

# MAC5 SERIES

## Digital controller Instruction Manual

Thank you for purchasing SHIMAX product. Please check that heproduct is the one you ordered. Please operate after you read the instruction manual and fully understand it.

<http://www.shimax.co.jp/>

### Preface

This instruction manual is intended for those who will be involved in wiring, installation, operation and routine maintenance of the MAC5. This manual describes the care, installation, wiring, function, and proper procedures regarding the operation of MAC5. Keep this manual on hand while using this device. Please follow the provided guidance.

### 1. Matters regarding safety

For matters regarding safety, potential damage to equipment and/or facilities and additional instructions are indicated as follows:

⊙ This mark indicates hazardous conditions that could cause injury or death of personnel. Exercise extreme caution as indicated.

#### ⚠ "WARNING"

⊙ This mark indicates hazardous conditions that could cause damage to equipment and/or facilities. Exercise extreme caution as indicated.

#### ⚠ "CAUTION"

⊙ This mark indicates additional instructions and/or notes.

#### NOTE

#### ⚠ "WARNING"

MAC5 is designed for controlling temperature, humidity, and other physical subjects in general industrial facilities. It must not be used in any way that may adversely affect safety, health, or working conditions.

#### ⚠ "CAUTION"

To avoid damage to the connected equipment, facilities or the product itself due to a fault of this instrument, safety countermeasures must be taken before usage, such as proper installation of the fuse and the overheating protection device. No warranty, expressed or implied, is valid in the case of usage without having implemented proper safety countermeasures.

#### ⚠ "WARNING"

- The ⚠ mark on the plate affixed to the instrument:  
On the terminal nameplate affixed to the case of your instrument, the ⚠ mark is printed. This is to warn you of the risk of electrical shock which may result if the charger is touched while it is energized.
- The external power circuit connected to the power terminal of this instrument must have a means of turning off the power, such as a switch or breaker. Install the switch or breaker adjacent to the instrument in a position which allows it to be operated with ease, and with an indication that it is a means of turning off the power. Use a switch or breaker, which meets the requirements of IEC127.
- Fuse:  
Since the instrument does not have a built-in fuse, do not forget to install a fuse in the power circuit to be connected to the power terminal. The fuse should be positioned between the switch or breaker and the instrument and should be attached to the L side of the power terminal.  
Fuse Rating: 250V AC 0.5A/medium lagged or lagged type.  
Use a fuse which meets the requirements of IEC127
- Load voltage/current to be connected to the output terminal and the alarm terminal should be within the rated range. Otherwise, the temperature will rise and shorten the life of the product and/or result in problems with the product.
- Voltage/current that differs from input specification should not be connected to the input terminal. It may shorten the life of the product and/or result in problems with the product.
- Input, output of voltage pulse, and output of electric current are not insulated. Therefore, do not ground an adjusted power terminal when a ground sensor is employed.
- A signal wire's common mode voltage to ground (signal wires other than contact output including power supply and event) should be less than 30V rms, 42.4V peak, and 60 VDC.

#### ⚠ "CAUTION"

- All the wires for the interior distribution, except for communication and contact output (including power supply and event), should be less than 30m in length. When the wire's length is 30m or more, or in the case of outdoor wiring, the suitable measure against a lightning surge is required.
- EMC standard (IEC61326) classifies MAC5 into Class A apparatus. Electromagnetic interference may occur when MAC5 is used at a business district or in the home. Please use after taking sufficient measures.

## 2. Introduction

### 2-1. Check before use

Before using MAC5, please check the model code, the exterior appearance and accessories. Also, make sure that there are no errors, impairs and shortages. Confirmation of model code: Check that the product you ordered is being delivered properly. Check the model code of the main body case against the following code table.

Example of model code

MAC5A-	M	C	F-	E	C
1	2	3	4	5	6

Item

- |                                                           |                                                                                                                                                                             |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Series                                                 | MAC5A-: 96×96mm size digital controller<br>MAC5B-: 48×96mm size digital controller<br>MAC5C: 72×72mm size digital controller<br>MAC5D-: 48×48mm size digital controller     |
| 2. Input                                                  | M: multi,                                                                                                                                                                   |
| 3. Control Output 1                                       | C: contact, S: voltage pulse, I: current (4~20mA),                                                                                                                          |
| 4. Power Supply                                           | F-: 90 - 264V AC,                                                                                                                                                           |
| 5. Event Output                                           | E: Event Output 1·2 (two points)                                                                                                                                            |
| 6. Control Output 2·Event Output·Optional Selection of DI | N-: none, C-: contact, S-: voltage pulse, ※1<br>E-: Event Output 3(one point),<br>D-: external control input (DI4) one point<br>※1 "S" can not be installed Out1 "S" or "I" |

Check of accessories

Instruction manual: 1 set, 1 unit label 1 set

「NOTE」: Please contact our agencies or business offices if you have any problem.  
We welcome any kind of inquiry such as defect of the product, shortage of accessory and so on.

### 2-2. Caution for use

- (1) Do not operate the front panel keys with hard or sharp objects.  
Do not fail to touch keys lightly with a fingertip.
- (2) Wipe gently with a dry rag and avoid using solvents such as thinner.

## 3. Installation and wiring

### 3-1. Installation site (environmental conditions)

#### ⚠ "CAUTION"

Do not use this product under the following conditions.  
Otherwise, failure, damage and fire may occur.

- (1) Where flammable gas, corrosive gas, oil mist or dust generate or grow rife.
- (2) Where the temperature is below -10°C or above 55°C
- (3) Where the humidity is over 90%RH or where condensation occurs.
- (4) Where high vibration or impact occurs
- (5) Where inductive interference may easily affect the operation.  
Or, in the region of strong electric circuit area.
- (6) Where waterdrops or direct sunlight exists.
- (7) Where the altitude is above 2,000m.

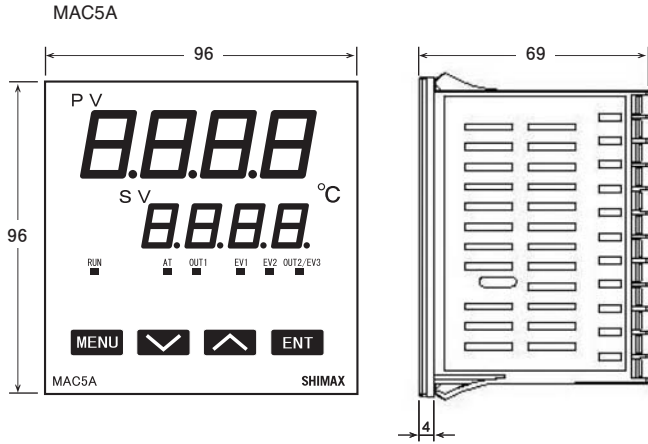
「NOTE」: The environmental conditions comply with the IEC664.  
Installation category is II and the pollution degree is 2.

### 3-2. Mounting

- (1) Machine the mounting hole by referring to the panel-cut illustration in Section 3-3.
- (2) Applicable thickness of the mounting panel is 1.2 ~ 2.8mm.
- (3) As this product provides mounting fixture, insert the product into the panel.

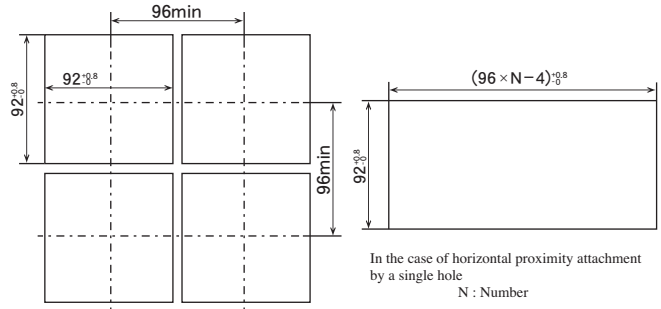
### 3-3. External dimension and panel cutout

MAC5 external dimensions (unit : mm)

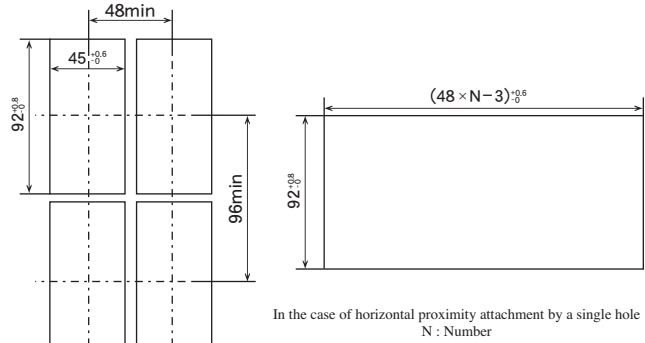


MAC5 panel cutout (unit : mm)

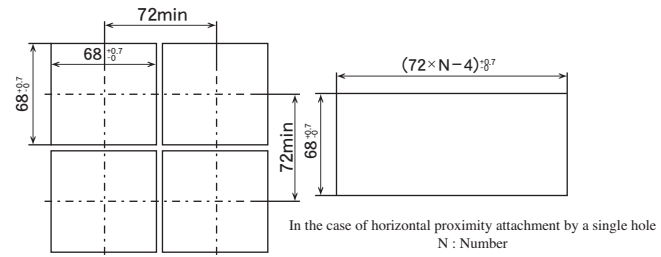
MAC5A 96x96size



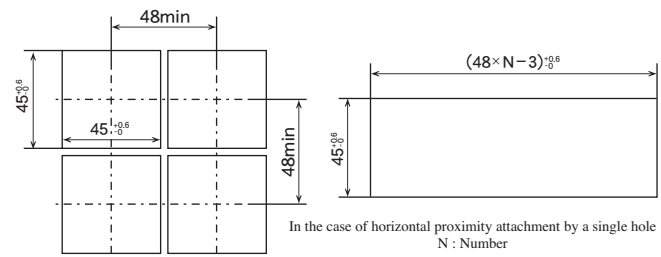
MAC5B 48x96size



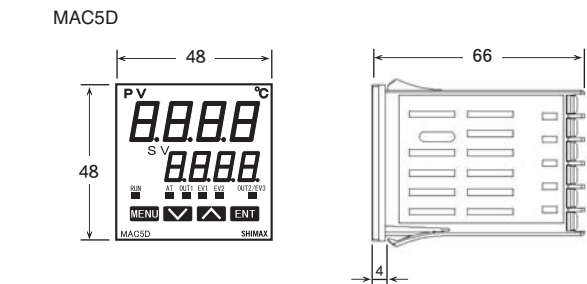
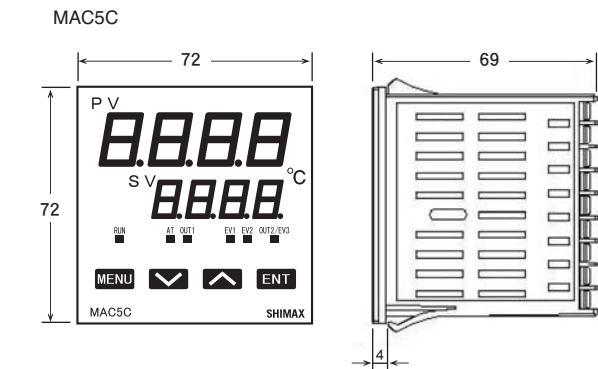
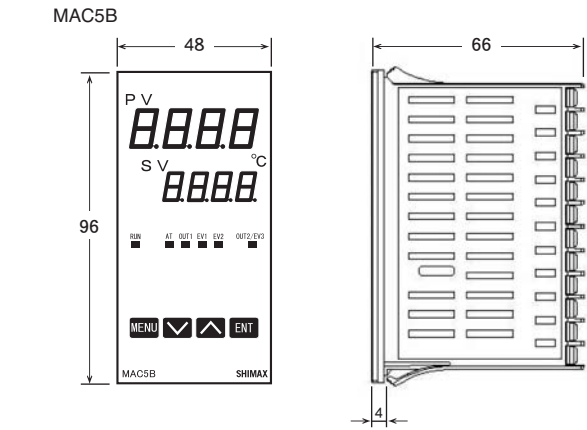
MAC5C 72x72size



MAC5D 48x48size



「NOTE」: Proximity attachment by a single hole is possible only in the case of horizontal direction.  
When an apparatus that was attached in vertical direction is removed, a dedicated detachment tool is required.



### 3-4. Wiring

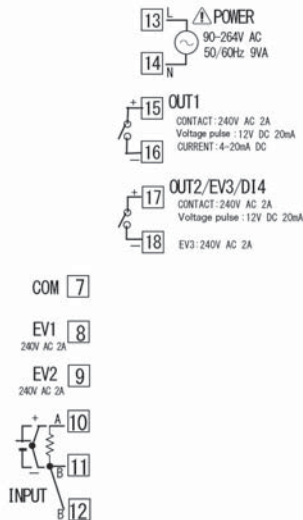
⚠ "WARNING"

- ⊙ Do not turn on electricity while wiring to avoid an electric shock.
- ⊙ Do not touch a terminal or live part while turning on electricity.

- (1) Make sure that wiring operation is properly done in line with a terminal wire diagram of section 3-5.
- (2) Choose a suitable compensation lead wire in the case of thermocouple input.
- (3) In the case of resistance bulb input, resistance value of each lead wire must be less than 5Ω and that of three lead wires must be equal.
- (4) Do not wires an input signal line inside of an electric wire pipe or a duct same with the high voltage line.
- (5) Shield wiring (single point grounding) is effective against static induction noise.
- (6) Wiring twisted at equal short intervals is effective against electromagnetic induction noise.

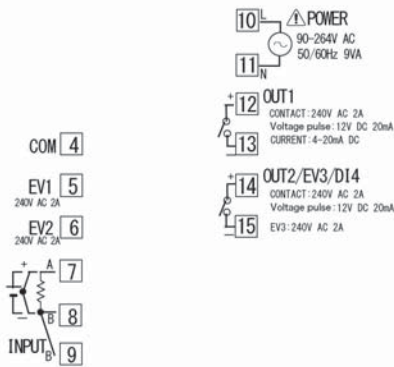
### 3-5. Terminal arrangement diagram

3-5. Terminal arrangement plan of MAC5A and MAC5B



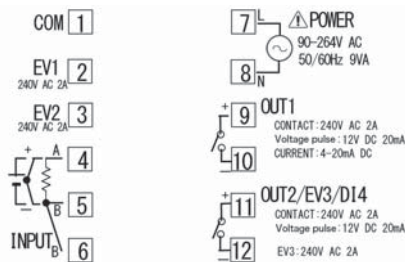
「NOTE」: If input type is thermocouple or voltage, errors may occur when terminal 11 and terminal 12 terminal are short-circuited

Terminal arrangement plan of MAC5C



「NOTE」: If input type is thermocouple or voltage, errors may occur when terminal 8 and terminal 9 terminal are short-circuited

Terminal arrangement plan of MAC5D



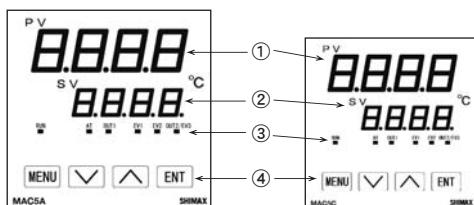
「NOTE」: If input type is thermocouple or voltage, errors may occur when terminal 5 and terminal 6 terminal are short-circuited

## 4. Description of front panel

### 4-1. Names of front panel.

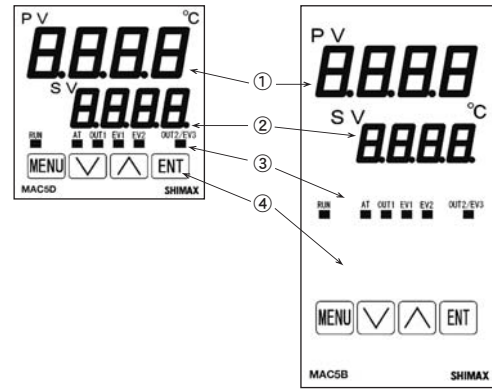
MAC5A 96x96size front

MAC5C 72x72size front



MAC5D 48x48size front

MAC5B 48x96size front



### 4-2. Explanation of front panel section

- ① : Display of measured value (PV) (red)  
Measured value (PV) and type of setting is displayed on each setting screen.
- ② : Display of target value (SV) (green)  
Target value and set value are displayed on each setting screen.
- ③ : Monitor LED
  - (1) RUN monitor LED RUN (green)  
If RUN is performed with RUN key, operation mode1 screen, external control input (DI), and communication, it lights up, and put out by standby. It blinks, if a manual output is chosen in output monitoring screen or external control input (DI).
  - (2) Auto tuning operation monitor LED AT (green)  
If AT is chosen in ON or external control input (DI), blinks during AT execution. Lights up when AT is on standby, and puts out with AT automatic termination or release.
  - (3) control out put 1 monitor LED OUT1 (green)  
At the time of a contact or a voltage pulse output, the it lights up with ON and lights off with OFF. Lights off with 0% power output, and lights up with 100% power.  
And blinks in intermediate ratio.
  - (4) Event output monitors LED EV1 and EV2 (yellow)  
Lights up when the allotted event output turns to ON.
  - (5) Control out put 2/event output 3 monitors LED OUT2/EV3 (yellow)  
When control output 2 is chosen, it operates like control output 1 monitor LED does.  
When event output 3 is chosen, it operates like event output monitor LED does.
- ④ : Key-switch section
  - (1) [MENU] (MENU) key  
Press this key to move onto the next screen among the screens.  
Press [MENU] (MENU) key for three seconds on the basic screen, then it jumps to the lead screen of Mode 1. Press [MENU] key for three seconds on the lead screen of each Mode screens, then it jumps to the basic screen. Press [MENU] key for three seconds on the lead screen of FIX, then it jumps to the basic screen.
  - (2) [DOWN] (DOWN) key  
Press [DOWN] (DOWN) key one time, and the shown value decreases by one numerical value.  
One time press of [DOWN] key decreases by one numerical value. By pressing the key continuously, the value as well consecutively decreases. A decimal point of the smallest digit blinks at this time. This shows that a setting change is in progress.
  - (3) [UP] (UP) key  
Press [UP] (UP) key one time, and the shown value increases by one numerical value.  
By pressing continuously, the value By pressing the key continuously, the value consecutively increases. A decimal point of the smallest digit blinks at this time. This shows that a setting change is in progress. key between lead screen in each mode screens.
  - (4) [ENT] (ENTRY/REGISTER) key  
The setting data changed on each screen is determined (the decimal point of the minimum digit is also lighted off).  
Press [ENT] key for 3 seconds on the output monitoring screen, then the shift between manual output and automatic output is carried out.  
Press the key for 3 seconds on the basic screen, then it shifts to FIX head screen.  
Push at FIX and each mode screens' lead screen, then shifts to setting screen.

## 5. Description of screens

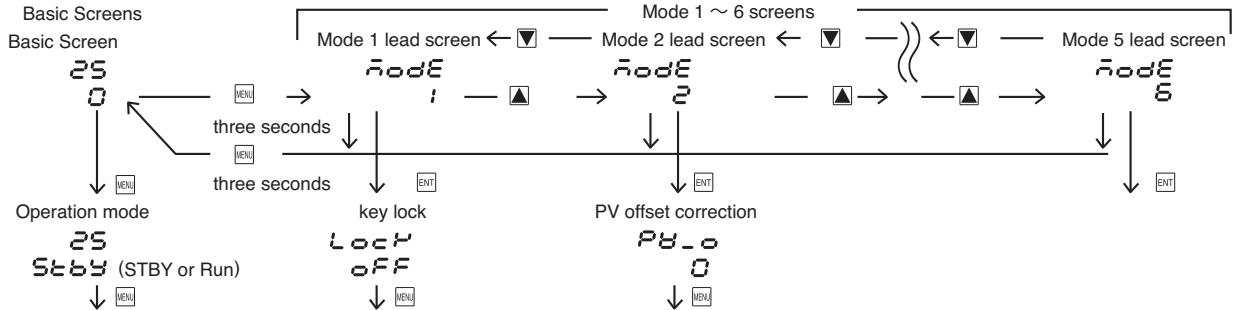
### 5-1. How to move to another screen

Basic Screen

25 — [ENT] 3 seconds → F C 4 (constant value control) lead screen of setting screens  
 0 ← [MENU] 3 seconds — S E t

Press the [ENT] key for 3 seconds on a basic screen, then it shifts to the lead screen of F C 4 (constant value control) setting screens.

Press the [MENU] key for 3 seconds on F C 4 the lead screen of setting screens, then it shifts to the basic screen. The shift is also possible when the F C 4 is chosen on the operation mode 2 screen.



Every time you press the [MENU] key on a basic screen, it shifts to each screen of the basic screens.

Press the [MENU] key for 3 seconds on a basic screen, then it shifts to the lead screen of mode 1 screens.

Press the [▲] key on the lead screen of mode 1 screens, then it further advances to mode 2, and mode 3. (Notes: If no corresponding option is found, the mode 4 - 9 is skipped)

Press the [▼] key on the lead screen of mode 1 screens, then it further advances to mode 9, and mode 8. (Notes: If no corresponding option is found, the mode 4 - 9 is skipped)

Press the [MENU] key for 3 seconds on the lead screen of mode 1 ~ 9 screens, then it shifts to the basic screen.

Press the [ENT] key on the lead screen of mode 1 ~ 9 screens, then it shifts to the first setting screen of each screens.

Press the [MENU] key on the the first setting screen of each screens, then it shifts to the next screen. Every time you press the [MENU] key, it shifts to the next setting screen.

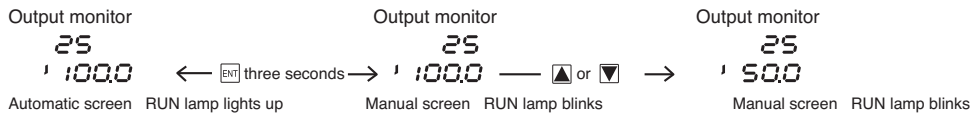
### 5-2. Setting Method

To change settings, display an appropriate screen and change the setting (value or function) by pressing [▲] or [▼] key.

On the output monitor screen of basic screens, you can change the control output from "Automatic" to "manual", and save its change of setting. Display the output monitor screen, and then press [ENT] key for three seconds to shift from Automatic to Manual. Then by pressing [▲] or [▼] key, you can adjust to the desirable output value. In this case, no need to press [ENT] key in order to determine the change of setting.

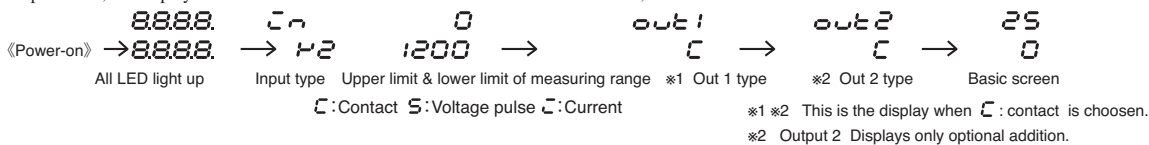
Press [ENT] key for three seconds as well to shift back to Automatic. Excluding when a keylock is OFF, Automatic ⇄ Manual switchover does not work while STBY and AT are in operation.

In the case of two-output type, the switchover between automatic and manual is operatable through output 1 and output 2. The setting is altered simultaneously.



### 5-3. Power-on and initial screen display

At power-on, the display section shows each screen of initial screens for one second, then moves on to the basic screen.



### 5-4. Explanation of each screen

#### (1) Basic Screens

Basic Screen

25 Executed SV initial value: Sensor input 0  
 0 Linear input Lower limit of scaring range  
 Setting range: Sensor input Within measuring range  
 Linear input With in scaring range  
 Within SV limiter besides  
 Targeted value (PV) is displayed on the upper row as four-digit, and target d value (SV) is displayed on the lower row also as four-digit.  
 (Notes: hereinafter, measured value and targeted value are referred to as "PV" and "SV")  
 At the time of FIX, execution SV is displayed and change of setting is possible.

Operation Mode screen

25 Initial value: Stby (stanby) (Initial value at the time of constant value control)  
 Stby Setting range: Stby Control stop [Output OFF (0%)] operation  
 run conduct of control operation  
 Choose run (RUN) by [▲] key. Decide by [ENT] key, then Monitor LED's RUN lights up to start control operation.

Choose Stby by [▼] key, Decide by [ENT] key, hen Monitor LED's RUN lights off and becomes control stop [Output OFF (0%)] conducting.  
 Priority is given to DI when RUN is allotted to external control input. DI Key operation cannot be performed unless allotment is canceled.  
 When measuring range, a unit, scaling, and output characteristics are changed it is initialized a Stby is displayed.

Output 1 monitoring screen  
 25 manual output setting range : 0.0-100.0% (within output limiter)  
 100.0 At the time of automatic output, monitor display only.  
 Refer to Item 5-2 about automatic ⇄ manual switchover, and setting method at the time of manual operation.  
 A manual output is canceled when an operation mode is made into Stby.  
 When a power source is intercepted and re-switched on, it returns to the condition just before intercepting.

PID No. monitoring screen

25

P2-1

Chosen PID No. is displayed when FIX is in operation. PID No. of output 1 is displayed in the first digital, and PID No. of output 2 is displayed in the third digital. The third digital is shown as - when there is no output 2 option. This screen is not displayed in the state of STBY (RST).

MEV key

Execution SV setting screen

F58

Initial value: 1  
Setting range: 1, 2, 3, 4

MEV key

AT (Auto Tuning) execution screen

A2

Initial value: OFF  
Setting range: OFF, ON

MEV key

AT is performed by ON selection, and canceled by OFF selection. Not displayed at the time of STBY, a manual output, and P (proportional band) =OFF. Except in the setting of keylock OFF, AT is unable to perform in scale over. (At the time of DI allotment, execution of AT by DI can be performed.) Even in such a case, halfway release is performed on this screen. Release of AT, STBY, EV operating point, setting of keylock, and mode 5 ~ 9 screen are operable with key. Except in th setting of AT normal end, execution of AT is canceled compulsorily at the time of STBY selection and AT release setup.

EV1 (event 1) operating-point setting screen

E81

1200

Initial value: upper limit absolute value measuring range Scaling upper lower limit absolute value measuring range Scaling lower limit

upper limit deviation 2000  
lower limit deviation -1999  
within deviation 0  
outside deviation 2000

Setting range: upper limit absolute value within measuring range within scaling lower limit absolute value within measuring range within scaling limit

MEV key

upper limit deviation -1999~2000 unit  
lower limit deviation -1999~2000 unit  
within upper-lower limit deviation 0~2000 unit  
outside upper-lower limit deviation 0~2000 unit

The operating point of the alarm type allotted to EV1 is set up. No option, No display when non, So, run, are allotted to EV1. The operation mode of each deviation alarm is run. Effective at the time of automatic output. Each deviation alarm serves as PV's deviation to Execution SV. Event operation other than each deviation alarm is always effective.

EV2 (event 2) operating-point setting screen

E82

0

Initial value, setting range, contents are the same with EV1

MEV key

Latching release screen

L Rch

rSt 1

Initial value: rSt 1  
Setting range: rSt 1 release EV1  
rSt 2 release EV2  
rSt 3 release EV3  
ALL release all EVs at a time

MEV key

On the latching setting screen of each EV mode, rSt and ALL which chose on are displayed. If latching is on once EV is outputted, EV output state is maintained even if EV is in the state of OFF. When EV is in a latching state, decimal point of the minimum digit blinks, and it shows that release of EV is possible. If MEV key is pressed, EV is released and a decimal point lights off. However, release is impossible when a state is in EV power range.

EV3 (event 3) is displayed when being added as optional option

E83

0

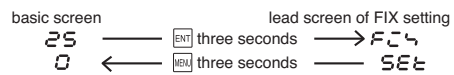
Initial value, setting range, contents are the same with EV1

Return to basic screen

## (2) FIX (constant value control) setting screens

At the time of no program option and with program option and F24 is chosen on Action mode2 screen of basic screens, lead screen of FIX setting screens is displayed when ENT key is pressed for 3 seconds.

If ENT key is pressed for 3 seconds on lead screen, it returns to basic screen.



FIX lead screen

F24

SEt

No setting on this screen. Press ENT key, then it shifts to the first setting screen SV1 setting screen.

ENT key

SV1 setting screen

S81

0

Initial value : At the time of sensor input 0  
linear input time scaling lower limit  
Setting range: sensor input time within measuring range  
linear input time within scaling range  
Moreover, within limit of SV limiter.

MEV key

When SV1 is Execution SV, being reflected in basic screen. Being initialized when measuring range, unit, and scaling are changed.

SV1 output1 PID No. setting screen

101P

1

Initial value : 1  
Setting range : 1, 2, 3  
When SV1 is Execution SV, PID No. that will be used for control of output 1 is chosen from 1~3.

MEV key

SV1 output2 PID No. setting screen

102P

1

Initial value : 1  
Setting range : 1, 2, 3  
When SV1 is Execution SV, PID No. that will be used for control of output 2 is chosen from 1~3. Displayed when output 2 option is added.

MEV key

SV2 ~ 4 setting screen

MEV key

Contents are the same with EV1

Return to FIX lead screen

## (3) Mode 1 screens key lock and SV limiter Setting

Mode 1 lead screen

nonE

1

Press MEV key for 3 seconds on basic screen, then displayed  
No setting on this screen. Press the ENT key, then it shifts to the first setting screen, keylock setting screen.

ENT key

Keylock setting screen

LocK

OFF

Initial value : OFF  
Setting range : OFF, 1, 2, 3, 4

MEV key

- 1 Only change of Execution SV (basic screen) and keylock is possible.
- 2 Possible to change numerical value value manually, and key lock level
- 3 Only change of a keylock is possible.
- 4 Only change of a keylock is possible. (same as No.3)

Notes : Even when keylock is set as 1 and 2, manual output value is possible to change.

SV limiter lower limit setting screen

S8-L

0

Initial value : measuring range lower limit  
Setting range : measuring range lower limit value~measuring range upper limit value-1 and bLP (SV display turn off)  
Lower limit value of target value is set.  
When upper limit value is smaller than lower limit value, the value compulsorily becomes lower limit value +1.

MEV key

When you choose bLP pressing MEV key at lower limit value, the SV display turn off at basic screen. But it will turn on at the setting screen.

SV limiter upper limit value setting screen

S8-H

1200

Initial value : measuring range upper limit  
Setting range : SV limiter lower limit value +1~ measuring range upper limit value  
Setting upper limit value of target value is set.

MEV key

Return to mode1 lead screen.

#### (4) Mode 2 screens Scale and PV setting

Mode 2 lead screen

**Mode** Press **▲** key in mode1 lead screen, or press **▼** key in mode3 lead screen, then being displayed.

**ENT** key If **ENT** key is pressed, it shifts to the first setting screen PV offset correction screen.

PV offset correction (PV bias) setting screen

**PV\_o** Initial value : 0  
Setting range : -500~500 Digits

**NEW** key Used for correction of input errors such as sensor. If offset correction is performed, control is also performed with the corrected value.

PV gain correction setting screen

**PV\_G** Initial value : 0.00  
Setting range : ±5.00%

**NEW** key Maximum input value is corrected within limit of ±5.00% of measuring range. If corrected, inclination of spang changes in straight line which connects zero point and correction maximum value.

PV filter setting screen

**PV\_F** Initial value : 0  
Setting range : 0 ~ 9999 seconds

**NEW** key When input change is violent or noise is overlapped, used in order to ease the influences. In 0 second setting, filter does not function.

Measuring range setting screen

**RRn** Initial value: multi **P2**, voltage **B I**, current **AA I**  
Setting range: Chosen from 5-5.measuring range code table.  
**NEW** key Combination of input type and measuring range is set by code.

Temperature unit setting screen

**Unit** Initial value : **C**  
Setting range : **C, F**

**NEW** key The temperature unit at the time of a sensor input is set up from **C** (°C) , **F** (°F). Not displayed when the linear input is chosen.

Input scaling lower limit value setting screen

**Sc\_L** Initial value : 0.0  
Setting range : -1999 ~ 9989 digits

**NEW** key Scaling lower limit value at the time of linear input is set up.

Input scaling upper limit value setting screen

**Sc\_H** Initial value : 100.0  
Setting range : -1989 ~ 9999 digits

**NEW** key Scaling upper limit value at the time of linear input is set up.

NOTE: Suppose that the difference between a lower limit value and upper limit value is 10 or less, or over 10,000. In this setting, upper limit value is compulsorily changed into that of +10 or ± 10000 digits. Upper limit value cannot be set as lower limit value of +10 digits or less, or that of over 10,000 digits.

Input scaling Decimal point position Setting screen

**dP** Initial value : the first place after decimal point (0.0)  
Setting range : no decimal point 0~the third place after decimal point (0.000)

**NEW** key Decimal point position of input scaling is set .

NOTE: The screen of input scaling serves as a monitor at the time of a sensor input. Setting change cannot be performed.

Return to mode 2 lead screen.

#### (5) Mode 3-4 screen Out 1, Out 2 setting

Mode 3 lead screen

**Mode** No setup  
If **ENT** key is pressed, it shift to the first setting screen, output 1 proportional band setting screen. In this screens, PID which can be used in output 1, 1~3 related Items and soft start of output 1, and proportional period output characteristics are set up.

Output 1 PID1 proportional-band (P) setting screen

**!\_P 1** Initial value : 3.0%  
Setting range : OFF, 0.1 ~ 999.9%

**NEW** key When performing auto tuning, no necessity for a setting basically. If OFF is chosen, it becomes ON-OFF (two positions) operation.

Output 1 PID1 Integral time (I) setting screen

**!\_I 1** Initial value : 120 seconds  
Setting range : OFF, 1 ~ 6000 seconds

**NEW** key When performing auto tuning, no necessity for a setting basically. This screen is not displayed at the time of ON-OFF operation. Becomes P operation or PD operation in I=OFF setting.

Output 1 PID1 Derivative time (D) setting screen

**!\_D 1** Initial value : 30 second  
Setting range : OFF, 1 ~ 3600 seconds

**NEW** key When performing auto tuning, no necessity for a setting basically. This screen is not displayed at the time of ON-OFF operation. Becomes P operation or PI operation in D=OFF setting.

\*1 Output1 PID1 manual reset setting screen

**!\_r 1** Initial value : 0.0  
Setting range : -50.0~50.0%

**NEW** key The offset correction at the time of I = OFF ( P operation, PD operation) is performed. This screen is not displayed at the time of ON-OFF operation.

Output 1 PID1 differential-gap setting screen

**!dF 1** Initial value : 5  
Setting range : 1 ~ 999 unit

**NEW** key The differential gap at the time of ON-OFF operation is set. Displayed at the time of P=OFF ( ON-OFF operation) setup.

Output1 PID1 minimum limiter setting screen

**!oL 1** Initial value : 0.0  
Setting range : 0.0 ~ 99.9%

**NEW** key Output lower limit value of output 1 PID1 is set up.

NOTE: At the time of STBY and scale over output, limiter value is disregarded.

Output 1 PID1 maximum limiter setting screen

**!oH 1** Initial value : 100.0  
Setting range : output limiter lower limiter values +0.1~100.0%

**NEW** key Upper limit value of output 1 PID1 is set .

Output 1 PID2 proportional band (P) setting screen

**!\_P 2** Initial value : 3.0%  
Setting range : OFF, 0.1~ 999.9%

**NEW** key Content is the same with output 1 PID1.

Output 1 PID2 integral-time (I) setting screen

**!\_I 2** Initial value : 120 seconds  
Setting range : OFF, 1~6000 seconds

**NEW** key Contents is the same with output 1 PID1.

Output 1 PID2 derivative-time (D) setting screen

**!\_D 2** Initial value : 30 seconds  
Setting range : OFF, 1~ 3600 seconds

**NEW** key Contents is the same with output 1 PID1.

\*1 Output 1 PID2 manual reset setting screen

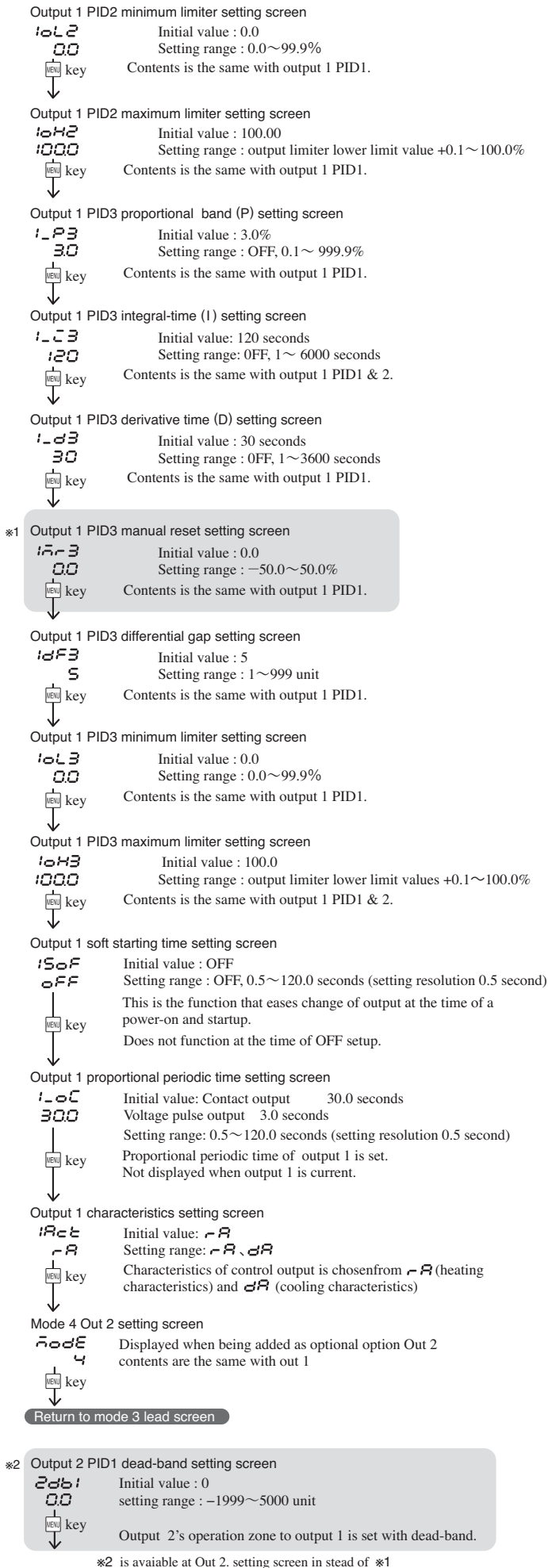
**!\_r 2** Initial value : 0.0  
Setting range : -50.0~50.0%

**NEW** key Contents is the same with output 1 PID1.

Output 1 PID2 differential gap setting screen

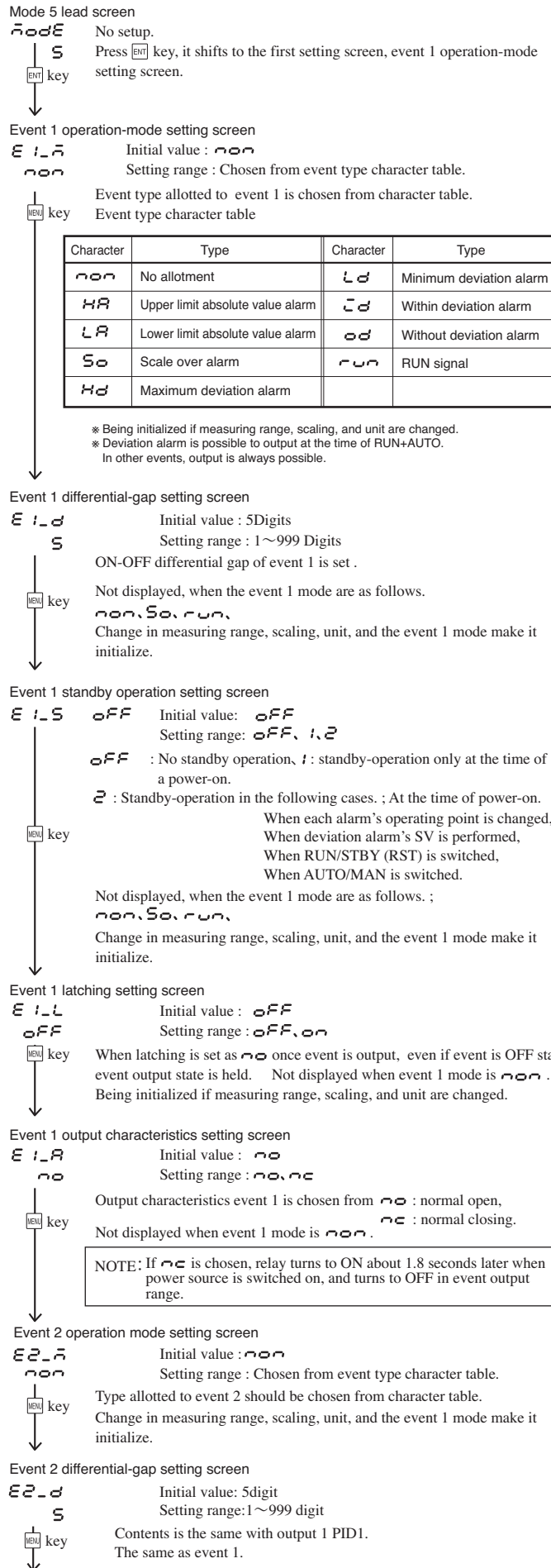
**!dF 2** Initial value : 5  
Setting range : 5~999 unit

**NEW** key Contents is the same with output 1 PID1.



## (6) Mode 5 screens EVENT setting

Mode 5 screens is the setup screens of event option. Not displayed when option is not added.



Event 2 standby operation setting screen

**E2\_S** Initial value : **OFF**  
**OFF** Setting range : **OFF, 1, 2**  
 The same as event 1.

↓ **MENU** key

Event 2 latching setting screen

**E2\_L** Initial value : **OFF**  
**OFF** Setting range : **OFF, ON**  
 The same as event 1.

↓ **MENU** key

Event 2 output characteristics setting screen

**E2\_R** Initial value : **NO**  
**NO** Setting range : **NO, NC**  
 The same as event 1.

↓ **MENU** key

Event 3

Displayed when being added as optional option event 3  
 contents are the same with event 1-2

↓ **MENU** key

Return to mode 5 lead screen

(7) Mode 6 screens

Mode 6 screens is the setup screens of external control input (DI4) option.  
 Not displayed when option is not added.  
 DI input is a no-voltage contact or open collector

Mode 6 lead screen

**NOdE** No setup.  
**E** Press **ENT** key, it shifts to the first setting screen, DI 4 mode setting screen.

↓ **ENT** key

DI 4 mode setting screen

Notes: Apart from DI 4 is displayed when being added as additional option.

**d4\_n** Initial value : **NON**  
**NON** Setting range : Chosen from DI operation character table.

↓ **MENU** key Choose DI operation that is allotted to DI 4 from character table.

Return to mode 6 lead screen

DI operation character table and restrictions concerning DI

DI operation character table

DI character	Operation type	Input detection	Contents
<b>NON</b>	No allotment		
<b>SB1</b>	1st SV	level	With closed DI terminal Execution SV=1nd SV
<b>SB2</b>	2nd SV	level	With closed DI terminal Execution SV=2nd SV
<b>SB3</b>	3rd SV	level	With closed DI terminal Execution SV=3rd SV
<b>SB4</b>	4th SV	level	With closed DI terminal Execution SV=4th SV
<b>RON</b>	control RUN	level	RUN with closed DI terminal, STBY with open one
<b>MAN</b>	manual input	level	Manual with closed DI terminal, auto with open one
<b>AT</b>	auto tuning	edge	AT-start with rise edge
<b>LRS</b>	latching release	level	All latching are released by rise edge
<b>LOCK</b>	super key lock	level	Super keylock with closed DI terminal Release With Opened

- When **AT** is allotted to, release in the middle of AT operation is performed, AT is released.
- While AT is performed, if STBY or a manual output is performed, AT is released.
- Even when a keylock is not OFF, conducting of DI is effective.
- Operation allotted to DI takes priority over DI. Key operation cannot be performed.
- Execution of DI operation is possible to perform. But neither release of AT nor numerical change of SV and manual output is possible to perform.
- In DI input, 5VDC 0.5mA is impressed. Use endurable switch, transistor and so on.
- Wiring distance of DI should be less than 30m.

5-5. Measuring rangecode table

Input Type	Code	Measuring Range		
		Unit Code <b>C</b> (°C)	Unit Code <b>F</b> (°F)	
Thermo Couple	R	<b>r1</b>	0 ~1700	0 ~3100
	K	<b>P1</b>	-199.9~ 400.0	-300 ~ 700
	K	<b>P2</b>	0 ~1200	0 ~2200
	K	<b>P3</b>	0.0~ 300.0	0 ~ 600
	K	<b>P4</b>	0.0~ 800.0	0 ~1500
	J	<b>J1</b>	0 ~ 600	0 ~1100
	J	<b>J2</b>	0.0~ 600.0	0 ~1100
	T	<b>t1</b>	-199.9~ 200.0	-300 ~ 400
	E	<b>E1</b>	0 ~ 700	0 ~1300
	S	<b>S1</b>	0 ~1700	0 ~3100
	*5 U	<b>U1</b>	-199.9~ 200.0	-300 ~ 400
	N	<b>n1</b>	0 ~1300	0 ~2300
	*1 B	<b>b1</b>	0 ~1800	0 ~3300
	*3 Wre5-26	<b>S-26</b>	0 ~2300	0 ~4200
Resistance Bulb Pt100	*4 PLII	<b>PL2</b>	0 ~1300	0 ~2300
		<b>P1</b>	-200 ~ 600	-300 ~1100
		<b>P2</b>	-100.0~ 200.0	-150.0~ 400.0
	*6	<b>P3</b>	0.0~ 100.0	0.0~ 200.0
	*6	<b>P4</b>	-50.0~ 50.0	- 60.0~ 120.0
		<b>P5</b>	-100.0~ 300.0	-150.0~ 600.0
		<b>P6</b>	-199.9~ 300.0	-300 ~ 600
		<b>P7</b>	-199.9~ 600.0	-300 ~1100
		<b>P8</b>	0 ~ 250	0 ~ 500
		<b>JP1</b>	-200 ~ 500	-300 ~ 900
		<b>JP2</b>	-100.0~ 200.0	-150.0~ 400.0
	*6	<b>JP3</b>	0.0~ 100.0	0.0~ 200.0
	*6	<b>JP4</b>	- 50.0~ 50.0	- 60.0~ 120.0
		<b>JP5</b>	-100.0~ 300.0	-150.0~ 600.0
	<b>JP6</b>	-199.9~ 300.0	-300 ~ 600	
	<b>JP7</b>	-199.9~ 500.0	-300 ~ 900	
	<b>JP8</b>	0 ~ 250	0 ~ 500	
Voltage(mV)*7	0~ 10	<b>n1</b>	Scaling Range : -1999~9999 Digit Span : 10~10000Digit Change of decimal point's position is possible (no decimal pont, 0.1, 0.01, 0.001)	
	0~100	<b>n2</b>		
	*7 -10~ 10	<b>n3</b>		
	0~ 20	<b>n4</b>		
	0~ 50	<b>n5</b>		
Voltage(V)	1~ 5	<b>u1</b>		
	0~ 5	<b>u2</b>		
	-1~ 1	<b>u3</b>		
	0~ 1	<b>u4</b>		
	0~ 2	<b>u5</b>		
Current(mA)	0~ 10	<b>u6</b>		
	4~ 20	<b>u7</b>		
	0~ 20	<b>u8</b>		

thermo couple B, R, S, K, E, J, T, N : JIS/IEC

resistance bulb Pt100 : JIS/IEC  
 JPt100 : former JIS

- \*1 thermo couple Accuracy is not guaranteed below B:400°C (752°F).
- \*2 thermo couple In K, T, U, accuracy is ± 0.5%FS for 0~100°C (-148°F) and ± 1.0%FS if it is below -100°C
- \*3 thermo couple Wre 5-26 : Product of Hoskins Mfg. co.,
- \*4 thermo couple PLII : Platinel
- \*5 thermo couple U : DIN43710
- \*6 resistance bulb accuracy of Pt/JPt ± 50.0°C, 0.0~100.0°C is ± 0.3%FS.
- \*7 voltage(mV) 0~10mV, accuracy of 0~10mV is ± 0.3% of input range.
- \*Setup of factory shipment is Multi input : thermo couple **P2** 0-1200°C  
 Voltage input : 1-5V **n1** ; 0.0-100.0  
 Current input : 4-20mA **u7** ; 0.0-100.0