



Field Balancer for General Rotating Machinery and High Precision Grinders



transfer data				初期測定											
共通項目				測定		VIB-1		VIB-2		VIB-3		VIB-4		VIB-5	
測定日	時間	No.	登録名称	回転数	位相	振動量	位相	振動量	位相	振動量	位相	振動量	位相	振動量	位相
2015/9/9	9:54:13 AM	1	Model001	10887	101	0.145	201	0.379							
2015/9/9	9:54:13 AM	2	Model001	11990	178	0.31	200	0.529							
2015/9/9	9:54:13 AM	3	Model001	12881	128	1.361	154	0.639							
2015/9/9	9:54:13 AM	4	Model001	13887	104	0.455	173	0.29							
2015/9/9	9:54:14 AM	5	Model001	15008	147	1.26	176	0.63							
2015/9/9	9:54:14 AM	6	Model001	15976	113	1.744	148	0.571							
2015/9/9	9:54:14 AM	7	Model001	16888	93	1.574	140	0.371							
2015/9/9	9:54:14 AM	8	Model001	17985	85	1.277	172	0.282							

Model	AC powered Battery powered	SB-7705R SB-7705RB	SB-7705RH SB-7705RHB	SB7705RS SB-7705RSB	SB-7705RL SB-7705RLB
Range of Measurement	Balancing Speed*1 Resolution of rotational speed display Amplitude range of synchronized vibration Resolution of vibration Vibration input channel Measuring method No. of Correction plane	180 to 61,000min ⁻¹ 1min ⁻¹ 0.001 to 999μm(at 6,000min ⁻¹) 0.001μm AC Type:2ch, 4ch, 6ch (factory option) / Battery Type:2ch Multi-speed Least square method, Conventional fixed-speed method 1, 2, 3 or 4 selectable	180 to 120,000min ⁻¹ 1min ⁻¹ 0.001 to 999μm(at 6,000min ⁻¹) 0.001μm AC Type:2ch, 4ch, 6ch (factory option) / Battery Type:2ch Multi-speed Least square method, Conventional fixed-speed method 1, 2, 3 or 4 selectable	180 to 240,000min ⁻¹ 1min ⁻¹ 0.001 to 999μm(at 6,000min ⁻¹) 0.001μm AC Type:2ch, 4ch, 6ch (factory option) / Battery Type:2ch Multi-speed Least square method, Conventional fixed-speed method 1, 2, 3 or 4 selectable	60 to 61,000min ⁻¹ 1min ⁻¹ 0.001 to 999μm(at 6,000min ⁻¹) 0.001μm AC Type:2ch, 4ch, 6ch (factory option) / Battery Type:2ch Multi-speed Least square method, Conventional fixed-speed method 1, 2, 3 or 4 selectable
Correction method	Polar coordinates Components of unbalance vector Correction weight	0° to 359° (angle resolution: 1°) 3 to 50 Add / Remove	0° to 359° (angle resolution: 1°) 3 to 50 Add / Remove	0° to 359° (angle resolution: 1°) 3 to 50 Add / Remove	0° to 359° (angle resolution: 1°) 3 to 50 Add / Remove
Vibration analysis function	Unbalance Vibration Analysis Harmonic analysis FFT Analysis (Optional) Overall amplitude monitoring Time domain Waveform (Optional)	0.001 to 999μm (at 6,000min ⁻¹) 0.001 to 999μm (at 6,000min ⁻¹) Maximum analysis frequency: 20kHz Acc P, Acc RMS, Acc CF, Vel R, Disp EQP (range Acc: 0.1 to 40m/s ²) 800 lines max.	0.001 to 999μm (at 6,000min ⁻¹) 0.001 to 999μm (at 6,000min ⁻¹) Maximum analysis frequency: 20kHz Acc P, Acc RMS, Acc CF, Vel R, Disp EQP (range Acc: 0.1 to 40m/s ²) 800 lines max.	0.001 to 999μm (at 6,000min ⁻¹) 0.001 to 999μm (at 6,000min ⁻¹) Maximum analysis frequency: 20kHz Acc P, Acc RMS, Acc CF, Vel R, Disp EQP (range Acc: 0.1 to 40m/s ²) 800 lines max.	0.001 to 999μm (at 6,000min ⁻¹) 0.001 to 999μm (at 6,000min ⁻¹) Maximum analysis frequency: 20kHz Acc P, Acc RMS, Acc CF, Vel R, Disp EQP (range Acc: 0.1 to 40m/s ²) 800 lines max.
Others	USB memory port USB interface microSD card slot Eccentricity compensation Measuring range selection No. of stored work data Graphic display Set up operation Power supply Environment Dimension of measuring unit Mass of measuring unit Dimension/Mass of Carrying case*3	AC Type:Available as standard / Battery Type:N/A USB mini-B connector (transfer to PC for data and Screenshots) AC Type:N/A / Battery Type:Available as standard Available as standard Automatic ranging 8(4)/2*2 5.7" TFT color LCD (LED back light) Dialog with touch screen AC type: AC 100 to 240V ±10% 50/60Hz Battery type: Li-Ion battery (Operating time: up to 10hours), AC 100 to 240V ±10% 50/60Hz Temperature: 10 to 40°C, Humidity: 20 to 80%RH (Non-condensing) AC type:204(W) × 71(L) × 137(H)mm, (105(L)mm for printer option) Battery type:187.5(W)×53.5(L)×130(H)mm AC type:Approx. 1.7kg (2.2kg for printer option) Battery type:Approx. 900g AC type:455(W) × 185(L) × 320(H)mm Approx. 8.0kg Battery type:385(W) × 120(L) × 255(H)mm Approx. 4.2kg	AC Type:Available as standard / Battery Type:N/A USB mini-B connector (transfer to PC for data and Screenshots) AC Type:N/A / Battery Type:Available as standard Available as standard Automatic ranging 8(4)/2*2 5.7" TFT color LCD (LED back light) Dialog with touch screen AC type: AC 100 to 240V ±10% 50/60Hz Battery type: Li-Ion battery (Operating time: up to 10hours), AC 100 to 240V ±10% 50/60Hz Temperature: 10 to 40°C, Humidity: 20 to 80%RH (Non-condensing) AC type:204(W) × 71(L) × 137(H)mm, (105(L)mm for printer option) Battery type:187.5(W)×53.5(L)×130(H)mm AC type:Approx. 1.7kg (2.2kg for printer option) Battery type:Approx. 900g AC type:455(W) × 185(L) × 320(H)mm Approx. 8.0kg Battery type:385(W) × 120(L) × 255(H)mm Approx. 4.2kg	AC Type:Available as standard / Battery Type:N/A USB mini-B connector (transfer to PC for data and Screenshots) AC Type:N/A / Battery Type:Available as standard Available as standard Automatic ranging 8(4)/2*2 5.7" TFT color LCD (LED back light) Dialog with touch screen AC type: AC 100 to 240V ±10% 50/60Hz Battery type: Li-Ion battery (Operating time: up to 10hours), AC 100 to 240V ±10% 50/60Hz Temperature: 10 to 40°C, Humidity: 20 to 80%RH (Non-condensing) AC type:204(W) × 71(L) × 137(H)mm, (105(L)mm for printer option) Battery type:187.5(W)×53.5(L)×130(H)mm AC type:Approx. 1.7kg (2.2kg for printer option) Battery type:Approx. 900g AC type:455(W) × 185(L) × 320(H)mm Approx. 8.0kg Battery type:385(W) × 120(L) × 255(H)mm Approx. 4.2kg	AC Type:Available as standard / Battery Type:N/A USB mini-B connector (transfer to PC for data and Screenshots) AC Type:N/A / Battery Type:Available as standard Available as standard Automatic ranging 8(4)/2*2 5.7" TFT color LCD (LED back light) Dialog with touch screen AC type: AC 100 to 240V ±10% 50/60Hz Battery type: Li-Ion battery (Operating time: up to 10hours), AC 100 to 240V ±10% 50/60Hz Temperature: 10 to 40°C, Humidity: 20 to 80%RH (Non-condensing) AC type:204(W) × 71(L) × 137(H)mm, (105(L)mm for printer option) Battery type:187.5(W)×53.5(L)×130(H)mm AC type:Approx. 1.7kg (2.2kg for printer option) Battery type:Approx. 900g AC type:455(W) × 185(L) × 320(H)mm Approx. 8.0kg Battery type:385(W) × 120(L) × 255(H)mm Approx. 4.2kg
Standard accessories (one each)	Vibration sensor Fixing magnet Sensor cable Rotation sensor Manual of rotation sensor Fixing magnet stand AC adapter Circular protractor Manual	P125C (Sensitivity: 10pC/(m/s ²)) KM-025C (Holding force: 100N) LN-041 (2.5m straight) SFS-M1H (with 2m cable) Manual and an adjusting driver AC Type:DG1030(Holding force: 800N) / Battery type:NF2021 (Holding force: 320N) US318-06 (DC6V 2.8A) 822-0001 (ø150mm) CD-ROM, Digest booklet	P125C (Sensitivity: 10pC/(m/s ²)) KM-025C (Holding force: 100N) LN-041 (2.5m straight) SFS-M1H (with 2m cable) Manual and an adjusting driver AC Type:DG1030(Holding force: 800N) / Battery type:NF2021 (Holding force: 320N) US318-06 (DC6V 2.8A) 822-0001 (ø150mm) CD-ROM, Digest booklet	P125C (Sensitivity: 10pC/(m/s ²)) KM-025C (Holding force: 100N) LN-041 (2.5m straight) SFS-M1H (with 2m cable) Manual and an adjusting driver AC Type:DG1030(Holding force: 800N) / Battery type:NF2021 (Holding force: 320N) US318-06 (DC6V 2.8A) 822-0001 (ø150mm) CD-ROM, Digest booklet	P125C (Sensitivity: 10pC/(m/s ²)) KM-025C (Holding force: 100N) LN-041 (2.5m straight) SFS-M1H (with 2m cable) Manual and an adjusting driver AC Type:DG1030(Holding force: 800N) / Battery type:NF2021 (Holding force: 320N) US318-06 (DC6V 2.8A) 822-0001 (ø150mm) CD-ROM, Digest booklet
Optional	Unbalance correction with 3 weights (G, GW) Vibration input channel Built-in printer(-P) Additional sensor for multi-point measurement	Balance weights arrangement for grinding wheel (G: 1-plane, GW: 2-plane) 2ch, 4ch, 6ch (AC type only) Mechanical dot printer (AC type only) Vibration sensor:P125C with cable:LN-041 (2.5m)	Balance weights arrangement for grinding wheel (G: 1-plane, GW: 2-plane) 2ch, 4ch, 6ch (AC type only) Mechanical dot printer (AC type only) Vibration sensor:P125C with cable:LN-041 (2.5m)	Balance weights arrangement for grinding wheel (G: 1-plane, GW: 2-plane) 2ch, 4ch, 6ch (AC type only) Mechanical dot printer (AC type only) Vibration sensor:P125C with cable:LN-041 (2.5m)	Balance weights arrangement for grinding wheel (G: 1-plane, GW: 2-plane) 2ch, 4ch, 6ch (AC type only) Mechanical dot printer (AC type only) Vibration sensor:P125C with cable:LN-041 (2.5m)

*1 In case of multi-speed measurement, lower limit is 600min⁻¹. *2 values in parenthesis are for 6 channel input option *3 Mass of carrying case with main body and all accessories.
*4 Model SB-7705RL and SB-7705RLB attach an additional vibration sensor for low speed (model V10L), cable and mounting magnet.



Balance Monitor

SB-7705series

The Field Balancer suitable for Flexible Rotors and High Precision Machinery

www.sigma-elec.co.jp

Multi-speed multi-plane balancing capability performs flexible rotor balancing and suppressing vibrations in all three directions (XYZ).

Improved performance, twice* processing speed and 0.2 times* resolution

For Balancing of both rigid and flexible rotors

All vibrations are suppressed at specified range of rotational speed

Predicting function of residual vibration

High efficiency balancing can be performed with prediction of residual vibration

Screen capture is available

FFT analyzer is installed as standard

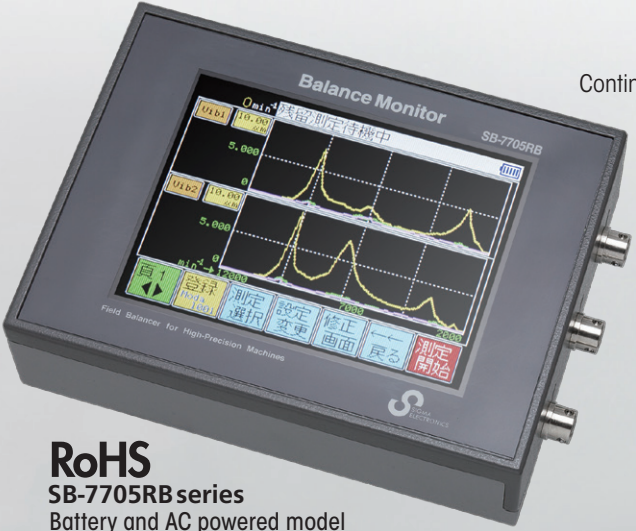
USB port is equipped as standard

Data can transfer to PC via USB port.

Lissajous Curve Display Function

Continuously displays Lissajous curve at each rotational speed.

Visual verification of shaft center locus.



RoHS
SB-7705RB series
Battery and AC powered model



CE
RoHS
SB-7705R series
AC powered model

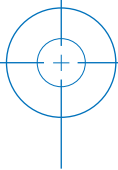


Carrying case



optional
Built-in printer

One vibration sensor is attached as standard.



Multi-speed multi-plane field balancing capability performs flexible rotor balancing and suppressing vibrations in all three directions (XYZ).

Main spindle of high speed rotating machinery is becomes relatively low stiffness and critical speeds exist in operating speed range. Multi-speed multi-plane balancing capability of SB-7705 series Field Balancer contributes balancing of such high speed machinery.

The Field Balancer suitable for Flexible Rotors and High Precision Machinery **SB-7705series**

Balancing of both flexible and rigid rotors

Discrete vibration data are acquired automatically during accelerating; the data are statistically processed and derive optimum balancing weights which suppress vibration at specified speed range. Number of vibration measuring point is 1 to 6, maximum number of correcting plane is 4.

Simultaneously suppress tri-directional (XYZ) vibration

Ordinarily the bearing stiffness is anisotropic, and therefore measured vibration at only one direction is insufficient to obtain the maximum vibration amplitude. SB-7705 series field balancer can expand input channel up to 6, then 2 of 3-axial accelerometer can be used. It is useful for balancing in the case of the major axis orientation of elliptic orbit motion is varied with rotational speed.

Easy creation of balancing report, Easy data management

- Each data can be stored with operator defined individual name.
- Measured data can be transferred to PC via USB.
- Measured data can be stored in USB memory (AC powered model).
- Measured data can be stored in microSD card (Battery powered model)
- Data of screen capture can be stored

Battery powered model is convenient to use at field

Battery and AC powered model SB-7705RB is compact and light weight then convenient to use in field. (Battery operation time is approx. 10 hours.)

CE Marking and RoHS compliant



Our products minimize environmental impact and comply with European safety standards (CE Marking) and the RoHS directive, which restricts the use of 6 dangerous substances.

Balancing of grinding wheels (Option)

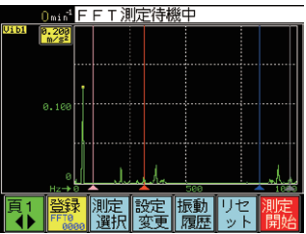
Balancing of grinding wheels in 1 or 2-plane with angular location adjustment by two or three fixed balance weights (Attach suffix -G: for 1 plane balancing, -GW: for 1-plane and 2-plane balancing)

Other options

- Built-in printer (Factory option of AC powered model)
- Additional input channel; 4 or 6 channels (Factory option of AC powered model)
- Additional vibration sensor and cable

FFT analyzer as a standard feature

The basic frequency analysis function with bearing diagnostic functions and giving information of bearing damage at inner race, outer race, cage, or rolling element.



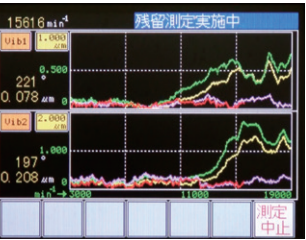
Lissajous curve display

Continuously displays Lissajous at each speed for visual verification of shaft center locus.



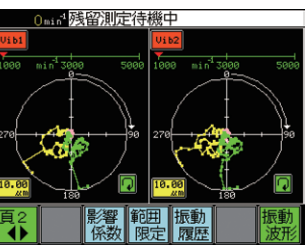
Multi-speed vibration response

Amplitudes of unbalance vibration in graph with rotational speed as horizontal axis are displayed, convenient to recognizing critical speeds etc. This mode displays not only measured vibration but also expected residual vibration with prospective unbalance correction.



Multi-speed display (modal circle)

Multi-speed vibration data are displayed in vectors for intuitively display amplitude and phase relationship of vibration.



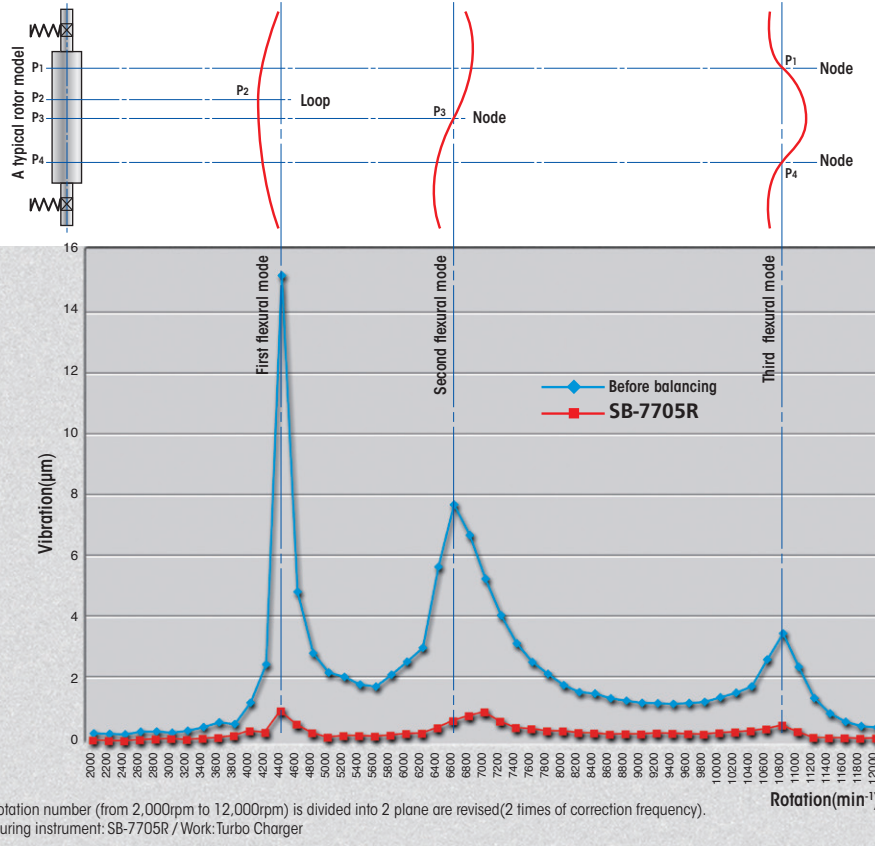
It is essential to suppress vibration at all speed range in case of high speed precision spindles.

Flexural rigidity of a rotor relatively decreases as higher speed and smaller size, and sometimes not only first mode but also higher mode balancing will be required. In such case, multi plane balancing is required. Sigma field balancer SB-7705 series can perform dynamic balancing at wide speed range simultaneously. The following is an example of 2-plane balancing utilizing the full range of rotation speeds from 2,000 rpm to 12,000 rpm divided into 51 speeds.

Typical applications

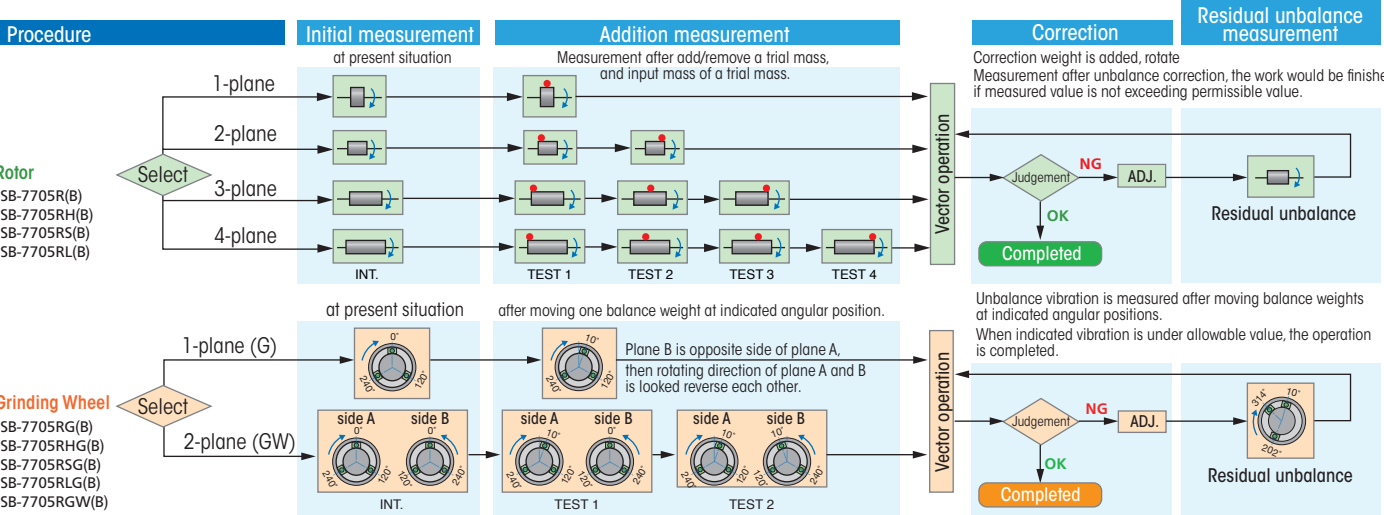
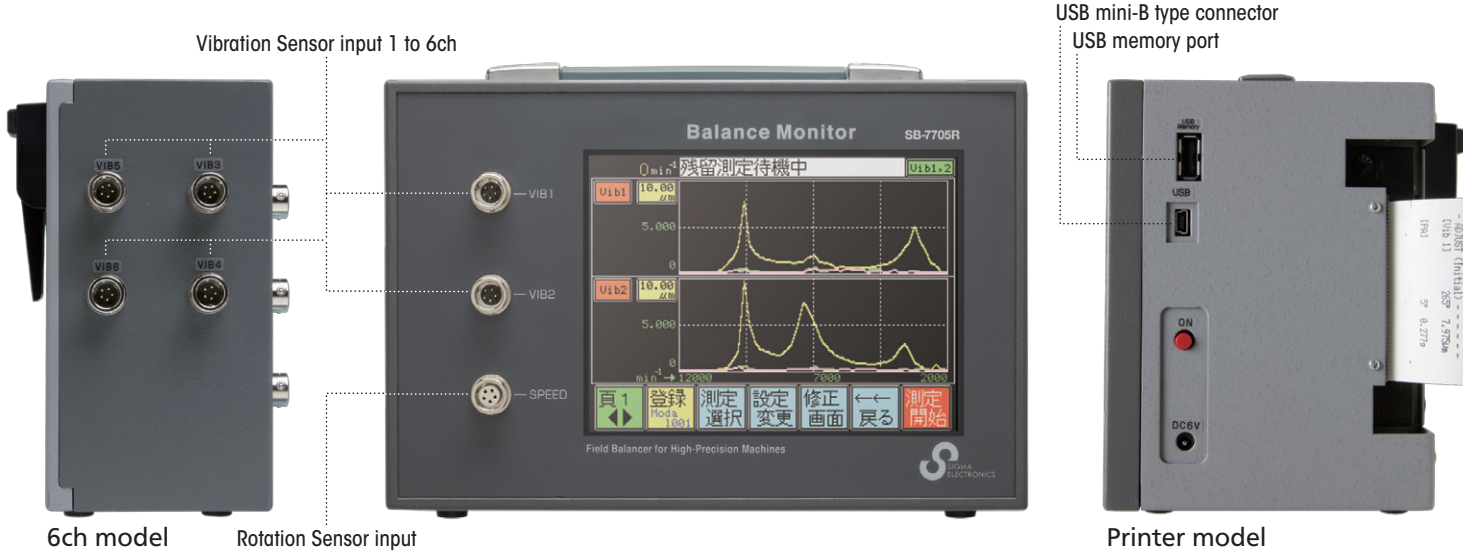
- Machinery with wide variable speed range such as; Machining centers, textile machinery, high-speed tapping centers etc.
- General machinery such as; NC lathe, high-speed die machining, high speed slicers, dicing saw, inner grinding machines, woodworking machines, crushers, blowers, pumps, compressors etc.
- Grinding machines (grinding wheel balancing option is required) such as; plane grinding machines, centerless grinding machines, cylindrical grinding machines

Natural mode of elastically supported flexible rotor



The rotation number (from 2,000rpm to 12,000rpm) is divided into 2 plane are revised (2 times of correction frequency).
Measuring instrument: SB-7705R / Work: Turbo Charger

A vibration actual measurement graph



Model
SB-7705
Balancing Speed
Ultra-high speed RS: 180 to 240,000min⁻¹
High speed RH: 180 to 120,000min⁻¹
Standard speed R: 180 to 61,000min⁻¹
Low speed RL: 60 to 61,000min⁻¹
In case of multi-speed measurement, lower limit is 600min⁻¹

Unbalance correction by balance weights
G: 1 plane
GW: 2 plane

Power Supply
B: Battery and AC adapter
blank: AC adapter

Optional
P: Internal Printer (for AC model only)
Vibration Channel
2: 2ch
4: 4ch
6: 6ch
only 2ch for Battery(-B) and Printer(-P) model