



*HORIZONTAL
BALANCING
MACHINES*

CATALOGUE



*VERTICAL
BALANCING
MACHINES*



EBS
ELETTORAVA BALANCE SYSTEMS

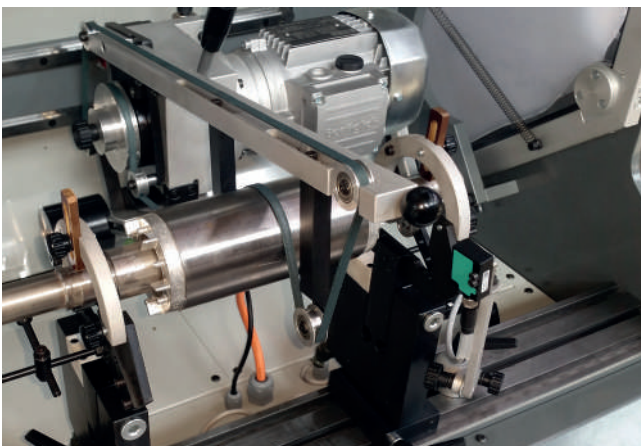
The future of tomorrow is now.



Our philosophy

EBS is born from the synergy between Elettrovava and Balance Systems, two leader companies in the balancing world. The history of these companies is deeply rooted in one of the strongest human feelings: passion, which has always nourished both to be the reference point for all our customers, creating and maintaining a high quality in every area of processing. The union has the aim of giving life to a company with unprecedented capabilities and constitutes the opportunity to expand our presence in the electromechanical sector, implementing the worldwide offer of balancing machines for rotating parts of all dimensions and weights and further

strengthening business principles such as innovation, dynamism, care and attention to the customer. Our mission has the purpose to develop and realize advanced technological solutions for the sector which distinguishes the company's production offer: manual, semi-automatic, automatic and customized balancing machines for different application sectors. Thanks to more than 60 years of experience, EBS offers unique solutions in the balancing field, able to reduce costs and production times, always exceeding expectations and promoting lasting relationships between customers and our operators.



Know-how

In any mechanical or electromechanical machine the vibration generated by the various rotating components limits its life and performance, as well as increasing its noise and energy consumption; to eliminate this phenomenon all rotating parts must be balanced, and for this reason we are specialized in the design and production of balancing machines.

Machinery division:

- Automatic balancing machines: suitable for large volume production cycles
- Semi-automatic balancing machines: suitable for processing small batches or with frequent changes
- Manual balancing machines: suitable for reduced volume production cycles

The balancing can be done by removing material (drilling or milling) or by adding material (screws, resin, rivets, metal points, masses welding).



R100G-VS

| from 1 to 100 kg

Horizontal balancing machine for balancing of rotors with a mass up to 100 kg, with force measuring hard bearing pedestals. The rotor is dragged by a cardan joint that is in axis with the piece to be balanced. A disc with a graduated scale between 0° and 360° allows an easy and rapid search of the angular position of the unbalance. The machine is equipped with the EQ21S-TS instrumentation.

Horizontal hard bearing belt drive balancing machine with a capacity up to 300 kg, with vertical electrical cabinet and EQ21S-TS equipment, complete with angular indexing. R300B is available with two different belt tensioning systems: pneumatic and manual. Machine is equipped with a safety guard tunnel sliding on the floor.

R300B-VS

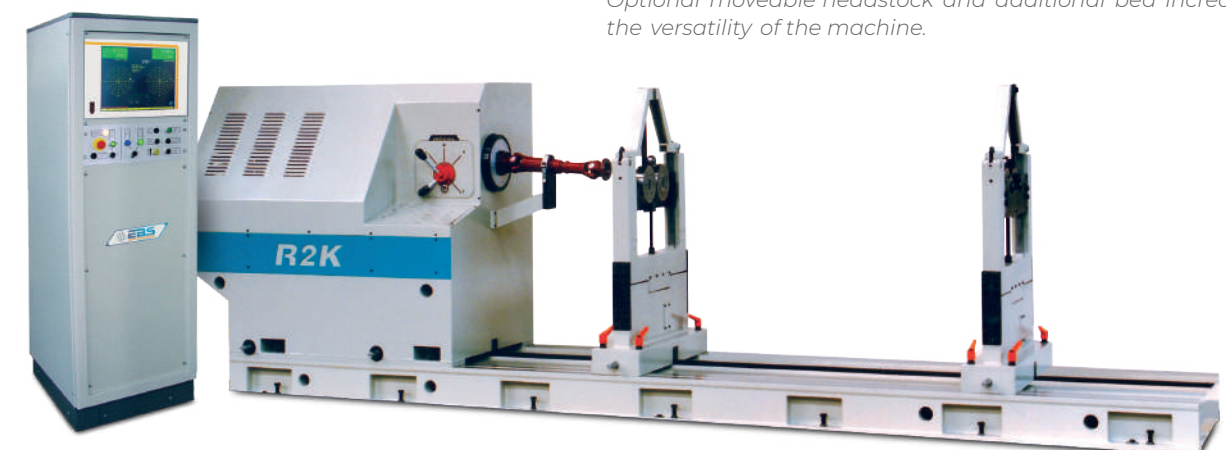
| from 3 to 300 kg



R2KG-VS

| from 20 to 2000 kg

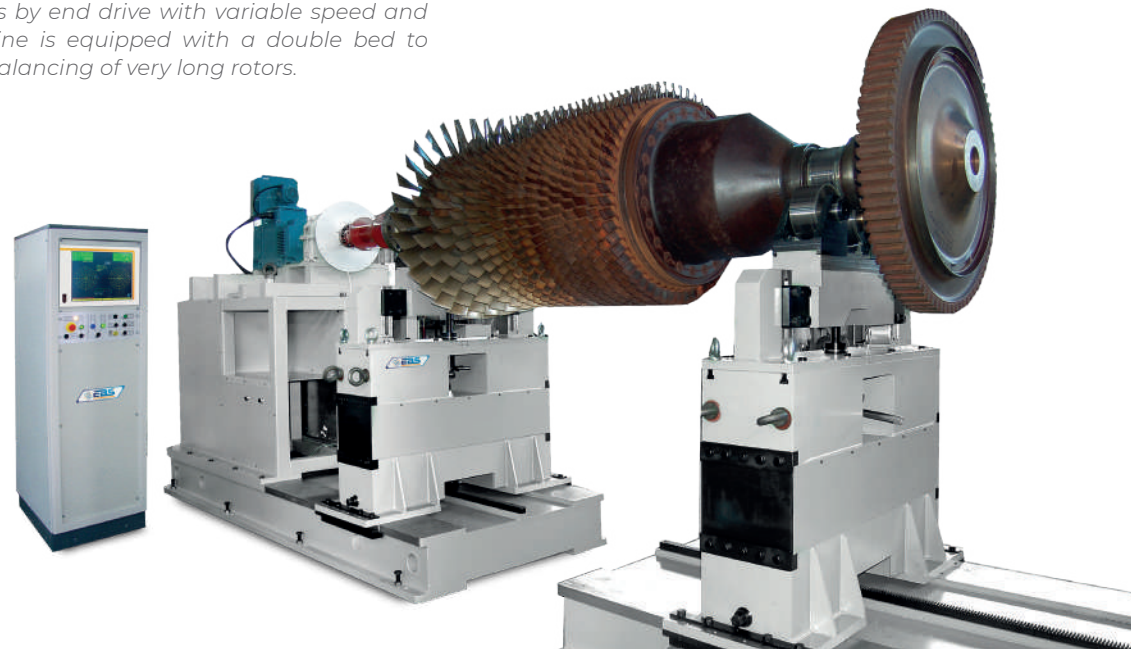
Horizontal hard bearing balancing machine with a capacity up to 2000 kg, with end drive system, four speed gearbox and variable speed motor. Electrical cabinet is separate and also contains the computerised instrumentation EQ21S-TS. Optional moveable headstock and additional bed increases the versatility of the machine.



Horizontal hard bearing balancing machine for balancing of rotors with a mass up to 50000 kg and diameter up to 3500 mm, with EQ21S-TS computerized electronic instrumentation complete with printer and angular indexing. The driving system is by end drive with variable speed and gearbox. The machine is equipped with a double bed to allow the dynamic balancing of very long rotors.

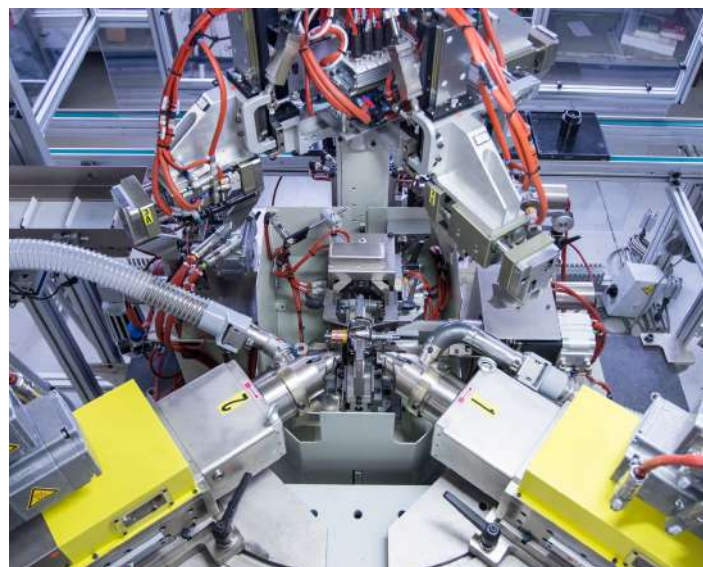
R50KG-VS

| from 500 to 50000 kg

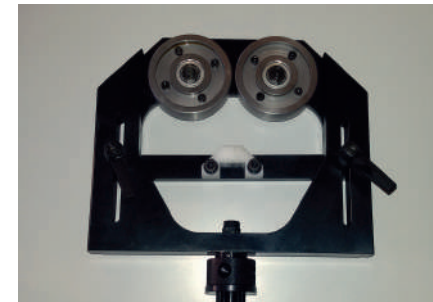


Automatic Solutions

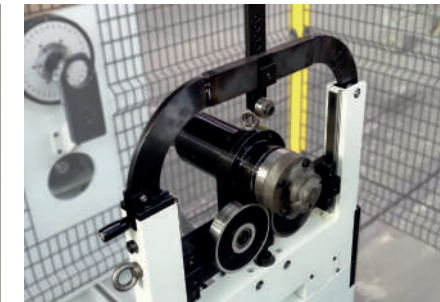
Automatic horizontal balancing machines, with different methods of correction including both adding and removing material are designed for fully automatic and semi-automatic production lines. The machines could be equipped with robotic arms and in/out piece conveyors. It is possible to design machines with more than one station including measurement, correction and final test stations to reduce procedure time. It is always necessary to have the complete technical specifications of both pieces to be balanced and production line to be able to design the optimum possible solution for each project.



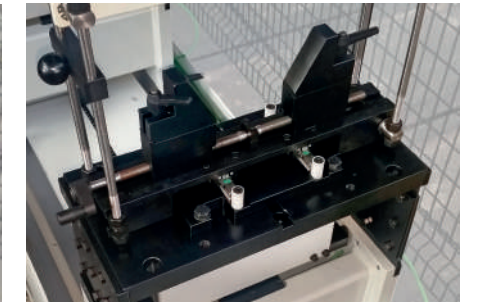
Carriages



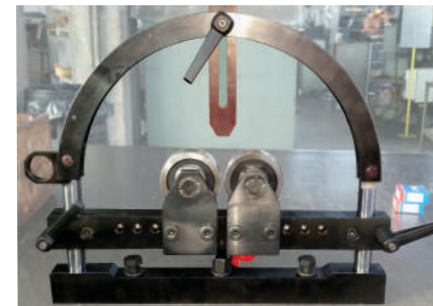
Counter support for cantilever rotors.



Spindles for drive shafts balancing.



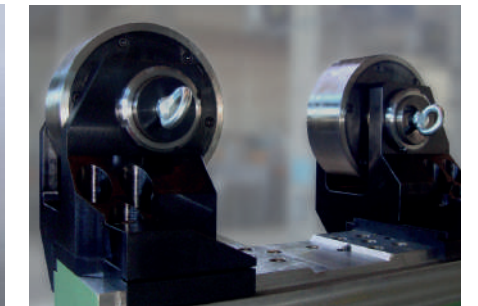
Tool with self-centering dowels for central supports for balancing drive shafts in 2 or 3 pieces.



Rollers on K300 soft bearing machine.



Standard roller carriages.



Special roller carriages for large machines.

Drive Systems



Joint / End / Cardan drive system.



Belt drive system with pneumatic tensioning tool. Belt drive systems are also available with manual arm tensioning tool.

Accessories

- Printer for creating the balancing certificate
- Angular position indexing, useful in belt drive machines
- Locking brake, useful to correct the imbalance of the machine
- Example rotor according to ISO2953, and test masses for machine verification
- Additional bed, useful for very long rotors
- Counter support for balancing overhung rotors
- Special rollers equipment for the out of standard journal diameters
- Special cradle supports for balancing rotors with their own bearings
- Automatic angular positioning
- Movable head along the bed

	NOTE NOTES	MODEL		R10	R30	R100
GENERAL DATA	-	Nominal capacity	kg	10	30	100
	1	Maximum weight for symmetric rotor	kg	15	45	150
	2	Maximum diameter on the bed	mm	400	600	800
	3	Journals diameter (min - max)	mm	5 - 40	10 - 70	10 - 70
	4	Standard bed length	mm	750	1600	2200
	5	Maximum sensitivity	g mm	0.2	0.4	0.5
END DRIVE	6	Type of motor drive	-	CA / AC	CA / AC	CA / AC
	7	Maximum rotor length	mm	550	730	1100
	-	Min. dist. between pedestals centreline	mm	25	37	37
	8	Balancing speed	RPM	300 - 3000	300-1500 300-3000	300 - 1500 300 - 2000
	9	Motor power	kW	0.18	1.5 - 2.2	1.5 - 2.2
BELT DRIVE	-	Movable drive Head (Optional)	-	SI / YES	NO	NO
	7	Maximum rotor length	mm	610	1400	2000
	-	Min. dist. between pedestals centreline	mm	40	95	110
	-	Diameter driven by belt	mm	10 - 150	30 - 200	30 - 200
	-	Motor pulley diameter	mm	38 - 76	98	98
	10	Motor speed	RPM	300 - 3000	300 - 3000	300 - 3000
	9	Motor power	kW	0.18	1.5	1.5 - 2.2

NOTES Technical specifications can be modified at any time by the manufacturer.

R300	R650	R1K	R2K	R3K	R5K	R10K	R20K	R50K
300	650	1000	2000	3000	5000	10000	20000	50000
450	1000	1300	3000	4500	7500	15000	30000	60000
1200	1600	1600	1600	1600	2100	2500	2500	3500
15 - 150	15 - 200	15 - 200	20 - 200	20 - 200	30 - 300	40 - 400	40 - 400	135 - 500
3000	4500	4500	4500	4500	5000	6000	6000	7000
1	2	3	4	6	15	25	50	150
CA / AC	CA / AC	CA / AC	CA / AC	CA / AC	CA / AC	CA / AC	CA / AC	CC / DC
1850	3000	3000	3000	3000	3500	4100	4100	4500
100	150	150	185	185	250	300	300	600
200 - 1500 200 - 2000	200 - 1000 200 - 1500	200 - 1000 200 - 1500	200 - 600 200 - 1000	200 - 400 200 - 800	120 - 400 120 - 600	120 - 400 120 - 600	120 - 400 120 - 600	60 - 400 60 - 600
3 - 5.5	5.5 - 7.5	7.5 - 11	11 - 15	15 - 22	30	35	50	110
SI / YES	SI / YES	SI / YES	SI / YES	SI / YES	SI / YES	NO	NO	NO
2800	4200	4200	4200	4200	4700	5500	5500	6500
280	330	330	385	385	450	500	500	700
40 - 400	50 - 500	50 - 500	50 - 650	50 - 650	100 - 800	100 - 1000	150-1500	200 - 2000
120	140	140	150	150	250	250	300	300
300 - 3000	300 - 3000	300 - 3000	200 - 2500	200 - 2500	150 - 2000	150 - 2000	100 - 1500	100 - 1000
3 - 4	5.5 - 7.5	7.5 - 11	7.5 - 11	11 - 15	18 - 22	25 - 35	40	90

- For asymmetric rotors each pedestal can be loaded considering half of his weight.
- A larger maximum diameter can be handled using movable drive head and bed extension.
- These diameters are valid for standard rollers. Special rollers for other diameters can be supplied upon request.
- Different bed lengths are available upon request.

- Maximum sensitivity for each plane defined according to DIN1319 regulation for rotors with dimensions in accordance with ISO2953 standard. The minimum achievable residual unbalance depends on the balancing speed, on the weight and properties of the rotor, on type and conditions of the cardan drive shaft or of the belt, and on the journals conditions.
- C.A. = alternating current asynchronous motor. C.C. = direct current motor.
- The maximum rotor length is defined as the distance between the end

- of the cardan shaft and the centreline of the farthest pedestal for end drive machines, and as the maximum distance between the centrelines of the pedestals for belt drive machines.
- All EBS balancing machines are equipped with adjustable speed with electronic control of speed and acceleration and braking ramps, in order to obtain a large versatility in the use of the machine.
 - Different powers are available upon request. The required power must be

- chosen considering the desired starting time, the maximum inertia of the rotor, the windage losses, and the number of starts per hour.
- The speed of the rotor is given by the motor speed multiplied by the ratio between the motor pulley diameter and the rotor diameter wrapped by the belt.

Safety guards

Guards are constructed in accordance with ISO 21940-23/2012 and can be in B or C class. The guards have a safety switch with electromagnet for the necessary consents: if the protection is open, the machine can't start, and during the measurement cycle the protection cannot be opened until the rotor has completely stopped.

Tilting safety guard

Tilting tunnel safety guard in transparent metalcrylate and aluminium profile.

Metal sheet safety guard

Tunnel safety guard made of sliding metal sheet on floor rails built in two or more pieces depending on the length of the bed. When closed, the protection completely covers the machine, and avoids the operator's contact with moving parts, but also prevents the leakage of masses which could detach from the rotor in any direction.

Perimetral safety guard

Metal mesh perimetral safety guard fixed to the floor around the machine. A front door, sliding or hinged, allows the access to the machine when is stopped. This type of protection avoids the contact of the operator with moving parts.

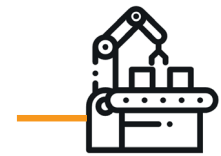


Vertical balancing machines

Production of universal vertical balancing machines designed for balancing components belonging to a wide range of industrial sectors such as automotive, aeronautic, automobile components, electrical appliances, power tools, industrial electric motors, and more. Our vertical machines correct the unbalance and balance the piece through the removal of material (drilling or milling) or by adding material (screws, resin, rivets, metal points, masses welding).

Components to be balanced:

- Dampers
- Transmission components
- Electric fan rotors
- Brake discs, turbine discs
- Flywheels
- Clutches
- Pump rotors
- Electric motor components
- Pulleys
- Propellers
- Train wheels



Fully automatic balancing machines

EBS balancing machines are intended for large volume production. Measuring, correction and control cycle are carried out in a completely automatic way by the machine; unbalance correction occurs by removing or adding material, while loading and unloading can be automatic or manual. Machines can be inserted in fully automated lines.



Semi-automatic balancing machines

EBS semi-automatic balancing machines allow to correct in a few and simple operations the unbalance present on rotating parts. The correction is carried out manually by an operator, but angular positioning of the piece and the rotation of the table in case of milling occurs automatically.



Manual balancing machines

EBS manual balancing machines allow to measure the unbalance present on different types of rotors, with centre bores only. The correction of unbalance is carried out in manual way through adding or removing material by the operator. Even the positioning of the piece is done manually.

Correction methods

V1 Vertical machines technical data

NOTES	MODEL		VR3	VR10	VR30	VR100	VR300	VR1K	VR2K	VR5K
1	Maximum rotor weight	kg	3	10	30	100	300	1000	2000	3000
2	Maximum diameter	mm	300	400	500	600	900	1300	1700	2500
3	Maximum height	mm	220	270	270	300	450	600	750	750
4	Balancing speed	RPM	1500	1000	1000	750	500	360	300	300
5	Drive motor power	kW	1.5	1.5	2.2	5.5	9	11	20	35
6	Measure uncertainty (1 plane)	g mm	2	5	10	20	50	100	200	300
-	Measure uncertainty (2 planes)	g mm	4	10	20	40	80	150	300	450
7	Maximum inertia	kg m ²	0.04	0.2	1	4.5	30	210	720	3900

NOTES Technical specifications can be modified at any time by the manufacturer.

1. Maximum rotor weight together with clamping tool
2. Maximum diameter with standard safety guard; larger diameters upon request
3. Maximum height of rotor and clamping tool with standard safety guard; higher height upon request
4. Lower balancing speed can be chosen during installation of the machine
5. Power of standard a.c. motor; higher power upon request in the case of rotors with high windage effect
6. Measure uncertainty according to DIN1319 standard for proving rotors manufactured according to ISO2953 standard, without clamping tool error
7. Maximum allowed inertia with standard motor; these values can also be exceeded with a more powerful motor or with longer starting time.

V2 One plane vertical machines with automatic drilling

MODEL		VR3AD	VR10AD	VR30AD	VR100AD
Maximum rotor weight	kg	3	10	30	100
Maximum diameter	mm	260	300	400	550
Maximum height	mm	120	150	200	250
Balancing speed	RPM	1500	1000	1000	750
Drive motor power	kW	3	3	7	7
Drilling diameter	mm	3-10	3-12	4-12	4-12
Drilling spindle motor power	kW	1.5	2.2	3	3
Tool rotational speed	RPM	500-2200	500-2200	500-2200	500-2200
Drilling spindle stroke	mm	200	200	300	200
Tool holder	-	ISO30	ISO30	ISO30	ISO30
Drilling force reaction device	-	YES	YES	YES	YES
Automatic rotor clamping	-	YES	YES	YES	YES

Technical specifications can be modified at any time by the manufacturer.

V1 AVAILABLE VERSIONS

- 1P = 1 Plane
- 2P = 2 Planes
- AW = Automatic angular positioning
- TV = Vertical drilling
- TO = Horizontal drilling
- MM = Manual milling

V2 AVAILABLE VERSIONS

- AD = Automatic drilling unit
- AD-O = Automatic horizontal drilling unit
- AM = Automatic milling unit
- Z = "Z" controlled axis
- X = "X" controlled axis

- V2: Multiple drilling head
- V2: Variable speed on drilling spindle

Accessories

- V1: Printer for creating the balancing certificate
- V1: Angular position indexing
- Holding brake
- Variable rotational speed
- Selector for acceleration and deceleration ramps
- Proving rotor and masses
- Vertical / horizontal manual drill
- Automatic angular positioning

- Laser device for detection of drilling surface position
- Automatic detection of prohibited zones for drilling
- Software for unbalance correction calculation with prohibited zones
- Residual unbalance position marking by ink jet
- Software to save balancing data for statistics
- Software to send balancing data to an external computer via RS232,USB
- Industrial chips exhauster
- Laser device for geometrical errors detection

ESA 2

| from 0,5 to 15 kg

Automatic balancing machine designed for balancing brake discs of automotive sector. Unbalance is automatically compensated in one plane by milling on the outer diameter of the disc. The machine allows production balancing of all types of automobile brake discs of existing in the market. The machine is equipped with automatic loading devices and in/out piece conveyors.



ESA 3

| from 1 to 100 kg

Totally automatic balancing machine for balancing electric brakes with mass up to 100 kg and diameter up to 550 mm with unbalance compensation by milling on two planes. After measuring unbalance, the piece is clamped on rotating table with three hydraulic self-centering jaws, and when the milling tool has entered into the piece in radial direction, the table indexes to the angle that is computed as a function of the unbalance quantity.

VR5K-2P

| from 50 to 5000 kg

Vertical balancing machine with 5000 kg maximum capacity, for balancing on two planes of turbines impellers and compressors. The machine is equipped with a peripheral metal wire mesh safety guard with electric interlock.



EQ21S-TS / EQ21S

All EBS balancing machines are equipped with EQ21S-TS or EQ21S computerized instrumentation. The measuring units model EQ21S-TS and EQ21S are electronic systems based on an industrial computer together with a DSP card (Digital Signal processor), and are used for processing and measuring the signals generated by the force transducers of the machine. The software allows the operator to enter **all the data of the rotor that have to be balanced** and to access to all machine functions in a simple and instantaneous way.



EQ21S-TS



EQ21S (Opzionale - Optional)

General characteristics

Windows 10 - IOT Enterprise

Fanless CPU

SSD removable storage memory

4 RS232 serial ports

2 LAN RJ45 ports

5 USB ports of which one on the frontal dashboard

Mouse on front panel (only for EQ21S model)

High resolution flat panel 12" (EQ21S) or 17" (EQ21S-TS) TFT colour screen for displaying unbalance values.

Sealed alphanumeric keyboard (EQ21S)

Touch Screen device integrated on the screen (EQ21S-TS)

Possibility to connect an external printer

Possibility of ethernet connection

Software characteristics

Direct indication of the unbalance in grams, g x mm, mg or kg and of the angular position in degrees

Visualization of the dynamic, static or couple imbalance

Visualization of rotational speed in revolutions per minute

Possibility to balance at a speed from 60 to 6000 RPM

Digital filtering system with DSP

Automatic calibration without the necessity of a previously balanced rotor

Possibility to choose between different measuring times and so different measuring accuracies

Possibility to set the equilibration tolerance values and comparison with the measured values, with IN TOLL information, through color change of the displayed value

Balancing tolerance calculation according to ISO 1940/1 standard

Possibility to generate balancing certificate

Setting up of geometrical data of the rotor to be balanced and parameters for the correction

Manual or automatic selection of the amplification

Automatic tool eccentricity determination and correction

Possibility of polar co-ordinates and representation of the unbalance in vector form

Electronic compensation of generated imbalances from key or other

Memory for storing 1000 different rotors (more upon request)

Data storage file (rotor code, initial unbalance, final unbalance)

Optional software

Statistic software

Assisted correction software (drilling, milling, adding weights)

Software used to detect prohibited zones

Integration with planning and scheduling software of MES (Manufacturing Execution System) production

Cabinets

Electric systems are made according to current regulations and inserted in cabinets with IP54 protection class. EQ21S-TS instrumentations can be inserted in hanging cabinets.





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