CKD

SM—215254—A

INSTRUCTION MANUAL

NEW HANDLING SYSTEM

NSR

- 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

- While this product is in operation, do not step into or place your hands within the operating range of moving parts. Your hands may get caught between parts, or other accidents may occur attributable to contact bodily with the machine.
- To prevent electric shocks, do not touch electric wiring connections (bare electric parts) of the solenoid valve, terminal block, etc. Before performing an overhaul inspection, turn off the power supply and the air source.

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NSR-10
NEW HANDLING SYSTEM
Manual No. SM-215254-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.

1. PART NAMES AND DESCRIPTIONS

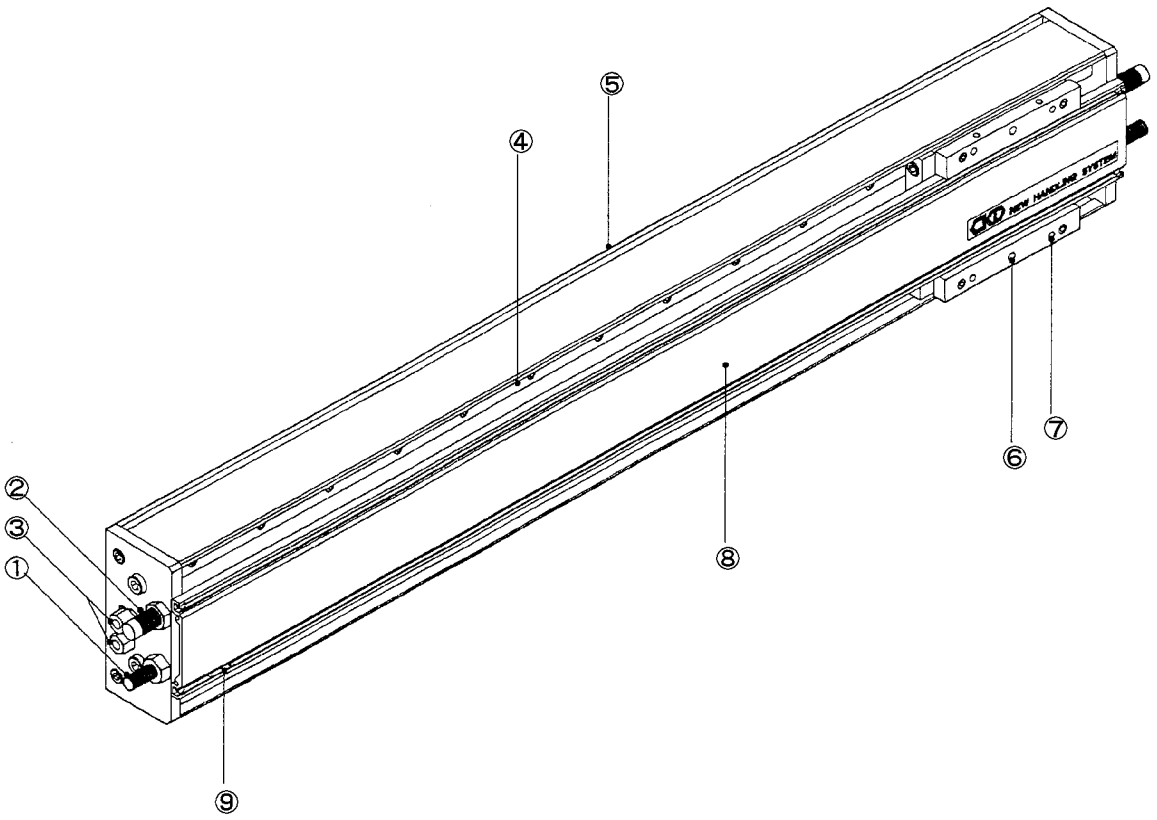


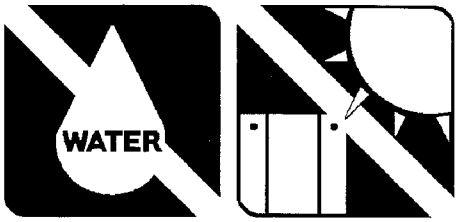
Table 1

① Stop bolt	Allows fine adjustment of stop position
② Shock absorber	Non-adjustment type shock absorber for smooth stopping at the end of stroke
③ Pipe joint	Rc1/8
④ LM guide	High rigidity LM guide made of GSR15
⑤ T slot for mounting the main unit	T slots at the back of the unit allow flexible mounting position adjustment (each slot accommodates six square nuts for M6 bolts)
⑥ Positioning pin hole	ϕ8 H7; Depth = 12
⑦ Tapping for fixing the work	M6; Depth = 12
⑧ Front cover	Decorative panel combining a dust cover and a sensor rail
⑨ Stroke end position detection sensor	Stroke end position detection sensor

2. OPERATING CONDITIONS

2.1 Surrounding Conditions

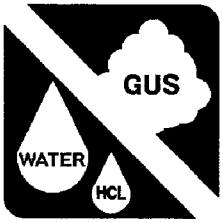
(1) Do not install the unit and other related components (filter, direction control valve, cylinder, etc.) where they can be affected by rain, water, or direct sunlight. Avoid outdoor installation.



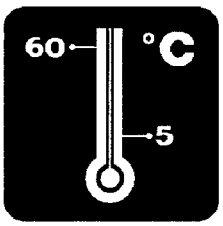
(2) Do not use the unit where there is no direct protection against the falling or splashing of chips, oil, coolant liquid, oil mist, etc. If the unit has to be installed where these elements are present, make sure to protect the unit by means of a cover or similar devise.

(3) Do not use the unit where there is no direct protection against undesirable elements that may be adrift in the air such as chips, dust, dirt, and spatters. If the unit has to be installed where these elements do exist, make sure to protect the unit by means of a cover or similar devise.

(4) Do not use the unit in an environment that is conducive to corrosion because it will cause damage and can cause the unit to malfunction.

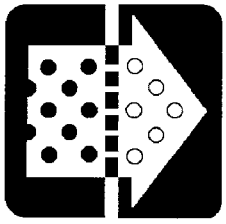


(5) Use the unit within a temperature range of between 5°C and 60°C. A temperature above 60°C can cause damage and lead to a malfunction in the unit. A temperature below 5°C can produce freezing of the moisture inside the pneumatic circuit, that can cause damage and lead to a malfunction in the unit. Take appropriate measures against the occurrence of such freezing.

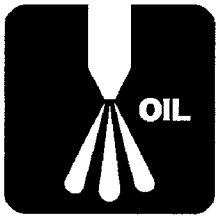


2.2 Fluid

(1) The unit requires the supply of clean and dry compressed air. Be sure to include a filter or other necessary devices in the pneumatic circuit. Note that the filtration rating and flow rate of the filter must be carefully determined, and also that the filter must be positioned close enough to the direction control valve. Be sure to discharge the drain liquid properly.
(Check the drain liquid level periodically and discharge the drain liquid before it reaches the filter element.)



(2) The unit can be used without lubrication. If the user decides to lubricate the unit, however, the user can do so with First Class Turbine Oil as per ISO VG32. The use of any other lubricant may cause a malfunction through damage to the packings. Once the unit is lubricated, watch out for a shortage of the lubricant. The operation becomes unstable when the lubrication becomes insufficient.

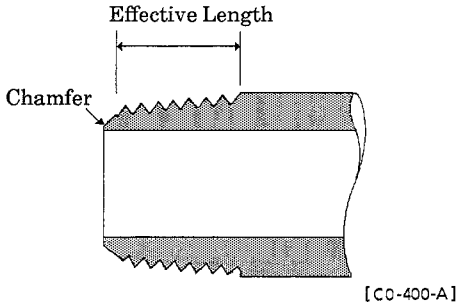


⚠ CAUTIONS

- If carbide (carbon, tar, or similar substances) in the compressor oil enters the pneumatic circuit, it will cause components to malfunction (filter, direction control valve, cylinder, etc.). Be sure to maintain and inspect the air compressor and other pneumatic components as instructed by the manufacturer.
- If unclean or humid compressed air is supplied, it will drastically decrease the life spans of components (filter, direction control valve, cylinder, etc.) and consumable parts (packings, gaskets, etc.) and may lead to a malfunction.
- If the air compressor is installed in an atmosphere that includes corrosive elements, corrosion will take place inside the components supplied with this compressed air, and this ultimately will result in damage or a malfunction.

2.3 Piping

1) For piping beyond the filter, use pipes that are tough against corrosion such as galvanized pipes, nylon tubes, rubber tubes, etc.
2) See to it that the pipe connecting cylinder and solenoid valve has an effective sectional area which is needed for the cylinder to drive at the specified speed.
3) Install filter preferably adjacent to the upper-stream to the solenoid valve for eliminating rust and foreign substances in the drain of the pipe.
4) Be sure to adhere to the effective thread length of gas pipe and make a chamfer of approx. 1/2 pitch from the threaded end.



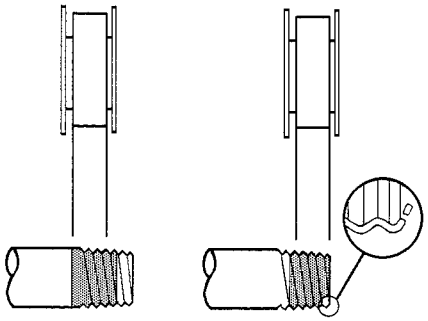
[CO-400-A]

5) Flush air into the pipe to blow out foreign substances and chips before piping.

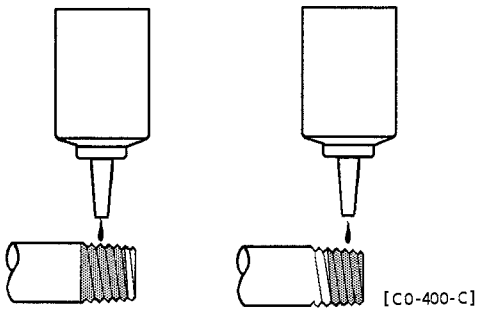

[CO-400-B]

6) Refrain from applying sealant or sealing tape approx. two pitches of thread off the tip of the pipe to avoid residual substances from falling into the piping system.

● Seal Tape


Right False

● Sealant (Paste or liquid)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[CO-400-C]

3. MOUNTING AND ADJUSTMENT

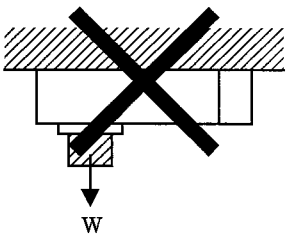
3.1 Notes on Transportation and Mounting

(Notes on transportation)

- The unit includes an LM guide that is a precision mechanism and should be handled as such: transport and handle the unit carefully to prevent dropping, bending, or hitting against an object, which may deform the unit.

(Notes on mounting)

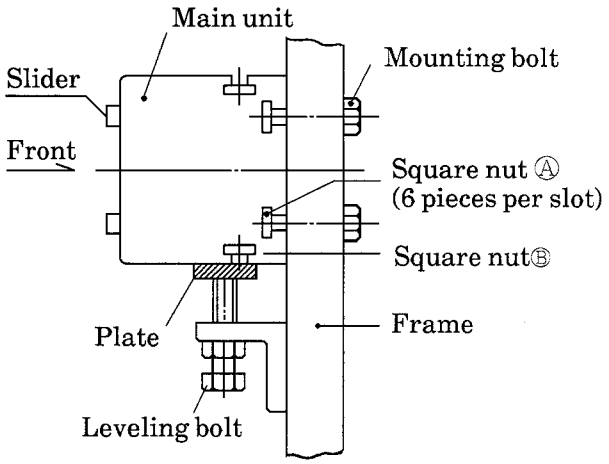
- Insufficient flatness (0.05 or worse) of the provided mounting surface will twist the frame and deform the LM guide. Deformation will prevent smooth slider movement and decrease the life span of the LM guide itself.
- Do not install the unit upside down to the ceiling; the slider may drop.



3.2 Mounting the Main Unit

(1) The main unit can be mounted by means of the T slots which provide flexibility in the longitudinal direction.

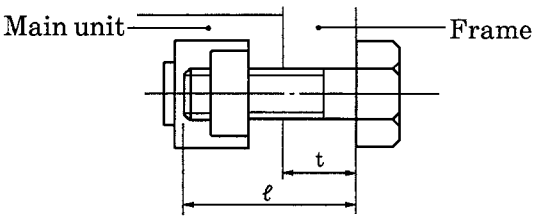
Note : To obtain the desired precision, it is not sufficient to bolt the main unit from the sides only, but its weight must be supported from underneath as well. Mounting becomes much easier if the fixture includes a leveling device.



(2) Refer to Table 2 below for the recommended lengths (l) of the main unit mounting bolts:

Table 2

Model No. / Location	NSR-10
Ⓐ	M6 ℓ=t+11
Ⓑ	M4 ℓ=t+8



(3) Recommended interval for mounting main unit to frame:

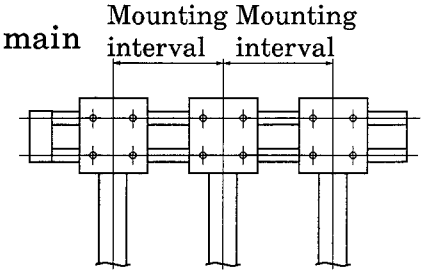


Table 3

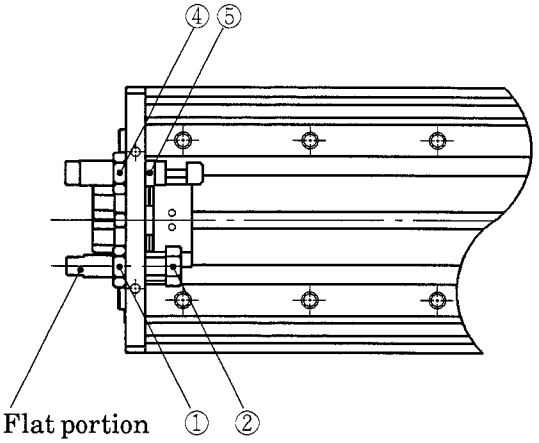
Model No.	Mounting interval
NSR-□-10	1000

3.3 Stroke Adjustment Method

3.3.1 Standard type

(1) Slacken the stop bolt lock nut ①. Turn the bolt by its flat portion until the slider position is adjusted as desired. Then tighten the lock nut to the torque given in Table 5 below.

(2) Slacken the shock absorber lock nut ④. Adjust the stroke to obtain the most appropriate energy absorption. Then tighten the lock nut to the torque given in Table 5 below.



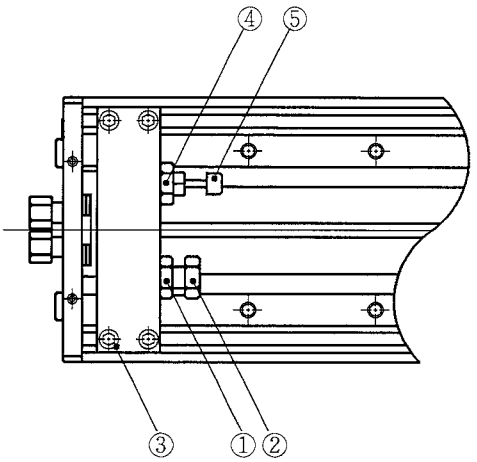
(3) Adjust the slider position on the cover. (See Section 4.4)

3.3.2 Unit having stroke adjustment block(s)

(1) Remove the front cover.

(2) Slacken the stroke adjustment block fixing bolts ③. Roughly adjust the block position. Then tighten the bolts to the torque given in Table 5 below.

(3) Slacken the stop bolt lock nut ①. Perform a fine adjustment of the block position. Then tighten the lock nut to the torque given in Table 5 below.



(4) Slacken the shock absorber lock nut ④. Adjust the stroke to obtain optimum energy absorption. Then tighten the lock nut to the torque given in Table 5 below.

(5) Fit the front cover and adjust the sensor position. (See Section 4.4)

Table 4

1	Stop bolt lock nut
2	Stop bolt
3	Stroke adjustment block fixing bolt
4	Shock absorber lock nut
5	Shock absorber

Table 5

Tightening torque Model	Stop bolt lock nut N·cm{×0.102kgf·cm}	Shock absorber lock nut N·cm{×0.102kgf·cm}	Stroke adjustment block fixing bolt N·cm{×0.102kgf·cm}	Sensor N·cm{×0.102kgf·cm}
NSR-10	4400~4800	450~600	520~560	10~20

4. MAINTENANCE AND INSPECTION

⚠ CAUTION

- Before opening the unit for inspection or maintenance, be sure to turn the unit's control circuit OFF and then release the residual pressure inside the pneumatic circuit. After completing the necessary adjustment, reconnect the unit with the pneumatic source, set the pneumatic pressure to the specified level, then turn the control circuit ON. When turning the control circuit ON, do not enter the moving area of the slider.

4.1 Periodical Inspection

4.1.1 Daily inspection before starting work

Inspect the unit for the following:

(1) Air leakage
(2) Shock absorber function
(3) Switch operation
(4) Abnormal noise and vibration from the LM guide

4.1.2 Periodical Inspection (once or twice a year)

Ispect the unit for the following:

(1) Slackening of the load screws and the main unit mounting screws
(2) Stroke abnormality
(3) Slackening or dislocation of the sensor mounting small screws
(4) Crack or fissure on the sensor lead wires or at locations where they connect with switches
(5) Attachment of chips or other magnetic substances to the sensor or magnet
(6) Abnormal change in the cycle time

4.1.3 Others

(1) If the cylinder is lubricated, check the lubrication amount and the remaining oil volume.

4.2 Maintenance

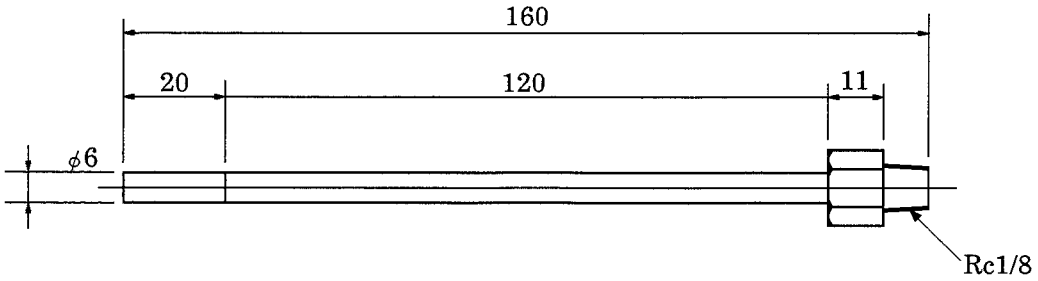
4.2.1 LM Guide

The LM guide in the unit requires greasing. Grease the LM guide through the grease nipple after every 100 Km of operation or 1.5 months, whichever comes first. Use lithium based grease. (Before delivery, the unit is charged with SHELL Albania EP grease.)

Note : If your grease gun does not fit the grease nipple, you can purchase the proper nozzle or grease gun from CKD Corporation.

Table 6

Model No.	Nozzle (only)	Grease gun set
NSR-※-10	Grease nozzle for NSR-10	Grease gun for NSR-10



Dimensions of grease gun for NSR-10

4.2.2 Adjustment and replacement of shock absorber

The shock absorber should be regarded as a consumable part. Though the exact life span depends on operating conditions, it must be replaced after about 1,000,000 (1 million) operations. The energy absorption by the shock absorber decreases with use. Inspect the unit periodically, and if an excessive shock is observed, adjust the shock absorber.
The energy absorption increases as the stroke is decreased.

Table 7

Model No.	Shock absorber
NSR-※-10	NCK-00-1.2-C

4.2.3 Replacing the cylinder

The cylinder (SRL2) used in the system should be regarded as a consumable part. Though the exact life span depends on the operating conditions, it must be replaced after about 2,000 Km of operation. The replacement can be done by assembly or by part (SRL2-20K-stroke).

Table 8 List of Cylinders

Description / Model No.	Without stroke adjustment	Stroke adjustment at one side	Stroke adjustment at both sides
NSR-1-10	SRL2-00-20N-[St+7]-R	SRL2-00-20N-[St+46]-R	SRL2-00-20N-[St+85]-R
NSR-2-10	SRL2-00-20N-[St+60]-R	SRL2-00-20N-[St+100]-R	

4.3 Cylinder Replacement Method

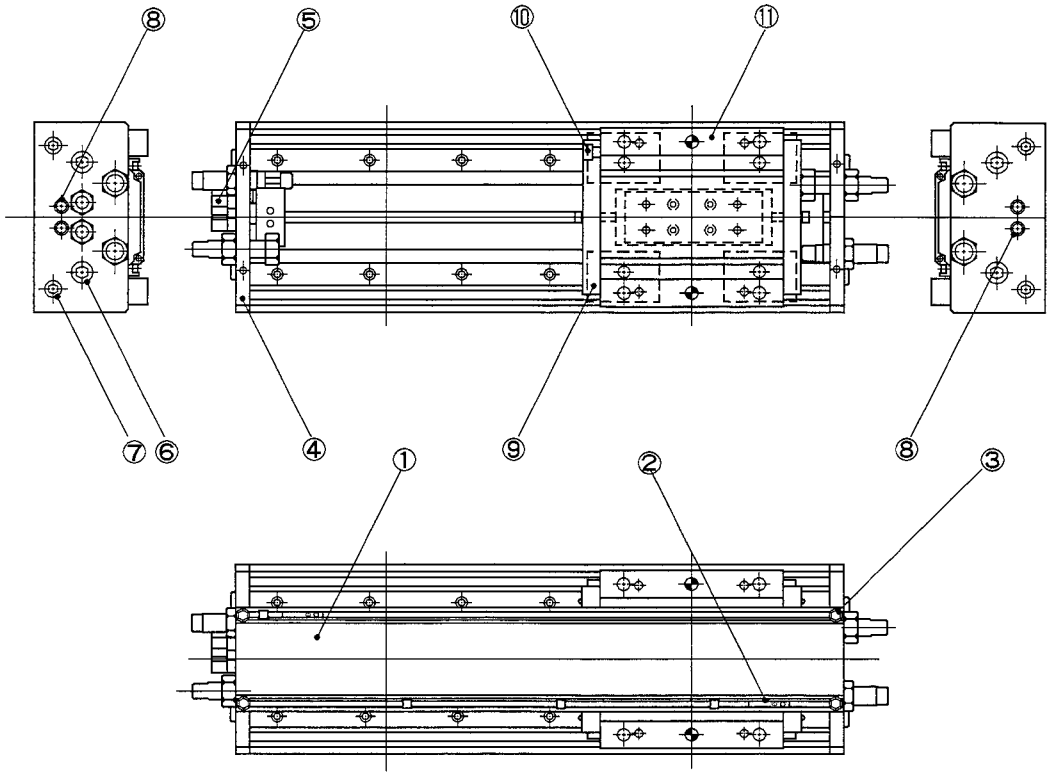


Table 9

①	Front cover
②	Sensor
③	Front cover fixing bolt
④	Side plate
⑤	Pipe joint
⑥	Side plate fixing bolt "1"
⑦	Side plate fixing bolt "2"
⑧	Cylinder fixing bolt
⑨	Cylinder connect plate
⑩	Cylinder connect plate fixing bolt
⑪	Slider

Replacement procedure:

(1) Remove the sensor ②, the front cover fixing bolts ③, and then the front cover ①.

(2) If the unit has stroke adjustment block(s), remove the block at the piping side.

(3) Using a spanner, turn to remove the two pipe joints ⑤.

(4) Remove the cylinder fixing bolts ⑧ on both sides (four bolts in total).

(5) Remove the side plate fixing bolts ⑥ ⑦ (two bolts each) and then the side plate. (Only the side plate at the pipe joint side needs to be removed.)

(6) Remove the two cylinder connect plate fixing bolts ⑩ on both the sides.

(7) Move the slider ⑪ further away from the pipe joints and then draw out the cylinder toward where the removed side plate ④ originally was.

The above procedure removes a cylinder; reverse the procedure to fit a new cylinder. When reassembling the unit, tighten the bolts to the torque given in Table 10 below after applying the anti-slackening agent (LOCKTITE 242 supplied by Loctite Co, LTD).

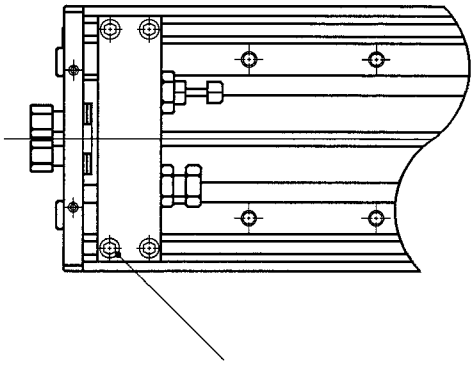


Table 10

Description	Bolt size	Torque N·cm{×0.102kgf·cm}
③ Front cover fixing bolt	M3	100~120
⑧ Cylinder fixing bolt	M4	300~340
Stroke adjustment block fixing bolt	M5	520~560
⑦ Side plate fixing bolt ⑩ Cylinder pressure plate fixing bolt	M6	1050~1150
⑥ Side plate fixing bolt	M8	1200~1300

4.4 Sensor Adjustment Method

Fix the slider in the stop position, then move the sensor back and forth on the slider until the position where the sensor turns ON is located. The position that comes in the middle between the above two positions is the sensor position of optimum sensitivity for the slider position. Fix the sensor at this optimum position.

5. SPECIFICATIONS

5.1 Specifications

Item Model No.		NSR-1-10
Cylinder bore	mm	20
Cylinder speed	mm/s	100~1000
Cushion		Shock absorber
Stroke	mm	50~1000(Pitch=1 mm)
Max. stroke	mm	2000
Allowable moment	N·m	M1=30,M2=30,M3=30
Slider inclination		±0.1° or less
Piping port size		Rc1/8
Position detection sensor		T-type contact-less switch, lead wire 3 m
Lord capacity for horizontal transfer	kg	10
Medium		Clean compressed air
Operating pressure	MPa	0.2~0.7
Guaranteed withstanding pressure	MPa	1.05
Ambient temperature	°C	5~60
Lubrication		Not required but allowable (with First Class Turbine Oil as per ISO V32 or equivalent)
Stop position repeatability	mm	±0.02
Weight	kg	(St×0.0109)+5.5

5.2 Specifications of Stroke Adjustment Feature

Item Symbol		None	R	L	D
Shock absorber		NCK-00-1.2-C			
Maximum energy absorption	J	12			
Absorber stroke	mm	10			
Max. colliding speed	mm/s	1000			
Max. frequency of use	cycle/min	30			
Stroke adjustment at the right side	mm	0~-15	Full stroke	0~-15	Full stroke
Stroke adjustment at the left side	mm	0~-15	0~-15	Full stroke	Full stroke
Additional weight	kg	0	0.685	0.685	1.37

5.3 Cable carry Specifications

Item		Description
Manufacturer		Tsubakimoto Chain
Model No.		TKPO320-2B
Inside diameter	mm	19×24
Load capacity	kg/m	MAX1.6
Additional weight	kg	(St÷2×0.0063)+0.482

5.4 Specifications of Two-Head Model

Item	NSR-2-10
Load capacity for horizontal transfer kg/head	5
Stroke mm	500
Max. stroke mm	1000
Pitch between heads mm	200~500
Max. pitch between heads mm	999
Weight kg	((St+pitch between heads)×0.0109)+6.6

5.5 Model No. Indication

NSR - 1 - 10 - 1000 - 500 - L 3 B A
ⓐ ⓑ ⓒ ⓓ ⓔ ⓕ ⓖ ⓗ

ⓗ Switch

None	T2H3	※1
A	T3H3	

ⓖ Cable protect devices

Symbol	None
B	Longitudinal mounting
F	Transverse mounting

ⓕ Port position, speed controller, LB

Symbol	None	2	3	4	5	6	7	8
Port position	L	R	L	R	L	R	L	R
With speed controller	—	—	○	○	—	—	○	○
Mounting bracket LB	—	—	—	—	○	○	○	○

ⓔ Stroke adjustment block

No symbol	None
R	Right side
L	Left side
D	Both sides

ⓓ Pitch between heads

200~999 (Pitch = 1 mm)
(Applicable to two-head models only)

ⓒ X-axis stroke

Stroke	100~1000 mm Pitch = 1 mm	1001~2000 mm With tensioning-type cover

ⓑ Load capacity

10	10kg

ⓐ Number of heads

1	1
2	2

※1 : Consider leakage current of T2-Type sensor for program controller useing.
(T2 Type is that valve with less than 1mA)