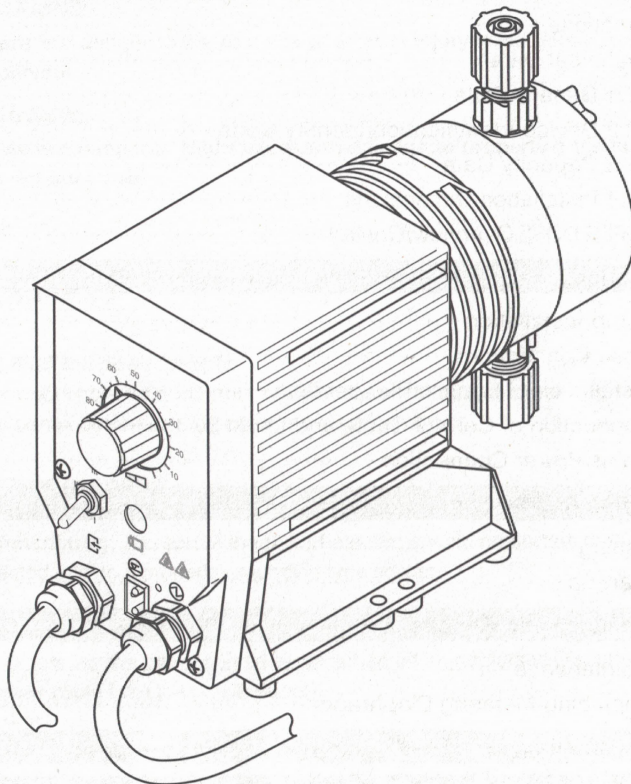


Operation Manual
Metering Pump
ProMinent® SUPER DOSE

ProMinent®



Please read through these operating manual first!
Do not discard! The warranty shall be invalidated for any
damage caused by operating no following this manual!

ProMinent Fluid Controls (Thailand) Co., Ltd.

Table of Contents

User Information	1
Safety Notes	1
1 Product Description	3
1.1 Functions	3
1.2 Technical Data	3
1.2.1 General Data	3
1.2.2 Device Identification/Identity Code	4
1.2.3 Capacity Data	5
1.2.4 Installation Dimensions	5
1.3 SUPER DOSE Overview/Control	6
2 Installation	6
2.1 Pump Installation	7
2.2 Hose Connections	7
2.3 Installation of Bypass Bleeder Line	7
2.4 Connection of Control Cable and Level Switch	7
2.5 Mains Power Connection	8
3 Operating and Setting	8
3.1 Setting	8
3.2 Start-up	9
4 Maintenance and Repairs	9
4.1 Maintenance	9
4.2 Replacing Metering Diaphragm	10
5 Troubleshooting	11
6 Spare Parts	12
Installation Instruction for nozzle and vent valve	13

User Information

Thank you for having selected SUPER DOSE type electromagnetic metering pumps. This manual will help you in handling, operating and troubleshooting for the pump. Please read this manual through before you handle the pump, to ensure it is operated safely and reliably.

Please familiarize yourself with the following designations and symbols:



WARNING:

There is a danger to life or a risk of serious injury if the notes on safety are not observed!



CAUTION:

There is a danger of slight injury and damage to property if the notes on safety are not observed!

Safety Notes



WARNING:

- Turn off the power supply.

Disconnect cable from the mains power supply before commencing work on the pump, otherwise may cause an electrical shock.



Electrical Shock

- Arrange grounding!

This pump is supplied with a grounding conductor and grounding-type attachment plug. To reduce the risk of electric shock, be certain that it is connected only to a properly grounding-type socket.



Electrical Shock

- Stop operating!

In emergencies the pump should be switched off immediately! Disconnect the power cable from the power supply!



Observe

- For specified application only.

It is forbidden to use a pump for any other purpose. The pump may be used only in compliance with the technical data and specifications given in the operating manual.



Prohibited

- No remodeling!

Do not modify the pump in any way or use parts which have not been tested and approved by ProMinent for assembly of ProMinent® metering pumps. This can result in damage to persons and property for which no liability will be accepted!



No Remodeling

- **Wear protective clothing**

Always wear protective clothing (goggles and gloves, etc.) when handling hazardous or unknown chemicals!



Wear Protectors



CAUTION:

- **Qualified operators only!**

The pump must not be operated by untrained and unauthorized personnel. Pump operators must have a sufficient knowledge of the pump and its operation.



Prohibited

- **Specified power only.**

It may result in damage or fire to use the power supply which doesn't correspond to the details device label! Only the specified power level is to be applied.



Prohibited

- **Do not run the pump dry.**

Do not run the pump dry (without liquid inside the pump). Otherwise heat generated by abrasion between elements inside the pump may damage the pump.



Prohibited

- **Ventilate!**

Dosing toxic or odorous media may result poisonings. Ensure the operating site with good ventilation.



Caution

- **Follow the instruction manual.**

Replace the wear parts according to the descriptions in the instruction manual. Do not disassemble any part which is not regarded as wear parts in the spare parts.



Observe

- **Limited operating site and storage.**

Do not install or store the pump in the following places:

Places where a flammable gas or material is used or stored.

Places where the ambient temperature is extremely high (45°C or higher) or extremely low (-10°C or lower).



Prohibited

- **Disposal of used pump**

For disposal of used or damaged pumps, please observe all locally applicable directives! (Consult a licensed industrial waste products disposing company.)



Observe

1 Product Description

1.1 Functions

The ProMinent® SUPER DOSE is a microprocessor-controlled short-stroke solenoid-operated diaphragm-type metering pump for metering liquid, non-combustible media.

Metering is based on a pulsating action. For each pulse coming from the electronic control, the solenoid energizes and completes a stroke. The diaphragm, stabilized by a steel core, displaces the medium in the liquid end, the balls on the intake side are pressed against their seat while the balls on the delivery side open, thus releasing the medium for metering. The solenoid is deactivated on completion of the stroke and returned to its initial position by a spring. In so doing, the valve on the delivery end closes while the valve on the intake side opens so as to draw medium into the liquid end. The safety diaphragm protects the leadthrough in the housing from dust and moisture.

The solenoid-operated, diaphragm-type metering pump covers a capacity range from approx. 0.7 l/h to 23 l/h (liter specifications at max. stroke length and max. stroke rate) at a max. back pressure of 1.5 bar to 16 bar. The recommended stroke length range, which will practically guarantee metering accuracy, is 30%–100%

The delivery capacity can be adjusted on the basis of the stroke length by means of a rotary knob and the stroke rate by means of a switch. The various operating statuses are indicated by an LED for operation and empty/fault signal.

The pump features a connection facility for a single-stage level switch.

1.2 Technical Data

1.2.1 General Data

Version	Fixed voltage	Universal voltage
power supply	220V ± 10%, 50/60Hz	100–230V, 50/60Hz
Power rating, approx	6–18 W	10–18 W
Current	0.1 ... 0.25A	0.2 ... 0.7A
Fuse	0.5A	0.8 AT
External control –pulse	Voltage with open contacts	5 V
	Minimum pulse duration	20 ms
External control –analog	4–20 mA	
Protection level	IP 65	
Ambient temperature in operation	–10 ... +45 °C	
Metering deviations	All material versions –10% ... +15%	
Metering reproducibility	± 2% (under constant conditions, stroke length > 30%)	

1.2.2 Device Identification/Identity Code

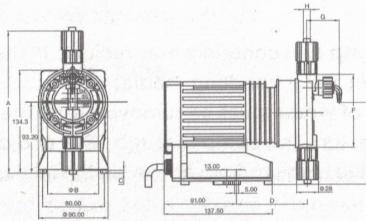
SD	Pump model example: SD 1600PP1000A000		
	Digits 1 & 2 = backpressure(bar), Digits 3 & 4 = pump's capacity (l/h)		
1600	1601	1602	1603
1001	1002	1003	
0703	0803	0806	
0306	0308	0313	
0212	0215	0223	
Dosing head / Sealing gaskets material			
PP1	PP / EPDM seal		
PP2	PP / FPM seal		
Valve spring			
0	Without valve spring		
1	With valve springs		
Hydraulic connection			
0	Standard connection		
Logo			
0	With ProMinent logo		
Electrical connection			
A	AC220V10%, 50/60Hz 1ph, 2m power cable, Standard European plug		
C	AC220V10%, 50/60Hz 1ph, 2m power cable, Standard Chinese plug		
D	AC220V10%, 50/60Hz 1ph, 2m power cable, without plug		
E	AC90-250V 50/60Hz 1ph, 2m power cable, without plug		
F	AC90-250V 50/60Hz 1ph, 2m power cable, Standard Chinese plug		
U	AC90-250V 50/60Hz 1ph, 2m power cable, Standard European plug		
Control type			
0	Three optional fixed frequencies: 100%*50%*25%		
1	Two optional fixed frequencies(100%, 50%) + external pulse		
2	Two optional fixed frequencies(100%*50%) + external analogue (4-20mA)		
Relay			
0	Without relay		
Accessories			
0	Without accessories		
1	With 1/2" injection and foot valve		
2	With 1/2" injection and foot valve, 2m PVC suction hose, 5m PE discharge hose		
*3	With 2m control cable		
4	Options 1 + 3		
5	Options 2 + 3		
*6	With 5m control cable		
7	Options 1 + 6		
8	Options 2 + 6		
*9	With 10m control cable		
A	Options 1 + 9		
B	Options 2 + 9		
<p>Remark: Accessories option 3 or 6 or 9 is necessary when selecting control type 1 & 2.</p>			

1.2.3 Capacity Data

Type	Pressure				Type	Pressure				Type	Pressure				Connection	Perm. Admiss. Pressure	Shipping weight
	bar	l/h	ml/stroke	strokes/min		bar	l/h	ml/stroke	strokes/min		bar	l/h	ml/stroke	strokes/min			
1600	16	0.72	0.20	60	1601	16	1.14	0.20	90	1602	16	1.44	0.20	120	6×4	8	2.36
										1603	16	2.10	0.20	180	6×4	8	2.36
1001	10	2.28	0.42	90	1002	10	3.12	0.43	120	1003	10	4.68	0.43	180	8×5	3	2.4
0703	7	3.6	0.66	90	0803	8	4.8	0.66	120	0806	8	7.2	0.66	180	8×5	3	2.4
0306	3	6.3	1.166	90	0308	3	8.7	1.208	120	0313	3	13.8	1.27	180	8×5	1.5	2.4
0212	1.5	12	2.22	90	0215	1.5	16.5	2.29	120	0223	1.5	24	2.22	180	12×9	0.8	2.5

Output range: [-10% — +15%]

1.2.4 Installation Dimensions

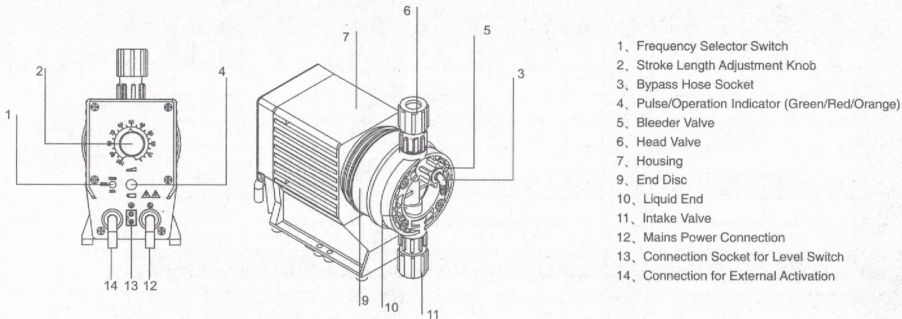


SD 02, 03, 08, 10, 16 Type PP Liquid End

Measurements in mm

Type	A	B	C	D	E	F	G	H
0212 0215 0223	185	Φ 66	4	92	107	95	42	12 × 9
0306 0308 0313	183	Φ 66	6.5	86.5	105.5	90	47	8 × 5
0703 0803 0806	183	Φ 66	6.5	86.5	104.5	90	43.5	8 × 5
1001 1002 1003	183	Φ 66	6.5	84	105.5	90	47	8 × 5
1600 1601 1602 1603	177	Φ 50	16	84.5	97	73	47	6 × 4

1.3 SUPER DOSE Overview/Control:



SD 02, 03, 08, 10, 16 Type PP and PVDF Liquid End

2 Installation



WARNING:

- The metering pump can contain water residue in the liquid end as the result of testing at the factory! If handling media, which must not come in contact with water, all traces of water must be removed from the liquid end before start-up! For this purpose, turn the pump through 180° and drain off the liquid end then flush with a suitable medium from above via the intake connection.

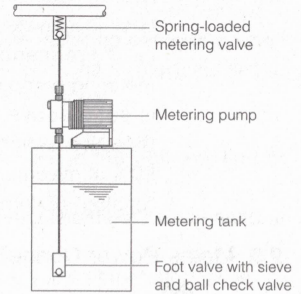


CAUTION:

- Pumps must be accessible at all times to facilitate operation and maintenance. Access points must not be obstructed or blocked!
- When operating the metering pump against a closed shutoff element on the delivery side, the resulting pressure buildup can reach a multiple of the maximum permissible backpressure! This can cause the delivery line to burst! To avoid this, it is advisable to install a ProMinent multifunction valve which limits the maximum pressure which can be reached!
- Only use the clamping rings and hose sockets intended for the relevant hose diameter as well as original hoses with the specified hose size and wall thickness otherwise the stability and durability of the connection will not be guaranteed!
Avoid reducing hose sizes!
The next higher line cross-section or a pulsation damper should be used for longer lines and high-viscosity media.

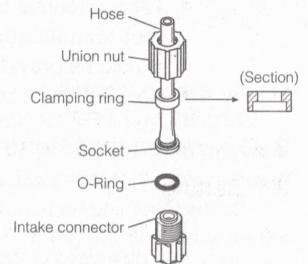
2.1 Pump Installation

- Mount metering pump on a tank or support bracket with bolts and U-washers ($\phi 5\text{mm}$).
- To ensure efficient operation, the valves of the liquid end must always be positioned vertically.
- Shorten intake lines such that the foot valve hangs approx. 10-30mm (approx. 50mm for heavily soiled metering solutions) over the bottom of the tank.
- Install delivery line and metering valve, pressure retention valve for free outlet.



2.2 Hose Connections

- Fit union nut and clamping ring over hose line.
- Push the hose end, cut at right angles, onto socket as far as it will go.
- Slightly widen hose end if necessary.
- Shorten hose end at right angles by approx. 10 mm for connecting several times.
- Press on hose and firmly tighten union nut.



2.3 Installation of Bypass Bleeder Line

Note: See section 1.3

- The bleeder valve (5) with bypass (3) is provided on the liquid end.
- Fit a hose on to bypass hose socket (3), preferably use 6 x 4 mm soft PVC.
- If PE lines are used, secure with a cable tie to prevent slipping.
- Insert free end of hose line in metering tank.
- Connect delivery line directly to delivery connection and metering valve.

2.4 Connection of Control Cable and Level Switch

- If applicable, connect level switch to connection socket (14) on the pump.
- For control type metering pump, control cable is connected to the pump (cable length is subject to order by Device Identification Code), please connect the cable to your control as follows:

Control mode \ Color	Brown	Blue	Black	Notes
4-20mA signal	External Lock Terminal	Analog Input(+)	Analog Input (-) and External Lock Terminal	External Lock Activated: Brown & Black shortage
External control signal	External Lock Terminal	Contact Input	Contact Input and External Lock Terminal	External Lock Inactive: Brown & Black breakdown

- External Lock Function provides safer dosing mode for customer: when External Lock is activated, the metering pump is controlled only by external control signal, i.e. if Frequency Selection Switch is switched to 100% or 50% positions, the metering pump won't stop, still respond to external control signal. If External Lock is set inactive, a required operation mode can be selected by Frequency Selection Switch: When switch to 100%, 50%, the pump will operate at 100% and 50% of maximum stroke frequency respectively, and when switch to "contact" or "analog" (External control), the metering pump will stop.

2.5 Mains Power Connection



WARNING:

- Take particular care to ensure that the mains voltage agrees with ratings on the type identification plate. A separate switching contact, e.g. relay or contactor should be provided for parallel connection with inductive loads.
- Connect mains power plug in the socket provided.

3 Operation and Setting

3.1 Setting

The stroke length is set by means of the stroke length setting knob (2) and the stroke rate by means of the frequency switch (1):

Setting 100%, 50% correspond to 100%, 50% of maximum stroke rate respectively; and setting 25 % corresponds to 25 % of maximum stroke rate or 0-100% stroke rate continuously adjustable for control type metering pump.

control type 3: setting 50% correspond to 100%, 50% of maximum stroke rate respectively; when setting pause, the pump will stop.

Control type	Setting position		
0	100%	50%	Standard: 25%
1	100%	50%	External: Contact
2	100%	50%	External: Analog
3	100%	50%	50%



CAUTION:

- For control type metering pump, when priming, if External Lock is inactive and External Lock is not reactivated after priming, then over dosing might occurs, this would be serious to some applications (such as disinfect drinking water with disinfectant containing chlorine).
- The stroke length should only be set with the pump in operation when the load on the metering stroke setting pin is relieved temporarily.

3.2 Start-up

- In order to prime the metering pump, as for control type metering pump and when External Lock is activated, if necessary, make External Lock inactivated, set stroke length knob (2) to 100% and stroke rate setting knob (1) to 100%.
- Open bleeder valve by approx. 1 turn.
- Allow pump to run until a little of the chemical is visible in the delivery line or emerges at the bleeder valve.
- On metering pumps without a bleeder valve, the delivery line must be released at the liquid end or a multifunction valve should be used.
- After priming, close bleeder valve (5) or resecure delivery line at metering valve.

4 Maintenance and Repairs



WARNING:

- Only qualified electricians are permitted to carry out electrical repairs (safety regulations of Employer's Liability Insurance Association: VBG 4 and ZH 1/11)!
- Disconnect power plug or power supply line before opening the pump! Isolate relay option if applicable! Check to ensure power is disconnected! Secure pump while carrying out repairs to ensure it cannot be switched on unintentionally!
- Always depressurize the delivery line first before carrying out any work on the pump! Always discharge and flush liquid end! Observe safety data sheets for metered liquid!



CAUTION:

- Before carrying out any maintenance and repair work always drain off and flush out the liquid end first if hazardous or unknown metered media are used! Observe data sheets of metered liquids!

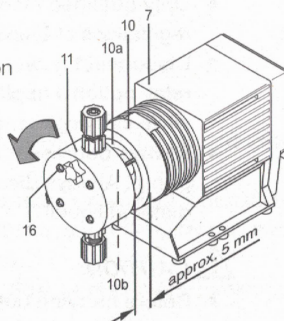
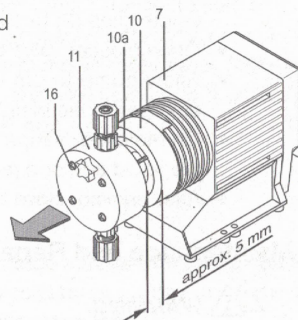
4.1 Maintenance

Maintenance of the SUPER DOSE metering pump is restricted to checking:

- The liquid end screws (firm fit)
- The delivery lines (firm fit)
- The head and intake valves (firm fit)
- The leakage hole at the end disc (moisture can indicate diaphragm failure)

4.2 Replacing Metering Diaphragm

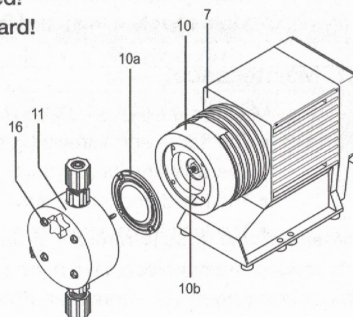
- With pump in operation, set stroke length to "0" with rotary knob (2).
- Release screws (16).
- Pull liquid end (11) together with screws out of end disc (10) and pump housing (7) (approx. 5 mm) until the screws no longer offer any resistance when turning the liquid end.
- Hold housing (7) in the left hand and release diaphragm (10a) with the right hand by lightly jolting liquid end (11) together with end disc (10) in counterclockwise direction and release screws (16) from drive spindle (10b).
- Now pull liquid end together with screws out of diaphragm and unscrew the entire assembly from the drive spindle.
- Remove diaphragm (10a) from end disc (10).
- Screw on new diaphragm (10a) as far as it will go on drive spindle (10b) and check thread movement.
- Once again remove diaphragm from drive spindle.
- Fit end disc on housing.
- Insert diaphragm in end disc and screw on by 2 thread turns.



ATTENTION:

Turn diaphragm such that the 4 holes in the diaphragm and end disc are precisely aligned!
The outlet in the end disc must face downward!

- Fit liquid end (intake connection must face downward!) with screws on to diaphragm and end disc (once again leave approx. 5mm space between liquid end and end disc) such that the parts can still be turned.
- Now slowly turn parts in clockwise direction until diaphragm is firmly fitted (resistance of return spring can be felt).



ATTENTION:

Do not overturn diaphragm, particularly in Type 1601!

- Set stroke length to 100 % with rotary knob (2) and with metering pump running, slowly turn the complete delivery unit in clockwise direction until the intake connection faces vertically downward.

- Stop pump.
- Tighten 4 screws (16) crosswise.

**ATTENTION:**

Observe screw tightening torques!

Check the tightening torque of the liquid end screws after 24 hours of operation!

Additionally check the tightening torques on PP pumps every 3 months!

Tightening torque for screws:

M4: 2.5 to 3 Nm

M5: 4.5 to 5 Nm

- Set required stroke length with pump in operation.

5 Troubleshooting

**WARNING:**

- Return the metering pump for repair only in a clean condition with the liquid end flushed clean. Pumps which are used for metering radioactive media must not be shipped!

Breakdown assistance

In order to be able to repair a small breakdown at any time, we recommend to always keep a spare parts kit in stock - consisting of diaphragm, valves, balls and seals. See chapter 6 for order information.

No pump intake despite full stroke movement and venting

Cause Crystalline deposits caused by valves drying out

Remedy • Remove intake hose out of metering tank and thoroughly flush out liquid end.

- If this provides no improvement, remove and clean valves.

The valve seat in the intake and head valve can be pressed out with a 3mm drift.

Warning lamp (4) lights red

Cause Chemical deficiency

Remedy • The fault signal is acknowledged automatically by filling the supply tank.

Warning lamp (4) lights orange

Cause External Lock is not activated

Remedy • If external mode is required, connect external control cable to make External Lock activated.

Liquid emerges at head end

Cause Delivery unit leaking at metering diaphragm

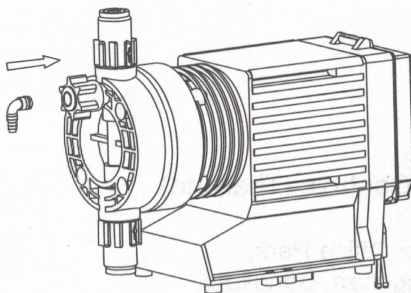
- Remedy**
- Retighten screws in liquid end crosswise.
 - If liquid still leaks out this indicates the diaphragm has failed and must be replaced.

6 Spare Parts

In order to repair small breakdowns at any time we recommend to always keep a spare parts kit in stock. This kit contains the following wearing or spare parts: 1 Intake valve, complete; 1 Discharge valve, complete; 1 set of seals; 1 diaphragm; 1 set of connection parts.

Type		Part number	Type	Part number	
0212/0215/0223	PP1	9070013	1001/1002/1003	PP1	9070016
	PP2	9070018		PP2	9070027
0306/0308/0313	PP1	9070022	1600/1601/1602/1603	PP1	9070019
	PP2	9070025		PP2	9070028
0703/0803/0806	PP1	9070012			
	PP2	9070026			

Installation Instruction for nozzle and vent valve



Before starting the pump, you should insert the nozzle into vent valve as diagram showed

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