

The background of the lower half of the page is a blue-tinted photograph of a factory interior. Several military vehicles, including what appear to be armored trucks and SUVs, are parked in a large, industrial space with high ceilings and structural beams. The lighting is somewhat dim, and the overall color palette is dominated by shades of blue.

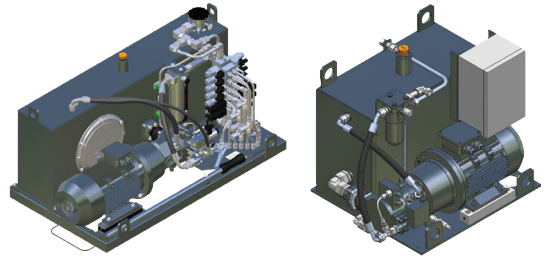
O I L
HYDRAULICS
F O R
D E F E N C E
I N D U S T R Y

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OIL HYDRAULIC POWER UNITS

Within the scope of the first project, we made a **hydraulic system**, consisting of, among other elements: of a **pump unit**, a **valve block** in a special version, **piston hydraulic cylinders** with double brake valves.

In order to implement the masking guidelines, the hydraulic cylinders used in this product feature a piston rod covered with a special dark coating.



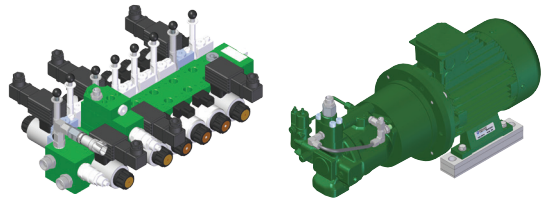
For the second product, we made a **hydraulic power unit** designed for lifting and unfolding structural elements.

The system consists of the following elements:

- a pump unit
- valve block
- oil tank
- piston hydraulic cylinders with mechanical brakes
- linear hydraulic cylinders
- rotary hydraulic cylinders.

Resistance to environmental conditions:

- work temperature: $-40^{\circ}\text{C} \div +50^{\circ}\text{C}$
- limit temperature: $-40^{\circ}\text{C} \div +65^{\circ}\text{C}$
- humidity: relative 95% +/- 3% at temp. 35 °C.



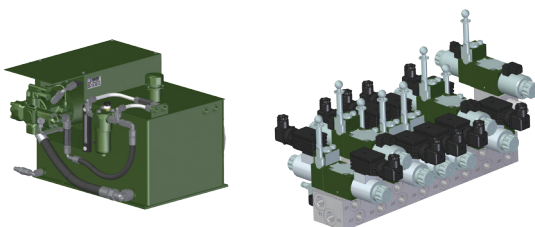
The hydraulic system built into the product is responsible for opening and closing two halves of the roof, and also for leveling the vehicle, raising and lowering the mast, as well as locking and unlocking the mechanisms.

The system consists of the following elements:

- a hydraulic power pack with a valve block
- rear leveling cylinders, piston/piston rod diameter 100/80mm, stroke 1150 mm
- front leveling cylinders, piston/piston rod diameter 100/80mm, stroke 800 mm
- antenna raising cylinder, piston/piston rod diameter 63/45mm, stroke 790 mm,

- roof opening cylinders, piston/piston rod diameter 50/36mm, stroke 398 mm
- hydraulic cylinder of a bolt
- swivel joint lock cylinder.

The project included the production and assembly of devices as well as hydraulic and mechanical start-up of individual elements.



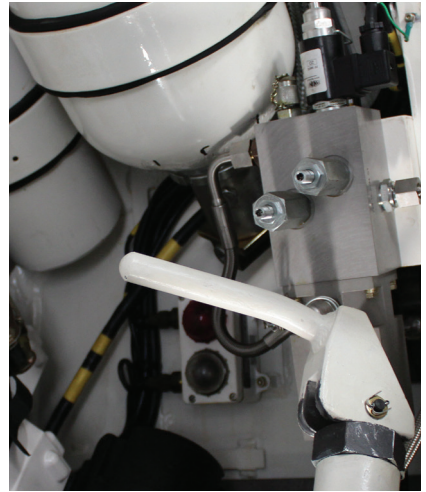
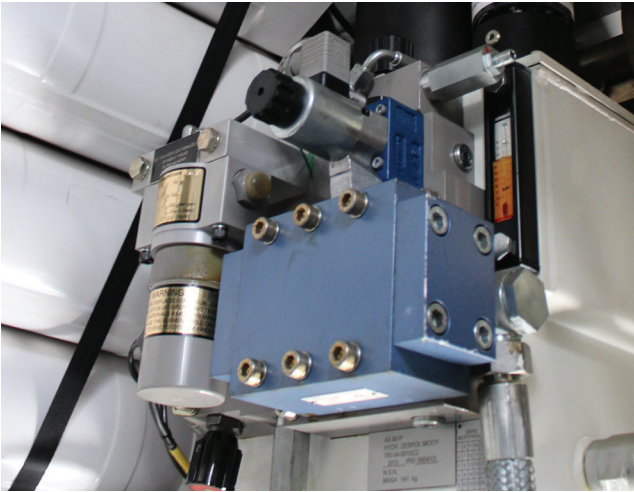
HYDRAULIC SYSTEM FOR A 155MM SELF-PROPELLED HOWITZER

PONAR Wadowice in cooperation with Huta Stalowa Wola S.A. designed and manufactured a cylinder and a hydraulic power pack for a 155 mm howitzer.

The cylinder called „balancing mechanism and a brake” performs the function of a balancing mechanism cylinder, providing a force counteracting the moment of rotation of the work relative to the axis of the trunnions.

It also functions as a hydraulic brake, used in conjunction with the lifting mechanism to counteract the effect of the inertia force of the swing assembly.

The hydraulic unit, called the „hydraulic power unit”, ensures that the system is supplied with hydraulic oil at the appropriate pressure, with appropriate efficiency.

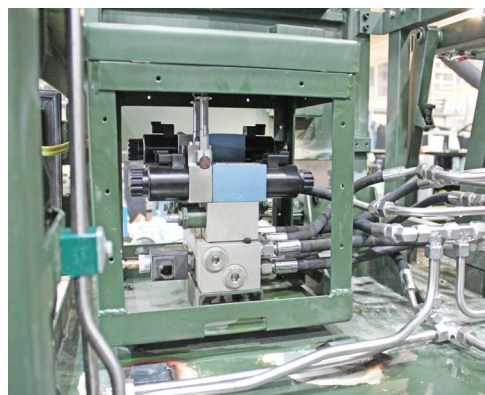


HYDRAULIC SYSTEM FOR ANTI-AIRCRAFT DEFENCE VEHICLES

Within the scope of the project PONAR Wadowice manufactured a hydraulic drive for lifting and bolting of the head unit, consisting of:

- a powering unit/hydraulic power pack
- a block of hydraulic valves
- hydraulic cylinders as actuators.

The application uses electrical connections made in accordance with the **DEUTSCH** standard (high IP) and slide valves equipped with levers for manual override of the device.



HYDROPNEUMATIC SUSPENSION FOR VEHICLES UP TO 25 AND 35T

PONAR Wadowice in cooperation with Huta Stalowa Wola S.A. developed a vehicle suspension systems that can be loaded with a maximum weight of 25 and 35 tons. The designed hydropneumatic rocker arms are an element acting as a damper in the suspension of the chassis.

One rocker is mounted on one wheel assembly. In the hydro-pneumatic suspension system, a gas spring is used to support the weight of the vehicle. A hydraulic and pneumatic mechanism is built into the rocker body to provide a twisting force around the axis of rotation. The air spring provides non-linear resistance to suspension deflection.

The vehicle clearance is regulated by the gas volume in the gas spring. The proper damping characteristics of the rocker arm movement are achieved through the appropriate design of the shock absorber. The design of the rocker arm allows it to be used in vehicles of various weights.

Proper characteristics are obtained by the appropriate nitrogen pressure in the gas chamber - filling through the gas valve and the selection of damping parameters of the shock absorber. When the suspension component is mounted on the vehicle, one can check and adjust the gas pressure in the spring system of each rocker arm to compensate for uneven vehicle weight distribution.

The shock absorber provides resistance to the rotational movement of the axle rocker, the amount of resistance being a function of the rotational speed of the rocker. The mechanical energy from the rotation of the driving arm is absorbed by the shock absorber and dissipated as heat to the environment.

Hydropneumatic rocker arms are tested on test rigs, where tightness tests, pressure tests of 970 bar, damping characteristics, tests at reduced temperature and resistance to vibration, humidity and salt fog are carried out.



HYDRAULIC SYSTEM FOR CLOSING THE LANDING BOARD WITH CYLINDERS



HYDRAULIC SYSTEM FOR FLOATING



ELEMENTS FOR OIL HYDRAULIC SYSTEMS

CABIN TILTING AND SPARE WHEEL HYDRAULIC SYSTEM

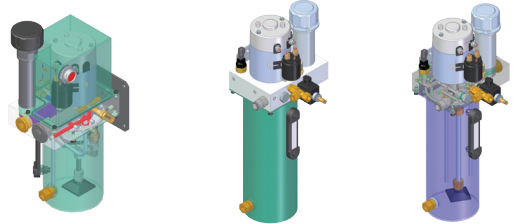
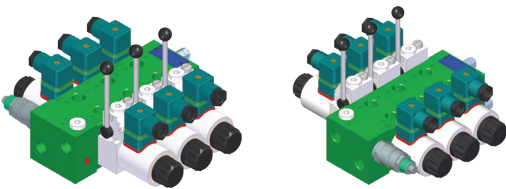
The system is mounted on a military chassis, highly mobile, intended for operation in very difficult field conditions.

The designed system meets the following requirements:

- temperatures range $-30\text{ }^{\circ}\text{C} \div +50\text{ }^{\circ}\text{C}$
- resistance to sinusoidal vibrations in the range of 40m/s^2 , 5-80Hz
- total resistance to increased humidity 95+3% at 35-40 °C
- longitudinal inclination $\pm 30^{\circ}$, lateral inclination 20° .

THE SYSTEM PROVIDES:

- the ability to automatically raise and lower the cabin and the spare wheel using the remote control. The time of raising the cabin is about 1 minute, the time of raising and lowering the spare wheel is about 30 seconds
- the ability to raise and lower the cabin and optionally a spare wheel using a hydraulic hand pump in the event of a power failure.



A SYSTEM FOR LIFTING AND LEVELING OF CONTAINERS

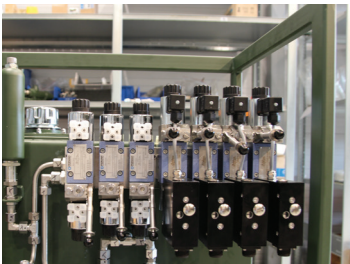
The system is installed inside the container structure elements, where the maximum total weight of the container is 12000 kg, and the lifting time is approx. 4 minutes.

The system uses a control system that enables:

- automatic operation and self-levelling of the container during unloading
- individual control of each of the main cylinders in manual mode
- control of the system from the operator panel and by means of a control cassette (wired or wireless)
- powering of individual cylinders by means of a built-in central hand pump (in the emergency state of the power supply system).

TECHNICAL CONDITIONS:

- ambient air temperature from -30°C (limit -40°C) up to $+50^{\circ}\text{C}$ (limit $+60^{\circ}\text{C}$)
- air humidity up to 98% at temperature up to $+25^{\circ}\text{C}$
- average air pollution 1g/m^3 at the height of 1,2 m in time up to 5 h,
- wind speed 30m/s
- the intensity of the ongoing rain 5 min. up to 180 mm/h
- resistance to low atmospheric pressure during air transport at an altitude of up to 12,000 m above sea level and salt fog (sea) during sea transport.



OIL HYDRAULICS FOR SPECIAL APPLICATIONS

- **FOR TEMPERATURES FROM -40°C TO +50°C ...S0536**

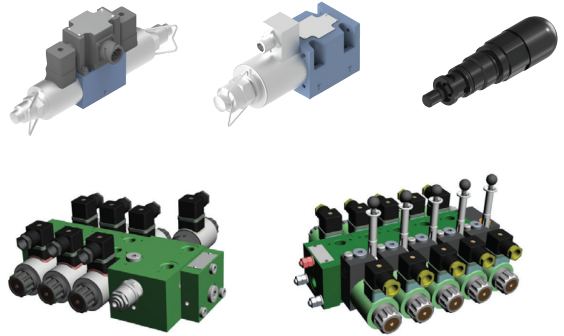
Products tested and compliant with defence standards: NO-06-A101 ÷ NO-060A108

- **IN VERSION UP TO + 90°C -TROIPIK, ...S07**

Elements of products in the TROIPIK version are galvanized or painted with phthalic enamel, tropical cyclorubber enamel, EMSGT... electromagnets are made of DNE winding wire in accordance with PN/EN-60317-0-1

- **IN MARINE VERSION**

Bodies and covers of products in marine versions are painted with ALBA LUX special alkyd enamel, while other elements are made of stainless steel.



SOLUTIONS FOR DEFENCE INDUSTRY

PONAR Wadowice S.A. products are used in many devices and applications for the defense industry. We offer complete special versions, designed to work in combat conditions, in extreme temperatures, high dustiness or humidity.

Our offer includes solutions tailored to the individual needs of our customers. We manufacture products based on documentation provided by the Customer or developed by our own design and construction department.

POWER OF PRECISION

PONAR Wadowice S.A. is the largest Polish manufacturer of hydraulic systems and components. The company consists of two main production plants: the plant in Wadowice, dealing with the production of hydraulic elements, and the plant in Łaziska Górne, producing oil hydraulic systems and high-pressure water systems.

TOP QUALITY

ISO 9001:2015, ISO 14001:2015

AQAP 2110:2016 - a certificate for armed forces suppliers

NCAGE - NATO Code of the National Economy Entity

MSWiA licence no. B-030/2016

ATEX - intrinsic safety certificate

Pressure Directive

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