Original Instructions CE

Doc. No.	NDP 524M-03

MAINTENANCE MANUAL

YAMADA PULSATION DAMPENER SERIES

AD Series

⚠ WARNING

・For safety reasons, be sure to read this maintenance manual thoroughly before starting maintenance of this product. After reading the manual, keep it in an easy-to-access place so that the user may refer to it whenever necessary.

This maintenance manual describes the items required for maintenance of the YAMADA Pulsation Dampener AD Series.
This document is based on products that were manufactured in July 2022 or sooner. Note that its contents are subject to change as a result of specification changes to be made in future. The units described in this manual are unified into SI units (international system of units).

・Warnings and Cautions

To use this product safely, be sure to observe the contents of the following descriptions. In this manual, warnings and cautions are indicated by using symbols. These symbols are intended to prevent death or serious injury. Each symbol is indicated and has a definition shown below. Read the description with a good understanding of its contents.

⚠WARNING : This indicates the existence of potential hazard which, if not avoided, will result in death or serious injury.

⚠CAUTION : This indicates the existence of potential hazard which, if not avoided, may result in bodily injury or in physical damage.

To indicate the contents of danger and damage, the following symbols are used together with the above indications.

This symbol indicates an act that is prohibited.

This symbol indicates the contents that must be observed.

⚠WARNING

・Before starting maintenance, shut off supply air and clean the pulsation dampener. If air pressure or residual liquid remains in the pulsation dampener, damage or explosion may occur.
(For cleaning the pulsation dampener, refer to Chapter 6 of the Operation Manual.)

・When replacing parts, be sure to use the genuine YAMADA parts or equivalents. Using parts other than genuine parts may result in failure.
(Refer to Parts list the separate sheets.)

⚠CAUTION

・When it is indicated that dedicated tools should be used, be sure to use these tools, otherwise the pulsation dampener may be damaged.

・Check the weight of the pulsation dampener by referring to “10.1 Main Specifications” in the operation manual and take extreme care when lifting it.

Table of Contents

1. Principles of Operation

1.1 AD-10, AD-25, AD-40 and AD-50

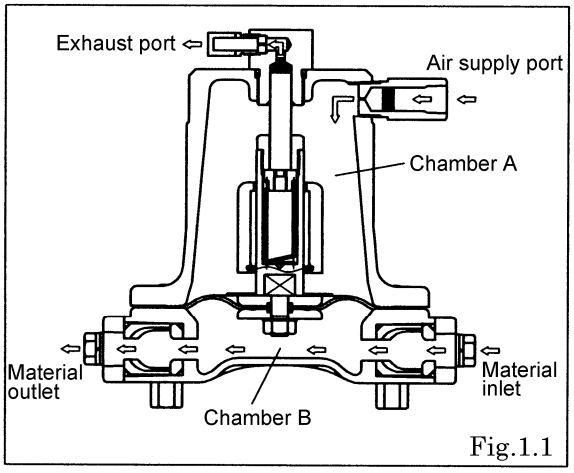

Fig.1.1

Compressed air is introduced into chamber A of the pulsation dampener at the same operating pressure as the Air-Powered Double Diaphragm Pump (APDD). When the APDD Pump produces a pulse (pressure spike), fluid will enter the in-line pulsation dampener raising the diaphragm compressing the air in chamber A.

Fluid remains in the pulsation dampener until the system pressure returns to normal or when the pump begins another stroke. The fluid is then pushed back into the system piping as the trapped compressed air expands.

The pulsation dampener does not restrict fluid flow, nor increase its pressure, but fills the voids and pressure fluctuations created by an APDD Pump.

2. Maintenance and Tools

2.1 Maintenance

Since Pulsation Dampener can be used in many different applications varying in pressure, temperature, viscosity corrosiveness, and other properties, it is best to do a periodic inspection. Recording data on each installed Pulsation Dampener during inspections will also serve as a record for any future maintenance. Typical maintenance involves inspection of the air valve, diaphragms and O-rings.
Diaphragms should be replaced if they show any sign of wear, abrading, or cracking. Refer to this manual for acceptable measurable working tolerances on other wearing components.

2.2 General Tools

- Socket Wrenches
  - 13 mm (AD-10, AD-25P□, AD-25V□)
  - 17 mm (AD-25, AD-40, AD-50)
  - 19 mm (AD-40, AD-50 excluding AD-40P□, AD-40VT)
  - 22 mm (AD-25A□, AD-25S□, AD-25F□)
  - 24 mm (AD-40, AD-50A□, AD-50S□, AD-50F□ excluding AD-40P□, AD-40VT)
- Box wrench
  - 13 mm (AD-10, AD-25P□, AD-25V□)
  - 17 mm (AD-10, AD-25, AD-40, AD-50)
  - 19 mm (AD-40, AD-50 excluding AD-40P□, AD-40VT)
  - 21 mm (AD-10P□)
  - 22 mm (AD-25A□, AD-25S□, AD-25F□)
- For snap ring pliers (AD-10, AD-25, AD-40, AD-50)
- Adjustable angle wrenches
- Hexagonal bar wrench 6 mm (AD-10P□)
- Flat-blade screwdriver

2.3 Dedicated Tools

- Dedicated tool (sold separately)
  Removal of center disk (AD-25P□, AD-25V□)
  Part No.771244

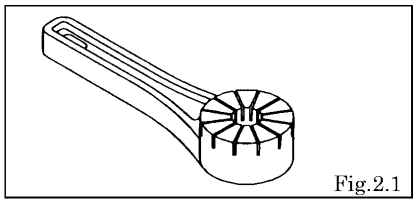
Fig.2.1

- PP wrench (sold separately)
  Removal of center disk (AD-40P□, AD-40VT, AD-50P□, AD-50V□)
  Part No.771868

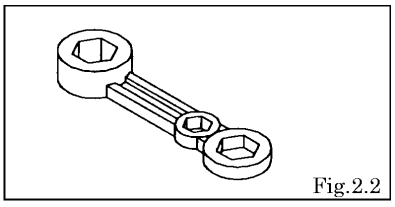
Fig.2.2

- Tweezers for a sleeve (sold separately)
  Removal of a guide
  Part number: 713148

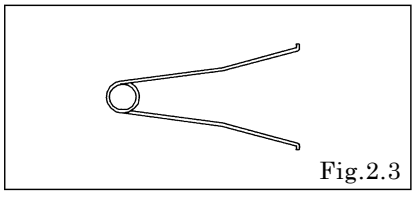
Fig.2.3

2.4 Other

- Grease — Urea grease grade (NLGI) No. 2 or equivalent
- Thread locking agent — Equivalent to LOCTITE® 222

3. Ordering Replacement parts

For accurate and speedy shipment of parts, be sure to order the right parts for your model to distributor. Indicate the part numbers, descriptions, and quantities.

4. AD-10, AD-25, AD-40 and AD-50

4.1 Removal

■A□, S□ and F□ types

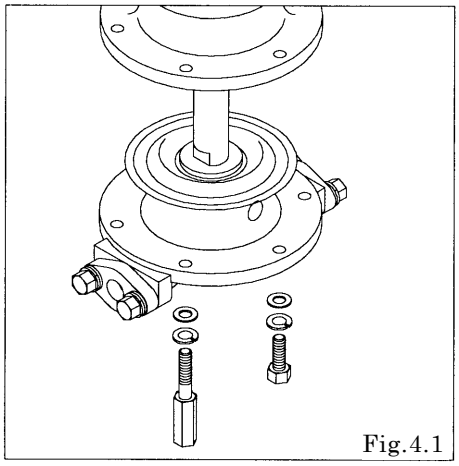

Fig.4.1

・Remove 6 out chamber mounting bolts and studs respectively, and remove the out chamber. (AD-10, AD-25) [Fig. 4.1]
・Remove the 8 out chamber locking bolts, studs and nuts respectively, and remove the out chamber. (AD-40, AD-50) [Fig. 4.1]
・Pull out the diaphragm, center disk and center rod from the main body. [Fig. 4.2]

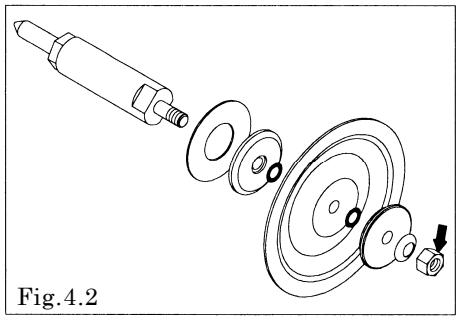

Fig.4.2

・Remove the nut, and remove the center disk, diaphragm and O ring (□T type, 10□C, 10□N) from the center rod. [Fig. 4.2]
＜NOTE＞
・Set the spanner at the 2 way part of the center rod. Be careful not to damage to the slide portion with pipe wrench.

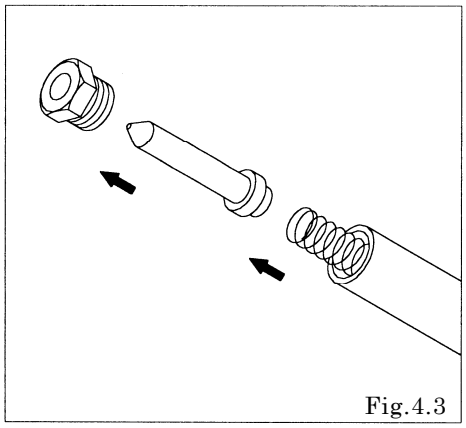

Fig.4.3

・Remove the nut, and remove the valve from the center rod. [Fig. 4.3]
・Remove the nut from the valve.
＜NOTE＞
・Set the spanner at the 2 way part of the center rod. Be careful not to damage to the slide portion with pipe wrench.

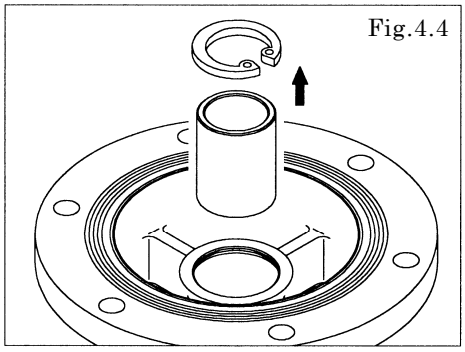

Fig.4.4

・Remove the C type snap ring, and remove the throat bearing from the air chamber. [Fig. 4.4]

■P□ and V□ types

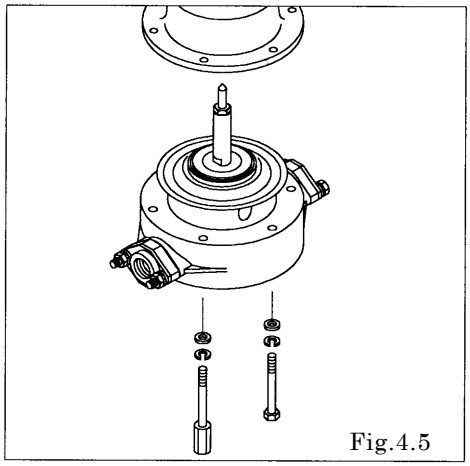

Fig.4.5

・Remove the 6 out chamber locking bolts and studs respectively, and remove the out chamber. (AD-10, AD-25) [Fig. 4.5]
・Remove the 8 out chamber locking bolts, studs and nuts respectively, and remove the out chamber. (AD-40, AD-50) [Fig. 4.5]
・Pull out the diaphragm, center disk and center rod from the main body. [Fig. 4.5]

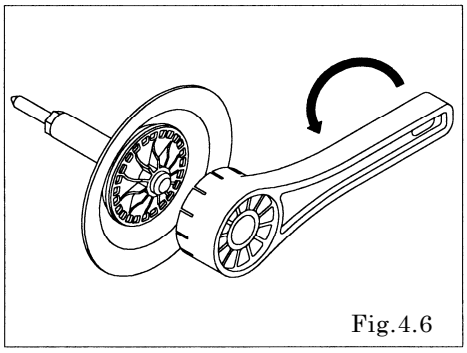

Fig.4.6

・Remove the center disk with spanner (21mm), and remove the diaphragm, center disk and O ring (PC, PT) from the center rod. (AD-10P□ type) [Fig. 4.6]
・Remove the center disk with the attached tool (dedicated tool: part No.771244), and remove the diaphragm, center disk and O ring (□T type) from the center rod. (AD-25P□, AD-25V□ type) [Fig. 4.6]
・Remove the center disk with the PP wrench (dedicated tool: part No.771868), and remove the diaphragm, center disk and O ring (□T type) from the center rod. (AD-40P□, AD-40VT, AD-50P□ and AD-50V□ types) [Fig. 4.6]

＜NOTE＞

・Set the spanner at the 2 way part of the center rod. Be careful not to damage to the slide portion with pipe wrench.

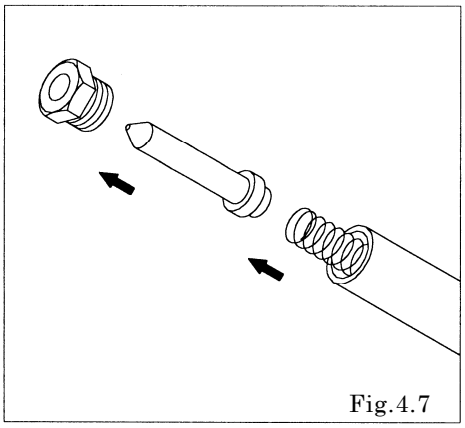

Fig.4.7

・Remove the nut, and remove the valve from the center rod. [Fig. 4.7]

＜NOTE＞

・Set the spanner at the 2 way part of the center rod.
・Be careful not to damage to the slide portion with pipe wrench.

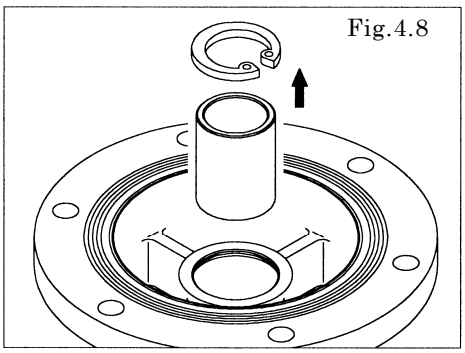

Fig.4.8

・Remove the C type snap ring, and remove the throat bearing from the air chamber. [Fig. 4.8]

4.2 Inspection

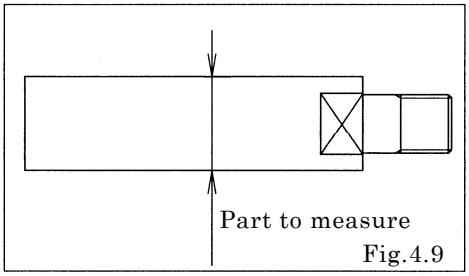

Fig.4.9

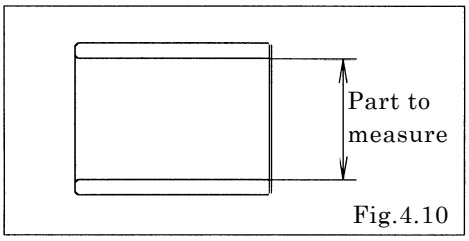

Fig.4.10

・Diaphragm

If the diaphragm is worn or damaged, replace it.

Frequency of inspecting the diaphragms
(Transferring water at room temperature)

AD-10	CR, NBR, PTFE	20,000,000 cycle
	TPEE, TPO	30,000,000 cycle
AD-25 AD-40 AD-50	CR, NBR, EPDM	20,000,000 cycle
	FKM	5,000,000 cycle
	PTFE	6,000,000 cycle
	TPEE, TPO	30,000,000 cycle

*The standard in our facility is 'Air supply pressure 0.5 MPa with no discharge pressure.

*It's recommended to conduct an inspection, if 3 months have passed since you start using the pump, or if the number of cycles reaches the above.

・Center rod [Fig. 4.9]

Measure the diameter. If the diameter is out of the usable range, replace it.

Usable range

Ø22.28 - Ø22.38 mm

・Throat bearing [Fig. 4.10]

Measure the internal diameter. If the internal diameter is out of the usable range, replace it.

Usable range

Ø22.47 - Ø22.63 mm

・Valve

If the valve is worn or damaged, replace it.

4.3 Installation

For installation, see [Exploded View] on the separate sheet and install in the reverse order of disassembly.

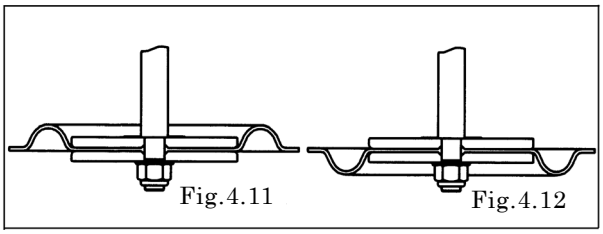
Fig.4.11 Fig.4.12

・AD-10, 25 and AD-40, 50 (□T, □H, □S) of An installation direction of diaphragm. [Fig. 4.11]

・AD-40, 50 (□C, □N, □E , □V) of An installation direction of diaphragm. [Fig. 4.12]

・Install the diaphragm with its convex side upward.

・Apply the screw locking agent and tighten the valve and nut. [Fig. 4.13 A portion]

・Apply the grease on a valve side, a nut and a center rod. [Fig. 4.13 B portion]

・Install the O ring at the center disk. (□T type, AD-10□C and AD-10□N types) [Fig. 4.14, Fig. 4.15]

・Apply the screw locking agent and tighten the center disk with dedicated tool. (part No.771244 :AD-25P□, AD-25V□ type or part No.771868 :AD-40P□, AD-40VT, AD-50P□, AD-50V□ types) [Fig. 4.15]

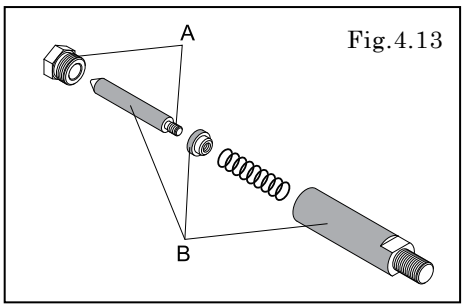

Fig.4.13

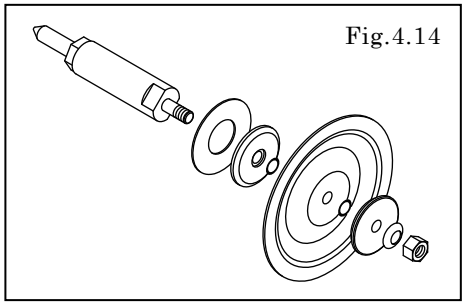
Fig.4.14

Center rod torque

AD-10		12 N・m
AD-25	□C, □N, □E, □V	40 N・m
	□H, □S, □T	
AD-40 AD-50	A□, S□, F□	60 N・m
	P□, V□	50 N・m

Valve torque

AD-10	5 N・m
AD-25	7 N・m
AD-40, AD-50	10 N・m

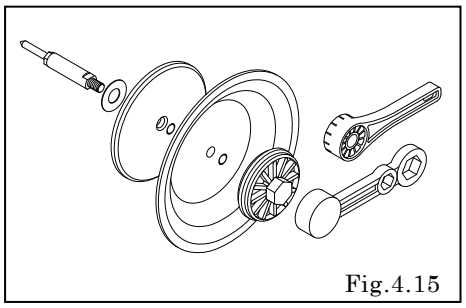

Fig.4.15

Out chamber locking bolt torque

		Diaphragm material	
		C, N, E, V	H, S, T
AD-10		12 N・m	
AD-25		10 N・m	20 N・m
AD-40	A□, S□, F□	40 N・m	
AD-50	P□, V□	35 N・m	

＜NOTE＞

・Torque bolts diagonally for uniform force.

・Take care about the installation direction of the conical spring.

4.4 Torque

・The torque should be applied on the occasion of

(1) Immediately before you operate the dampener for the first time.

(2) Liquid leakage is found at routine inspection.

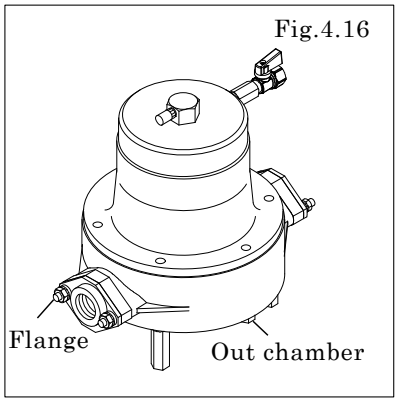

Fig.4.16

Plastic type (Fig. 4.16)

		Bolt (Out chamber)	Nut (Flange)
AD-10		12 N・m	8 N・m
AD-25	PC, PN, PE, PV, PS, VE, VV, VS	10 N・m	10 N・m
	PT, VT	20 N・m	12 N・m
	PH, VH	20 N・m	10 N・m
AD-40	PC, PN, PE, PV, PT, PH, PS, VT	35 N・m	20 N・m
AD-50	PC, PN, PE, PV, PT, PH, PS, VE, VV, VT, VH, VS	35 N・m	20 N・m

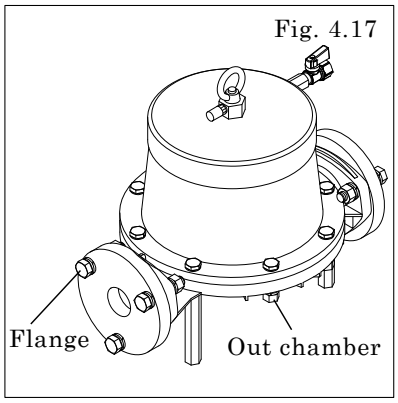

Fig. 4.17

Metal type (Fig. 4.17)

		Bolt (Out chamber)	Nut (Flange)
AD-10		12 N・m	12 N・m
AD-25	□C, □N, □E, □V	10 N・m	10 N・m
	□T	20 N・m	35 N・m
	□H, □S	20 N・m	10 N・m
AD-40, AD-50		40 N・m	25 N・m

＜NOTE＞

・Torque bolt diagonally for uniform force.

・Retighten the out chamber and then the flange in this order.

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