







Dynamic Strain Measuring Instrument Selection Chart

1-channel

Models	Channels	Measuring Targets		Bridge Excitation		Frequency Response	Indicators	Features	Power Supply	Pages
		Strain	Voltage	DC	AC					
Strain Amplifier DPM-911B/912B/913C  High stability High accuracy Easy operation	1	Yes			Yes	DPM-911B DC to 2.5 kHz DPM-912B DC to 5 kHz DPM-913C DC to 10 kHz	Digital	I/O isolated	100 VAC 115 VAC 200 VAC 230 VAC 10.5 to 15 VDC	3-5
Strain Amplifier DPM-951A DPM-952A  Robust against invert noise Easy operation	1	Yes			Yes	DPM-951A DC to 2 kHz DPM-952A DC to 5 kHz	Digital	Inverter noise reduction circuit I/O isolated	100 VAC 115 VAC 200 VAC 230 VAC 10.5 to 15 VDC	3-7
Signal Conditioner CDV-900A  High frequency response, 500 kHz Easy operation	1	Yes	Yes		Yes (Constant voltage)	DC to 500 kHz	Digital	DC amplifier function provides a maximum gain of 10000 times.	100 to 240 VAC 10.5 to 15 VDC	3-9
Signal Conditioner CDA-900A  High frequency response, 500 kHz Easy operation	1	Yes	Yes		Yes (Constant current)					

Multi-channel

Models	Channels				Measuring Targets						Output	Interface	Power Supply	Pages			
	6	8	14	16	Strain	Voltage	Pulse	Thermo couple	Piezoelectric Sensor	Potentiometer					LPF		
Multi Signal Conditioner MCF-B  Easy operation		8		16	Yes		Yes	Yes	Yes			Analog ±5 V	RS-485	10 to 30 VDC AC adapter (Optional accessory)	3-11		
Compact Signal Conditioner CDV-400B Series  Compact & lightweight	6	8	14		Yes	Yes	Yes					Yes	Yes	Analog ±2 V	—	11 to 30 VDC AC adapter (Optional accessory)	3-15

DPM-911B/912B/913C

Strain Amplifier



High stability High accuracy Easy operation

- Easy operation greatly reduce the working hours.
- Digital switch makes setting easy and the value set is easily seen even when power is off.
- High voltage output of ± 10 V and high SN ratio are ensured.
- Vertical bar meter is easy to check.
- The HPF cancels the effect of slow changes, such as temperature drift of gages or sensors.
- Sensitivity of TEDS compatible transducers is automatically registered.
- Input and output are isolated.
- Sensitivity is automatically set with the actual load calibration function.
- Built-in check function on bridge circuit
- Broad frequency response DC to 10 kHz (913C)
- Input Open Detection Function (913C)

Models

Models	Carrier Wave Frequencies	Frequency Response	SN Ratio
DPM-911B	5 kHz	DC to 2.5 kHz	54dB _{p-p} or more ^{*1} 60dB _{p-p} or more ^{*2}
DPM-912B	12 kHz	DC to 5 kHz	53dB _{p-p} or more ^{*1} 58dB _{p-p} or more ^{*2}
DPM-913C	28 kHz	DC to 10 kHz	48dB _{p-p} or more ^{*3} 53dB _{p-p} or more ^{*2}

*1 RTI: Within 2×10^{-6} strain_{p-p}, when 500×10^{-6} strain is input, outputs 10.00 V.

*2 when 1000×10^{-6} strain is input, outputs 10.00 V.

*3 RTI: Within 3.9×10^{-6} strain_{p-p}, when 500×10^{-6} strain is input, outputs 10.00 V.

[Common Condition] Bridge Excitation : $2 V_{rms}$, Bridge Resistance: 120 Ω , LPF = FLAT

Power Supply

Models etc.	Power Supply
DPM-xxxx	90 to 110 VAC (Approx. 12 VA: 100 VAC)
DPM-xxxx A115	108 to 132 VAC (Approx. 12 VA: 115 VAC)
DPM-xxxx A200	180 to 220 VAC (Approx. 12 VA: 200 VAC)
DPM-xxxx A230	207 to 253 VAC (Approx. 12 VA: 230 VAC)
An optional DC power cable P-69 is required.	10.5 to 15 VDC (Approx. 0.6 A: 12 VDC)

xxxx: Part of model, example: 911B

Specifications

Measuring Targets	Strain gages, strain-gage transducers
Channels	1
	Simultaneous operation is available by using multiple units.
Compatible Bridge Resistance	60 to 1000 Ω
Gage Factor	2.00 fixed
Bridge Excitation	$2 V_{rms}$, $0.5 V_{rms}$, switchable
Balance Adjustment	Resistance: Within $\pm 2\%$ ($\pm 10000 \times 10^{-6}$ strain) Capacity: Within 2000 pF
Balance Adjustment Method	Resistance: Auto balance Accuracy: Within $\pm 0.5 \times 10^{-6}$ strain (When 500×10^{-6} strain is input, outputs 10 V, excitation voltage: $2 V_{rms}$) Capacitance: CST method (Capacitance self-tracking)
Nonlinearity	Within $\pm 0.1\%$ FS Within $\pm 0.2\%$ FS (913C)
Output Impedance	Approx. 2 Ω
Calibration Strain (CAL)	$\pm (1 \text{ to } 9999 \times 10^{-6} \text{ strain})$ Setting: CAL switch (4-digital switch) Accuracy: Within $\pm (0.5\% + 0.5 \times 10^{-6} \text{ strain})$ Within $\pm (0.5\% + 1 \times 10^{-6} \text{ strain})$ (913C) Applicable scope of CAL accuracy: $\pm (10 \text{ to } 9999) \times 10^{-6} \text{ strain}$
Sensitivity Adjustment	Sensitivity is set in combination with CAL and VOLTAGE OUT switches (4-digit digital switches). CAL switch range: 100 to 9999×10^{-6} strain by 1×10^{-6} strain step (Set with CAL switches) VOLTAGE OUT switch range: 1.00 to 10.00 by 0.01 V step Accuracy: Within $\pm 0.5\%$ Within $(\pm 0.5\% + 5 \text{ mV})$ (913C) (When Bridge Excitation is $2 V_{rms}$) Range: $\times 200$ to $\times 20000$
Fine Sensitivity Adjustment	Range: 1 to 1/2.5
Frequency Response	See table below. Deviation: $\pm 10\%$
LPF	Transfer characteristic: 2nd order Butterworth Cutoff frequencies: 10, 30, 100, 300 Hz, 1 k Hz and FLAT - 6 steps Amplitude ratio at cutoff point: -3 ± 1 dB Attenuation: -12 ± 1 dB/oct.
HPF	Cutoff frequencies: 0.2 Hz, OFF - 2 steps
SN Ratio	See table below.
Output	OUTPUT A: ± 10 V (Load resistance 5 k Ω or more) OUTPUT B: ± 10 V (Load resistance 5 k Ω or more)
Stability	Temperature Zero point: Within $\pm 0.1 \times 10^{-6}$ strain per $^{\circ}\text{C}$ Zero point: Within $\pm 0.2 \times 10^{-6}$ strain per $^{\circ}\text{C}$ (913C) Sensitivity: Within $\pm 0.05\%$ / $^{\circ}\text{C}$ Time Zero point: Within $\pm 0.5 \times 10^{-6}$ strain/24 h Zero point: Within $\pm 1.0 \times 10^{-6}$ strain/24 h (913C) Sensitivity: Within $\pm 0.3\%$ /24h Power supply Zero point: Within $\pm 0.05\%$ FS/power fluctuation $\pm 10\%$ Sensitivity: Within $\pm 0.05\%$ /power fluctuation $\pm 10\%$ Stability condition: When 500×10^{-6} strain is input, outputs 10.00 V.
Withstand Voltage	1000 VAC for 1 minute between measuring bridge and case 1000 VAC for 1 minute between AC power supply and case
Output Voltage Indication	4½ digit digital display (7-segment LED) 11-segment LED bar meter
Over Input Indication	Output voltage display flashing (4½ digit digital display only)
Check Functions	Bridge check
Input Open Detection Function	When the input is open, output saturates to the negative side. (913C only)
Key Lock Functions	Locks all keys other than POWER switch. (Allows settings on CAL and VOLTAGE OUT switches to be changed.)
Remote Functions	Capable of controlling the following functions. Balance adjustment execute (BAL), calibration strain output execute (CAL), key lock
Synchronization Method	Automatically determines internal (INT) or external (EXT) and manual setting.



Dynamic Strain
Measuring Instruments

Outline

1-channel

Multi-channel

DC Amplifier

Other

TEDS	Reads the sensor TEDS information, and sets the rated output to the VOLTAGE OUT output voltage. (Condition: Within the setting range of the sensitivity adjuster)
Actual Load Calibration	Sets actual load input to the VOLTAGE OUT output voltage. (Condition: Within the setting range of the sensitivity adjuster)
Vibration Resistant	5 to 200 Hz, with 29.4 m/s ² (3 G) in X, Y and Z directions for 12 cycles, 10 min/cycle
Impact Resistant	15 G, 11 ms or less, in X, Y and Z directions, every 3 cycles
Operating Temperature	-10 to 50°C
Operating Humidity	20 to 85% (Non-condensing)
Storage Temperature	-30 to 70°C
Power Supply	See table on the page 3-5
Dimensions	49 W × 128.5 H × 262.5 D mm (Excluding protrusions) Panel-cut dimensions: 50 W × 113 H mm
Weight	Approx. 1.2 kg

Standard Accessories

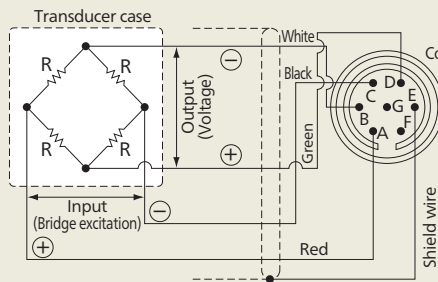
- Output cable U-08, U-59, 1 each
- AC power cable P-25 (With 2-pin conversion plug CM-52)
- Fuse (Midget type 0.5 A, 1 A)
- Instruction manual
- Simple manual sticker

Optional Accessories

- Extension cables N-81 to N-85
- Bridge boxes DB, DBB, and DBS
- Housing case YC-A
- Noise filter F-7B, F-BNC
- Amplifier stand FA-1B
- Shielded conversion cable N-117

To Ensure Safe Usage

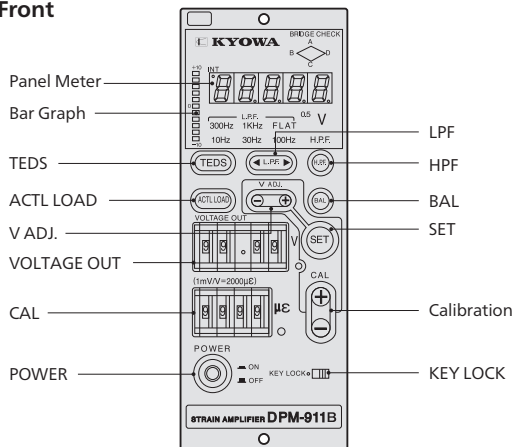
The bridge check function shows the error information - that indicates the wire-breaking location - on the monitor. Note that if 2 or more wires are broken, the bridge check function shows the error information of only one wire.



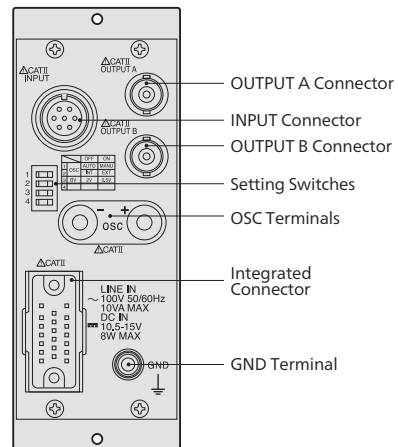
Wire-breaking locations	Error
A (Red)	Er-a
B (White)	Er-b
C (Black)	Er-c
D (Green)	Er-d
3 wires or more	Er-b

Panel

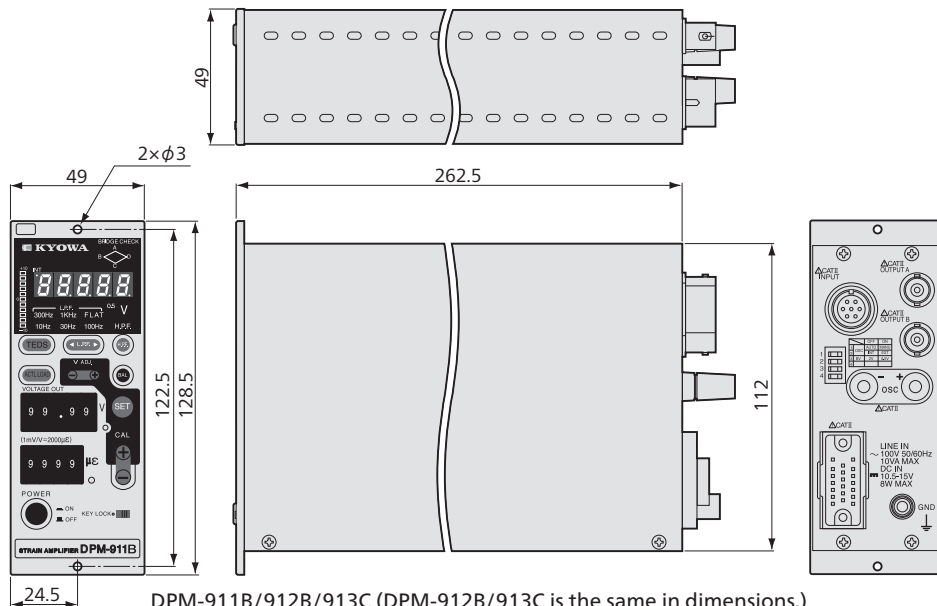
●Front



●Rear



Dimensions




DPM-911B/912B/913C (DPM-912B/913C is the same in dimensions.)

Dynamic Strain Measuring Instruments

- Outline
- 1-channel
- Multi-channel
- DC Amplifier
- Other

DC Amplifier

Models	Channels	Measuring Targets		Bridge Excitation		Frequency Response	Indicators	Features	Power Supply	Pages
		Strain	Voltage	DC	AC					
DC Amplifier DA-710A  Isolated High accuracy	2		Yes		—	DC to 10 kHz	—	I/O isolated Allowable common mode voltage: ± 300 V Allowable max. input voltage: ± 110 V	100 VAC	3-17



Dynamic Strain
Measuring Instruments

Outline

1-channel

Multi-channel

DC Amplifier

Other

DPM-911B/912B/913C

Strain Amplifier



High stability High accuracy Easy operation

- Easy operation greatly reduce the working hours.
- Digital switch makes setting easy and the value set is easily seen even when power is off.
- High voltage output of ± 10 V and high SN ratio are ensured.
- Vertical bar meter is easy to check.
- The HPF cancels the effect of slow changes, such as temperature drift of gages or sensors.
- Sensitivity of TEDS compatible transducers is automatically registered.
- Input and output are isolated.
- Sensitivity is automatically set with the actual load calibration function.
- Built-in check function on bridge circuit
- Broad frequency response DC to 10 kHz (913C)
- Input Open Detection Function (913C)

Models

Models	Carrier Wave Frequencies	Frequency Response	SN Ratio
DPM-911B	5 kHz	DC to 2.5 kHz	54dB _{p-p} or more ^{*1} 60dB _{p-p} or more ^{*2}
DPM-912B	12 kHz	DC to 5 kHz	53dB _{p-p} or more ^{*1} 58dB _{p-p} or more ^{*2}
DPM-913C	28 kHz	DC to 10 kHz	48dB _{p-p} or more ^{*3} 53dB _{p-p} or more ^{*2}

*1 RTI: Within 2×10^{-6} strain_{p-p}, when 500×10^{-6} strain is input, outputs 10.00 V.

*2 when 1000×10^{-6} strain is input, outputs 10.00 V.

*3 RTI: Within 3.9×10^{-6} strain_{p-p}, when 500×10^{-6} strain is input, outputs 10.00 V.

[Common Condition] Bridge Excitation : $2 V_{rms}$, Bridge Resistance: 120 Ω , LPF = FLAT

Power Supply

Models etc.	Power Supply
DPM-xxxx	90 to 110 VAC (Approx. 12 VA: 100 VAC)
DPM-xxxx A115	108 to 132 VAC (Approx. 12 VA: 115 VAC)
DPM-xxxx A200	180 to 220 VAC (Approx. 12 VA: 200 VAC)
DPM-xxxx A230	207 to 253 VAC (Approx. 12 VA: 230 VAC)
An optional DC power cable P-69 is required.	10.5 to 15 VDC (Approx. 0.6 A: 12 VDC)

xxxx: Part of model, example: 911B

Specifications

Measuring Targets	Strain gages, strain-gage transducers
Channels	1
	Simultaneous operation is available by using multiple units.
Compatible Bridge Resistance	60 to 1000 Ω
Gage Factor	2.00 fixed
Bridge Excitation	$2 V_{rms}$, $0.5 V_{rms}$, switchable
Balance Adjustment	Resistance: Within $\pm 2\%$ ($\pm 10000 \times 10^{-6}$ strain) Capacity: Within 2000 pF
Balance Adjustment Method	Resistance: Auto balance Accuracy: Within $\pm 0.5 \times 10^{-6}$ strain (When 500×10^{-6} strain is input, outputs 10 V, excitation voltage: $2 V_{rms}$) Capacitance: CST method (Capacitance self-tracking)
Nonlinearity	Within $\pm 0.1\%$ FS Within $\pm 0.2\%$ FS (913C)
Output Impedance	Approx. 2 Ω
Calibration Strain (CAL)	$\pm (1 \text{ to } 9999 \times 10^{-6} \text{ strain})$ Setting: CAL switch (4-digital switch) Accuracy: Within $\pm (0.5\% + 0.5 \times 10^{-6} \text{ strain})$ Within $\pm (0.5\% + 1 \times 10^{-6} \text{ strain})$ (913C) Applicable scope of CAL accuracy: $\pm (10 \text{ to } 9999) \times 10^{-6} \text{ strain}$
Sensitivity Adjustment	Sensitivity is set in combination with CAL and VOLTAGE OUT switches (4-digit digital switches). CAL switch range: 100 to 9999×10^{-6} strain by 1×10^{-6} strain step (Set with CAL switches) VOLTAGE OUT switch range: 1.00 to 10.00 by 0.01 V step Accuracy: Within $\pm 0.5\%$ Within $(\pm 0.5\% + 5 \text{ mV})$ (913C) (When Bridge Excitation is $2 V_{rms}$) Range: $\times 200$ to $\times 20000$
Fine Sensitivity Adjustment	Range: 1 to 1/2.5
Frequency Response	See table below. Deviation: $\pm 10\%$
LPF	Transfer characteristic: 2nd order Butterworth Cutoff frequencies: 10, 30, 100, 300 Hz, 1 k Hz and FLAT - 6 steps Amplitude ratio at cutoff point: -3 ± 1 dB Attenuation: -12 ± 1 dB/oct.
HPF	Cutoff frequencies: 0.2 Hz, OFF - 2 steps
SN Ratio	See table below.
Output	OUTPUT A: ± 10 V (Load resistance 5 k Ω or more) OUTPUT B: ± 10 V (Load resistance 5 k Ω or more)
Stability	Temperature Zero point: Within $\pm 0.1 \times 10^{-6}$ strain per $^{\circ}\text{C}$ Zero point: Within $\pm 0.2 \times 10^{-6}$ strain per $^{\circ}\text{C}$ (913C) Sensitivity: Within $\pm 0.05\%$ / $^{\circ}\text{C}$ Time Zero point: Within $\pm 0.5 \times 10^{-6}$ strain/24 h Zero point: Within $\pm 1.0 \times 10^{-6}$ strain/24 h (913C) Sensitivity: Within $\pm 0.3\%$ /24h Power supply Zero point: Within $\pm 0.05\%$ FS/power fluctuation $\pm 10\%$ Sensitivity: Within $\pm 0.05\%$ /power fluctuation $\pm 10\%$ Stability condition: When 500×10^{-6} strain is input, outputs 10.00 V.
Withstand Voltage	1000 VAC for 1 minute between measuring bridge and case 1000 VAC for 1 minute between AC power supply and case
Output Voltage Indication	4½ digit digital display (7-segment LED) 11-segment LED bar meter
Over Input Indication	Output voltage display flashing (4½ digit digital display only)
Check Functions	Bridge check
Input Open Detection Function	When the input is open, output saturates to the negative side. (913C only)
Key Lock Functions	Locks all keys other than POWER switch. (Allows settings on CAL and VOLTAGE OUT switches to be changed.)
Remote Functions	Capable of controlling the following functions. Balance adjustment execute (BAL), calibration strain output execute (CAL), key lock
Synchronization Method	Automatically determines internal (INT) or external (EXT) and manual setting.



Dynamic Strain
Measuring Instruments

Outline

1-channel

Multi-channel

DC Amplifier

Other

TEDS	Reads the sensor TEDS information, and sets the rated output to the VOLTAGE OUT output voltage. (Condition: Within the setting range of the sensitivity adjuster)
Actual Load Calibration	Sets actual load input to the VOLTAGE OUT output voltage. (Condition: Within the setting range of the sensitivity adjuster)
Vibration Resistant	5 to 200 Hz, with 29.4 m/s ² (3 G) in X, Y and Z directions for 12 cycles, 10 min/cycle
Impact Resistant	15 G, 11 ms or less, in X, Y and Z directions, every 3 cycles
Operating Temperature	-10 to 50°C
Operating Humidity	20 to 85% (Non-condensing)
Storage Temperature	-30 to 70°C
Power Supply	See table on the page 3-5
Dimensions	49 W × 128.5 H × 262.5 D mm (Excluding protrusions) Panel-cut dimensions: 50 W × 113 H mm
Weight	Approx. 1.2 kg

Standard Accessories

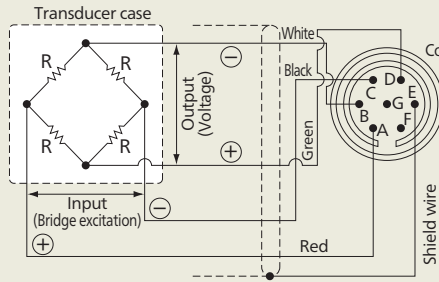
- Output cable U-08, U-59, 1 each
- AC power cable P-25 (With 2-pin conversion plug CM-52)
- Fuse (Midget type 0.5 A, 1 A)
- Instruction manual
- Simple manual sticker

Optional Accessories

- Extension cables N-81 to N-85
- Bridge boxes DB, DBB, and DBS
- Housing case YC-A
- Noise filter F-7B, F-BNC
- Amplifier stand FA-1B
- Shielded conversion cable N-117

To Ensure Safe Usage

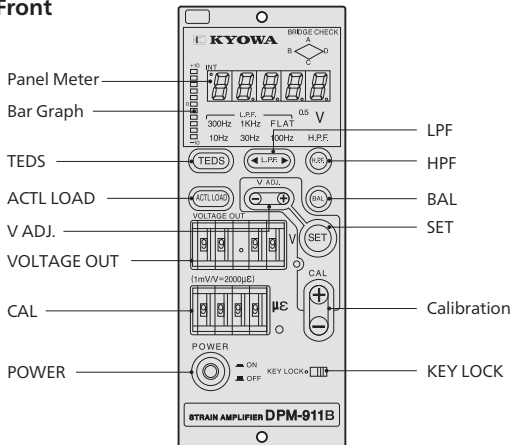
The bridge check function shows the error information - that indicates the wire-breaking location - on the monitor. Note that if 2 or more wires are broken, the bridge check function shows the error information of only one wire.



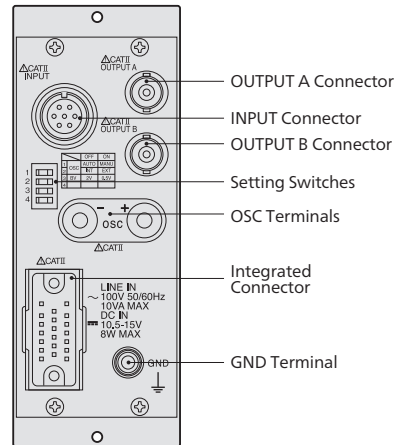
Wire-breaking locations	Error
A (Red)	Er-a
B (White)	Er-b
C (Black)	Er-c
D (Green)	Er-d
3 wires or more	Er-b

Panel

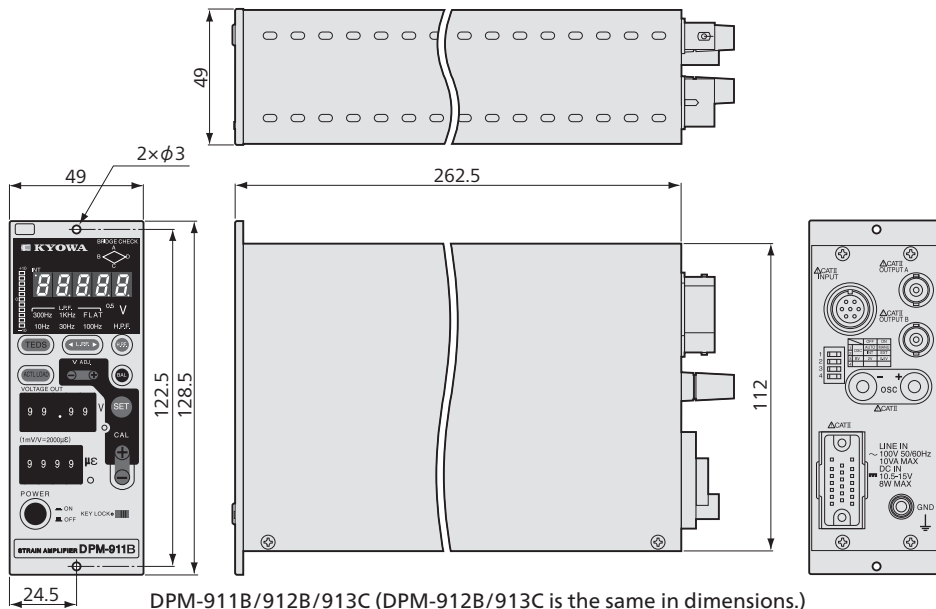
●Front



●Rear



Dimensions



Dynamic Strain Measuring Instruments

- Outline
- 1-channel
- Multi-channel
- DC Amplifier
- Other

CDV-900A, CDA-900A

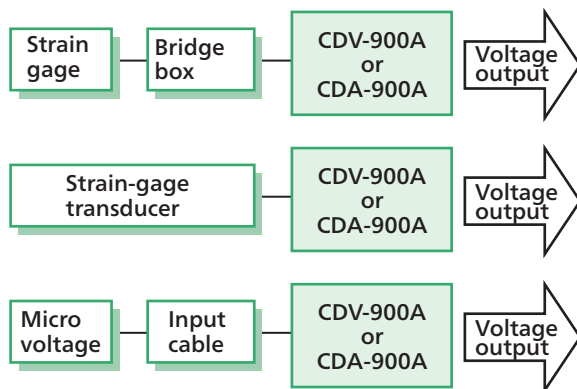
Signal Conditioner



High S/N is ensured by the strain DC amplifiers

- Easy operation greatly reduces the working hours.
- High sensitivity (Up to 10000 times)
- Fast response (DC to 500 kHz)
- Long-distance testing (Up to 2 km)
- Excellent nonlinearity (Within $\pm 0.01\%$ FS)
- Universal power supply (CDV/CDA-900A) (100 to 240 VAC or 10.5 to 15 VDC)
- TEDS compatible
- Distinguishes TEDS and remote sensing automatically.
- Low noise (30% reduction when compared to conventional models)

Block diagram



*Output noise will increase in case of combining with a torque transducer.

Models

Models	CDV-900A	CDV-900A-DC	CDA-900A	CDA-900A-DC
Excitation Modes	Constant voltage		Constant current *1	
Bridge Excitation *2	1, 2, 5, 10 V		120 Ω : 8.3, 16.7 mA 350 Ω : 5.7, 14.3, 28.6 mA	
Applicable Bridge Resistance	60 to 1000 Ω		120, 350 Ω	
User's Function	Cable-resistance compensation (Cable resistance in one way 0 to 200.0 Ω) Setting the remote sensing "ALWAYS ON"		Bridge-resistance compensation (Bridge resistance: 60.0 to 1000 Ω)	
Remote Sensing	Yes *3			
Cable Extension	Up to 2 km *4 (Using a sensing cable)		Up to 2 km *5	
CE Directive		Yes		Yes
Power Supply	100 to 240 VAC 10.5 to 15 VDC	10.5 to 15 VDC	100 to 240 VAC 10.5 to 15 VDC	10.5 to 15 VDC

*1: 60.0 to 1000.0 Ω : By using the user-specified registration function) By using the user-specified registration function

*2: Setting by DIP switch 1 to 4 on rear panel

*3: Performs BAL switch, CAL switch, and key-lock function

*4: By a 6-conductor (0.5 mm²) shielded cable

*5: By a 4-conductor (0.5 mm²) cable

Specifications

Measuring Targets	Strain gages, strain-gage transducers and voltage	
Channels	1	
Applicable Bridge Resistance	See table.	
Gage Factor	2.00 fixed	
Bridge Excitation	See table.	
Balancing Range(BAL)	Within $\pm 2\%$ ($\pm 10000 \times 10^{-6}$ strain)	
Balancing Method	Auto-balance	
	Accuracy: ± 1 m/m	
	[At sensitive of $10V/1000 \times 10^{-6}$ strain]	
	Saved in nonvolatile memory	
Nonlinearity	Within $\pm 0.01\%$ FS	
Input Impedance	10 M Ω + 10 M Ω or more	
Output Impedance	Approx. 2 Ω	
Calibration (CAL)	Equivalent strain: $\pm(1$ to 9999×10^{-6} strain)	
	DC voltage: $\pm(10$ to $99990 \mu V)$	
	Setting: CAL switch (4-digital switch)	
	Accuracy: Within $\pm(0.2\%+0.5 \times 10^{-6}$ strain)	
	Within $\pm(0.1\%+5.0 \mu V_{RTI})$	
Sensitivity Adjustment	Sensitivity is set in combination with CAL and VOLTAGE OUT switches (4-digit digital switches)	
	CAL switch range: 100 to 9999×10^{-6} strain by 1×10^{-6} strain step	
	VOLTAGE OUT switch range: 1.00 to 10.00 by 0.01 V step	
	Accuracy: Within $\pm(0.5\%+5$ mV)	
	Range: $\times 200$ to $\times 10000$	
Fine Sensitivity Adjustment	Range: 1 to 1/2.5	
Frequency Response	DC to 500 kHz	
	(Amplitude deviation: 1, -3 dB)	
Low-pass Filter(LPF)	Transfer characteristic: 4th order Butterworth	
	Cutoff frequencies: 10, 100, 1 k, 10 k, 100 k Hz and FLAT - 6 steps	
	Amplitude ratio at cutoff point: -3 ± 1 dB	
	Attenuation: -24 ± 1 dB/oct.	
High-pass Filter(HPF)	Cutoff frequencies: 0.2 Hz, OFF - 2 steps	
Output	OUTPUT A: ± 10 V (Load resistance: 5 k Ω or more)	
	OUTPUT B: ± 10 V (Load resistance: 5 k Ω or more)	
Noise	Low-pass filter	Noise (RTI)
	FLAT	40 μV_{p-p} or less
	100 kHz	16 μV_{p-p} or less
	10 kHz	6 μV_{p-p} or less
	1 kHz	4 μV_{p-p} or less
	100 Hz	3 μV_{p-p} or less
	10 Hz	2 μV_{p-p} or less
	[At the bridge excitation: 2 V and bridge resistance: 120 Ω , when 1000×10^{-6} strain is input, outputs 10 V.]	



Dynamic Strain
Measuring Instruments

Outline

1-channel

Multi-channel

DC Amplifier

Other

Safe Input	± 15 V
Safe Common Mode Input	± 10 V
CMRR	100 dB or more
Stability	Temperature Zero point: ±1 × 10 ⁻⁶ strain per °C Sensitivity: ±0.01%/°C
	Time Zero point: ±5 × 10 ⁻⁶ strain/24 h Sensitivity: ±0.05%/24 h
	Power supply Zero point: ±0.05%FS/power fluctuation ±10% Sensitivity: ±0.05%/power fluctuation ±10% [when 1000×10 ⁻⁶ strain is input, outputs 10.00 V.]
Withstand Voltage (CDV/CDA-900A only)	
	1 kVAC for 1 min between AC power supply and case
Output Voltage Display	4½ digit digital display (7-segment LED) 11-segment LED bar graph meter
Over Input Indication	Output voltage: Flickers (4 1/2 digits, digital display only)
Check Functions	Bridge resistance check
Key Lock Function	For prohibiting operations other than POWER switch. (However, the setting values of the CAL switch and VOLTAGE OUT switch can be changed.)
Remote Functions	Performs BAL switch, CAL switch, and key-lock function
TEDS	Loads the TEDS information of the sensor and sets the rated output to the output voltage of the VOLTAGE OUT switch.
Actual Load Calibration	Sets the actual load to the output voltage of the VOLTAGE OUT switch.

User's Function	See table.
Remote Sensing	See table.
Cable Extension	See table.
Vibration Resistant	5 to 200 Hz, with 29.4 m/s ² (3 G) in X, Y and Z directions for 12 cycles, 10 min/cycle
Impact Resistant	15 G, 11 ms or less, in X, Y and Z directions, every 3 cycles
Operating Temperature	-10 to 50 °C
Operating Humidity	20 to 85% (Non-condensing)
Storage Temperature	-30 to 70 °C
Power Supply	100 to 240 VAC, approx. 8 VA (At 100 VAC)
	10.5 to 15 VDC, approx. 4 W (At 12 VDC) (CDA/CDV-900A-DC: DC power supply only)
Dimensions	49 W × 128.5 H × 262.5 D mm (Excluding protrusions)
Weight	Approx. 1.0 kg
Compliance (CDV/CDA-900A-DC only)	
	Directive 2014/30/EU (EMC)
	Directive 2011/65/EU, (EU)2015/863 (10 restricted substances) (RoHS)

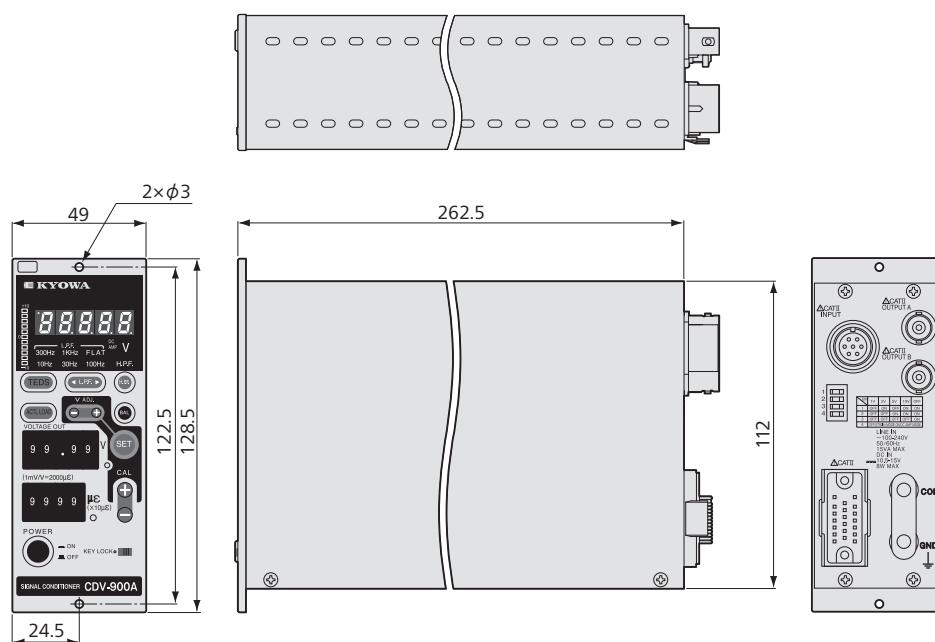
Standard Accessories

- Output cable U-08, U-59
- AC power cable P-25 (With 2-pin conversion plug CM-52, CDV/CDA-900A only)
- DC power cable P-69 (CDV/CDA-900A-DC only)
- Ferrite core × 5 (CDV/CDA-900A-DC only)
- Instruction manual

Optional Accessories

- Input cable U-37
- Extension cables N-81 to N-85
- Housing case YC-A
- Amplifier stand FA-1B
- AC adapter SA-10A-AMP (CDV/CDA-900A-DC only)

■ Dimensions



CDV-900A, CDA-900A (CDA-900A is the same in dimensions.)

MCF-B

Multi Signal Conditioner

● 8 or 16 channels



*RoHS compliant models except CFV-90A.
CFV-90A: RoHS compliant models are available. Inquires are welcome.

Simple-operation amplifier for various fields.

- Easy operation greatly reduces the working hours.
- 4-digit CAL switch.
- Hardly affected by noise.
- Various fixing fixtures and handles.
- You can set and control the MCF-B from your PC.
- Input Open Detection Function (DPM-91A/92A)

The MCF-B is a portable amplifier and builds a high-performance system by using conditioner cards. The CAL LOCK function keeps outputting the calibration values.

System Content

■ Unit Base

- MCF-8B (For measurement of up to 8 conditioner cards)
- MCF-16B (For measurement of up to 16 conditioner cards)

■ Conditioner Cards*

- DPM-91A/91A-I (Strain Amplifier Card, carrier frequency 5 kHz)
- DPM-92A/92A-I (Strain Amplifier Card, carrier frequency 12 kHz)

(The suffix "-I" means with feature of robustness against inverter noise.)

- CDV-90A (Signal Conditioner Card)
- CTA-90A (Thermocouple Card)
- CCA-90A (Charge Amplifier Card)
- CFV-90A (F/V Converter Card)

*The carrier frequencies are different. Please be sure DPM-91A and DPM-92A are not mounted in the same unit base.

* When using strain gages, use bridge boxes.

* When mounting the CTA-90A and an empty channel exists, be sure to mount the dummy card.

*The software for the command control functions should be prepared by yourself. We have released the control commands.

*To use the command control functions, you may require to update the firmware of conditioner cards.

Note that the update should be handled by Kyowa (with charge).

Specifications

Multi Signal Conditioner MCF-B													
Number of Conditioner Cards	8 (MCF-8B) 16 (MCF-16B)												
Applicable Conditioner Cards													
	<table border="1"> <thead> <tr> <th>Card Model</th> <th>Compatible Firmware</th> </tr> </thead> <tbody> <tr> <td>DPM-91A, DPM-91A-I DPM-92A, DPM-92A-I</td> <td>Ver.03.00 or later</td> </tr> <tr> <td>CDV-90A</td> <td>Ver.03.00 or later</td> </tr> <tr> <td>CTA-90A</td> <td>Ver.01.02 or later</td> </tr> <tr> <td>CFV-90A</td> <td>Ver.03.01 or later</td> </tr> <tr> <td>CCA-90A</td> <td>Ver.03.00 or later</td> </tr> </tbody> </table>	Card Model	Compatible Firmware	DPM-91A, DPM-91A-I DPM-92A, DPM-92A-I	Ver.03.00 or later	CDV-90A	Ver.03.00 or later	CTA-90A	Ver.01.02 or later	CFV-90A	Ver.03.01 or later	CCA-90A	Ver.03.00 or later
Card Model	Compatible Firmware												
DPM-91A, DPM-91A-I DPM-92A, DPM-92A-I	Ver.03.00 or later												
CDV-90A	Ver.03.00 or later												
CTA-90A	Ver.01.02 or later												
CFV-90A	Ver.03.01 or later												
CCA-90A	Ver.03.00 or later												
Monitor Meter	Indicate output voltage of selected any channel by 1-digit sign and 4-digit value.												
	When error occurs, error No. and message are indicated.												
Control Switch	(Front)												
	CH select: Switching channels that indicate on the monitor meter.												
	BAL: Balance adjustment is executed all channels simultaneously.												
	+CAL, -CAL: Calibration output is executed all channels simultaneously.												
	KEY LOCK: When set to ON, no operation switches are available.												
	(Rear)												
	OSC select: To select the oscillator signal internal or external.												
	COM change-over: To change open or short between COM terminal and GND terminal.												
Channel Indication	CH LED lights up when the channel is monitored.												
Key-lock Indication	KEYLOCK LED lights up when Key-lock set to ON.												
PHYSICAL QUANTITY Indication													
	PHYSICAL QUANTITY LED lights up when the conditioner card in TEDS mode.												
Master Indication	OSC INT LED lights up when use DPM card and when OSC select switch sets to INT as internal oscillator.												
Other Function	Automatically select carrier frequency according to the types of the connected DPM card.												
Command Control Function													
Signaling System	RS-485 half duplex system												
Communication Speed	9600 bps												
Character Length	8 bits												
Parity	None												
Stop Bit	1 bit												
Delimiter	CR: Command transmission to the MCF-B. CR+LF: Data transmission from the MCF-B.												
Device ID	0 to F (up to 16 units can be controlled by one computer) *Device IDs are set using the DIP switches in the monitor display section.												
Communication Range	Up to 200 m												
Command	Start command control End command control Select monitor display channel Get card type Get connected models Get version Get error number Get voltage Execute balance adjustment (DPM-90A series, CDV-90A) Set calibration output (DPM-90A series, CDV-90A, CTA-90A, CFV-90A, CCA-90A) Set internal gain (DPM-90A series, CDV-90A, CTA-90A, CFV-90A, CCA-90A)												



Dynamic Strain
Measuring Instruments

Outline

1-channel

Multi-channel

DC Amplifier

Other



	Perform zero-point adjustment (DPM-90A series, CDV-90A, CFV-90A, CCA-90A)
	Perform internal gain adjustment (DPM-90A series, CDV-90A, CTA-90A, CCA-90)
	Set bridge voltage (CDV-90A)
	Switch TEDS mode on/off (DPM-90A series, CDV-90A, CCA-90A)
	Load TEDS information (DPM-90A series, CDV-90A, CCA-90A)
	Set low-pass filter cutoff frequency (DPM-90A series, CDV-90A, CTA-90A)
	Set high-pass filter cutoff frequency (DPM-90A series, CDV-90A)
	Select thermocouple type (CTA-90A)
	Switch measurement range (CFV-90A)
	Set input coupling (CFV-90A)
	Set trigger level (CFV-90A)
	Switch Status in Command Control Mode
	Switch operations are locked (except for [CH SELECT] switches).
	Notification in Command Control Mode
	[KEY LOCK] LED flashes.
	Exiting Command Control Mode
	Canceled by command or using switch.
	Settings After Exiting Command Control Mode
	Retains most recent settings.
Vibration Resistance	49.03 m/s ² (5 G) 5 to 55 Hz 15 cycles each in X, Y, Z directions, 1 min/cycle
Operating Temperature	-10 to 50°C
Operating Humidity	20 to 85% (Non-condensing)
Storage Temperature	-20 to 60°C
Power Supply	10 to 30 VDC
Current Consumption	1.5 A or less (MCF-8B) 3 A or less (MCF-16B) (Fully equipped with CDV-90A cards, bridge excitation = 2 V, bridge resistance 60 Ω, power supply 15 VDC.)
Connector	Centralized output connector (MDR connector, pincount 26, female) BNC connector
Dimensions	246.4 W × 101 H × 170 D mm (Excluding protrusions, MCF-8B) 440 W × 101 H × 170 D mm (Excluding protrusions, MCF-16B)
Weight	Approx. 3.5 kg, unit base only (MCF-8B) Approx. 5 kg (With 8 DPM-91A cards mounted, MCF-8B) Approx. 5 kg, unit base only (MCF-16B) Approx. 8 kg (With 16 DPM-91A cards mounted, MCF-16B)
Compliance	Directive 2014/30/EU (EMC) Directive 2011/65/EU, (EU) 2015/863 (10 restricted substances) (RoHS)
Standard Accessories	DC power cable P-76 (Approx. 1.8 m) Ground wire P-72 (Approx. 5 m) Synchronous cable U-59 (Approx. 1.5 m) Connector for centralized output cable Spare fuse Instruction manual (CD-R)
Optional Accessories	AC adapter UEA360-1540 1 channel dummy card MCF-DUMMY2 RS-485 extension cable for MCF N-136 (Approx. 1 m) RS-485 communication Y cable for MCF N-137 (Approx. 0.3 m) Independent left/right rack fixture MCF-BKT MCF handle fixture MCF-HANDLE Fixture for JIS rack for MCF-16B MCF-JIS Fixture for DIN rack for MCF-16B MCF-DIN

Strain Amplifier Card DPM-91A, 92A		
Frequency Response and Carrier Frequencies		
Models	Frequency Response	Carrier Frequencies
DPM-91A (-I)	DC to 2.5 kHz (Deviation ±10%)	5 kHz
DPM-92A (-I)	DC to 5 kHz (Deviation ±10%)	12 kHz
Measuring Targets	Strain gages (A separate bridge box is necessary.) Strain-gage transducers	
Channels	1	
Compatible Bridge Resistance	60 to 1000 Ω	
Gage Factor	2.00 fixed	
Bridge Excitation	2 V _{rms}	
Balance Adjustment	Resistance: Within ±2% (±10 k × 10 ⁻⁶ strain) Capacitance: 2000 pF or less (Bridge resistance 120 Ω)	
Balance Adjustment Methods	Resistance: Auto balance (Stored in nonvolatile memory) Accuracy: Within ±0.5 × 10 ⁻⁶ strain (When 5 V output to 100 × 10 ⁻⁶ strain input) Capacitance: CST (Capacitance self-tracking)	
Nonlinearity	Within ±0.2% FS	
Calibration (CAL)	±(1 to 9999 × 10 ⁻⁶ strain) Accuracy: Within ± (0.5% + 0.5 × 10 ⁻⁶ strain)	
Sensitivity Adjustment	Sensitivity is set in combination with a 4-digit INPUT switch and a 3-digit OUTPUT switch. OUTPUT switch range: 1.00 to 5.00 V in 0.01-V step INPUT switch range: 100 to 9999 × 10 ⁻⁶ strain in 1 × 10 ⁻⁶ strain step Accuracy: Within ±(0.5%+5 mV) Range: ×200 to ×50000	
Fine Sensitivity Adjustment	×0.4 to ×1	
LPF	Transfer characteristic: 2nd order Butterworth Cutoff frequencies: 10, 30, 100, 300, 1 k Hz and FLAT (6 steps) Amplitude ratio at cutoff point: -3 ±1 dB Attenuation: (-12 ±1) dB/oct. (Except set at 1 kHz.)	
HPF	Cutoff frequencies: 0.2 Hz, OFF (2 steps)	
SN Ratio	Conditions: When 200 × 10 ⁻⁶ strain input and 5V output, 120 Ω short. DPM-91A: ≥49 dB _{p-p} DPM-91A-I: ≥44 dB _{p-p} DPM-92A: ≥45 dB _{p-p} DPM-92A-I: ≥40 dB _{p-p}	
Stability	Temperature	Zero point: Within ±0.1 × 10 ⁻⁶ strain per °C Sensitivity: Within ±0.05%/°C
	Time	Zero point: Within ±1 × 10 ⁻⁶ strain per 8 h Sensitivity: Within ±0.3%/8 h (When 100 × 10 ⁻⁶ strain input and 5 V output, zero point is measured by 120 Ω short, sensitivity is measured by 120 Ω bridge.)
Output	Dual output (The same voltage is output to BNC connector and centralized output connector.) Output voltage: Within ±5 V or over (Load 5k Ω or more) Zero adjustment: Within ±0.1 V or over	
Output Off Function	Available	
Output Impedance	2 Ω or less	
Withstand Voltage	500 VAC within 1 min in: Between input and output. Between input and case. Between output and case.	
Over Input Indication	LED lights up.	
TEDS	Reads the sensor's TEDS information then sets the rated output to OUTPUT switch as output voltage.	
Input Open Detection Function	Saturates output in the negative direction when input is open.	
Connector Shape	Input connector: NDIS4102 (7 pins) connector Output connector: BNC connector	
Dimensions	24 W × 96 H × 170 D mm (Excluding protrusions)	
Weight	Approx. 190 g	
Compliance	Directive 2011/65/EU, (EU)2015/863 (10 restricted substances) (RoHS)	
Standard Accessories	Output cable U-59	



Dynamic Strain Measuring Instruments

Outline

1-channel

Multi-channel

DC Amplifier

Other

■ Signal Conditioner Card CDV-90A	
Measuring Targets	Strain gages (A separate bridge box is necessary.) Strain-gage transducers
Channels	1
Gage Factor	2.00 fixed
Balance Adjustment	Within $\pm 2\%$ ($\pm 10 \text{ k} \times 10^{-6}$ strain)
Balance Adjustment Methods	Resistance: Auto balance (Compensated value stored in nonvolatile memory) Accuracy: Within $\pm 1 \times 10^{-6}$ strain (With excitation 10 V, 5 V output to 200×10^{-6} strain input)
Nonlinearity	Within $\pm 0.05\%$ FS
Input Impedance	20 M Ω or more
Output Impedance	2 Ω or less
Calibration Strain	$\pm(1 \text{ to } 9999 \times 10^{-6}$ strain) Accuracy: Within $\pm(0.3\% + 1 \times 10^{-6}$ strain)
Sensitivity Adjustment	Sensitivity is set in combination with a 4-digit INPUT switch and a 3-digit OUTPUT switch. OUTPUT switch range: 1.00 to 5.00 V in 0.01-V step INPUT switch range: 200 to 9999×10^{-6} strain in 1×10^{-6} strain step Accuracy: Within $\pm(0.5\% + 5 \text{ mV})$ Range: $\times 200$ to $\times 5000$
Fine Sensitivity Adjustment	$\times 0.4$ to $\times 1$
Compatible Bridge Resistance	300 Ω to 1 k Ω (With excitation 10 V) 60 Ω to 1 k Ω (With excitation 2 V)
Bridge Excitation	2 or 10 VDC, switchable
Frequency Response	DC to 50 kHz (Deviation $+0.5, -3$ dB)
Output	Dual output (The same voltage is output to BNC connector and centralized output connector.) Output voltage: Within ± 5 V or over (Load 5k Ω or more) Zero adjustment: Within ± 0.1 V or over
Low-pass Filter	Transfer characteristic: 2nd order Butterworth Cutoff frequencies: 10, 30, 100, 300, 1 k, 3 k, 10k Hz and FLAT (8 steps) Amplitude ratio at cutoff point: -3 ± 1 dB Attenuation: (-12 ± 1) dB/oct.
High-pass Filter	Cutoff frequencies: 0.2 Hz, OFF (2 steps)
Noise	10×10^{-6} strain _{p-p} (When 10 V bridge excitation voltage, 200×10^{-6} strain input, 5 V output and 350 Ω short)
Stability	Temperature Zero point: Within $\pm 1 \times 10^{-6}$ strain per $^{\circ}\text{C}$ Sensitivity: Within $\pm 0.02\%/^{\circ}\text{C}$ Time Zero point: Within $\pm 10 \times 10^{-6}$ strain per 8 h Sensitivity: Within $\pm 0.1\%/8$ h (When 2 V bridge excitation voltage, 1000×10^{-6} strain input and 5 V output. Zero point is measured by 350 Ω short, sensitivity is measured by 350 Ω bridge.)
Output Off Function	Available
Withstand Voltage	500 VAC for 1 min, between the following two positions respectively. (Input and output, input and case, output and case)
Over Input Indication	LED lights up.
TEDS	Reads the sensor's TEDS information then sets the rated output to OUTPUT switch as output voltage.
Input Open Detection Function	Saturates output in the negative direction when input is open.
Connector Shape	Input connector: NDIS4102 (7 pins) connector Output connector: BNC connector
Dimensions	24 W \times 96 H \times 170 D mm (Excluding protrusions)
Weight	Approx. 150 g
Compliance	Directive 2011/65/EU, (EU)2015/863 (10 restricted substances) (RoHS)
Standard Accessories	Output cable U-59

■ Thermocouple Card CTA-90A	
Applicable Thermocouples	K, T, J, N, E, and R (Thermocouple resistance is 1 k Ω or less)
Measuring Range	K: -200 to 1300 $^{\circ}\text{C}$, T: -200 to 400 $^{\circ}\text{C}$ J: -200 to 1200 $^{\circ}\text{C}$, N: -200 to 1300 $^{\circ}\text{C}$ E: -200 to 1000 $^{\circ}\text{C}$, R: 0 to 1700 $^{\circ}\text{C}$
Channels	1
Reference Junction Compensation	± 2.5 $^{\circ}\text{C}$ (-10 to 50 $^{\circ}\text{C}$) ± 1 $^{\circ}\text{C}$ (20 ± 3 $^{\circ}\text{C}$)
Frequency Response	DC to 10 Hz (Deviation: $+0.5, -1$ dB)
Linearizer Accuracy	Within $\pm 0.5\%$ FS (With type K, J, N, E, R) Within $\pm 1\%$ FS (With type T)
Calibration	100 to 1700 $^{\circ}\text{C}$ from step up of 100 $^{\circ}\text{C}$ (Full scale depends on the type of thermocouple.) Accuracy: Within $\pm 0.5\%$ FS
Sensitivity Adjustment	Sensitivity is set in combination with a 2-digit INPUT switch and a 3-digit OUTPUT switch. OUTPUT switch range: 1.00 to 5.00 V in 0.01-V step INPUT switch range: 100 to 1700 $^{\circ}\text{C}$ in 100 $^{\circ}\text{C}$ step
Fine Sensitivity Adjustment	$\times 0.4$ to $\times 1$
Frequency Response	DC to 10 Hz (Deviation $+0.5, -1$ dB)
Noise	30 mV _{p-p} or less (Input short)
Stability	Temperature Zero point: Within $\pm 0.05\%$ FS/ $^{\circ}\text{C}$ Sensitivity: Within $\pm 0.05\%/^{\circ}\text{C}$ Time Zero point: Within $\pm 0.5\%$ FS/8 h Sensitivity: Within $\pm 0.5\%/8$ h (Using K type, 5 V output to 1300 $^{\circ}\text{C}$)
Withstand Voltage	500 VAC for 1 min, between the following two positions respectively: Input and output, input and case, output and case
Over Input Indication	LED lights up.
Connector Shape	Input connector: One-touch type terminal block Output connector: BNC connector Applicable wire Solid wire: $\phi 0.4$ mm to $\phi 1.3$ mm (UL AWG16 to 26) Twisted wire: $\phi 0.2$ mm ² to $\phi 1.3$ mm ² (UL AWG16 to 24)
Dimensions	24 W \times 96 H \times 170 D mm (Excluding protrusions)
Weight	Approx. 140 g
Compliance	Directive 2011/65/EU, (EU)2015/863 (10 restricted substances) (RoHS)
Standard Accessories	Output cable U-59
■ Charge Amplifier Card CCA-90A	
Channels	1
Measuring Targets	IEPE accelerometer, Max. ± 5000 mV (built-in amplifier type) *Charge converter is necessary when using a charge output accelerometer. Recommended item: Fuji ceramics corporation, "CAC1R0"
Input	Input format: Unbalanced input Sensor supply: Built-in constant-current supply Constant current 4 mA Excitation voltage: Approx. 24 V
Frequency Response	0.2 Hz to 50 kHz (Deviation $+1, -3$ dB)
Sensitivity Adjustment	Sensitivity is set in combination with a 4-digit INPUT switch and a 3-digit OUTPUT switch. INPUT switch range: 20 to 5000 mV in 1-mV step OUTPUT switch range: 1.00 to 5.00 V in 0.01-V step Accuracy: Within $\pm(0.5\% + 5 \text{ mV})$ Range: $\times 1$ to $\times 250$
Fine Sensitivity Adjustment	$\times 0.4$ to $\times 1$
Calibration (DC CAL)	$\pm(1 \text{ to } 5000 \text{ mV})$ Accuracy: Within $\pm 0.3\%$ FS



Dynamic Strain Measuring Instruments

Outline

1-channel

Multi-channel

DC Amplifier

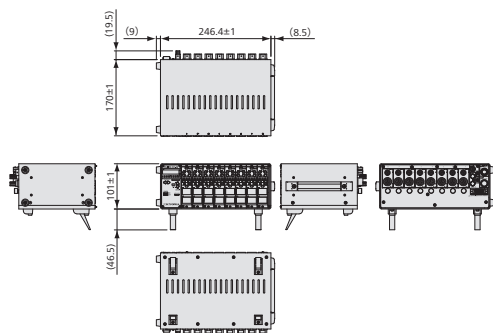
Other

Low-pass Filter	Transfer characteristic: 2nd order Butterworth Cutoff frequencies: 300, 1k, 3k, 10k Hz and FLAT (5 steps) Amplitude ratio at cutoff point: -3 ± 1 dB Attenuation: (-12 ± 1) dB/oct.
Distortion Rate	Within 1% (When ± 5 V output)
SN Ratio	48 dB _{pp} or more (When 20 mV input and 5 V output)
Stability	Temperature Zero point: Within ± 0.5 mV per °C Sensitivity: Within ± 0.05 %/ °C
	Time Zero point: Within ± 5 mV per 8h Sensitivity: Within ± 0.5 %/8h
TEDS	Reads the sensor's TEDS information then displays it on the monitor meter to the value that converted the output voltage into the physical quantity.
Output	Dual output, both BNC connector and integrated connector output the same signal. Voltage output: ± 5 V or more, when load resistance 5 kΩ or more Zero adjustment: -0.1 to 0.1 V or wider
Output Off Function	Available
Output Impedance	2 Ω or less
Withstand Voltage	500 VAC for 1 min, between the following two positions respectively: Input and output, input and case, output and case
Over Input Indication	LED lights up.
Connector Shape	Input connector: BNC Output connector: BNC
Dimensions	24 W × 96 H × 170 D mm (Excluding protrusions)
Weight	Approx. 140 g
Compliance	Directive 2011/65/EU, (EU)2015/863 (10 restricted substances) (RoHS)
Note) The specifications does not include the accuracy of the optional charge converter.	
Standard Accessories	Output cable U-59
■ F/V Converter Card CFV-90A	
Channels	1
Measuring Targets	AC signal
	Pulse signal (including open collector signal)
Frequency Range	0.2 Hz to 100 kHz
	*When set to 1.0 V output and 20 kHz range, 100 kHz input can measure as 5 V.
Input Voltage	± 0.5 to ± 50 V
Input Coupling	AC or DC
	Select by switch operation.
Trigger Level (Input Detection Level)	0.0 to 5.0 V in 0.1-V step
	Trigger level is set from the 2-digit thumbwheel switch.
	(When trigger level set to 5.1 V or more, trigger level saturates at 5.0 V.)

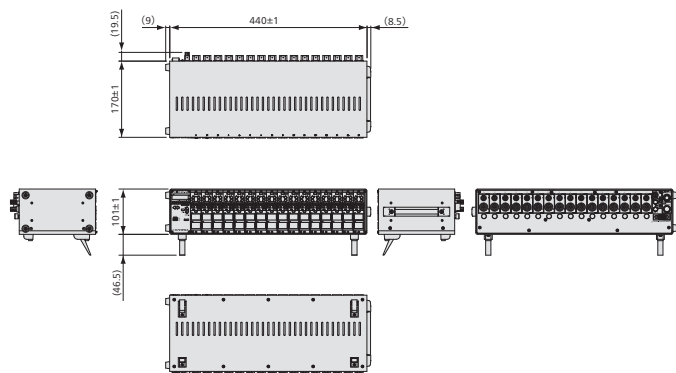
Nonlinearity	Within ± 0.1 % FS
Sensitivity Adjustment (RANGE)	500, 1k, 2k, 5k, 10k, 20 kHz (6 steps)
	Full scale of the range is output with the voltage set with the OUTPUT switch (3-digit thumbwheel switch).
	Accuracy: Within $\pm (0.1\% + 5$ mV) (Setting Example)
	When "SET" is executed with RANGE set to 20 kHz and OUTPUT switch set to 1.0 V, 1.0 V output at 20 kHz input, 5.0 V output at 100 kHz input.
Calibration (CAL)	100% or 50% of each RANGE Accuracy: Within ± 0.5 %
Response Time	When frequency continuous: Less than one cycle of the input signal $+25$ μs or less (At the start of output voltage rising)
	When frequency cutoff: Less than two cycle of the input signal $+25$ μs or less (At the start of output voltage falling)
Power Supply to Sensors	12 VDC ± 10 % (At load current is 50 mA or less.)
Noise	30 mVp-p or less (When input the signal: Square, frequency 100 kHz, amplitude: ± 0.5 V)
Stability	Temperature Zero point: Within ± 0.01 % FS per °C Sensitivity: Within ± 0.01 %/ °C
	Time Zero point: Within ± 0.05 % FS per 8h Sensitivity: Within ± 0.05 %/8h
Output	Dual output (The same voltage is output to BNC connector and centralized output connector.) Output voltage: Within 0 to 5 V (Load 5 kΩ or more) Zero adjustment: Within ± 0.1 V
Output Off Function	Available
Output Impedance	2 Ω or less
Withstand Voltage	500 VAC for 1 min, between the following two positions respectively: Input and output, input and case, output and case
Over Input Indication	LED lights up.
Connector Shape	Input connector: NDIS4109 (Small round 9 pins) Output connector: BNC
Dimensions	24 W × 96 H × 170 D mm (Excluding protrusions)
Weight	Approx. 140 g
Note) When using MCF-16B, CFV-90A maximum installed amount are 12 units. (When CFV-90A only installed.) When using mixed the other conditioner card, CFV-90A maximum installed amount are 8 units. When using MCF-8B, no restriction on the number of units to be installed.	
Standard Accessories	Output cable U-59 Input connector plug 4109P

■ Dimensions

● MCF-8B



● MCF-16B



CDV-400B Series

Compact Signal Conditioner

- Compact & lightweight
- Multiple channels



CDV-458B

Compact and lightweight Suitable for an on-vehicle and mobile application.

- Different kinds of conditioner units are available for configuration of an optimum system for the measurement purpose.
- Signals of multiple units are output from a single integrated connector.
- Simultaneous calibration of all channels is possible on the unit base.

CDV-400B series is a multi-channel signal conditioner for measuring physical quantity such as strain, acceleration, load, voltage and frequency. Several conditioner cards are mounted to the unit base to configure an optimum measurement system for any application. The system operates on DC power, also an AC adapter SA-6A is available as an option. The compact and lightweight design makes the system suitable for measurement on motorcycles, tractors, boats and wheelchairs.

System content

● Unit Bases CDV-456B/458B/464B

These unit bases are for slotting various conditioner cards, which have a monitor meter, a channel select switch for a monitor meter and an integrated output connector.

● Signal Conditioner Units CV-10B/11B

These units are a signal conditioner with DC excitation voltage, which are connected to strain gage or strain-gage transducers to measure load, pressure, acceleration etc. The CV-11B is based on the auto balance method and the CV-10B is based on the manual balance method.

● LPF Module LFU-10B

This unit is used for removing unnecessary high frequency signals.

● Potentiometer Unit CPT-11B

This unit is a unit to measure a rotation angle and speed together with a potentiometer. A power supply to measure a potentiometer resistance is built-in. Just connecting a potentiometer will start measurement.

● F/V Converter Module CFV-11B

This unit is used for frequency-to-voltage conversion.

Dynamic Strain
Measuring Instruments

Outline

1-channel

Multi-channel

DC Amplifier

Other

Specifications

■ Unit Bases CDV-456B/458B/464B

Channels	CDV-456B: 6 CDV-458B: 8 CDV-464B: 14
Power Supply	11 to 30 VDC AC line with optional AC adapter SA-6A (Except for CDV-464B) For current consumption, see table below.
Vibration Resistance	98.07 m/s ² (10 G), 10 to 500 Hz (Amplitude 10 mm)
Dimensions & Weight	See table below.

Models	Current Consumption*	Dimensions (Excluding protrusions)	Weight (Approx.)	
			Unit Base Only	With full units of CV-11B
CDV-456B	0.5 A or less	115×59×130 mm	490 g	880 g
CDV-458B	0.6 A or less	147×59×130 mm	530 g	1 kg
CDV-464B	1.1 A or less	259×62×135 mm	880 g	1.8 kg

* At 12 VDC, with full units of CV-11B

Standard Accessories

Output cable U-59 (1 per channel), DC power cable P-65, integrated output connector HDEB-9P (HDAB-15P for CDV-464B), miniature screwdriver, fuse, instruction manual

Optional Accessories

AC adapter SA-6A, dummy panel DUMMY-400B-N

■ Signal Conditioner Units CV-10B/11B

Channels	1
Compatible Bridge Resistance	120 to 1000 Ω, full bridge system
Balance Adjustment Range	
CV-11B	±1% (±5000 × 10 ⁻⁶ strain) or more Fine zero trimmer provided
CV-10B	±0.7% (±3500 × 10 ⁻⁶ strain) or more if bridge resistance 120 Ω ±1% (±5000 × 10 ⁻⁶ strain) or more if bridge resistance 350 Ω
Balance Adjustment Methods	
CV-11B	Auto balance Accuracy: Within ±2 × 10 ⁻⁶ strain (At range 200 × 10 ⁻⁶ strain)
CV-10B	Manual balance
Bridge Excitation	2 VDC
Sensitivity	±0.1 V per 10 × 10 ⁻⁶ strain input
Output	±2 V or more (Load 5 kΩ or more)
Nonlinearity	Within ±0.1% FS
Range	5 steps of 200, 500, 1 k, 2 k, and 5 k × 10 ⁻⁶ strain Accuracy: Within ±1% FS
Fine Sensitivity Adjustment	Continuously variable between ×1 to ×1/2.5
Calibration (CAL)	Linked with selected range 10 steps of ±200, ±500, ±1 k, ±2 k, and ±5 k × 10 ⁻⁶ strain Accuracy: Within ±0.5%
Frequency Response	DC to 2.5 kHz (Deviation ±1 dB)
Noise	8 × 10 ⁻⁶ strain p-p (See input, band noise value)
Power Supply	From the unit base (Within ±30 mA)
Weight	Approx. 65 g (CV-11B), approx. 55 g (CV-10B)
Standard Accessories	Input cable U-09 (1 piece/unit)

■ LPF Module LFU-10B

Channels	1
DC Gain	1:1 (Accuracy: Within ±0.1% FS)
Nonlinearity	Within ±0.1% FS
Cutoff Frequencies	5 steps of 10, 30, 100, 300 [Hz] and FLAT Amplitude ratio at cutoff point: -3 ±1 dB
Attenuation	(-12 ±1) dB/oct.
Output	Voltage: ±2 V or more (Load 5 kΩ or more) Current: ±10 mA or more (Load 30 Ω)
SN Ratio	52 dB or more to output of ±2 V
Power Supply	From the unit base (Within ±20 mA with no load)
Weight	Approx. 45 g
Standard Accessories	Input cable (10 cm) with BNC connectors at both ends

■ Potentiometer Unit CPT-11B

Channels	1
Compatible Resistance	1 to 10 kΩ
Power Supply to Potentiometer	Constant voltage of 1 V (Built-in)
Balance Adjustment	90% or more of potentiometer resistance
Balance Adjustment Methods	Auto balance
Output	Voltage: ±2 V or more (Load 5 kΩ or more)
Nonlinearity	Within ±0.1% FS
Range	4 steps of 10, 20, 50 [%] and OFF Accuracy: Within ±0.5%
Fine Sensitivity Adjustment	Continuously variable between ×1 and ×1/2.5
Calibration	Linked with selected range 7 steps of ±10, ±20, ±50 and OFF Accuracy: Within ±0.05%
Frequency Response	DC to 100 Hz, ±0.5 dB
SN Ratio	46 dB or more to maximum output
Power Supply	From the unit base (Within ±30 mA)
Weight	Approx. 65 g
Standard Accessories	Input cable U-10 (1 piece/unit)

■ F/V Converter Module CFV-11B

Channels	1
Input Signal	DC to 5 kHz (Square wave)
Output	Voltage: ±2 V or more (Load 5 kΩ or more)
Nonlinearity	Within ±0.1% FS
Range	5 steps of 0.5, 1, 2.5, 5 [kHz] and OFF Accuracy: Within ±0.5%
Calibration	Linked with selected range 4 steps of 0.5, 1, 2.5 and 5 kHz Accuracy: Within ±0.5%
Fine Sensitivity Adjustment	Continuously variable between ×1 and ×1/2.5 Accuracy: Within ±0.5%
Response Time	30 ms or less
Withstand Voltage between Input and Output	250 V _{rms} or 700 V _{p-p} for one minute
Allowable Power Supply to Input Connector	±6 V, ±30 mA (12 V power supply)
Power Supply	From the unit base (80 mA or less)
Weight	Approx. 73 g
Standard Accessories	Input cable U-10 (1 piece/unit)

When mounting the modules, take care of the following limitations.

Mounted Models	Power Supply to Sensors	Mountable Units			
		CDV-456B	CDV-458B	CDV-464B	
				CH 1 to 7	CH 8 to 14
CFV-11B	Yes	2	2	2	2
	No	4	3	3	3
LFU-10B and other units mounted in combination		Remaining channels accept units other than CZA-10B/11B.			
CFV-11B mustn't be mounted to the last channel.					



Dynamic Strain Measuring Instruments

Outline

1-channel

Multi-channel

DC Amplifier

Other

DA-710A

DC Amplifier

- Isolated
- High accuracy



Highly accurate 2-channel isolated DC amplifiers

- Input-output isolation ensures excellent stability and makes it less affectable by noise.
- LPF enables measurement at high SN ratio.
- Highly accurate
- Allowable common mode voltage ± 300 V and allowable max. input voltage ± 110 V
- Voltage calibration function
- Moderate price

The DA-710A is a highly accurate 2-channel isolated DC amplifier which satisfies requirements for high input impedance, high gain accuracy and stability. Since the channels are isolated from each other, the DA-710A can effectively be used for measurement if the 2 channels are connected to different signal sources. In addition, input-output isolation ensures excellent stability and outstandingly minimizes noise effects. The allowable common mode voltage is ± 300 VDC, while setting the attenuation switch to 1/100 makes the allowable max. input voltage ± 110 VDC. Furthermore, high-frequency components are eliminated by the LPF for measurement at a high SN ratio.

Thus, the DA-710A is used for various purposes including general micro voltage measurement, temperature measurement in combination with a thermocouple, and as a preamplifier for recorders and data processors.

Specifications

Channels	2
Input Modes	Differential, isolated between input and output, and between channel and channel
Isolation Methods	Optical
Input Impedance	10 M Ω + 10 M Ω or more (ATT \times 1 and OFF) 1 M Ω + 1 M Ω or more (ATT \times 1/100)
Gain	13 steps of 10, 20, 50, 100, 200, 500 (\times 1 and \times 1/100) and OFF; continuously variable between \times 1 and \times 2.5 or more Gain accuracy: $\pm 0.1\%$ FS (ATT \times 1) $\pm 0.3\%$ FS (ATT \times 1/100)
Stability Zero Balance	Within $\pm 5 \mu\text{V}_{\text{RTI}}$ / $^{\circ}\text{C}$ (With input shorted and gain 500) Gain: Within $\pm 0.02\%$ / $^{\circ}\text{C}$
Nonlinearity	Within $\pm 0.05\%$ FS
Frequency Response	DC to 10 kHz (+1, -3 dB)
Output A	± 10 V (Load resistance 10 k Ω or more)
Output B	± 10 V (Load resistance 10 k Ω or more)
Output Impedance	1 Ω or less
CMRR	120 dB or more (DC to 60 Hz) (With balanced input of 1 k Ω , gain 500 and ATT \times 1)
Allowable Common Mode Voltage	± 300 VDC or AC peak Insulation resistance 1000 M Ω or more
Allowable Max. Input Voltage	± 2 VDC or AC peak (ATT \times 1) ± 110 VDC or AC peak (ATT \times 1/100)
Zero Balance Adjustment Range (Output)	± 5 V (OUT A and B linked) ± 1 V (OUT B independent)
Noise	10 $\mu\text{V}_{\text{p-p}}$ (RTI) + 6 mV $_{\text{p-p}}$ (RTO) (With input shorted, gain 500 and ATT \times 1)
Calibration Voltage (Output)	Within 4 V $\pm 0.2\%$
Settling Time	100 μs or less, output: Within $\pm 0.1\%$
Overload Recovery Time	100 μs or less, output: Within $\pm 0.1\%$
Crosstalk Between Channels	10 $\mu\text{V}_{\text{p-p}}$ (RTI) + 6 mV $_{\text{p-p}}$ (RTO) or less
Common Mode Crosstalk Rejection Ratio	10 $\mu\text{V}_{\text{p-p}}$ (RTI) + 6 mV $_{\text{p-p}}$ (RTO) or less
LPF Transfer characteristic	2nd order Butterworth
	Cutoff frequencies: 10, 30, 100, 300, 1 k Hz and FLAT (6 steps)
	Amplitude ratio at cutoff point: -3 ± 1 dB
	Attenuation: (-12 ± 1) dB/oct.
Operating Temperature	-10 to 50 $^{\circ}\text{C}$
Operating Humidity	20 to 80% (Non-condensing)
Storage Temperature	-20 to 70 $^{\circ}\text{C}$
Storage Humidity	5 to 95% (Non-condensing)
Withstand Voltage	Between [Channel 1 input connector pin] and [Output, case, AC power supply]: 1 kVAC for 1 min Between [Channel 2 input connector pin] and [Output, case, AC power supply]: 1 kVAC for 1 min Between [AC power supply] and [Output, case]: 1 kVAC for 1 min Between [Channel 1 input] and [Channel 2 input]: 1 kVAC for 1 min
Power Supply	100 VAC, 4.5 VA
Dimensions	49 W \times 128.5 H \times 262.5 D mm (Excluding protrusions)
Weight	Approx. 1.0 kg

Standard Accessories Input cable U-108
Output cable U-63
AC power cable P-25 (With 2-pin conversion plug CM-52)
Miniature screwdriver
CD-R (Instruction manual)
Simplified manual

Optional Accessories Housing case YC-A
Amplifier stand FA-1B

Dynamic Strain
Measuring Instruments

Outline

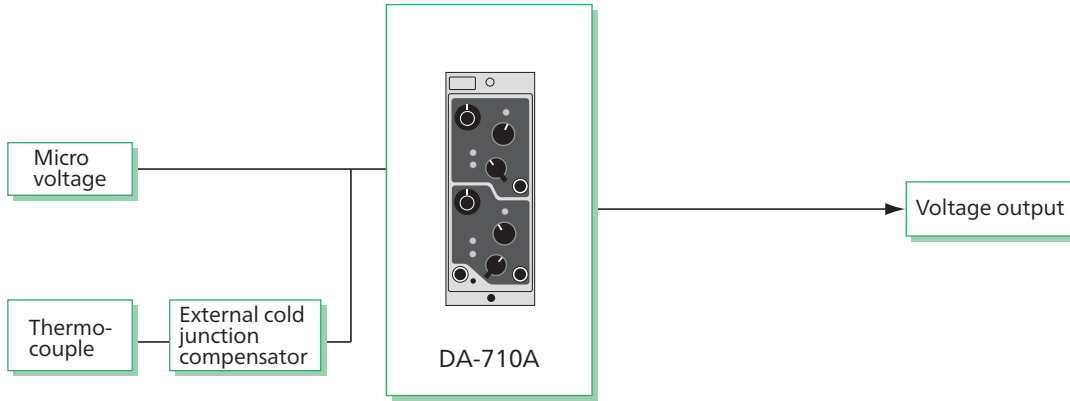
1-channel

Multi-channel

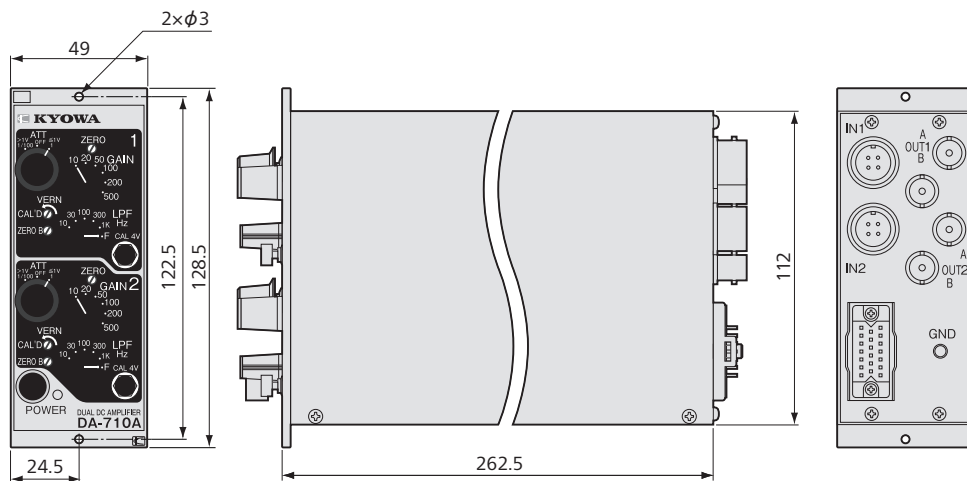
DC Amplifier

Other

■ Block diagram



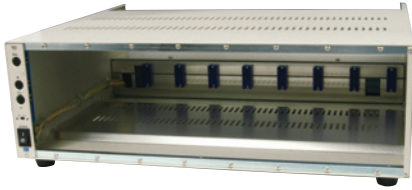
■ Dimensions



Optional Accessories for Dynamic Strain Measuring Instruments

Housing Cases

● Portable Housing Case YC-A (For DPM-900 Series, CDV/CDA-900A, VAQ-700A, DA-710A)



YC-8A

Specifications

Power Supply	100 VAC
	100 VAC or 12 VDC (YC-A-AC/DC)
Switches	Switches on the front panel
	Power SW, BAL SW, All-Channel CAL SW, and
	Key-lock SW
Terminals on Rear Panel	Remote switched on the rear panel
	Balance adjustment, calibration, key lock,
	and synchronized connection

1. No function to get status.
2. The DPM-900 Series and CDV/CDA-900A SET function is not supported.
3. Not suitable for use in on-vehicle test.
4. The unit may not be stood on its rear surface.
5. YC-3A/4A have a carrying handle.
6. CDV/CDA-900A-DC: For YC-A-AC/DC only

Standard Accessories

AC power cable P-17 (With 2-pin conversion plug CM-52)
Instruction manual

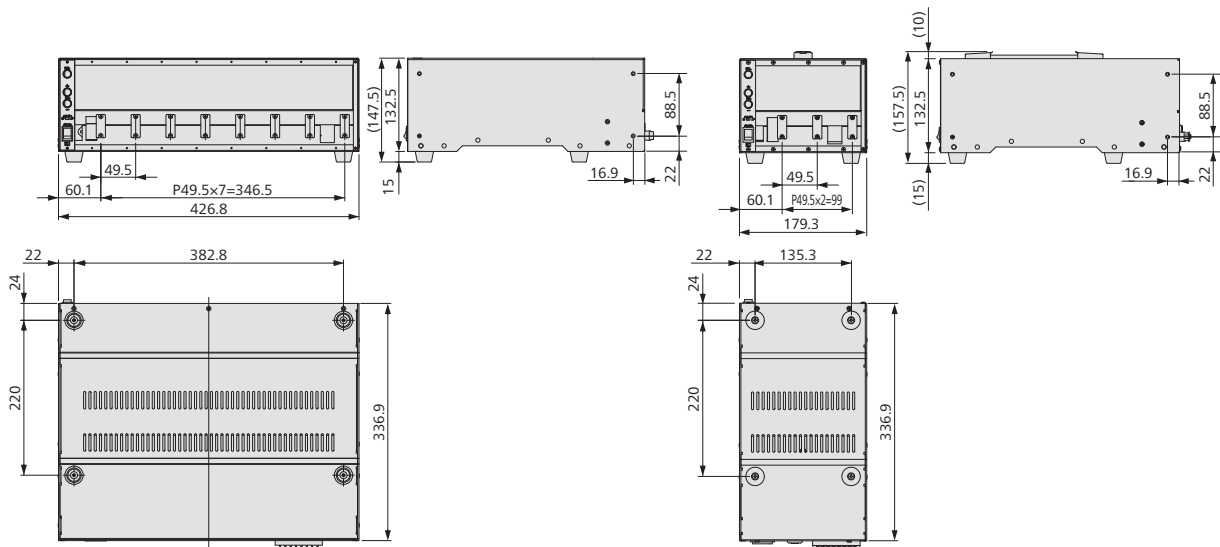
Optional Accessories

JIS rack mounting bracket YC-JIS (Supports YC-8A only)
DIN rack mounting bracket YC-DIN (Supports YC-8A only)
Dummy panel for 1 channel YB-DUMMY
Handle for YC-A YC-HANDLE

Models

Models	Power Supply	Housing Units	Width [mm]	Depth [mm]	Height [mm]
YC-3A	AC	3	179.3	336.9	157.5
YC-3A-AC/DC	AC or DC				
YC-4A	AC	4	228.8		
YC-4A-AC/DC	AC or DC				
YC-6A	AC	6	327.8		147.5
YC-6A-AC/DC	AC or DC				
YC-8A	AC	8	426.8		
YC-8A-AC/DC	AC or DC				

■ Dimensions



YC-8A

YC-3A



- Outline
- 1-channel
- Multi-channel
- DC Amplifier
- Other

Noise Filters

To remove noise containing high-frequency components.

●F-7B



For input of
all DPM series models

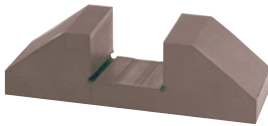
●F-BNC



For output of
all DPM series models

Amplifier Stands

●FA-1B



DPM-900 series,
DA-710A, CDV-900A
CDA-900A, VAQ-700A

Bridge Boxes

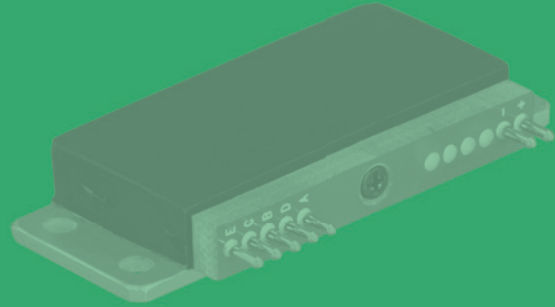
●DB-120A



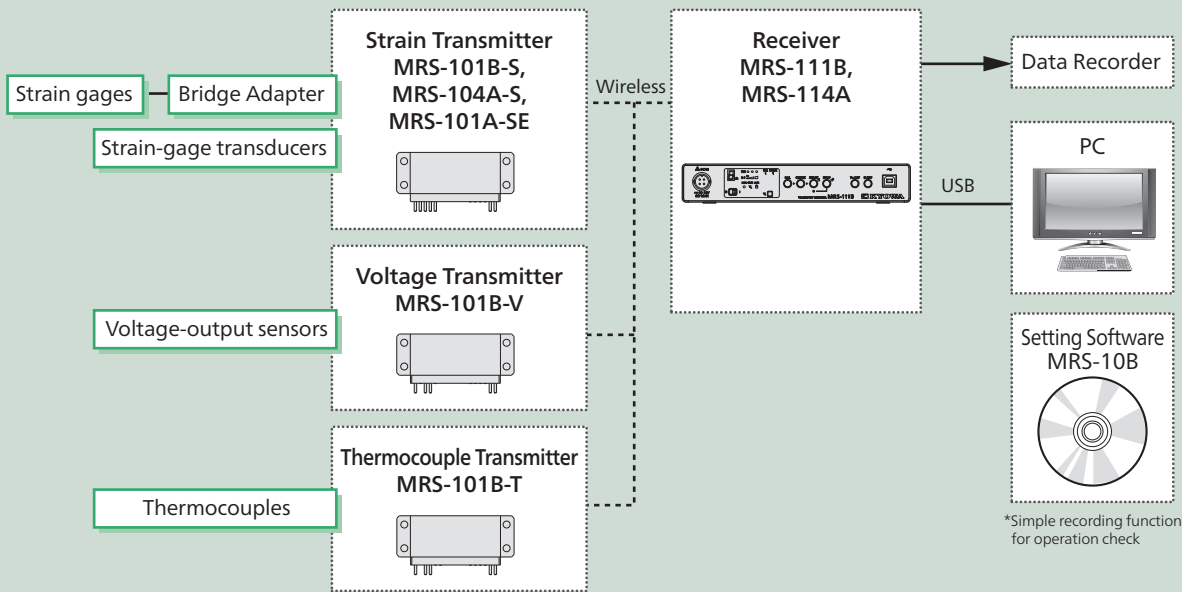
For details, see page 3-131.

Wireless Instruments

A wireless measuring instrument can save labor and measure rotating bodies by establishing a wireless connection between the measuring instrument and sensors or computers. We provide digital telemeters and a variety of other products to use in industrial measurement and laboratory research fields.



Digital Telemeter MRS-100 Series





*Simple recording function for operation check





Wireless Instrument Selection Chart

Wireless connection between the measuring instrument and sensor

Models	Channels	Measuring Targets	Radio Certification	Radio Communication Distance (Max.)	Frequency Response (Max.)	Interfaces	Output	Pages
Digital Telemeter MRS-100 Series   Transmitter Receiver Fast response	1 4	Strain (Gage, transducer) Voltage- output sensors Thermocouples	Japan the USA China Thailand Taiwan EU India Korea (Option)	50 m	DC to 370 Hz	USB	Analog ±5 V	3-23

Wireless connection between the measuring instrument and PC

Models	Channels	Measuring Targets	Radio Certification	Compliance Standard	Frequency Response (Max.)	Interfaces	Pages
Compact Recorder CTRS-100 Series   Shock Resistance 490 m/s ² (50 G)	4 (Max.128)	Strain (Gage, transducer) Voltage- output sensors Thermocouples CAN (FD) signal	Japan the USA	IEEE 802.11 a/b/g/n/ac	100 kHz	Wireless USB LAN SD card	3-57