SHOCK DAMPER

INSTRUCTION MANUAL

Light Series & Heary Series

Standard models(Low speeded collision models)

DP002A025(-TE) DP005A032(-TE)
DP002A050(-TE) DP005A063(-TE)
DP010A040(-TE) DP030A063(-TE)
DP010A080(-TE) DP030A125(-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 notice 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 personal) 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 if the 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 of 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. Mounting Position

The TSUBAKI SHOCK DAMPER may be mounted at any position; horizontally or vertically with the piston rod up or down.

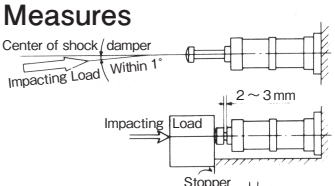
2. Mounting Support

①Direct Mount
Use the tapped screw holes on both housing ends for mounting the SHOCK DAMPER.

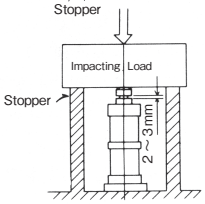
②Flange mounting of Foot mounting(option)
The flange mounting or foot mounting is available by ordering.

⚠ 3. Special Safety Measures

①The moving load must be guided and set within one degree, between the centerline of the SHOCK DAMPER and the direction of the impacting load.



②Set an external mechanical stop to prevent the SHOCK DAMPER from bottoming out. The mechanical stopper should be 2～3 mm from the end of the stroke.



③Maintain sufficient surrounding space for better heat radiation. The suitable ambient temperature is 0～50℃(32～122˚F). If the temperature exceeds the above allowance, please contact our engineer.

④The supporting structure must be rigid. The necessary strength of the mounting base of the SHOCK DAMPER is shown in the catalog.

4. Adjustment

It is assumed the SHOCK DAMPER size has been properly chosen for the load conditions.

①Insert the adjusting handle into one of the holes located on the adjusting case. Rotate the adjusting case and set the required value of equivalent weight of moving load (Wn).

②The graduated scale on the adjusting case has been calibrated to indicate the value of the equivalent mass of the moving load (Wn).

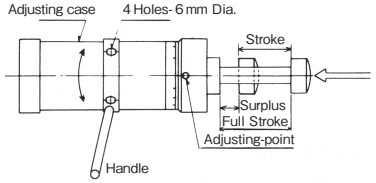
③As shown bellow, the equivalent weight of the moving load (Wn) can be calculated with kinetic energy (Ek) and velocity (V) to determine the proper adjustment setting.

$$Wn = \frac{2 \times g \times Ek}{V^2} = \frac{19.6Ek}{V^2}$$

④If a moving load is propelled by an external force, such as an air or hydraulic cylinder or gravity, the additional energy (Ek2) must be added to Ek1 .

⑤Test the SHOCK DAMPER under actual load and check its working stroke.

⑥If the working stroke appears to move without the full stroke of the SHOCK DAMPER or if the load appears to stop too abruptly, decrease this resistance by turning the adjusting case, step by step, until the stroke reaches its maximum length 2～3 mm surplus, between the back face of the piston cap and the front head of SHOCK DAMPER.



⑦If the load appears to move through the SHOCK DAMPER without resistance, and there is metal-to-metal contact between the back face of the piston cap and the front head of SHOCK DAMPER, increase the resistance by turning the adjusting case, step by step, until the stroke reaches desired position.

⑧In the case where there is an external force, check the working stroke when the piston rod is moved by the impact load.

⑨The working stroke will frequently with ambient

temperature and rising oil temperature. Thus keep testing for about an hour until the working stroke is stable and readjust the working stroke to set the 2～3 mm surplus for optimum performance.

⚠ 5. Precaution in operation

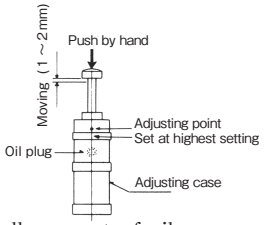
①Do not use when there are overloading conditions.
②Confirm the kinetic energy, equivalent weight of moving load, velocity of moving load and operating frequency of your machine.
③When two SHOCK DAMPER are used. Both graduations should be the same.
④Do not turn the piston rod forcibly.
⑤Do not loosen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

6. Fluid Change

Please consult our company about the exchange of fluid.
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

①Turn the adjusting case to the lowest setting and remove the plug.
②Pour oil slowly into the filler port or soak the SHOCK DAMPER in the oil.
③At the same time, move the piston rod in and out to make the changing time shorter.
④Do this until there is no more air in the SHOCK DAMPER.
⑤Replace the oil plug.
⑥Test 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 1～2mm before form resistance is met. The SHOCK DAMPER is not thoroughly bled if the rod action moves easily or moves more than 1～2mm without resistance.
⑦Set 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

①Standard Models
Light and Heavy Series models are delivered with Mobil DTE24 installed. The oils on the right can be used.

Manufacturer	Product Name
Mobil	Mobil DTE24
Showa Shell	Shell Tellus Oil 32
JX Energy	Highland Oil 32
Idemitsu	Dephney Hydraulic fluid 32
Cosmo	Cosmo Hydro RO 32

②Low-collision Speed Specification Models (-TE)
Low-collision speed specification models are delivered with KF961-1000 silicon oil manufactured by Shinetsu Chemical installed.
③VOLUME-Reference table

	Type	Oil Volume ($\times 10^{-3}\ \ell$)
LIGHT	DP002A025	40
	DP002A050	60
	DP005A032	70
	DP005A063	100
HEAVY	DP010A040	170
	DP010A080	260
	DP030A063	870
	DP030A125	1,320

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℃(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 more 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

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