

Structure/Outlines

FMC/FMA Magnum Series

Magnum Series is the newest model of industrial soft absorber implemented with the innovative next generation deceleration technology for self-correction/adjusting type. It consists of four types with external threads of M33, 36, 45, and 64.

The newest sealing technology, high precision bearing, and the design to allow the use of the main unit as a stopper are applied for the internal structure, which achieves high durability in an extreme usage environment.

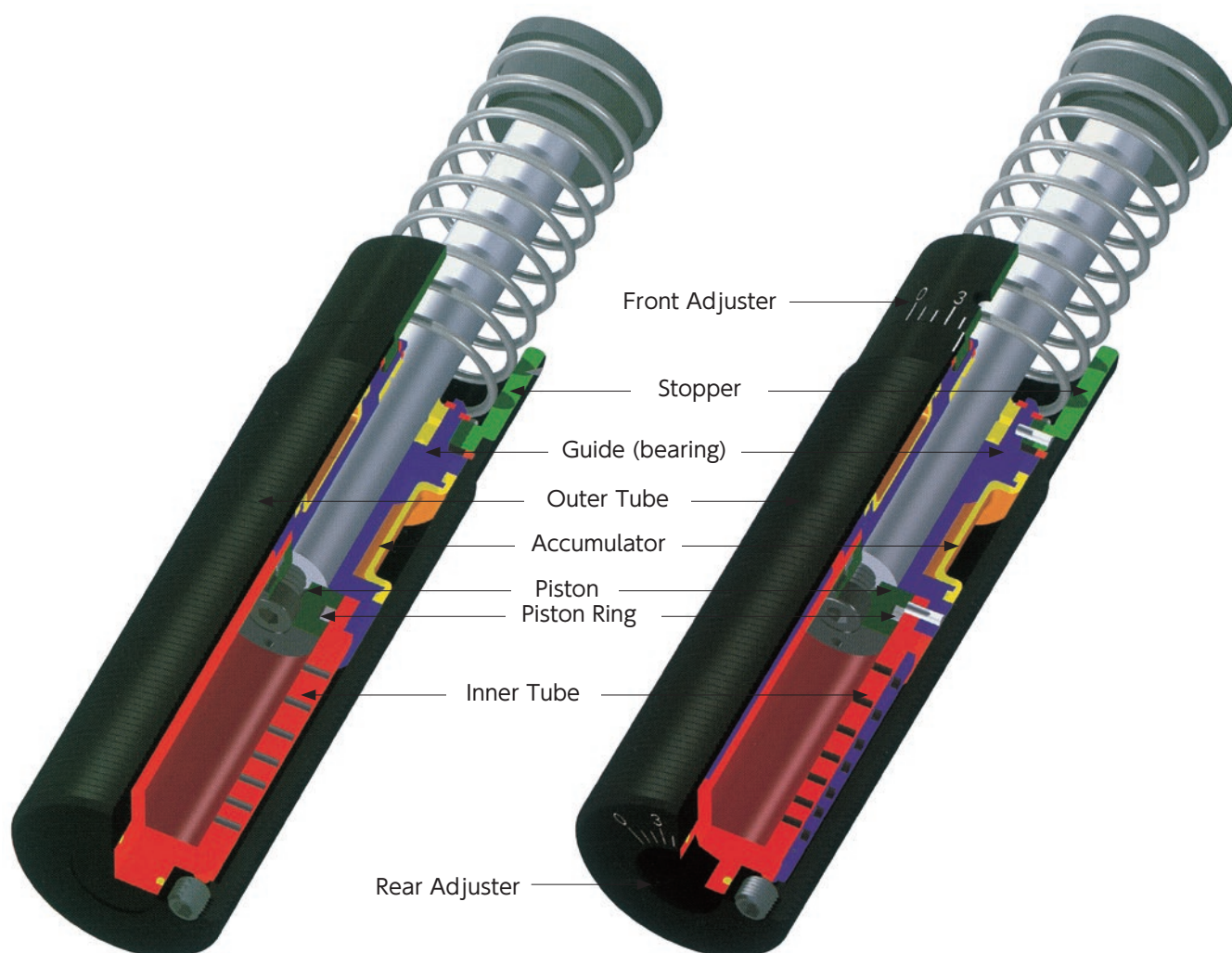
The full thread type main unit makes a wide variety of mountings possible compared to conventional types.

From a performance viewpoint, this series has an increased absorption energy capacity by 50% compared with conventional products, and also has a wider equivalent mass range.

In addition the adjusting type FML model, developed as a low speed specification, provides a wide range of uses in a low speed impact. As explained, the Magnum Series is a new series with the performance and appearance to improve the capability of production machines and equipment by 100%.

FMC33 ~64 (Self-correction type)

FMA & FML33 ~64 (Adjusting type)



<Model number>

FMC - With External Returning Spring (Standard Type)

FMCA - Air Return Type (Without Returning Spring)

* When an external tank is used.

<Model number>

FMA/FML - With External Returning Spring (Standard Type)

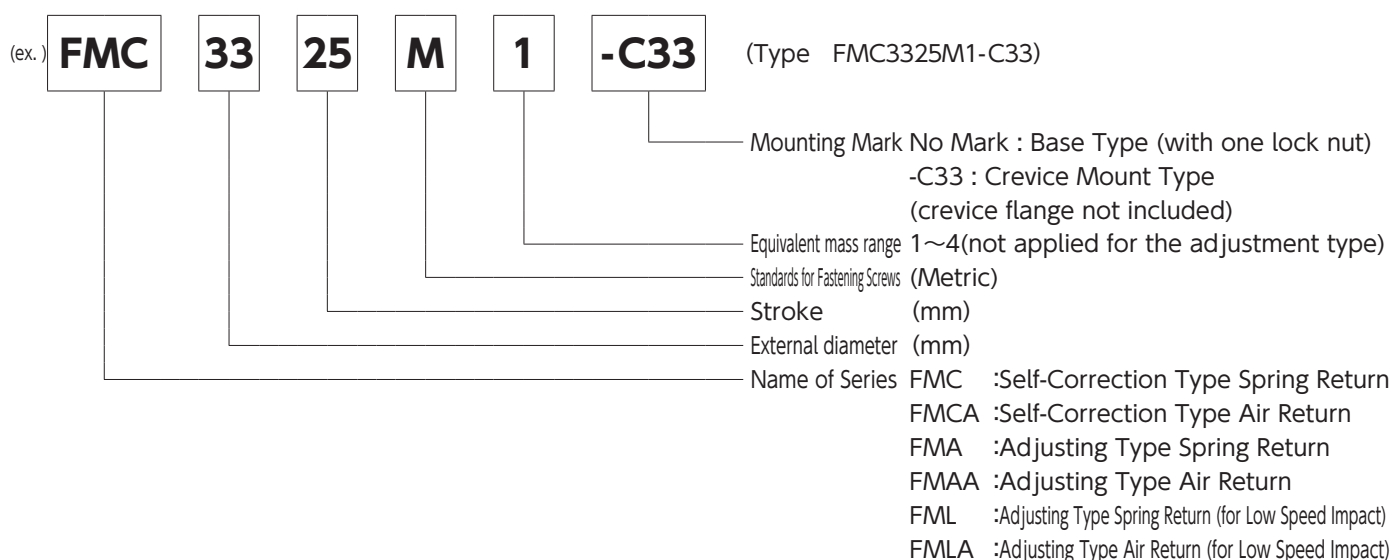
FMAA/FMLA - Air Return Type (Without Returning Spring)

* When an external tank is used.

Outlines

	Self-correction type	Adjusting type	
	FMC•FMCA	FMA•FMAA	FML•FMLA
Range of impact rate	0.15~5m/s	0.15~5m/s	0.02~0.46m/s
Adjustment method	Unnecessary	Adjustable at the front stopper or bottom. (Direction to "0" for harder, Direction to "9" for softer)	
Oil type	Automatic Transmission Fluid (ATF)		
Range of operating temperature	-12℃~66℃		

Key to Model Number



(*) If the mounting parts such as flanges are required, please order together with the models above.

(ex.) QF33 : Square flange
S33 : Side mount fixture

Caution

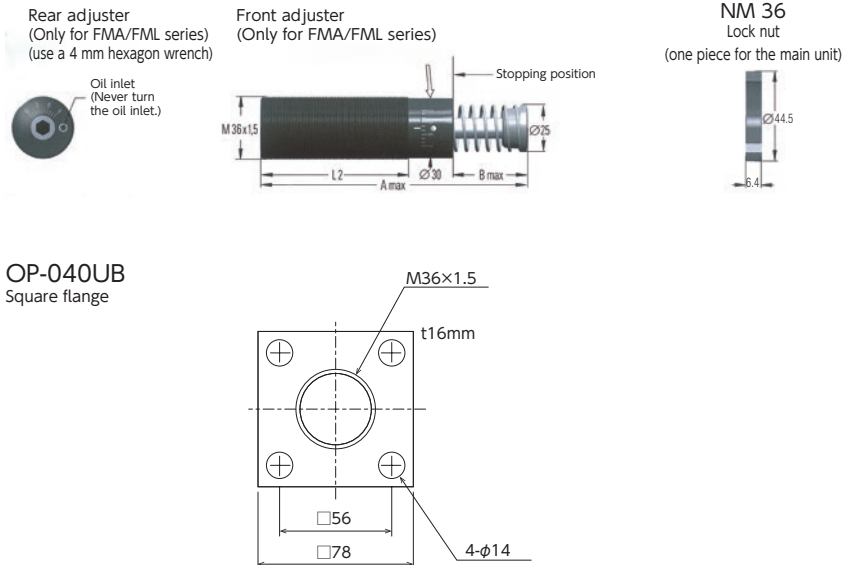
- For appropriate heat radiation, do not apply a coating on the soft absorber.
If used in an acid, dirt, dust, steam, or water environment, please protect the soft absorber main unit.
Install the soft absorber on a smooth structure with proper strength.
- If a square flange/rectangular flange is used:
Be sure to mount the flange in front of the structure and avoid direct loading on the mounting bolts.
- If side mount fixture is used:
Be sure to support the side mount with a stopper to avoid direct shearing force on the mounting bolts.

Magnum Series

Self-Correction Type FMC36/Adjustable Type FMA/FML36 Series

RoHS Compliant

●Products specification might be changed without notice.



< FMA36 Series Adjustable Type >

Model
FMA3625M (Spring Turn)
FMA3650M (Spring Turn)

< FML36 Series Low Speed Adjustable Type>

Model
FML3625M (Spring Turn)
FML3650M (Spring Turn)

< FMC36 Series Self-Compensation Type> * □ will be filled in with 1-4.

Model
FMC3625M□ (Spring Turn)
FMC3650M□ (Spring Turn)

< Option >

Model
Lock Nut NM36
Square Flange OP-040UB

Dimensions (mm)

Model	Stroke	A max	B max	L2
FMA, FML, FMC 3625M	25	138	23	83
FMA, FML, FMC 3650M	50	189.0	48.5	108.0

Specifications

Model	Absorption energy per time J	Max. absorption energy per hour J			* Equivalent mass kg				Pis ton rod		Max. allowable	
					Soft		Hard					
		Standard	External Tank	Oil circulator	1 min-max	2 min-max	3 min-max	4 min-max	recovering power N min-max	Returning time s	Eccentric angle °	Mass kg
FMC3625M	155	75,000	124,000	169,000	9-40	30-120	100-420	350-1,420	45-90	0.03	4	0.56
FMC3650M	310	85,000	135,000	180,000	18-70	60-250	210-840	710-2,830	45-135	0.06	3	0.68

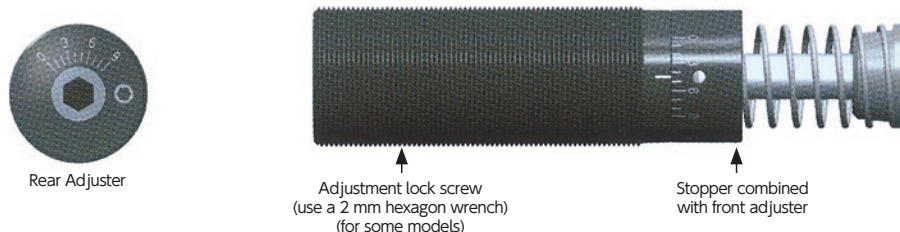
Model	Absorption energy per time J	Max. absorption energy per hour J			* Equivalent mass kg		Pis ton rod		Max. allowable	
		Standard	External Tank	Oil circulator	FMA series min-max	FML series min-max	recovering power N min-max	Returning time s	Eccentric angle °	Mass kg
FMA, FML3625M	170	75,000	124,000	169,000	9-1,700	300-50,000	45-90	0.03	4	0.56
FMA, FML3650M	340	85,000	135,000	180,000	13-2,500	500-80,000	45-135	0.06	3	0.68

RoHS Compliant

Cautions on Mounting Methods/Mounting Work

No external stopper required

Magnum Series has a stopper integrated into the Soft Absorber.



Setting of a most appropriate absorption energy condition.

Self-Correction Type Absorber

FMC model is a Self-Soft Absorber.

Can be used under the varying conditions of weight of impact load/impact rate/thrusting force as long as the condition of use is within the equivalent mass range.

The products for this model are prepared for handling the equivalent mass range (min. - max.) of five stages.

Select the model by the attached tail Nos. -0 (soft) - 4 (hard) of the type in accordance with the condition of use.

The best deceleration performance will be achieved under conditions with no sudden change in the speed of load at the top or end of the absorber piston rod.

If there is an impact at the start of stroke - change to one stage softer model (with smaller tail No.)

If there is an impact at the stroke end - change to one stage harder model (with larger tail No.)
or change to the use of two in parallel.

Adjusting Type Absorber

There is an adjusting scale of 0 ~9 on the FMA/FML models adjustment type soft absorber.

Before starting adjustment, loosen (maximum 1/2 turns) the locking screw (excluding 150mm stroke, FMA/FML 64 series only) located at the side of main unit using a hexagon wrench (2mm).

The Magnum Series is adjustable with the rear adjuster on the bottom of main unit, or the front adjuster (front stopper).

Both of the adjusters are internally linked together, and the adjusted scale of one side will be synchronous with the other scale.

After mounting, check the functioning several times, and turn the adjuster to a scale which provides the best deceleration. (At the start of stroke and stroke end of the piston rod, confirm that there is no impact.)

The soft absorbers are delivered with the adjusting scale positioned at 5.

If there is an impact at the start of stroke, turn the adjusting scale to 9 (soften) .

If there is an impact at the stroke end, turn the adjusting scale to 0 (harden).

* If the adjusting scale indicates 0 or 9, consider changing to another model.

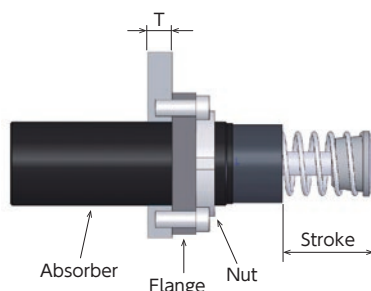
If the adjusting scale indicates 0: A) Due to the very slow impact rate, change to FML model.

or

B) Too small size of absorber, please study the adoption of an absorber that is one stage larger.

Thickness of mounting base/Mounting strength/Tightening torque for the lock nut (recommendation)

Model (External thread)	Thickness T (minimum)	Mounting strength	Tightening torque for the lock nut
FMA, FML, FMC33/36 (M33/36x1.5)	10mm	1,150kg	15~30kgf·m
FMA, FML, FMC45 (M45x1.5)	13mm	1,800kg	30~60kgf·m
FMA, FML, FMC64 (M64x2)	16mm	5,100kg	50~100kgf·m



* Reinforce the thickness T applying a rib etc.
as necessary.

Measures for Eccentric Load

The impact of eccentric load over 3° will speed up the wear of the piston rod bearing and rapidly reduce the life cycle of the soft absorber. For maintaining the durability, the use of an eccentric angle adaptor is recommended.

Solutions:

The use of an eccentric angle adaptor is recommended. If possible, dividing the center of stroke to set the impact angle to 1/2 is recommended, as shown below.

Equations:

$$\alpha = \tan^{-1}\left(\frac{s}{2 \cdot R_s}\right) \quad R_{smin} = \frac{s}{2 \cdot \tan \alpha_{max}}$$

Sample Calculations:

$$s = 0.025m$$

$$\alpha_{max} = 25^\circ$$

$$R_s = 0.1m$$

$$\alpha = \tan^{-1}\left(\frac{0.025}{2 \cdot 0.1}\right) \quad R_{smin} = \frac{0.025}{2 \cdot \tan 25}$$

$$\alpha = 7.13^\circ$$

$$R_{smin} = 0.027m$$

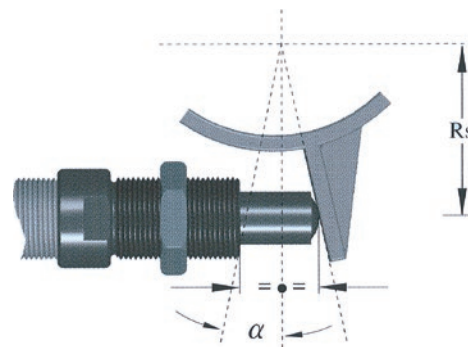
α = Eccentric angle: °

α_{max} = Maximum Allowable Eccentric Angle: °

s = Absorber Stroke: m

R_s = Mounting Distance (radius): m

R_{smin} = Shortest Possible Mounting Distance (radius): m



Eccentric Angle Adaptor:

The durability will be improved by taking a measure for eccentric angle of 3°~ 25° using a BV eccentric angle adaptor.

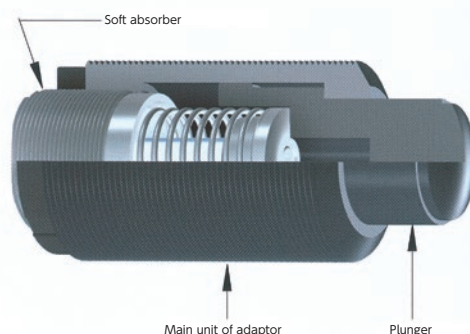
When using the eccentric angle adaptor, screw in the absorber until the end cap of the absorber contacts the plunger.

Be sure to lock the nut for absorber main unit after mounting.

Be careful not to screw in the absorber too deep: the absorption performance may be influenced if the stroke is short.

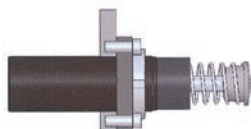
BV3325 (external diameter M45x1.5) - for FMC, FMA, FML3325 (M33x1.5)

BV4525 (external diameter M64x2) - for FMC, FMA, FML4525 (M25x1.5)



Example of installation

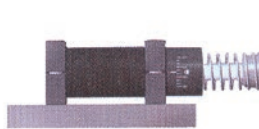
Base type



Flange mount



Side mount



Crevice mount



* For side mountings, be sure to support with the stopper to avoid direct force to the mounting bolt.