

Balance Monitor

Field Balancer for General Rotors

SB-7005series

Field Balancer for precision machine covering from low speed till ultra high speed, 400,000min⁻¹



Everything fits in carrying case

Highly accurate and speedy balancing

60min⁻¹(SB-7005RL) to 400,000min⁻¹(SB-7005RS)
Resolving ±0.001µm

Color LCD touch panel

Easy operation with the graphic display
Attached description

USB Port, Internal Printer

Store data easily on USB memory
Communicate data directly to PC via USB port (optional)
Print out data with an internal dot printer (optional)

CE Marking and RoHS compliant

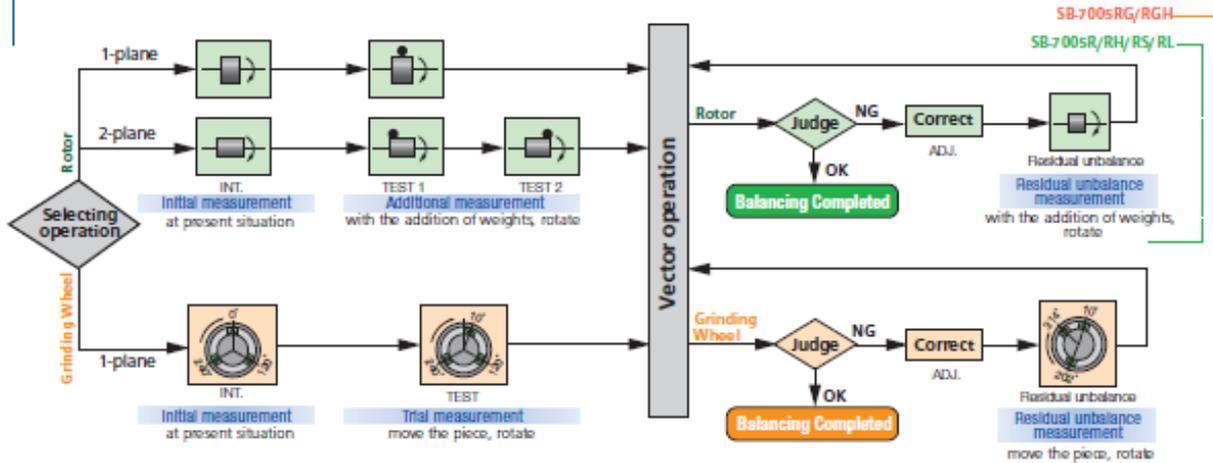
Comply with European safety standards (CE Marking) and RoHS directive



* One standard sensor included

Field Balancer for General Rotor SB-7005series

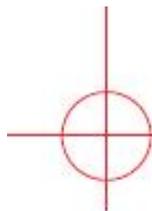
A suitable model of machines can be selected depending on your choice, from a machine tool to a turbo molecule pump.



Model	SB-7005R	SB-7005RH	SB-7005RS	SB-7005RL	SB-7005RG	SB-7005RGH
Balance Ranges						
Balance speed in rpm (min ²)	180 - 61,000	180 - 120,000	180 - 400,000	180 - 61,000	180 - 61,000	180 - 120,000
Balance resolution (min ²)				±1 (at 30,000min ²)		
Dynamic unbalance			0.001 - 999µm (at 6,000min ²)			
Vibration resolving resolution			±0.001µm			
Oscillatory input			2ch			
Measuring method			fixed speed			
Correction method			polar coordinates/ component force (3 - 36) : 1 - 4 plane			
Correction method: Balance piece moving				1 plane	1 plane	1 plane
Vibration analysis function						
Unbalance vibration analysis						
Harmonic vibration analysis						
Overall vibration monitor						
Other						
Eccentricity compensation function						
Measurement range selection			Fully automatic			
Work data memory			10			
USB memory port (typ A)						
Display			5.7 inch TFT color LCD			
Operation			Interactive touch panel			
Power supply			AC100 - 240V ±10% 50/60Hz			
Operating environment			Temperature: 10 - 40°C / Humidity: 20 - 80% RH (non-condensing)			
Dimensions			215(W) × 100(D) × 155(H) mm			
Weight			approx. 2 kg			
Weight with all accessories	approx. 8 kg	approx. 8 kg	approx. 8 kg	approx. 9 kg	approx. 8 kg	approx. 8 kg
Standard accessories						
Vibration sensor (sensitivity: 100µC/g)	P125	P125	P125 + SL-1 ^{*1}	P125	P125	P125
Vibration sensor cable			RM-025C (strength: 100N)			
Vibration sensor magnet			LN-041(2.5m)			
Rotation sensor (with 2 meter cable)	SFS2-65	SFS-M1H	SFS2-65	SFS2-65	SFS-M1H	SFS2-65
Rotation sensor magnet			NF2021			
Rotation sensor instruction manual						
Circular protractor			822-0001(ø15cm)			
Balancer instruction manual			CD-ROM (with simplified instruction booklet)			
AC adaptor			US318-06 (DC6V 2.8A)			
Carrying case			Aluminum case / 455(W) × 185(D) × 320(H) mm			
Options						
Data transmission to PC ^{*2}			USB interface (type B)			
Data output			Dot printer (internal)			
Optional parts for multi-plane correction ^{*3}			Vibration sensor P12 + Vibration sensor cable LN-041(2.5m)			
V type vibration sensor magnet			NF0037			

^{*1} SPS1005-65 is included with ultra low speed sensor (model : SL-1). ^{*2} Model with optional 4.5m, 5m, 10m, 20m, 30m (for vibration and rotary) SB-7005RL

^{*3} To perform 2 plane correction, option for 2 plane correction is needed.



Balance Monitor

SB-7702series

The Field Balancer for Elastic Rotors and High Precision Machines

The industry's only multi-speed, multi-plane field balancer to succeed in detecting and suppressing all vibrations in all three directions (XYZ).

Balance correction for both rigid and elastic rotors

Balance correction with a full range of rotation speeds from low to ultra-high speed

Results prediction function

Predicts correction results for efficient balancing

FFT analyzer as standard feature

Performs basic frequency analysis and bearing diagnostic function

USB Port, Internal Printer

Store data easily on USB memory

Communicate data directly to PC via USB port (optional)

Print out data with an internal dot printer (optional)

Lissajous Curve Display

Continuously displays each revolution's Lissajous data

Visual verification of shaft center locus



Fits securely into carrying case



* One standard sensor included



SB-7702series The Field Balancer for Elastic Rotors and High Precision Machines

Choose the Sigma high precision balancer that best meets your needs.



Everything fits in carrying case

Carrying case: external dimensions: 455 (W) × 185 (D) × 320 (H) mm
Total weight: Approx. 8 kg

System Products The Field Balancer for Standard Rotors



SB-8801series



Model	SB-7702R	SB-7702RH	SB-7702RS
Balance Range			
Balance speed in rpm (fixed speed) min ²	180 - 61,000	180 - 120,000	180 - 240,000
Balance speed in rpm (multi-speed) min ²	600 - 61,000	600 - 120,000	600 - 240,000
Balance resolution (min ²)	1 (at 30,000min ²)		
Dynamic Unbalance	0.001 - 999µm(at 6,000min ²)		
Vibration masking resolution	±0.001µm		
Oscillatory input	2ch/4ch/6ch		
Measuring method	multi-speed / multi-plane, fixed speed		
Correction plane	1 - 4plane		
Correction method	polar coordinates / component force (3 - 3G)		
Vibration analysis function			
Unbalance vibration analysis	✓		
Harmonic vibration analysis	✓		
Overall vibration monitor	✓		
FFT Analyzer	✓ (with bearing diagnostic function)		
Other			
Eccentricity compensation function	✓ (fixed speed only)		
Measurement range selection	fully automatic		
Work data memory *1	8 (4)	8 (4)	4 (2)
USB memory port (type A)	✓		
Display	5.7 inch TFT color LCD		
Operation	interactive touch panel		
Power supply	AC100 - 240V ±10% 50/60Hz		
Operating environment	Temperature: 10 - 40°C / Humidity: 20 - 80% RH (non-condensing)		
Dimensions	215(W)×105(D)×155(H)mm		
Weight	Approx. 2kg		
Weight with carrying case	Approx. 8kg *2		
Standard accessories			
Vibration sensor	PT25 (sensitivity: 100pC/g)		
Vibration sensor magnet	KM-025C (strength: 100N)		
Vibration sensor cable	LN-041(2.5m)		
Rotation sensor (with 2 meter cable)	SFS-05	SFS-M1H	SFS-M1H
Rotation sensor cable	OC1030		
Rotation sensor instruction manual	✓		
Circular protractor case	823-0001(φ150mm)		
Balancer instruction manual	CD-ROM (with simplified instruction booklet)		
AC adapter	US318-06(DC9V 2.0A)		
Carrying case	Aluminum case / 455(W)×185(D)×320(H)mm		
Options			
Oscillatory input options	Choose from 2, 4, or 6 channels		
Data transmission to PC	USB interface (type B)		
Data output *3	Dot printer (internal)		
Optional parts for multi-plane correction *4	Vibration sensor PT2 + Vibration sensor cable LN-041(2.5m)		
V type vibration sensor magnet	NF0037		
Extension cable for vibration and rotation sensors	2.5m, 5m, 10m, 20m, 30m		

*1 6ch specifications can store the work data from 2 or 4 measurements.

*2 Weight with field balancer and all accessories included.

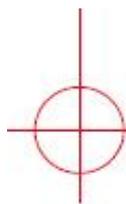
*3 Printer is available only with 2ch specifications.

*4 Requires optional multi-plane correction function.

External transmission screen

測定項目		測定値						
測定日	時間	No.	質量合計	重心	VR-1	VR-2	偏心率	
2010/3/3	3:55:04 PM	1	Mot6000	18389	180	0.108	1.66	0.018
2010/3/3	3:55:04 PM	2	Mot6000	18732	230	0.108	1.81	0.034
2010/3/3	3:55:04 PM	3	Mot6000	18185	225	0.114	1.61	0.3
2010/3/3	3:55:04 PM	4	Mot6000	18829	190	0.089	1.87	0.209
2010/3/3	3:55:04 PM	5	Mot6000	18902	216	0.124	2.07	0.394
2010/3/3	3:55:04 PM	6	Mot6000	14969	180	0.085	2.13	0.22
2010/3/3	3:55:04 PM	7	Mot6000	18709	230	0.111	2.01	0.249
2010/3/3	3:55:04 PM	8	Mot6000	18948	220	0.106	2.01	0.22





Balance Monitor

The Field Balancer for General Rotating Machines

SB-8000series

*Easy-to-use and affordable than ever!
Definitive field balancer for general rotary bodies*

SB-8003R



type **SB-8002R/RE** max.61,000min⁻¹

type **SB-8003R** max.61,000min⁻¹

Applications

SIGMA's field balancer boasts high-speed rotation and high performance thanks to its unique operation principle, and is suitable for balancing high-speed slicers, machine tool spindles, high-speed spindle motors, centrifugal machines, air blowers, grinders, etc.

SB-8002R
SB-8002RE



*one standard sensor included

SB-8000series The Field Balancer for General Rotating Machines



*one standard sensor included

Delivered in A4-size attaché case



SB-8002R/RE



SB-8003R

Specification

Model	SB-8002R/RE	SB-8003R
Measurement range		
Vibration	0.001 - 999 μm ($\approx 1,200 \text{ min}^{-1}$)	
Revolution	180 - 61,000 min^{-1}	
Resolution		
Vibration displacement	$\pm 0.001 \mu\text{m}$	
Revolution	$\pm 1 \text{ min}^{-1}$ (Display unit: 10 min^{-1})	
Sensor		
Vibration sensor	P125, Rotary sensor: SFS2-6s	
Correction method		
Correction	Single/double-plane, polar coordinates/component force, addition/deletion	
Component count	from 3 to 39	
Display		
7-segment LED	angle position, vibration displacement, rotation speed	
LED lamp	measurement conditions, action indicator	
Power voltage		
Voltage	100 - 240 VAC $\pm 10\%$, 50/60 Hz	
Current consumption	7 VA	30.1/40.1 VA
Other		
Dimensions	340 (W) \times 240 (D) \times 120 (H)	170 (W) \times 100 (D) \times 230 (H)
Carrying case	-	385 (W) \times 175 (D) \times 296 (H)
Weight	Approx. 3.5 kg	Approx. 7 kg
Usage environment	Temperature: 5 - 40°C, Humidity: 20 - 80% RH	
Accessories		
AC adaptor	12 DCV, 1 A, 2 m cord*	6 DCV, 2 A, 2 m cord*
Vibration sensor	P125 (Sensitivity: 100 $\mu\text{V}/\text{G}$)	
Magnet base	KMA025C (Attraction force: 100 N)	
Correction cable	UN-041 (2.5 m, serial)	
Rotary sensor	SFS2-6s (With 2 m cable)	
Instruction manual	with a flathead screwdriver for adjusting sensitivity	
Magnet base MIB-B	Attraction force: 800 N	
Circular protractor	B22-0001 (15 cm)	
Instruction manual	✓	✓

(1) The main unit and carrying case are not water-proof.

(2) The attraction force of the magnet is measured on SS400 ($\pm 10 \text{ mm}$) grinded surface.

Sister model.....

Field Balancer for High-Precision Grinders

SB-8001G/GH max. 61,000 min^{-1}



Ultimate balancer with polished usability and compact design

SB-8002R/SB-8002RE/SB-8003R

A rotor's flexural rigidity decreases relative to its speed. Sigma balancers perform dynamic balancing within speeds from 2,000 rpm to 12,000 rpm divided into 51 speeds.

1. Features

This is the first balancer in Japan which is approved by EU authorized organization, TÜV

It is well-known to engineers today that balancing rotational parts in making components is highly effective to prevent machine vibration. Generally, machine vibration generated by rotational parts has various frequency elements. Therefore, it is important to choose a balancer that is capable of detecting unbalanced vibration from other vibrations of varied frequency.

Easy-to-use and affordable than ever, SB-8002R/8002RE/8003R field balancer is specifically designed for use with the general rotary bodies. It employs SIGMA's original multivariate analysis system, which has been one of the unique and reliable features of our products favored by many.



1. Extremely high measurement accuracy
Resolution: 40.001 μm

2. Displays both the phase and the amplitude of a vibration at the same time
Easy-to-use 7-segment LED display
Automatically switches sensitivity ranges

3. Speedy, accurate balancing
Easy operation with individual keys for each function
Switchable between polar coordinates/component force correction display at any time
Very short measurement time (approximately four times faster than the conventional SIGMA product)

4. Capable of balancing high-speed rotational machines
Measurable range of revolution speed: 180 ~ 61,000 min⁻¹
(Employs multivariate analysis which exceeds other methods particularly for rotation speed of over 1,000 min⁻¹.)

5. Printer provided as standard feature (SB-8003R)
6. Optional RS-232C or USB function (SB-8003R)
Measurement data can be automatically output in an Excel file.

3. Correction Method

Single-plane balancing

There are two types of rotating unbalance: static unbalance and couple unbalance. Unbalance can be either corrected by single-plane (static) balancing, or double-plane (dynamic) balancing, and what should be considered when choosing between these two balancing methods are the ratio of static unbalance and couple unbalance.

Single-plane balancing only eliminates static unbalance from rotating unbalance. This method is suitable for rotary bodies that are relatively thin and their weight distribution does not have much variance in the direction of their axis due to their height. With these types of rotary bodies, there is slight couple unbalance which can be ignored without it being a major problem.

Double-plane balancing

In case of relatively high rotary bodies, couple unbalance cannot be ignored and thus double-plane (dynamic) balancing is necessary. As shown in figure 1, couple unbalance of vertically long rotary bodies can be corrected by changing the weight distribution at its two ends.

4. New features

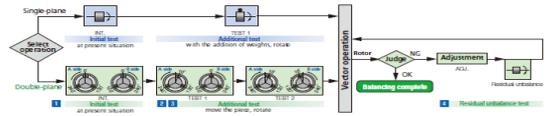
1. Incorporates advanced micro computers for even higher measurement accuracy
The accuracy of unbalance vibration measurement is dramatically improved from our previous models, enabling high accuracy, and high decreasing rate balancing.

2. Switchable "increase/decrease" direction on angular scale
The direction of the angular scale can be changed with a simple button according to the rotation direction of measured bodies.

3. Back-up function

Influential coefficient and other various settings (single/double planes, single scale, etc.) are saved even when the power is turned off, and therefore there is no need to re-enter the settings every time you turn on the machine.

5. Operational procedure



1 In initial test, a rotor is measured without adjustment.

2 In additional tests, a rotor is measured with testing weights installed on the plane to be corrected, and the balancer automatically saves this position as "0" (in case of balancing, using component forces, this position is saved as Point 1).

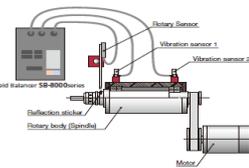
3 After completing additional tests, enter the weight of the testing weights. The balancer calculates and displays the weight (amount) and angle of the remaining unbalance.

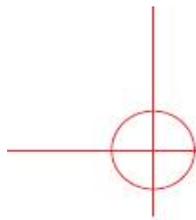
4 In residual unbalance test, the rotor is measured after adding the correcting weights specified in **3** to assess if the unbalance has been reduced to acceptable level.

Basic configuration

Installing and preparing sensors

1. Attach the vibration sensor on the spindle bearing component either by using the magnet at its bottom, or by removing the magnet and then fixing the sensor with M6 screws.
2. Attach a reflection sticker for the rotary sensor on the spindle. When doing so, choose an area with even surface.
3. Connect the rotary sensor and the vibration sensor with the main unit by linking them with the connectors. Turn on the power.
4. Hold the tip of the rotary sensor close to the reflection sticker and check that the lamp on the sensor main unit is lit. Make sure that it is not lit when away from the sticker.
5. This is the end of the preparation. Perform balancing by following instructions.





Balance Monitor

SB-8801 series

The Field Balancer for General Rotors and High Precision Grinders

SIGMA's balance measuring instrument is high precision and an easy handling. A4 suitcase size and reasonable price.



Everything fits in A4 carrying case

Light, compact and reasonable price

Speedy, and extremely high accurate

4x speed by 2-plane measurements.
High precision, 120,000min⁻¹ Resolving $\pm 0.001\mu\text{m}$

Color LCD touch panel

Easy operation with the graphic display
Attached description

Easy making report

Communicate data directly to a computer via USB port (optional)

Available for balance correction

by calculation of equal weight balance piece.

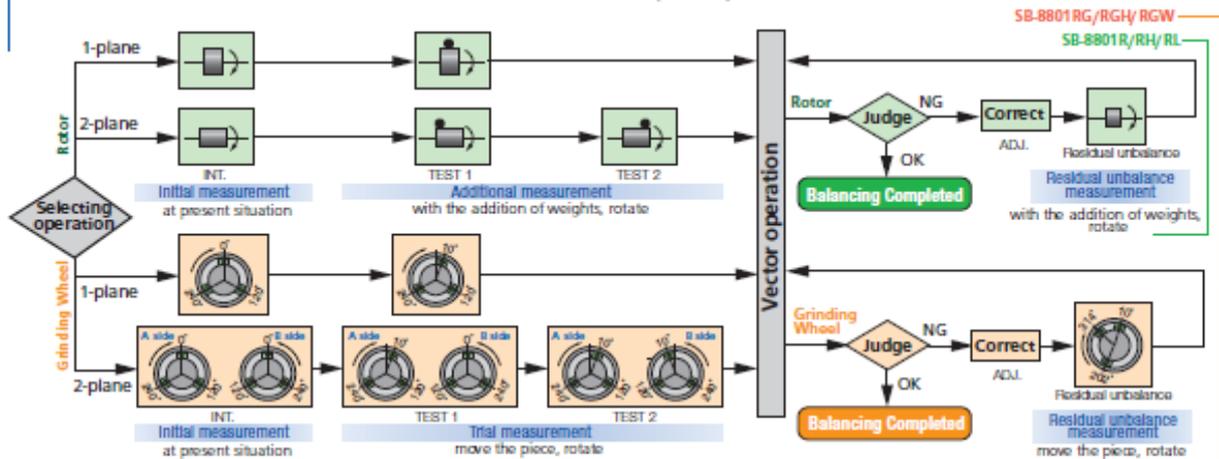


* One standard sensor included



The Field Balancer for General Rotors and High Precision Grinders SB-8801series

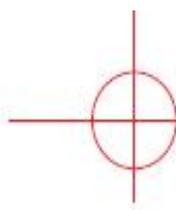
A suitable model of machines can be selected depending on your choice, from a machine tool to a turbo molecule pump.



Model	SB-8801R	SB-8801RH	SB-8801RL	SB-8801RG	SB-8801RGH	SB-8801RGW
Balance Ranges						
Balance speed in rpm (min ⁻¹)	180 - 61,000	180 - 120,000	60 - 61,000	180 - 61,000	180 - 120,000	180 - 61,000
Balance resolution (mm ³)			±1 (at 30,000min ⁻¹)			
Dynamic unbalance			0.001 - 999µm (at 6,000min ⁻¹)			
Vibration resolving resolution			±0.001µm			
Oscillatory input			2ch			
Measuring method			fixed speed			
Correction method			polar coordinate/component force (3 - 3S) 1 - 4 plane			
Correction method: Balance piece moving				1 plane		2 plane
Vibration analysis function						
Unbalance vibration analysis						
Harmonic vibration analysis						
Overall vibration monitor						
Other						
Eccentricity compensation function						
Measurement range selection			Fully automatic			
Work data memory			10			
Display			5.7 inch TFT color LCD			
Operation			Interactive touch panel			
Power supply			AC100 - 240V ±10% 50/60Hz			
Operating environment			Temperature: 10 - 40°C / Humidity: 20 - 80% RH (non-condensing)			
Dimensions			385(W) × 255(D) × 120(H) mm			
Weight *1)			approx. 4.2 kg			
Standard accessories						
Vibration sensor magnet	P125	P125	P125 + SL-1*4	P125	P125	P125
Vibration sensor cable			KM-025C (strength: 100N)			
Rotation sensor (with 2 meter cable)	SFS2-6S	SFS-M1H	SFS2-6S	SFS2-6S	SFS-M1H	SFS2-6S
Rotation sensor magnet			NF2021			
Circular protractor			822-0001 (ø15cm)			
Balancer instruction manual			CD-ROM (with simplified instruction booklet)			
AC adaptor			US318-0s (DC6V 2.8A)			
Carrying case			Aluminum case			
Options						
Data transmission to PC *3)			USB interface			
Optional parts for multi-plane correction *4)			Vibration sensor P12 + Vibration sensor cable LN-041 (2.5m)			
V type vibration sensor magnet			NF0037			
Extension cable			2.5m, 5m, 10m, 20m, 30m (for vibration and rotation sensors)			

- *1) Weight with field balancer and all accessories included.
- *2) To perform 2 plane correction, option for 2 plane correction is needed.
- *3) Model with optional USB interface, Fill in suffix-4. Ex.) SB-8800R-4
- *4) SB-8801RL is included with ultra low speed sensor(model : SL-1).

Please be aware that specifications may change without prior notice due to continuous improvement efforts, etc.



Balancing Machine

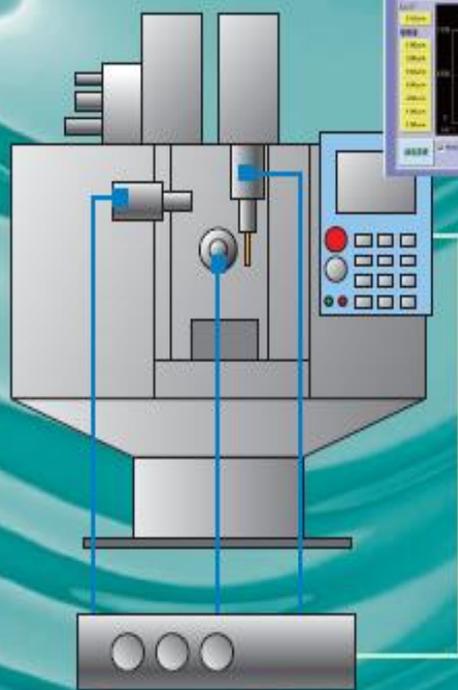
状態監視システム

CM-1000series

故障を未然に予知

無人自動化ラインの状態監視システム

振動評価&バランス測定



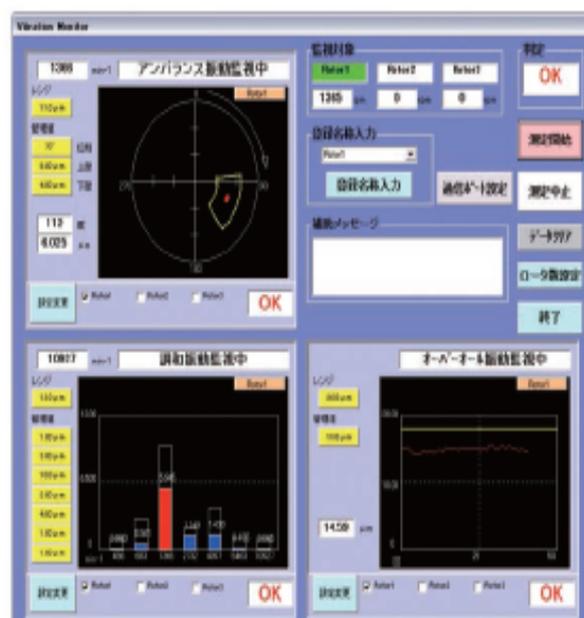
状態監視システム CM-1000series

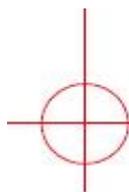
Features

近年の産業機械、自動車、エレクトロニクス業界の生産設備は、無人自動化が進み、その生産設備の異常は、製品品質に直接影響するため、効果的な設備保全システムの構築すなわち生産設備の状態監視システムの導入が叫ばれています。
本システムは、生産設備の異常を早期に発見し、異常原因の究明と対策を容易に支援することを目的とした監視システムです。

Specification

項目	
測定回転数	max 61,000 min ⁻¹
振動入力ch数	3ch
回転入力ch数	3ch
監視モード	アンバランス振動 調和振動(高周波成分) オーバーオール振動





Balance Monitor

Field Balancer for High-Precision Grinders

SB-8001Gseries

*Easy-to-use and affordable than ever!
Definitive grinding wheel balancer*

type SB-8001G max.10,000min⁻¹

type SB-8001GH max.61,000min⁻¹

Benefits

SIGMA's field balancer measures the vibration of a grinding wheel while they are rotating on grinders, so it allows you to correct the unbalance of the entire wheel spindle system as well as the wheel itself. Perfectly balanced wheel spindle system leads to stable grinding force, improved surface finishing, longer machine life, and reduced grinding wheel wear.



SB-8001Gseries Field Balancer for High-Precision Grinders

Easy-to-use and affordable than ever, SB-8001G/8001GH field balancer is specifically designed for use with the grinding wheel, and employs SIGMA's original multivariate analysis system, which has been one of the unique and reliable features of our products favored by many.

Features

1. Extremely high precision measurement (Resolution: 0.001 μm).
2. Designed for grinders with 2 to 3 balancing weights – easy operation.
3. Easy-to-read large LCD.
4. Displays the balancing weight angle and the amount of displacement at real time.
5. Small, light and affordable (Delivered in a special attaché case).

New Function

1. Incorporates advanced micro computers for even higher measurement accuracy
The accuracy of unbalance vibration measurement is dramatically improved from our previous models, enabling high accuracy, and high decreasing rate balancing.
2. Switchable "increase/decrease" direction on angular scale
The direction of the angular scale can be changed with a simple button according to the rotation direction of measured bodies.
3. Back-up function
Influential coefficient and other various settings (single/double planes, angle scale, etc.) are saved even when the power is turned off, and therefore there is no need to re-enter the settings every time you turn on the machine.

Delivered in A4-size attaché case



Specification

Model	SB-8001G	SB-8001GH
Measurement range		
Vibration	0.001 – 999 μm (at 1,200 min^{-1})	
Revolution	180 – 10,000 min^{-1}	180 – 64,000 min^{-1}
Resolution		
Vibration displacement	±0.001 μm	
Revolution	±1 min^{-1}	
Correction method		
Single-plane correction	by calculating the angles of balancing weights of the same weight (2 or 3 balancing weights can be selected).	
Other		
Power voltage	100 – 240 VAC ±10%, 50/60 Hz	
Dimensions	340 (W) × 120 (D) × 240 (H)	
Weight	Approx. 3.5 kg	
Usage environment	Temperature: 5 – 40°C, Humidity: 20 – 80% RH	

Sister model

Field Balancer for general rotors

SB-8002R/RE max.61,000 min^{-1}



Field Balancer for general rotors

SB-8003R max.61,000 min^{-1}



Please be aware that specifications may change without prior notice due to continuous improvement efforts, etc.

Benefits in the use with grinders

SB-8001G/GH

The measurement is performed while a grinding wheel is rotating, which enables to balance the entire wheel spindle system instead of just the wheel.
Balanced grinding wheel stabilizes grinding force, which leads to longer machine life, reduced grinding wheel wear and improved surface finishing.

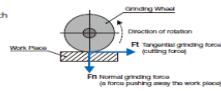
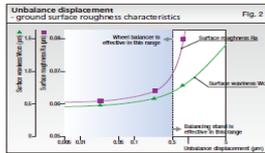
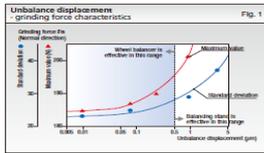


Fig. 1 and 2 show the relationship between grinding force, ground surface roughness, and the amount of grinding wheel unbalance. In these graphs, "static balancing range" indicates the range of unbalance that can be effectively corrected by conventional balancing stands, which is decided by the amount of residual unbalance of each wheel spindle system. The lower limit of the range generally falls between 0.3 to 1 µm. In Fig. 1 and 2, we used a value measured in a test that was carried out on a certain grinder (0.5 µm). It indicates that for this particular grinder, static balancing method cannot effectively reduce the amount of unbalance to 0.3 µm or lower.

Ideally, grinding force should be low and consistent under the same conditions. From Fig. 1 and 2, it can be deduced that in order to perform high-precision grinding, the unbalance displacement needs to be kept under 0.1 µm. When the unbalance displacement gets higher than 0.1 µm, it also increases the maximum grinding force, thus causing more radial grinding wheel wear and higher surface roughness. An extremely unbalanced wheel can also lead to waviness in grinding force, which results in unbalanced wear of the grinding wheel and rough ground surface. See the table below:



1. Unbalance displacement - grinding force characteristics

Measured value	Unbalance displacement: 0.088 µm	Measured waveform
Ft: Tangential grinding force (5 N/V)	Measurement = 25.4 N	
Fn: Normal grinding force (50 N/V)	Measurement = 187.5 N	
Measured value	Unbalance displacement: 2.860 µm	Measured waveform
Ft: Tangential grinding force (5 N/V)	Measurement = 38.4 N	
Fn: Normal grinding force (50 N/V)	Measurement = Approx. 214 N	

2. Unbalance displacement - ground surface roughness characteristics Ra (JIS B 0601)



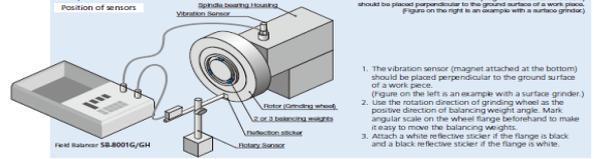
3. Unbalance displacement - surface waviness characteristics Wcm (JIS B 0610)



Grinding Conditions	Conditions of surface roughness and surface waviness measurement
Grinding method	Surface roughness (JIS B 0601) Measurement Method (Method A) measured by high speed microscope
Grinding wheel	Surface waviness (JIS B 0610) Measurement Method (Method A) measured by high speed microscope
Grinding force	Surface roughness and surface waviness measurement is carried out on a certain grinder (0.5 µm)
Grinding speed	Surface roughness and surface waviness measurement is carried out on a certain grinder (0.5 µm)
Grinding wheel speed	Surface roughness and surface waviness measurement is carried out on a certain grinder (0.5 µm)
Grinding wheel diameter	Surface roughness and surface waviness measurement is carried out on a certain grinder (0.5 µm)
Grinding wheel material	Surface roughness and surface waviness measurement is carried out on a certain grinder (0.5 µm)
Work piece material	Surface roughness and surface waviness measurement is carried out on a certain grinder (0.5 µm)
Work piece diameter	Surface roughness and surface waviness measurement is carried out on a certain grinder (0.5 µm)

Facilities	Facilities	Facilities
Measuring tool	Dynamic wheel surface grinder	Surface roughness measuring instrument
Grinding force	Force sensor, grinding dynamometer	Surface roughness measuring instrument
Grinding speed	Speedometer	Surface waviness measuring instrument
Grinding wheel speed	Speedometer	Surface waviness measuring instrument
Grinding wheel diameter	Caliper	Surface waviness measuring instrument
Grinding wheel material	Grinding wheel	Surface waviness measuring instrument
Work piece material	Work piece	Surface waviness measuring instrument
Work piece diameter	Caliper	Surface waviness measuring instrument

Example of use



1. The vibration sensor (magnet attached at the bottom) should be placed perpendicular to the ground surface of a work piece. (Figure on the left is an example with a surface grinder.)
2. Use the rotation direction of grinding wheel as the positive direction of balancing weight angle. Mark angular scale on the wheel flange beforehand to make it easy to move the balancing weights.
3. Attach a white reflective sticker if the flange is black and a black reflective sticker if the flange is white.