Doc. no. MY*A-OM0002H-D

Operation Manual

PRODUCT NAME

Mechanically Jointed Rodless Cylinder
Basic short type
Basic standard type
Slide bearing type

MODEL/ Series

MY3A/3B/3M Series

SMC Corporation

Contents

Operation manual of MY3A/3B/3M Series

Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by a label of "Caution", "Warning". To ensure safety, be sure to observe ISO4414(Note 1), JIS B 8370(Note 2) and other safety practices.

⚠ Warning	Operator error could result in serious injury or loss of life.
⚠ Caution	Operator error could result in injury or equipment damage.

(Note 1) ISO4414: Pneumatic fluid power - General rules relating to systems
(Note 2) JIS B 8370: General Rules for Pneumatic Equipment

Explanation of Graphical symbol

Graphical symbol	Meaning of graphical symbol
 Prohibition	"⊘" shows the prohibition (Do not do). A concrete content of the prohibition is in the chart sign and directed by the picture and sentences to be near.
 Instruction	"⊘" shows the compulsion of the directed act (Do). A concrete content is in the chart sign and directed by the picture and sentences to be near.

⚠ Warning

1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.

Instruction

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. Please examine all content of the specification according to a product catalog and material which is hereafter the latest, and compose the system in consideration of the situation of the possibility of the breakdown of the equipment.

2. Only trained personnel should operate pneumatically operated machinery and equipment.

Instruction

Compressed air can be dangerous if handled incorrectly. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.

Instruction

1. Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc. (Bleed air into the system gradually to create back pressure.)

4. Contact SMC if the product is to be used in any of the following conditions:

Instruction

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

Instruction

5. There is a danger of sudden action by air cylinders if sliding parts of machinery are twisted, etc., and changes in forces occur.

In such cases, human injury may occur; e.g., by catching hands or feet in the machinery, or damage to the machinery itself may occur.
Therefore, the machine should be designed to avoid such dangers.

Instruction

6. Install a protective cover when there is a risk of human injury.

If a driven object and moving parts of a cylinder pose a danger of human injury, design the structure to avoid contact with the human body.

Instruction

7. Securely tighten all mounting parts and connecting parts so that they will not become loose.

Especially when a cylinder operates with high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.

Instruction

8. A deceleration circuit or shock absorber, etc., may be required.

When a driven object is operated at high speed or the load is heavy, a cylinder's cushion will not be sufficient to absorb the impact. Install a deceleration circuit to reduce the speed before cushioning, or install an external shock absorber to relieve the impact. In this case, the rigidity of the machinery should also be examined.

Instruction

9. Consider a possible drop in operating pressure due to a power outage, etc.

When a cylinder is used in a clamping mechanism, there is a danger of work pieces dropping if there is a decrease in clamping force due to a drop in circuit pressure caused by a power outage, etc. Therefore, safety equipment should be installed to prevent damage to machinery and/or human injury. Suspension mechanisms and lifting devices also require consideration for drop prevention.

Instruction

10. Consider a possible loss of power source.

Measures should be taken to protect against human injury and equipment damage in the event that there is a loss of power to equipment controlled by air pressure, electricity or hydraulics, etc.

Instruction

11. Design circuitry to prevent sudden lurching of driven objects.

When a cylinder is driven by an exhaust center type directional control valve or when starting up after residual pressure is exhausted from the circuit, etc., the piston and its driven object will lurch at high speed if pressure is applied to one side of the cylinder because of the absence of air pressure inside the cylinder. Therefore, equipment should be selected and circuits designed to prevent sudden lurching because, there is a danger of human injury and/or damage to equipment when this occurs.

Instruction

12. Consider emergency stops.

Design so that human injury and/or damage to machinery and equipment will not be caused when machinery is stopped by a safety device under abnormal conditions, a power outage or a manual emergency stop.

Instruction

13. Consider the action when operation is restarted after an emergency stop or abnormal stop.

Design the machinery so that human injury or equipment damage will not occur upon restart of operation. When the cylinder has to be reset at the starting position, install safe manual control equipment.

Prohibition

14. Confirm the specifications.

The products advertised are designed according to use in industrial compressed air systems. If the products are used in conditions where pressure, temperature, etc., are out of specification, damage and/or malfunction may be cause. Do not use in these condition. (Refer to specifications)

Consult SMC if you use a fluid other than compressed air.

Prohibition

15. Use clean air.

Does not use compressed air which includes chemicals, synthetic oils containing organic solvents, salt or corrosive gas, etc., as it can cause damage or malfunction.

Prohibition

16. Do not use in environments where there is a danger of corrosion.

Refer to the construction drawings regarding cylinder materials.

Instruction

17. Please follow the manual of auto switch for the handling of auto switch.

⚠ Caution

Instruction

1. Operate the piston within a range such that collision damage will not occur at the stroke end.

Operate within a range such that damage will not occur when the piston having inertial force stops by striking the cover at the stroke end. Refer to the cylinder model selection procedure for the range within which damage will not occur.

Instruction

2. Use a speed controller to adjust the cylinder drive speed, gradually increasing from a low speed to the desired speed setting.

Instruction

3. Provide intermediate supports for long stroke cylinders.

Provide intermediate supports for cylinders with long strokes to prevent bending of the tube, and deflection due to vibration and external loads, etc.

Prohibition

4. Do not apply strong impacts or excessive moment to the slide table (slider).

The slide table (slider) is supported by precision bearings or resin bearings. Therefore, do not apply strong impacts or excessive moment, etc., when mounting work pieces.

Prohibition

5. Do not scratch or gouge the cylinder tube by striking or grasping it with other objects.

Cylinder bores are manufactured to precise tolerances, so that even a slight deformation may cause malfunction.

Instruction

6. Readjust with the cushion needle.

The cushion is adjusted before shipment from the factory, but the cushion needle located on the cover should be readjusted before operation according to the load and operating speed, etc. Turning the cushion needle clockwise closes the restriction and increases the strength of the cushion.

Prohibition

7. Do not operate with the cushion needle completely closed.

This can cause damage to seals.

8. Be careful not to get hands caught in the unit.

Instruction

When using a product with stroke adjusting unit, the space between the slide table (slider) and the stroke adjusting unit becomes narrow, causing a danger of hands getting caught. Install a protective cover to prevent direct contact with the human body.

9. Do not use until you can verify that equipment can operate properly.

Instruction

Verify correct mounting by suitable function and leakage inspections after compressed air and power are connected following mounting, maintenance or conversions.

10. Preparation before piping

Instruction

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

11. Wrapping of pipe tape

Instruction

When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the piping.
Also, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.

12. Lubrication of non-lube type cylinder

Instruction

The cylinder is lubricated at the factory and can be used without any further lubrication.
However, in the event that it will be lubricated, use class 1 turbine oil (without additives) ISO VG32.
Stopping lubrication later may lead to malfunction due to the loss of the original lubricant. Therefore, lubrication must be continued once it has been started.

13. Install air filters.

Instruction

Install air filters at the upstream side of valves. The filtration degree should be 5 μm or finer.

14. Install an after cooler, air dryer or water separator, etc.

Instruction

Air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an after cooler, air dryer or water separator, etc.

Instruction

15. Use the product within the specified range of fluid and ambient temperature.

Take measures to prevent freezing, since moisture in circuits can be frozen under 5℃, and this may cause damage to seals and lead to malfunction.

Instruction

16. Drain flushing

Remove drainage from air filters regularly.

Instruction

17. Piston speed

As for mechanically jointed rodless cylinder, the fluctuation of the piston speed might become large compared with the standard air cylinder.
Please consult us if considering it is used in the application for which the definite speed is necessary.

1. Mounting

1. 1 Cylinder mounting face

While a high level of flatness is desired for the surface on which the cylinder is to be mounted, if sufficient flatness cannot be attained, use shims to adjust the mounting of the cylinder so that the slide table can be operated throughout its stroke under the minimum operating pressure (0.15MPa).

1. 2 How to mount

Instruction

[1] Mount the main body at the head cover parts on both ends. The mounting face that is at the bottom of the tube more than 5mm is necessary for the cylinder both ends fixed part.
(Refer to Fig.-1)

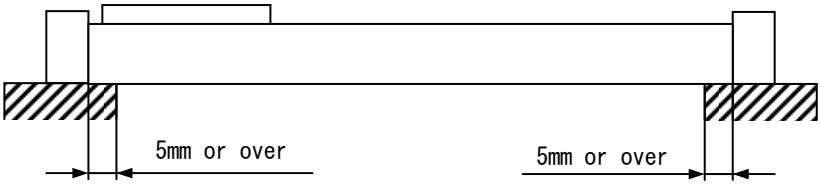


Fig-1

Instruction

[2] When a cylinder is mounted on the ceiling or the wall, support a cylinder tube both ends part by the side supports in addition to the fixed bolt of the head cover port. (Refer to Fig.-2)

Fig-2

Prohibition

[3] Avoid mounting at slide table.(Refer to Fig.-3) It means the excessive load on the bearing part and it causes mal function.

[4] Also, consult with us in the case of overhang mounting. (Refer to Fig.-4) It may cause malfunction due to be deflected of tube.

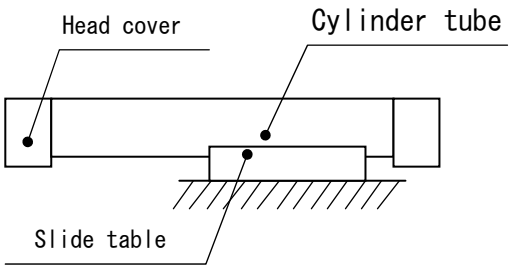


Fig.-3 Mounting at Slide table
〈Forbidden〉

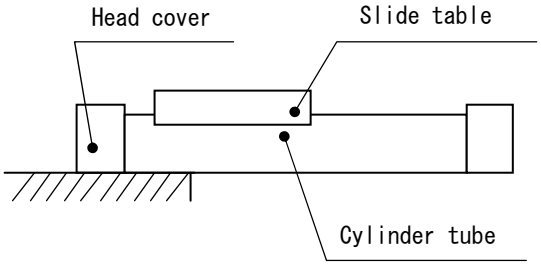


Fig.-4 Overhang mounting
〈Contact SMC〉

1－3 Piping

The piping connection of head cover is selected according to the situation.

Referring to the port variation (Figure-5) ,select the most suitable piping connection ⓇⓁ . (Applicable fitting for ports with * in drawing is limited when stroke adjusting unit is used)

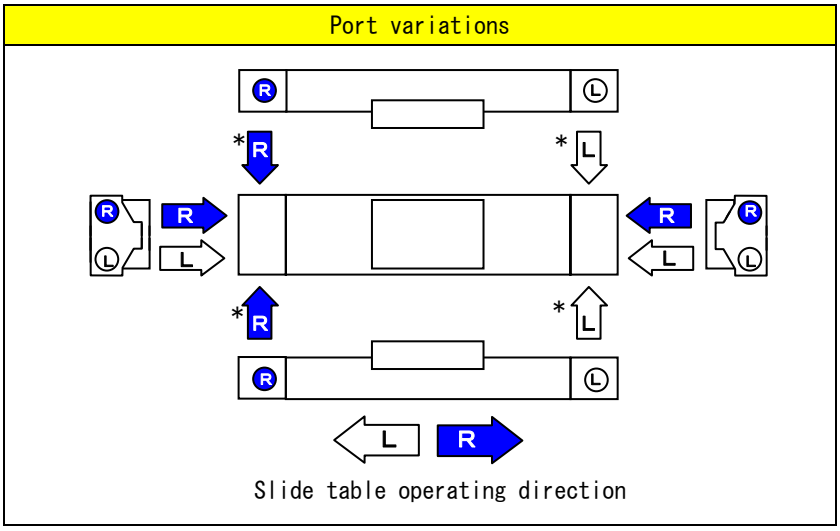


Fig.-5

1－4 Cautions in mounting

⚠ Caution

Prohibition ①Be careful not to give a strong impact or an excessive moment to the slider.

Instruction ②Align carefully when connecting to a load having an external guide mechanism.

Instruction ③Before mounting, the connection piping needs to be flushed sufficiently so that any dust or chips should not enter the cylinder.
(Any chips, seal tape or dust in piping operation cause the malfunction such as air leakage.)

Prohibition ④Be careful to avoid flaws or cracks on the peripheral surface of the cylinder tube. They lead the damage of Bearing or Scraper and cause the malfunction.

⑤When the cylinder is unavoidably operated in an atmosphere with chips or dust (like paper powder or waste thread) and cutting oil (like light oil or water), consider the cover setting.

⑥When mounting the load, settle with 4 set screws on top surface of the slide table. Otherwise, the slide table and set screws are damaged.

⑦For MY3A/3B series When the amount of looseness of slide table becomes larger during using by reason of wearing out the slide bearing, replace the bearing according to "Guide for Replacement of MY3A/3B Sliding bearing ".
Initial situation of use can be obtained by replacement of bearing.
Although the slide table of MY3M series is adjusted when shipped out, please adjust or replace according to attached “Adjusting procedure of MY3M slide bearing ”, and “Disassembly/Assembly procedure of MY3M” when the deflection amount becomes large during operation.
If the amount of looseness becomes larger in a short period, or a large looseness exists even after replacement, check the operation conditions for use again and consult with us.

Instruction

⑧When the cylinder with long stroke is used, it may have deflection due to self-weight or load. In that case, use the cylinder by supporting the intermediate position with the side support so that the supporting interval (=L) shown Fig.-6 in the following is less than the value of graph (Fig.-7)

Note) However, if accuracy of mounting surface of the cylinder tube is unknown, the side support may lead malfunction. So, when you mount, adjust the accuracy level.

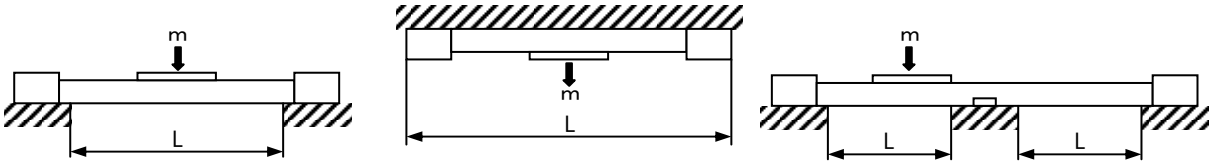


Fig.-6

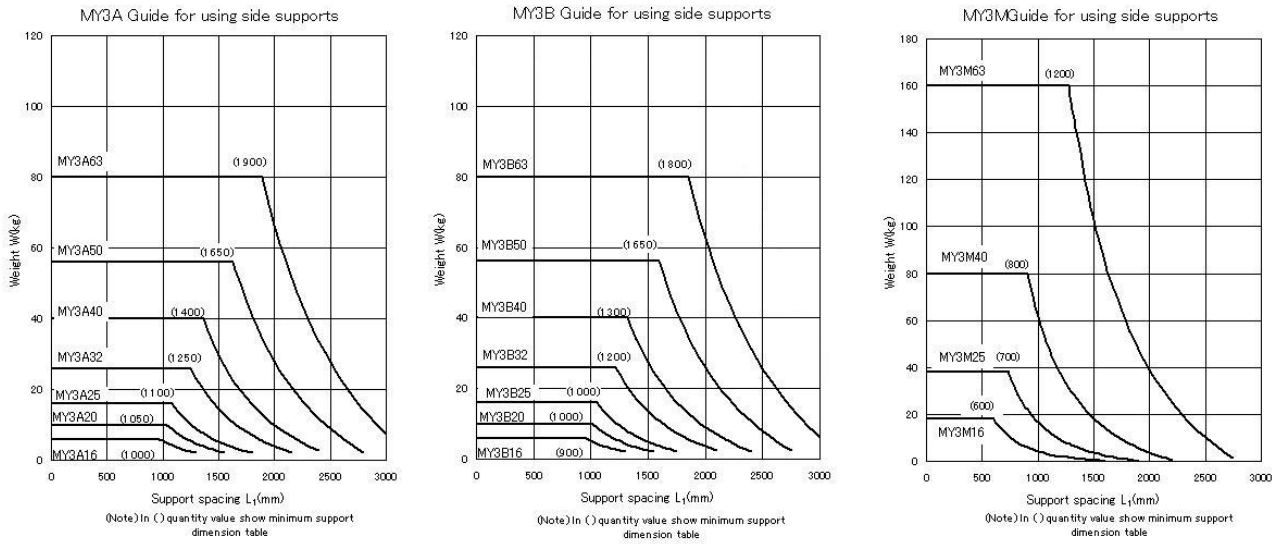


Fig.-7

1－5　How to mount a switch

①Pick up the switch spacer by fingers, push it into the groove and confirm or correct the mounting direction.

②Slide the auto switch and lap it over the switch spacer.

③Tighten the switch mounting screw of accessory by flat head watchmakers screw driver.

Switch spacer model　(mm)

Applicable bore size (mm)	16	20	25	40	50	63
Switch spacer model	BMY3-016					

Note) When tightening the mounting screw (included with the auto switch), use a watchmakers screw driver with a handle 5 to 6mm in diameter. The tightening torque should be 0.05 to 0.1N·m. Rough standard is to rotate from the position at which you feel tight by 90°

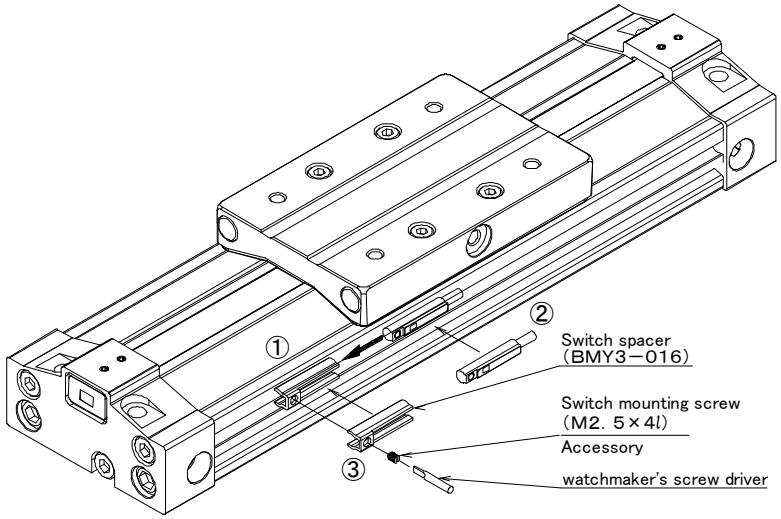


Fig.-8

1－6　Auto Switch mounting positions

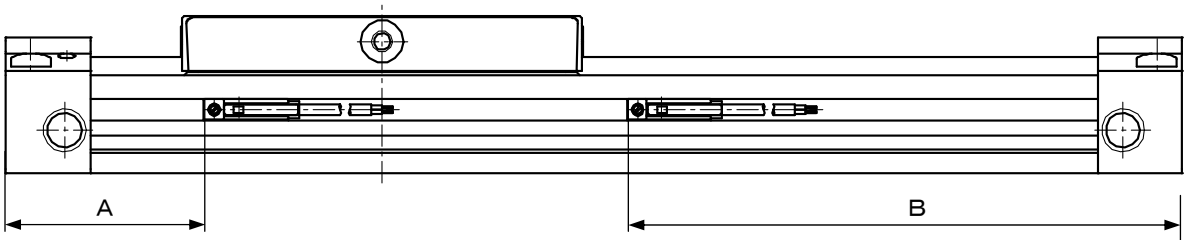


Fig.-9

MY3A

D-A9, D-A9□V　(mm)

Bore size	A	B	Operating range
16	22	88	6.5
20	22	106	9.5
25	29	121	10.5
32	36.5	156.5	12
40	42.5	197.5	15
50	42.5	231.5	13.5
63	53.5	266.5	14

D-M9□　(mm)

Bore size	A	B	Operating range
16	26	84	3.5
20	26	102	6
25	33	117	6
32	40.5	152.5	5.5
40	46.5	193.5	8
50	46.5	227.5	9.5
63	57.5	262.5	8

MY3B/3M

D-A9, D-A9□V　(mm)

Bore size	A	B	Operating range
16	28	94	6.5
20	32	116	9.5
25	43	135	10.5
32	52.5	172.5	12
40	60.5	215.5	15
50	60.5	249.5	13.5
63	71.5	284.5	14

D-M9□　(mm)

Bore size	A	B	Operating range
16	32	90	3.5
20	36	112	6
25	47	131	6
32	56.5	168.5	5.5
40	64.5	211.5	8
50	64.5	245.5	9.5
63	75.5	280.5	8

Note) The operating range is a guide including hysteresis, but is not guaranteed. They may be large variations (as such as ±30%) depending on the ambient environment.

⚠ Caution

Prohibition ①Do not drop, bump or apply excessive impacts while handling.

Prohibition ②Avoid repeatedly bending or stretching lead wires.

Prohibition ③Do not use in strong magnetic field.

④Auto switch can be placed at an intermediate position. However, it should be adjusted so that the cylinder speed is detected with in 300mm/sec considering the response time of load relay.

⑤When multiple auto switch cylinders are used in close proximity, maintain a minimum cylinder separation of 40mm. (Refer to Fig.-10)

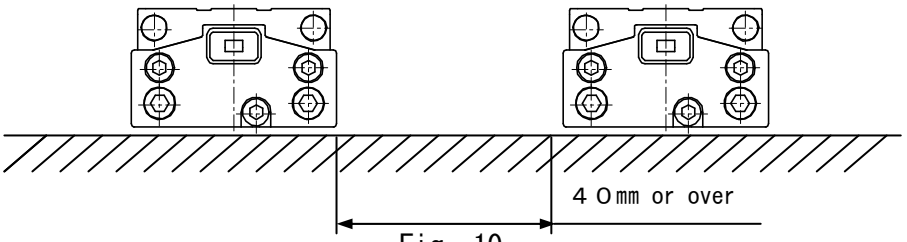


Fig.-10

2 How to select of cylinder

A general selection process to select MY3 series best suited to your application is introduced with the following flow.

As for MY3A and MY3B series, how to select it varies according to an external guide' s presence

As for guide selection to use a cylinder with external guides, please examine it by the guide manufacturer's materials for selection.

Even if a cylinder is operated without external guides, it can be gave a load directly within range of the capacity of the built-in guide. Allowable load varies according to the drive speed and the mounting direction of the cylinder. You refer to the following flow, and select MY3 series.

(Refer to detailed selection flow of the following from ① to ⑥)

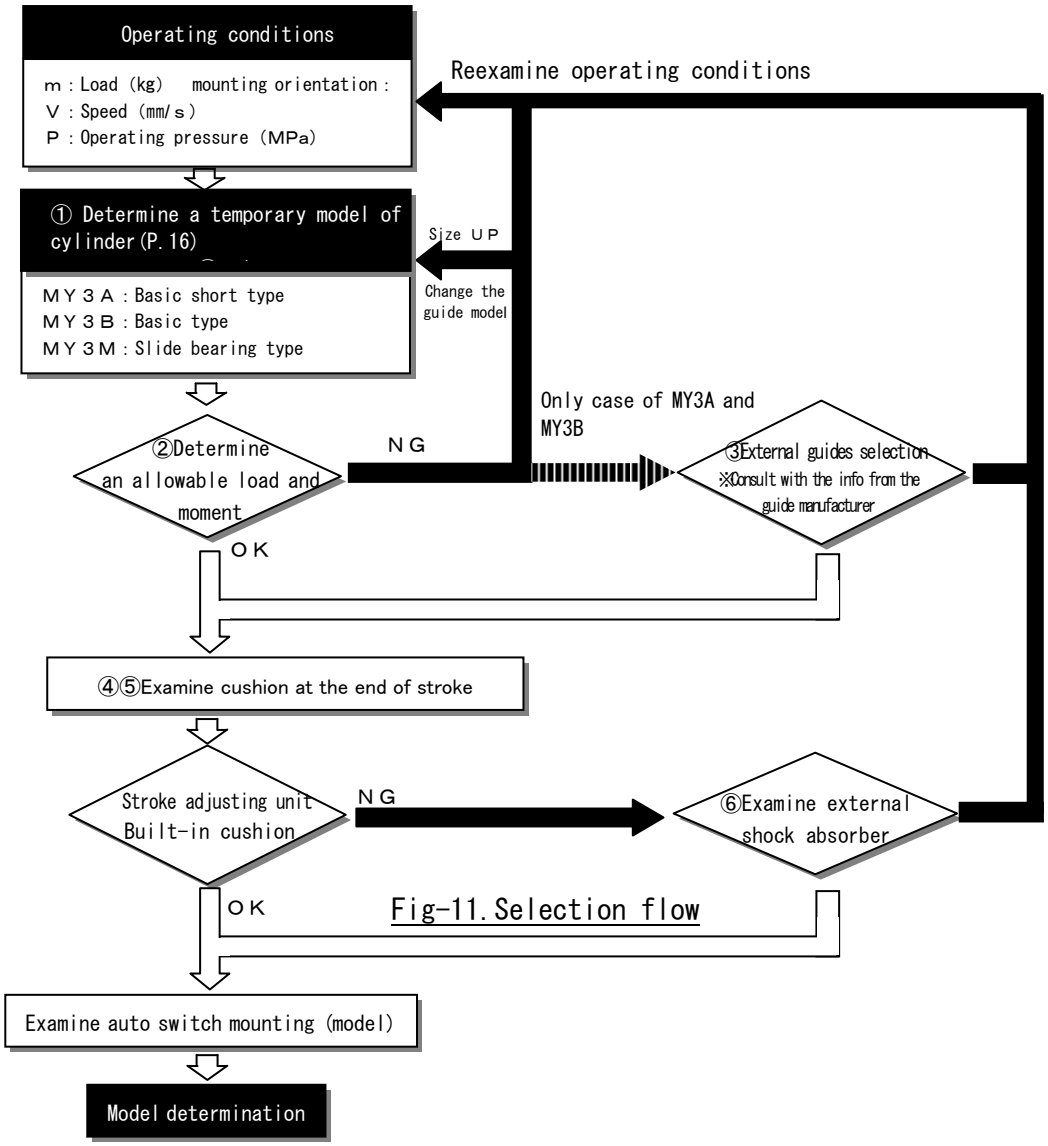


Fig-11. Selection flow

① Temporarily determine a model of cylinder

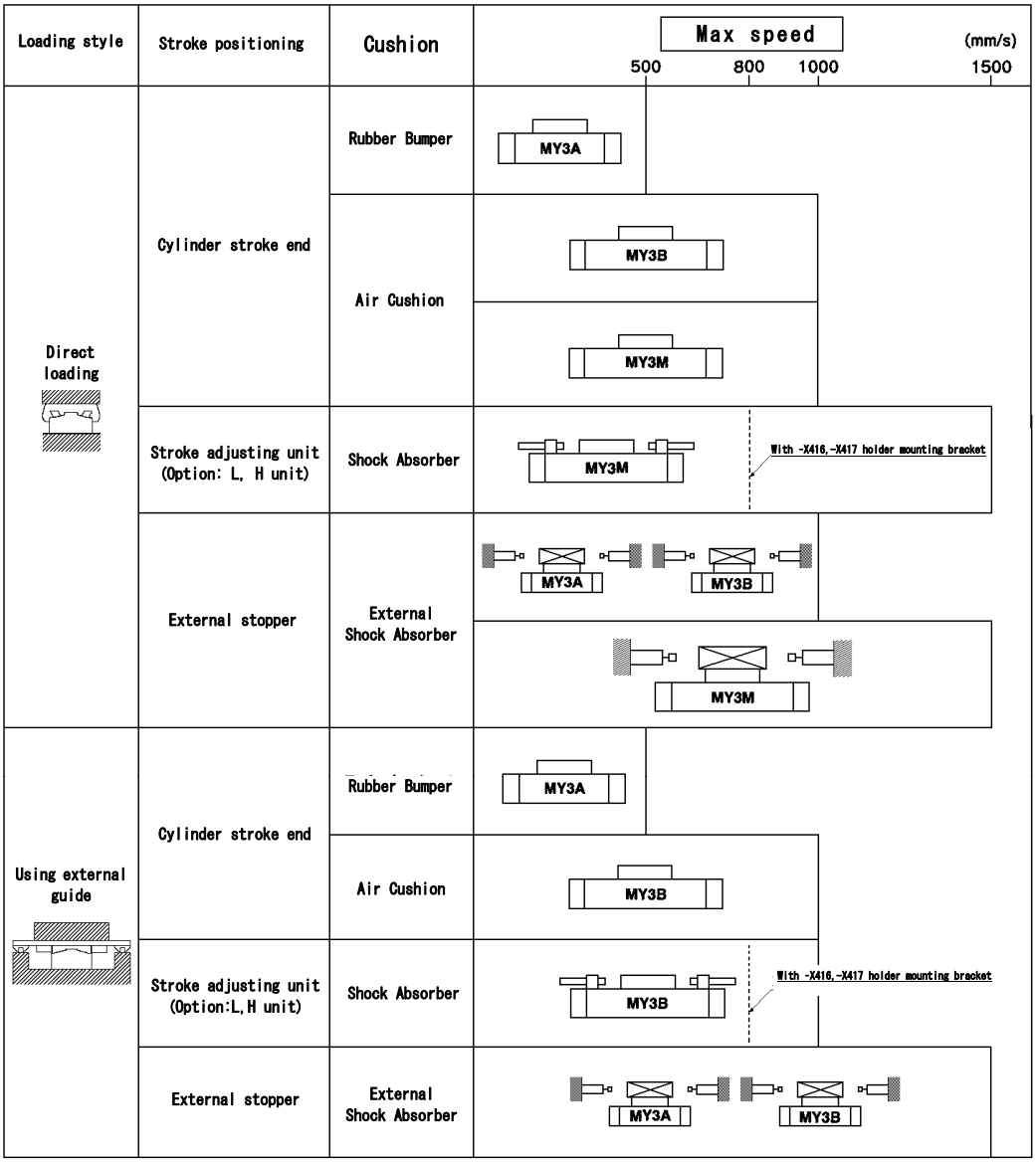
First of all, you temporarily determine a model of cylinder. According to the operating purpose (a stroke accuracy, installing the stroke adjusting unit or not, operating speed), refer to Table-1, and do a temporary selection of cylinder model.

Table -1. Standards for model selection Ⅰ

Cylinder model no.	Stroke accuracy	Applicability of external guide	Direct loading (Horizontal)	Table accuracy (Note 1)	Direct loading (Wall)	Load resistance Moment resistance	Comment
MY3A	△	◎	△	△	△	△	Mainly combined with separate guide and reduce the full length the minimum.
MY3B	◎	◎	○	△	△	△	Mainly combined with separate guide and require the accuracy.
MY3M	◎	×	◎	○	○	○	Directly place the work load, and require the stroke accuracy.

Note 1) Table accuracy indicates the table deflection when the moment is applied.

Table -2. Standards for model selection Ⅱ



Note) Max. operating speed when MY3B16,MY3B20 L unit is used is 800mm/s when the stroke is within the range of fine adjustment. 500mm/s when the stroke is out of fine adjustment range.

② A cylinder individual operating selection (When you choose "Without external guides")

②－1 Examine allowable load and moment

Static load (①maximum loading mass and ②static moment) and dynamic load (③ dynamic moment : at the time of collision) must be examined for calculation of allowable load.
Also total factor should not exceed 1($\Sigma \alpha n \leqq 1$).
In case of ($\Sigma \alpha n > 1$), increase the bore size, change the cylinder model or select the other guide)

*To evaluate ,use Va(average speed) for static load (①, ②), V(impact speed V=1.4Va) for load (③) ,calculate m_{max} for ① from the maximum allowable load graph(m_1, m_2, m_3) and M_{max} for ②,③ from the maximum allowable moment graph(M_1, M_2, M_3).

(Note 1) (Note 2) (Note 3)

$$\text{Sum of load factors } \Sigma\alpha = \frac{\text{Load mass(m)}}{\text{Maximum allowable load (mmax)}} + \frac{\text{Static moment}}{\text{Allowable static moment (Mmax)}} + \frac{\text{Dynamic moment}}{\text{Allowable dynamic moment (MEmax)}} \leqq 1$$

Note 1) Depending on the shape of the work piece, multiple moments may occur. When this happens, the sum of the load factors ($\Sigma \alpha$) is the total of all such moments.
Note 2) Moment generated by the load, etc., with cylinder in resting condition.
Note 3) Moment by load equivalent to impact generated at the stroke end (at the time of collision).

Reference formulae [Dynamic moment at impact]

Use the following formulae to calculate dynamic moment when shock for stopper collision is taken into consideration.

m : Mass (kg)　　V : Collision speed (mm/s)

F : Load (N)　　L1 : Distance up to center of gravity of mass (mm)

FE : Load equivalent to impact (N)

Va : Average speed (mm/s)　　ME : Dynamic moment (N・m)

M : Static moment (N・m)　　g : Gravitational acceleration (9.8m/s)

σ : coefficient of cushion (Rubber bumper:4/100, air cushion:1/100, shock absorber:1/100)

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σ : coefficient of cushion (Rubber bumper:4/100, air cushion:1/100, shock absorber:1/100)

$$V = 1.4Va \ (mm/s) \qquad F_E = \frac{1.4}{100} Va \cdot g \cdot m$$

$$\therefore M_E = \frac{1}{3}{}^{\text{Note 4)}} \cdot F_E \cdot L_1 \ (N \cdot m)$$

(Note 4) Average load coefficient (This coefficient is average for the maximum load moment at the time of collision according to expected life.)

Limit value of maximum allowable load and allowable moment depends on mounting orientation, piston speed, etc. Please confirm with the graph of each series.

③ Select external guides (In the case of MY3A/3B)

Select external guides by the guide manufacturer materials.

Caution

Instruction

When a cylinder is operated with external guides, support all loads with external guides and it is operated as actuating purpose only.

If floating connection doesn't function fully, it gives the cylinder excessive power. Therefore, the cylinder may be damaged.

④ Examine cushion at the end of stroke (When you choose "Without external guides")

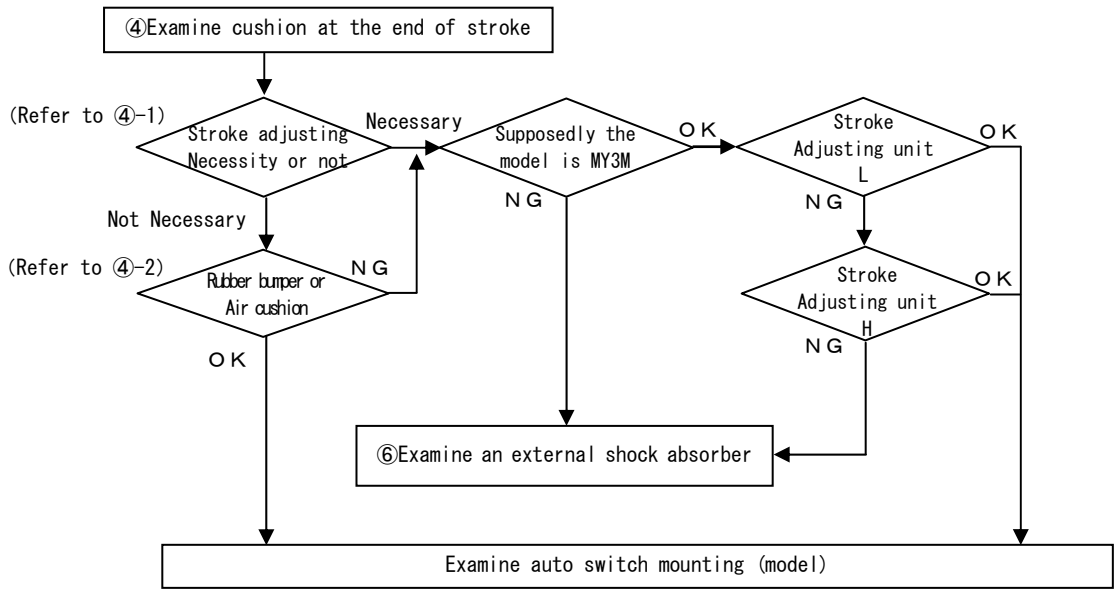


Fig-12 Examine cushion at the end of stroke "MY3-without external guides"

④－１ If you choose "MY3A/3B Without external guides", and stroke adjustment is necessary, install an external absorber. (Refer to ⑥ for the examination of an external shock absorber.)
(MY3B series is possible to be operated with stroke adjusting unit in the only case of "With external guides".)
MY3M series is possible to be operated in the only case of "Without external guides".

④－２ If stroke adjustment is not necessary, it is possible to be operated with built-in cushion (MY3A : Rubber bumper, MY3B/3M: Air cushion).
If it is operated with a built-in cushion, it is done within range of absorption capacity (refer to catalog).
If it is operated outside range of that, consider installing an external shock absorber (refer to ⑥), or changing the operating condition or bore size. MY3M series is possible to be operated with stroke adjusting unit.

⑤ Examine cushion at the end of stroke (In the case of "With external guides")

Choosing "With external guides", how to select the cushion at the end of stroke varies according to the temporarily selection of cylinder model in ①. For MY3M series, the external guide is not selectable because the usage is not recommended. If you temporarily select "MY3A" in ① ,refer to ⑤-1. If you temporarily do "MY3B" ,refer to ⑤-2 .

⑤－１. In the case of tentative selection of MY3A in ①

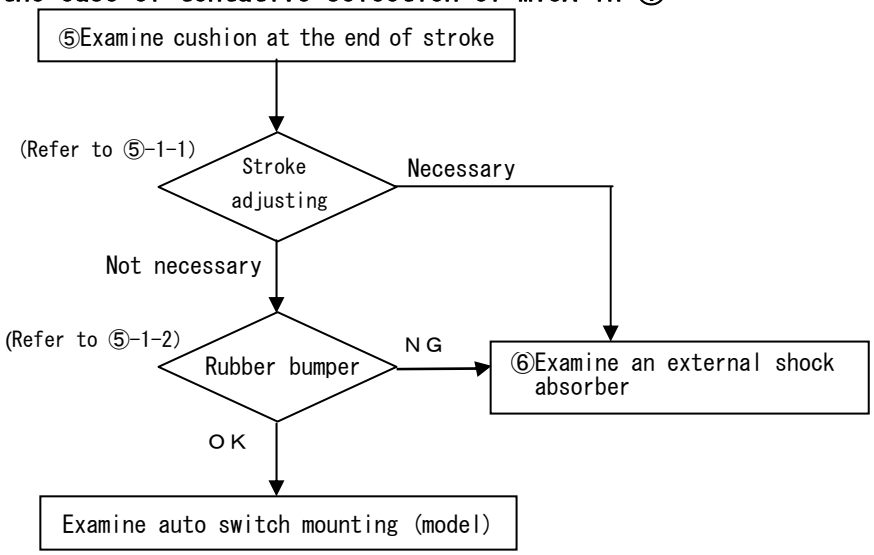


Fig.-13 Examine cushion at the end of stroke in the case of "MY3A with external guides"

⑤－１－１ If stroke adjustment should be necessary ,consider installing an external shock absorber ,because MY3A series doesn't have a stroke adjusting unit (Refer to ⑥ for the examination of an external shock absorber.)

⑤－１－２ If the stroke adjustment isn't necessary ,it is need to be operated within range of absorption capacity of Rubber bumper (refer to catalog of MY3 Series). If you use outside range of that, consider installing an external shock absorber or changing the operation condition or bore size or change cylinder type MY3A for MY3B and so on.

⑤－２. In the case of tentative selection of MY3B in ①

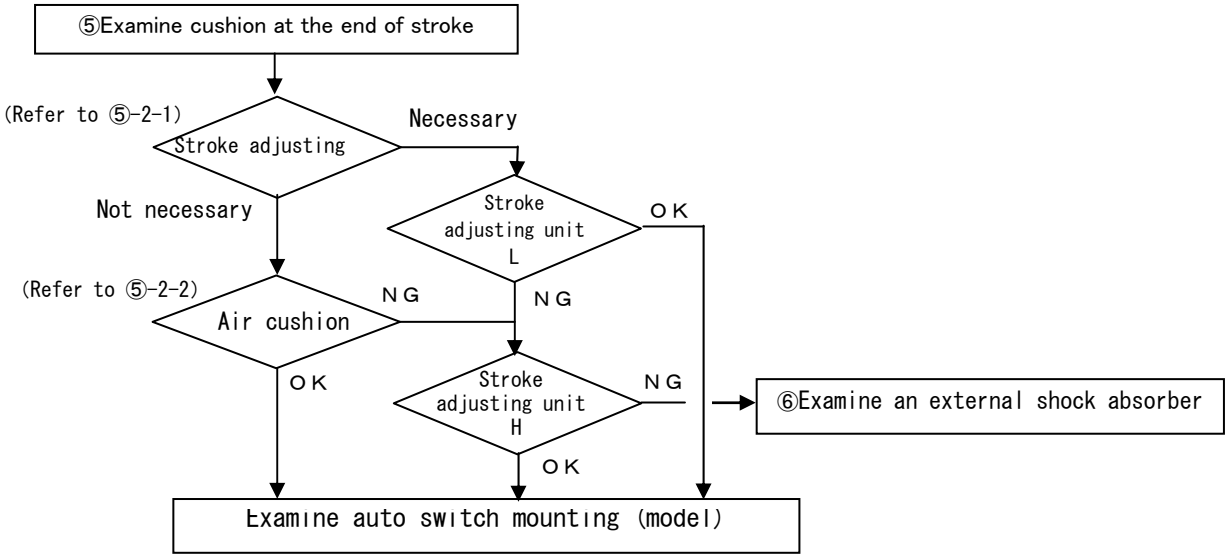


Fig.-14 Examine cushion at the end of stroke-"MY3B with external guides"

⑤－２－１ If stroke adjustment is necessary , a cylinder is operated with a stroke adjusting unit L or H. And you can adjust stroke. (Only case of "With external guides")

⑤－２－２ No matter that it is operated with an air cushion or stroke adjusting unit , a cylinder needs to be operated within range of absorption capacity.
If it is operated outside range of absorption capacity (refer to catalog), consider installing an external shock absorber or changing operation condition or bore size and so on.

⑥ Examine an external shock absorber
(No matter that you choose "With external guides" or "Without external guides")

Caution

Instruction

If you choose "Without external guides", first of all, examine allowable load and allowable moment in ② . You confirm it that the sum of load factor (Σ α) don't exceed 1 , and examin for an external shock absorber.

Instruction

MY3 series has light-weight structure, so if the external shock absorber which generates the large anti-power is installed, a cylinder may be damaged by the shock-power at the end of stroke.
So, it is need to have the shock absorber of low anti-power type used for the external shock absorber.
Be sure to select the proper external shock absorber in accordance with the following selection flow.

(Note 1) An external shock absorber : It is different from stroke adjusting unit which attached to the body directly and the thing of the shock absorber which is independent of the cylinder.

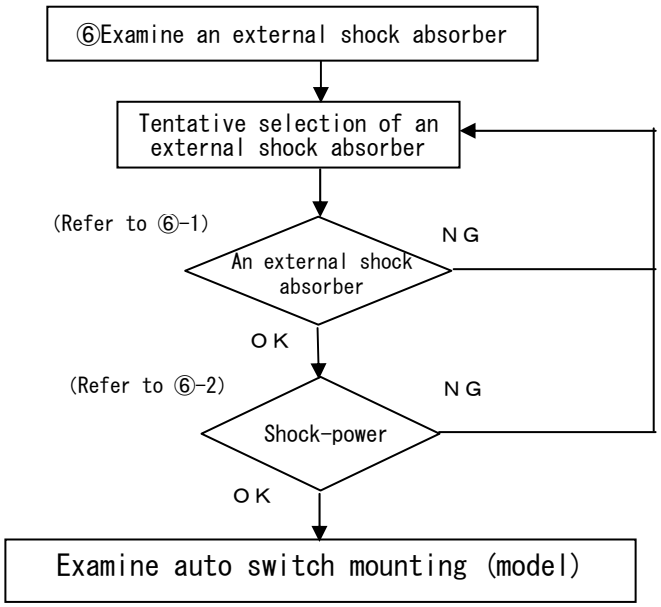


Fig.-15 Examination flow of selection of an external shock absorber in the case of "MY3- with or without external guides"

⑥－１ Please select an external shock absorber by the shock absorber manufacture materials of selection.

⑥－２ If you install an external shock absorber , It is necessary that a cylinder is operated within range of absorption capacity ,and shock-power (refer to Note 2) at the end of stroke becomes within range of the allowable shock-power (refer to catalog of MY3 series).

Calculate shock-power by shock absorber manufacture's materials of selection.

If it is operated outside range of absorption capacity, install a lower anti-power shock absorber, or consider change of operation condition or bore size.

(Note 2) Shock- power : Thrust (N) was added to the power (N) (acceleration [G] x Load [kg]) calculated from acceleration at the end of stroke. By some selection software, only acceleration may be calculated.
In such a case, calculate shock-power as the following,
Shock-power [N] ＝Acceleration [G] × Load [kg] ＋Thrust [N]

We show the following operating example of the case that an external shock absorber (Our product of adjustment type shock absorber RB-OEM Series) is installed "With external guides" and "Without external guides".

⚠ Caution

Instruction

The shock-power calculated by selection software may be different from the actual value of that, so it is to select in consideration of room.

The shock-power calculated by selection software is value what the most suitable adjustment is made and anti-power of an absorber becomes the smallest. Be careful of the actual value of shock-power because it becomes larger than the shock-power calculated by the selection software and a cylinder may be damaged if it doesn't make the most suitable adjustment.

Example 1 : The examination of an external shock absorber in the case of "Without external guides".

Operating conditions

Cylinder : ＭＹ３Ａ２５－２００
Load Ｗ : ２ｋｇ
The center of gravity position : (ｘ , ｙ , ｚ) ＝ (０, １０, ２０)
Average speed Ｖ : ５００ｍｍ／ｓ
Operating pressure Ｐ : ０. ５ＭＰａ
An external shock absorber : Our product of adjustment type shock absorber
ＲＢ－ＯＥＭ０. ２５Ｍ
How to collide : horizontal movement- propulsion force by cylinder entails it case.
External guides : Nothing
Note) Max. speed (Impact speed): Vmax=1.4V=700mm/s

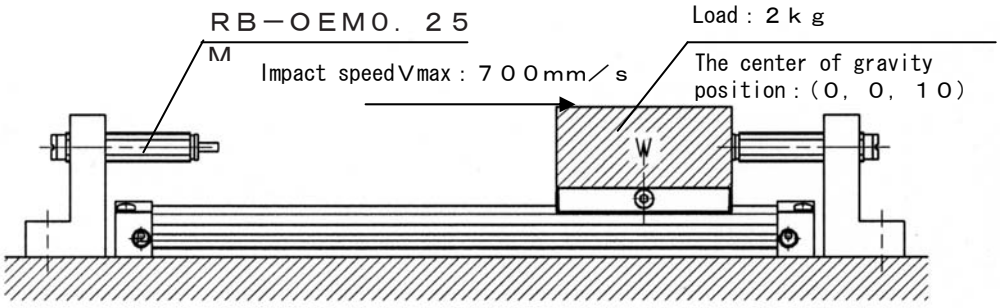


Fig.-16 How to use

First, the calculation of allowable load and moment is done, because In the case of "Without external guide", load factor calculation has to be done before doing the examination of an external shock absorber.

a. The calculation of allowable load and moment

Load applied to guide

	Load	Static load
①	Load weight in horizontal direction by W	m_1
②	Moment generated by Fe when stopping	M_1v

1. Calculation of static load
① m_1 Load

→ m_1 max.(by using Table-MY3A/m_1) = 6.40 kg

Load factor $\alpha 1$ = m1/m1max = 2.00 / 6.40 = 0.31

2. Calculation of dynamic load

Moment generated at stroke end when stopping
Load equivalent at the time of collision

Fe = m × g × δG = 19.61 × 7.00 = 137.29 N

② M_1v moment

Moment generated at stroke end when stopping

→ M_1v max.(Examination 1.4Va = 700mm/s) = 1.71 N·m

M_1v = Fe × Z × 1/3 = 137.29 × 0.01 × 1/3 = 0.46

Load factor $\alpha 2$ = M1v/M1vmax = 0.46 / 1.71 = 0.27

3. Examine of the factor

	α_n
①	0.31
②	0.27
$\Sigma \alpha_n$	0.58
Determination	$\Sigma \alpha n < 1$ therefore OK

From the above, there is no problem in the operating condition because it is in the allowable value.

It is sure that it is within range of the allowable load and moment.
"b. The examination of the external shock absorber" is done next.

b. The examination of the external shock absorber

Acceleration in collision is calculated by the selection software of our product of "Adjustment type shock absorber RB-OEM Series".
It shows the following.

Input condition : Load (ｋｇ)、Operating pressure (ＭＰａ)、How to collide、Collision speed (ｍｍ／ｓ)

Result : The shock-power : ３４０．８１ [N] ·····①

You refer to the graph of "Allowable shock-power in installation of an external shock absorber" (refer to catalog), and it confirms that in the case of "Load : 2kg" the allowable shock-power is equal to 580[N] .·····②

From ①, ②

The calculated shock-power (340.81N) < The allowable shock-power (580N)

It is judged "within the allowable range" under this operating conditions.

(You need to calculate the shock-power whatever a shock absorber you installed.)

So it is judged operating possibility under this operating condition.

Example 2: The examination of an external shock absorber in the case of "With external guides"

Operating conditions

Load : ８ｋｇ
Average speed Ｖ : ７００ｍｍ／ｓ (Impact speed Ｖmax : ９８０ｍｍ／ｓ)
Operating pressure : ０．５ＭＰａ
The external shock absorber : Our company product of adjustment type shock absorber
ＲＢ－ＯＥＭ０．２５Ｍ
How to collide : horizontal movement-propulsion force by cylinder entails it case
External guide : Installed

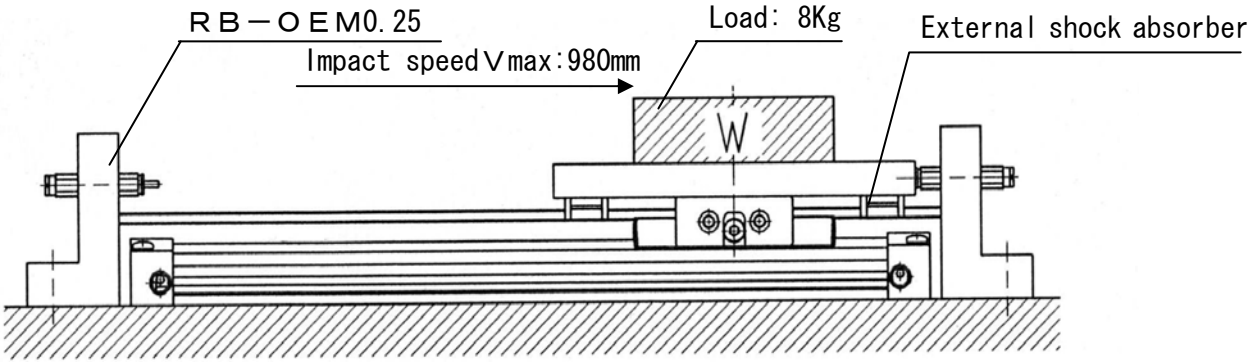


Fig.-17 How to use

a. The calculation of allowable load and moment

Calculate the allowable load and moment by the guide manufacture's materials of selection.

b. The examination of the external shock absorber

Acceleration in the collision is calculated by using selection software of our company product of adjustment type shock absorber "RB-OEM Series".

The shock-power is calculated in the same way as Example 1 by using the selection software

Result : The shock-power : ６５９．７９ [Ｎ] ····· ①

And, according to the graph of "Allowable shock-power in installation of an external shock absorber" (refer to catalog), allowable shock-power is equal to 580N in the case of "load: 8kg".·····②

From ①, ②

The calculated shock-power (659.79N)> The allowable shock-power (580N)

It is outside range of the allowable one, it is necessary for changing of bore size or type of shock absorber (changing to lower anti-power type) or the consideration the operating condition (speed, load etc.).

Here, **we change only an operating condition (speed) and calculate again.**

Average speed V: 700mm/s is changed into 500mm /s (Impact speed Vmax: 980mm /s → 700mm /s) and the shock-power is calculated by the selection software. The result is as follows.

Shock-power: 513.75N

According to the graph of "Allowable shock-power in installation of an external shock absorber" (refer to catalog), allowable shock-power is equal to 580N

The calculated shock power (513.7N) > The allowable shock power (580N)

So, it is judged operating possibility.

3. Replaceable parts and inspection, maintenance

3－1 Replaceable parts

Please refer to a catalog of MY3 Series.

3－2 Inspection, maintenance

Refer to the attached file 'Inspection Procedure for the mechanically jointed rodless cylinder' for the daily and regular inspection.

Regular grease applying (once a month) to the bearing sliding surface and the dust seal band is recommended for more improvement of life. (Refer to Applicable grease.)

For the slide bearing adjustment and replacement, please refer 'MY3* series Slide bearing replacement/Adjustment procedure'

Refer to 'Guide for replacement of MY3* dust seal band' to replace the dust seal band.

4. Precautions

4. 1 Operating environment

Prohibition

Do not use in an environment exposed directly to powder, dust, spatter, and cutting oil. Consider installing cover or mounting facing the slide table downward when using in such an environment. Care should be taken for coolant since some coolant may influence on seal parts.

4．2 Intermediate stop

Instruction

① Mechanically jointed rodless cylinder has a structure allowing a little air leakage. Therefore intermediate stop position can't be hold with close circuit. If necessary, select the machine for intermediate stopping.
For details, consult SMC.

Prohibition

② MY3 series may be damaged when the slide table is made to intermediate stop by the mechanical stopper without absorption, because it has light structure.

Prohibition

③ Avoid the way of catching a load with a distance from slide table halfway. It is likely to be damaged when a slide table part touches a load shockingly in the case of using as pusher.

4．3 Use a cylinder with external guides

Instruction

① If a cylinder is operated with external guides, support all loads with external guides and it is operated as drive source only.
If it connects a cylinder to external guides, be sure to align them. The longer the stroke, the greater becomes any variance in the shaft centers. Therefore, consider the connecting method (floating mechanism) that can absorb any deviation in alignment.

Instruction

② You operate the cylinder installed stroke adjusting unit with external guides, it is operated within range of the cushion absorption capacity. (MY3A/MY3B)

③ Floating mechanism is made to floating by setting up very small looseness between the pin of floating bracket and floating bracket. Therefore, if a cylinder installed stroke adjusting unit with external guides is mounted in the place where there is the vibration source near here (refer to Fig.-18), while stopping at the end of stroke, work piece fine vibrates due to very small looseness of floating mechanism. In such a case, give it as a structure that the external shock absorber is caught directly at the gravity position of load. (Refer to Fig.-19)

Prohibition

④ Care should be taken for excessively load condition, the pin of floating connection may be damaged by the lurching phenomenon or in adjusting.

⑤ If stroke-positioning with absorption is necessary, give it as a structure that the external shock absorber is caught directly at the gravity position of load. (Refer to Fig.19)

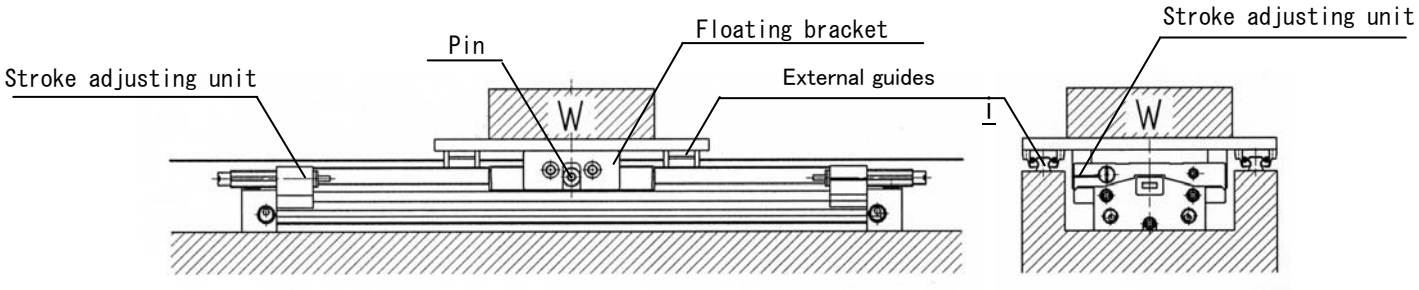


Fig.-18 In the case of installing the external absorber with external guides

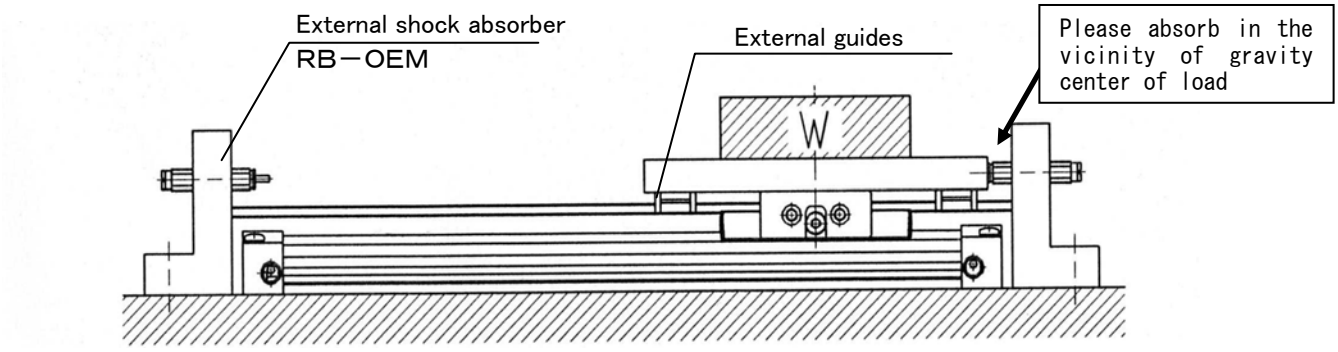


Fig.-19 In the case of using stroke adjusting unit with external guides

4．4 Parallel operation of cylinders

It is very difficult to drive more than two cylinders in the synchronism, because excessive moment may be applied to slide table, which causes malfunction.

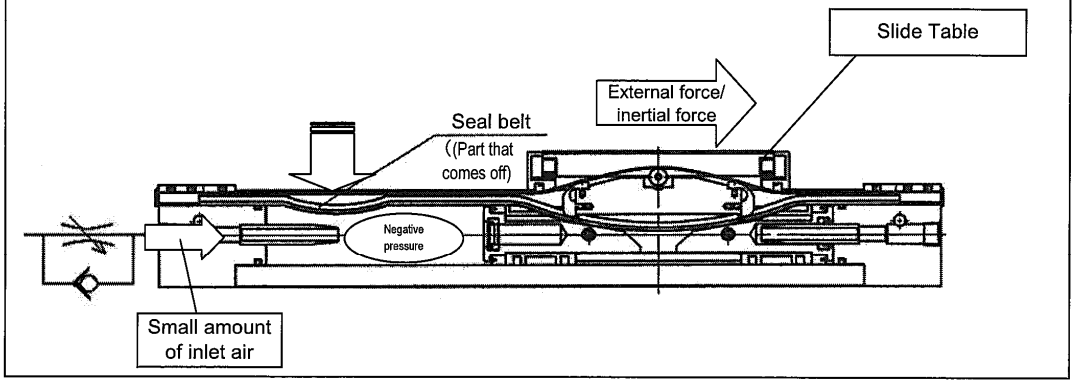
4. 5 Air leakage caused by detachment of seal belt

When the mechanical joint type rodless cylinder (slit type: holding the seal belt on the side of the slit) is used, negative pressure may occur in the cylinder due to external and inertia force because of its structure. In this case, depending on the operating conditions, if the seal belt comes off, external leakage may occur temporarily.

If the seal belt is damaged in the process of being put back onto the cylinder tube, the air leakage may continue permanently. Therefore, when putting the seal belt back on, please refer to [how to put back the seal belt if it comes off].

How to put back the seal belt if it comes off

If the slide table is moved rapidly by external force under non-pressurized conditions with the air supply stopped,
negative pressure occurs in the cylinder, which may cause the seal belt to come off in the cylinder.
If the cylinder is pressurized while the seal belt has come off, air may leak (blow out).



	Procedure	Cautions
①	Shut off the air supply and keep it unpressurized.	Do not leave any residual pressure.
②	Remove the piping connected to the cylinder, and release it to atmosphere.	Remove anything that will act as a restrictor, such as a speed controller, wherever possible.
③	Make sure the cylinder can perform a total stroke	If a stroke adjustment unit is mounted, remove it or adjust the stroke to perform a total stroke. If an external stopper is mounted, remove it or take measures so it will not stop the cylinder from performing the total stroke.
④	Move the slide table slowly by hand to make a full return stroke.	If the slide table gets stuck (does not move smoothly) while it is being moved, do not force it. Pull it back slightly and then move it forward again. (If the cylinder is mounted vertically, remove work pieces and move the slide table by hand, the same as
⑤	Connect the piping to the cylinder and supply air gradually.	If air does not blow out, this completes the procedure.

4．6 About rubber bumper displacement (applied to only MY3A).

Stroke position with built-in rubber bumper of MY3A series varies according to the operating pressure. If you need standards for the position at the end of stroke, you calculate displacement in operating pressure by the graph of "displacement of Rubber bumper" and add the calculated displacement to the its position in non-pressure.

The graph of "displacement of Rubber bumper" shows about displacement when horizontal mounting is done. If vertical mounting is done, convert the force by the self-weight (load + slider) into the air-pressure and add the calculated displacement to its position at the end of lift, or subtract the calculated one from its position at the end of descent. (Refer to a table 4 for the slider mass.)

If the positioning accuracy at the end of stroke is necessary , consider installing an external shock absorber (Refer to "⑥ Examine an external absorber") and changing the type of cylinder to MY3B series.

Table 4 slider mass (kg)

Bore size	Slider mass
φ16	0.07
φ20	0.11
φ25	0.23
φ32	0.37
φ40	0.81
φ50	1.08
φ63	2.84

We show the following, an example how to calculate displacement

Example

Cylinder: MY3A25

Mounting direction： Vertical mounting

Load: 1kg

Operation pressure: 0.5MPa

Slider mass: 0.23kg (Refer to Table.4)

①You convert the self-weight (Load +Slider mass) into air-pressure.

$$P[MPa] = \frac{F[N]}{\frac{\pi \times D[mm]^2}{4}}$$

(Note) P: Air pressure equivalent to self-weight
F: Force by the self-weight (Load + Slider mass)
D: Bore size

$$P = \frac{(1[kg]+0.23[kg]) \times 9.8}{\frac{\pi \times 25(mm)^2}{4}} \fallingdotseq 0.02[MPa]$$

②How to calculate displacement at the end of lift.

You subtract the air pressure equivalent to self-weight, "P (=0.02MPa)", from the operation pressure (0.5MPa). Referring to the graph of "displacement of Rubber bumper" (refer to catalog), you confirm the displacement of Rubber bumper.
It is equal to 1.2mm when the operation pressure is equal to 0.48MPa.

③How to calculate the displacement at the end of descent

You add the air pressure equivalent to self-weight to the operation pressure. Referring to the graph of "Displacement of Rubber bumper", you confirm the displacement of Rubber bumper.
It is equal to 1.3mm when the operation pressure is equal to 0.52MPa.

Prohibition

4. 7 Air cushion adjustment (MY3B/3M series only)

You keep turning cushion needle for the air cushion adjustment to the counterclockwise direction (the direction where the effect condition of the cushion becomes poor), you feel big resistance to keep turning it.

Don't turn it to the counterclockwise direction further from the position, because it may be that cushion needle comes out.

Be careful because it is very dangerous that cushion needle would come out while providing air.

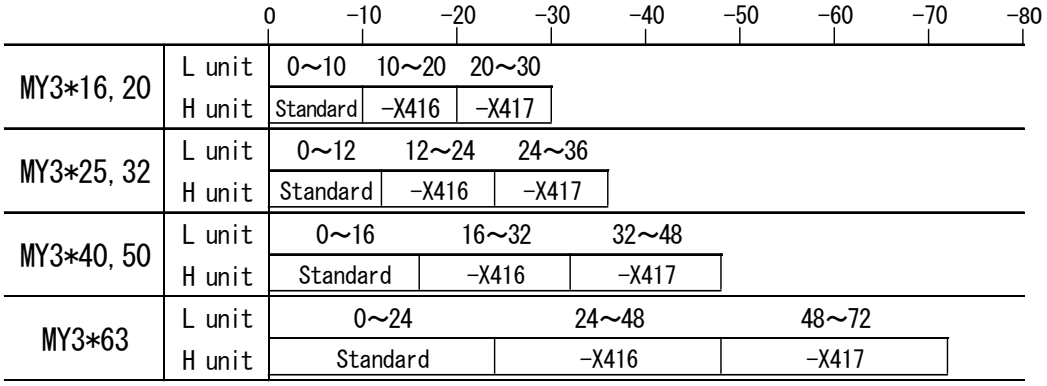
Instruction

4. 8 Stroke adjusting unit (MY3B/3M series only)

If you adjust stroke outside stroke adjustment range, stroke adjusting unit is used with an intermediate holding holder mounting bracket (-X416, -X417) we have.

As for the stroke adjustment range, -X416, -X417, refer to Table-4.

Be careful of using with -X416, -X417, because maximum operating speed is equal to 800mm/s (with MY3B16, 500mm/s) when you use -X416, -X417.



Table－4 stroke adjustment range (Standard, -X416, -X417)

Applicable grease

The recommended grease is a SMC grease package GR-S-10(10g) or GR-S-20(20g).
If it is not available, the following grease commercially available are compatible with the seal and applicable.
When any other grease than the SMC grease package is used, please wipe off the grease applied and avoid using the grease of same brand but a different grade and consider the conditions of oil supply described in the instruction sheet of the grease.

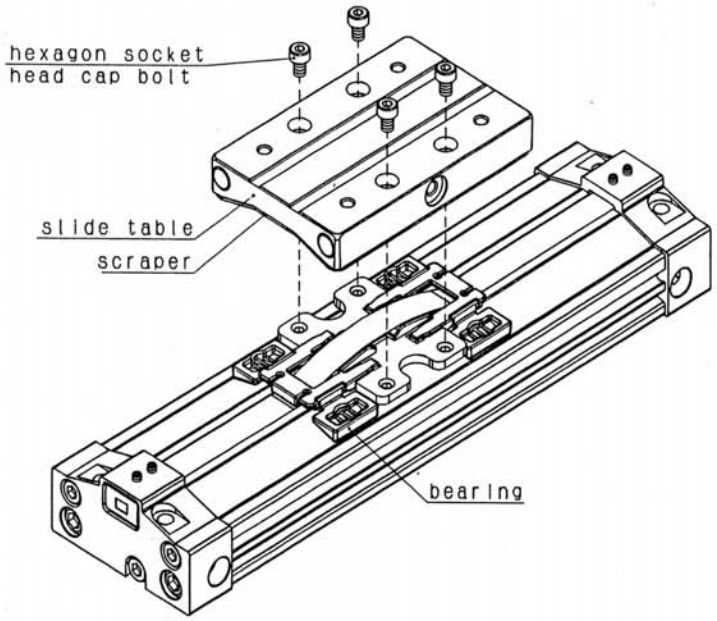
Applicable grease to seal (lithium type soap base grease with grade 1 or 2)

Description	Manufacturer
Daphne Eponex Grease	Idemitsu Kosan
Shell Alvania Grease	Showa Shell Sekiyu
Shell Alvania Grease EP	
Cosmo Grease Dynamax	Cosmo Oil
Cosmo Shuchu Grease	

Guide for Replacement of MY3A/B Sliding bearing

[Disassembling]

1. Detached Slide table by removing four hexagon socket head cap bolts for fixing on Slide table.
   There is a possibility that the bearing and the scraper fall when the Slide table is detactched.
2. After such a removal work, the bearing which remained on the inside of the Slide table or the cylinder tube is detached.



[Installation]

1. Put bearings for replacement at a correct position.
2. Setting condition of the scraper is confirmed or reset in the slide table ditch.
3. The Slide table is put on a fixed position while adjusting the fixed bolt position and fixes with four hexagon socket head cap bolts.
4. Spread grease on the entire upper surface cylinder tube.

Note) Use Lithium soap group grease with consisitency No. 1 or No. 2 (like Mitsubishi Diamonnd Grease Multi purpose No. 2) as grease.

No.	MY*A-PM0001N

MY3A/MY3B Seal Belt Replacement Procedure (Version B)

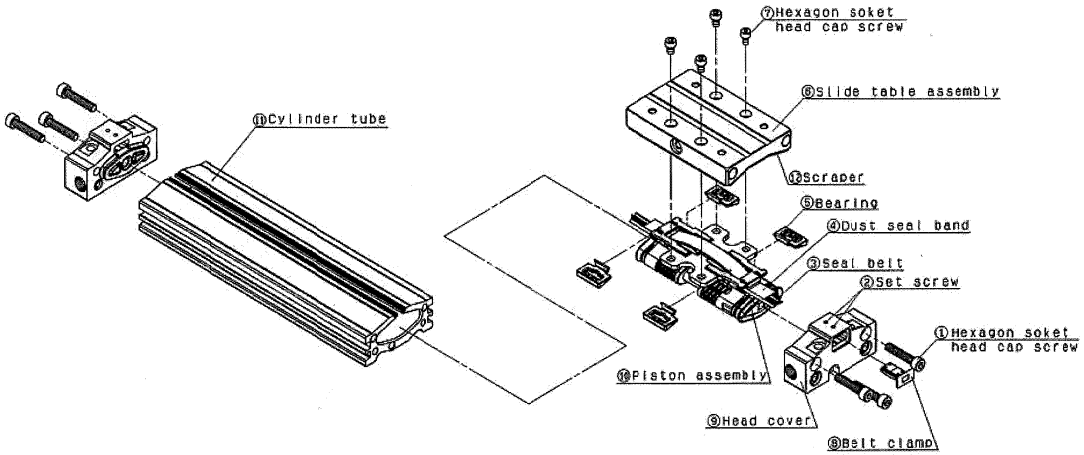


Figure 1

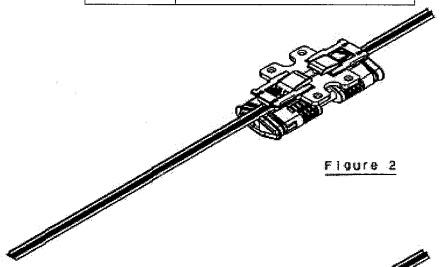


Figure 2

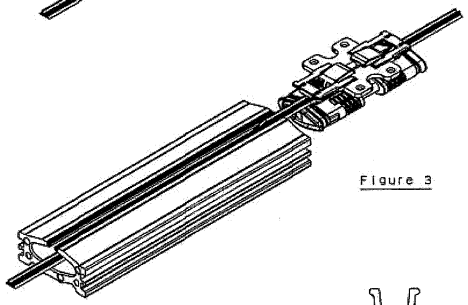


Figure 3

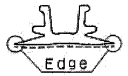


Figure 4

[Disassembly]

1. Loosen two setscrews ② on the top of head cover ⑨.
2. Remove belt clamp ⑧.
3. Remove four retaining hexagon socket head cap screws ⑦ on the top of slide table assembly ⑥.
4. Remove slide table assembly ⑥. (At this time, please watch that the bearings ⑤ and the scraper ⑫ might fall. (Note 2)
5. In this condition, Pull out dust seal band ④.
6. Remove four bearings ⑤in the right and left from piston assembly ⑩.
7. Remove three head cover ⑨ retaining hexagon socket head cap screws ①.
8. Pull out head cover ⑨ from cylinder tube ⑪.
9. Pull out the other head cover ⑨ from cylinder tube ⑪ in the same method.
10. Pull out piston assembly ⑩ from cylinder tube ⑪.
11. Pull out seal belt ③ from cylinder tube ⑪.

[Assembly]

1. Avoid flaws on seal belt, as it may cause air leakage (Pay special attention to the edges indicated by arrows in Figure 4).
2. Check that the total length of seal belt is of a recommended length and apply grease to the whole surface (Refer to Table 1).
3. Put seal belt through piston assembly and assemble it to cylinder tube as shown in Figures 2 and 3.
4. Keep the same extra length of seal belt on both left and right ends of cylinder tube and slowly reciprocate piston assembly once to fit seal belt into cylinder tube. Then reciprocate piston assembly a couple of times more and wipe the extra grease collected forward of the piston off. (When grease remains on the contact side of the piston and the head cover, it may cause the lurching by sticking.
5. Insert the right and left head cover in the cylinder tube, and tighten head cover retaining hexagon socket head cap screws.
6. Put dust seal band in piston assembly. (Note 1)
7. Insert bearing into piston assembly. (Note 1)
8. Assemble slide table assembly to piston assembly with retaining hexagon socket head cap screws. (Note 1)
9. Cut off the extra seal belt over the head cover ends with cutter and assemble belt clamp.
10. Tighten two setscrews each on the top of both head covers. (Note 1)
11. This is the end of replacement work.
    If air leakage is considerable after replacement, consult SMC.

Table 1. Seal Belt Part No.

	Bore size	Part No.	Recommended Length
MY3A	φ16	MY3A16-16A-st	st+206
	φ20	MY3A20-16A-st	st+225
	φ25	MY3A25-16A-st	st+246
	φ32	MY3A32-16A-st	st+289
	φ40	MY3A40-16A-st	st+336
	φ50	MY3A50-16A-st	st+370
	φ63	MY3A63-16A-st	st+416
MY3B	φ16	MY3B16-16A-st	st+218
	φ20	MY3B20-16A-st	st+245
	φ25	MY3B25-16A-st	st+274
	φ32	MY3B32-16A-st	st+321
	φ40	MY3B40-16A-st	st+372
	φ50	MY3B50-16A-st	st+406
	φ63	MY3B63-16A-st	st+452

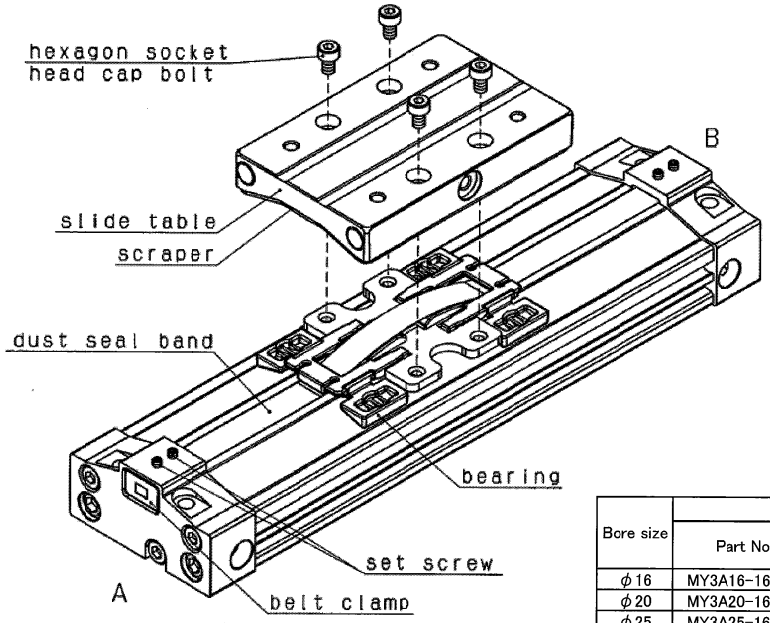
(Note 1) Refer to "Dust Seal Band Replacement Procedure" for dust seal band assembling (installation of the bearing and the slide table assembly).
(Note 2) When parts fall check no adhesion of the foreign objects and assemble it.

No.	MY*A-PM0002N

Guide for Replacement of MY3A/B Dust seal band (Version B)

[Disassembling]

1. Loosen two set screws at one side, that is, four set screws both sides totally for three rotations.
2. Remove Slide table by removing two hexagon socket button bolts for fixing on Slide table.
   Pay attention not to let the bearing and scraper come off when the slid table is removed.
3. Pull out Dust seal band at this condition.



[Installation]

1. Cut the replacement dust seal band to the dimensions shown in Table 1.
   *Length of dust seal band is defined as regulated, but check the length again before mounting for shipping.
2. Pass the replacement dust seal band through the opening (at 2 places) of the belt separator, and mount on the cylinder body.
3. Set the bearing in place.
4. Mount the scraper into the groove on the slide table.
5. Set the slide table in place referring to the fixing bolt position, and fix it by 4 hexagon socket head bolts.
6. Align the end surfaces and insert them to the head cover so that the protruded amount of the dust seal band from the cylinder tube will be L dimension shown in Table 2, and fix the set screw closer to the A side holding the belt clamp.
7. Pull the dust seal band to the B side until it has no protruded part, and fix the set screw close to the B side holding the belt clamp.
8. Tighten the set screw closer to the cylinder tube on the top of the head cover until all of the l iftedd part of the dust seal band near the cylinder tube ends at both of A and B sides are eliminated. In that case, adjust so that Dust seal band located near screws does not lift due to excessive tightening. Proper tightening torque is 0.1 N·m{1kgf·cm}.
9. Cycle the slide table at full stroke 2 to 3 times, and check there is no lifted part all over the dust seal band.
10. Apply grease to the whole sliding part (top of the cylinder tube) of the dust seal band.

Note 1) Handle the dust seal band with care because it is thing and easily bent.
Note 2) Apply grease uniformly as Fig- 4 . Use lithium soap grease with consistency No.1 or No.2.

Bore size	MY3A		MY3B	
	Part No.	Recommended Length	Part No.	Recommended Length
φ16	MY3A16-16B-st	st+106 $^{0}_{-2}$	MY3B16-16B-st	st+118 $^{0}_{-2}$
φ20	MY3A20-16B-st	st+125 $^{0}_{-2}$	MY3B20-16B-st	st+145 $^{0}_{-2}$
φ25	MY3A25-16B-st	st+146 $^{0}_{-2}$	MY3B25-16B-st	st+174 $^{0}_{-2}$
φ32	MY3A32-16B-st	st+189 $^{0}_{-2}$	MY3B32-16B-st	st+221 $^{0}_{-2}$
φ40	MY3A40-16B-st	st+236 $^{0}_{-2}$	MY3B40-16B-st	st+272 $^{0}_{-2}$
φ50	MY3A50-16B-st	st+270 $^{0}_{-2}$	MY3B50-16B-st	st+306 $^{0}_{-2}$
φ63	MY3A63-16B-st	st+316 $^{0}_{-2}$	MY3B63-16B-st	st+352 $^{0}_{-2}$

Table 2. Dust seal band L dimension (MY3A/B)

Bore size	L dimension (mm)
φ16	11.5
φ20	14
φ25	18
φ32	20.5
φ40	25
φ50	25
φ63	29

Adjusting Procedure of MY3M Slide Bearing

Slide bearing of MY3M cylinder is adjusted to the prescribed values beforehand. Do not change the setting of the adjusting screw carelessly.

As rubber material is used for the bearing MY3M cylinder, position of the slide table can be changed a little depending on the load application conditions.

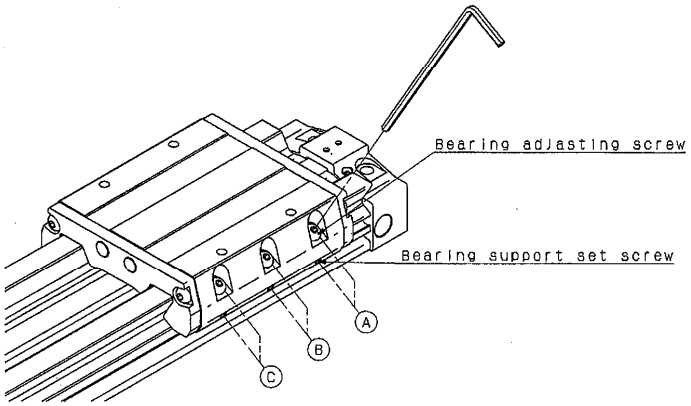
When the slide table happens to change its position in a wide range during its operation, take the following adjusting procedure.

1. Remove the load applied to the slide table.
2. Loosen the bearing adjusting screw, A, B and C. (About a half rotation)
3. Loosen the bearing support set screw, A, B and C. (Do not have to remove them, 1 or 2 rotations.)
4. Move the slide table manually for 2 or 3 reciprocations.
5. Tighten the bearing adjusting screws lightly and tentatively in A, C, B order, and retighten them in the same order.
   Refer to Table 1 for the setting torque for retightening.
6. Tighten the bearing support set screws with the prescribed torque in B, C, A order.
   Setting torque is shown in table 1, as a standard, tighten them until it is felt tightened.

* In case of shown below, take the adjusting procedure again.
  1) When the minimum operating pressure exceeds 0.15MPa.
     (When without load: After running-in for 2 or 3 rotations)
     - Over torque of bearing support set screw.
  2) When the play of the slide table by hand is big.

Note

Please consult when several times of adjustment does not solve the big play of the slide table.



	bore	Set torque(Nm)	Hex. wrench
Bearing adjusting screw	φ16	0.6	Nominal size 2
	φ25	1.4	Nominal size 2.5
	φ40	2.8	Nominal size 3
	φ63	4.8	Nominal size 4
Bearing support set screw	φ16	0.3	Nominal size 1.5
	φ25	0.7	Nominal size 2
	φ40	1.4	Nominal size 2.5
	φ63	2.4	Nominal size 3

Table 1 Set torque

Disassembly/Assembly Procedure of MY3M

A Bering replacement See [Disassembly] 1 to 2 [Assembly] 3 to 4
B Dust seal band replacement See [Disassembly] 1 to 3-2 [Assembly] 1-5 to 4
C Seal belt replacement See [Disassembly] 1 to 4 [Assembly] 1 to 4

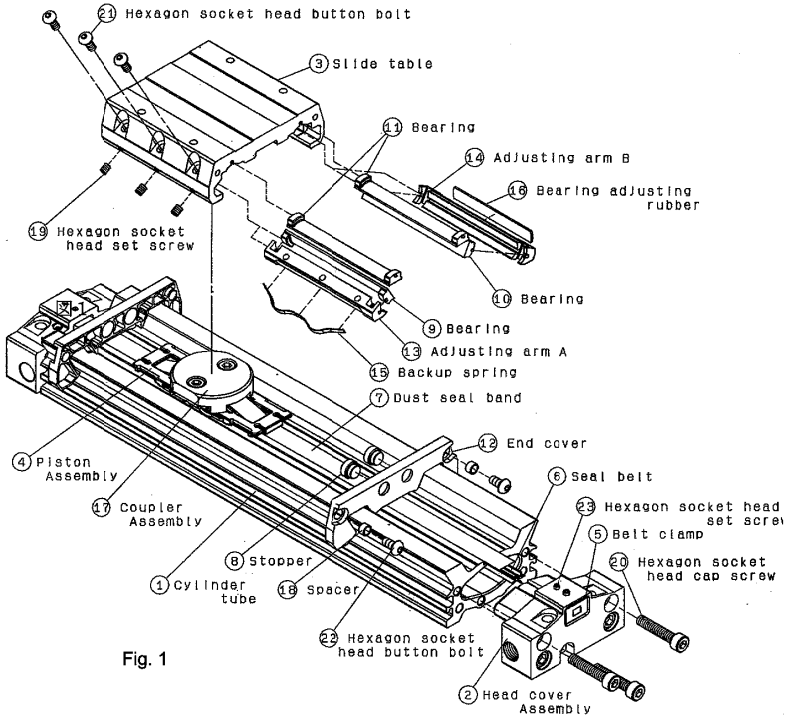


Fig. 1

Table1 stroke guide line for disassembly

Bore	Stroke
ϕ16	65mm or less
ϕ25	95mm or less
ϕ40	160mm or less
ϕ63	220mm or less

[Disassembly]

1 Disassembly Preparation

1-1 Remove the load mounted to ③Slide table

1-2 Remove the stroke adjusting unit.

2 Slide table removal

When the stroke is short (see Table 1), ⑬Adjusting arm A may not be pulled out. In this case, remove ②head cover Assembly according to procedure of No.3 below. (For Bearing replacement, remove only one side)

2-1 Loosen ㉑Hexagon socket head button bolt, and remove ⑫End cover.

Don't remove them from the Cylinder tube. Don't lose ⑱Spacer, ⑧Stopper. They are easily missed.

2-2 Loosen ⑲Hexagon socket head set screw for 3 to 4 turns, and remove ㉑Hexagon socket head button bolt.

2-3 Pull out ⑬Adjusting arm A from the end of ③Slide table.

⑮Backup spring, and ⑨Bearing are pulled out at the same time. If they become tight in the middle and can not be pulled out, loosen ⑲Hexagon socket head set screw more.

2-4 Press ③Slide table against ⑭Adjusting arm B, and remove Adjusting arm B to ①Cylinder tube side.

2-5 Pull out ⑭Adjusting arm B from the end of ③Slide table.

⑯Bearing adjusting rubber, and ⑪Bearing are pulled out at the same time. If Bearing adjusting rubber become tight because of close contact to the Slide table, pull out from the other side.

2-6 Remove ③Slide table from the top.

It may be difficult to pull out due to adhesion to ⑰Coupler Assembly. Rotate the Slide table from side to side and remove the Coupler Assembly so that it is not pulled out. When the Coupler Assembly was removed at the same time, ⑦Dust seal band may be damaged, or bent. In this case, please replace the Dust seal band.

2-7 Remove ⑪Bearing from ③Slide table.

3 Head cover Assembly removal

3-1 Loosen ㉓Hexagon socket head set screw for 3 turns, and remove ⑤Belt clamp.

3-2 Remove ⑦Dust seal band.

If ⑰Coupler Assembly is removed, return it to the original position.

3-3 Loosen ⑳Hexagon socket head cap screw, and remove ②Head cover Assembly on both ends of ①Cylinder tube.

4 Piston Assembly, Seal belt removal

4-1 Pull out ⑫End cover and ④Piston Assembly from the end of the cylinder tube.

4-2 Fall off ⑥Seal belt from ①Cylinder tube, and pull it out.

Table 2 Seal belt spec. length (mm)

Bore	Spec. length
ϕ16	Stroke+218 $^{0}_{-2}$
ϕ25	Stroke+274 $^{0}_{-2}$
ϕ40	Stroke+372 $^{0}_{-2}$
ϕ63	Stroke+452 $^{0}_{-2}$

Table 3 Dust seal band spec. length (mm)

Bore	Spec. length	L dimension
ϕ16	Stroke+118 $^{0}_{-2}$	11.5
ϕ25	Stroke+174 $^{0}_{-2}$	18
ϕ40	Stroke+272 $^{0}_{-2}$	25
ϕ63	Stroke+352 $^{0}_{-2}$	29

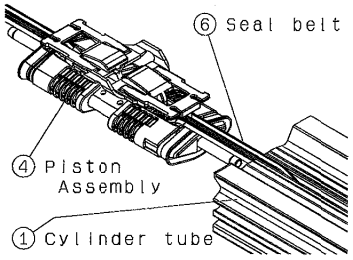


Fig. 2

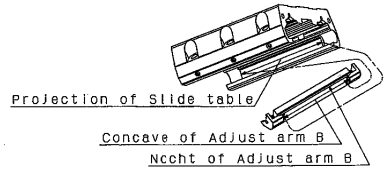


Fig. 3

[Assembly]

1 Piston Assembly, Seal belt, Dust seal band mounting

1-1 Confirm ⑥Seal belt full length is specification value (Table 2), and grease all over it evenly.

The damage caused on the Seal belt lead to cause air leakage. Attention should be taken. (Especially on the edges)

1-2 Referring Fig. 2, insert ⑥Seal belt to ④Piston Assembly and mount it to ①Cylinder tube.

1-3 Keep ⑥Seal belt projection of both ends of ①cylinder tube the same, then make a slow travel of stroke of ④Piston Assembly to mount the Seal belt to the cylinder tube opening.

1-4 Make ④Piston Assembly travel the stroke for 2 or 3 times to wipe off excess grease gathered at the Piston Assembly end surface.

(If grease is adhered to the contact surface of Piston Assembly and ②Head cover Assembly, it lead to cause lurching of the Piston.)

1-5 Mount ⑰Coupler Assembly to the slot on top of ④Piston Assembly.

1-6 Confirm ⑦Dust seal band full length is specification value (Table 3), and grease all over it evenly.

1-7 Insert ⑦Dust seal band to the opening of ⑰Coupler Assembly and ④Piston Assembly (3 places in total) to mount it to the cylinder.

2 Head cover Assembly mounting

When ②Head cover Assembly is removed before Slide table removal in [Disassembly], perform process No.3 beforehand.

2-1 Insert ②Head cover Assembly on the right and left to ①Cylinder tube, and settle it with ⑳ Hexagon socket head cap screw.

Mind so that the bottom surface of Head-cover Assembly and ①Cylinder tube bottom surface become flat.

2-2 Cut off ⑥Seal belt coming out of ②Head cover Assembly counterbore surface.

2-3 Keep the projection of ⑦Dust seal band from ①Cylinder tube so that the length becomes the L dimension of table 2. And insert it to ②Head cover Assembly. Then, settle it with ㉓ Hexagon socket head set screw which locate outward of A side while holding ⑤Belt clamp.

2-4 Pull ⑦Dust seal band to B side, and settle with ㉓Hexagon socket head set screw which locate outward of B side while holding ⑤Belt clamp.

2-5 Tighten inner ㉓Hexagon socket head set screw until ⑦Dust seal band close to ①Cylinder tube on both A and B side closely contact to the body.

2-6 Make ④Piston Assembly travel full stroke for 2 or 3 times to confirm ⑦Dust seal band is closely contact with the Cylinder tube. (No floating part from the body)

3 Slide table mounting

3-1 Mount two ⑪Bearings to ③Slide table.

Insert deep enough so that the Bearings do not float.

3-2 Align the center of ③Slide table to the upper part of ⑰Coupler Assembly and mount it from the top.

Push until ⑪Bearing contact with the sliding surface.

3-3 Mount ⑩Bearing to the arc of ⑭Adjusting arm B, and mount ⑱Bearing adjusting rubber to the opposite side. Then move ③Slide table to Adjusting arm B side, and insert them from the end surface.

The side of Adjusting arm B with notch is upper part (Fig. 3).

3-4 Move ③Slide table towards ⑬Adjusting arm A side, and mount so that ⑭Adjusting arm B and the Slide table are engaged properly.

Position so that projection and concave of Fig. 3 are properly engaged.

3-5 Assemble ⑨Bearing to the arc of ⑬Adjusting arm A, and ⑮Backup spring to the opposite side of ⑬Adjusting arm A. Then, insert them to the ③Slide table.

Surface with flat screw hole is the top surface. See Fig. 1 for the direction of the Backup spring.

3-6 Adjust the Bearing according to attached [Adjusting Procedure of MY3M Slide Bearing].

3-7 Deform ⑰End cover and mount it from ①Cylinder tube end surface.

3-8 Tighten ㉒Hexagon socket head button bolt.

When ②Head cover Assembly is removed before Slide table [Disassembly], perform process No.2 beforehand.

4 Finish

4-1 Mount the stroke adjusting unit and the load.

Revision history		
・Ver.D	Add bore size of MY3A/B series Correction applicable grease	NV

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