



# Catalog

## High efficiency balancing equipment

Universal  
balancing machines

Machines for balancing cardan  
and crank shafts

Machines for balancing  
flexible rotors

Machines for balancing rotors  
of agricultural machines

Upgrade of balancing  
machines

Measurement systems  
for balancing equipment

Universal  
balancing devices

Welding gantry systems for  
balancing masses

Drilling gantry systems  
for crank shafts

MADE  
IN RUSSIA

EAC



## About us



[WWW.ENSET.RU](http://WWW.ENSET.RU)



[WWW.DONSTU.RU](http://WWW.DONSTU.RU)

ENSET is a Russia-based developer and manufacturer of balancing machines and special-purpose equipment. The founder of our company is the Don State Technical University. The Company's cutting-edge developments rely on scientific groundwork and the research base of the Flagship University of the Rostov region. The company employs over thirty professional R&D engineers, one of them having a Doctorate degree in Engineering and three of them having Ph.D. degrees in Engineering.

Balancing equipment produced by ENSET is used by Power Machines PJSC (one of the leading power-machine manufacturing companies), Rostvertol PJSC (manufacturing of civil and military Mi-26 helicopters, combat Mi-35M and Mi-28N "Night hunter" helicopters), KAMAZ PJSC (Russia's biggest manufacturer of heavy trucks), Rostselmash Combine Harvester Plant LLC – manufacturer of full range of agricultural machines and equipment under brands "Rostselmash" and "Versatile), Novocherkassk Electric Locomotive Plant LLC (Russia's biggest electric locomotive manufacturing) and other leading Russian companies. The VIBROLAB vibration balancing measuring system developed by ENSET is listed in the state register of measuring equipment.

Our partners – manufacturers of special-purpose equipment – have successfully used it in gas, oil and power generation industries. In addition, ENSET has developed and produces the full range of equipment for diagnostics, upgrade, repair and restoration of cardan shafts, including pressing, welding, and balancing machines. In addition to our machines, we offer a wide range of special tooling suitable for work with any types of cardan shafts.

Now, ENSET is developing a national network of cardan shaft service stations (SKV franchise) to provide cardan shaft repair services and manufacture customized cardan shafts for cars, trucks, special machinery and industrial equipment. We invite regional companies to take part in this project and become our partners.

ENSET is open to mutually beneficial cooperation.  
We appreciate every inquiry!



**РОСТСЕЛЬМАШ**

# VIBROLAB vibration balancing measuring system

Vibration displacement amplitude measuring system that operates as a part of the balancing machine for calculation of unbalance values, unbalance angles and correction masses

Listed in the state register  
of measuring instruments

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RUSSIA

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The operation principle of the VIBROLAB vibration balancing measuring systems is based on the transformation of machine support vibration into an electric signal proportional to the vibration displacement, with further automatic calculation of the values and angles of unbalance for the balanced part and the values of correction masses according to the universal mathematical model of the rotor system. The vibration displacement amplitude is measured by means of piezoaccelerometers or accelerometers with a built-in amplifier installed in each support of the balancing machine.

Next, the device filters signals from primary transducers, defines rotor speed and current angular position of the balanced rotor. It measures amplitudes and vibration phases at the rotor speed and calculates unbalance values and their angles in every rotor plane, using the method of vector influence coefficient. Finally, the device calculates correction masses.

## High accuracy and reliability of the VIBROLAB measuring system

The VIBROLAB vibration balancing measuring system has been listed in the state register of measuring instruments since 2016 and can be supplied with calibration. High accuracy, reliability, and electromagnetic compatibility of ENSET's measuring system are confirmed by Independent Verification and Validation.

VIBROLAB is based on a reliable industrial computer running on Microsoft Windows Embedded OS, which means that the system is protected from failures and power surges. No power cut-out is a threat to data safety. Simple and user-friendly interface in Russian and English with prompts for the operator helps to avoid errors.

A unique peculiarity of our system is the algorithms for balancing of quasi-flexible and flexible rotors that significantly decrease balancing time and ensure neutral balance of rotors at any rotation speed.

All balancing machines supplied by ENSET are equipped with the VIBROLAB measuring system. The system can also be used for upgrade of outdated balancing machines from other manufacturers; our company has an extensive experience of this kind of works. We offer the VIBROLAB vibration balancing measuring system to our partners, manufacturers of universal and special balancing equipment.



## VIBROLAB key features

Listed in the state registry of measuring instruments since 2016 and can be supplied with calibration

Simple and user-friendly interface in Russian and English with prompts for the operator helps to avoid errors

Unique built-in algorithms for accurate and fast balancing of quasi-flexible and flexible rotors

Indication of current angular position of the rotor

Based on a reliable industrial computer running on MS Windows Embedded OS and protected from failures and power surges

Various built-in correction programs, including by structural angles, drilling, milling, grinding, by arc or by sector

Acceleration and deceleration times calculated from the moment of inertia of the balanced rotor

Control of frequency converter using MODBUS digital protocol

Unbalances calculated using vector influence coefficients

Automatically turns the rotor to the correction angle.

Digital filtering of signals guarantees the accuracy of vibration measurement

Prints out the balancing protocol or saves it to removable media

## VIBROLAB system technical specifications

Application	Dynamic and static (in dynamic mode) balancing of rigid, quasi-rigid, quasi-flexible and flexible rotors as a part of balancing machines
Number of Measuring Vibration Displacement Channels	1 – 4 pcs
Type of Vibration Sensors	Pieaccelerometer, accelerometers with built-in amplifier, piezoelectric force sensors
Measurement Range of Vibration Displacement Amplitude	0,1 – 1000 µm
Permissible Relative Error of Vibration Displacement Amplitude Measurement	± 2 %
Range of Rotor Rotation Speed	180–30,000 rpm
Permissible Rotor Speed Measuring Error	± (1 + 0.0025 n) rpm, where n – is the rotor rotation speed
Range of Measured Unbalances	0.05–500 g•mm/kg
Operating Frequency Range	3–500 Hz
Type of Angle Sensor (Encoder)	TTL 5 V, LIR 158 or similar
Type of Keyphasor	100 W
Power Consumption, max	100 W
User Interface	17" color touchscreen, impact-, oil- and dirt-resistant
Overall Main Unit Dimensions (L x W x H), max	430 x 125 x 370 mm
Main Unit Weight	15 kg
Supply Voltage	AC, 50 Hz, 220 V +10% -15%
Operating Temperature Range	+ 10 to + 35 °C
Operating Temperature Range	40,000 h
Average Service Life	25 years

# BALKAR series balancing machines

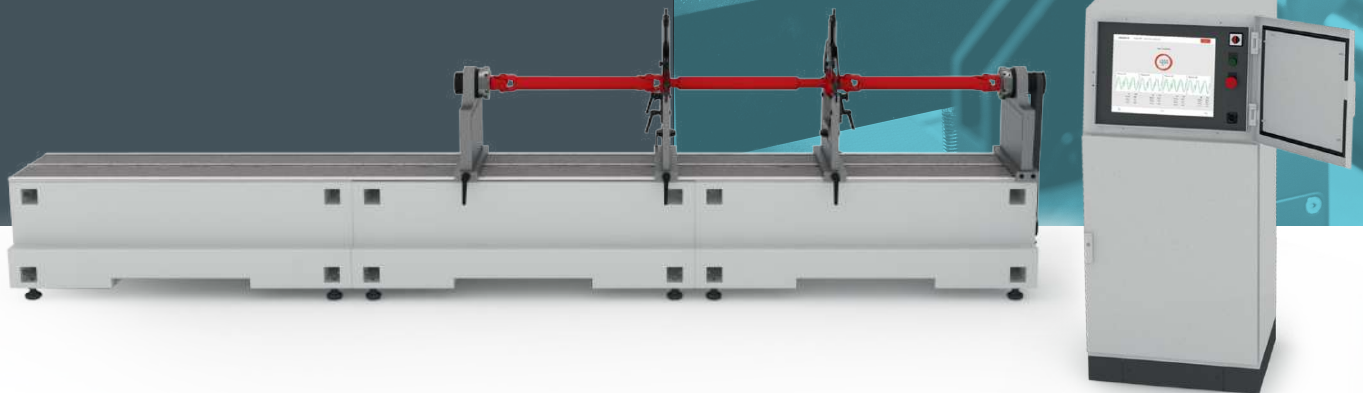
Universal horizontal hard-bearing modular machines for balancing any rotors under 500 kg

Equipped with  
VIBROLAB

Simple basement-free  
installation

MADE IN  
RUSSIA

ENET



## BALKAR machines are universal highly effective balancing machines

BALKAR machines has been produced by ENSET since 2005. The innovative technologies and balancing means introduced to the BALKAR series have found use in various industries in Russia and the CIS. A unique design and a highly accurate measuring system (VIBROLAB) developed by ENSET ensure efficient balancing of any types of rotors: electric motor armatures, pulleys and flywheels, cardan and crank shafts, and many other.

## BALKAR for quick and highly accurate balancing

We managed to significantly decrease the rotor balancing time. Standard rotor balancing time with BALKAR machines is 5 minutes, while the same operation with competitors' machines takes 15-20 minutes. High balancing accuracy meets the requirements of both Russian and international standards. Reliability of ENSET machines is ensured by European components and multi-level quality control during assembly.

### The machines have a wide range of tooling and additional equipment:

Belt drive system for balancing rotors  
(a set of belt drive, positioning stoppers  
and a laser keyphasor)

Fixtures for installing rotors on the machine supports  
(support rollers, slide bearings of different sizes)

Mandrels for installation car and truck cardan  
shafts of all common standards

Electromagnetic brake of the driving spindle for rotor  
retaining during unbalance correction

Drive cardan shaft

Tooling set for balancing crankshafts  
of inline engines

Tooling set for balancing  
V-engine crankshafts

Drilling gantry system  
for crankshafts

Welding gantry system  
for balancing masses

## BALKAR series key features

Equipped with the VIBROLAB vibration balancing measuring system that is listed in the state register of measuring

IP55 compliant sealed electric cabinet protected from dust and water ingress

Rigid hard-bearing design for unbalance correction, also by removing masses or welding them on the machine

Easy manual adjustment of supports with highly accurate linear roller guides

Unique system for quick clamping of intermediate bearings on the intermediate supports of the machine

European-made electrical and mechanical components

No basement required

Modular take-apart design with the possibility of further elongation

12 months warranty for the machine and all components

## BALKAR series technical characteristics

Model	BALKAR-1500	BALKAR-3000	BALKAR-4500	BALKAR-6000
Machine Type	Horizontal, hard-bearing, modular balancing machine			
Rotor Drive Type	End drive (belt drive – option)			
Number of Supports	2 pcs – spindle type	4 pcs: 2– spindle type, 2– intermediate type, adjustable heigh		
Rotor Weight	0.15 – 150 kg	0.15 – 300 kg		0.15 – 500 kg
Rotor Diameter, max	up to 800 mm (over the machine bed)			
Rotor Length	140 – 1,400 mm	140 – 2,700 mm	140 – 4,200 mm	140 – 5,700 mm
Balancing Quality Grade	G1 as per ISO 1940-1			
Power Supply	1 phase, 220 V AC, 50 Hz, 10 A, protective grounding is mandatory			
Electric Drive	Variable frequency asynchronous motor, 400-2,000 rpm, 2.2 kW			
Rotor Turn To Correction Position	Manual or automatic (option)			
Rotor Drive Brake	Electromagnetic (option)			
Vibration Sensors	Piezoelectric force sensors built in the supports			
Protection Against Dust And Water	IP55			
Overall Machine Dimensions (L x W x H)	1590 x 620 x 1180 mm	3080 x 620 x 1180 mm	4570 x 620 x 1180 mm	6060 x 620 x 1180 mm
Overall Electric Cabinet Dimensions (L x W x H)	600 x 500 x 1400 mm			
Machine Weight (With Electric Cabinet)	1190 kg	1845 kg	2542 kg	3269 kg
Balancing Certificate Printout	Laser printer (option)			
User Interface	Color touch-screen, impact-, oil- and dirt-resistant			

# Balancing Machine BALKAR-3000K

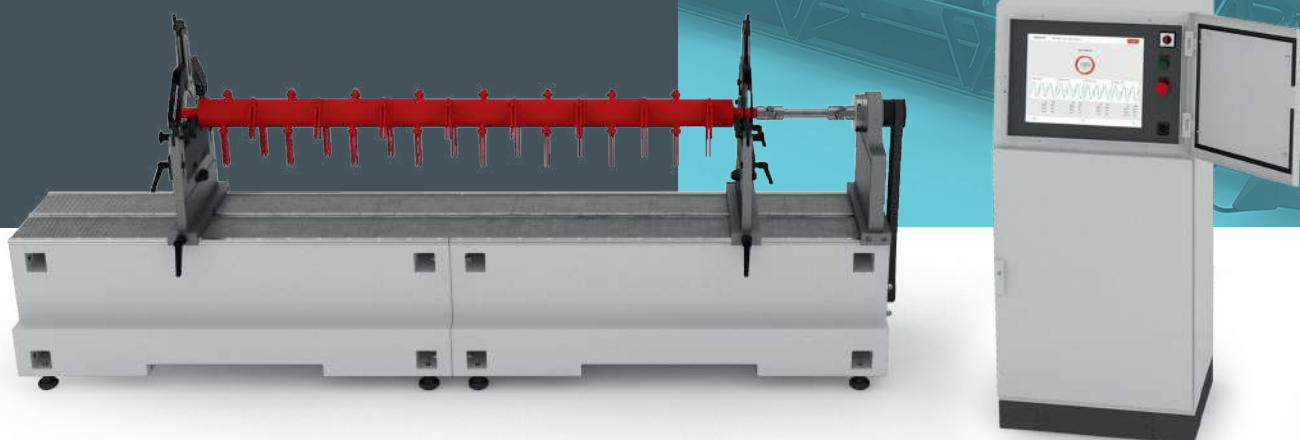
Horizontal hard-bearing modular machine  
for balancing agricultural equipment rotors

Equipped with  
VIBROLAB

Simple basement-free  
installation

MADE IN  
RUSSIA

EAC



BALKAR-3000K machine is optimized for efficient balancing of most types of rotors for agricultural equipment (sowing and harvesting machines, such as harvesters, tractors seeders, harvesters, and mowers).

## Quick and highly accurate balancing of flexible rotors for agricultural equipment

Today, there is a steady trend to reduce the material consumption and increase the working speed of rotating parts of agricultural machines, which means a transition from traditional rigid rotors to quasi-flexible and flexible ones. Rotating parts of mechanized sowing and harvesting equipment are more and more often designed as flexible or quasi-flexible rotors.

Technological solutions implemented in BALKAR-3000K significantly reduce balancing time of flexible and quasi-flexible rotors of agricultural equipment. At the same time, high balancing quality (accuracy) and neutral balance at any, even maximum, rotor speed, are guaranteed. The risks of destruction of the machine and the balanced rotors, which are typical for conventional flexible rotor balancing technologies, are eliminated. Balancing operations can be effectively carried out at subcritical speed.

### The standard delivery set of BALKAR-3000K machine includes:

A set of big supporting rollers

A set of special clamping rolling inserts

Drive cardan shaft

All BALKAR accessories can be used for BALKAR-3000K

## BALKAR-3000K key features

Optimized for balancing rotors of agricultural equipment

VIBROLAB balancing measuring system is listed in the state register of measuring instruments

IP55 compliant sealed electric cabinet protected from dust and water ingress

Heavy-duty drive with powerful gearmotor

Rigid hard-bearing design for unbalance correction, also by removing masses or welding them on the machine

Easy manual adjustment of supports with highly accurate linear roller guides

European-made electrical and mechanical components

No basement required

Modular take-apart design with the possibility of further elongation

12 month warranty for the machine and all components

## BALKAR-3000K technical specifications

Machine Type	Horizontal, hard-bearing with rigid supports
Rotor Drive Type	Axial (belt drive – optional)
Number of Supports and Measurement Planes	3 pcs, including 1 spindle type and 2 intermediate
Rotor Weight	0.15 – 300 kg
Rotor Diameter, max	up to 800 mm (over the machine bed)
Rotor Length	140 – 2,700 mm
Balancing Quality Grade	G1 according to ISO 21940-21-2012
Power supply	1 phase, 220 V, 50 Hz, 10 A, protective grounding is required
Electric Drive	Variable frequency asynchronous, with reducer, 400–2,000 rpm, 2.2 kW

Rotor Turn To Correction Position	Manual or automatic (optional)
Rotor Drive Brake	Optional
Vibration Sensors	Piezoelectric force sensors built into the supports
Protection Against Dust And Water	IP55
Overall Machine Dimensions (L x W x H)	3,080 x 620 x 1,180 mm
Overall Electric Cabinet Dimensions (L x W x H)	500 x 600 x 1,400 mm
Machine Weight with Electric Cabinet	1,845 kg
Balancing Certificate Printout	Laser printer (optional)
User Interface	Color touchscreen, impact resistant



# Balancing Machine BALKAR-1500KV

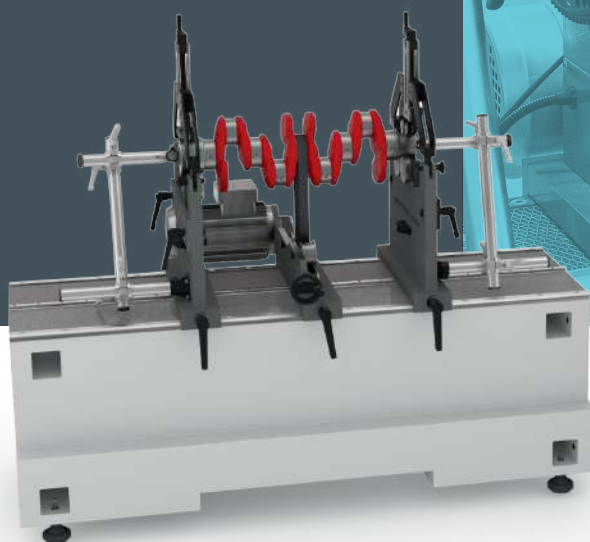
Horizontal hard-bearing modular machine for balancing any two-support rotors, including crankshafts, under 150 kg

Equipped with  
VIBROLAB

Simple basement-free  
installation

MADE IN  
RUSSIA

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The BALKAR 1500KV machine is designed for balancing any two-support rotors, including crankshafts, under 150 kg. The BALKAR modular bed consists of 1.5-meter-long sections, making it possible to assemble the machine of any required length, depending on the client's needs. Thanks to the dynamic balancing algorithm of the VIBROLAB system, BALKAR-1500KV effectively balances disc-shaped rotors (pump impellers, flywheels, pulleys, etc.).

Rigid hard-bearing design for unbalance correction by drilling on the machine. The automated drilling of rotors on the machine is possible thanks to the optional ENSET drilling gantry. With the optimized operation algorithms, BALKAR-1500KV and the gantry can be used as one unit. BALKAR-1500KV is perfect for enterprises engaged in repair of internal combustion engines.

## **BALKAR-1500KV has a wide range of tooling and additional equipment:**

Drilling gantry system for crankshafts

Tooling set for balancing crankshafts of inline engines

Tooling set for balancing V-engine crankshafts

Fixtures for installing rotors on the machine supports  
(support rollers, slide bearings of different sizes)

Welding gantry system for balancing masses

## BALKAR-1500KV key features

Optimized for balancing crankshafts	Easy manual adjustment of supports with highly accurate linear roller guides
Equipped with the VIBROLAB vibration balancing measuring system that is listed in the state register of measuring	European-made electrical and mechanical components
IP55 compliant sealed electric cabinet protected from dust and water ingress	No basement required
Rigid hard-bearing design for unbalance correction, also by removing masses or welding them on the machine	Modular take-apart design with the possibility of further elongation
	12 month warranty for the machine and all components

## BALKAR-1500KV technical specifications

Machine Type	Horizontal, hard-bearing with rigid supports	Rotor Turn To Correction Position	Manual or automatic (optional)
Rotor Drive Type	Belt (axial type – optional)	Rotor Drive Brake	Optional
Number of Supports and Measurement Planes	2 pcs, adjustable height	Vibration Sensors	Piezoelectric force sensors built into the supports
Rotor Weight	0.15 – 150 kg	Protection Against Dust And Water	IP55
Rotor Diameter, max	800 mm (over the machine bed)	Overall Machine Dimensions (L x W x H)	1,590 x 620 x 1,180 mm
Rotor Length	140 – 1,400 mm	Overall Electric Cabinet Dimensions (L x W x H)	500 x 600 x 1,400 mm
Balancing Quality Grade	G1 according to ISO 21940-21-2012	Machine Weight with Electric Cabinet	1,190 kg
Power Supply	1 phase, 220 V, 50 Hz, 10 A, protective grounding is required	Balancing Certificate Printout	Laser printer (optional)
Electric Drive	Variable frequency asynchronous, 400–2,000 rpm, 2.2 kW	User Interface	Color touchscreen, impact resistant
		Phase Sensor Type for Belt Drive	Laser keyphasor

# DBR series balancing machines

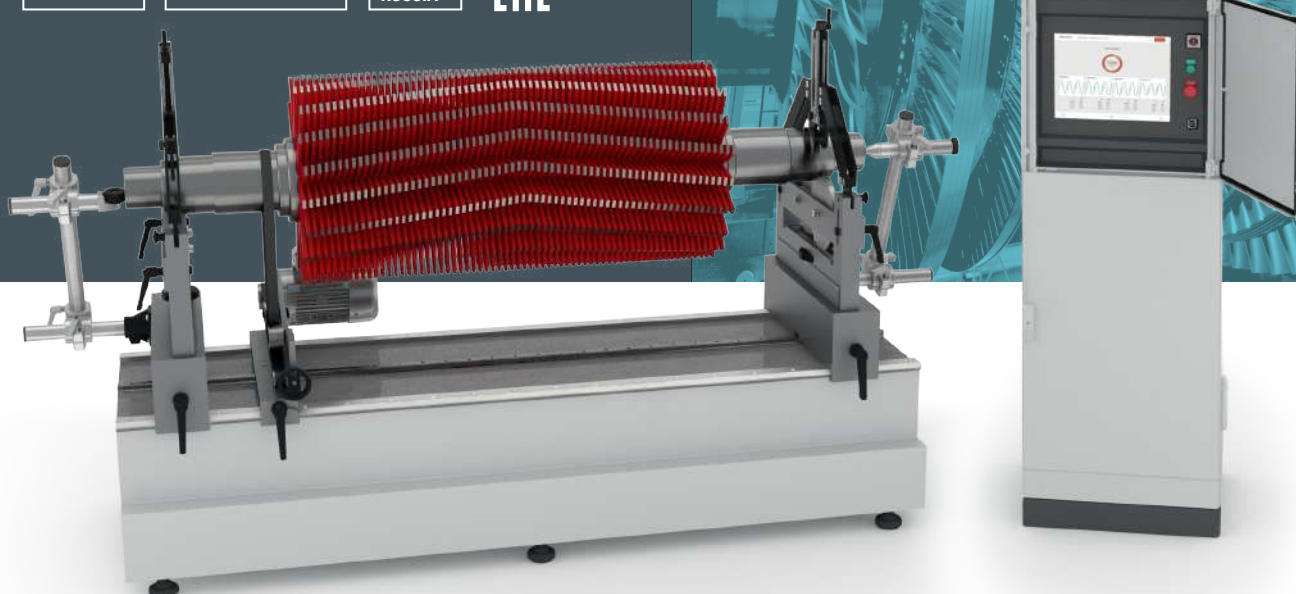
Horizontal hard-bearing modular machines for  
balancing flexible and rigid rotors under 40 tons

Equipped with  
VIBROLAB

Simple basement-free  
installation

MADE IN  
RUSSIA

ENET



## Special modular machines for balancing flexible and rigid rotors under 40 tons

ENSET has developed and successfully implemented innovative technological solutions and means for balancing rotor systems. The universal mechanical-mathematical model of the rotor system, formalized algorithms and the hardware and software complex of the DBR series machines make it possible to balance flexible and quasi-flexible, rigid and quasi-rigid rotors at low speed with high accuracy.

## Uniquely fast, highly accurate and safe balancing of flexible rotors

Technological solutions implemented in the DBR series machines significantly reduce balancing time of flexible and quasi-flexible rotors: only three runs at low speed are enough. The DBR series machines ensure at least 95% Unbalance Reduction Ratio (URR) for flexible rotors. No competing balancing machine can achieve such URR value for flexible rotors. At the same time, we guarantee high quality (accuracy) of balancing of flexible and quasi-flexible rotors, meeting Russian and international standards and ensuring neutral balance of the balanced rotor at any, even maximum speed. The risks of destruction of the machine and the balanced rotors, which are typical for conventional flexible rotor balancing technologies, are eliminated. Balancing operations can be effectively carried out at subcritical speed.

### The standard delivery set of DBR series machine includes:

A set of support rolling blocks

Electric scales

A set of vee blocks

## DBR series key features

Optimized for balancing flexible rotors

Accuracy of a soft-bearing machine and rigidity of a hard-bearing machine thanks to the innovative design of supports

Unbalance Reduction Ratio (URR)  $\geq 95\%$ .

Equipped with the VIBROLAB vibration balancing measuring system that is listed in the state register of measuring instruments

IP55 compliant sealed electric cabinet protected from dust and water ingress

Rigid hard-bearing design for unbalance correction, also by removing masses or welding them on the machine

Easy manual adjustment of supports with highly accurate linear roller guides

European-made electrical and mechanical components

No basement required

Modular take-apart design with the possibility of further elongation

24 month warranty for the machine and all components

## DBR series technical specifications

Model	DBR-10	DBR-150	DBR-1500	DBR-15000	DBR-40000
Machine Type	Horizontal, hard-bearing with rigid supports				
Rotor Drive Type	Belt (axial type — optional)				
Number of Supports	2 pcs, adjustable height, rollers included				
Rotor Weight	0.03 – 12 kg	0.15 – 150 kg	1.5 – 1,500 kg	1.5 – 15,000 kg	40 – 40,000 kg
Rotor Diameter, max	up to 290 mm (over the belt drive)	up to 1,600 mm (over the machine bed)	up to 2,000 mm (over the machine bed)	up to 3,000 mm (over the machine bed)	up to 4,000 mm (over the machine bed)
Rotor Length	40 – 455 mm	80 – 1,400 mm	100 – 2,700 mm	140 – 5,700 mm	200 – 10,000 mm
Balancing Quality Grade	G0.4 according to ISO 21940-21-2012				
Power Supply	1 phase, 220 V, 50 Hz, 6 A	1 phase, 220 V, 50 Hz, 10 A	3 phase, 380 V, 50 Hz, 16 A		
Protective grounding	required				
Electric Drive Variable frequency asynchronous, with reducer	180 – 10,000 rpm	100 – 2,000 rpm			
Rotor Turn To Correction Position	Automatic				
Rotor Drive Brake	Optional				
Vibration Sensors	Piezoelectric force sensors built into the supports				
Protection Against Dust And Water	IP55				
Overall Machine Dimensions Without Electric Cabinet (L x W x H)	500 x 409 x 507 mm	1,500 x 750 x 1,180 mm	3,000 x 750 x 1,180 mm	6,000 x 1,000 x 1,180 mm	10,500 x 1,200 x 500 mm
Machine Weight (With Electric Cabinet)	45 kg	1,160 kg	3,290 kg	14,710 kg	25,450 kg
Balancing Certificate Printout	Laser printer (optional)	Laser printer (included)			
User Interface	Color touchscreen, impact resistant				

# VIBROLITE universal balancing device

Portable device for balancing rotors rotating with their own bearings or mounted on a balancing machine

Compatible with OS Windows, Android, iOS, macOS devices

MADE IN RUSSIA

EAC



The VIBROLITE portable universal balancing device is designed for rotor balancing both on machine and as a measurement system of a balancing machine. The device can be used for assembly, installation and repair works to eliminate dynamic loads to the bearings caused by the rotor system imbalance. VIBROLITE can also be used to determine rotation speed of the rotors in machine complexes.

## Universal balancing device

VIBROLITE is universal indeed, because is compatible with any types of sensors: accelerometers, force sensors, sensors with active electronics, and passive sensors. The device is compatible with laser keyphasors, protected from any ambient illumination, and inductive keyphasors to be installed on designated positions. VIBROLITE is compatible with an encoder for definition of angular position of the rotor during balancing.

No need for external power supply – it can be connected to Windows, Android, iOS, macOS devices (laptop, PC or tablet) via USB cable. Simple and user-friendly interface in Russian and English with prompts for the operator helps to avoid errors.

A unique peculiarity of VIBROLITE is the algorithms for balancing of quasi-flexible and flexible rotors that significantly decrease balancing time and ensure neutral balance of rotors at any rotation speed.

### Key features of VIBROLITE balancing device:

Can be used for rotor balancing both on machine and as a measurement system of a balancing machine

No need for external power supply – can be connected to Windows, Android, iOS, macOS devices (laptop, PC or tablet) via USB cable.

Simple and user-friendly interface in Russian and English with prompts for the operator helps to avoid errors

Compatible with any sensors: accelerometers, force sensors, sensors with active electronics, and passive

Compatible with laser keyphasors, protected from any ambient illumination, and inductive keyphasors to be installed on designated positions

Compatible with an encoder for definition of angular position of the rotor during balancing

Controls frequency converters by Schneider Electric, Toshiba, Delta

Unique built-in algorithms for accurate and fast balancing of quasi-flexible and flexible rotor



## VIBROLITE balancing device technical specifications

Number of Measuring Vibration Displacement Channels	1 – 4 pcs
Type of Vibration Sensors	Accelerometers, force sensors, sensors with active electronics, and passive sensors
Measurement Range of Vibration Displacement Amplitude	0.1 – 1,000 $\mu\text{m}$
Permissible Relative Error of Vibration Displacement Amplitude Measurement	$\pm 2\%$
Range of Rotor Rotation Speed	180 – 30,000 rpm
Permissible Rotor Speed Measuring Error	$\pm (1 + 0.0025 n)$ rpm, where n is the rotor rotation speed
Range of Measured Unbalances	0,05 – 500 g•mm/kg
Operating Frequency Range	3 – 500 Hz
Type of Angle Sensor (Encoder)	TTL 5 V, LIR 158 or similar
Type of Keyphasor	MARK-1M, laser type
Power Consumption, max	2,5 W
Overall Main Unit Dimensions (L x W x H), max	130 x 105 x 35 mm
Main Unit Weight	260 g
Supply Voltage	5 V
Operating Temperature Range	+ 10 to + 35 °C
Mean Time Between Failures	40,000 h
Average Service Life	25 years

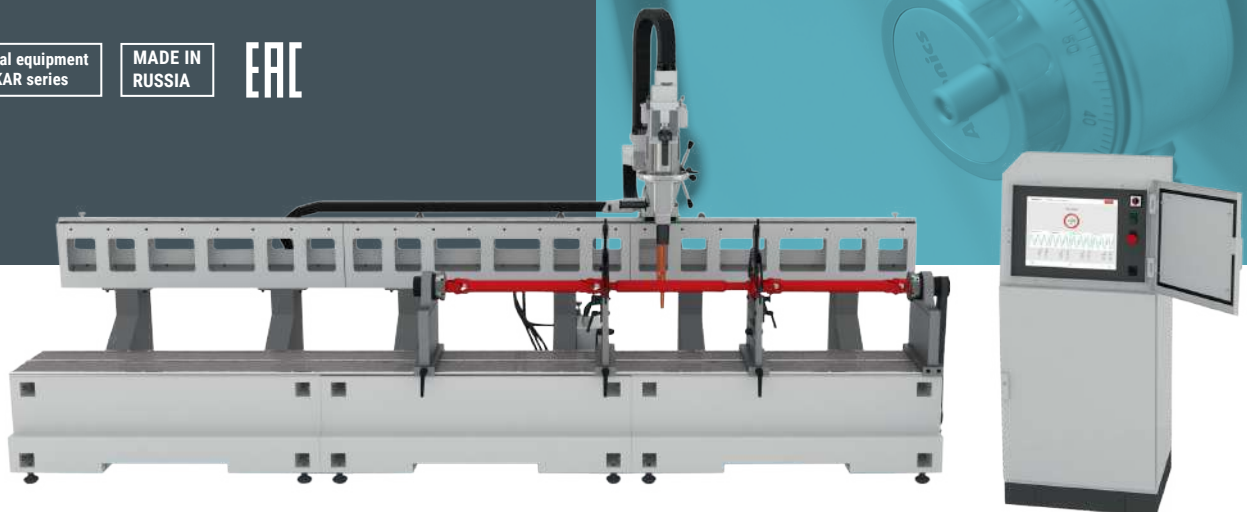
# Welding gantry system for balancing masses

Spot welding gantry with transport system for rapid welding of balance masses

Additional equipment  
for BALKAR series

MADE IN  
RUSSIA

ERC



Spot welding gantry with a transport system for rapid welding of balance masses is an optional supplement to the BALKAR series machines. The gantry is used for automation of final correction of rotor unbalance by welding balancing masses. It is equipped with a high quality welding unit manufactured by TECNA, Italy. The operating algorithms are optimised to run the gantry and the balancing machine as a single unit.

## Welding gantry technical specifications

Power Supply	2 phase, 400 V, 50 Hz, 10 A, protective grounding is required
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Length of Track	450 m
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Vertical Travel	160 mm
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Overall Gantry Dimensions (L x W x H) (length equals the length of BALKAR machine bed)	1,250 x 2,400 mm
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Welding Unit	TECNA-3024
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Timer	Built-in
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Capacity, max	115 kVA
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Short Circuit Current	22,8 kA
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Cable Cross Section, Length L=30 m	16 mm <sup>2</sup>
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Delayed Action Fuse	63 A
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Number of Direct Call Programs	2 pcs
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Secondary Circuit	Copper, fully cooled
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Control	Welding unit handle
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Basement	Not required
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Weight, max	1,004 kg
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# Gantry drilling systems for BALKAR series machines

Series of gantry complexes for drilling crankshafts and other rotors

Additional equipment machines

MADE IN RUSSIA

EAC

The gantry drilling systems for unbalance correction by drilling are optional for the BALKAR balancing machines. The option includes supports with rail guides and a drilling module with travelling device. The universal design allows equipping the drilling system with a welding unit for addition of masses (to be purchased separately). The system is easy to assemble and extend thanks to the modular design. The operating algorithms are optimised to run the gantry and the BALKAR machine as a single unit.



## Technical specification of gantry drilling systems for BALKAR machines

Model	1500	3000	4500	6000
Power Supply	1 phase, 220 V, 50 Hz, 16 A, protective grounding is required			
Electric Drive	Variable frequency asynchronous, 1.1 kW			
Number of Machine Beds	1 pcs	2 pcs	3 pcs	4 pcs
Length of Track Along Machine Bed	1,200 mm	2,700 mm	4,200 mm	5,700 mm
Length of Track	590 mm			
Vertical Travel	230 mm			
Drill Bit Diameter, max	16 mm			
Depth Gauge Accuracy	± 0,1 mm			
Overall Gantry Dimensions (L x W x H)	1,500 x 590 x 1,150 mm	3,000 x 590 x 1,150 mm	4,500 x 590 x 1,150 mm	6,000 x 590 x 1,150 mm
Overall Drilling Module Dimensions (L x W x H)	1,028 x 450 x 1,152 mm	1,730 x 450 x 1,152 mm	2,480 x 450 x 1,152 mm	3,227 x 450 x 1,152 mm
Overall Dimensions of Assembled System (L x W x H)	1,750 x 1,350 x 2,250 mm	3,250 x 1,350 x 2,250 mm	47,50 x 1,350 x 2,250 mm	6,250 x 1,350 x 2,250 mm
Drilling Module Weight	140 kg			
Weight of Assembled System	454 kg	719 kg	984 kg	1,271 kg
Gantry Weight	314 kg	579 kg	844 kg	1,131 kg



## Balancing machines upgrade

ENSET upgrades hard-bearing and soft-bearing balancing machines produced by any manufacturer. Thanks to the integration of our technological solutions, knowledge and experience, we turn outdated machines into highly accurate and reliable equipment, optimized for client's current needs and complying with modern balancing standards.

Upgraded machines are equipped with the VIBROLAB measuring system (listed in the state register of measuring instruments since 2016 and can be supplied with calibration). High accuracy and reliability of ENSET's measurement system are confirmed by Independent Verification and Validation. The VIBROLAB system is installed in a sealed cabinet (several options available, IP55 protection class) and is running on the basis of an industrial computer and Microsoft Windows Embedded OS. The system is safely protected from malfunctions and surges. No power cut-out is a threat to data safety. Simple and user-friendly interface in Russian and English with prompts for the operator helps to avoid errors. VIBROLAB has unique built-in algorithms for routine and out-of-schedule machine tests according to ISO.

If the measurement system and vibration sensors need changing, the mechanical part of the machine will be adapted.

### **Depending on the customer needs, the upgrade works may include:**

- machine drive replacement with a modern frequency controlled drive;
- replacement or restoration of the supports;
- replacement or restoration of the machine belt drive;
- retrofit of the axial drive with electromagnetic brakes;
- replacement or restoration of the support rollers and the drive cardan shaft;
- replacement of power electronic parts and wiring of the machine;
- design and manufacturing of special tooling;
- manufacturing of a test rotor according to ISO;
- retrofit with balancing protocols printout system.



### **The standard upgrade services package includes:**

- examination and inspection of the main units of the machine;
- preparation of engineering documentation for the upgrade;
- manufacturing and supply of equipment and components for the upgrade;
- installation of new units and adaptation of old parts of the machine;
- preparation of a set of supporting documentation;
- commissioning;
- training of personnel how to operate the upgraded machine;
- acceptance tests.

The upgrade price and timeframe depend on the scope of works. You can get a price estimate within 1-2 working days after consulting our specialist.

These companies chose us for upgrade of their balancing machines:

Rostselmash Combine Harvester Plant LLC (manufacturer of full range of agricultural machines and equipment under brands "Rostselmash" and "Versatile"), Novochoerkassk Electric Locomotive Plant Manufacturing Company LLC (Russia's biggest Electric Locomotive manufacturing), Rostvertol PJSC (manufacturing of civil and military Mi-26 helicopters, combat Mi-35M and Mi-28N "Night hunter" helicopters), Mari paper mill OJSC (multifunctional industrial complex, manufacturing of paper, cardboard, cellulose pulp, fiberboard, paper bags), Rostovenergomont OJSC (repair of large electric machines and power transformers, electric machines winding) and other companies.

All balancing machines, upgraded by ENSET, reliably contribute to the success of our clients.



## Fast and skilled technical support

Work schedule of ENSET technical support specialists is optimized for prompt response to incoming requests. During business hours you can be sure to get a feedback within 30 minutes. If needed, our designers and original equipment manufacturer will join the technical support specialists to assist you. The consultations will continue until your problem is completely solved.

## Training of personnel

To ensure proper balancing of your rotors and efficient operation of our equipment and software, we provide training for your personnel at our premises free of charge.

## Warranty

The warranty for all equipment is twelve (12) months, starting with the equipment put into operation. For DBR machines the warranty period is extended to 24 months.

## Production time and payment terms

Following payment terms are available:

- 50% prepayment of the contract amount; 50% upon ready for shipment notification;
- 50% prepayment of the contract amount; 10% upon ready for shipment notification; the rest of the amount to be paid in equal monthly payments during the next 6 months;
- other payment terms are negotiable.

Production time and readiness for shipment do not exceed 60 business days after 50% prepayment.



Contact phone numbers:

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Contact phone numbers:

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