MA２０Ｉ

DIGITAL INDICATION ALARM METER

Instruction manual

Thank you for purchasing SHIMAX products. Please check that the delivered Product is the item you ordered. Please do not begin operating this product until You have read this instruction manual thoroughly and understand its contents.

「Notice」

Please ensure that this manual is given to the final user of the instrument.

Preface

This instruction manual is meant for those who will be involved in wiring, installation, operation and routine maintenance of the MA20I.

This manual describes the care, installation, wiring, function, and proper procedures regarding the operation of MA20I. Keep this manual on hand while using this device. Follow the guidance provided herein.

１．Matters regarding safety

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

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

「⚠WARNING」

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

「⚠CAUTION」

◎This heading indicates additional instructions and/or notes

「NOTE」

「⚠WARNING」

MA20I is designed for controlling temperature, humidity, and other physical subjects. It must not be used in any way that may adversely affect safety, or working conditions.

「⚠CAUTION」

To avoid damage to the connected equipment, facilities or the product itself due to a fault of the product, 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 counter measures.

「⚠CAUTION」

●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.

●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 reduce the life of the product and/or result in problems with the product.

●Voltage different from that of the input specification should not be connected to the input terminal. It may reduce the life of the product and/or result in problems with the product.

●This instrument is provided with a vent for heat discharge. Take care to prevent metal or other foreign matter from obstructing the vent. Failure to do so may result in problems with the product and may even result in fire.

「⚠CAUTION」

●This instrument has basic insulation between the power supply and the secondary circuit.If accessible Safety Extra Low Voltage (SELV) circuits are to be connected to Signalinput/output terminals (Input, DI, Analog output, Communication, and other secondary circuit), ensure to provide a basic insulation between the SELV circuits and these terminals (For example, use transformer which has a basic insulation or higher degree of insulation). The basic insulation requires a clearance at least 1.5mm and a creepage of at least 3.0mm.

●Do not block the vent or allow dust to accumulate. The rise in temperature or insulation failure caused by blocking the vent may result in reducing the life of the product and/or problems with the product.

●Repeated tolerance tests against voltage, noise, surge, etc. may lead to deterioration of the instrument.

●No modification or irregular usage is allowed.

２．Introduction

２－１．Check before use

Before using this product, you are required to check the model code, the external view of the product and the accessories to make sure that there is no error, damage, or shortage of delivered items.
Confirmation of model code: Check the model codes on the case of the product to ascertain that the delivered item is what you ordered by referring to the following code table.

Example of model code

MA２０	Ｉ－	Ｍ	Ｆ－	２Ｎ－	０
1	2	3	4	5	6

Item

1.Series MA20 2. Classification I-:Indication alarm
3.Input M: multi V: voltage I: current
4. Power Supply F-: 90 – 264V AC L-: 21.6 – 26.4V DC/AC
5. Option 1N-: alarm output 1 point 2N-: alarm output 2 points 3N-: alarm output 3 points
1D-: alarm output 1 point + external control input (DI) 2 points
2D-: alarm output 2 points + external control input (DI) 2 points
1T-: alarm output 1 point + analog output (4～20mA)
2T-; alarm output 2 points + analog output (4～20mA)
1R-: alarm output 1 point + communication of RS-485
2R-: alarm output 2 points + communication of RS-485
1B-: alarm output 1 point with buzzer 2B-:alarm output 2 points with buzzer
3B-: alarm output 3 points with buzzer
7. Remarks 0: without 9: with

Check of accessories

Instruction manual: 1 set

「NOTE」: Contact our representative or our local office concerning any problems with the product and accessories, or for any inquiry.

２－２．Caution for use

(1) Avoid operating the front panel keys with hard or sharp objects.
Touch the keys lightly with fingertips.
(2) To clean, wipe gently with a dry cloth. Avoid using solvents such as thinner.

３．Installation and wiring

３－１．Installation site (environmental conditions)

「⚠CAUTION」

Do not use this instrument under the following conditions.
Otherwise, the likelihood of fire and/or other dangerous situations are considerable.

(1) Where flammable gas, corrosive gas, oil mist or dust that can deteriorate. electrical insulation is generated or is abundant.
(2) Where the temperature is below -10℃ or above 60℃
(3) Where the humidity is over 90%RH or where condensation occurs.
(4) Where highly intense vibration or impact is generated or can affect the operation of the product.
(5) Near high voltage power lines or where inductive interference can affect the operation of the product.
(6) Where there are dewdrops or direct sun light.
(7) Where the altitude is above 2,000m.

「NOTE」: The environmental conditions here comply with the installation category Ⅱ and the pollution degree 2 set by IEC664.

３－2. Mounting.

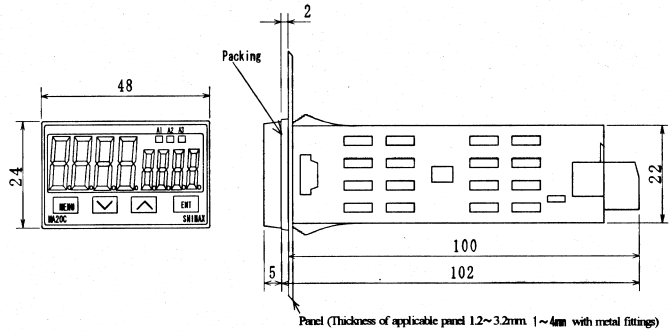
(1) Machine the mounting hole by referring to the panel-cut illustration in Section 3-3.
(2) Applicable thickness of the mounting panel is 1.2～3.2mm. (With metal fittings, it can be 1.0～4.0mm.)
(3) As this product provides mounting fixture, insert the product into the panel.

「NOTE」: MA20C is a panel set-up type. Please use the product after setting up to the panel.

MA20IF-1DE August. 2020

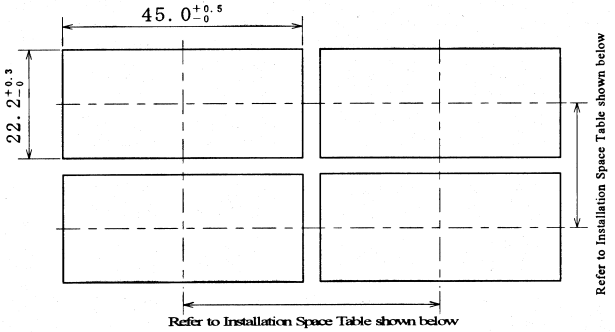
3－3．External dimension and panel cutout

MA20I external dimensions (unit: mm)



MA20I panel cutout (unit: mm)

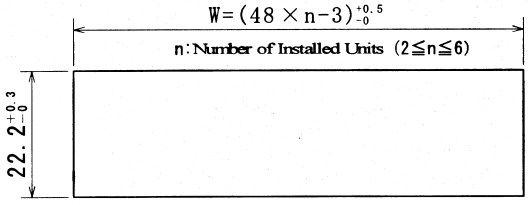
Individual Installation for one unit and more than one unit closely mounted each in one hole



Min. Installation Space According to Thickness of the Panel

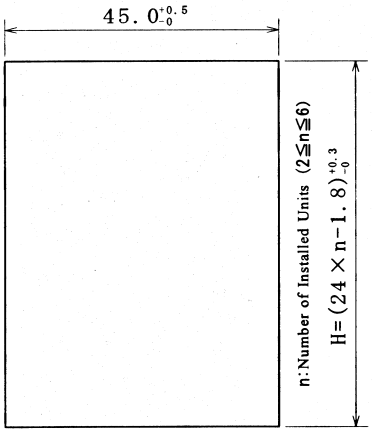
Thickness of Panel	Installation Space (Vertical)	Thickness of Panel	Installation Space (Vertical)	Installation Space (Horizontal)
1.0	25.0	2.3	24.0	More than 48.0 as for
1.2	25.0	2.8	24.0	horizontal direction
1.6	24.4	3.2	24.0	More than 66.0 with
2.0	24.0			metal fittings

Horizontally Consecutive Installation in One Hole (Max. 6 units) Non-application of IP66



n	2	3	4	5	6
W	93	141	189	237	285

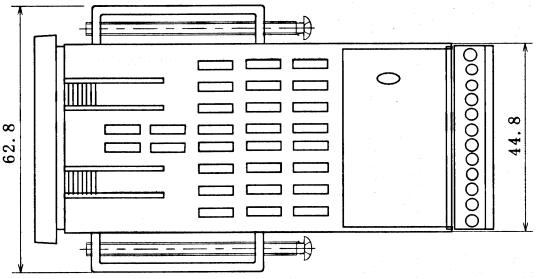
Vertically Consecutive Installation in One Hole (Max. 6 units) Non-application of IP66



n	2	3	4	5	6
H	46.2	70.2	94.2	118.2	142.2

「NOTE」 : Metal fittings are needed for each unit in case of vertically consecutive installation in one hole.

External View of Installation with Metal fittings

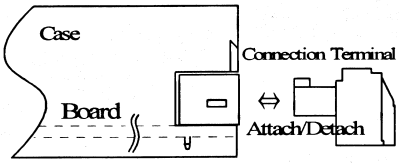


3－4．Wiring

「⚠ WARNING」

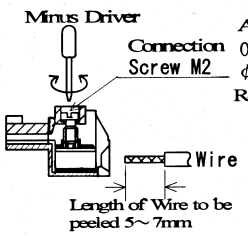
◎To prevent electrical shock, turn off electricity during wiring operation.
◎Avoid touching the wired terminals and chargers while supplying power.

(1) Wiring operation should be done according to the instruction of the terminal arrangement plan in section 3-5
(2) In case of thermocouple input, choose the compensation wire suitable to the thermocouple type.
(3) In case of R.T.D. input, leads should be less than 5Ω in resistance and three leads should have the same resistance.
(4) Input signal line should not be laid in the same wire or duct as that of the high voltage line.
(5) Shield wiring (single point grounding) is effective for static induction noise.
(6) Short interval twisted pair wire for input signal is effective for electromagnetic induction noise.
(7) When wiring, the connector terminal can be removable if it is pulled right and left one after the other as shown in the drawing bellow.



(8) To avoid wiring slip and short circuit, use the suitable cable, insert it thoroughly, and fasten the connection screws tightly with a minus driver.

Tightening torque: 0.2 ~ 0.25N•m (recommended performance)
0.3 N•m (guaranteed performance)

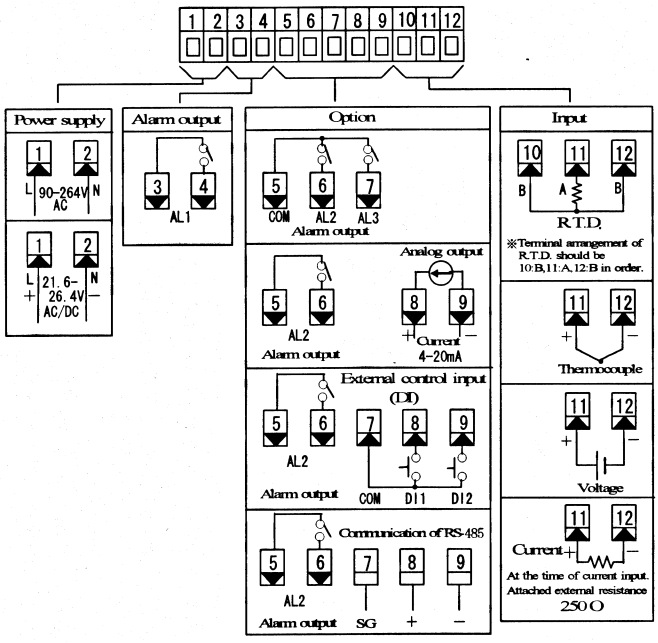


Appropriate Wire
0.12~1.25mm² (Stranded Wire)
φ0.4~1.2mm (Solid Wire)

Recommended Adhesion Terminal

WAGO Color Ferrules Type	Appropriate Wire (mm²)
216-301	0.25
216-302	0.34
216-201	0.5
216-202	0.75

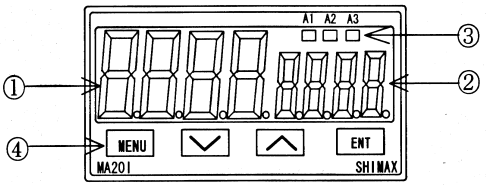
3－5. Terminal arrangement plan



「NOTE」 : When input type is thermocouple or voltage a shoot circuit between 10 and 12 terminals cause measurement errors.

4．Description of front panel

4－1．Drawing and the name of parts.



4－2．Description of parts on the front panel

① : Display section of measured value (PV) (red)
Measured value (PV) and type of setting on each setting screen are displayed.

② : Display section of alarm 1 (yellow)
Alarm 1 and set value on each setting screen are displayed.
Alarm 1 operating point (higher and lower limit absolute value alarm) can be set.
When "non" is chosen on alarm 1 mode setting screen, "non" is displayed.
When "So"(scale-over) is chosen on alarm 1 mode setting screen, "So" is displayed.

③ : Monitor LED section
Alarm output monitor LED A1, A2, A3 (red)
LED lights up when assigned alarm output turns ON

④ : Key-switch section
(1) MENU (MENU) key
Press MENU key to move on to the next screen.
Press MENU key for three seconds on the basic screen and the screen jumps to the lead screen of Mode 1.
Press MENU key for three seconds on the lead screen of each of Mode screens and the screen jumps to the basic screen.

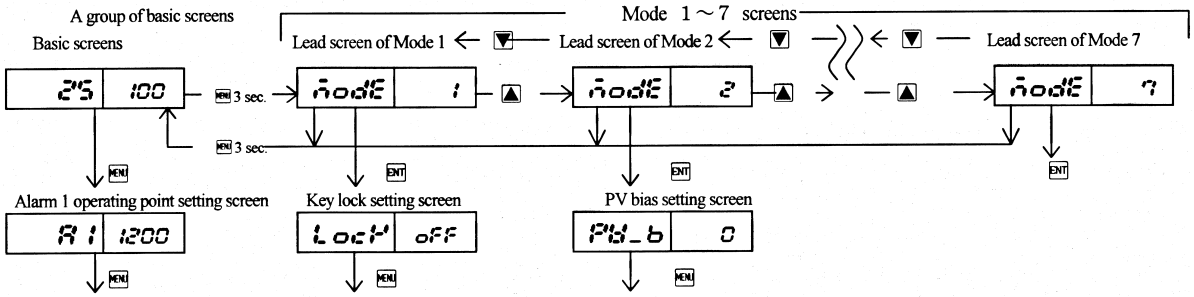
(2) ▼ (DOWN) key
One press of ▼ key decreases the set value by one.
By pressing the key, the value continues decreasing.
During setting, a dot beside the least decimal place is blinking.

(3) ▲ (UP) key
One press of ▲ key increases the set value by one.
By pressing the key, the value continues increasing.
During setting, a dot beside the least decimal place is blinking.

(4) ENT (ENTRY) key
Press ENT key to resister the setting changed by ▲ or ▼ key.
(A dot beside the least decimal place stops blinking.)
Press ENT key on the lead screen of each of Mode screens the screen moves to a setting screen.

5．**Description of screens**

5－1．How to move to another screen



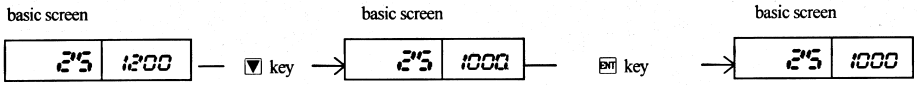
Press MENU key on the basic screen to move to another basic screen.
Press MENU key on the basic screen for three seconds to jump to the lead screen of Mode 1.
Press ▲ key on the lead screen of Mode 1 to move to the lead screen of Mode 2, Mode 4 in order. (When there is no option assigned to Mode 4 ~ Mode 7, they are skipped.)

NOTE: Screens of Mode 3 are skipped and are not displayed.

Press ▼ key on the lead screen of Mode 1 to move to the lead screen of Mode 7, Mode 6 in order. (When there is no option assigned to Mode 4 ~ Mode 7, they are skipped.)
Press ENT key on the lead screen of Mode 1 ~ 7 to move to the first setting screen of each Mode.
Press MENU key on the first setting screen of each Mode to move to the next setting screen.

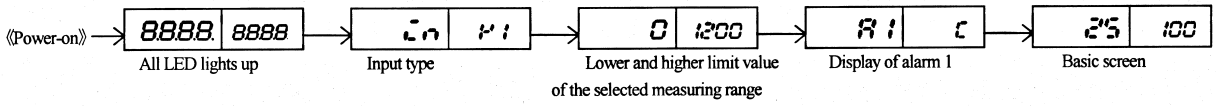
5－2．How to set

To change settings, display an appropriate screen and change the setting (value or function) by pressing ▲ or ▼ key. Then press ENT key to resister the setting.



5－3．Power-on and initial screen display

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



5－4．Description of screens

（1）A group of basic screens

Basic screen

PS 1200

Alarm 1 setting initial value:
Higher limit absolute value measuring range higher limit of scaling range
Lower limit absolute value measuring range lower limit of scaling range
When non is chosen non
When So is chosen So
Setting range:
Higher limit absolute value within measuring range within scaling range
Lower limit absolute value within measuring range within scaling range

MON key

On the basic screen, the 4-digit-number section on the left displays a measuring value (PV) and the 4-digit-number section on the right displays alarm 1 setting. When "non" or "So" is chosen as alarm 1 action mode, "non" or "So" is displayed and setting cannot be changed.

Alarm 1 operating point setting screen

A1 1200

Initial value：
Higher limit absolute value measuring range higher limit of scaling range
Lower limit absolute value measuring range lower limit of scaling range

MON key

Setting range：
Higher limit absolute value within measuring range within scaling range
Lower limit absolute value within measuring range within scaling range

Operating point of the alarm type assigned to Alarm 1 can be set.
When "non" or "So" is chosen as AL1 action mode , the setting is not displayed.

Alarm 2 operating point setting screen

A2 0

MON key

Initial value, setting range, and other conditions are the same as those of Alarm 1.
When there is no alarm №2 option, there is no display.

Alarm 3 operating point setting screen

A3 0

MON key

Initial value, setting range, and other conditions are the same as those of Alarm 1.
When there is no alarm №3 option, there is no display.

Latching cancellation screen

LAch rSt 1

Initial value：rSt 1
Setting range：rSt 1 cancellation of alarm 1
rSt2 cancellation of alarm 2
rSt3 cancellation of alarm 3
ALL simultaneous cancellation of all the alarm

MON key

When on is chosen on latching setting screen of each alarm mode, rSt number and ALL are displayed.
When latching is ON, once alarm turns on, the alarm output condition continues even if alarm turns OFF. On this screen, on-going alarm output can be cancelled.
When alarm is in latching condition, a dot beside the least decimal place blinks. The blinking indicates that it is possible to cancel the alarm setting.
When ENT key is pressed, the alarm is cancelled and the dot stops blinking.
However, the condition is within alarm output region, cancellation is impossible.

Back to the basic screen

（2）A group of Mode 1 screens

Lead screen of Mode 1

mode 1

There is no setting on this screen.

ENT key

This screen is displayed when MON key is pressed for 3 seconds on the basic screen.
Press ENT key and the screen will shift to the first setting screen, Key lock setting screen.

Key lock setting screen

Loch oFF

Initial value: oFF

MON key

Setting range: oFF、1、2、3

1 Only alarm 1 (on the basic screen) and "key lock" can be changed.
2 Only "key lock" can be changed.
3 Only "key lock" can be changed, and there is no display of SV on the basic screen.

Back to the lead screen of Mode 1

（3）A group of Mode 2 screens

Lead screen of Mode 2

mode 2

There is no setting on this screen.

ENT key

This screen is displayed when ▲ key is pressed on the lead screen of Mode 1, or when ▼ key is pressed on the lead screen of Mode 4.
Press ENT key and the screen will shift to the first setting screen, PV bias setting screen.

PV bias setting screen

Pb_b 0

Initial value：0

MON key

Setting range：-200～200unit

This setting is used to correct sensor input errors, etc.

PV filter setting screen

Pb_F 0

Initial value: 0

MON key

Setting range: 0～100 sec.

This setting is used to reduce the adverse effects in case of large input change and noise overlapping.
This function is not performed if the setting is 0 sec.

Measuring range setting screen

rAnG P1

Initial value: multi P2 voltage/current b1

MON key

Setting range: 5－5 according to Measuring range code table

Measuring range is set by combination of input type and measuring range.

Unit setting screen

Unit c

Initial value: c

MON key

Setting range: c、F

Temperature unit at the time of sensor input can be chosen between c(℃) and F(℉).
When linear input is chosen, there is no display.

Input scaling lower limit setting screen

Sc_L 0.0

Initial value: 0.0

MON key

Setting range: -1999～9989 unit

Lower limit of scaling range at the time of linear input can be set

Input scaling higher limit setting screen

Sc_H 1000

Initial value: 100.0

MON key

Setting range: -1989～9999 unit

Higher limit of scaling range at the time of linear input can be set.

NOTE: If the difference between the lower and higher limits is set at less than 10 or at more than 10000, the higher limit setting is automatically changed to +10 or +10000.
The higher limit cannot be set at less than +10 or more than +10000.

Input scaling decimal point setting screen

dP 0.0

Initial value: 1st decimal place (0.0)

MON key

Setting range: No decimal point ~ 3 rd decimal place (0.000)

The decimal place of scaling range can be set.

NOTE: Input scaling screens become a monitor at the time of sensor input, and the setting can be changed.

Back to the lead screen of Mode 2

（4） A group of Mode 4 screens

A group of Mode 4 screens are alarm-setting screens.

Lead screen of Mode 4

mode 4 There is no setting on this screen.

ENT key Press ENT key and the screen will shift to the first setting screen, alarm 1 mode setting screen.

Refer to 5-6. Alarm Action chart regarding actions.

Alarm 1 mode setting screen

A1_n HA Initial value: HA

KEY key Setting range: according to Alarm type code table

Alarm type to be assigned to Alarm 1 can be chosen and set according to the code table.

Alarm type code table

Alarm code	Alarm type	Alarm code	Alarm type
non	Not assigned	So	Over scale
HA	Higher limit absolute value	LA	Lower limit absolute value

When measuring range, unit, or scaling range is changed the setting is initialized.

Alarm 1 differential gap setting screen

A1_d 5 Initial value: 5 unit

KEY key Setting range: 1 ~ 999 unit

ON-OFF differential gap of Alarm 1 can be set on this screen.

When Alarm 1 mode is non and So, there is no display.

When measuring range, unit, scaling range or Alarm 1 mode is changed, the setting is initialized.

Alarm 1 stand-by action setting screen

A1_S oFF Initial value: oFF

KEY key Setting range: oFF、 1、 2

oFF: no stand-by action

1: stand-by action only at the time of power-on

2: stand-by action when each alarm operating point is changed at the time of power-on

When Alarm 1 mode is non and So, there is no display.

When measuring range, unit, scaling range or Alarm 1 mode is changed, the setting is initialized.

Alarm 1 latching setting screen

A1_L oFF Initial value: oFF

KEY key Setting range: oFF、 on

When latching is set as "on", once alarm output turns on, the alarm output condition continues even if alarm turns "OFF".

When Alarm 1 mode is "non", there is no display.

When measuring range, unit, scaling range or Alarm 1 mode is changed, the setting is initialized.

Alarm 1 output characteristic setting screen

A1_A no Initial value: no

KEY key Setting range: no、 nc

Alarm 1 output characteristic can be chosen between "no": normal open and "nc": normal close.

When Alarm 1 mode is "non", there is no display.

NOTE: When nc is chosen, relay turns ON after 500m s from power-on and turns OFF in alarm region.

Alarm 1 tone of buzzer setting screen

A1_b 1 Initial value: 1

KEY key Setting range: oFF, 1～32

Can be set alarm 1 tone of buzzer from 1 to 32.

Buzzer is not sounded when this screen set oFF.

When the option is not added, these screens are not displayed.

This screen is not displayed when Alarm 1 mode is non.

Alarm 1 sound time of buzzer setting screen

A1_t cont Initial value: cont

KEY key Setting range: 1～100 sec., cont

Can be set alarm 1 sound time of buzzer.

Continue sound of buzzer between alarm 1 on action when set cont.

When the option is not added, these screens are not displayed.

This screen is not displayed when Alarm 1 tone of buzzer set is oFF.

This screen is not displayed when Alarm 1 mode is non

For alarm 2 mode setting screen

Alarm 2 mode setting screen

A2_n LA Initial value: LA

KEY key Setting range: according to Alarm type code table

Alarm type to be assigned to Alarm 2 can be chosen and set according to the code table.

When measuring range, unit, or scaling range is changed the setting is initialized.

When there is no Alarm 2 option, there is no display.

Alarm 2 differential gap setting screen

A2_d 5 Initial value: 5 unit

KEY key Setting range: 1 ~ 999 unit

The same as those of Alarm No. 1.

When there is no Alarm 2 option, there is no display.

Alarm 2 stand-by action setting screen

A2_S oFF Initial value: oFF

KEY key Setting range: oFF、 1、 2

The same as those of Alarm No. 1.

When there is no Alarm 2 option, there is no display.

Alarm 2 latching setting screen

A2_L oFF Initial value: oFF

KEY key Setting range: oFF、 on

The same as those of Alarm No. 1

When there is no Alarm 2 option, there is no display.

Alarm 2 output characteristic setting screen

A2_A no Initial value: no

KEY key Setting range: no、 nc

The same as those of Alarm No. 1

When there is no Alarm 2 option, there is no display.

Alarm 2 tone of buzzer setting screen

A2_b 2 Initial value: 2

KEY key Setting range: oFF, 1～32

The same as those of Alarm 1

When there is no Alarm 2 option, there is no display.

Alarm 2 sound time of buzzer setting screen

A2_t cont Initial value: cont

KEY key Setting range: 1～100 sec., cont

The same as those of Alarm 1

When there is no Alarm 2 option, there is no display.

Alarm 3 mode setting screen

A3_n non Initial value: non

KEY key Setting range: according to Alarm type code table

Alarm type to be assigned to Alarm 3 can be chosen and set according to the code table.

When measuring range, unit, or scaling range is changed the setting is initialized.

When there is no Alarm 3 option, there is no display.

Alarm 3 differential gap setting screen

A3_d 5 Initial value: 5 unit

KEY key Setting range: 1 ~ 999 unit

The same as those of Alarm No. 1

When there is no Alarm 3 option, there is no display.

Alarm 3 stand-by action setting screen

A3_S oFF Initial value: oFF

KEY key Setting range: oFF、 1、 2

The same as those of Alarm No. 1

When there is no Alarm 3 option, there is no display.

Alarm 3 latching setting screen

A3_L oFF Initial value: oFF

KEY key Setting range: oFF、 on

The same as those of Alarm No. 1

When there is no Alarm 3 option, there is no display.

Alarm 3 output characteristic setting screen

A3_A no Initial value: no

KEY key Setting range: no、 nc

The same as those of Alarm No. 1

When there is no Alarm 3 option, there is no display.

For alarm 3 tone of buzzer setting screen

Alarm 3 tone of buzzer setting screen

A3_b oFF

Initial value: oFF

key

Setting range: oFF, 1～32

The same as those of Alarm 1

When there is no Alarm 3 option, there is no display.

Alarm 3 sound time of buzzer setting screen

A3_t cont

Initial value: cont

key

Setting range: 1～1００sec., cont

The same as those of Alarm 1

When there is no Alarm 3 option, there is no display.

Back to the lead screen of Mode 4

（5）A group of Mode 5 screens

A group of Mode 5 screens are external control input (DI) option setting screens.
When the option is not added, these screens are not displayed.
DI input is either no-volt contact or open collector.

Lead screen of Mode 5

mode 5

There is no setting on this screen.

ENT key

Press ENT key and the screen will shift to the first setting screen, DI 1 mode setting screen.

DI 1 mode setting screen

d1_n non

Initial value: non

key

Setting range: according to DI action code table

DI action to be assigned to DI 1 can be chosen and set according to the code table.

ＤＩ２モード設定画面

d2_n non

Initial value: non

key

Setting range: according to DI action code table

DI action to be assigned to DI 2 can be chosen and set according to the code table.

Back to the lead screen of Mode 5

DI Action Code Table and Constraint Items

DI Action Code Table

DI Code	Action type	Input Detection	
non	No assignment		
L_cS	Latching cancel	Edge	Latching cancellation with leading edge
Lock	Super Key Lock	Level	Super Key Lock with DI terminals closed Cancellation with DI terminals open

- DI action is still effective even when "key lock" is set at other than OFF.
- The same action cannot be assigned to DI 1 and DI 2.
- The action assigned to DI takes precedence, and no key operation is possible.
- When "super key lock" is executed, the setting is fixed on the basic screen.
  While DI action can be executed, no key operation is possible.
- At the time of DI input, 12VDC 2mA is added per point.
  Switches and transistors should be tolerable to the condition.
- The distance of DI wiring should be within 30 meters.

（6）A group of Mode 6 screens

A group of Mode 6 screens are analog output option setting screens.
When the option is not added, these screens are not displayed.

Lead screen of Mode 6

mode 6

There is no setting on this screen.

ENT key

Press ENT key and the screen will shift to the first setting screen, analog output mode setting screen.

Analog output mode setting screen

Ao_n PV

Initial value: PV

key

Setting range: PV

The mode is only PV.
The setting cannot be changed.

Analog output scaling lower limit setting screen

AS_L 0

Initial value: Sensor input lower limit of measuring range
Linear input lower limit of input scaling

key

Setting range: Sensor input lower limit of measuring range ~ higher limit of measuring range –1
Linear input lower limit of input scaling range ~ higher limit of input scaling range -1

Lower limit of scaling range to be assigned to analog output can be set.

Analog output scaling higher limit setting screen

AS_H 1200

Initial value : Sensor input higher limit of measuring range
Linear input higher limit of input scaling

key

Setting range: Sensor input lower limit of measuring range +1~ higher limit of measuring range
Linear input Lower limit of input scaling range +1 ~ higher limit of input scaling range

Higher limit of scaling range to be assigned to analog output can be set.

Analog output limit lower value setting screen

AL_L 0.0

Initial value: 0.0

key

Setting range: 0.0 ~ 100.0%

Lower limit of analog output value (4 ~20mA) could be set in %.
For examples, 8mA when the setting is 25.0, 1.2mA when the setting is 50.0, 16mA when the setting is 75.0, and 20mA when the setting is 100.0.
It is the output value of the lower side.

Analog output limit higher value setting screen

AL_H 100.0

Initial value: 0.0

key

Setting range: 0.0 ~ 100.0%

Higher limit of analog output value (4 ~20mA) could be set in %.
AL_L and AL_H cannot be set at the same value.

Back to the lead screen of Mode 6

NOTE: Analog output limit can be set in reverse scaling.
Examples: Output range: 0 (4mA) ~ 1200℃ (20mA) can be changed to 0 (20mA) ~ 1200℃(4mA) Set 100.0% in AL_L, and set 0.0% in AL_H

（7） A group of Mode 7 screens

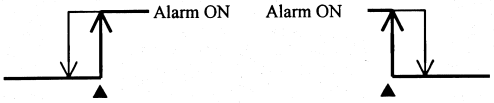
A group of Mode 7 screens are communication of RS-485 option setting screens.
When the option is not added, these screens are not displayed.
For details,please refer to the instruction manual for communication interface.

5 − 5 . Measuring range code table

Input type			Code	Measuring range	
				Unit code c (℃)	Unit code F (℉)
	Thermo Couple	R	r 1	0 ～1700	0 ～3100
		K	P 1	-199.9～ 400.0	-300 ～ 700
		K	P2	0 ～1200	0 ～2200
		J	J 1	0 ～ 600	0 ～1100
		T	t 1	-199.9～ 200.0	-300 ～ 400
		E	E 1	0 ～ 700	0 ～1300
		S	S 1	0 ～1700	0 ～3100
		U	U 1	-199.9～ 200.0	-300 ～ 400
		N	n 1	0 ～1300	0 ～2300
		B	b 1	0 ～1800	0 ～3300
	R.T.D. Pt100Ω		P 1	-200 ～ 600	-300 ～1100
			P2	-100.0～ 200.0	-150.0～ 400.0
			P3	0.0～ 100.0	0.0～ 200.0
	0～ 10 mV		n 1	Scaling range : -1999～9999 count	
	0～100 mV		n2	Span : 10～10000 count	
	1～ 5 V		U 1	decimal point changeable	
	0～ 5 V		U2		
	4～ 20 mA		U 1	※At the time of current input	
	0～ 20 mA		U2	Attached external resistance 250Ω at the U code	

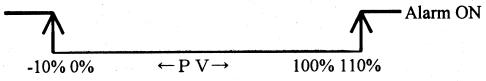
5 − 6 . Drawing of alarm action

HR : Higher limit absolute value　　LR : Lower limit absolute value



△ : S V　　▲ : Alarm set point

So : Over scale



6. **Principal Specification**

General specifications

Supply voltage : 90 – 264V AC 50/60Hz or 21.6 – 26.4V AC(50/60Hz)/ DC

Power consumption : 90 – 264V AC 7VA maximum, 24V AC 4VA maximum, 24V DC 3W maximum

Applicable standard Safety : EN61010-1

EMC : EN61326-1

EN61000-3-2, EN61000-3-3

Use environment

Temperature : -10～60℃

Humidity : below 90%RH (no condensation)

Altitude : 2000 m above sea level max. Category : Ⅱ Pollution degree : 2

Storage temperature : –20～65℃

Protective structure : Only front panel has dust-proof and drip-proof structure. Equivalent to IP66 Applicable standard IEC60529: 1989+Amendment: 1999

※IP66 Required thickness of applicable panel: 1.2, 1.6, 2.0, 2.3, 2.8, 3.2mm (1～4mm with metal fittings)

Insulation resistance / withstand voltage : Between input/output terminal and power supply terminal 500V DC 20MΩ min. /1500V AC per minute

Between analog output or external control input and other input/output terminals 500V DC 20MΩ min. /500V AC per minute

Quake resistance : Frequency 10～55～10Hz Amplitude 0.75mm (half) ….100m/s Direction 3 directions

Sweep rate 1 octave/ minute (reciprocation approx. 5 minutes/ cycle) Number of sweep 10 times Applicable standard IEC60068-2-6/1995

Case material : ＰＰＯ

External detention : H24×W48×D107mm (The depth detention of panel inside 100mm)

Weight : Approx. 60g (without panel metal fittings)

Display

Display accuracy : ±(0.25%FS+1 digit) CJ measurement errors excluded No guarantee at 400℃ or below in B thermocouple

During EMC test the accuracy is 5%FS

Display accuracy range : 23±5℃

Measured value display range : −10%～110% of measuring range (−240～680℃in case of the measuring range of R.T.D. −200~600℃)

Input

Thermocouple Input impedance: 500kΩ min. External resistance range 100Ω max.

Cold junction temperature compensation accuracy : 1℃ (ambient temperature of 18～28℃) 2℃ (ambient temperature of 0～50℃)

±0.5%FS (the index value is −100℃～0℃) ±1.0%FS (the index value is below −100℃)

R.T.D. Standard current : 0.25 mA

Voltage Input impedance : 500kΩ min.

Current Receiving impedance: 250Ω (The accessories external resistance should be connected to the input terminal.)

Alarm output

Alarm type/ rating : Contact 1a/ 240V AC 2A (resistive load)

External control input (DI)

Input type/rating : No-volt contact or open collector / approx. 12V DC 2mA ※the distanced of DI wiring should be within 30 meters.

Analog output

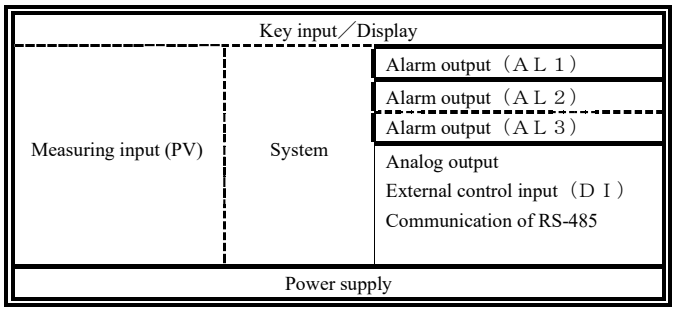
Output rating : 4～20mA DC Load resistance 300Ω max.

Insulation : Not insulated between alarm output AL1 and AL2.

The rest are basic insulation or functional insulation. Refer to the insulation block chart shown below.

Insulation block chart

basic insulation Functional insulation No insulation



RoHS information for China

中华人民共和国中国电子行业标准 SJ/T11364-2014

People's Republic of China Electronic Industry Standard SJ/T 11364-2014

产品 / Product	MA20 Series Digital controller/Indicator					
零件名称 / Part Name	有毒有害物质或元素 / Hazardous Substances					
	铅/Pb	汞/Hg	镉/Cd	六价铬/Cr6+	多溴联苯/PBB	多溴二苯醚/PBDE
电路模块 / PCB Assembly	X	0	0	0	0	0
壳体 / Enclosure	0	0	0	0	0	0
包装 / Packaging	0	0	0	0	0	0

0	指明产品所有均质材料包含的有害物质要低于GB/T26572限定的要求 Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.
X	指明产品所用的至少一种均质材料包含的有害物质高于GB/T26572限定的要求 Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

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S H I M A X CO., LTD. URL http://www.shimax.co.jp

Head Office: 190 Shimoniiyachi, aza, yotsuya, Daisen-shi, Akita 014-0102, Japan

Phone: 0187-86-3400 Facsimile:0187-62-6402

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