Balance Systems

Absolute Balancer

AUTOMATIC BALANCERS ON 1 AND 2 PLANE
FOR GRINDING MACHINE

ABSOLUTE® BALANCER

The range of ABSOLUTE BALANCER® heads, exclusive Balance Systems design, represents the state-of-the-art in the automatic balancing technology.
ABSOLUTE BALANCER® are available in all configurations for 1 and 2 plane. They ensure unprecedented performances both in terms of execution speed and final accuracy.The balancing heads are managed via contact less control (NoLink) by VM25 modular multifunction unit.

Features

- Exclusive Balance Systems design with moment-free architecture
- Designed in a wide range of diameters and shapes for built-in spindle mounting, starting from diameter 28mm
- Embedded rotational speed sensor
- Operating rotation speed up to 25.000 rpm
- Residual unbalance achievable at least 10 times less than traditional solutions on 1 and 2 plane
- Deterministic balancing time
- Automatic neutral cycle (weights at 180°)
- Acoustic emission sensor (AE) can be integrated (optional)

Benefits

- Corrects all dynamic effects on the grinding spindle, optimizing the surface geometry and quality of the work-piece
- Increases the machine productivity
- Increases of the spindle and wheels lifetime
- Increases of dressing interval with reduced environmental impact
- Does not require surveillance

The needs

For grinders in a production environment, it is becoming increasingly critical to obtain high dimensional control, geometric tolerances and surface finish qualities while maintaining or improving productivity levels.

The highest quality is achieved with a grinding wheel where both the static and the dynamic components of the unbalance are virtually eliminated.

The lack of homogeneity of the grinding wheel material, its consumption during use and the absorption of the coolant together with the tolerances of mechanical assembly, create an overall unbalance which affects the quality of the production and reduce the lifespan of the spindle.

To operate in optimal conditions, the unbalance must be compensated by a balancing head that automatically positions weights in response to the vibrations detected, so that this is reduced within the programmed tolerance limits. In order to correct the unbalance, depending on the spindle configuration and the type of grinding wheel, it is possible to act on 1 plane (when it is enough to remove the static component of the unbalance) or on 2 plane (when it is necessary to remove both the static and the dynamic components of the unbalance).

The balancing cycle, which interrupts the grinding cycle and thus stops production, typically have taken longer for two plane balancing than for single plane.

The productivity of grinders that require balancing on two planes can be significantly improved by providing a faster, more precise balancing system.

The solution

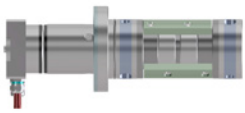
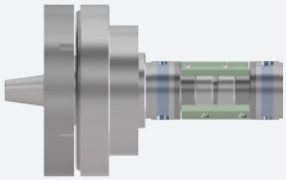
To meet the needs of cycle control on grinding machines with high quality and productivity, Balance Systems has developed the new digital balancing system ABSOLUTE BALANCER® for 1 and 2 plane which ensures unprecedented performances both in terms of execution speed and final accuracy.

The ABSOLUTE BALANCER® system uses a digital hardware architecture at the state-of-the-art and sophisticated adaptive algorithms for the correction of unbalance. In few seconds and with high precision, the system reduces to zero the unbalance vibrations detected by 1 or 2 accelerometers positioned on the spindle.

A complete range of solutions allows the integration of the system on each type of grinding machine.

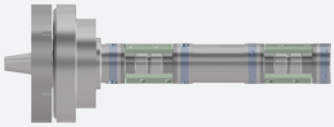
Typical applications for 1 plane balancing

- Gear grinding machines
- Grinding machines with super-abrasive wheels (e.g. CBN)
- Grinding machines performing high speed cycles
- Grinding machines for mass production

Configuration		Description
A		Spindle with access on the side of the grinding wheel only. The control is performed by contact less collector (NoLink) embedded with the balancing head body
B		Spindle clamped by conical device (e.g. HSK). The control is performed by contact less collector with ring shape.
E		Spindle with access on both sides, connected with internal bore. The balancing head is mounted on the grinding wheel side while the contact less collector is remoted on the opposite side.

Typical applications for 2 plane balancing

- Gear grinding machines with single or double grinding wheel (roughing and finishing)
- Cylindrical grinding machines between centers in configuration with one grinding wheel on both sides of the spindle
- Cylindrical grinding machines with super-abrasive wheels (e.g.: CBN) requiring an additional correction plane
- Centerless grinding machines
- Cylindrical grinding machines with grinding wheels pack

Configuration		Description
A		Spindle with double side access and without internal bore. The control is performed by contact less collector embedded with the balancing head body on both sides.
B		Spindle clamped by conical device (eg. HSK). The control is performed by contact less collector with ring shape.
C		Spindle with double side access with internal bore. The control is performed by contact less collector embedded with the balancing head body on one side only.
D		Spindle with one side access which is covering the full length. The control is performed by contact less collector embedded with the balancing head body on one side only.
E		Spindle with access on both sides, connected with internal bore. The balancing head is mounted on the grinding wheel side while the contact less collector is remoted on the opposite side.

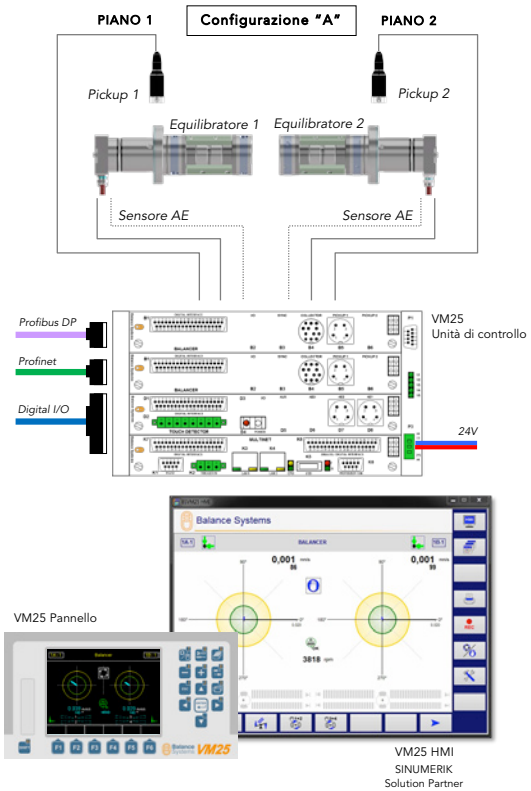
Operating

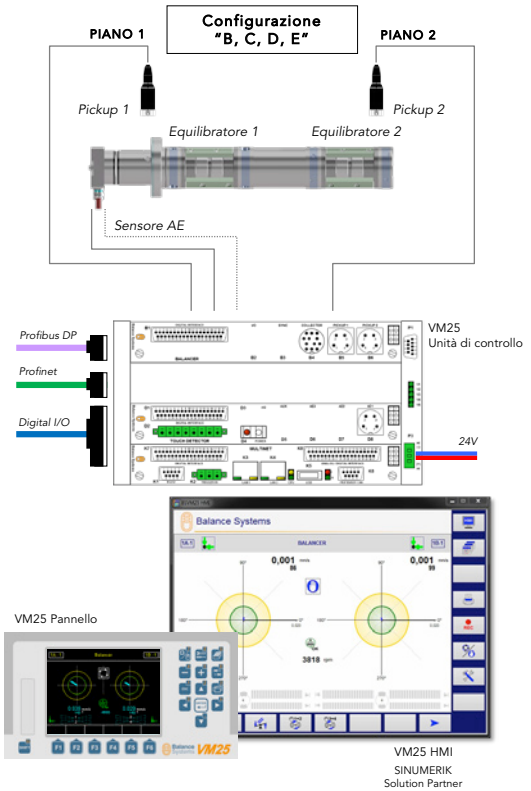
The system is composed by the VM25 modular multi-function control unit which manages the entire range of ABSOLUTE BALANCER® heads for 1 and 2 plane.

The balancing head is controlled, via the contact less collector (NoLink), to the balancing function card installed into the VM25 rack.

The balancing head can be designed with a single body and single collector (configurations B, C, D, E), or with two independent bodies with one single collector (1 plane) or two collectors (2 plane) (configuration A). The collector can be cylindrical (configurations A, C, D, E) or ring shaped (configuration B).

The acoustic emission sensor (AE), which can be integrated as an option, allows to implement the touch detection control for gap elimination, anti-crash monitoring and dressing process control.





The VM25 multi-function modular system

The control unit VM25 can integrate, at any time, additional functions, in order to complete the application in the machine:

- Manual pre-balancing of the grinding spindle on 1 and 2 plane
- Control of the wheel-piece contact (e.g. “gap” for air gap elimination and “crash” for collision detection), with acoustic emission and power sensors
- Control of the wheel-work dressing profile, with acoustic emission sensors
- Pre-in-post process control of diameters using absolute gauge device (Top Gauge Absolute) on stationary or rotating parts with continuous and interrupted surface
- Pre-in-post process control of diameters, thickness and taper using gauge heads (Top Gauge 200) with a dedicated master to each measure, on stationary or rotating parts with continuous and interrupted surface
- Active and passive axial positioning of the work piece
- In-post process roundness and shape analysis

The VM25 can be integrated with the grinding machine NCU/PLC thanks to several available protocols and interfaces:

- Digital I/O
- DP Profibus
- Profinet

The VM25 control unit is provided with an user panel as well as a VM25 HMI software application for PC ®Windows. Both of them can be used by the operator to configure the application through menu and to manually control the entire device.

The PC ®Windows VM25 HMI software package includes graphic libraries allowing the integration of the user panel into the HMI application of the machine OEM. The standard package includes the software application “VM25 Service” (for PC ®Windows). This allows local as well as remote maintenance for operations like parameters backup, restore and software updating.

Technical data	
VM25 versions	Rack and table
Power source	18-30 Vdc – max 78 W
Unbalance measuring unit	µm, mm/s
Resolution of unbalance measure	0,001
No. of unbalance tolerance limits	Up to 3 programmable
Part program	4
Range of the balancing heads diameters (*)	28, 30, 32, 38, 42, 50, 55, 60, 70, 81 mm
Balance head capacity (*)	Up to 8700 gcm
Max operating rotational speed	25000 turns/min
Rotational speed sensor	Integrated
No. of channels for vibration transducers	1 or 2
Vibration transducer	Accelerometer
Digital interface to PLC/NCU	Opto-isolated contacts, 24Vdc source or sink
Fieldbus	Profibus DP or Profinet
Analog interface [optional]	0..10V programmable
Neutral cycle (weights at 180°)	Included
Pre-balancing on 1 plane (guided procedure)	Optional
Pre-balancing on 2 plane (guided procedure)	Optional
Acoustic emission sensor (AE)	Optional

(*) Customized solutions with different dimensions and capacities are available upon

UNI EN ISO 9001

Distributor:

Balance Systems S.r.l
Via Roberto Ruffilli, 8/10
20060 Pessano con Bornago
(Milan) - Italy
Tel. (+39) 02.9504955
Fax (+39) 02.9504977
info@balancesystems.it
www.balancesystems.com

Balance Systems