



# OPERATION MANUAL

Mechanical Joint Type Rodless Cylinder  
Series MY1M/C

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SMC CORPORATION

INDEX

	Page
1. Mounting instructions	1
1-1. Mounting surface of the equipment	
1-2. How to mount	
1-3. Piping method	
1-4. Cautions in use of Auto switch	
2. Allowable load range and how to select the suitable bore size	5
2-1. Procedure for selection	
2-2. Allowable load and Moment	
2-3. Example of how to define allowable load	
3. Replaceable parts and Maintenance	10
3-1. Replaceable parts	
3-2. Maintenance	
Slide bearing adjustment	
Dust seal band replacement	
4. Air	10
5. Other instructions	10
6. Technical data	12

1. Mounting instructions

1-1. Mounting surface of the equipment

This mounting surface is desired to be as flat as possible. However, when its flatness is not sufficient, mount it so that the slide table (the moving unit) will be operated under the minimum operating pressure on the whole process by shim adjustment.

Minimum operating pressure	
MY1M	0.15MPa
MY1C	0.1 MPa

1-2. How to mount

Mount the main body in the head cover parts on both ends. Do not mount on the slide table. Mounting on the slide table means the excessive load on the bearing part and it causes malfunction. Also, consult with us in case of over hung mounting (see Fig.2). It may be cause malfunction due to tube flexing.

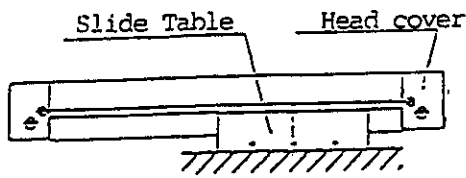


Fig.1 Mounting on Slide Table  
(Using this mode is prohibited.)

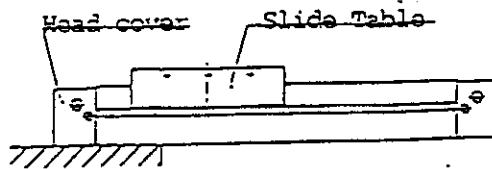


Fig.2 Mounting with overhung support  
(Prior consultation with us is necessary.)

The following two methods are available as mounting method of the head cover part. Choose the suitable method to the mounting surface and mounting place.  
(Use the side port fittings for only supporting purposes.)

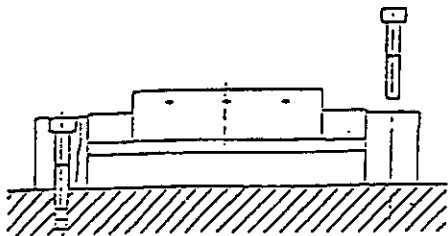


Fig.3 Fixing from top face with hexagon socket bolt

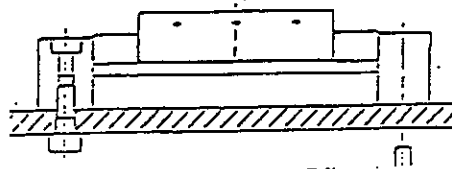


Fig.4 Fixing from the bottom face

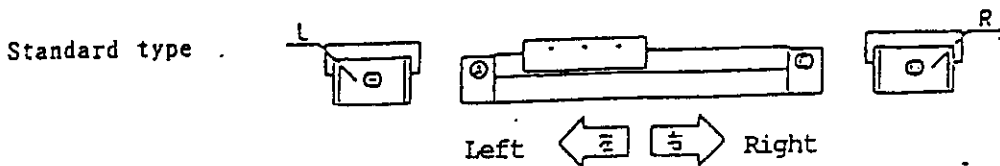
[Cautions in mounting]

- ① Before mounting, any dust or chips should not be entered the cylinder by thorough flushing of connection piping.  
(Any chips, seal tapes or dust in piping operation cause the malfunction such as air leakage.)

- ② Be careful to avoid flaws of the peripheral surface of the cylinder tube. Its flaws bring about the damage of the bearing or scraper and then cause malfunction.
  - ③ Be careful not to add the strong impact or excessive moment in case of work mounting because the slide table are supported with the slide bearing made of resin. Also, the high precision machined mounting surface of the slide table will require a flatness of 0.03 or less on the other mounting surface. (If the required flatness is not obtained, adjust the shim according to the procedure shown in "1-1 Mounting surface")
  - ④ When using in the environment with chip or dust (such as paper powder or waste thread) and cutting oil (such as gas oil or water(warm water)), consider the cover setting or back to back mounting.
  - ⑤ The slide table of this cylinder has been shipped after adjusting the amount of backlash when shipping. In case of the large backlash in use, readjust it according to [Slide bearing adjusting procedure].
- <Note> In case of large backlash in short period, consult with us after ensuring the conditions for use again.

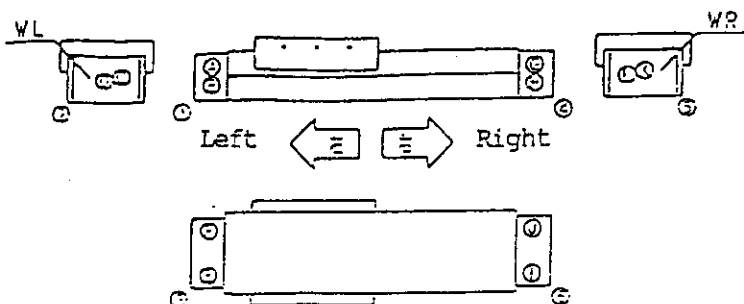
1-3. Piping method (Standard type/ Centralized piping type)

The piping connection of head cover can be freely selected to match the condition.



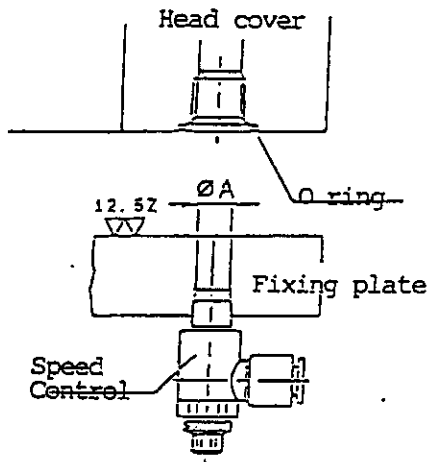
Kind of head cover		Head cover L		Head cover R	
Operating direction	Left	/	/	C	D
	Right	A	B	/	/

Centralized piping type



Kind of head cover		Head cover VL			Head cover WR		
Piping surface number		①	②	③	④	⑤	⑥
Piping surface		Front	Side	Bottom	Front	Side	Bottom
Operating direction	Left	A	C	E	G	K	I
	Right	B	D	F	H	L	J

Dimensions when mounted on bottom face:

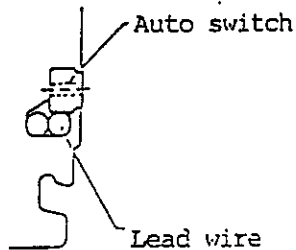


	φ 16.	φ 20	φ 25.	φ 32	φ 40	φ 50.	φ 63.
O ring	C6		C9		C11.2	C15	
φ A size	φ 4		φ 6		φ 8	φ 10	

Note) When mounting on the bottom face, consult with us about the arrangement of the packing.

#### 1-4. Cautions in use of Auto switch

The auto switch can be mounted in the middle position, but adjust it so that the cylinder speed may be detected within 300mm/sec due to response time of load relay.

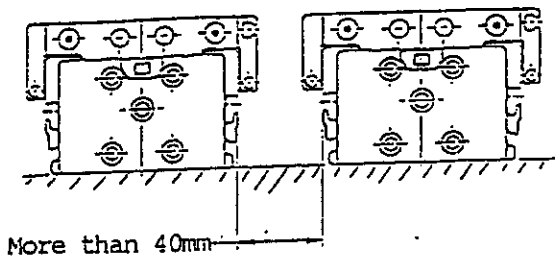


Sizes of the auto switch mounting screw
Minus set screw
: M2.5 × 0.45 × 4Z

① When handling, be careful not to drop anything on the auto switch or not add the excessive impact.

② Avoid using in the strong magnetic field.

③ When two or more cylinders are used in parallel, the distance of 40mm is required between each cylinder tube. (Refer to the following figure )



④ Avoid using in cases where the repeated bending stress and the tensile force are applied to the lead wire.

2. Allowable load range and how to select the suitable bore size.

2-1. Procedure for selection

The following is a general procedure for selection of the appropriate MY series.

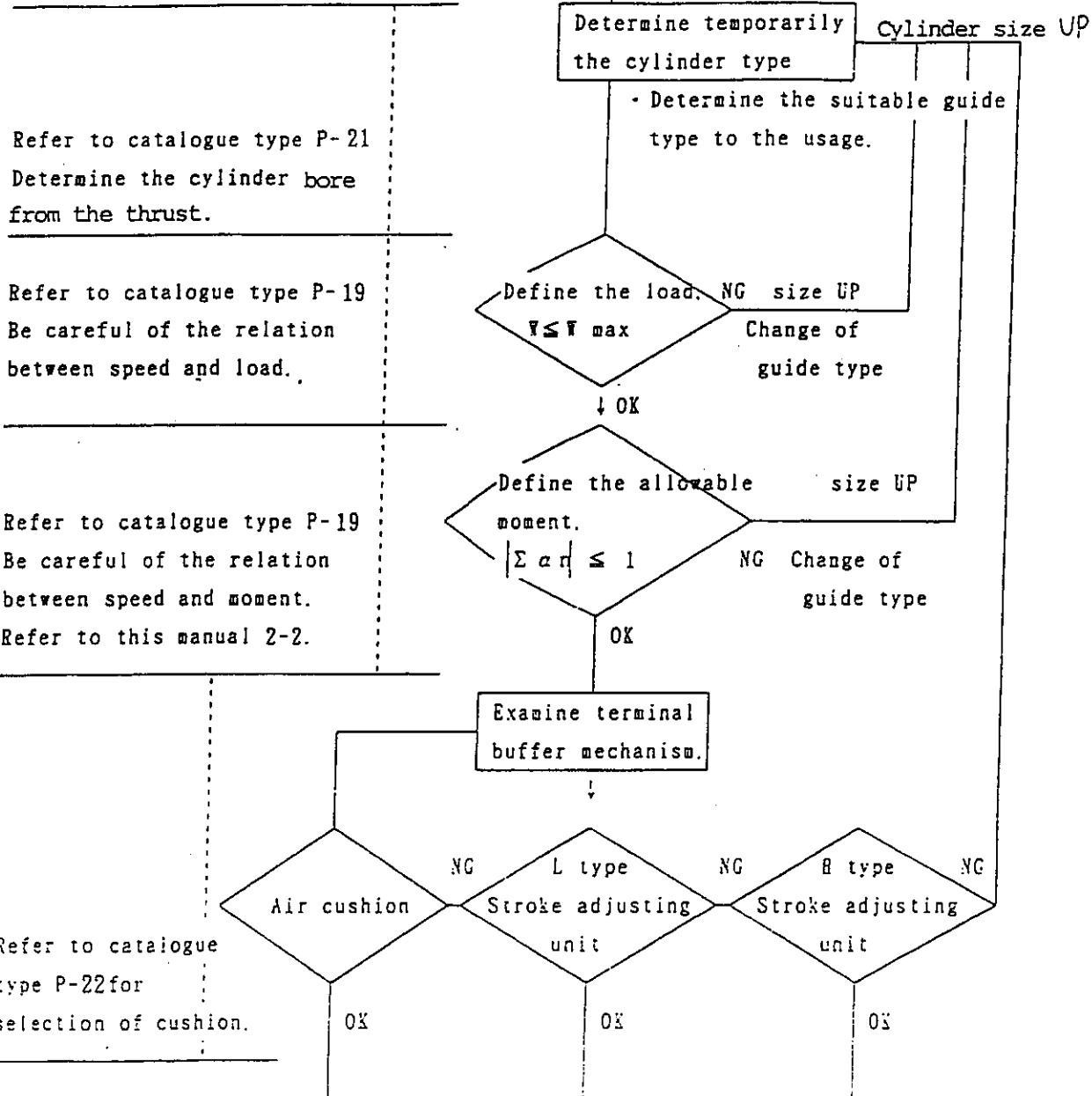
Refer to the catalogue in regard of the specification and allowable value.

Guideline for the selection of suitable guide form

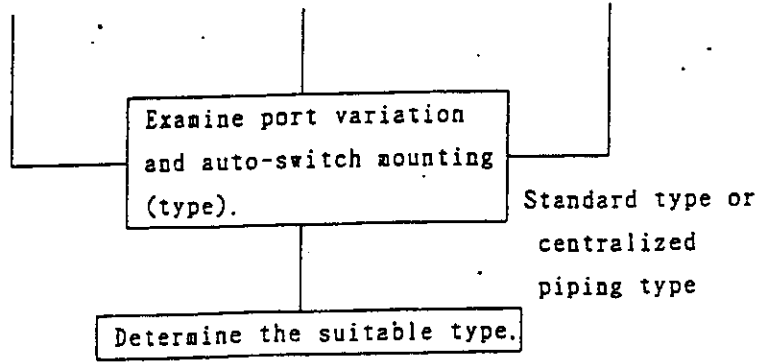
	Allowable values of backlash of the slide table.
MY1M	± 0.12mm or more is allowable.
MY1C	0.05mm or more is allowable.

Conditions for use	
Y: Load(N)	Mounting style:
V: Speed(mm/s)	Accuracy:
P: Pressure(MPa)	Environment:

MY1M: Slide bearing type  
MY1C: Cam follower guide type



Refer to this manual 1-3.  
Catalogue type P- 20.21



## 2-2. Allowable load and Moment

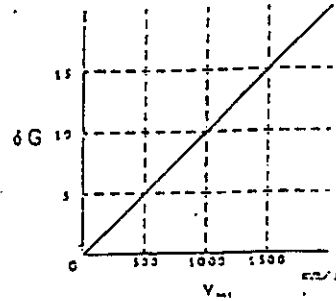
When calculating the allowable load, examine both static load and dynamic load so that the total of load rate does not exceed 1 ( $\sum \alpha n \leq 1$ ).  
 (In case of  $\sum \alpha n > 1$ , examine the changing to larger cylinder size or the remedy of conditions.)

### 1. Dynamic load

When the load stops at the stroke end, the inertia force gives the impact load  $\delta G$  in proportion to the inrush speed of the absorber.

$$\delta G = V \times \delta G$$

(The inrush speed means  $V_{max} = V(\text{Average speed}) \times \frac{1.4}{\text{Corrective coefficient}}$ )



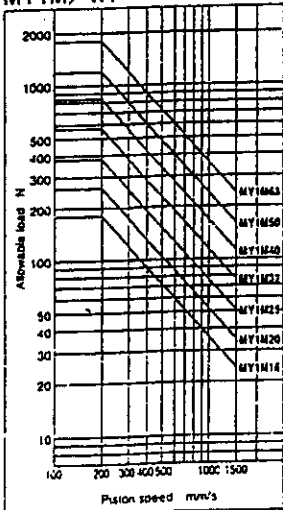
### 2. Load rate

$$\alpha = \frac{F}{F_{max}}$$

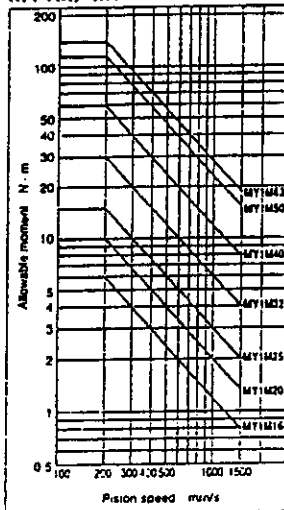
$F$  = Calculated load  
 $F_{max}$  = Max. allowable load at a given speed  
 (The value shown in the graph.)

Speed and Impact value

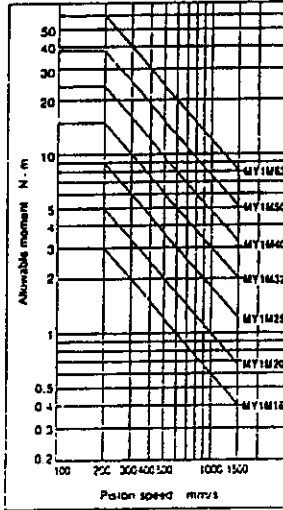
MY1M/W1



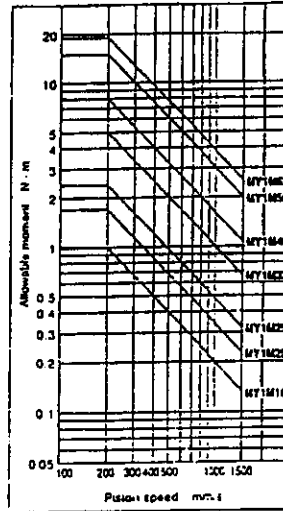
MY1M/M1



MY1M/M2



MY1M/M3



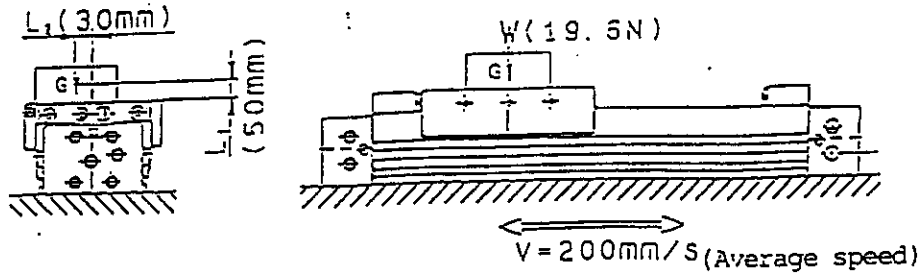
2-3. Example of how to define allowable load  
(for the wall-installed type)

1. Ensure the conditions

Dia. of cylinder: MY1M25	Load W : 19.6N (2kgf)
Speed V : 200mm/s	pressure P: 0.5MPa (5kgf/d)
L1 : 50mm	L2 : 30mm

Max. speed  $V_{max}$  is assumed as  $1.4V$ .

(This was calculated by the speed calculation software.)



Bearing	Load explanation	Static load	Dynamic load
Load added to (guide)	① Load by W	W1	
	② Moment by W	M2	
	③ Moment which happens from "Te" when stopping		M1v
	④ "		M3v

2. Calculate the static load

Load added all the time

① →  $W1 \text{ max. } (MY1M/W1) = 147N$

$$\rightarrow \text{Load rate } \alpha 1 = \frac{W1}{W1 \text{ max.}} = \frac{19.6}{147} = 0.14$$

② →  $M2 \text{ max. } (MY1M/M2) = 3.92N \cdot m$

$$M2 = W \times L2 = 19.6 \times 0.03 = 0.59 N \cdot m$$

$$\rightarrow \text{Load rate } \alpha 2 = \frac{M2}{M2 \text{ max.}} = \frac{0.59}{3.92} = 0.15$$

3. Calculate the dynamic load

Load added when stopping

Equivalent load in impact

$$W_e = W \times \delta G = 19.6 \times (\text{※ 1}) 2.8 = 54.9 \text{ N}$$

(Note※ 1) Refer to 2-2 the dynamic load.

M1 Moment

M1 Moment which happens at the stroke end when stopping.

$$\text{④} \rightarrow M_{1v} \text{ max. } (V_0 = 1.4V = 280 \text{ mm/s}) = 7.0 \text{ N}\cdot\text{m}$$

$$M_{1v} = W_e \times L_1 \times \frac{1}{3} = 54.9 \times 0.05 \times \frac{1}{3} = 0.92 \text{ N}\cdot\text{m}$$

$$\text{Load rate } \alpha_4 = \frac{M_{1v}}{M_{1v} \text{ max.}} = \frac{0.92}{7.0} = 0.13$$

(Note※ 2) Average load coefficient of impact value =

M3 Moment

$$\text{③} \rightarrow M_{3v} \text{ max. } (V_0 = 1.4V = 280 \text{ mm/s}) = 1.5 \text{ N}\cdot\text{m}$$

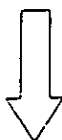
$$M_{3v} = W_e \times L_3 \times \frac{1}{3} = 54.9 \times 0.03 \times \frac{1}{3} = 0.55 \text{ N}\cdot\text{m}$$

$$\text{Load rate } \alpha_3 = \frac{M_{3v}}{M_{3v} \text{ max.}} = \frac{0.55}{1.5} = 0.37$$

4. Resultant force of load

	$\alpha_n$
①	0.14
②	0.15
③	0.13
④	0.37
$\Sigma \alpha_n$	0.79
Decision	OK from $\Sigma \alpha_n \leq 1$

The above shows there are no problem in conditions due to within allowable value.



Decision on MY1N25

### 3. Replaceable parts and Maintenance

#### 3-1. Replaceable parts

MY1M Series → Refer to catalogue type p-29

MY1C Series → Refer to catalogue type p-43

#### 3-2. Maintenance

- Regular grease (once a month) to the bearing contact surface and the dust seal band is recommended for more improvement of life.  
(Refer to Table.5 Appropriate grease.)
- Refer to 「Procedure for adjustment of slide bearing」 「Outline for replacement of slide bearing」 when the slide bearing is adjusted and
- Refer to 「Procedure of slide table adjustment」 when the cam follower is adjusted.
- Refer to 「Outline for replacement of MY1M/C dust seal band」 when replacing the dust seal band.

#### 4. Air

Supplied air should be filtered by AF series air filter manufactured by SMC and adjusted to the specified pressure by AR series regulator due to non-lubricated cylinder.

When lubricated, use the turbine oil(ISO VG32).

#### 5. Other instructions

##### 5-1. Environment

- When this cylinder is handled at the environment where water(warm water) or coolant liquid is used, consider about the cover mounting or back mounting. Consult with us if each mounting is impossible.

Especially, be careful that some coolant liquid influences the dust seal band badly. Refer to the following table 3.

When this cylinder is used at an environment with much dust such as powdery paper or iron dust, the slide bearing and the dust seal band may be influenced badly. Consult about the same mounting as the previous page.

Table 3. Chemicals resistance and oil resistance of the dust seal band and lining materials

	Organic solvent	Salt	Alkaline	Acid	Oxidation	Cutting oil	
						chlorinous	Sulfuric
Polyvinyl chloride(solt)	△	○	○	△	△	×	×

#### 5-2. Attachment to the outside guide

Sufficient centering is required to connect with other shaft (such as LM guide). The longer the stroke is, the more the shaft center changes. Therefore, apply the method of connection to absorb the amount of deflection. (Floating mechanism CY1B: Refer to the manual.)

#### 5-3. Intermediate stop control

It is impossible for the rodless cylinder to stop the outside air leakage completely in consideration of its structure. Also, the air leakage at the both sides of piston becomes unequally in use. Be careful that the intermediate stop on air circuit causes the malfunction which the intermediate stop position cannot be held.

#### 5-4. Synchronized operation of Cylinders

It is impossible for the rodless cylinders to operate synchronously. When it cannot synchronized the excessive moment is added to the slide table and it causes the malfunction of the slide table.

#### 5-5. Side support

When the cylinder with the long stroke is used, some weight or load causes deflection. In that case, support the intermediate position so that the following support interval=l is less than the value of the Fig..

Table 5. Appropriate grease

Grease(Grease of the Lithium Soap Group with consistency No.1 or No.2)

Grease name	Manufacturer
Kyoseki Lithonic Grease No.1	Zyodo Oil
" No.2	"
Listan No.1	Esso standard Oil
" No 2	"
" EP1	"
" EP2	"
Duffney Colonex Grease No.1	Idemitsu Kosan
" No.2	"
Diamond multi-purpose Grease No.1	Mitsubishi Sekiyu
" No.2	"
Mobilax Grease No.1	Mobile Oil
" No.2	"
Shell Albania Grease No.1	Shell Oil
" No.2	"
Shell Albania EP grease No.1	"
" No.2	"
Dynanax Grease Super No.1	Cosmo Oil
" No.2	"
Cosmo Concentrated Grease No.1	"
" No.2	"
Cutcol Multi-purpose Grease No.1	Fuji Kosan
" No.2	"
Multi-knock Grease No.1	Nippon Oil
" No.2	"
Ebinock Grease No.1	"
" No.2	"
Fuji Sunlight Grease No.2	Showa Oil
" EM1	"
" EP1	"
" EP2	"
Zemico Grease WP-1	General Sekiyu
" WP-2	"
" MU-1	"
" MU-2	"

Note)1. Number of grease name means the appropriate consistency.

Since the slide bearing of MY1M Cylinder is adjusted to the prescribed value in advance, avoid changing the setting of an adjusting screw part carelessly. When yawing of the slide table becomes larger, adjust according to the following procedure.

1. Remove the load of the slide table.
2. Loosen three fixed screws three rotations and then loosen the adjusting screws (A) (B) (C). (It is unnecessary to remove.)
3. Reciprocate the slide table a few times manually.
4. Tighten the adjusting screw in order of (A) → (B) → (C) with set torque and tighten (A) again. < Note 2 >

Set torque is regulated by values shown in Table 1, but the following angles are the standard for rotation in the direction of drawing 1 from the position which the wrench was tightened.

MY1M16~20...About 60°

MY1M25 ...About 45°

MY1M32~63...About 60°

Reassemble again in the following cases.

- 1) In case of exceeding of 0.15MPa of the min. operating pressure.

(In case of no load.)

- 2) In case of  $\pm 0.12\text{mm}$  or more of yawing of A dimension in figure 2)

5. Tighten three fixed screws and fix the adjusting screw. (Rotate about 90° from the position which was tightened.)

Note

In case of large yawing of the slide table (Yawing of A dimension of figure 2 is over about  $\pm 0.12\text{mm}$ ) after adjusting the bearing, consult with us.

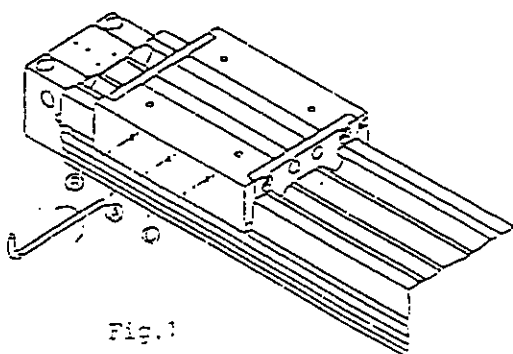


Fig. 1

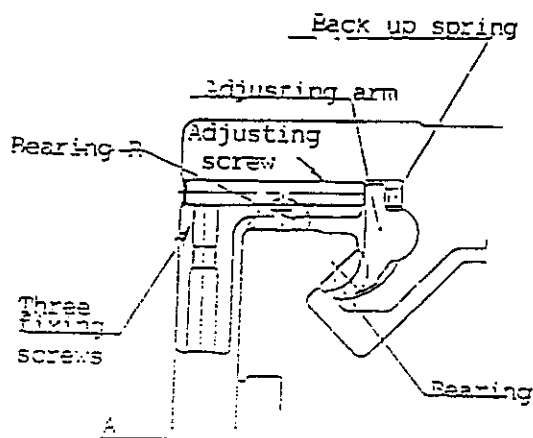


Fig. 2

Table 1. Tightening torque of adjusting screw

	N · m	Hexagon socket wrench
MY1M16	0.044	Nominal number 1.5
MY1M20	0.098	Nominal number 1.5
MY1M25	0.016	Nominal number 1.5
MY1M32	0.088	Nominal number 2.0
MY1M40	0.157	Nominal number 2.5
MY1M50	0.176	Nominal number 2.5
MY1M63	0.176	Nominal number 2.5

## Outline for replacement of MY1W cylinder slide bearing

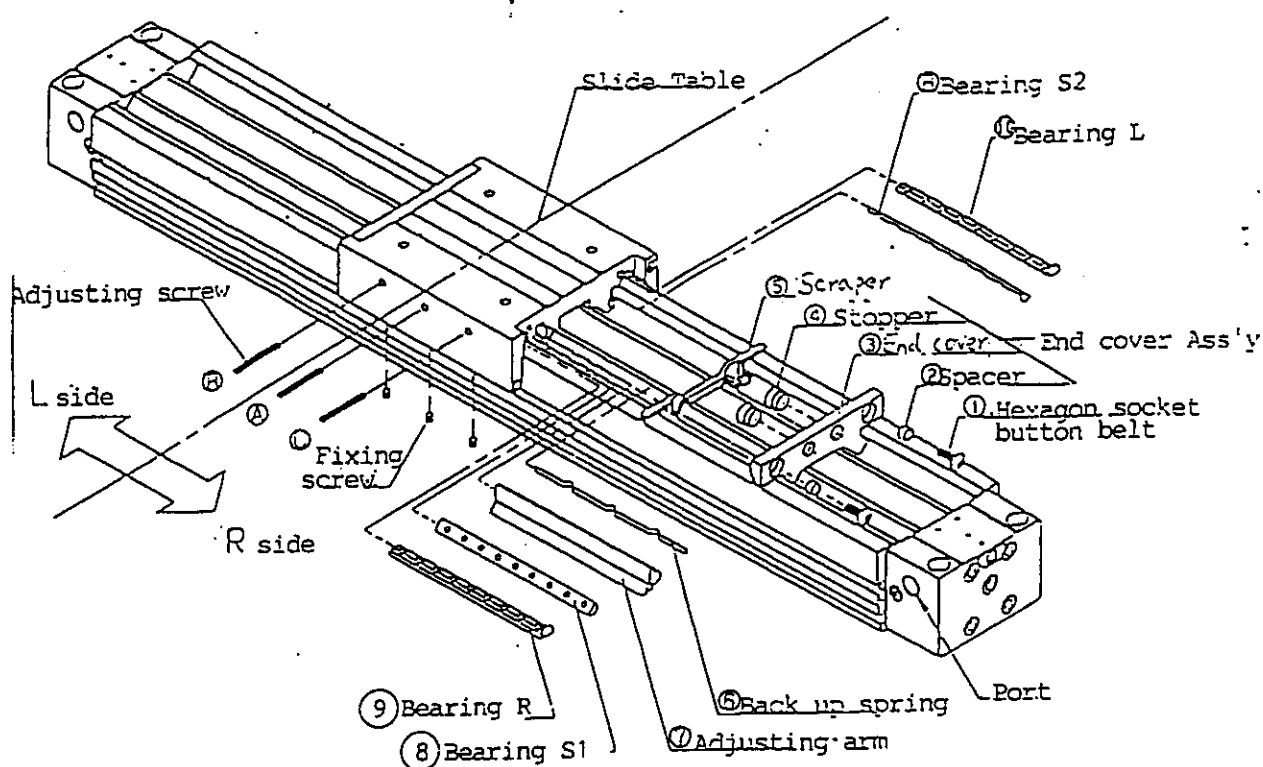
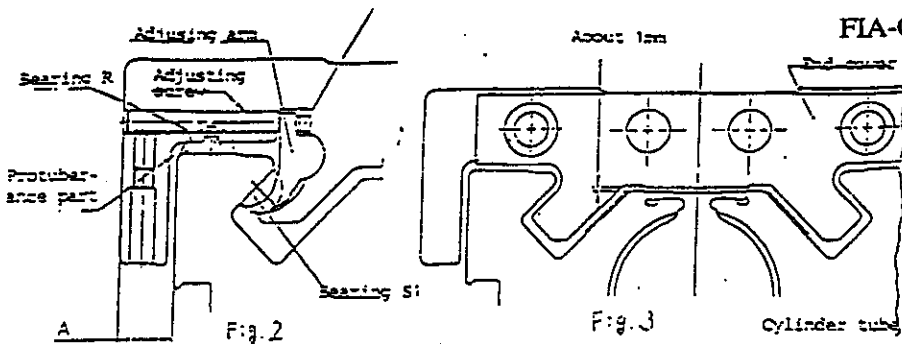


Fig. 1

## Procedure

1. Remove the load of slide table.
2. The cylinder port should be placed in front and do the following procedure at R side of the slide table.
3. Loosen the hexagon socket button bolt (M4) ① and remove the end cover Ass'y from the slide table. <Note 1>
4. Loosen three fixed screws three rotations and then loose the adjusting screws ① ② ③. (It is unnecessary to remove it.)
5. Pulling out the bearing R, L, S1 and S2 from slide table respectively.
6. Grease the whole contact surface of bearing R, L, S1 and S2 for replacement (Refer to an attachment sheet in regard of grease.)
7. Insert the bearing R ⑨ and bearing ⑩ in the slide table.  
(The protuberance of bearing R ⑨ and bearing ⑩ should be outside.  
- Refer to figure 2. -)
8. Insert the bearing S1 and S2.  
(Operation will be easy if S2 is inserted at first and the adjust arm is pulled out when inserting S1.)
9. Tighten the adjusting screws with the set torque in order of ① → ② → ③ and tighten A again. <Note 2>



10. Tighten three fixed screws and fix the adjusting screw. (Rotate 90° from the position where is tightened as the standard.)
11. Install the end cover Ass'y finally and tighten with the hexagon socket button bolt.  
(Install the end cover so that the clearance between the end cover ③ and the cylinder tube is about 1mm. - Refer to figure 3. -)

※ Consult with us when the slide table yaws large after exchanging the bearing. (The yawing of A dimension in figure 2 is over about  $\pm 0.12\text{mm}$  as standard.)

Note

1. Be careful that the end cover Ass'y parts (especially spacer ②, stopper ④) are apt to be lost.
2. Tightening torques of adjusting screw are regulated by values shown in table 1, but the following angles are the standard for rotation in the direction of figure 4 from the position which the wrench was tightened.

- MY1M16~20...About 60°
- MY1M25...About 45°
- MY1M32~63...About 60°

※ Reassemble again in case of the followings.

- 1) In case of exceeding 0.15MPa of the minimum operating pressure  
(In case of no load)
- 2) In case of over  $\pm 0.12\text{mm}$  of yawing of A dimension in figure 2.

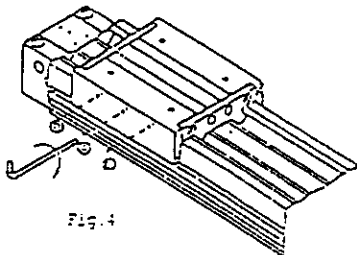


Table 1. Tightening torque of adjusting screw

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MY1M25	0.016	Nominal number 1.5
MY1M32	0.088	Nominal number 2.0
MY1M40	0.157	Nominal number 2.5
MY1M50	0.176	Nominal number 2.5
MY1M63	0.176	Nominal number 2.5

## MY1C PROCEDURE OF SLIDE TABLE ADJUSTMENT

Do not touch the locking screw carelessly as the cam follower of MY1C cylinder is adjusted to a specified value at shipping.  
Adjust it again following this procedure if the readjustment is required.

1. Take off the load on the slide table.
2. Remove the end cover ass'y from both ends of the slide table by unscrewing the hexagon socket button bolts.
3. Loosen the locking screw by half revolution to free the adjusting gear.  
※ Never turn it around more than half revolution. Otherwise, the gear may fall off.
4. Rotate the adjusting gear with torque close to the one shown in the table I using a torque screwdriver (minus). Then, tighten the locking screw. (Be careful not to set with excessive torque. It may lead to breakage and shorter life.)
5. Operate the slide table as it is. Then, check that there is no rattle and floating of the cam follower on the table all along the stroke. (Such a condition as the unstability cannot be felt by hand.)
6. Fasten the locking screw with torque close to the ones shown in the table II using a hexagonal wrench.
7. Lastly install the end cover ass'y, which is the end of the adjustment work. It is fixed to provide approx. 1mm of clearance between the bottom of the cover and the top of the cylinder tubes.

※ Examine the operating conditions, and then consult us if the slide table still rattles a lot or makes abnormal noises at operation after the readjustment. There is a possibility of damaging the cam follower.

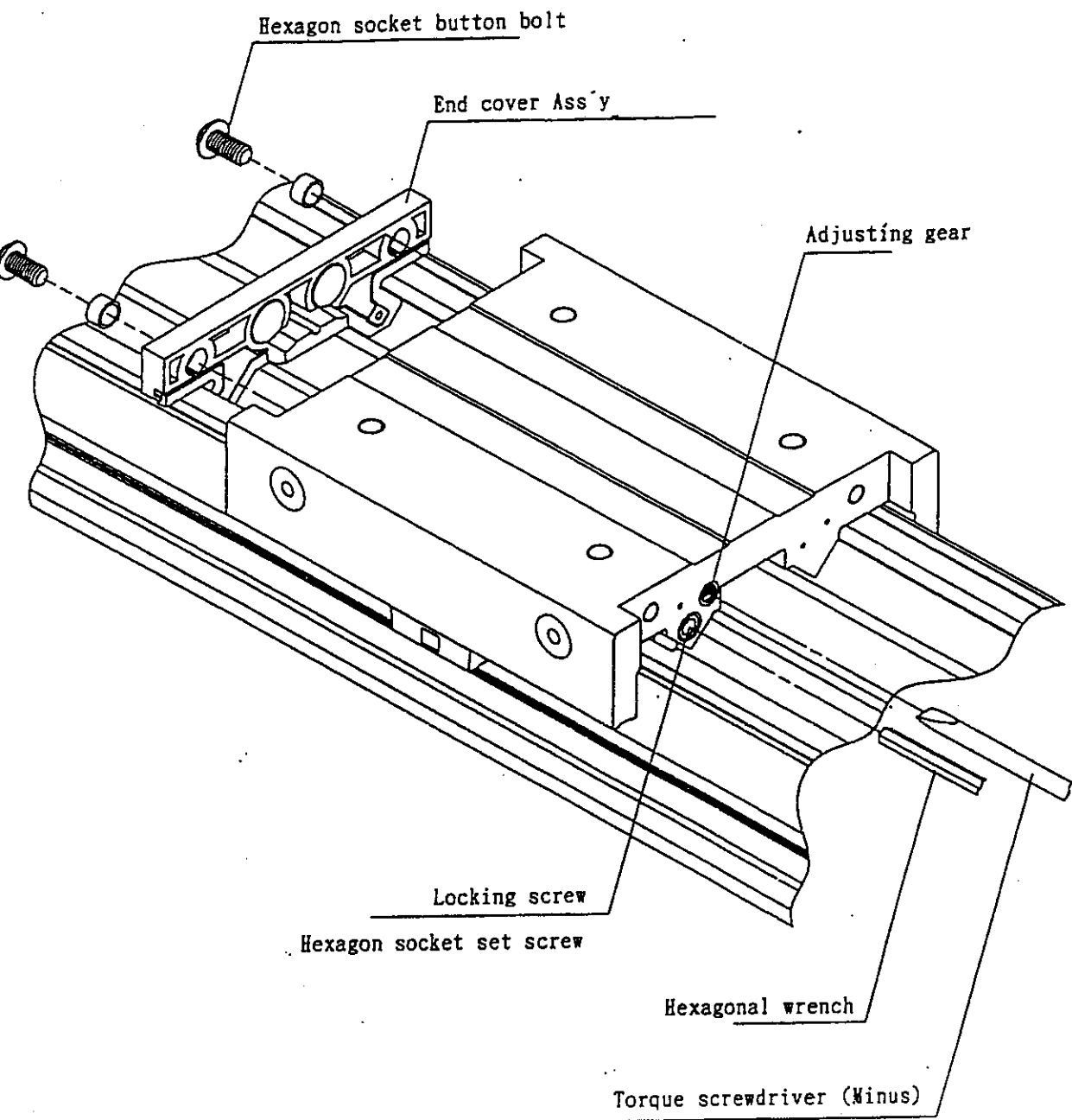
Table I Unit: N · m (kgf · cm)

	MY1C16	MY1C20	MY1C25	MY1C32	MY1C40	MY1C50	MY1C63
Max. Torque for Adjusting Gear	0.1 (1.0)						

Table II Unit: N · m (kgf · cm)

	MY1C16	MY1C20	MY1C25	MY1C32	MY1C40	MY1C50	MY1C63
Tightening Torque for Locking Screw	1.4 (14.5)	2.4 (24.5)	6.0 (61.0)	12.0 (122)	21.1 (215)		

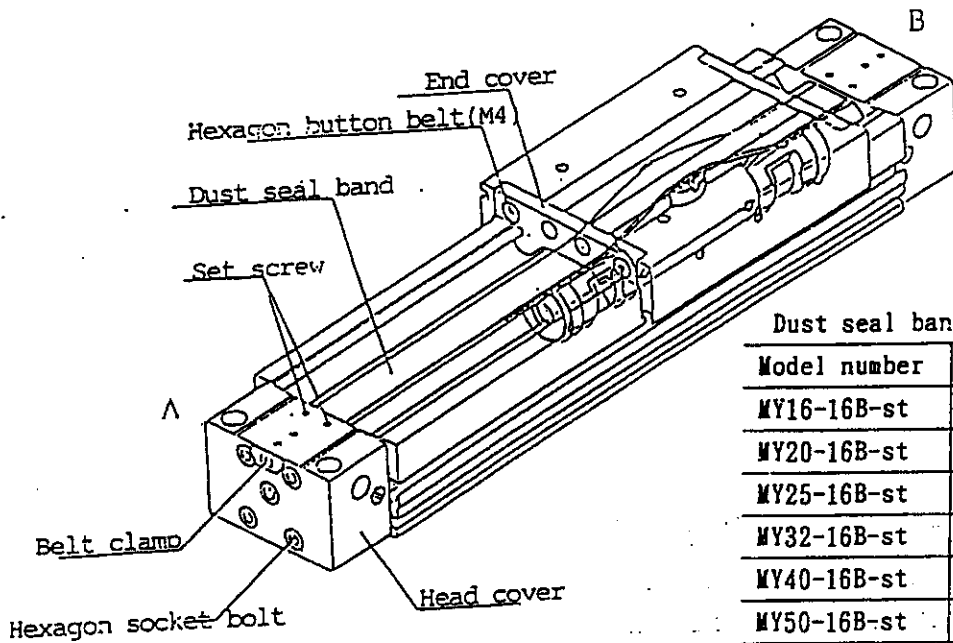
※ The locking screw should be turned approx. 60° more from the point where tightness is first felt.



Outline for replacéaent of MY1W/C dust seal band

[Disassembling]

1. Loosen the two set screws at one side, that is, four set screws at both sides.
2. Remove the end cover by removing two(four) hexagon socket button bolts for fixing which are on the end cover.
3. Remove the opposite end cover as same way.
4. Pull out the dust seal band in this condition.



Dust seal band standard list

Model number	Standard length
MY16-16B-st	st+142
MY20-16B-st	st+172
MY25-16B-st	st+182
MY32-16B-st	st+228
MY40-16B-st	st+272
MY50-16B-st	st+328
MY63-16B-st	st+382

Note) 2 type of dust seal bands are available and the part no. depends on treatment of setscrew.  
 Black zinc chromate → MY\*\*-16B-st  
 Nickel plating → MY\*\*-16BW-st

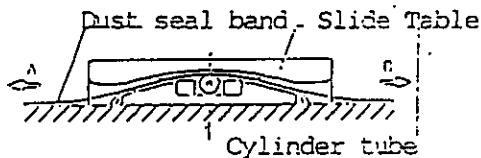
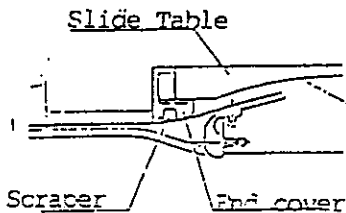


Fig. 4

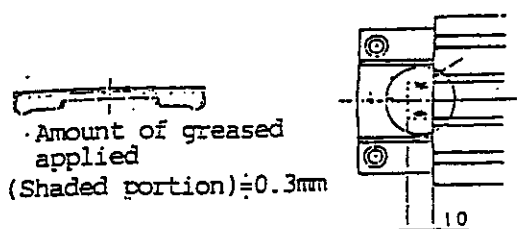


Fig.1

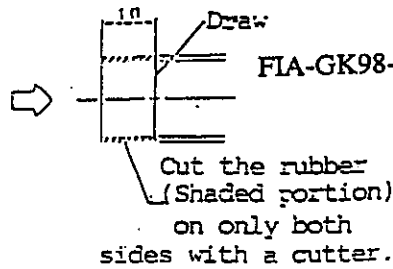


Fig.2

FIA-GK98-0004 pg 2/2

[Installation]

1. The dust seal band for replacement should be added the process of drawing 2 and greased wholly as shown in figure 1.
2. The dust seal band for replacement is pierced the slide table.
3. The end cover is fixed so that the clearance between the end cover Ass'y bottom part and the cylinder tube upper surface is about 1mm.  
The adequate tightening torque at this time is 0.7 N·m (7kgf·cm).  
The opposite end cover is fixed as same way. (figure 3)
4. The dust seal bands of both sides are inserted in the head cover to the position drawn with a pen (about 10mm). Then, at the same time, insert the dust seal band in the groove of cylinder tube by pulling it to both sides. (figure 4)
5. If the dust seal band is installed properly without coming to the surface, tighten two set screws at A side. Adequate tightening torque is 0.1N·m (1kgf·cm).
6. Reciprocate the slide table three or four times to both stroke ends in order to remove the sag of the dust seal band.
7. Be sure to return the slide table to B side stroke end and tighten the set screw at B side after ensuring that the dust seal band is inserted in the head cover of about 10mm.
8. Reciprocate the slide table again manually a few times and ensure that the dust seal band does not come to the surface.

Note 1) Grease uniformly as the drawing 1. Use consistency No.1 or No.2 of the lithium soap grease (such as Mitsubishi Diamond grease multi purpose No.2).