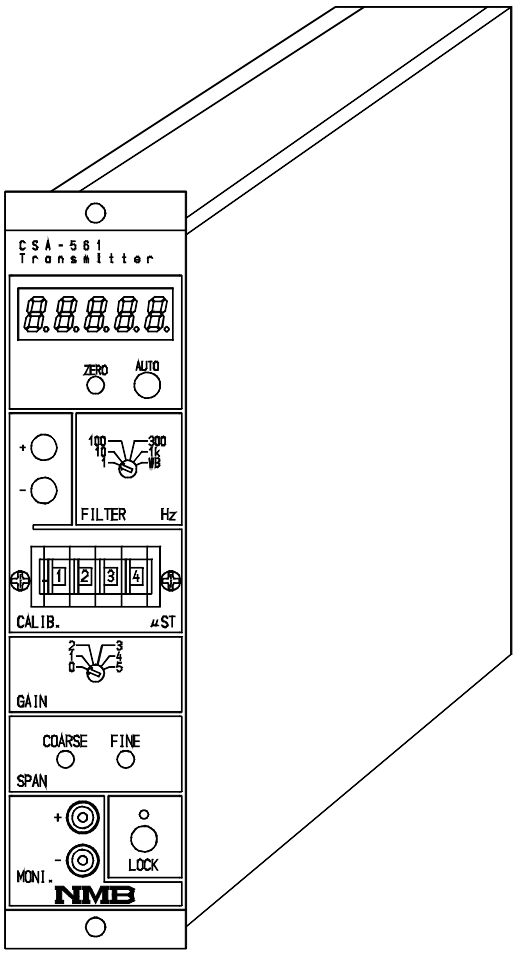
MINEBEA CO., LTD.

Instruction manual

DC DYNAMIC STRAIN AMPLIFIER

CSA-561



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 read it as soon as necessity requires.

EN294-1050G

RECORD OF REVISION

DATE	INSTRUCTION MANUAL NO.	REMARKS
FEB. 1996	DRW. NO. 11294-1050	Due to classification of documents for ISO.
MAR. 1996	DRW. NO. 11294-1050A	Corrections in some sentences and length of wiring in synchronous operation are added.
SEP. 1996	DRW. NO. 11294-1050B	Change in changeover voltage for bridge voltage.
MAR. 1999	DRW. NO. EN294-1050C	Due to FN96-2117, FN97-2006, FN98-2036, FN98-2119 and FN99-2029 Changed point ・All the sentences in the paragraph 4-1 is changed. Added point ・The phrase of “In case of Combined adjustment has made” was added in the paragraph 4-3-4.
APR. 1999	DRW. NO. EN294-1050D	Due to FN99-2056. “Recycled paper”
DEC. 2003	DRW. NO. EN294-1050E	Due to FN03-02176 -Addition- ・Notes for external control is added.
FEB. 2010	DRW. NO. EN294-1050F	Due to FN10-02026. Front cover`s logo is changed.
OCT 2010	DRW. NO. EN294-1050G	Due to FN10-02140 Minebea logo is changed.

------ FORWARD ------

Thank you very much for your purchasing Minebea's Transmitter for Torque transducer (for exclusive use) CSA-561.
This Manual explains installation procedure and connecting method and operating method for Transmitter for Torque transducer CSA-561.
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 close at hand after reading over.

* The contents of the Manual may subject to change without notice.

** 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" for each item.
Be sure to read the items where these marks are attached.

⚠ Warning	• Warning causes injury or accident that develop into harm to the operator.

	• Caution during operation and working. Be sure to read the item to prevnet malfunction.

Mark during operation

 • Press the SW.

For safe operation

Be sure to read this Instruction Manual before use.

1. Installation place

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

Environmental temperature : -10~50 ℃

Environmental humidity : Less than 85 %R.H. (Non-condensing.)

(1) Places where installation is not allowed.

Warning • Do not install the instrument on the places such as follows :
It causes unexpected faulty of the instrument.

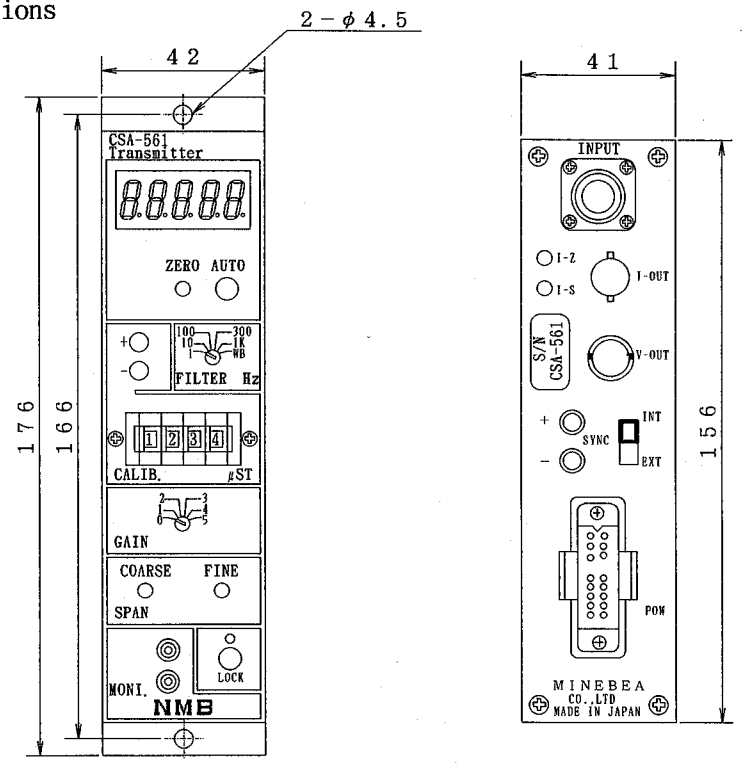
- Don't locate the instrument in direct and /or high temperature area.
- Don't use the instrument in a high humid area.
- Do not install the instrument where there is high mechanical vibraion.
- Do not use the instrument where there is excess of dust and fine particles.
- Do not install the instrument where there is rapid change of temperature and humidity.
- Do not install the instrument near the devices that are magnetized or generate electromagnetic fields.
- Avoid the location where chemical reaction may cause, such as loboratory like that.
- Don't use the instrument in the atmosphere where corrosive gas and salt may exist.

(2) Installing the instrument

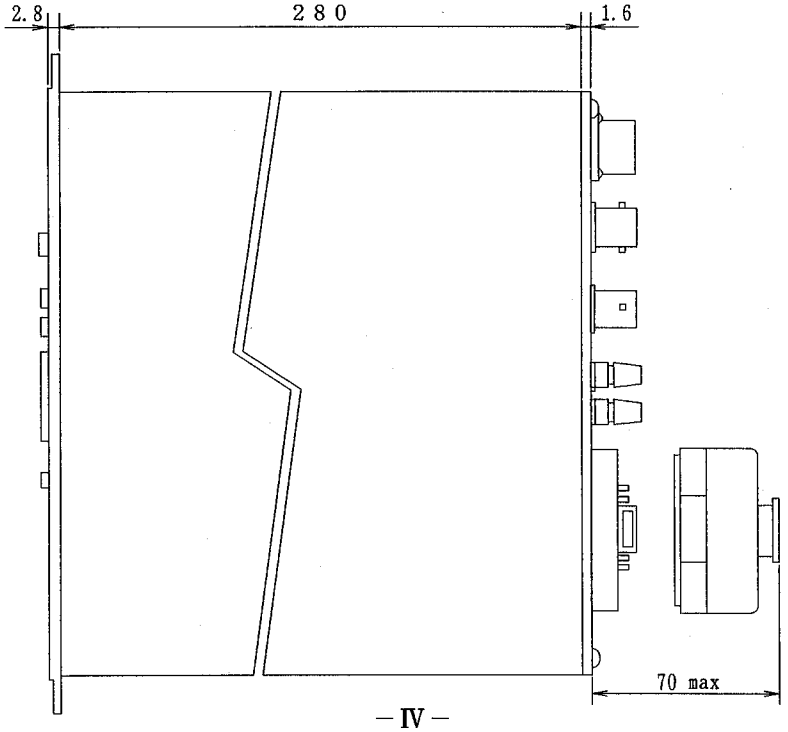
When installing the instrument, install as referring to the below figure and secure the space around the instrument.

Each dimension and required dimension for the environment are as follows :

Installing dimensions

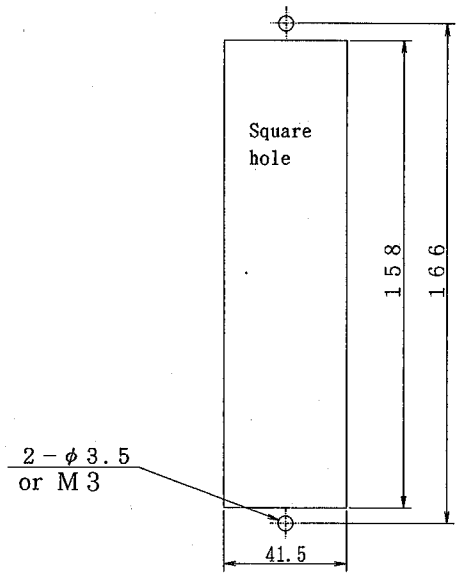


Required space



Unit:mm

Panel cut dimensions



Unit : mm

⚠Warning When you install the instrument, take care for the following point to prevent from faulty of the instrument and electric shock to the operator.

- Installation/removable of power supply cable and interface cable should be made after checking the power is not supplied.

2. Power supply

⚠ Warning It is very dangerous for you to operate electric instrument, so take care not to injure yourself.

- Allowable range of power voltage and frequency is AC100 V+10 %, -15 %, 50/60 Hz.

- Be sure to confirm the indication of supply voltage of the instrument. If you find unclear points, please contact Minebea.

INSTRUCTION MANUAL

CONTENTS

1 General

1-1 Features

① Calibration value with 4 digits digital SW
The instrument can set between 1μst and 9999 μst with the step of 1μst by the operation of 4 digits digital SW.

② Digital display monitor
The instrument adopts 4 1/2 digits digital display for monitoring output voltage and 1 mV monitoring is possible.

③ Electronic automatic balance function
By pressing the "AUTO" button, initial imbalance up to ±2.5 mV/V can be internally cancelled automatically.
Moreover, condenser type battery is adopted for back-up system of automatic balance.

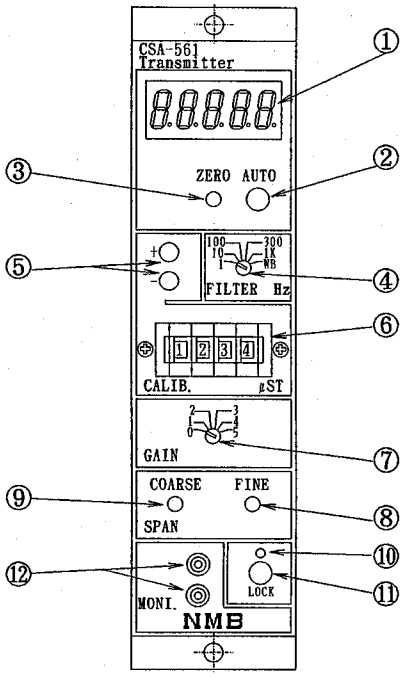
④ LOCK function
This function inhibits the operation of "AUTO" and "±CALIB" SW on front panel and also inhibits the operation of "AUTO" and "±CALIB" at internal input signal.

⑤ Isolation of input/output
The circuit of input side and output side are isolated electrically.

⑥ Equipment for current output
Current output can be installed by adding options.

2 Each name and function

2-1 Front panel



① Monitor

Output voltage will be displayed digitally. (The minimum digit is 1mV range.) Moreover, it flashes on and off when output voltage is out of the warranty of non-linearity (More than +10V(approx.) and less than -10V (approx.).)

② Automatic balance SW

Initial balance can be adjusted automatically.

③ ZERO trimmer

This is used when initial balance wants to be adjusted more precisely.

④ FILTER setting SW

This is the SW for setting cut-off frequency for low pass filter.

⑤ CALIB SW

+ : While the SW is pressed, calibration value of + polarity will be output.

− : While the SW is pressed, calibration value of - polarity will be output.

⑥ Digital SW for setting calibration value

Calibration value can be set from 1~9999 μst with the step of 1 μst.

⑦ GAIN setting SW

This is the SW for setting sensitivity.

⑧ COARSE trimmer (SPAN Coarse adjustment) This is used when coarse adjustment of sensitivity is made.

⑨ FINE trimmer (SPAN fine adjustment)

This is used when fine adjustment of sensitivity is made.

⑩ LOCK LED

LED lights when the LOCK SW is ON condition.

⑪ LOCK SW

When LOCK SW is ON condition, the operation of "AUTO" "±CALIB" SW and "AUTO" "±CALIB" for external input signal will be inhibited.

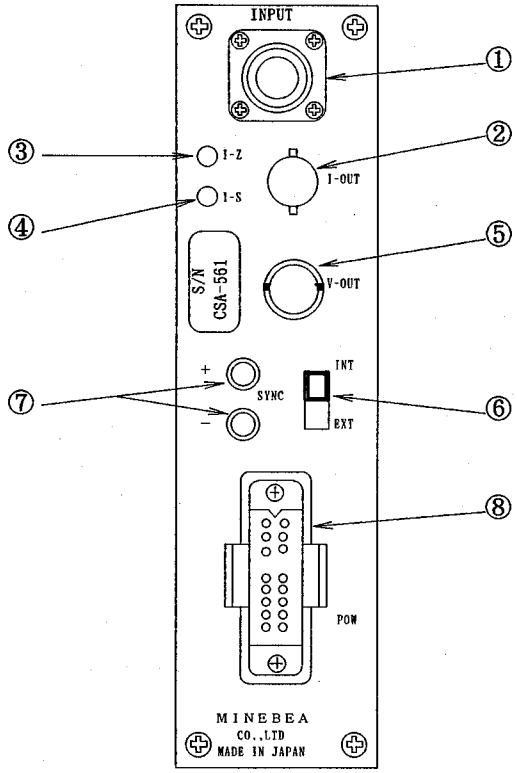
ON condition : By pressing once, the SW will be locked and enters into ON condition.

OFF condition: By pressing the SW once while ON condition, it wil become OFF condition.

⑫ MONI. terminal

Monitoring terminal for output voltage.

[2]−2 Rear panel



① I N P U T connector
Connects with torque transducer.

② I − O U T connector (BNC)
Connects with external equipment with current output connector.
※ When optional setting on current output isn't applied, blind rubber is attached instead of BNC connector.

③ I − Z trimmer (Zero adjustment on current output)
Zero point on current output can be adjusted.
※ The trimmer isn't attached when setting of optional current output isn't applied.

④ I − S trimmer (Sensitivity adjustment on current output)
※ The trimmer isn't attached when setting of optional current output isn't applied.

⑤ V − O U T connector (BNC)
This is the connector for voltage output, and connects with external equipment.

⑥ S Y N C changeover SW
Changeover SW for synchronous operation. Set to INT side when single operation is performed.

⑦ S Y N C terminal
Input/output terminal for synchronous operation.

⑧ Power supply
Connector for input/output for control and for power supply.

3 Wiring and installation method

3-1 INPUT connector

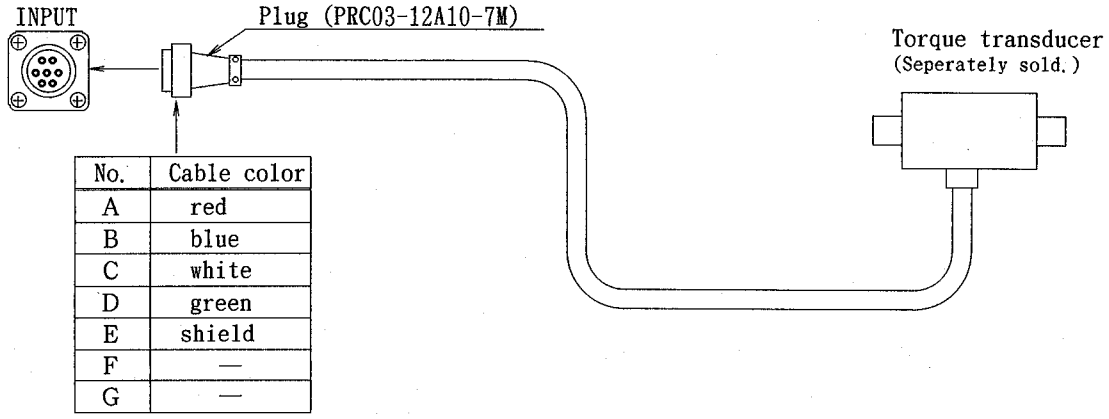
〔Suitable plug PRC03-12A10-7M TAJIMI ELECTRONICS CO., LTD.(Sold seperately.)〕

1) Pin configuration

Pin No.	Signal name	Minebea's cable color	Remarks
A	Bridge power supply +	red	EXC. +
B	Amplifier input −	blue	SIG. −
C	Bridge power supply −	white	EXC. −
D	Amplifier input +	green	SIG. +
E	Shield	(yellow)	SHIELD
F	N. C.		
G	N. C.		

* Cable color indicates the case when CAB-502 type is connected.
* N.C. : Empty terminal (Impossible to connect.)

2) Connection with torque transducer



No.	Cable color
A	red
B	blue
C	white
D	green
E	shield
F	—
G	—

When connecting the instrument with torque transducer, be sure to use the attached cable with torque transducer. Besides, do not use extension cable with terminal board together and so on, because it may suffer external noise or it may cause deterioration of accuracy.
When longer cable length is required than the attached standard one, contact with Minebea's sales agent or representatives.

TMNR type : Cable length 5m
TMNR-ME type : Cable length Can be specified among 10m, 20m, and 30m.

3-2 V-OUT, I-OUT, MONI connector

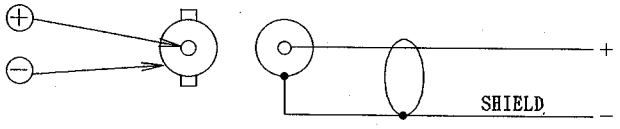
1) Pin configuration for V-OUT, MONI and connector

① V-OUT 〔Suitable plug : Standard BNC plug〕

Center of connector : Output ⊕

Edge of outer side : Output ⊖

(Metal section)



② MONI.

MONI.+ : Output ⊕

MONI.- : Output ⊖

Electrical condition 〔V-OUT only〕

Load resistance : 2 kΩ or more

Capacity load : 0.1 μF or less

2) Pin configuration for I-OUT connector

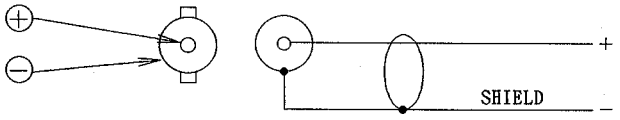
(The connector is not attached when optional setting of current output is not applied.)

① I-OUT 〔Suitable plug : Standard BNC plug〕

Center of connector : Output ⊕

Edge of outer side : Output ⊖

(Metal section)



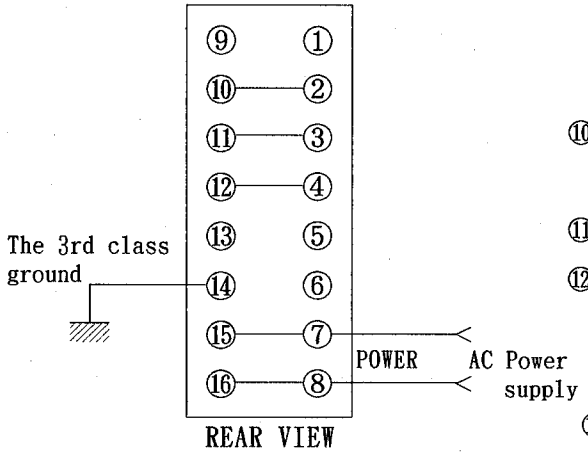
Electrical condition

Load resistance : 510 Ω or less

[3]－3 POWER connector

〔Suitable attached cable with plug exclusive cable for CSA－561
2m(Attached.)〕

1) Pin configuration

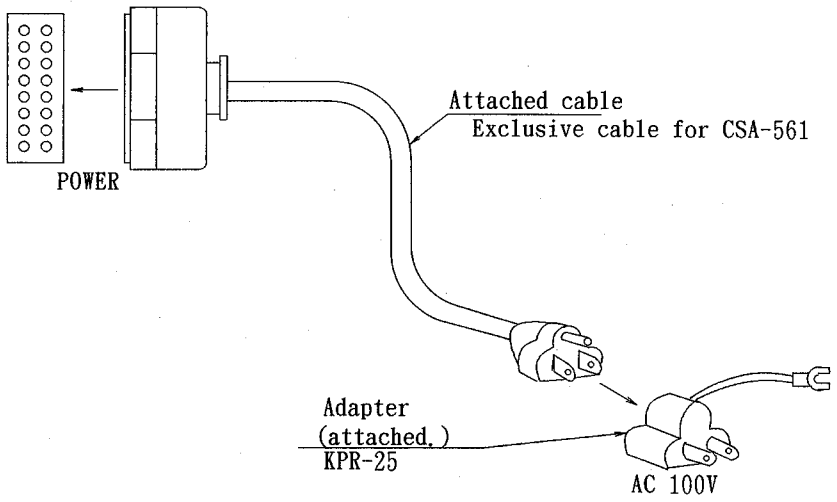


① : External input terminal for -CALIB
⑨ : External input terminal for +CALIB
⑩ ② : External input terminal for automatic balance
⑪ ③ : Input/output synchronous terminal
⑫ ④ : Common for -CALIB, +CALIB, automatic balance and synchronous terminal.
⑤ : Output terminal for BUSY
⑬ : Output terminal for ERROR
⑥ : Common for BUSY and ERROR
⑭ : (GND) terminal for the 3rd class
⑮ ⑦ : Connecting terminal for one side of (AC)AC power supply.
⑯ ⑧ : Connecting terminal for the other side of (AC)AC power supply.

※ Standard product corresponds to AC100 V+10 %, -15 %.

2) Connection with attached cable

Power supply cable (Exclusive cable for CSA－561) is attached.



[3]-4 Connection with power supply and earth

Be sure to supply safe AC100 V for the instrument.
The grounding should be the 3rd class and connects with single earth.
At the same time, do not use with another power equipment together.

⚠ Warning Refer to [9]-3, as for change of supply voltage. (Select one from AC100 V, AC110 V and AC120 V.)

[3]-5 Note for installation and connection

① Installation place

When installing the instrument, be sure to pay atention to the following items.
If you neglect, it may cause abnormal malfunction or faulty of the instrument.

- Do not install the instrument where mechanical vibration and corrosive gas might exist. Moreover, do not apply external force to the instrument.
- Do not use the instrument where water may cling to. Moreover, do not splash water directly to the instrument.

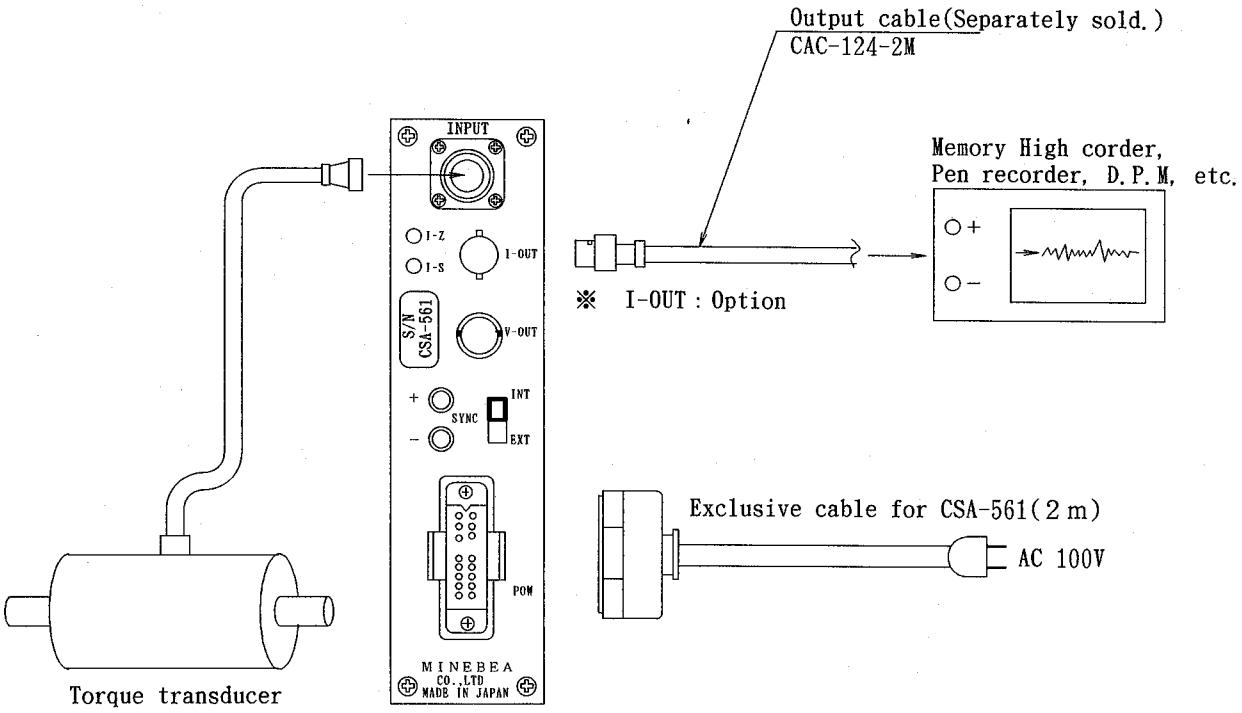
② Connections

- Be sure to use the attached cable with torque transducer when cable connection is made.
- Connecting cable with the instrument should be isolated from the noise source as far as possible, such as power supply line (motor, inverter) and I/O line for control. If wiring has made near these lines, it may cause deterioration of accuracy (zero point variation, output voltage variation and so on) due to the effect from noise. Especially, for the connecting cable with torque transducer and the instrument, isolate it from these lines more than 50 cm.
- When the instrument is used with several pcs of the instruments in parallel, use them with synchronized operation.

Refer to [9]-1, as for the synchronous operation.

3－6 Example for connection

Following is the connecting example for general use.



4 Calibration procedures

4-1 Calibration procedures for torque

There are two (2) kinds of calibration prodecures for torque for the instrument.

① Electrical calibration

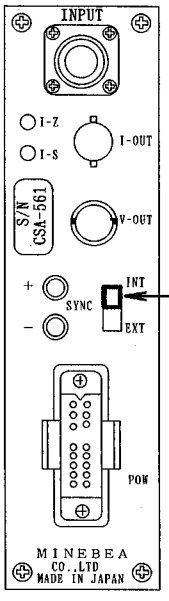
Electrical calibration can be performed by the data on the "Calibration Certificate" (Inspection data) attached to the torque transducer. (However, the Certificate is attached to TMNR-*type Toque transducer only and "Combined Calibration Certificate is attached to TMNR-*ME type troque transducer.) When combined ajdustment is specifed, apply calibration by referring to to the calibration value written on the "Combined Inspection data" attached. When combined adjustment is not required, adjust with the rated output value by referring to the Calibration value on the "Single Inspection Data" attached. However, the data on the "Single Inspection Data" is detected from one pce of CSA-561(With 5 m Junction cable)for Minebea's inspection purpose, so there may have the possibility of calibration error of ±0.5 % at Max. among the same instruments of CSA-561.

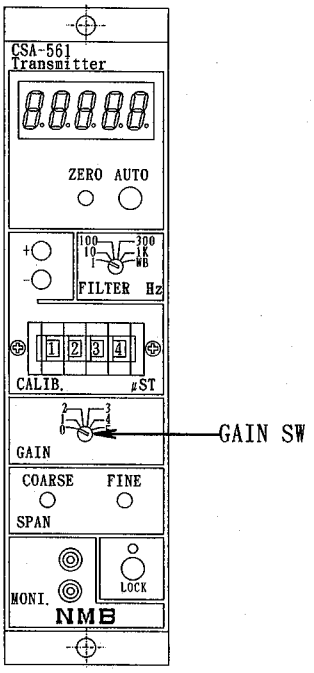
② Actual torque calibration

Apply the maximum actual torque required on the torque transducer connected, and then make calibration at the same condition.

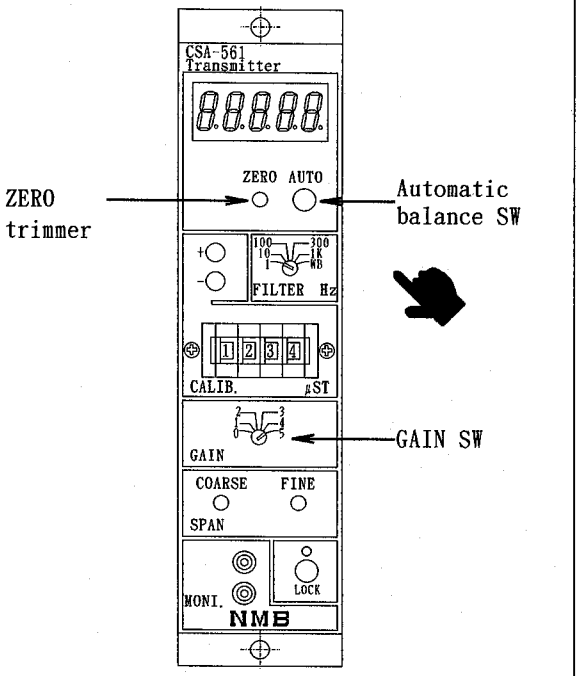
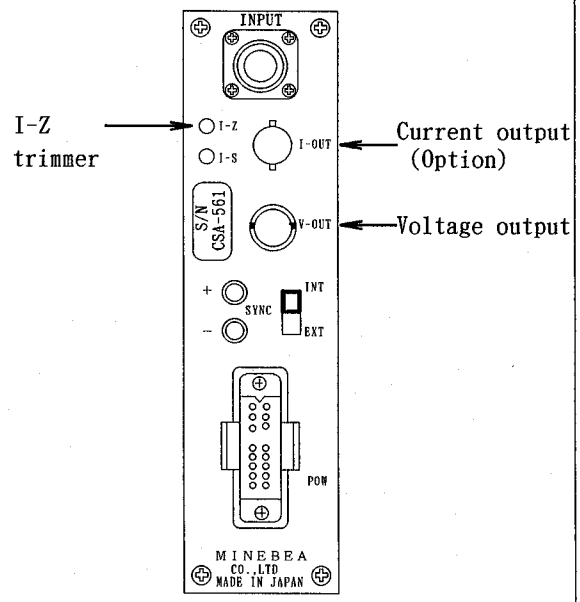
To obtain the inspection accuracy of ±0.2 %R.O. with the TMNR-*ME type torque transducer, be sure to make actual torque calibration by the equipments with torque transducer attached.

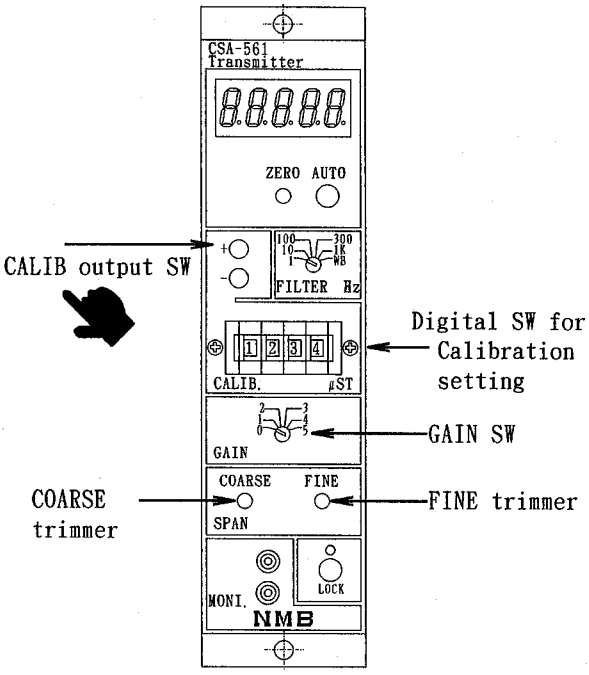
4-2 Preparations before adjustment

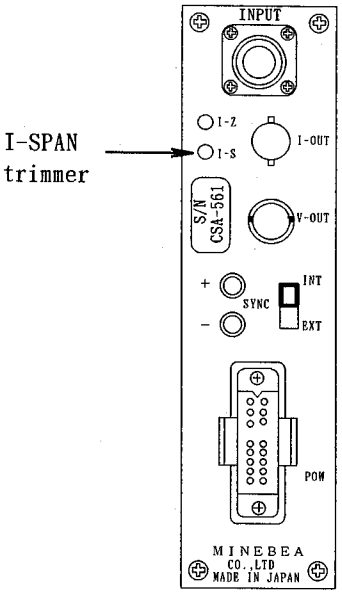
No.	Procedures	
1	"Setting when single operation is made with one pce of the instrument" Check that rear panel SYNC changevoer SW indicates to 「INT.」 position. When the instruments are operated with 2 pcs or more in parallel, synchronous operation will become required, so make specified wiring and change SW by referring to 9-1.	 SYNC changeover SW (Set to INT.)

No.	Procedures	
2	"Check on connection" Check that torque transducer and power supply are connected correctly, then supply power. (Refer to [3].) Note) After power is supplied, the instrument will ready to operate, however, make preliminary operation for aboout 15 ~ 20 mimutes to stabilize the operation. Besides, when preliminary operation is made, set the GAIN SW to 0 (zero) position.	

[4]-3 Electrical calibration

No.	Procedures	
1	Set the torque transducer with initial torque applied. (Combined condition with the instrument used together.)	
2	"Cancellation for initial torque" Check that LOCK SW indicates OFF(LED lights off.) and set the GAIN SW to the position of 5, and press the Automatic balance SW once. Check that voltage output becomes 0V or current output (option) will become near 4mA.	
3	"Zero point adjustment" By turning the ZERO trimmer, adjust so that the voltage output becomes 0.000V or current output(option) will become near 4.000mA. When voltage output and current output (option) are used together, adjust the voltage output at first, then adjust the current output(option) with I-Z trimmer (Current output zero adjustment trimmer) on the rear panel.	

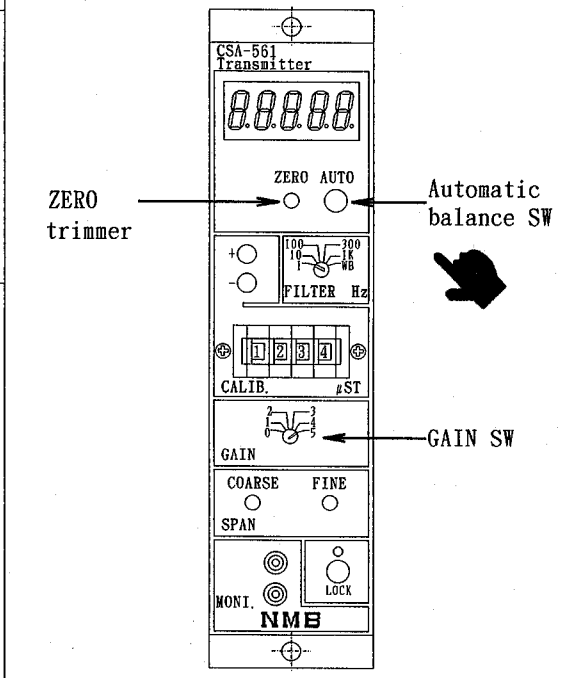
No.	Procedures	
4	"Setting CALIB(Calibration value)" 1) Combined adjustment is not made. The rated output value is written on the "Calibration Certificate" attached to the torque transducer. So set the written value to the digital SW for setting calibration value. For example, when the rated output shows 2000 x 10^{-6} strain, set the digital SW for setting calibration value to 「2000」. * On the "Calibration Certificate", the rated output value is shown in the unit of mV/V and x10^{-6} strain. But, apply the value of x10^{-6} strain for the insturment. Besides, each unit has the relation as follows: ① 10^{-6}strain=1μST ② 1mV/V =2000×10^{-6}strain 2) Combined adjustment has made. Set the CALIB setting value on the "Combined Inspection data" attached to the torque transducer to the digital SW for setting calibration value.	試 験 成 績 表 CALIBRATION CERTIFICATE トルク変換器 TORQUE TRANSDUCER 試験温度 Ambient Temp. ℃ 型式 Type 製品番号 Serial No. 定格容量 Rated Capacity Kg.p 最高回転数 Maximum Speed R.P.M. 性能：PERFORMANCE 定格出力 Rated Output mV/V (×10⁻⁶strain) 非直線性 Nonlinearity %R.O. ヒステリシス Hysteresis %R.O. 再現性 Repeatability %R.O. 回転による零出力移動 1時間後 Zero Shifto on Rotating After an Hour ± ×10⁻⁶strain/ rpm 回転による零出力変動 1時間後 Zero Drift on Rotating After an Hour ± ×10⁻⁶strain/ rpm 組合せ受増幅器 Applied Amplifier TYPE DSA-603 備考：REMARKS 上記性能は動歪増幅器 DSA-603 との組合せ試験結果です。 This performance tested by combinations of dynamic amplifier with DSA-603. (1mV/V=2000×10⁻⁶strain) 検査者 Tested by 責任者 Certified by MINEBEA CO., LTD. (TMNR.NT)X104080-2A
5	"Span adjustment" 1) Combined adjustment is not made. While only the "+" on CALIB is pressed, output of calibration value corresponding to the number of setting by digital SW for setting calibration value can be acquired. While the "+" on CALIB SW is pressed, turn the GAIN SW in order to set the nearest position of required output voltage. Adjust the required output voltage with the COARSE trimmer (Coarse adjustment trimmer for SPAN) and FINE trimmer (Fine adjustment trimmer for SPAN). 2) Combined adjustment has made. Set the GAIN SW to the same value written on the "Combined Inspection Data". While the "+" on CALIB SW is pressed, adjust the output voltage with the COARSE & FINE trimmer so that the CALIB output value (*.***V) can be the same written value shown on the "Combined Inspection Data".	"Calibration Certificate"(Inspection data) is attahed only for TMNR-* type torque transducer. And "Combine Inspection Data" is attached to TMNR-*ME type torque transducer.) 

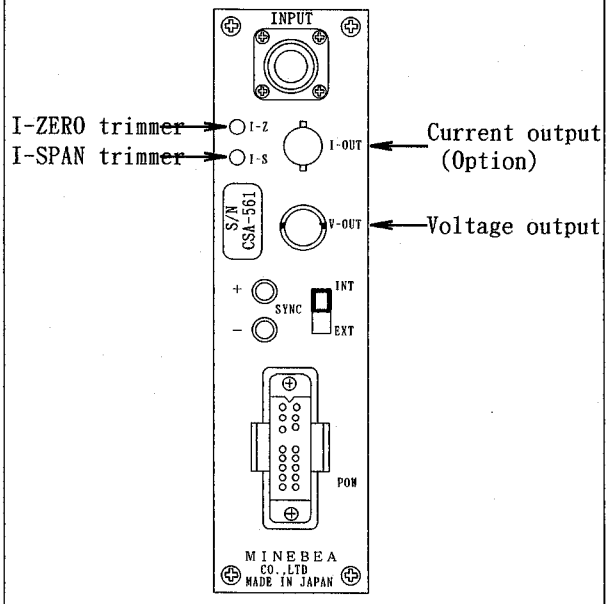
No.	Procedures	
6	"Span adjustment" (Continued.) When voltage output and current output (option)are used together, adjust the voltage output by the previous procedures, then adjust the current output (option) with the I-SPAN trimmer on the rear panel. But, variable range of I-SPAN trimmer is effective when voltage output is 10V, change of GAIN of current output will be necessary when required current output value is not obtained. Refer to [9]-4, as for changing method.	
7	"Zero point re-adjustment" Remove your hand from the CALIB SW, and adjust with the procedure of 1 and 2, again so that the voltage output will become 0.000V or current output (option) will become 4.000mA.	
8	"Confirmation" Check the procedures of 4~5, again.	
9	Calibration has completed.	

[4]-4 Actual torque calibration

Before performing calibration for actual torque, prompt calibration can be available when electrical calibration has completed. Refer to [4]-3 Electrical calibration.

No.	Procedures
1	"Cancellation for initial torque" Set the transducer with initial torque applied. (with the condition calibration jig applied for the purpose of actual torque calibration.)
2	"Cancellation for initial torque" Check that LOCK SW indicates OFF (LED lights off.), then set the GAIN SW to the position of 5, and press the automatic balance SW once. Check that voltage output shows 0V or current output (option) shows near 4 mA.
3	"Zero point adjustment" Adjust with ZERO trimmer so that the voltage output shows 0.000 V or current output(option) will become 4.000 mA. When voltage output and current output (option) is used together, adjust the voltage output at first, then also adjust the current output (option) with I-ZERO trimmer on the rear panel.
4	"Span adjustment" Apply actual torque on torque transducer and set with GAIN SW to the position of the nearest value of output voltage required. Adjust to the required output voltage with COARSE trimmer (Coarse adjustment trimmer for SPAN) and FINE trimmer (FINE adjustment trimmer for SPAN). When voltage output and current output (option) is used together, adjust the voltage output at first, then also adjust the current output(option) with I-SPAN trimmer on the rear panel. However, variable range of I-SPAN trimmer is effective only when voltage output is 10 V, change of GAIN will become required if required voltage can't be obtained. Refer to [9]-4, as for changing method.





No.	Procedures	
5	"Re-adjustment on zero" Remove the actual torque applied in the procedure of 3, that is, keep the condition of initial torque applied, then check that the voltage output shows 0.000 V or current output (option) shows 4.000 mA.	
6	"Confirmation" Check the procedure of 3 and 4, again.	
7	Calibration has completed.	

5 Input·output signal

5-1 Input signal

+CALIB : + Calibration value shall be output by shortening between +CALIB↠COM1.

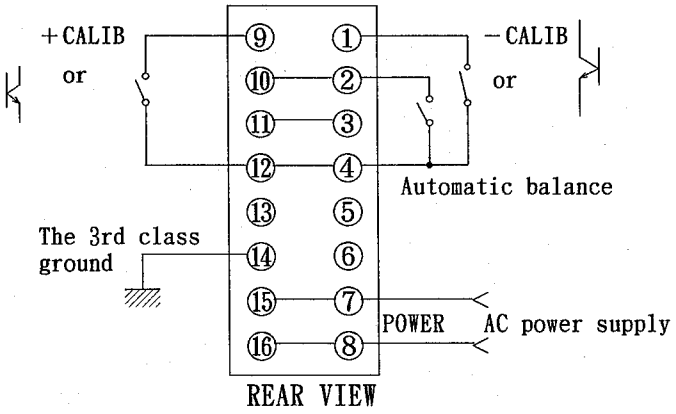
−CALIB : - Calibration value shall be output by shortening between-CALIB↠COM1.

Automatic balance : Initial balance can be adjusted automatically by shortening between automatic balance ↔ COM1.

+CALIB, −CALIB: Level input

Automatic balance : Pulse input (200 msec or more) 《EX.》

While the LOCK SW on the front panel is ON, the operation of ±CALIB and automatic balance can't be made.



⚠ When the condition changes by the external control, check the timing at the time of change with the instrument(amplifier) thoroughly and also adjust the timing by the timer process as necessity requires.

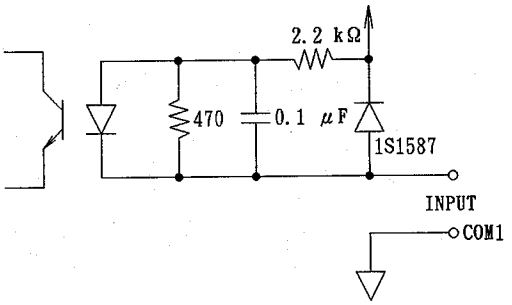
5-2 Output signal

BUSY : Outputs when automatic balance function is executed. While this signal is output, do not provide variation on the torque applied to torque transducer.

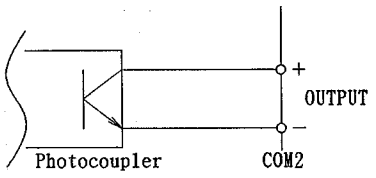
ERROR : Outputs when voltage output or current output (option) has reached out of the linearity range of warranty. At the same time, the front panel monitor will flash on and off showing "0.000".

5-3 Equivalent circuit for input·output section

Equivalent circuit for input section

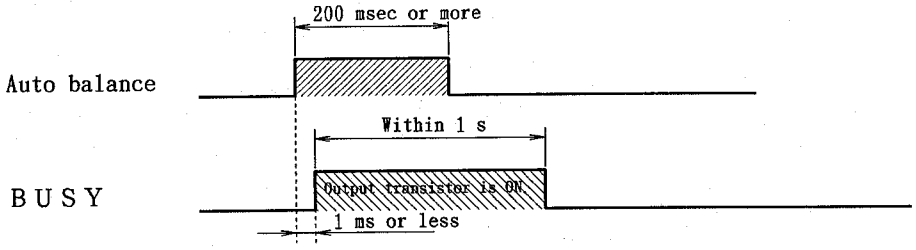


Equivalent circuit for output section



※ DC30 V, 15 mA MAX

5-4 Timing chart for automatic balance and BUSY



6 Specifications

6-1 Specifications

Bridge power supply	AC2.0 V(rms) Sine-wave 5 KHz ±0.1 kHz
Applicable transducers	Strain gage type Torque transducers
Input range	0.5 mV~3 mV (1 mV/V=2 000×10^{-6} strain)
Output	±10 V output (When 0.5 mV/V is inputted, bridge power supply is AC2.0 V.(rms)
Output load resistance	Resistance load 2 kΩ or more Capacity load 0.1 μF or less
Zero adjustment range	±2.5 mV/V Coarse adjustment : Automatic balance SW Fine adjustment : Zero adjustment trimmer Approx. 1% of resistance value (±2.5 mV/V) and 2 000 PF of capacitance value will be available. Auto balance time approx.1 s, accuracy ±0.2 %F.S., back-up time is 24 h or more
Non-linearity	±0.05 % F.S.
Effect due to temperature variation	Zero point ± 0.1 μV/℃ (Input conversion) Sensitivity : Within ± 0.05 %/℃
CALIB (Calibration)	Set with digital SW (0 to ± 9 999×10^{-6} strain) Accuracy ± 0.5 %
Frequency response range	DC~2 kHz (Filter : W/B) (1 Hz, 10 Hz, 100 Hz, 300 Hz, 1 KHz and W/B can be variable.) However, 10 Hz to W/B:+1 dB, -3 dB±1 dB, 1 Hz:+1 dB, -3 dB±3 dB
Display	Output voltage display 0~ ± 10.000 Digital display (Green LED) Sampling Approx. 4 times/s
ERROR function	When output reached out of the linearity range of (+10 V or more or less than -10 V), display will flash on and off with 0.000 or -0.000, then ERROR will be output. (Photocoupler output)
Remote function	Automatic balance ±CALIB
LOCK function	Inhibits operation of Automatic balance ±CALIB (Auto balance of remote function ±CALIB is inculded.)

6-2 General specifications

Operating temperature/humidity range	Temperature -10 ℃ ~ +50 ℃ Humidity Less than 85 %RH (Non-condensing.)
Power supply	Power supply votage : AC100 V ± 10 V Power supply frequency: 50/60 Hz Power consumption: Approx.10 VA(At AC100 V)
Withstand voltage	Between power supply and each input terminal (A, B, C, D) AC1 000V 1 min Between output and each input terminal of case (A, B, C, D, E) AC250 V 1 min
Outline dimensions	42(W) x 176(H) x 284.4(D) mm (Excludes protruding parts.)
Weight	Approx.1.5 kg

6 -3 Standard specifications

Bridge power supply	AC2 V(rms)
S P A N	10 V output at 1mV/V ouput(With P07 is applied, 4～20 mA)
Frequency response range	10 Hz

6 -4 Accessories

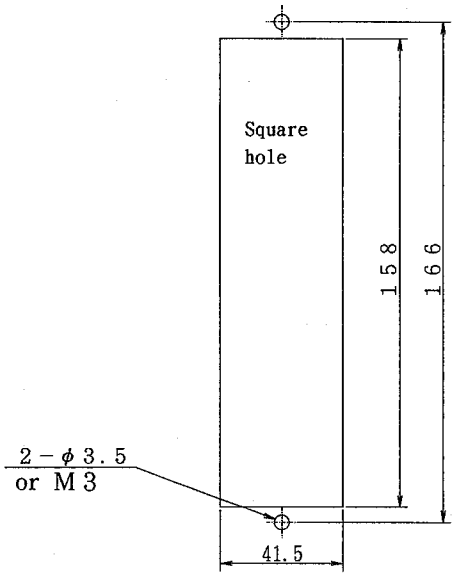
o Instruction manual	.....	1 pce
o Fuse	.....	1 pce
o Power supply cable	.....	1 pce
o Minus driver	.....	1 pce

7 Options

7-1 Current output

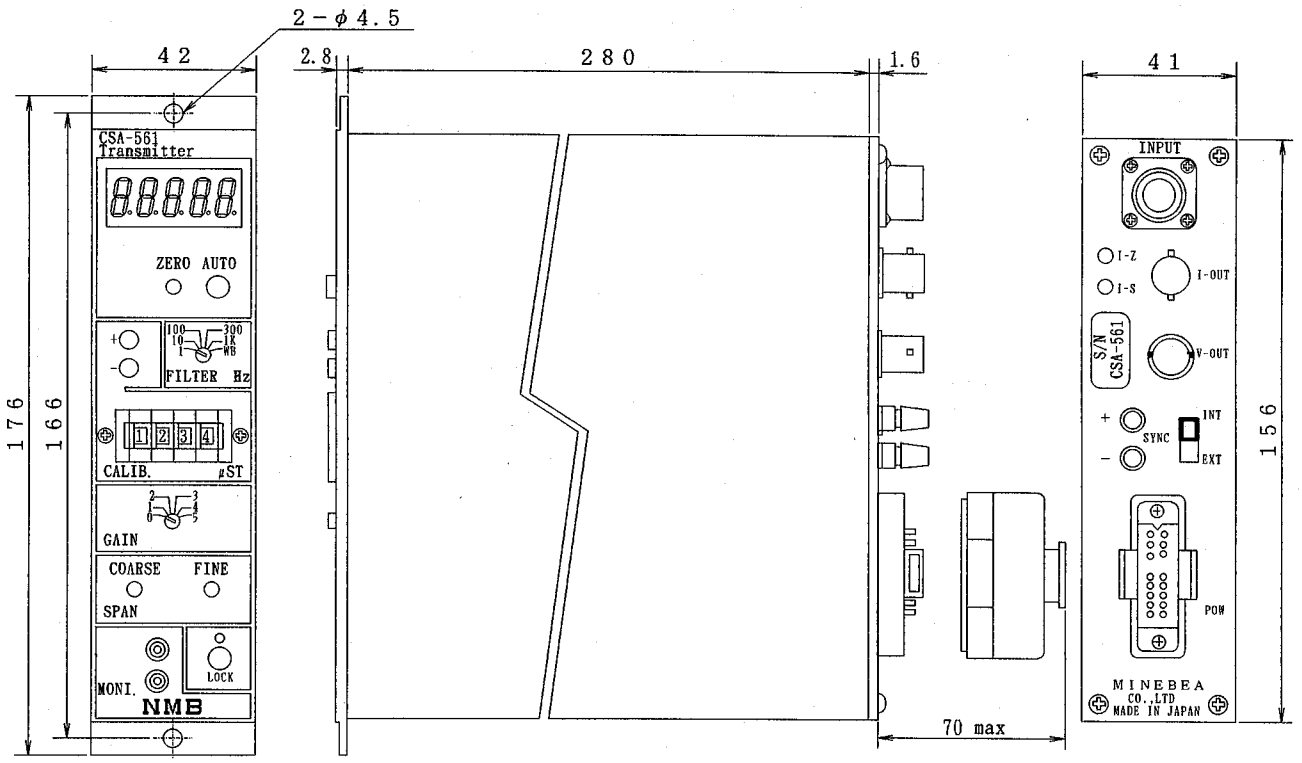
Name of P/N	CSA561-P07
Output	4 mA to 20 mAa
Load resistance	510 Ω or less
Non-linearity	±0.05 % or less

7-2 Outline dimensions



Panel cut dimensions

Unit : mm



Unit : mm

8 Warranty・ Repair

8 －1 Warranty

- The instrument is covered by a warranty for a period of one (1) year from the date of delivery.
- As for repairs of after-service required during the period of warranty, contact with Minebea's sales office or sales agency from which you have purchased.

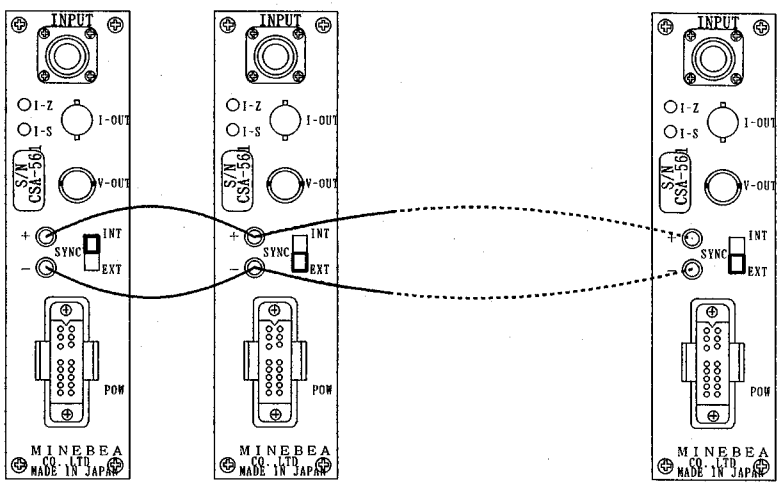
8 －2 Repair

- Before asking repairs, please make checks once again that the connections, setting and adjustment for the instrument have finished precisely.
  Moreover, make special checks whether the connections of transducers are disconnected or cut off.
  After that, still there may be found some defects in the instrument, please contact Minebea'a sale office or sales agency from which you purchased.

9 Appendix

9 −1 Setting synchronous operation

Synchronous operation is required for the application of more than 2 pcs of the instruments.

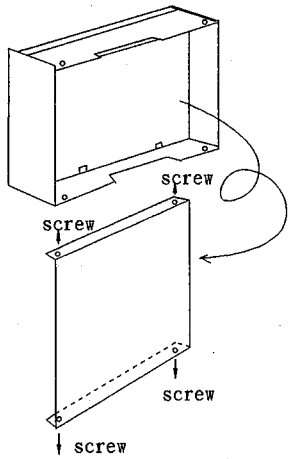


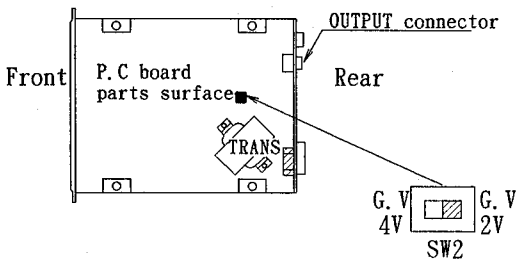
1) Decide 1 set of Parent and set the SYNC SW to the INT position.
2) Other than the 1 set of Parent are all children, so set the each SYNC SW to EXT position.
3) Each ⊕, ⊖ SYNC terminal should be connected with wire individually.
   As for the wire, use the vinyl wire specifies more than 0.5□ (AWG 22), and wiring should be made with the shortest length (Within 100mm) and do not use with another line together. (Up to 10 sets of connections can be available as for children.)

9 −2 Change of bridge voltage

Warning In order to prevent from damage to the instrument and electric shock, to the operator, be sure to check that power supply is off when change of bridge voltage is made.

① By removing the chassis cover at right side facing the front panel, (Fixed with M2.6x5, 4 pcs of Flat head machine screws.) parts surface of P.C. board will be appeared.



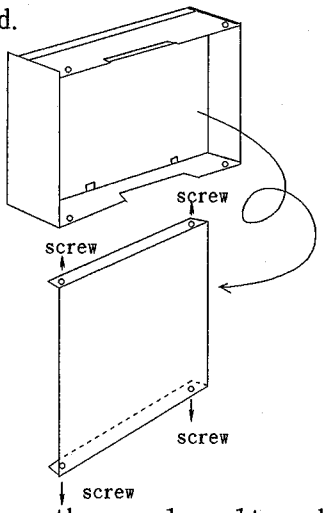


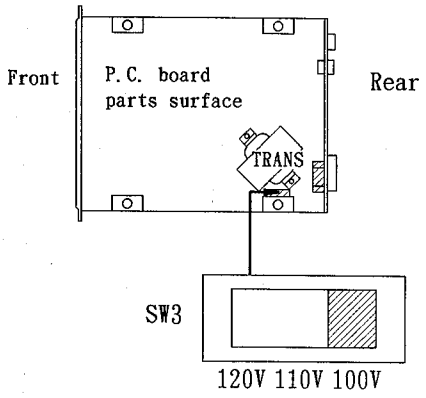
② Change the bridge voltage with changeover of SW2. (2V rms as a standard)
③ After the work has completed, set the cover.

[9] −3 Change of supply voltage

> ⚠ Warning In order to prevent from damage to the instrument and electric shock, be sure to check that power supply is off when change of current output is made.

① By removing the chassis cover (Fixed with M2.6×5, 4 pcs of Flat head machine screws.) at the right side facing the front panel, parts surface on the P.C board will be appeared.





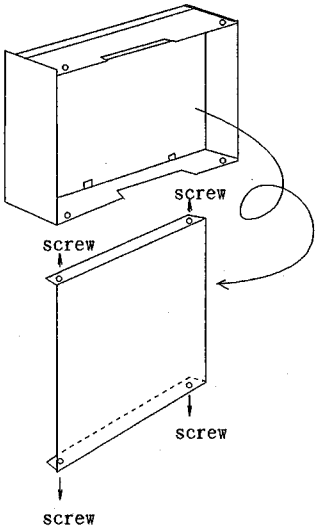
③ Change the supply voltage by changing SW3. (Standard 100VAC)
Permissible regulation for supply voltage will be +10%, -15% for each setting voltage.

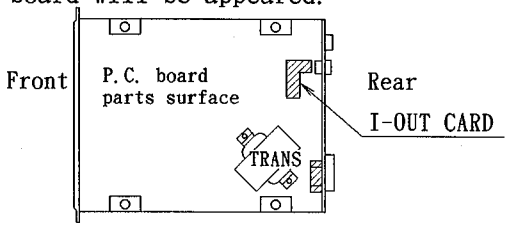
④ After the work has completed, set the cover.

[9] −4 Change of current output (option)

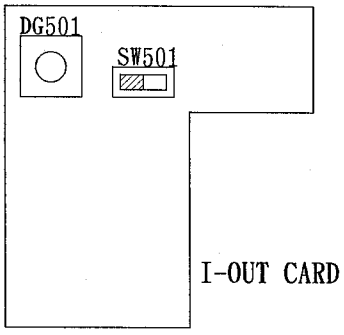
> ⚠ Warning In order to prevent from damage to the instrument and electric shock to the operator, be sure to check that power supply is off when change of current output is made.

① Parts surface on the P.C. board will be appeared.





② SW501 and DG501 are located on the I-OUT CARD (board) on the instrument.



③ When the current output is other than 10V, set 20mA for current output. Now, main setting can be shown.

a) Current output is 4mA when voltage output is 0V.

Voltage output	Current output	SW501	DG501
0～10V	4～20mA	□▨	2
0～ 5V	4～20mA	□▨	4
0～ 2V	4～20mA	□▨	A
0～ 1V	4～20mA	□▨	F

b) Current output is 12mA when voltage output is 0V.

Voltage output	Current output	SW501	DG501
−10～10V	4～20mA	▨□	1
− 5～ 5V	4～20mA	▨□	2
− 2～ 2V	4～20mA	▨□	5
− 1～ 1V	4～20mA	▨□	A

※ In this case, I-Z trimmer is for the adjustment of 12mA.

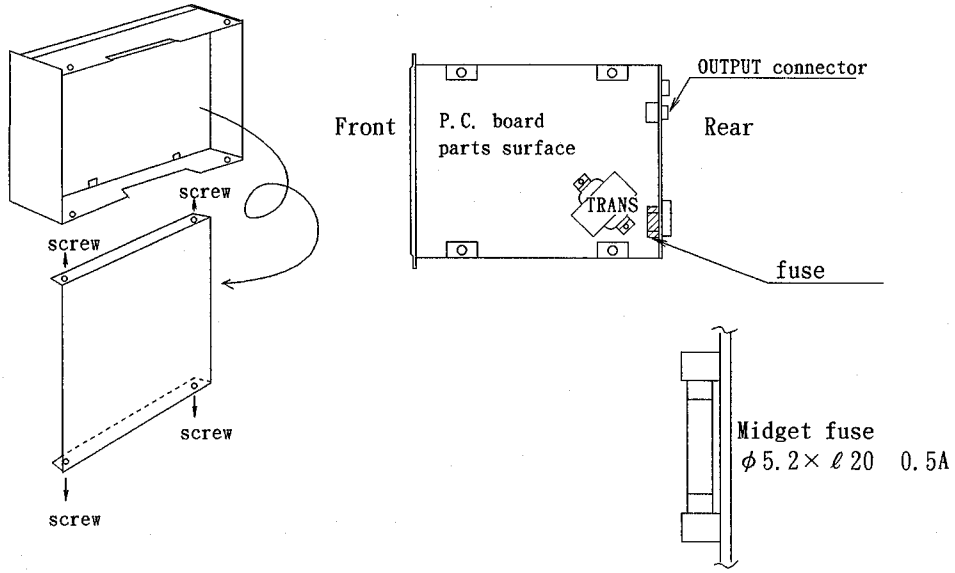
④ After the work has completed, set the cover.

9−5 Replacement of fuse

> ⚠ Warning In order to prevent from damage to the instrument and electric shock to the operator, be sure to check that power supply is off during replacement of fuse is made.
> Moreover, replace the fuse after checking the cause of blown-out.

① By removing the chassis cover at right side facing the front panel, (Fixed with M2.6×5, 4 pcs of Flat head machine screws.)parts surface of P.C. board will be appeared.

② Replace the fuse on the board attached at the rear panel.



③ After the work has completed, set the cover.

[9]-6 Measure for noise

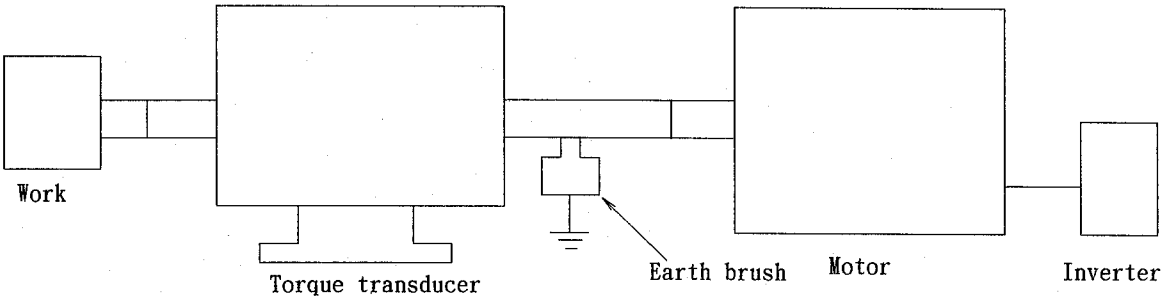
> ⚠ Warning In order to prevent from damage to the instrument and electric shock to the operator, be sure to check that power supply for the SW4 is off.

When there is noise ingredient at output voltage, it will become effective if you make measures as follows:

① In case of coupling with the motor controlled through inverter control and Torque transducer directly.

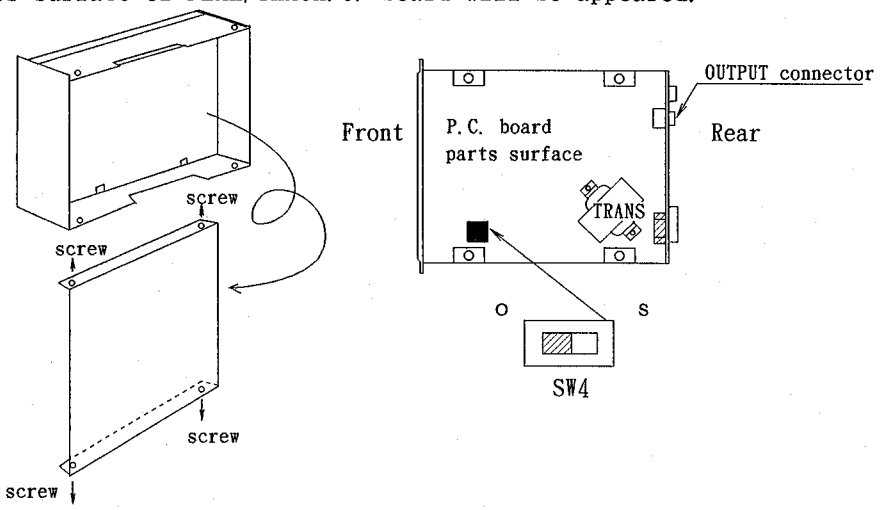
We recommend to apply an earth brush (Brush holder: Gr60, Brush: Gr61) at the shaft of Torque transducer where coupling is made with the motor directly.

(As for ME type Torque transducer, it is installed as a stahdard.)



② Even though you follow the measure with earth brush and/or ② Connections in [3]-5 Note for installation and connection, there still are noise ingredients, change the SW4 to the S side according to the following procedures.

By removing the chassis cover (Fixed with M2.6x561 4 pcs of Flat head screws) parts surface of PEAK/TRACK.C. board will be appeared.

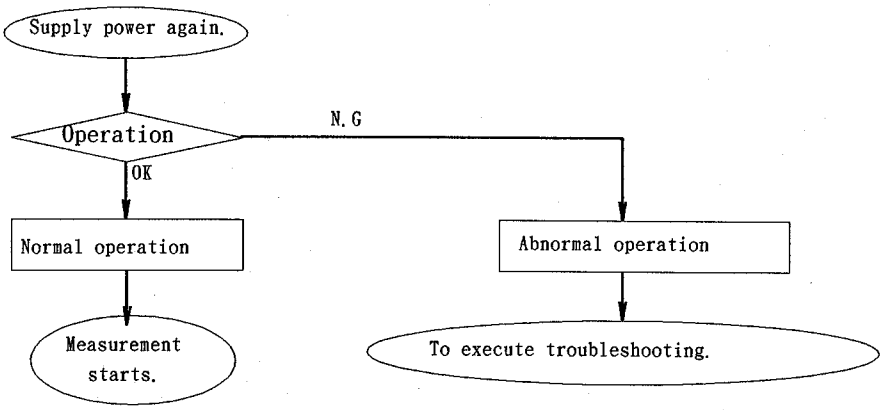


> ⚠ Warning When the SW4 has changed to the S side, the circuit of input/outpu side will become common electrically (Non-isolation of input/output).
> Change should be made after checking that there is no problem at the external instruments that connect with the output voltage of the instrument.

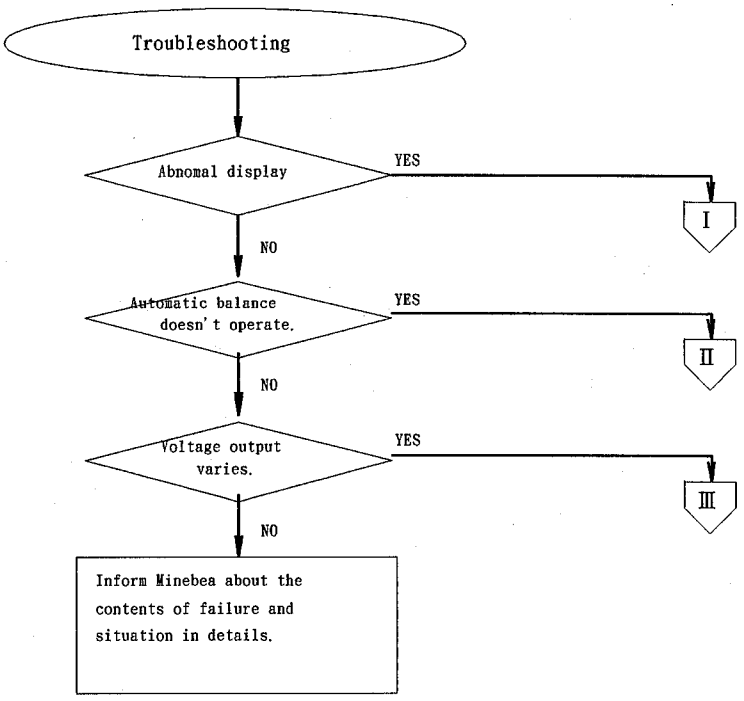
[9] −7 Troubleshooting

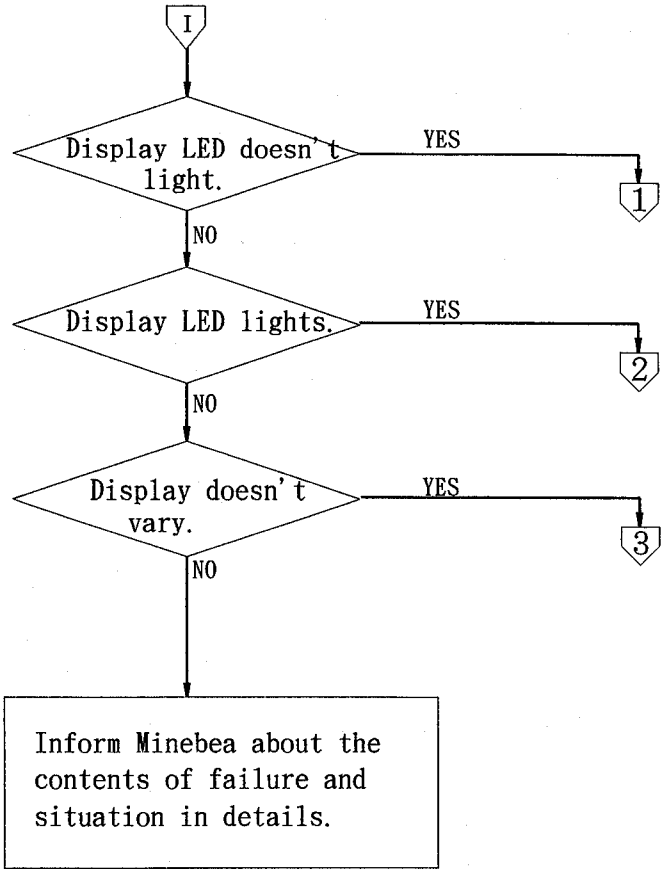
When the instrument doesn't operate normally, check by the following procedures. However, when applicable item can't be found or symptom of trouble can't be solved, contact with Minebea.

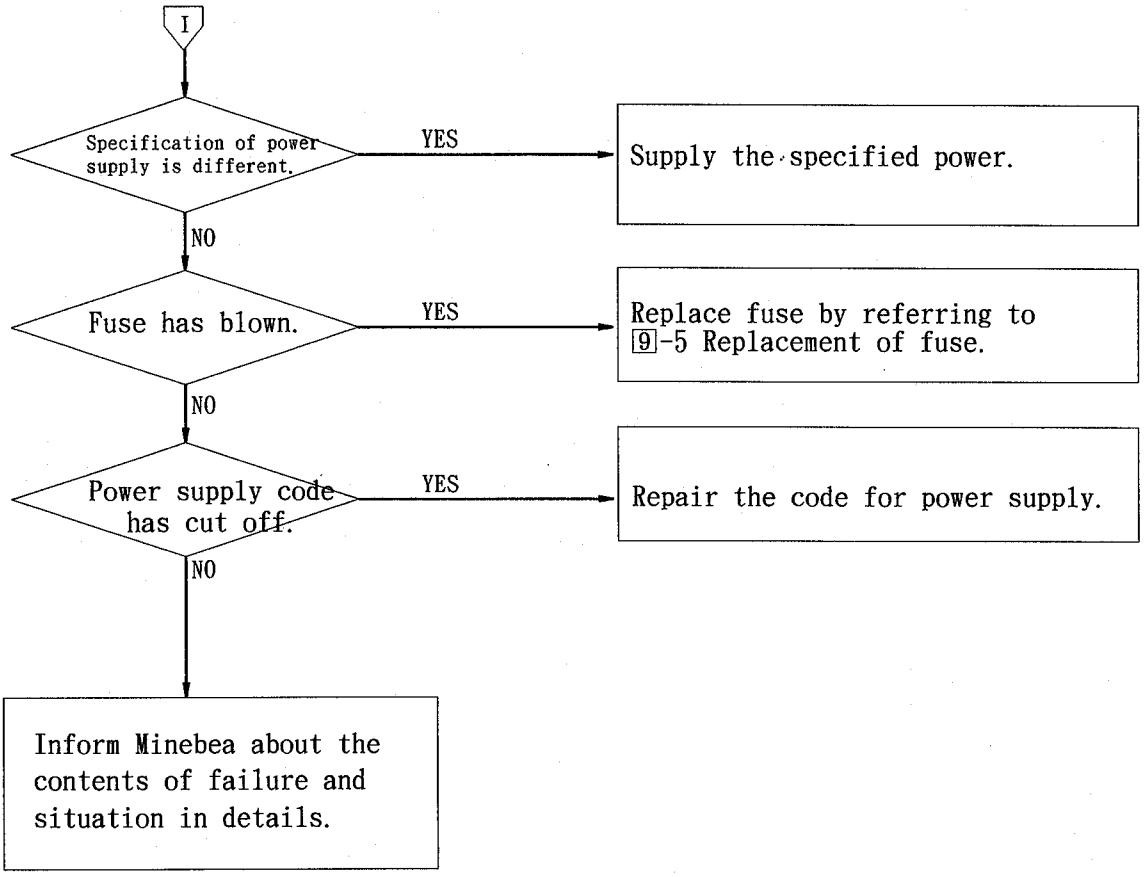
> ⚠ Warning Checking when power is supplied may cause electric shock to the operator or cause electric leakage, so operate with care fully.

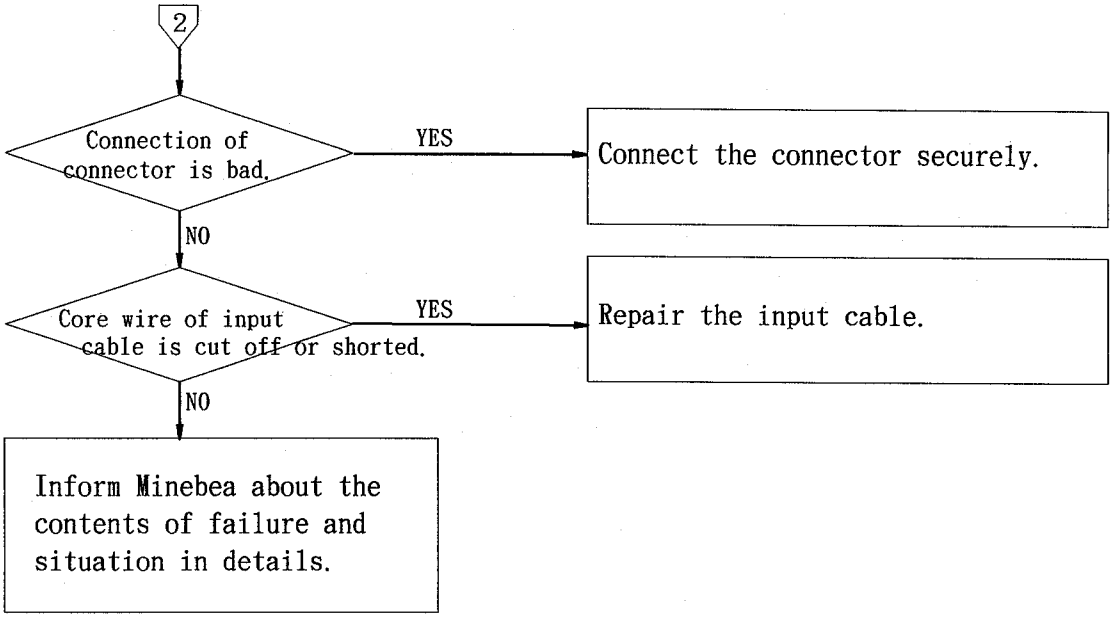


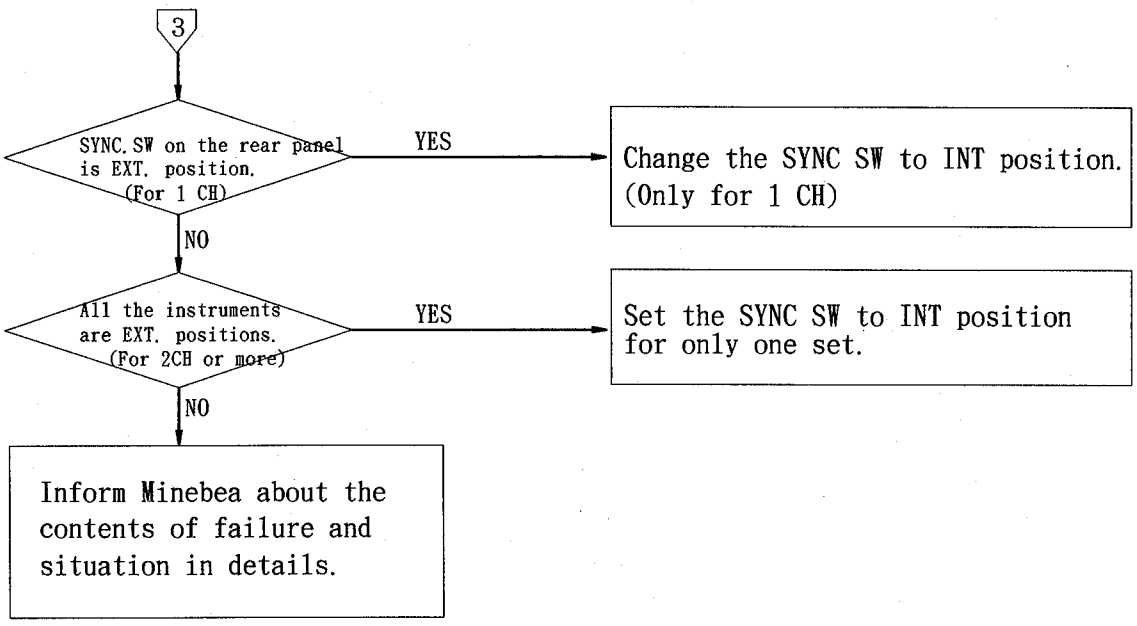
[9] -7-1

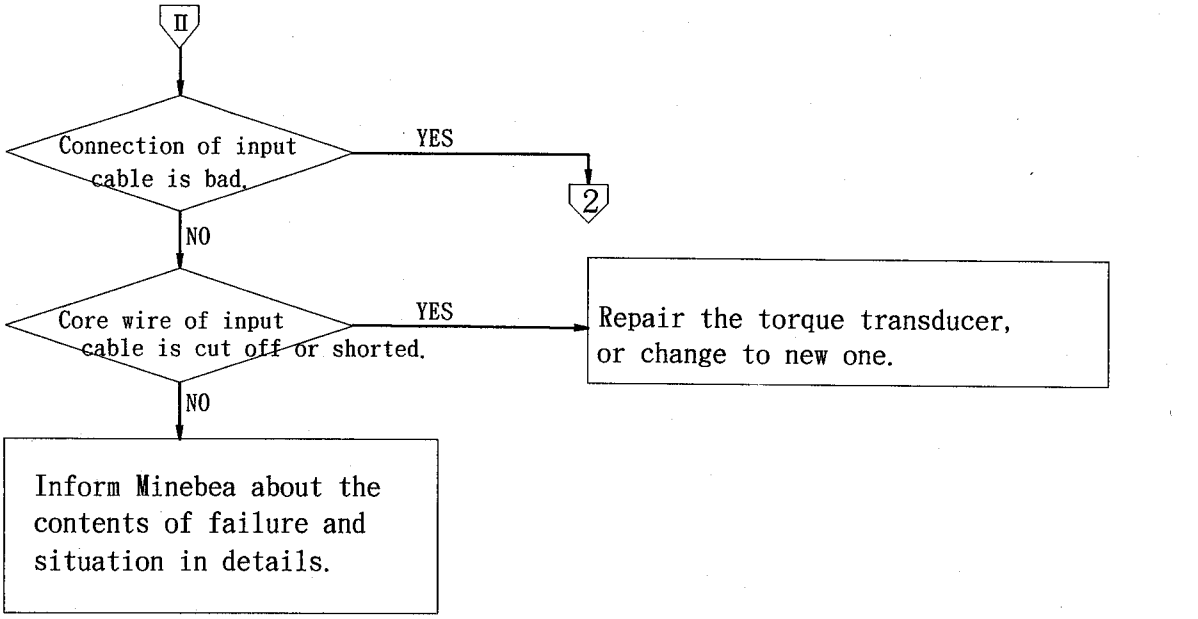


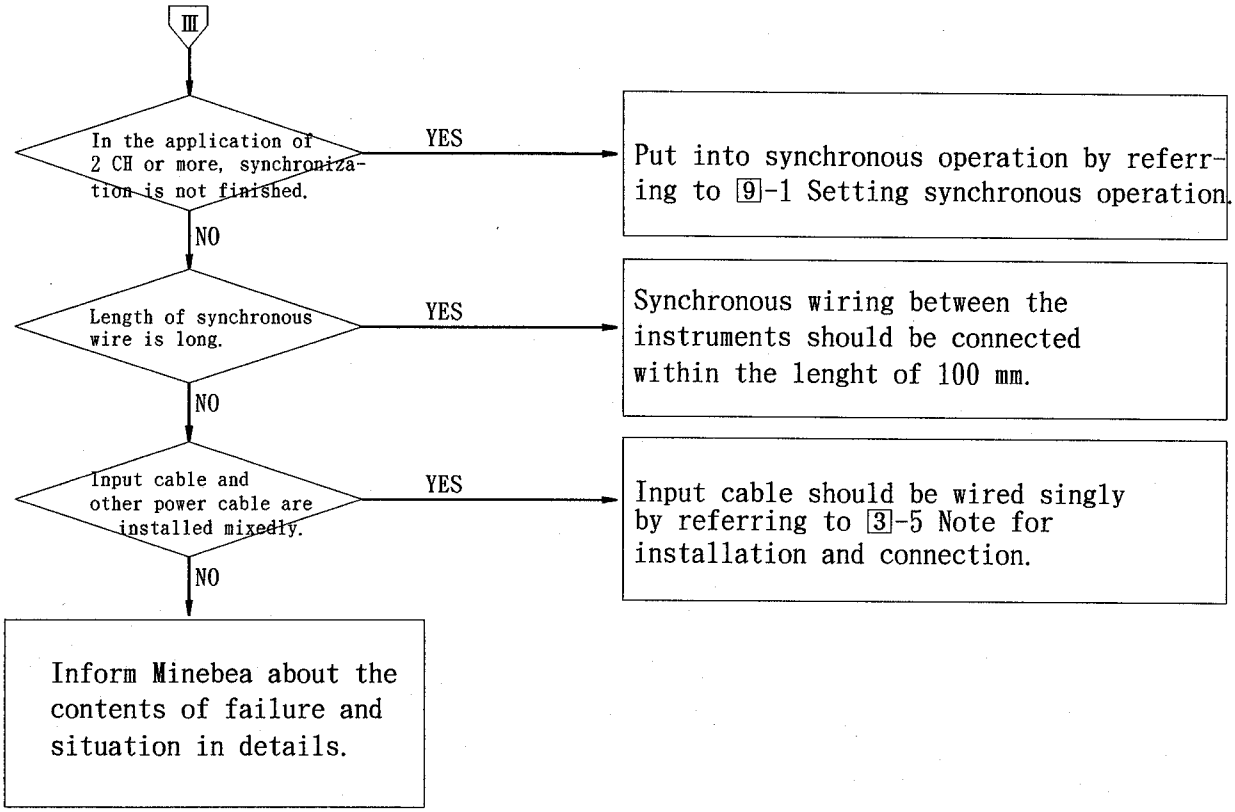

I
Display LED doesn't light.
YES
1
NO
Display LED lights.
YES
2
NO
Display doesn't vary.
YES
3
NO
Inform Minebea about the contents of failure and situation in details.


I
Specification of power supply is different.
YES
Supply the specified power.
NO
Fuse has blown.
YES
Replace fuse by referring to 9-5 Replacement of fuse.
NO
Power supply code has cut off.
YES
Repair the code for power supply.
NO
Inform Minebea about the contents of failure and situation in details.


2
Connection of connector is bad.
YES
Connect the connector securely.
NO
Core wire of input cable is cut off or shorted.
YES
Repair the input cable.
NO
Inform Minebea about the contents of failure and situation in details.


3
SYNC. SW on the rear panel is EXT. position. (For 1 CH)
YES
Change the SYNC SW to INT position. (Only for 1 CH)
NO
All the instruments are EXT. positions. (For 2CH or more)
YES
Set the SYNC SW to INT position for only one set.
NO
Inform Minebea about the contents of failure and situation in details.


II
Connection of input cable is bad.
YES
2
NO
Core wire of input cable is cut off or shorted.
YES
Repair the torque transducer, or change to new one.
NO
Inform Minebea about the contents of failure and situation in details.


III
In the application of 2 CH or more, synchronization is not finished.
YES
Put into synchronous operation by referring to 9-1 Setting synchronous operation.
NO
Length of synchronous wire is long.
YES
Synchronous wiring between the instruments should be connected within the lenght of 100 mm.
NO
Input cable and other power cable are installed mixedly.
YES
Input cable should be wired singly by referring to 3-5 Note for installation and connection.
NO
Inform Minebea about the contents of failure and situation in details.

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

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