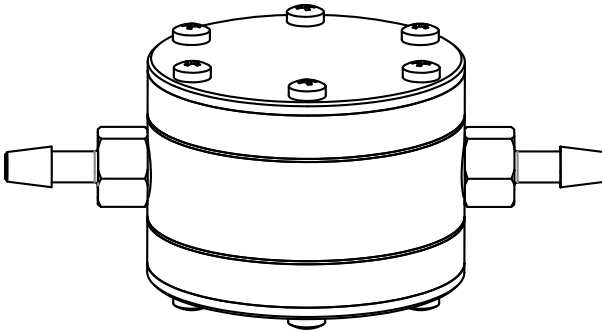




# ZN60/ZN100 Pulse Damper Operating Manual



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## Safety Precautions



### Attention

- Please review the manual thoroughly before operation.
- For optimal performance, the pulse damper is to be used in conjunction with a peristaltic pump. Connecting other types of pumps may potentially impair the damper's performance or cause damage.
- Ensure that the distance between the pulse damper outlet and the pipeline outlet is adequate. A too-short distance could reduce the effectiveness of the damper.
- While using the pulse damper, it's common to observe temporary air bubbles in the pipeline. This condition typically resolves itself after a short period of time.
- When transporting supercooled or overheated liquids, reduce flow rate and allow sufficient preheating or precooling time for the pulse damper to prevent leakage at threaded joints due to temperature variations. Ensure the pulse damper operates within specified calibration parameters. We're not liable for any personal injury or material loss resulting from usage beyond these parameters.



### Note

The chemical compatibility table provided serves as a tool for evaluating the suitability of the pulse damper for particular liquid transmissions. The compatibility testing duration is 48 hours. Golander does not guarantee the application of these chemicals in other contexts.



### Warning

Changes in temperature, pressure, concentration, and other conditions can alter fluid properties, increasing the risk of damper failure and leakage, which could lead to severe injury or material loss. Please exercise caution when handling chemicals, particularly toxic substances, to mitigate the risk of personal injury and damage. Furthermore, this product is not designed for use in clinical medicine.

# Sicherheitsmaßnahmen



## Achtung

- Bitte lesen Sie das Handbuch gründlich vor der Inbetriebnahme durch.
- Für optimale Leistung sollte der Impulsdämpfer in Verbindung mit einer Peristaltikpumpe verwendet werden. Die Verwendung anderer Pumpentypen kann die Leistung des Dämpfers beeinträchtigen oder Schäden verursachen.
- Stellen Sie sicher, dass der Abstand zwischen dem Auslass des Impulsdämpfers und dem Auslass der Schlauchleitung ausreichend ist. Ein zu kurzer Abstand könnte die Wirksamkeit des Dämpfers verringern.
- Während der Verwendung des Impulsdämpfers können vorübergehende Luftblasen in der Schlauchleitung auftreten. Dieser Zustand löst sich in der Regel nach kurzer Zeit von selbst.
- Bei der Übertragung von unterkühlten oder überhitzten Flüssigkeiten den Durchfluss verringern und ausreichend Zeit für Vorheizen oder Vorkühlen des Impulsdämpfers einplanen, um Undichtigkeiten an Gewindeverbindungen aufgrund von Temperaturschwankungen zu vermeiden. Betrieb des Impulsdämpfers innerhalb der angegebenen Kalibrierungsparameter sicherstellen. Keine Haftung für Verletzungen oder Materialverluste bei Verwendung außerhalb dieser Parameter.



## Hinweis

Die bereitgestellte chemische Verträglichkeitstabelle dient als Referenz zur Bewertung der Eignung des Impulsdämpfers für bestimmte Flüssigkeitstransmissionen. Die Dauer der Verträglichkeitsprüfung beträgt 48 Stunden. Golander übernimmt keine Garantie für die Verwendung dieser Chemikalien in anderen Kontexten.



## Warnung

Änderungen der Temperatur, des Drucks, der Konzentration und anderer Bedingungen können die Eigenschaften von Flüssigkeiten verändern und das Risiko von Dämpferausfällen und Undichtigkeiten erhöhen, was zu schweren Verletzungen oder Materialverlusten führen kann. Bitte seien Sie beim Umgang mit Chemikalien, insbesondere mit giftigen Substanzen, vorsichtig, um das Risiko von persönlichen Verletzungen und Schäden zu minimieren. Darüber hinaus ist dieses Produkt nicht für den Einsatz in der klinischen Medizin vorgesehen.

# 1 Description

The Pulse Damper serves as a pressure vessel designed to mitigate liquid pressure pulsations and flow fluctuations within a pipeline. It effectively stabilizes fluid pressure and flow, mitigates pipeline vibrations, and safeguards downstream instruments and equipment.

The main body of the ZN60/ZN100 Pulse Damper is made of PTFE (polytetrafluoroethylene) material and tailored specifically for peristaltic pump applications. When considering use with other pump types or under different conditions, consult the damper's performance parameters.

The internal volume of the ZN60 Pulse Damper is around 11ml, withstanding a maximum pressure of 0.18MPa at room temperature. For the ZN100 Pulse Damper, the internal volume is approximately 94ml, capable of withstanding a maximum pressure of 0.25MPa at room temperature.

# 2 Applications

- Pulse frequency: 0 to 2000 Hz
- Flow Rate for ZN60: 0 to 1200 ml/min
- Flow Rate for ZN100: 500 to 8000 ml/min

Applicable tubing for each model:

- ZN60: 14#, 19#, 16#, 25#, 17#, 15#, 24#;
- ZN100: 16#, 15#, 25#, 17#, 24#, 18#, 35#, 36#, 73#, 82#.

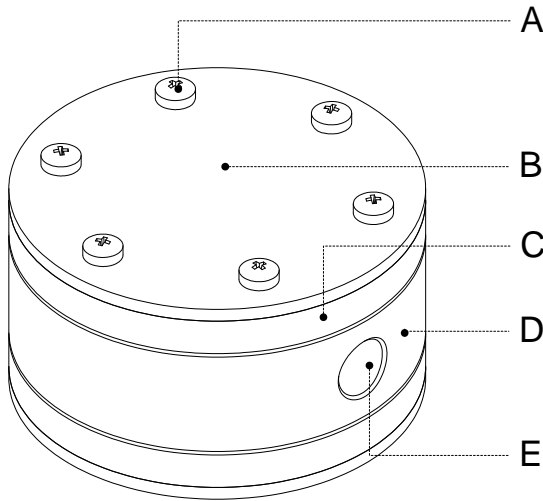
# 3 Functions and Features

With its simple structure, compact size, and user-friendly design, this product is well-suited for a diverse array of high-flow applications, effectively minimizing fluctuations during high-throughput liquid transmission.

The damper body incorporates spoiler wings, serving to convert fluid laminar flow at the input interface into turbulence, thereby dissipating some of the fluid's pulsation energy. Additionally, these wings divert fluid to the buffer membrane, where it is absorbed and mitigates fluid pulse energy.

Equipped with a pressure ring and limit cover on the buffer film surface, the pulse damper offers protection against pipeline pressure and sharp object damage, prevents fluid overflow, provides explosion-proof capabilities, and mitigates potential safety risks associated with fluid pulse dampers.

## 4 Components and Connectors



*Figure 1. Components and Connectors*

- A. Bolt: Used to install and secure the limit cover and pressure ring.
- B. Limit Cover: Transparent material, allows observation of liquid flow state within the damper, while also serving as a protective structure to isolate the internal and external environments of the damper.
- C. Pressure Ring: Circular structure designed to evenly press the

buffer structure onto the damper body.

- D. Body: The main structure of the damper, with the central space serving as a buffer chamber for liquid pulsations, and internally equipped with spoiler wings to suppress pulsations.
- E. Connector Hole: Threaded hole with NPT threads, where the connector hole for ZN60 is 1/8 NPT and for ZN100 is 3/8 NPT. Install pipe connectors of matching sizes based on the specific tubing used in operation.
- Please refer to Pulse Dampener Connectors for connector and pipeline specifications.
  - Ensure that the direction of liquid flow through the damper aligns with the directional arrow indicated on the limit cover.
  - To prevent leakage at the connection between the damper and connector, securely tighten the joint during installation. Please note that this product utilizes an end-face seal joint, where the joint's end face should be snug against the sealing ring at the bottom of the threaded hole. The tightening torque for the joint is 0.15 N·m (alternatively, it can be determined by observing the distance between the joint and the damper. While tightening, ensure the connector is close to the exterior of the damper body, with a distance of approximately 0.5mm).
  - Due to the high internal pressure during damper operation, it is imperative to ensure proper sealing of the pipeline and connectors.

## 5 Operating Instructions

### 5.1 Damper Installation

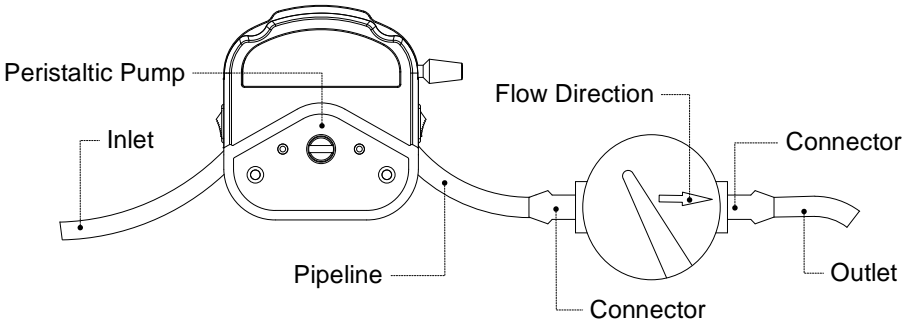


Figure 2. Damper Installation

- (1) Connect the NPT connectors to the damper.
- (2) Connect the pipeline with the connector, ensuring that the distance between the fluid outlet and the damper exceeds 20cm.

**Note:** The installation direction indicated on the damper should align with the direction of liquid flow.

- (3) Install tubing on the peristaltic pump.

### 5.2 Buffer Film Replacement

The damper comes pre-installed with a 0.5mm buffer film. Additionally, the product package includes two pieces each of 0.1mm and 0.2mm buffer films, along with two buffer film gaskets. If the inner diameter of the tubing exceeds 4.8mm and the damping effect is not noticeable, at speeds below 300rpm, users are advised to replace the buffer film with a thinner one. The specific replacement method is outlined below.



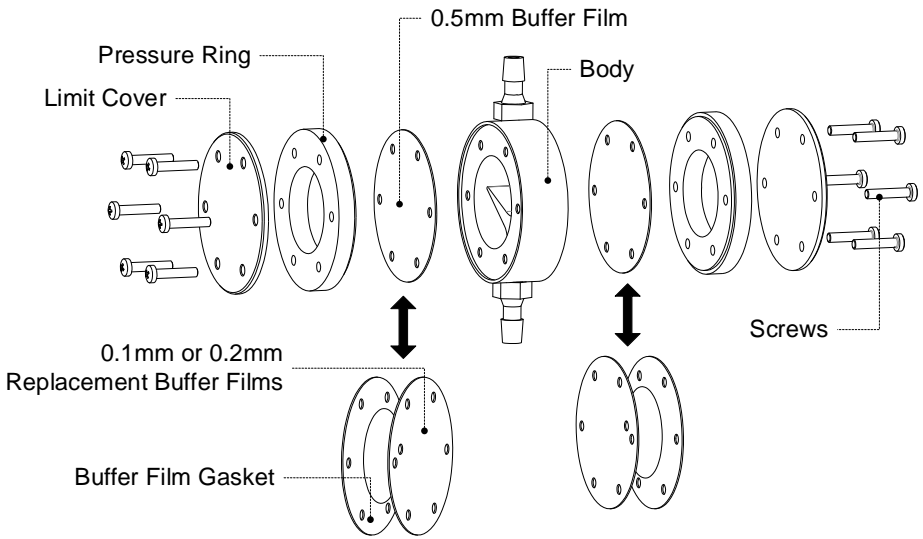


Figure 3. Disassemble Damper

- (1) Remove the fastening screws on both upper and lower sides of the ZN60/ZN100 damper (as shown in [Figure 3](#)), disassemble the damper, and take out the 0.5mm buffer film.
- (2) Remove the 0.2mm or 0.1mm buffer film from the package, peel off the protective film from both sides, and take out two buffer film gaskets. Affix one side of the buffer film gasket to the pressure ring, then attach the thinner replacement buffer film to the other side of the buffer film gasket. Finally, tighten the screws on the top of the body.
- (3) When installing one side of the buffer film, first ensure that the body aligns flush with the embedded nut surface (as shown on the left side of [Figure 4](#)). Begin by screwing in the screws on the top, but do not tighten them at this point. Proceed to screw in the screws underneath the body, then tighten them (as shown on the right side of [Figure 4](#)). This sequence is important as tightening screws opposite to the embedded nut first will prevent the nut from slipping inside the body. Finally, tighten the screws on the top.

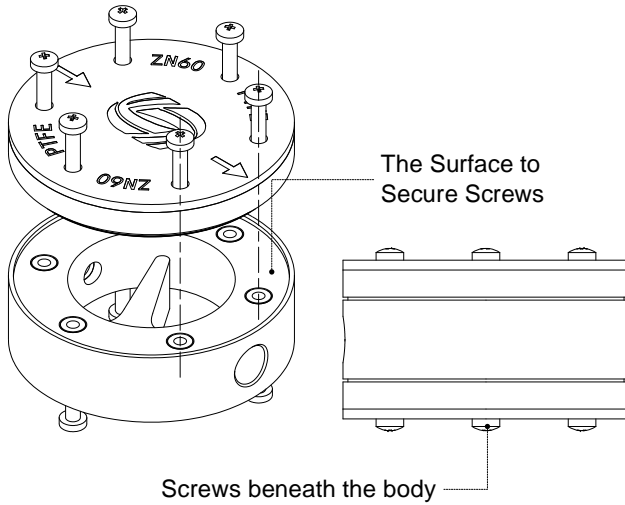


Figure 4. Disassemble Damper

(4) After installation, ensure that there are no wrinkles in the buffer film.

**Note:** The damper material is soft, so please do not remove the connector from the damper when it is unnecessary!

## 6 Regular Maintenance

To prevent liquid from settling and crystallizing in the damper, it's important to promptly wash the damper after use.

## 7 Malfunction and Maintenance

### 7.1 Warranty

The product includes a one-year warranty for both labor and parts. The limited warranty does not cover any damage that is caused by improper usage and handling.

## 7.2 Malfunction Solutions

| Malfunction  | Solution   |
|--|--|
| 1. Pronounced pulsations at the outlet                 | <ol style="list-style-type: none"> <li>1. The liquid flow rate exceeds the upper limit. Replace the tubing with a larger inner diameter and reduce the speed of peristaltic pump.</li> <li>2. The liquid flow rate is too low. Replace the tubing with a smaller inner diameter and increase the speed of peristaltic pump</li> <li>3. The outlet pipeline of damper is too short. Extend the length of the outlet pipeline.</li> <li>4. If the damper is inverted or tilted, the inner space of the damper will be filled with liquid. Empty the damper and keep it upright.</li> <li>5. Condensation of liquid vapor in the damper can lead to a decrease in pressure within the damper's inner space. Maintain the damper's temperature close to that of the liquid to prevent condensation.</li> </ol> |
| 2. Liquid leakage between the damper and the connector | <ol style="list-style-type: none"> <li>1. Ensure that the connector is tightened properly. If necessary, retighten the connector.</li> <li>2. If the sealing ring at the connector fails to seal, replace the sealing ring.</li> <li>3. Repeated installation of the connectors may have caused damage to the damper threads. Trim the damper threads as needed.</li> </ol>  |
| 3. Leakage from the damper screws                      | <ol style="list-style-type: none"> <li>1. If the screws on both sides of the damper are loose, use tools to tighten them securely.</li> <li>2. If the liquid pressure is excessively high and the damper fails, determine the transmission</li> </ol>  |

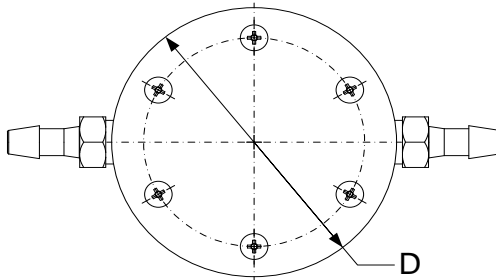
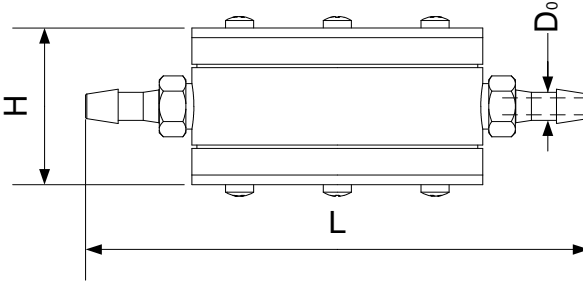
## ZN60/ZN100 Pulse Damper

liquid characteristics and select the appropriate buffer film or damper model.



If a problem cannot be solved, please contact the manufacturer or distributor.

## 8 Pulse Damper Connectors



### ZN60 Damper

| Model |   | NPT Connector | Applicable tube | Dimensions(mm) |      |     |     |
|-------|---|---------------|-----------------|----------------|------|-----|-----|
|       |   |               |                 | D              | H    | L   | Do  |
| ZN60  | A | 1/8-2.4       | 14#, 19#        | 58             | 32.5 | 85  | 3.6 |
|       | B | 1/8-3.2       | 16#, 19#        |                |      | 91  | 4.8 |
|       | C | 1/8-4.0       | 16#, 25#        |                |      | 95  | 5.8 |
|       | D | 1/8-4.8       | 15#, 25#        |                |      | 99  | 7.1 |
|       | E | 1/8-6.4       | 17#, 24#        |                |      | 112 | 8.9 |

**ZN100 Damper**

| Model |   | NPT Connector | Applicable tube | Dimensions(mm) |    |     |      |
|-------|---|---------------|-----------------|----------------|----|-----|------|
|       |   |               |                 | D              | H  | L   | Do   |
| ZN100 | A | 3/8-6.0       | 16#,15#,25#     | 99             | 63 | 162 | 6.5  |
|       | B | 3/8-8.0       | 17#, 24#        |                |    | 162 | 8.5  |
|       | C | 3/8-10.0      | 18#, 35#        |                |    | 168 | 10.5 |
|       | D | 3/8-12.0      | 36#, 73#        |                |    | 172 | 12.5 |
|       | E | 3/8-14.0      | 73#, 82#        |                |    | 174 | 14.5 |
|       | F | 3/8-16.0      | 82#             |                |    | 174 | 16.5 |

**9 Chemical Compatibility**

|                          |                        |                                 |                    |                               |                                 |
|--------------------------|------------------------|---------------------------------|--------------------|-------------------------------|---------------------------------|
| Ammonia                  | Calcium hydroxide      | Aluminum sulfate                | Magnesium chloride | Barium hydroxide              | Rosin                           |
| 10% Ammonia              | Lye: sodium hydroxide* | 10% Aluminum potassium sulfate  | Sodium chloride    | Calcium hydroxide             | Whisky and wine                 |
| White liquor (pulp mill) | Glue, P.V.A.           | 100% Aluminum potassium sulfate | Nickel chloride    | Calcium hydroxide (saturated) | Detergent                       |
| Propylene glycol         | Propylene glycol       | magnesium sulphate (Epsom salt) | Copper chloride*   | 10% Calcium hydroxide         | Potassium nitrate               |
| Ozone                    | Buttermilk             | Manganese sulfate*              | Honey              | Magnesium hydroxide           | Silver nitrate                  |
| Propanol                 | Ammonium phosphate     | Sodium sulphate                 | Alum*              | Sodium hydroxide (20%)**      | Epsom salts (magnesium sulfate) |
| Methanol                 | Diammonium phosphate** | Nickel sulfate                  | Gelatin            | Sodium hydroxide (50%)*       | Sodium sulfite                  |

## ZN60/ZN100 Pulse Damper

|                       |                       |   |                         |                                    |                   |
|-----------------------|-----------------------|---|-------------------------|------------------------------------|-------------------|
| Isopropanol**         | Triammonium phosphate | Sodium bisulfate                        | Citric acid             | Sodium hydroxide (80%)*            | Sodium bisulfite  |
| Isobutanol**          | Trisodium phosphate   | 5% Copper sulphate                      | Milk                    | Potassium cyanide solution         | Calcium oxide     |
| Vinegar               | Sodium sulfosulfate   | >5% Copper sulphate                     | Boric acid              | Liquid sodium cyanide              | Carbon monoxide** |
| Lead acetate          | Barium sulfide        | Zinc sulfate                            | Sodium borate(borax)    | Copper cyanide                     | Glycolic acid     |
| Acetic acid steam     | Potassium sulfide     | Barium chloride                         | Beer                    | Cyanic acid*                       | Ethylenediamine   |
| 10% hydrogen peroxide | Sodium sulfide        | Calcium chloride (30% aqueous solution) | Sodium metaphosphate    | Latex                              | Glycol            |
| Seawater*             | Ammonium sulphate     | Calcium chloride (saturated)            | Glucose                 | Deionized water**                  | Acetaldehyde      |
| Methanol              | Barium sulfate        | Potassium chloride                      | Glucose                 | Lactic acid                        | Acetylene         |
| 10% Methanol          | Potassium sulphate    | Lithium chloride *                      | Grape Juice             | Photographic developing solution * | Castor oil        |
| Natural gas           | Beet juice*           | soybean oil                             | Peanut oil              | Cottonseed oil                     | Flax seed oil     |
| Coconut oil           | Corn oil              | Sugarcane juice                         | Potassium dichromate    | Calcium bisulfite                  | Cupric acid*      |
| Carbonic acid         | Calcium carbonate     | Sodium carbonate                        | Potassium bicarbonate * | Sodium bicarbonate                 | Sugar (liquid)    |

**Note:** \* - Test condition: 22 °C (-5.6 °F).

\*\* - Test Condition: 48 °C (8.9 °F).

For other reagent compatibility, please contact us.

## 10 Specifications

|                            |  |
|----------------------------|--|
| <b>Model number</b>        | <b>ZN60-PTFE</b>   |
| <b>Tube inner diameter</b> | 1.6-3.2mm  |
| <b>Tube model</b>          | Silicone, Pharmed, PVC, Viton, A-60-G/F (please refer to silicone tubing for tubing selection) |
| <b>Working pressure</b>    | 0.15MPa  |
| <b>Maximum pressure</b>    | 0.18MPa  |
| <b>Material</b>            | PTFE, silicone   |
| <b>Seal up</b>             | Silicone   |
| <b>Damper connector</b>    | 1/8 NPT  |
| <b>Internal volume</b>     | 11ml   |
| <b>Work conditions</b>     | 0-80°C (temperature drop≤5 °C /min)  |
| <b>Dimensions</b>          | 58*58*32.5mm   |
| <b>Damper weight</b>       | 132g   |

|                            |  |
|----------------------------|--|
| <b>Model number</b>        | <b>ZN100-PTFE</b>  |
| <b>Tube inner diameter</b> | 3.1-13mm   |
| <b>Tube model</b>          | Silicone, Pharmed, PVC, Viton, A-60-G/F (please refer to silicone tubing for tubing selection) |
| <b>Working pressure</b>    | 0.2MPa   |
| <b>Maximum pressure</b>    | 0.25MPa  |
| <b>Material</b>            | PTFE, silicone   |
| <b>Seal up</b>             | Silicone   |
| <b>Damper connector</b>    | 3/8 NPT  |
| <b>Internal volume</b>     | 94ml   |
| <b>Work conditions</b>     | 0-80°C (temperature drop≤5 °C /min)  |
| <b>Dimensions</b>          | 99*99*63   |
| <b>Damper weight</b>       | 625g   |

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