

INSTRUCTION MANUAL

WGA-910A

INSTRUMENTATION AMPLIFIER

(FOR OPTIONS)

WGA-910A-1: BCD

WGA-910A-2: D/A

WGA-910A-3: RS-485

WGA-910A-12: BCD and D/A

Thank you for purchasing KYOWA's product WGA-910A Instrumentation Amplifier.

Read this Instruction Manual carefully in order to make full use of the high performance capabilities of the product.

Do not use the product in methods other than described in this Manual.

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The contents of the Instruction Manual are subjected to change without prior notice.

Please follow the safety precautions and other precautions described in this manual.

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STANDARD ACCESSORIES

The following accessories are packed with the WGA-910A-1, WGA-910A-2, WGA-910A-3, WGA-910A-12. When unpacking, check the contents to ensure that all accessories are enclosed.

Instruction Manual	1 (CD-R) *1
Product Warranty	1
Software License Agreement	1

*1. Including a PC software and a setting file for wave comparison mode.

OPTIONAL ACCESSORIES

<BCD connector> (WGA-910A-1 BCD)

Connector	Model: FCN-361J040-AU	Manufacture:	FUJITSU COMPONENT LIMITED
Cover	Model: FCN-360C040-B	Manufacture:	FUJITSU COMPONENT LIMITED

<RS-485 connector> (WGA-910A-3 RS-485)

Connector	Model: XM3D-0921	Manufacture:	OMRON Corporation
Cover	Model: XM2S-0913	Manufacture:	OMRON Corporation

<BCD connector> (WGA-910A-12 BCD and D/A)

Connector	Model: 10136-3000PE	Manufacture:	Sumitomo 3M Limited
Cover	Model: 10336-52F0-008	Manufacture:	Sumitomo 3M Limited

SAFETY PRECAUTIONS

The WGA-910A-1, WGA-910A-2, WGA-910A-3 and WGA-910A-12 are designed to be used according to "1-3.BCD OUTPUT SPECIFICATIONS ", "2-3.D/A OUTPUT SPECIFICATIONS", "3-3, RS-485 SPECIFICATIONS ", and "4-3.BCD and D/A OUTPUT SPECIFICATIONS ". Do not use the product in an environment exceeding the specifications.

Or, it may cause troubles.

PRIOR TO USE

For safe use of the product, do not forget to read the "Safety Precautions" prior to use.

Kyowa Electronic Instruments Co., Ltd. assumes no liability for any damage resulting from the user's failure to comply with the safety precautions.

For safety operation of the product, the following symbol marks are used in the Instruction Manual.

	Indicates "PROTECTIVE GROUND TERMINAL." Be sure to connect the GND terminal to the ground.
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SAFETY SYMBOLS

For safety operation of the product, the following symbol marks are used in the Instruction Manual.

	WARNING	Improper operation of the system may result in death or severe injury of the operator.
	CAUTION	Improper operation of the system may result in injury of the operator and physical damage of the system.



WARNING

●Warning

Be sure to observe the safety precautions described in the WGA-910A Instruction Manual.

●Power Supply

To prevent a fire hazard, before connecting the power cable, be sure to check the local line voltage is matched with the operating voltage specified for the WGA-910A.

The power supply voltage is described in following.

AC100 V~240 V 50/60 Hz Power consumption : 20 VA or less

●Power Cable and Power Outlet

To prevent an electric shock or fire hazard, connect a power cable and 3P-2P conversion adapter to a plug with protective ground terminal.

When using 3P power cable, use a 3P power plug with protective ground terminal.

Operators must be cautioned that use of an extension power cable with no ground conductor disables the protective ground function.

Check the Instruction Manual in advance, connect the power cable to the WGA-910A and connect the power plug to an outlet.

●Protective Ground

To prevent an electric shock hazard, be sure to ensure protective ground before connecting the power cable.

When using the 3P-2P conversion adapter, be sure to ground the grounding wire of the adapter to the GND terminal.

When using a plastic 2P power cable, be sure to connect an optional grounding wire to the protective grounding terminal.

●For Electrical Operator Safety

To prevent an electric shock hazard, operators must be cautioned not to cut the protective grounding conductor or disconnect the GND terminal.

●Confirmation of Protective Ground

To prevent an electric shock hazard, be sure to check safe protective ground function before operating the WGA-910A. If any abnormal matters are found in the protective ground function, fuse holder, etc., do not operate the WGA-910A.

●External Connection

To prevent an electric shock hazard, ensure the safe protective ground of all concerned instrument and then, connect the WGA-910A to the measuring object and external devices, PC, etc.

●Fuse

Used for preventing a fire hazard.

If you want to replace fuses, contact KYOWA or our representatives.

●Inflammable Gaseous Environment

To prevent fire and explosion hazards, do not operate the WGA-910A where it is exposed to inflammable gases, inflammable vapors or inflammable dust.

●If Any Trouble Occurs

To prevent a fire hazard, if smoke is emitted from the WGA-910A, immediately disconnect the AC adaptor from the receptacle and stop using the WGA-910A.

●Maximum Input Voltage Range

The WGA-910A is a measuring instrument specified for strain gage transducers and strain gages. Do not input high voltage. Or, deteriorated performance and damage of the product may result.

●About built-in lithium battery

Do not short-circuit the battery terminals after disassembling. Or, it may cause an overheating and fire.

Never throw the battery into a fire or put it near a fire.

It may cause an overheating, fire, and explosion.

Do not charge the using battery since it is not rechargeable.

Or, it may explode.



CAUTION

●Caution

Be sure to observe the safety precautions described in the WGA-910A Instruction Manual.

●Do not use the product outdoors

Or, it may cause electric shock, fire hazard, lower the performance and cause troubles.

●Do not turn ON the power switch immediately after turning it OFF

After turning OFF the power switch, wait (5 seconds) until the power supply is shut OFF before turning ON the power switch again.

If the power is repeatedly turned ON and OFF within 5 seconds, rush current generated by switching the power ON may damage the product.

●Use the product within temperature ranging from -10 to +40 °C

Use at temperatures exceeding the specified range may lower the performance and cause trouble.

If use under direct sunlight or in a cold place is inevitable, prepare a sunscreen or take proper measures to keep it warm.

●Use the product in the specified operating humidity of 20 to 85 %

Use in a humid place exceeding the specified range or where it is exposed to splashing water may lower the performance and cause trouble.

●Do not use the product immediately after the change in the environment

Leave the product as it is until it becomes adaptable to the environment.

Abrupt change in ambient temperature due to transportation, etc. may cause dew condensation, which may result in lower performance and troubles.

●Use the product under environment without excessive vibration or high impact

Vibration resistance: 19.6 m/s² (2 G), 10 to 200 Hz (when in operation)

Use the product in an area where vibration and impact can be kept within the scope of specifications.

Continuous vibration or severe impact may cause deteriorated performance and system failure.

●Do not use the product in strong electromagnetic field

Use the product in a magnetic field environment where the PC may be used.

Performance may be lowered and erroneous operation and troubles may result if it is used near a telemetry system, microwave oven, electronic furnace or any other equipment generating a strong magnetic field.

●Do not use the product under poor conditions

Use a power source that is free from momentary power outages and noise.

Make sure that fluctuations in the power supply to the device do not exceed $\pm 10\%$ of the nominal voltage.

Operate the product within the range 50/60 Hz.

●Do not pull cords and cables

Lay cords and cables with a certain allowance so that unreasonable force is not applied to the connections.

Or, it may interrupt the measurements, break the cables, and damage the connectors.

●Avoid installing sensors and products near a welding machine

Failure to do so will pose the risk of erroneous data, malfunction and failure.

●Do not disassemble or remodel the product

Or, it may cause electric shock hazards or damage the product. This warranty does not cover any damaged or defective parts that results from disassembling or remodeling.

●Do not use or storage the product under dusty or fine particles or corrosive gas environment

Use or storage under these environment, may result in lower performance and troubles.

●Do not expose the product to the air if it is used and stored nearby sea

Air exposure nearby sea may cause lower performance and products failure.

●Take care when handling the CD-R

Do not expose the CD-R to direct sun light, high temperature, or high humidity.

Do not apply pressure to the CD-R by laying object or bending.

Dust, scratches, and fingerprints on either side of the CD-R can cause write errors.

●Preheat the product before use

After the power ON, always preheat the product for approximately 30 minutes.

●Cleaning

When the product gets dirty, clean the product with a dry soft cloth. When dust exists inside the WGA-910A, clean it by using an air blow gun. Do not touch electronic parts.

PRECAUTIONS ON CE MARKING

NOTE

When satisfying the following conditions, we evaluated the compatibility against the requirements of the EU Directives and confirmed that the product satisfied the requirements.

- To connect products, be sure to use the shielded D/A output cable, shielded BCD output cable and shielded RS-485 cable. Wiring should be 30 m or less.
- Before connecting the following cables, be sure to mount ferrite core near the terminal or connector.
 - D/A output cable
Recommended ferrite core E04SR301334 (SEIWA ELECTRIC MFG. CO., LTD.)
 - RS-485 cable
Recommended ferrite core E04SR301334 (SEIWA ELECTRIC MFG. CO., LTD.)
 - BCD output cable
Recommended ferrite core E04SR200932 (SEIWA ELECTRIC MFG. CO., LTD.)
- Be sure to mount the product on the control panel, etc. Before turning ON the power, make sure the product is covered to avoid contact with hands.
- The product connection should be executed by experts in electrical work.
- To immediately turn OFF the product, place switches or circuit breakers inside the building and near the product and display the functions as well.
Use switches and circuit breakers conforming to the IEC60947-1 and IEC60947-3.
- Use the product in area where elevation is 2000 m or below.
- When mounting the product in your system, approaches to satisfy the CE marking requirements vary with the configuration of the control panel to be used, the other devices to be connected, and wirings. Therefore, customers are required to check whether the CE marking requirements on the product are satisfied or not.
- Be sure to connect the protective grounding terminal to the ground by using the optional ground wire.

NOTATIONS USED IN THE INSTRUCTION MANUAL

The following notations are used in the Instruction Manual for convenience.

- Names described on the panel surface

Names described on the panel surface are expressed in double quotation mark " ".

- Informational notes

Certain notations are used as necessary to attract your attention to information that requires special care when handling the product, and to information provided for reference purposes.

Examples of Notations

NOTE

Essential precautions required when handling the product.

MEMO

Reference items required when handling the product.

IMPORTANT PRECAUTIONS WHEN USING WGA-910A AND OPTIONAL UNITS

NOTE

- The output signal (voltage/current) when the transducer cable is broken.
When the transducer cable is broken, the product may output the following output signal (voltage/current).
Therefore, take countermeasures to avoid the adverse effect, from the output signals, on the other measuring instruments.
 - D/A output and BCD D/A output
Voltage output: Approx. 11.2 V
Current output: Approx. 22.1 mA
- The output signal (voltage/current) and unbalance load
 - D/A output and BCD D/A output
Voltage output: The unbalance load should be 2k ohm or more.
Current output: The unbalance load should be 500 ohm or less.
- The communication
 - RS-485
RS-232C communication is not available.

1. BCD OUTPUT

1-1. OUTLINE OF PRODUCT

The WGA-910A-1 is an instrumentation amplifier with the BCD option. These products are able to retrieve the indicated values as the BCD data.

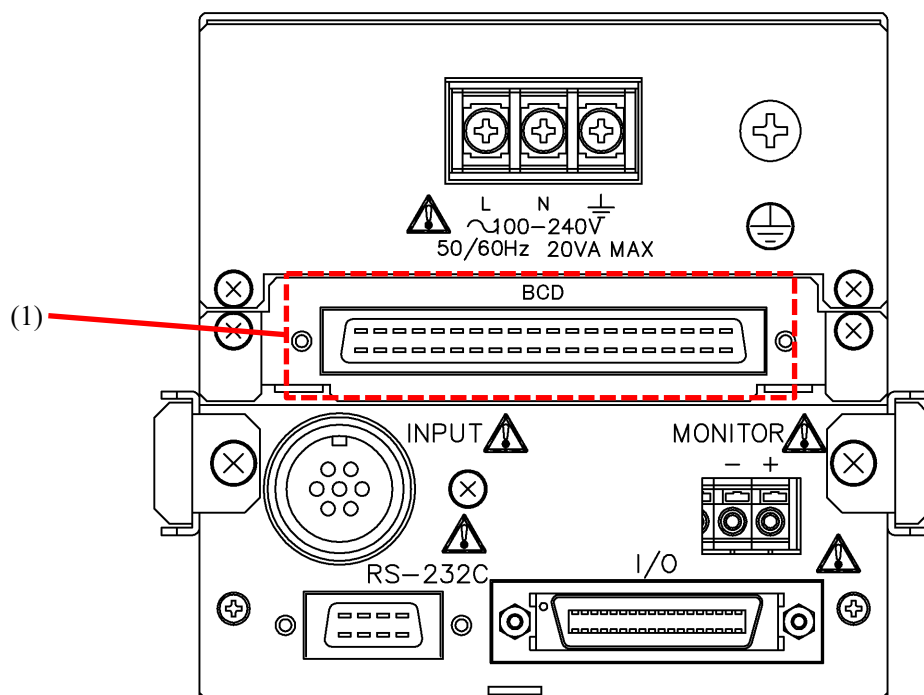
The product is able to control the PLC (sequencer), and be able to print data by using printers.

In addition, the input/output circuit is insulated from the WGA-910A circuit.

NOTE

Logic cannot be changed since the holding input and output prohibit input are fixed to the negative logic.

1-2. CONTROLS AND INDICATORS (REAR PANEL)



(1) BCD connector

Retrieves the indicated values as the BCD data.

Controlled by using various input signals and output signals.

1-3. BCD OUTPUT SPECIFICATIONS

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 (NPN)
 Max load capacity: 30 VDC, 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 (NPN) or Non-voltage contact signal
 Voltage 12 VDC and current 5 mA can be applied.

Setting Contents Transmission speed: Approx. 16, 32, 64, 125, 250, 500, and 1000 times / sec.
 Polarity logic, EOC logic, Data logic: Negative or positive logic
 Data form: BCD, Binary Changeable
 BCD Classification: Hold Value 1, Hold Value 2, Measured Value

1-4. PIN NUMBERS AND SIGNAL NAMES

Pin assignments of the BCD output are as follows.

Pin No.	Signal Name		Pin No.	Signal Name	
	BCD Output	Binary Output		BCD Output	Binary Output
A1	Data 1 Output	Data 2 ⁰ (1) Output	B1	Data 2 Output	Data 2 ¹ (2) Output
A2	Data 4 Output	Data 2 ² (3) Output	B2	Data 8 Output	Data 2 ³ (4) Output
A3	Data 10 Output	Data 2 ⁴ (5) Output	B3	Data 20 Output	Data 2 ⁵ (6) Output
A4	Data 40 Output	Data 2 ⁶ (7) Output	B4	Data 80 Output	Data 2 ⁷ (8) Output
A5	Data 100 Output	Data 2 ⁸ (9) Output	B5	Data 200 Output	Data 2 ⁹ (10) Output
A6	Data 400 Output	Data 2 ¹⁰ (11) Output	B6	Data 800 Output	Data 2 ¹¹ (12) Output
A7	Data 1000 Output	Data 2 ¹² (13) Output	B7	Data 2000 Output	Data 2 ¹³ (14) Output
A8	Data 4000 Output	Data 2 ¹⁴ (15) Output	B8	Data 8000 Output	Data 2 ¹⁵ (16) Output
A9	Data 100000 Output	Data 2 ¹⁶ (17) Output	B9	Data 20000 Output	Data 2 ¹⁷ (18) Output
A10	Data 400000 Output	Always OFF	B10	Data 80000 Output	Always OFF
A11	Minus (polarity) Output	Always OFF	B11	OVER	
A12	EOC (End Of Conversion) Output		B12	Holding Block Output	
A13	Detecting Block Output		B13	N.C	
A14	N.C		B14	N.C	
A15	N.C		B15	N.C	
A16	N.C		B16	N.C	
A17	BCD Holding Input		B17	BCD Output Prohibited Input	
A18	COM		B18	COM	
A19	N.C		B19	N.C	
A20	N.C		B20	N.C	

(Note 1): Holding Block Output (Pin No. B12)

When in holding block: Open collector output is ON (Low).

(Note 2): Detecting Block Output (Pin No. A13)

When in detecting block: Open collector output is ON (Low).

NOTE

The model and manufacture of connectors in BCD option is different from that of BCD connectors in BCD and D/A option (Model: WGA-910A-12).

1-5. CONNECTING BCD OUTPUT

Compatible connectors of the cable side are as follows when connecting the external device.

Compatible connector

Connector	Model: FCN-361J040-AU	Manufacture: FUJITSU COMPONENT LIMITED
Cover	Model: FCN-360C040-B	Manufacture: FUJITSU COMPONENT LIMITED

NOTE

The model and manufacture of connectors in BCD option is different from that of BCD connectors in BCD and D/A option (Model: WGA-910A-12).

1-6. SETTING BCD OUTPUT

(1) Transmission Speed

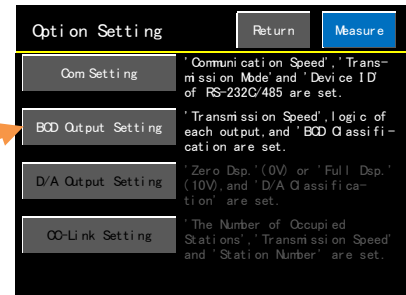
Sets the transmission speed of the BCD data output.

<Setting Range>

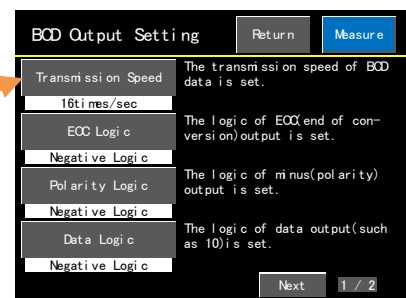
Approx. 16, 32, 64, 125, 250, 500, 1000 times/sec.

<How to operate>

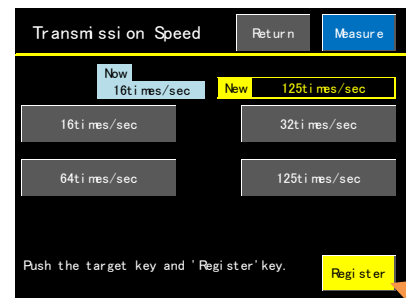
1) Press the **BCD Output Setting** key on the “Option Setting” window.



2) Press the **Transmission Speed** key on the “BCD Output Setting(1/2)” window.



3) Press the target key and **Register** key to register the target value.



(2) EOC Logic

Sets the logic of the EOC (end of conversion) output.

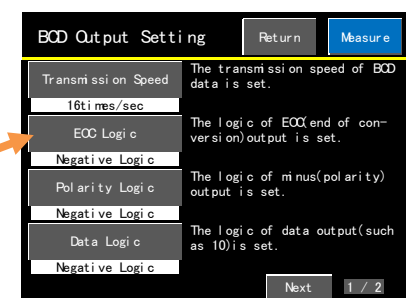
For the negative logic, the open collector output of the BCD output terminal is ON, for the positive logic, the output is OFF.

<Setting Range>

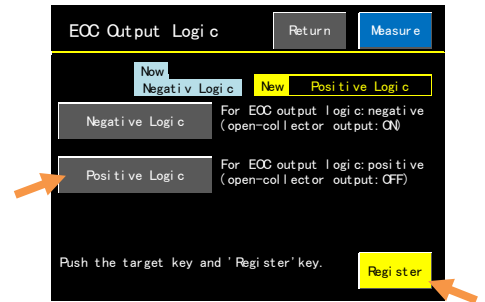
Negative logic / Positive logic

<How to operate>

1) Press the **EOC Logic** key on the “BCD Output Setting(1/2)” window.



2) Press the target key and **Register** key to register the target value.



(3) Polarity Logic

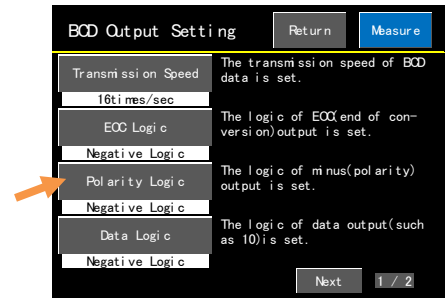
Sets the logic of the minus (polarity) output.

<Setting Range>

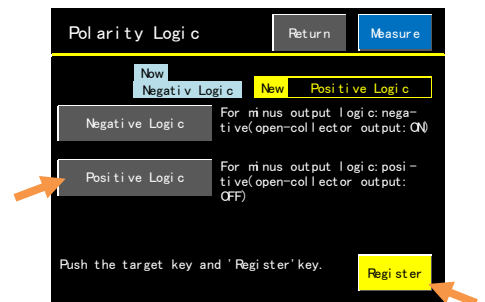
Negative logic / Positive logic

<How to operate>

1) Press the **Polarity Logic** key on the “BCD Output Setting(1/2)” window.



2) Press the target key and **Register** key to register the target value.



(4) Data Logic

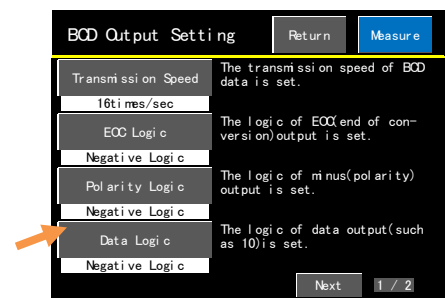
Sets the logic of the data output (10 etc).

<Setting Range>

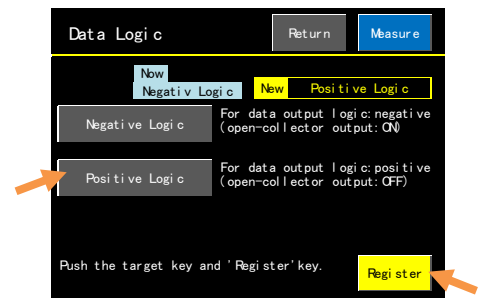
Negative logic / Positive logic

<How to operate>

1) Press the **Data Logic** key on the “BCD Output Setting(1/2)” window.



2) Press the target key and **Register** key to register the target value.



(5) Data Form

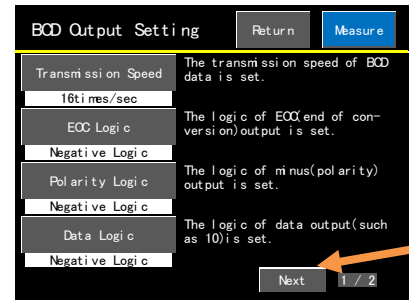
Sets to change BCD or binary for the type of outputted data.

<Setting Range>

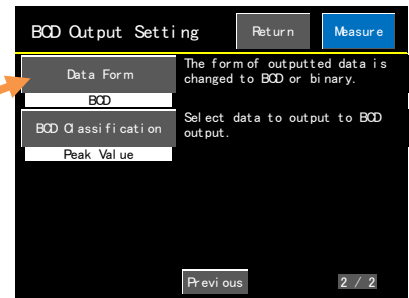
BCD / Binary

<How to operate>

1) Press the **Next** key on the “BCD Output Setting (1/2)” window.



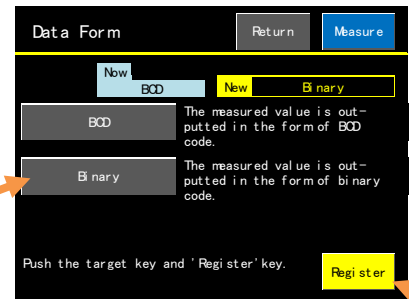
2) Press the **Data Form** key on the “BCD Output Setting(2/2)” window.



3) Press the target key and **Register** key to register the target value.

NOTE

The type of outputted binary data is offset binary.



Measured value	Binary data				
	18	16	12	8	4
99999	01	1000	0110	1001	1111
1	00	0000	0000	0000	0001
0	00	0000	0000	0000	0000
-1	11	1111	1111	1111	1111
-99999	10	0111	1001	0110	0001

←The left number shows the bit position.

(6) BCD Classification

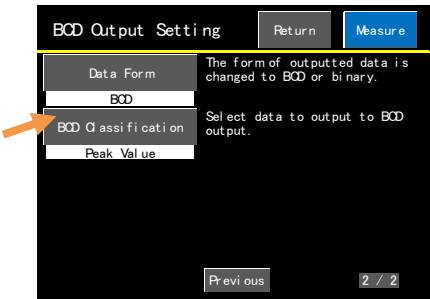
Outputs the target data to the BCD output.

<Setting Range>

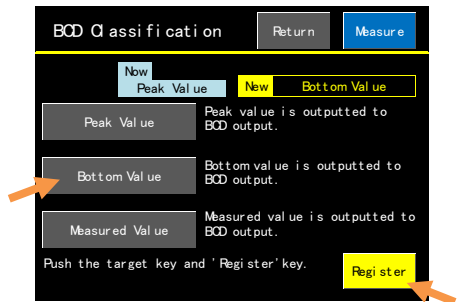
Hold Value 1, Hold Value 2 or Measured value (See next page for details)

<How to operate>

- 1) Press the **BCD Classification** key on the "BCD Output Setting (2/2)" window.



- 2) Press the **Register** key to register the target value.



< Setting Range of BCD Classification >

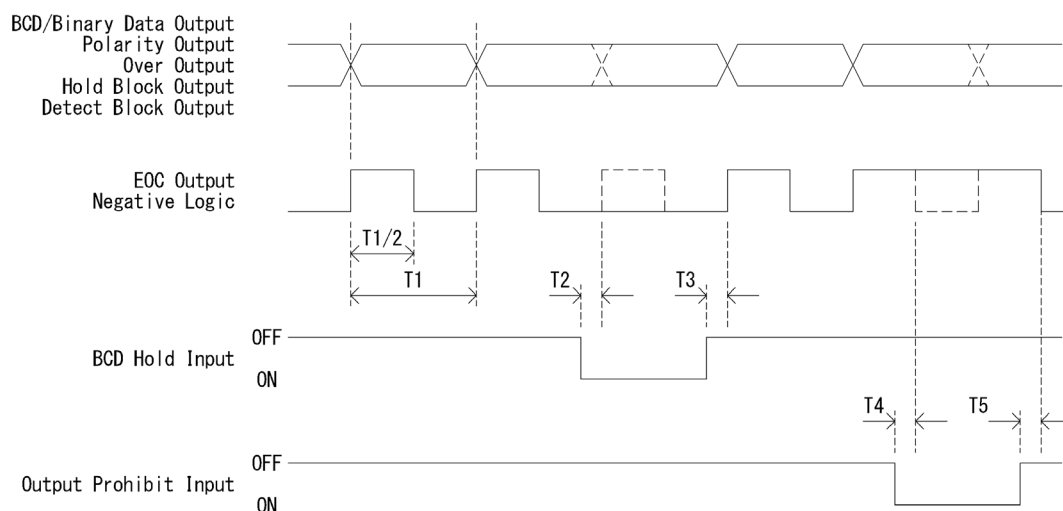
When you change the operation mode, the items (screen) that can be set change.

Items are as follows.

Mode name	Notation of setting screen	Hold Value 1	Hold Value 2	Measured Value
Normal	Normal	—	—	—
Peak hold	Peak Hold	Holding Value (Peak)	—	Measured Value
Block Peak hold	Block Peak	Holding Value (Peak)	—	Measured Value
Time Peak hold	Time Peak	Holding Value (Peak)	—	Measured Value
Bottom Hold	Bottom Hold	Holding Value (Bottom)	—	Measured Value
Block Bottom Hold	Block Bottom	Holding Value (Bottom)	—	Measured Value
Time Bottom Hold	Time Bottom	Holding Value (Bottom)	—	Measured Value
Arbitrary Hold	Arbitrary Hold	Holding Value (Arbitrary)	—	Measured Value
Block Peak Bottom Hold	Block Peak Bottom	Peak Value	Bottom Value	Measured Value
Time Peak Bottom Hold	Time Peak Bottom	Peak Value	Bottom Value	Measured Value
Block Average Measurement	Block Average	Holding Value (Average)		Measured Value
Time Average Measurement	Time Average	Holding Value (Average)	—	Measured Value
Block Inflection Hold	Block Inflection	Inflection Point	—	Measured Value
Time Inflection Hold	Time Inflection	Inflection Point	—	Measured Value
Block Maximal / minimal Hold	Block Max/min	Maximal Value	minimal Value	Measured Value
Time Maximal / minimal Hold	Time Max/min	Maximal Value	minimal Value	Measured Value
Block Peak / Average Hold	Block Peak/Avg.	Peak Value	Average Value	Measured Value
Time Peak / Average Hold	Time Peak/Avg.	Peak Value	Average Value	Measured Value
Block Bottom / Average Hold	Block Peak/Avg.	Bottom Value	Average Value	Measured Value
Time Bottom / Average Hold	Time Peak/Avg.	Bottom Value	Average Value	Measured Value
Block Peak / Arbitrary Hold	Block Peak/Arb.	Peak Value	Arbitrary Value	Measured Value
Time Peak / Arbitrary Hold	Time Peak/Arb.	Peak Value	Arbitrary Value	Measured Value
Block bottom / Arbitrary Hold	Block Bottom/Arb.	Bottom Value	Arbitrary Value	Measured Value
Time bottom / Arbitrary Hold	Time Bottom/Arb.	Bottom Value	Arbitrary Value	Measured Value
Previous Value Comparison Peak Hold	Pre.Comp.Peak	Peak Value	Pre. Value Difference	Measured Value
Block Previous Value Comparison Peak Hold	Block Pre.Comp.P.	Peak Value	Pre. Value Difference	Measured Value
Time Previous Value Comparison Peak Hold	Time Pre.Comp.P.	Peak Value	Pre. Value Difference	Measured Value
Previous Value Comparison Bottom Hold	Pre.Comp.Bottom	Bottom Value	Pre. Value Difference	Measured Value
Block Previous Value Comparison Bottom Hold	Block Pre.Comp.B.	Bottom Value	Pre. Value Difference	Measured Value
Time Previous Value Comparison Bottom Hold	Time Pre.Comp.B.	Bottom Value	Pre. Value Difference	Measured Value

1-7. BCD SIGNAL TIMING

The operation timing is as follows.



Delay time

(Delay time between input and BCD output)

= (Delay time between input and D/A output) + (BCD conversion time)

Delay time between input and D/A output : Max. 3 msec (Analog Filter: none, Moving Average: none)

BCD conversion time: Max. 0.5 msec (The number of outputs: 1000 times/sec)

(1) OVER signals

Outputs the OVER signals when the value exceeds the input range or display range. (The OFL1, OFL2, OFL3, or OFL4 appears.)

The BCD output at this time is the value, immediately before detecting the exceeding value.

(2) POL (negative polarity) signals

Outputs the POL signal when the indicated value is negative (-).

(3) BCD OUTPUT-prohibited signals

When the OUTPUT-prohibited signal is "L (ON)", the transistor outputs are all OFF.

To connect multiple BCD outputs or to select the target channels, use the BCD OUTPUT-prohibited signals.

T1: Data output and EOC signal output time

The number of BCD output (times/sec)	T1 (msec)
Approx. 1000	Approx. 1
Approx. 500	Approx. 2
Approx. 250	Approx. 4
Approx. 125	Approx. 8
Approx. 62.5	Approx. 16
Approx. 31.3	Approx. 32
Approx. 15.6	Approx. 64

T2, T3: 1 msec (min)

Relationship between the EOC signals and DATA HOLDING signals.

Loads the DATA HOLDING signals when the EOC signal is turned ON.

When the DATA HOLDING signal is ON, the product does not output data and does not output EOC signals.

T4, T5: 1 msec (min)

Relationship between the EOC signals and OUTPUT-prohibited signals.

Loads the OUTPUT-prohibited signals when the EOC signal is turned OFF.

When the OUTPUT-prohibited signal is "L (ON)", the data transistor outputs are all OFF. The product does not output EOC signals.

NOTE

- The “Holding Input” does not hold the indicating values.
- The BCD data output and binary data output do not output decimal points.
- When the OUTPUT-prohibited signal is "L (ON)", the transistor outputs are all OFF.
- To load the each data within T1/2 (msec) from the falling edge ("H" → "L").
- To load data after holding the BCD data, make sure the DATA HOLDING signal is "L (ON)." Then load the data 5 msec or later. The BCD data does not vary when the DATA HOLDING signal is "L (ON)."

MEMO

- While setting the BCD data output and binary data output, the BCD data output and binary data output hold the values immediately before the setting.
- To load the multiple BCD data outputs connected in parallel successively, control the OUTPUT-prohibited signal.
- The BCD data output COM and binary data output COM are connected to the control input COM of the WGA-910A.
- When the indicating value is in the detecting block or holding block, as the WGA-910A outputs the BCD data or binary data, the “Detecting Block Output” or “Holding Block Output” becomes ON.

2. D/A OUTPUT

2-1. OUTLINE OF PRODUCT

The WGA-910A-2 is an instrumentation amplifier with the D/A output option. These products are able to convert the measured values into analog signals and output them.

Convenient for processing such as recording, etc. by connecting the oscilloscope or AD board for the PC, etc.

Set the measured value (zero display) of 0 V or 4 mA output and measured value (full display) of 10 V or 20 mA output for the analog (D/A) output to work with the measured value.

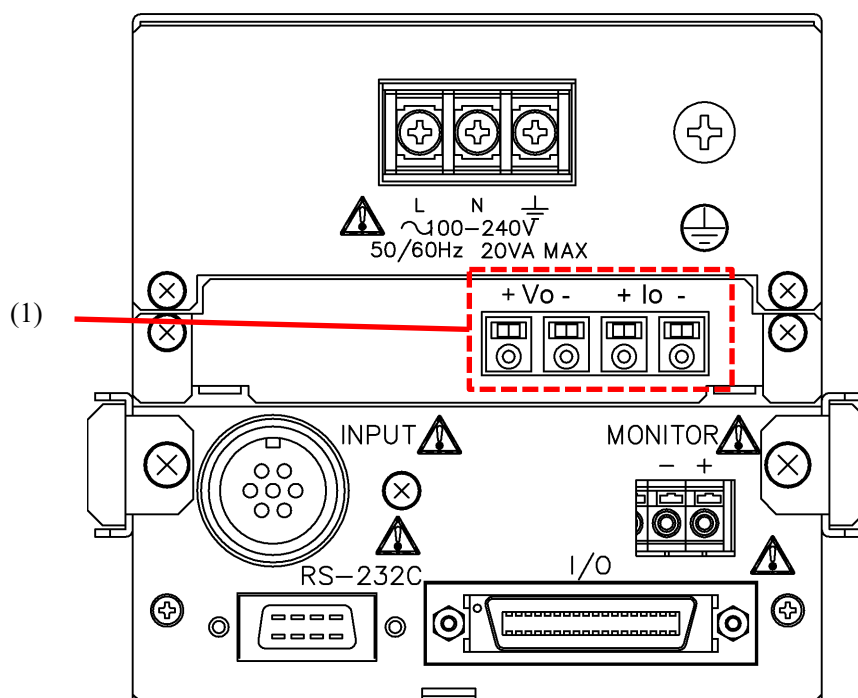
In addition, the output circuit is insulated from the WGA-910A main circuit and the resolution is 14-bit or equivalent to -10 to +10 V and 4 to 20 mA.

Conversion speed is 4000 times/sec.

NOTE

The current output 4 to 20 mA is fixed to the voltage output 0 to 10 V.

2-2. CONTROLS AND INDICATORS (REAR PANEL)



- (1) D/A output terminal block Converts the measured values into analog signals and outputs them.
Vo: Voltage output
Io: Current output

2-3. D/A OUTPUT SPECIFICATIONS

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	250 VAC for 1 minute (output voltage and output current are non-insulated)
Conversion Speed.....	4000 times/sec
Nonlinearity.....	±0.1 %FS
Setting contents	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	Hold Value 1, Hold Value 2, Measured Value
Delay time between input and	Max. 3 msec(Analog Filter: none , Moving Average: none)
D/A output :	

2-4. TERMINAL NAMES AND SIGNAL NAMES

Terminal names (the following terminal names are described in order from left to right seeing from the back) and signal names of the D/A output terminals are as follows.

Terminal Name	Signal Name
Vo +	+ side of the voltage output (±10 V)
Vo -	- side of the voltage output
Io +	+ side of the current output (4 to 20 mA)
Io -	- side of the current output

2-5. CONNECTING D/A OUTPUT

Load resistance should be set as follows for connecting the external device.

Voltage Output: 2 kohm or more

Current Output: 500 ohm or less

<How to connect>

1) Peel off a jacket of a connecting wire approx. 10 mm and twist the tip of the wire for not to loosen.

Available wire range is

Single wire: ϕ 0.4 mm (AWG26) to ϕ 1.0 mm (AWG18),

Twist wire: 0.3 mm² (AWG22) to 0.75 mm² (AWG20).

2) Press the upper button hard with a slotted screwdriver.

Use the slotted screwdriver with blade diameter 3 mm and width of blade edge 2.6 mm (precision screwdriver, etc).

3) Carefully insert the twisted wire to the lower hole.

4) Release the slotted screwdriver from the upper button and lightly pull the cable to check that the cable is securely clamped.

NOTE

- For connecting more than 1-m long cable, use a twisted cable.
- For connecting more than 3-m long cable, use a 2-conductor shielded cable and always ground the shielded cable to the ground terminal.
- In addition, for connecting more than 30-m long cable or using outdoors, take special countermeasures against noise.
- Do not pre-solder the wires or connect soldless terminals.
- Before connecting cables, be sure to turn OFF the power.
- Before connecting multiple wires, be sure to twist them together in advance.
After twisting, make sure the wires satisfy the wire range.

2-6. D/A OUTPUT SET

2-6-1. D/A Display

Sets the measured value (zero display) of 0 V or 4 mA output and the measured value (full display) of 10 V or 20 mA output.

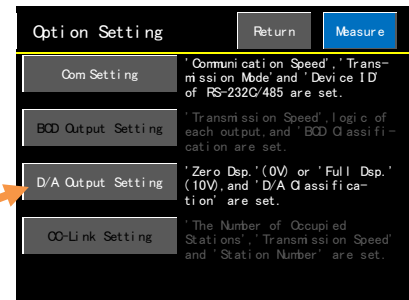
<Setting Range>

Zero Dsp. (Zero Display): -99999 to 99999

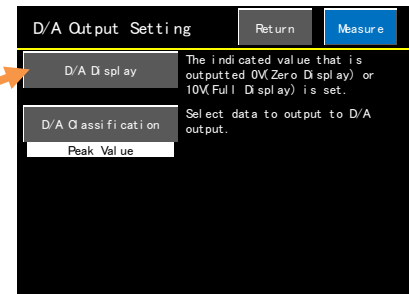
Full Dsp. (Full Display): -99999 to 99999

<How to operate>

1) Press the **D/A Output Setting** key on the “**Option Setting**” window.

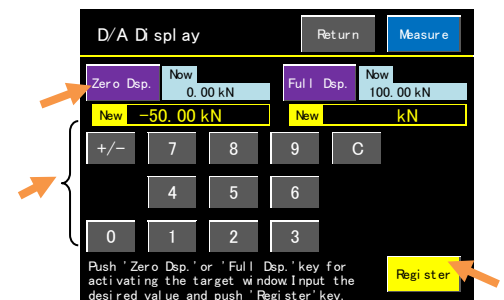


2) Press the **D/A Display** key on the “**D/A Output Setting**” window.



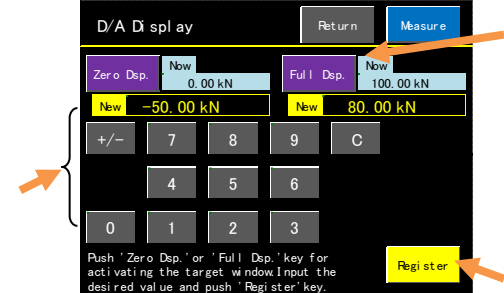
3) After pressing the **Zero Dsp.** key, input a setting value with the numerical keyboard.

Press the **Register** key for registering.



4) After pressing the **Full Dsp.** key, input a setting value with the numerical keyboard.

Press the **Register** key for registering.



NOTE

Be sure to set the ZERO display < Full display.
Or, the correct voltage and correct output are not output.

2-6-2. D/A Classification

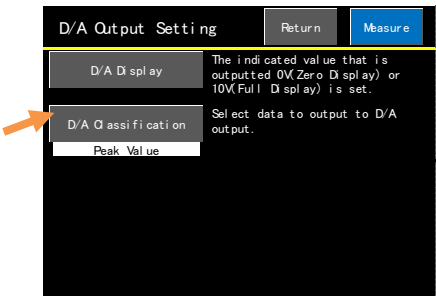
Outputs the target data to the D/A output.

<Setting Range>

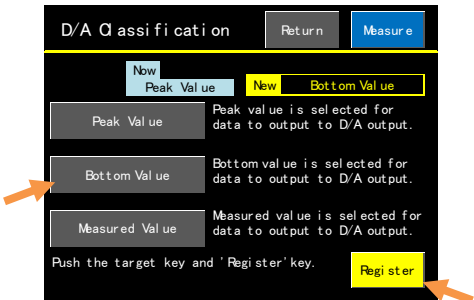
Hold Value 1, Hold Value 2 or Measured value (See next page for details)

<How to operate>

- 1) Press the **D/A Classification** key on the "D/A Output Setting" window.



- 2) Press the **Register** key to register the target value.



< Setting Range of D/A Classification >

When you change the operation mode, the items (screen) that can be set change.

Items are as follows.

Mode name	Notation of setting screen	Hold Value 1	Hold Value 2	Measured Value
Normal	Normal	—	—	—
Peak hold	Peak Hold	Holding Value (Peak)	—	Measured Value
Block Peak hold	Block Peak	Holding Value (Peak)	—	Measured Value
Time Peak hold	Time Peak	Holding Value (Peak)	—	Measured Value
Bottom Hold	Bottom Hold	Holding Value (Bottom)	—	Measured Value
Block Bottom Hold	Block Bottom	Holding Value (Bottom)	—	Measured Value
Time Bottom Hold	Time Bottom	Holding Value (Bottom)	—	Measured Value
Arbitrary Hold	Arbitrary Hold	Holding Value (Arbitrary)	—	Measured Value
Block Peak Bottom Hold	Block Peak Bottom	Peak Value	Bottom Value	Measured Value
Time Peak Bottom Hold	Time Peak Bottom	Peak Value	Bottom Value	Measured Value
Block Average Measurement	Block Average	Holding Value (Average)		Measured Value
Time Average Measurement	Time Average	Holding Value (Average)	—	Measured Value
Block Inflection Hold	Block Inflection	Inflection Point	—	Measured Value
Time Inflection Hold	Time Inflection	Inflection Point	—	Measured Value
Block Maximal / minimal Hold	Block Max/min	Maximal Value	minimal Value	Measured Value
Time Maximal / minimal Hold	Time Max/min	Maximal Value	minimal Value	Measured Value
Block Peak / Average Hold	Block Peak/Avg.	Peak Value	Average Value	Measured Value
Time Peak / Average Hold	Time Peak/Avg.	Peak Value	Average Value	Measured Value
Block Bottom / Average Hold	Block Peak/Avg.	Bottom Value	Average Value	Measured Value
Time Bottom / Average Hold	Time Peak/Avg.	Bottom Value	Average Value	Measured Value
Block Peak / Arbitrary Hold	Block Peak/Arb.	Peak Value	Arbitrary Value	Measured Value
Time Peak / Arbitrary Hold	Time Peak/Arb.	Peak Value	Arbitrary Value	Measured Value
Block bottom / Arbitrary Hold	Block Bottom/Arb.	Bottom Value	Arbitrary Value	Measured Value
Time bottom / Arbitrary Hold	Time Bottom/Arb.	Bottom Value	Arbitrary Value	Measured Value
Previous Value Comparison Peak Hold	Pre.Comp.Peak	Peak Value	Pre. Value Difference	Measured Value
Block Previous Value Comparison Peak Hold	Block Pre.Comp.P.	Peak Value	Pre. Value Difference	Measured Value
Time Previous Value Comparison Peak Hold	Time Pre.Comp.P.	Peak Value	Pre. Value Difference	Measured Value
Previous Value Comparison Bottom Hold	Pre.Comp.Bottom	Bottom Value	Pre. Value Difference	Measured Value
Block Previous Value Comparison Bottom Hold	Block Pre.Comp.B.	Bottom Value	Pre. Value Difference	Measured Value
Time Previous Value Comparison Bottom Hold	Time Pre.Comp.B.	Bottom Value	Pre. Value Difference	Measured Value

3. RS-485 OPTIONS

3-1. OUTLINE OF PRODUCT

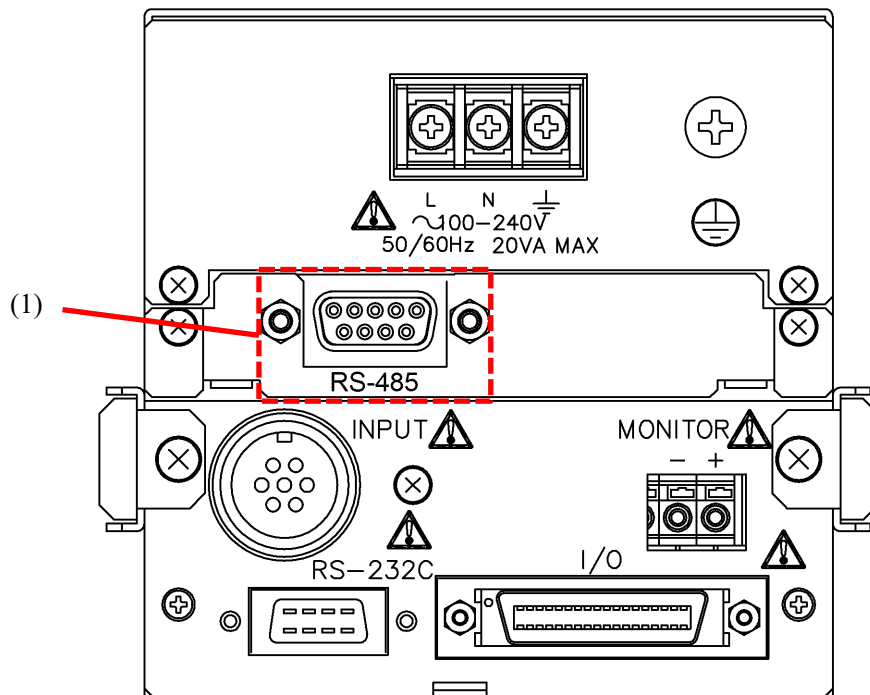
The WGA-910A-3 is instrumentation amplifier with the RS-485 option. These products are able to set various functions and read measured values by using external devices.

These products are able to connect multiple WGA-910A-3 units on the RS-485 network and able to control them.

NOTE

The RS-232C of the standard equipment is invalid and the RS-485 is valid when equipping the optional RS-485. Other than above, the RS-232C is functioned.

3-2. CONTROLS AND INDICATORS (REAR PANEL)



- (1) RS-485 connector Sets various functions and reads measured values by using external devices (PC, etc.).

3-3. RS-485 SPECIFICATIONS

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
Delay time between input and RS-485 output	Max. 30 msec

3-4. CONNECTOR PIN NUMBERS AND SIGNAL NAMES

Pin No.	Signal Name
1	+ (Noninverting)
2	+ (Noninverting)
3	— (Noninverting)
4	— (Noninverting)
5	SG
6	TERMINATOR
7	N.C.
8	N.C.
9	TERMINATOR

3-5. CONNECTING TO EXTERNAL DEVICE

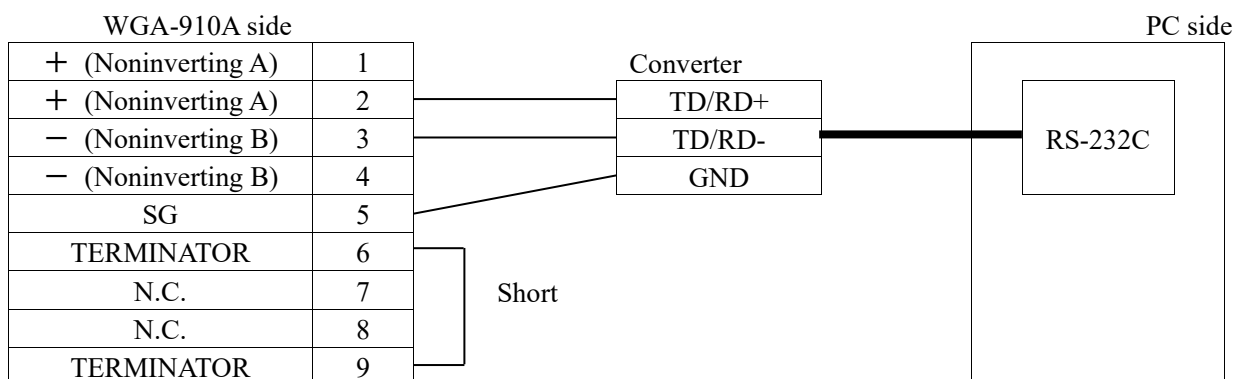
Compatible connectors of the cable side are as follows when connecting the external device.

Compatible connector

Connector	Model: XM3D-0921	Manufacture: OMRON Corporation
Cover	Model: XM2S-0913	Manufacture: OMRON Corporation

1) Connection Cable

- For connecting external devices to the PC, use the RS-485 ↔ RS-232C converter.
- Pin No. 1 and 2 as well as pin No. 3 and 4 are provided with the same functions to be used for by wiring.
- It is required to attach a terminating resistor to a device connected at the end of the transmission line.
Short-circuit connector pin No. 6 and 9. Then, terminating resistor (120 ohm) attached state is obtained.
- Set the converter switch of the RS-485 ↔ RS-232C to DTE.



NOTE

Turn OFF the both WGA-910A and external device before connecting a cable.
Or, the WGA-910A may not function correctly or cause damage

2) Setting the external device

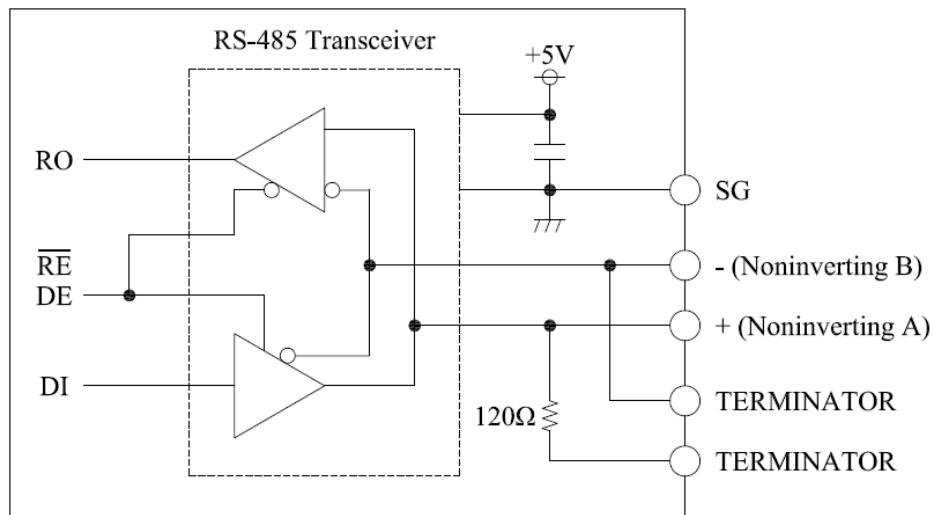
Set external devices by conforming to signal specifications of the WGA-910A.

RS-485 transceiver of the WGA-910A is provided with fail safe function that is designed to have the CPU output (RO) becomes 1 (Hi) when signal is received and when between [+ (noninverting A)] and [- (noninverting B)] is short-circuited or in float state.

In addition, when the WGA-910A is waiting to receive the signal, between A and B becomes nearly short-circuited. And if transceiver of the external device does not have fail safe function, the output of the CPU side may not become (Hi).

As a result, data transmitted from the WGA-910A may not be properly received. Therefore, it is recommended to use the transceiver with the fail safe function.

The WGA-910A side: RS-485 circuit



Logical Table

[Sending]

INPUT			OUTPUT	
/RE	DE	DI	B	A
0	1	1	0	1
0	1	0	1	0
X	0	X	Hi-Z	Hi-Z

[Receiving]

INPUT		A-B	OUTPUT
/RE	DE		RO
0	0	$\geq 200 \text{ mV}$	1
0	0	$\leq -200 \text{ mV}$	0
0	0	OPEN	1
0	0	SHORT	1

3-6. COMMUNICATION PROCEDURES

1) Establishing communication

Since the RS-485 is in a “one-to n” communication system, the RS-485 communication is established by specifying the ID.

Use binary code available software and input the following command.

Communication establishing command

<ENQ>01<CR>

└── Device ID (Specified with 2 digits.)

After establishing the communication, the following response is received.

<ACK>01<CR><LF>

└── Device ID

MEMO

No response is received with different device ID.

2) Entering command

After establishing the communication, input the required command by referring to “Table of Control Commands.”

MEMO

No response is received to this end command.

3) End of transmission

Input the following command to end the communication.

<EOT><CR>

If a different ID is specified without opening the communication, the new communication is established with the newly specified ID.

4) Command interval

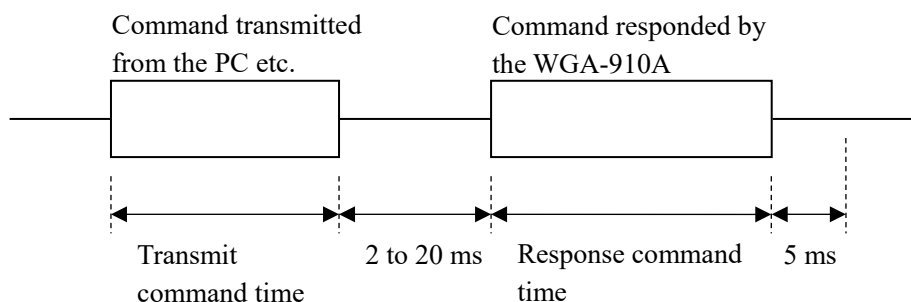
When a command is transmitted from the PC, PLC, etc., set command transmit interval to a time more than that obtained by the following expression. (Excluding calibration and setting commands.)

Command Interval = Transmit command time + 20 ms + Response command time + 5 ms

where: Transmit command time: Send character transmit time with the preset baud rate.

Response command time: Response character transmit time with the preset baud rate.

Initial value of the baud rate: The recommended command interval of the measured value output command [GDT1] is 50 ms or more in 9600 bps.



3-7. CONTROL COMMAND

The following is an explanation of the formats and kinds of control commands which are output to the WGA-910A from external equipment such as PC.

Sets the control command that is output from the external device to WGA-910A.

(1) Outline of the control command

1) Control command code

- Control command conforms to ASCII code (3 capital letters).
- According to the command characteristic, some control commands are suffixed by parameters.
- A termination code is added to the end of a control command.

Different termination codes are used as follows.

<CR>: Command output to the WGA-910A.

<CR><LF>: Data output from the WGA-910A.

- If an unrecognizable command or number is input and if the decimal point position of the calibration value is incorrectly input, the character string of that command is returned in the following format.

W□□□□□? <CR><LF>

- If an error happened when writing the setting value to the EEPROM, the following format is returned.
ng<CR><LF>

2) About delimiters

- Added to the end of the control command.
- Different delimiters are used as follows.

<CR>: Command output from the external equipment to the WGA-910A.

<CR><LF>: Data output from the WGA-910A to the external equipment.

3-7-1. Table of Control Commands

The control commands are the same as the RS-232C.

For the control commands, see “8. RS-232C COMMUNICATION” in the WGA-910A INSTRUMENTATION AMPLIFIER INSTRUCTION MANUAL.

This section describes the control commands used in the RS-485 only.

Kinds	Contents	Command
Binary Code (RS-485 only)	[1] Establishing the communication.	<ENQ>
	[2] Ending the communication.	<EOT>

3-7-2. Details of Control Commands

[1] Establishing the communication

Format:	<ENQ>xx<CR> └───┘ Device ID (Specified with 2-digit)
Return value format:	<ACK>xx<CR> └───┘ Device ID (No response is received with different device IDs.)
Description and others	For terminal software, enter Ctrl + E 0 1 . (Device ID: 01)

[2] End of transmission

Format:	<EOT><CR>
Return value format:	None
Description and others	For terminal software, enter Ctrl + D .

3-8 OPERATION AND FUNCTION OF THE COM. SETTING (COMMUNICATION SETTING)

(1) Communication Speed

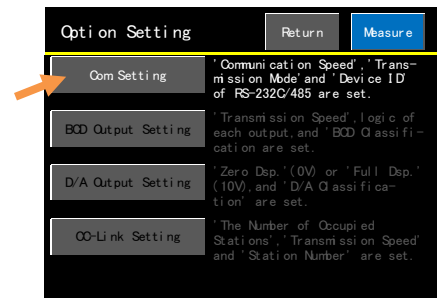
Sets the communication speed (baud rate) of the RS-485.

<Setting Range>

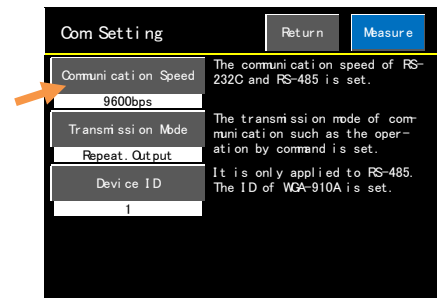
2400, 4800, 9600, 19200 (bps)

<How to operate>

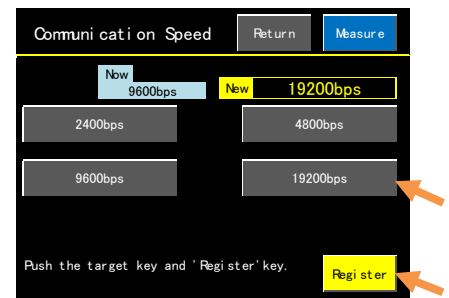
1) Press the **Com. Setting** key on the “**Option Setting**” window.



2) Press the **Communication Speed** key on the “**Com. Setting**” window.



3) Press the target key and **Register** key to register the target value.



(2) Transmission Mode

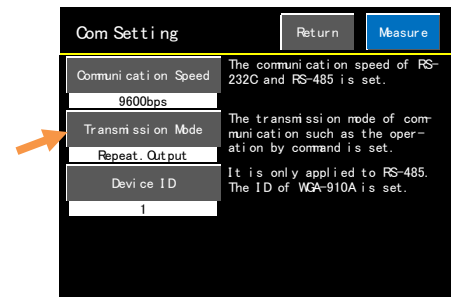
Sets the transmission mode of the communication such as the measured value, sending method of the status, operation by the command, etc.

<Setting Range>

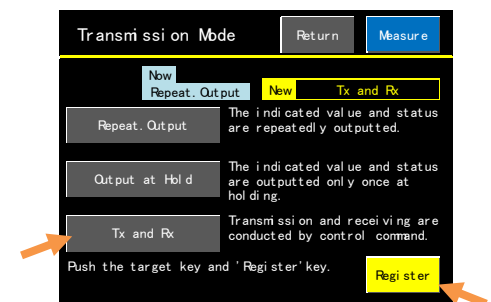
Repeat Output	Continuously outputs the measured value and status (such as the HH comparator is ON, etc).
Output at Hold	Outputs the measured value and status once during the holding time.
Tx and Rx	Sends and receives the data with the control command.

<How to operate>

1) Press the **Transmission Mode** key on the “Com. Setting” window.



2) Press the target key and **Register** key to register the target value.



(3) Device ID

Sets the ID of the WGA-910A.

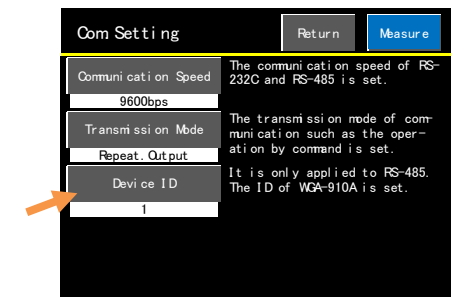
The **Device ID** key is displayed in gray when the optional RS-485 is not equipped.

<Setting Range>

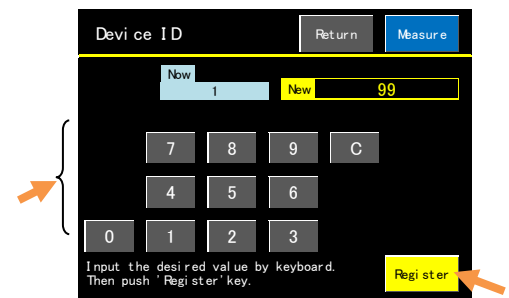
1 to 99

<How to operate>

1) Press the **Device ID** key on the “Com. Setting” window.



2) Input a setting value with the numeric keyboard and press the **Register** key to register the setting value.

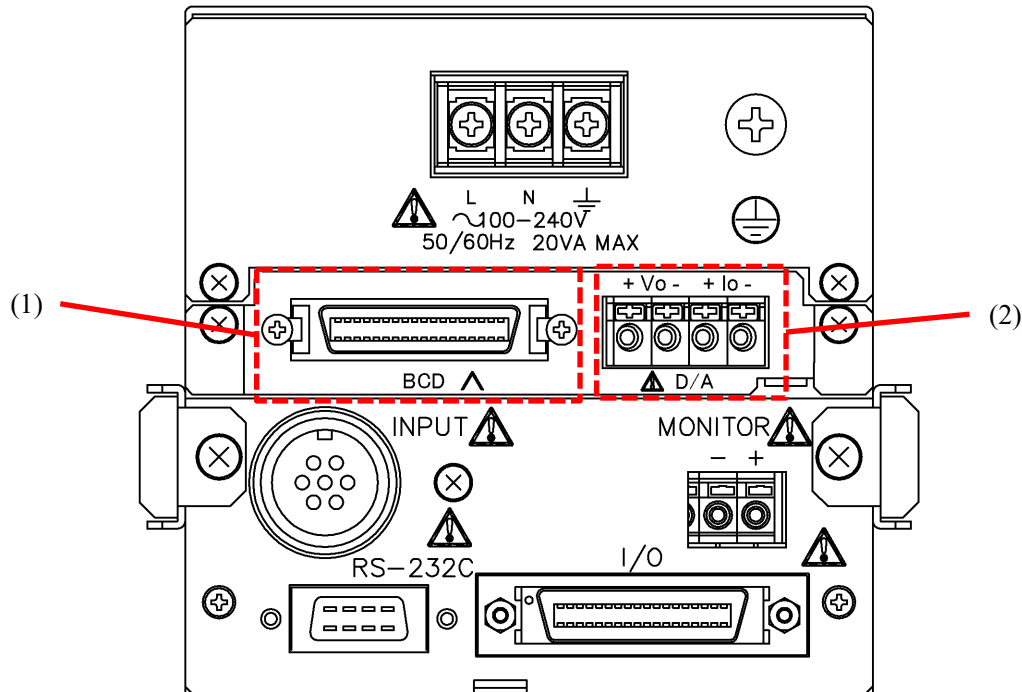


4. BCD and D/A OUTPUT SETTING

4-1. OUTLINE OF PRODUCT

The measured value can be acquired as BCD or binary coded data, and the measured value output converted to the analog signal can be taken out simultaneously by the optional BCD and D/A output.

4-2. CONTROLS AND INDICATORS (REAR PANEL)



(1) BCD connector

Retrieves the indicated values as the BCD data.

Controlled by using various input signals and output signals.

(2) D/A output terminal block

Converts the measured values into analog signals and outputs them.

V_O: Voltage output

I_O: Current output

4-3. BCD AND D/A OUTPUT SPECIFICATIONS

4-3-1. BCD / Binary output

Output BCD data: 20 bit (4-bit ×5-digit)
Binary data: 18 bit (offset binary)
Minus code: 1 bit
Over: 1 bit
EOC (End Of Conversion): 1 bit
Output format: Open-collector (NPN)
Capacity: 30 VDC, 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 (NPN) or Non-voltage contact signal
Voltage 12 VDC and current 5 mA can be applied.

Setting contents Transmission speed: Approx. 16, 32, 64, 125, 250, 500 and 1000 times / sec.
Polarity logic, EOC logic, Data logic: Negative or positive logic
Data type: BCD, Binary Changeable
BCD Classification: Hold Value 1, Hold Value 2, Measured Value

4-3-2. 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..... 250 VAC for 1 minute (output voltage and output current are non-insulated)

Conversion Speed..... 2000 times/sec

Nonlinearity..... Within±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: Hold Value 1, Hold Value 2, Measured Value

4-4. OUTLINE OF BCD / BINARY OUTPUT

The setting contents of BCD / binary output by the optional BCD and D/A output is the same as that of the optional BCD output. (Refer to “1-6. BCD Output Set.”)

4-5. PIN NUMBERS AND SIGNAL NAMES OF THE BCD OUTPUT TERMINAL

Pin assignments of the BCD output are as follows.

Pin No.	Signal Name		Pin No.	Signal Name	
	BCD Output	Binary Output		BCD Output	Binary Output
1	Data 1 Output	Data 2 ⁰ (1) Output	19	Data 2 Output	Data 2 ¹ (2) Output
2	Data 4 Output	Data 2 ² (3) Output	20	Data 8 Output	Data 2 ³ (4) Output
3	Data 10 Output	Data 2 ⁴ (5) Output	21	Data 20 Output	Data 2 ⁵ (6) Output
4	Data 40 Output	Data 2 ⁶ (7) Output	22	Data 80 Output	Data 2 ⁷ (8) Output
5	Data 100 Output	Data 2 ⁸ (9) Output	23	Data 200 Output	Data 2 ⁹ (10) Output
6	Data 400 Output	Data 2 ¹⁰ (11) Output	24	Data 800 Output	Data 2 ¹¹ (12) Output
7	Data 1000 Output	Data 2 ¹² (13) Output	25	Data 2000 Output	Data 2 ¹³ (14) Output
8	Data 4000 Output	Data 2 ¹⁴ (15) Output	26	Data 8000 Output	Data 2 ¹⁵ (16) Output
9	Data 10000 Output	Data 2 ¹⁶ (17) Output	27	Data 20000 Output	Data 2 ¹⁷ (18) Output
10	Data 40000 Output	Always OFF	28	Data 80000 Output	Always OFF
11	Minus (polarity) Output	Always OFF	29	OVER Output	
12	EOC (End Of Conversion) Output		30	Holding Block Output	
13	Detecting Block Output		31	N.C	
14	N.C		32	N.C	
15	N.C		33	N.C	
16	N.C		34	N.C	
17	BCD Holding Input		35	BCD Output Prohibited Input	
18	COM		36	COM	

(Note 1): Holding Block Output (Pin No. 30)

When in holding block: Open collector output is ON (Low).

(Note 2): Detecting Block Output (Pin No. 13)

When in detecting block: Open collector output is ON (Low).

4-6. CONNECTING BCD OUTPUT

Compatible connectors of the cable side are as follows when connecting the external device.

Compatible connector

Connector	Model: 10136-3000PE	Manufacture: Sumitomo 3M Limited
Cover	Model: 10336-52F0-008	Manufacture: Sumitomo 3M Limited

NOTE

The model and manufacture of connectors in BCD and D/A option is different from that of connectors in BCD option (Model: WGA-910A-1).

4-7. OUTLINE OF D/A OUTPUT

The setting contents of D/A output of the optional BCD and D/A output is the same as that of the optional D/A output. (Refer to “2-6. D/A Output Set.”)

In addition, the output circuit is insulated from the WGA-910A main circuit and the resolution is 14 bits equivalent. (Output range: -10 to +10 V, 4 to 20 mA)

Conversion speed is 2000 times/sec.

NOTE

Conversion speed of the optional BCD and D/A is half as much as that of the optional D/A (model: WGA-910A-2).

4-8. TERMINAL NAMES AND SIGNAL NAMES OF THE D/A OUTPUT TERMINAL

Terminal names (the following terminal names are described in order from left to right seeing from the back) and signal names of the D/A output terminals are as follows.

Terminal Name	Signal Name
Vo+	+ side of the voltage output (± 10 V)
Vo-	- side of the voltage output
Io+	+ side of the current output (4 to 20 mA)
Io-	- side of the current output

4-9. CONNECTING D/A OUTPUT

Load resistance should be set as follows for connecting the external device.

Voltage Output: 2 kohm or more

Current Output: 500 ohm or less

<How to connect>

1) Peel off a jacket of a connecting wire approx. 10 mm and twist the tip of the wire for not to loosen.

Available wire range is

Single wire: $\phi 0.4$ mm (AWG26) to $\phi 1.2$ mm (AWG16),

Twist wire: 0.2 mm^2 (AWG24) to 1.25 mm^2 (AWG16).

2) Press the upper button hard with a slotted screwdriver.

Use the slotted screwdriver with blade diameter 3 mm and width of blade edge 2.6 mm (precision screwdriver, etc).

3) Carefully insert the twisted wire to the lower hole.

4) Release the slotted screwdriver from the upper button and lightly pull the cable to check that the cable is securely clamped.

NOTE

- For connecting more than 1-m long cable, use a twisted cable.
- For connecting more than 3-m long cable, use a 2-conductor shielded cable and always ground the shielded cable to the ground terminal.
- In addition, for connecting more than 30-m long cable or using outdoors, take special countermeasures against noise.
- Do not solder the wire or mount the press-fit terminal.
- Be sure to turn OFF the WGA-910A before connecting cables.
- For connecting multiple wires, twist them in advance. Check that the twisted wires are within the above range.

5. TROUBLE SHOOTING

In the event that the product would not operate as expected or in a stable manner, you should trace the factor(s) that may be causing such a condition before concluding that the system has failed.

Items to be checked and countermeasure against various phenomena are described in the following table.

If troubles are not solved despite countermeasures, contact Kyowa or our representatives.

If the product is damaged due to any causes other than as written in the Instruction Manual or if the user has disassembled or remodeled the product, Kyowa Electronic Instruments Co., Ltd. may not be able to offer repair service.

For troubles and countermeasures relating to the main unit, see WGA-910A INSTRUCTION MANUAL.

5-1. OPERATION STOPS AND ACCEPTS NO INSTRUCTION AT ALL

The operation failed due to noise.

Turn OFF the power and turn ON again.

If the same phenomenon still generates, take appropriate countermeasures for removing the noise from operating environment, power supply, etc.

Moreover, use the shielded BCD output cables, shielded D/A output cables, and shielded RS communication cables and connect them to the GND terminal.

5-2. THE BCD OUTPUT IS STABLE

- The indicating value and analog monitor output are stable, and the BCD output is also stable.
The input cable is not connected to the [INPUT] connector correctly or is breaking.
Check the channels.
- The indicating value and analog monitor output are not stable, but the BCD output is stable.
The BCD output cable is not connected to the connector correctly or is breaking.
Repair the BCD output cable or replace the cable with a new one.

5-3. THE D/A OUTPUT IS STABLE

- The indicating value and analog monitor output are stable, and the D/A output is also stable.
The input cable is not connected to the [INPUT] connector correctly or is breaking.
Check the channels.
- The indicating value and analog monitor output are not stable, but the D/A output is stable.
The D/A output cable is not connected to the terminal block correctly or is breaking.
Repair the D/A output cable or replace the cable with a new one.

If all this fails to recover normal operation, contact KYOWA or our representatives.

6. MAINTENANCE

For the product, the following items should be serviced for scheduled maintenance.

Maintenance service should be performed at the intervals specified below.

(1) Calibration of apparatus

An annual maintenance inspection is recommended to ensure the operation and measuring accuracy of the product.

Must be returned to KYOWA for the scheduled maintenance inspection.

(2) Replacement of limited life parts

Item	Content	Frequency
Aluminum electrolytic capacitor	The signal-noise ratio will lower due to capacity shortage or smoke will be emitted due to liquid leak, resulting in a malfunction of the product. Service life, depends on the frequency of use and ambient temperature, is approximately 5 years at 25 °C. Overhaul the product every 5 years.	Every 5 years
Lithium battery	When the battery is died, the clock function is reset to the default settings after turning on the power. The startup window is also reset to the default settings. Service life, depends on the frequency of use and ambient temperature, is approximately 5 years. Replace the product every 5 years.	Every 5 years

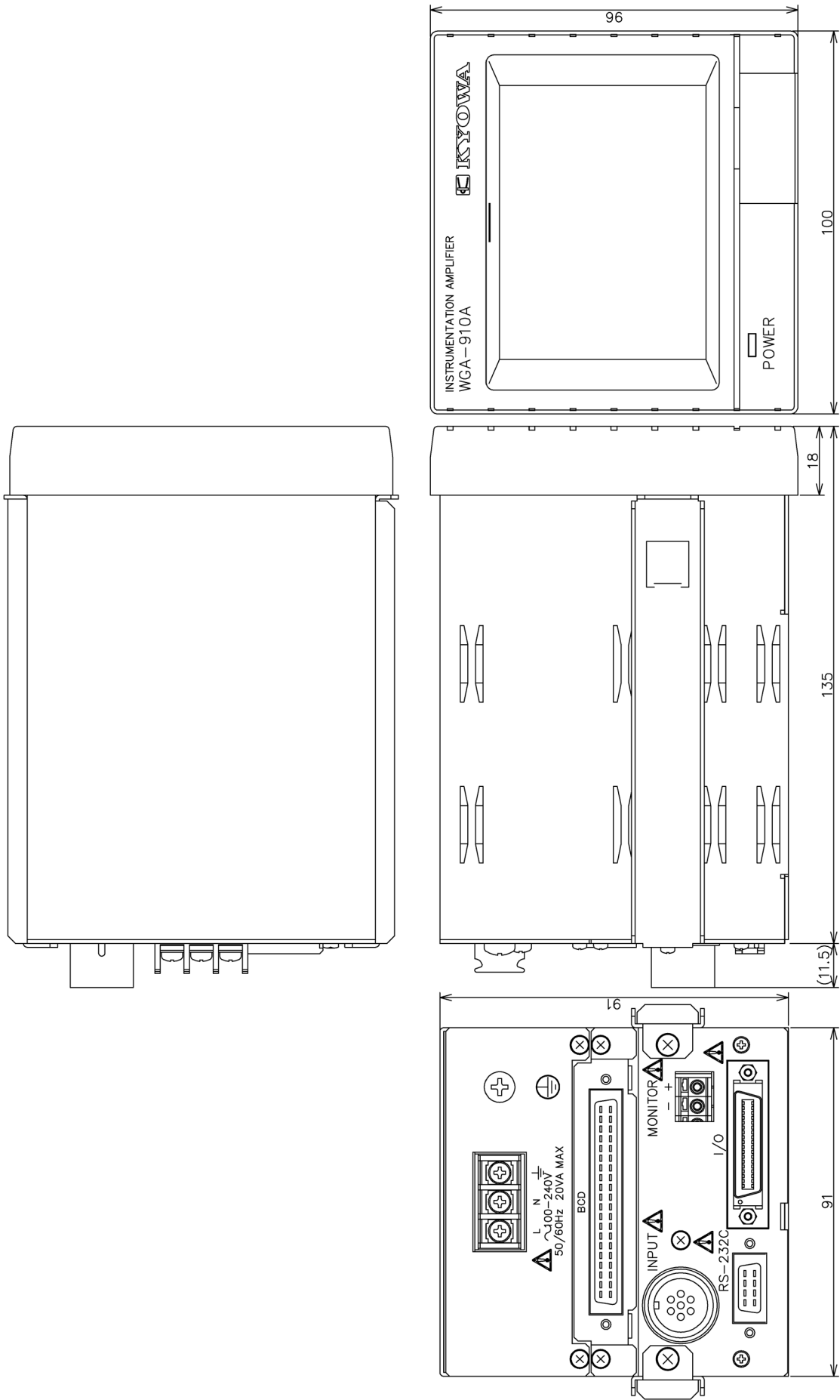
The above figure is only a rough indication. We do not promise or guarantee that the product is error-free or will be repaired at no additional cost during the above period.

To operate the product normally, finding a sign of the product failure early by daily/periodic inspections and taking the corrective action are required.

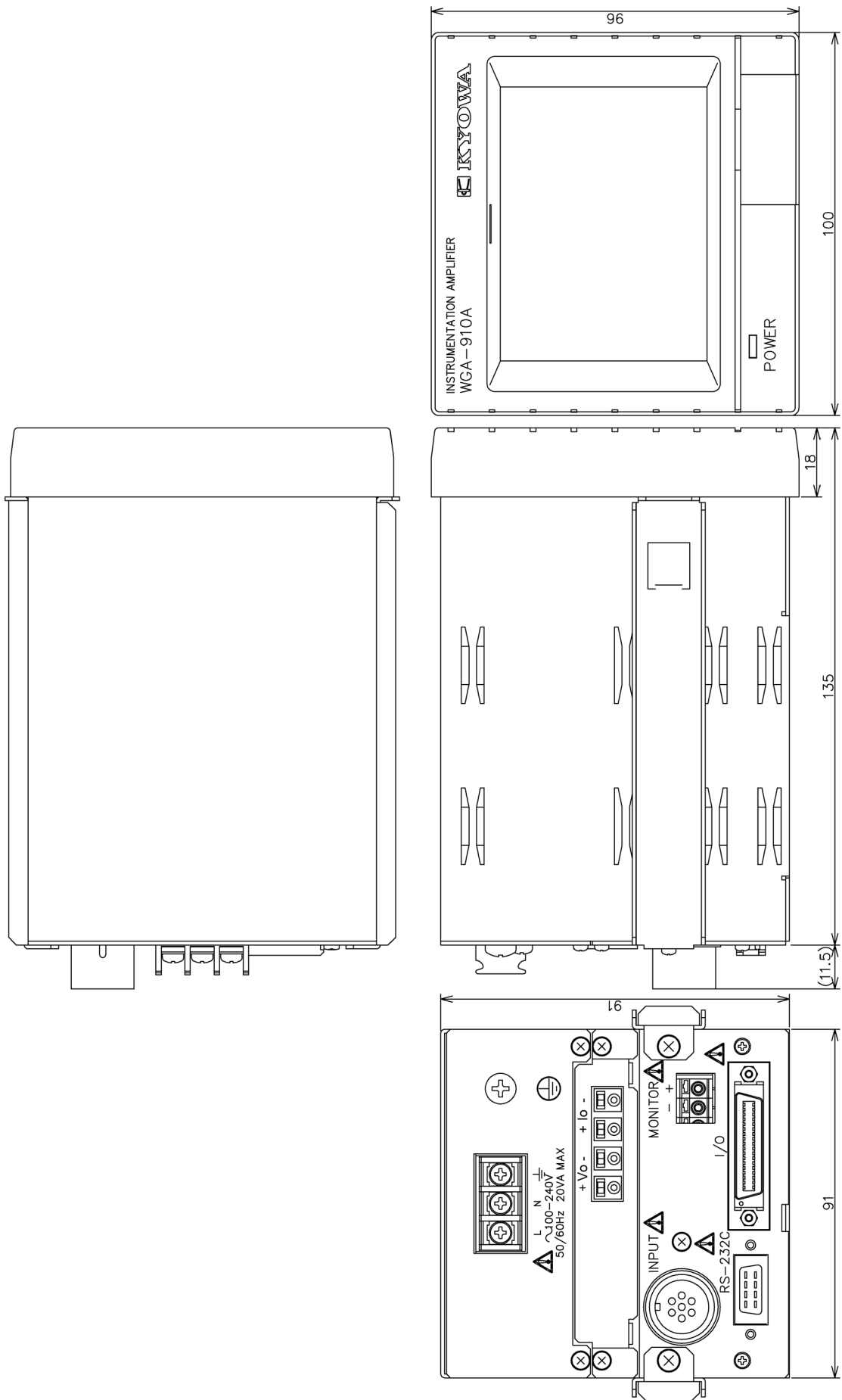
We do not guarantee any damage resulting from the user's failure to comply with the safety precautions. Replacement will be charged within the warranty period.

7. OUTSIDE DRAWING

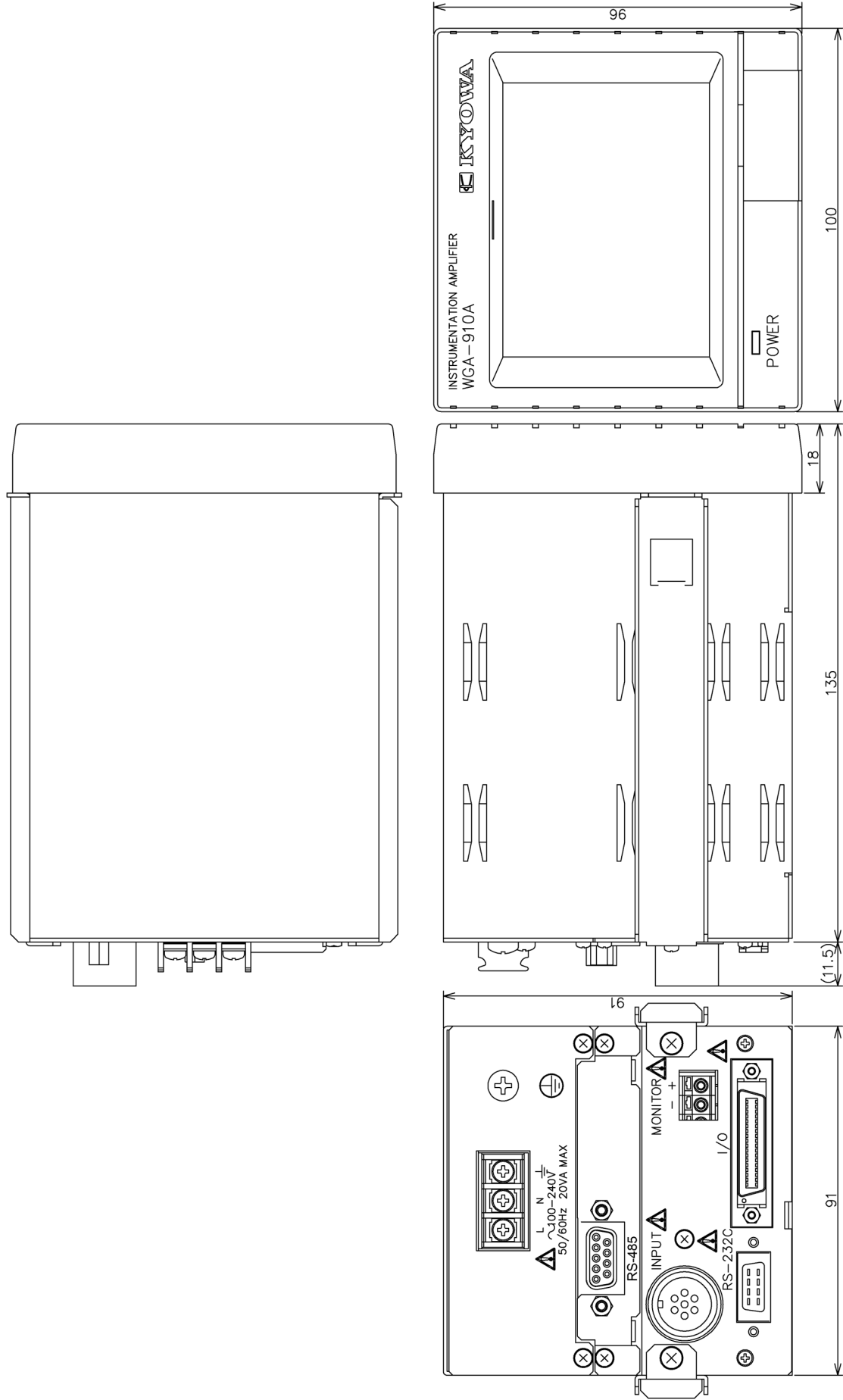
7-1. WGA-910A-1: BCD OPTION Unit : mm



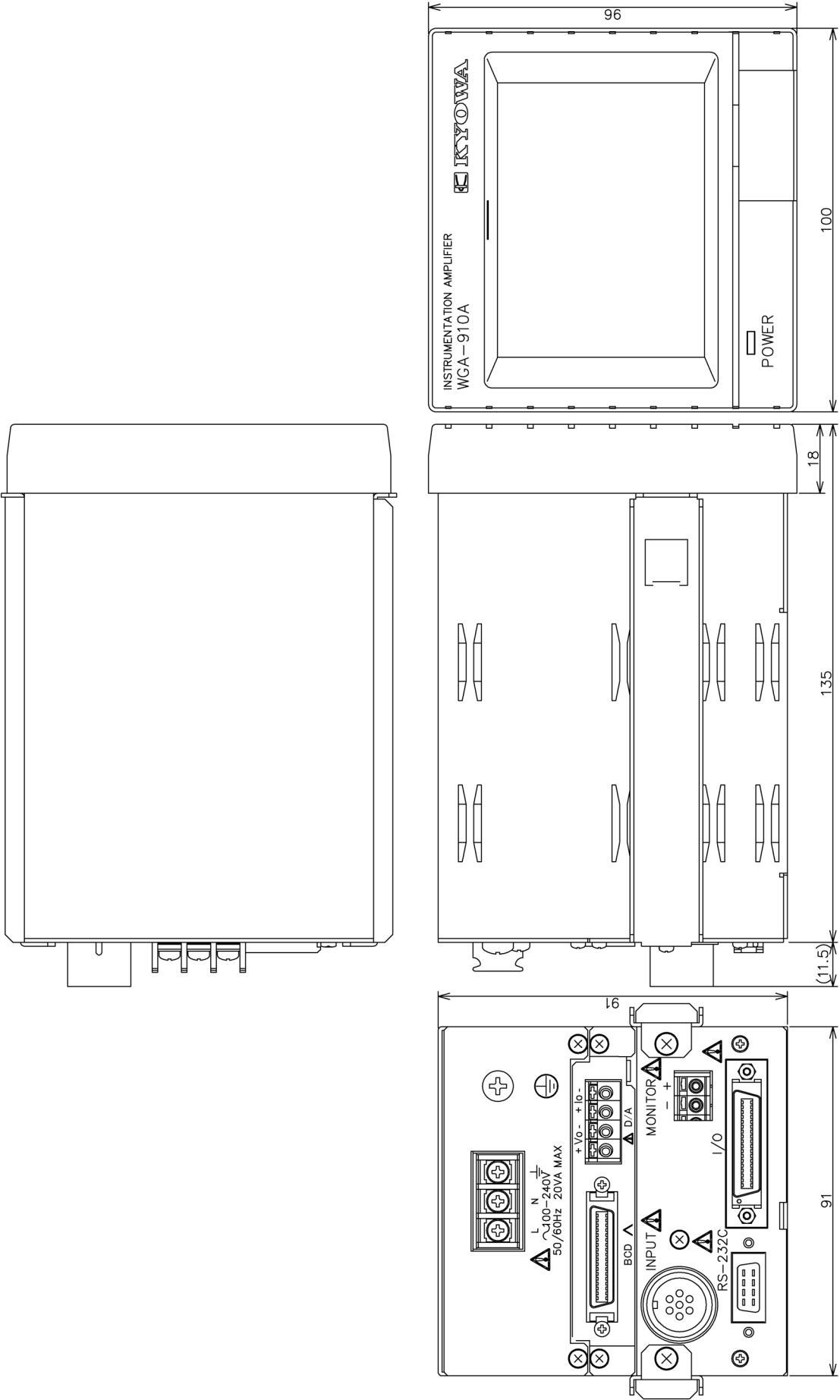
7-2. WGA-910A-2: D/A OPTION Unit : mm



7-3. WGA-910A-3: RS-485 OPTION Unit : mm



7-4. WGA-910A-12: BCD and D/A OPTION Unit : mm



8. APPENDIX

8-1. Option Setting

Item	Function Name	Parameter Name	Setting Value	Initial Value
Com. Setting	Communication Speed		0: 2400 bps, 1: 4800 bps, 2: 9600 bps, 3: 19200 bps	9600 bps
	Transmission Mode		00: Repeat. Output, 02: Output at Hold, 10: Tx and Rx	Tx and Rx
	Device ID		1 to 99	1
BCD output setting	Transmission Speed		0: Approx. 16 times/sec., 1: Approx. 32 times/sec., 2: Approx. 64 times/sec., 3: Approx. 125 times/sec. 4: Approx. 250 times/sec. 5: Approx. 500 times/sec. 6: Approx. 1000 times/sec.	Approx. 16 times/sec.
	EOC Logic		0: Negative Logic, 1: Positive Logic	Negative Logic
	Polarity Logic		0: Negative Logic, 1: Positive Logic	Negative Logic
	Data Logic		0: Negative Logic, 1: Positive Logic	Negative Logic
	Data Form		0: BCD, 1: Binary	BCD
	BCD Classification		0: Hold Value 1, 1: Hold Value 2, 2: Measured Value	Hold Value 1
D/A Output Setting	D/A Display	Zero Dsp.	-99999 to 99999	0
		Full Dsp.	-99999 to 99999	10000
	D/A Classification		0: Hold Value 1, 1: Hold Value 2, 2: Measured Value	Hold Value 1



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