KYOWA

IM-A-1146E December 2022

GETTING STARTED GUIDE

WGA-910A

INSTRUMENTATION AMPLIFIER

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.

●STANDARD ACCESSORIES

The WGA-910A comes with the following standard accessories. When unpacking, check to be sure that all the listed accessories are included.

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

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

● OPTIONS

	Model	Manufacture
AC power cable (AC:100V)	P-23	KYOWA ELECTORONIC INSTRUMENTS CO., LTD.
AC power cable (AC:200V)	P-28	
INPUT connector	PRC03-12A10-7M10.5	TAJIMI ELECTRONICS CO., LTD
I/O connector	PCR-S36FS+, PCR-LS36LA	HONDA TSUSHIN KOGYO CO., LTD.
RS-232C connector	FCN-361J008-AU,FCN-360C008-B	FUJITSU COMPONENT LIMITED
BCD connector (BCD OPTION)	FCN-361J040-AU, FCN-360C040-B	
RS-485 connector	XM3D-0921, XM2S-0913	OMRON Corporation
BCD connector (BCD and D/A OPTION)	10136-3000PE, 10336-52F0-008	3M Japan
CC-Link connector	35505-6000-BOM GF, 35715-L010-B00 AK, 35T05-6M00-BOM GF	

● SAFETY PRECAUTIONS (Do not forget to read the safety precautions prior to use.)

The WGA-910A is designed to be used according to "INSTRUCTION MANUAL 11.SPECIFICATIONS". Do not use the WGA-910A in an environment exceeding the specifications. Or, failure of the WGA-910A may result.

・PRIOR TO USE

This Instruction Manual describes detailed instructions for operating the WGA-910A Instrumentation Amplifier (hereinafter referred to as the WGA-910A).
Kyowa Electronic Instruments Co., Ltd. assumes no liability for any damages resulting from user's failure to comply with the safety precautions.
For safety operation of the WGA-910A, the following symbol mark is attached to the WGA-910A.

⏚	Indicates "PROTECTIVE GROUND TERMINAL." Be sure to connect the GND terminal to the ground. Excluding when using a 3P AC power cable for grounding.

・SAFETY SYMBOLS

For safety operation of the WGA-910A, 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 ℃
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/s^2 (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 ±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.
●The capacity of the SDHC card, compatible to the product, is up to 32 GB
The product does not support the SDXC cards 64 GB or more.
Never insert the SDXC cards 64 GB or more.

● PRECAUTIONS ON CE MARKING

To confirm that WGA-910A maintain EMC and Low Voltage Directives, please refer to "PRECAUTIONS ON CE MARKING" in the WGA-910A INSTRUCTION MANUAL.

● OUTLINE OF PRODUCT

◆ OUTLINE

The WGA-910A Instrumentation Amplifier (hereinafter referred to as the WGA-910A) is a high-speed and sophisticated amplifier designed to be used for displaying physical quantities (load, etc.) with strain gage transducers.
The WGA-910A is able to be operated from the front touch panel. The WGA-910A includes various functions (comparator functions, hold functions, etc.) as standard equipment.
The WGA-910A is compatible for measurements in a wide range from the high-speed measurements (high-speed sampling press fitting, high-speed sampling pressing, etc.) to high-resolution load measurements.
The WGA-910A has the optional models; BCD model, D/A model, RS-485 model, and CC-Link model. The CC-Link model is able to control through the PLC.

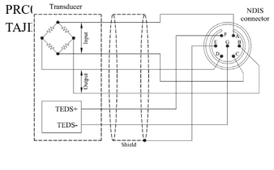
● WIRING

◆ Connecting transducer

・Input connector is NDIS one-touch connector.
・When using a KYOWA's sensor with the NDIS standard connector at the tip of the cable, the both TEDS-compatible and non-TEDS-compatible sensors (excluding six-wire system remote sensing) can be directly connected to an input connector
・When using the KYOWA's sensor without a connector at the tip of the cable or when using other manufactures made sensor, connect the sensor to the NDIS standard connector (option) as follows.

Compatible connector Model: PRC(
Manufacture: TAJI

Pin No.	Signal Name	
A	＋BV	(red)
B	－SIG	(White)
C	－BV	(Black)
D	＋SIG	(Green)
E	Shield	



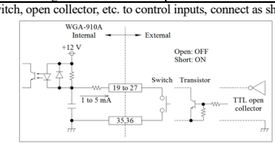
F	TEDS(＋)	(Yellow)
G	TEDS(－)	(Blue)

◆ Connecting Control Input

・Compatible connector of the cable side is as follows.
Connector model: PCR-S36FS+ Manufacture: HONDA TSUSHIN KOGYO CO., LTD.
Case model: PCR-LS36LA Manufacture: HONDA TSUSHIN KOGYO CO., LTD.

Pin No.	Signal Name	Pin No.	Signal Name
19	ZERO command	28	Reserve
20	HOLD command	29	Reserve
21	RESET command	30	Reserve
22	TEDS command	31	Reserve
23	Waveform command	32	Reserve
24	Measuring condition select 0	33	Reserve
25	Measuring condition select 1	34	Reserve
26	Measuring condition select 2	35	Input COM
27	Measuring condition select 3	36	Input COM

・When using external switch, open collector, etc. to control inputs, connect as shown in the following figure.



◆ Connecting Control Output

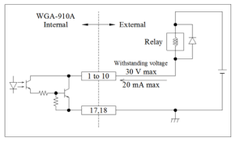
・Compatible connector of the cable side is as same as that of the control input side.

Pin No.	Signal Name	Pin No.	Signal Name
1	HH comparator output	10	SD
2	HI comparator output	11	SD Error
3	OK comparator output	12	Wave comparator HI output
4	LO comparator output	13	Wave comparator OK output
5	LL comparator output	14	Wave comparator LO output
6	Abnormal channel	15	Motion detect output
7	Abnormal memory	16	Inflection point/Extreme value
8	Communication error	17	Output COM
9	Healthy	18	Output COM

・Equivalent circuit is described as the right figure.

Output Signal	Transistor
0	ON
1	OFF

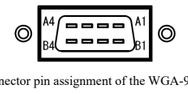
* Suppose output logic is "Negative logic."
For the "positive logic," the transistor output is reverse of the above table.



◆ Connecting RS-232C Interface

・Compatible connector of the cable side is as follows.
Connector model: FCN-361J008-AU Manufacture: FUJITSU COMPONENT LIMITED
Case model: FCN-360C008-B Manufacture: FUJITSU COMPONENT LIMITED

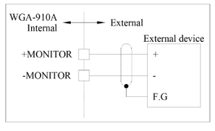
Pin No.	Signal Name
A1	DCD
B1	RXD
A2	TXD
B2	DTR
A3	GND
B3	DSR
A4	CTS
B4	RTS



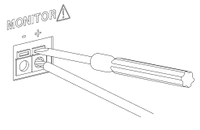
Connector pin assignment of the WGA-910A

◆ Connecting Analog Monitor

・A voltage output is available on the terminal board provided on the amplifier's rear.
・Outputs approx. ±5 V / ±3.2 mV.
・Use this voltage output to perform initial balancing, maintenance and inspection as well as operational testing.
・It also lets you to review measured waveform on an oscilloscope.



<How to connect>
1)Peel off a jacket of a connecting wire approx. 10 to 11 mm and twist the tip of the wire for not to loosen.
Available wire range is
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.



● SPECIFICATIONS

Number of channel	1
Compatible sensor	Strain gage transducers (Connectable TEDS compatible sensor)
Compatible bridge resistance	87.5 to 1000 Ω
TEDS compatible	Interface: Compatible with IEEE1451.4 Mixed Mode Transducer Interface Class 2 Compatible transducer: Should have the information according to IEEE template No. 33.cable length should be 30 m or less
Bridge excitation	10 VDC, 2 VDC, selectable
Measurement range	±3.2 mV/V (input range including zero adjustment range)
Zero adjustment range	Within measurement range (Not retained when power supply interrupted)
Nonlinearity	Within ±(0.02 %FS+1 digit)
Stability	Zero point: Within ±0.25 μV_{RTI}/°C Sensitivity: Within ±0.005 %/°C
Peak/Bottom detection	Detecting scheme: digital hold
Frequency response range	DC to 1 kHz (+1 dB, -2 dB)
Sampling speed	4000 times/s
AD resolution	24 bits
Analog monitor	Voltage output: ±(5 V ±200 mV) (load resistance 5 kΩ or more)
Indicators	3.5-inch TFT color LCD, Display area : 70.6 × 59.2 mm, 320 × 240 dots, touch panel
Indication	Setting range: -99999 to +99999 count Update speed: Numeric value display: Approx.4 times/s Wave display: Approx.2 times/s
Calibration function	Manual calibration: Sensitivity registering calibration, Actual load calibration, Unit TEDS auto calibration TEDS part calibration: TEDS calibration item TEDS operation Configuration: TEDS reading operation, Zero during TEDS TEDS Information display Numeric value registering calibration
Smoothing Function	Analog filter: 1, 30, 300 Hz, Flat (1 kHz or more) Attenuation characteristics: -12 dB/oct Minimum scale: 1, 2, 5, 10, 20, 50, 100 counts Moving average: None, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048 times
Zero compensation function	Zero tracking (Auto digital Zero within the setting range) Judging time: 0.00 to 9.99 sec. Compensation range: 0 to 99999 count Zero near zero (Auto zero display) Setting range: 0 to 9 count
Additional value	-99999 to +99999 count
Original value (Sensor output value)	-3.2000 to +3.2000 mV/V (5 digit) Accuracy: within ±0.1 %FS
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, communication command.
Comparator setting	The number of points: 4 Type: extra high (HH), high (HI), low (LO), extra low (LL). If there are two hold values, they are assigned as follows. Hold value1: high1 (HI1), low1 (LO1), Hold value2: high2 (HI2), low2 (LO2). Setting range: -99999 to +99999 count Hysteresis width: 0 to 9999 count Setting: Using comparator can be set Output logic: positive/negative Comparison speed: 4000 times/s (Normal comp. mode)
Judgment function	The number of point: 1, Type: OK
Waveform comparison setting	The number of points: 2 Type: Wave HI, Wave LO Set Reference Waveform, Waveform comparison HI, Waveform comparison LO, Move Waveform, Comparison Area, Register Waveform, Waveform Comparison Logic: positive/negative
Waveform comparison function	The number of point: 1, Type: Wave OK
Motion detect	Motion Detect Function Enable/Disable Motion Detect Width: 0 to 99999 Motion Detect Time: 0.01 to 9.99 Motion Detect Logic: positive/negative
Measurement mode setting	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 Hold, Time Peak-Bottom Hold, Block Average Hold, Time Average Hold Block Inflection Hold, Time Inflection Hold, Block Maximal/minimal Hold, Time Maximal/minimal Hold, Block Peak/Average Hold, Time Peak/Average Hold, Block Bottom/Average Hold, Time Bottom/Average Hold, Block Peak/Arbitrary Hold, Time Peak/Arbitrary Hold, Block Bottom/Arbitrary Hold, Time bottom/Arbitrary Hold, Previous Value Comparison Peak Hold, Block Previous Value Comparison Peak Hold, Time Previous Value Comparison Peak Hold, Previous Value Comparison Bottom Hold, Block Previous Value Comparison Bottom Hold, Time Previous Value Comparison Bottom Hold Detect times 0.01 to 9.99 sec. Delay time 0.00 to 9.99 sec. The following settings can be changed according to the operation mode. Detection trigger level, Detection trigger way Inflection point discrimination time, Inflection point discrimination value, Extreme value discrimination setting, Initial value for compare with measuring value Comparison mode: Normal comparison, Hold comparison Display mode: Normal display, Hold display
Wave form display	X-axis setting: End point: 0.5, 1.0, 2.0, 5.0, 10.0, 20.0, 50.0, 100.0 sec. 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 level way, Holding time of waveform WGA displays the waveform of the input variation regardless to the "Operation Mode Set" setting.
System	Key lock, Setting value initialize, Backlight illumination time, Language, Clock, Comparison Display Color, Display Stability
Self-check	Memory, channel
Operation check	Display, Touch panel, Control input/output, Communication, BCD output, D/A output, SD card
Control input	The 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 (NPN) (Capacity: 12 VDC, 5 mA or more)
Control output	The number of points: 16 Type: HH, HI, OK, LO, LL, Healthy, Abnormal channel, Abnormal memory, SD, Communication error, SD Error, WaveHI, WaveOK, WaveLO, Motion detect, Inflection point/Extreme value Output format: Open collector (NPN) Load capacity: 30 VDC, 20 mA (Resistance load)
Communication	Signal system: RS-232C Full duplex system Transmission mode: Asynchronous Bit configuration: Data bit: 7 Stop bit: 1 Parity bit: Odd number Flow control: Not compatible Setting contents: Communication speed: 2400, 4800, 9600, 19200 bps Transmission mode: Repeat Output, Output at hold, Tx and Rx
NOTE: When equipping the optional CC-Link or RS-485, RS-232C of the standard equipment is disabled. Otherwise, RS-232C is enabled.	
SD card	Saving setting value: Saves the all setting value to the SD card (Calibration values are not included) Reading setting value: Reads the all setting value from the SD card and rewrite those of the WGA to the read one. (Calibration values are not included) Recording measuring value: Pushing recording key, WGA records the wave data to the SD card. View wave file name: Browsing the waveform data, deleting the wave data, and deleting the directory are available. Format: Erase all data that are saved in the SD card is available (Quick format is available) Update: Capable of updating the program version that is saved in the SD card SD card type: SD, SDHC (up to 32 GB)
Power supply	100 to 240 V 50/60 Hz, Power consumption: 20 VA or less
Dimensions	100 (W) ×96 (H) ×135 (D) mm (Not include protrusions)
Weight	Approx. 950 g (Not include Option)
Operating temperature Humidity	-10 to 40 °C, 20 to 85 %(Noncondensing)
Compliance	Directive 2014/30/EU (EMC) Directive 2014/35/EU (LVD) Installation category II, Pollution degree 2 Directive 2011/65/EU,(EU)2015/863 (10 restricted substances) (RoHS)