

SHOCK DAMPER

INSTRUCTION MANUAL

Mini M Series

Standard models (Low speeded collision models)

DP-M02A012 (-TE)

DP-M04A018 (-TE)

DP-M08A025 (-TE)

NOTICE FOR SAFETY

- Read thoroughly this Instruction Manual and other attached documents before installing and using SHOCK DAMPER.
- Use SHOCK DAMPER only after having full knowledge of the equipment and all applicable safety procedures.
- Keep this instruction manual where the user can always refer to it.

In this Instruction Manual, safety noticen are divided into two levels : WARNING and CAUTION



WARNING

: There is the possibility of a dangerous situation, death, or serious injury when SHOCK DAMPER is used incorrectly.



CAUTION

: There is the possibility of a dangerous situation, and injury or only physical damage (except for personnel) when SHOCK DAMPER is installed incorrectly.

Note : Even if an item is marked CAUTION there is a possibility of serious injury depending on the situation. For safe operation it is important to comply with the contents of this Instruction Manual.

WARNING

- Fix the object not to move suddenly and to provide safety to any individuals in the area, when installing / removal / maintenance / inspection of SHOCK DAMPER.
- Comply with all applicable safety standards of your country. when revisions are published, the updated editions shall apply.
- When installing / removal / maintenance / inspection of SHOCK DAMPER.
- Comply the Instruction Manual.
- Always lock out power switch.
- Wear safety glasses, protective clothing, gloves and safety shoes.

CAUTION

- Make sure the goods received are exactly as ordered. There is the possibility of injury or damage if the incorrect item is used.
- Adjust the absorption energy of SHOCK DAMPER only when the equipment is stopped.
- Install a mechanical stopper to support the load at the end of the piston stroke.
- Use the fixture with the strength of SHOCK DAMPER's maximum allowable resistance and stronger.
- Capacity / performance of SHOCK DAMPER may decrease due to the wear / life of parts. Do the periodic inspection in accordance with this Instruction Manual. Contact our sales office or our dealers for repair if something is wrong.
- Read thoroughly this Instruction Manual and other attached documents before installing and using SHOCK DAMPER. Contact our sales office or our dealers with Model No. / Series for extra instruction manual.
- Forward this Instruction Manual to the customer who uses SHOCK DAMPER.

1. Direction for installation

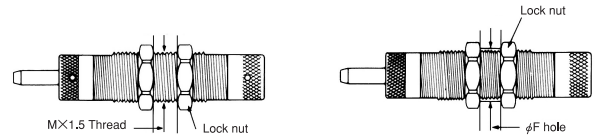
A direction in which SHOCK DAMPER Mini M must be set up is not specified particularly.

2. Installation

- ① Install by mounting in a hole drilled and tapped with $M \times 1.5$ threads as per following Table-1. Tighten supplied lock nut to hold SHOCK DAMPER in place and prevent rotation. It is available to mount SHOCK DAMPER either from a front side or from an opposite side.
- ② Install by mounting in a hole drilled with F-diameter as per following table-1. Tighten supplied lock nuts on both side to hold SHOCK DAMPER in place and prevent rotation.

Table 1.

Type	thread	F-diameter
DP-M02A012 (-TE)	$M20 \times 1.5$	$\phi 20$
DP-M04A018 (-TE)	$M24 \times 1.5$	$\phi 24$
DP-M08A025 (-TE)	$M30 \times 1.5$	$\phi 30$

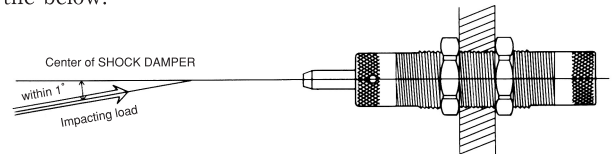


- ③ A Flange - or Foot - mount or Y - shape Clevis can be obtained by ordering.

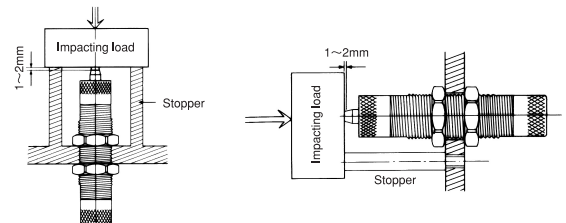


3. PRECAUTION AGAINST INSTALLATION

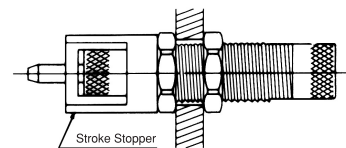
- ① Set within 1° degree between the center of SHOCK DAMPER and the direction of the impacting load as shown the below.



- ② Set an external mechanical stopper to prevent SHOCK DAMPER from bottoming out. This stopper should be 1~2mm from the end of the stroke.



A stroke stopper (S) can be obtained by ordering, if desired.



- ③ Take an enough surrounding space for better heat-radiation. The suitable temperature is $0 \sim 50^\circ\text{C}$ degree.
- ④ Take an enough strength of a mounting base. (Necessitate strength of a mounting for SHOCK DAMPER Mini M sereis are mentioned in its catalog.)
- ⑤ In case of that the nuts is loosened by the vibration from the equipment, Installing apply thread lock cements on nuts, threads and install keep tight.

4. ADJUSTMENT

4-1 Method

Take the following steps to protect Mini M Series.

- ① Eleven degrees of setting are marked on the front ring and rear ring, but setting is continuous. 0 indicates minimum and 10 is maximum damping force. The two setting rings can be turned together.
- ② A preferable stroke surplus at stroke end by impacting load is (R-min.) + (1~2)mm as per Fig. and Table-2.

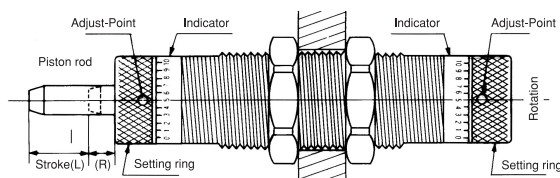


Table 2.
(mm)

Type	Stroke (L)	R-min
DP-M02A012 (-TE)	12	6
DP-M04A018 (-TE)	18	8
DP-M08A025 (-TE)	25	8

- ③ Turn the setting ring and adjust at 7 or 8 degree. Impact the load 1 or 2 times carefully and then check the stroke surplus by impacting load.
- ④ In case if the stroke surplus by impacting load is longer than (R-min.)+(1~2)mm, turn the setting ring into the smaller degree and test gradually until the stroke surplus will be suitable.
- ⑤ In the opposite case, turn the setting ring into the larger degree and adjust as same as same as 4-4). However, DO NOT use out of 0-10 degree area. If adjustment is set to largest degree, a larger type is required.

⚠ 5. Precaution in operation

- ① Do not use when there are overloading conditions.
- ② Confirm the kinetic energy, equivalent weight of moving load, velocity of moving load and operating frequency of your machine.
- ③ When two shock dampers are used. Both graduations should be the same.
- ④ Do not turn the piston rod forcibly.
- ⑤ Do not loosen the oil plug except when changing the fluid.
- ⑥ Use in atmospheric pressure.

6. Fluid Change

To ensure optimum performance, the operating fluid should be changed periodically to keep proper fluid quality. Under normal usage, operating fluid should be changed every 6 months.

6-1 Change Method

- ① Turn the adjusting case to the lowest setting and remove the plug.
- ② Pour oil slowly into the filler port or soak the shock damper in the oil.
- ③ At the same time, move the piston rod in and out to make the changing time shorter.
- ④ Do this until there is no more air in the shock damper.
- ⑤ Replace the oil plug.
- ⑥ Test the shock damper. To be sure it is thoroughly bled, set the adjusting case to the highest setting and push the piston rod in and out. The piston rod should move less than 0.5mm before form resistance is met. The shock damper is not thoroughly bled if the rod action moves easily or moves more than 0.5mm without resistance.
- ⑦ Set the graduation to the previous setting.

Even under normal operation, a small amount of oil appears on the piston rod and it makes oil replacement necessary after long service.

Use same inspection procedure as 6-⑥ for establishing the recommended oil replacement time.

6-2 HYDRAUL OIL

- ① Standard Models
Mini M Series models are delivered with KF96-50 silicon oil manufactured by Shinetsu Chemical installed.
- ② Low-collision Speed Specification Models (-TE)
Low-collision speed specification models are delivered with KF961-1000 silicon oil manufactured by Shinetsu Chemical installed.
- ③ VOLUME REFERENCE TABEL

Type	Oil Volume (× 10 ⁻³ ℓ)
DP-M02A012 (-TE)	4
DP-M04A018 (-TE)	6
DP-M08A025 (-TE)	13

7. Trouble Shooting Guide

MALFUNCTION	PROBABLE CAUSES	COUNTER PLAN
Insufficient shock absorption. Bottoming out with shock load	1 Incorrect adjustment setting adjustment setting too low	Set at proper or higher graduation
	2 Insufficient oil	Replace oil
	3 Oil has broken down from heavy use or extreme heat.	Change oil or increase the size of SHOCK DAMPER
	4 Piston rod is worn	Exchange shock damper
Surface temperature too high. Over 30°C (86°F) higher than ambient temperature	5 Exceeded allowable frequency.	Reduce the operation frequency.
	6 Exceeded allowable velocity of the load.	Reduce the velocity
	7 Improper oil Viscosity of oil is too high	Use recommended oil
Piston rod does not move freely or return all the way.	8 Piston rod is scored	Exchange the shock damper
	9 Piston rod is bent	Exchange the shock damper
	10 Direction of moving load does not force to center of the piston rod.	Reinstall the shock damper properly

Warranty:

TSUBAKIMOTO CHAIN CO. : hereinafter referred to as "Seller"

Customer: hereinafter referred to as "Buyer"

Goods sold or supplied by Seller to Buyer: hereinafter referred to as "Goods"

1. Warranty period without charge

18 months effective the date of shipment or 12 months effective the first use of Goods, including installation of Goods to Buyer's equipment or machine - whichever comes first.

2. Warranty coverage

Should any damage or problem with the Goods arise within the warranty period, given that the Goods were operated and maintained according to the instructions provided in the manual, Seller will repair and replace at no charge once the Goods are returned to the Seller.

This warranty does not include the following:

- 1) Any costs related to removal of Goods from the Buyer's equipment or machine to repair or replace parts.
- 2) Cost to transport Buyer's equipment or machines to the Buyer's repair shop.
- 3) Costs to reimburse any profit loss due to any repair or damage and consequential losses caused by the Buyer.

3. Warranty with charge

Seller will charge any investigation and repair of Goods caused by:

- 1) Improper installation by failing to follow the instruction manual.
- 2) Insufficient maintenance or improper operation by the Buyer.
- 3) Incorrect installation of Goods to other equipment or machine.
- 4) Any modifications or alterations of Goods by the Buyer.
- 5) Any repair by engineers other than the Seller or those designated by the Seller.
- 6) Operation in an inappropriate environment not specified in the manual.
- 7) Force Majeure or forces beyond the Seller's control such as natural disasters and injustices done by a third party.
- 8) Secondary damage or problem incurred by the Buyer's equipment or machine.
- 9) Defected parts supplied, or specified by the Buyer.
- 10) Incorrect wiring or parameter setting by the Buyer.
- 11) The end of life cycle of the Goods under normal usage.
- 12) Loss or damage not liable to the Seller.

4. Dispatch service

Service to dispatch a Seller's engineer to investigate, adjust or trial test Seller's Goods is at the Buyer's expense.

5. Disclaimer

- 1) In our constant efforts to improve, TSUBAKIMOTO CHAIN may make changes to this document or the product described herein, without notice.
- 2) Considerable effort has been made to ensure that the contents of this document are free from technical inaccuracies and errors. However, any such inaccuracies or errors reported will be gladly examined and amended as necessary.



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