

Aerospace technology

About PBS Velka Bites

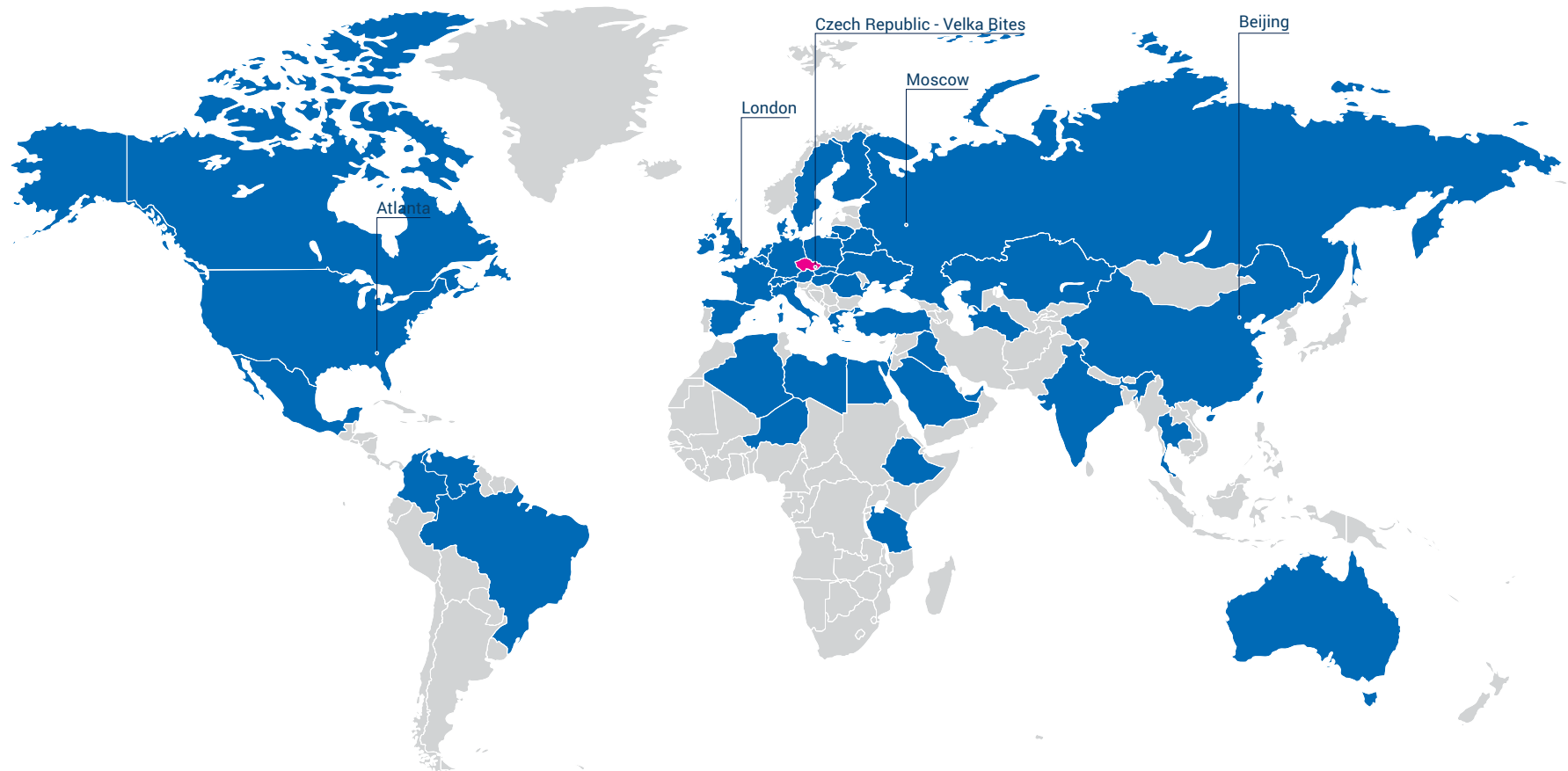
PBS Velka Bites (PBS) is a successful and reliable partner to many significant aviation manufacturers and final assemblers.

The unique ability of PBS to carry out in-house design and development, manufacture and testing of small jet engines, APUs and environmental control systems in accordance with global aerospace standards has greatly contributed to its enduring success on the global market.

PBS is approved by the European Aviation Safety Agency (EASA) and has the DOA, POA and MOA status.

Facts & Figures

- 200 years of brand tradition
- 50 years experience in aerospace technology
- More than 7,000 aircraft engines, APUs and ECS sold
- Export to over 30 countries around the world
- Sales representatives in the USA, UK, China and Russia
- 800 qualified employees







ENGINES

PBS has designed and successfully launched on the market a series of high-quality, reliable small turbine engines, used mainly in UAVs, target drones, missiles, experimental aircraft and ultralight helicopters.

Due to their high-level technical parameters, PBS engines hold a major advantage with their excellent power-to-weight ratio ranking them among world leaders in their field.

Products

- **PBS TP100**
- **PBS TS100**
- **PBS TJ150**
- **PBS TJ100**
- **PBS TJ80**
- **PBS TJ40**
- **PBS TJ23U**

PBS TP100

TURBOPROP ENGINE

is designed for experimental aircraft and UAVs



Main features

- Low weight
- Small installation dimensions
- Excellent power-to-weight ratio
- Digital interface for control and monitoring
- Stable operation at high altitudes and at high temperatures
- Ability to run at cold temperatures below -30 °C without preheating
- Gearbox design offers the possibility to install an additional alternator with output power up to 1.6 kW

The turboprop engine PBS TP100 turboprop engine is suitable for small aircraft and unmanned aerial vehicles (UAVs). The system is designed for use in both push and tractor configuration depending on its mounting position on the aircraft.

Its main advantage is low weight, power of 180 kW and its capacity to achieve flight altitude up to 9,000 m with a maximum starting altitude of 6,000 m. The turbine engine is able to start in cold conditions as low as -30 °C without preheating.

Technical parameters

Technical parameters

Output shaft speed	2,158 RPM	2,158 RPM
Power supply	28 V DC	28 V DC
Electrical power output	720 W	720 W

Power

Take-off	180 kW	241 HP
Max. continuous	160 kW	214 HP
Cruise	140 kW	188 HP

Specific fuel consumption

Take-off	0.515 kg/kW/h	0.847 lb/HP/hr
Max. continuous	0.525 kg/kW/h	0.863 lb/HP/hr
Cruise	0.548 kg/kW/h	0.901 lb/HP/hr

Dimensions and weight

Height x width - without exhaust	398 x 330 mm	15.67 x 13.00 in
Length	891 mm	35.08 in
Weight	61.6 kg	135.8 lb

Other parameters

Max. generator speed	58,500 RPM	58,500 RPM
Fuel	JET A, A-1, B, according to DERD 2494 standard, TS-1, T2, RT, according to GOST 10227-86 standard	
Oil	according to MIL-L-23699 Mobil Jet Oil II / AeroShell 560	

Operating range - engine operation

Max. altitude	9,000 m	29,500 ft
Ambient temperature	-50 °C to ISA +30 °C	-58 °F to ISA +86 °F

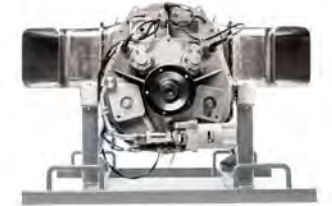
Operating range - engine start

Max. altitude	6,000 m	19,700 ft
Ambient temperature	-30 °C to ISA +30 °C	-22 °F to ISA +86 °F

PBS TS100

TURBOSHAFT ENGINE

is designed for light helicopters and UAVs



Main features

- Low weight
- Small installation dimensions
- Excellent power-to-weight ratio
- Digital interface for control and monitoring
- Stable operation at high altitudes and at high temperatures
- Ability to run at cold temperatures below -30 °C without preheating
- Gearbox design offers the possibility to install an alternator with output power up to 1.6 kW

The turboshaft engine PBS TS100 is suitable for light helicopters with maximum takeoff weight up to 1,000 kg.

The engine offers a power take-off of up to 180 kW. The maximum continuous power mode of 160 kW is available up to 2,000 m, even at high temperatures. The turboshaft engine can be started even at cold temperatures below -30 °C without preheating.

Technical parameters

Technical parameters

Output shaft speed TS100ZA/TS100DA	5,978 RPM / 2,158 RPM	5,978 RPM / 2,158 RPM
Power supply	28 V DC	28 V DC
Electrical power output	720 W	720 W

Power

Take-off	180 kW	241 HP
Max. continuous	160 kW	214 HP
Cruise	140 kW	188 HP

Specific fuel consumption

Take-off	0.515 kg/kW/h	0.847 lb/HP/hr
Max. continuous	0.525 kg/kW/h	0.863 lb/HP/hr
Cruise	0.548 kg/kW/h	0.901 lb/HP/hr

Dimensions and weight

Height x width - without exhaust	398 x 330 mm	15.67 x 13.00 in
Length TS100ZA/TS100DA	829 mm / 881 mm	32.64 in / 34.69 in
Weight TS100ZA/TS100DA	56.7 kg / 61.3 kg	125 lb / 135 lb

Other parameters

Max. gas generator speed	58,500 RPM	58,500 RPM
Fuel	JET A, A-1, B, according to DERD 2494 standard, TS-1, T2, RT, according to GOST 10227-86 standard	
Oil	according to MIL-L-23699 Mobil Jet Oil II / AeroShell 560	

Operating range - engine operation

Max. altitude	9,000 m	29,500 ft
Ambient temperature	-50 °C to ISA +30 °C	-58 °F to ISA +54 °F

Operating range - engine start

Max. altitude	6,000 m	19,700 ft
Ambient temperature	-30 °C to ISA +30 °C	-22 °F to ISA +54 °F

PBS TJ150

TURBOJET ENGINE

is designed for UAVs, target drones and missiles



Main features

- Compact design
- Excellent thrust-to-weight ratio
- Low power consumption
- The built-in starter-generator
- Electric starting system
- Possibility of ground and in-flight restart

The turbojet engine PBS TJ150 is designed for UAVs, missiles and target drones.

Compact design, excellent thrust-to-weight ratio, and low fuel consumption are among its main advantages.

Technical parameters

Technical parameters

Max. thrust	1,500 N	337 lbf
Power supply	28 V DC	28 V DC
Electrical power output	600 W	600 W
Specific fuel consumption at max. thrust	0.119 kg/N/h	1.167 lb/lbf/hr

Dimensions and weight

Outer diameter	272 mm	10.7 in
Length	520 mm	20.5 in
Weight	19.6 kg	43.2 lb
Weight of accessories	0.8 kg	1.764 lb

Other parameters

Max. speed	55,300 RPM	55,300 RPM
Fuel	Jet A-1 or equivalent	
Oil	according to MIL-PRF-23699 Mobil Jet Oil II / AeroShell 560	

Operating range - engine operation

Max. altitude	9,000 m	29,528 ft
Max. speed	0.9 M	0.9 M
Ambient temperature	-50 °C to +45 °C	-58 °F to +113 °F

Operating range - engine start

Max. altitude	4,000 m	13,123 ft
Max. speed	0.6 M	0.6 M
Ambient temperature	-40 °C to +45 °C	-40 °F to +113 °F

PBS TJ100

TURBOJET ENGINE

is designed for UAVs, target drones,
missiles, powered gliders and experimental aircraft



Main features

- Compact design
- Excellent thrust-to-weight ratio
- Low power consumption
- The built-in starter-generator
- Possibility of landing on water
- Modification according to customer needs

The turbojet engine PBS TJ100 is designed for unmanned vehicles, missiles, light sport aircraft and powered gliders.

Compact design, low weight with a thrust of up to 1,300 N, and low fuel consumption are among its main advantages. The generator output is 750 W. One of the PBS TJ100 engine versions is designed in sea-recoverable configuration.

Technical parameters

Technical parameters

Max. thrust	1,300 N	292 lbf
Power supply	28 V DC	28 V DC
Electrical power output	750 W	750 W
Specific fuel consumption at max. thrust	0.115 kg/N/h	1.1278 lb/lbf/hr

Dimensions and weight

Outer diameter	272 mm	10.7 in
Length	625 mm	24.6 in
Weight	19.5 kg	43 lb
Weight of accessories	1.05 kg	2.32 lb

Other parameters

Max. speed	60,600 RPM	60,600 RPM
Fuel	Jet A-1 or equivalent	
Oil	according to MIL-PRF-23699 Mobil Jet Oil II / AeroShell 560	

Operating range - engine operation

Max. altitude	10,000 m	32,808 ft
Max. speed	0.8 M	0.8 M
Ambient temperature	-50 °C to +50 °C	-58 °F to +122 °F

Operating range - engine start

Max. altitude	6,000 m	19,685 ft
Max. speed	0.5 M	0.5 M
Ambient temperature	-30 °C to +50 °C	-22 °F to +122 °F

PBS TJ80

TURBOJET ENGINE

is designed for missiles, target drones and UAVs



Main features

- Compact design
- Excellent thrust-to-weight ratio
- Low power consumption
- Lubrication with fuel mixed with oil, maintenance-free operation
- Electric start
- Built-in BLDC starter-generator including control unit (ECU) and inverter
- Easy start
- Start in any position, restart option on the ground and in flight
- Shortened start sequence under 23 seconds

The turbojet engine PBS TJ80 is designed for missiles, target drones and UAVs.

PBS TJ80 is simple design engine, lubricated by fuel with oil admixture, fitted with BLDC starter generator, electric fuel pump and electronic control system of FADEC type. With the weight of 12 kg the PBS TJ80 provides take-off thrust of 900 N. The output of the generator is 750 W.

Other features include engine start temperatures as low as -40 °C and a shortened start-up sequence that comes in at less than 23 s. The engine has the ability to repeat starts – on the ground or in flight – and can be used in any position at the time of launch.

Technical parameters

Technical parameters

Max. thrust	900 N	202 lbf
Power supply	28 V DC	28 V DC
Electrical power output	750 W	750 W
Specific fuel consumption at max. thrust	0.123 kg/N/h	1.206 lb/lbf/hr

Dimensions and weight

Outer diameter	235 mm	9.25 in
Length	514 mm	20.24 in
Weight	12 kg	26.5 lb

Weight of accessories

Other parameters	0.5 kg	1.1 lb
Max. speed	60,600 RPM	60,600 RPM
Fuel	Jet A-1 or equivalent, with 3% turbine oil	
Oil	Mobil Jet Oil II / AeroShell 500 / Exxon 2388 or equivalent	

Operating range - engine operation

Max. altitude	10,000 m	32,808 ft
Max. speed	0.9 M	0.9 M
Ambient temperature	-50 °C to +50 °C	-58 °F to +122 °F

Operating range - engine start

Max. altitude	6,000 m	19,685 ft
Max. speed	0.6 M	0.6 M
Ambient temperature	-40 °C to +50 °C	-40 °F to +122 °F

PBS TJ40

TURBOJET ENGINE

is designed for UAVs, target drones and experimental aircraft



Main features

- Compact design - all accessories incorporated in the engine (except for the fuel pump)
- Excellent thrust-to-weight ratio
- Low power consumption
- Simple and fast start with kerosene
- Repeatable start on the ground and in flight
- Any engine position during start
- Shortened start sequence under 25 seconds

The jet engine PBS TJ40 is designed for unmanned systems and experimental aircraft.

With the weight 3.3 kg, the engine offers thrust up to 395 N.

There are two versions of the engine PBS TJ40 with different generator power output to the aircraft deck:

- PBS TJ40-G1 provides power 14 V / 150 W
- PBS TJ40-G2 provides power 28 V / 1.1 kW

Technical parameters

Technical parameters

Max. thrust	395 N	88.8 lbf
Power supply	13.8 V DC	13.8 V DC
Electrical power output	150 W	150 W
Specific fuel consumption	0.147 kg/N/h	1.44 lb/lbf/hr

Dimensions and weight

Outer diameter	147 mm	5.79 in
Length	304 mm	11.97 in
Weight	3.3 kg	7.27 lb
Weight of accessories	0.2 kg	0.44 lb

Other parameters

Max. speed	100,000 RPM	100,000 RPM
Fuel	Jet A-1 or equivalent, with 3% turbine oil	
Oil	Mobil Jet Oil II / AeroShell 500 / Exxon 2388 or equivalent	

Operating range - engine operation

Max. altitude	9,000 m	29,500 ft
Max. speed	0.9 M	0.9 M
Ambient temperature	-50 °C to +50 °C	-58 °F to +122 °F

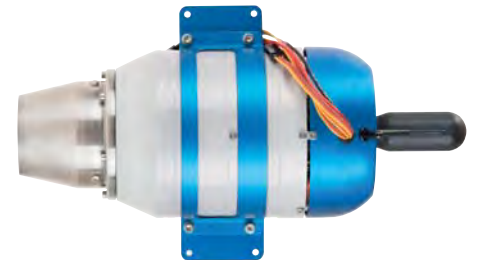
Operating range - engine start

Max. altitude	4,500 m	14,700 ft
Max. speed	0.35 M	0.35 M
Ambient temperature	-40 °C to +50 °C	-40 °F to +122 °F

PBS TJ23U

TURBOJET ENGINE

is designed for small-sized UAVs



Main features

- Compact design
- Excellent thrust-to-weight ratio
- Low power consumption
- Electric start, one fuel supply, constant engine thrust independent of ambient temperature
- Easy and fast start
- Operation via battery connection and supply of fuel mixture with 3% turbine oil

The turbojet engine PBS TJ23U is designed for small unmanned systems. The main advantage is its low weight of 1.98 kg and thrust of 230 N.

It comes with electric starting, a fuel pump and a sparkplug built into the casing of the combustion chamber – the ideal components for UAV platforms.

Technical parameters

Technical parameters

Max. thrust	230 N	51,706 lbf
Power supply	-	-
Specific fuel consumption	0.165 kg/N/h	1.6181 lb/lbf/hr

Dimensions and weight

Outer diameter	121 mm	4.76 in
Length	316 mm	12.44 in
Weight	1.98 kg	4.37 lb
Weight of accessories	230 g	0.51 lb

Other parameters

Max. speed	122,000 RPM	122,000 RPM
Fuel	Jet A-1 or equivalent, with 3% turbine oil	
Oil	Mobil Jet oil II / AeroShell 500 / Exxon 2388 or equivalent	

Operating conditions

Max. altitude	6,000 m	19,700 ft
Max. speed	0.6 M	0.6 M
Ambient temperature	-40 °C to +50 °C	-40 °F to +122 °F





AUXILIARY POWER UNITS

PBS Velka Bites is a manufacturer of Auxiliary Power Units designed especially for airplanes and helicopters serving in the defense and civilian industries. These products are manufactured according to specific customer requirements.

Auxiliary Power Units are used for starting the main engines or for supplying onboard devices and air conditioning units.

Products

- **SAFIR 5K/G MI**
- **SAFIR 5K/G MI40**
- **SAFIR 5K/G MIS**
- **SAFIR 5K/G Z8**

SAFIR 5K/G MI

is designed to deliver compressed air for starting the main engines and to supply AC power to the deck network

Main features

- Simultaneous supply of electric power and compressed air
- Continuous operation for 6 hours
- High reliability
- Purity of the air supplied to the air-conditioning system
- Long service life
- Simple maintenance
- Ecological fuel drainage
- Start and operation up to 6,000 m

The APU Safir 5K/G MI is an autonomous power unit designed to supply compressed air for starting the main engines, and to supply AC voltage to the aircraft on-board network.

The compressed air can be used for the environmental control system.

The APU Safir 5K/G MI has been certified for civil aviation by AR MAK according to AP VD and by CCA CZ according to TSO-C77b (recognized by EASA).

Technical parameters

Technical parameters

Nominal power	20 kVA	20 kVA
Power supply	3× 115 V/200 V/400 Hz	3× 115 V/200 V/400 Hz
Max. bleed air	28.3 kg/min	62.4 lb/min
Fuel consumption	55 kg/h	121 lb/hr

Dimensions and weight

Height x width - including air intake	491 × 365 mm	19.3 × 14.3 in
Length - including generator	819 mm	32.2 in
Weight - including generator	63 kg	141 lb

Operating conditions

Max. altitude	6,000 m	19,700 ft
Ambient temperature	-55 °C to +60 °C	-67 °F to +140 °F



SAFIR 5K/G MI40

is designed to deliver compressed air for starting the main engines and to supply AC power to the deck network

Main features

- Simultaneous supply of electric power and compressed air
- Continuous operation for 6 hours
- High reliability
- Purity of the air supplied to the air-conditioning system
- Long service life
- Simple maintenance
- Ecological fuel drainage
- Start and operation up to 6,000 m

The APU Safir 5K/G MI40 is an autonomous power unit designed to supply compressed air for starting the main engines and to supply AC voltage to the aircraft on-board network. Compressed air can be also taken in by the aircraft environmental control systems.

The APU Safir 5K/G MI40 is under development.

Technical parameters

Technical parameters

Nominal power	40 kVA	40 kVA
Power supply	3× 115 V/200 V/400 Hz	3× 115 V/200 V/400 Hz
Max. bleed air	28.3 kg/min	62.4 lb/min
Fuel consumption	55 kg/h	121 lb/hr

Dimensions and weight

Height x width - including air intake	491 × 365 mm	19.3 × 14.3 in
Length - including generator	819 mm	32.2 in
Weight - including generator	68 kg	150 lb

Operating conditions

Max. altitude	6,000 m	19,700 ft
Ambient temperature	-55 °C to +60 °C	-67 °F to +140 °F



SAFIR 5K/G MIS

is designed to deliver compressed air for starting the main engines and to supply DC power to the deck network

Main features

- Simultaneous supply of electric power and compressed air
- Continuous operation for 6 hours
- High reliability
- Purity of the air supplied to the air-conditioning system
- Long service life - TBO 1,500 hours, 3,000 APU starts
- Simple maintenance
- Ecological fuel drainage
- Start and operation up to 6,000 m

The APU Safir 5K/G MIS is an autonomous power unit designed to supply compressed air for starting the main engines and to supply DC voltage to the aircraft on-board network.

The compressed air can be used for the environmental control system.

The APU Safir 5K/G MIS has been certified for civil aviation by AR MAK according to AP VD and by EASA according to TSO-C77b.

Technical parameters

Technical parameters

Nominal power	6 kW	6 kW
Nominal current	200 A	200 A
Power supply	28 V DC	28 V DC
Max. bleed air	28.3 kg/min	62.4 lb/min
Fuel consumption	55 kg/h	121 lb/hr

Dimensions and weight

Height x width - including air intake	468 × 365 mm	18.4 × 14,37 in
Length - including generator	819 mm	32.2 in
Weight - including generator	57 kg	125.6 lb

Operating conditions

Max. altitude	6,000 m	19,700 ft
Ambient temperature	-55 °C to +60 °C	-67 °F to +140 °F



SAFIR 5K/G Z8

is designed for main engine electrical starting and electrical power supply to the deck network

Main features

- Continuous operation for 6 hours
- High reliability
- Simple maintenance
- Ecological fuel drainage
- Start and operation up to 6,000 m

The APU Safir 5K/G Z8 is an autonomous power unit designed to supply AC voltage for starting the main engines and to the deck network.

Technical parameters

Technical parameters

Nominal power	40 kVA	40 kVA
Power supply	3× 115 V/200 V/400 Hz	3× 115 V/200 V/400 Hz
Fuel consumption	55 kg/h	121 lb/hr

Dimensions and weight

Height x width - including air intake	398 × 400 mm	15.7 × 15.8 in
Length - without generator	638 mm	25.1 in
Weight - without generator	48.5 kg	107 lb

Operating conditions

Max. altitude	6,000 m	19,700 ft
Ambient temperature	-55 °C to +60 °C	-67 °F to +140 °F





ENVIRONMENTAL CONTROL SYSTEMS

PBS Velka Bites is a designer and manufacturer of Environmental Control Systems for aircraft and helicopters. Environmental Control Systems are designed to maintain a comfortable thermal environment in the cockpit, passenger cabin and cargo holds of aircraft and helicopters during ground operations and all flight modes. Every system is tailored to specific aircraft in order to comply with the main aircraft engine source of compressed air for air-conditioning units.

Products

- **ECS-M1V**
- **ECS-Y12F**
- **ECS-K8**
- **ECS L-39, L-59, L-159**

Main components

- Turbocooler
- Heat exchanger
- Water separator
- Control valves
- Shut-off valve
- Check valve
- Thermostats
- Pneumatic regulation

Main features

- Cooling, heating and ventilation in one compact system
- Ability to draw air from both the APU and the main engines
- Ecological operation - no coolant
- Minimal power consumption

ECS-M1V

The system is designed for air-conditioning and ventilation of Mi-8/17/171 series helicopters, with the option of modifications for other applications. ECS-M1V modifies hot compressed air taken from the APU or the main engines to the required temperature of the air entering the helicopter cockpit. The system allows ventilation, heating and cooling of the pilot cockpit, passenger cabin and helicopter cargo area on the ground and in all its flight modes.



Technical parameters

Inlet air pressure	max. 400 kPa	max. 58 psi
Inlet air temperature	max. 210 °C	max. 410 °F
Airflow	max. 1,500 kg/h	max. 3,300 lbs/hr
Cooling performance	max. 10.8 kW	max. 36,900 BTU/hr
Heating performance	max. 62.0 kW	max. 211,800 BTU/hr
Range of air temperature control	0 °C to +90 °C	+32 °F to +194 °F
Temperature of air entering the cockpit	+15 °C to +30 °C	+59 °F to +86 °F
Ambient temperature range	-55 °C to +60 °C	-67 °F to +140 °F
Operating altitude	0 to 6,000 m	0 to 19,700 ft
Weight	60 kg	132.3 lbs
Length × height × width	1,695 × 592 × 466 mm	66.73 × 23.31 × 18.35 in
Service life	12,000 h	12,000 hr

ECS-Y12F

The system is designed for cooling and heating the lightweight twin-propeller Y12F aircraft with a capacity for 19 passengers and 2 pilots. The system can also be modified for other applications.



Technical parameters

Inlet air pressure	max. 1,000 kPa	max. 145 psi
Inlet air temperature	max. 350 °C	max. 662 °F
Airflow	max. 1,000 kg/h	max. 2,200 lbs/hr
Cooling performance	max. 7.0 kW	max. 23,900 BTU/hr
Heating performance	max. 19.7 kW	max. 67,300 BTU/hr
Range of air temperature control	0 °C to +90 °C	+32 °F to +194 °F
Temperature of air entering the cockpit	+15 °C to +30 °C	+59 °F to +86 °F
Ambient temperature range	-50 °C to +45 °C	-58 °F to +113 °F
Operating altitude	0 to 7,000 m	0 to 23,000 ft
Weight	41.0 kg	90.4 lbs
Length × height × width	1,024 × 323 × 771 mm	40.31 × 12.72 × 30.35 in
Service life	9,000 h	9,000 hr

ECS-K8

The system is designed for heating and cooling the cockpit of jet trainer aircraft K8. The ECS-K8 also enables the „de-fog“ function, which removes fogging with hot air and further regulates the pressure in the cockpit.



Technical parameters

Inlet air pressure	max. 1,100 kPa	max. 160 psi
Inlet air temperature	max. 350 °C	max. 662 °F
Airflow	540 ± 20 kg/h	1,190 ± 44 lbs/hr
Cooling performance	max. 3.3 kW	max. 11,300 BTU/hr
Heating performance	max. 16.8 kW	max. 57,324 BTU/hr
Range of air temperature control	0 °C to +93 °C	+32 °F to +199 °F
Temperature of air entering the cockpit	+12 °C to +33 °C	+54 °F to +91 °F
Ambient temperature range	-55 °C to +60 °C	-67 °F to +140 °F
Operating altitude	0 to 11,000 m	0 to 36,000 ft
Weight	32.5 kg	71.7 lbs
Length × height × width	1,030 × 203 × 570 mm	40.55 × 8.00 × 22.44 in
Service life	4,500 h	4,500 hr

ECS L-39, L-59, L-159

The system is designed for heating and cooling the cockpit of jet trainer aircraft L-39, L-59 and L-159.



Technical parameters

Inlet air pressure	max. 1,400 kPa	max. 203 psi
Inlet air temperature	max. 430 °C	max. 806 °F
Airflow	max. 600 kg/hour max.	1,320 lbs/hour
Cooling performance	max. 3.3 kW	max. 11,300 BTU/hr
Heating performance	max. 16.8 kW	max. 57,324 BTU/hr
Range of air temperature control	0 °C to +130 °C	+32 °F to +266 °F
Temperature of air entering the cockpit	+12 °C to +33 °C	+54 °F to +91 °F
Ambient temperature range	-55 °C to +50 °C	-67 °F to +122 °F
Operating altitude	0 to 12,000 m	0 to 39,400 ft
Weight	separate components	separate components
Length × height × width	separate components	separate components
Service life	8,000 h	8,000 hr

STARTER GENERATOR EMG-200

An air-cooled brush machine designed to power APUs or aircraft engines and to supply power to airplane and helicopter deck systems.

- Low weight
- Long service life
- Possible short-term overload
- High operating flight altitude
- Self-cooling system



Technical parameters

Output voltage	28 V DC
Rated load current	200 A
Rated output power	6 kW
Speed range	8,000 to 12,150 RPM
Starter properties	
Max. input current	1,000 A with a drop to 800 A within 1.5 s
Reliable operating lifetime	
Hours of operation	4,500 h
Number of starts	9,000
Mechanical properties	
Weight	9.4 kg
Diameter and length	134 × 188 mm
Direction of rotation	Both rotation directions are possible

SINGLE-CHANNEL IGNITION

PBS single-channel ignition is designed to generate voltage impulses for a spark plug, in the spark gap of which the jumping spark ignites the fuel-air mixture in the APU turbine combustion chamber or jet engine

- Service life: 8 years or 3,000 starts with starts lasting 30 seconds
- Expected technology life cycle: 25 years or 9,000 starts with starts lasting 30 seconds



Technical parameters

Rated voltage	28 V DC
Nominal current consumption	< 1.5 A
Input voltage	14 V DC ÷ 30 V DC
Output voltage	2.5 ÷ 3 kV
Delivered power	> 0.6 J
Discharge frequency at 14 V DC	3 Hz ÷ 6 Hz
Discharge frequency at 30 V DC	4 Hz ÷ 7 Hz
Operating temperature	-55 °C ÷ 100 °C
Weight	0.55 kg
Type of operation	intermittent (with the option of permanent operation)

TWO-CHANNEL IGNITION

PBS ignition is designed to generate voltage impulses for two spark plugs, in the spark gap of which the jumping spark ignites the fuel-air mixture in the APU turbine combustion chamber

- Service life: 8 years or 3,000 starts with starts lasting 30 seconds
- Expected technology life cycle: 25 years or 9,000 starts with starts lasting 30 seconds



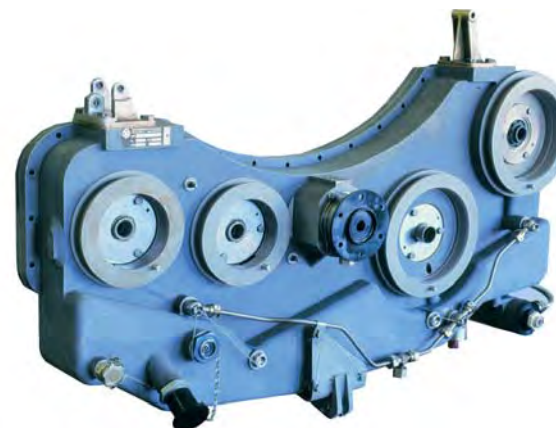
Technical parameters

Rated voltage	28 V DC
Nominal current consumption	< 3 A
Input voltage	14 V DC ÷ 30 V DC
Output voltage	2.5 ÷ 3 kV
Delivered power	> 0.6 J
Discharge frequency at 14 V DC	3 Hz ÷ 6 Hz
Discharge frequency at 30 V DC	4 Hz ÷ 7 Hz
Operating temperature	-55 ÷ 100 °C
Weight	1.1 kg
Type of operation	intermittent (with the option of permanent operation)

AIRCRAFT GEARBOXES

We offer the production of complete aircraft gearboxes and reducers, or the grinding of separate gears

- Service life: 8 years or 3,000 starts with starts lasting 30 seconds
- Expected life cycle: 25 years or 9,000 starts with starts lasting 30 seconds



Technical parameters

Max. PTO shaft speed	16,000 RPM
Idle PTO shaft speed	9,280 RPM
Max. input power	124.0 kW
Max. speed of electric generator and hydraulic pumps	8,000 RPM
Max. electric generator power	58.0 kW
Max. hydraulic pump power	33.0 kW
Flight altitude	15,250 m
Working conditions	from -40 ° to +75 °C
Weight	45.0 kg
Type of operation	intermittent (with the option of permanent operation)

GEAR GRINDING

Gear grinding and measuring using the NILES ZE 400 gear profile grinding machine and the KLINGELNBERG P26 gear measuring centre. We grind and measure cylindrical gears with outer involute straight or helical gearing. We ensure complete manufacture of gears and as well as complete gear boxes including testing.



COATING OF TURBINE BLADES

Coating of bladed components of jet engines and combustion turbines.

- „Out of Pack“ coating method
- Vertical vacuum furnace
- Standard coat thickness



Grinding machine parameters

Module	0.5 - 12 mm	0,02 - 0.5 in
Helix angle of tooth	+/- 45°	+/- 45°
Max. outside diameter	260 mm	10.2 in
Max. gearing width	400 mm	15.7 in
Max. workpiece diameter between centres	600 mm	23.6 in
Max. workpiece weight	30 kg	66.1 lb
Modification	vertical and longitudinal	
Degree of accuracy	3 - 4 according to DIN 3962	

Coating furnace parameters

Working space Ø	400 mm	15.7 in
Standard coat thickness	40 µm–70 µm	
Deposition temperature	> 1,000 °C	> 1,832 °F
Max. usable coating temperature	1,100 °C	2,012 °F
Coated material	INC713LC	

HEAT TREATMENT IN VACUUM

Heat treatment of stainless steel, nickel alloys, super alloys and brazing with nickel solders in a vacuum. The utilized SECO/WARWICK 15.0VPT-4025 vacuum furnace also offers annealing on all types of steel and non-ferrous metals and hardening of tool materials with nitrogen.



PRECISION CNC MACHINING

All structural steels machining, including corrosion resistant and tool steels using Hermle and Fehlmann 5-axis CNC machining centres. Furthermore, we can process any alloy of aluminium, titanium, and other metals. Maximum weight of the part is 30 kg.



Vacuum furnace parameters

Working space (w x d x h)	600 × 600 × 400 mm	23.6 × 23.6 × 15.7 in
Max. weight of charge	400 kg	881.8 lb
Max. working temperature	1,300 °C	2,372 °F
Max. variation of temperature field	+/- 6 °C	+/- 42.8/21.2 °F
Workpiece diameter between centres	max. 600 mm	23.6 in
Working vacuum	10 ⁻⁴	10 ⁻⁴
Max. working overpressure	Ar = 9 bar, N2 = 14 bar	Ar = 130,5 psi, N2 = 203 psi

5-axis CNC machining centers

Machine name	Machine working space	Machine working space
Hermle C 42 U	Ø 800 × 550 mm	Ø 31.5 × 21.6 in
Hermle C 32 U	Ø 650 × 500 mm	Ø 25.6 × 19.7 in
Hermle C 20 U	Ø 600 × 450 mm	Ø 23.6 × 17.7 in
Fehlmann Picomax 90-M	Ø 200 × 200 mm	Ø 7.9 × 7.9 in
Fehlmann Picomax 60	Ø 160 × 200 mm	Ø 6.3 × 7.9 in



OUR CAPABILITIES

Aerospace technology testing

- › 16 test cells
- › Vibration test system TIRA

Engine design

- › Customization according to customer requirements

Gear grinding

- › Grinding and measuring of cylindrical gears with outer involute straight or helical gearing

Surface treatment

- › Anodizing coating of aluminium and its alloys

Research & Development

- › Design studies, analysis and optimization of aerospace technology

Brazing in vacuum

- › Heat treatment and brazing with nickel solders in vacuum, in nitrogen and argon atmosphere

Precision castings

- › In-house precision casting of turbine engine wheels

NDT

- › Radiography, FPI, Magnetic particle testing

Coating of turbine blades

- › Coating of the flow parts of jet engine turbines using the method „Out of Pack“



Contact us

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