

Autonics MEASURE COUNTER FM SERIES INSTRUCTION MANUAL



Thank you for choosing our Autonics product. Please read the following safety considerations before use.

Safety Considerations

- Please observe all safety considerations for safe and proper product operation to avoid hazards.
- Safety considerations are categorized as follows.
- Warning** Failure to follow these instructions may result in serious injury or death.
- Caution** Failure to follow these instructions may result in personal injury or product damage.
- The symbols used on the product and instruction manual represent the following:
 - ⚠ symbol represents caution due to special circumstances in which hazards may occur.

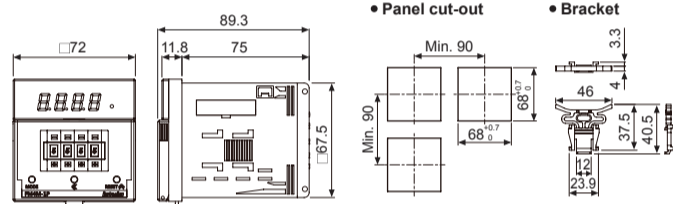
Warning

- Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss.** (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
- Failure to follow this instruction may result in personal injury, fire, or economic loss.**
- The unit must be installed on a device panel before use.**
- Failure to follow this instruction may result in electric shock.**
- Do not connect, repair, or inspect the unit while connected to a power source.**
- Failure to follow this instruction may result in electric shock.**
- Do not disassemble or modify the unit. Please contact us if necessary.**
- Failure to follow this instruction may result in electric shock or fire.**

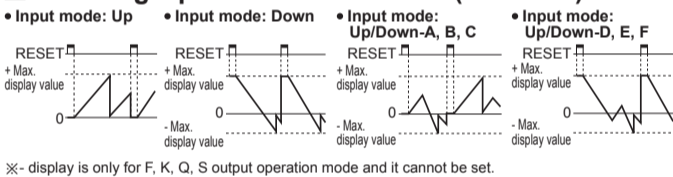
Caution

- Do not use the unit outdoors.**
- Failure to follow this instruction may result in shortening the life cycle of the unit, or electric shock.**
- When connecting the power input or relay output cables, make sure to use AWG 20 (0.50mm²) cables and make sure to tighten the terminal screw bolt above 0.74 to 0.90N·m.**
- Failure to follow this instruction may result in fire due to contact failure.**
- Use the unit within the rated specifications.**
- Failure to follow this instruction may result in shortening the life cycle of the unit, or fire.**
- Do not use water or oil-based detergent when cleaning the unit. Use dry cloth to clean the unit.**
- Failure to follow these instructions may result in electric shock or fire.**
- Do not use the unit where flammable or explosive gas, humidity, direct sunlight, radiant heat, vibration, and impact may be present.**
- Failure to follow this instruction may result in fire or explosion.**
- Keep dust and wire residue from flowing into the unit.**
- Failure to follow this instruction may result in fire or product malfunction.**

Dimensions



Counting Operation for Indicator (FM-M-14)



Input Operation Mode

Input mode	Voltage input (PNP) method	No-voltage input (NPN) method
Up/Down-A command input [Ud-A]		
Up/Down-B individual input [Ud-B]		
Up/Down-C phase difference input [Ud-C]		
Up adding input [UP]		
Up/Down-D command input [Ud-D]		
Up/Down-E individual input [Ud-E]		
Up/Down-F phase difference input [Ud-F]		
Down subtracting input [dn]		

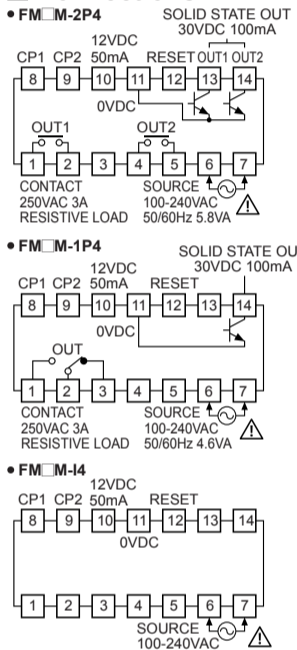
※A: over min. signal width, B: over than 1/2 of min. signal width. If the signal is smaller than these width, it may cause counting error (±1).
 ※The above specifications are subject to change and some models may be discontinued without notice.

Specifications

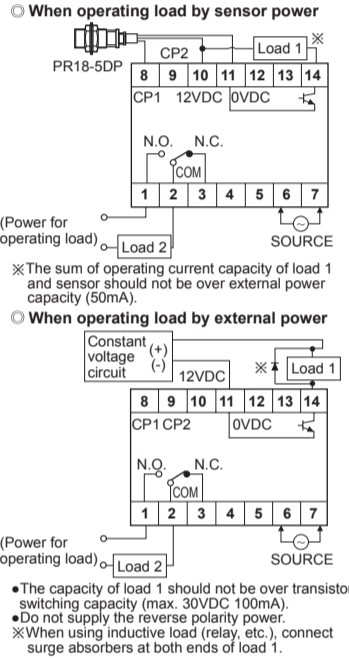
Model	1-stage setting 2-stage setting Indicator	FM4M-1P4 FM4M-2P4 FM4M-14	FM6M-1P4 FM6M-2P4 FM6M-14
Display digit	4-digit	4-digit	6-digit
Character size (W×H)	6×10mm	6×10mm	4×8mm
Power supply	100-240VAC-50/60Hz		
Permissible voltage range	90 to 110% of rated voltage		
Power consumption	●1-stage: max. 4.6VA ●2-stage: max. 5.8VA ●Indicator: max. 3.8VA		
Max. counting speed of CP1/CP2	Selectable 1cps/30cps/300cps/2kcps/5kcps		
Return time	Max. 500ms		
Min. signal width	RESET: approx. 20ms		
Input method	Selectable voltage input (PNP) method or no-voltage input (NPN) method [Voltage input (PNP) method]-input impedance: max. 10.8kΩ, [H]: 5-30VDC-, [L]: 0-2VDC [No-voltage input (NPN) method]-short-circuit impedance: max. 470Ω, short-circuit residual voltage: max. 1VDC, open-circuit impedance: min. 100kΩ		
One-shot output time	0.01 to 99.99 sec		
Control output	Contact Type Capacity Solid state Type Capacity	●1-stage: Instantaneous SPDT (1c) ●2-stage: OUT1-Instantaneous SPST (1a), OUT2-Instantaneous SPST (1a) ●1-stage: 1 NPN open collector ●2-stage: OUT1-1 NPN open collector, OUT2-1 NPN open collector NPN open collector output Load voltage: max. 30VDC- Residual voltage: max. 1VDC- Load current: max. 100mA	
Relay life cycle	Mechanical	Min. 10,000,000 operations	
Insulation resistance	Electrical	Min. 100,000 operations (250VAC 3A resistive load) Over 100MΩ (at 500VDC megger)	
External power supply	Mechanical	Max. 12VDC±10% 50mA	
Memory retention	Electrical	Approx. 10 years (non-volatile memory)	
Dielectric strength	Mechanical	2,000VAC 50/60Hz for 1 min (between all terminals and case)	
Noise immunity	Electrical	±2kV the square wave noise (pulse width 1μs) by noise simulator 0.75mm amplitude at frequency 10 to 55Hz (for 1 min) in each X, Y, Z direction for 1 hour	
Vibration	Mechanical	0.5mm amplitude at frequency 10 to 55Hz (for 1 min) in each X, Y, Z direction for 10 minutes	
Shock	Mechanical	300m/s ² (approx. 30G) in each X, Y, Z direction for 3 times 100m/s ² (approx. 10G) in each X, Y, Z direction for 3 times	
Environment	Ambient temp.	-10 to 55°C, storage: -25 to 65°C	
Protection structure	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH	
Approval	Protection structure	IP20 (front part, IEC standard)	
Weight	Approval	CE, RoHS	
Indicator	1-stage setting	Approx. 245g (approx. 180g)	
	2-stage setting	Approx. 265g (approx. 200g)	
	Indicator	Approx. 225g (approx. 160g)	

※1: The weight includes packaging. The weight in parenthesis is for unit only.
 ※Environment resistance is rated at no freezing or condensation.

Connections



Example of Input/Output Connection

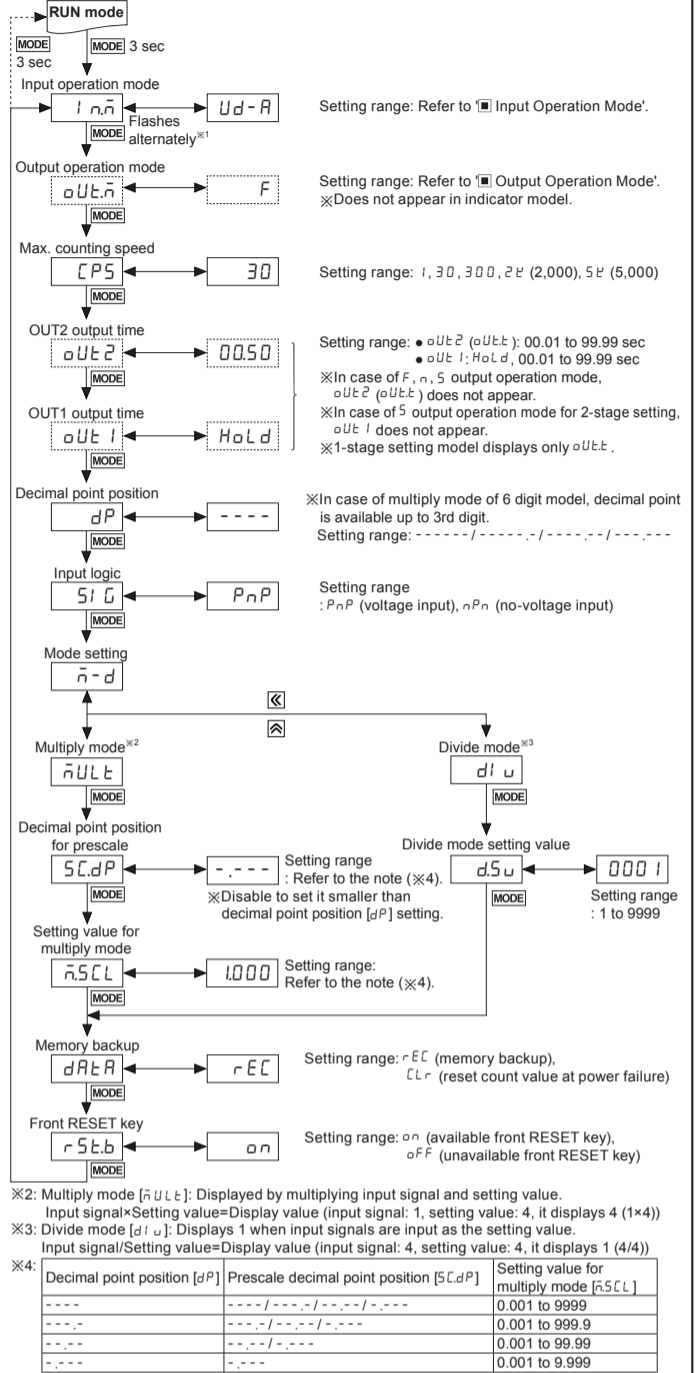


Output Operation Mode

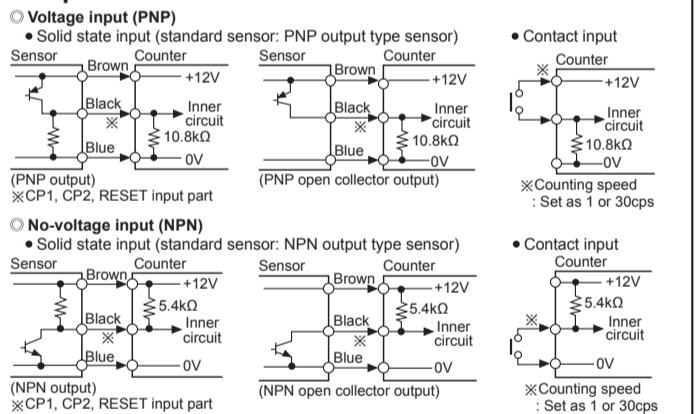
Output mode	Input mode	Operation
One-shot output of OUT2 (0.01 to 99.99 sec)	Up, Up/Down-A, B, C	After count-up, counting display value increases or decreases until reset signal input is applied and self-holding output is maintained.
	Down, Up/Down-D, E, F	After count-up, counting display value is reset and self-holding output of OUT1 turns OFF after one-shot output time of OUT2.
One-shot output of OUT1 (0.01 to 99.99 sec)	Up, Up/Down-A, B, C	After count-up, counting display value is reset after one-shot output time of OUT2 and it counts simultaneously. Self-holding output of OUT1 turns OFF after one-shot output time of OUT2.
	Down, Up/Down-D, E, F	After count-up, counting display value is reset after one-shot output time of OUT2 and it counts simultaneously. Self-holding output of OUT1 turns OFF after one-shot output time of OUT2.
Self-holding output	Up, Up/Down-A, B, C	After count-up, counting display value is reset after one-shot output time of OUT2 and it counts simultaneously. Self-holding output of OUT1 turns OFF after one-shot output time of OUT2.
	Down, Up/Down-D, E, F	After count-up, counting display value is reset after one-shot output time of OUT2 and it counts simultaneously. Self-holding output of OUT1 turns OFF after one-shot output time of OUT2.

Parameter Setting

- Hold the **MODE** key for 3 sec to save the setting value and return to RUN mode after changing the setting value.
- If there is no key input for 60 sec while setting the parameters, the new settings are ignored, and the unit returns to RUN mode with previous settings.
- Press the **MODE** key to select or set the desired value. Press the **MODE** key once after changing the setting value, to save the setting value and move to the next parameter.
- The dotted line parameters may not appear depending on output specifications or other parameter settings.
- ※1: Each parameter and corresponding setting value will flash alternately every 0.5 sec.



Input Connection



Factory Default

Parameter	Default	Parameter	Default	Parameter	Default	Parameter	Default
i nā	Ud-A	oUt 2	0.050	Si G	P n P	n5CL	1000
oUt ā	F	oUt 1	HoLd	n-d	nULt	dRtR	rEC
CPS	30	dP	---	5CdP	---	r5t.b	oFF

Cautions During Use

- Error**

Display	Error	Troubleshooting
Err0	Setting value is 0.	Change the setting value anything but 0.

 - If error occurs, the output turns OFF.
 - In case of 2-stage setting model, error displays when 2nd setting value is 0 (zero).
 - 1st setting value is set as 0 (zero), OUT1 maintains OFF.
 - 2nd setting value is smaller than 1st setting value, 1st setting value is ignored and only OUT2 output operates.
 - Indicator model does not have error display function.
- Power**
 - The inner circuit voltage rises within 100ms after supplying the power to the unit.
 - The input may be unavailable at this period.
 - Be sure that the inner circuit voltage drops within 500ms after turning OFF the power.
 - Use the unit within the rated power supply.
 - When supplying or cutting the power, use a switch not to occur chattering.
- Input signal line**
 - Shorten the cable from the sensor to the unit.
 - Use shield cable when input cable is longer.
 - Wire the input signal line separately from power line.
- Testing dielectric voltage or insulation resistance when the unit is installed at control panel**
 - Isolate the unit from the circuit of control panel.
 - Short all terminals of the unit.
- Do not use the unit in the following environments.**
 - Environments with high vibration or shock.
 - Environments with strong alkali or strong acid materials.
 - Environments with exposure to direct sunlight.
 - Near machinery which produces strong magnetic force or electric noise.
- This product may be used in the following environments.**
 - Indoor
 - Pollution degree 2
 - Altitude max. 2,000m
 - Installation category II

Major Products

- Photoelectric Sensors
- Fiber Optic Sensors
- Door Sensors
- Door Slide Sensors
- Area Sensors
- Proximity Sensors
- Pressure Sensors
- Rotary Encoders
- Connector/Sockets
- Switching Mode Power Supplies
- Control Switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper Motors/Drivers/Motion Controllers
- Graphic/Logic Panels
- Field Network Devices
- Laser Marking System (Fiber, Co., Nd: YAG)
- Laser Welding/Cutting System
- Temperature Controllers
- Temperature/Humidity Transducers
- SSR/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometer/Pulse (Rate) Meters
- Display Units
- Sensor Controllers
- Surplus

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