

INSTRUCTION MANUAL

SHOCK KILLER NCK

- Read this manual carefully and thoroughly before using this product.
- In particular, read the safety notes carefully.
- Retain this instruction manual with the product for further consultation whenever necessary.

For safety use

To use this product safely, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (to the level pursuant to JIS B 8370 Pneumatic System Rules).

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.

Our customers use this product for a very wide range of applications, and we cannot keep track of all of them. Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, examine whether the product meets your application, requirements, and how to use it.

This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents, **read this instruction manual carefully and fully understand its contents for proper operation.**

Observe the precautions on handling described in this manual, as well as the following instructions:



DANGER:

Indicates an imminent hazard. Improper handling will cause death or serious injury to people.



WARNING:

Indicates a potential hazard. Improper handling may cause death or serious injury to people.



CAUTION:

Indicates a potential hazard. Improper handling may cause injury to persons or damage to property.

 <p>WARNING:</p>	<p>a) This product is designed and manufactured as equipment and part for general industrial machinery. Therefore, handling should be performed by persons with sufficient knowledge and experience.</p> <p>b) Be sure to use the product within the product use range. Please consult with us regarding the suitability of use if the product is used outside its specified operating range, outdoors, or under the conditions and environments listed below. Never modify or perform any additional work on the product.</p> <p>[1] Industries and equipment such as nuclear power, railways, aviation, marine vessels, vehicles, and medical devices; equipment or applications that come into direct contact with beverages or food; applications where safety is critical, including amusement equipment, emergency shut-off circuits, press machines, brake circuits, and safety devices;</p> <p>[2] and applications where significant impact on people or property is anticipated and safety is particularly critical.</p> <p>c) Be sure to observe all organization safety standards, laws and regulations, etc. related to equipment design, management, etc. ISO4414, JIS B 8370: General Rules for Pneumatic Systems) JIS B 8368 (Pneumatic Cylinders) JPAS 005 (Guideline for the Use and Selection of Pneumatic Cylinders) High Pressure Gas Safety Act, Industrial Safety and Health Act and other safety regulations, organization standards, laws and regulations, etc.</p> <p>d) Do not handle this product or remove any piping or equipment until you are sure of its safety.</p> <p>[1] Before inspecting or maintaining machines or equipment, be sure to confirm that all systems involving this product are safe.</p> <p>[2] Even when the operation is stopped, there may still be hot or charged parts present, so please be careful.</p> <p>[3] When inspecting or maintaining equipment, shut off the supply air and supply water as energy sources and the power to the relevant equipment, exhaust any compressed air in the system, and take care to avoid water leaks and electrical leaks.</p> <p>[4] When starting up or restarting machinery or equipment that uses pneumatic equipment, confirm that the safety of the system is ensured through measures such as ejection prevention.</p>
 <p>CAUTION:</p>	<p>a) Before performing an overhaul inspection on the actuator, release any residual pressure completely.</p> <p>b) While the actuator is operating, do not step into or place hands in the driving mechanism.</p> <p>c) Touching the electrical wiring connection (bare charging part) of an actuator with a solenoid valve, an actuator with a switch, etc. may cause electric shock. Perform an overhaul inspection with the power off. Also, do not touch the charging part with wet hands.</p>

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NCK

SHOCK KILLER

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1. PRODUCT

1.1 Specifications

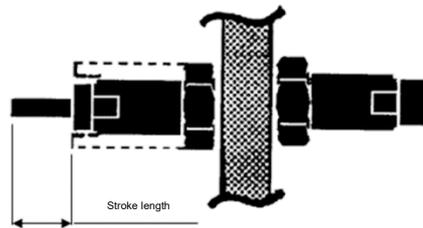
Model number		NCK-00-0.1	NCK-00-0.3	NCK-00-0.7	NCK-00-1.2
Item					
Type/classification		Without adjuster		Spring reverting type	
Max. absorption energy	J	1	3	7	2
Stroke length	mm	4.5	6	8	10
Max. absorption energy per hour	kJ/hour	4.8	6.3	12.6	21.6
Max. impulsive speed	m/s	1.0	1.5		2.0
Max. frequency of repetition	Times/min	80	35	30	
Ambient temperature	°C	-10 to 80			
Maximum load (Drag)	N	536	1,180	2,050	2,800
Return time	s	0.3 or less			
Product mass	kg	0.009	0.012	0.02	0.04
Returning spring of force	When elongated N	3.0		2.0	2.9
	When compressed N	4.6		4.3	5.9

Model		NCK-00-2.6	NCK-00-7	NCK-00-12	NCK-00-20
Item					
Type/classification		Without adjuster		Spring reverting type	
Max. absorption energy	J	26	70	120	200
Stroke length	mm	15	20	25	30
Max. absorption energy per hour	kJ/hour	39.0	84.0	86.4	108.0
Max. impulsive speed	m/s	2.0	2.5	3.0	
Max. frequency of repetition	Times/min	25	20	12	9
Ambient temperature	°C	-10 to 80			
Maximum load (Drag)	N	4,080	8,140	11,150	15,680
Return time	s	0.3 or less	0.4 or less		0.5 or less
Product mass	kg	0.07	0.2	0.3	0.45
Returning spring of force	When elongated N	5.9	9.8	16.3	
	When compressed N	11.8	21.6	33.3	33.9

2. CAUTION

2.1 Selecting appropriate model

- 1) We recommend calculating the energy required to activate the shock killer and selecting a model number with a margin of 25% to 50% more than the maximum absorbable energy. If the selected shock killer lacks sufficient margin relative to the maximum energy absorption capacity, its replacement cycle may become shorter. Conversely, if the selected shock killer has too much margin relative to the maximum energy absorption capacity, the workpiece may bounce upon impact, or it may take excessively long to absorb the energy.
- 2) The shock killer absorbs the rated energy with the rated stroke. If the stroke is adjusted with a stop nut, etc., the absorbed energy will be less than the rated energy.



2.2 Use with other functions

- 1) If the shock killer is driven by a cylinder, use the cylinder's speed controller to control its speed.
- 2) When using the product with a model that has an added air cushion function at the end of the cylinder stroke, it is recommended that the needle be used in the open state (cushion is disabled).

3. INSTALLATION

3.1 Mounting orientation

The product can be mounted horizontally, vertically, or inclined freely.

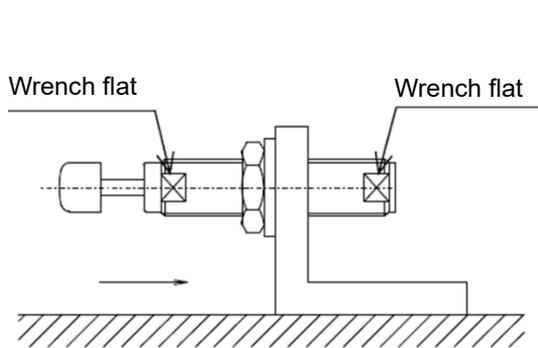
3.2 Sizes of screws and wrench flats

The entire outer diameter is threaded. Wrench flats are provided at both ends. Please use this thread for installation.

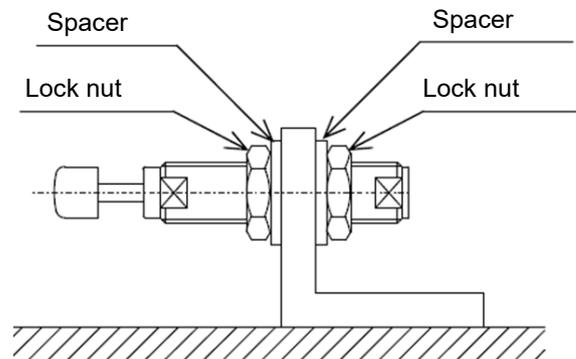
Model	NCK-00-0.1	NCK-00-0.3	NCK-00-0.7	NCK-00-1.2
Screw size	M8 × 0.75		M10 × 1.0	M12 × 1.0
Wrench size	7		9	11

Model	NCK-00-2.6	NCK-00-7	NCK-00-12	NCK-00-20
Screw size	M14 × 1.5	M20 × 1.5	M25 × 1.5	M27 × 1.5
Wrench size	13	19	24	

3.3 Installation procedure and position adjustment

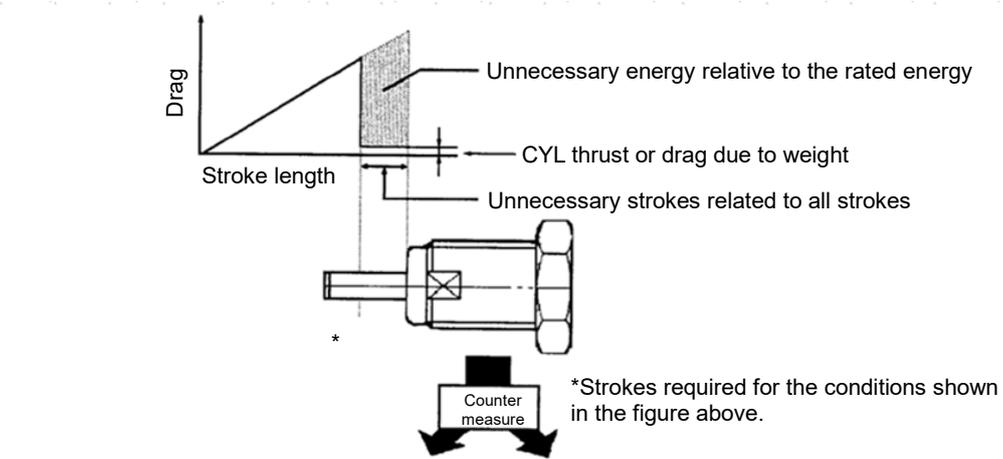


- 1) Using a wrench, screw the shock killer into the appropriate position. (Remove the spacer and lock nut from the side where it will be screwed in.)

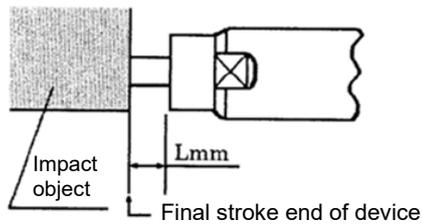


- 2) Temporarily tighten the lock nuts on both sides.

- 3) For the NCK, the drag force peaks during the latter half of the stroke. Therefore, under conditions where energy absorption is completed just before the end of the stroke, the takt time can be reduced by adjusting the position of the stop nut or the NCK unit itself.

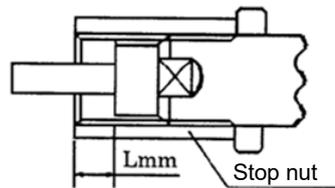


① When the stroke is controlled by the device



Adjust the position of the shock killer to allow a margin of L mm relative to the stroke end of the device.

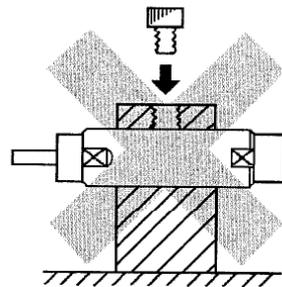
② When the shock killer is used as a stopper



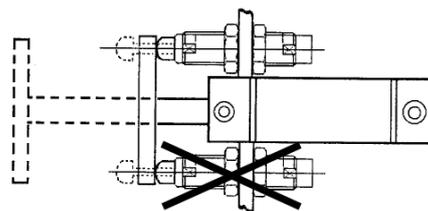
Set to allow for a margin of L mm using an optional stop nut.

L mm: A gap sufficient to prevent the impact object from striking the shock killer body, or the stroke adjustment amount

- 4) Do not tighten the NCK from the side with small screws, etc., as shown in the figure on the right. Doing so may cause return failure after operation.



- 5) Do not use two or more shock killers in parallel, as it is difficult to synchronize them. Use a single shock killer with a large amount of energy absorbed. Failure to do so may cause a decrease in durability and damage.



6) Tightening torque for standard nuts must be within the range shown in the table below.

Model name	Tightening torque range
NCK-00-0.1	1.2 to 2.0 N·m
NCK-00-0.3	1.2 to 2.0 N·m
NCK-00-0.7	3 to 4 N·m
NCK-00-1.2	4.5 to 6 N·m
NCK-00-2.6	7.5 to 10 N·m
NCK-00-7	22 to 30 N·m
NCK-00-12	55 to 70 N·m
NCK-00-20	100 to 130 N·m

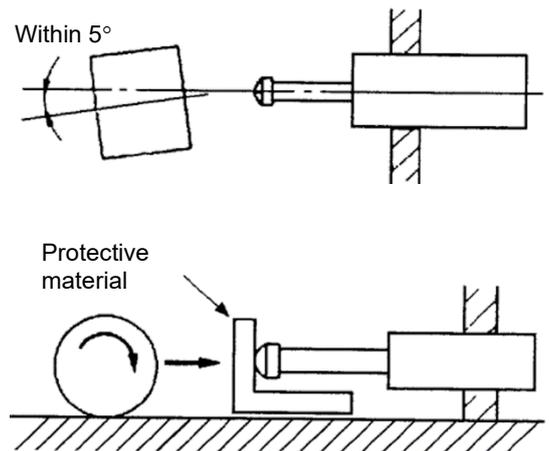
3.4 Notes on installation

WARNING

- 1) The impact object must hit the center of the rod, and its motion must be aligned with the rod's axis. Large impact angles can cause lubricant leakage in a short period of time. The impact angle must be kept within 5°.
- 2) When rotating objects impact, or when deformation or wear occurs between the shock killer and the impact object, protective materials must be used to receive the impact object to prevent deformation and wear.
- 3) Do not use the product under conditions where oil droplets or water droplets splash and adhere to the rod surface. If this is done, normal energy absorption may not occur, potentially causing malfunctions.
- 4) Do not scratch or attach foreign objects to the rod.
(Doing so may cause oil leakage.)

Example 1) Rod scratches due to scattered chips

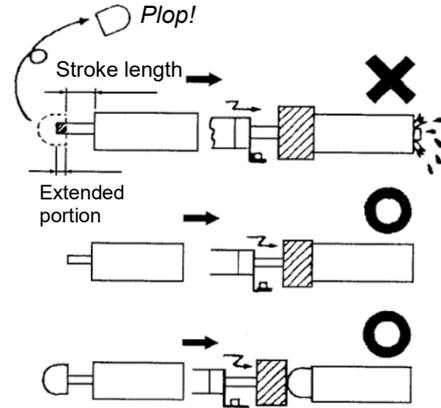
Example 2) Adhesion of grease applied to other equipment, etc.



3.5 Other notes

WARNING

- 1) Do not remove the cap from products with a cap attached to the tip.
The piston has been extended to fit the cap. Using it as is may result in bottoming out, which could damage the base.



- 2) Do not throw the shock killer into a fire. If it is thrown into fire, there is a risk of explosion or ignition due to its sealed oil.
- 3) If the mounting part is not strong enough, there is a risk of damaging the shock killer itself and the equipment on which it is mounted. Ensure sufficient strength.

- 4) If there is vibration in the impact object, a guide is required.

If the impact object vibrates or is exposed to forces perpendicular to the axis, provide a solid guide for it.

- 5) Mounting, dismounting, and stroke adjustment must be performed after the equipment is turned off and the machine has been stopped.

- 6) Do not use the product in clean rooms.

Doing so may cause contamination of the clean room.

- 7) Do not operate the product without an external stopper.

If the product is operated without an external stopper, machines where the shock killer is mounted may be damaged due to bottoming up.

To prevent the external stopper from bottoming out, install the shock killer with a gap so that its body does not come into contact with the impact object at the push-in end.

4. MAINTENANCE

4.1 Periodic inspection

- 1) Perform periodic inspections for the following items.

Please note that the shock killer cannot be disassembled for repair, so please replace it in the event of failure.

- 2) Inspection item

- (1) Looseness of body mounting nuts.
- (2) Scratches and deformation of the body.
- (3) Scratches and deformation of the rod.
- (4) Oil leakage.
- (5) Stroke failures.
- (6) Change in sound when activated.

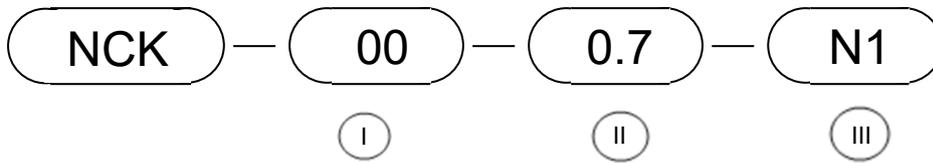
Check the above points. If there is any abnormality, refer to "4.2 TROUBLESHOOTING."

4.2 Troubleshooting

Problem	Cause	Countermeasure
Looseness of mounting nuts	Small tightening torque.	Retighten the nuts. (Tighten the nuts with the tightening torque shown on page 5.)
	Loosening due to equipment vibration, etc.	Suppress equipment vibration.
Impact cannot be fully absorbed.	The energy being applied is great.	Replace the shock killer with a size larger. Reduce the impact speed.
	The stroke is stopped by an external stopper in the middle of the stroke.	Adjust the external stopper to lengthen the absorption stroke.
	The direction of motion of the impact object is misaligned with the axis center of the rod.	Align the direction of motion of the impact object with the axis center of the rod.
	The impact angle of the impact object deviates more than 5° from the rod axis center.	Align the impact angle of the impact object with the rod axis center.
	The impact object vibrates.	Provide a firm guide on the impact object to prevent it from vibrating.
	The shock killer body is used as a stopper.	Provide a stop nut or external stopper.
	High ambient temperature.	Cool the shock killer to a temperature of 80°C or less.
	Foreign matter adhered to the rod surface, and the oil seal was damaged.	Provide a cover to prevent foreign matter from adhering to the rod.
	The rotating object is directly impacting the shock killer.	Provide protective material to prevent direct contact between the rotating object and the rod.
	End of product life.	Replace the shock killer.
Rod and tip cap wear.	The impact object vibrates.	Provide a firm guide on the impact object to prevent it from vibrating.
Tip cap is damaged.	The energy being applied is great.	Replace the shock killer with a size larger.
		Reduce the impact speed.

Problem	Cause	Countermeasure
Piston stops at a halfway point of stroke or repulses.	Energy caused by the impact object is small compared to the allowable absorbed energy.	Use a stop nut or an external stopper to shorten the stroke of the shock killer. Replace the shock killer with a size smaller.
	The external stopper is hit before energy absorption is complete.	Adjust the position of the external stopper.
	Oil droplets, water droplets, etc. that adhere to the rod have entered the shock killer.	Provide a cover to prevent oil droplets, water droplets, etc. from adhering to the rod.
	Low ambient temperature.	Warm the shock killer to a temperature of -10°C or higher.
Inner oil is leaking	Foreign matter adhered to the rod surface, and the oil seal was damaged.	Provide a cover to prevent foreign matter from adhering to the rod.
	Low ambient temperature.	Warm the shock killer to a temperature of -10°C or higher.
	End of product life.	Replace the shock killer.
Rod does not return	The direction of motion of the impact object is misaligned with the axis center of the rod.	Align the direction of motion of the impact object with the axis center of the rod.
	The impact angle of the impact object deviates more than 5° from the rod axis center.	Align the impact angle of the impact object with the rod axis center.
	The impact object vibrates.	Provide a firm guide on the impact object to prevent it from vibrating.
	The shock killer body is used as a stopper.	Provide a stop nut or external stopper.
	Low ambient temperature.	Warm the shock killer to a temperature of -10°C or higher.
	End of product life.	Replace the shock killer.
Loud noise during shock absorption	The energy being applied is great.	Replace the shock killer with a size larger. Reduce the impact speed.
	The stroke is stopped by an external stopper in the middle of the stroke.	Adjust the external stopper to lengthen the absorption stroke.
	The direction of motion of the impact object is misaligned with the axis center of the rod.	Align the direction of motion of the impact object with the axis center of the rod.
	The impact angle of the impact object deviates more than 5° from the rod axis center.	Align the impact angle of the impact object with the rod axis center.
	The impact object vibrates.	Provide a firm guide on the impact object to prevent it from vibrating.
	The shock killer body is used as a stopper.	Provide a stop nut or external stopper.
	High ambient temperature.	Cool the shock killer to a temperature of 80°C or less.
	Foreign matter adhered to the rod surface, and the oil seal was damaged.	Provide a cover to prevent foreign matter from adhering to the rod.
	The rotating object is directly impacting the shock killer.	Provide protective material to prevent direct contact between the rotating object and the rod.
	End of product life.	Replace the shock killer.

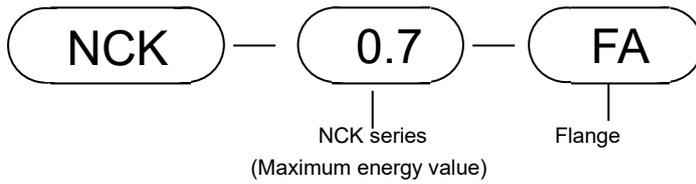
5. Model number coding



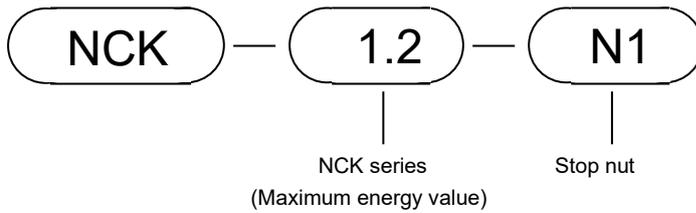
I Supporting style		II Series (maximum energy value)		III Option	
Code	Description	Code	Description	Code	Description
00	Basic type	0.1	1 J	No symbol	Standard
FA	Flange type	0.3	3 J	N1	With stopper nut
		0.7	7 J	C	With tip cap
		1.2	12 J		
		2.6	26 J		
		7	70 J		
		12	120 J		
		20	200 J		

Accessory part number indication method

- Metal flange



- Stop nut + Hexagon nut (1 each)



- Hexagon nut (x 1)

