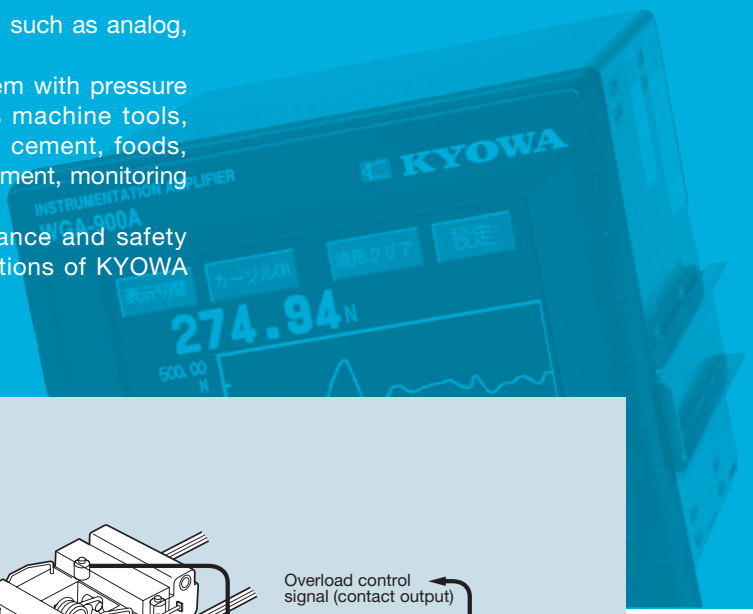
Instrumentation Amplifier

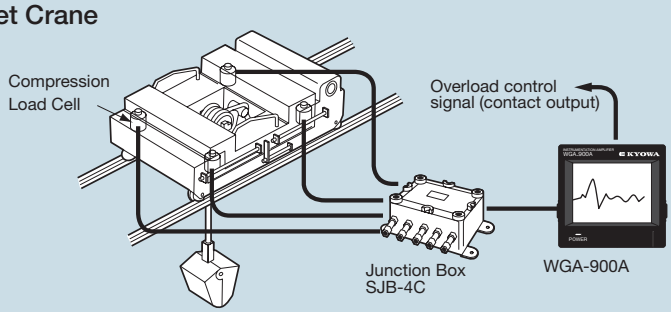
Kyowa's instrumentation amplifiers can be connected to widely used several strain gage transducers such as loadcells, pressure transducers e,t,c, and enable us to monitor various physical quantities such as weight, force, pressure, displacement and torque.
Besides they provide several output signal for control such as analog, comparator, BCD and RS-232C.
A weighing system with loadcells built-in, or a system with pressure transducers built-in, are incorporated into various machine tools, or industrial robots which are used in steelmaking, cement, foods, pharmaceutical, chemical, for the purpose of measurement, monitoring or control on various tests.
Recent trends toward, labor saving, quality assurance and safety management have increasingly accelerated applications of KYOWA instrumentation amplifiers in various industrial fields.



Load cell Applied Systems

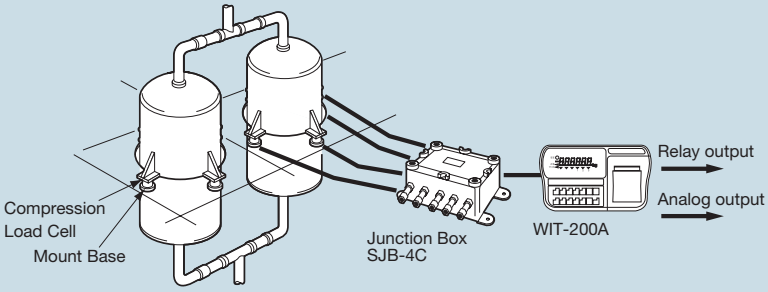
●Controlling the Load of a Bucket Crane

Receiving loads from a hoisting mechanism using multiple load cells, the system detects the total weight, and then measures the real load after detects the tare.
Since WGA-900A output analog signal to an external meter, a hoisting load can be monitored.
In addition, high& low limit signal let you know overload and it makes the system suitable for safety management.



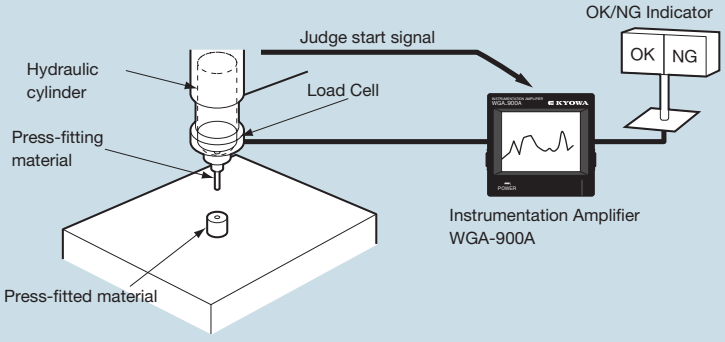
●Monitoring Contents of Tanks

Weighing contents of each tanks enables automation and labor saving on mixing work.
Three or four load cells are usually mounted on each tanks. Output signals are summed with a junction box and then amplified.
Relay output is used to monitor the amount of material in each tanks.



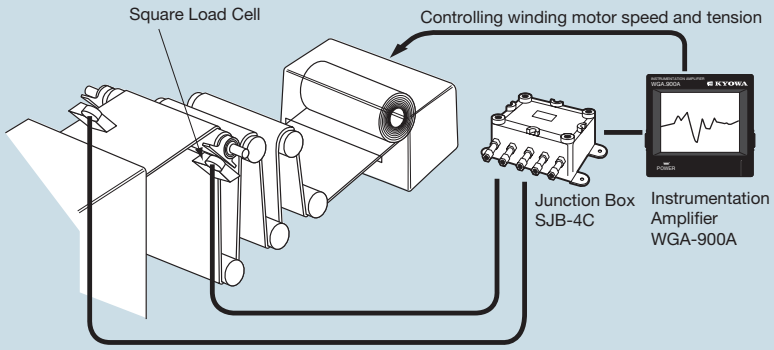
●Measuring Press-fit Load

In the automotive parts industry, a compression load cell and WGA-900A is used to measure and judge the load given through press-fitting A/C parts. The instrumentation amplifier provides a peak hold function and outputs the judgment signal to the OK/NG indicator after comparing each measured value with the reference value. The system can be applied to similar press-fitting processes in other industries.



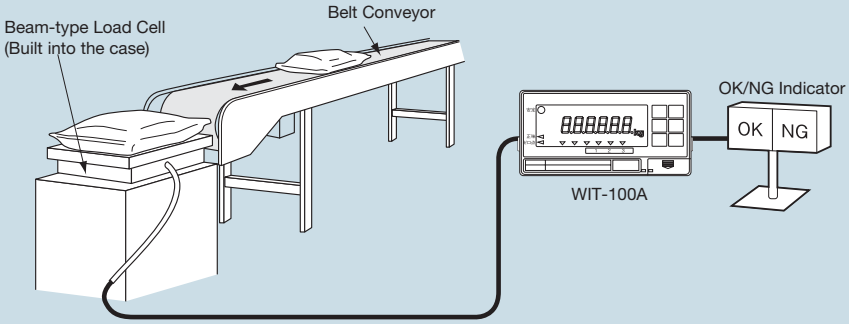
●Controlling Cloth Tension

In textile industry, for the quality control ,square load cells and WGA-900A are used to measure cloth tension and to make the tension uniform. The same system can be widely used for the production process for rolling steel, metal, paper, film and tape.



●Measuring Flour Weight

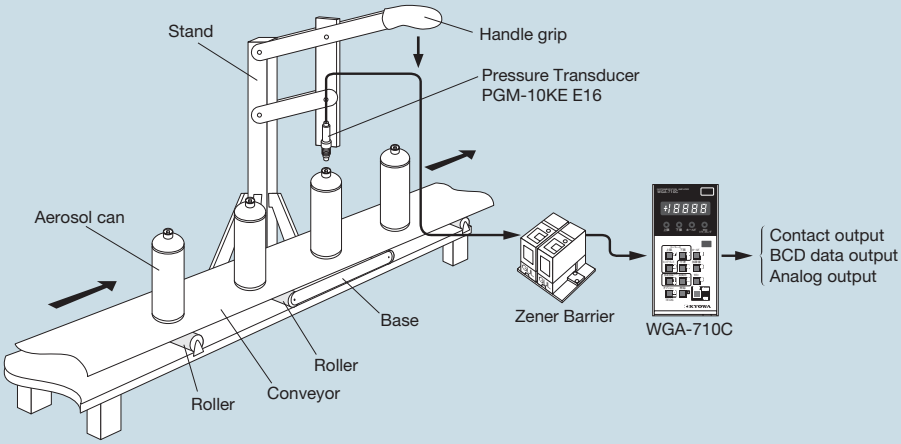
In the flour industry, a beam-type load cell and WIT-100A are used to weigh the bagged material for the purpose of judging whether the weight is as specified. The result is output to an OK/NG indicator. Since the beam-type load cell is highly accurate and thin, it is suitable as a sensor for the system. The same system can also be used for weighing bagged materials in the fields of feedstuff, cement, and foods.



■Pressure Transducer Applied System

●Quality Control of products

With this system, a PGM-10KE E16 detects the pressure of a explosive gas which is sealed in a can, and a WGA-710C instrumentation amplifier measures the detected signal and then compare it with the preset value for OK/NG judgement.
Since the measured object is explosive gas, it is intrinsically safe system.



Instrumentation Amplifier Selection Chart

Industrial instrumentation amplifiers are lightweight, compact, multi-functional and low-cost for measurement of physical quantities such as load, pressure, displacement, torque and acceleration in combination with strain gage Transducers. They are available in different models to enable selection of an optimum one for each individual measurement purpose and can be used not only for measurement but also for control and judgment.

Model		Features	Ref. Page
For built-in equipments	**WGA-100B** Instrumentation Preamplifiers	●Analog output ・Voltage 0 to ±10 V ・Current 4 to 20 mA ・Frequency response 500 Hz 	2-159
For built-in equipments	**WGA-101A** Instrumentation Preamplifiers	●Panel mount ●Monitor terminal on the front panel ●Analog output Voltage 0 to ±10 V Current 4 to 20 mA 	2-160
Compact General-Purpose Indicator	**WGI-400A** Instrumentation Amplifiers	●Input range ±3.2 mV/V ●Sampling 50 times/sec. ●High/low limit judgment ●Options: BCD, RS-232C, RS-485 ●Analog output 0 to ±10 V, 4 to 20 mA 	2-157
Load Indicator	**WGA-650B** Instrumentation Amplifiers	●Analog output (D-A) Data update: 4 times/sec. 0 to ±10 V, 4 to 20 mA ●2-step comparator ●Option : BCD 	2-151
General-Purpose Indicator	**WGA-710C** Instrumentation Amplifiers	●Peak hold 1 kHz ●2-step comparator ●Options Analog output (D-A) , Data update 15 times/sec. 0 to 10 V, 4 to 20 mA Isolated analog output, 1 kHz Analog output, 1 kHz BCD, RS-232C, 8-step comparator 	2-154
General-Purpose High-Speed Indicator	**WGA-670B** Instrumentation Amplifiers	●Peak hold 100Hz ●Continuous hold function ●2-step comparator ●Analog output(D-A) Data update 500 times/sec. 0 to ±10V, 4~20mA ●Optional BCD, RS-232C, TEDS 	2-152
High-Speed Calculation	**WGC-140A** 4-Channel Signal Conditioner	●Max. 4 measuring channels ●Disconnection check function ●Analog output 5 (signals of 4 channels and the total) 0 to ±10 V Frequency response 150 Hz 	2-161
Load Cell Conditioner NEW	**F08-9026-S2** Instrumentation Controller	●Provides all input and output signals required for rolling control. ●Keypad ensures easy setting and commanding. ●Slender design facilitate s installation in the operation panel. 	2-163
Load Cell Conditioner	**WDC-810C1** Instrumentation Controller	●Pins are compatible with t hose of the foregoing Type : WDC-810B & WDC-810C. ●Provides all input and output signals required for rolling control. ●Keypad ensures easy setting and commanding. ●Slender design facilitates installation in the operation panel. All functions and the adjustments can be set with the keyboard WDC-810B-KB. 	2-165
High-Speed, Multi-function Waveform Indicator NEW	**WGA-900A** Waveform Indicator Type Instrumentation Amplifiers	●A/D Converter. Sampling speed : 4000 times/sec Resolution: 24 bits ●Analog Monitor Voltage output : ±(5 V ±200 mV) (load resistance 5 KΩ or more) ●Indicators 3.5-inch STN color LCD, display area: 73.0 × 55.2 mm 320 × 240 dots, touch panel ●Indication ±99999 Speed: 3 times/sec ●Comparator Setting The number of points : 5 ●Balance Analog filter(Low-pass filter) 	2-148
Handy Type Indicator Sensor Checker	**WDS-180A/185AS1** Small-Sized Digital Indicator **WDS-500A** Sensor Checker NEW **SDB-410CS** Handy Digital Indicator	 WDS-180A  WDS-500A	2-168 2-169 2-170
Simple Strain Generators	**CAB-E** **WDS-10**	 CAB-E  WDS-10	2-171 2-172
Junction Boxes	**SJB-4D** **JBS-4C**	 SJB-4D  JBS-4C	2-173

Note : In rare cases, measuring range may be exceeded due to initial unbalance generated when a pressure transducer and a displacement transducer is used in combination with an instrumentation amplifier in WGA series. In such cases please, contact KYOWA.

WGA-900A

Instrumentation Amplifiers

Model	Description
WGA-900A-0	Standard
WGA-900A-1	BCD output
WGA-900A-2	D/A output
WGA-900A-3	RS-485
WGA-900A-12	BCD and D/A out put

Enables Checking Waveform through Easy Operation

- Easy to see display numbers of 5 digits (±99999)
- Wide measuring range up to ±3.2mV/V
- Comparator in 5 points enables delicate monitoring and controlling
- Display of waveform
- Easy calibration even for TEDS compatible senors
- Easy operation using touch panels on with easy explanations. No need to see a operation manual.
- SD card available as standard
- High resolution and high speed sampling
- Result of comparison will be showed on different colors
- Analog-hold circuit is used for detecting peak/bottom value
- MONITOR – output, RS-232C and I/O port is equipped as standard.
- Optional BCD-output, D/A output or RS-485 card are available.

Specifications

■WGA-900A-0

Number of Measuring Channels : 1
Applicable Transducer : Strain gage transducer
Applicable Bridge Resistance : 87.5 Ω to 1 KΩ
(Up to four 350 Ω transducers can be connected in parallel.)
TEDS Compatible : Interface: Compatible to IEEE1451.4 Mixed Mode Transducer Interface Class 2.
Applicable transducer: Should have the information according to IEEE template No. 33.
(Cable length: 30 m or less)
Excitation Voltage : 10 or 2V DC
Input Range : ±3.2 mV/V (including zero adjustment range)
Nonlinearity : Within (±0.02%FS +1 digit)
Stability : Zero : Within ±0.25μVRTI/°C
Sensitivity : Within ±0.005%/°C
Peak/Bottom Detection : Detecting method : Analog circuit and digital hold in combination/Digital hold only
Frequency response : DC to 1 kHz (+1 dB, -2dB)
A/D Converter : Sampling speed : 4000 times/sec
Resolution: 24 bits
Analog Monitor : Voltage output: ±(5 V ±200 mV)
(load resistance 5 KΩ or more)
Indicators : 3.5-inch STN color LCD,
display area : 73.0 × 55.2 mm
320 × 240 dots, touch panel
Indication : ±99999
Speed: 3 times/sec
Calibration :
Manual calibration : No-load zero calibration, sensitivity registering calibration, actual load calibration, unit
TEDS-based automatic calibration
Partial calibration based on TEDS calibration data: TEDS calibration item
TEDS operation setting : TEDS reading operation, zero at TEDS calibration time, TEDS information display
Smoothing Function :
Analog filter : 1, 30, 300 Hz and None(1 kHz or more)
Roll-off characteristic: -12 dB/oct.
Minimum scale : 1, 2, 5, 10, 20, 50, 100
Moving average : None, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, and 2048 times
Zero Compensation : Zero at every preset compensation time
(Conducts digital zero when the measuring value is within the compensation range at every preset compensation time.)
Determination Time : 0.00 to 9.99 sec
Compensation Range : 0 to 99999
Least significant digit fixed at zero
(Automatically changes the least significant digit number to zero.)
Setting Range: 0 to 9
Additional Value : Setting range: ±99999
Sensor Output Value : Transducer output (±3.2 mV/V) is measured at 0.5-second intervals.
Measurement condition numbers :
32 points (16 for control input) of measurement condition file can be saved.
Capable of switching by the key operation, control input, and communication command.
Comparator Setting :
The number of points : 5
Type: extra high (HH), high (HI), OK, low (LO), extra low (LL)
Compared value : ±99999
Hysteresis Width : 0 to 9999
Using comparator can be set.
Comparison speed : 4000 times per second (Normal Comp. Mode)

Measurement Mode :	
Operation mode :	Normal, peak hold, block-specified peak hold, time-specified peak hold, bottom hold, block-specified bottom hold, time-specified bottom hold, arbitrary point hold, block peak-bottom, time peak-bottom, block arerage, time average
Detect times :	Delay time, comparison mode and display mode can be set.
Waveform Display :	
X-axis setting	End point : 0.5, 1.0, 2.0, 5.0, 10.0 seconds
Y-axis setting	Start point : -99999 to 99999
	End point : 250, 500, 1000, 2000, 5000, 10000, 20000, 50000, 100000, 200000
Start mode of waveform, passed level, passed way, hold time of waveform	
Displays the waveform of the input variation regardless to the "Measure Mode Set" setting.	
System Setting :	Key lock, setting value initialize, backlight illumination time, contrast, clock
Self-check :	Memory, channel
Operation Check :	Display, touch panel, control input/output, communication, BCD output, D/A output, SD card
Control Input :	
Number of points : 9	
Type :	Zero command, hold command, reset command, waveform command, TEDS command, measurement condition select 0 to 3
Signal format :	Non-voltage contact signal or open collector signal (12 VDC voltage and 5 mA current can be applied.)
Control Output :	
Number of points: 10	
Type :	HH, HI, OK, LO, LL, healthy, abnormal channel, abnormal memory, communication error, SD
Output format : Open collector	
Load capacity : 30 VDC, 20 mA	
Communication :	
Signaling system : RS-232C full duplex system	
Transmission system : Asynchronous	
Communication speed : 2400, 4800, 9600, and 19200 bps	
Bit configuration :	Data bit 7
	Stop bit 1
	Parity Odd number
	Flow control Not compatible
Setting contents :	Communication speed : 2400, 4800, 9600, 19200 bps.
	Transmission mode : Repeat Output, Oulput at Hold, Tx and Rx
SD Card :	
Saving set value :	Saves the all setting value (excluding the calibration value) to the SD card.
Reading setting value :	Reads the all setting value (excluding the calibration value) from the SD card and rewrite those of the WGA-900A to the read one.
Waveform data editing :	Browsing the waveform data, changing the name of the data, and deleting the data are available.
Format :	Erase all data that are saved in the SD card (Quick format) available
Update :	Capable of updating the program version that is saved in the SD card.
SD card type : Up to 2 GB; Non-SDHC-compliant	
Power Supply : 85 to 264 VAC, 50/60 Hz, 20 VA or less	
Dimensions : 100 mm (W) × 96 mm (H) × 135 mm (D)	
Weight : Approx. 1.0 kg (excluding options)	
Operating Temperature : 0 to 40 ˚C, 20 to 85 %RH (noncondensing)	
Pannel cut Dimentions : 92×92mm	

Optional Accessories AC power supply cable(P-23), SD card(2GB)

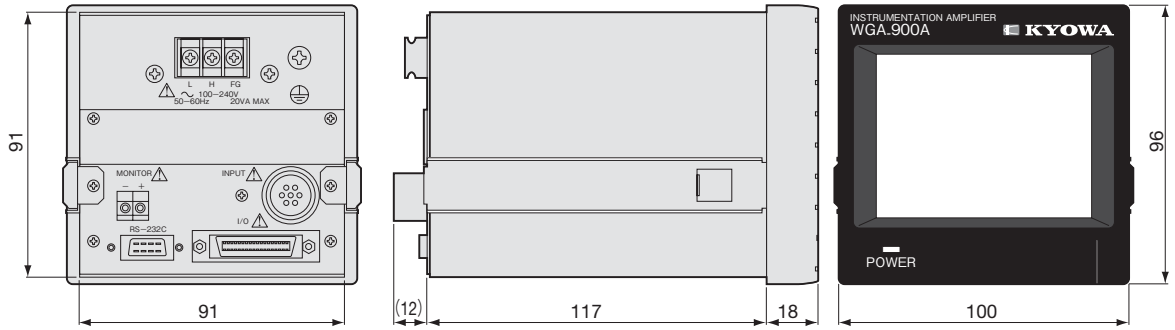
OPTION

■BCD Output (Model : WGA-900A-1)	
Output :	BCD data : 20 bits (4-bit×5-digit)
	Binary data : 18 bits (offset binary)
	Minus code : 1 bit
	Over : 1 bit
	EOC (End Of Conversion) : 1 bit
	Format : Open-collector
	Max load capacity : 30V DC, 20 mA (load resistance)
Input :	Number of points : 2
	Contents : Data hold input : Negative logic (Hold at "L")
	Output prohibit input : Negative logic (Prohibition at "L")
	Type : Open collector or Non-voltage contact signal
	Voltage 12V DC and current 10 mA can be applied.
Setting Contents :	Transmission speed : Approx. 16, 32, 64, and 125 times/sec.
	Porality logic, EOC logic, Data logic : Negative or positive logic
	Data form : BCD, Binary Changeable
	BCD classification : Peak value, bottom value
■D/AOutput (Model : WGA-900A-2)	
OutputVoltage :	±10 V (load resistance 2 kohm or more), arbitrary scaling is available.
Output Current :	4 to 20 mA (load resistance 500 ohm or less)
	4 to 20 mA output is fixed when the voltage
	0 to 10 V is applied.
Insulation Voltage :	250V AC for 1 minute (output voltage and output current are non-insulated)
Conversion Speed :	2000 times/sec
Nonlinearity :	±0.1%FS
Setting contents :	D/A display : Zero disp. (Displayed value when the voltage 0 V is outputted)
	Full disp. (Displayed value when the voltage 10 V is outputted)
	D/A classification : Peak value, bottom value
■RS-485((Model : WGA-900A-3)	
Signaling System :	RS-485 Half duplex system
Data Rate :	2400, 4800, 9600, 19200 bps
Device ID :	Setting range : 1 to 99
Bit Structure :	Data bit : 7
	Stop bit : 1
	Parity : Odd number
Flow Control :	Not compatible
Setting contents :	Device ID : 1 to 99
	Communication speed : 2400, 4800, 9600, 19200 bps
	Transmission mode : Repeat Output, Output at Hold, Tx and Rx
■BCD and D/A Output (Model : WGA-900A-12)	
BCD/ Binary output :	
Output :	BCD data : 20 bits (4-bit×5-digit)
	Binary data : 18 bits (offset binary)
	Minus code : 1 bit
	Over : 1 bit
	EOC (End Of Conversion) : 1 bit
	Format : Open-collector
	Max load capacity : 30V DC, 20 mA (load resistance)
Input :	Number of points : 2
	Contents :
	Data hold input : Negative logic (Hold at "L")
	Output prolubit input : Negative logic (prohibition at "L")
	Type : Open collector or Non-voltage contact signal Voltage 12V DC and current 10 mA can be applied.
Setting contents :	Transmission speed : Approx. 16, 32, 64, and 125 times/sec.
	Porality logic, EOC logic,
	Data logic : Negative or positive logic
	Data form : BCD, Binary Changeable
	BCD classification : Peak value, bottom value

D/A Output		
Output Voltage :	±10 V (load resistance 2 kohm or more),	
	arbitrary scaling is available.	
Output Current :	4 to 20 mA (load resistance 500 ohm or less)	
	4 to 20 mA output is fixed when the voltage	
	0 to 10 V is applied.	
Insulation Voltage :	250V AC for I minute (output voltage and output	
	current are non-insulated)	
Conversion Speed :	2000 times/sec	
Nonlinearity :	±0.1%FS	
Setting contents :	D/A display : Zero disp. (Displayed value when	
		the voltage OV is outputted)
		Full disp. (Displayed value when
		the voltage 10V is outputted)
	D/A classification : Peak value, bottom value	

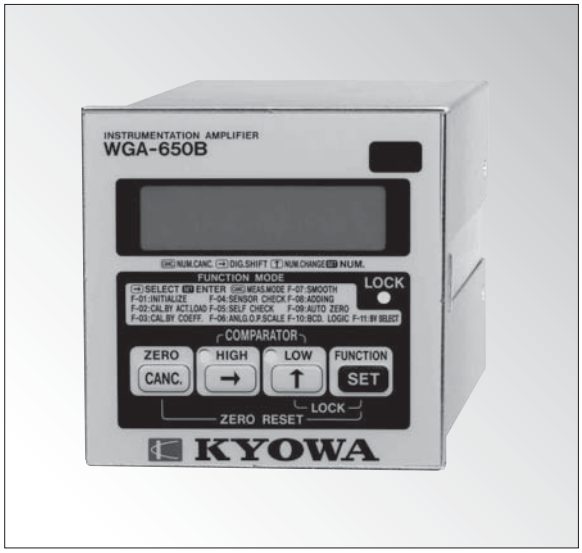
※Firmware version 1.14B is necessary for WGA-900A.

■Dimensions



WGA-650B

Instrumentation Amplifiers

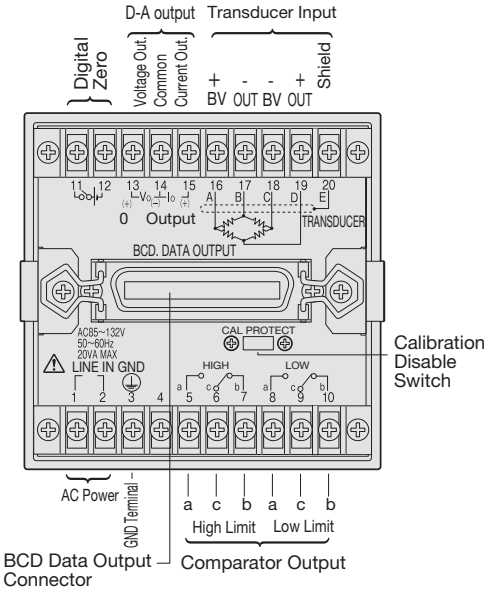


Compact size and low price

- Wide no-load zero adjustment range (±2mV/V)
- High/low limit comparator (relay contact output)
- Indicated value can be output in a voltage range of 0 to 10 V or in a current range of 4 to 20 mA.
- Indication range -1999 to 19999
- DIN size (96 x 96 mm) ensures easy installation.
- Up to 4 transducers with 350Ω bridge resistance can be connected in parallel.†

The WGA-650B series is compact, low price instrumentation amplifiers enabling direct reading of physical quantities such as loads e.t.c. in combination with a strain gage transducer. All operations can be performed with front-panel keys including high/low limit comparator keys. While all models in this series provide D-A converted signal output, models with additional digital output (BCD) are available.

■Rear View (WGA-650B-1)



●Equipment Incorporated

Type	Model	Power Source
Standard	WGA-650B-0 M449	AC170 to 264V
With BCD output	WGA-650B-1 M449	AC170 to 264V

Specifications

Number of Measuring Channels : 1	
Applicable Transducers :	
Strain gage transducers with bridge resistance of 350Ω	
(up to 4 transducers connectable in parallel)	
Measuring Range :	0 to 2.5 mV/V
Bridge Excitation :	10V DC/2V DC, switchable
No-load Zero Adjustment Range : ±2 mV/V	
Analog adjustment and digital adjustment in combination	
Calibration :	Possible by inputting a numeric value or by applying an actual load
Display :	-1999 to 19999 (Decimal point can be put anywhere.)
	Character height 15.24 mm, red LED
Sampling Rate :	4 times/sec.
Nonlinearity :	Within ±(0.03% FS + 1 digit)
Zero Stability :	±0.5 μVRTI / ˚C
Sensitivity Stability :	±0.0025% / ˚C
High/Low Limit Comparator :	
Number of setting points : 2 (high limit, low limit)	
Setting range : -1999 to 19999	
Contact output : Relay contact output (1 transfer circuit for each point)	
Contact capacity : 250 VAC, 0.5 A (resistive load)	
Smoothing :	Analog filter, cutoff frequency 1 Hz
	Number of moving averaging times: 2, 4, 8, 16
	Minimum scale: 1, 2, 5, 10, 20, 50, 100
Zero Compensation :	
Digital zero compensation : Possible with external voltage signal (10 to 30V DC)	
Automatic zero compensation : Indication is made zero when the reading is in the setting range for 2 seconds or more.	
Adding Function : Setting range -1999 to 19999	
D-A Output :	
Voltage : 0 to 10 V (load resistance 2kΩ or more)	
Desired scaling possible	
Current : 4 to 20 mA (load resistance 500Ω or less)	
Corresponds to voltage output of 0 to 10 V.	
Withstand voltage between the output and chassis : 500V AC for one minute	
BCD Output (WGA-650B-1) :	
Output mode : Isolated open collector output; output logic selectable	
Driving capacity : 30V DC, 20 mA	
Output signals : 5-digit BCD value, minus sign, OVER, print command (EOC)	
Connector : 57-40360 (DDK) or the equivalent	
Check Function :	Transducer check, self-check
Input Terminal Board :	M3 screw board (applicable crimp-style terminals 1.25-3A and 1.25-3B or the equivalent)
Operating Temperature/Humidity Range :	-10 to 50˚C, 20 to 85% RH (noncondensing)
Power Supply : AC 170~264V, 50/60 Hz, 20 VA or less	
Dimensions & Weight : 96(W) x 96(H) x 139(D) mm (excluding protrusions), Approx. 1.3 kg	
Panel Cut Dimensions : 92 x 92 mm	

Standard Accessories: Unit seal, AC power cable P-23 for 100V AC, Instruction Manual

Optional Accessories

- AC power cable P-28 for 200 VAC
- Input cables U-33 to U-36
  For connection between WGA-650B and transducer with NDIS connector; NDIS connector to transducer and round crimp-style terminal (M3) to WGA-650B
  U-33 50 cm long, U-34 1 m long, U-35 2 m long, U-36 5 m long
- BCD output connector BCD-CONNE (57-30360 (DDK) or the equivalent)
- Instrumentation printer 442B-K01

WGA-670B

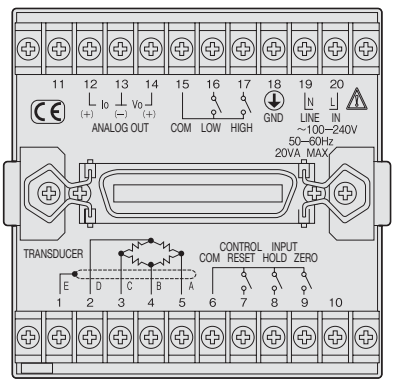
Instrumentation Amplifiers

High-spead sampling

- ●High-speed sampling at 2000 times/second
- ●Up to 4 transducers with 350Ω bridge resistance can be connected in parallel.
- ●High/low limit comparator and peak hold function are provided standard.
- ●Continuous peak hold function is provided to indicate the peak of each phenomenal waveform.
- ●Indication range -19999 to 19999
- ●DIN size (96 x 96 mm) ensures easy installation.
- ●Frequency response range 10 Hz or 100 Hz selectable
- ●TEDS*-compatible model WGA-670B-7 is available.

The WGA-670B series is compact, low-cost instrumentation amplifiers enabling direct reading of physical quantities such as load through high-speed sampling of signals from a strain gage transducer. All operations can be performed with front-panel keys. While all models in this series provide high/low limit comparator, hold function and D-A converted signal output, models with optional BCD or RS-232C output are available. The high-speed sampling capability makes the WGA-670B series suitable for measurement and control of quickly changing phenomena by press-fitting or pressing.

■Rear View （WGA-670B-1）



●Equipment Incorporated

Model \ Function	High/Low Limit Comparator	Peak Hold	D-A Output	BCD Output	RS-232C	TEDS Compatible
WGA-670B-0	●	●	●			
WGA-670B-1	●	●	●	●		
WGA-670B-7	●	●	●		●	●

(※)To let a measuring instrument read a correct value corresponding to a sensor, the measuring instrument should be adjusted based on the calibration data of the sensor. Conventionally, the adjustment task has been made manually. A TEDS-installed sensor has calibration data in its memory and a TEDS-compatible instrument read the data automatically to perform adjustment, thereby reducing adjustment time and preventing erroneous setting.

Specifications

■WGA-670B-0

Number of Measuring Channels : 1
Applicable Transducers : Strain gage transducers
Applicable Bridge Resistance : 87.5Ω to 10kΩ (Up to 4 transducers with 350Ω bridge resistance can be connected in pallarel.)
Measuring Range : ±3.2 mV/V (including tare)
Bridge Excitation : 10V DC/2V DC, switchable by panel switch
Digital Zero Adjustment Range : Same as measuring range (digital adjustment only)
Calibration : Possible by inputting a numeric value or by applying an actual load
Display : ±19999 (Decimal point can be put anywhere.)
Character height 14 mm, red LED
Mode : Normal/hold
Update : 15.6 times/sec. in normal mode
Sampling Rate : 2000 times/sec.
Frequency Response Range : DC to 100 Hz (within -3 dB at 100 Hz)
DC to 10 Hz (within -3 dB at 10 Hz)
Nonlinearity : Within (±0.03% FS + 1 digit)
Zero Stability : ±0.25 μV_{RTI}/ ℃
Sensitivity Stability : ±0.01%/℃
High/Low Limit Comparator :
Number of setting points : 2 (high limit, low limit)
Setting range : ±19999
Max. hysteresis width : Can be set in a range of 0 to 19999
Output : Open collector
Load capacity : 30 VDC, 20 mA (resistive load)
Comparison mode : Normal/hold
Comparison rate : 500 times/sec.
Smoothing :
Minimum scale : 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000 counts
Number of moving averaging times : 8, 16, 32, 64, 128, 256, 512, 1024, 2048
Analog filter : 10, 100 Hz
Automatic zero compensation : Indication is made zero when the reading is in the setting range for 2 seconds or more.
Approximated zero compensation : Indication is made zero when the reading is in a preset range of 0 to 9.
Adding Function : Setting range ±19999
Original Value Measurement : ±3.200 mV/V
Measurement Mode : Selectable from the following:
Normal : Measured value is normally indicated.
Point-based hold : Value measured at a selected point is held.
Section-based peak hold : Peak in a designated section is held.
Time-based peak hold : Peak in a designated period is held.
Control Input : Number of commands : 3
Kinds : HOLD, HOLD RESET, BALANCE
Input system : No-voltage contact signal or open collector signal (should enable application of 12V DC and current flow of 5 mA.)
D-A Output : ±10 V (load resistance 2kΩ or more)
Voltage : Desired scaling possible
Current : 4 to 20 mA (load resistance 500Ω or less)
Corresponds to voltage output of 0 to 10 V.
Insulation withstand voltage between the DA-output and main circuit:
250 VAC for one minute (Circuit between voltage output and current output is not isolated.)

Resolution :	13 bits
Nonlinearity :	Within ±0.1% FS
Conversion rate :	500 times/sec.
Zero stability :	±150 μV RTI/°C
Sensitivity stability :	Within ±0.01%/°C
Setting parameters :	Indication for 0 V output (±19999)
	Indication for 10 V output (±19999)
Check Function :	Self-check
Input/Output Terminal Board :	M3 screw terminal
	(Applicable crimp-style terminal
	V1.25-3A, 1.25-3B or the equivalent)
Operating Temperature/Humidity Range :	
-10 to 50°C, 20 to 85% RH (noncondensing)	
Power Supply :	AC 100~240V±10%, 50/60 Hz, 20 VA or less
Dimensions :	96(W) x 96(H) x 139(D) mm (excluding protrusions)
Weight :	Approx. 1.1 kg
Panel Cut Dimensions :	92 x 92 mm
EMC Standard :	Conforms to IEC61326-1 (class A)
Safety Standard :	Conforms to IEC61010-1 (installation category II,
	pollution degree 2)

Standard Accessories: Unit seal,Instruction Manual

Optional Accessories:
●AC power cables
2 m long with round crimp-style terminal (M3) to WGA-670B and flat power plug to wall outlet
P-23 for 100 VAC
P-28 for 200 VAC
●Input cables U-33 to U-36
For connection between WGA-670B and transducer with NDIS connector; NDIS connector to transducer and round crimp-style terminal (M3) to WGA-670B
U-33 50 cm long, U-34 1 m long, U-35 2 m long, U-36 5 m long

Specify the desired model when ordering.

■WGA-670B-1 with BCD Data Output

This model can output the reading in binary coded decimal. Thus, controlling production process or tabulating or recording measured data can be conveniently performed by connecting it to the PC, process controller, sequencer or printer. The input/output circuits and internal circuit are electrically isolated by photo coupler.

Output :	Data : 18 bits (4 bits x 4 digits + 2 bits)
	Sign : 1 bit
	OVER signal : 1 bit
	Print command (EOC) : 1 bit
	Output system : Open collector
	Max. applied voltage : 30V DC
	Max. applied current : 20 mA
Input :	Number of input signals : 2
	HOLD, negative logic (hold at low level)
	OUTPUT DISABLE, negative logic (output disable at low level)
	Input system : No-voltage contact signal or open
	collector signal
	(should enable application of 12 V DC
	and current flow of 5 mA.)
Setting Items :	Data output logic (including sign)
	EOC output logic
	Transfer rate from approx. 16, 32, 64 or 125 times/sec.
Connector :	57-40360

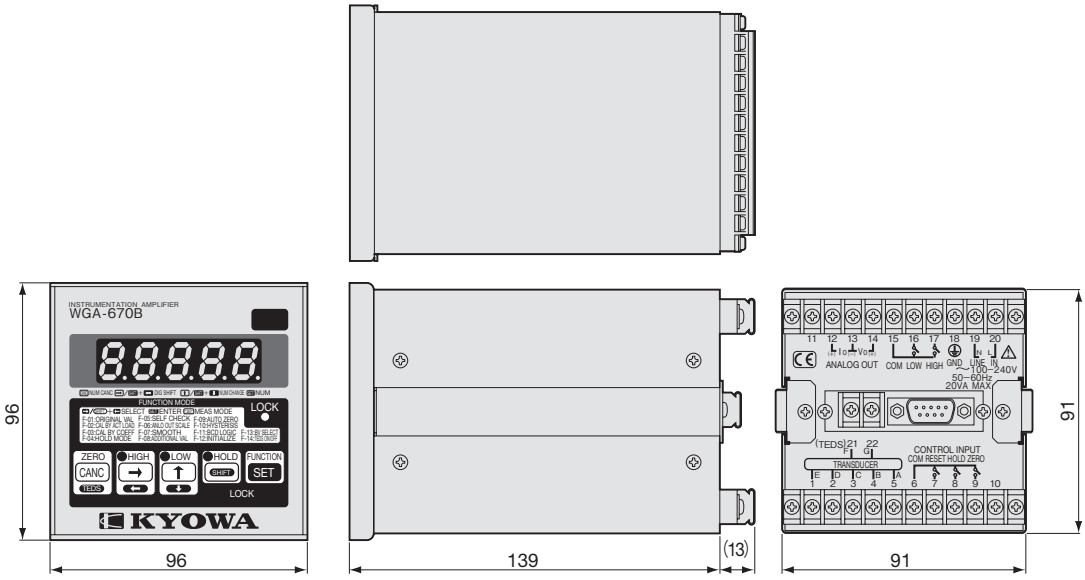
Optional Accessories: BCD output connector BCD-CONNE
Instrumentation printer 442B-K01

■WGA-670B-7 with RS-232C, TEDS-Compatible

RS-232C enables this model to transmit data and status signals to external equipment and to receive setting conditions from it. Thus, controlling production process or tabulating or recording measured data can be conveniently performed by connecting this model to PC, process controller or sequencer. The input/output circuits and internal circuit are electrically isolated by photo coupler.
In addition, the TEDS compatibility enables automatic setting of sensitivity and excitation voltage with TEDS-installed sensor connected. If multiple sensors are connected, they should be the same model to effect the TEDS compatibility.

Applicable Transducers :	Strain gage transducers
	(TEDS-installed models connectable)
Calibration :	Possible by entering the sensitivity,
	by applying an actual load or based on TEDS
RS Output :	Signal system: RS-232C full duplex system
	Transmission system: Start-stop transmission
	Transmission speed: 9600 bps
	Bit structure : 7 data bits
	1 stop bit
	Odd parity bit
	Flow control : None
	Connector D-Sub 9 pins (male)
TEDS Compatibility :	
Interface : Compatible with IEEE 1451.4 Mixed Mode Trans-ducer	
Interface Class 2	
Applicable transducers : Should have the information according to	
	IEEE template No. 33, cable length should
	be 30 m or less.

■Dimensions（WGA-670B-7）



WGA-710C

Instrumentation Amplifiers

TEDS- compatible, Simple, Lightweight, Excellent Interference Immunity, Suitable for Industrial Measuring Instruments

- Key lock for mis-operation
- Suitable excitation supply for transducer is selectable
- Built-in remote signal detection circuit to realize high accurate measurement

It is a compact, lightweight, multi-functional and low-cost amplifier with display and it is designed to measure load, pressure, torque and displacement. Using low noise amplifier is helpful to achieve stable measurement. It is easy to conduct setting and control for each function by using keys. Since all setting values are recorded in a NVRAM, it still functions in case of power failure. It has been widely used in machinery, electric machinery, food and chemistry. Apart from production line control system.

※ Cannot be used with TEDS function together with remote signal detection.

●Wide Application

Type

Model \ type	AC power Voltage (V)	High/low limit Comparative function	Peak hold function	BCD data output	EIA-232-D (RS-232C)	D/A Compact	Analog amplifier	8-step comparator
WGA-710C-0	100	●	●					
WGA-710C-0 A115	115	●	●					
WGA-710C-0 A200	200	●	●					
WGA-710C-0 A220	220	●	●					
WGA-710C-1	100	●	●	●				
WGA-710C-1 A115	115	●	●	●				
WGA-710C-1 A200	200	●	●	●				
WGA-710C-1 A220	220	●	●	●				
WGA-710C-2	100	●	●		●			
WGA-710C-2 A115	115	●	●		●			
WGA-710C-2 A200	200	●	●		●			
WGA-710C-2 A220	220	●	●		●			
WGA-710C-3	100	●	●				●	
WGA-710C-3 A115	115	●	●				●	
WGA-710C-3 A200	200	●	●				●	
WGA-710C-3 A220	220	●	●				●	
WGA-710C-4	100	●	●			●		
WGA-710C-4 A115	115	●	●			●		
WGA-710C-4 A200	200	●	●			●		
WGA-710C-4 A220	220	●	●			●		
WGA-710C-5	100	●	●				●	
WGA-710C-5 A115	115	●	●				●	
WGA-710C-5 A200	200	●	●				●	
WGA-710C-5 A220	220	●	●				● (Insulated)	
WGA-710C-6	100	●	●					●
WGA-710C-6 A115	115	●	●					●
WGA-710C-6 A200	200	●	●					●
WGA-710C-6 A220	220	●	●					●
WGA-710C-12	100	●	●	●	●			
WGA-710C-12 A115	115	●	●	●	●			
WGA-710C-12 A200	200	●	●	●	●			
WGA-710C-12 A220	220	●	●	●	●			
WGA-710C-14	100	●	●	●		●		
WGA-710C-14 A115	115	●	●	●		●		
WGA-710C-14 A200	200	●	●	●		●		
WGA-710C-14 A220	220	●	●	●		●		

Remote-sensing cannot be used simultaneously with TEDS

Specifications

■WGA-710C-0

Number of Measuring Channels :	1
Applicable Transducers :	Strain gage transducers
Applicable Bridge Resistance :	87.5Ω to 10kΩ (Up to 4 transducers with 350Ω bridge resistance can be connected in parallel)
Measuring Range :	±3.2mV/V(±6400μm/m)
Excitation Voltage :	DC10V, 5V, 2.5V (selectable by the switch)
	Remote sensing possible for 120mA or less
Input Mode :	Balanced differential
Input Impedance :	10MΩor more
Input Terminal Board :	Gage clamp type
Sensitivity Adjustment :	Automatic by internal calculation (accuracy within ±0.1%FS)
Display :	Max. ±9999 (Decimal point can be put anywhere)
	Character height 10mm, red LED
	Lowest place digit can be fixed to 0
Sampling Rate :	Approx. 15 times/sec.
Nonlinearity :	Within ±(0.03%FS+1digit) (with transducer output 0.5mV/V)
Zero Stability :	±0.25μV_{RTI}/℃, ±0.05%FS, 10% power voltage
	Sensitivity stability : ±0.01%/℃, ±0.05% FS, 10% power voltage
High/low Limit Comparator :	
Number of setting points :	2 (high limit, low limit)
Response time :	200ms or less
Setting range :	0000 to ±9999
Contact output :	relay contact (1 transfer circuit/point)
Contact capacity :	AC250V, 0.5A (resistive load)
Hold Function :	ON/OFF switchover by panel key or external contact input

Mode Switchover :	ON/OFF Switchover by panel key
	No hold, point-based hold, peak hold,
	section-based peak hold, time-based peak hold
	Frequency response range : DC to 1kHz
Digital Zero Function :	Action input: by panel key or external contact input
Adding Function :	Setting range: 0000 to ±9999
Original Value Monitor :	Accuracy within±0.1%FS
Zero Tracking Function :	Zero can be traced in changing quantities
	of ±1,2,5 counts each for delays of 20, 10
	and 5 seconds, 9 ranges in total Setting is
	made by panel keys
Digital Filter Function :	The number of moving averaging times is
	4, 8, 16, 32, 48 or 64, selected by panel keys
TEDS-compatible :	
Interface :	Compatible with IEEE1451.4 Mixed Mode Transducer
	Interface Class2
Applicable Transducers :	Should have the information according to IEEE
	Template No.33
	Cable length should be 30m or less
	(Remote sensing cannot be used together with TEDS)
Operating Temperature/Humidity Range :	-10 to 40˚C, 80%RH or less
	(noncondensing)
Power Supply :	AC100V±10%, 115V±10%, 200V±10%,
	220V±10% (select one),
	50/60Hz 20VA or less, DC11 to 30V on request
Dimensions :	72(W)×144(H)×188(D)mm (excluding protrusions)
Weight :	Approx. 1.7kg
Panel Cut Dimensions :	136×68mm

Standard Accessories

AC power cable P-23 for AC 100V Spare fuse,
Miniature screwdriver for terminal board connection Unit seal
Panel mounting fixture
BCD output connector BCD-CONNE (57-30360 (DDK) or the equivalent; attached to WGA-710C-1, 12, 14 only)
Instruction Manual

Optional Accessories AC power cable P-28 for AC 200V

Specifications (specify the desired one when ordering)

■WGA-710C-1 with BCD data Output

It enables WGA-710C-1 to output indicated values as BCD (binary coded decimal) by connecting the optional dedicated printer 442B-K01 (refer to page P.4-references).

Output Mode :	Isolated open collector output
Driving Capacity :	DC30V, 20mA
Output Signals :	4-digital BCD value, minus sign, OVER signal,
	print command (EOC); positive or negative logic
	selected by the switch.
Input Command :	BCD hold, output disable, negative logic
Connector :	57-40360 (DDK) or the equivalent

■WGA-710C-2 with EIA-232-D (RS-232C)

EIA-232-D (RS-232C) enables this model to transmit indicated data and status signals and write preset high/low limit values to external equipment without digitizing.

Signal System :	RS-232C full duplex system
Transmission Mode :	Synchronous adjustment
Transmission rate :	4800bps
Bit Structure :	7 data bits, 1 stop bit
	Odd parity bit
Connector :	17-13250-27 (DDK) or the equivalent

■WGA-710C-3 with Analog Amplifier

This model is designed to amplify and output the analog signal of a transducer to external equipment without digitizing.

Measuring Range :	±3.2mV/V
Zero Adjustment Range :	±2.5mV/V
Sensitivity Adjustment Range :	0.5~3.0mV/V can be adjusted to 10V
Calibration :	1mV/V±0.1%
Voltage Output :	±10V (load resistance 2kΩ or more)
	Nonlinearity within±0.03%
Current Output :	4 to 20mA (load resistance 350Ω or less)
	corresponding to voltage output of 0~10V);
	nonlinearity within ±0.1%FS
Frequency response range :	DC~1kHz

■WGA-710C-4 with D-A Converter

This model can output an analog signal with the digital indication. Digital zeroing, hold and smoothing functions are provided.

Output Analog Signal Level :	+10V, 20mA for the full scale setting on the chassis
Zero Adjustment Range :	Within ±10%FS
Sensitivity Adjustment Range :	Within ±10%FS
Nonlinearity :	Within ±0.1%FS
Frequency Response :	Depends on the examination cycle
	(approx. 15 times/sec.) of the mainframe
Withstand Voltage :	AC500V for one minute with the mainframe
Voltage Output :	0 to 10V (load resistance 2kΩ or more)
Current Output :	4 to 20mA (load resistance 350Ωor less)
	(corresponding to voltage output of 0 to 10V)

■WGA-710C-5 with Isolation Analog Amplifier

This model is designed to amplify and output the analog signal of a transducer to external equipment without digitizing.

Measuring Range :	±3.2mV/V
Zero Adjustment Range :	±2.5mV/V
Sensitivity Adjustment Range :	1.0 to 3.0mV/V can be adjusted to 10V
Calibration :	1mV/V±0.1%
Withstand Voltage :	AC500V for one minute with the chassis
Voltage Output :	±10V (load resistance 2kΩ or more),
	nonlinearity within±0.05%FS
Current Output :	4 to 20mA (load resistance 350Ωor less)
	(corresponding to voltage output of 0 to 10V)
	nonlinearity within±0.1%FS
Frequency Response Range :	DC to 1kHz

■WGA-710C-6 with 8-step Comparator

This model provides 4 sets of high/low limits for comparison. The high/low limit relay (transformer contact) outputs the result of 1 set of high/low limits compared.

Number of Comparison Points :	8 (4 each high/low limits)
Setting Method :	Select from external contact input and set by the
	panel keys
Setting Range :	0 to ±9999
Output System :	Isolated open collector
Drive Capacity :	DC30V, 20mA

Note: the relay contact output of the mainframe is selected from external contact input.

■WGA-710C-12 with BCD Data Output / EIA-232-D(RS-232C)

This model enables simultaneous use of BCD data output and RS-232C.

■WGA-710C-14 with BCD Data Output/D-A Converter

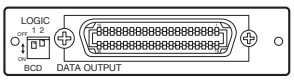
This model enables simultaneous use of BCD data output and D-A converter.

Optional Accessories

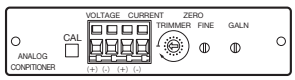
Connection cables between WGA-710C and NDIS connector plug
4-conductor cables U-17(50cm), U-18(1m), U-19(2m),
U-20(5m, bared at the tip to the mainframe and NDIS connector plug to transducer 6-conductor cables U-25(50cm), U-26(1m),
U-27(2m), U-28(5m), bared at the tip to the mainframe and NDIS connector plug to transducer
Dedicated printer 442B-K01

■Card Panels by Functions

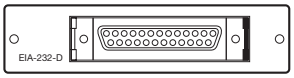
●BCD Data Output (WGA-710C-1)



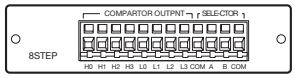
●Isolation Analog Amplifier (WGA-710C-5)



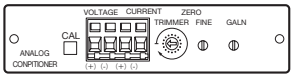
●EIA-232-D(RS-232C) (WGA-710C-2)



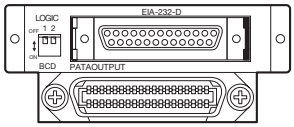
●8-Step Comparator (WGA-710C-6)



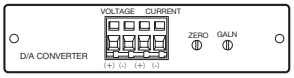
●Analog Amplifier (WGA-710C-3)



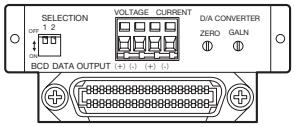
●BCD Data Output/EIA-232-D (WGA-710C-12)



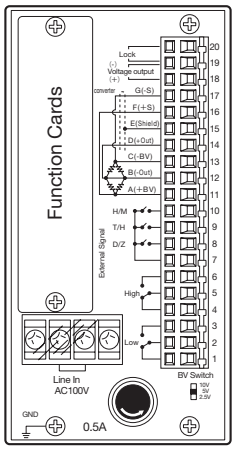
●D-A Converter (WGA-710C-4)



●BCD Data Output/D-A Converter (WGA-710C-14)

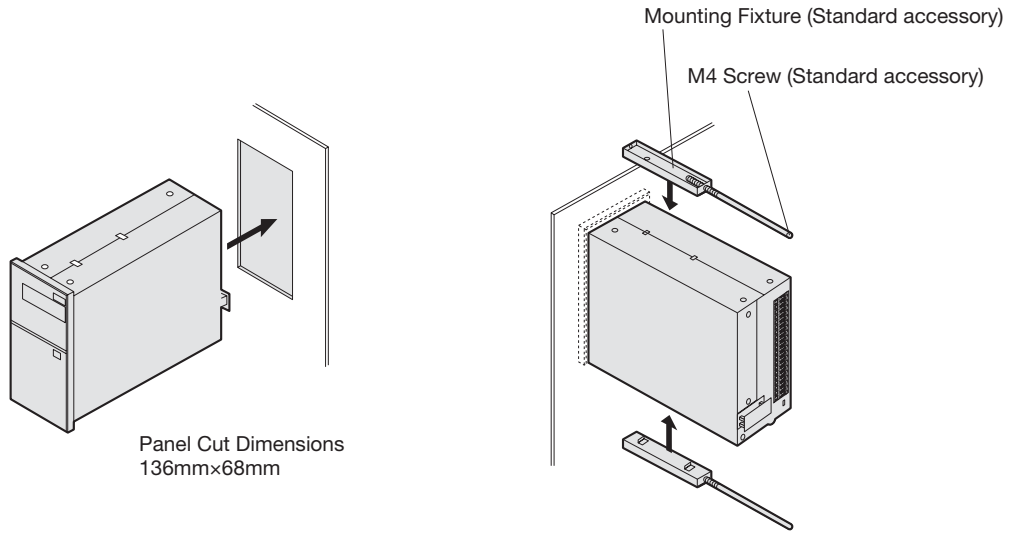


Rear Panel

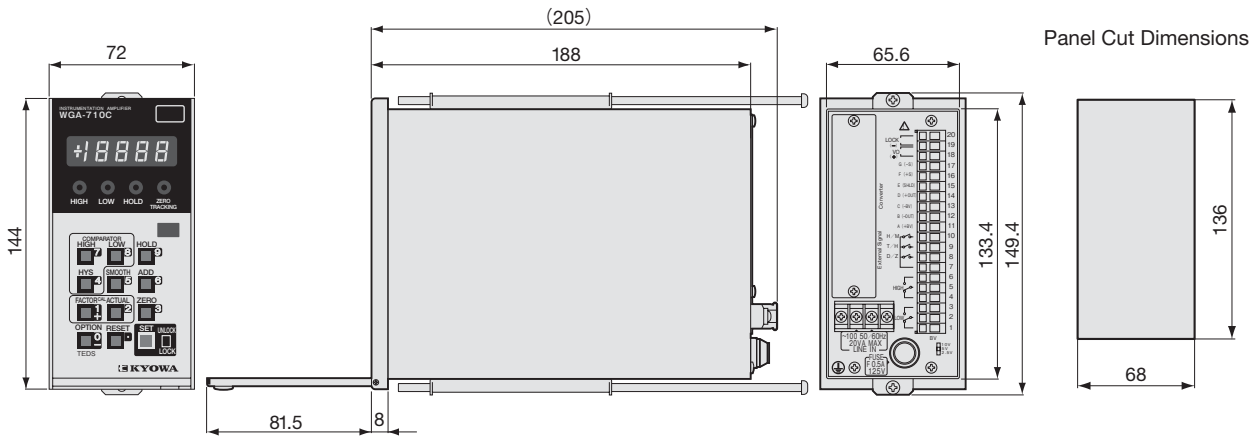


No.	Functions
20	Calibration restricted short circuit terminal
19	Signal common of 18 & 20
18	Voltage output
17	BV remote sense (-)
16	BV remote sense (+)
15	Shield
14	BV output (+)
13	BV input (-)
12	BV output (-)
11	BV input (+)
10	Hold command (H/M)
9	Hold command (T/H)
8	Digital zero command (D/Z)
7	External signal common
6	High limit relay contact out. (a contact)
5	High limit relay contact out. (COM)
4	High limit relay contact out. (b contact)
3	Low limit relay contact out (a contact)
2	Low limit relay contact out (COM)
1	Low limit relay contact out (b contact)

Installation Example



Dimensions



WGI-400A

Instrumentation Amplifiers

●Compact, General-Purpose ●Wide Input Range

Models

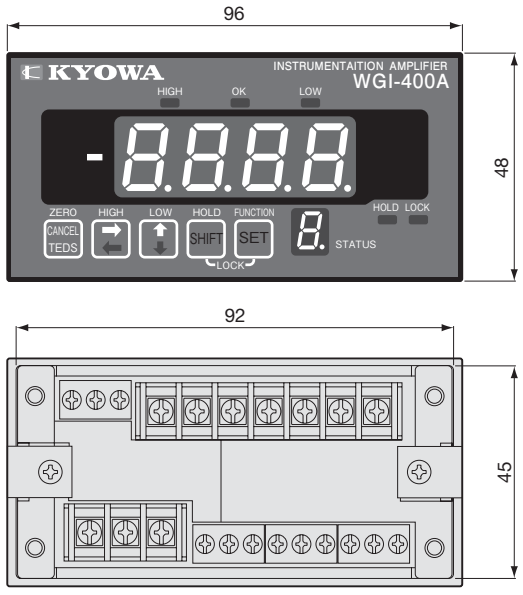
Model	Power supply	Model	Power supply
WGI-400A-00	AC operation with no optional function	WGI-400A-10	DC operation with no optional function
WGI-400A-01	AC operation with BCD output	WGI-400A-11	DC operation with BCD output
WGI-400A-02	AC operation with RS-232C	WGI-400A-12	DC operation with RS-232C
WGI-400A-03	AC operation with RS-485	WGI-400A-13	DC operation with RS-485

Compact, 48×96 mm (front surface) Wide measuring range ±3.2 mV/V

- ●3 sensitivity registration modes (actual load calibration, sensitivity-registered calibration, numerical value-registered calibration)
- ●Selectable 4 high/low limit patterns in memory
- ●Level test with desired set-value
- ●Wide operating voltage range : 90 to 240 VAC or 10 to 30V DC (AC or DC selected when ordering)
- ●3 optional functions: RS-232C, RS-485, BCD output

The WGI-400A is a compact general-purpose low-cost instrumentation amplifier providing basic functions required for measurement in combination with strain gage transducers. The wide input range ensures usage without worrying about initial value of transducer. Furthermore, it provides new functions such as switchable relative value memory patterns and preset value-based level test.

■Dimensions



Specifications

●Measuring Section

Number of Channels :	1
Applicable Transducers :	Strain gage transducers
Applicable Bridge Resistance :	87.5 to 1000Ω
Bridge Excitation :	2V DC, 30 mA or 4V DC, 50 mA, selectable
Measuring Range :	±3.2 mV/V (Including zero adjustment range)
Sampling Rate :	Approx. 50 times/sec.
Resolution :	64000 counts/input range in both polarities
Calibration Modes :	Actual load calibration, sensitivity-registered calibration, numerical value-registered calibration

●Indication Section

Indication Range :	-9999 to +9999
Nonlinearity :	Within±(0.1% FS ±1 digit)
Zero Stability :	Within±0.5μV_{RTI} / ˚C
Sensitivity Stability :	Within±0.01% FS/˚C
Decimal Point :	Can be put anywhere.
Zero Function :	Any value in the input range can be set to digital zero; execution by key operation or external contact signal
Minimum Scale :	Selectable from 1, 2, 5, 10, 20, 50 or 100
Moving Averaging Function :	Selectable from OFF, 2, 4, 8, 16 or 32
Zero Tracking :	By setting the time, width and operating range
Zero Approximation :	A desired value can be preset to let the indicator read 0 for any signal in a range of 0 to the preset value.
Adding Function :	Indicated value at the time of executing zero compensation can be set to a desired value.
Original value display function :	Enable to display input value in mV/V
Level Test :	Possible with a desired value input

●Control Input

Number of Input Signals :	4 (ZERO command, level test command and 2 pattern select commands)

●Control Output

Number of Output Signals :	3 (HI, OK and LO)
Output System :	Open collector
Rated Output :	30V DC, 20 mA (resistive load)
Comparison/Judgment :	Based on high/low limits
Judgment Result :	1 (OK)
Relative Value Memory Patterns :	4 patterns. switchable

●Analog Output

Output Signal :	±10 V or 4 to 20 mA, switchable
Nonlinearity :	Within±0.1% FS
Scaling :	Can freely be set.
Response Speed :	Approx. 0.25 sec.

●Others

EMC :	Conforms to IEC61326-1(class A)
Safety Feature :	Conforms to IEC61010-1 (Installation categoryⅡ pollution degree 2)
Power Supply :	AC 90~240V, 50/60 Hz, or 10 to 30 VDC (to be specified when ordering)
Power Consumption :	Approx. 6 VA (AC operation), approx. 8 W (DC operation)
Operating Temperature Range :	-10 to 50˚C
Dimensions :	96(W) x 48(H) x 142(D) mm (with no option)
Panel Cut Dimensions :	$92^{+0.4}_{-0}$ x $45^{+0.4}_{-0}$ mm
Panel thickness :	0.8 to 5.0 mm
Weight :	Approx. 500 g

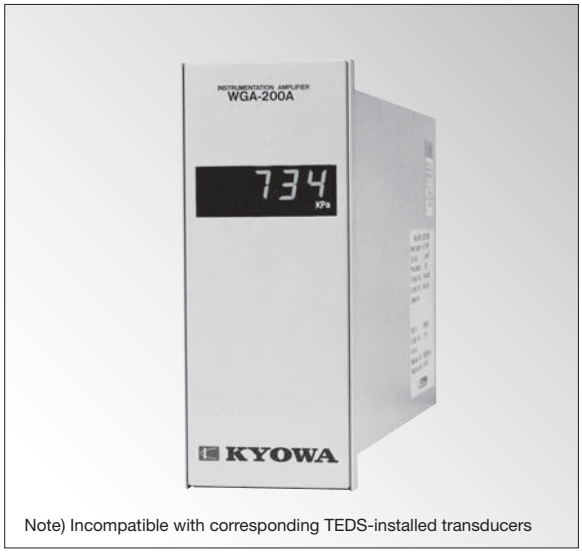
Standard Accessories Unit seal. Instruction Manual

Optional Accessories

AC power cables P-23 (for 100 VAC), P-28 (for 200 VAC)
BCD output cable N-43
BCD output printer cable N-44

WGA-200A Series

Instrumentation Amplifiers



Note) Incompatible with corresponding TEDS-installed transducers

WGA-200A Series signal amplifier is low cost and for Built-in suitable to be used in industrial equipment

- Multi-functional and versatility
- Voltage output, current output, and remote-sensing is standard.
- Compact, robust, dustproof and drip proof

WGA-200A Series signal amplifier can be combined with strain gage transducers and suitable to measure load, pressure, torque and displacement. It is compact, lightweight with high performance and low price. Suitable for industrial equipment

●Low-cost and Multi-functional

Specifications

Number of Measuring Channels : 1	
Applicable Transducers : 350Ω Strain gage transducers(Up to 4	
tronsducers with 350 bridge resistance can be connected in paralle)	
Excitation Voltage :	DC10, 4, 2V (select one)
	Remote sensing possible
Initial Adjustment :	ZERO ±1.5mV/V 18-turn trimmer capacitor
	(Tare weight compensation) FINE
	Sensitivity SPAN 1/1 to 1/100 18-turn trimmer capacitor
Adjustment Monitor :	Use the monitor in the front of the panel
Nominal Output :	Voltage±10V(1mV/V when BV=10V)
	Insulation output(-5V to +10V)
	Current 4 to 20mA (corresponding voltage output 0 to 10V)
Nominal Value :	0.25, 0.5, 1, 1.5, 2mV/V (select one)
Frequency Characteristic : DC to 1, 10, 30, 100, 200, 500Hz (select one)	
Operating Temperature Range : -10 to 50℃, 85%RH or less (noncondensing)	
Power Supply :	AC100V or AC200V (select one)
Dimensions :	60×150×250mm (excluding protrusions)
Weight :	Approx. 1.5kg

Optional Accessories AC power cable AC200V (refer to P-28)

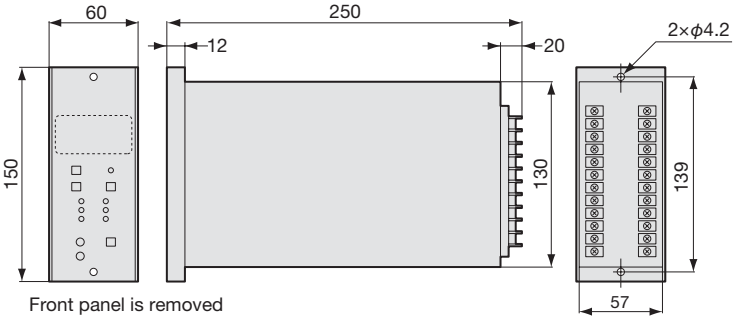
Refer to the item selection table to choose the desired functions
Note) The above spec. is when Excitation = 10v.
Nominal output is proportional to excitation voltage.

Model

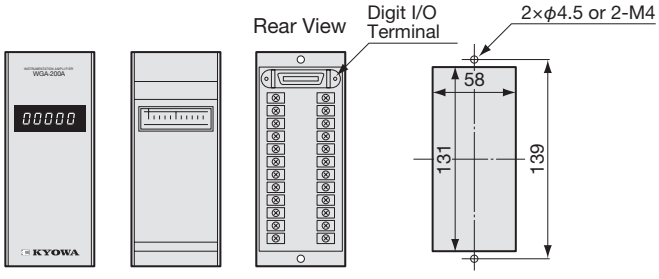
Power Supply	Nominal Value	Frequency Characteristic	Voltage Output	Current Output	Converter ※	Monitor	Bridge Power supply	Additional Functions	Content Code
S	C	F	V	A	L	M	E	T	
	0.25mV/V	DC to 1Hz			None	None	DC10V	None	0
90~121V	0.5mV/V	DC to 10Hz	Non-insulated	Non-insulated	1-step model B			Auto Zero balancing	1
	1mV/V	DC to 30Hz	Insulated	Insulated	2-step model B	With indicator 50×18	DC2V	Peak hold	2
180~242V	1.5mV/V	DC to 100Hz			3-step model B				3
	2mV/V	DC to 200Hz			1-step model M		DC4V	Auto Zero balancing Peak hold	4
		DC to 500Hz			2-step model M	With indicator (10000)			5
					3-step model M	With BCD output			6

Note) Please add number specified in the above table to the end of the product model according to SCFVALMET sequence in your order.
For example: WGA-200A-121112000
V and A cannot be the combination of "2"
When V=2, T cannot be the combination between 2 and 4
When A=2, T cannot be the combination between 2 and 4

■Dimensions, Panel Cut Dimensions



Front panel is removed



(With display) (with measuring unit) (with BCD output) (Panel cut)

DC500V 1min
Contact capacity of converter
AC250V1A
DC50V (resistance load)

※After power-on, when model B is below the setting value, it is「OFF」
After power-on, when model M is below the setting value, it is「ON」

WGA-100B

Instrumentation Amplifiers

Compact, lightweight, low-cost high performance Simultaneous output of voltage and current signals

- Excitation voltage, sensitivity, calibration value and frequency response are switchable.
- Auto balance function provided (WGA-100B-10/11/12)

The WGA-100B is a compact, lightweight and low-cost instrumentation amplifier suitable for measurement of load, pressure, torque and displacement in combination with strain gage transducers. Available in 2 types: manual balance and auto balance which is also possible with external contact, the WGA-100B can easily be changed in the excitation voltage, sensitivity, calibration value and frequency response by changing jumper connection. Simultaneous output of voltage and current signals is possible, no need for switchover.

Compact, Low Cost

Models:

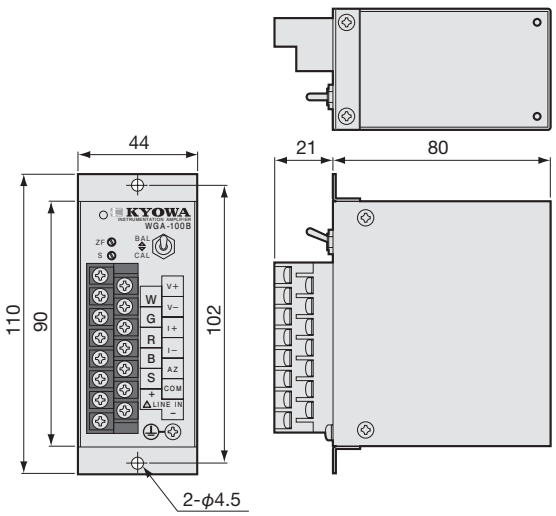
Model	Power Requirements	Balance Adjustment
WGA-100B-00	10 to 30 VDC, 3.5 W or less	Manual
WGA-100B-01	100 VAC ±10%, 5 VA or less	
WGA-100B-02	200 VAC ±10%, 8 VA or less	
WGA-100B-10	10 to 30 VDC, 3.5 W or less	Automatic
WGA-100B-11	100 VAC ±10%, 5 VA or less	
WGA-100B-12	200 VAC ±10%, 8 VA or less	

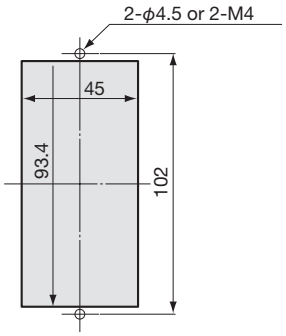
Specifications

Number of Measuring Channels :	1
Applicable Transducers :	Strain gage transducers
Applicable Bridge Resistance :	87.5Ω to 350Ω(Up to 4 transducers with bridge resistance 350Ω can be connected in parallel. Bridge excitation voltage is limited to 5 V for transducers with bridge resistance 175Ω or less)
Bridge Excitation :	10 or 5V DC, switchable by changing internal jumper connection
Rated Output :	Dual output Voltage : ±10 V (load resistance 2kΩ or more) Current : 4 to 20 mA (load resistance 500Ω or less), (corresponding to voltage output of 0 to 10 V)
Zero Adjustment Range :	±1.5 mV/V, by trimmer or auto balance
Sensitivity Adjustment Range :	x1000 or x4000, switchable by changing internal jumper connection Adjustable between x1/1 and x1/4 by the trimmer
Calibration :	0.25, 0.5 or 1.0 mV/V, switchable by changing internal jumper connection
Frequency Response :	10, 30, 100 or 500 Hz, switchable by changing internal jumper connection Attenuation : -12 dB/oct.
Nonlinearity :	±0.02% FS
Zero Stability :	±0.7μV_{RTI}/ ˚C
Sensitivity Stability :	±0.01%/˚C
EMC :	Conforms to IEC61326-1(class A)
Safety Feature :	Conforms to IEC61010-1 (Installation categoryⅡ pollution degree 2)
Operating Temperature/Humidity Range :	-10 to 50˚C, 20 to 80% RH (noncondensing)
Power Supply :	Refer to table above.
Dimensions :	44(W) x 90(H) x 80(D) mm (excluding protrusions)
Panel Cut Dimensions :	45.0 x 93.4 mm
Weight:	Approx. 400 g

Optional Accessories: AC power cables P-23 (for 100 VAC), P-28 (for 200 VAC)
DIN rail mounting fixture H-11223

Dimensions, Panel Cut Dimensions





(Panel Cut Dimensions)

DIN rail Mounting fixture included

WGA-101A

Instrumentation Amplifiers

Compact, lightweight, low-cost, high performance and easy operation Simultaneous output of voltage and current signals

- Excitation voltage, sensitivity, calibration value and frequency response are switchable.
- Auto balance function provided (WGA-101A-10/11/12)

The WGA-101A is a compact, lightweight and low-cost instrumentation amplifier suitable for measurement of load, pressure, torque and displacement in combination with strain gage transducers. Available in 2 types: manual balance and auto balance which is also possible with external contact, the WGA-101A can easily be changed in the excitation voltage, sensitivity, calibration value and frequency response by changing jumper connection. In addition, the WGA-101A provides simultaneous output of voltage and current signals and has the monitor terminal which facilitates monitoring voltage signals even after it is incorporated into equipment.

Compact, Suitable for Panel Mounting

Models:

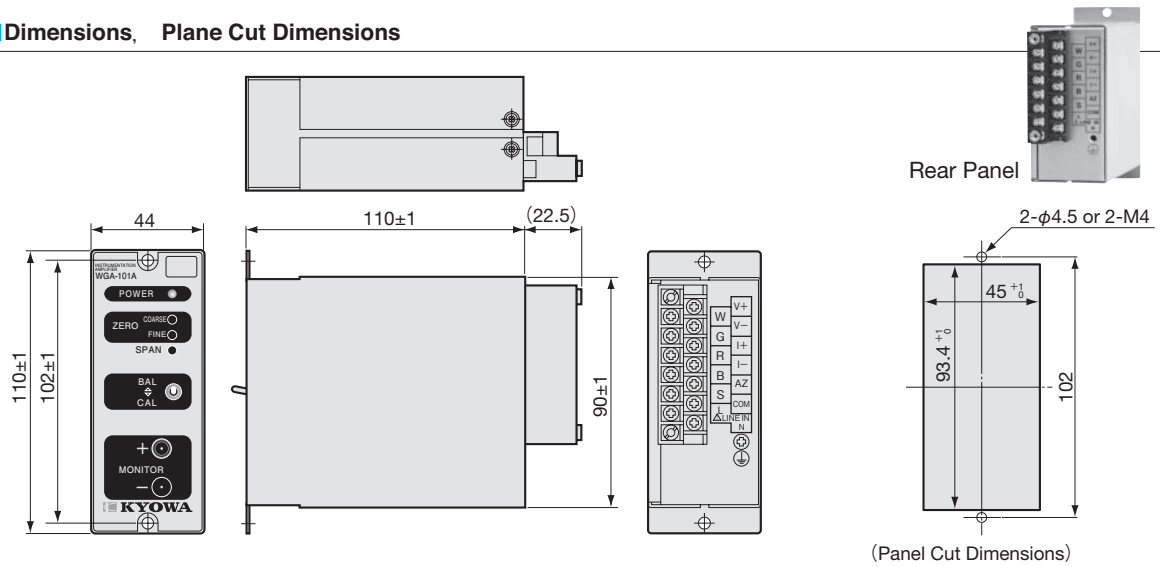
Model	Power Requirements	Balance Adjustment
WGA-101A-00	10 to 30 VDC, 3.5 W or less	Manual
WGA-101A-01	100 VAC ±10%, 5 VA or less	
WGA-101A-02	200 VAC ±10%, 8 VA or less	
WGA-101A-10	10 to 30 VDC, 3.5 W or less	Automatic
WGA-101A-11	100 VAC ±10%, 5 VA or less	
WGA-101A-12	200 VAC ±10%, 8 VA or less	

Specifications

Number of Measuring Channels :	1
Applicable Transducers :	Strain gage transducers
Applicable Bridge Resistance :	
	87.5Ω to 1000Ω (Bridge excitation voltage is limited to 5 or 2 V for transducers with bridge resistance 175Ω or less)
Bridge Excitation :	10, 5 or 2 VDC, switchable by changing internal jumper connection
Rated Output :	Dual output
	Voltage : ±10 V (load resistance 2kΩ or more)
	Current : 4 to 20 mA (load resistance 500Ω or less), (corresponding to voltage output of 0 to 10 V)
Zero Adjustment Range :	±1.5 mV/V, by trimmer or auto balance (WGA-101A-10/11/12)
Sensitivity Adjustment Range :	
	x1000 or x4000, switchable by changing internal jumper connection
	Adjustable between x1/1 and x1/4 by the trimmer
Calibration :	0.25, 0.5 or 1.0 mV/V, switchable by changing internal jumper connection
Frequency Response :	10, 30, 100 or 500 Hz, switchable by changing internal jumper connection
	Attenuation : -12 dB/oct.
Nonlinearity :	Within ±0.02% FS
Zero Stability :	±0.5 μV_{RTI}/°C
Sensitivity Stability :	±0.01%/°C
EMC :	Conforms to IEC61326-1(class A)
Safety Feature :	Conforms to IEC61010-1 (Installation categoryⅡ pollution degree 2)
Operating Temperature/Humidity Range :	-10 to 50°C, 20 to 85% RH (noncondensing)
Power Supply :	Refer to table above.
Dimensions :	44(W) x 90(H) x 110(D) mm (excluding protrusions)
Panel Cut Dimensions :	45.0 x 93.4 mm
Weight :	650 g or less

Optional Accessories: AC power cables P-23 (for 100 VAC), P-28 (for 200 VAC)

Dimensions, Plane Cut Dimensions



WGC-140A

4-Channel Signal Conditioner

●Compact Multichannel Unit

High-speed processing at 2ms, a compact 4 -Channels instrumention conditioner

- ●Up to 4 units of 350Ω strain gage type transducers can be connected independently to respective amplifier circuits.
- ●Circuits are designed to make it difficult for a channel with transducer trouble to affect other channels.
- ●Switchable indicated value, channel to channel or the total
- ●Analog voltage output of all channels and the total
- ●High/low limit comparator for the total value
- ●High-speed output suitable for control, input/outplut delay approx. 10 ms
- ●Sensor check and self-test functions
- ●Indication range-19999 to 19999 with decimal point anywhere

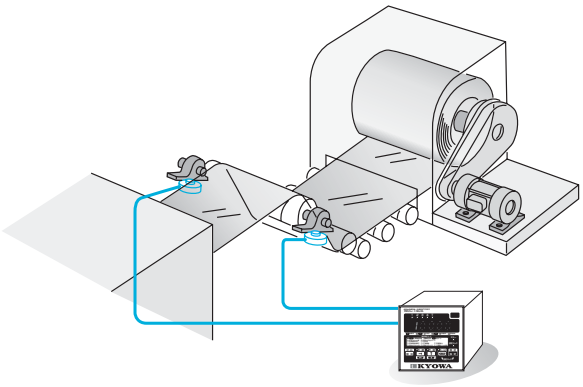
Thus, the WGC-140A is suitable for measurement and control of the load applied to each column of press and the total load or for tension control through measurement of load balance and total load in various fields. In addition, the WGC-140C enables multplication of the total value by a coefficient, thereby facilitating the operator to take emergent countermeasures against transducer trouble by changing the coefficient.

Specifications

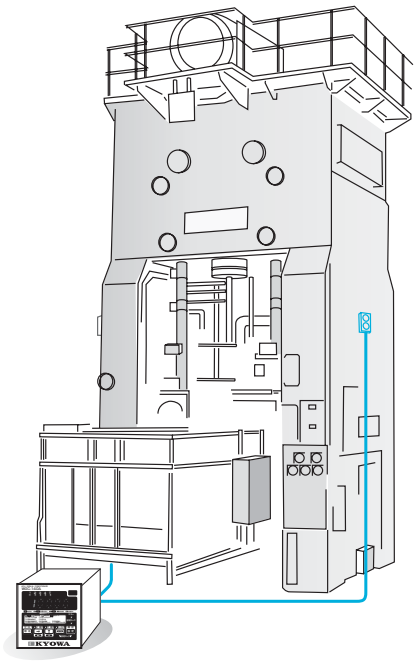
Number of Measuring Channels :	Max.4
Applicable Transducers :	Strain gage Transducers
Applicable Bridge Resistance :	350Ωto 1000Ω
Measuring Range :	±3mV/V(including tare)
Input Filter :	150Hz
Bridge Excitation :	5V DC
Digital Zero :	Can be set at any point in the measuring range
Calibration :	By inputting the value by every channel
	By applying an actual load by every channel
Indicator :	±19999 (Decimal point can be put anywhere,
	the same position is applied to all channels.)
	Character height : 14 mm Red LED
	Indicated Value :
	Measured value of a channel selected from 1 to 4
	Total of measurements of channels 1 to 4
Calculation Speed :	2 ms (500 times/sec.)
Nonlinearity :	Within ±0.05% FS
Zero Stability :	Within±0.5μV RTI/˚C
Sensitivity Stability :	Within±0.01%/˚C
High/Low Limit Comparator :	
Number of setting points : 2 (high/low limits of total value)	
Setting range : ±19999	
Max. hysteresis width : Can be set in a range of 0 to 19999.	
Output system : Open collector	
Load capacity : 30V DC, 20 mA (resistive load)	
Response speed : 10 ms or less	
Smoothing Function :	
Minimum scale : Selectable from 1, 2, 5, 10, 20, 50, 100, 200, 500 or 1000 counts	
Moving averaging function : Selectable from 2, 4, 8, 16, 32, 64, 128 or 256 times	
Adding Function :	Selectable in a range of ±19999
Original Value Measurement :	±3 mV/V or more
Control Input :	
Number of input signals : 6 (4 calculation channel select commands, 1 each ZERO and CHECK commands)	
Input system : No-voltage contact or open collector (should enable application of 12V DC and current flow of 5 mA.)	
Control Output :	
Number of output signals : 7 (1 HEALTHY signal, 4 ABNORMAL signals and high/low limit signals)	
Output system : Open collector	
Load capacity : 30V DC, 20 mA (resistive load)	
Analog Output :	
Number of signals : 5 (signals of 4 channels and the total)	
Output voltage : ±10 V	
Withstand voltage : 250 VAC for one minute	
Resolution : 13 bits	
Nonlinearity : Within ±0.1% FS	
Conversion rate : 500 times/sec.	
Setting values : Indicated value with 0 V output (±19999)	
Indicated value with 10 V output (±19999)	
Check Functions :	
Self-test : Tests the program checksum and memory.	
Transducer test : Checks each channel for the bridge current, over-input and disconnection of transducer cable.	
Input/Output Terminal Board :	
Transducer Input: NDIS connector plugs	
Power Connector, etc. : M3 screw terminal board (applicable crimp-style terminal V1.25-3 or the equivalent)	
Data Output Terminal : Connector 57-40360 (DDK) or the equivalent	
Operating Temperature/Humidity Range :	-10 to 55˚C, 20 to 85% RH (noncondensing)
Power Supply :	AC 100V~240V±10%, 50/60 Hz, approx. 30 VA or less
Dimensions :	96 x 96 x 139 mm (excluding protrusions)
Weight :	Approx. 1.2 kg
Panel Cut Dimensions :	92 x 92 mm

Standard Accessories: Unit seal, Instruction Manual

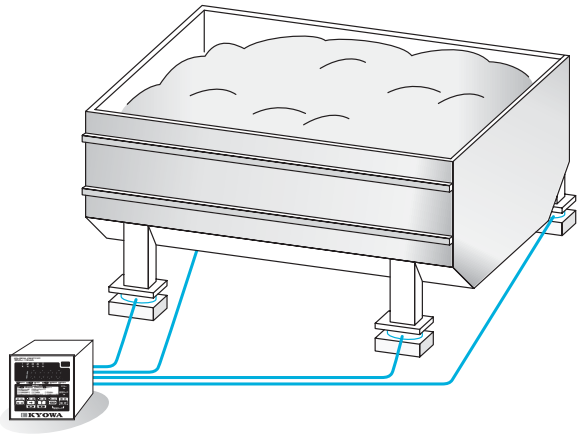
Optional Accessories: AC power cables P-23 for 100 VAC
P-28 for 200 VAC



Steel production Line (Tension Control)

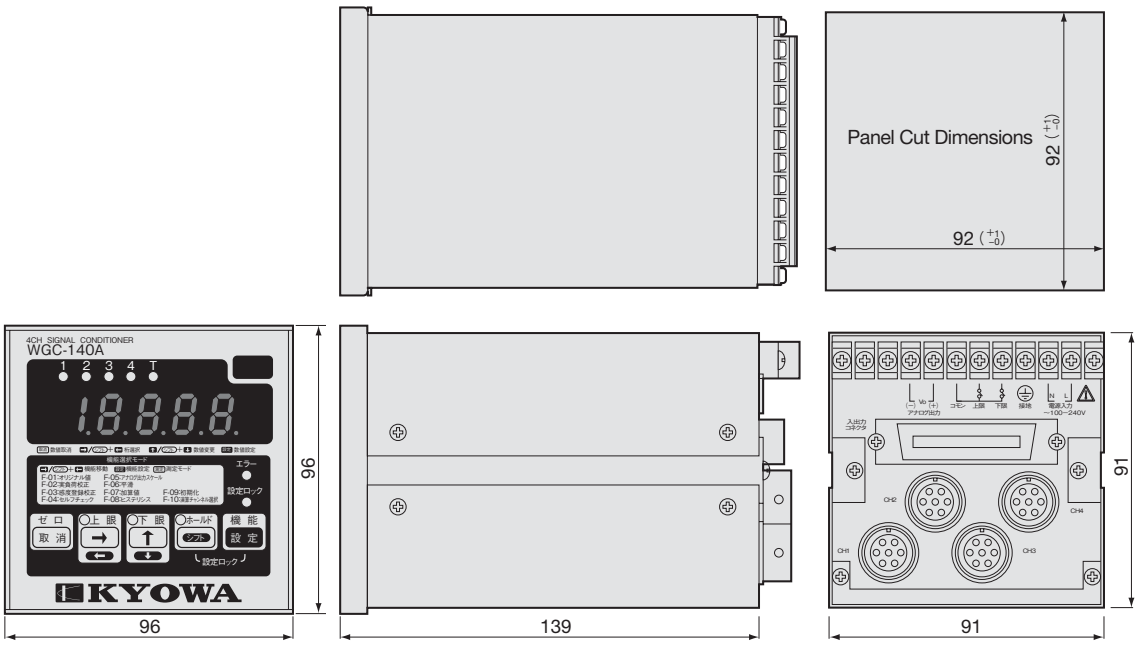


Press (Force Control)



Tank/Hopper Scale (Weighing with 4 Load Cells)

Dimensions



F08-9026-S2

Measuring Equipment Controller

Highly Universal Controller for tension and compression

Measuring equipment controller is for 2-input measuring equipment controller for compression and tension control in a steel mill. It can display plus/minus calculation results through analog output and wide analog instruments.
It is a highly universal measuring equipment controller with unilateral operation function, standard switchover function, comparison function and peak hold function.

Specifications

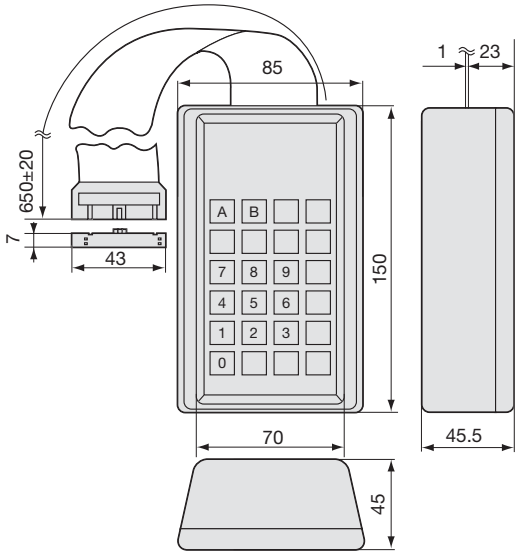
Number of Measuring Channels :	2 points (LOAD A, LOAD B)
Applicable Transducers :	87.5~700Ω
Additional Bridge Voltage :	DC10V±2%
Remote Sensing :	Cable resistance 10Ω or less
Measuring Range :	±2.5mV/V
Sensitivity Adjustment Range :	0.25mV/V~2.5mV/V
Zero Adjustment Range :	±1mV/V (hardware zero adjustment)
	Count zero (auto zero balancing) measurement range
Nominal Value (CAL) :	50% output for relative measurement range
Frequency Characteristic (stop) :	10Hz, 500Hz
Nonlinearity :	±0.05%FS (output voltage through amplifier)
Zero Stability :	±0.02%FS/℃(1mV/VFS)
Sensitivity Stability :	±0.02%/℃(1mV/VFS)
A-D Conversion Speed :	Sampling frequency 4kHz (input 2ch, 2kHz
	sampling frequency each)
	Resolution : 16Bit
D-A Output :	±10V, ±5V (load resistance 2kΩ or more)
	4 to 20mA (load resistance 500Ω or less)
	Can set each port through any key input
	Current output switchable through SW on main port
	Mainframe insulation output, insulated withstand voltage
	AC500V, 1min.
Resolution :	16bit
Output Points :	Mainframe: 4 ports, additional: 4 ports, total 8 ports
	Insulated between 4 mainframe ports and 4 additional
	ports output (No. 6 and No. 7 ports are for analog monitor)
Output Mode :	A-alone, B- alone, A+B and A-B
	Each port can be set randomly
Nonlinearity :	±0.1%FS or less
Analog Monitor :	For total value: 0 to 100(%)
	For difference value: -50 to 50(%)
ROM :	128k flash memory
Interface :	PPI(CN5): for keyboard of WDC-810B-KB
	EIA-232-D (for maintenance)

Comparison Output :	
	4 points, open collector output LOAD ON 1, LOAD ON 2,
	OVER LOAD 1, OVER LOAD 2
	Condition setting : through keyboard of WDC-810B-KB
	Setting items : comparison value (%), comparative mode (A/B-alone,
	plus, minus). A-alone for comparator, B-alone, A+B,
	A-B, random setting)
	Max. input voltage : 30V Residual voltage : 1V or less
	Max. load current : 100mA
Control Output :	7 points, open collector output
	Response (ZERO, CAL, A×2, B×2, HIGH)
	POWER ON HEALTHY, CPU ERROR
Control Input :	11 points (dry contact), Auto zero command (ZERO)
	CAL command
	Unilateral operation (A×2, B×2 command)
	Interlock OFF command
	Standard switch over 5 points (Memory management
	sensitivity log-in value and ZERO value)
	Gain command (HIGH)
Peak Hold Action :	Peak hold action can be set by keyboard
	Setting through PORT
	① when strain capacity is over baseline value,
	clear previous hold value, setting time is(1 to 9.9sec)0
	② Measure through peak hold after setting time
	③ Baseline value and setting time are set by keyboard input
	Setting value can be used together with each PORT
Power Supply :	AC100 to 240V±10% 50/60Hz
Operating Temperature Range :	-10~ +55℃ 85%RH (noncondensing)
Weight :	Approx. 5kg

●Keyboard WDC-810B-KB (optional)

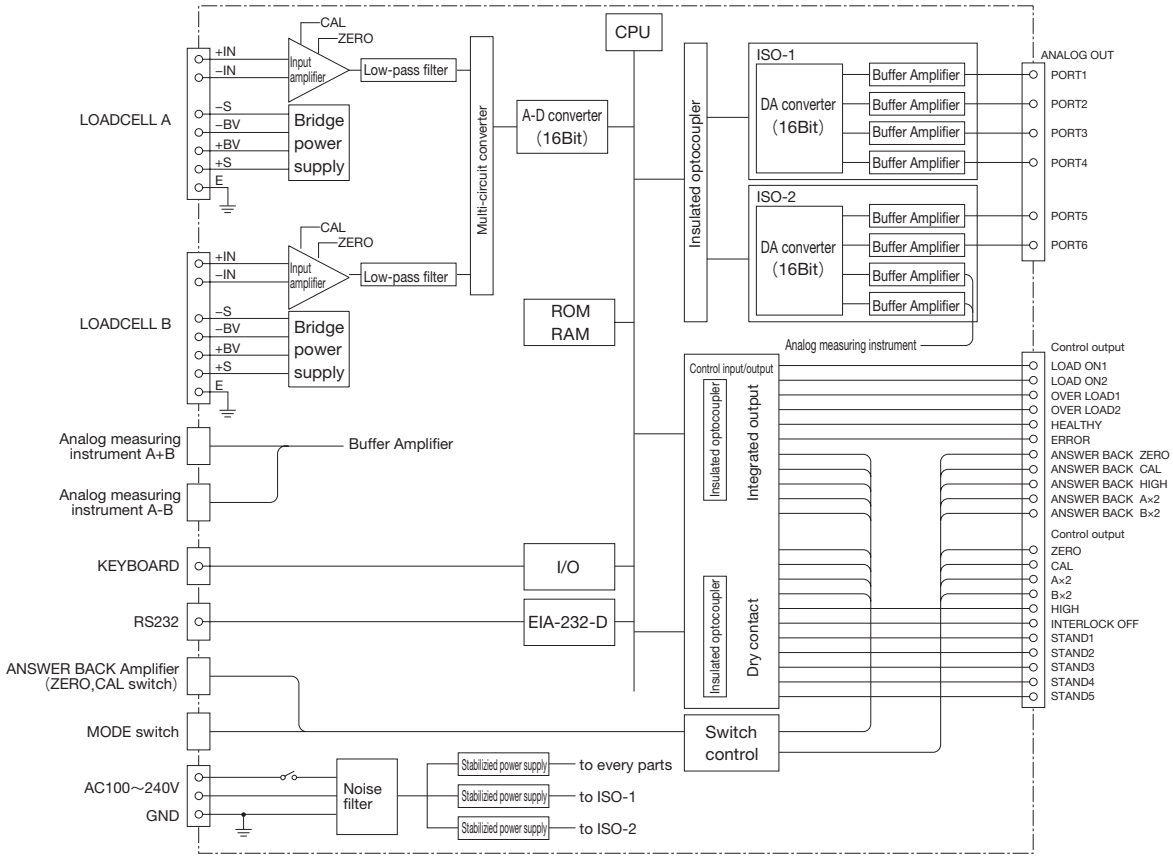
Function Key :	Channel Key	(A) (B)
	Key 0	(ZERO)
	TAB key	(CAL)
	Port Selection Key	(PORT)
	Display Key	(DISPLAY)
	Mark Key	(F0) (F1)
	Number Key	(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)
	Load Key	(LOAD ON)
	Overload Key	(OVER LOAD)
	Gain Key	(GAIN)
	Clear Key	(CLR)
	Return Key	(ENT)
Dimensions :	150(H)×85(W)×45.5(D)mm	

■Keyboard Dimensions

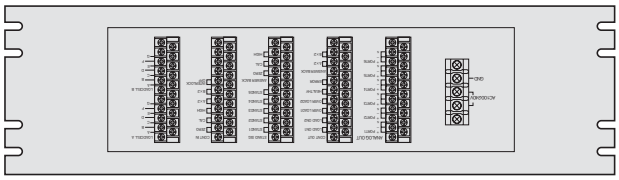


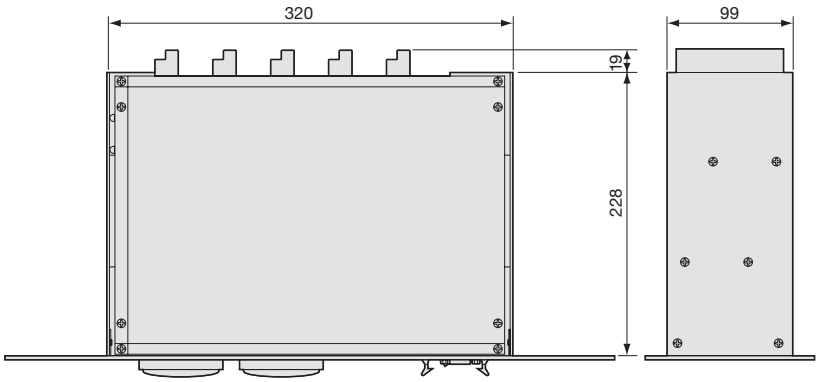
Keyboard

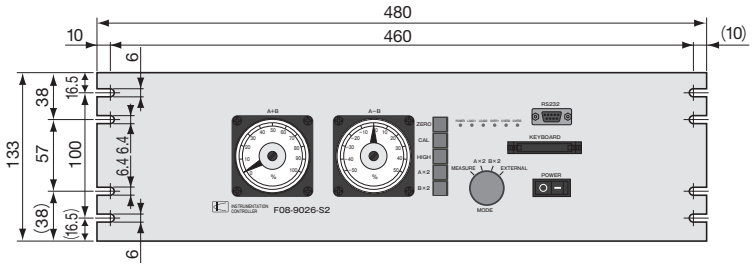
Block Diagram



Dimensions







WDC-810C1

Measuring Instrument Controller

●For rolling mill and tension control

Thin design and suitable for compression and tension control

●Easy to match necessary input/output signals as a compression controller
●Setting though keyboard Simplifies operation commands and operation
●Can be used at wide range of applications

Measuring Instrument Controller is suitable to measure compression and tension load detected by load transducers that are mounted on a steel mill. It is a load transducer amplifier to output voltage and current signals according to a certain format specified in CPU. Because of its thin design, it can be used together with different transducers. Through keyboard, users can carry out setting and command input. The controller can not only output basic form A, compression and tension load of Bside load transducer (A and B outputs separately), compression load (A+B and output), compression load balance (A-B output) but also output plus only, minus only or plus and minus. It is able to output according to the requirements of lines. This Measuring Instrument Controller has more than 1 CPU, but has output for 8 systems including CPU for measuring instruments, control and electrical system.

Setting value can be written in non-volatile memory in case of power cut. Users do not need to use keyboard to input constants again. Meanwhile, it is able to adopt a flexible corresponding method for compression load measurement and load transducer measurement or control.

Specifications

●Basic specifications

Power :	AC100V±10%　50/60Hz　1φ
Insulation Resistance :	AC line-case, use 500V insulated resistor, 1000MΩ or more
Insulation Withstand Voltage :	AC line-case, AC1500V 1min
Operating Temperature Range :	0 to 40˚C, 85RH or less (noncondensing)
Action Temperature Range :	-10 to 55˚C, 90%RH or less (noncondensing)
Temperature Stability :	ZERO：±0.02%/˚C, span: ±0.02%/˚C
Dimensions :	348(H)×49(W)×250(D)mm
Weight :	Approx. 3.3kg

●Load Transducer Amplifier

Input Points :	2 points (Aside, Bside)
Applicable Transducer :	Load Cells
Number of Transducers Connected :	Up to 4 350Ω Load Cells can be connected in parallel
Bridge Power :	DC10V±2% Remote sensing possible
Measuring Range :	±2.5mV/V input/output equivalent value
Sensitivity :	Output 10.000V of +0.25mV/V to +2.5mV/V input
Nonlinearity :	±0.05%FS
A-D converter :	16bit
Zero Adjustment Range :	±1.0mV(hardware zero adjustment)
	counter measuring range
Span Measuring Range :	Setting by 0.25mV/V~2.5mV/V key input
Nominal Value :	50% output to measuring range

●Control Input Interface

Input Points :	11
Input Mode :	Dry a contact
Photoconpler :	Reversed withstand voltage 6Vmax
	Current　80mA max
	Power consumption　120mW max
Input :	· ZERO
	· CAL
	· A×2
	· B×2
	· INTERLOCK OFF
	· HIGH
	· Sensitivity selection　1～5

●Control Output Interface

Output Points :	11 points
Output Mode :	Open collector
	Collector current 100mAmax
	Withstand voltage between collector and emitter
	30Vmax
Output Content :	Load on 1 (LOAD　ON1)
	Load on 2 (LOAD　ON2)
	Overload 1 (OVER　LOAD1)
	Overload 2 (OVER　LOAD2)
	Response : auto zero adjustment, in A×2, B×2, HIGH, CAL
	Normal(HEALTHY)
	Error(ERROR)

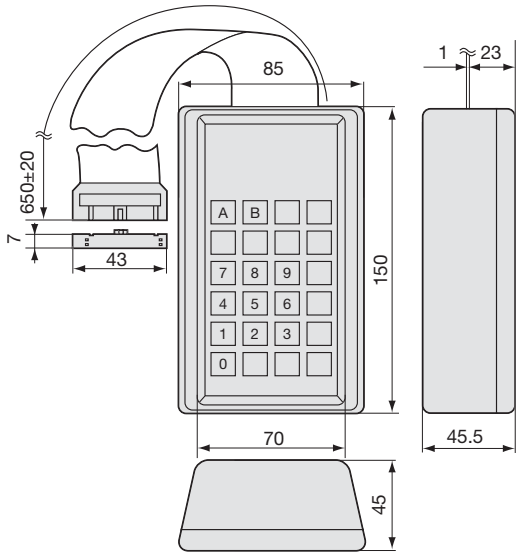
●D-A Converter (16Bit) and Current/Voltage Buffer

Input Points :	8 (16Bit)
Nonlinearity :	±0.05%FS
Buffer Output :	No
	0 to ±5V
	4 to 20mA
	0 to ±10V
Output Type :	None
	A-alone output
	B-along output
	A+B and output
	A-B polarity difference output

●WDC-810B-KB keyboard (optional)

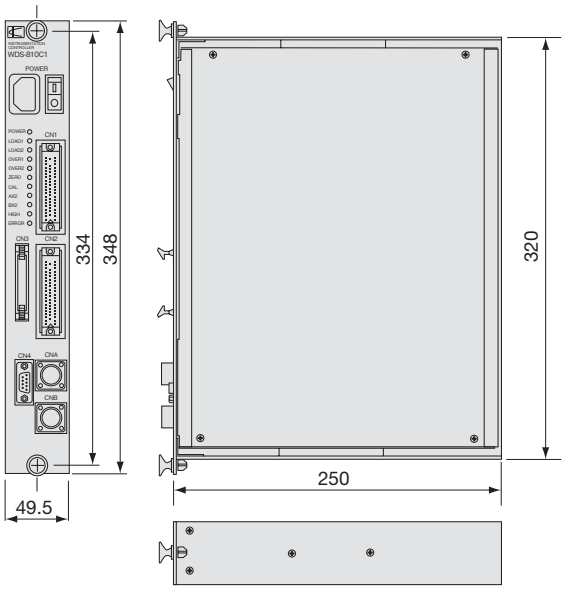
Function Key :	Channel Key	〔A〕〔B〕
	Key 0	〔ZERO〕
	TAB key	〔CAL〕
	Port Selection Key	〔PORT〕
	Display Key	〔DISPLAY〕
	Mark Key	〔F0〕〔F1〕
	Number Key	〔0〕〔1〕〔2〕〔3〕〔4〕〔5〕〔6〕〔7〕〔8〕〔9〕
	Load Key	〔LOAD ON〕
	Overload Key	〔OVER LOAD〕
	Gain Key	〔GAIN〕
	Clear Key	〔CLR〕
	Return Key	〔ENT〕
Dimensions :	150(H)×85(W)×45.5(D)mm	

■keyboard Dimensions



Dimensions of Keyboard Keyboard

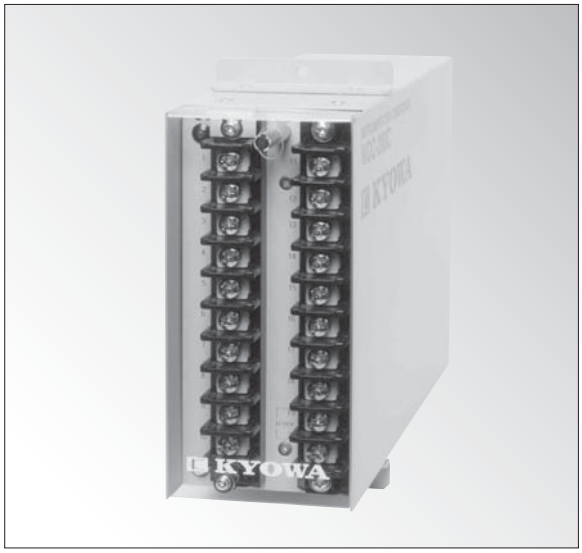
■Dimensions



WDC-200C Series

Instrumentation Conditioners

●For Long-Distance Transmission



Compact design ensures efficient use of the panel.High tolerance for noise suitable for use on production lines

- ●Panel-incorporated design with terminal boards on the front panel facilitates handling and maintenance.
- ●Original circuit design ensures excellent zero stability.
- ●Output is not affected by thermoelectromotive force in the input system, thereby ensuring stable operation irrespective of ambient temperature changes.
- ●Dual analog output
- ●Abundant additional functions
- ●Suitable as long-distance transmission preamplifier or transmitter

The WDC-200C series is instrumentation conditioners for use with strain gage load cells. The dual output enables simultaneous output of voltage and current signals.
The originally developed circuit automaticaly cancels any zero drift of the amplifier circuit and unnecessary thermoelectromotive force generated in the input system including a load cell, junction box and cable, thereby ensuring stable operation irrespective of ambient temperature changes.
To enable use in a wide range of instrumentation fields, abundant additional functions are available including a remote zero adjuster, remote calibration circuit setting device, input/output protector and isolation amplifier.
Designed to be mounted into the operation panel, the WDC-200C series has the front panel composed of input and output terminals only, thereby facilitating instrumentation task and operation. In addition, the compact package ensures increased efficiency of the operation panel.
The WDC-200C series is suitable as a long-distance transmission preamplifier or transmitter.

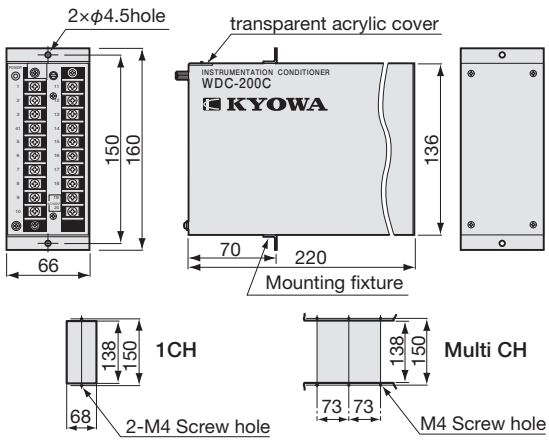
Models

Function / Model	Conditioner + Analog Output	2-Step Setting Device	Remote Zero Adjuster	Remote Calibration Circuit	Polarity Inverter
WDC-200C	●			●	
WDC-202C	●		●	●	●
WDC-210C	●	●		●	

Specifications

Number of Measuring Channels :	1
Applicable Transducers :	Load cells with bridge resistance 350Ω
	(Up to 4 units can be connected in parallel.)
Measuring Range :	±0.25 mV/V to ±2mV/V or more
Bridge Excitation :	Applied peak voltage 10V AC, line frequency-synchronized system
Zero Adjustment Range :	Coarse adjustment : 3 steps of ±0.5 mV/V, ±1.0 mV/V and ±1.5 mV/V for tare compensation
	Middle adjustment : Continuously variable between 0 to ±0.5 mV/V or more
Span Adjustment Range :	Coarse adjustment : 3 steps
	±5 V output for ±0.25 mV/V input
	±5 V output for ±0.5 mV/V input (standard sensitivity)
	±5 V output for ±1.0 mV/V input
	Moderate adjustment : Continuously variable between 1/1 to 1/2 or more
	Fine adjustment : Continuously variable between 1/1 to 23/25 or more
Output :	0 to ±5 V (unbalanced load 5kΩ or more)
Calibraration Value :	Coarse adjustment : Continuously variable between +0.25 mV/V and +1.0 mV/V or more
	Fine adjustment : Continuously variable between 1/1 to 23/25 or more
●Analog Output	
Number of Output Channels :	2 (1 each for current and voltage)
Voltage Output :	0 to ±5 V, unbalanced load 5kΩ or more
Current Output :	4 to 20 mA, unbalanced load 400Ω or less
●Environment & Power Supply, etc.	
Operating Temperature/Humidity Range :	0 to 40˚C, 85% RH or less (noncondensing)
Power Supply :	AC 100/110V±10% or AC200/220V±10%, 50/60 Hz, 50 VA or less
Dimensions :	66 x 136 x 220 mm (maximum but not including mounting fixture)
Weight :	Approx. 1.5 kg
●Additional Functions	
Setting Device	
Number of Setting Channels :	2
Setting System :	Analog potentiometer
Contact Output :	No-voltage a-contact, 1 circuit each
Contact Capacity :	24V DC, 5 A or less (non-inductive load)
	250V AC, 3 A or less (non-inductive load)
Remote Zero Adjuster	
Adjustment Range :	±1/2 full scale or full scale with standard sensitivity
Adjustment Signal :	External no-voltage a-contact input, contact capacity 24 VDC, 0.1 A
Remote Calibration Circuit	
Calibration Signal :	External no-voltage a-contact input, contact capacity 24 VDC, 0.1 A
Polarity Inverter	
Polarity Inverting Signal :	External no-voltage a-contact input, contact capacity 24 VDC, 0.1 A

■Dimensions



WDS-180A/185AS1

Compact Digital Indicators

●Enables direct reading for physical value

Suitable for simple measurement and checking of a load,pressure or displacement transducer.

- ●WDS-180A provides TEDS reading circuit for easy and error-free setup.
- ●Indicates measured values in μm/m or mV/V.
- ●Operates on 2 pieces of AA size dry cell which is available anywhere.
- ●Measure mode enables direct reading of physical quantities in proper engineering unit.
- ●Actual load calibration or sensitivity registration calibration is possible.
- ●Compact and lightweight(66.5mm×92.0mm×28.0mm,approx.180g)

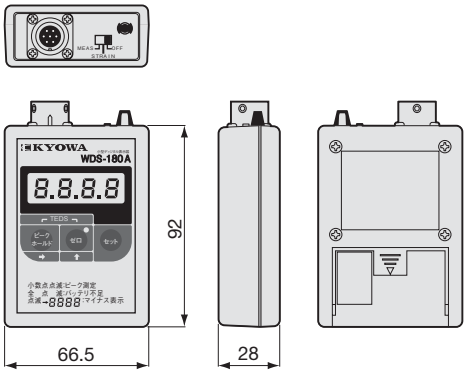
Two models are available for constant voltage or constant current type.
Enable reading in N,Pa or mm

Specifications

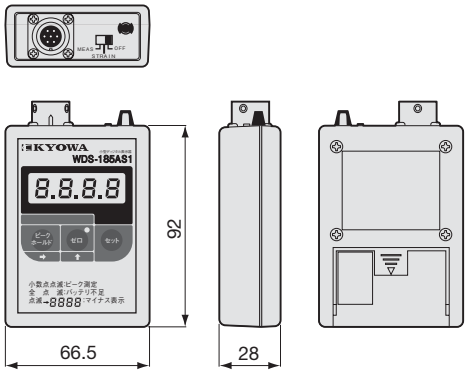
model :	WDS-180A( )
	WDS-185AS1( )
Number of Measuring Channels : 1	
Applicable Transducers : Strain-gage transducers(full-bridge)	
Applicable Bridge Resistance : WDS-180A: 60 to 1000Ω	
	WDS-185AS1: 350Ω
Bridge Excitation :	WDS-180A:1V(constant voltage)
	WDS-185AS1:2mA(constant current)
Measureing Range:	±5mV/V(±10000μm/m),
	including zero adjustment range
Digital Zero Compensation : Possible in the measuring range	
Sampling Rate :	Approx.3 times per second
Calibration Modes :	Actual load calibration
	Sensitivity registration calibration
	In addition,the WDS-180A enables calibration
	by reading TEDS
	information or by reading TEDS and registered
	profile data.
Indication :	7-segment LCD
	Character height:8.9 mm
	Decimal point : Can be set at any desired
	place (in measure mode only)
	(Once set, the decimal point is fixed and not floated.)
	Indication range : -9999 to 9999 (minus is
	indicated by flickering the center segment of
	thousands' place digit.)
Indication Accuracy :	±(0.05%rdg.+5)μm/m
Indication Modes :	Strain mode : Switchable between μm/m and mV/V
	measure mode : Proper engineering unit through
	multiplication by calibration coefficient
Minimum Scale Value : Switchable to 1,2 or 5(in measure mode)	
Peak Hold :	Holds a maximum value during measurement.
Auto Power OFF :	Can be set in a range of 1 to 99 minutes or none.
Low Battery Indication : All digits of LED indicator flicker	
	(battery voltage 2.3 to 1.9V).
Operating Temperature/Humidity Range :- 5 to 40˚C,	
	20 to 85%RH(noncondensing)
Storage Temperature Range : -10 to 60˚C	
Power Supply :	AA size dry cell×2
Continuous Operation :	24 hours or longer (with manganese dry cells)
Dimensions :	66.5(W)×92.0(H)×28.0(D)mm (excluding protrusions)
Weight :	Approx.180g(with manganese dry cells built in)

Standard Accessories: Hook to attach a strap, AA battey×2, label for measurement unit

■Dimensions



WDS-180A



WDS-185AS1

WDS-500A

Sensor Checker

●Compact size

A compact size checker is able to check a strain gage type transducer and a strain amplifier

●Strain output enables checking of strain amplifiers.
●Strain, input/output resistance or insulation resistance can be measured individually by pressing the key.
●All these variables can be measured simultaneously in automatic mode.
●Enables reviewing of information of TEDS-installed transducers.
●Compact and lightweight (66.5 × 112 × 28 mm, approx. 200 g)
●Operates on 2 pieces of AA size dry cell which is available anywhere.

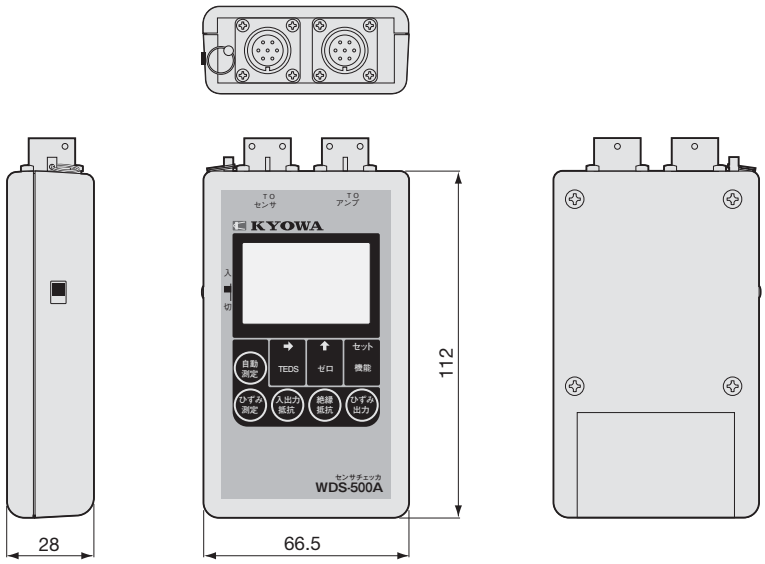
Specifications

Applicable Instruments :	Strain-gage transducers&strain amplifiers
Sampling Rate :	Approx.2 times per second
Auto Power OFF :	Selectable from 1 to 99 minutes or none
Operationing Temperature/Hmidity Tange :	-5to 40℃, 20 to85%RH(noncondedsing)
Power Supply :	2 pieces of AA size dry cell
Continuous Operation :	Approx. 8 hours(with manganese dry cells used for measurement of 350Ω transducer under normal temperature)
Weight :	Approx.200g (including built-in dry cells)
Dimensions :	66.5(W)×112(H)×28(D)mm (excluding protrusions)
●Strain Measurement	
Applicable Bridge Tesistance :	60 to 1000Ω
Measuring Range :	±5mV/V (±10000με)
Bridge Excitation :	Approx.1V DC
Indication Acuracy :	Within±(0.2%rdg.+0.003)mV/V
	Within±(0.2%rdg.+5)με
Measurement Mode :	Strain mode : Where input strain quantity is indicated in mV/V or με; zero compensation possible
●Input/Output Resistance Measurement	
Measureing Range :	0 to 2000Ω
Indication Acuracy :	±(0.2%rdg+5)Ω
●Insulation Resistance Measurement	
Measring Range :	0M to 300MΩ
Applied Voltage :	Approx. 20V DC
Indication Acuracy :	±(15%+10)MΩ
●Srain Output	
Output Range :	0.000 to ±5.000mV/V(0.010mV/V steps)
	0 to ±10000με(10με steps)
Output Accuracy :	±(0.5% of setting value+0.020)mV/V
Input/Output Resistance :	±(0.5% of setting value+20)με
Input/Output Resistance :	Approx. 350Ω
Note : This can not use with carrier type amplifier	
●Automatic Measurement Function	
Enables simulataneous measurement of input strain,input/output resistance and insulation resistance.	
●Teds Information Indication Function	
Indicated Contents :	Model number of transducer,KYOWA original serial number,rated capacity,engineering unit of rated capacity,rated output,input resistance and serial number of TEDS format.

Standard Accessories: Instruction Manual,AA size dryeell×2

Optional Accessories: U-16(4-conductor cable alligotor clip)

■Dimensions



SDB-410CS

Handy Digital Indicator

●For site examination

Specifications

Number of Measuring Channels : 1	
Measuring Target :	Strain gage transducers (60 to 1000Ω)
	Strain gage
	1 Strain gage method 120Ω
	2 Strain gage method 60 to 1000Ω
	4 Strain gage method 60 to 1000Ω
Measuring Range :	0 to ±19999μm/m
Measuring Accuracy :	Within ±(0.2% of indicating+2 digits)
	Within 1500μm/m ±(5 digits)
Bridge Power Supply :	DC 2V
Response Time :	Approx. 2sec. or less (within 2 values for)
Display :	7-segment LCD, character height 11.4mm
	For automatic polarity switchover (-) symbol only
Sampling Rate :	Approx. 2 times/sec.
Operating Temperature Range :	0~45℃
Stability :	±0.01%FS/℃
Insulated Resistance Checking Range :	
Action range : approx. 10MΩ or less	
Measured transducer has insulated resistance when operation OFFSET switch	
Alarm with buzzing sound in abnormal conditions	
Alarm sound changes with resistance value.	
Power Supply :	4 AA nickel-cadmium batteries with continuous operating
	time (350Ω bridge) approx. 20hs, dedicated charger
	(standaed accessory) compatible with AC power units.
	Charging time: approx. 15h
	Display for voltage reduction signal
Dimensions :	90×33×180mm (excluding protrusions)
Weight :	Approx. 450g

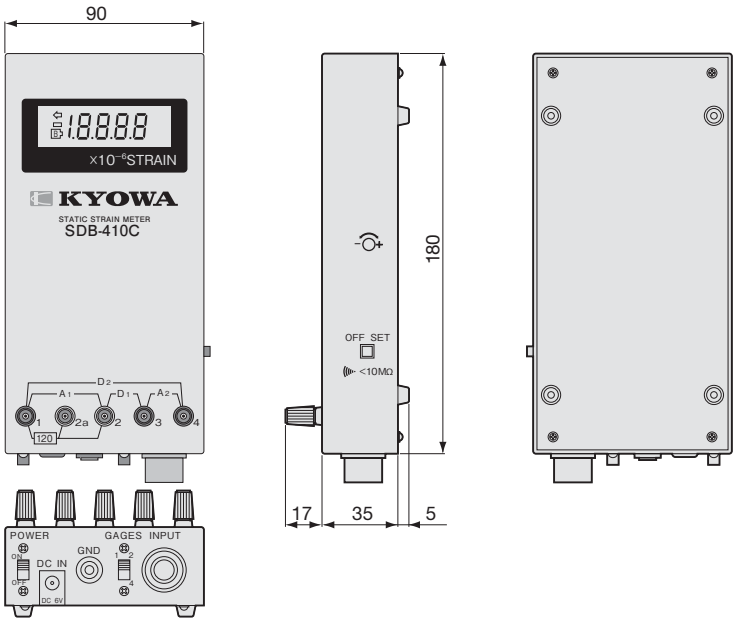
Standard Accessories: Instruction Manual
AA nickel-cadmium batteries
Dedicated charger

Compact, Lightweight, Suitable for on site Application

- ●Can detect insulated resistance in strain measurement
- ●Measuring range 0~±19999μm/m
- ●Connectable with switch box (model SS-R, optional) to achieve multi-channel measurement

SDB-410CS is compact, light weight and it has high accuracy. It is a portable transducer indicator with excellent performance. Besides stain measurement function (1, 2, 4 strain gage methods), it has a built-in insulated resistance abnormity detection circuit, which can detect status with 10MΩ or less and alarm in case of displacement adjustment.

■Dimensions



CAB-E
Strain Generators

●For Checking Strain Measuring Instruments

CAB-120E

Specifications

Model	I/O Resistance, Accuracy	Bridge Applied Voltage
CAB-120E	120Ω, +1 -10%	4V DC or less
CAB-350E	350Ω, +1 -10%	12V DC or less

Equivalent Strain :	RANGE dial : 4 steps of x-500, x-100, x100 and x500
	STRAIN dial : 11 steps of 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 μm/m
	Generated strain level is determined by setting of both dials.
Accuracy :	Within (±1.5% of setting + 5 μm/m)
Gage Factor :	2.0 fixed
Input/Output Resistance & Accuracy :	Refer to table above.
Bridge Applied Voltage :	Refer to table above.
Operating Temperature/Humidity Range :	0 to 45°C, 20 to 80% RH (noncondensing)
Output Connector :	NDIS connector
Dimensions :	122(W) x 70(H) x 52(D) mm
Weight :	Approx. 350 g

Standard Accessories

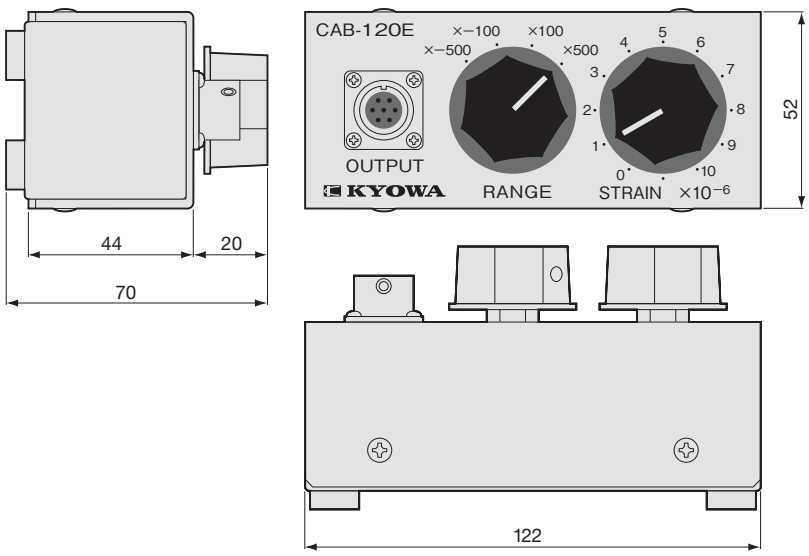
Connection cable with NDIS connector at both ends, 1 m long

A compact and light weight strain generator for checking strain amplifiers.

The CAB-E is a compact and lightweight device, which generates equivalent strains to check strain measuring instruments. A generated strain level can be set with STRAIN and RANGE dials in combination. The CAB-E is compatible with remote sensing.
Power supply is not necessary.

Notes:
1. Since the CAB-E is designed to be compatible with remote sensing, it cannot be used for the systems such as EDX-2000A, MCD-A and DIS-3000B, with which F and G terminals of input NDIS connector are used for other purposes.
2. It is not recommended to use for carrier-type strain amplifiers such as DPM series.
3. Since the CAB-E has a special circuit structure, the stated accuracy may not be satisfied depending on measuring instruments under test.
4. The CAB-E is designed for checking and cannot be used for calibration.

■Dimensions



WDS-10
Strain Generator

●For Checking Strain Measuring Instruments

Specifications

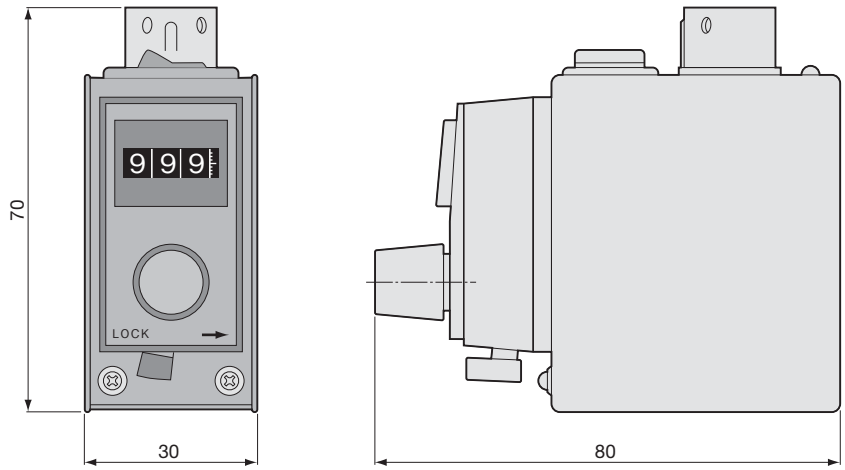
Input/Output Resistance :	350Ω±7Ω
Equivalent Strain :	0 to ±1000, ±2000 or ±4000 μm/m
Dial Range :	000 to 999
Setting Accuracy :	Within (±0.5% rdg + 5 digits) (dial value)
Dimensions :	30 x 70 x 80 mm
Weight :	Approx. 350 g

Notes:
1. Since the WDS-10 has a special circuit structure, the stated accuracy may not be satisfied depending on measuring instruments under test.
2. The WDS-10 is designed for checking and cannot be used for calibration.

Compact,lightweight For check strain gage measuring intruments

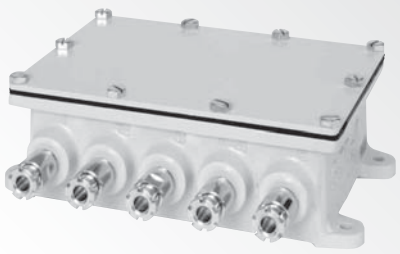
The WDS-10 is an equivalent strain generator for checking strain measuring instruments. It can continuously generate equivalent strain with positive or negative polarity selected by the switch. The dials operate in digital steps.
The compact and lightweight design ensures convenient use anywhere.

■Dimensions

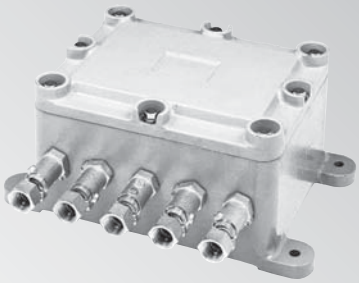


SJB-C,D/JBS-C

Junction Boxes



SJB-4D



JBS-4C

Cable connections for load cells and more intensive use of inputs

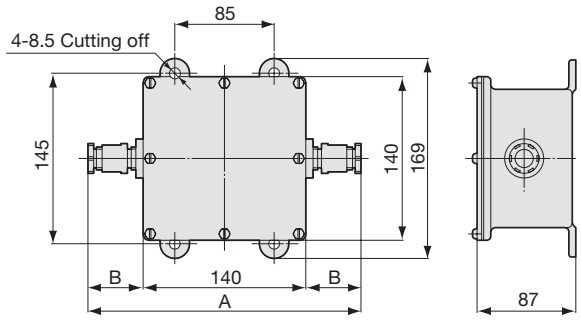
A junction box is used when connecting a load cell and amplifier using an extension cable or when connecting cables of multipe load cells to an amplifier using a single cable for weighing a tank or hopper.
The SJB-C/D are designed for general purpose and the JBS-C is for use under hazardous, and explosive environment.

Model

Model	Number of Connectable Load Cell	Applicable Cable Diameter	Remarks
SJB-1C	1	10 to 11 mm (15C)	4-conductor (0.5 mm²) shielded cable
SJB-4C	4		
SJB-1D	1	7 to 8 mm (10B)	4-conductor (0.3 mm²) shielded cable
SJB-4D	4		
JBS-1C	1	10 to 11 mm as specified	Pressure-resistant and explosionproof class,Ignition degree d2G4
JBS-4C	4		

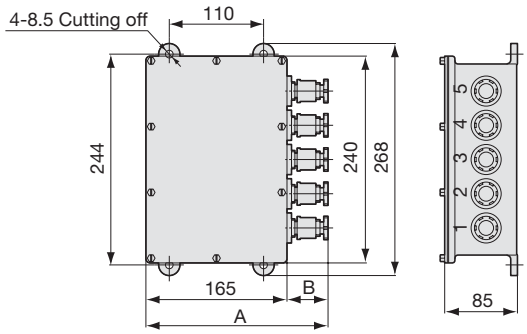
Notes：Please specify the cable diameter

●SJB-1C,1D



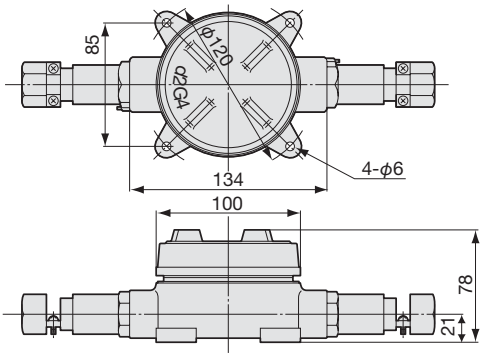
Model	A	B	Weight (Approx.)
SJB-1C	234	47	2.3kg
SJB-1D	226	43	2.2kg

●SJB-4C,4D



Model	A	B	Weight (Approx.)
SJB-4C	212	47	4.7kg
SJB-4D	208	43	4.4kg

●JBS-1C



●JBS-4C