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INSTRUCTION MANUAL

FOR

CSD-801 DIGITAL INDICATOR

MINEBEA CO., LTD.
SHINKOH COMMUNICATION DIVISION

DRW.NO. 294-1011-A

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§1. OUTLINE

The equipment is CPU mounted digital indicator for instrumentation.

§2. FEATURES

- o Remote setting function is provided to the converter (transducer) power, and the error from cable length will be cancelled.

- o Flying capacitor is adopted at signal amplifier input step. In common mode noise reduction ratio is set at 120dB.

- o Drift at the signal amplifier is reduced as much as possible by chopper amplifier.

- o Maximum indication is 9999, with multi (multiplying) function and, at dumy (-)0, indication up to (±)199980 is possible.

- o Provided with BCD parallel-out output (open collector), which can simultaneously output the total load and net load.

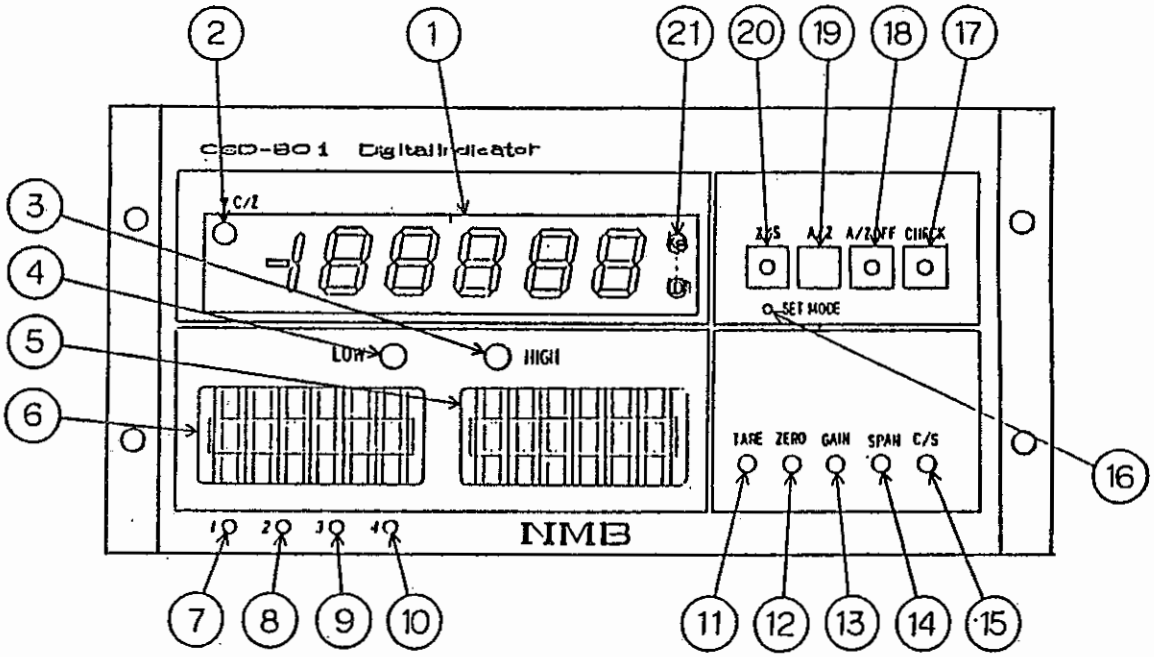
- o Setter is provided with 5-digits 2-steps digital switch, as well as pre-set cancellation and judgment functions. It can also be connected to MINEBEA digital setter CSD-551B by using BCD parallel out connector.

- o By its zero tracking function, secular change in zero-point of the converter and the like will be cancelled.

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§3. NAME OF EACH PART

3-1 Front panel



1	5-1/2 digits 7 segments LED	12	Zero trimmer
2	C/Z LED	13	GAIN rotary switch
3	High LED	14	Span trimmer
4	Low LED	15	C/S rotary switch
5	High setting digi-switch	16	Set mode switch
6	Low setting digi-switch	17	Check switch (with LED)
7	V-out zero adjust trimmer	18	A/Z off switch (with LED)
8	V-out span adjust trimmer	19	A/Z switch
9	I-out zero adjust trimmer	20	Z/S switch (with LED)
10	I-out span adjust trimmer	21	Unit select LED
11	TARE rotary switch		

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§4. 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 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 compensated range : 0 ∿ 50°C)

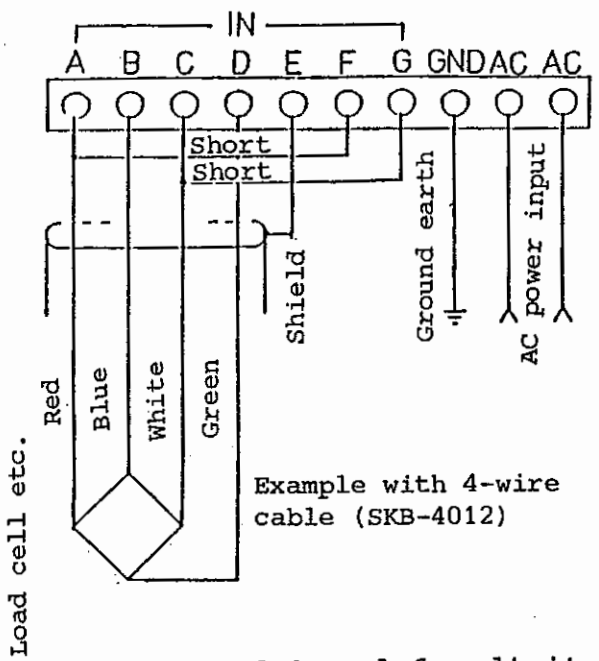
(2) The equipment is panel-mount type. When mounting to a panel, prepare square holes at designated positions.

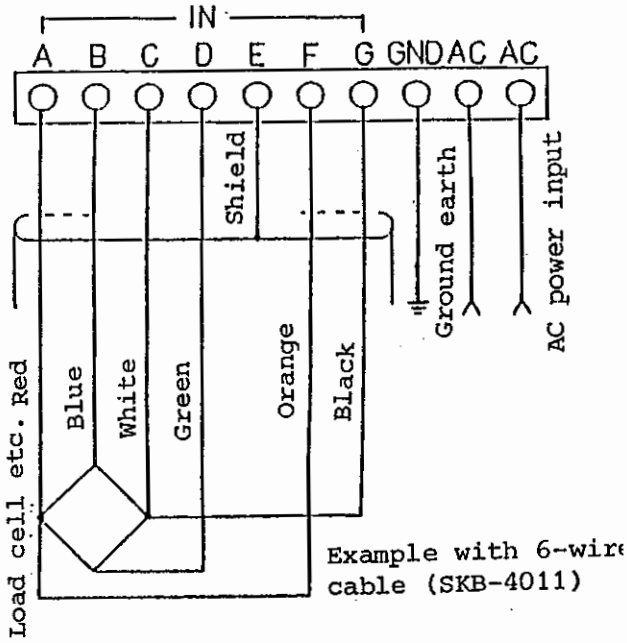
(Refer to panel outline drawing and panel cut dimensions.)

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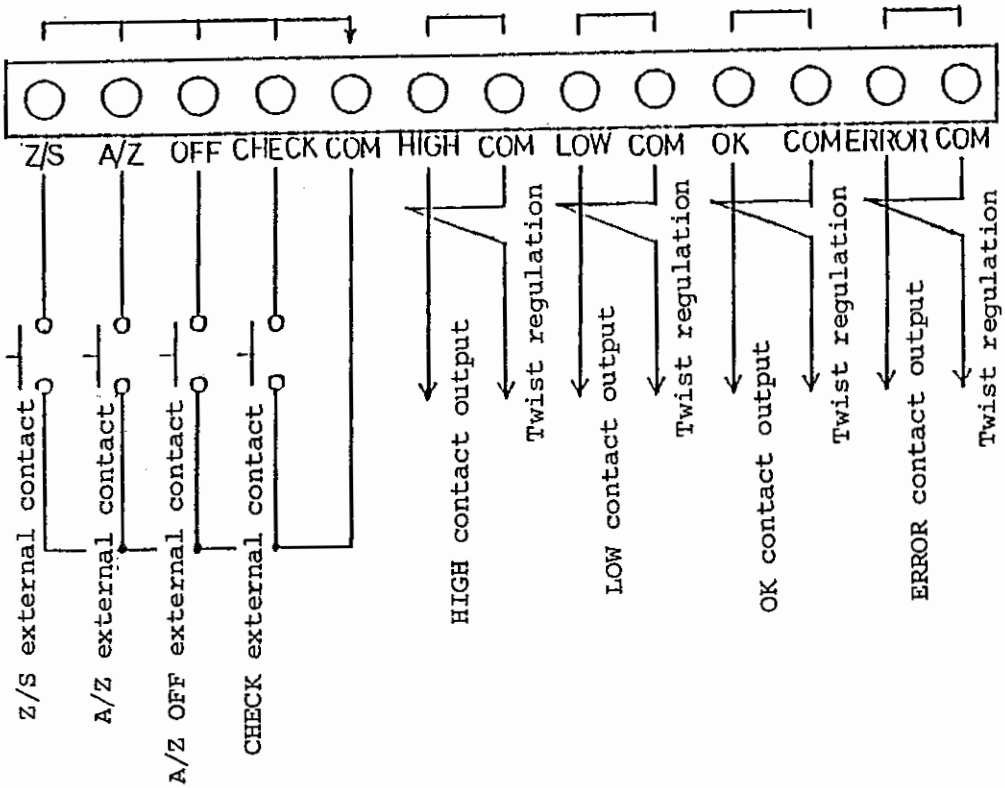
§5. CONNECTION METHOD

5-1 Terminal board for power and transducer



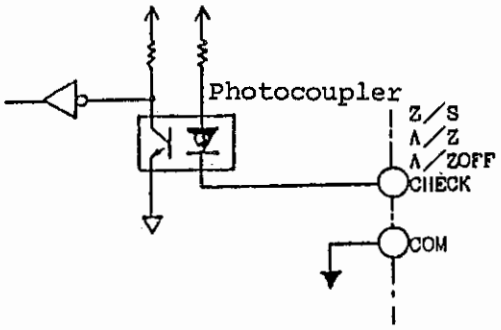


5-2 Terminal board for digital control

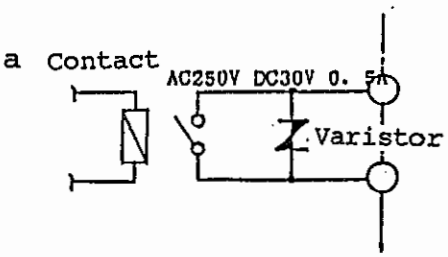


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°Input circuit (Z/S,A/Z,OFF,CHECK)



°Output circuit (HIGH,LOW,OK,ERROR)



5-3 BCD-OUT connector

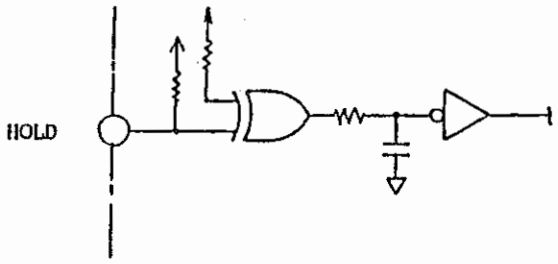
°Pin arrangement

25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
ERROR	HOLD-T	POL-N	POL-T	OVF-T				1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1
								10^4 N		10^3 N				10^2 N				10^1 N				10^0 N		
50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
COM	HOLD-N	PC-N	PC-T	OVF-N				1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1
								10^4 T		10^3 T				10^2 T				10^1 T				10^0 T		

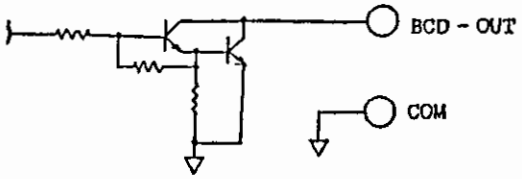
POL	L at + data and H at - data when polarity is high true.	ERROR	Error
OVF	Data over (overflow)	COM	Signal ground
PC	Print command (during data conversion)	XXX-N	Net load
HOLD	Data hold (fixed low true input)	XXX-T	Total load

(Note) In case of TTL level output (option), the true will be reverse.

°Input circuit (HOLD)



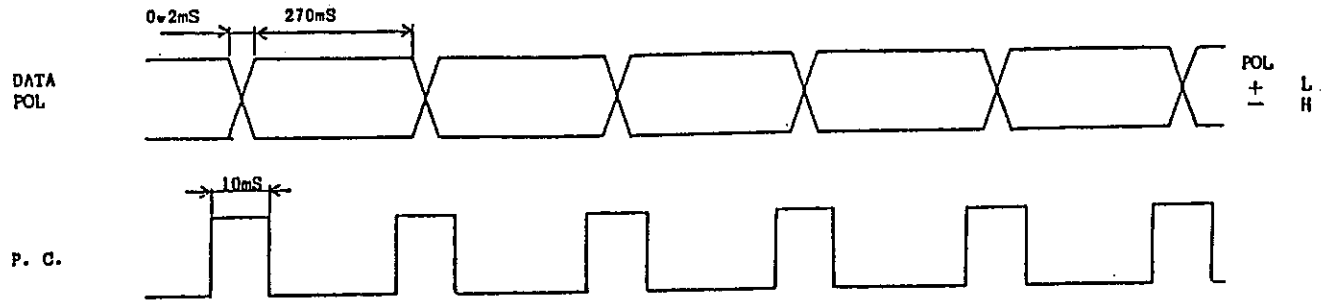
°Output circuit (Others)



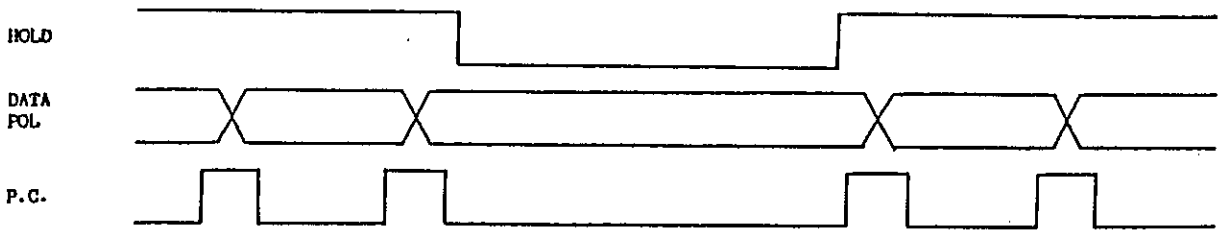
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Timing Chart (When data command is high true output)

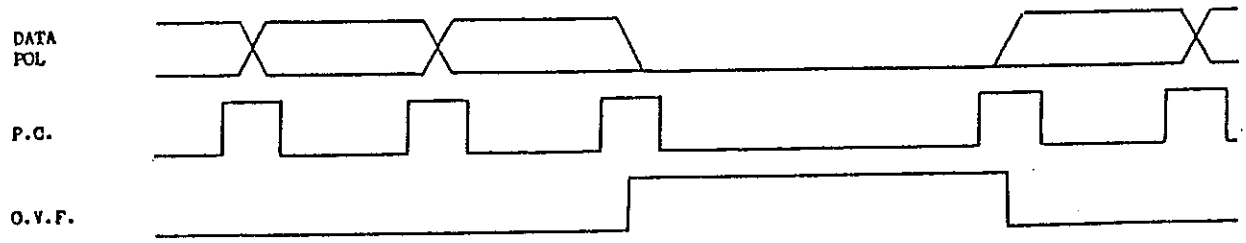
°Normal



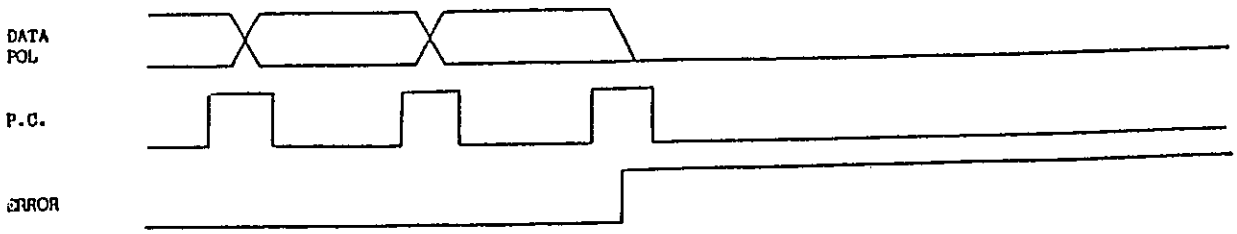
°Hold signal input



°Data over (overflow)



°Error



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5-4 Precautions for connection

(1) Wiring of sensor input (A, B, C, D, E, F, G)

For connection, use MINEBEA shild cable SKB-4012 (4-wires) or SKB-4011(6-wires). When using 6-wires cable, maximum length of the cable should be up to 200m.
It is essential that this wiring is separated from the wirings for power circuit and for control contact output circuit. In any case, it must not be placed near a cable with big current flow such as power cable. Therefore, in case of conduit wiring, a separate conduit from that of power circuit and control contact output circuit should be used.

(2) Wiring of "Out" circuit (V-Out, I-Out)

Use 2-core shilding wire. The load shall be more than 2 kΩ at V-Out and less than 500 Ω at I-Out (option). Wiring should be as short as possible, and as in (1) above, should be wired away from power cable or the like.

(3) Wiring of control signal input circuit (Z/S, A/Z, OFF, CHECK)

In order to avoid the reception of external noise, the input circuit is received internally at the photocoupler, but the wiring should be short and should be away from power cable or the like.

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(4) Wiring of control contact output circuit (HIGH, LOW, OK, ERROR)

Wiring cable should be determined according to the applied voltage, current and so forth. Normally, the cable does not require shielding.

(5) Wiring of GND (earth) circuit

GND terminal is linked with the amplifier body. From this terminal, pull out the earth wire and, preferably solder to copper plate or copper rod and bury in wet ground.
Please note that GND terminal and analog common (V-Out-terminal etc.) are not common, so make sure it will not short-circuit.

(6) Wiring of power circuit

"AC" terminal is a connecting terminal for alternate current power circuit.
"AC" voltage is standard "100V", but if the equipment is manufactured in specification other than "100V" according to the customer's requirements, such voltage value will be entered. Therefore, make sure that the designated voltage is supplied at all times.
If the voltage supplied is below the rating, the instrument will not operate, or if operated, its performance cannot be guaranteed. If excessive voltage is supplied, the fuse will cause the breaking of wire, or, there is a danger of internal power transformer being burned.

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§6. HANDLING PROCEDURE

In order to utilize the various functions of CSD-801 effectively, adjustments shall be made according to the following procedure.

In case of changing our standard adjusted product to the customer's specification or changing the specification of previously adjusted product.		In case the product has been shipped from our factory, with adjustment required by the customer's specification already completed.	
Using digital output only	Combined use of analog output	Using digital output only	Combined use of analog output
6-1 (Connection) ↓ 6-2 (Power on) ↓ 6-3 (Actual load calibration I) ↓ 6-8 (Function registration by set mode) ↓ 6-9 (Start measurement)	Basically, adjustment in our factory will be required. Please contact our sales representative.	6-1 (Connection) ↓ 6-2 (Power on) ↓ ↓ 6-4 6-6 (Actual load calibration II· Electric calibration I) ↓ 6-8 (Function registration by set mode) ↓ 6-9 (Start measurement)	6-1 (Connection) ↓ 6-2 (Power on) ↓ ↓ 6-5 6-7 (Actual load calibration III· Electric calibration II) ↓ 6-8 (Function registration by set mode) ↓ 6-9 (Start measurement)

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6-1 Connection

Connect the transducer and the body (CSD-801) according to Section 5.
When using 4-wires cable (equivalent to our SKB-4012) for wiring the equipment to the transducer, use the attached short cable (one each of red and white) and shorten between A-F and C-G of the terminal board for transducer, located on the back panel of the equipment.

6-2 Power ON

Check the voltage and current and supply the power. (standard AC100V)
Confirm the self-diagnosis indication by the equipment. The indications are as follows.

1) E-□ : Internal memory will be checked. If there is an error, a number will be indicated in the □. (For details, refer to Section 10.)

2) 0. 0 : Shows the version of the program. In case of malfunction, inform this number.

3) : Indications will increment from the right end, and finally all LED will flash.

4) : With the completion of the above, measuring mode will start.
Also confirm that the condition of each LED on the front panel are as follows.

Indication data	:	XXXX (some value)
[Z/S] LED	:	OFF
[A/Z OFF] LED	:	ON
[CHECK] LED	:	OFF

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6-3 Actual load calibration-I (for changing specification, no analog output)

(1) Maintain the condition with initial load on transducer.

(2) Adjust the TARE rotary switch (coarse adjustment) and ZERO trimmer (fine adjustment) of the equipment, and confirm that the indication will be 0 (zero).

(3) Apply maximum load on the transducer.

(4) What is the maximum indication required under the condition of (3) above.

1) less than 999 → to (5)
2) less than 1999 → to (6)
3) less than 4999 → to (7)
4) less than 9999 → to (8)
5) more than 10000 → to (9)

(5) Multiply the required indication by 10 times (x 10)

Eg.) If the maximum indication is 800, then
800 x 10 = [8000]

To obtain the calculated value, adjust the [GAIN] rotary switch and [SPAN] trimmer on the front panel with the attached micro-driver.
If the adjustment cannot be made, change the bridge voltage by referring to 12-3 in page 69, and repeat the same adjustment.
If the adjustment still cannot be made, proceed to (6).

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If the adjustment is completed, set mode (refer to Section 8) will start, and by utilizing the minimum effective digit setting function (Section 8-3, page 34) cut the 10^8 digit.
After completion, pass through the set mode and proceed to (10).

(6) Multiply the required indication by 5 times (x 5)

Eg.) If the maximum indication is 1500, then
1500 x 5 = [7500]

To obtain the calculated value, adjust the [GAIN] rotary switch and [SPAN] trimmer on the front panel with the attached micro-driver.
If the adjustment cannot be made, change the bridge voltage by referring to 12-3 in page 69, and repeat the same adjustment.
If the adjustment still cannot be made, proceed to (7).
If the adjustment is completed, set mode (refer to Section 8) will start, and by utilizing the multiplication function (Section 8-4, page 38), set the indication data at 1/5.
After completion, pass through the set mode and proceed to (10).

(7) Multiply the required indication by 2 times (x 2)

Eg.) If the maximum indication is 3000, then
3000 x 2 = [6000]

To obtain the calculated value, adjust the [GAIN] rotary switch and [SPAN] trimmer on the front panel with the attached micro-driver.

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If the adjustment cannot be made, change the bridge voltage by referring to 12-3 in page 69, and repeat the same adjustment.
If the adjustment still cannot be made, proceed to (8).
If the adjustment is completed, set mode (refer to Section 8) will start, and by utilizing the multiplication function (Section 8-4, page 38), set the indication data at 1/2.
After completion, pass through the set mode and proceed to (10).

(8) To obtain the required indication value, adjust the [GAIN] rotary switch and [SPAN] trimmer on the front panel with the attached micro-driver.
If the adjustment cannot be made, change the bridge voltage by referring to 12-3 in page 69, and repeat the same adjustment.
If the adjustment still cannot be made, it is possible that it is out of the specification of the equipment. Please contact our sales representative.
If the adjustment is completed, proceed to (10).

(9) Multiply the required indication by 1/2 time (x 1/2)

Eg.) If the maximum indication is 16000, then
16000 x 1/2 = [8000]

To obtain the calculated value, adjust the [GAIN] rotary switch and [SPAN] trimmer on the front panel with the attached micro-driver.
If the adjustment cannot be made, change the bridge voltage by referring to 12-3 in page 69, and repeat the same adjustment.

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If the adjustment still cannot be made, it is possible that it is out of the specification of the equipment. Please contact our sales representative.
If the adjustment is completed, set mode (refer to Section 8) will start, and by utilizing the multiplication function (Section 8-4, page 38), set the indication data by x 2. After completion, pass through the set mode and proceed to (10).

(10) Remove the load and confirm that the indication is 0 (zero) and that C/Z LED is lighted. If it cannot be confirmed, adjust the front panel zero trimmer which should give 0 (zero) indication.
Once again, provide maximum load and adjust the [SPAN] trimmer to obtain the required indication.
Repeat the above operation several times.

(11) Remove the load and turn on the front panel [CHECK] switch.

(12) Suitably turn the front panel [C/S] rotary switch, and adjust so that the indication will be at about 80% of the required maximum indication. Record the indicated value. Hereafter, electric calibration can be made by this value.
By turning on the [CHECK] switch again, check value will be released.

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6-4 Actual load calibration-II (for detection, no analog output)

(1) Apply initial load on the transducer.

(2) Adjust the TARE rotary switch (coarse adjustment) and ZERO trimmer, and confirm that the indication becomes 0 (zero).

(3) Apply maximum load on transducer.

(4) Adjust the [SPAN] trimmer to obtain required indication at (3) condition.

(5) Remove the load and confirm that the indication is 0 (zero) and that C/Z LED is lighted. If it does not work properly, adjust the ZERO trimmer, and the indication will be 0 (zero). Apply the maximum load again and adjust the [SPAN] trimmer to obtain required indication. Repeat the above operation several times.

(6) Remove the load and turn on the front panel [CHECK] switch. Check value will be indicated, and such value should be recorded.
Hereafter, electric calibration will be possible with this value.
By turning on the [CHECK] switch again, the check value will be released.

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6-5 Actual load calibration-III (for detection, with analog output)

(1) Apply initial load on the transducer.

(2) Turn the front panel [TARE] rotary switch and adjust so that the indication will be nearest to 0 (zero).

(3) Further, turn the front panel [ZERO] trimmer so that the indication will be 0 (zero) and that "C/Z" LED will be lighted.

(4) In case there is a voltage output (V-Out), separate zero adjustment should be done. By adjusting the trimmer No.1, located at the lower left side of the front panel, V-Out should be 0.000 V when the indication is 0 (zero).

(5) In case there is an isolation output (I-Out), by similaly adjusting trimmer No.3, I-Out should be 4.00 mA when the indication is 0 (zero).

(6) Apply maximum load on the transducer.

(7) Adjust the [SPAN] trimmer to obtain the required indication at (6) condition.

(8) If there are further analog output, adjust to obtain required analog value with the following trimmer.

Front panel lower left side trimmer No.2 ..... V-Out SPAN
Front panel lower left side trimmer No.4 ..... I-Out SPAN

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(9) Remove the load and repeat the above (3)∿(8) several times.

Note: ZERO, SPAN adjustment (trimmer No.1∿4) of analog output are not interlocked with the indication. Therefore, adjustments should be made by confirming the output of V-Out or I-Out with digital multi-meter or the like.

(10) Remove the load and turn on the front panel [CHECK] switch. Record the indication and analog value. Hereafter, electric calibration will be possible with this value.

(11) Hereafter, ZERO and SPAN adjustment of the indication and analog output should be made by [ZERO] and [SPAN] trimmer, located at lower right of the front panel. If, for some reason, there should be a gap between the proportion of the indication and voltage output, adjust the trimmer No.1∿4.

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6-6 Electric calibration-I (for detection, no analog output)

(1) Apply initial load on the transducer.

(2) Adjust the TARE rotary switch (coarse adjustment) and ZERO trimmer (fine adjustment), and confirm that the indication will be 0 (zero).

(3) Turn on the front panel [CHECK] switch. An indication will be given. Then, adjust the [SPAN] trimmer so that the value will be the same as the CHECK value in the test report sheet, attached to the equipment.
(If there is no report sheet, adjust with the CHECK value recorded at the time of actual load inspection.)

(4) Turn on the [CHECK] switch again and the indication will be 0 (zero). If it does not become 0 (zero), adjust the front panel ZERO trimmer (fine adjustment), and after confirming that the indication is 0 (zero), then carry out (3) above.

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6-7 Electric calibration-II (for detection, with analog output)

(1) Apply initial load on the transducer.

(2) With the front panel [ZERO] trimmer, adjust to obtain 0 (zero) indication as well as "C/Z" LED light.
(If adjustment cannot be made, jointly use the [TARE] rotary switch.)
Also, adjust the trimmer No.1 (V-Out) or trimmer No.3 (I-Out), so that voltage output will be 0.000 V or current output will be 4.00 mA when the indication is 0 (zero).

(3) Turn on the front panel [CHECK] switch. Indication and analog output will be shown.
In the attached test report sheet, indicated value and analog value are noted as the check values.
First, adjust the [SPAN] trimmer so that the indicated value will be the same.
Then, adjust trimmer No.2 (V-Out) or trimmer No.4 (I-Out) so that the analog value will be the same.

(4) By turning on the [CHECK] switch again, the indication will be 0 (zero). If it does not become 0 (zero), repeat the above (2) and (3) several times.

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6-8 Registration of each function by set mode

By referring to Section 8. (page 28), register each function.

Eg.) 1) Setting of decimal point
2) Changeover of the unit
3) Changeover of BCD-OUT true
.
.
.
.
.
etc.

6-9 Start of measurement

Turn on the [Z/S] switch and start the measurement.
As required, set the value of comparative setter.

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§7. FUNCTION IN MEASUREMENT MODE

This function is a function which can be carried out during normal measurement. Condition at the time of power supply to this equipment is in this mode.

7-1 Zero set function (Digital tare cancel, hereinafter abbreviated as Z/S)

A function to make the indication 0 (zero) regardless of the analog output.
It can be used for tare cancel and the like.
At the time of Z/S function OFF, it will be

(Indication data) = (BCD output: Total load) = (BCD output: Net load) = (~~Total~~ load) - input value ..... (a)

But with the Z/S function ON, it will be

(Indication data) = (BCD output: ~~Net load~~) =

(~~Total load~~ - Z/S cancel data) ..... (b)

(Input value — ")

Z/S cancel data is the total load data when the Z/S function is turned ON.
Also, by turning ON the Z/S function, it will be possible to use AUTO ZERO function and ZERO TRACKING function.

(1) Z/S ON

By turning ON the front panel Z/S switch, red LED in the Z/S switch will be lighted, and the total load value at such time will be memorized and the indication will be 0 (zero).
Thereafter, the indication will be made according to formula (b).

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(2) Z/S OFF

By repeating the same operation as above (1), red LED in the Z/S switch will be put out and the total load value at such time will be indicated.
Thereafter, the indication will be made according to formula (a). (However, this function is effective only when the LED in the A/Z OFF switch is lighted.)

7-2 AUTO ZERO, AUTO ZERO OFF Function

(hereinafter, AUTO ZERO will be abbreviated as A/Z)
As in Z/S function, this function indicates 0 (zero) regardless of the analog output.
While the Z/S function is a function to determine the basis of indication (indication 0), A/Z function is a function for easy understanding of the changed amount of the data, which will give optional value a 0 (zero), and can indicate 0 repeatedly.
In case of A/Z function OFF, indication will be made according to the formula (a) or (b) shown in Z/S function.
In case of A/Z function ON, it will be

(Indication data) = (BCD output: Net load) =

~~(Total load - Z/S cancel data - A/Z cancel data)~~ ..... (c)
(Input value - Z/S cancel data - A/Z cancel data)

A/Z cancel data means (Total load - Z/S cancel data) when the A/Z function is turned ON.
A/Z function can be used only when the Z/S function ON, and not at Z/S function OFF.

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(1) A/Z ON

By turning ON the front panel A/Z switch, red colored LED in the A/Z OFF switch will be put out.
(Total load - Z/S cancel data) at such time will be memorized and the indication will be 0 (zero).
Hereafter, indication will be made according to formula (c).
Also, it is possible to turn ON the A/Z function repeatedly without turning OFF the A/Z function. With A/Z function ON, Z/S function will be locked and Z/S function OFF will not be accepted.

(2) A/Z OFF

By turning ON the front panel A/Z OFF switch, red colored LED in the A/Z OFF switch will be lighted, and thereafter indicate according to formula (b).
Also, with A/Z function OFF, locked condition of Z/S function will be released and Z/S function OFF will be possible.

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7-3 Comparative setting function (comparator)

This is a function which will turn ON the rear contact at above or below the setting value against the indication.
There are two setting points, HIGH and LOW, and each can be set at high or low limits. Also, it will output signals to show that, by setting, it is within the range of two (2) settings. (OK)

(1) Setting of comparative value

Set the setting values of each 2 points at the front panel digital switch. The set values include the sign, so if rear contact ON is desired at indicated value "+", set the sign at "+", and if rear contact ON is desired at indicated value "-", then set the sign at "-".

(2) Setting of comparative conditions

When in standard specification or in back-up data clear, both HIGH and LOW points will be set at high limits, and when the indicated value is above the set value of front panel digital switch, rear contact output will be ON.
To change the condition, setting contents exchange function of initial setting will be used.
Also, in case the condition of HIGH is at low limit and condition of LOW is at high limit, and if setting value of HIGH $\geqq$ indicated value $\geqq$ setting value of LOW, then contact output of OK will be ON in addition to contacts of HIGH and LOW. This OK contact can be controlled by the judgement function of initial setting. (For the above, refer to initial setting function.)

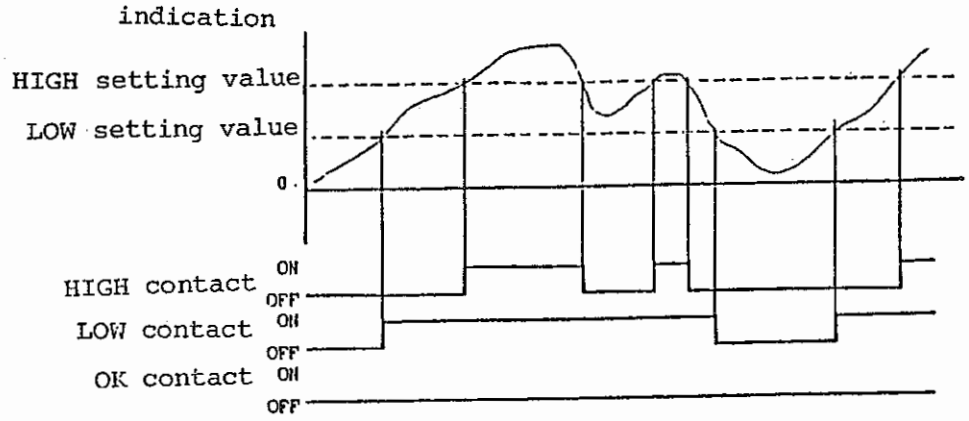
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(3) Output of comparative results

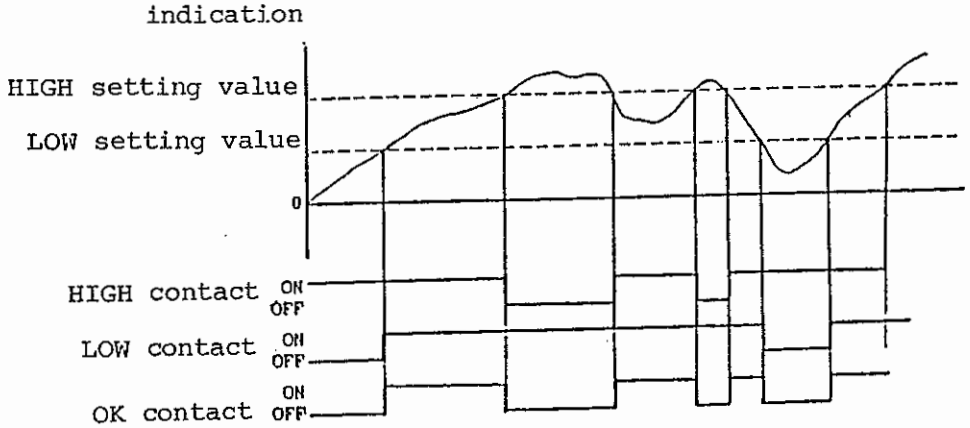
If the indicated value satisfies the conditions of (2) against the setting of (1), then contact output will be ON and front panel LED (color : red) will be ON.

Note : If the indicated value is unsteady in the vicinity of the set value, contact output will similary be unsteady.

Eg.1 LOW=high limit setting HIGH=high limit setting



Eg.2 LOW=high limit setting HIGH=low limit setting



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7-4 CENTER ZERO function

Turn on the front panel C/Z LED (color: red) when both the indication is 0 (zero) and the total load value is less than ± 1/2 of 1 digit.

Example : 1

Total load value	Z/S cancel data	Z/S cancel data	Indication	C/Z
+ 1000.0	OFF	OFF	+ 1000.0	OFF
+ 1000.0	+ 1000.0	OFF	+ 0	OFF
+ 1000.0	+ 500.0	+ 500.0	+ 0	OFF
+ 1000.0	− 1000.0	+ 2000.0	+ 0	OFF
+ 0.5	OFF	OFF	+ 0	OFF
+ 0.0	+ 1000.0	OFF	− 1000.0	OFF
+ 0.0	+ 1000.0	− 1000.0	+ 0	ON
+ 0.0	OFF	OFF	+ 0	ON
+ 0.3	OFF	OFF	+ 0	ON
− 0.3	− 0.3	OFF	+ 0	ON

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§8. FUNCTION BY SET MODE (INITIAL SETTING FUNCTION)

This function is for carrying out the various functions of this equipment and to set required data for such functions.

Using the attached micro-driver, press the hole located at front panel SET MODE. Then, SET MODE switch will be ON, indication will be "P" and will be in SET MODE. Normal measurement (Measurement Mode) will not be made while indication is "P". To achieve measurement mode, turn ON the SET MODE again.

Functions which can be registered by SET MODE are as follows.

1) ZERO TRACKING
2) Minimum effective digit setting
3) Multiplication
4) Pre-set (weight) cancellation
5) Setting contents exchange
6) Judgment
7) Dummy 0 indication
8) Decimal point indication
9) Sign inversion
10) Sign transfer
11) Unit indication changeover
12) Manual Z/S function
13) Back-up data clear

Each of the above functions will be registered under the condition of SET MODE (indication "P").

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8-1 Required switches for SET MODE

During the SET MODE (indication "P" lighted), each switch on the front panel will have a different meaning from that in Measurement Mode.

(1) Digital switch (LOW)

Setting function Nos.

(2) Digital switch (HIGH)

Data setting
Set the data per each function set by digital switch(LOW).

(3) [Z/S] switch

Function data register
Contents set by digital switches (HIGH/LOW) will be registered in internal memory. While this switch is pressed, indication will show the contents of digital switch (HIGH). If the switch is released, the indication will be "P" again.

(4) [A/Z] or [A/Z OFF] switch

Memory dump
Will indicate the data, presently registered within the function set by digital switch (LOW).
Data will be indicated while the switch is pressed, and indication will be "P" if switch is released.

(5) [CHECK] switch

Self-check
Similar self-check as in initial power feed.

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8-2 ZERO TRACKING (Z/T)

While the indication is 0 (zero), it will cancel the changing indication, due to drift of input data caused by internal and external reasons.
Z/T will indicate 0 (zero) when the data, with the exception of 0 (zero), is within a certain width and time, and the data out of such position will be added to Z/S cancel value (see 7-1).

Note : This function will be effective by Z/S switch ON during Measurement Mode, after Set Mode register.

Registration Procedure

(1) Yes or no of Z/T execution will be set at the front panel, digital switch.

Note 1.

Digital switch LOW	+/-	0	0	0	0	0	(Function No.)

Note 1. *1 *2 *3

Digital switch HIGH	+/-	0	x	x	x	x	(Data)

- 0: Z/T ineffective
- 1: Z/T effective
- 2~9: Error (E-3)

*1 : For minimum effective digit setting (see 8-3)

*2 : For pre-set (weight) cancellation function (see 8-5)

*3 : For multiplication (see 8-4)

Note 1. : + or - both possible

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(2) Turn ON the [Z/S] switch and register the set value at (1) to internal memory.
(While the [Z/S] switch is ON, value set by digital switch HIGH will be indicated, and when the switch is released, "P" will be indicated. "E-3" will be indicated when there is an error in digital switch setting. In this case, data set at digital switch will not be registered. Reconfirm the contents of the digital switch.)

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(3) Set the data required for Z/T to digital switch

Note 1

Digital switch LOW	+/-	0	0	0	0	1

(Function No.)

Note 1

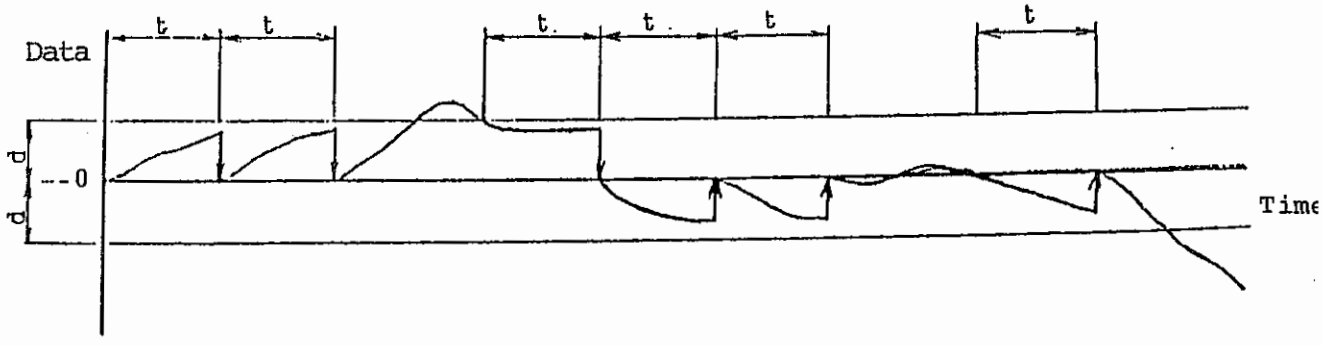
Digital switch HIGH	+/-	0	0	0	X	X

(Data)

- Z/T time width setting
  - 0 : 0 sec.
  - 1 : 1 sec.
  - 2 : 2.5 sec.
  - 3 : 4 sec.
  - 4 : 6 sec.
  - 5 : 8 sec.
  - 6∿9: Error (E-3)
- Data width to be zero cancelled
  - 0 : 0 (Z/T ineffective)
  - 1 : 1 count or below
  - 2 : 1.5 count or below
  - 3 : 3 count or below
  - 4∿9: Error (E-3)

Note 1 : + or - both possible

See the following graph for the relation between time width and data width.



t : Time width

d : Data width

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(4) Turn ON the [Z/S] switch and register the set value at (3) to internal memory.
(While the Z/S switch is ON, value set by digital switch HIGH will be indicated, and when the switch is released, "P" will be indicated. "E-3" will be indicated when there is an error in digital switch setting. In this case, data set at digital switch will not be registered. Reconfirm the contents of the digital switch.)

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8-3 Minimum effective digit setting function

This function is for setting the minimum digit of indication, and to determine the increment (indication change) of such digit.
Also, it is possible to select whether to cut and close to the right or to leave as 0 (zero), such digits below the set digit.

(Example)

- Normal increment: 1993 → 1994 → 1995 → 1996 → 1997
- When minimum digit is 10^0 and increment is 2: 1992 → 1994 → 1994 → 1996 → 1996
- When minimum digit is 10^1, below to be cut and increment is 1: 199 → 199 → 200 → 200 → 200

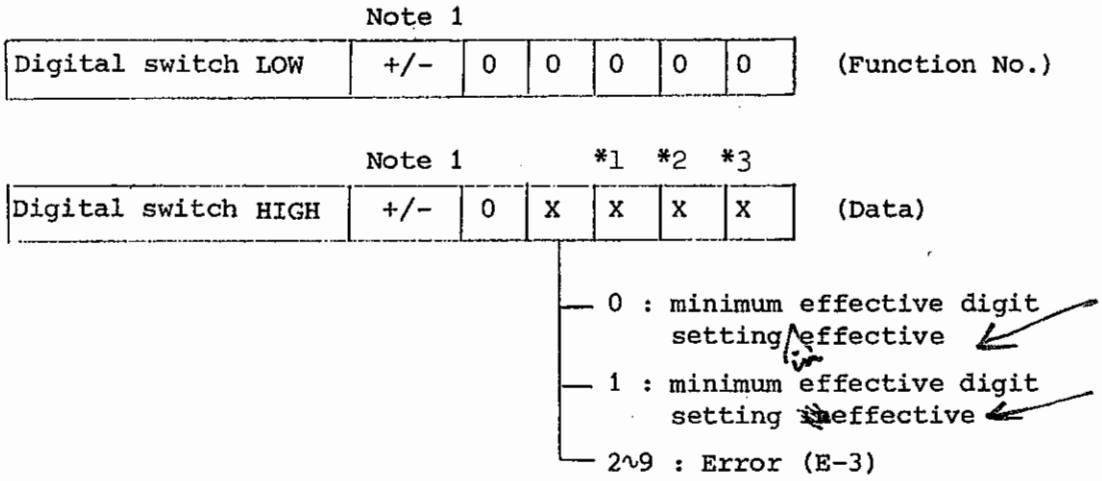
(Note)

This function is effective for BCD output data as well, but close to the right function will, in BCD output, become leave as 0 (zero).

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Registration Procedure

(1) Yes or no to execute minimum effective digit setting will be set.



*1 : For pre-set (weight) cancellation function (see 8-5)

*2 : For multiplication (see 8-4)

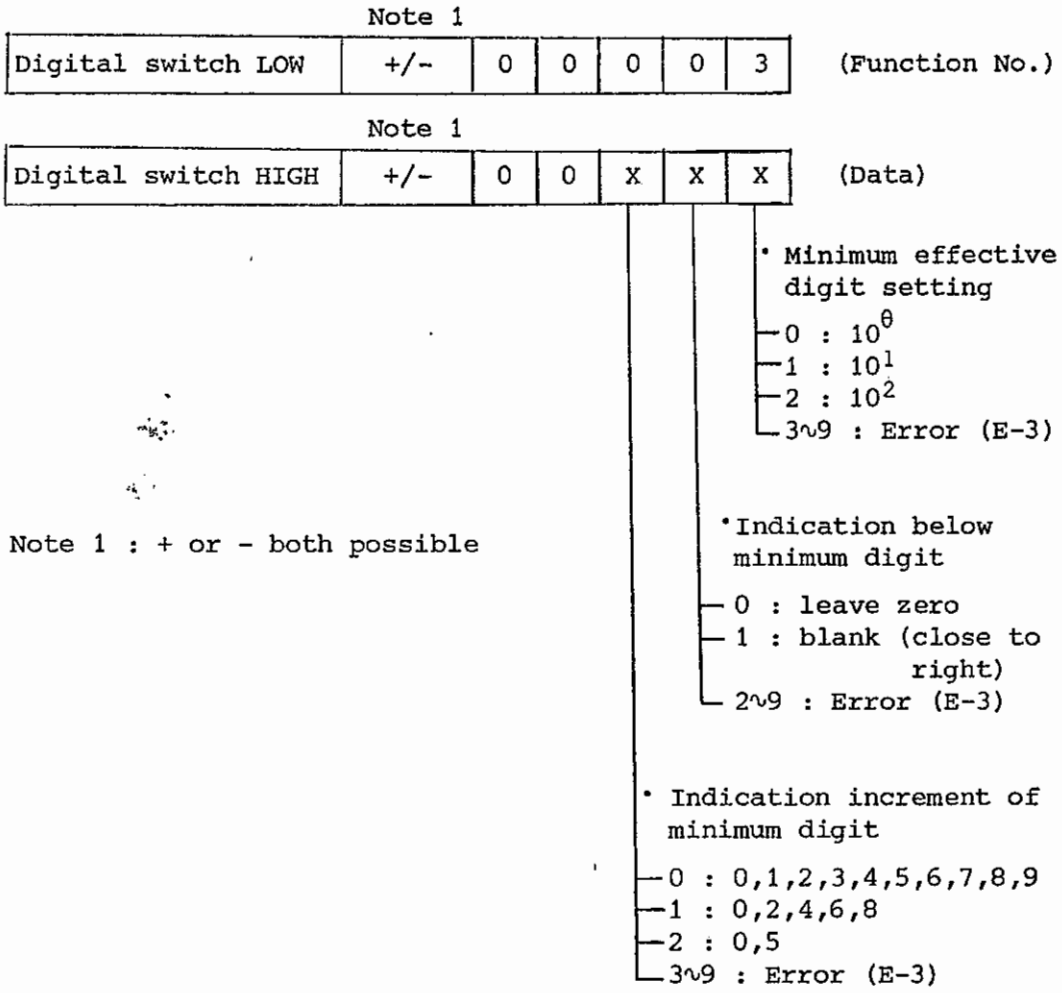
*3 : For Z/T (see 8-2)

Note 1 : + or - both possible

(2) Turn ON the [Z/S] switch and register the set value at (1) to internal memory.
(While the [Z/S] switch is ON, value set by digital switch HIGH will be indicated, and when the switch is released, "P" will be indicated. "E-3" will be indicated when there is an error in digital switch setting. In this case, data set at digital switch will not be registered. Reconfirm the contents of the digital switch.)

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(3) Set the data required for minimum effective digit setting function.



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(4) Turn ON the [Z/S] switch and register the set value at (3) to internal memory.
(While the [Z/S] switch is ON, value set by digital switch HIGH will be indicated, and when the switch is released, "P" will be indicated. "E-3" will be indicated when there is an error in digital switch setting. In this case, data set at digital switch will not be registered. Reconfirm the contents of the digital switch.)

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8-4 Multiplication function

This function will indicate the data multiplied by constant and BCD output.
According to the constant, maximum indication and maximum setting value of digital switch will change.

Constant	Maximum indication (or set value)
X 2	+/- 19998
X 1	+/- 9999
X 1/2	+/- 4999
X 1/5	+/- 1999

In standard specification and after back-up data clear the constant will be at (X1).

Note : If the [Z/S] switch is ON just prior to the transfer from measurement mode to set mode, the constant cannot be changed in this function. Be sure to register under [Z/S] switch off condition.

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Registration Procedure

(1) Set the multiplication constant

	Note 1						
Digital switch LOW	+/-	0	0	0	0	0	(Function No.)

	Note 1		*1	*2		*3	
Digital switch HIGH	+/-	0	X	X	X	X	(Data)

- Multiplication constant
  - 0 : X 1
  - 1 : X 1/2
  - 2 : X 1/5
  - 3 : X 2
  - 4∿9 : Error (E-3)

*1 : For minimum effective digit setting function (see 8-3)

*2 : For pre-set (weight) cancellation function (see 8-5)

*3 : For Z/T (see 8-2)

Note 1 : + or - both possible

(2) Turn ON the [Z/S] switch and register the set value at (1) to internal memory.
(While the [Z/S] switch is ON, value set by digital switch HIGH will be indicated, and when the switch is released, "P" will be indicated. "E-3" will be indicated when there is an error in digital switch setting. In this case, data set at digital switch will not be registered. Reconfirm the contents of the digital switch.)

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8-5 Pre-set (weight) cancellation function

This function is for comparative setting, with a method where a reference point (quantitative point) is established on digital switch HIGH and to set the excess and deficiency data (cancel portion) against such point on digital switch LOW.

Eg.) When HIGH contact ON at quantitative 1000 kg, and LOW contact ON at pre-quantitative 200 kg (indication 800 kg), then,

- Method to date :
  Digital switch HIGH setting ----------→ +01000
  Digital switch LOW setting ----------→ +00800

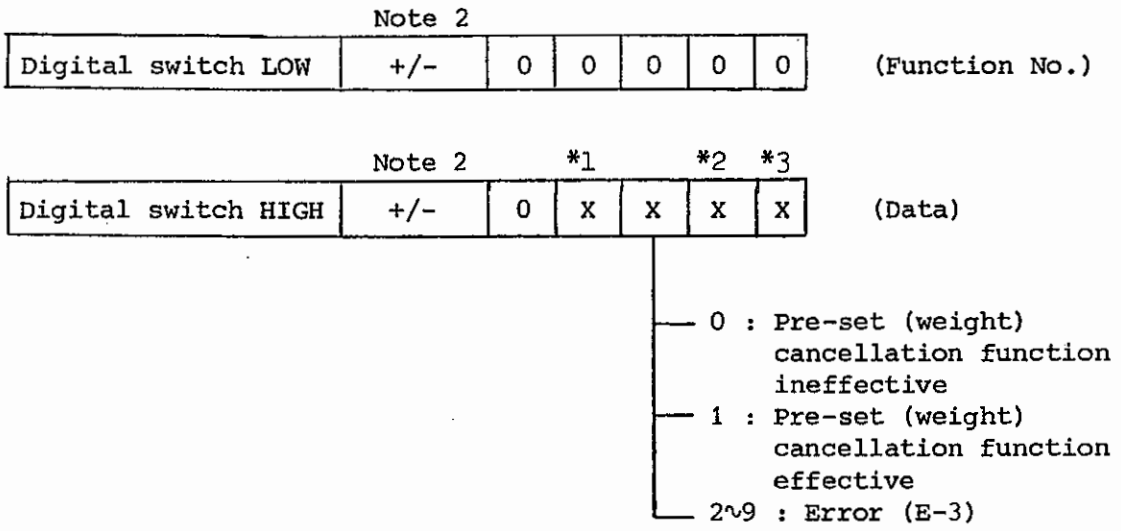
- By using pre-set (weight) cancellation function:
  Digital switch HIGH setting ----------→ +01000
  Digital switch LOW setting ----------→ -00200

Note 1) Consider polarity when setting digital switch LOW.
If set as +00200, contact on LOW side will be ON at indication +01200.

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Registration Procedure

(1) Set yes or no to execute pre-set (weight) cancellation function



*1 : For minimum effective digit setting function (see 8-3)

*2 : For multiplication function (see 8-4)

*3 : For Z/T (see 8-2)

Note 2 : + or - both possible

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(2) Turn ON the [Z/S] switch and register the set value at (1) to internal memory.
(While the [Z/S] switch is ON, value set by digital switch HIGH will be indicated, and when the switch is released, "P" will be indicated. When there is an error in digital switch setting, data set at digital switch will not be registered. Reconfirm the contents of digital switch.)

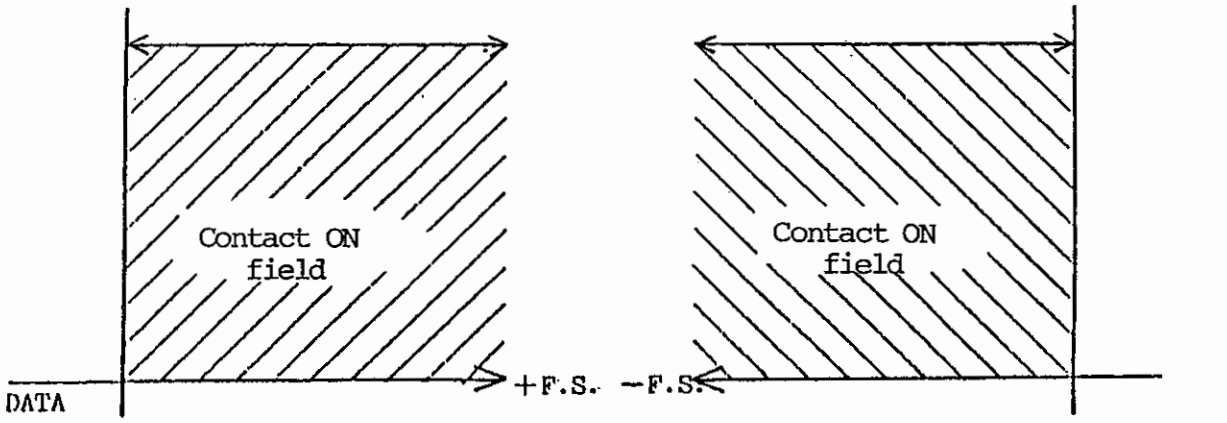
(3) When registration is finished and measurement mode is carried out, LED for contact monitor on th front surface will be green.

(4) Refer to preceeding example and select the set value.

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8-6 Comparative setting condition changeover function

Can select comparative condition of setting points for HIGH and LOW each.
Comparative condition is a condition to turn ON the relay contact, according to the size relation of setting value and indication value, and will be as the following figure.

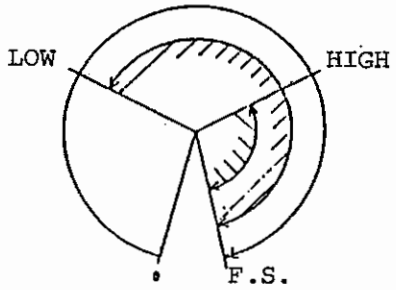


High Limit Setting

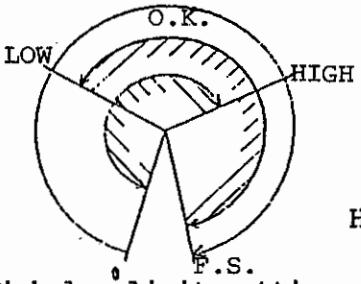
Low Limit Setting

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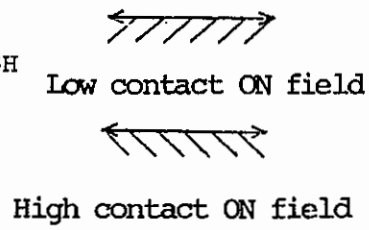
Therefore, as this equipment is incorporated with 2 points of setting points, 4 points of setting methods are possible as shown below. Furthermore, with the setting method (3), output of OK contact can be obtained in addition to 2 points of contacts HIGH and LOW.

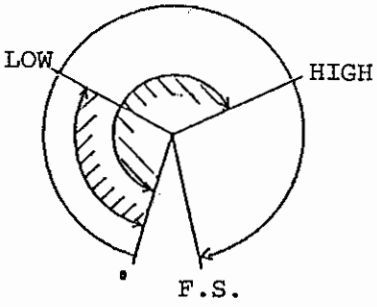


(1) High high limit setting

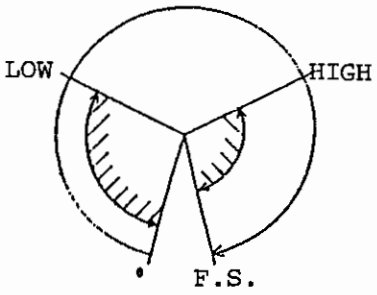


(3) High low limit setting





(2) Low low limit setting



(4) Low high limit setting

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Registration Procedure

(1) Set HIGH and LOW each of comparative setting conditions.

	Note 1						
Digital switch LOW	+/-	0	0	0	0	2	(Function No.)

	Note 1			*1			
Digital switch HIGH	+/-	0	0	X	X	X	(Data)

- Comparative condition for digital switch LOW
  - 0 : High limit setting
  - 1 : Low limit setting
  - 2∿9 : Error (E-3)
- Comparative condition for digital switch HIGH
  - 0 : High limit setting
  - 1 : Low limit setting
  - 2∿9 : Error (E-3)

*1 : For judgment function (see 8-7)

Note 1 : + or - both possible

(2) Turn ON the Z/S switch and register the set value at (1) to internal memory.
(While the Z/S switch is ON, value set by digital switch HIGH will be indicated, and when the switch is released, "P" will be indicated. "E-3" will be indicated when there is an error in digital switch setting. In this case, data set at digital switch will not be registered. Reconfirm the contents of the digital switch.)

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8-7 Judgment function

As described in 8-6, if the comparative conditions of comparative setting function are set as

1) HIGH ..... low limit setting
2) LOW ..... high limit setting

and the indication value satisfies the condition of

setting value of LOW $\leqq$ Indication value $\leqq$ setting value of HIGH ... (1)

then it is possible to output OK contact in addition to 2 contacts of HIGH and LOW.

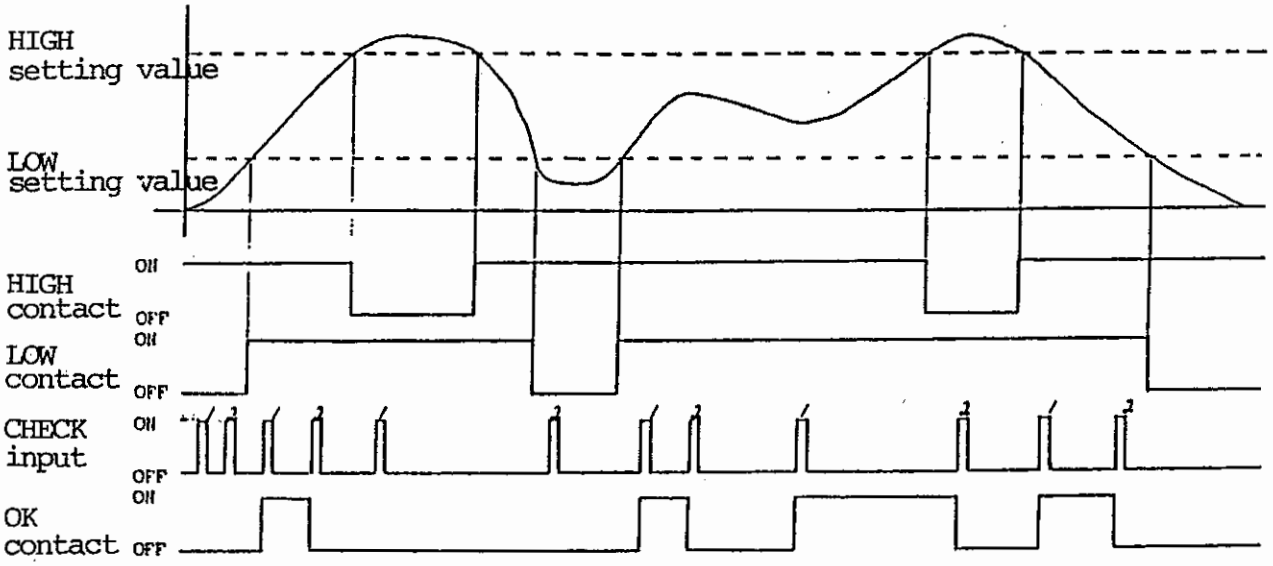
This function is to further control such OK contact output by external signal, with [CHECK] switch used for the external signal.

Operationally, normally there will be no OK contact output when the indication value is satisfying the condition of formula (1), but will output by turning ON the [CHECK] switch. By putting the [CHECK] switch ON again, output will be OFF. Once the OK contact is ON, the condition will be maintained unless input of [CHECK] switch is made again, so even if the condition of the indication value no longer satisfies the conditions of formula (1), OK contact output will continue to be in output.

Relationship between data fluctuation and input/output signal will be as follows.

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Data fluctuation by time



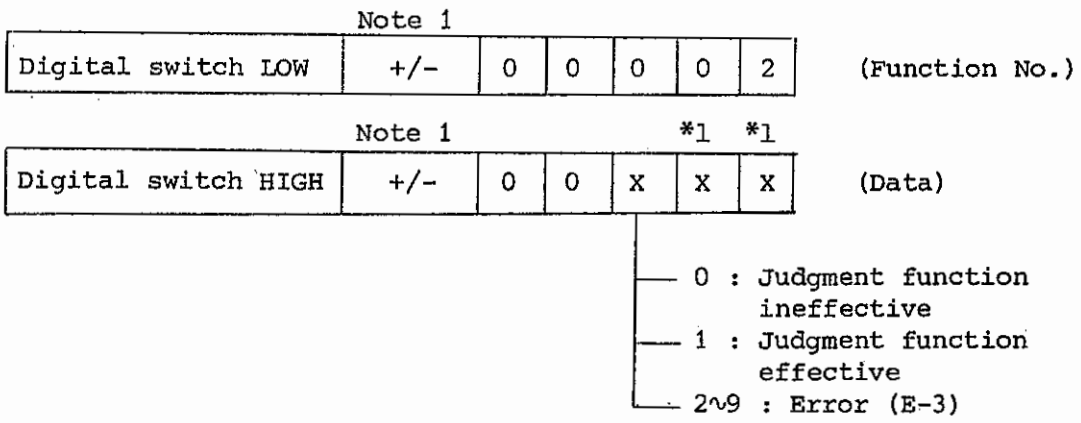
Remarks : 1 - judgement ON
2 - judgement OFF

Note : By executing this function, conventional CAL function by [CHECK] switch cannot be carried out.

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Registration Procedure

(1) Set yes or no of judgment function execution



*1 : For comparative setting condition changeover function (see 8-6)

Note 1 : + or - both possible

(2) Turn ON the Z/S switch and register the set value at (1) to internal memory.
(While the Z/S switch is ON, value set by digital switch HIGH will be indicated, and when the switch is released, "P" will be indicated. "E-3" will be indicated when there is an error in digital switch setting. In this case, data set at digital switch will not be registered. Reconfirm the contents of the digital switch.)

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8-8 Dummy 0 indication

Normally, dummy 0 (leave 0) will be lighted at the right end of 4 digits indication.

Registration Procedure

Note : This function cannot be registered if [Z/S] switch is ON in the measurement mode, just prior to set mode ON ("P" indication). ("E-3" will be indicated at the time of registration in set mode.)
Be sure to enter set mode after [Z/S] switch OFF.

(1) Set yes or no of dummy 0 indication

	Note 1						
Digital switch LOW	+/-	0	0	0	0	4	(Function No.)

	Note 1		*1	*2	*3		
Digital switch HIGH	+/-	0	X	X	X	X	(Data)

- 0 : dummy 0 ineffective
- 1 : dummy 0 effective
- 2∿9 : Error (E-3)

*1 : For sign transfer indication function (see 8-11)

*2 : For sign inversion function (see 8-10)

*3 : For decimal point indication (see 8-9)

Note 1 : + or - both possible

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(2) Turn ON the [Z/S] switch and register the set value at (1) to internal memory.
(While the [Z/S] switch is ON, value set by digital switch HIGH will be indicated, and when the switch is released, "P" will be indicated. "E-3" will be indicated when there is an error in digital switch setting. In this case, data set at digital switch will not be registered. Reconfirm the contents of the digital switch.)

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8-9 Decimal point indication

Add decimal point to indication data

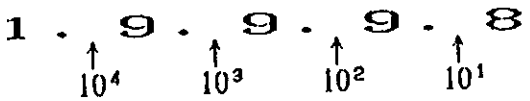
Registration procedure

Note : This function cannot be registered if Z/S switch is ON in the measurement mode, just prior to set mode ON ("P" indication). ("E-3" will be indicated at the time of registration in set mode) Be sure to enter set mode after Z/S switch OFF.

(1) Set necessary digits of decimal point

	Note 1						
Digital switch LOW	+/-	0	0	0	0	4	(Function No.)

	Note 1		*1	*2		*3	
Digital switch HIGH	+/-	0	X	X	X	X	(Data)



- Decimal point indication digit
  - 0 : OFF (No decimal point)
  - 1 : 10^1
  - 2 : 10^2
  - 3 : 10^3
  - 4 : 10^4
  - 5∿9 : Error (E-3)

*1 : For sign transfer indication (see 8-11)

*2 : For sign inversion function (see 8-10)

*3 : For dummy 0 indication (see 8-8)

Note 1 : +/- both possible

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(2) Turn ON the [Z/S] switch and register the set value at (1) to internal memory.
(While the [Z/S] switch is ON, value set by digital switch HIGH will be indicated, and when the switch is released, "P" will be indicated. "E-3" will be indicated when there is an error in digital switch setting. In this case, data set at digital switch will not be registered. Reconfirm the contents of the digital switch.)

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8-10 Sign inversion function

Will invert the sign of indication and BCD output. Therefore, it will be (-) indication at (+) data and (+) indication at (-) data.

Registration Procedure

Note : This function cannot be registered if Z/S switch is ON in the measurement mode, just prior to set mode ON ("P" indication). ("E-3" will be indicated at the time of registration in set mode) Be sure to enter set mode after Z/S switch OFF.

(1) Register yes or no of sign inversion function execution.

Note 1

Digital switch LOW	+/-	0	0	0	0	4

(Function No.)

Note 1 *1 *2 *3

Digital switch HIGH	+/-	0	X	X	X	X

(Data)

- 0 : Sign inversion function ineffective
- 1 : Sign inversion function effective
- 2∿9 : Error (E-3)

*1 : For sign transfer indication (see 8-11)

*2 : For decimal point indication (see 8-9)

*3 : For dummy 0 indication (see 8-8)

Note 1 : +/- both possible

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(2) Turn ON the [Z/S] switch and register the set value at (1) to internal memory.
(While the [Z/S] switch is ON, value set by digital switch HIGH will be indicated, and when the switch is released, "P" will be indicated. "E-3" will be indicated when there is an error in digital switch setting. In this case, data set at digital switch will not be registered. Reconfirm the contents of the digital switch.)

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8-11 Sign transfer function

Normally, (-) sign is fixed at the left end of the front panel indicator, but with this function, (-) sign will transfer to left/right according to the digit of indication.

Registration Procedure

Note : This function cannot be registered if Z/S switch is ON in the measurement mode, just prior to set mode ON ("P" indication). ("E-3" will be indicated at the time of registration in set mode) Be sure to enter set mode after Z/S switch OFF.

(1) Register yes or no of sign transfer function execution.

	Note 1						
Digital switch LOW	+/-	0	0	0	0	4	(Function No.)

	Note 1			*1	*2	*3	
Digital switch HIGH	+/-	0	X	X	X	X	(Data)

- 0 : Sign transfer function ineffective
- 1 : Sign transfer function effective
- 2∿9 : Error (E-3)

*1 : For indication of sign inversion (see 8-10)

*2 : For decimal point indication (see 8-9)

*3 : For dummy 0 indication (see 8-8)

Note 1 : +/- both possible

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(2) Turn ON the [Z/S] switch and register the set value at (1) to internal memory.
(While the [Z/S] switch is ON, value set by digital switch HIGH will be indicated, and when the switch is released, "P" will be indicated. "E-3" will be indicated when there is an error in digital switch setting. In this case, data set at digital switch will not be registered. Reconfirm the contents of the digital switch.)

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8-12 BCD-OUT true conversion

Function to chengeover the output true of BCD-OUT. Logic can be changed according to net load, total load and data (including sign), command.

Registration Procedure

(1) Set the data separately for data and command of net load and total load.

Note 1

Digital switch LOW	+/-	0	0	0	0	5

(Function No.)

Note 1

Digital switch HIGH	+/-	0	X	X	X	X

(Data)

1) Load data

BCD data

Polarity (POL)

2) Load command

P.C. (Print command)

O.V.F. (overflow)

Note : +/- both possible

- Net load data
  - 0 : HIGH TRUE
  - 1 : LOW TRUE
  - 2∿9 : ERROR (E-3)
- Total load data
  - 0 : HIGH TRUE
  - 1 : LOW TRUE
  - 2∿9 : ERROR (E-3)
- Net load command
  - 0 : HIGH TRUE
  - 1 : LOW TRUE
  - 2∿9 : ERROR (E-3)
- Total load command
  - 0 : HIGH TRUE
  - 1 : LOW TRUE
  - 2∿9 : ERROR (E-3)

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8-13 Unit indication changeover

For changeover of unit indication of the front panel.

Registration Procedure

(1) Select the unit desired to be indicated.

Note 1

Digital switch LOW	+/-	0	0	0	0	6	(Function No.)

Note 1

Digital switch HIGH	+/-	0	0	0	0	X	(Data)

- Unit selection
  - 0 : kg
  - 1 : ton
  - 2 : Blank
  - 3 ∿ 9: Error (E-3)

Note : +/- both possible

(2) Turn ON the [Z/S] switch and register the set value at (1) to internal memory.
(While the [Z/S] switch is ON, value set by digital switch HIGH will be indicated, and when the switch is released, "P" will be indicated. "E-3" will be indicated when there is an error in digital switch setting. In this case, data set at digital switch will not be registered. Reconfirm the contents of the digital switch.)

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8-14 Manual Z/S function

This is a function to confirm the Z/S cancellation value in Z/S function (7-1).

Registration Procedure

(1) Set the function No.

Note 1

Digital switch LOW	+/-	0	0	0	0	8	(Function No.)

Note : + or - both possible

(2) By turning ON A/Z switch or A/Z OFF switch, Z/S cancellation value will be indicated while it is ON. Use for confirmation of Z/S cancellation value.

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8-15 Back-up Data Clear

All back-up data will be cleared and written into initial values.

Registration Procedure

(1) Set yes or no to execute back-up data clear function.

	Note 1					*1	
Digital switch LOW	+/-	0	0	0	1	X	(Function No.)

	Note 1						
Digital switch HIGH	+/-	0	0	0	0	1	(Data)

*1 : Any number of 0 ∿ 9.

Note 1 : + or - both possible

(2) Turn ON [Z/S] switch at the set value of (1). When turned ON, indication will flash at "0001". (Here, if memory clear is not to be done, then turn ON either [A/Z] switch or [A/Z OFF] switch, and this registration will be cancelled.)

(3) If memory clear is to be done, once again turn ON the [Z/S] switch while the indication is still flashing. Then it will be as similar condition as power feed and internal memory will be cleared.

Note) When this function is executed, it will automatically be in measurement mode after the function is executed.

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§9. SELF-CHECK FUNCTION

At the time of power feed or by front panel [CHECK] switch ON during set mode ("P" indication), self-check can be made.
As the contents of self-check, followings will be done.

1)	ROM check	:	Program check
2)	RAM check	:	Memory check
3)	Back-up check	:	Back-up check
4)	A/D check	:	Operation check of internal A/D converter
5)	Indication check	:	Check abnormal indication

§10. ERROR INDICATION

When the following various errors should occur, each will be indicated and rear panel ERROR contact will be ON. Also, the bit of BCD-OUT connector No.25 pin (ERROR) will be ON.

(1) [----]

Data over
Will be indicated when input data exceeds indication maximum value. Normally, indication maximum value is 9999, but when multiplication function (see 8-4) is used, it will be 4999 at x 1/2, 1999 at x 1/4 and 19998 at x 2.

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(2) E - 0

ROM error
Will be indicated when error is discovered during self-check per Section 9. When this error is indicated, the program will stop. Cut off the power then refeed.
If "E-0" is still indicated, please contact our sales representative.

(3) E - 1

RAM error
Will be indicated when error is discovered during self-check per Section 9. When this error is indicated, the program will stop. Cut off the power then refeed.
If "E-1" is still indicated, please contact our sales representative.

(4) E - 2

Back-up data error
Will be indicated when error is discovered during self-check per Section 9. It will light and indicate for about 1 second and then proceed to next operation.
When this indication is given, it will be judged that there is abnormality in the back-up data, and all data registered per Sections 7 and 8 will be cancelled, and will be in standard specification condition. Therefore, all digital functions should be registered again.
Normally, back-up data will remain memorized for about 1 month, even when the power is cut off.
If "E-2" indication is repeated many times, please contact our sales representative.

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(5) [E - 3]

Key operation error
Will be indicated when a wrong digital switch is set, while registering the data in set mode of Section 8. Also, depending on the registration function during set mode, it could be indicated if [Z/S] switch is ON just prior to turning the [SET MODE] switch ON (measurement mode).

(6) [E - 4]

Digital switch setting value error
Will be indicated when the setting value of digital switch during measurement mode should exceed the indication maximum value.
Reconfirm the setting value.

(7) [X X X X X]

A/D error
Will be indicated if abnormality in internal A/D converter is discovered when self-check in set mode is made.
Method of checking A/D converter is, first, input REF. voltage of 1V to A/D and confirm if digital output is within 10000 $\pm$ 10 count. In all, digital output should be confirmed 10 times.
If more than $\pm$ 10 count is detected, its value and number of confirmation order will be indicated.

Eg.) If the 5th confirmation is 9876,

Indication will be [98765]

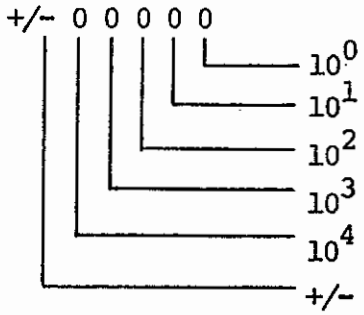
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This indication will be released by [CHECK] switch ON.
If there is no error thereafter, it will move to indication check.
If error indication is repeated several times, please contact our sales representative.

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§11. SET MODE SETTING VALUE TABLE

Switch (HIGH) for setting the contents are expressed as follows.



Function No (LOW)	Data (HIGH)		
	digit	value	Setting contents
+/- 00000	10^0	0 1	Z/T OFF ON
	10^1	0 1 2 3	Multiplication constant × 1 × 1/2 × 1/5 × 2
	10^2	0 1	Preset (weight) cancellation OFF ON
	10^3	0 1	Minimum effective digit setting OFF ON
+/- 00001	10^0	0 1 2 3 4 5	Z/T OFF Z/T Time width Approx. 1 sec. Approx. 2.5 sec. Approx. 4 sec. Approx. 6 sec. Approx. 8 sec.
	10^1	0 1 2 3	Z/T OFF Z/T Data width Less than 1 Less than 1.5 Less than 3
+/- 00002	10^0	0 1	Comparative setting condition (LOW) High limit Low limit
	10^1	0 1	Comparative setting condition High limit Low limit
	10^2	0 1	Judgement fucntion OFF ON

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+/- 00003	10^0	0 1 2	Minimum effective digit	10^0 10^1 10^2
	10^1	0 1	Below minimum effective digit indication	0 display
	10^2	0 1 2	Minimum effective digit indication	0,1,2,3,4,5,6,7,8,9 0,2,4,6,8 0,5
+/- 00004	10^0	0 1	Dummy 0	OFF ON
	10^1	0 1 2 3 4	Decimal point	10^{-1} 10^{-2} 10^{-3} 10^{-4}
	10^2	0 1	Sign inversion	OFF ON
	10^3	0 1	Sign trnasfer	OFF ON
+/- 00005	10^0	0 1	BCD output logic,Net load data	High true Low true
	10^1	0 1	BCD output logic,Total load data	High true Low true
	10^2	0 1	BCD output logic,Net load command	High true Low true
	10^3	0 1	BCD output logic,Total load command	High true Low true
+/- 00006	10^0	0 1 2	Unit	Kg TON blank
+/- 00007	10^1	0 1 2	Unused	
+/- 00008	10^0 ~ 10^4 +/-	0 ~ 9	Z/S cancel data	
+/- 0001X	10^0	0 1	Ineffective Back-up data clear	

Note 1 : Cannot register if [Z/S] switch is ON just prior to turning on the set mode switch.

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§12. ANALOG ADJUSTMENT

Although standard internal adjustments have been made at the time of shipment from the factory, changes can be made by the following procedure, if various changes are required.

12-1 Standard parts adjustment

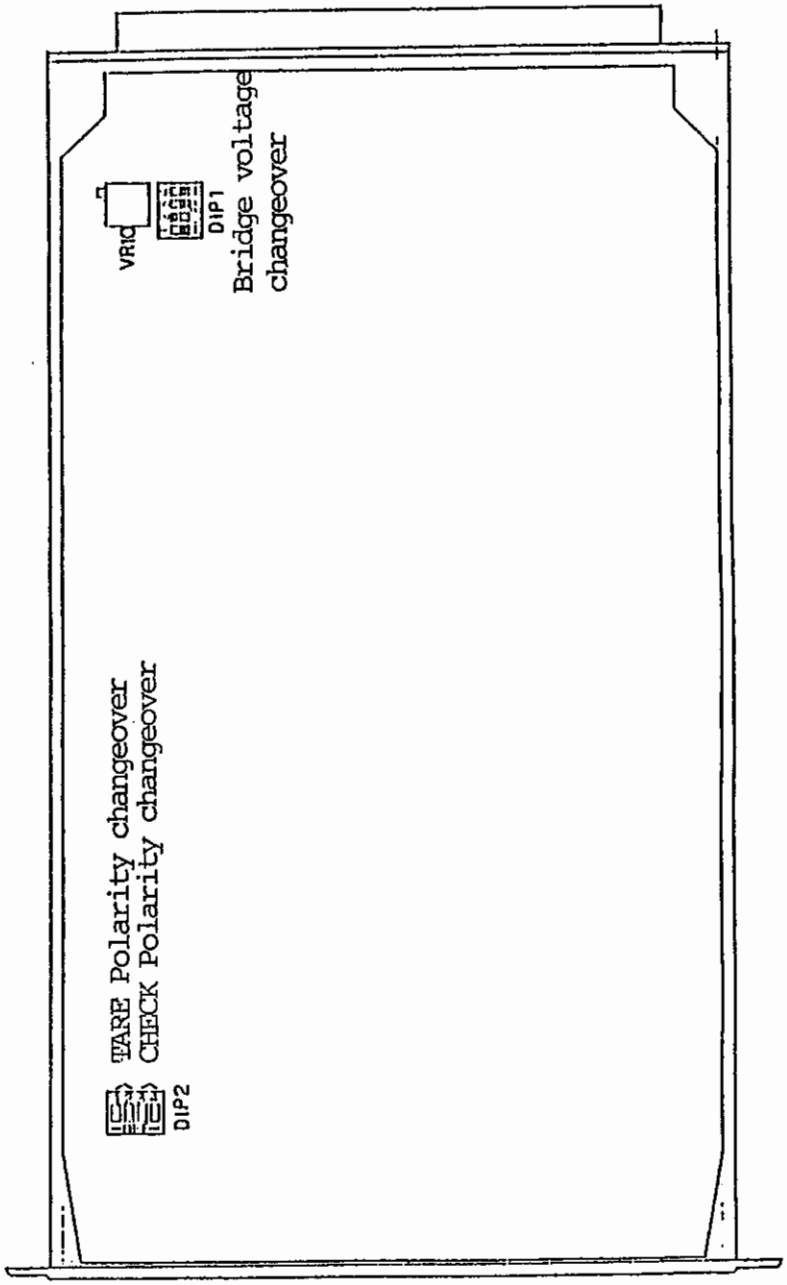
(1)	Bridge voltage	DC5V
(2)	GAIN	X2000 times
(3)	Sensitivity	10V output at 1 mV/V input
(4)	TARE cancel	0 mV/V
(5)	CHECK value	approx. 8V
(6)	Indication	10000 indication at 10V output (in conversion)*
(7)	Unit	Select kg *
(8)	Power voltage	AC 100V $\pm$ 10% 50/60 Hz
(9)	BCD-OUT	Open collector True Total load data/command ... High true * Net load data/command ... High true *
(10)	ZERO TRACKING	Time width 0, data width 0 (no execution) *
(11)	Multiplication	Constant 1
(12)	Comparative setting	HIGH/LOW high limit setting * Pre-set (weight) cancellation, judgment function (no execution)*
(13)	Minimum effective digit setting	10^0 digit * 0,1,2,3,4,5,6,7,8,9 indication *

*: Can be changed by initial setting function

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12-2 Layout of adjustment parts

By removing the chassis cover at the lower part facing the soldered surface panel, soldered surface of amplifier card will appear.



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12-3 Adjustment of bridge voltage (Standard adjustment : 5V)

Bridge voltage can be set by the dip switch (DIP1) on the soldered surface of amplifier card and by trimmer VR10.
However, there are limitations according to transducer impedance and number to be calculated.

Bridge voltage	DIP1	Transducer Impedance	
		350Ω	120Ω
3V	only 1 ON	1∿4 point calculation	1∿4 point calculation
5V	only 2 ON	"	"
10V	only 3 ON	"	Not possible
Use Zener barrier	only 4 ON	"	"

Note : When using Zener barrier at remote sensing, select DIP 1∿4 and adjust VR10 so that the voltage between A-C of the terminal board of this equipment will not exceed 10V (9.5V).

12-4 GAIN adjustment (standard adjustment : X2000)

GAIN is for coarse adjustment by front panel rotary switch (GAIN). Also, fine adjustment will be made by front panel trimmer (SPAN).

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Required GAIN (G) can be obtained by the following formula.

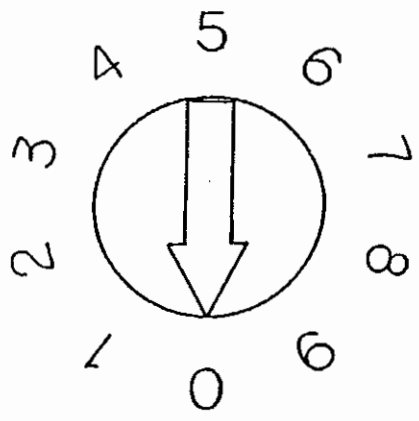
$$G = \frac{V\theta}{Vb \times E}$$

Where,

Bridge voltage	: Vb	[V]
Output of used transducer (actual output)	: E	[mV/V]
Required output voltage	: Vθ	[mV]
Required GAIN	: G	[times]

Related formula of GAIN rotary switch setting and GAIN are as the following table.

Setting	GAIN
0	2040
1	1785
2	1530
3	1275
4	1020
5	765
6	510
7	255
8	2040
9	1785



GAIN setting switch

For SPAN adjustment, adjust 1/1∿3/4 against each of the above GAIN value.

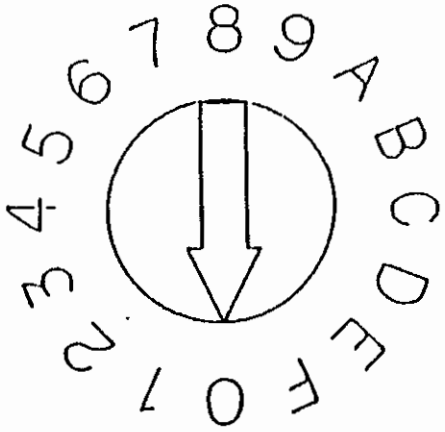
Note : GAIN values in this section are based on analog output (V-Out).
Indicated data will be 1/10 values.

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12-5 Change of CHECK value (standard specification : approx. 8V)

Check value can be adjusted by front panel rotary switch (C/S).
Turn on the front panel "CHECK" switch (LED lighted) and rotate this rotary switch.

Setting	CHECK value(mV/V) (± 2%)
0	0
1	0.200
2	0.401
3	0.601
4	0.802
5	1.002
6	1.203
7	1.403
8	1.603
9	1.803
A	2.004
B	2.204
C	2.405
D	2.605
E	2.806
F	3.006



CHECK value setting switch

Note : DO NOT rotate this switch since it has been adjusted at the time of shipment from the factory.

Note : Above CHECK values are data of 350Ω transducer at 1-point connection.

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Note : CHECK values are normally (+) data, but when changing POL, changeover dip switch (DIP2) on the soldered surface of amplifier card.

DIP2	CHECK Value
Only 3 ON	POL (-)
Only 4 ON	POL (+)

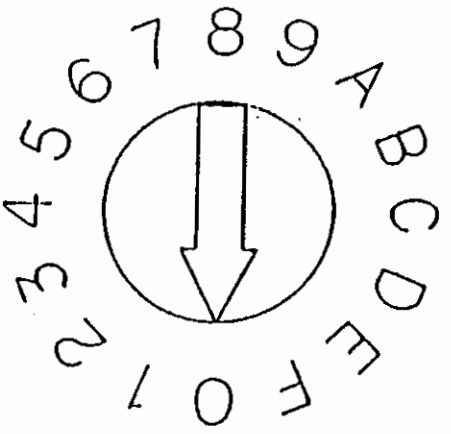
Standard setting finished.

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12-6 Change of TARE cancel value (standard specification : 0 mV/V)

This function is for cancelling the initial load (TARE) to the transducer.
Set the front panel rotary switch (TARE) to a position where the output will be the least under initial load condition.

Setting	Cancel volume (mV/V)
0	0
1	-0.167
2	-0.334
3	-0.501
4	-0.667
5	-0.834
6	-1.001
7	-1.168
8	-1.334
9	-1.501
A	-1.668
B	-1.834
C	-2.001
D	-2.167
E	-2.335
F	-2.501



TARE cancel switch

Note : Above cancel values are data based on 350Ω transducer at 1-point connection.

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Note : CHECK values are normally (-) data, but when changing POL, changeover dip switch (DIP2) on the soldered surface of amplifier card.

DIP2	CHECK value
Only 1 ON	POL (-)
Only 2 ON	POL (+)

Standard setting finished.

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§13. SPECIFICATION

13-1 General specification

Analog section

Bridge voltage	DC10V ±3%, within 150mA (Capable of 3V, 5V by DIP switch) attached with remote sensing (capable of security response)
Signal input range	0.5mV/V ∿ 3mV/V
Number of load cell connection	Up to 4 sets of strain gauge type converter (350Ω)
Maximum sensitivity	10V output at 0.5mV/V input (2000 times) (provided that the bridge voltage is 10V)
Output	±10V max. (more than 2K ±Ω output impedance) 4-20mA (option) (less than 500Ω output impedance)
GAIN	2000 times max. (8-steps adjustment by the front panel rotary switch)
SPAN (Gain fine adjustment)	Adjust 1/1 ∿ 3/4 of F.S. by the front panel SPAN adjustment trimmer
TARE cancel	0 ∿ ± approx. 2.5mV/V range to be cancelled in 16 separations by the front panel TARE cancellation switch.
ZERO	Approx. ±0.1mV/V to be adjusted by the front panel ZERO adjustment trimmer.
Nonlinearity	0.02% F.S.
CHECK	Output by the front panel CHECK switch ON, or by short of rear terminal board CHECK terminal. Adjusted to approx. 80% at the time of shipment from the factory.
Frequency characteristic	DC ∿ 1.5 Hz (-3dB)
Temperature characteristics	ZERO ±0.02μV/°C RTI SPAN ±0.01% reading/°C

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A/D section

Resolution	±1/19999
Sampling speed	Approx. 4 times/sec.

Digital section

Indication	4 digits 9999 max., with minus sign (smallest digit dummy 99990) 7 segment LED (red) (-----indication when over)
Decimal point	10^{-1}, 10^{-2}, 10^{-3}, 10^{-4} (set by initial setting) *note
Unit	kg TON (set by initial setting) *note
Output	Output both the net load and the total load °net load Output the processed data by each digital function °total load Output the amplifier input data, regardless of the digital function (except the multiplication function and minimum effective digit setting function) With BCD 4 digits parallel output polarity Open collecter 0∿30V 30mA (option TTL level output equivalent to LS374) Print command (conversion) HOLD command (maintain data, low true input fix) ERROR command (synchronous to error contact output) O.V.F. command (overflow) Possible output true conversion by data and command groups (set by initial setting) *note
Output connector	Amphenol 57-30500 (equivalent to DDK) (possible connection to MINEBEA CSD-551B)

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Battery back-up	More than 1 month

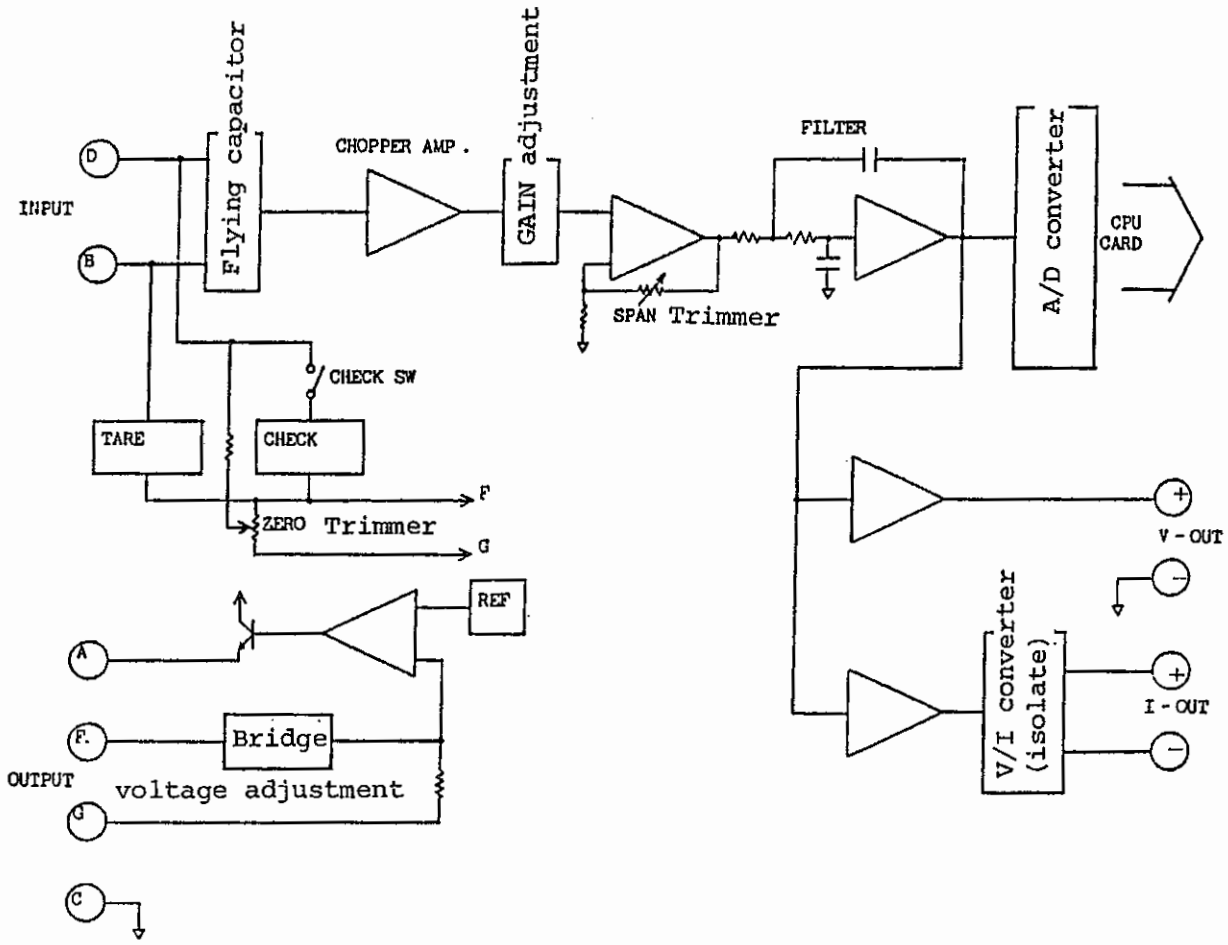
Overall specification

Working temperature range	Compensated range 0 ∿ 50°C Operational range -10 ∿ 60°C
Humidity	20 ∿ 30% RH
Power voltage	AC100V ±10% 50/60 Hz (approx. 20V) (AC110V, 200V, 220V)
Weight	Approx. 3 kg

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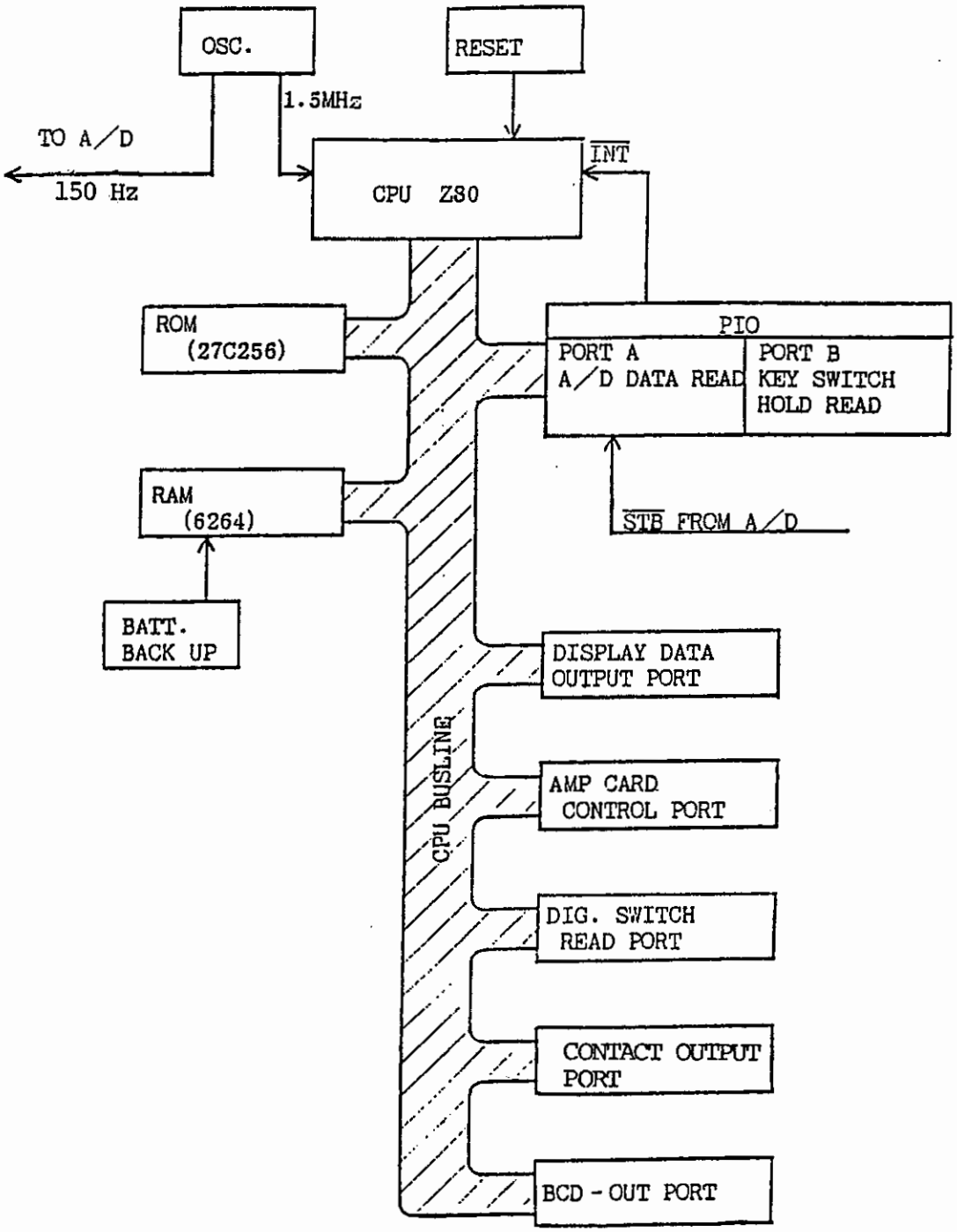
13-2 Block Diagram

(1) Amplifier section



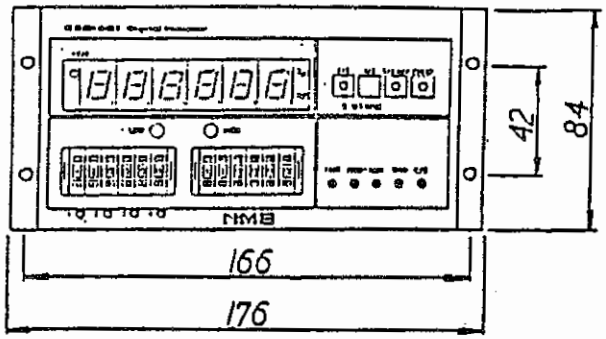
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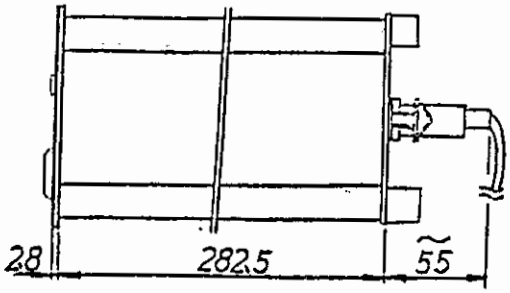
(2) Digital section

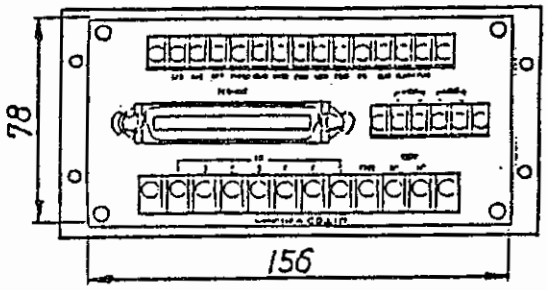


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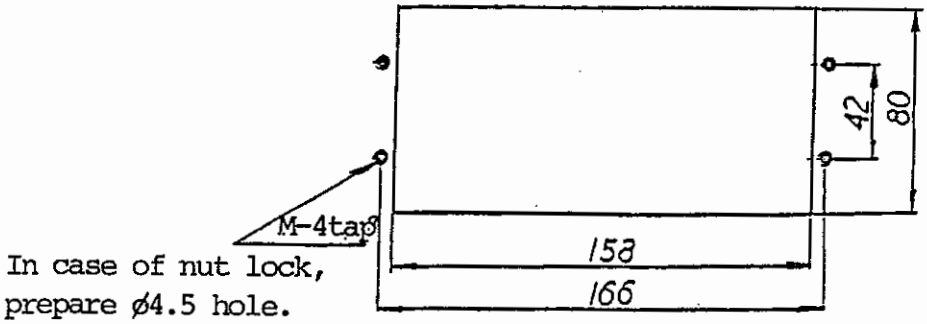
13-3 Appearance Drawing







Panel cut



In case of nut lock,
prepare ø4.5 hole.

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§14. ACCESSORIES

(1)	Fuse (φ5. x L20 1A)	1 pc.
(3)	Micro-driver	1 pc.
(4)	BCD-OUT connector (57-30500)	1 pc.
(5)	Instruction manual (this book)	1 set

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