



YOUR AIRCRAFT **OUR POWER**

**GROUND SUPPORT
EQUIPMENT**



1968

establishment of Experimental Production Works of the Military University of Technology which is continued by WCBKT S.A.– Central Military Bureau of Design & Technology

FOR MORE THAN 50 YEARS

the company has been focused on designing and manufacturing of modern defense equipment for the Polish Armed Forces. We have met the needs of the Polish Armed Forces in many respects, from the construction of lasers and electron microscopes (among others the first in Poland mirror electron microscope ZME-2) to training equipment and ground support equipment (GSE).

TRAINING EQUIPMENT

we offer comprehensive trainers for crew training for users of T-72, PT-91 tanks and BMP-1 combat vehicles.

THE ONLY COMPANY IN POLAND

that designs and manufactures comprehensive range of ground support equipment (GSE) for the Polish Armed Forces • ground power units • hydraulic power units • oxygen, nitrogen and air distributors • oxygen and nitrogen gasifiers • air compressors • dehumidifiers • lighting towers • tow tractors • diagnostic devices • high-pressure flexible hoses

2008

WCBKT S.A.

transformation of WCBKT into a state-owned company named WCBKT S.A.

2010

REMOTE DIAGNOSTICS SYSTEM ONLINE

we are developing a system that enables constant control of the device operation, regardless of its location The system ensures failure-free operation, minimizing the probability of unforeseen failures and thus reducing the costs of operating GSE.

2014

CIVIL MARKET

we start our activity on the civil market by offering GPU TAURUS 7/90 power supplies. As the first manufacturer of this type of device in the world, we equip it with an online remote diagnostics system and a desktop with a touch screen. These power supplies are used by Polish trading companies to supply energy for airplanes such as Antonov AN-225 Mrija, AN-124 Ruslan, Boeing 787-9 Dreamliner, Bombardier Q400 and Air Force One.

PGZ S.A.

WCBKT S.A. joins Polish Armaments Group SA.

2017

STOPFIRE®

we implement STOPFIRE® – Fire Extinguishing and Explosion Suppression System in tanks and combat vehicles. The author of the detection subsystem is the Military University of Technology in Warsaw.

2018

EQUIPMENT FOR AIRFIELDS AND HANGARS

we introduce to our offer hangar and airport equipment, including passenger stairs, maintenance stairs, luggage trailers, trailers for pallets and containers, ULDs pallet racks as well as modern and fully equipped technological lines for CARGO terminals.

CDiSS NOSP

Ground Support Equipment (GSE) Delivery and Maintenance Center (CDiSS NOSP) starts to operate in the structures of WCBKT S.A. Its main purpose is to comprehensively ensure the availability and operability of equipment for all types of aircraft operated by the Polish Armed Forces.

2019

WIRST

we start work on the WIRST virtual training system. These are holographic glasses for training in the use of GSE devices with built-in software that uses augmented reality (AR) technology.

2020

e-NOSP

we are improving the online remote diagnostics system by developing, together with the Air Force Institute of Technology, e-NOSP, the Network-Centric System for Managing the Readiness of GSE Devices with the use of data teletransmission.

QUALITY MANAGEMENT

ISO 9001:2015

AQAP 2110:2016

INTERNAL INSPECTION SYSTEM

NATO COMMERCIAL AND GOVERNMENT ENTITY CODE NCAGE 0791H



GROUND POWER UNIT LUZES V/D SERIES V

- built on the chassis of the JELCZ 442.32 off-road vehicle
- designed for powering onboard aircraft systems, engine start-up and the onboard equipment technical condition checks anywhere in the airport or landing site
- mounted on a standard 15 ft. container frame with which it can be installed on any truck
- can simultaneously power two aircraft
- no external power source required
- mobile device driven by a diesel engine
- the ability to control via tablet
- adapted for air transport

TACTICAL AND TECHNICAL FEATURES

- the unit is able to simultaneously provide two types of energy 28V d.c. and 115V a.c. during **aircraft technical inspection**
- 28V d.c. (operates two aircraft simultaneously)
- 3-phase a.c.; voltage 115/200V 400Hz (operates two aircraft simultaneously)
- 1-phase a.c.; voltage 115V 400Hz (operates two aircraft simultaneously)
- 3-phase a.c.; voltage 3x36V 400Hz (operates one aircraft)
- during **aircraft engine startup**
- voltage 28V d.c.(operates two aircraft – one after the other)
- 3-phase a.c. voltage; 115/200V 400Hz (operates two aircraft – one after the other)

TECHNICAL PARAMETERS

OUTPUT A.C. PARAMETERS

3-phase rated voltage	3x115/200V, 400Hz, 4 wire, 2 sides
voltage regulation scope	112V ÷ 118V
continous power	125KVA for cos φ 0,8-1 at 40°C
intermittent power	110% of continous power for 1h, every 6h at 40°C
rated phase current	360A (260A on 1 wire)
max. phase current	400A (290A on 1 wire)
1-phase rated voltage	1x115V, 400Hz, 2 wire, 2 sides
rated current	50A
3-phase rated voltage	3 x 36V, 400Hz, 3 wire, 1 side
rated current	25A

OUTPUT D.C. PARAMETERS

rated voltage	28V, 2 sides
voltage regulation	26V ÷ 29V
rated current	800A
max. current (for 30 sec)	1800A
max. current (for 4 sec)	2500A

OVERALL PARAMETERS

length	7700 mm
width	2550 mm
height	2900 mm
wheelbase	4100 mm
front whel track	2000 mm
rear wheel track	2000 mm
clearance	400 mm
fuel type	diesel, kerosene or biofuel
entry and descent angle	35°
chassis weight	8800 kg
container weight	3900 kg

TRACTION PARAMETERS

max. speed	110/85 ADR km/h
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STANDARDS

- MIL-STD-704 F_CHG-1, AIRCRAFT ELECTRIC POWER CHARACTERISTIC
- ISO 6858:2017 AIRCRAFT – GROUND SUPPORT ELECTRICAL SUPPLIES
- IATA AIRPORT HANDLING MANUAL (AHM) 40th



GPU LUZES V/D on the chassis of the JELCZ 442.32 off-road vehicle



GROUND POWER UNIT LUZES V/N SERIES IV

- designed for powering onboard aircraft systems, engine start-up, and the onboard equipment technical condition checks
- mounted on a standard 15 ft. container frame which can be installed on low chassis
- built on a chassis adapted for towing anywhere in the airport or landing site and on public roads with a maximum speed 90 km/h
- mobile device driven by a multi-fuel diesel engine
- adapted for air transport



TECHNICAL PARAMETERS

OUTPUT A.C. PARAMETERS

3-phase rated voltage	3x115/200V, 400Hz, 4 wire, 2 sides
voltage regulation range	112V ÷ 118V
continuous power	125kVA for cos φ 0,8-1 at 40°C
intermittent power	110% of continuous power for 1h, every 6h at 40°C
rated phase current	360A (260A on 1 wire)
max. phase current	400A (290A on 1 wire)
1-phase rated voltage	1x115V, 50A, 400Hz, 2 wire, 2 sides
voltage regulation	112V ÷ 118V
3-phase rated voltage	3 x 36V, 400Hz, 3 wire, 1 side
rated voltage	28V, 2 sides
voltage regulation	26V ÷ 29V
rated current	800A
max. current	1800A (for 30 sec) 2500A (for 4 sec)

OVERALL PARAMETERS

length	7080 mm with tow, 4630 mm without tow
width	2550 mm
height	2500 mm
wheelbase	3100 mm
chassis weight	3800 kg
container weight	4000 kg

TRACTION PARAMETERS

max. speed	110/85 ADR km/h
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DISPENSING CABLES

length	20 m
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TACTICAL AND TECHNICAL FEATURES

the unit is able to simultaneously provide two types of energy 28V d.c. and 115 V a.c.

during aircraft technical inspection

28V d.c. (operates two aircraft simultaneously)

3-phase a.c.; voltage 115/200V 400Hz (operates two aircraft simultaneously)

1-phase a.c.; voltage 115V 400Hz (operates two aircraft simultaneously)

3-phase a.c.; voltage 3x36V 400Hz (operates one aircraft)

during aircraft engine startup

28V d.c. (operates two aircraft – one after the other)

3-phase a.c.; voltage; 115/200V 400Hz (operates two aircraft – one after the other)

STANDARDS

- MIL-STD-704 F_CHG-1, AIRCRAFT ELECTRIC POWER CHARACTERISTIC
- ISO 6858:2017 AIRCRAFT GROUND SUPPORT ELECTRICAL SUPPLIES
- IATA AIRPORT HANDLING MANUAL (AHM) 40th



GROUND POWER UNIT LUZES II/M SERIES VI

- designed to power on-board aircraft systems with a.c. and d.c. power
- built on a chassis adapted for manual rolling and towing with maximum speed up to 25 km/h
- designed for powering onboard aircraft systems, engine startup and onboard equipment technical condition checks with access to 3x400V/50Hz power source with a nominal load of 125 anywhere in the airport or landing site
- adapted for air transport



TECHNICAL PARAMETERS

POWER SOURCE PARAMETERS

LUZES II/M series VI is powered from two sources 230 V/400V a.c. 50Hz with rated current 125A (each), 5 wire TN-S power supply. The unit can also be powered from one source with a nominal power limitation of 50 %.

OUTPUT A.C. PARAMETERS

3-phase rated voltage	3 x 115/200V, 400Hz, 4 wire, 2 sides
voltage regulation range	112V ÷ 118V
continuous power	90 kVA, 1 side for cos φ 0,8-1 at 40°C
rated phase current	260A on 1 wire, 1 side
maximum current in phase	4 x In on 1 wire for 1 sec
1-phase rated voltage	1x115V, 400Hz, 2 wire, 2 sides
rated current	52A on 1 wire, 2 sides
3-phase rated voltage	3 x 36V, 400Hz, 3 wire, 1 side
rated current	25A

OUTPUT D.C. PARAMETERS

rated voltage	28V, 2 sides
voltage regulation	26V ÷ 29V
rated current	800A, 2 sides
max. current	1800A (for 30 sec), 2500A (for 4 sec)

OVERALL PARAMETERS

length	2900 mm
width	1827 mm
height	1628 mm
weight	3200 kg

TACTICAL AND TECHNICAL FEATURES

the unit is able to simultaneously provide two types of energy 28V d.c. and 115V a.c.

during aircraft technical inspection

28V d.c. (operates two aircraft simultaneously)

3-phase a.c.; voltage 115/200V 400Hz (operates two aircraft simultaneously)

1-phase a.c.; voltage 115V 400Hz (operates two aircraft simultaneously)

3-phase a.c.; voltage 3x36V 400Hz (operates one aircraft)

during aircraft engine startup

28V d.c. (operates two aircraft – one after the other)

3-phase a.c.; voltage 115/200V 400Hz (operates two aircraft – one after the other)

STANDARDS

- ISO 6858:2017 AIRCRAFT GROUND SUPPORT ELECTRICAL SUPPLIES



GROUND POWER UNIT LZE-6/M SERIES III

- designed for powering the on-board aircraft systems with d.c. power during engine start-up and the on-board equipment technical condition checks
- electrically powered and designed for use in a hangar and on airfield area
- can be transported manually (pushed) by two people and behind the vehicle at a speed not exceeding 15 km/h



TECHNICAL PARAMETERS

POWER SOURCE PARAMETERS

powered from a 3-phase TN-S or TN-C a.c. power network equipped with a residual current breaker

acceptable changes of supply voltage +10% ÷ -15%

rated voltage 3 x 400V

rated phase load 42A

power factor 0,96

rated frequency 50Hz

OUTPUT PARAMETERS

rated power 22,4kW

rated voltage 28V d.c.

rated current 800A d.c.

max. current (for 4 sec) 2500A d.c.

CABLES

dispensing cables length 2 x 16,5 m

power cable length 60 m

OVERALL PARAMETERS

length (tow rod in vertical position) 1300 mm

length (tow rod in horizontal position) 2100 mm

width 1200 mm

height 1040 mm

height with power source cables 1180 mm

weight with no cables 410 kg

weight with cables 580 kg

TACTICAL AND TECHNICAL FEATURES

the unit is powering systems of the aircraft

during aircraft engine startup

28V d.c. (operates one aircraft)

during aircraft technical inspection

28 V d.c. (operates two aircrafts simultaneously)

CERTIFICATES & STANDARDS

- CE
- PN-EN 12312-20 / PN-EN 1915-1 / PN-EN ISO 14121-1
- IATA AHM-972



AIRFIELD NITROGEN DISTRIBUTOR LDA/N

- designed for filling aircraft systems with compressed nitrogen
- includes a closed body containing systems and units for nitrogen compression, storage, purification and discharge
- single modular low-chassis container adapted for towing behind the vehicle on the roads of airports and airfields with maximum speed 20 km/h
- adapted for air transport



TECHNICAL PARAMETERS

medium	technical nitrogen
number of cylinders	8 pcs, 2 groups of 4 cylinders
cylinders capacity	50dm ³
gas reserve in cylinders at pressure 35MPa	140m ³ (127,5 kg)
safety valve opening pressure	36 MPa
maximum working pressure in cylinders	35 MPa
discharged nitrogen operating pressure	infinitely adjustable from 0 to 9,3 MPa infinitely adjustable from 0,3 to 35 MPa
compressor engine power	12kW
distributor capacity ambient temperature + 20°C, gas pressure in suction line 12 MPa	≥120 m ³ /h
„dew point“ at pressure 0,1 MPa	no more than -55°C
discharged nitrogen temperature	≤ +70°C

EXTERNAL PARAMETERS

length	3700 mm
width	1780 mm
height	1600 mm
length with tow rod	5580 mm
track of wheels	1430 mm
wheelbase	2720 mm
weight with full gas cylinders and fuel tank	3500 kg

CRITICAL PARAMETERS

discharged nitrogen parameters	according to PN-91/L-01262
operating temperature	-30°C ÷ +55°C
continuous compressor operation duration	max. 4h



YOUR AIRCRAFT
OUR POWER



AIRFIELD AIR DISTRIBUTOR LDP/N

- designed for filling aircraft systems with compressed air
- includes a closed body containing systems and units for air compression, storage, purification and discharge
- single modular low-chassis container adapted for towing behind the vehicle on the roads of airports and airfields with maximum speed 20 km/h
- adapted for air transport



TECHNICAL PARAMETERS

gas type	technical air
output gas temperature	≤ +70°C (at outside temperature +50°C)
number of cylinders	20 pcs, 5 groups of 4 cylinders
single cylinder capacity	50 dm ³
maximum working pressure in cylinders	35 MPa
safety valve opening pressure	36 MPa
gas dispensing installation	adjustable gas pressure, 2 output modes 0,07÷10 MPa and 0,3÷35 MPa
distributor filling	adapted for filling from an external source of compressed air (eg. LSP/N compressor)

OVERALL PARAMETERS

length	3840 mm
width	1780 mm
height	1530 mm
length with tow	5720 mm
truck of wheels	1500 mm
wheelbase	2720 mm
weight with full bottles	3540 kg

CRITICAL PARAMETERS

output air parameters	according to PN-91/L-01261
cylinder battery capacity at pressure 35 MPa	350 m ³ (~450 kg)
operating temperature	-30°C ÷ +55°C



AIRFIELD OXYGEN DISTRIBUTOR LDT/N

- designed for filling aircraft systems with compressed oxygen
- includes a closed body containing systems and units for oxygen compression, storage, purification and discharge
- single modular low-chassis container adapted for towing behind the vehicle on the roads of airports and airfields with maximum speed 20 km/h
- adapted for air transport



TECHNICAL PARAMETERS

medium	gaseous oxygen
number of cylinders	8 pcs, 2 groups of 4 cylinders
single cylinder capacity	45 dm ³
gas reserve in cylinders at pressure 15MPa	50 m ³
safety valve opening pressure	17 MPa or 18 MPa (depending on the version)
maximum working pressure in cylinders	16,5 MPa
discharged oxygen operating pressure	15 MPa, 3 MPa
compressor engine power	12kW
distributor capacity ambient temperature + 20°C, gas pressure in suction line 12 MPa	≥85 m ³ /h
„dew point“ at pressure 0,1 MPa	no more than -55°C
discharged oxygen temperature	≤ +70°C

OVERALL PARAMETERS

length	3700 mm
width	1780 mm
height	1550 mm
length with tow rod	5580 mm
track of wheels	1430 mm
wheelbase	2720 mm
weight with full gas cylinders	3300 kg

CRITICAL PARAMETERS

discharged oxygen parameters	according to PN-93/L-01267
operating temperature	-30°C ÷ +55°C
continuous compressor operation duration	max. 4h



AIRFIELD OXYGEN DISTRIBUTOR LDT/N

- designed for filling aircraft systems with compressed oxygen
- installed on the homologated chassis
- adapted for air transport



TECHNICAL PARAMETERS

medium	gaseous oxygen
number of cylinders	8 pcs, 2 groups of 4 cylinders
single cylinder capacity	45 dm ³
gas reserve in cylinders at pressure 15MPa	50 m ³
safety valve opening pressure	17 MPa or 18 MPa (depending on the version)
maximum working pressure in cylinders	16,5 MPa
discharged oxygen operating pressure	15 MPa, 3 MPa
compressor engine power	12kW
distributor capacity ambient temperature + 20°C, gas pressure in suction line 12 MPa	≥85 m ³ /h
„dew point“ at pressure 0,1 MPa	no more than -55°C
discharged oxygen temperature	≤ +70°C

OVERALL PARAMETERS

length	6590 mm
width	2460 mm
height	2150 mm

CRITICAL PARAMETERS

discharged oxygen parameters	according to PN-93/L-01267
operating temperature	-30°C ÷ +55°C
continuous compressor operation duration	max. 4h



AIRFIELD NITROGEN GASIFIER LGA/N

- designed for gasification of liquid nitrogen for filling dispenser cylinders and external cryogenic tanks with gaseous nitrogen
- it also allows the filling of portable tanks with liquid nitrogen
- single modular low-chassis container adapted for towing behind the vehicle on the roads of airports and airfields with maximum speed 20 km/h
- adapted for air transport



TECHNICAL PARAMETERS

power supply parameters	TN-C or TN-S three-phases a.c. mains or a power generator with the following parameters: 3x400V + 6%-10%, 50Hz±0,5Hz, max.40kVA main protection in the form of time delay fuse Izn≥80A Izn≥80A
medium	liquid nitrogen
product after gasification	gaseous nitrogen
liquid nitrogen tank capacity	432 dm ³
working pressure in the gasifier tank	≤ 1,4 MPa
opening pressure of high pressure safety valve	38,5 MPa
opening pressure of the liquid nitrogen tank safety valve	1,4 MPa

LIQUID NITROGEN DISCHARGE INSTALLATION

max. filling pressure of portable tanks with liquid nitrogen	1,4 MPa
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GAS DISPENSING INSTALLATION

ABILITY TO WORK IN AUTOMATIC MODE

max. pressure of gaseous nitrogen discharged from the installation	≤ 35 MPa
gasifier capacity measured on the gaseous nitrogen release board (ambient +20°C, output pressure 35 MPa)	min.125 m ³ /h
discharged nitrogen „dew point“ at pressure 0,1 MPa	no more than -55°C
max. discharged nitrogen temperature	≤ +70°C

OVERALL PARAMETERS

length	4000 mm
width	1780 mm
height	1590 mm
length with tow rod	5900 mm
track of wheels	1315 mm
wheelbase	3040 mm
weight with full liquid nitrogen tank	2757 kg
weight with empty liquid nitrogen tank	2410 kg

CRITICAL PARAMETERS

parameters of gaseous nitrogen	according to PN-93/L-01262
output parameters	according to PN-C-84919
operating temperature	-30°C ÷ +55°C





AIRFIELD OXYGEN GASIFIER LGT/N

- designed for gasification of liquid oxygen for filling dispenser cylinders and external cryogenic tanks with gaseous oxygen
- it also allows the filling of portable tanks with liquid oxygen
- single modular low-chassis container adapted for towing behind the vehicle on the roads of airports and airfields with maximum speed 20 km/h
- adapted for air transport



TECHNICAL PARAMETERS

power supply parameters	TN-C or TN-S three-phases a.c. mains or a power generator with the following parameters: 3x400V + 6%-10%, 50Hz±0,5Hz, max.40kVA main protection in the form of time delay fuse I _{zn} ≥80A
medium	liquid oxygen
product after gasification	gaseous oxygen
liquid oxygen tank capacity	433 dm ³
working pressure in the gasifier tank	≤ 1,4 MPa
opening pressure of high pressure safety valve	19 MPa
opening pressure of the liquid oxygen tank safety valve	1,4 MPa
LIQUID OXYGEN DISCHARGE INSTALLATION	
max. filling pressure of portable tanks with liquid oxygen	1,4 MPa
GAS DISPENSING INSTALATION	
ABILITY TO WORK IN AUTOMATIC MODE	
max. pressure of gaseous oxygen discharged from the installation	≤ 15 MPa
gasifier capacity measured on the gaseous oxygen release board (ambient +20°C, output pressure 15 MPa)	min.125 m ³ /h
discharged oxygen „dew point“ at pressure 0,1 MPa	no more than -55°C
max. discharged oxygen temperature	≤ +70°C
OVERALL PARAMETERS	
length	4000 mm
width	1780 mm
height	1580 mm
length with tow rod	5900 mm
track of wheels	1315 mm
wheelbase	2930 mm
weight with full liquid oxygen tank	2900 kg
weight with empty liquid oxygen tank	2459 kg
CRITICAL PARAMETERS	
parameters of gaseous oxygen	according to PN-93/L-01267
output parameters	according with PN-C-84911
operating temperature	-30°C ÷ +55°C



AIRFIELD AIR COMPRESSOR LSP/N SERIES II

- designed for filling dispensers and/or other high-pressure vessels with compressed air with pressure up to 35 MPa
- mounted on a standard 15 ft. container frame which can be transported on any truck or on a low chassis anywhere in the airport or landing site and on public roads with a maximum speed 90 km/h
- equipped with a system of supervision, prompts and automatic stop of compression after reaching the set pressure
- an autonomous device can work independently after being removed from the trailer
- equipped with a system of remote diagnosis and monitoring of operating parameters
- equipped with a pre-heating system for starting at low temperatures
- equipped with a compressed air cooler/heater system
- adapted for air, land and marine transport



TECHNICAL PARAMETERS

CLIMATIC CONDITIONS

operating max. temperature	+55°C
operating min. temperature	-30°C
rated humidity at +25°C	98 %
temperature for storage temperature/humidity	> +5°C / < 80%
resistance to elevated storage temperature	+65°C
resistance to reduced storage temperature	-50°C

COMPRESSED AIR PARAMETERS

medium	compressed air acc. to PN-91/L-01261
moisture content of gas released (dew point at pressure 0,1 MPa)	≤ -55°C
filtering accuracy	10 μm
maximum released air pressure	35 MPa
efficiency (for gas pressure 35 MPa with ambient temperature +20°C)	≥ 125 Nm ³ /h
maximum temperature of dispensed gas	+70°C
range of dispensing pressure	0,34 to 35 MPa
high pressure tank capacity	600 dm ³

COMPRESSOR PARAMETERS

type	WP 4351
efficiency (acc.to ISO 1217, for 1800 RPM)	120 Nm ³ /h
number of compression stages / numer of cylinders	4/4
drive type	direct via combustion engine

ENGINE PARAMETERS

power /rotations	100kW/1800 RPM
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OVERALL PARAMETERS

length without tow rod	4630 mm
length with tow rod	7080 mm
width	2500 mm
height	2390 mm
weight	5050 kg



AIRFIELD HYDRAULIC POWER UNIT LZH/N SERIES II

- designed to check the technical condition of the hydraulic systems with no need to startup aircraft engine
- cleaning the working fluid of the aircraft hydraulic systems
- fills-up hydraulic systems and checks for leaks in the hydraulic components of the aircraft
- equipped with two independent hydraulic lines, able to supply both aircraft hydraulic installations (lines „A” and „B”)
- has completely separated (independent) dispensing lines
- desired level of hydraulic oil in the tank of the aircraft is kept automatically
- the use of the HMI interface enables the display and recording (on a memory card) of flow and pressure that change over time when working with an airplane.
- possibility of cooperation with aircraft with pressurized and non-pressurized tanks in a hydraulic system
- adapted for towing behind the vehicle on the roads of airports and airfields with maximum speed 30 km/h
- adapted for air transport



PATENT no. 236308
issued by the Patent Office of the Republic of Poland

TECHNICAL PARAMETERS

HYDRAULIC PARAMETERS OF EACH LINE

(possible to work on one engine, connection to standard 125A network secured)

pressure	280bar (4200psi) at flow 100 dm ³ /min (27GPM)
pressure	200bar (3000psi) at flow 130 dm ³ /min (35GPM)
pressure	333bar (4950psi) at flow 90 dm ³ /min (25GPM)
max. pressure	400bar (6000psi) limited time of action

HYDRAULIC PARAMETERS WHEN OPERATING IN A PARALLEL LINE

(work on two engines required, 200A secured network)

max. pressure	200bar (3000psi) at flow 260 dm ³ /min (70GPM)
max. pressure	280bar (4200psi) at flow 200 dm ³ /min (54GPM)

OVERALL DIMENSIONS

dimensions (L x W x H)	3000 mm x 1600 mm x 1700 mm
weight	3200 kg
oil tank capacity:	2 x 120 dm ³
length of output cables	10 m
length of powering cables	2 x 15 m
standard tow rod	eye NATO Ø 76

trailer road lighting

ELECTRICAL PARAMETERS

2 x electrical engine 55kW; 230/400V a.c., 3 phase 50Hz; Soft start

INSTALLATION PARAMETERS

filtering the entire (full) oil tank < 3 min (42 dm³/min)

self-venting hydraulic system with independent cooling

tanks equipped with an air dehumidifiers

possibility of topping up/draining oil of an aircraft installation during operation

registration of operating parameters in the form of charts (pressures, flows for each aircraft, the ability to keep data on SD or USB memory)

remote diagnostic

installation of filling / topping up of unit tanks

signalling filter contamination

signaling exceeding the permissible operating temperature

Confirmed compliance with oil according to standards

U.S.: Approved MIL-PRF-83282D; MIL-PRF-5606H

British MIL-PRF-83282D; Approved DEF STAN 91-48 Grade Superclean (European production only) Meets DEF STAN 91-48 Grade Normal (European production only) Equivalent to DEF STAN 91-48 Grades Superclean & Normal (U.S. production only)

French: Approved DCSEA 437/A; Approved DCSEA 415/A

Russian: GOST 6794; GOST 17479.3

NATO Code: H-537; H-515, H-520

Joint Service Designation: OX-19; OM15 (equivalent OM-18)





AIRFIELD DEHUMIDIFIER LOP/N

- mobile unit, constructed on its own homologated trailer can be transported within the airport and airfields and also on public roads with maximum speed 90 km/h
- designed to provide drained and heated air into the aircraft and its cargo spaces before start and during technical checks
- applies to all types of aircraft which dispensing hoses with dry and hot air can be inserted into
- allows to eliminate frost, icing and moisture in the condensed form and contained in the air from elements sensitive to the impact of these factors
- shortens the time of preparing the aircraft for flight and reduces failure of cold or damp electronics during engine start-up
- is used to drain internal spaces of the following types of the aircraft: Mi-8, Mi-14, Mi-17, Mi-24, W-3, SW-4, SH-2G, An-28 / M-28, F-16, MiG-29,C-295M and C-130 and passenger planes, including B737, Gulfstream G550
- can be used to heat helicopter main gear such as W-3, Mi-8, Mi-17, Mi-14, Mi-24 which have for that purpose the corresponding holes
- it can simultaneously handle two aircraft or two spaces distant from each other even by several meters
- adapted for air transport

TECHNICAL PARAMETERS

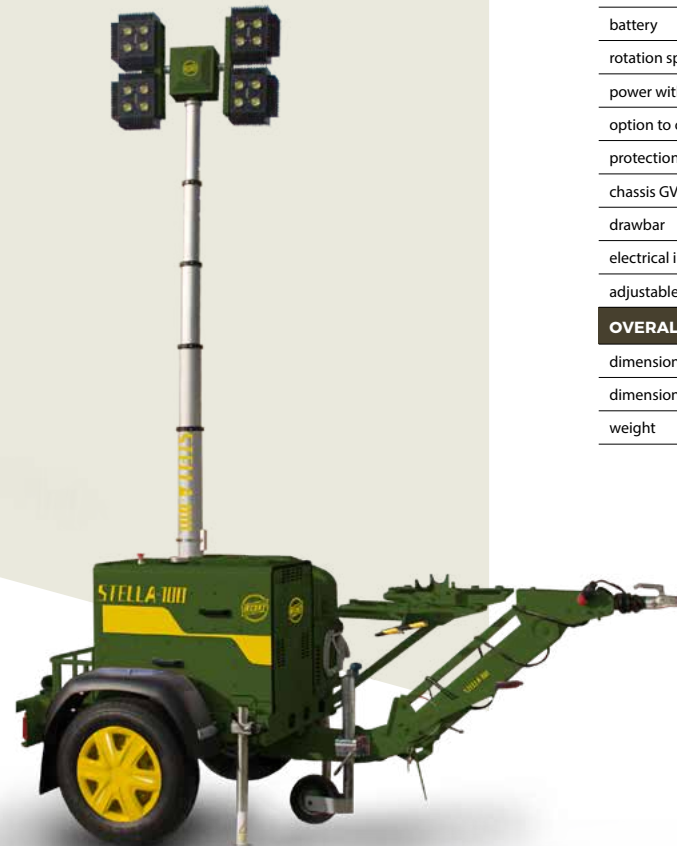
dehumidification capacity (for air output parameters +20°C, 60%RH)	10 kg/h
max. pressure of delivered air	3 kPa
amount of dry air (for atmospheric air pressure 1013 mbar, density 1,2 kg/m ³ with ambient temp. +20°C)	1450 Nm ³ /h
max. temperature of delivered air	+75°C
OVERALL PARAMETERS	
length	3676 mm
width	1845 mm
height	1616 mm
track of wheels	1618 mm
distance from the ground	213 mm
DISPENSING CABLES	
dispensing cables length	3 x 15 m
CRITICAL PARAMETERS	
operating temperature	-30°C ÷ +55°C
air humidity	100%





MOBILE LIGHTING TOWER STELLA-100

- designed to illuminate airfields or landing grounds at night, as well as objects in hangars or at airfields under insufficient visibility conditions
- equipped with an additional output as well as air compressor
- mobile unit installed on a low chassis adapted for towing behind the vehicle at a speed not exceeding 30 km/h
- equipped with two independent power sources - an electric power unit and a multi-fuel engine
- adapted for air transport



TECHNICAL PARAMETERS

luminous flux	100 000 lm
max. mast height	3,94 m
illumination angle	120°÷ 150°
additional output	3 x 230V a.c. 50Hz 1 x 12V d.c.
lamp power	1 x LED 400W, 4 x LED 1600W
LED life on one tank	20 h
LED adjustment range (vertical - horizontal)	360°
compressor capacity	160 l/min
power generator	single-cylinder direct injection 418 cm ³ , diesel engine, AVR output voltage stabilization
fuel	diesel
fuel tanks capacity	16 dm ³
electric starter	0,9kW/12V
battery	28Ah
rotation speed	3000 RPM
power with LED lamps on	5kVA
option to connect external 230V a.c. and an aggregate power of 4.5kW (3 sockets)	
protection	B16A
chassis GVW	1000 kg
drawbar	with ball or eye hook
electrical instalation	12V
adjustable hitch height	600÷1200 mm
OVERALL PARAMETERS	
dimensions in working position (L x W x H)	3220 mm x 1550 mm x 3940 mm
dimensions in marching position (L x W x H)	3220 mm x 1550 mm x 1200 mm
weight	550 kg



GPU: **LUZES V/D** on the chassis of STAR off-road vehicle and **LUZES V/N** installed on the low chassis while operating aircraft MiG-29G and MiG-29GT



LOAD BANK LO-115/260-D

- portable resistive load bank with digital display
- designed for testing and servicing ground power units of 3x115Va.c., 1x115Va.c. and 3x36Va.c.
- program for engine decarbonising
- testing GPU procedure for aircraft strat-up in two modes: automatic or manual



TECHNICAL PARAMETERS

INPUT

MS90362-4 (for 3x115/200V 400Hz)

6 measurement panel mounting sockets (Ø4 mm – A, B, C, E, F, N)

MEASUREMENTS & SAFETY

3x115/200V a.c. →0A-400A(±5%); 0V-250V(±5%); 360/400Hz(±5%)

1x115/200V a.c.→0A-50A(±5%) – with adaptor plug 3x115Va.c→1x115V a.c.

3x36V a.c →0A-25A(±5%) – with adaptor plug 3x115Va.c→3x36Va.c. + Power AC/DC (power supply)

operational safety systems in the form of an emergency switch on the cover and a thermal protection unit.

OVERALL DIMENSIONS

- L x W x H
610 mm x 235 mm x 660 mm
- weight
37 kg

PROTECTION LEVEL

IP21

WORKING CONDITIONS

suitable for indoor and/or outdoor operation

environmental operating temperature -20°C + +55°C

air humidity up to 80% at 25°C

CERTIFICATES & STANDARDS

- CE
- ISO 6858, ISO 1540, PN-EN 1915-4+A1, DSF 400, ARP 5015, PN – ISO 461
- IATA AHM-972



SIMULATORS FOR T-72 AND PT-91 TANK CREWS

BESKID

- **BESKID-2M/K** training simulator is designed to provide an initial training for the commander, gunner and driver and complex training for the T-72 tank crews without using real combat equipment
- **BESKID-2M/Z** training simulator is a single station version of BESKID-2M/K simulator designed for T-72 gunners training
- **BESKID-2M/PT** is designed to provide initial training of PT-91 tank gunners. The simulator can operate in the self-training mode or the training can be supervised by the instructor





INFANTRY COMBAT VEHICLE SIMULATORS FOR BMP-1 **ORTLES**

- **ORTLES-3M/K** is designed to educate and train how to provide comprehensive cooperation of the entire crew of the BMP-1 combat vehicle (commander, gunner and driver) trained on single-station versions of ORTLES devices. Training with a simulator, without the use of combat equipment is cheaper than the traditional, easier to organize and independent of weather conditions. The advantage of the simulator is the ability to quickly mastering of the required skills by the trainees and the possibility of creating real situations similar to the real battlefield
- **ORTLES-3M/Z** is a single-station version of ORTLES-3M/K simulator designed to provide training for the gunner of the BMP-1. It is a modified version of the TWS-3 ORTLES-3/M type device which has been successfully used for many years in military units
- **TMK-ORTLES/2001** is designed to provide initial training (self education) for drivers of BMP-1 and advanced training under the supervision of an instructor
- **TWS-3 ORTLES-3/M'20** is the upgraded and modified version of the device designed for initial training of the gunner BMP-1, developed on the basis of the current Combat Vehicle Shooting Program (Training 856/2012) using the latest achievements of computer technology
- **MODIFICATION** of the simulators to the 2020 version is possible for all single-station devices of the TWS-3 ORTLES-3/M series and the ORTLES-3M/Z series operated in training centers and military units in the territory of the Republic of Poland





STOPFIRE®

FIRE EXTINGUISHING AND EXPLOSION SUPPRESSION SYSTEM



- intended to protect the crew, engine compartments and external surfaces of combat vehicles
- reacts to the puncture of a combat vehicle by a cumulative jet and to a fire or explosion of fuel, preventing the spread of fire and destruction of the vehicle
- correctly selected range of the observed infrared (IR) spectrum guarantees excellent identification of phenomena, resulting in flawless distinguishing of actual threats to life of the crew of a combat vehicle (fire, explosion) from typical interferences
- elements of the system are individual for each type of combat vehicle according to the size of the crew compartment, the engine and the external surface of the vehicle
- used in tanks, combat vehicles and transporters as well as various types of service vehicles (army, police, fire brigade)
- developed in cooperation with Institute of Optoelectronics at University of Technology in Warsaw, Poland
- certificate of Military Institute of Armoured and Automotive Technology

SUB-SYSTEM FUNCTION	HAZARD DETECTION TIME	HAZARD ELIMINATION TIME
CREW COMPARTMENT PROTECTION (fuel explosion, cumulation jet, fire)	< 3 ms	< 150 ms as a rule 80-120 ms
ENGINE COMPARTMENT PROTECTION (fire)	< 5 sec	< 20 sec
EXTERNAL VEHICLE PROTECTION (flame on the outer surfaces of the vehicle caused by spilling incendiary mixture)		Manual control, elimination time depends on the hazard type and may be up to 60 sec



VIRTUAL TRAINING SYSTEM WIRST

- an application for learning how to use and service Ground Support Equipment, providing virtual support in the user's daily work
- allows to recreate actual model of device at any scale which permit precise view of the elements and accurate learn of the processes

AUGMENTED REALITY (AR) TECHNOLOGY

- 3D Digital Image Processing
- mobile service
- form of training without the participation of a trainer
- faster and cheaper acquisition of competence

ADVANTAGES

- lower cost of training users of GSE devices
- faster acquisition of skills to operate GSE devices
- on-line updating of technical documentation and procedures in real time
- solving problems in real time





HIGH-PRESSURE FLEXIBLE HOSES



FLEXIBLE HOSES (MT) filling armaments and military equipment with:

- compressed oxygen
- compressed nitrogen
- compressed air
- hydraulic oils

Length	from 500 mm to 20 000 mm
Nominal diameter (DN):	6, 8, 10, 12,16, 20, 25, 32, 40, 50
Working temp.	from - 40 °C up to + 100 °C
Working pressure	from 4,0 MPa up to 45,0 MPa
Manufactured according to the following standards:	EN, ISO, DIN, BSP, JIS, SAE

- manufacturing qualifications in the field of assembly, repairs and modernization of equipment for filling military equipment of the Polish Armed Forces issued by the Chief of Military Technical Supervision
- technical passports for new high-pressure hoses
- technical documentation agreed with the Military Technical Supervision
- performing pressure tests, preparing flexible hoses for technical checking, periodic and operational tests
- specialized technical staff
- metrological supervision

Orders based on individual customers' expectations.
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