

MANUAL LOADER
(with 4-digit digital meter, LED bar indicator)MODEL **SM10****CONTENTS**

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BEFORE USE

Thank you for choosing M-System. Before use, check the contents of the package you received as below.

If you have any problems or questions with the product, please contact M-System's Sales Office or representatives.

- This product is for use in general industrial environments, therefore may not be suitable for applications which require higher level of safety (e.g. safety or accident prevention systems) or of reliability (e.g. vehicle control or combustion control systems).
- For safety, installation and maintenance of this product must be conducted by qualified personnel.

■ PACKAGE INCLUDES:

Manual loader	(1)
Mounting bracket	(2)

■ MODEL NO.

Confirm that the model number described on the product is exactly what you ordered.

■ OPERATING MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection, basic maintenance procedures and detailed operations.

POINTS OF CAUTION

■ POWER INPUT

- Locate the power input rating marked on the product and confirm its operational range as indicated below:

Rating 100 – 240V AC: 85 – 264V, 50/60 Hz,
 approx. 9VA at 100V
 approx. 12VA at 200V
 approx. 13VA at 264V

Rating 24V DC: 24V \pm 10%, approx. 4W

- Supplying any level of power other than specified above can damage the unit or the power source.
- Power supply start-up characteristics must reach within 5 seconds to the operational voltage range of the unit.
- Power cables and signal I/O cables for the unit must be located separately.
- Power cables and signal I/O cables for the unit should not be bundled together.
- To increase noise resistance of the power input wires, twist the strands before connecting.

■ GENERAL PRECAUTIONS

- Before you remove the unit, turn off the power supply and I/O signal for safety.
- Do not disassemble or modify the unit in any way. Doing so may result in a fire or an electrical shock.
- Do not block the unit's ventilation openings or use it in areas where heat accumulates.
 Additionally, do not store or use it under high-temperature conditions.
- Do not use this unit in an environment where flammable/corrosive gases are present.
- Do not store or use this unit in locations subject to direct sunlight, or where excessive dust, dirt or metal particles are present.

- This unit is a precision instrument. Do not store or use it where large shocks or excessive vibration can occur.
- Do not store or use this unit in environments subject to chemical evaporation (such as that of organic solvents), or where there are chemicals and/or acids present in the environment.
- Do not use paint thinner or organic solvents to clean this unit.
- Observe the environmental conditions when using this unit.
- Wait at least 30 seconds before turning on the power supply after it was tuned off.

■ ENVIRONMENT

- Indoor use
- This unit is designed to be mounted on a vertical panel. It is not suitable for a slanted or a horizontal panel surface.
- Environmental temperature must be within -5 to +55°C (23 to 131°F) with relative humidity within 5 to 90% RH in order to ensure adequate life span and operation.

■ GROUNDING

- Be sure to determine in advance the most stable grounding point in the environment and earth the unit's FG terminal and that of connected devices to it in order to protect the devices from dielectric breakdown.
- Grounding is also effective to eliminate noise that could cause errors in the unit's operation.

■ MINIMIZING NOISE INTERFERENCE TO ANALOG SIGNAL CABLES

- Noise entering through the analog signal cables may cause irregular measurement values, degradation of overall accuracy, and malfunction of the product. We recommend that you would conduct wiring to the unit with the following points of caution.
- Do not install cables (power supply, input and output) close to noise sources (high frequency line, etc.).
- Do not bind the analog I/O cables together with those in which noises are present. Do not install them in the same duct.

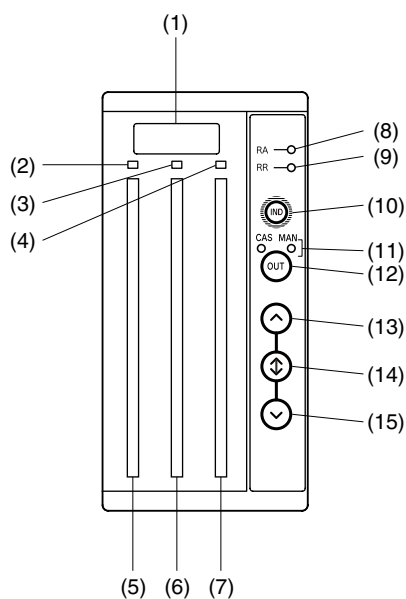
■ DO NOT APPLY OVERRANGE INPUT

- Do not apply voltages exceeding \pm 15V across the voltage input terminals to prevent damage.
- Do not apply currents exceeding \pm 100mA to the current input terminals to prevent damage.

■ AND

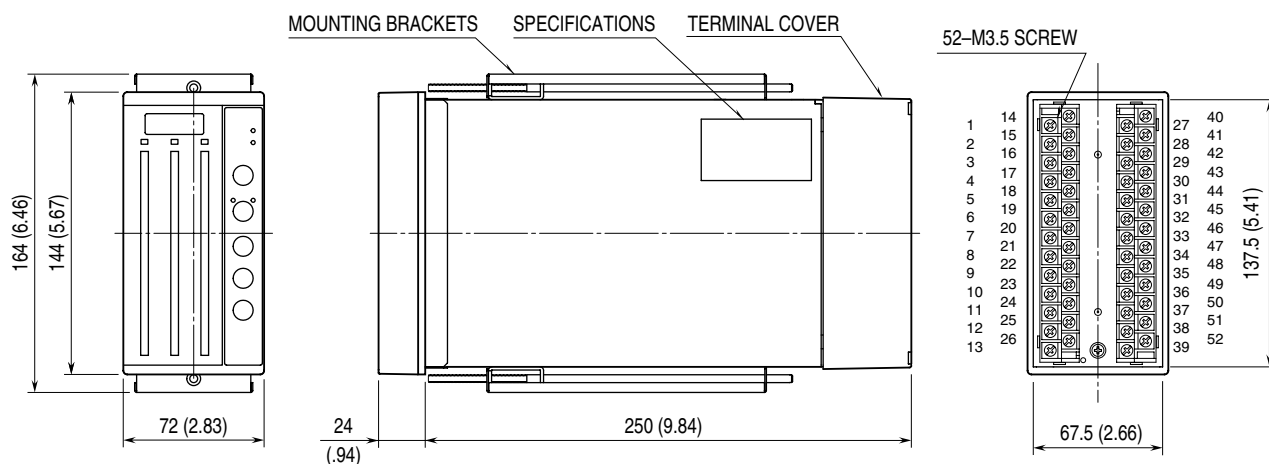
- We recommend use of an UPS to supply power backups.
- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.
- With voltage output, do not leave the output terminals shortcircuited for a long time. The unit is designed to endure it without breakdown, however, it may shorten appropriate life duration.

COMPONENT IDENTIFICATION



1. Digital meter
2. PV indicator (turns on when the digital meter shows PV)
3. CAS indicator (turns on when the digital meter shows CAS)
4. MV indicator (turns on when the digital meter shows MV)
5. PV bargraph meter
6. CAS bargraph meter
7. MV bargraph meter
8. Retroactive time LED (RA)
9. Transition ramp rate LED (RR)
10. Input indication selector (IND)
11. CAS/MAN indicator LED
12. CAS/MAN selector (OUT)
13. Manual operation button (UP)
14. Acceleration button (FAST)
(Accelerates the operation by pressing simultaneously with UP or DOWN button)
15. Manual operation button (DOWN)

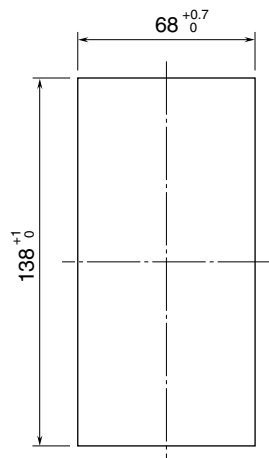
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



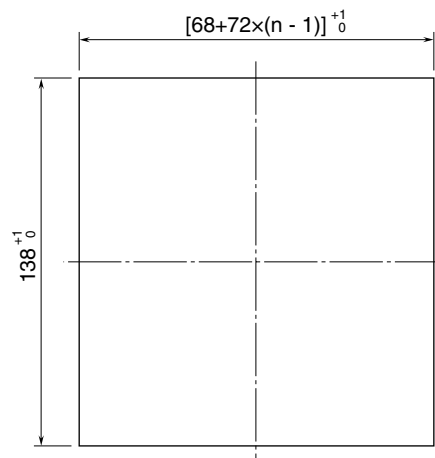
INSTALLATION

■ PANEL CUTOUT unit: mm

• Single mounting



• Clustered mounting



n = number of units

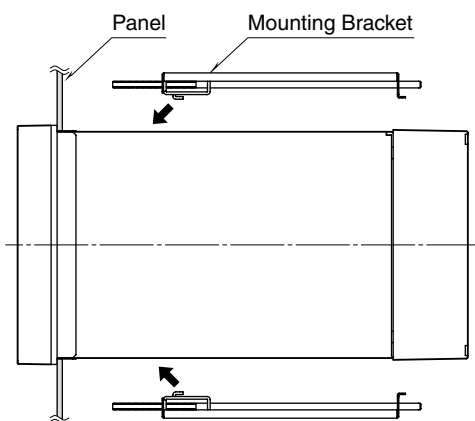
Panel thickness 2.3 – 20

■ CAUTION

- IP 55 is ensured for the front panel of the unit mounted independently to a panel. Test the sealing at the mounting surface once the device is installed.
- Set the unit on a vertical surface with its digital meter at the top side. Mounting in other directions may cause heat built up inside the unit and shorten its life or degrade its performance.
- Ensure that there is sufficient space for ventilation inside a panel. Do not install above the devices that generate high heat such as heaters, transformers or resistors. Observe at the minimum of 30 mm (1.2") in all directions for maintenance purpose (e.g. wiring, removing or installing).

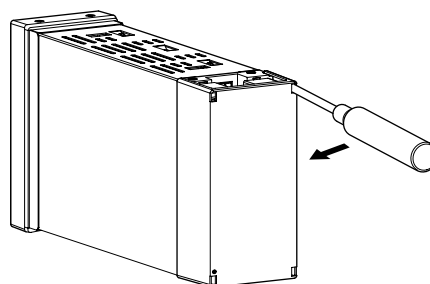
■ HOW TO MOUNT THE UNIT ON A PANEL

- 1) Remove both mounting brackets.
- 2) Detach the terminal cover and insert it first and then the module itself into the cutout hole. (The cover is slightly wider than the module.)
- 3) Put and slide the brackets back into the holes at the top and the bottom and tighten them until the module is firmly fixed.

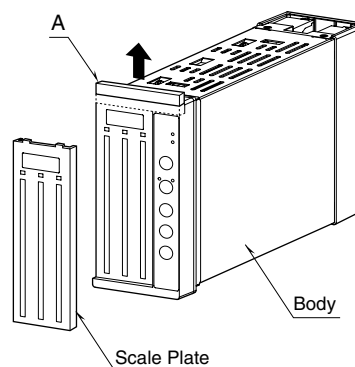


■ HOW TO REMOVE THE TERMINAL COVER

Insert the minus tip of a screwdriver into each hole at the four corners of the cover and pull it to the direction as indicated below to separate the terminal block cover.



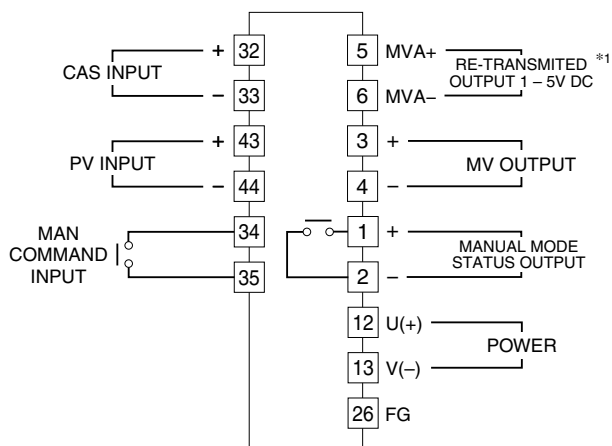
■ HOW TO REPLACE THE SCALE PLATE



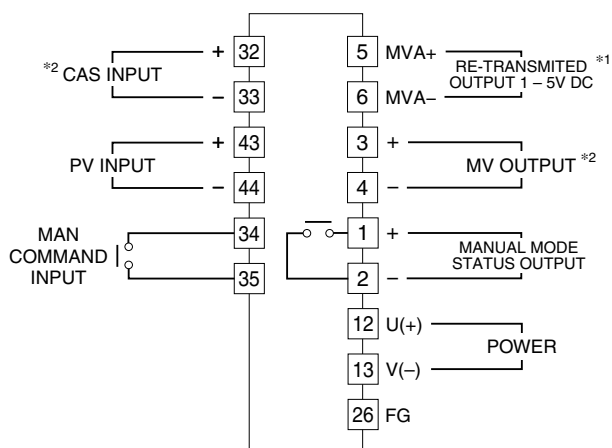
Pull up the part 'A' when replacing the scale plate.

CONNECTION DIAGRAM

• 'MV Output off at Power Down' option without 'CAS input'



• 'MV Output off at Power Down' option with 'CAS input'



*1. MV and re-transmitted output circuits are not included in this schematic circuit diagram. Do not close across Re-transmitted (MVA-) and MV output (-) terminals.

*2. Only available with 4 – 20 mA DC.

PREPARATION & WIRING TO THE UNIT

■ POWER SUPPLY

Confirm the power input rating marked on the product.

- 1) Remove the terminal cover.
- 2) Loosen three screws at the power supply terminals.
- 3) Connect power input and protective earth cables to them.
- 4) Replace the terminal cover.

■ I/O SIGNALS

Refer to the following example of connecting CAS input signal:

- 1) Turn off the power supply and remove the terminal cover.
- 2) Connect positive signal wire to the terminal +[32] and negative wire to -[33].
- 3) Replace the terminal cover.

Choose appropriate solderless terminals and wires:

Connection: M3.5 screw terminal (torque 1.0 N·m)

Screw terminal: Nickel-plated steel

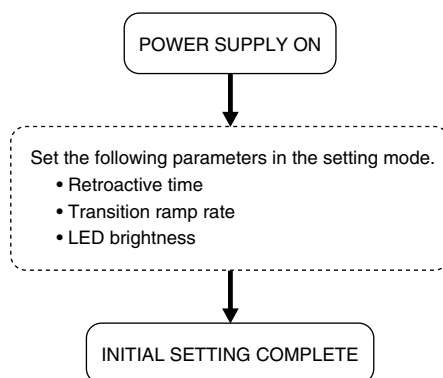
Recommended solderless terminal: R1.25-3.5

LIGHTNING SURGE PROTECTION

M-System offers a series of lightning surge protector for protection against induced lightning surges. Please contact M-System to choose appropriate models.

SETTING FLOWCHART

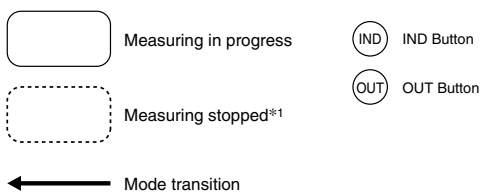
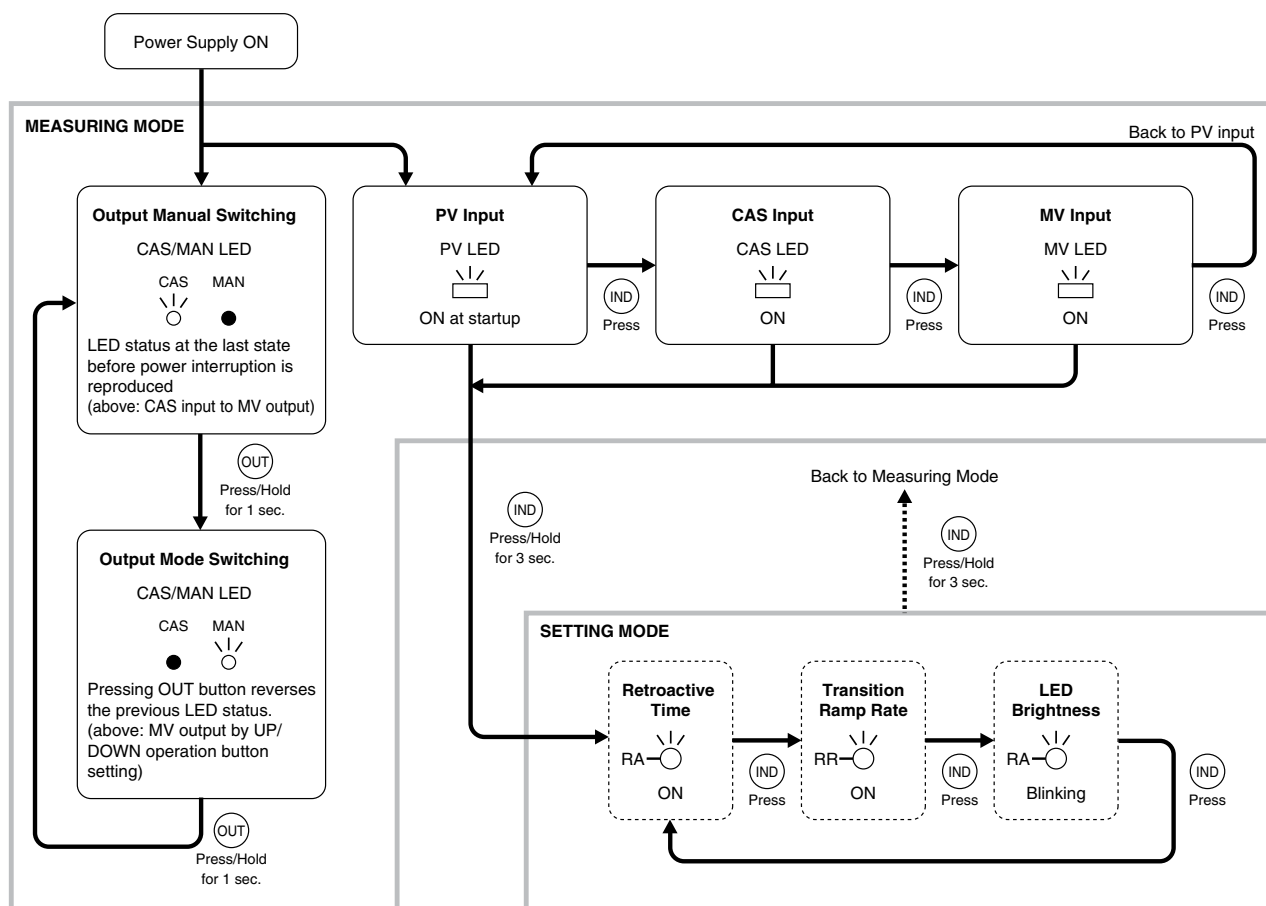
■ INITIAL SETTING FLOW CHART



■ SETTING MENU

When the power supply is turned on, the SM10 starts at the measuring mode.

Pressing and holding the indication selector button (IND button) for longer than 3 seconds turns the module into the setting mode.

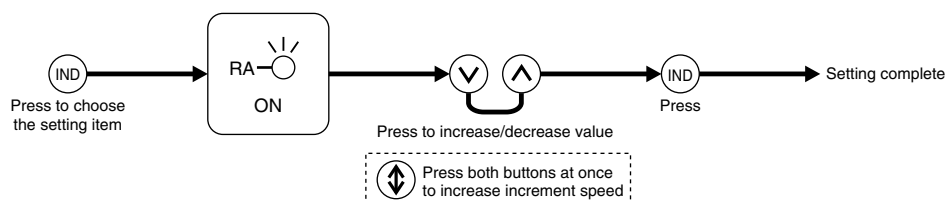


*1. Value before interruption is held.

SETTING MODE

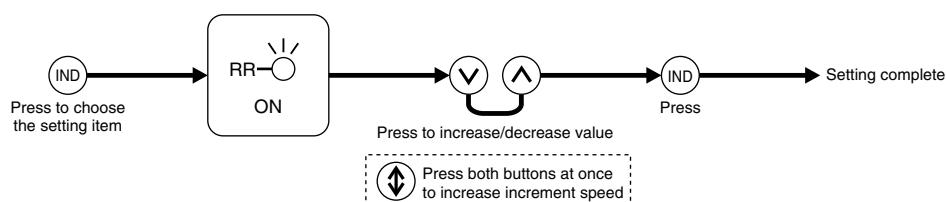
Press and hold IND button for longer than 3 seconds to enter Setting Mode. Various parameters can be adjusted in this mode.

■ RETROACTIVE TIME (range: 0 – 30 seconds)



- 1) Confirm that the unit is in the setting mode.
- 2) Press IND button one or more times to choose the LED RA turned on.
- 3) Use UP/DOWN button to set a desired value on the digital meter.
- 4) Press IND button to move on to the next item.

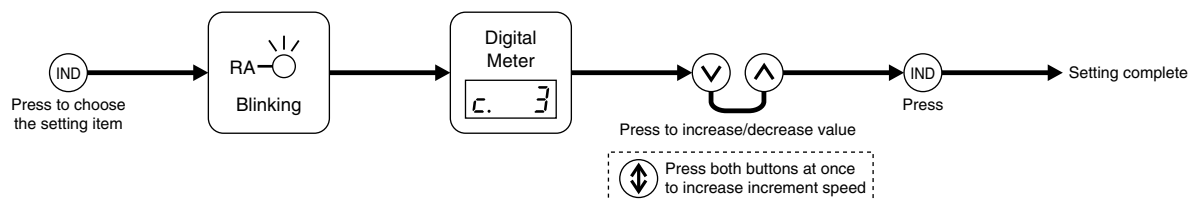
■ TRANSITION RAMP RATE (range: 0 – 30 seconds)



- 1) Confirm that the unit is in the setting mode.
- 2) Press IND button one or more times to choose the LED RR turned on.
- 3) Use UP/DOWN button to set a desired value on the digital meter.
- 4) Press IND button to move on to the next item.

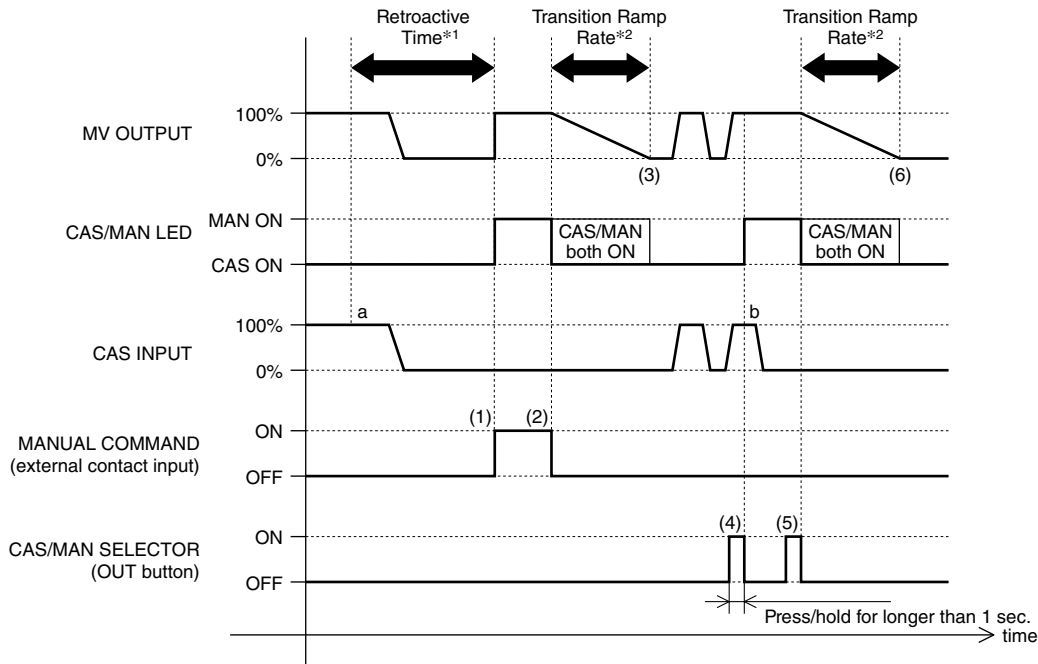
Refer to the next page for the definitions of Retroactive Time and Transition Ramp Rate.

■ LED BRIGHTNESS (range: 1, 2, 3)



- 1) Confirm that the unit is in the setting mode.
- 2) Press IND button one or more times to choose the LED RA in blinking state.
- 3) The digital meter shows the present setting.
- 4) Use UP/DOWN button to set a desired value on the digital meter.
- 5) Press IND button to move on to the next item.

• Definitions of Retroactive Time and Transition Ramp Rate



[Remotely Switching Output]

- (1) The device is turned into manual control mode when the manual command input (external contact) is turned on. MAN indicator is turned on and the MV output tracked down by the retroactive time setting (100% output at the point 'a' in the above example) is provided. Though the above example shows no manual control, the MV value can be changed to a desired value by manipulating UP/DOWN buttons during this period.
- (2) The manual control mode is cancelled when the manual command input is turned off. Both CAS and MAN indicators turn on and the MV output is matched gradually to CAS input in the transition ramp rate.
- (3) When the MV value reaches CAS value, MAN indicator turns off and only CAS indicator remains on.

[Manually Switching Output]

- (4) The device is turned into manual control mode when CAS/MAN selector (OUT button) is pressed and held for longer than 1 second. MAN indicator is turned on. The retroactive time setting is not applied in this operation, therefore the CAS value at the point of switching control (100% output at the point 'b' in the above example) is provided at the MV output. The MV can be also changed to a desired value by manipulating UP/DOWN buttons.
- (5) The manual control mode is cancelled when again OUT button is pressed and held for longer than 1 second. Both CAS and MAN indicators turn on and the MV output is matched gradually to CAS input in the transition ramp rate.
- (6) When the MV value reaches CAS value, MAN indicator turns off and only CAS indicator remains on.

*1. The retroactive time setting is applied only when the control is switched by the manual command input.

*2. When the control is switched to MAN mode (ON) and then back to CAS mode (OFF), the MV output changes gradually to match CAS input in the preset ramp rate (1 s/100% at default setting, selectable from 0 to 30 s/100%).

If the control is switched to MAN mode during the transition, the MV output value depends upon how it has been switched: MV value when it is switched manually by OUT button; CAS input value when it is switched remotely by the manual command input.

M-SYSTEM WARRANTY

M-System warrants such new M-System product which it manufactures to be free from defects in materials and workmanship during the 36-month period following the date that such product was originally purchased if such product has been used under normal operating conditions and properly maintained, M-System's sole liability, and purchaser's exclusive remedies, under this warranty are, at M-System's option, the repair, replacement or refund of the purchase price of any M-System product which is defective under the terms of this warranty. To submit a claim under this warranty, the purchaser must return, at its expense, the defective M-System product to the below address together with a copy of its original sales invoice.

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