

TML

DA-16A/DA-36A

Carrier Wave Type Dynamic Strainmeters**Precise sensitivity adjustment
and wide measuring range**

AC/DC dual power

DC-96A

Wide-Band Direct-Current Dynamic Strainmeter**improved autobalancing,
superior measuring precision**

Wide frequency response range, from DC to 200 kHz

Dynamic
Strainmeters**Tokyo Sokki Kenkyujo Co., Ltd.**

Dynamic Strainmeters

Superior basic performance, innovative functions,
easy operation - For all your measuring needs.

The high-performance DA-16A/36A and DC-96A are
designed to measure continuously changing strain.

Each is compact, easy to operate, and features advanced
digital technology that provides extremely precise sensitivity adjustment.

Thanks to an improved electronic autobalancing function,
each also provides accurate measurement over a broader frequency range.



Dynamic Strainmeters

DA-16A/DA-36A

Precise sensitivity adjustment, easy operation

These carrier wave type strainmeters use the most common dynamic strain measuring system. Each offers a high S/N ratio (ratio of specified output at set sensitivity to noise) and superior stability. The DA-16A has a frequency response of 2.5 kHz, the DA-36A of 10 kHz. Each is equipped with one measuring point channel. Two or more units can be installed in an optional case or rack to create a multi-channel system.

■ SPECIFICATIONS

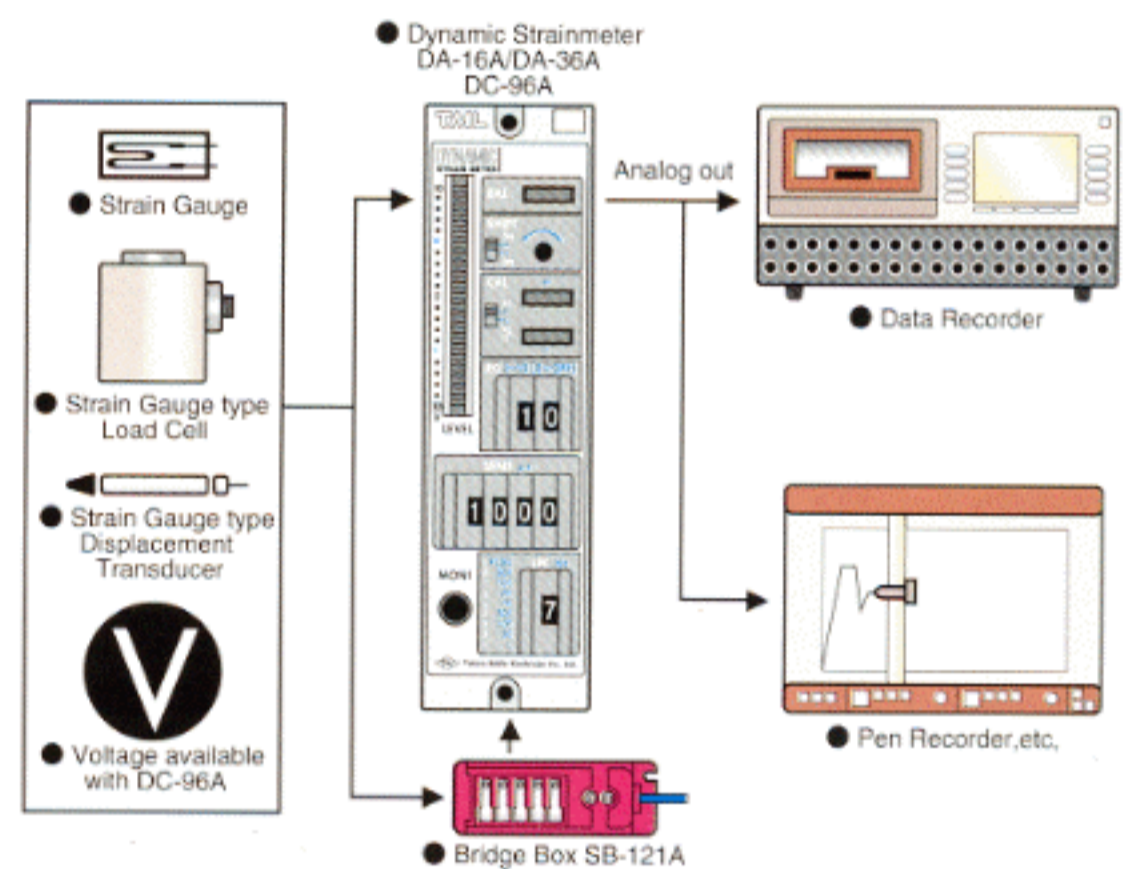
Number of measuring points	1	Sensitivity	
Applicable gauge resistance	60-1000 Ω	OUT V	1V (5k Ω load)
Gauge factor	2.00	OUT I	12mA (30 Ω load)
Bridge excitation	2 or 0.5Vrms DA-16: 5kHz DA-36A: 20kHz		at 50×10^{-6} strain with 2Vrms excitation
Balancing method		Measuring range	$\pm 50000 \times 10^{-6}$ strain at bridge excitation 2Vrms
Resistance	Pure electronic automatic (REMOTE available)	Non-linearity	DA-16A: $\pm 0.1\%$ FS DA-36A: $\pm 0.2\%$ FS
Adjusting time	2 sec.	Output	
Capacity	Pure electronic automatic	OUT V	± 10 V (5k Ω load)
Balancing range		OUT I	± 50 mA or over (30 Ω load) or ± 10 V (5k Ω load)
Resistance	$\pm 10000 \times 10^{-6}$ strain	Output shift	
Capacity	5000pF	Function	Output shift by rotating potentiometer
Balancing accuracy	$\pm 1 \times 10^{-6}$ strain or less (Bridge excitation 2Vrms) With sensitivity of 200×10^{-6} strain/1Vout or less	Range	-10V ~ +10V or OFF
Rated Output (RO)	1-10V, 1 voltage division can be set	Calibration reference	
Sensitivity adjustment (SENS)	At RO=1.0V $50 \sim 5000 \times 10^{-6}$ strain At RO=10.0V $500 \sim 10000 \times 10^{-6}$ strain 1×10^{-6} strain division adjustable with 2Vrms excitation	Output voltage	$\pm (RO, RO/2)$
Fine adjustment (I.SENS)	1/10 ~ 1 (OUT I)	Accuracy	$\pm 0.5\%$
		Frequency response	DA-16A: DC to 2.5kHz (-3 dB ± 1 dB) DA-36A: DC to 10kHz (-3 dB ± 1 dB) At PASS of lowpass filter, DC coupling



Features

- Gauge resistance assures reduced sensitivity fluctuation
- New digital sensitivity setting system
To adjust the amp sensitivity, simply select the rated amp output (between 1 and 10 V) and set the corresponding strain in the 4-digit digital setting device.
- Improved electronic autobalancing-twice the accuracy of previous models
- Capacity balance featuring auto tracing system
- Isolated input and output
- Frequency response of 10 kHz (DA-36A)
- Dual output-equipped with terminals for output of both voltage and current
- Built-in low-pass and high-pass filters
- External control of balance and calibration output possible
- AC/DC dual power source system

SYSTEM BLOCK



Lowpass filter (Amplitude flat)	
Cut-off frequency	DA-16A:10, 30, 100, 300Hz (−3dB±1dB), PASS DA-36A:30, 100, 300Hz, 1kHz (−3dB±1dB), PASS
Slope	−12dB±1dB/oct −36dB/oct(PASS)
Highpass filter AC coupling mode	
Cut-off frequency	0.3Hz±0.15Hz (−3dB)
Slope	−6dB±1dB/oct
SN ratio	With 2Vrms excitation, 10V output at maximum DA-16A 52dB _{P-P} or over (less than 2.5×10^{-6} strain _{P-P} input equivalent) DA-36A 50dB _{P-P} or over (less than 3.2×10^{-6} strain _{P-P} input equivalent) at SENS=100×10 ⁻⁶ strain, RO=1.0V, LPF=PASS DA-16A 58dB _{P-P} or over DA-36A 56dB _{P-P} or over at SENS=200×10 ⁻⁶ strain or over, RO=1.0V, LPF=PASS
Stability(with 2Vrms excitation)	
on zero	±0.1×10 ⁻⁶ strain/°C (at max. sensitivity)

	±0.5×10 ⁻⁶ strain/24h (at max. sensitivity)
on Span	±0.05%/°C ±0.2%/24h
OUTPUT monitor	41 LED level meter (OVER indication)
Vibration tolerance	29.4m/s ² (50Hz 0.6m _{P-P}) in 3 directions
Environment	−10~+50°C 85%RH or less (no condensation)
Power source	90-132V AC 50/60Hz 8VA Max, or 180-250V AC 50/60Hz 8VA Max, selectable 10-30V DC 0.3A Max
Dimensions	40 (W)×140(H)×266(D)mm (excluding projection parts)
Weight	1kg
Standard accessories	
Operational manual	1
Power cable (CR-06)	1
Output cable (CR-30)	1
Output cable (CR-32)	2
Fuse (0.2A/1A)	3 each
Screwdriver	1
Accessory box	1



Wide-Band Direct-Current Dynamic Strainmeter **DC-96A**

A host of advanced functions to meet a wide range of measuring needs

With its high frequency response and superb linearity, the DC-96A is ideal for measuring impact strain in cases where high response performance is demanded. Because the DC-96A uses direct current, there's no need for capacity balancing. The bridge power supply system allows the use of constant voltage and constant current. When set for constant current, there's no loss of sensitivity due to resistance in cables connecting to a strain-gauge-type transducer and bridge box. The DC-96A is equipped with one measuring point channel. You can install two or more DC-96A units in an optional case or rack to create a multi-channel system.

■ SPECIFICATIONS

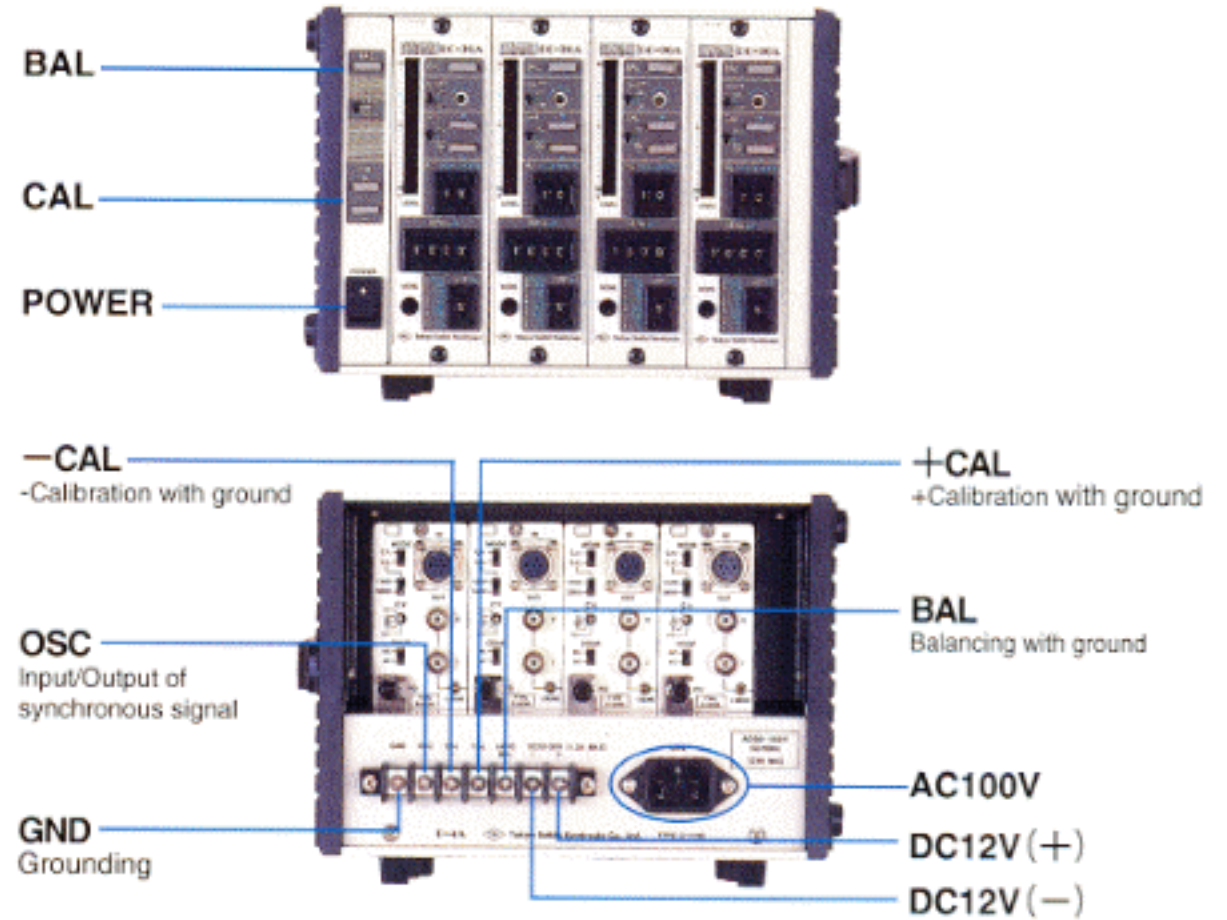
Number of measuring points	1		
Applicable gauge resistance			
Constant voltage	60-1000 Ω		
Constant current	120、350 Ω		
Gauge factor	2.00		
Bridge excitation			
Constant voltage	0.5、1、2、5、10V		
Constant current	4.2、8.3、17、42mA with 120 Ω bridge resistance 1.4、2.9、5.7、14、29mA with 350 Ω bridge resistance		
Input impedance	10M Ω + 10M Ω (Balanced differential input)		
Balancing method			
Resistance	Pure electronic automatic (REMOTE available)		
Adjusting time	2 sec.		
Capacity	Pure electronic automatic		
Balancing range			
Resistance	±10000×10 ⁻⁶ strain		
Capacity	5000pF		
Balancing accuracy	±5×10 ⁻⁶ strain or less		
Rated Output (RO)	1-10V、1 voltage division can be set (Bridge excitation 2Vrms) With sensitivity of 200×10 ⁻⁶ strain or less		
Sensitivity adjustment (SENS)	At RO=1V 50~10000×10 ⁻⁶ strain		
			At RO=10V 500~10000×10 ⁻⁶ strain 1×10 ⁻⁶ strain div. adjustable with 2Vrms excitation
		As DC amplifier	At RO=1V 0.050~10.000mV At RO=10V 0.500~10.000mV 0.001mV division adjustable
			Fine adjustment(I.SENS) 1/10~1 (OUT I)
		Sensitivity	
		OUT V	1V (5k Ω load)
		OUT I	12mA (30 Ω load) at 50×10 ⁻⁶ strain with 2Vrms excitation
		As DC amplifier at 0.05mV	
		OUT V	1V (5k Ω load)
		OUT I	12mA (30 Ω load)
		Measuring range	±100000×10 ⁻⁶ strain at bridge excitation 2Vrms
		As DC amplifier	±100mV
		Non-linearity	±0.02%FS
		Output	
		OUT V	±10V (5k Ω load)
		OUT I	±50mA or over (30 Ω load) or ±10V (5k Ω load)
		Output shift	
		Function	Output shift by rotating potentiometer
		Range	-10V ~ +10V or OFF
		Calibration reference	
		Output voltage	±(RO、RO/2)

Features

- High frequency response (DC to 200 kHz) - twice as high as previous models
- New digital sensitivity setting system
To adjust the amp sensitivity, simply select the rated amp output (between 1 and 10 V) and set the corresponding strain in the 4-digit digital setting device.
- Improved electronic autobalancing - twice the accuracy of previous models
- Improved zero-point stability against temperature fluctuation - provides high precision of 0.5×10^{-6} strain/ $^{\circ}\text{C}$
- Can be used as a DC amplifier
- Bridge power supply is switchable between constant voltage and constant current
- Dual output - equipped with terminals for output of both voltage and current
- Built-in low-pass and high-pass filters
- External control of balance and calibration output possible
- AC/DC dual power source system

Front/Rear panels

※Below shows 4 units housed in optional Carrying case P-4A. Refer to page 7 for different cases.



Accuracy	$\pm 0.5\%$
Frequency response	DC to 200kHz ($-3\text{dB} \pm 1\text{dB}$) At PASS of lowpass filter, DC coupling
Lowpass filter (Amplitude flat)	
Cut-off frequency	10、30、100、300Hz、1k、3k、10k、30kHz ($-3\text{dB} \pm 1\text{dB}$), PASS
Slope	$-12\text{dB} \pm 1\text{dB/oct}$
Highpass filter	
Cut-off frequency	AC coupling mode $0.05\text{Hz} \pm 0.015\text{Hz}$ (-3dB)
Slope	$-6\text{dB} \pm 1\text{dB/oct}$
SN ratio	With 2Vrms excitation, 10V output at maximum PASS $28\text{dB}_{\text{P-P}}$ or over DC~10Hz $40\text{dB}_{\text{P-P}}$ or over DC~1kHz $44\text{dB}_{\text{P-P}}$ or over DC~100kHz $50\text{dB}_{\text{P-P}}$ or over at SENS= 100×10^{-6} strain, RO=1.0V
Stability	
on zero	With 2Vrms excitation $\pm 0.5 \times 10^{-6}$ strain/ $^{\circ}\text{C}$ (at max. sensitivity) $\pm 5 \times 10^{-6}$ strain/24h (at max. sensitivity)
on Span	$\pm 0.01\%/^{\circ}\text{C}$ $\pm 0.05\%/24\text{h}$
as DC amplifier	
on zero	$\pm 0.5 \mu\text{V}/^{\circ}\text{C}$ (at max. sensitivity) $\pm 5 \mu\text{V}/24\text{h}$ (at max. sensitivity)
on Span	$\pm 0.01\%/^{\circ}\text{C}$ $\pm 0.05\%/24\text{h}$

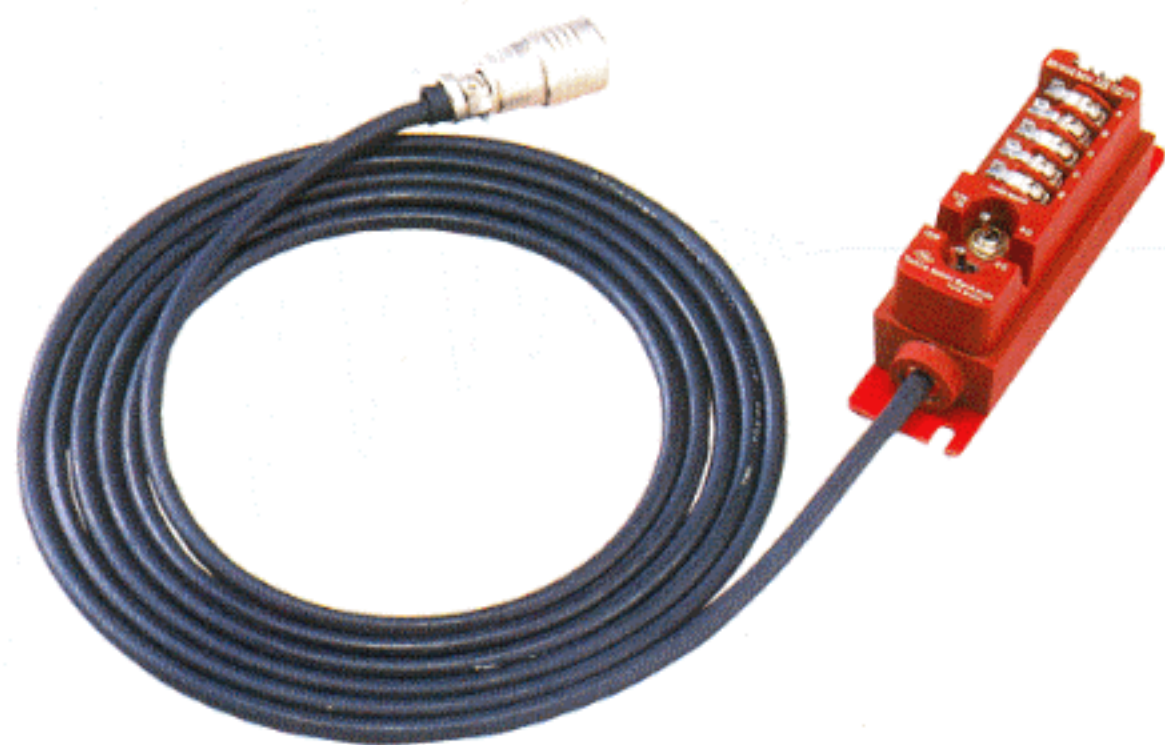
OUTPUT monitor	41 LED level meter (OVER indication)
Self-diagnostic	Amplifier sensitivity、 Bridge excitation、 Open over
In-phase signal cancellation	
	60dB or better
Vibration tolerance	29.4m/s^2 (50Hz 0.6mp-p) in 3 directions
Environment	$-10 \sim +50^{\circ}\text{C}$ 85%RH or less (no condensation)
Power source	90-132V AC 50/60Hz 10VA Max, or 180-250V AC 50/60Hz 10VA Max, selectable 10-30V DC 0.6A Max
Dimensions	40 (W)X140(H)X266(D)mm (excluding projection parts)
Weight	1.2kg

Standard accessories

Operational manual	1
Power cable (CR-06)	1
Output cable (CR-30)	1
Output cable (CR-32)	2
Fuse (0.5A/2A)	3 each
Screwdriver	1
Accessory box	1

Bridge Box

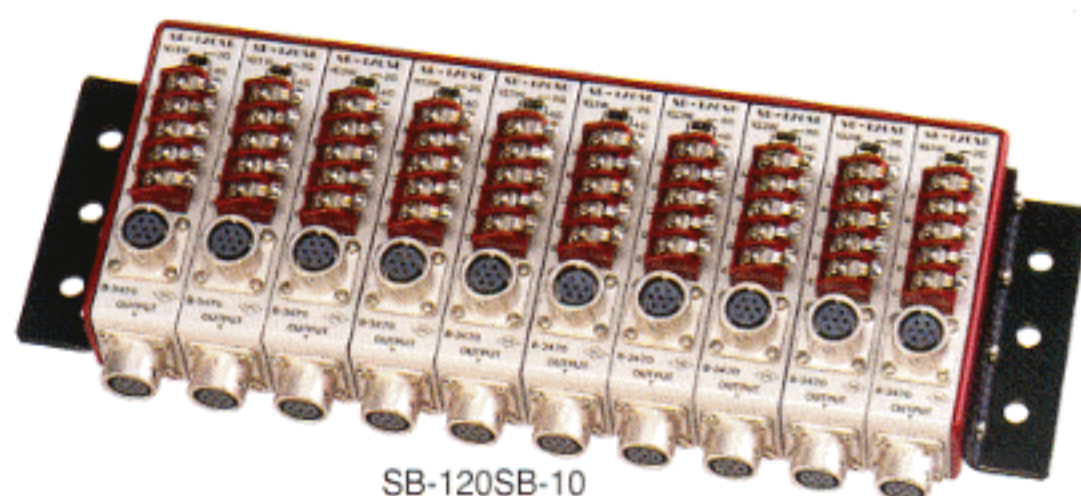
SB-121A/SB-351A SB-120SB-8/SB-120SB-10



SB-121A/SB-351A



SB-120SB-8



SB-120SB-10

SB-121A/SB-351A

These are used to connect a strain gauge for quarter bridge with 3-wire measurement and half bridge measurement. Each has built-in resistance for forming a bridge. Use of a bridge box allows terminal connection to a full bridge transducer with separated end wires. You can configure a variety of different bridge types by simply changing the switch settings.

Features

- Compact size – about one-third the size of previous models
- Slide switches make it easy to set the measuring method

SPECIFICATIONS

Number of channels	1
Input	Strain Gauge、 Strain Gauge type transducer Quarter bridge 3-wire system (Quarter bridge available with supplied short bar accessory) SB-121A: 120 Ω SB-351A: 350 Ω Half bridge、 Full bridge 60~1000 Ω for both models
Switcher	Toggle switch
Connector	Screwing、 Soldering
Environment	-20~+60°C 85%RH or less (no condensation)
Input/Output cable	φ 6mm 4-core shielded cable 3m with one-touch NDIS plug
Dimensions	35(W)×39 (H)×81 (D)mm (excluding projection parts)
Weight	160g
Standard accessories	Fixing jig Short bar Operation manual

SB-120SB-8/SB-120SB-10

These bridge boxes have eight and 10 input points, respectively. Slide switches make it easy to change between the quarter bridge, quarter bridge with 3-wire, half bridge, and full bridge measuring methods. Lead wires can be connected either by soldering or with screws, and an NDIS connector can also be used for input.

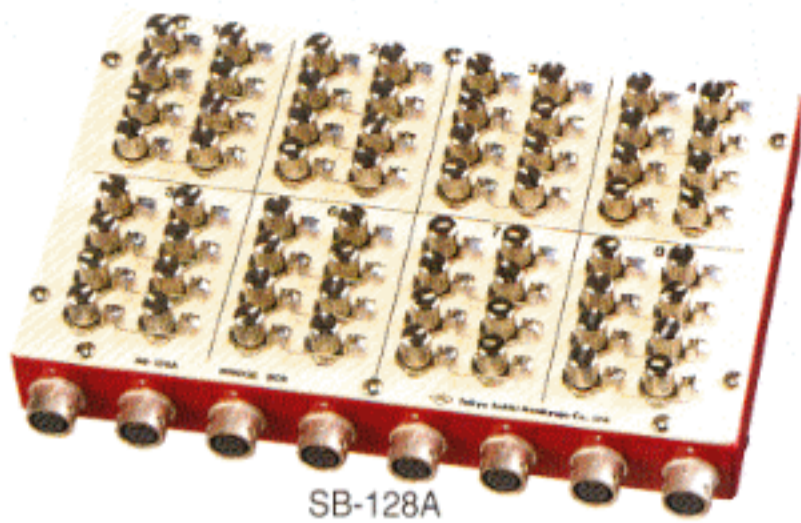
Features

- Compact size, light weight
- Slide switches make it easy to set the measuring method

SPECIFICATIONS

Number of channels	SB-120SB-8: 8 SB-120SB-10: 10
Input	Quarter bridge (B-C short-circuit)、 Quarter bridge 3-wire 120 Ω Half bridge、 Full bridge 60~1000 Ω
Connection	Terminal: M3×5P terminal fixing screw Connector: one-touch NDIS 7P connector
Switcher	Sliding switch
Connector	Screwing、 Soldering、 One-touch NDIS connector
Environment	-20~+60°C 85%RH or less (no condensation)
Dimensions	SB-120SB-8: 205(W)×35(H)×100 (D)mm (excluding projection parts) SB-350SB-10: 255(W)×35(H)×100 (D)mm (excluding projection parts)
Weight	SB-120SB-8: 1.2kg SB-120SB-10: 1.4kg
Standard accessories	Mounting jig 1 pair

SB-128A SB-120B/SB-350B

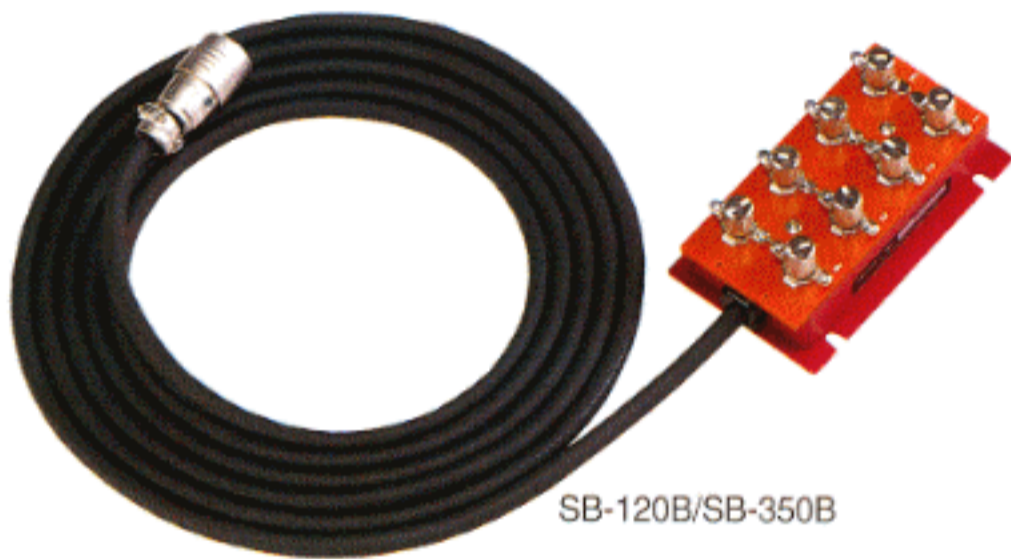


SB-128A

Compact bridge box for 8-point measurement

■SPECIFICATIONS

Number of channels	8
Input	Quarter bridge, Quarter bridge 3-wire system, Opposite half bridge, Opposite half bridge 3-wire system 120 Ω Half bridge, Full bridge 60~1000 Ω
Terminal	Screwing, Soldering
Environment	-20~+60°C 85%RH or less (no condensation)
Dimensions	240(W)×50(H)×150(D)mm (excluding projection parts)
Weight	1.3kg



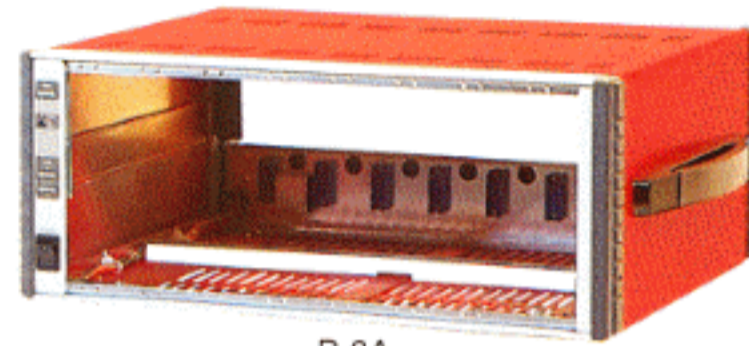
SB-120B/SB-350B

These are used to connect a strain gauge for quarter bridge and half bridge measurement. Each has built-in resistance for forming a bridge. Use of a bridge box allows terminal connection to a full bridge transducer with separated end wires. You can configure a variety of different bridge types by simply changing the terminal connections.

■SPECIFICATIONS

Number of channels	1
Input	Quarter bridge, Quarter bridge 3-wire system, Opposite half bridge, Opposite half bridge 3-wire system SB-120B:120 Ω SB-350B:350 Ω Half bridge, Full bridge 60~1000 Ω for both models
Terminal	Screwing, Soldering
Environment	-20~+60°C 85%RH or less (no condensation)
Input/Output cable	φ 9mm 4-core shielded cable 3m with one-touch NDIS plug
Dimensions	65(W)×40(H)×110(D)mm (excluding projection parts)
Weight	0.7kg

Carrying Case



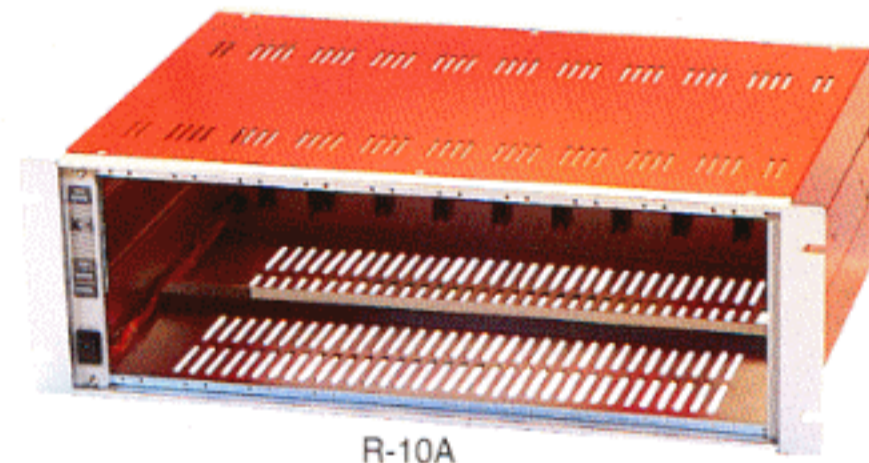
These carrying cases are used to configure multi-channel systems with DA series, and DC series units. Each is equipped with a power switch for simultaneous On/Off of all channels, a calibration strain generation switch, and a balance button.



Model	Number of channels	Dimensions(W×H×Dmm)
P-4A	4	208×148×308
P-6A	6	288×148×308
P-8A	8	368×148×308

Excluding projection parts

Rack



This standard JIS rack lets you configure a system with up to 10 channels using DA series, or DC series units. It is equipped with a power switch for simultaneous On/Off of all channels, a calibration strain generation switch, and a balance button.

Model	Number of channels	Dimensions (W x H x D mm)
R-10A	10	480×149×310

Excluding projection parts

Strainmeter stand

Mounts on the strainmeter's bottom to allow its stand-alone use for one-channel measurement.

Applicable models

DA series dynamic strainmeters
DC series direct-current type strainmeters
FV-15B FV converter



※ Specifications subject to change without prior notice.



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ISO 9001



Approval Certificate No:957261
Design and manufacture of strain measuring equipment
Manufacture of transducers
No.2 and No3.Production Divisions
(Tokyo Head Office and Kiryu Factory)

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