NMB

MINEBEA CO., LTD.

INSTRUCTION MANUAL

TRANSMITTER:CSA-504S-1B

Note: Please read this Instruction manual carefully before use.
Be sure to follow the items that require attention described in the manual.
Keep the manual at hand so that you can pick it up and read it as soon as necessity requires.

"Recycled papers"

DRW.No. EN294-1065A

NMB

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PRIOR TO APPLICATION

TRANSMITTER : CSA−504S−1B

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FORWARD

Thank you very much for your purchasing Minebea Transmitter CSA-504S-1B.
This manual explains installation procedures and connecting method and operating method for Transmitter CSA-504S-1B.
Use properly after reading through the manual carefully.

This manual is intended for technical experts to read.
Be sure to deliver the manual to the end user.
Moreover, the end user should keep the manual at hand after reading it over.

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

- The instrument is covered by a warranty for a period of one (1) year from the date of delivery.

Marks and arrangements used in this manual.

The following marks are attached 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 that may cause injury or accident that may harm to the operator. Don't do these things described here.

	●Notice and limitation during operating and working. Be sure to read the item to prevent malfunction.

For safe operation

Be sure to read this manual before use.

1.Installation place

● Use the instrument where the temperature/humidity specifies within the range as follows.

Environmental temperature: 0 ℃ to 50 ℃
Environmental humidity : 20 % to less than 80 % R.H.
(Non−condensing.)

(1)Places where installation is not allowed.

Warning ●Do not locate the instrument on the places such as follows: It causes unexpected faulty in the instrument.

•Don't use the instrument where water/moist exists a lot.

•Don't locate the instrument in direct and/or high temperature area.

•Don't install the instrument where there is high mechanical vibration.

•Do not use the instrument where there are excess of dusts and fine particles.

•Do not install the instrument where there is rapid change of temperature and humidity.

•Do not install the instrument near the devices that become magnetized or generate an electromagnetic field.

•Avoid the location where chemical reaction my cause such as in a labora−tory or like that.

(2)Installing the instrument

●When installing the instrument, secure the space around the instrument.

As for the dimensions, refer to (17) Outline dimensions in Page 17.

⚠Warning ●In order to prevent from damage to the instrument and electric shock to the operator, be sure to check the following point.

• Be sure to check that power supply is off when installing/removing the power supply cable or interface cable.

2.Power supply

⚠Warning ●It's very dangerous for you to operate electric instrument, so take care of yourself not to be injured.

• Permissible range for power supply voltage is from DCV ± 15V ± 5 %

If you fine unclear points, please contact with Minebea.

Record of revision

Date	Instruction NO,	Revised reasons (contents)	Remarks
JUL, 1992	DRW.NO. 11294−1065	First version	
APR, 1999	DRW.NO. EN294−1065A	Due to FN99−2056.: "Recycled papers"	

** CONTENTS **

§ 1. General

The instrument is a card method ultra compact amplifier for the application of transducer.

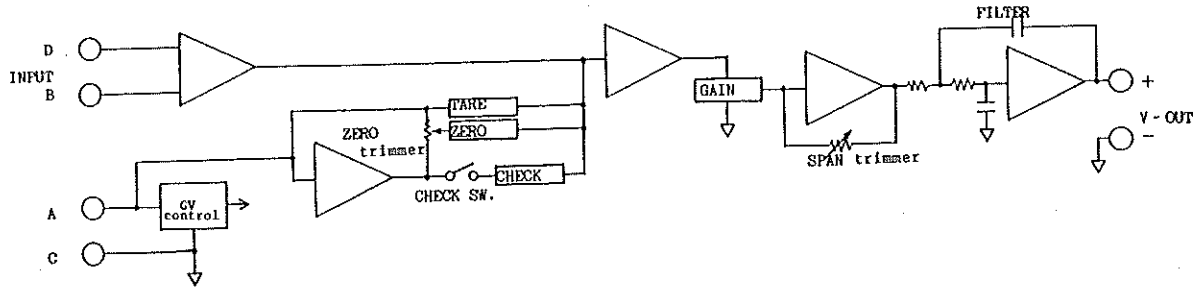
§ 2. Features

Due to ultra compact type, installation space will be reduced widely.
So it is the most suitable for built-in equipment in system applications.

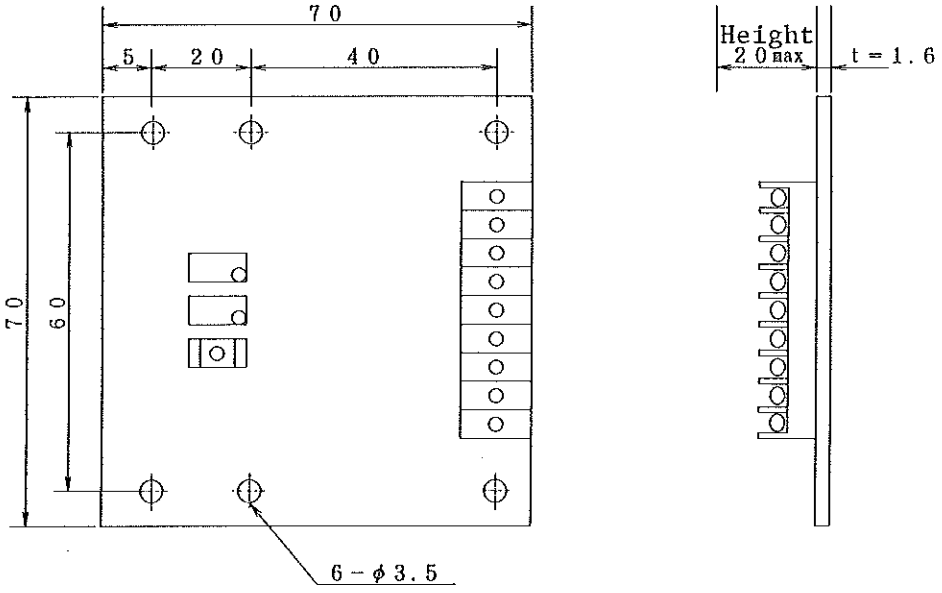
§ 3. Specifications

(1) Bridge power supply	DC 10V ±10% (Constant)
(2) Number of transducer's connections	Up to 4 pcs of strain gage applied transducers (350Ω)
(3) Input method	Differential input (CMRR 100dB)
(4) Sensitivity	10V output at 1mV/V input (1000 times)
(5) GAIN	1000 times
(6) SPAN adjustment (GAIN fine adjustment)	Adjust ±10% F.S.
(7) ZERO adjustment	±0.1mV/V (Input conversion)
(8) Output	±10V at Max. (Load resistance 1kΩ or more)
(9) Frequency response	DC ~ 10Hz (-3dB)
(10) Non-linearity	Within ±0.05% F.S.
(11) CHECK	Approx. 80% F.S. will be output by internal fixed resistance
(12) TARE	Adjust by internal fixed resistance
(13) Temperature characteristics	ZERO : 2μv/℃ (Input conversion) SPAN : ±0.05% Reading/℃
(14) Operating temperature	Compensated range : 0 ~ 50℃ Operating range : -10 ~ 60℃
(15) Supply voltage	DC ±15V ±5% or AC36V center tap applied (Option)

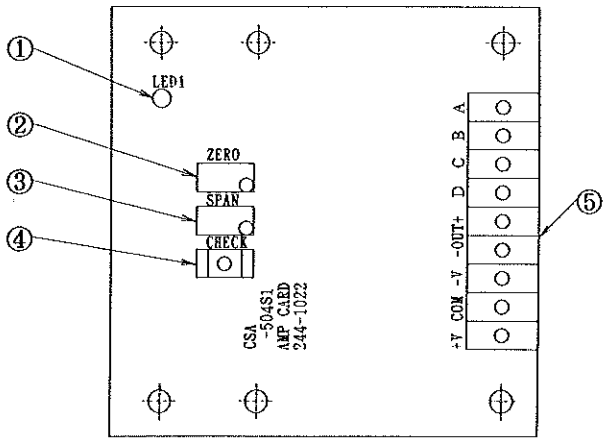
(16) Block diagram



(17) Outline dimensions



§ 4. Each name



① POWER LED
② ZERO adjustment trimmer
③ SPAN adjustment trimmer
④ CHECK SW
⑤ Input/output terminal board

A
B
C
D
— Transducer's connection

OUT ± output
+V : DC +15V
COM : COM
-V : DC-15V

or

AC18V
center tap
AC18V
— AC36V (Option)

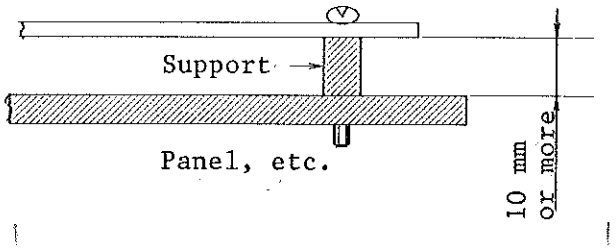
§ 5. Installation

For the safe and complete operation of the instrument, it is important that equipment is installed properly in a suitable location. Ideally, a dry room with a uniform temperature environment will be the most suitable location.

(1) When installing, select a location where mechanical vibration and corrosive gas are minimal, with small temperature change near the normal temperature.
(Temperature range compensated : 0 ~ +50℃)

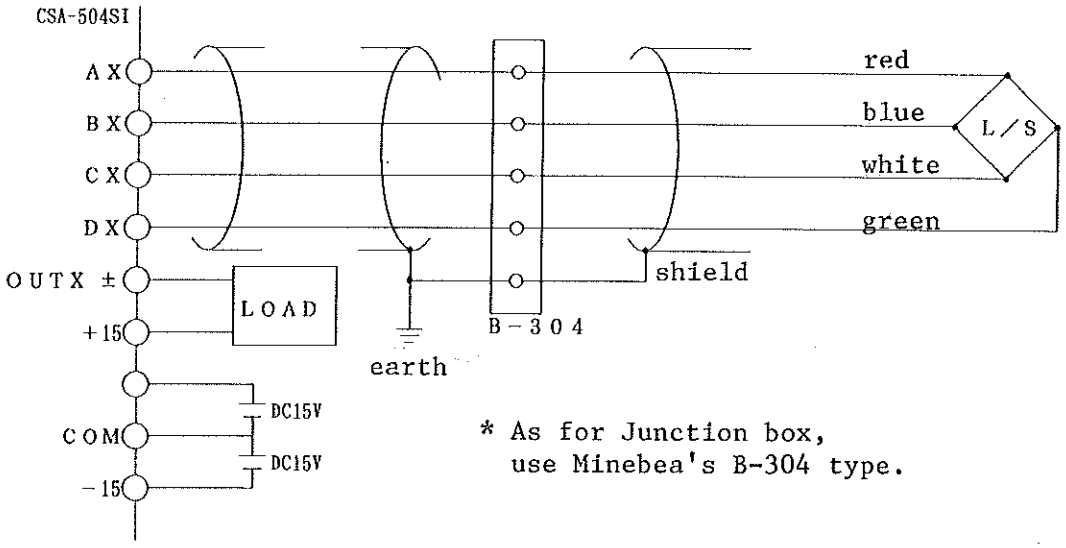
(2) When install an AMP card to the panel directly by using 4 holes worked at the card, place it having the space of 10 mm or more by inserting insulation support. (bakelite, spacer, etc.)

CSA-504SI AMP CARD



§ 6. Connecting method

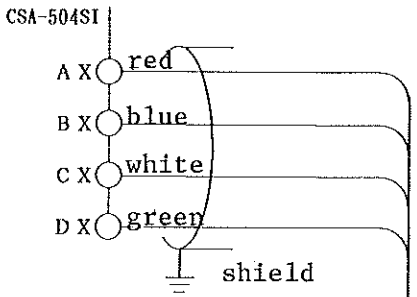
6-1 In case of single transducer's application



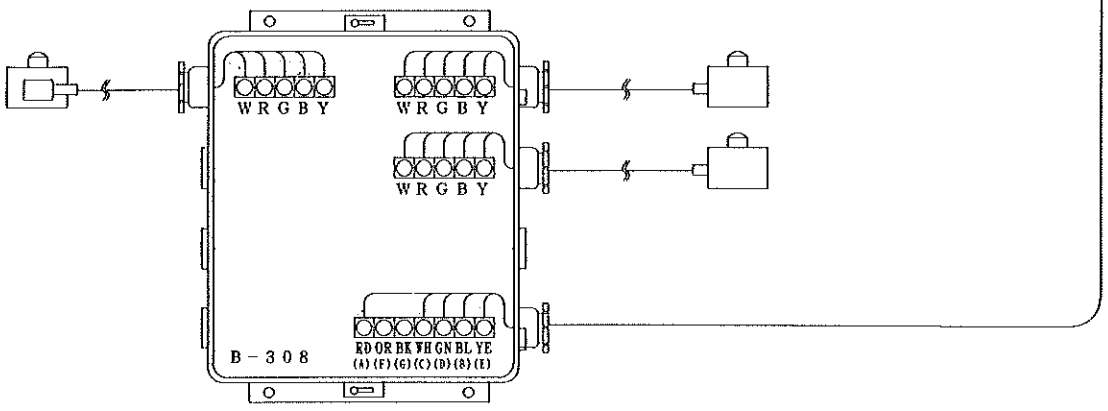
* As for Junction box, use Minebea's B-304 type.

(Note) As a standard, power supply specifies DC ±15V input unless specially required. Take a full care of it when connection with power supply is made.

6-2 In case of 2 ~ 4 pcs of transducers' application



(EX) Load cell's 3(three) points addition



B-308 type
Summing type Junction box

§ 7. Adjustment procedures

Although standard internal adjustment (or required specific adjustment) have been made at the time of shipment from the factory, changes can made by the following procedure, if various changes like bridge voltage, GAIN, TARE value and CHECK value are required.

7-1 Standard adjustment

(1) Bridge voltage	10V
(2) GAIN	1000 times
(3) Sensitivity	Outputs 10V at 1mV/V
(4) TARE compensation	0mV/V
(5) CHECK value	Approx. 0.8mV/V (Input conversion)
(6) Supply voltage	DC ±15V ±5%

7-2 Change of supply voltage

When change of input supply voltage from DC ±15V to AC 36V (center tap applied) is required, apply the procedures as below :

Remove the jumper of JP1, JP2, JP3 and JP4 individually.

Solder three terminal regulator at IC1. (Take care of polarity.)

P/N 78L015P Maker : Toshiba

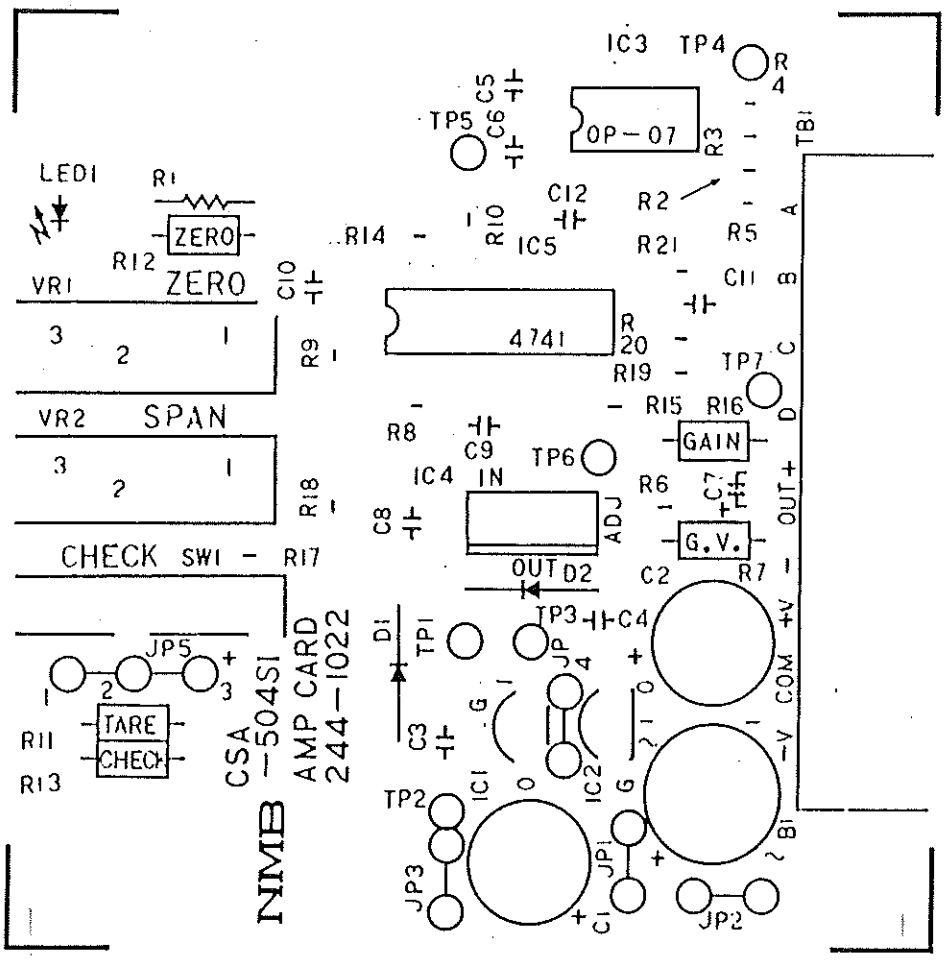
Solder three terminal regulator at IC2. (Take care of polarity.)

P/N 79L015P Maker : Toshiba

Solder diode bridge at B1. (Take care of polarity.)

P/N W-02 Maker : GENREAL INSTRUMENT

◎ Layout of each part



7-3 Adjustment of bridge voltage (Standard adjustment : 10V)

Bridge voltage can be set by changing amplifier's resistance value as below :

Resistance value to set the required bridge voltage can be obtained according to the below formula.

$$R_b = 376 \times V_b - 470$$

R_b = Resistance value for the setting of bridge voltage [Ω]

V_b = Required bridge voltage [V]

Care should be taken that there are limitations of setting due to impedance of transducer and the number of addition. (Output current should not exceed 200mA.)

Moreover, maximum setting value of bridge voltage should be limited to +12V DC.

(Note) Moreover, when sensitivity of transducer exceeds 2mr/v, bridge voltage should be adjusted below 7V or so.

Bridge voltage	RX 02 Resistance value	Impedance of transducer	
		350 Ω	120Ω
10V	3.3kΩ	1 ~ 4 points addition	Impossible
5V	1.5kΩ	1 ~ 4 points addition	1 ~ 2 points addition
3V	680 Ω	1 ~ 4 points addition	1 ~ 4 points addition

(Installed as a standard.)

7-4 Adjustment of GAIN (Standard adjustment : 1000 times)

GAIN can be set by changing amplifier's resistance value as shown below :

Required GAIN and resistance value can be obtained from the following formulas (1) and (2).

(1) $$G = \frac{V_o}{V_b \times E} \times 10^3$$

(2) $$R_G = \frac{G}{3K - G} \times 10$$

G : Required GAIN (Max. 1000) [times]
V_o : Required output voltage (Max. 10) [V]
V_b : Bridge voltage [V]
E : Output of transducer applied (actual output) [mV/V]
R_G : Resistance value for GAIN adjustment [kΩ]
K : Constant due to number of adding transducers
(Refer to Table 1.)

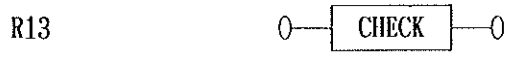
No. of addition	B-308 or B-306 is applied.		B-308 nor B-306 isn't applied.	
	Transducer's impedance		Transducer's impedance	
	350 Ω	120Ω	350Ω	120Ω
1	K= 180	K= 190	K= 333	K= 369
2	K= 247	K= 256	K= 360	K= 380
3	K= 281	K= 289	K= 370	K= 383
4	K= 302	K= 309	K= 375	K= 385

(Table 1)

Front panel SPAN adjustment trimmer performs fine adjustment of ±10% of GAIN.

7-5 Adjustment of CHECK value (Standard adjustment : 0.8mV/V)

CHECK value can be set by changing amplifier's resistance value as below :



Resistance value to set required CHECK value can be obtained according to the below formula.

$$R_C = \frac{10}{E \times K \times X} \times 10^3$$

R_C : Resistance value for setting CHECK value [KΩ]

E : Output of transducer applied (actual output) [mV/V]

K : Constant due to addition of transducers
(Refer to Table 1.)

X : Rate of CHECK value to the output of transducer
Normal X = 0.8
In case of 10% X = 0.1

7-6 Adjustment of TARE compensation value (Standard adjustment : 0mV/V)

This function is for the cancellation of initial load (TARE) of transducer.

TARE compensation value can be set by changing resistance value of amplifier card as below :

Resistance value to set required TARE compensation value can be obtained according to the below formula.

$$R_T = \frac{10}{E_T \times K} \times 10^3$$

R_T : Resistance value for the setting of TARE compensation value [kΩ]

E_T : Tare weight [mV/V]

K : Constant due to addition of transducers
(Refer to Table 1.)

§ 8. Operating procedures

(1) Make connections between transducer and main body (CSA-504S1).
(Refer to § 6 Connecting method, and take care of supply voltage.)

(Note) In the connections of the instrument, power supply is used with 4CH commonly. However, connection with transducer can be available with single CH operation. (Ex. 2CH only)

(2) Feeding power and make confirmation POWER LED lights.

(3) Adjust output voltage to 0.000V by using ZERO adjustment trimmer.

(4) In order to become the required output voltage, adjust by using SPAN adjustment trimmer with the load applied.

(5) Remove the load and make confirmation of ZERO. If ZERO is not obtained, repeat from the procedure of item (3).

(6) After completing the load calibration, press CHECK SW to record the output voltage.

(7) Hereinafter, apply SPAN adjustment in order to become this CHECK value.

§ 9. Accessories

(1) Small minus driver ... 1 pce
(2) Instruction manual (this book) ... 1 pce

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

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