CKD

SM-10766-A

INSTRUCTION MANUAL

SHOCK KILLER

NCK

- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

CKD Corporation

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 for proper operation.

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

⚠ Precautions

- Before performing an overhaul inspection on the actuator, deactivate residual pressure completely.
- While the actuator is operating, do not step into or place hands in the driving mechanism.
- To prevent an electric shock, do not touch the electric wiring connections (exposed live parts) of the actuator equipped with a solenoid valve or switch.
  Perform an overhaul inspection with the power off. Also, do not touch these live parts with wet hands.

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NCK
Shock Killer
Manual No. SM-10766-A

NOTE : Letters & figures enclosed within Gothic style bracket (examples such as [C2-4PP07] · [V2-503-B] etc.) are editorial symbols being unrelated with contents of the book.

Dec.1.1997

1. PRODUCT

1.1 Specification

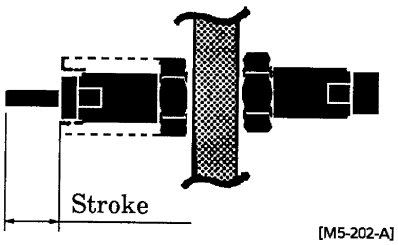
Model code / Item			NCK-00-0.1	NCK-00-0.3	NCK-00-0.7	NCK-00-1.2
Type and classification			Without an abjuster, Spring reverting type			
Max. absorption energy		J	1	3	7	12
Stroke		mm	4.5	6	8	10
Max. absorption energy per an hour		J/h	4,800	6,300	12,600	21,600
Max. impulsive speed		m/s	1.0	1.5		2.0
Max. frequency of repetition		Times/min	80	35	30	
Ambient working temperature		°C	−10 - 80			
Required strength of mounting bracket		N	1580	3540	6150	8400
Returning force of spring	When elongated	N	3.0	3.0	2.0	2.9
	When compressed	N	4.6	4.6	4.3	5.9
Reverting time		sec	0.3 or less			
Mass of product		kg	0.009	0.012	0.02	0.04

Model code / Item			NCK-00-2.6	NCK-00-7	NCK-00-12	NCK-00-20
Type and classification			Without an abjuster, Spring reverting type			
Max. absorption energy		J	26	70	120	200
Stroke		mm	15	20	25	30
Max. absorption energy per an hour		J/h	39,000	84,000	86,400	108,000
Max. impulsive speed		m/s	2.0	2.5	12	9
Max. frequency of repetition		Times/min	25	20	3.0	
Ambient working temperature		°C	−10 - 80			
Required strength of mounting bracket		N	12100	24400	33500	47000
Returning force of spring	When elongated	N	5.9	9.8	16.3	
	When compressed	N	11.8	21.6	33.3	33.9
Reverting time		sec	0.3 or less	0.4 or less		0.5 or less
Mass of product		kg	0.07	0.2	0.3	0.45

2. CAUTION

2.1 Selection of appropriate model

1) Select the model with ample reserve of max. energy absorption by calculating the energy generated when shock killer is activated.
2) Shock killer absorbs rated energy with rated stroke. The shorter the stroke is adjusted by means of stop nut, the less energy absobed than the rated energy.



[M5-202-A]

2.2 Joint use with other function

1) Plan to control the speed making use of the speed controller of cylinder when the system is being driven by a cylinder.
2) When a cylinder with air cushion functions at its stroke end is combined, it is recommended to set needle open condition (voiding its function).

3. INSTALLATION

3.1 Mounting configuration

There is no restriction of mounting posture, neither horizontal, perpendicular nor inclined.

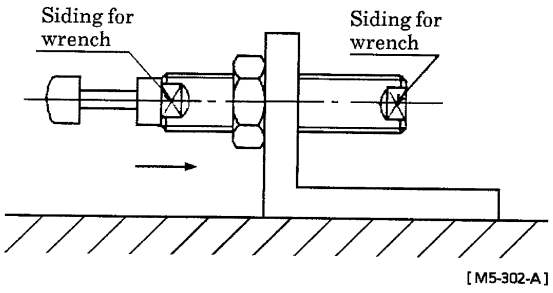
3.2 Sizes of thread and wrench opening

Body stem is threaded all the way. There are siding for wrench at both ends of body. Make use of the thread for mounting the shock killer.

Model No.	NCK-00-0.1	NCK-00-0.3	NCK-00-0.7	NCK-00-1.2
Size of thread	M8×0.75	M8×0.75	M10×1.0	M12×1.0
Wrench opening	7	7	9	11

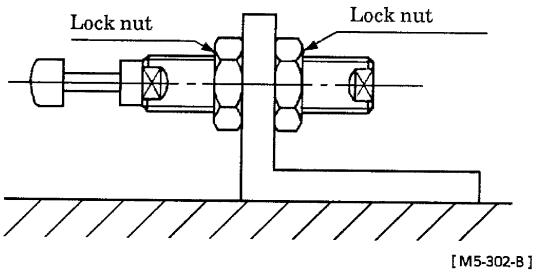
Model No.	NCK-00-2.6	NCK-00-7	NCK-00-12	NCK-00-20
Size of thread	M14×1.5	M20×1.5	M25×1.5	M27×1.5
Wrench opening	13	19	24	24

3.3 Mounting procedure and position adjustment



[M5-302-A]

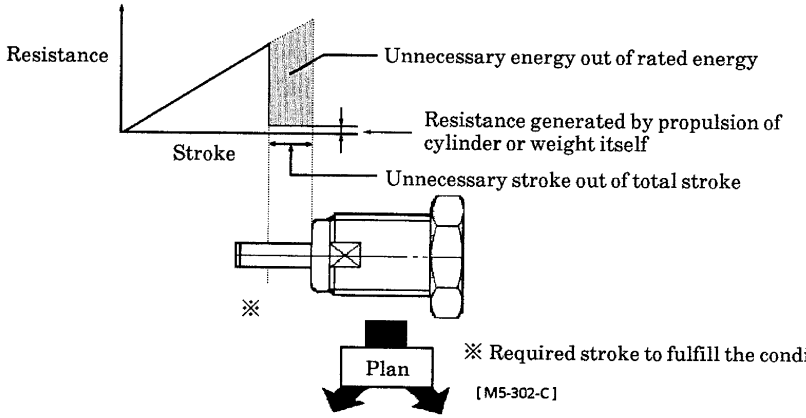
1) Make use of sidings for wrench to screw-in the shock killer itself. (Remove a spacer and lock nut on the end of body to be screwed-in.)



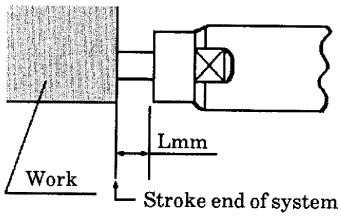
[M5-302-B]

2) Apply a lock nut tentatively when the shcok killer is screwed-in to an approximate position.

3) NCK is designed to generate peak resistance at latter half of its stroke. Therefore, it is able to cut the tact time reasonably short by merely adjusting the position of either stop nut or NCK body itself, with the provision of accomplishing the energy absorption before its stroke end.

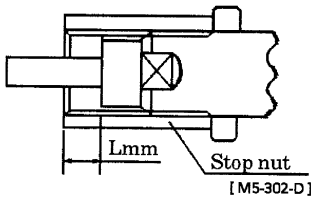


ⓐ Stroke regulation by system itself



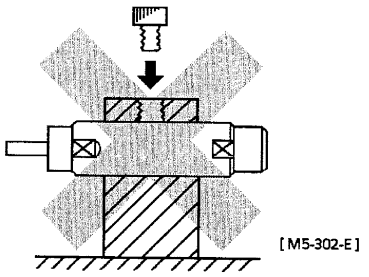
Adjust the location of shock killer to retain a room of L mm away from the stroke end of the system.

ⓑ Making use of shock killer as a stopper

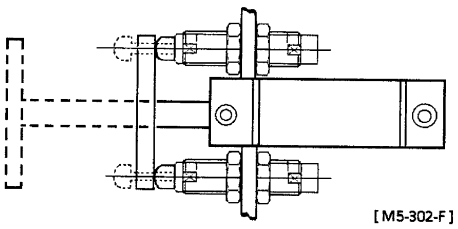


Make use of the optional stop nut, setting it to make shock killer retain the room of L mm.

4) void mounting NCK by tightening a screw from side of NCK. It may sometime hinder reverse stroke after functioning.



5) In case where specific requirement of parallel installation of shock killers exists, designing of doing so is allowable but install two NCKs upon collectively tying up tips of both shock killers.



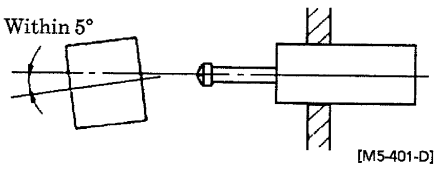
6) Over standard nuts, apply tightening torque posted in the table below.

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

3.4 Considerations during installation

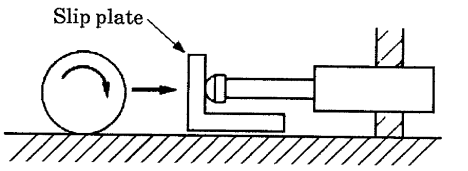
⚠ Warning

1) Arrange so that the impact of the contacting work load is taken at the center of the rod, and align the moving direction of the work with the axial center line of the rod. A large contacting angle will cause oil leakage after a short period of time. Keep the contacting angle within to 5 degrees.



[M5-401-D]

2) In case rolling work makes contact with the rod, or if deformation or wear of the shock killer and contacting work occurs, provide a slip plate to support the contacting load and prevent deformation or wear.



[M5-401-F]

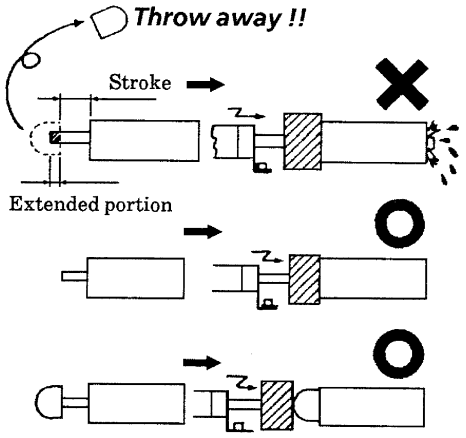
3) Do not use the shock killer under conditions where splashed oil or water may stick to the surface of the rod.
Energy will not be properly absorbed and failure may result.

4) Prevent giving rod a scratch mark or allowing foreign particle sticking on the rod surface. (It may cause an oil leakage.)
Example 1) Scratches of the rod caused by scattering metal chips
Example 2) Contamination on the rod by grease scattering from other equipment

3.5 Other consideration

⚠ Warning

1) When NCK with tip cap is used, keep its cap on. Operation with the cap removed will cause damage to the other end of NCK due to extended length of rod provided to mount a cap.



[M5-302-G]

2) Do not throw the shock killer into fire because it has oil sealed within it and there may be a high risk of ignition or explosion.

3) In cases where the mounted portion does not have sufficient strength, the shock killer body and mounted machines may be damaged. Ensure there is sufficient strength.

4. MAINTENANCE

4.1 Periodic inspection

1) Carry out a periodic inspection over the following items.
Still less, replace this type of shock killer when it causes malfunction as it is non-disassembling type.

2) Check the following.
(1) Loosened body-mounting nut
(2) Scratch and deformation of body
(3) Scratch and deformation of rod
(4) Trace of oil leakage
(5) Check for improper stroke.
(6) Change in noise during operation
If any problems are detected, refer to "4.2 Troubles and corrective measures" and implement proper measures.

4.2 Trouble Shooting

Trouble	Cause	Correction
Mounting nut becomes loosened.	Tightening torque is small.	Retighten. (Use the tightening torque listed on page 5.)
	Nut becomes loose due to vibration, etc. of device	Control vibration of device.
Shock is not being absorbed completely.	Applied energy is too large.	Replace shock killer with the next largest size.
	Stroke is suspended halfway by external stopper.	Adjust external stopper and extend absorption stroke.
	Moving direction of contacting work shifts from the axial center line of the rod.	Align moving direction of contacting work with the axial center line of the rod.
	Contacting angle of contacting work shifts 5 degrees or more from the axial center line of the rod.	Align contacting angle of contacting work with the axial center line of the rod.
	Vibration occurs during contacting work.	Provide contacting work with a secure guide to prevent vibration.
	Shock killer body is being used as a stopper.	Provide a stop nut or an external stopper.
	Ambient temperature is too high.	Cool shock killer temperature to below 80C.
	Foreign objects attach to rod surface and oil seal is damaged.	Provide a cover to prevent foreign objects from attaching to rod.
	Rolling work makes direct contact with shock killer.	Provide a slip plate to prevent rolling work from directly contacting the rod.
	Product life	Replace shock killer.

Trouble	Cause	Correction
Piston stops at a halfway point of stroke or repulses.	Energy caused by contacting work is small in respect to the allowable absorbed energy.	Shorten the shock killer stroke using the stop nut or the external stopper.
		Replace the shock killer with one that is one size smaller.
	Shock killer is in contact with the external stopper before energy absorption is completed.	Adjust the position of the external stopper.
	Oil or water drips, etc. attached to the shock killer have entered the inside of shock killer.	Install a cover on the rod to prevent oil drips and water drips, etc. from attaching to it.
	Low ambient temperature	Heat the shock killer to raise the temperature above −10°C.
Inner oil is leaking.	Foreign objects attach to rod surface and oil seal is damaged.	Provide a cover to prevent foreign objects from attaching to rod.
	Low ambient temperature	Heat the shock killer to raise the temperature above −10°C.
	Product life	Replace shock killer.
Rod does not reset.	Moving direction of contacting work shifts from the axial center line of the rod.	Align moving direction of contacting work with the axial center line of the rod.
	Contacting angle of contacting work shifts 5 degrees or more from the axial center line of the rod.	Align contacting angle of contacting work with the axial center line of the rod.
	Vibration occurs during contacting work.	Provide contacting work with a secure guide to prevent vibration.
	Shock killer body is being used as a stopper.	Provide a stop nut or an external stopper.
	Low ambient temperature	Heat the shock killer to raise the temperature above −10°C.
	Product life	Replace shock killer.
Large noise generated when impact is absorbed	Applied energy is too large.	Replace shock killer with the next largest size.
	Stroke is suspended halfway by external stopper.	Adjust external stopper and extend absorption stroke.
	Moving direction of contacting work shifts from the axial center line of the rod.	Align moving direction of contacting work with the axial center line of the rod.
	Contacting angle of contacting work shifts 5 degrees or more from the axial center line of the rod.	Align contacting angle of contacting work with the axial center line of the rod.
	Vibration occurs during contacting work.	Provide contacting work with a secure guide to prevent vibration.
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	Ambient temperature is too high.	Cool shock killer temperature to below 80C.
	Foreign objects attach to rod surface and oil seal is damaged.	Provide a cover to prevent foreign objects from attaching to rod.
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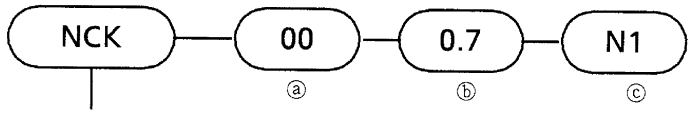
	Product life	Replace shock killer.

5. HOW TO ORDER



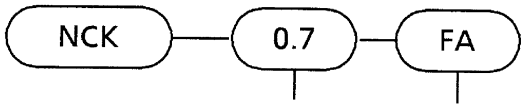
Shock killer corresponding

ⓐ Mounting type		ⓑ Series (Max. value of energy absorption)		ⓒ Option	
Marking	Discription	Marking	Discription	Marking	Discription
00	Standard type	0.1	1J	No marking	Standard
FA	Flange mounting	0.3	3 J	N1	w/stop nut
		0.7	7 J	C	w/rod tip cap
		1.2	12 J		
		2.6	26 J		
		7	70 J		
		12	120 J		
		20	200 J		

Note) 3 hex. nuts are supplied for model N1.

MODEL CODE OF ACCESSORIES

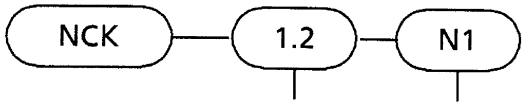
● Metal flange



NCK series (Max. value of energy absorption)

Flange type

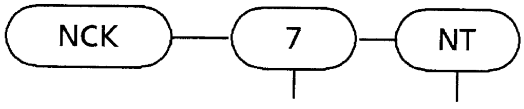
● Stop nut + hex. nut (One, each nut)



NCK series (Max. value of energy absorption)

Stop nut

● Hexagonal nut (One)



NCK series (Max. value of energy absorption)

Hex. nut