experienced professionals
- the owner of two production plants and many regional branches

Areas of our activity:

Production and distribution of oil hydraulic elements:

- directional control and seated valves
- check valves, pressure control valves, flow control valves
- proportionally controlled elements
- intrinsically safe elements
- cartridge and mobile hydraulics
- hydraulic cylinders and hydraulic accumulators
- pressure switches
- filters and heat exchangers
- hydraulic fittings - couplings, pipes, flexible hoses

services:

- design, production, on-site assembly of hydraulic drive and control systems
- selection and supply of hydraulic components
- repairs and upgrades of hydraulic systems and machinery
- consultation and technical advice
- reliable and professional service



NCAGE Code 2994H (NATO)



AQAP 2110:2009



MSWiA concession B-030/2016



ISO 9001:2008, ISO 14001:2004



Certificates: ATEX, GOST-R, MakNII



Transport Directive 2000/9/EC



Pressure Directive 97/23/EC

We are the largest Polish producer of oil hydraulics elements and systems

To our Customers we offer a full range of services: from design, production, servicing to the final product. Our many years experience in the market of oil hydraulic is an asset in cooperation with the Customer.

We are always looking forward to satisfy the market needs by offering solutions which allows to use our products in various environments, which improve efficiency, safety and help to reduce costs.

Our professionalism is proven by numerous certifications and the quality is appreciated by the world's leading producers of machinery.

Fourth time in a row, PONAR Wadowice S.A. was awarded with a Platinum Certificate for the supplier of elements, components and products for Caterpillar.

■ OIL HYDRAULICS FOR SPECIAL APPLICATIONS

Oil hydraulics for temperatures from -40°C to + 50°C ...S0536

Products tested and compliant with defence industry standards:

NO-06-A101 ÷ NO-060A108

1. Directional control valves type 4WE6...12/G24.../S0536 with spools E, J, G, T
2. Pressure relief valves type DBDS6.../S0536
3. Check valves type S8.../S0536, Z2S6.../S0536, UZZR32-6A/S0536
4. Throttle valves type MG10.../S0536

Requirements:

Application of working fluid suitable for specific temperatures range (e.g. MIL-PRF-5606 in USA or H515, H520 NATO).

Oil hydraulics for temperatures from + 90°C –TROIPIK, ...S07

Products in TROPIC versions, where elements are zinc-coated or painted with an alkyd enamel, tropical cyclo-rubber, and electro-magnets EMSGT... of winding wire DNE acc. to PN/EN-60317-0-1

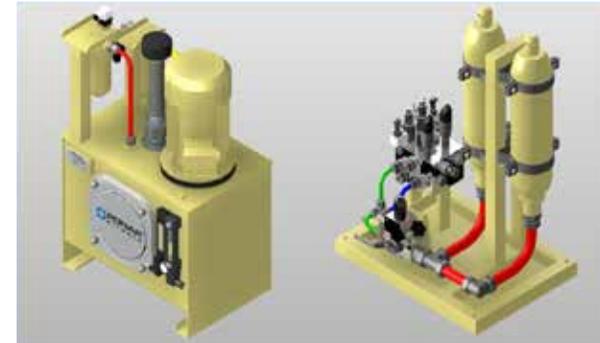
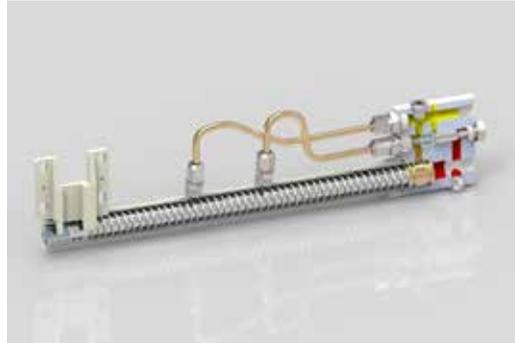
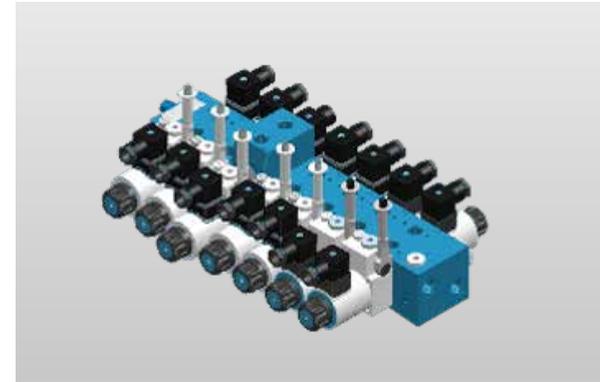
1. Directional control valves type 4WE6...12/.../S07
2. Directional control valves 4WE10...15/.../S07
3. Pressure relief valves type DBDS6, 10, 20.../S07, UZPD.../S07
4. Reducing valves type UZRC.../S07
5. Check valves type S.../S07, Z2S6, 10.../S07, UZSB.../S07
6. Flow controllers type 2FRM.../S07
7. Throttle valves type MK.../S07, MG.../S07

■ OIL HYDRAULICS FOR SPECIAL APPLICATIONS _____

Oil hydraulics in marine versions

Products in MARINE versions, in which the bodies and covers are painted with special alkyd enamel ALBA LUX and other elements are made of stainless steel.

1. Directional control valves type 4WMM6, 10.../SO15
2. Directional control valves type 4WE6, 10.../SO15
3. Check valves type Z2S6.../SO15
4. Throttle valves type Z2FS6.../SO15
5. Flow controllers type 2FRM10.../SO15



MOBILE HYDRAULIC DIAGNOSTIC STAND

Task: Proposition of application, and later a design and production of mobile hydraulic stand for testing hydraulic receivers (e.g. hydraulic cylinders, hydraulic motors, valves, pumps).

Solution: A mobile diagnostic stand for hydraulic systems, which consists of the following elements:

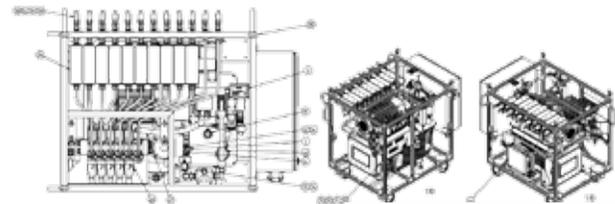
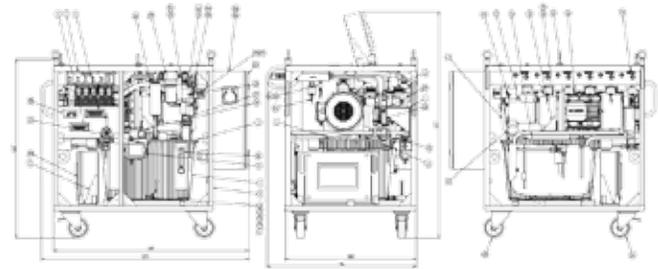
- pumps assembly 250 bar/35 lpm
- measuring system QpT (flow, temperature, pressure) at the supply thread
- measuring systems Qp at threads from the directional control valves block, in total 10 channels. It means that the Customer can check e.g. 5 cylinders or 5 hydraulic motors, or 10 other receivers
- a device for measuring cleanliness class of oil

For changing the direction of medium, for the first time a proportional multi-sectional directional control valve WREM was used. On a mobile unit a LCD panel was installed, where one can set the flow values, read all the QpT signals from the systems or check the cleanliness class of oil, acc. to norms: ISO, NAS, AS. The device was adjusted for continuous operation (installed heat exchangers) and within the temperature range -40°C to $+60^{\circ}\text{C}$.



Technical parameters:

- 25 MPa
- 40 dm³/min
- pumps assembly (constant power controller, pressure setting of pump reset, unloading the pump)
- measurement of oil temperature (T), oil pressure (P), flow rate (Q)
- monitoring of oil cleanliness - ICM
- independent control of operation of 5 receivers (hydraulic cylinders) by using proportional directional control valves
- manual control by means of a lever with a flap
- electric control - controller 20RC10E
- touch panel



■ SELF-PROPELLED ANTI-AIRCRAFT MISSILE SET

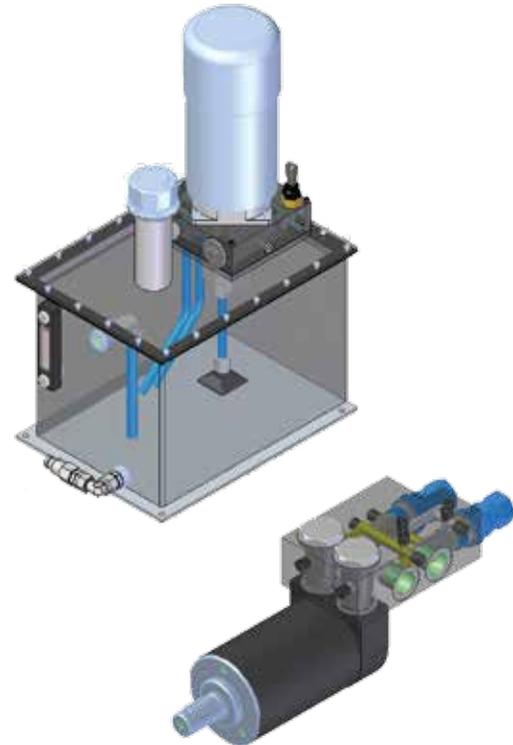
A hydraulic drive of lifting and locking of the head system, consisting of the following elements:

- powering unit/hydraulic power pack
- directional control valves block
- hydraulic cylinders and hydraulic motors as receivers

A new feature used in this application, introduced on Customer request, is application of electrical connections acc. to standard DEUTSCH (high IP) and emergency overriding with a lever.

Technical parameters:

- flow in the powering system: $\sim 10 \text{ dm}^3/\text{min}$
- pressure in the system: 13 MPa
- power of electric motor: 3 kW
- supply of electric motors: 24 VDC
- controlling current: 24 VDC
- medium: hydraulic fluid acc. to MIL-PRF-5606
- ambient temperature: $-40 \div 65 \text{ }^\circ\text{C}$
- size of the tank: 40 dm^3
- filtration precision: $6 \text{ }\mu\text{m}$



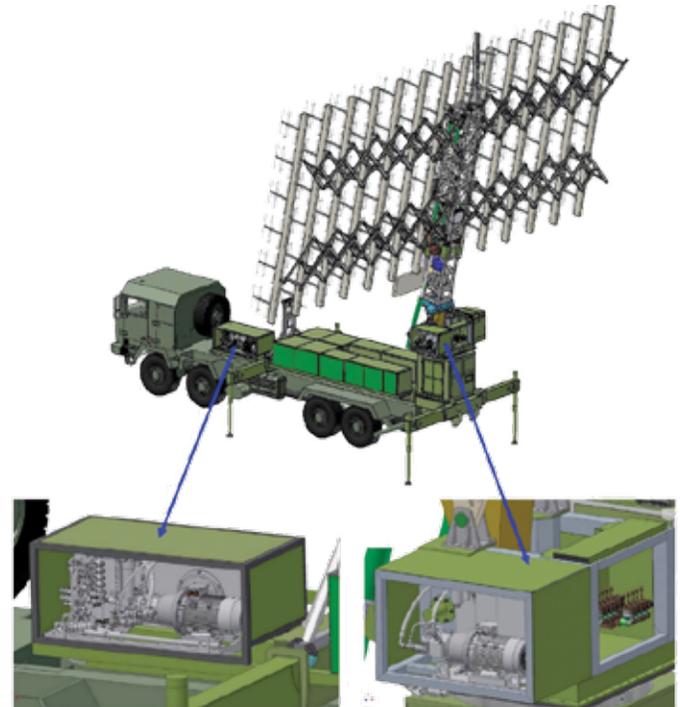


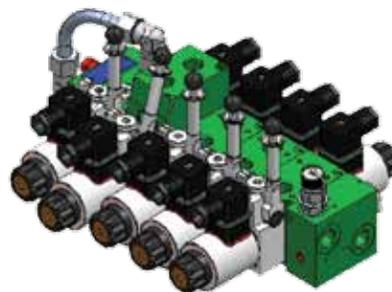
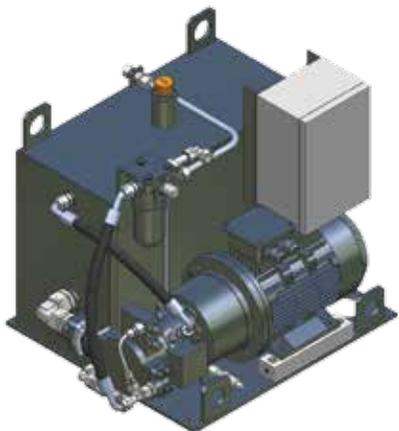
■ A LONG-RANGE RADIOLOCATION STATION

A long-range radar station on a chassis of vehicle Jelcz P882 D43 is the largest object of this type in Europe. The radar consists of two parts: a mobile transport platform and of a radio-location device. Each of these parts was equipped with a hydraulic power pack, independent from the power supply of the traction vehicle and hydraulic cylinders as working elements.

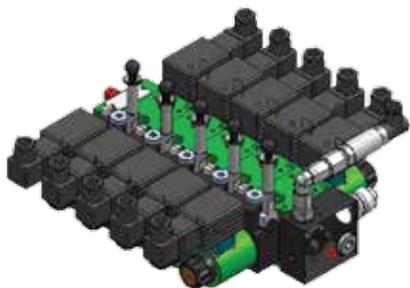
Transport device is a mobile base for installing a radio-location device. Transport and operation of the radar is performed in connection with the transport platform. During operation of the antenna, which turns 360°, the role of the platform is to provide stability to the radar set operation. The platform is equipped with hydraulic supports, automatically sliding, used for levelling the product of a weight of 32 tons. The movement scope of the supports allows for levelling the device: along the vehicle on uneven ground up to 3°, across the vehicle up to 4°.

Meeting the Customer needs for camouflage, hydraulic cylinders used in this product have a matt piston rod of a dark colour. The surface of piston rods are not chrome-covered as in traditional cylinders, but thanks to proper electro-chemical processing have special coated surface.

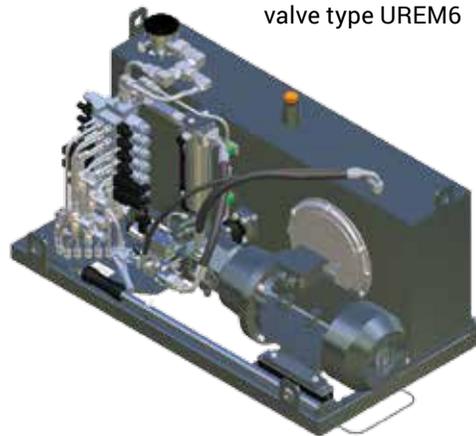




directional control
valve type UREM6



proportional directional
control valve type WREM6



■ SELF-PROPELLED HOWITZER 155MM

Within the scope of hydraulic system polonization for the howitzer 155 mm, PONAR Wadowice designed and manufactured a special hydraulic-pneumatic cylinder and a hydraulic power pack. The cylinder, also referred to as „Balancing element with a brake” performs two functions:

- cylinder of a balancing mechanism, providing a force counterbalancing the moment of rotation of the cannon in the axis of plugs, caused by the weight of the barrel system.
- hydraulic brake, used in connection with the lifting element to counteract the inertial forces effect of the swinging system.

The hydraulic power pack referred to as Hydraulic Power Supply provides hydraulic oil to the system at the proper pressure, with specific capacity.

Technical parameters:

- flow at the powering system: $\sim 8 \text{ dm}^3/\text{min}$.
- pressure in the system: 18,5 MPa
- electric motor power: 2,5 kW
- electric motor supply: 48 VDC
- power supply: 24 VDC
- oil temperature: $-40/+65^\circ\text{C}$





■ AUTOMATIC KDA CANNON SYSTEM

Operation and control system of the cannon (UKiSA) provides control of the working elements of the hydraulic equipment of the cannon: locking device, side of supplying the ammo switch, reloading of the cannon, trigger of the cannon and sensor of shell chamber state (full/empty).

A hydraulic lock delivered by PONAR Wadowice consists of a hydraulic power pack, hydraulic accumulator station with a safety block, directional control valves block.

Due to conditions of work, all of the hydraulic blocks are made of stainless steel, PONAR Wadowice valves were manufactured in "marine" versions (special materials, coatings and sealing).

An interesting fact is that our system before being installed on a ship, underwent all testing for compliance with defence standards NO-06-A101–NO-06-A108 (kinetic testing, durability tests and resistance to mechanical exposures, EMC testing).

The system was exposed to, among other factors: sinusoidal vibration, mechanical shocks, higher or lower ambient temperature, increased humidity, salt fog salt spray, condensing precipitation.





■ UNIVERSAL WATER CANNON 23MM

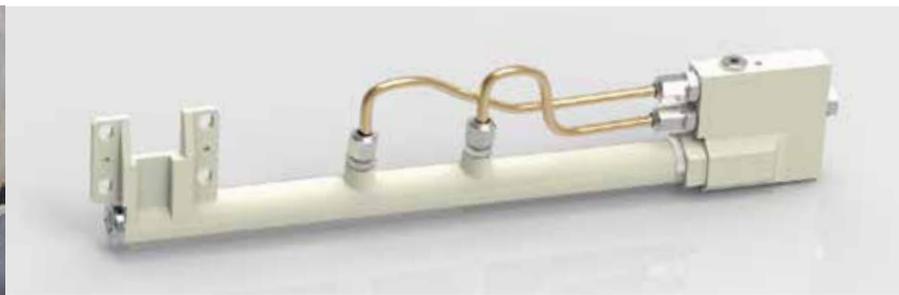
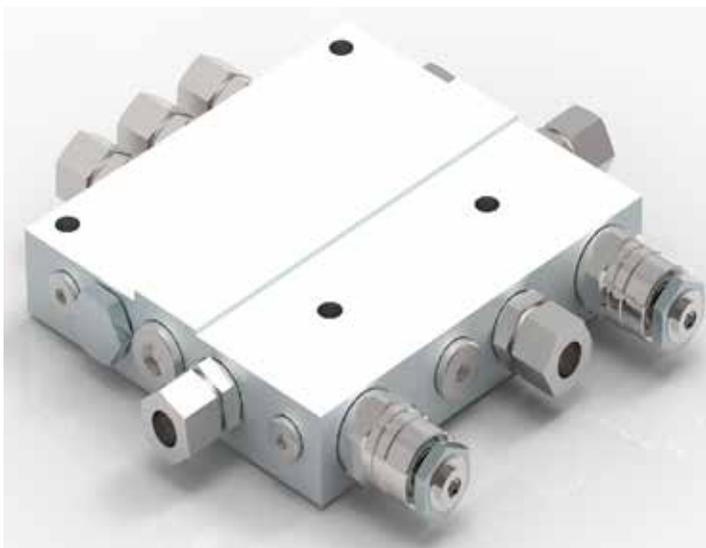
Modernization of a hydraulic system of marine cannon 23 mm was a significant challenge for PONAR Wadowice. On the one hand, we developed a new hydraulics, on the other hand, it had to cooperate with already existing mechanical elements of the cannon.

To suit the needs of the application, PONAR Wadowice constructed a new hydraulic power pack that had to fit the old space of the installation and also meet all the required parameters of work. PONAR Wadowice manufactured special reloading cylinders, valve blocks and directional control valves. The drive system in azimuth and elevation and the cannon reloading system created a new „Hydraulic drive of lifting and rotation for UNIVERSAL MARINE CANNON 23 MM”. In addition, PONAR manufactured a hydraulic installation on the towering system and provided support of technical service during the commissioning and start-up.

Technical parameters:

- nominal capacity of oil tank: 35 dm³
- pump capacity (first section) 13,7 cm³/obr.
- pump capacity (second section) 11,7 cm³/obr.
- nominal working pressure of the system 100 bar
- working temperature range: -40÷65°C





PONAR Wadowice Service:

- repairs and regeneration of hydraulic equipment

These are the primary activities of our service unit, provided for our own and third-party products. Only the parts and components of approved quality standards for mass-produced items are used in repairs and maintenance. When the task is completed, all the equipment is carefully inspected for compliance with the requirements for new products and is given a six months warranty.

- hydraulic systems diagnostics and upgrades

We offer our knowledge and experience in the area of technical operation and maintenance of hydraulic systems to ensure their long and reliable service; modernization and upgrades of old hydraulic systems.

This knowledge is supported with a high-quality equipment for taking dynamic measurements of pressure, flow and oil cleanliness..

- assembly and putting the system into service

The Company provides a professional installation and assembly of the elements and complete hydraulic systems. Special attention is paid to maintaining cleanliness during the entire work.

For performing diagnostics and assisting during the assembly and installation, dedicated service vehicles with proper equipment are used. After finishing the installation and putting the equipment into service, the Company ensures that a professional technical operation training is given to the users..

- consultation and technical advice

The Company provides technical advice in the areas of replacing of other manufacturers' equipment with the products of PONAR Wadowice S.A.; design, operation and application of hydraulic elements manufactured by PONAR Wadowice S.A.; trainings on technical operation and real-life maintenance of hydraulic components and systems.

Contact us:

PONAR Wadowice S.A.
Head Office in Wadowice
ul. Wojska Polskiego 29
34-100 Wadowice

tel. +48 33 488 21 00

fax +48 33 488 21 03

e-mail: export@ponar-wadowice.pl

you are welcome to visit our website: www.ponar.pl



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