

Warranty

Atto Corporation warrants all its products subject to the terms and conditions set forth below.

1. This warranty covers all new products that are sold by Atto Corporation (hereinafter called Atto).
2. Expendable items are not covered by this agreement.
3. Claims under this warranty are limited to defects in material and workmanship of the products.
4. Malfunction and/or damage due to neglect, abuse, operation or repair contrary to specifications and/or instructions presented by Atto are not warranted.
5. Atto shall not be liable to consequential damage, labor, loss or expense directly or indirectly arising from use of the products.
6. Damage due to transit is not covered by this warranty.
7. The warranty period is one (1) calendar year from a date when the products are shipped from Atto to an original purchaser.
8. This warranty is not applied to any defect that is reported to Atto later than one (1) calendar month from a date of warranty termination.
9. Atto Shall supply parts to replace faulty parts of defective products under this warranty, free of charge.
10. Atto shall repair defective products under this warranty, which cannot be repaired at field, free of charge.
11. Atto shall replace defective products under this warranty, which cannot be repaired, free of charge.
12. Freight charges for return and replacement shipments under this warranty are shared by Atto and a purchaser, that is one way by either party and another way by another party.
13. Warranty period of repaired products and replacement products or parts is three (3) calendar months from a date when the said products or parts are shipped from Atto, or a remaining term of an original warranty period of the defective products, whichever lasts longer.
14. Return of the products for credit or refund is not accepted unless otherwise agreed in writing by Atto.



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Operating Instructions

AC-2120 Perista Pump



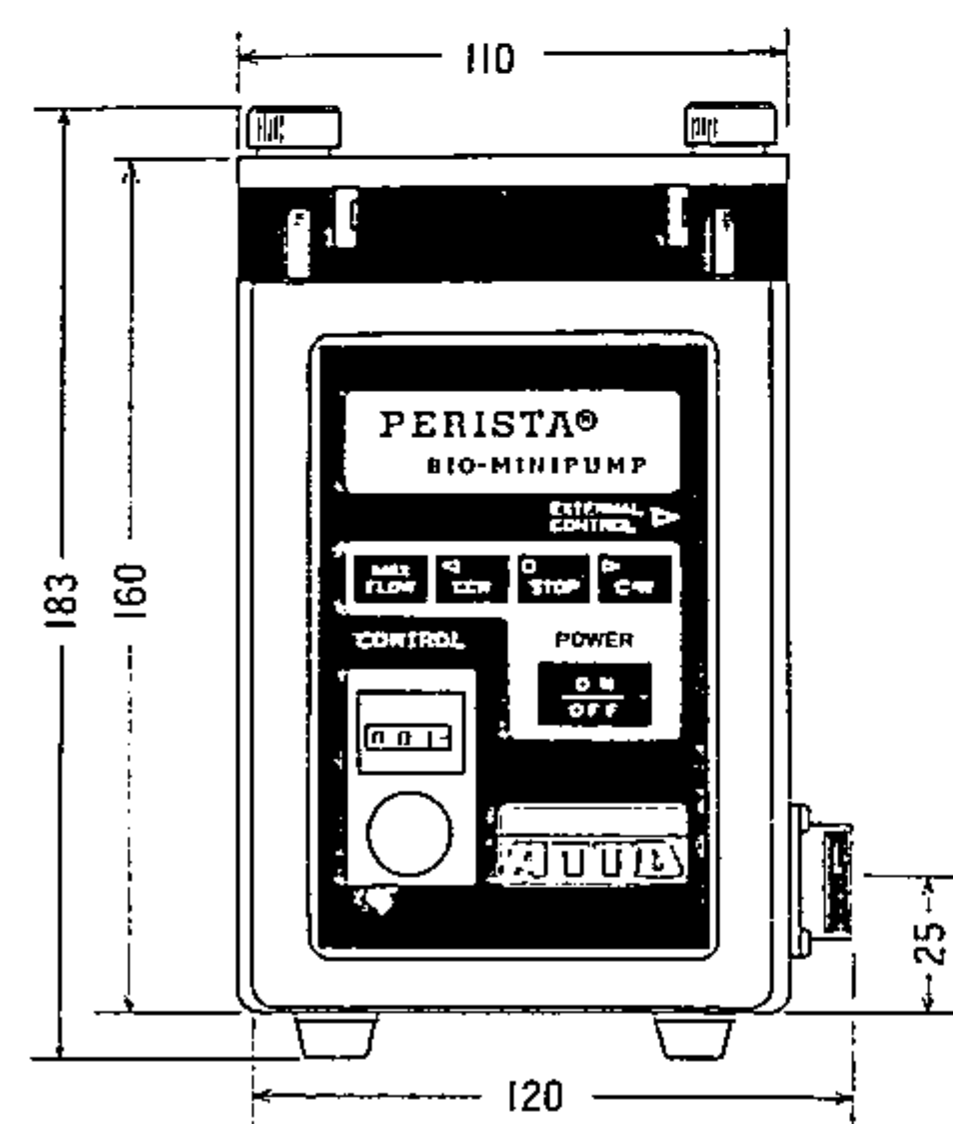
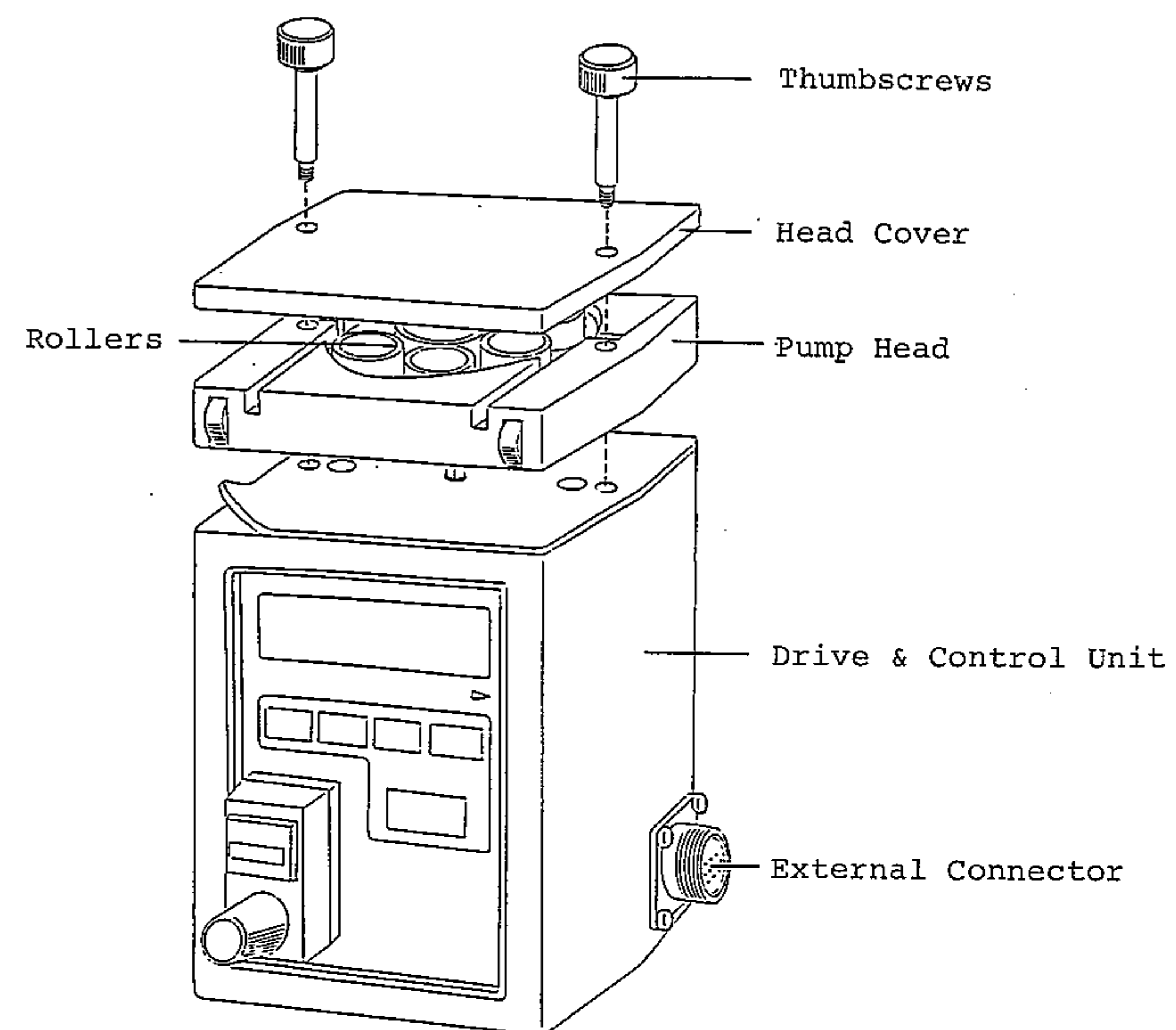
Safety Warning

- Prior to using this apparatus, operating and/or handling instructions of this apparatus and apparatus, reagents and/or chemicals that are used with this apparatus must have been understood.
- Use of this apparatus includes application of electricity, which may be fatal or injurious to human. Care should be taken against electricity when applying it to this apparatus.
- Use of this apparatus includes handling of reagents and/or chemicals which may be chemically hazardous or carcinogenic. Care should be taken for protection from hazardous or carcinogenic reagents and/or chemicals when handling them.
- Environments of high temperature, high humidity, dust, corrosive gas, excessive source-voltage fluctuation, excessive electrical noise, and physical shock or vibration should be avoided.
- This apparatus and apparatus that are used with this apparatus should be installed on a flat which is level, solid and stable.
- Prior to operating this apparatus, the apparatus and its components and/or parts should be thoroughly clean and dry. Caution should be exercised against water or moisture which may cause electrical hazards.

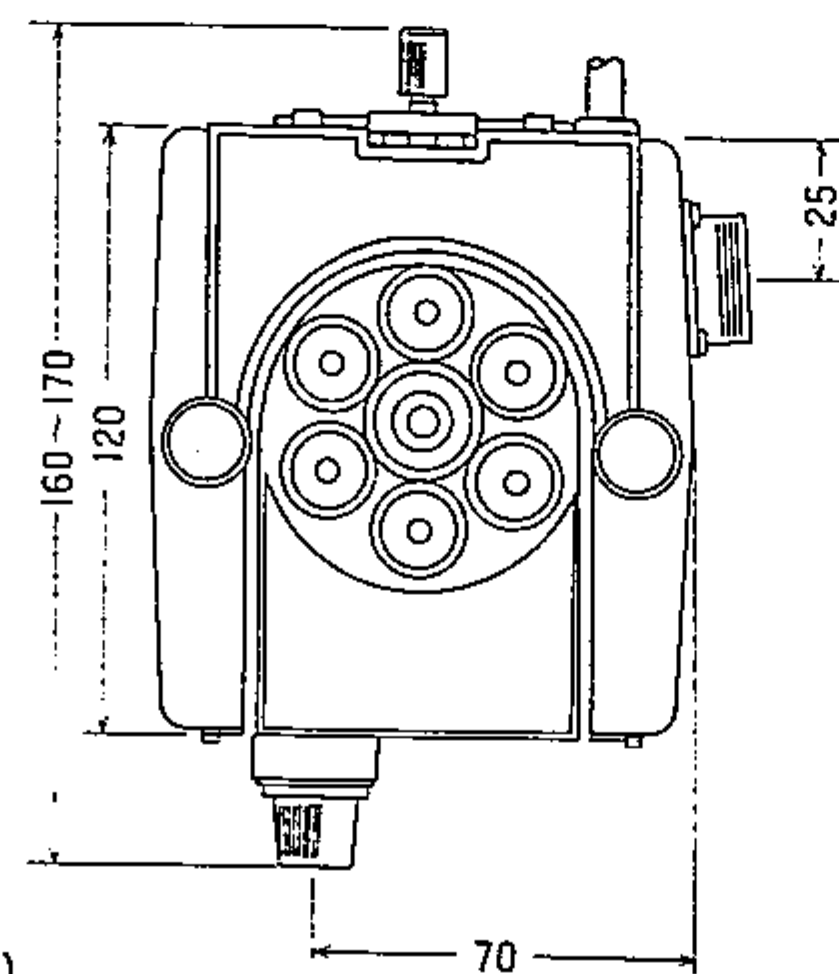
Section 1. SPECIFICATIONS

- 1.1 Flow rate range: 0.18 to 180 ml/hr with 1 mm i.d. tubing
0.5 to 500 ml/hr with 2 mm i.d. tubing
1 to 1000 ml/hr with 3 mm i.d. tubing.
- 1.2 Flow rate repetitive accuracy: $\pm 0.2\%$.
- 1.3 Flow rate stability: $\pm 0.2\%$ with $\pm 10\%$ source voltage fluctuation.
 $\pm 0.5\%$ with 0° to 40°C temperature variation.
- 1.4 Discharge pressure: 2.1 kg/cm^2 , maximum.
- 1.5 Maximum fluid viscosity: 1500 cps.
- 1.6 Drive: AC variable speed motor, 6 W.
- 1.7 Control: Automatic motor speed control, with rotary encoder & frequency-voltage conversion system.
- 1.8 Environmental temperature: 0° to 40°C .
- 1.9 External control: TTL input for CW, CCW and STOP flow switching.
0 to 5 VDC input for motor speed control.
- 1.10 Power requirements: 110 or 220 VAC, 50&60 Hz, 10 W.
- 1.11 Dimensions: 12 cm W, 17 cm D, 18.3 cm H, approx.
- 1.12 Net weight: 2.2 kg, approx.
- 1.13 Standard accessory: Silicone rubber tubings, 1, 2 & 3 mm i.d.,
1 meter long.

Section 2. CONSTRUCTION & PARTS NAMES

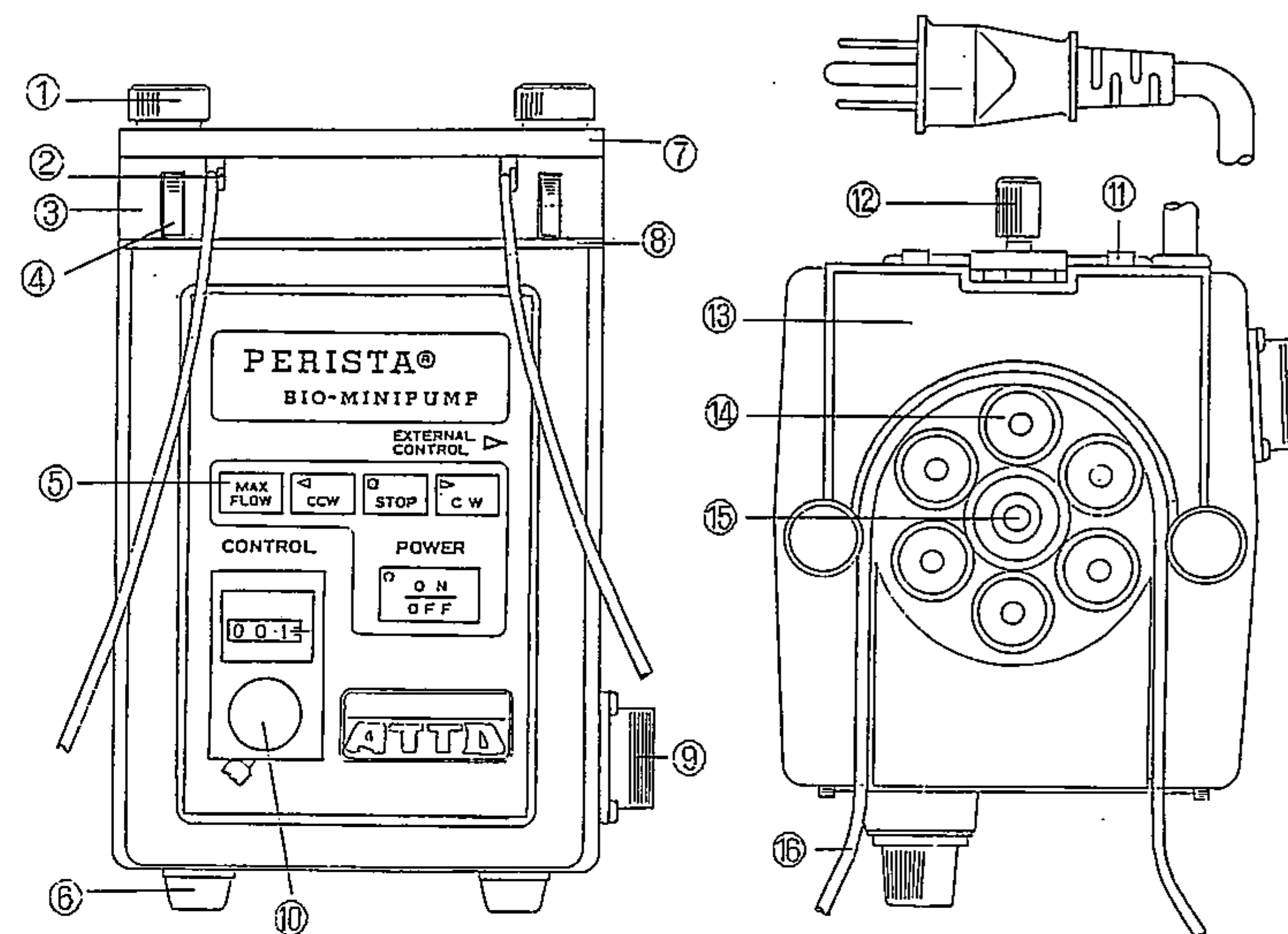


(unit: mm)



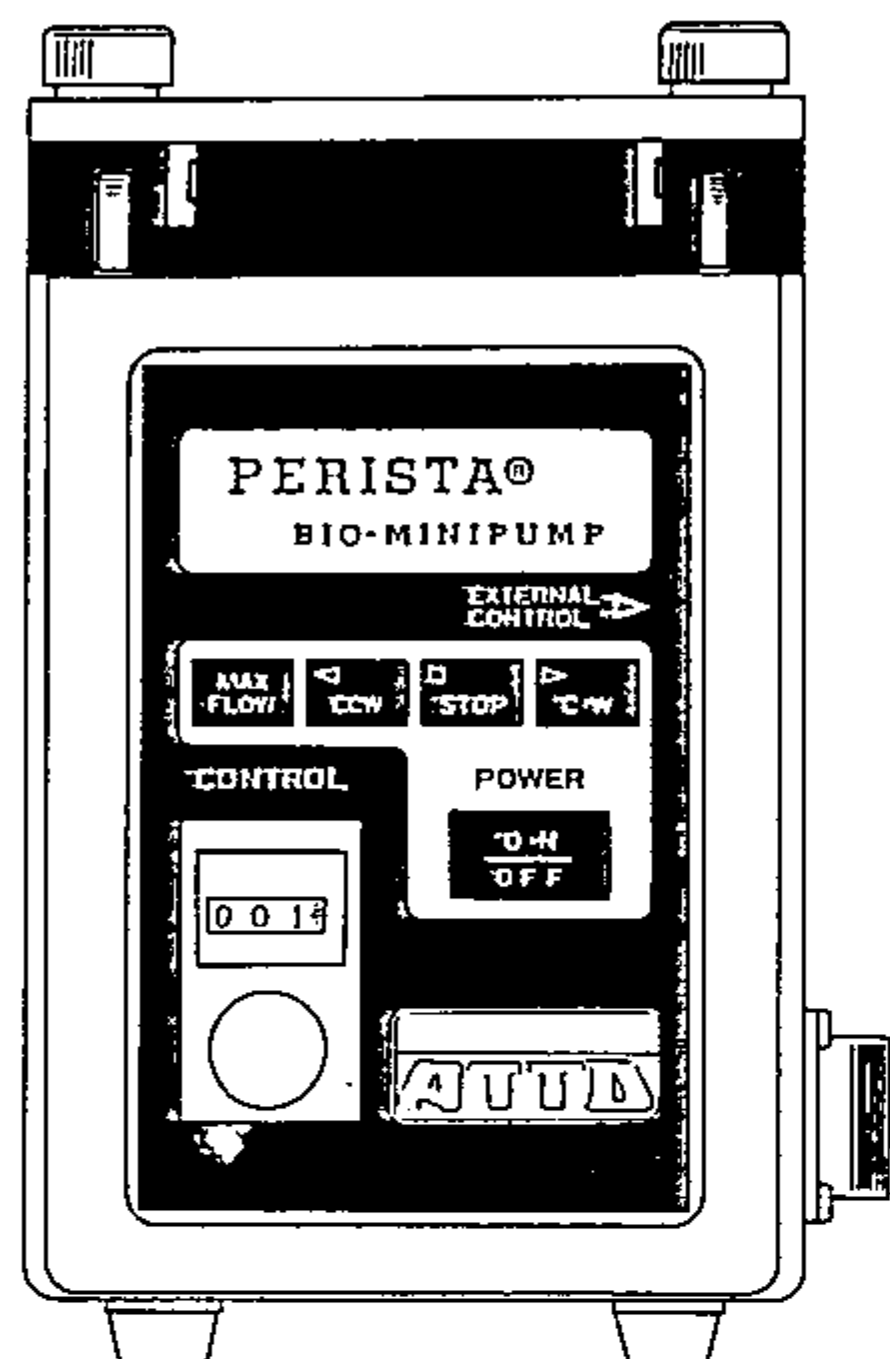
Section 8. PARTS LIST

1292 121	SILICONE TUBING, 1 MM ID, 5 M (3 mm o.d.)
1292 120	SILICONE TUBING, 2 MM ID, 5 M (4 mm o.d.)
1292 119	SILICONE TUBING, 3 MM ID, 5 M (5 mm o.d.)
1292 122	TYGON TUBING, 1/16" ID, 5 M (1/8" o.d.)
1292 148	TYGON TUBING, 3/32" ID, 5 M (5/32" o.d.)
1292 123	TYGON TUBING, 1/8" ID, 5 M (3/16" o.d.)
1292 170	VITON TUBING, 1 MM ID, 5 M (3 mm o.d.)
1292 171	VITON TUBING, 2 MM ID, 5 M (4 mm o.d.)
1292 172	VITON TUBING, 3 MM ID, 5 M (5 mm o.d.)
1292 134	THUMBSCREW, LONG
1292 105	HEAD COVER
1292 103	ROLLER ASSY (Set of 6 rollers & 1 drive wheel)
1292 101	PUMP HEAD ASSY (incl. Roller Assy)
1292 129	GASKET
1292 215	EXTERNAL CONNECTOR PLUG (SRC 061A16-10P)



- | | |
|----------------------|------------------------|
| ① Thumbscrews | ⑩ Control Knob |
| ② Tubing Clamps | ⑪ Drains |
| ③ Pump Head Assembly | ⑫ Compression Adjuster |
| ④ Clamp Adjusters | ⑬ Tubing Compressor |
| ⑤ Switches | ⑭ Rollers |
| ⑥ Rubber Feet | ⑮ Drive Wheel |
| ⑦ Head Cover | ⑯ Tubing |
| ⑧ Gasket | |
| ⑨ External Connector | |

Section 3. CONTROLS & INDICATORS



POWER Switch:

Press either to turn on or to turn off main power. On turning on power, the light on the switch is lit.

CW Switch:

Press to set flow in the clockwise direction, and the high frequency alarm sounds and the light on the switch is lit.

CCW Switch:

Press to set flow in the counterclockwise direction, and the high frequency alarm sounds and the light on the switch is lit.

STOP Switch:

Press to stop flow, and the high frequency alarm sounds and the light on the switch is lit.

CONTROL Knob & Dial:

Rotate the knob clockwise to increase flow rate, and vice versa. With 10 turns of the knob, the 3-digit dial reads "000" through "999". The figures are proportional to motor speeds or flow rates. Flow rate with the dial at "001" is 1/1000 to that with the dial at 1000, i.e. "000" that "1" above "999".

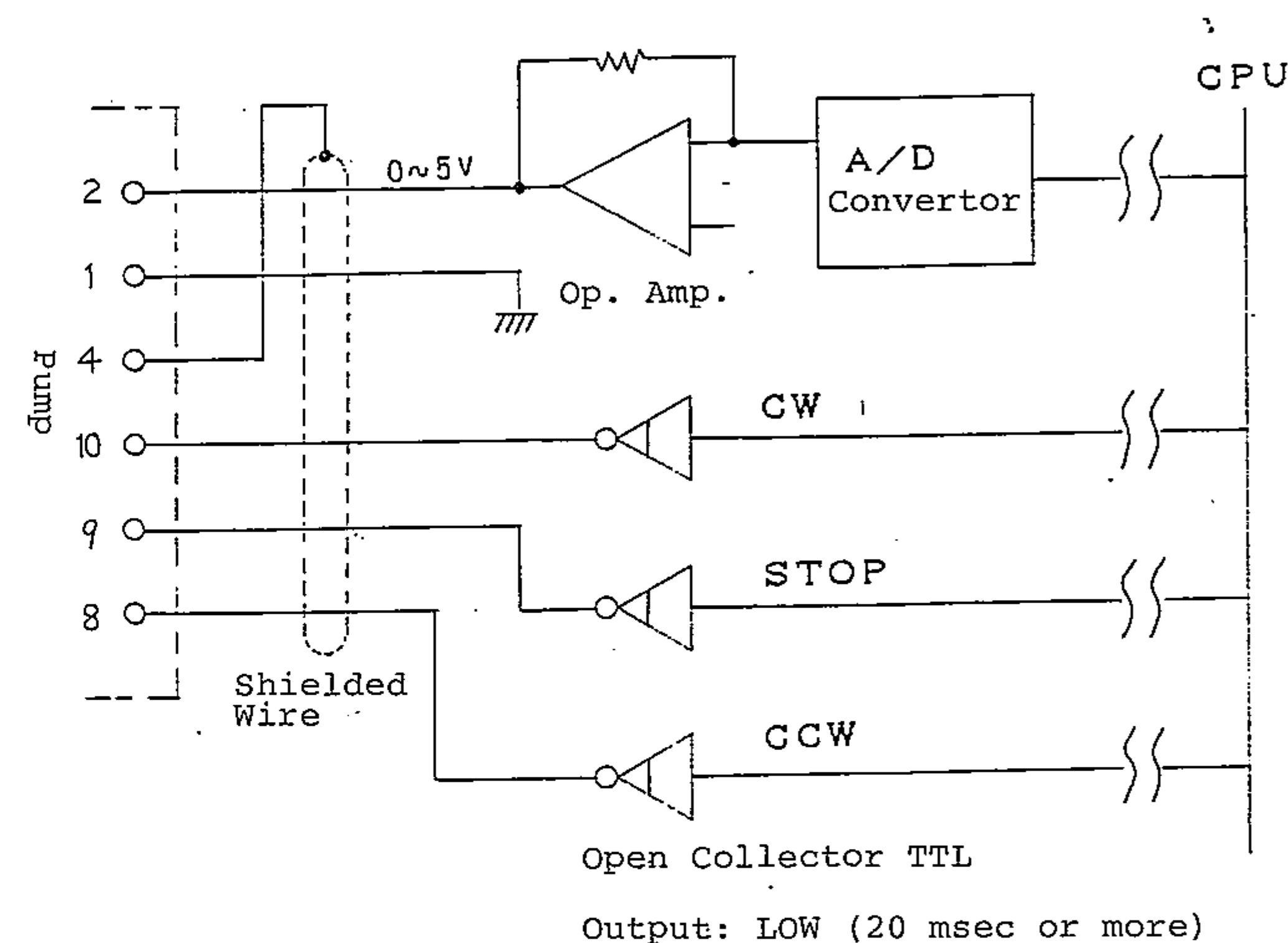
MAX FLOW Switch:

While the switch is depressed, the pump provides about 80% of the maximum flow rate irrespective of the flow control knob. On releasing the switch, it returns to the flow rate set with the flow control knob.

EXTERNAL CONTROL Indicator:

Lights when the pump is externally controlled. During external control, operation of any controls at the front panel, except the power switch is not accepted.

7.3 Control with External Computer (an example)

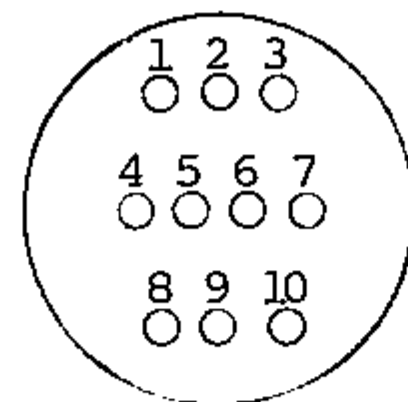


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Section 7. EXTERNAL CONTROL

7.1 External Connector

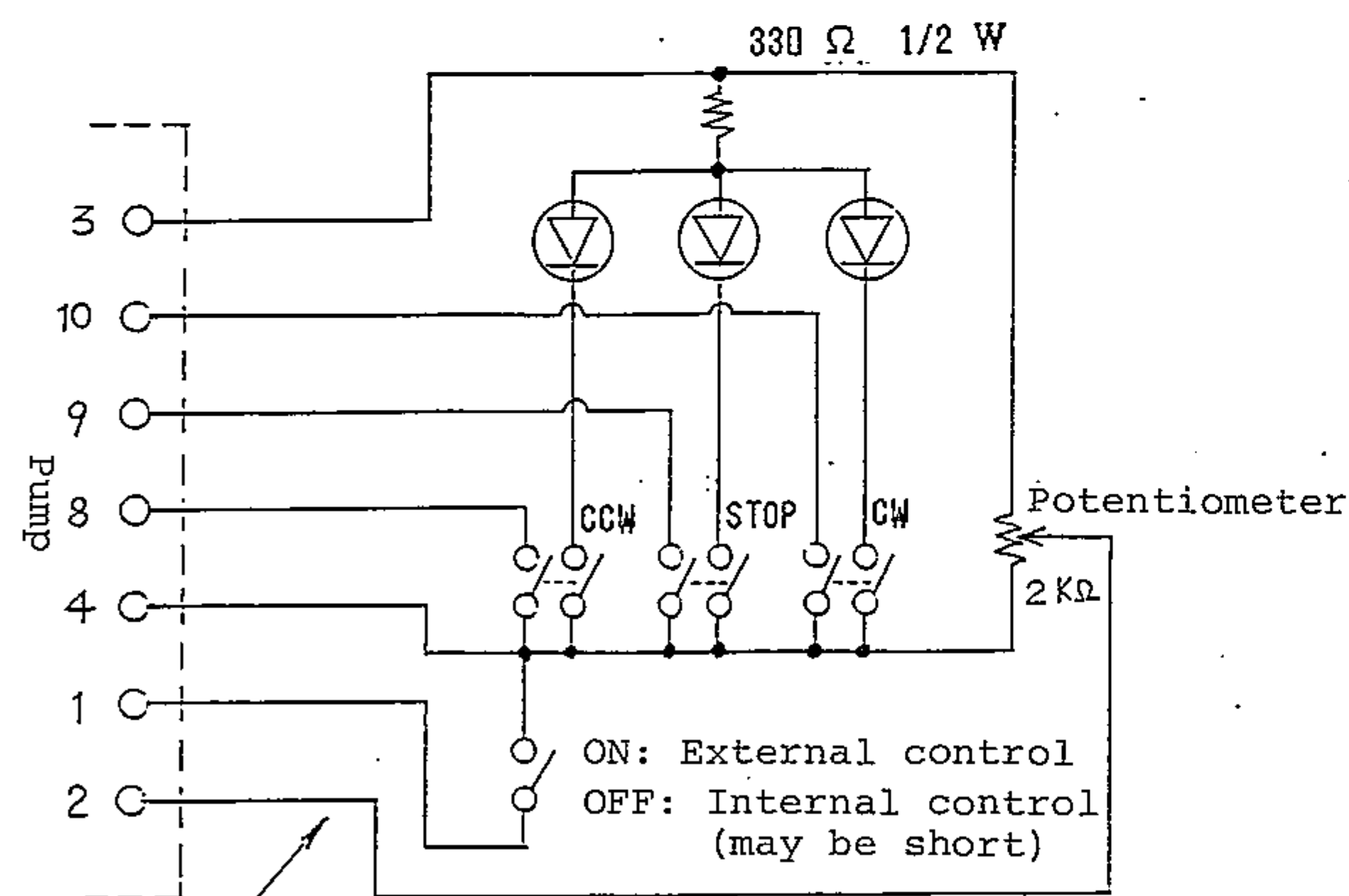
Disposition of terminals:



Function of terminals:

- No. 1 Common 1, 0 V.
- No. 2 Motor speed control. Input 0 to 5 VDC. Impedance 1 M Ω .
- No. 3 Power supply, 5 VDC (30 mA max.)
- No. 4 Common 2. Connect with Common 1 for external operation.
- No. 8 CW switch. Connect with Common 1 for CW flow.
- No. 9 STOP switch. Connect with Common 1 to stop flow.
- No. 10 CCW switch. Connect with Common 1 for CCW flow.
- No. 5, 6 & 7 are open.

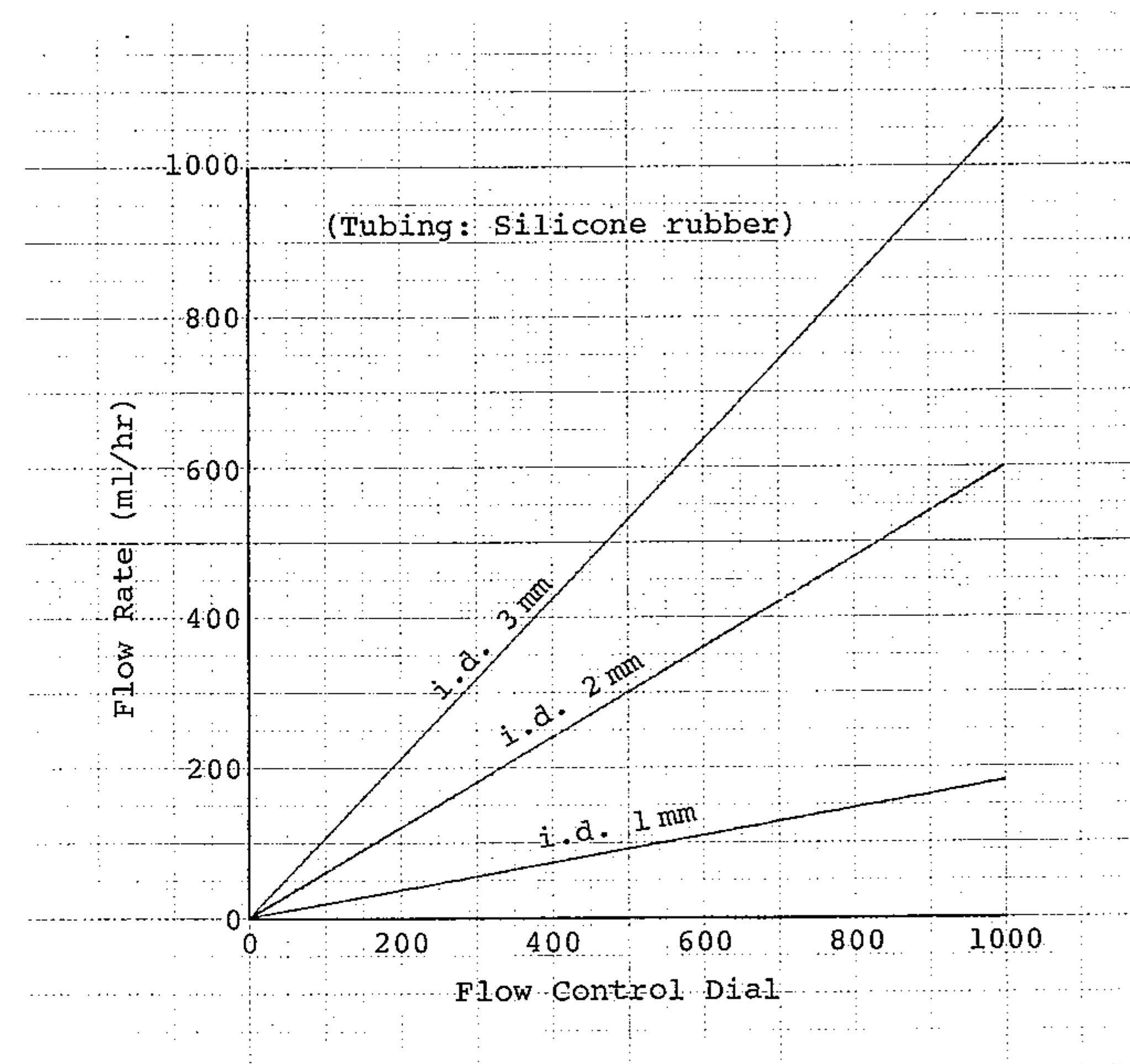
7.2 Control with External Switches and Potentiometer (an example)



Shielded wire. Connect the sheath with Terminal No. 1.

Section 4. FLOW CHART

The chart represents flow rates according to readings of the flow control dial. Note that the chart is a guide to set the control knob, as flow rates are variable depending on tubings used, conditions of tubings, setting of tubings or such. For accurate flow rates, flow rates should be measured actually.



Section 5. OPERATION

- 5.1 Install the pump on a solid, flat top.
It is recommended to connect drainage tubings to the drains at the rear of the pump head, to drain accidental leak.
- 5.2 Unscrew the thumbscrews, and remove the head cover.
Rotate the compression adjuster fully counterclockwise, to retract the tubing compressor.
Rotate the clamp adjusters fully upward, to retract the tubing clamps.
The 6 rollers should be evenly distributed around the drive wheel. Position the rollers so that they are apart from each other approximately at the same intervals.
- 5.3 Place a tubing in the U-shaped groove of the pump head.
While lightly pulling the slack of the tubing, rotate the clamp adjusters upward, to settle the tubing with the clamps.
Replace the head cover, and tighten the thumbscrews.
- 5.4 Prior to connecting the power cord to a power source, rotate the control knob fully counterclockwise.
Note: For protection against power failure during operation, the pump keeps operation of the switches stored. So, when it is connected to power source, main power may have been turned on and flow may have been set to start.
Connect the pump to power source of the specified voltage...
- 5.5 Turn on main power with the power switch.
Set either flow direction with the CW or CCW switch.
- 5.6 Rotate the control knob clockwise a little, to confirm that the rollers start moving and the tubing is secured.
Rotate the compression adjuster clockwise until the compressor presses the tubing against the rollers and flow starts.
Note: Excessive compression causes backward flow.
Adjust flow rates with the control knob.
- 5.7 Press the MAX FLOW switch to instantly increase flow rate, at need.
- 5.8 After use, stop flow with the STOP switch, turn off power with the power switch, and disconnect the power cord.

Section 6. CAUTIONS

- 6.1 Tubings of silicone rubber, Tygon and Viton are standardly offered. While, equivalent or similar tubings may be used. Outer diameter of a tubing should be 5 mm or less. Wall thickness of a tubing should be 0.5 mm or more. Chemical compatibility of a tubing with fluids pumped is inevitable.
- 6.2 Avoid direct rays and high temperature environment.
- 6.3 Leakage in the pump head is drained through the drains at the rear of the head. The pump should not be installed inclined to the front, not to allow leakage to flow to the front. The drains should be always clean.
- 6.4 The pump is designed to be operated only for single channel. It should not be operated with a gang of pump heads.
- 6.5 Avoid any liquid on the front panel to protect the electric components.
- 6.6 Do not allow the rollers to contact with each other.
- 6.7 Avoid excessive compression on tubings which shortens life of tubings and may cause backward flow.
- 6.7 Allowing the same part of a tubing to be rubbed with the rollers shortens life of the tubing. Change position of a tubing at times.
- 6.8 Worn tubings may cause rupture during operation. Replace tubings at times.
- 6.9 The rollers are worn out in long usage. Then, replace the set of the rollers and the drive wheel with a new set of rollers and drive wheel (available as Roller Assy).
- 6.10 To clean the pump, use water with detergent. Organic solvents should be avoided.
- 6.11 In case of leakage, remove the pump head and clean the head and the drive & control unit thoroughly.