

Minebea

TRANSMITTER
CSA-522B

Instruction Manual

MINEBEA Co. Ltd.
Measuring Components Business Unit

EN294-1348-B

Forward

Thank you very much for purchasing Minebea’s Transmitter, model CSA-522B. This manual explains installation procedures and connecting method and also operating method for the transmitter. Make use of it properly after reading through the manual carefully. This manual is intended for the technical experts to read.

Marks and arrangements used in this manual

The following marks are put to the explanation on the matters that indicate “Don’t do this.”, “Take care” and “For reference”.

Be sure to read these items where these marks are attached.



Warning

Warning may cause injury or accident that may harm to the operator.
Don’t do these things described here.



Caution

It is a description when the occurrence only of the assumption of danger by which the user owes injury when handling is mistaken, and the material damage is assumed.



It is attention and a limitation in the operation and work
Be sure to read the items to prevent the malfunction.

For safe operation

Be sure to read this instruction manual before use.

1. Installation place

Caution

The temperature and humidity must use it in the place within the following ranges.

- Environmental temperature : $-10\text{ }^{\circ}\text{C}$ to $50\text{ }^{\circ}\text{C}$
- Environmental humidity : 85 %RH or less (Non condensing)

Warning

Do not set up this instrument in the following places. It might cause an unexpected faulty in the instrument.

① Location where installation is not allowed.

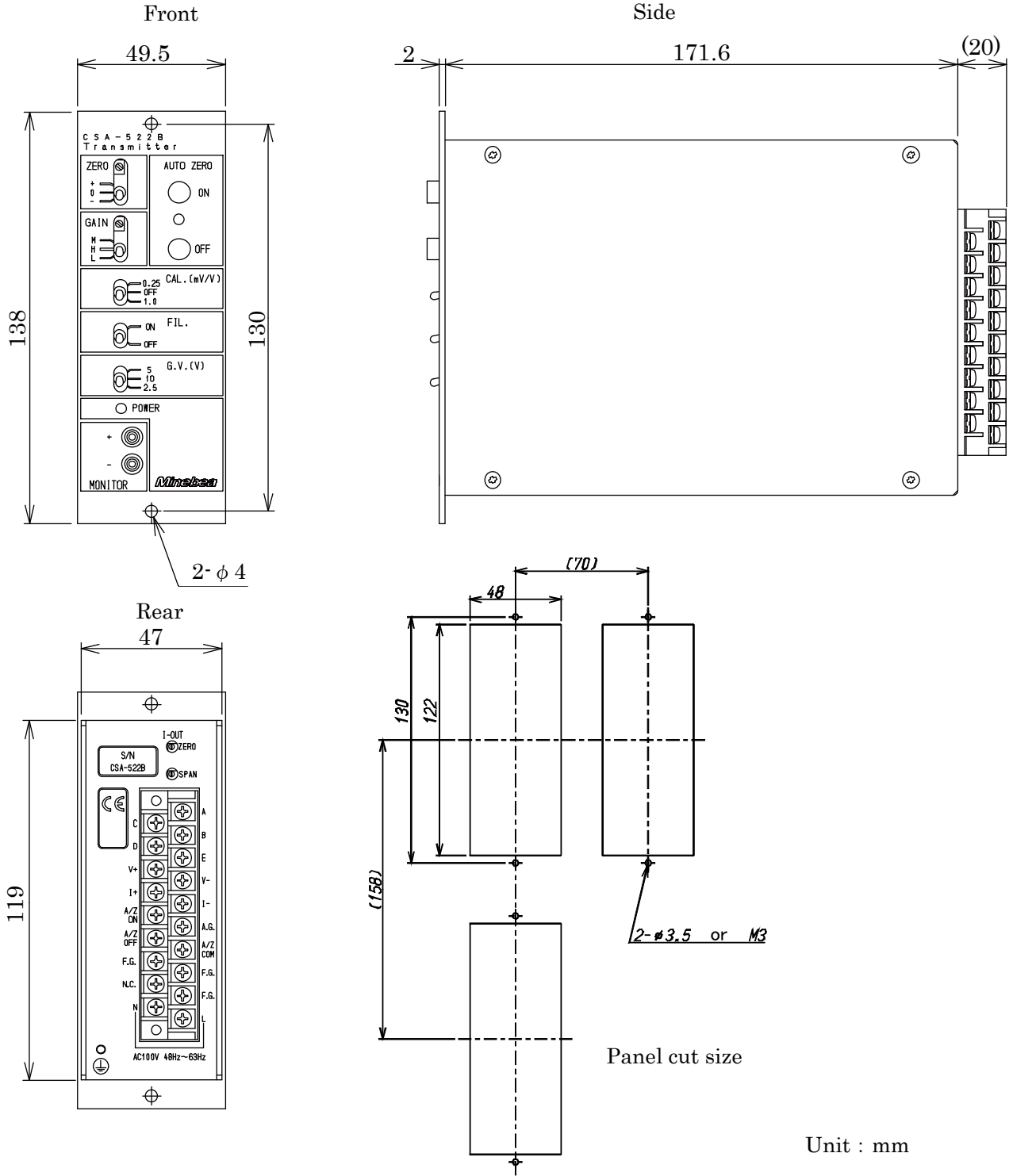
- Don't locate the instrument in direct sunshine and/or high temperature area.
- Don't use the instrument in the high humid area.
- Don't install the instrument in the place with the vibrations and shock.
- Don't use the instrument where there is excess of dusts and fine particles.
- Don't use the instrument where there are corrosive gas and salt and like that.
- Don't install the instrument where there is rapid change of temperature and humidity.
- Don't install the instrument near the devices that are magnetized or generate an electromagnetic field.
- Don't install the instrument where the instrument may be affected by radioactivity or radial rays.
- Avoid the location where chemical reaction may take place such as in a laboratory, or like that.

② When you set up this instrument

Warning

Install based on the following sizes to set up this instrument, and secure the space for surroundings of this container.

Each dimensions of the instrument and required dimensions for the environmental spaces are as follows:



Unit : mm

2. Power supply

Warning

Install each cable while turned off the power supply. Might it get an electric shock, and this instrument be damaged when working with the power supply enters.

Warning

Confirm the indication of the power supply voltage of the instrument and the specifications are corresponding to the supplied power supply before turning on the power supply. Consult with MINEBEA when not matching. There is danger of causing damage and the electric shock of this instrument when using it like the uncertainty.

Caution

Groundline should be connected securely. When groundline is not connected, it may cause a malfunction of the instrument or electric shock to the operator

3. Application note

Caution

Before this instrument is newly used, or when the strain gage applied transducer is exchanged with a new one, please execute the calibration. If not calibrating, it may cause not obtaining the correct measurement result, or a malfunction in the instrument and there is a possibility of the damage of peripherals. Moreover, there is a similar possibility that the result is incorrect even if the calibration has been already made. Please take the calibration again.

Caution

Please confirm connecting wires is correctly executed when you use this instrument. If it is not connected correctly, it may cause the malfunctions on the instrument, and the damage to the peripheral equipments or even worse serious accidents.

Caution

CautionIt causes not obtaining a correct measurement result, and the malfunction when the setting change is carelessly executed while measuring it with this instrument and there is a possibility of the damage of peripherals.。

Caution

Please do not give the impact such as throwing the thing at this instrument.
There is a possibility of causing the malfunction on this instrument, or causing the damage of the electric circuit.

4. CE conformity standard

This instrument has suited the following standard.

EN61326-1:2006

“Electrical equipment for measurement, control, and laboratory use – EMC requirements”

“Immunity test requirements for equipment intended for use in industrial locations”

EN61010-1:2001

“Safety requirements for electrical equipment for measurement, control and laboratory use”

The operating condition to conform this standard is as follows :



Caution

Please observe the following conditions strictly when this instrument suits the above-mentioned standard.
If neglected, there is a possibility of not suiting the above-mentioned standard.

4-1. Place of installation

- Please set up this instrument in the shielded case or control panel where EMC measures are given.

4-2. Wiring

① Shield processing

- Please make sure to shield all the signal cable by using the shielded cable or using the conduit piping including the storage case and control panel.
- Please make sure to shield the power cable by using the conduit piping including the storage case and control panel.

② Grounding

- Please make sure to apply the grounding through the case and control panel where EMC measures are given with protective earth terminal.

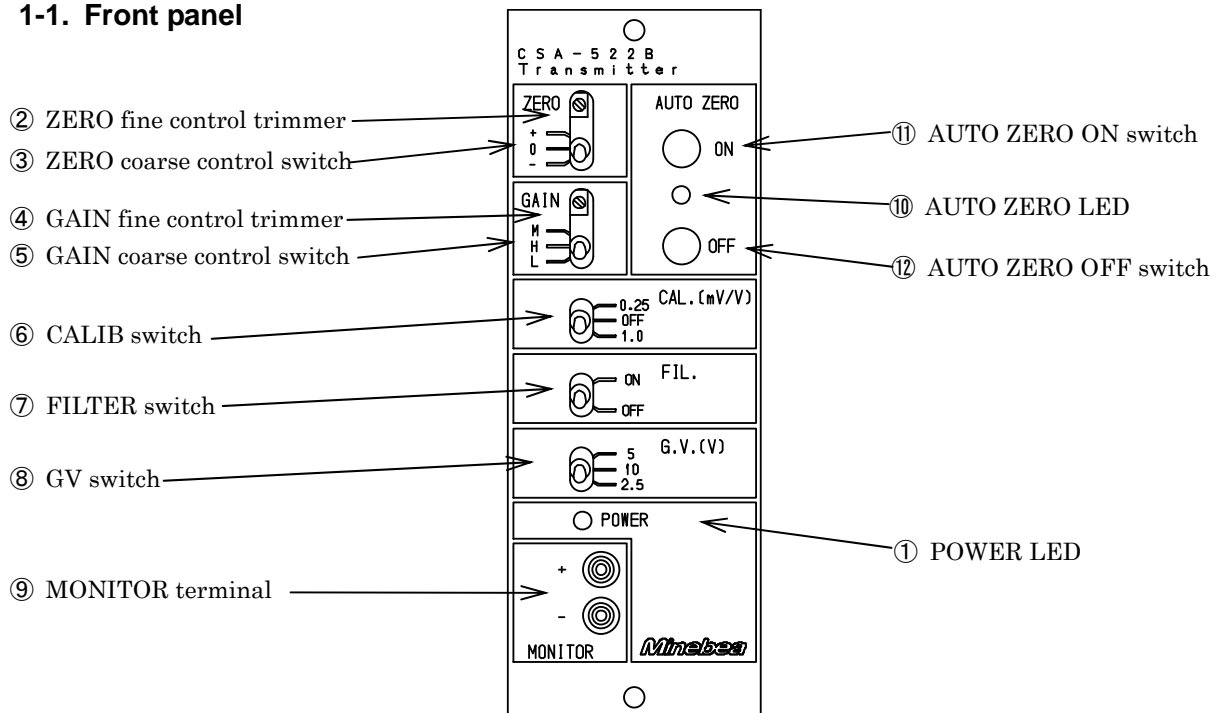
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1. Each function and name

1-1. Front panel



① POWER LED

It lights by turning on the power supply (POWER switch ON).

② ZERO Fine control trimmer

It is a trimmer for the fine control of zero.

③ ZERO Coarse control switch

It is a switch for the coarse control of zero. Some $\pm 0.3\text{mV/V}$ input is shifted.

④ GAIN Fine control trimmer

It is a trimmer for the fine control of amplification degree.

⑤ GAIN Coarse control switch

It is a trimmer for the coarse control of amplification degree. It is 1000 times in L, 2000 times in M, and 3000 times in H.

⑥ CALIB switch

It is a switch that turns the CALIB value on and off.

⑦ FILTER switch

It is a switch that changes the frequency response.

It is 25 kHz in OFF, and 1 Hz or 30 Hz in ON. (Change with the DIP switch on the circuit board.)

⑧ GV switch

The power supply voltage of the bridge to the strain gage applied transducer is selected.

⑨ MONITOR terminal

It is a terminal to monitor the output voltage value.

⑩ AUTO ZERO LED (Options)

LED lights while auto zero executions

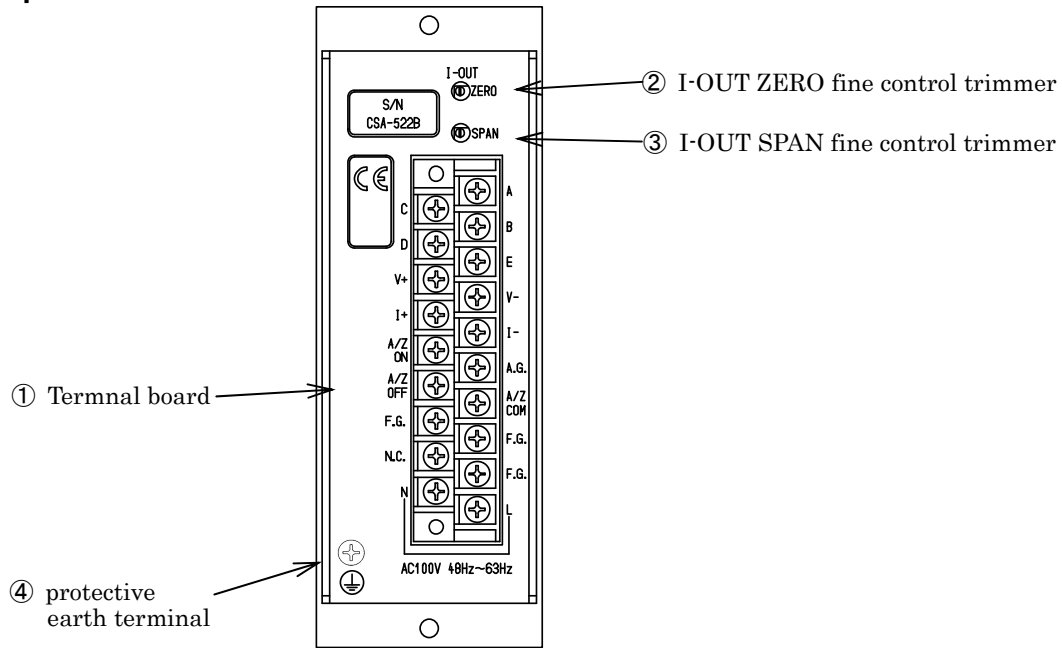
⑪ AUTO ZERO ON switch (Options)

The analog output when pushing is adjusted to 0 volt.
Please release the auto zero when you calibrate.

⑫ AUTO ZERO OFF switch (Options)

Auto zero is released.

1-2. Rear pannel



① Terminal board

The various strain gage applied transducers like load cell, etc., voltage output, current output, external control input (Option), grounding wire and AC power supply are connected.

② I-OUT ZERO fine control trimmer

It is the fine control trimmer of the current output (DC4 mA).

③ I-OUT SPAN fine control trimmer

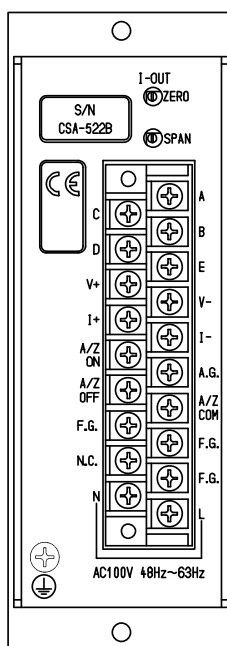
It is the fine control trimmer of the current output (DC20 mA).

④ Protective earth terminal

Connect the grounding line to suit the CE Conformity Standard.
Do not connect excluding the grounding wire.

2. Connecting method

2-1. Allocation of the terminals



Name of terminal	Description	Usage
A	Bridge power supply(+)	Strain gage applied transducer
C	Bridge power supply (-)	
D	Amplifier input (+)	
B	Amplifier input (-)	
E	Shield	
A.G.	Analog ground	For check
F.G.	Frame ground	
F.G.	Frame ground	
F.G.	Frame ground	Voltage output
V +	Voltage output terminal(+)	
V -	Voltage output terminal (-)	Current output
I +	Current output terminal (+)	
I -	Current output terminal (-)	External control input (Option)
A/Z ON	Terminal for AUTO ZERO ON control	
A/Z OFF	Terminal for AUTO ZERO OFF control	
A/Z COM	Common for controlling auto zero	Do not use.
N.C.	No use	
L	Power supply input terminal (L)	Power supply
N	Power supply input terminal (N)	
⊕	Protective earth terminal	



- The terminal F.G. and the terminal E are connected internally.
- The terminal A.G. and the terminal V-OUT (-), the terminal I-OUT (-) are connected internally.

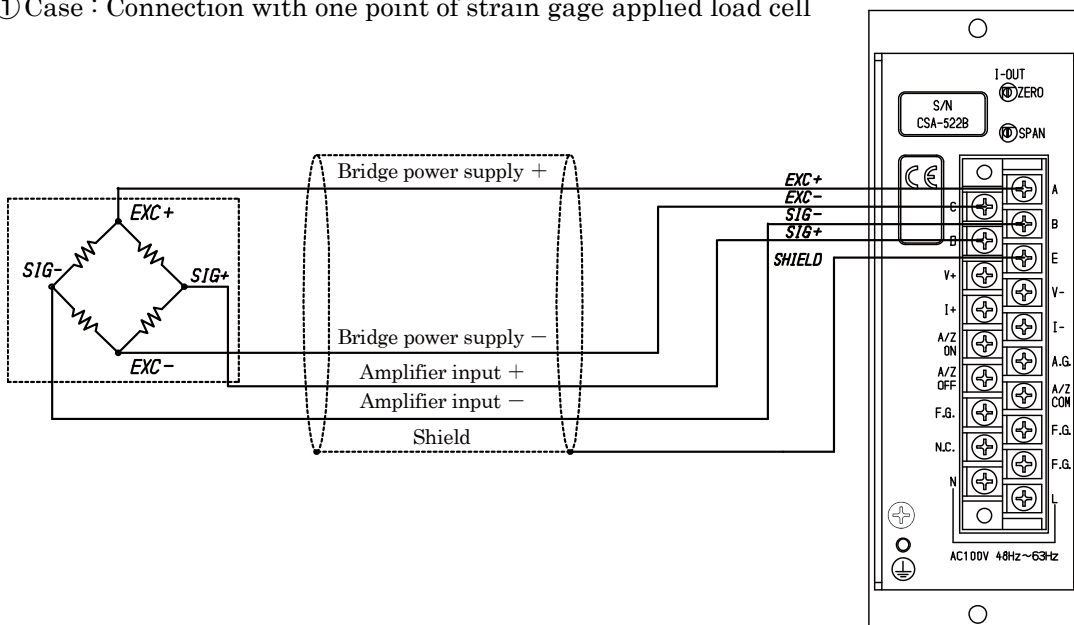
2-2. Notes on connections

- Please go after turning off the power supply without fail when you connect wires.
- Please do not energize the power supply until the installation is completed.
- Keep the connecting cable with the instrument away from the noise source like power supply line and I/O line for control as far as possible.
- Conduit wiring should be the type of exclusive one, and avoid using with another line together.
- Please connect the earthing cable securely. The earthing should be D class with single earth. Don't share with the earth of power supply system.
- The crimp type terminal lugs that suits the terminals of this instrument is as shown in the table below.

Width of crimp type terminal lugs	Suitable crimp type terminal lugs
6.0 mm or less	1.25-3 or Y-type 1.25-3.5

2-3. Connection with strain gage applied transducer

① Case : Connection with one point of strain gage applied load cell

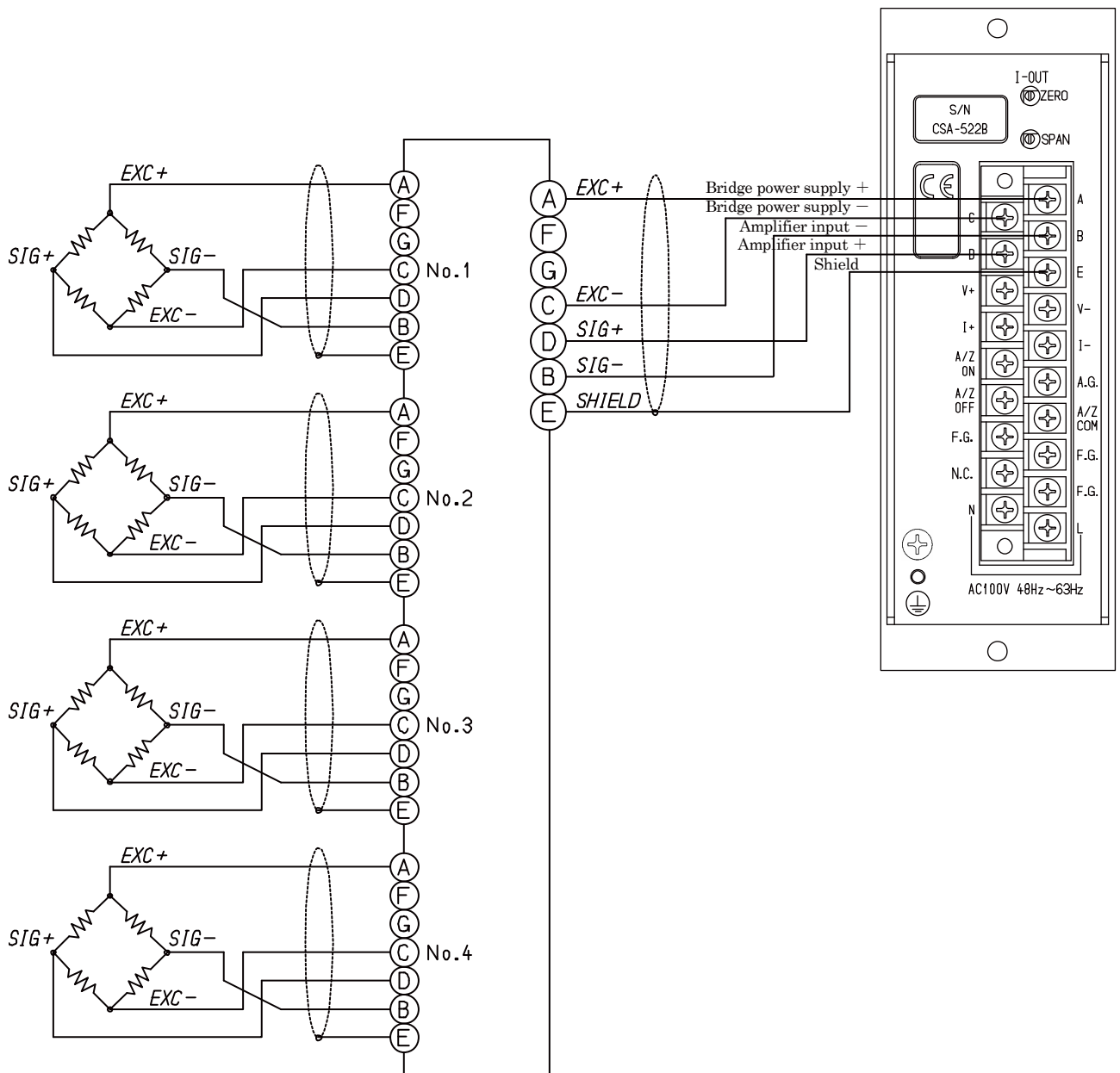


- When tension load is applied with the application of tension type or universal (compression / tension) type of load cell, and output of “+” direction is required, please replace and connect “Amplifier input +” and “Amplifier input -”.
- When the total length of cable specifies more than 30 m, the accuracy may be out of warranty because the resistance of cable makes the input voltage of the instrument decreased.
- When the length of cable is applied more than 10 m, or when the system is using the zener barrier, the CALIB value is not applicable.
- When this instrument suits the CE standard, please make sure to shield the signal cable by mounting this in the storage case or control panel where EMC measures are given with protective earth terminal.

② Case : Connection with 2 to 4 points of strain gage applied transducers.

Plurality of of the strain gage applied transducers might be connected parallel.

The parallel connection can be easily done by using optional SB-310 and SB-320 (Summing type junction box).



- When tension load is applied with the application of tension type or universal (compression / tension) type of load cell, and output of “+” direction is required, please replace and connect “Amplifier input +” and “Amplifier input -”.
- When the total length of cable specifies more than 30 m, the accuracy may be out of warranty because the resistance of cable makes the input voltage of the instrument decreased.
- When the length of cable is applied more than 10 m, or when the system is using the zener barrier, the CALIB value is not applicable.
- When this instrument suits the CE standard, please make sure to shield the signal cable by mounting this in the storage case or control panel where EMC measures are given with protective earth terminal.

2-4. Connection with power supply and ground

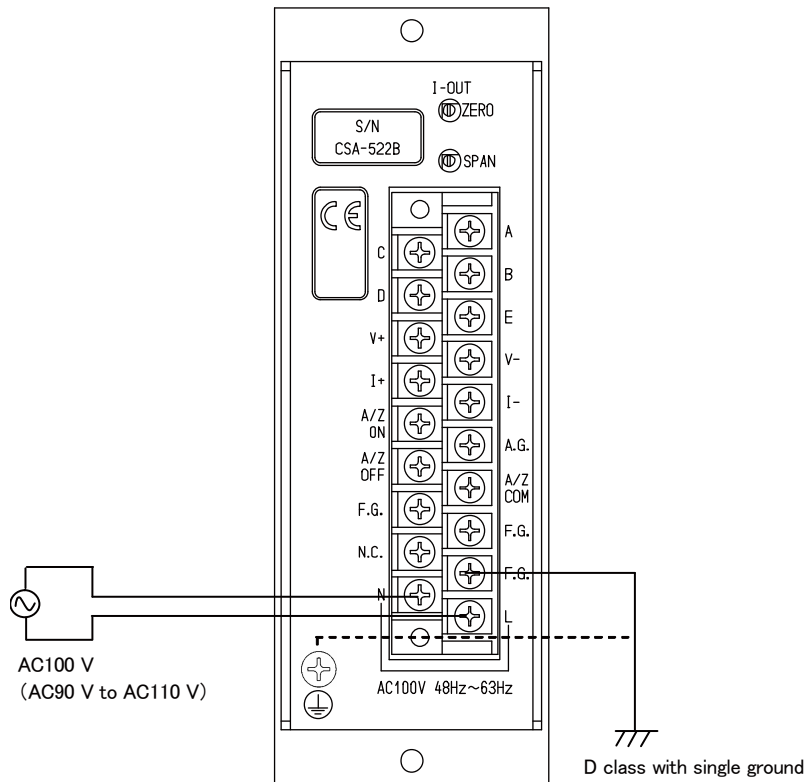
The connection with power supply and ground should be made as follows:

Beside, the grounding should be the D class with single ground.

Power supply voltage AC100 V (Permissible variable range AC90 V to AC110 V)

Power supply frequency 50/60 Hz

Power consumption Approx. 15 VA (without any options at AC100 V)



* When the power supply is AC110 V (CSA522B-P61), AC200 V (CSA522B-P63) or AC220 V (CSA522B-P64), please refer the paragraph 6-2, 6-3 and 6-4.

Caution

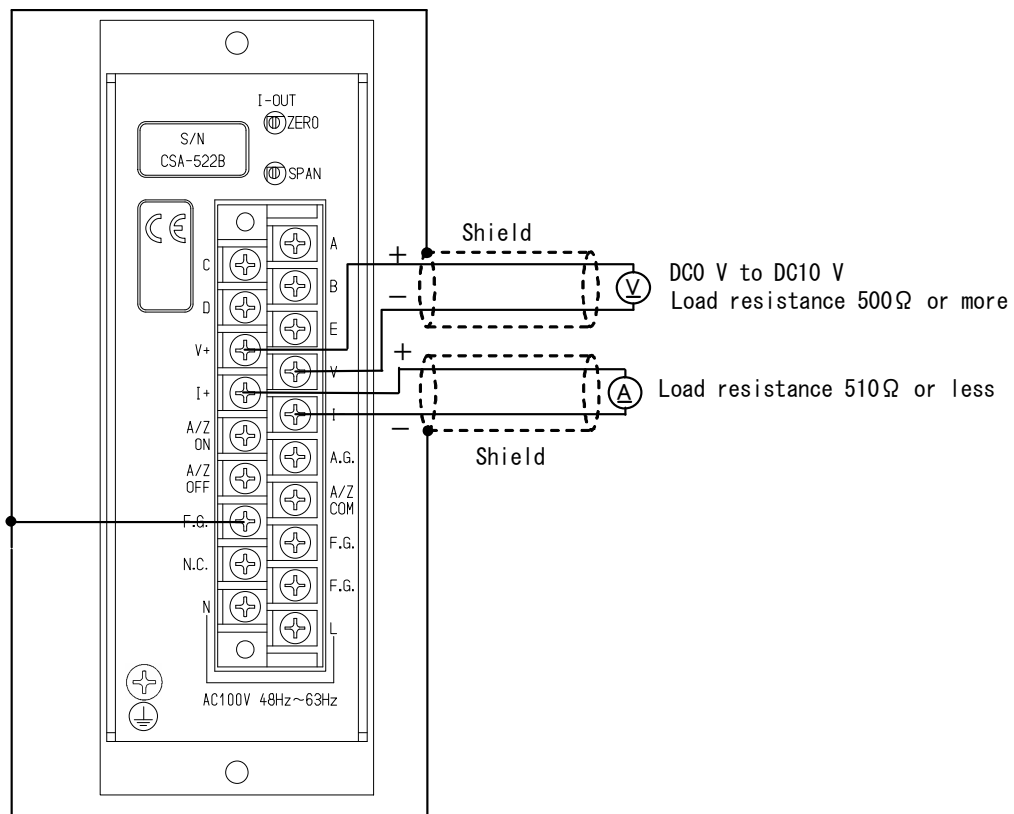
- Connection with power supply and ground should be made securely as the figure indicates and also should be used within the specified condition of power supply.



- The grounding for the instrument should be the D class with single ground. If neglected, it may cause an unexpected malfunction due to the effects of noise from the other equipment.
- GND terminal and F.G. terminal is connected with the frame of the instrument.
- When this instrument suits the CE standard, please execute the single ground with protective earth terminal.

2-5. Connection with analog output

The connection with analog output should be made as follows:

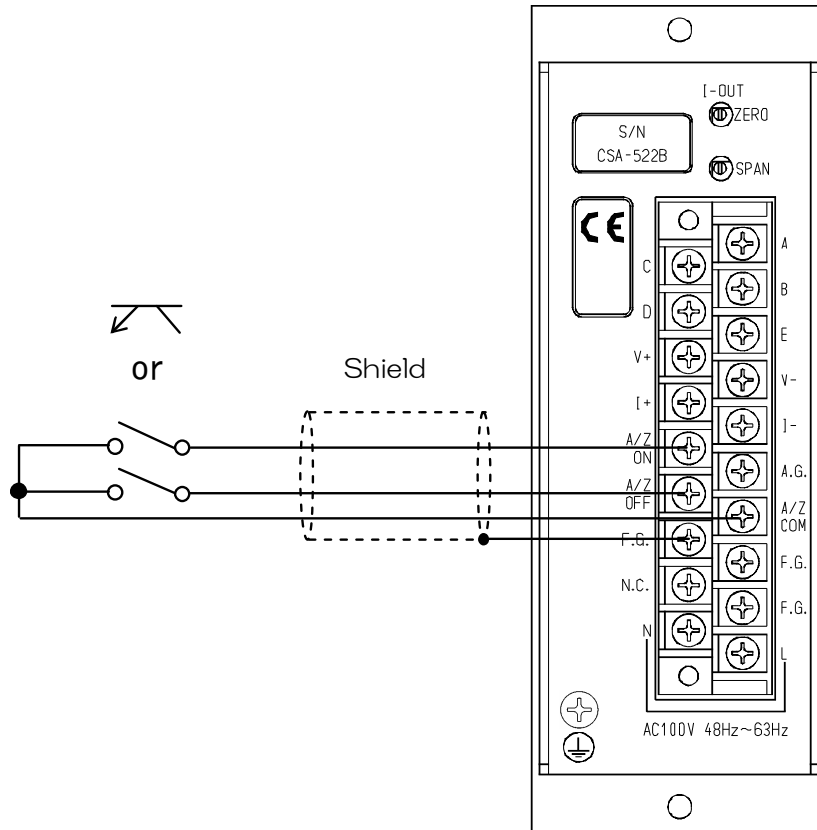


- Please use the shielded cable for the connection with analog output, and connect the shield with F.G. terminal of the terminal block. There is a possibility of causing the malfunction by the influence of the exogenous noise etc. when not connecting it.
- When this instrument suits the CE standard, please make sure to shield the signal cable by mounting this in the storage case or control panel where EMC measures are given with protective earth terminal.

2-6. Connection with the auto zero by the external control input

“A/Z ON” and “A/Z OFF” of the external control input are connected with “COM” terminal by using the point of contact or open collector connection as shown in the figure below. (Effective when the optional CSA522B-P99 is installed.)

Please refer the paragraph 6. for the function of each input



- Please use the shielded cable for the connection with analog output, and connect the shield with F.G. terminal of the terminal block.
There is a possibility of causing the malfunction by the influence of the exogenous noise etc. when not connecting it.
- When this instrument suits the CE standard, please make sure to shield the signal cable by mounting this in the storage case or control panel where EMC measures are given with protective earth terminal.

3. Calibration

3-1. Calibration method

The load calibration method of this instrument has two kinds of the following.

- ① Calibration with actual load
- ② Electrical calibration by the CALIB input



Caution

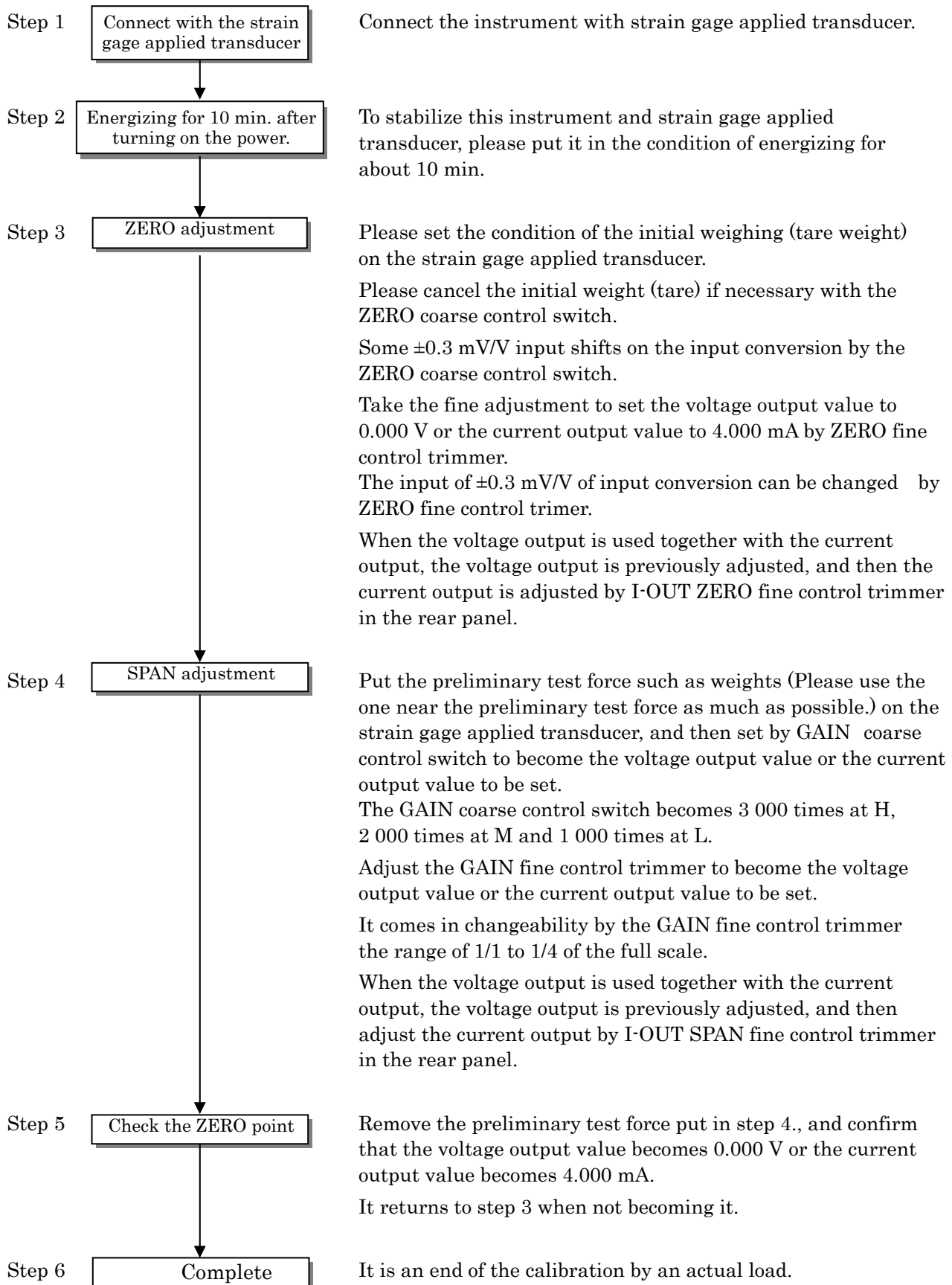
- Before using the new instrument or after exchanging the strain gage applied transducer with a new one, be sure to make calibration. If calibration is not made, the correct measurement results may not be obtained. or it may cause malfunction to the instrument and it may damage the peripheral equipment. Moreover, even if calibration has made, there may occur the similar case as above when the result is not correct. So, make precise calibration again.
- When the auto zero option (CSA-522B-99) is applied, please calibrate with pushing the A/Z OFF switch, or shorten between A/Z OFF and A/Z COM for about 100 ms or more.
- Please make the calibraton while the CALIB switch turns off.



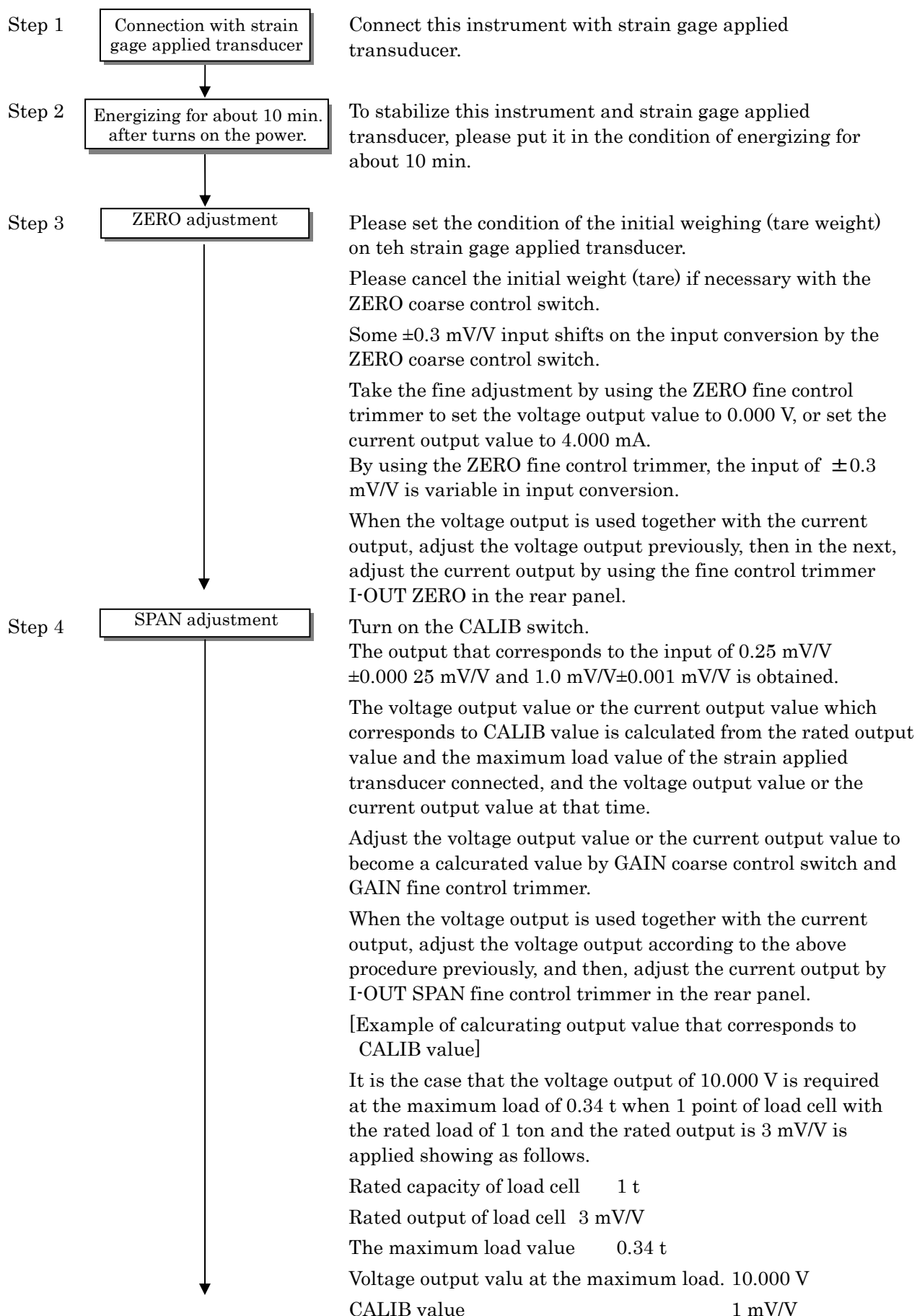
- The accuracy of calibration by CALIB input is 1/500 or so.

3-2. Calibration procedure

4-6. Calibration by actual load



4 - 7 . Calibration by CALIB input



(Load cell output value at the maximum load)

$$\frac{(\text{Rated output value of load cell}) \times (\text{The maximum load value})}{(\text{Rated load value of load cell})}$$
$$= \frac{3 \text{ mV/V} \times 0.34 \text{ t}}{1 \text{ t}}$$
$$\approx 1.02 \text{ mV/V}$$

(Voltage output value corresponding to CAL value)

$$\frac{(\text{Voltage output value at the maximum load}) \times (\text{CALIB value})}{(\text{Load cell output value at the maximum load})}$$
$$= \frac{10.000 \text{ V} \times 1 \text{ mV/V}}{1.02 \text{ mV/V}}$$

$$\approx 9.804 \text{ V}$$

Accordingly, the voltage output value at turning on the CALIB switch is adjusted to 9.804 V by GAIN fine control trimmer.

Step 5

Confirm ZERO point

Turn of the CALIB switch.

Confirm to the voltage output value becomes 0.000 V or the current output value becomes 4.000 mA.

Otherwise, it returns to step 3.

Step 6

Completing calibration

The calibration by CALIB input is completed.



Caution

- Please make the rated output value of the load cell used in the calculator with the value written in the individual inspection data sheet.

4. Function and operation

4-1. Setting of ZERO adjustment

Zero point can be changed by ZERO coarse control switch and ZERO fine control trimmer.

ZERO coarse control switch	Variable range by ZERO fine control trimmer
+	Approx.0.3 mV/V to Approx.0.6 mV/V
0	Approx. -0.3 mV/V to Approx.0.3 mV/V
—	Approx.-0.6 mV/V to Approx.-0.3 mV/V

4-2. Setting of GAIN adjustment

Sensitivity can be changed by GAIN coarse control switch and GAIN fine control trimmer.

GAIN coarse adjustment switch	Variable range by GAIN fine control trimmer	Sensitivity
M	0.5 mV/V to 2.0 mV/V	Approx. 500 times to Approx. 2 000 times
H	0.35 mV/V to 1.4 mV/V	Approx. 750 times to Approx. 3 000 times
L	1.0 mV/V to 4.0 mV/V	Approx. 250 times to Approx. 1 000 times

The variable range above mentioned is input conversion to get the output of DC10V.
(When the bridge power supply voltage is set as DC10V.)

4-3. Setting of CALIB value

The voltage or the current corresponding to the CALIB set value (input conversion value) is output.

CALIB switch	Input conversion value to be output
0.25 mV/V	0.25 mV/V \pm 0.000 25 mV/V
OFF	0 mV/V
1.0 mV/V	1.0 mV/V \pm 0.001 mV/V

4-4. Setting of frequency response

Frequency response can be selectable.

FILTER switch	Frequency response	Attenuation rate
ON	1 Hz or 30 Hz	-12 dB/oct bessel type
OFF	25 kHz	-6 dB/oct

The changeover of 1 Hz and 30 Hz at FILTER ON is selected by DIP switch on circuit board.
When both 1 and 2 of DIP1 on the printed circuit board turns OFF, 1 Hz is selected.
(The standard is 30 Hz. The setting is that both 1 and 2 of DIP1 turns ON.)

4-5. Setting of bridge power supply voltage

The bridge power supply voltage is selectable.

Please select the voltage value less than the maximum rated voltage of a strain gage applied transducers.

G.V. switch	Bridge power supply voltage
5 V	5 V \pm 0.15 V
10 V	10 V \pm 0.3 V
2.5 V	2.5 V \pm 0.075 V



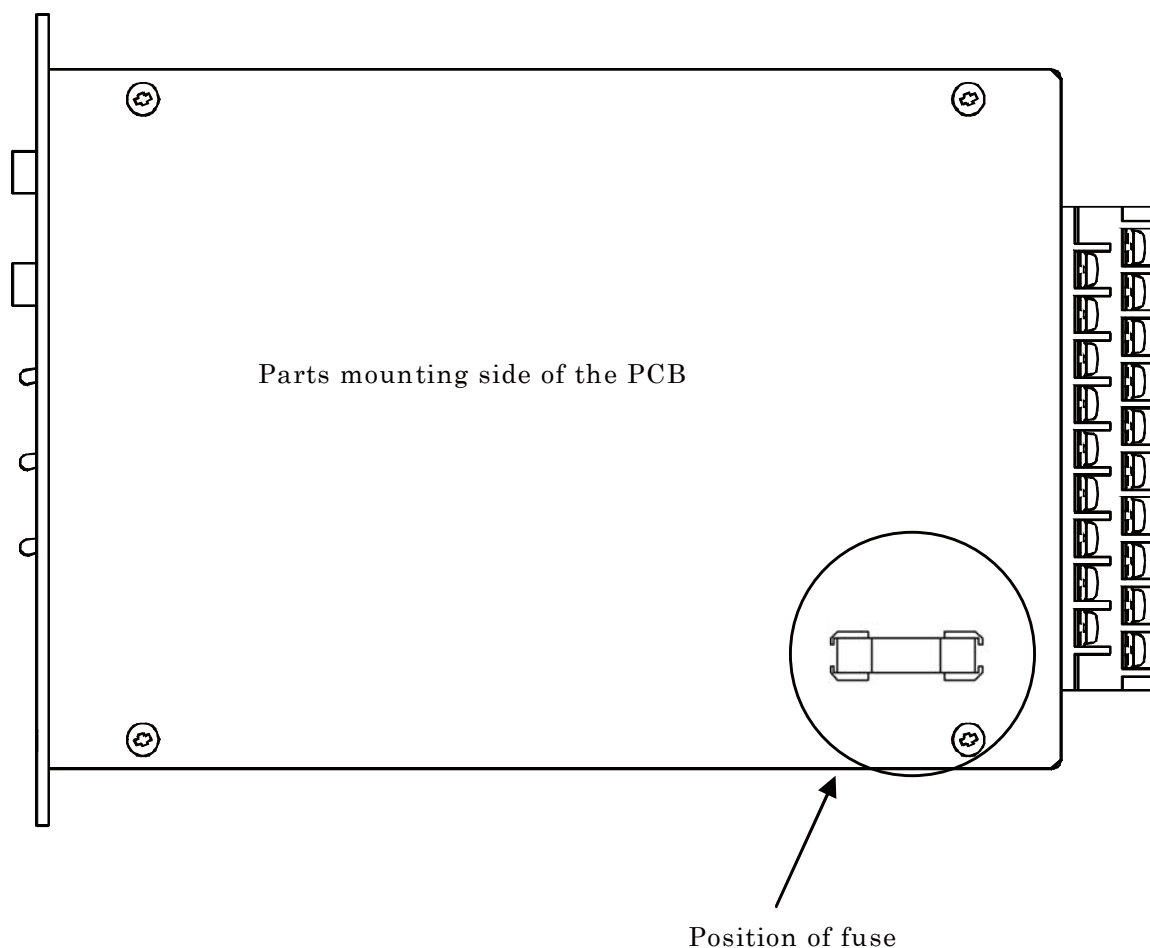
● Please execute the calibration again when the bridge power supply voltage is changed.

5. How to change the Fuse

Caution

- When the procedure of installing the fuse, and the capacity of installed fuse is improper, it will cause an unexpected failure.

- ① Turn off the power supply to the terminal of this instrument.
- ② Detach the screw (M2.6 x 5) of 4 points at the right side of the front panel, and remove the cover.
- ③ Replace the fuse (1 A) attached at the parts mounting side of PCB showing as follows.
- ④ Put the cover, and install the screw to 4 points.

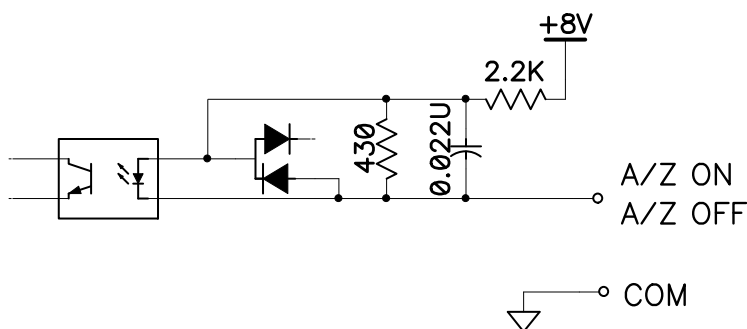


6. Option

6-1. Auto zero (CSA522B-P99)

- | | | |
|--------------------------------|-------------|--|
| (1) Input range of auto zero | : | within ± 2.4 mV/V |
| (2) Range of auto zero | : | within ± 10 V |
| (3) Required time of auto zero | : | within approx. 1 s |
| (4) Accuracy of auto zero | : | within ± 5 mV |
| (5) Back-up time | : | Approx. 10 years (under the usage of Lithem battery) |
| (6) Temperature effect | Zero point | : within ± 0.005 %F.S./ $^{\circ}$ C |
| | Sensitivity | : within ± 0.005 %F.S./ $^{\circ}$ C |

6-1-1. Equivalent circuit of external input



6-1-2. Explanation of the function

(1) A/Z ON

When the “A/Z ON” switch at the front panel is pressed, or shorten the terminal between A/Z ON and COM for about 100 ms or more, auto zero (tare weight cancellation) is executed, and the voltage output value and the current output value becomes zero. The voltage output value or the current output value becomes the output for net weight.

(2) A/Z OFF

When pressing the “A/Z OFF” switch, or shorten the terminal between A/Z OFF and COM for about 100 ms or more, the function of auto zero clear (tare weight cancellation clear) will work. The voltage output value or the current output value becomes the output of gross weight.

Caution

- Don't press the A/Z ON switch in the condition of pressing the A/Z OFF switch. It enters the adjustment mode for our maintenance, and it becomes a fixed output of DC0 V compulsorily, and AUTO ZERO LED blinks.
Please push the A/Z ON switch with the A/Z OFF switch pushed again, and make clear the adjustment mode when it enters the adjustment mode by mistake.



- The operation of A/Z ON and A/Z OFF by the external control input is started when the input signal is shorten for about 100 ms or more.
- Don't execute the A/Z OFF during the 1 second executing the A/Z ON by the external control input and the switch at the front panel.
- When the optional auto zero is attached, the temperature effect of auto zero is added on the standard temperature effect.
- When the condition changes by the external control input, please confirm the timing of the changeover, and adjust the timing by processing the timer if necessary.

6-2. Power supply voltage AC110 V (CSA522B-P61)

Power supply voltage AC110 V (Permissible variable range AC99 V to AC127 V)

Power supply frequency 50/60 Hz

Power consumption Approx.15 VA

6-3. Power supply voltage AC200 V (CSA522B-P63)

Power supply voltage AC200 V (Permissible variable range AC180 V to AC220 V)

Power supply frequency 50/60 Hz

Power consumption Approx.15 VA

6-4. Power supply voltage AC220 V (CSA522B-P64)

Power supply voltage AC220 V (Permissible variable range AC198 V to AC253 V)

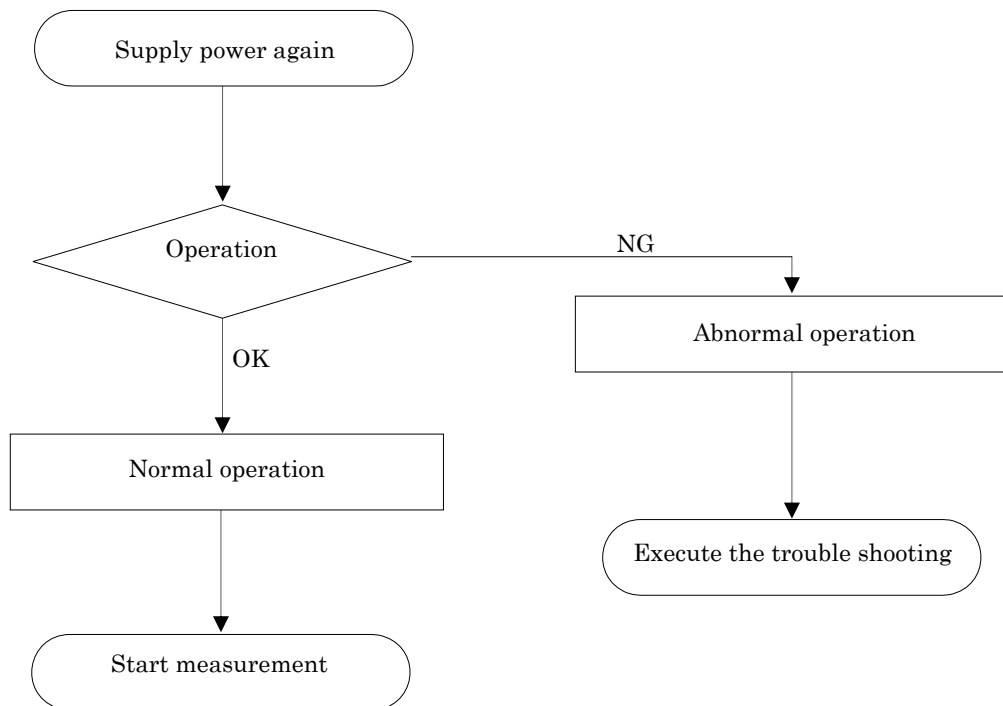
Power supply frequency 50/60 Hz

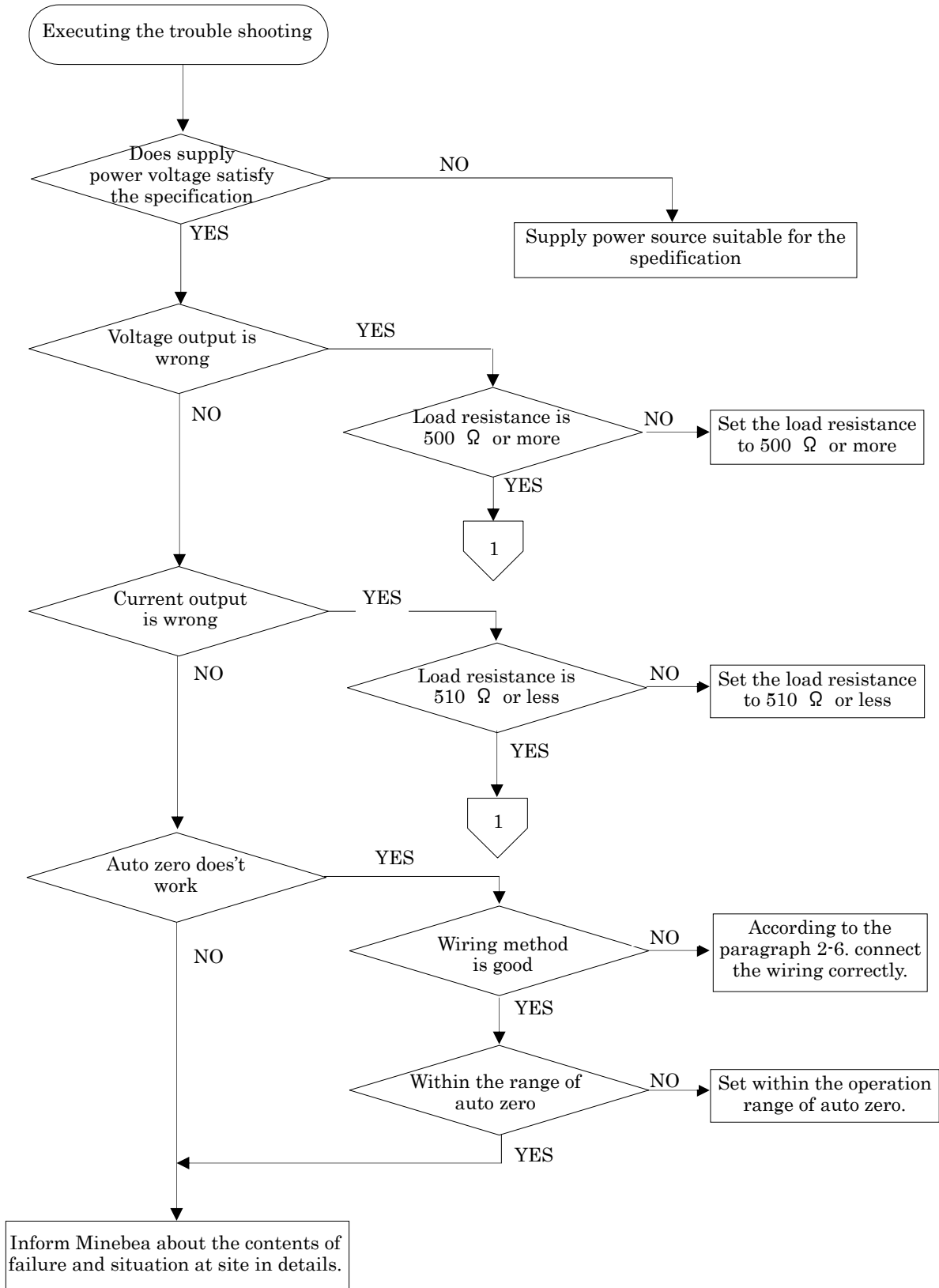
Power consumption Approx.15 VA

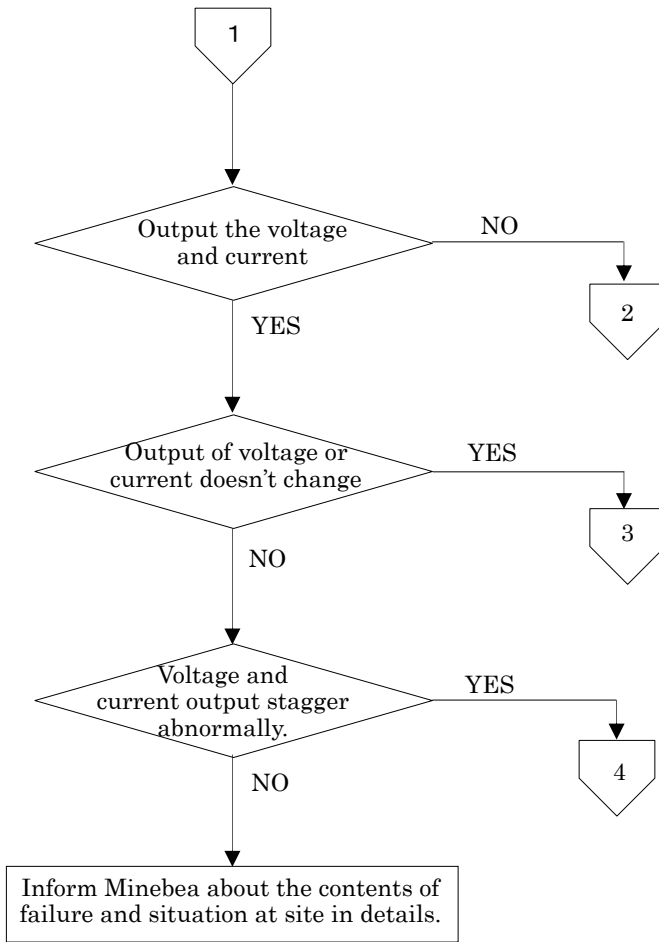
7. Trouble shooting

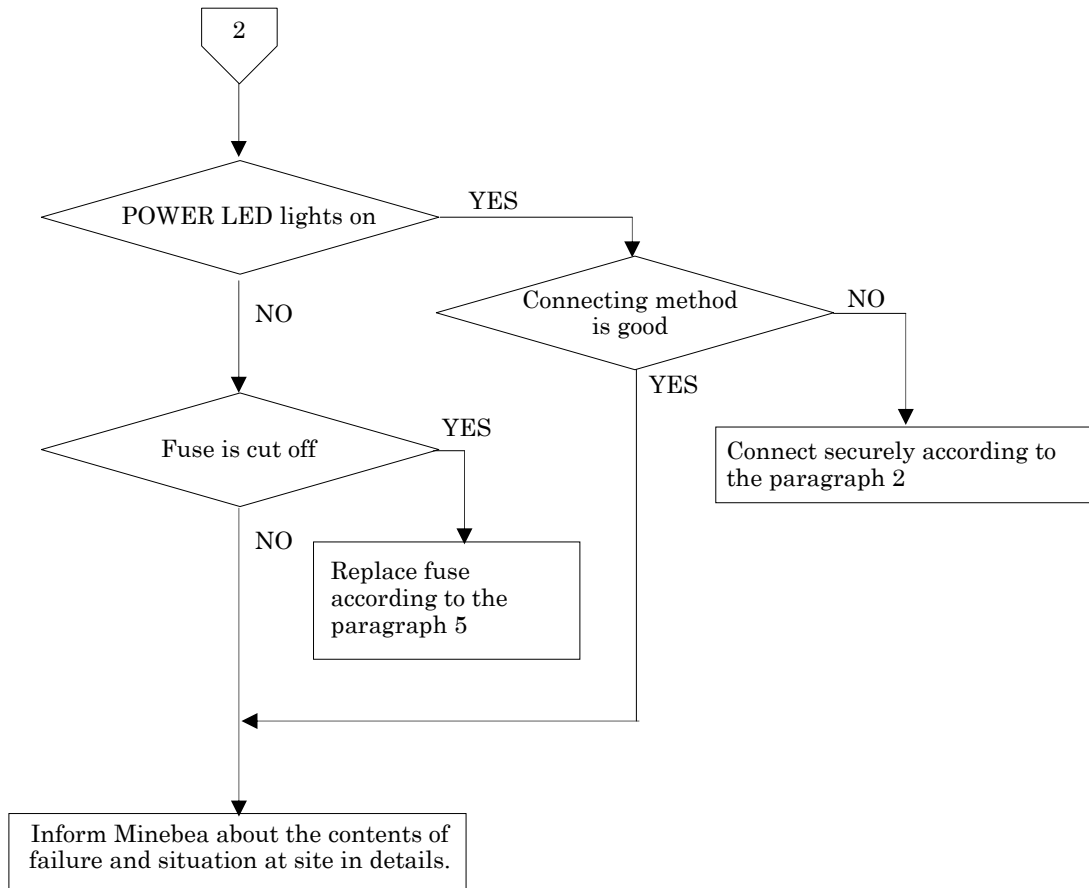
Please check the instrument according to the following procedures when abnormality is found in operation.

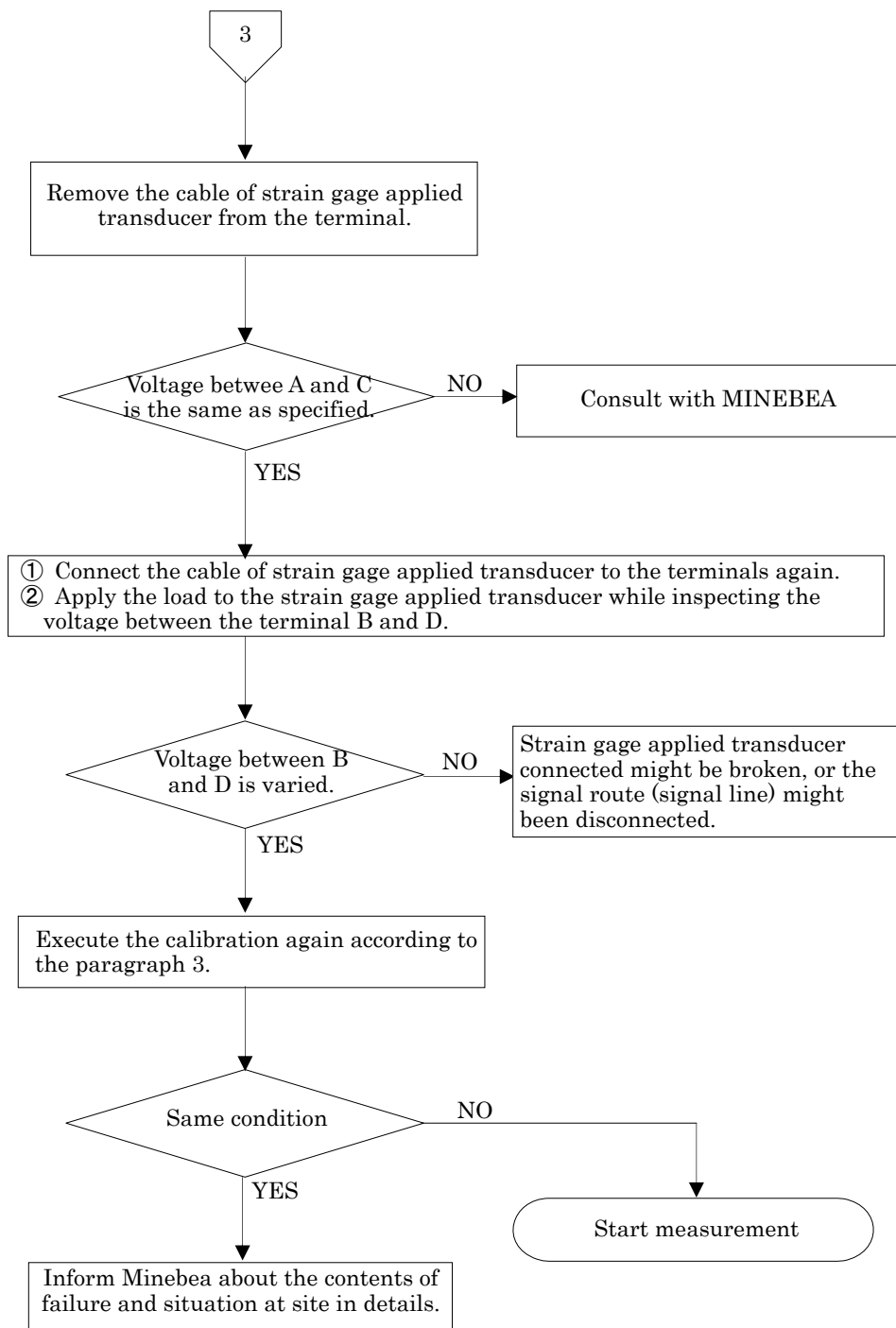
Moreover, please contact with MINEBEA when there is no corresponding item, and the symptom does not disappear even if the solution is done.



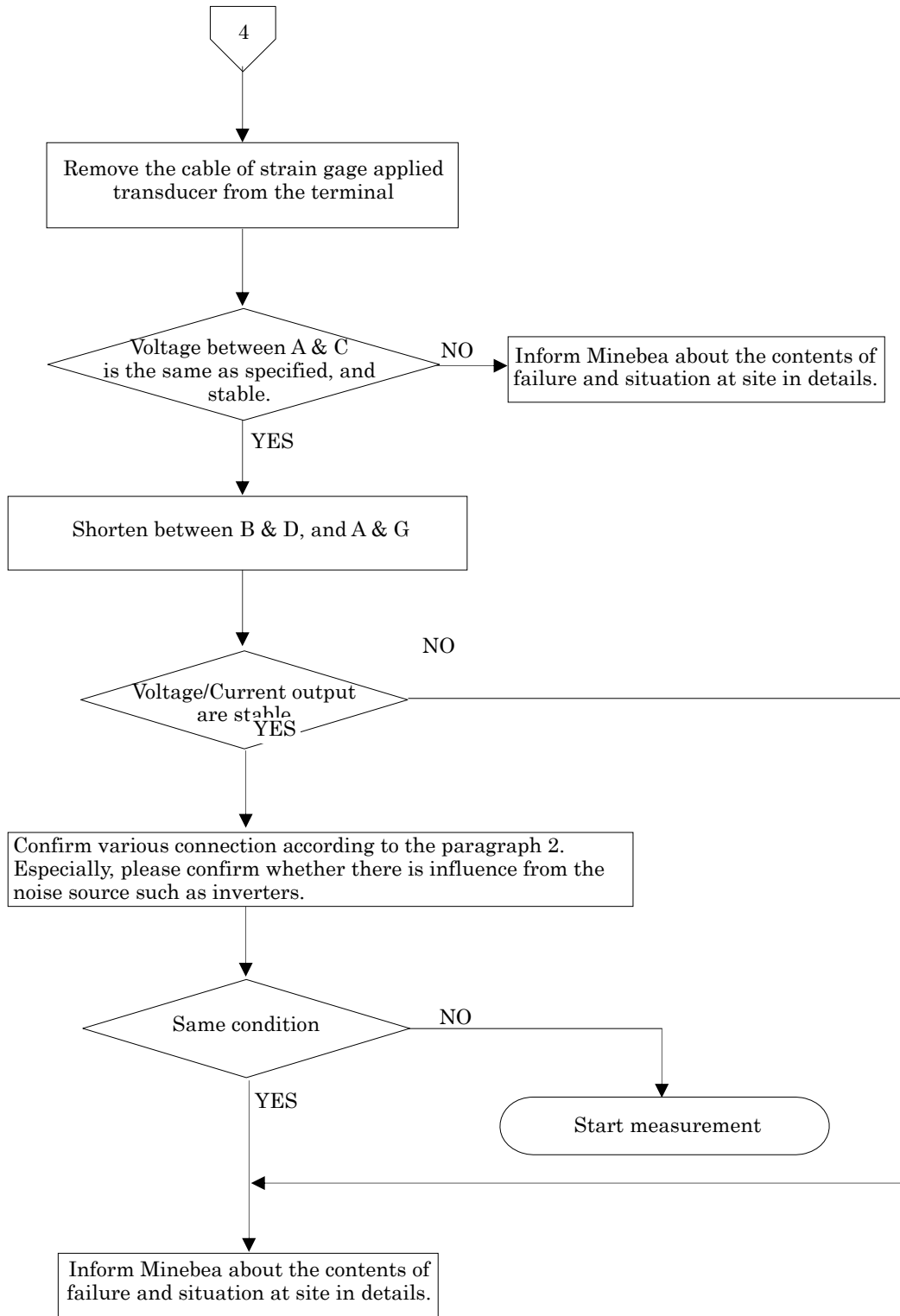








- In confirming the voltage between A and C, please set the connection range of the measuring instrument such as tester to DC·V.
- In confirming the voltage between B and D, please set the connection of the measuring instrument to DC·mV.



- In confirming the voltage between A and C, please set the connection range of the measuring instrument such as tester to DC·V.
- In confirming the voltage between B and D, please set the connection of the measuring instrument to DC·mV.

8. Specifications

8-1. Specifications

Bridge power supply		DC10 V \pm 0.3 V within 120 mA (Changeable to DC2.5 V and DC5 V)
Applicable transducer		Strain gage applied transducer from 60 Ω to 2 k Ω
Input range		0.35 mV/V to 3.5 mV/V
Output		\pm 10 V, \pm 20 mA(Non-isolation)
Load resistance on output		500 Ω or more
Adjustable range on sensitivity		L : 1 000 times, M : 2 000 times, H : 3 000 times Adjusted 1/1 to 1/4 against each setting
Adjustable range on zero point		\pm 0.6 mV/V
Non-linearity		0.005 %F.S.
Temperature coefficient (voltage)	Zero point	\pm 0.2 μ V/ $^{\circ}$ C(Input conversion)
	Sensitivity	\pm 0.005 %F.S./ $^{\circ}$ C
CALIB		0.25 mV/V \pm 0.000 25 mV/V and 1 mV/V \pm 0.001 mV/V
Frequency response		1 Hz or 30 Hz (-12 dB/oct) Bessel type (Selectable by dip-switch on P.C. board) and 25 kHz (-3 dB)
Current output		DC4 mA to 20 mA (Non-isolation, at the output of DC0 V to 10 V)
Load resistance on current output		510 Ω or less
Non-linearity on current output		0.05 %F.S. or less
Temperature coefficient (Current)	Zero point	\pm 0.01 %F.S./ $^{\circ}$ C
	Sensitivity	\pm 0.01 %F.S./ $^{\circ}$ C

8-2. General specification

Operating temperature /humidity range	temperature	-10 $^{\circ}$ C to 50 $^{\circ}$ C
	humidity	85 %RH or less (Non condensing)
Power supply	Power supply voltage	AC100 V (Permissible variable range AC90 V to AC110 V)
	Power supply frequency	50/60 Hz
	Power consumption	Approx.15 VA
Insuration resistance		DC500 V 100 M Ω or more between the power supply line and case
Withstand voltage		AC1 500 V in 1 min. between the power supply line and case
Outline dimensions(W \times H \times D)		49.5 mm \times 138 mm \times 173.6 mm (Excludes protruding parts.)
Weight		Approx.1.2 kg

8-3. Accessories

Instruction manual	1 piece
Time lag fuse	1 piece(1 A)
Minus driver	1 piece

8-4. Options

8-4-1. Auto zero

P/N	CSA522B-P99	
Input range of auto zero	within ± 2.4 mV/V	
auto zero range	within ± 10 V	
Required time for auto zero	within approx. 1 s	
Accuracy of auto zero	within ± 5 mV	
Back-up time	Approx. 10 years (with the usage of Lithium battery)	
Temperature coefficient	Zero point	± 0.005 %F.S./ $^{\circ}$ C
	Sensitivity	± 0.005 %F.S./ $^{\circ}$ C

8-4-2. Power supply voltage

P/N	CSA522B-P61	
Power supply voltage	AC110 V (Permissible variable range AC99 V to AC127 V)	
Power supply frequency	50/60 Hz	
Power consumption	Approx. 15 VA	

P/N	CSA522B-P63	
Power supply voltage	AC200 V (Permissible variable range AC180 V to AC220 V)	
Power supply frequency	50/60 Hz	
Power consumption	Approx. 15 VA	

P/N	CSA522B-P64	
Power supply voltage	AC220 V (Permissible variable range AC198 V to AC253 V)	
Power supply frequency	50/60 Hz	
Power consumption	Approx. 15 VA	

8-5. Standard specification at the shipment

Bridge power supply	DC10 V	
Sensitivity adjustment	1 000 times (DC10 V output at 1.0 mV/V input)	
Range of frequency response	30 Hz (-12 dB/oct) Bessel type, and 25 kHz (-3 dB)	

9. Warranty

9-1. Warranty

- The instrument is covered by a warranty for a period of one year from the date of delivery.
- As for repairs and/or after service is required during the period of warranty, contact with Minebea's sales office or sales agent from which you have purchased.

9-2. Repair

Before asking repairs, make checks once again that the connection, setting and adjustment for the instrument have finished properly by referring to 9. Trouble shooting.

Especially, make checks whether the connections of sensors are disconnected or cut off.

After that, still there may be found some defects in the instrument, contact with Minebea's sales office or sales agency from which you have purchased.

- The contents of this manual may subject to change without notice.

HEAD QUARTER : **MINEBEA CO., LTD.**

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