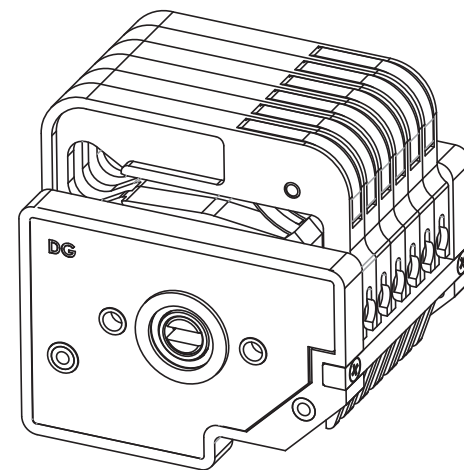


# DG Series Pump Head Operation Manual



## Safety Precautions



### Important information:

**Be sure to read the manual carefully before operation!**

|                                                                                   |                                                                    |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------|
|  | This icon warns: Keep fingers away from moving parts.              |
|  | This icon warns: Be careful.                                       |
|  | This icon warns: Be careful, the surface is hot.                   |
|  | This icon warns: Be careful, electric shock hazard.                |
|  | This icon warns: To recycle this product.                          |
|  | This icon warns: Personal protective equipment (PPE) must be worn. |

### Danger:

|                                                                                     |                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Please use the same power supply as that on the nameplate of the machine, otherwise the equipment will be damaged!                                                                                           |
|  | Do not disassemble the casing or modify the interior of the equipment by yourself, otherwise it may cause malfunctions or even electric shock accidents!                                                     |
|  | When installing and disassembling the pump tube, please turn off the power first and do not approach the rotating roller to prevent fingers and clothing from getting entangled in the mechanical mechanism! |
|  | If used for transporting hazardous liquids, a dedicated operating procedure must be established for this liquid, and personnel injury must also be prevented during using.                                   |

### Warning:

|                                                                                     |                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Before using, please confirm that the transmitted liquid will not react chemically with the tube or pump head, otherwise it will damage the tube or pump head. If unsure, please consult our engineers.                                                                                                                        |
|  | Tubes are vulnerable parts, please pay attention to regular inspections. Our company is not responsible for the losses caused by tube damage, especially the leakage of toxic, harmful, and precious liquids!                                                                                                                  |
|  | Please use tubes that are suitable for the pump head model and refer to the "Suitable Tube and Flow Rate of Pump Head" in the manual                                                                                                                                                                                           |
|  | If the peristaltic pump is stopped for too long, please lift the pressure block on the pump head to prevent the inner wall of the tube from sticking due to prolonged compression.                                                                                                                                             |
|  | Due to actual working environment conditions (including temperature, humidity, power supply voltage, etc.) exceeding our technical specifications and causing machine damage, our company is responsible for paid warranty, but we do not bear any responsibility for any other damage caused by this!                         |
|  | The main protection provided for operators to prevent them from being injured by the moving parts of the pump is provided by the safety device of the pump head. Please note that the safety devices for different products vary depending on the model of the pump head. Please refer to the pump head section in the manual. |
|  | If the pump is running before the power outage, it will automatically start after the power is reconnected.                                                                                                                                                                                                                    |

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Description

The DG series pump head is designed specifically for micro flow and multi-channel fluid transmission, which can achieve simultaneous transmission of multiple tube lines ranging from 1 to 48 and above, with a compact structure and convenient use. A card type structure that can be independently loaded and unloaded, making it easy to replace and fix the pump tube. There are two types of card pressure tube devices: ratchet gear adjustment and adaptive spring. The gear adjustment card has a gear display, and the pressure tube gap can be manually adjusted according to the size of the pump tube to adapt to different wall thicknesses of pump tubes and transmission pressures. The spring card adopts an adaptive design, and the pressure pipe gap will be automatically adjusted according to the pump tube wall thickness. The material of the pump head roller is high-strength stainless steel, and the card material can be POM and PVDF high-performance plastics to meet different working conditions. Suitable for tubes with a wall thickness of 0.8mm-1mm and an inner diameter of 0.13mm-3.17mm. There are 6 or 10 optional rollers for the pump head.

Pump Head Structure

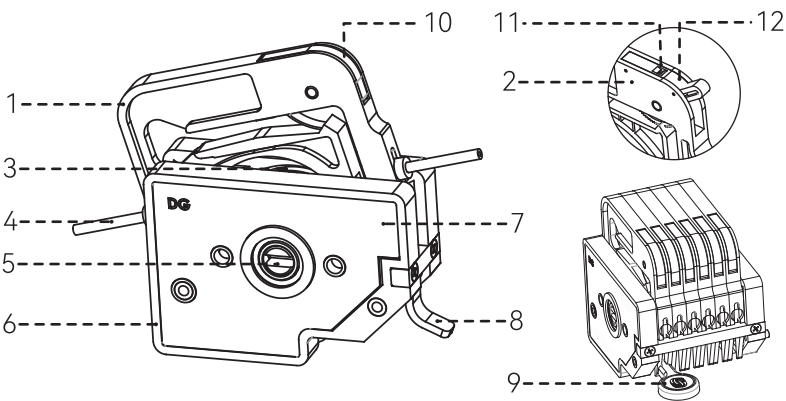


Figure 1 Structure of Pump Head

### ◆ Component Name and Function

1. **Spring Card:** used for clamping tubes, with adaptive pressure pipe clearance
2. **Shift Card:** used for installing tubes and manually adjusting the gap between pressure tubes
3. **Roller Body:** rotate and compact the tube to transfer liquid
4. **Flexible Tube:** conveying liquid, with positioning sleeves at both ends
5. **Pump head spindle:** used to connect the pump head to the driver or cascade the pump heads
6. **Pump Head Body:** pump head support structural components
7. **Pump Head Labeling:** display information such as pump head model
8. **Lever:** used for dismantling cards (press down), standard for channels 1 to 3
9. **Small Wrench:** used for card disassembly, standard for 3 or more channels, and can be installed on the positioning hole in front of the pump head when not in use
10. **Adaptive Spring:** used for spring cards to automatically adjust the pressure tube gap
11. **Gear Display Window:** displays the adjustment gear and anti over voltage adjustment limit
12. **Shift Ratchet:** used for shifting cards and manually adjusting the pressure tube gap.

### Usage Method

#### ◆ DG Card Selection

- There are two types of cards: 1. Spring type, 2. Shift type

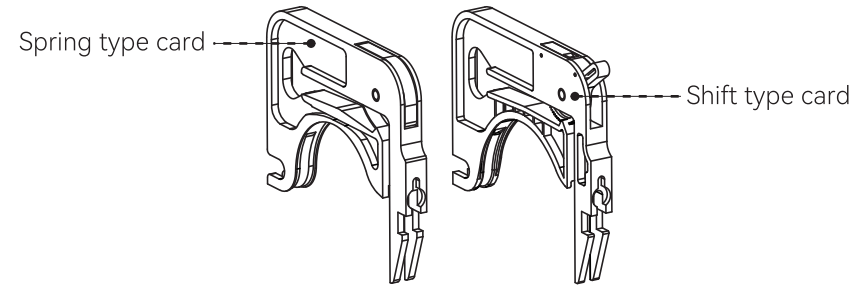


Figure 2 Card Type

- **Spring Type:** can be used after installing the clamp tube, without adjustment
- **Shift Type:** the pressure tube gap can be adjusted according to the tube used
- After installing the clamp tube, adjust the lever up and down to change the pressure tube gap. Select different color ranges based on different tube materials and specifications (see attached table)
- If high-pressure transmission is required, several gears can be adjusted based on the calibrated gear, but it will shorten the service life of the tube

#### Note:

- Adjusting the gear lever will not change the flow rate
- The higher the gear, the pressure is greater. It is not recommended to use it under high pressure unless it is a special case

#### ◆ Install Pump Head

- Remove the card from the pump head
- According to the direction shown in the diagram, align the pump head positioning hole with the pump head bracket positioning column, align

the pump head shaft flat with the driver coupling groove, and then push in to make the pump head tightly adhere to the pump head bracket

- Firstly, insert the two screws provided into the installation holes on the rear mounting plate. Then insert an Allen wrench into the connection hole of the front mounting plate and tighten the screws

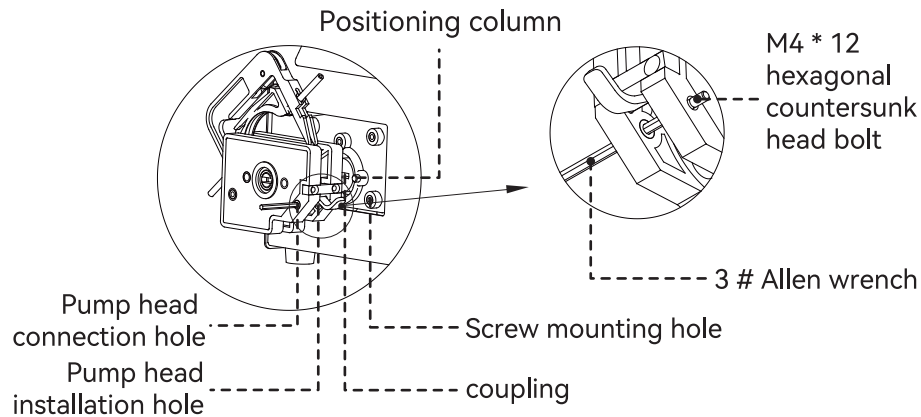


Figure 3 Pump Head Installation

- When connecting pump heads in series, install the second pump head in front of the first pump head according to the previous method.



Note: when tightening the pump head screws, try to ensure that the tightening torque of the four screws is the same and should not be too tight!

### ◆ Tube Selection

- DG pump head is suitable for tubes: domestic tubes and imported tubes.
- The dimensional accuracy of the wall thickness and inner diameter of the tube, as well as the installation distance accuracy between tube clamps, will affect the flow accuracy. It is recommended to use imported tubes for high-precision transmission, preferably standard tubes with tube clamps.

### ◆ Install the Tube

- Put the tube onto the tube clamp with a length of 74mm between the two tube clamps, as shown in Figure 4.

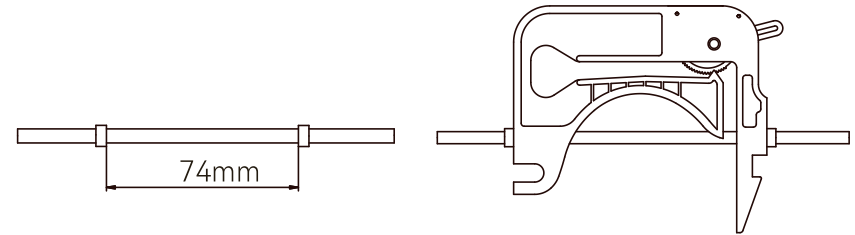


Figure 4 Tube Installation

- Install the card into the pump head, as shown in Figure 5.

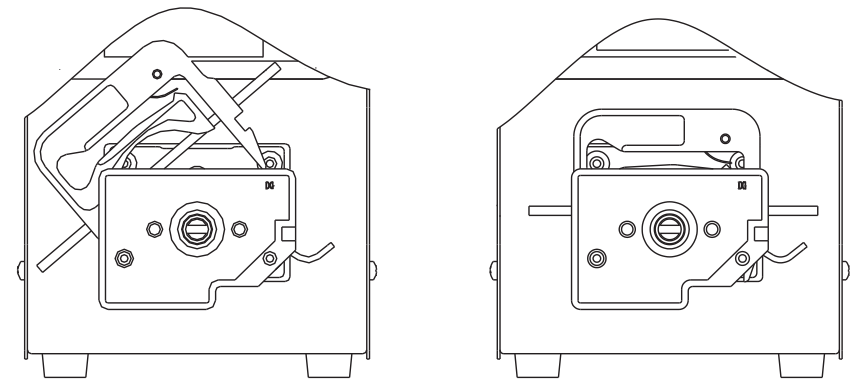


Figure 5 Card Installation

### Note:

- The tube inside the pump head shall be free of distortion and deflection.
- When using multi-channel pump heads, ensure that the distance between the tube clamps and tubes of each channel is equal to ensure the consistency of flow between channels

### ◆ Take Out the Tube

- **1-3 channels:** Press the lever on the right side, and the card will automatically pop up, as shown in Figure 6
- Use a small wrench to disassemble the card for more than 3 channels, as shown in Figure 7

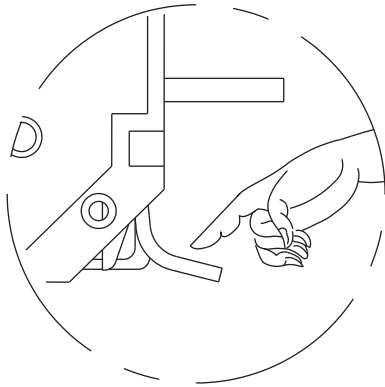


Figure 6 Removing card view 1

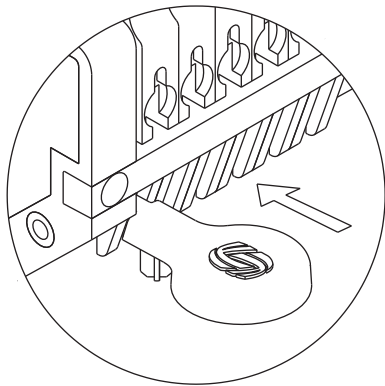


Figure 7 Removing Card View 2

- Lift the card up to the left to remove the card
- Take out the tube along the direction of the card groove

### ◆ Precautions for Using

- The tube flow will fluctuate with the use time. Please pay attention to adjust the speed of the peristaltic pump (please re calibrate the flow of the flow type peristaltic pump).
- The flow of 10 rollers pump head is smaller than that of 6 rollers pump head, but the fluid pulsation during transmission is smaller.
- When multiple channels of the pump head are used at the same time, there is a deviation in the flow between each channel. If the consistency of the flow is high, please contact the engineer.
- After long-term using, the pump head may make slight noise which is normal. The pump head can be disassembled and a proper amount of grease can be applied to both ends of the oil bearing.

### Malfunction and Maintenance

#### ◆ Daily Maintenance

- If the tube is used for 50H, check whether it is damaged or loses elasticity
- Coating silicone oil on the tube can prolong the service life.
- The pump head cannot be washed with water. If the pump tube breaks during operation, the liquid in the pump head shall be wiped or dried in time
- Do not use chemical reagents to clean the pump head

### ◆ Malfunction Solutions

| NO. | Malfunction                                         | Description                                                                                                                                     | Solution                                                                                            |
|-----|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 1   | Unable to transfer liquid                           | Check whether the tube is broken                                                                                                                | Replace the new tube                                                                                |
|     |                                                     | Improper selection of tube specification                                                                                                        | Please select the tube with appropriate wall thickness                                              |
|     |                                                     | The negative pressure at the inlet end of the tube is too large or blocked                                                                      | Check the liquid inlet tube                                                                         |
|     |                                                     | Excessive liquid viscosity                                                                                                                      | Shorten the length of the inlet end or increase the diameter                                        |
|     |                                                     | Tube installation error                                                                                                                         | Reinstall according to the instructions                                                             |
|     |                                                     | Motor shaft and roller slip                                                                                                                     | Clean the roller and tube surface (alcohol is recommended)                                          |
|     |                                                     | The pump head has not been used for a long time, and the part where the tube contacts the roller is severely squeezed and deformed              | Remove the tube and manually knead the deformed part of the tube                                    |
| 2   | The service life of the tube is obviously shortened | The roller does not rotate flexibly                                                                                                             | Clean the surface of the roller. If it is damaged, please contact the company's after-sales service |
|     |                                                     | Tube installation error                                                                                                                         | Reinstall according to the instructions                                                             |
|     |                                                     | Excessive impurities in the pump head                                                                                                           | Clean the inside of pump head                                                                       |
|     |                                                     | The tube is not fixed firmly and there is tube running                                                                                          | Retighten the tube                                                                                  |
|     |                                                     | Whether the liquid contains solid hard particles, too large particles will cause the tube life to be seriously reduced or cannot be transmitted | Filter out impurities                                                                               |

### Suitable Tube and Flow Rate of Pump Head

#### Experimental conditions:

1. Normal temperature and pressure
2. Test medium: Water
3. Tubeline: The length of inlet and outlet is 500mm, and the inlet and outlet are at the same level.

When the liquid, viscosity, tubeline length, inlet and outlet pressure difference and other service conditions change, the flow value will change. Please consult the engineer.

#### DG6 flow rate table: (flow unit: mL/min)

| ID \ Speed | 0.13 mm | 0.25 mm | 0.5 mm | 0.76 mm | 1 mm   | 1.22 mm |
|------------|---------|---------|--------|---------|--------|---------|
| 0.1 rpm    | 0.00016 | 0.0005  | 0.0022 | 0.0048  | 0.0058 | 0.0108  |
| 1 rpm      | 0.0016  | 0.005   | 0.022  | 0.048   | 0.058  | 0.108   |
| 50 rpm     | 0.08    | 0.25    | 1.1    | 2.4     | 2.9    | 5.4     |
| 100 rpm    | 0.16    | 0.5     | 2.2    | 4.8     | 5.8    | 10.8    |

#### DG6 flow rate table: (flow unit: mL/min)

| ID \ Speed | 1.52 mm | 1.65 mm | 2.1 mm | 2.4 mm | 2.79 mm | 3.17 mm |
|------------|---------|---------|--------|--------|---------|---------|
| 0.1 rpm    | 0.017   | 0.018   | 0.021  | 0.026  | 0.035   | 0.049   |
| 1 rpm      | 0.17    | 0.18    | 0.21   | 0.26   | 0.35    | 0.49    |
| 50 rpm     | 8.5     | 9       | 10.5   | 13     | 17.5    | 24.5    |
| 100 rpm    | 17      | 18      | 21     | 26     | 35      | 49      |

#### DG10 flow rate table: (flow unit: mL/min)

| ID \ Speed | 0.13 mm | 0.25 mm | 0.5 mm  | 0.76 mm | 1 mm   | 1.22 mm |
|------------|---------|---------|---------|---------|--------|---------|
| 0.1 rpm    | 0.00011 | 0.00045 | 0.00177 | 0.0039  | 0.0048 | 0.008   |
| 1 rpm      | 0.0011  | 0.0045  | 0.0177  | 0.039   | 0.048  | 0.080   |
| 50 rpm     | 0.055   | 0.225   | 0.885   | 1.956   | 2.42   | 3.981   |
| 100 rpm    | 0.11    | 0.45    | 1.77    | 3.91    | 4.84   | 7.96    |



## DG Pump Head Operation Manual

**DG10 flow rate table: (flow unit: mL/min)**

| ID<br>Speed | 1.52 mm | 1.65 mm | 2.1 mm | 2.4 mm | 2.79 mm | 3.17 mm |
|-------------|---------|---------|--------|--------|---------|---------|
| 0.1 rpm     | 0.013   | 0.014   | 0.016  | 0.02   | 0.028   | 0.041   |
| 1 rpm       | 0.134   | 0.140   | 0.161  | 0.2    | 0.28    | 0.41    |
| 50 rpm      | 6.714   | 7.031   | 8.05   | 10     | 14      | 20.5    |
| 100 rpm     | 13.43   | 14.06   | 16.1   | 20     | 28      | 41      |

**DG specifications of common pump tubes:**

| Tube<br>Parameter  | 0.5*0.8 | 2.4*0.8 | 1*1 | 2*1 | 3*1 |
|--------------------|---------|---------|-----|-----|-----|
| Wall thickness(mm) | 0.8     |         | 1   |     |     |
| ID (mm)            | 0.5     | 2.4     | 1   | 2   | 3   |
| Pressure (Mpa)     | 0.1     |         |     |     |     |

## Dimensions

Unit: mm

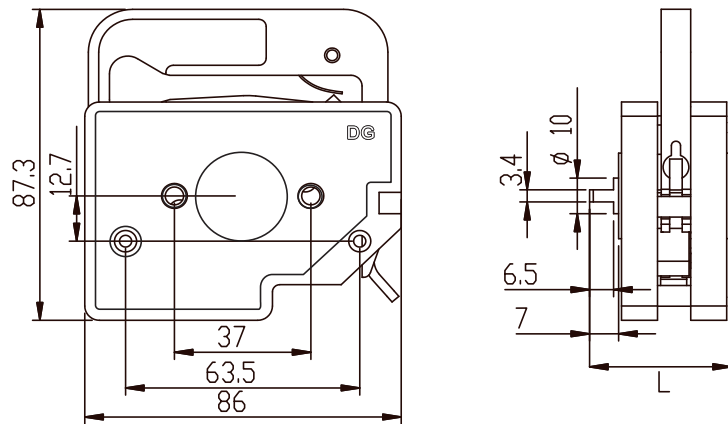


Figure 8 Dimension

| Model  | DG-1 | DG-2 | DG-4 | DG-6 | DG-8 | DG-10 | DG-12 |
|--------|------|------|------|------|------|-------|-------|
| L (mm) | 38.5 | 47.5 | 63.5 | 80.5 | 95.5 | 112.5 | 128   |

## Comparison Table of Gear Card Tube and Reference Gear

| Tube No.<br>(ID) | Material      | Reference Gear Selection |        | Card Gear Color                                                                                                                                    |
|------------------|---------------|--------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |               | DG6                      | DG10   |                                                                                                                                                    |
| 0.5              | Silicone tube | Red                      | White  | Yellow: First gear<br>White: Second gear<br>Black: Third gear<br>Red: Fourth gear<br>Blue: Fifth gear<br>Green: Sixth gear<br>Purple: Seventh gear |
| 1                |               |                          | Yellow |                                                                                                                                                    |
| 2                |               | Black                    | White  |                                                                                                                                                    |
| 2.4              |               |                          | Yellow |                                                                                                                                                    |
| 3                |               |                          | Yellow |                                                                                                                                                    |
| 0.13—3.2         | PVC pharmed   | Green                    | Blue   |                                                                                                                                                    |
| 0.13—3.2         | Fluororubber  | Blue                     | Blue   |                                                                                                                                                    |

## Technical Parameters

### DG series pump head

|                         |                                                                                  |
|-------------------------|----------------------------------------------------------------------------------|
| Suitable Drive          | BT10XX series, BT100X-1 series                                                   |
| Suitable Tube Size      | Wall Thickness: 0.8mm-1mm, ID: 0.13mm-3.17mm                                     |
| Suitable Tube Type      | Silicone, Pharmed etc.                                                           |
| Speed Range             | 0-100rpm                                                                         |
| Flow Range              | 0-49 mL/min                                                                      |
| Channels                | 1, 2, 3 (OEM customization), 4, 6, 8, 10, 12                                     |
| No. of Rollers          | 6 rollers, 10 rollers. 304 stainless steel (316 material needs to be customized) |
| Case Material           | ABS                                                                              |
| Card Material           | POM, PVDF optional                                                               |
| Pressure Tube Structure | Gear adjustment type, spring adaptive type                                       |
| Work Environment        | Temperature 0~40°C Relative humidity <80%                                        |
| Dimensions (mm)         | L*86*87.2mm                                                                      |