

Instruction Manual

Digital Panel Meter Model 3153B

I-01999

1. Preface

Please take care that this instruction manual is certainly delivered to the person in charge of operating this instrument.

For safe use of this product, please observe the following warning and caution.

In order to help the users' safe use of the products, the following symbol marks are used in this manual.

⚠ WARNING This is the warning to avoid the danger when it is assumed that such danger as may cause fatal accident or severe injury to a user occurs in case that the product is mishandled.

⚠ CAUTION This is the caution to avoid the danger when it is assumed that such danger as may cause minor injury to a user or generate only physical obstacle occurs in case that the product is mishandled.

⚠ WARNING

- There is no power on-off switch on the model 3153B. It immediately starts to operate after turning the power.
- Do not touch terminals when turning the power on.

⚠ CAUTION

Preserve followings for your safety.

- The rated data is, however, defines with more than 15 minutes warming-up times.
- When the product is installed in the cabinet, perform the appropriate heat radiation to keep less than 50 °C in it.
- Avoid the close-contacted mounting of the meter. The rise of internal temperature affects the life of product.
- Do not install under the following conditions.
 - Where it is exposed to direct sunlight, dust, corrosive gases, rain, etc.
 - Where ambient temperature or humidity is high.
 - Where it is exposed to excessive noise or static electricity.
 - Where there is constant vibration or shock
- Store the instrument within the specified temperature range for storage (-20~70°C).
- When the front panel or the case becomes dirty, wipe it with soft cloth.
For heavy dirt, wipe it lightly with the soft cloth wetted with the neutral cleaner thinned by water, and finish the cleaning with dry cloth. Do not use organic solvent like benzene or paint thinner as they may deform or discolor the case.

2. Specifications

2.1 Specifications for installation

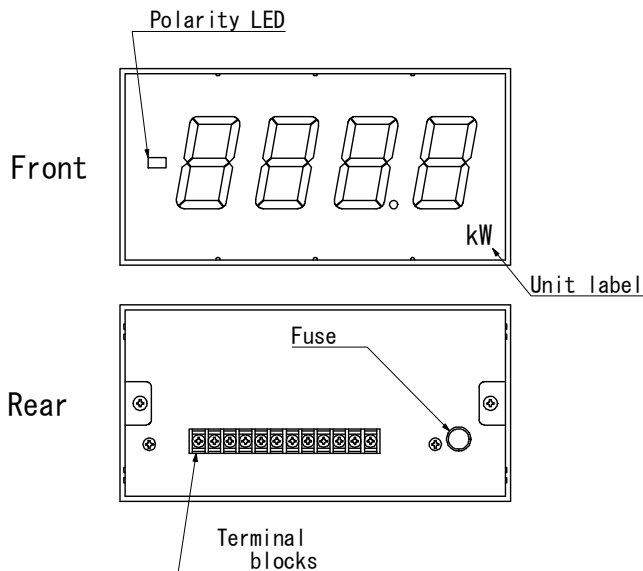
Power supply	: AC100V~AC240V 50/60Hz
Tolerance of source power voltage	: AC90~250V
Power consumption	: Approximately 4VA at AC100V supply, approximately 5VA at AC200V supply.
Operating ambient temperature	: 0~50°C
Storage temperature	: -20~70°C
Weight	: Approximately 900g
Mounting method	: From the product's rear side, by dedicated bracket.

2.2 General specifications

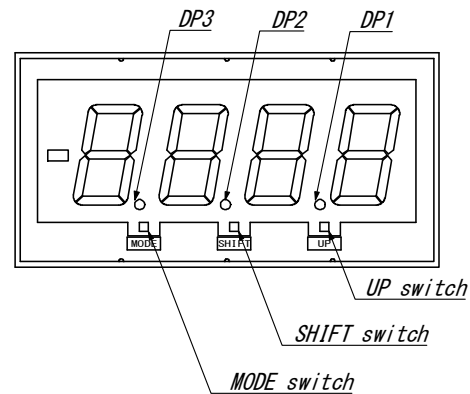
Display	: -9999~9999, red or green LED, character height 45mm, with zero-suppress function.
Decimal point	: Arbitrarily settable from the terminal blocks.
Over-range indication	: When exceeded 100% or 130%, indicated with ▯▯▯▯ . When exceeded -100% or -130%, indicated with ▯▯▯▯ . 100% or 130% is selectable by the panel front switch.
Display scaling	: Full scale display -9999~9999 Offset display -9999~9999
Resolution	: 1/10000
Power source line interfusing noise	: 1000V
Insulation Resistance	: DC500V 100MΩ or more
Withstanding Voltage	: Input terminals - Case AC1500V for 1 min. Power supply terminals - Case AC1500V for 1 min. Power supply terminals - Input terminals AC1500V for 1 min.
Protection degree	: Front side IP40, back side IP20
Unit indication	: Designated character is adhered at the right bottom of the front mask. (It has to be designated at the time of ordering.)

3. Name of parts

3.1 Exterior



3.2 Inside front mask



4. Wiring

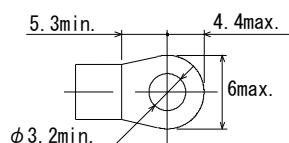
4.1 Terminal arrangement

Terminal name	INH _i	INL _o	P·B	HOLD	COM	DP1	DP2	DP3	NC	GND	P2	P1
	1	2	3	4	5	6	7	8	9	10	11	12
Function	Input		Peak / bottom	Hold	Common	Decimal point <small>10¹ 10² 10³</small>			—	Ground	Power source	

Terminal screws: M3

Fastening torque: 0.46~0.62N·m

Crimp terminal: As shown on the right.



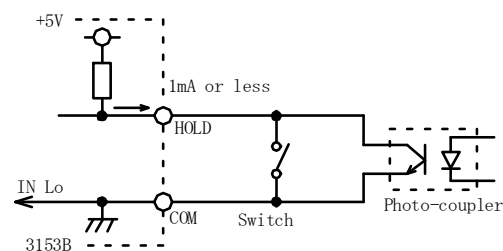
4.2 Cautions for wiring

⚠ WARNING
<ul style="list-style-type: none"> ● To avoid an electrical shock, turn the power off when wiring. ● Do not wire with moistened hands. Locate away from the wet place. ● Do not touch terminals when turning the power on.

⚠ CAUTION
<ul style="list-style-type: none"> ● Apply the source power voltage and the load within the rated values. Otherwise, it may damage the product. ● Apply the supply voltage so that it can reach the rated value within one second. ● When the power to the product is turned OFF and ON again, provide the downtime of about 10 seconds. ● Do not use the product with wrong wiring, which may cause the breakdown of the product.

■ Other cautions for wiring

- Be sure to wire the input line and source power line independently with each other. If they are wired in parallel, it may cause an unstable display.
- In case that the noise is frequently occurred, it will be effective to store the product in the shielded housing or to insert the power source line filter or insulated transformer.
- P·B, HOLD, COM, DP1~3 terminal blocks are not isolated from the input, so in case that each functional terminal is controlled, it is recommended to make the isolation by photo-coupler, relay and so on. Also, when a number of the product are controlled at a time, make the isolation for each product.



4.3 Explanation of terminal blocks

● Input terminals (INH_i INL_o)

Connect the measurement input with correct polarity.

Connect the measurement input of higher polarity to Hi.

Be sure to wire the input line and source power line independently with each other.

If they are wired in parallel, it may cause an unstable display.

● Peak/Bottom terminals (P·B)

By connecting the peak or bottom terminal to common terminal (COM), the maximum or minimum value can be displayed.

The selection of maximum or minimum value can be made by the panel front switch.

Active "L" $I_{IL} \leq -1\text{mA}$, "L" $=0\sim 1.5\text{V}$, "H" $=3.5\sim 5\text{V}$

● Hold (HOLD)

The displayed value can be held by connecting the hold terminal (HOLD) to common terminal (COM).

Active "L" $I_{IL} \leq -1\text{mA}$, "L" $=0\sim 1.5\text{V}$, "H" $=3.5\sim 5\text{V}$

● Decimal point (DP1~DP3)

The decimal point can be set to the arbitrary position by short-circuiting the terminal of $10^1\sim 10^3$ digit to common (COM).

Active "L" $I_{IL} \leq -1\text{mA}$, "L" $=0\sim 1.5\text{V}$, "H" $=3.5\sim 5\text{V}$

● Common (COM)

It is the common for peak-bottom, hold and decimal point.

● Power supply (P1, P2)

Apply the source power supply within the rated range AC90~250V.

5. Explanation of function

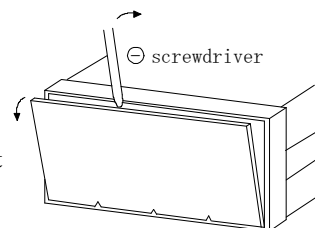
Each following function can be set by the panel front switch:

- Offset : Display of the offset value of the scaling can be arbitrarily set.
- Full scale : Display of the full scale of the scaling can be arbitrarily set.
- Over-range indication : Trigger of over-range indication is selectable from 100% or 130% of the input.
When exceeded 100% or 130%, indicated with **u u u u**.
When exceeded -100% or -130%, indicated with **n n n n**.
- Display cycle : Display cycle can be changed.
SP1: 67ms, SP2: 400ms, SP3: 1s, SP4: 2s, SP5: 3s, SP6: 4s, SP7: 5s
(During the moving average, it is SPM: 67ms.)
- Average calculation : Divisional averaging or moving average, and the numbers of samples for averaging can be selected.
OFF : No moving averaging
ON : Divisional averaging
Numbers of sample for averaging, 2, 4, 8, 16, 32
- Offset fixation : The display for the value less than the offset value can be set to display the offset value.
When the scaling is set to 4~20mA=0~1000, the input less than 4mA is fixed to display 0.
- 10⁰ digit turn out : The display of 10⁰ digit is compulsorily turn out.
- Peak / Bottom change-over: Function of the terminal block P/B can be changed to maximum or minimum value display.

6. Setting

6.1 Function of panel front switch

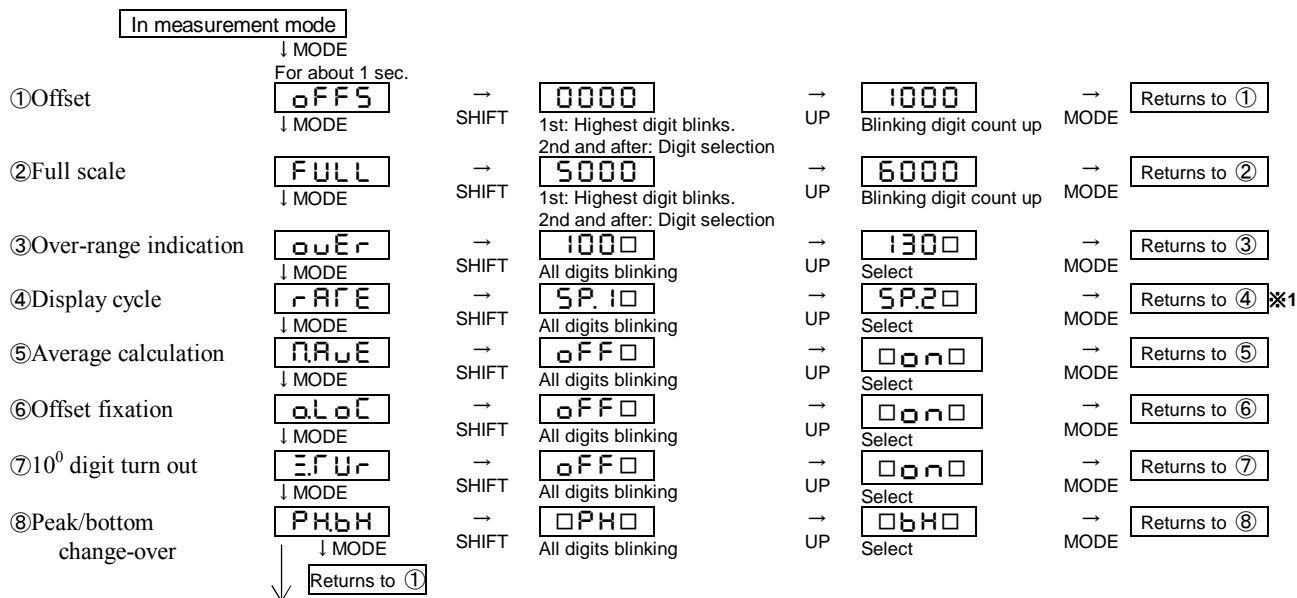
- MODE switch : In measurement mode, it switches over to the setting mode.
In setting mode, it switches over to the measurement mode.
- SHIFT switch : In setting mode, it selects the digit of value to set, displays the content of setting and switches over to the adjustment mode.
- UP switch : In setting mode, it changes the set value and selects the content to set.



- How to remove the front mask
Insert a “-” screwdriver in between the front frame and front mask and wrench it.

6.2 How to set

In measurement mode, a press of MODE switch for one second changes the mode to setting mode.



Memorizes in EEPROM and returns to measurement mode.

- Action of UP switch during the setting of offset and full scale value.
10³ digit : 1 → 2 → 3 → → 8 → 9 → -9 → -8 → → -2 → -1 → -0 → 0
Other digit : 1 → 2 → 3 → → 8 → 9 → 0 → 1 → 2
- □ is blank display.
- When there is no switch operation for 5 minutes in setting mode, the meter automatically returns to measurement mode, without memorizing any content of setting having been done.
- ※1 When the averaging calculation is made by moving average, the display cycle can not be changed.

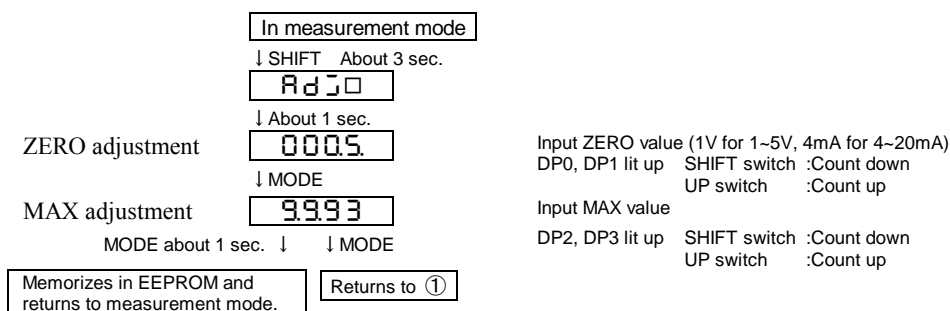
6.3 Default setting at delivery from factory

Function	Setting
Offset	0000
Full scale	9999
Over-range indication	130%
Display cycle	400ms
Average calculation	Divisional averaging ON
Offset fixation	OFF
10 ⁰ digit turn-off	OFF
Peak/Bottom change-over	Peak

6.4 Adjustment method

A fine adjustment of the display is possible.

In measurement mode, keep pressing the SHIFT key, then the display changes to $\text{Ad}\square\square$ and the meter enters in adjustment mode.



※Adjustable range is about 5%.

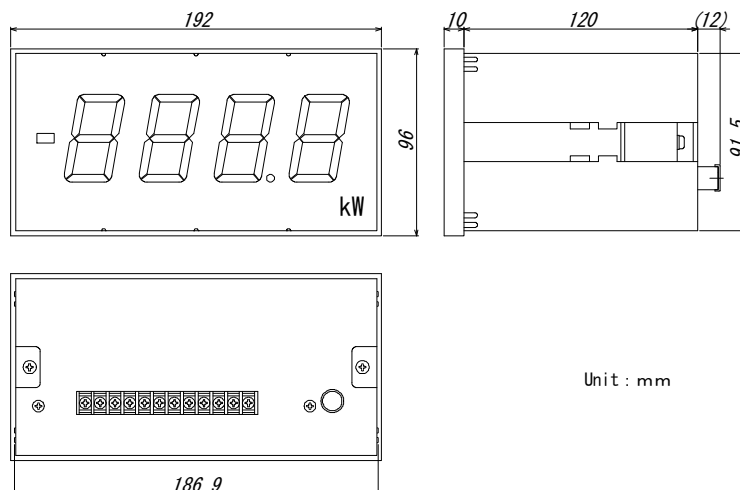
6.5 Error message

Display	Cause	Action to take
Err 1	When, in setting mode, the average calculation is set to the moving average, the set content for the display cycle is indicated as $\text{SP}\square\square$. If the UP switch is pressed at this time, the error indication is given.	Change the setting of average calculation either to OFF or divisional averaging ON.

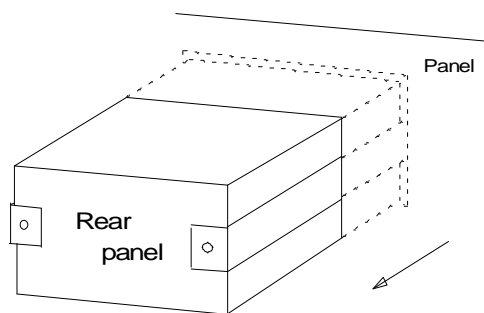
6.6 LED display



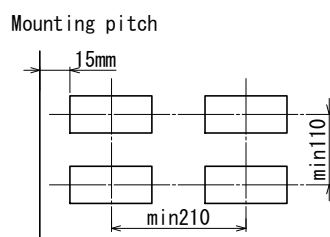
7. Dimension



8. Installation



Remove the metal bracket on both sides of the meter, insert it from the front and fix it.



Panel cut-out dimension: $188^{+0.8/0} \times 92^{+0.8/0}$ mm
 Allowable panel thickness: 1.0 ~ 6mm

Note: Recommended thickness for the panel of aluminum is 1.5mm or more to avoid deformation of the panel.

Optimum torque of fixing screws: 0.25 ~ 0.39N·m

9. Model designation

3153B - □ - A - □
 1 2 3

1: Measuring input 2: Power supply voltage 3: Display color

[1] Measuring Input

Code	Measuring range	Input resistance	Accuracy	Overload
02	$\pm 99.99\text{mV}$	$100\text{M}\Omega$	$\pm(0.05\%$ of rdg. + 1 digit)	DC $\pm 250\text{V}$
03	$\pm 999.9\text{mV}$	$10\text{M}\Omega$	$\pm(0.05\%$ of rdg. + 1 digit)	DC $\pm 250\text{V}$
04	$\pm 9.999\text{V}$	$10\text{M}\Omega$	$\pm(0.1\%$ of rdg. + 1 digit)	DC $\pm 250\text{V}$
05	$\pm 99.99\text{V}$	$10\text{M}\Omega$	$\pm(0.1\%$ of rdg. + 1 digit)	DC $\pm 500\text{V}$
09	1~5V	$1\text{M}\Omega$	$\pm(0.1\%$ of rdg. + 1 digit)	DC $\pm 250\text{V}$
13	$\pm 999.9\ \mu\text{A}$	100Ω	$\pm(0.1\%$ of rdg. + 1 digit)	DC $\pm 50\text{mA}$
14	$\pm 9.999\text{mA}$	10Ω	$\pm(0.1\%$ of rdg. + 1 digit)	DC $\pm 150\text{mA}$
15	$\pm 99.99\text{mA}$	1Ω	$\pm(0.1\%$ of rdg. + 1 digit)	DC $\pm 500\text{mA}$
16	$\pm 999.9\text{mA}$	0.1Ω	$\pm(0.1\%$ of rdg. + 1 digit)	DC $\pm 2\text{A}$
19	4~20mA	12.5Ω	$\pm(0.1\%$ of rdg. + 1 digit)	DC $\pm 150\text{mA}$

※ Accuracy : Defined in the condition of $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 45~75%RH.

※ Temperature coefficient : $\pm 150\text{ppm}/^{\circ}\text{C}$, defined at the operating temperature 0~50°C.

[2] Power supply voltage

Code	Power source voltage
A	AC100~240V

[3] Display color

Code	Specification
R	Red LED
G	Green LED

Contact Information

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 Address : 1-3-23 Minami-Sumiyoshi, Sumiyoshi-ku, Osaka-shi
 558-0041 Japan