DISPENSING VALVE

MODEL VD510

INSTRUCTION MANUAL
CONTENTS

1 Introduction  page 3

2 Specifications  page 3

3 Part Description  page 4

4 Operation Principles  page 5

5 Operating Procedure  page 6
   5-1 Setup  page 6
   5-2 Maintenance  page 9

6 Sectional Drawing & Dimension  page 11

7 Exploded View & Parts List  page 12
1. INTRODUCTION

The VD510 is a diaphragm valve designed for precise flow control of low to medium viscosity materials (under 10,000 cps). The valve is ideal for dispensing cyanoacrylates, reagents, electrolytes, glues, solvents, paints, alcohol and other volatile substances. Shot sizes may be fine tuned by turning the stroke adjustment knob at the top of the valve.

2. SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Air Pressure</td>
<td>4.0~6.0kgf/cm² (60-90)</td>
</tr>
<tr>
<td>Material Delivery Pressure</td>
<td>Max 5.0kgf/cm²</td>
</tr>
<tr>
<td>Maximum Number of Cycle</td>
<td>500 cycles or more/min</td>
</tr>
<tr>
<td>Flux (KV value)</td>
<td>0.3ℓ/min</td>
</tr>
<tr>
<td>Minimum Shot Size</td>
<td>0.001 (material dependant)</td>
</tr>
<tr>
<td>Valve Structure</td>
<td>Diaphragm Valve</td>
</tr>
<tr>
<td>Weight</td>
<td>76g (2.7oz)</td>
</tr>
<tr>
<td>Driving Part Materials</td>
<td>Body : AL (Hard coated, Black)</td>
</tr>
<tr>
<td></td>
<td>Piston : SUS303</td>
</tr>
<tr>
<td></td>
<td>Piston Seal : NBR</td>
</tr>
<tr>
<td>Wetted Part Materials</td>
<td>Valve Head : UHMW-PE (option : Teflon, PEEK, Acetal)</td>
</tr>
<tr>
<td></td>
<td>Diaphragm : UHMW-PE</td>
</tr>
<tr>
<td>Connecting Ports</td>
<td>Operating Air Inlet: M5xP0.8</td>
</tr>
<tr>
<td></td>
<td>Material Inlet: BSPT1/8&quot;</td>
</tr>
<tr>
<td></td>
<td>Material Outlet: Luer Lock</td>
</tr>
</tbody>
</table>
3. PART DESCRIPTION

Stroke Adjust Knob
You can control the flux. If you lock the knob the stroke will be shorter. In this way you can decrease the flux.

Stroke index Tape
The range of stroke for flux control is 0~0.8mm. This range is converted into circle type.

Reference Mark

Mount Hole (opposite side) 
(M5×P0.8×D8)

Driving Part

Air In Port(M5×P0.8)
This is air connecting port which is linked to dispenser controller. (*4 ethane hose)

CHECK PORT
This checks if diaphragm is damaged. (In case of damage materials will be leaked)

Diaphragm
Diaphragm acts as a seal between driving part and liquid contacting part.

Chamber
Depending on the distance between needle of diaphragm and valve seat, the dispensing amount will be changed.

Needle
Choose proper needle according to the dispensed material and its amount.

Material of Inner Port(PT1/8")
Wind teflon tube on the fitting to prevent leakage.

Index Tape for Flux Control (Luer Lock)
You can mount standard needle.
4. OPERATION PRINCIPLES

<table>
<thead>
<tr>
<th>Dispensing OFF</th>
<th>Dispensing ON</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="Image" alt="Dispensing OFF" /></td>
<td><img src="Image" alt="Dispensing ON" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stroke</th>
<th>Shot Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>short</td>
<td>small</td>
</tr>
<tr>
<td>long</td>
<td>large</td>
</tr>
</tbody>
</table>

In the “Normal” state (air off), the diaphragm is closed – material is not dispensed.

Because "Air" is not entering into the driving parts, the diaphragm is closed. In this case, the material path is closed, so material is not dispensed.

When air is applied, the diaphragm is opened and material is dispensed.

If air is applied to the valve, the diaphragm will open. At this time material will be dispensed.

You can increase or decrease the shot volume by adjusting the stroke (shot volume control knob).

⚠️ **Notice**

The maximum stroke length is 0.6mm (1 rotation). There is no effect after turning the knob more than (1) rotation.
5. OPERATING PROCEDURE

5-1. Setup

(example for general installation)
5-1-1) Fasten the valve firmly using mount hole.
   (M5*P0.8*D98)
5-1-2) Connect air hose to Air In Port and Controller.
   Valve driving pressure is Min 4.0kgf/cm² or more.

5-1-3) Connect fitting for material supply hose to the inner port (BSPT1/8")

⚠️ Notice
Do not insert fitting too deeply (7 mm or more).

5-1-4) Connect a suitable sized needle to the outer port.

5-1-5) Adjust the material pressure (max 5.0kgf/cm²).
   When dispensing low viscosity materials (like water, solvent) set material pressure at
   0.5kgf/cm². For high-viscosity materials, set material pressure at 2.0kgf/cm².
   Increase or decrease pressure as needed.

5-1-6)
   At the time of delivery, the scale of shot volume control knob is being initiated
to point 3(½ of full stroke). Increase or decrease the number as needed.

Maximum length of stroke is 0.6 mm.
   (This is corresponding to the amount when shot volume control knob makes 1 round).

⚠️ Notice
If you make 2 or more revolutions counterclockwise, the tensile strength of spring
is weaker and the valve becomes open state all the time. In this way liquid can
be dispensed.

5-1-7) 
After steady mode in controller and reducing pressure of pressure container,
make dispensing the liquid come out slowly.
   (This is to remove bubble and dispense the first liquid from valve)
5-1-8)
Choose "timer" or "steady" mode of controller according to the state of dispensing.

5-1-9)
You can control dispensing amount by selecting 1 of following 4 options.

4 options

<table>
<thead>
<tr>
<th>By increasing or decreasing pressure to container</th>
<th>Pressure increase → Dispensing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pressure decrease → Dispensing</td>
</tr>
<tr>
<td>Thickness of Needle</td>
<td>Thick Needle → Dispensing amount</td>
</tr>
<tr>
<td></td>
<td>Thin Needle → Dispensing amount</td>
</tr>
<tr>
<td>Flux Control Knob</td>
<td>Long stroke → Dispensing amount</td>
</tr>
<tr>
<td></td>
<td>Short stroke → Dispensing amount</td>
</tr>
<tr>
<td>Dispensing Time</td>
<td>Long dispensing time → Dispensing</td>
</tr>
<tr>
<td></td>
<td>Short dispensing time → Dispensing</td>
</tr>
</tbody>
</table>

*Choose the way of controlling dispensing time preferentially to get proper dispensing amount.
5-2. Maintenance

5-2-1) Washing

① Wash valve thoroughly after using if dispensed liquid has tendency to be stiff or has possibility to damage liquid contacting part.

② First of all dispense all liquid entirely from pressure container, liquid supply hose and liquid contacting part until sufficient air comes out.

③ Wash liquid inside of valve with a little of proper solvent.

④ Then wash thoroughly in order of air→solvent→air→solvent.

5-2-2) Disassembly

① In case of disassembly for washing or replacing part, refer to "7. Exploded View & Parts List".

② In case of washing valve head with sharp pin or others, try not to scratch needle or seat part. If damaged you need to replace parts because of leakage.

5-2-3) Assembly

① Diaphragm Assembly

① Loosen stroke control knob by turning twice counterclockwise.

② Separate valve head.
Remove diaphragm by turning counterclockwise.

Screw new diaphragm carefully to become horizontal to piston road screw-thread.

⚠️ **Notice**
If it isn't fit thread properly leakage may occur.

After fixing diaphragm at regular intervals (0.4mm) like the picture, for matching cylinder body and mount screw, please turn to the location that you want using a screwdriver like next picture.

To reinstall valve head fasten L(hexagon)-wrench bolt firmly.

Fasten stroke control knob until it is closed.

Then open it again until stroke is appropriate.

⚠️ **Notice**
Scale may not indicate to ‘0’ of reference mark. In this case refer to relative scale.

(No problem to use)
6. SECTIONAL DRAWING & DIMENSIONS

▶ Cross-sectional View

Driving Part  Dosing Part

▶ Dimension

- Measurements shown in millimeters.
7. EXPLODED VIEW & PARTS LIST

▶ Exploded View

▶ Parts List

<table>
<thead>
<tr>
<th>Part No</th>
<th>Description</th>
<th>Q'TY</th>
<th>Part No</th>
<th>Description</th>
<th>Q'TY</th>
</tr>
</thead>
<tbody>
<tr>
<td>VD510-1</td>
<td>CHAMBER</td>
<td>1</td>
<td>VD510-7</td>
<td>WASHER</td>
<td>1</td>
</tr>
<tr>
<td>VD510-2</td>
<td>CYLINDER</td>
<td>1</td>
<td>VD510-8</td>
<td>O-RING(P4)</td>
<td>1</td>
</tr>
<tr>
<td>VD510-3</td>
<td>CYLINDER CAP</td>
<td>1</td>
<td>VD510-9</td>
<td>O-RING(AS016)</td>
<td>1</td>
</tr>
<tr>
<td>VD510-4</td>
<td>COLLAR</td>
<td>1</td>
<td>VD510-10</td>
<td>SPRING</td>
<td>1</td>
</tr>
<tr>
<td>VD510-5</td>
<td>DIAPHRAGM</td>
<td>1</td>
<td>VD510-11</td>
<td>O-RING(P15)</td>
<td>1</td>
</tr>
<tr>
<td>VD510-6</td>
<td>PISTON</td>
<td>1</td>
<td>561964</td>
<td>FITTING</td>
<td>1</td>
</tr>
</tbody>
</table>

561964 FITTING