
Flow Monitor

FM-01

User's Manual

**Please read this User's Manual carefully before use.
Operating the pump incorrectly in disregard of these instructions
may lead to death, injury and/or cause property damage.**

Applicable Models

FM-01

- Thank you for purchasing this TACMINA product. Please read this User's Manual carefully in order to ensure that you will use the product safely and correctly.
- Be sure to keep this User's Manual in a place where it will be easily available for reference.
- If the product you purchased conforms to special specifications not described in this User's Manual, handle the product according to details of separate meetings, drawings and approved documents.
- Additional information on this product and manuals in other languages may be found on our website.

For the Safe Use of This Product

This manual is intended to help the operator to handle the product safely and correctly. In support of this aim, important safety-related instructions are classified as explained below.

Be sure to follow them at all times.



Warning

- If the product is operated incorrectly in contravention of this instruction, it is possible that an accident resulting in death of serious injury will occur.



Caution

- This indicates that improper operation can result in an injury or physical damage to the product.

Important

- This indicates information that should always be followed to maximize the product's performance and service life.

Operating conditions



Caution

- Do not use the product outside the following usage ranges. Doing so may cause malfunctions.

Ambient temperature	0 to 45°C
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Checking the Product

When unpacking, please confirm the following items:

- Is the enclosed product the same model you ordered?
- Do the details on the Flow Checker nameplate match your order?
- Are all the accessories present and correct?
- Please refer to the accessory list below.
- Can you detect any damage due to vibration or shock during transportation?
- Are there any loose or disconnected screws?

All TACMINA products are carefully checked prior to shipment. If, however, you find a defect, please contact your supplying agent.

■ Accessory list

Model	
Accessory	FM-01
User's Manual	1

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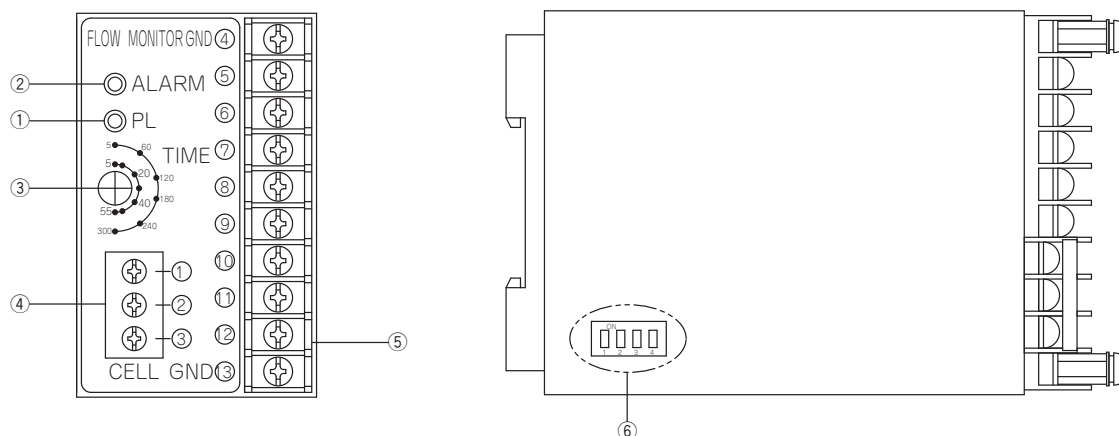
Explanation of Product

The Flow Monitor is a discharge volume alarm annunciator for metering pumps, and is used in combination with a Flow Checker.

This sensor monitors abnormal discharge from the metering pump by outputting an alarm when the discharge signal does not arrive within the specified time interval during pump operation.

Names of Parts

- ① Power/input indicator (PL)
This indicator lights when the power is ON, and blinks when an input signal is input.
- ② Alarm indicator (ALARM)
This indicator lights when an alarm is output.
- ③ Time setting knob (TIME)
This knob is for setting the alarm time. The time can be set within the range 5 to 55 seconds, or 5 to 300. (The factory setting of the range is 5 to 55 seconds. To change the range, turn on DIP switch SW1.)
- ④ Terminal block 1
This terminal block is for connecting the Flow Checker.
- ⑤ Terminal block 2
This terminal block is for connecting the power supply, alarm contacts and interlock (pump interlock signal).

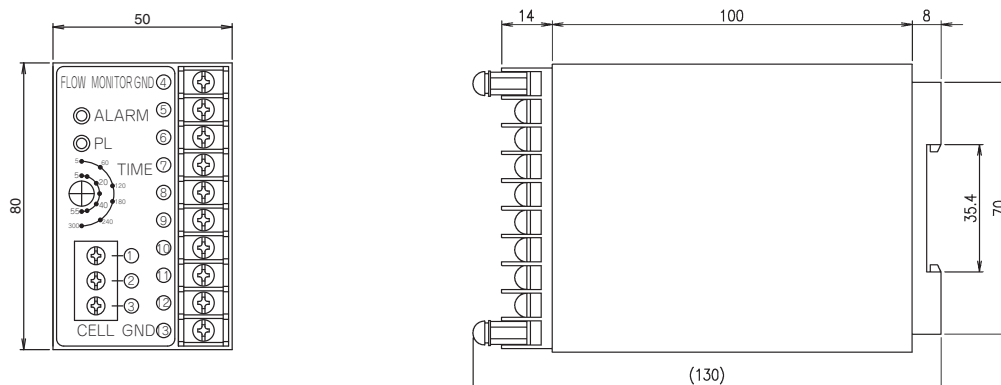


Specifications

■ Performance Specifications

Model	FM-01	
Set time	5 to 55 seconds or 5 to 300 seconds	
Input	Sensor input Interlock	Open collector (Flow Checker signal, 1 mL/Pulse) No-voltage contact
Sensor power supply	12 VDC 30 mA	
Alarm	Output contact 1C	
Contact capacity	200 VAC 1 A (resistance load)	
Display	Power/input pulse Alarm	Green LED indicator lights. Red LED indicator lights.
Power supply	100/200 VAC 10±% (selected on terminal)	
Power consumption	Approx. 5 VA	
Installation	DIN rail mounted type (for enclosing in box)	

■ External dimensions

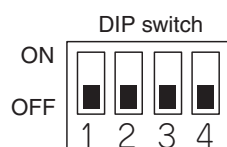


Installation

The Flow Checker is mounted on a DIN rail.

DIP switch settings

DIP switch is on the right side of the main unit. If needed, you can change the settings.



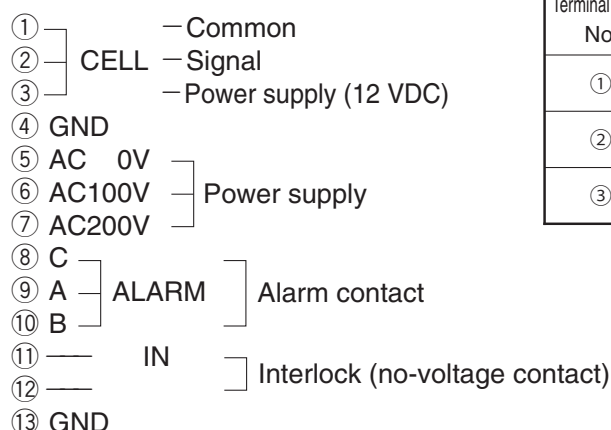
SW	Details	OFF (default)	ON
SW1	Alarm generation time	5 to 55 seconds	5 to 300 seconds
SW2	Sensor	For flow checker	For photoelectric sensor
SW3	Input pulse polarity	OFF only	
SW4	Interlock polarity	Working when closed	Working when opened

Electrical Wiring

Wire correctly referring to the following diagram and paying attention to the following points:

- ① Connect the power supply ground to the GND terminal.
Be sure to connect to a different system from the motor power ground.
- ② Connect the shield of the input signal lead to the No.1 terminal.
- ③ Wire the input signal lead in a separate duct from the motor power leads. Limit the wiring distance between the Flow Monitor and the Flow Checker to 50 m.
Use 3-core shielded cable (of cross-sectional area 0.75 mm² or more) for the extension cable.
- ④ The alarm functions only when the interlock (no-voltage contact) is connected.

Flow Monitor terminal



Terminal block No.	Flow checker lead	Photoelectric sensor lead
①	black	blue
②	white	black
③	red	brown

- Limit the transfer distance to 50 m.

Setting the Alarm

■ How to set the alarm

When setting the alarm operation time, provide a sufficient margin as indicated in the following example:

[Setting example] Outputting an alarm when the sensor does not output discharge signal for at least 10 seconds.

Set time = 10 seconds x 1.5 (degree of margin) = 15 seconds.

[Setting range]

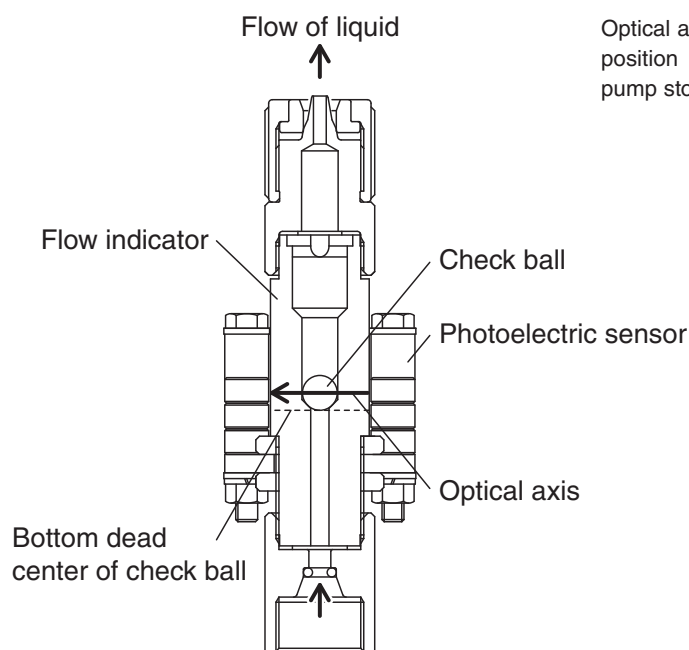
Set time	
DIP switch SW1 OFF	DIP switch SW1 ON
5 to 55 seconds	5 to 300 seconds

Note

- Set the time adjusting knob (TIME) in the vicinity of "15" using a miniature screwdriver or similar tool.
- Turning the knob clockwise increases the set time.
- * This knob is a simple type. Do not exert strong force when turning the knob.

Connecting to Photoelectric Sensor

Installing photoelectric sensor



Optical axis of photoelectric sensor should be set at the position where check ball shields the light when the pump stops.

Connecting leads to Flow Monitor

Flow Monitor terminal

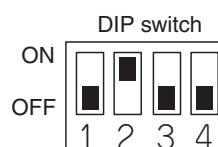
- ① — Common
- ② — CELL — Signal
- ③ — Power supply (12 VDC)
- ④ GND
- ⑤ AC 0V
- ⑥ AC100V
- ⑦ AC200V
- ⑧ C
- ⑨ A — ALARM
- ⑩ B — Alarm contact
- ⑪ — IN
- ⑫ — Interlock (no-voltage contact)
- ⑬ GND

Terminal block No.	Photoelectric sensor lead
①	blue
②	black
③	brown

- Limit the transfer distance to 50 m.

DIP switch settings

Turn on SW2.



After-sales Services

If any aspects of the terms and conditions of the after-sales service applying to the repairs to be provided during the warranty period and other such matters are not clear, consult your vendor or a TACMINA representative.

Warranty

- (1) The warranty period shall be one year from the date of dispatch from TACMINA's factory.
- (2) If, during the warranty period, the product sustains malfunctions or damages as a result of design, manufacturing, or material defect, or if the product does not meet its specifications, TACMINA will arrange for repairs, provide replacement components, or replace the product, at TACMINA's discretion, at no charge to the customer. However, this warranty only covers direct damage to the product. Any consequential losses or damages, including, but not limited to, profit losses and any secondary damages, caused by malfunctions, breakage, or impaired performance of this product shall not be covered by this warranty. The limitation of TACMINA's liability shall not exceed the sales value of the defective product.
- (3) If a malfunction or damage is found, notice shall be given to distributor or TACMINA with documents that prove the malfunction or damage is caused by improper design, manufacturing failure or material defect within 14 days after awareness of such malfunction or damage. If the distributor or TACMINA does not receive such notice within aforementioned period, even though the warranty period is still in effect, TACMINA shall not be liable for any malfunction and damage.
Please note that TACMINA may request to give further information or to return the product for investigation. If the cause is attributable to TACMINA's action, the shipping fees, cost of investigation and checks performed by TACMINA shall be borne by TACMINA.
- (4) Even in the warranty period, the cost of repairs in the following conditions shall be paid to the distributor or TACMINA.
 - 1) Damages and deterioration of consumables.
 - 2) Damages or malfunctions of the warranted product caused by carelessness in handling or incorrect use.
 - 3) Damages or malfunctions of the warranted product caused by the failure to perform maintenance such as periodic inspections and repairs and replacements of consumables.
 - 4) Damages or malfunctions of the warranted product caused by falls or impacts.
 - 5) Damages or malfunctions of the warranted product resulting from the use of parts other than the ones supplied by TACMINA.
 - 6) Damages or malfunctions of the warranted product resulting from product repairs or remodeling undertaken by individuals other than TACMINA employees or personnel of businesses authorized by TACMINA.

- 7) Damages or malfunctions of the warranted product resulting from fires, natural disasters, geological calamities, and force majeure.
- 8) Damages or malfunctions of the warranted product resulting from loose bolts or nuts or from defective hose connections.
- 9) Discoloration, deterioration, damages, or malfunctions of the warranted product resulting from ultraviolet rays, corrosive gases, or flooding.
- 10) Damages or malfunctions of the warranted product resulting from corrosion, swelling, or melting caused by the adhesion or chemical effect of the used liquid.
- 11) Damages or malfunctions of the warranted product resulting from damages to products other than those made by TACMINA.
- 12) Damages or malfunctions of the warranted product resulting from usage outside of the range of the usage conditions listed in the operation manual.
- (5) The judgment of damages, malfunctions, and impaired performance as well as the judgment of whether the cause is the design of the product and product defects shall be performed by TACMINA's technical department.

Repair

■Before requesting repairs

Please read this operation manual carefully and inspect the product again.

■Who to request repairs from

Ask your vendor to take care of the repairs. If you are not sure of who your vendor is, contact TACMINA.

■Precautions when sending the product for repairs

Be sure to observe the following items to protect worker safety and to protect the environment:

- If any chemicals have affixed to the product, wash it clean.
- Attach the safety data sheet (SDS) to the product.
- If a "maintenance data" page is present at the end of the operation manual, fill in this page and attach it to the product.
- * The product may not be repaired if the necessary materials are not attached.
- * Even when the necessary materials are attached, TACMINA may send the product back if it is determined that repairing the product will constitute risks or dangers.

■Minimum retention period for consumables

TACMINA will continue to supply consumables for its pumps for a period of eight (8) years after the manufacture of the pumps has been discontinued.

TACMINA CORPORATION

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Product designs and specifications are subject to change without notice for product improvement.

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