

Shock Absorber

Series RB/RBL/RBQ

Absorbing impact and noise

Dampening to meet the high speed requirements of the modern world.

Shock absorber: Series RB
Coolant resistant type: Series RBL

Usable without a stopper nut
 The strong body can be positioned directly.

Short type: Series RBQ

A compact style that has been shortened lengthwise

Allowable eccentric angle is 5°
 Suitable for absorption of rotation energy.

Usable without a stopper nut
 The strong body can be positioned directly.

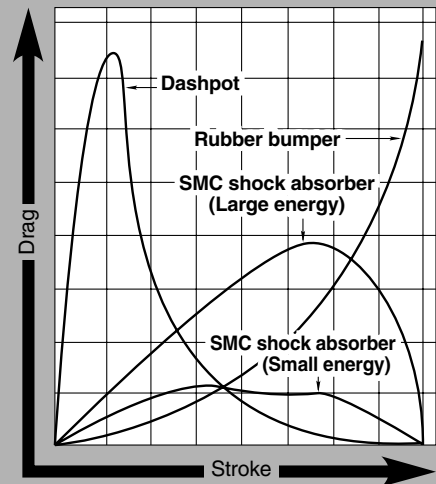


Shock absorber

Automatic adjustment to the most appropriate absorption performance

Specially designed orifice can absorb energy comprehensively and most appropriately in many different applications. This ranges from high speed low loads, to load speed high loads; without requiring additional adjustment of the shock absorber.

Example of comparison for drag characteristics



* Drag waveform will vary depending on the operating conditions.

Series Variations

Series	Basic type	With cap or bumper (Option)	Hexagon nut *	Stopper nut (Option)	Foot bracket	Page
Series RB 	Series RB	●	●	●	●	18-10-2
Coolant resistant Series RBL (Except 08 type)		●	●	●	●	18-10-8
Series RBQ 	Series RBQ	●	●	●		18-10-10

* 2 Hexagon nuts are attached for Series RB and standard models RBQ.

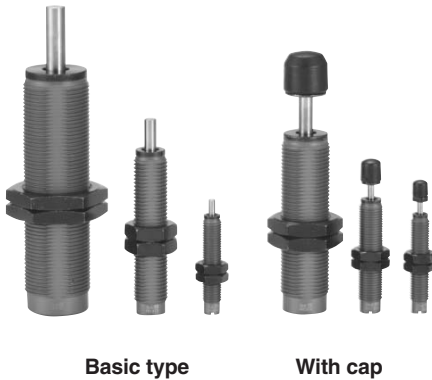
- RE^A_B
- REC
- C□X
- C□Y
- MQ^Q_M
- RHC
- MK(2)
- RS^Q_G
- RS^H_A
- RZQ
- MI^W_S
- CEP1
- CE1
- CE2
- ML2B
- C^J_G5-S
- CV
- MVGQ
- CC
- RB**
- J
- D-
- X
- 20-
- Data

Shock Absorber Series *RB*

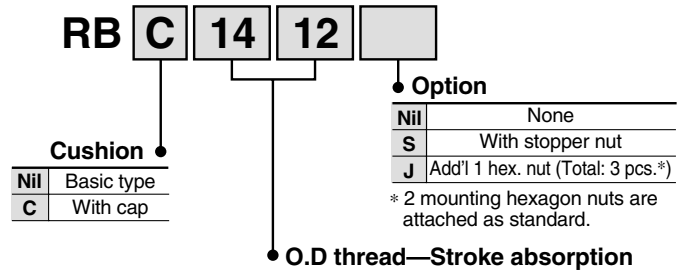
Specifications

Specifications	Model	RB0805	RB0806	RB1006	RB1007	RB1411	RB1412	RB2015	RB2725
	Basic type	RB0805	RB0806	RB1006	RB1007	RB1411	RB1412	RB2015	RB2725
Max. energy absorption (J)	With cap	0.98	2.94	3.92	5.88	14.7	19.6	58.8	147
Stroke absorption (mm)		5	6	6	7	11	12	15	25
Collision speed (m/s)		0.05 to 5.0							
Max. operating frequency * (cycle/min)		80	80	70	70	45	45	25	10
Max. allowable thrust (N)		245	245	422	422	814	814	1961	2942
Ambient temperature range (°C)		-10 to 80 (No freezing)							
Spring force (N)	Extended	1.96	1.96	4.22	4.22	6.86	6.86	8.34	8.83
	Retracted	3.83	4.22	6.18	6.86	15.30	15.98	20.50	20.01
Weight (g)	Basic type	15	15	23	23	65	65	150	350
	With cap	16	16	25	25	70	70	165	400

* It denotes the values at the maximum energy absorption per one cycle.
Max. operation cycle/min can increase in proportion to energy absorption.



How to Order



Replacement part no./Cap (Resin part only)

RBC 08 C

Applicable model

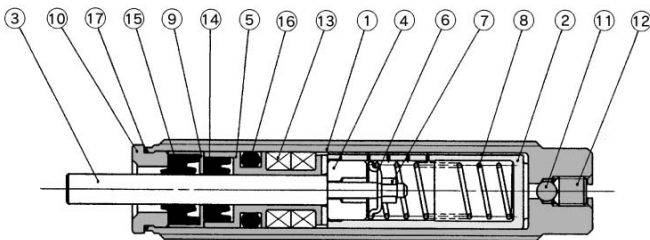
08	RBC0805, 0806	20	RBC2015
10	RBC1006, 1007	27	RBC2725
14	RBC1411, 1412		

Cap

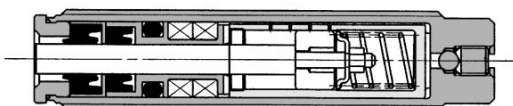
Cap cannot be mounted for basic type. Please place an order with cap type from the beginning.

Construction

Extended



Compressed



Component Parts

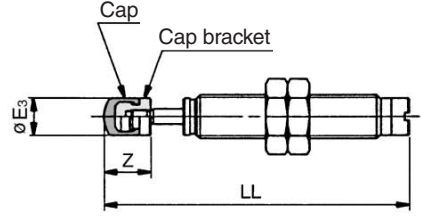
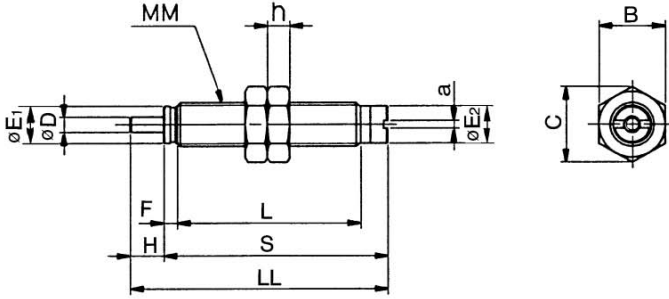
No.	Description	Material	Treatment
①	Outer tube	Rolled steel	Gray coated
②	Inner tube	Special steel	Heat treated
③	Piston rod	Special steel	Electroless nickel plated
④	Piston	Special steel	Heat treated
⑤	Bearing	Special bearing material	
⑥	Spring guide	Carbon steel	Zinc chromated
⑦	Lock ring	Copper	
⑧	Return spring	Piano wire	Zinc chromated
⑨	Seal holder	Copper alloy	
⑩	Stopper	Carbon steel	Zinc chromated
⑪	Steel ball	Bearing steel	
⑫	Set screw	Special steel	
⑬	Accumulator	NBR	Foam rubber
⑭	Rod seal	NBR	
⑮	Scraper	NBR	
⑯	Gasket	NBR	
⑰	Gasket	NBR	Only RB(C)2015, 2725

Dimensions

Basic type: RB0805, RB0806, RB1006, RB1007

With cap: RBC0805, RBC0806
RBC1006, RBC1007

* Other dimensions are the same as the basic type.

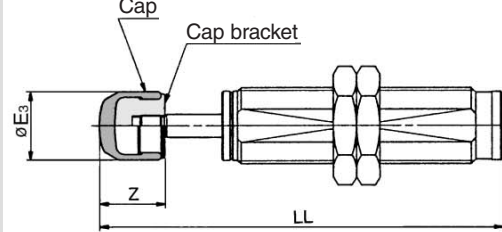
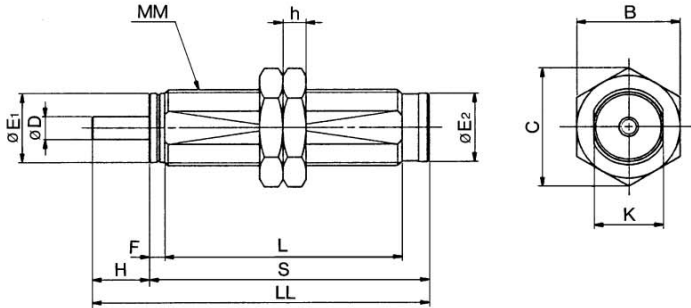


Model		Basic type dimensions										With cap*			Hexagon nut		
Basic type	With cap	D	E ₁	E ₂	F	H	a	L	LL	MM	S	E ₃	LL	Z	B	C	h
RB0805	RBC0805	2.8	6.8	6.8	2.4	5	1.4	33.4	45.8	M8 x 1.0	40.8	6.8	54.3	8.5	12	13.9	4
RB0806	RBC0806	2.8	6.8	6.8	2.4	6	1.4	33.4	46.8	M8 x 1.0	40.8	6.8	55.3	8.5	12	13.9	4
RB1006	RBC1006	3	8.8	8.6	2.7	6	1.4	39	52.7	M10 x 1.0	46.7	8.7	62.7	10	14	16.2	4
RB1007	RBC1007	3	8.8	8.6	2.7	7	1.4	39	53.7	M10 x 1.0	46.7	8.7	63.7	10	14	16.2	4

Basic type: RB1411, RB1412, RB2015, RB2725

With cap: RBC1411, RBC1412
RBC2015, RBC2725

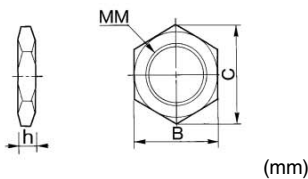
* Other dimensions are the same as the basic type.



Model		Basic type dimensions										With cap*			Hexagon nut		
Basic type	With cap	D	E ₁	E ₂	F	H	K	L	LL	MM	S	E ₃	LL	Z	B	C	h
RB1411	RBC1411	5	12.2	12	3.5	11	12	58.8	78.3	M14 x 1.5	67.3	12	91.8	13.5	19	21.9	6
RB1412	RBC1412	5	12.2	12	3.5	12	12	58.8	79.3	M14 x 1.5	67.3	12	92.8	13.5	19	21.9	6
RB2015	RBC2015	6	18.2	18	4	15	18	62.2	88.2	M20 x 1.5	73.2	18	105.2	17	27	31.2	6
RB2725	RBC2725	8	25.2	25	5	25	25	86	124	M27 x 1.5	99	25	147	23	36	41.6	6

Hexagon Nut

(2 pcs. standard equipment)

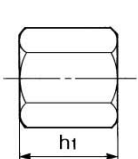


Part no.	Dimensions			
	MM	h	B	C
RB08J	M8 x 1.0	4	12	13.9
RB10J	M10 x 1.0	4	14	16.2
RB14J	M14 x 1.5	6	19	21.9
RB20J	M20 x 1.5	6	27	31.2
RB27J	M27 x 1.5	6	36	41.6

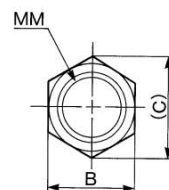
Option

Stopper nut

For basic type



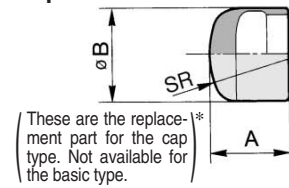
For cap type



Part no.		Dimensions						
Basic type	With cap	B	C	h1	h2	MM	d	f
RB08S	RBC08S	12	13.9	6.5	23	M8 x 1.0	9	15
RB10S	RBC10S	14	16.2	8	23	M10 x 1.0	11	15
RB14S	RBC14S	19	21.9	11	31	M14 x 1.5	15	20
RB20S	RBC20S	27	31.2	16	40	M20 x 1.5	23	25
RB27S	RBC27S	36	41.6	22	51	M27 x 1.5	32	33

Replacement Parts

Cap



Material: Polyurethane

Part no.	Dimensions		
	A	B	SR
RBC08C	6.5	6.8	6
RBC10C	9	8.7	7.5
RBC14C	12.5	12	10
RBC20C	16	18	20
RBC27C	21	25	25

RE^A_B
REC
C□X
C□Y
MQ^Q_M
RHC
MK(2)
RS^Q_G
RS^H_A
RZQ
MI^W_S
CEP1
CE1
CE2
ML2B
C^J_{5-S}
CV
MVGQ
CC
RB
J
D-
-X
20-
Data

Model Selection

Model Selection Step

1. Type of impact

- Cylinder stroke at load (Horizontal)
- Cylinder stroke at load (Downward)
- Cylinder stroke at load (Upward)
- Conveyor stroke at load (Horizontal)
- Free horizontal impact
- Free dropping impact
- Rotating impact (With torque)

2. Enumeration of operating conditions

Symbol	Operating condition	Unit
m	Impacting object weight	kg
v	Collision speed	m/sec
h	Dropping height	m
ω	Angle speed	rad/sec
r	Distance between axis of cylinder and impact point	m
d	Bore size	mm
p	Cylinder operation pressure	MPa
F	Thrust	N
T	Torque	N·m
n	Operation cycle	cycle/min
t	Ambient temperature	°C
μ	Friction coefficient	—

3. Specifications and operational instructions

Ensure that the collision speed, thrust, operation cycle, the ambient temperature and atmosphere fall within the specifications. *Be aware of the min. installation radius in the case of rotating impacts.

4. Calculation of kinetic energy E1

Using the equation suitable for the classification of impact.

In the case of cylinder stroke at load and free horizontal impact, substitute respective figures for **Data A** in order to calculate E1.

5. Calculation of thrust energy E2

Select any shock absorber as a provisional model.

In the case of thrust energy of cylinder E1, substitute respective figures for **Data B** or **Data C**.

6. Calculation of corresponding weight of impacting object Me

Absorbed energy $E = E_1 + E_2$
Corresponding weight of impacting object $Me = \frac{2}{v^2} \cdot E$

Substitute both absorbed energy E and collision speed v for **Data A** in order to calculate the corresponding weight of the impacting object.

7. Selection of applicable model

Taking into consideration the corresponding weight of the impacting object Me, calculated using **Data D** and collision speed v, check provisional model compatibility with the condition of application. If this is satisfactory, then the said provisional model will be the applicable one.

Caution on Selection

In order for the shock absorbers to operate accurately for long hours, it is necessary to select a model that is well-suited to your operating conditions. If the impact energy is smaller than 5% of the maximum energy absorption, select a model that is one class smaller.

Selection Example

1. Type of impact		Cylinder stroke at load (Horizontal)
Collision speed (1)		v
Kinetic energy E1		$\frac{1}{2} \cdot m \cdot v^2$
Thrust energy E2		F1 · S
Absorbed energy E		E1 + E2
Corresponding (2) weight of impacting object Me		$\frac{2}{v^2} \cdot E$
2. Operating conditions		m = 50 kg v = 0.3 m/s d = 40 mm p = 0.5 MPa n = 20 cycle/min t = 25°C
3. Specifications and operational instructions		• Confirmation of specifications v ... 0.3 < 5 (max.) t ... -10 (min.) < 25 < 80 (max.) F ... F1 ... 628 < 1961 (max.)
4. Calculation of kinetic energy E1		• Kinetic energy E1 Use [Formula] to calculate E1. Substitute 50 for m and 0.3 for v. E1 ≅ 2.3 J
5. Calculation of thrust energy E2		• Thrust energy E2 Provisionally select a model RB2015 and make the use of Data B . According to d = 40, E2 is obtained. E2 ≅ 9.4 J
6. Calculation of corresponding weight of impacting object Me		• Corresponding weight of impacting object Me Use the formula "Absorbed energy E = E1 + E2 = 2.3 + 9.4 = 11.7 J" to calculate Me. Substitute 11.7 J for E and 0.3 for v. Me ≅ 260 kg
7. Selection of applicable model		• Selection of applicable model According to Data D , the tentatively selected RB2015 satisfies Me = 260 kg < 400 kg at v = 0.3. Ultimately, it will result in an operating frequency of n ... 20 < 25, without causing a problem. YES Select RB2015

1. Type of Impact

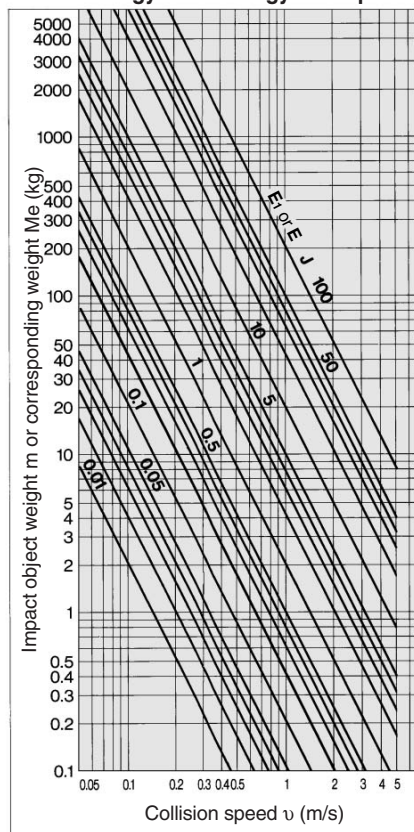
Type of impact	Cylinder stroke at load (Downward)	Cylinder stroke at load (Upward)	Conveyor stroke at load (Horizontal)	Free dropping impact	Rotating impact (Weight torque)
Collision speed (1)	v	v	v	$\sqrt{2gh}$	ω · R
Kinetic energy E1	$\frac{1}{2} \cdot m \cdot v^2$	$\frac{1}{2} \cdot m \cdot v^2$	$\frac{1}{2} \cdot m \cdot v^2$	m · g · h	$\frac{1}{2} \cdot I \cdot \omega^2$
Thrust energy E2	F1 · S + m · g · S	F1 · S - m · g · S	m · g · μ · S	m · g · S	T · $\frac{S}{R}$
Absorbed energy E	E1 + E2	E1 + E2	E1 + E2	E1 + E2	E1 + E2
Corresponding (2) weight of impacting object Me	$\frac{2}{v^2} \cdot E$	$\frac{2}{v^2} \cdot E$	$\frac{2}{v^2} \cdot E$	$\frac{2}{v^2} \cdot E$	$\frac{2}{v^2} \cdot E$

Note 1) Collision speed is momentary velocity at which object is impacting against shock absorber.

Note 2) An "Impact body equivalent weight" is the weight of an impact object without involving thrust, into which an object's total energy has been converted., refer to the catalog of rotary actuator. Hence, $E = \frac{1}{2} \cdot Me \cdot v^2$

Note 3) For the formula of moment of inertia I (kg·m²), refer to the catalog of rotary actuator.

Data A Kinetic Energy E1 or Energy Absorption E



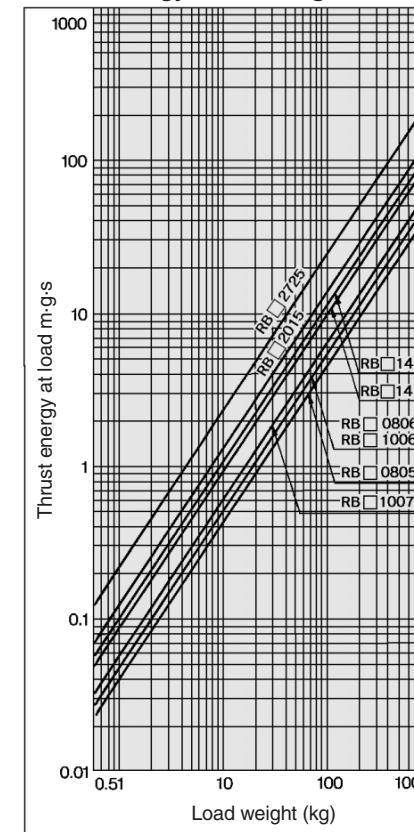
Data B (Operating pressure 0.5 MPa) Thrust Energy of Cylinder F1 · S (J)

Model	RB0805	RB0806	RB1006	RB1007	RB1411	RB1412	RB2015	RB2725
Stroke absorption (mm)	5	6	7	11	12	15	25	
Bore size d (mm)	6	10	15	20	25	30	40	50
	0.071	0.085	0.099	0.156	0.170	0.212	0.353	
	0.196	0.236	0.274	0.432	0.471	0.589	0.982	
	0.442	0.530	0.619	0.972	1.06	1.33	2.21	
	0.785	0.942	1.10	1.73	1.88	2.36	3.93	
	1.23	1.47	1.72	2.70	2.95	3.68	6.14	
	1.77	2.12	2.47	3.89	4.24	5.30	8.84	
	3.14	3.77	4.40	6.91	7.54	9.42	15.7	
	4.91	5.89	6.87	10.8	11.8	14.7	24.5	
	7.79	9.35	10.9	17.1	18.7	23.4	39.0	
	12.6	15.1	17.6	27.6	30.2	37.7	62.8	
	19.6	23.6	27.5	43.2	47.1	58.9	98.2	
	30.7	36.8	43.0	67.5	73.6	92.0	153	
	38.5	46.2	53.9	84.7	92.4	115	192	
	50.3	60.3	70.4	111	121	151	251	
	63.6	76.3	89.1	140	153	191	318	
	78.5	94.2	110	173	188	236	393	
	123	147	172	270	295	368	614	
	177	212	247	389	424	530	884	

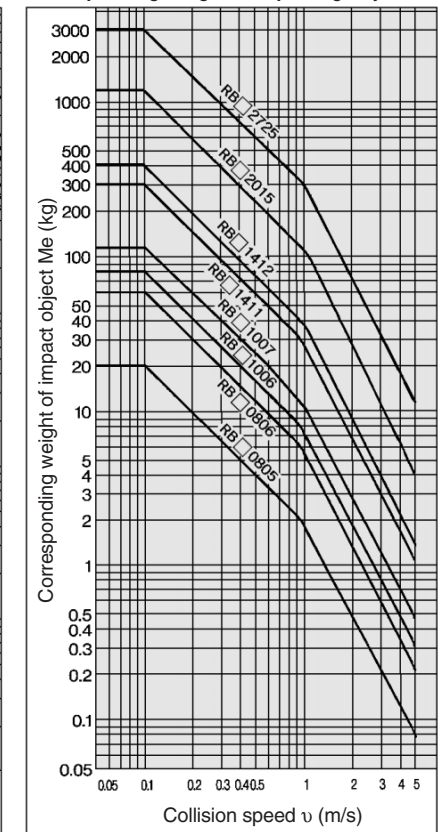
Operating pressure other than 0.5 MPa: Multiply by the following coefficient.

Operating pressure (MPa)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Coefficient	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8

Data C Thrust Energy at Load m · g · s



Data D Corresponding Weight of Impacting Object Me



Symbol

Symbol	Specifications	Unit
d	Bore size	mm
E	Absorbed energy	J
E1	Kinetic energy	J
E2	Thrust energy	J
F1	Cylinder thrust	N
g	Acceleration of gravity (9.8)	m/s ²
h	Dropping height	m
I (3)	Moment of inertia around the center of gravity	kg·m ²
n	Operating frequency	cycle/min
p	Cylinder operation pressure	MPa
R	Distance between axis of cylinder and impact point	m
S	Shock absorber stroke	m
T	Torque	N·m
t	Ambient temperature	°C
v	Collision speed	m/s
m	Impact object weight	kg
Me	Corresponding weight of impact object	kg
ω	Angle speed	rad/s
μ	Friction coefficient	—

- RE^A_B
- REC
- C□X
- C□Y
- MQ^Ω_M
- RHC
- MK(2)
- RS^Ω_G
- RS^H_A
- RZQ
- MI^v_S
- CEP1
- CE1
- CE2
- ML2B
- C¹_G-S
- CV
- MVGQ
- CC
- RB
- J
- D-
- X
- 20-
- Data

⚠ Precautions

Be sure to read before handling. Refer to pages 10-24-3 to 10-24-6 for Safety Instructions and Actuator Precautions.

Selection

⚠ Danger

1. Energy absorption

Select a model so that the aggregated energy of impact object should not exceed the maximum absorption energy. Otherwise, it could cause changes in properties or result in damaging the shock absorber.

2. Corresponding weight of impacting object

Make a model selection, so that the corresponding weight of impacting object does not exceed the allowable range. Pulsation will occur in buffer and deceleration force, thus making it difficult to absorb shock smoothly.

3. Collision speed

Use it in the conditions that collision speed is within the specified range. It could cause the changes in buffer characteristics or lead to damage a shock absorber.

⚠ Warning

1. Static load

Design the system, so that any other forces than the buffer capacity or impacts should not be applied to the piston rod which is stopped at the retracted state.

⚠ Caution

1. Maximum operating frequency

Design the system in the conditions under which it is not used at the frequency exceeding the specified maximum operating frequency. (But, the maximum operating frequency will vary depending on the absorbed energy.)

2. Stroke

The maximum absorption energy in the specifications cannot be exerted unless the full stroke is used for both Series RB and RBL.

3. Work surface of an impact object

The contact surface of the impact object with which the piston rod comes into contact must be highly rigid. In the case without a cap, a high surface compression load is applied to the contact surface of the impact body with which the piston rod comes into contact. Therefore, the contact surface must be highly rigid (hardness of HRC35 or more).

4. Be aware of the return force of the impact object.

If used in a conveyor drive, after the shock absorber has absorbed energy, it could be pushed back by the spring that is built-in. For the spring force in the specifications, refer to the column (page 10-18-2).

5. Selection of size

As the number of operation proceeds, the maximum absorption energy of shock absorbers will be decreased by the following reasons such as abrasion, or deterioration, etc. of the internal working fluid. Taking this into consideration, selecting a size which is 20 to 40% affordable against the amount of absorption energy is recommended.

6. Drag characteristics

In general, the values of drag (reactive force generated during operation) generated by the operating speed will vary in hydraulic shock absorber. And then, by adopting "Porous orifice construction", the RB series can adapt to such this fast/slow speed and can absorb shock smoothly in a wide range of speed.

But, the speed reduction (speed reduction G) would be larger around the stroke terminal, depending upon the operating conditions. Please note that it might be encountered that stroke time is long, motion is not smooth, etc. If this would be a problem, we recommend that stroke amount should be restricted by using our optional component like "Stopper nut", etc.

Including this case, if the data on operational status (stroke time, reactive force, deceleration, etc.) are required, please consult with SMC.

2. Using inside a clean room

Do not use the shock absorber in a clean room, as it could contaminate the clean room.

⚠ Caution

1. Temperature range

Do not use it, exceeding the specified allowable temperature range. Seal could be softened or hardened or worn out, or leading to leak a working fluid, deterioration, or impact characteristic changes.

2. Deterioration by atmosphere

Do not use in an atmosphere such as salt damage, sulfurous acid gas which makes the metal corroded, or having solvent, etc. which makes seal deteriorated.

3. Deterioration by ozone

Do not use it under the direct sunlight on the beach, or by the mercury lamp, or the ozone generator, because the rubber material will be deteriorated by ozone.

4. Cutting oil, water, blown dust

Do not use the product under the condition, where the liquid such as cutting oil, water, blown dust, solvent, etc. is exposed either directly or in atomized form to the piston rod, or where blown dust could be adhered around the piston rod. This could cause malfunction.

5. Vibration

When vibrations are applied on impact objects, implement a secure guide on impact objects.

Mounting

⚠ Warning

1. Before performing installation, removal, or stroke adjustment, make sure to cut the power supply to the equipment and verify that the equipment has stopped.

2. Installation of protective cover

We recommend the protective cover should be installed in the case workers might be getting close during the operation.

3. The rigidity of the mounting frame must be taken into consideration

If the mounting frame lacks strength, the shock absorber will vibrate after an impact, causing bearing wear and damage. Load on mounting plate can be calculated as follows.

$$\text{Load on mounting plate } N \cong 2 \frac{E (\text{Absorbed energy J})}{S (\text{Stroke m})}$$

⚠ Warning

1. Tightening torque of mounting nut should be as follows.

When threading on a mounting frame in order to mount a shock absorber directly, prepared hole dimensions are referred to the table below.

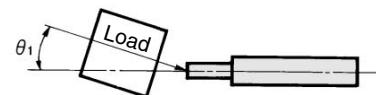
For tightening torque of a nut for shock absorber, kindly abide by the table below.

If the tightening torque that is applied to the nut exceeds the value given below, the shock absorber itself could become damaged.

Model	RB(C)0805 RB(C)0806	RB(C)1006 RB(C)1007	RB(C)1411 RB(C)1412	RB(C)2015	RB(C)2725
O.D. thread (mm)	M8 x 1.0	M10 x 1.0	M14 x 1.5	M20 x 1.5	M27 x 1.5
Thread prepared bore (mm)	ø7.1 +0.1 0	ø9.1 +0.1 0	ø12.7 +0.1 0	ø18.7 +0.1 0	ø25.7 +0.1 0
Tightening torque (N·m)	1.67	3.14	10.8	23.5	62.8

2. Deviation of impact

The installation must be designed so that the impact body is perpendicular to the shock absorber's axial center. An angle of deviation that exceeds 3° will place an excessive load on the bearings, leading to oil leaks within a short period of operation.



Allowable eccentric angle $\theta_1 < 3^\circ$

Operating Environment

⚠ Danger

1. Operation in an environment which requires explosion-proof

- When mounting in places where static electricity is accumulated, implement a distribution of electrical energy by grounding.
- Do not use the materials for buffer face which might cause to spark by collision.

⚠ Warning

1. Pressure

Do not use it in the vacuum state, which is substantially different from the atmospheric pressure (above sea level) and in the atmosphere under being pressurized.

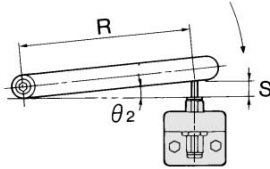
⚠ Precautions

Be sure to read before handling. Refer to pages 10-24-3 to 10-24-6 for Safety Instructions and Actuator Precautions.

Mounting

3. Rotating angle

If rotating impacts are involved, the installation must be designed so that the direction in which the load is applied is perpendicular to the shock absorber's axial center. The allowable rotating angle until the stroke end must be $\theta_2 < 3^\circ$.



Allowable rotating eccentric angle $\theta_2 < 3^\circ$

Installation Conditions for Rotating Impact (mm)

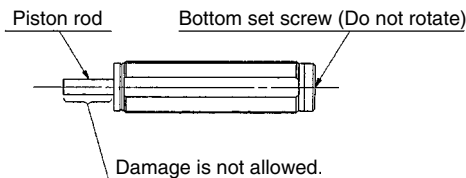
Model	S (Stroke)	θ_2 (Allowable rotating angle)	R (Min. installation radius)
RB□□0805	5	3°	96
RB□□0806	6		115
RB□□1006	6		115
RB□□1007	7		134
RB□□1411	11		210
RB□□1412	12		229
RB□□2015	15		287
RB□□2725	25		478

4. Do not scratch the sliding portion of the piston rod or the outside threads of the outer tube.

Failure to observe this precaution could scratch or gouge the sliding portion of the piston rod, or damage the seals, which could lead to oil leakage and malfunction. Furthermore, damage to outside threaded portion of the outer tube could prevent the shock absorber from being mounted onto the frame, or its internal components could deform, leading to a malfunction.

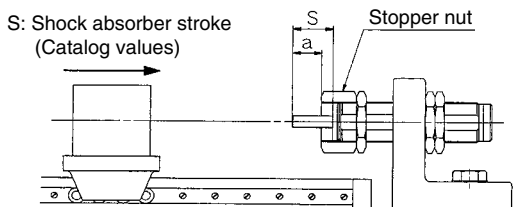
5. Never turn the screw on the bottom of the body.

This is not an adjusting screw. Turning it could result in oil leakage.



6. Adjust the stopping time through the use of the stopper nut, as follows:

Control the stopping time of the impact object by turning the stopper nut in or out (thus changing length "a"). After establishing the stopper nut position, use a hexagon nut to secure the stopper nut in place.



Maintenance

⚠ Caution

1. Check the mounting nut is not loosen.

The shock absorber could become damaged if it is used in a loose state.

2. Pay attention to any abnormal impact sounds or vibrations.

If the impact sounds or vibrations have become abnormally high, the shock absorber may have reached the end of its service life. If this is the case, replace the shock absorber. If use is continued in this state, it could lead to equipment damage.

3. Confirm that abnormality, oil leakage, etc. in the outward surface.

When a large amount of oil is leaking, replace the product, because it is believed to be happening something wrong with it. If it keeps on using, it may cause to break the equipment which is mounted by this product.

4. Inspect the cap for any cracks or wear.

If the shock absorber comes with a cap, the cap could wear first. To prevent damage to the impact object, replace the cap often.

RE^A_B

REC

C□X

C□Y

MQ^Q_M

RHC

MK(2)

RS^Q_GRS^H_A

RZQ

MI^W_S

CEP1

CE1

CE2

ML2B

C_G5-S

CV

MVGQ

CC

RB

J

D-

-X

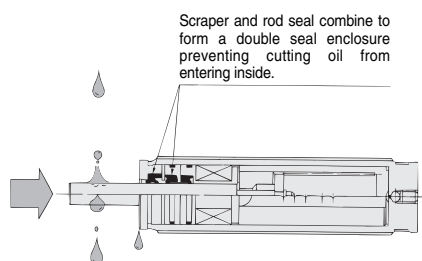
20-

Data

Shock Absorber: Coolant Resistant Type

Series *RBL*

Can be operated in an environment exposed to non-water soluble cutting oil. (Mainly JIS Class 1 equivalent)



Specifications

Specifications	Model	RBL1006	RBL1007	RBL1411	RBL1412	RBL2015	RBL2725
	Basic type	RBL1006	RBL1007	RBL1411	RBL1412	RBL2015	RBL2725
Max. energy absorption (J)	With cap	RBLC1006	RBLC1007	RBLC1411	RBLC1412	RBLC2015	RBLC2725
Max. energy absorption (J)		3.92	5.88	14.7	19.6	58.8	147
Stroke absorption (mm)		6	7	11	12	15	25
Collision speed (m/s)		0.05 to 5					
Max. operating frequency* (cycle/min)		70	70	45	45	25	10
Max. allowable thrust (N)		422	422	814	814	1961	2942
Allowable temperature range (°C)		-10 to 80					
Effective atmosphere		Non-water soluble cutting oil					
Spring force (N)	Extended	4.22	4.22	8.73	8.73	11.57	22.16
	Retracted	6.18	6.86	14.12	14.61	17.65	38.05
Weight (g)	Basic type	26	26	70	70	150	365
	With cap	28	28	75	75	165	410

* It denotes the values at the maximum energy absorption per one cycle.
Max. operation cycle/min can increase in proportion to energy absorption.

How to Order

RB L C 14 12

Coolant resistant type
Cushion
Option
O.D. thread—Stroke absorption

Nil	Basic type	None
C	With cap	With stopper nut
		Add'l 1 hex. nut (Total: 3 pcs.)*

* 2 mounting hexagon nuts are attached as standard.

Replacement part no./Cap (Resin part only) **RBC 10 C**

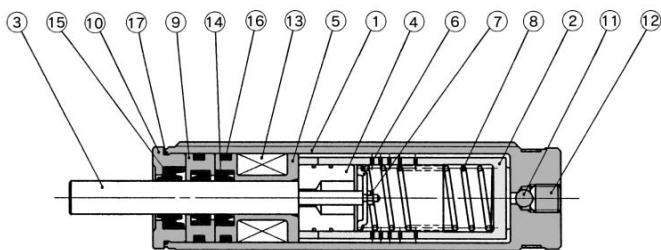
Applicable model

10	RBL1006, 1007	20	RBL2015
14	RBL1411, 1412	27	RBL2725

Cap

Cap cannot be mounted for basic type. Please place an order with cap type from the beginning.

Construction



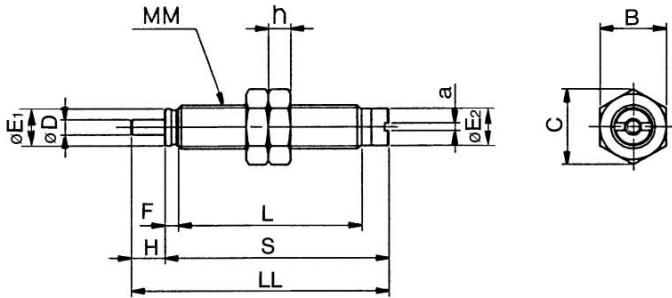
Component Parts

No.	Description	Material	Treatment
①	Outer tube	Rolled steel	Gray coated
②	Inner tube	Special steel	Heat treated
③	Piston rod	Special steel	Electroless nickel plated
④	Piston	Special steel	Heat treated
⑤	Bearing	Special bearing material	
⑥	Spring guide	Carbon steel	Zinc chromated
⑦	Lock ring	Copper	
⑧	Return spring	Piano wire	Zinc chromated
⑨	Seal holder	Copper alloy	
⑩	Stopper	Carbon steel	Zinc chromated
⑪	Steel ball	Bearing steel	
⑫	Set screw	Special steel	
⑬	Accumulator	NBR	Foam rubber
⑭	Rod seal	NBR	
⑮	Scraper	NBR	
⑯	Gasket	NBR	
⑰	Gasket	NBR	Only RBL(C)2015, 2725

Shock Absorber: Coolant Resistant Type **Series RBL**

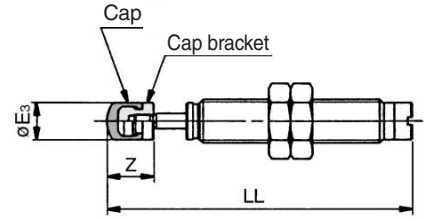
Dimensions

Basic type: RBL1006, RBL1007



With cap: RBLC1006, RBLC1007

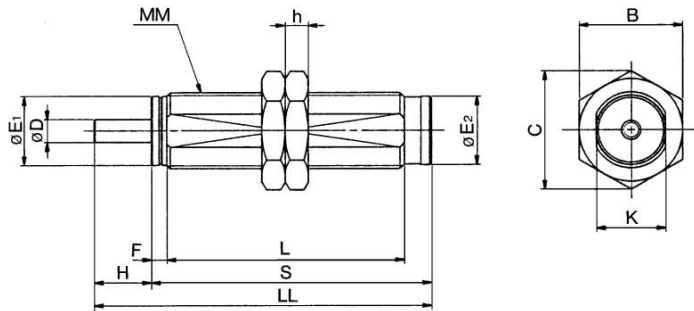
* Other dimensions are the same as the basic type.



Model		Basic type dimensions										With cap*				Hexagon nut		
Basic type	With cap	D	E ₁	E ₂	F	H	a	L	LL	MM	S	E ₃	LL	Z	B	C	h	
RBL1006	RBLC1006	3	8.8	8.6	2.7	6	1.4	43.8	57.5	M10 x 1.0	51.5	8.7	67.5	10	14	16.2	4	
RBL1007	RBLC1007	3	8.8	8.6	2.7	7	1.4	43.8	58.5	M10 x 1.0	51.5	8.7	68.5	10	14	16.2	4	

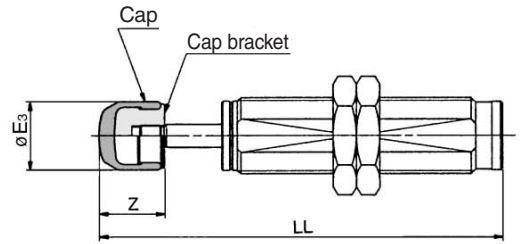
Note) L, LL and S dimensions of RBL(C)1007/1006 are different from those of RB(C)1007/1006.

Basic type: RBL1411, RBL1412, RBL2015, RBL2725



**With cap: RBLC1411, RBLC1412
RBLC2015, RBLC2725**

* Other dimensions are the same as the basic type.

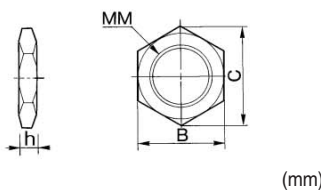


Model		Basic type dimensions										With cap*				Hexagon nut		
Basic type	With cap	D	E ₁	E ₂	F	H	K	L	LL	MM	S	E ₃	LL	Z	B	C	h	
RBL1411	RBLC1411	5	12.2	12	3.5	11	12	63.6	83.1	M14 x 1.5	72.1	12	96.6	13.5	19	21.9	6	
RBL1412	RBLC1412	5	12.2	12	3.5	12	12	63.6	84.1	M14 x 1.5	72.1	12	97.6	13.5	19	21.9	6	
RBL2015	RBLC2015	6	18.2	18	4	15	18	62.2	88.2	M20 x 1.5	73.2	18	105.2	17	27	31.2	6	
RBL2725	RBLC2725	8	25.2	25	5	25	25	91.5	129.5	M27 x 1.5	104.5	25	152.5	23	36	41.6	6	

Note) L, LL and S dimensions of RBL(C)1007/1006 are different from those of RB(C)1007/1006.

Hexagon Nut

(2 pcs. standard equipment)

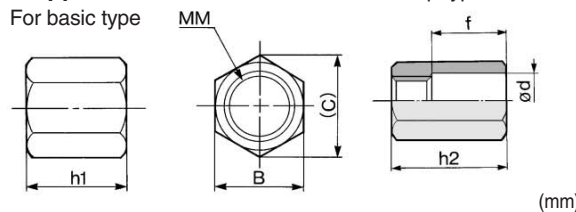


Part no.	Dimensions			
	MM	h	B	C
RB10J	M10 x 1.0	4	14	16.2
RB14J	M14 x 1.5	6	19	21.9
RB20J	M20 x 1.5	6	27	31.2
RB27J	M27 x 1.5	6	36	41.6

Option

Stopper nut

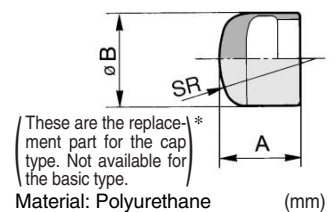
For basic type



Part no.	With cap	Dimensions						
		B	C	h1	h2	MM	d	f
RB10S	RBC10S	14	16.2	8	23	M10 x 1.0	11	15
RB14S	RBC14S	19	21.9	11	31	M14 x 1.5	15	20
RB20S	RBC20S	27	31.2	16	40	M20 x 1.5	23	25
RB27S	RBC27S	36	41.6	22	51	M27 x 1.5	32	33

Replacement Parts

Cap



(These are the replacement part for the cap type. Not available for the basic type.)

Material: Polyurethane (mm)

Part no.	Dimensions		
	A	B	SR
RBC10C	9	8.7	7.5
RBC14C	12.5	12	10
RBC20C	16	18	20
RBC27C	21	25	25

RE^A_B
REC
C□X
C□Y
MQ^Q_M
RHC
MK(2)
RS^Q_G
RS^H_A
RZQ
MI^W_S
CEP1
CE1
CE2
ML2B
C^J_{G5-S}
CV
MVGQ
CC
RB
J
D-
-X
20-
Data

Shock Absorber: Short Type

Series *RBQ*

Allowable eccentric angle is 5°

Ideal for absorption of rotating energy



With bumper
Series RBQC

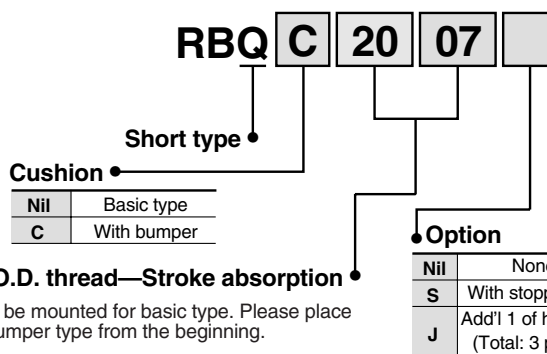
Basic type
Series RBQ

Specifications

Specifications	Model	RBQ1604	RBQ2007	RBQ2508	RBQ3009	RBQ3213
	Basic type	RBQC1604	RBQC2007	RBQC2508	RBQC3009	RBQC3213
Max. energy absorption (J)		1.96	11.8	19.6	33.3	49.0
Stroke absorption (mm)		4	7	8	8.5	13
Collision speed (m/s)		0.05 to 3				
Max. operating frequency * (cycle/min)		60	60	45	45	30
Max. allowable thrust (N)		294	490	686	981	1177
Ambient temperature (C°)		-10 to 80				
Spring force (N)	Extended	6.08	12.75	15.69	21.57	24.52
	Retracted	13.45	27.75	37.85	44.23	54.23
Weight (g)		28	60	110	182	240
Option/Stopper nut		RBQ16S	RB20S	RBQ25S	RBQ30S	RBQ32S

* It denotes the values at the maximum energy absorption per one cycle. Therefore, the operating frequency can be increased according to the energy absorption.

How to Order



Replacement part no./Bumper

RBQC 16 C

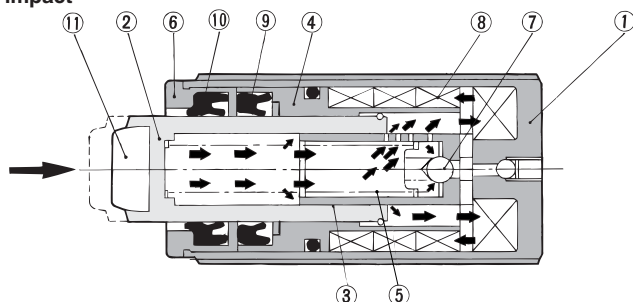
Applicable model

16-RBQC1604
20-RBQC2007
25-RBQC2508
30-RBQC3009
32-RBQC3213

* 2 mounting hexagon nuts are attached as standard.

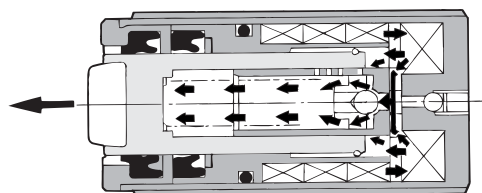
Construction

At impact



An impact object that strikes against the piston rod end pressurizes oil inside the piston. Thus, pressurized oil jets out through the orifice inside the piston, thereby generating hydraulic resistance to absorb the energy of the impacting object. The oil jetted out through the orifice is collected inside the outer tube by means of the stretching action of the accumulator.

At returning



When the impact object is removed, the return spring pushes out the piston rod, and negative pressure, generated at the same time, opens the check ball to permit oil to return to the shock absorber ready for the next impact.

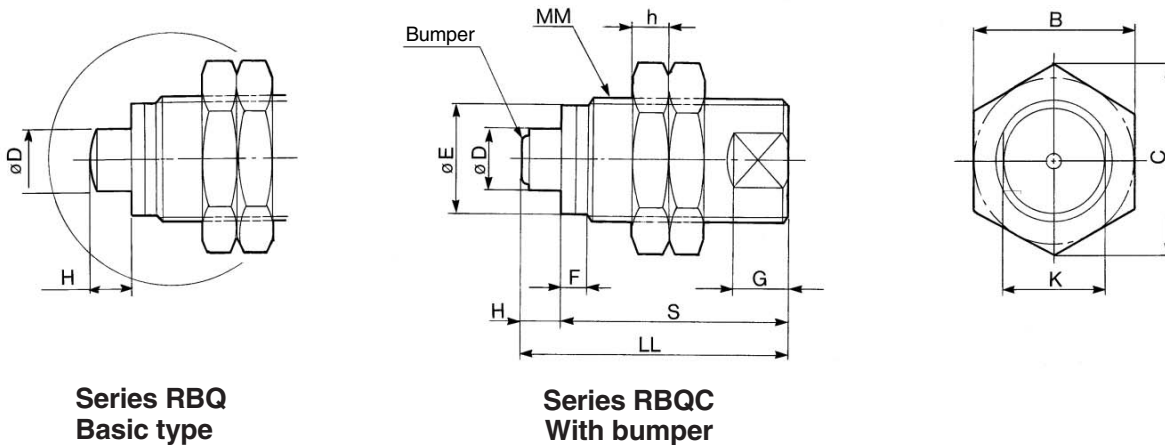
Component Parts

No.	Description	Material	Treatment
①	Outer tube	Rolled steel	Black nickel plated
②	Piston rod	Special steel	Heat treated, Hard chrome plated
③	Piston	Special steel	Heat treated
④	Bearing	Special bearing material	
⑤	Return spring	Piano wire	Zinc chromated
⑥	Stopper	Carbon steel	Zinc chromated

No.	Description	Material	Treatment
⑦	Check ball	Bearing steel	
⑧	Accumulator	Fluoro rubber	Foam rubber
⑨	Rod seal	NBR	
⑩	Scraper	NBR	
⑪	Bumper	Polyurethane	Only with bumper

Shock Absorber: Short Type Series RBQ

Dimensions



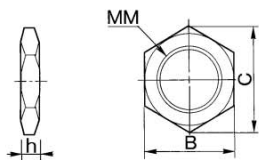
Series RBQ
Basic type

Series RBQC
With bumper

Model		Shock absorber									Hexagon nut			
Basic type	With bumper	D	E	F	H	K	G	LL	MM	S	B	C	h	
RBQ1604	RBQC1604	6	14.2	3.5	4	14	7	31	M16 x 1.5	27	22	25.4	6	
RBQ2007	RBQC2007	10	18.2	4	7	18	9	44.5	M20 x 1.5	37.5	27	31.2	6	
RBQ2508	RBQC2508	12	23.2	4	8	23	10	52	M25 x 1.5	44	32	37	6	
RBQ3009	RBQC3009	16	28.2	5	8.5	28	12	61.5	M30 x 1.5	53	41	47.3	6	
RBQ3213	RBQC3213	18	30.2	5	13	30	13	76	M32 x 1.5	63	41	47.3	6	

Hexagon Nut

(2 pcs. standard equipment)

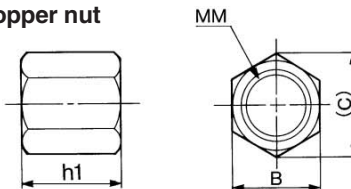


Part no.	MM	h	B	C
RBQ16J	M16 x 1.5	6	22	25.4
RB20J ⁽¹⁾	M20 x 1.5	6	27	31.2
RBQ25J	M25 x 1.5	6	32	37
RBQ30J	M30 x 1.5	6	41	47.3
RBQ32J	M32 x 1.5	6	41	47.3

Note 1) In the case of RB20J, RB and RBQ are common.

Option

Stopper nut

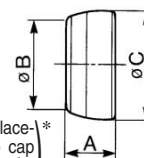


Part no.	B	C	h1	MM
RBQ16S	22	25.4	12	M16 x 1.5
RB20S ⁽²⁾	27	31.2	16	M20 x 1.5
RBQ25S	32	37	18	M25 x 1.5
RBQ30S	41	47.3	20	M30 x 1.5
RBQ32S	41	47.3	25	M32 x 1.5

Note 2) In the case of RB20S, RB and RBQ are common.

Replacement Parts

Bumper



(These are the replacement part for the cap type. Not available for the basic type.)*

Part no.	A	B	C
RBQC16C	3.5	4	4.7
RBQC20C	4.5	8	8.3
RBQC25C	5	8.3	9.3
RBQC30C	6	11.3	12.4
RBQC32C	6.6	13.1	14.4

- RE^A_B
- REC
- C□X
- C□Y
- MQ^Q_M
- RHC
- MK(2)
- RS^Q_G
- RS^H_A
- RZQ
- MI^W_S
- CEP1
- CE1
- CE2
- ML2B
- C^J_G-S
- CV
- MVGQ
- CC
- RB
- J
- D-
- X
- 20-
- Data

Series RBQ/Shock Absorber: Short Type

Technical Data:

Model Selection

Model Selection Step

1. Type of impact

- Cylinder stroke at load (Horizontal)
- Cylinder stroke at load (Downward)
- Cylinder stroke at load (Upward)
- Conveyor stroke at load (Horizontal)
- Free dropping impact
- Rotating impact (With torque)

2. Enumeration of operating conditions

Symbol	Operating conditions	Unit
m	Impacting object weight	kg
v	Collision speed	m/sec
h	Dropping height	m
ω	Angle speed	rad/sec
r	Distance between axis of cylinder and impact point	m
d	Bore size	mm
p	Cylinder operation pressure	MPa
F	Thrust	N
T	Torque	N·m
n	Operation cycle	cycle/min
t	Ambient temperature	°C
μ	Friction coefficient	—

3. Specifications and operational instructions

Ensure that the collision speed, thrust, operation cycle, the ambient temperature and atmosphere fall within the specifications.
* Be aware of the min. installation radius in the case of rotating impacts.

4. Calculation of kinetic energy E₁

Using the equation suitable for the classification of impact.

In the case of cylinder stroke at load and free horizontal impact, substitute respective figures for **Data A** in order to calculate E₁.

5. Calculation of thrust energy E₂

Select any shock absorber as a provisional model.

In the case of thrust energy of cylinder E₂, substitute respective figures for **Data B** or **Data C**.

6. Calculation of corresponding weight of impacting object Me

Absorbed energy E = E₁ + E₂

Corresponding weight of impacting object $Me = \frac{2}{v^2} \cdot E$

Substitute both absorbed energy E and collision speed v for **Data A** in order to calculate the corresponding weight of the impacting object.

7. Selection of applicable model

Taking into consideration the corresponding weight of the impacting object Me, calculated using **Data D** and collision speed v, check provisional model compatibility with the condition of application. If this is satisfactory, then the said provisional model will be the applicable one.

Caution on Selection

In order for the shock absorbers to operate accurately for long hours, it is necessary to select a model that is well-suited to your operating conditions. If the impact energy is smaller than 5% of the maximum energy absorption, select a model that is one class smaller.

Selection Example

Cylinder stroke at load (Horizontal)	
1. Type of impact	
Collision speed (1) v	v
Kinetic energy E ₁	$\frac{1}{2} \cdot m \cdot v^2$
Thrust energy E ₂	F ₁ · S
Absorbed energy E	E ₁ + E ₂
Corresponding (2) weight of impacting object Me	$\frac{2}{v^2} \cdot E$
2. Operating conditions	m = 20 kg v = 0.7 m/s d = 40 mm p = 0.5 MPa n = 20 cycle/min t = 25°C
3. Specifications and operational instructions	● Confirmation of specifications v ... 0.7 < 3 (max.) t ... -10 (min.) < 25 < 80 (max.) F ... F ₁ < 628 < 686 (max.)
4. Calculation of kinetic energy E₁	● Kinetic energy E ₁ Use Formula to calculate E ₁ . Suitable 20 for m and 0.7 for v. E₁ ≅ 4.9 J
5. Calculation of thrust energy E₂	● Thrust energy E ₂ Provisionally select a model RBQ2508 and make the use of Data B . According to d = 40, E ₂ is obtained. E₂ ≅ 5.0 J
6. Calculation of corresponding weight of impacting object Me	● Corresponding weight of impacting object Me Use the formula "Absorbed energy E = E ₁ + E ₂ = 4.9 + 5.0 = 9.9 J" to calculate Me. Substitute 9.9 J for E and 0.7 for v. Me ≅ 40 kg
7. Selection of applicable model	● Selection of applicable model According to Data D , the tentatively selected RBQ2508 satisfies Me = 40 kg < 60 kg at v = 0.7. Ultimately, it will result in an operating frequency of n ... 30 < 45, without causing a problem. YES Select RBQ2508

1. Type of Impact

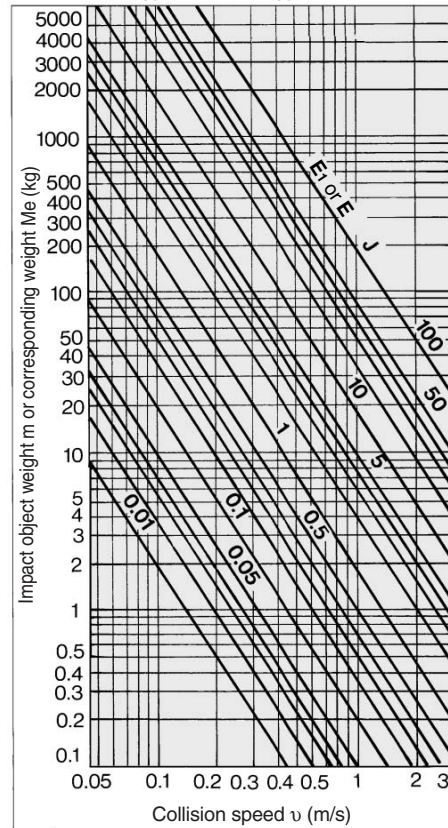
Type of impact	Cylinder stroke at load (Downward)	Cylinder stroke at load (Upward)	Conveyor stroke at load (Horizontal)	Free dropping impact	Rotating impact (Weight torque)
Collision speed (1) v	v	v	v	$\sqrt{2gh}$	ω · R
Kinetic energy E ₁	$\frac{1}{2} \cdot m \cdot v^2$	$\frac{1}{2} \cdot m \cdot v^2$	$\frac{1}{2} \cdot m \cdot v^2$	m · g · h	$\frac{1}{2} \cdot I \cdot \omega^2$
Thrust energy E ₂	F ₁ · S + m · g · S	F ₁ · S - m · g · S	m · g · μ · S	m · g · S	T · $\frac{S}{R}$
Absorbed energy E	E ₁ + E ₂	E ₁ + E ₂	E ₁ + E ₂	E ₁ + E ₂	E ₁ + E ₂
Corresponding (2) weight of impacting object Me	$\frac{2}{v^2} \cdot E$	$\frac{2}{v^2} \cdot E$	$\frac{2}{v^2} \cdot E$	$\frac{2}{v^2} \cdot E$	$\frac{2}{v^2} \cdot E$

Note 1) Collision speed is momentary velocity at which object is impacting against shock absorber.

Note 2) An "Impact body equivalent weight" is the weight of an impact object without involving thrust, into which an object's total energy has been converted. Refer to the catalog of rotary actuator. Hence, $E = \frac{1}{2} \cdot Me \cdot v^2$

Note 3) For the formula of moment of inertia I (kg·m²), refer to the catalog of rotary actuator.

Data A Kinetic Energy E₁ or Energy Absorption E



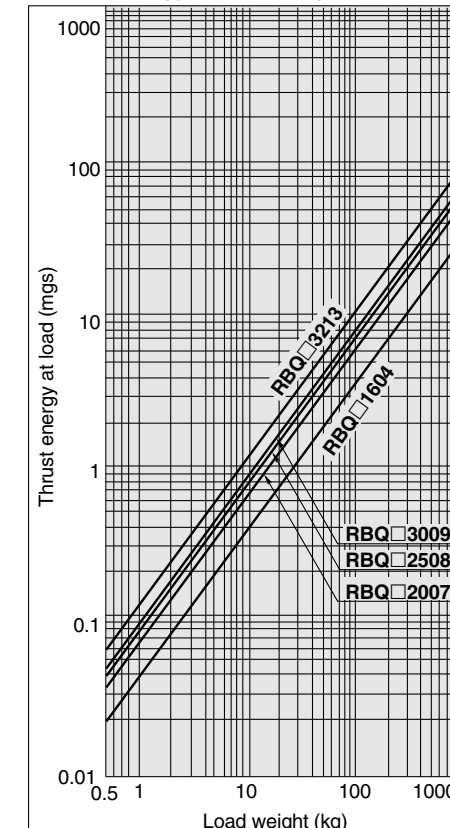
Data B (Operating pressure 0.5 MPa) Thrust Energy of Cylinder F₁ · S (J)

Model	RBQ 1604	RBQ 2007	RBQ 2058	RBQ 3009	RBQ 3213
Stroke absorption (mm)	4	7	8	8.5	13
6	0.057	0.099	0.113	0.120	0.184
10	0.157	0.274	0.314	0.334	0.511
15	0.353	0.619	0.707	0.751	1.15
20	0.628	1.10	1.26	1.34	2.04
25	0.982	1.72	1.96	2.09	3.19
30	1.41	2.47	2.83	3.00	4.59
40	2.51	4.40	5.03	5.34	8.17
50	3.93	6.87	7.85	8.34	12.8
63	6.23	10.9	12.5	13.2	20.3
80	10.1	17.6	20.1	21.4	32.7
100	15.7	27.5	31.4	33.4	51.1
125	24.5	43.0	49.1	52.2	79.8
140	30.8	53.9	61.6	65.4	100
160	40.2	70.4	80.4	85.5	131
180	50.9	89.1	102	108	165
200	62.8	110	126	134	204
250	98.2	172	196	209	319
300	141	247	283	300	459

Operating pressure other than 0.5 MPa: Multiply by the following coefficient.

Operating pressure (MPa)	1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Coefficient	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8

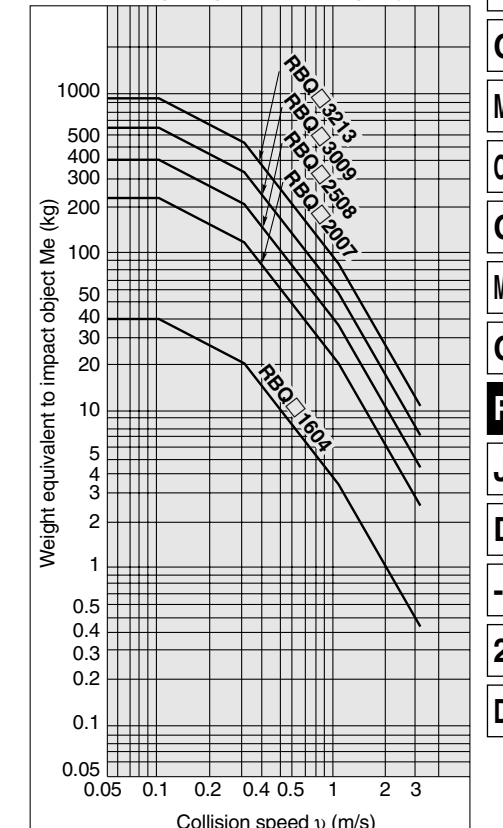
Data C Thrust Energy at Load m · g · s



Symbol

Symbol	Specifications	Unit
d	Bore size	mm
E	Absorbed energy	J
E ₁	Kinetic energy	J
E ₂	Thrust energy	J
F ₁	Cylinder thrust	N
g	Acceleration of gravity (9.8)	m/s ²
h	Dropping height	m
I ⁽³⁾	Moment of inertia around the center of gravity	kg·m ²
n	Operating frequency	cycle/min
p	Cylinder operation pressure	MPa
R	Distance between axis of cylinder and impact point	m
S	Shock absorber stroke	m
T	Torque	N·m
t	Ambient temperature	°C
v	Collision speed	m/s
m	Impact object weight	kg
Me	Corresponding weight of impact object	kg
ω	Angle speed	rad/s
μ	Friction coefficient	—

Data D Corresponding Weight of Impacting Object Me



⚠ Precautions

Be sure to read before handling. Refer to pages 10-24-3 to 10-24-6 for Safety Instructions and Actuator Precautions.

Selection

⚠ Danger

1. Energy absorption

Select a model so that the aggregated energy of impact object should not exceed the maximum absorption energy. Otherwise, it could cause changes in properties or result in damaging the shock absorber.

2. Corresponding weight of impacting object

Make a model selection, so that the corresponding weight of impacting object does not exceed the allowable range. Pulsation will occur in buffer and deceleration force, thus making it difficult to absorb shock smoothly.

3. Collision speed

Use it in the conditions that collision speed is within the specified range. It could cause the changes in buffer characteristics or lead to damage a shock absorber.

⚠ Warning

1. Static load

Design the system, so that any other forces than the buffer capacity or impacts should not be applied to the piston rod which is stopped at the retracted state.

⚠ Caution

1. Maximum operating frequency

Design the system in the conditions under which it is not used at the frequency exceeding the specified maximum operating frequency. (But, the maximum operating frequency will vary depending on the absorbed energy.)

2. Stroke

The maximum absorption energy in the specifications cannot be exerted unless the full stroke is used.

3. Work surface of an impact object

The contact surface of the impact object with which the piston rod comes into contact must be highly rigid.

In the case without a cap, a high surface compression load is applied to the contact surface of the impact body with which the piston rod comes into contact. Therefore, the contact surface must be highly rigid (hardness of HRC35 or more).

4. Be aware of the return force of the impact object.

If used in a conveyor drive, after the shock absorber has absorbed energy, it could be pushed back by the spring that is built-in. For the spring force in the specifications, refer to the column (page 10-18-10).

5. Selection of size

As the number of operation proceeds, the maximum absorption energy of shock absorbers will be decreased by the following reasons such as abrasion, or deterioration, etc. of the internal working fluid. Taking this into consideration, selecting a size which is 20 to 40% affordable against the amount of absorption energy is recommended.

6. Drag characteristics

In general, the values of drag (reactive force generated during operation) generated by the operating speed will vary in hydraulic shock absorber. And then, by adopting "Porous orifice construction", the RB series can adapt to such this fast/slow speed and can absorb shock smoothly in a wide range of speed.

But, the speed reduction (speed reduction G) would be larger around the stroke terminal, depending upon the operating conditions. Please note that it might be encountered that stroke time is long, motion is not smooth, etc. If this would be a problem, we recommend that stroke amount should be restricted by using our optional component like "Stopper nut", etc. Including this case, if the data on operational status (stroke time, reactive force, deceleration, etc.) are required, please consult with SMC.

Operating Environment

⚠ Danger

1. Operation in an environment which requires explosion-proof

- When mounting in places where static electricity is accumulated, implement a distribution of electrical energy by grounding.
- Do not use the materials for buffer face which might cause to spark by collision.

⚠ Warning

1. Pressure

Do not use it in the vacuum state, which is substantially different from the atmospheric pressure (above sea level) and in the atmosphere under being pressurized.

2. Using inside a clean room

Do not use the shock absorber in a clean room, as it could contaminate the clean room.

⚠ Caution

1. Temperature range

Do not use it, exceeding the specified allowable temperature range. Seal could be softened or hardened or worn out, or leading to leak a working fluid, deterioration, or impact characteristic changes.

2. Deterioration by atmosphere

Do not use in an atmosphere such as salt damage, sulfurous acid gas which makes the metal corroded, or having solvent, etc. which makes seal deteriorated.

3. Deterioration by ozone

Do not use it under the direct sunlight on the beach, or by the mercury lamp, or the ozone generator, because the rubber material will be deteriorated by ozone.

4. Cutting oil, water, blown dust

Do not use the product under the condition, where the liquid such as cutting oil, water, blown dust, solvent, etc. is exposed either directly or in atomized form to the piston rod, or where blown dust could be adhered around the piston rod. This could cause malfunction.

5. Vibration

When vibrations are applied on impact objects, implement a secure guide on impact objects.

Mounting

⚠ Warning

1. Before performing installation, removal, or stroke adjustment, make sure to cut the power supply to the equipment and verify that the equipment has stopped.

2. Installation of protective cover

We recommend the protective cover should be installed in the case workers might be getting close during the operation.

3. The rigidity of the mounting frame must be taken into consideration

If the mounting frame lacks strength, the shock absorber will vibrate after an impact, causing bearing wear and damage.

Load on mounting plate can be calculated as follows.

$$\text{Load on mounting plate } N \cong 2 \frac{E (\text{Absorbed energy J})}{S (\text{Stroke m})}$$

⚠ Warning

1. Tightening torque of mounting nut should be as follows.

When threading on a mounting frame in order to mount a shock absorber directly, prepared hole dimensions are referred to the table below.

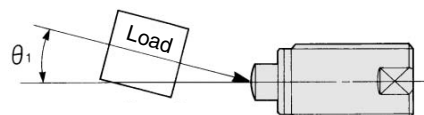
For tightening torque of a nut for shock absorber, kindly abide by the table below.

If the tightening torque that is applied to the nut exceeds the value given below, the shock absorber itself could become damaged.

Model	RBQ(C)1604	RBQ(C)2007	RBQ(C)2508	RBQ(C)3009	RBQ(C)3213
O.D. thread (mm)	M16 x 1.5	M20 x 1.5	M25 x 1.5	M30 x 1.5	M32 x 1.5
Thread prepared bore (mm)	ø14.7 $^{+0.1}_0$	ø18.7 $^{+0.1}_0$	ø23.7 $^{+0.1}_0$	ø28.7 $^{+0.1}_0$	ø30.7 $^{+0.1}_0$
Tightening torque (N·m)	14.7	23.5	34.3	78.5	88.3

2. Deviation of impact

The installation must be designed so that the impact body is perpendicular to the shock absorber's axial center. An angle of deviation that exceeds 5° will place an excessive load on the bearings, leading to oil leaks within a short period of operation.



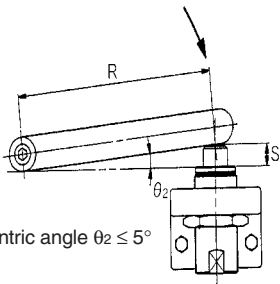
Allowable eccentric angle $\theta_1 < 5^\circ$

⚠ Precautions

Be sure to read before handling. Refer to pages 10-24-3 to 10-24-6 for Safety Instructions and Actuator Precautions.

Mounting

3. Rotating angle
 If rotating impacts are involved, the installation must be designed so that the direction in which the load is applied is perpendicular to the shock absorber's axial center.
 The allowable rotating eccentric angle until the stroke end must be $\theta_2 \leq 5^\circ$.



Allowable rotating eccentric angle $\theta_2 \leq 5^\circ$

Installation Conditions for Rotating Impact (mm)

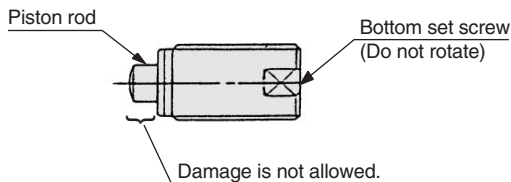
Model	S (Stroke)	θ_2 (Allowable rotating angle)	R (Min. installation radius)
RBQ□1604	4	5°	46
RBQ□2007	7		80
RBQ□2508	8		92
RBQ□3009	8.5		98
RBQ□3213	13		149

4. Do not scratch the sliding portion of the piston rod or the outside threads of the outer tube.

Failure to observe this precaution could scratch or gouge the sliding portion of the piston rod, or damage the seals, which could lead to oil leakage and malfunction. Furthermore, damage to outside threaded portion of the outer tube could prevent the shock absorber from being mounted onto the frame, or its internal components could deform, leading to a malfunction.

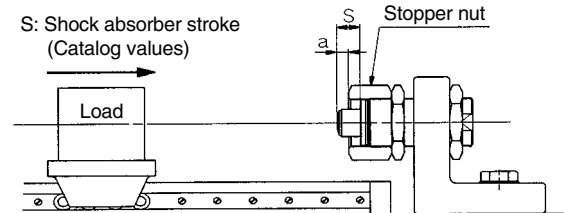
5. Never turn the screw on the bottom of the body.

This is not an adjusting screw. Turning it could result in oil leakage.



6. Adjust the stopping time through the use of the stopper nut, as follows:

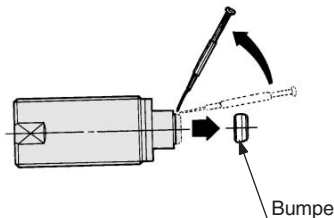
Control the stopping time of the impact object by turning the stopper nut in or out (thus changing length "a"). After establishing the stopper nut position, use a hexagon nut to secure the stopper nut in place.



Maintenance

⚠ Caution

- 1. Check the mounting nut is not loosen.**
 The shock absorber could become damaged if it is used in a loose state.
- 2. Pay attention to any abnormal impact sounds or vibrations.**
 If the impact sounds or vibrations have become abnormally high, the shock absorber may have reached the end of its service life. If this is the case, replace the shock absorber. If use is continued in this state, it could lead to equipment damage.
- 3. Confirm that abnormality, oil leakage, etc. in the outward surface.**
 When a large amount of oil is leaking, replace the product, because it is believed to be happening something wrong with it. If it keeps on using, it may cause to break the equipment which is mounted by this product.
- 4. Inspect the bumper for any cracks or wear.**
 If the shock absorber comes with a bumper, the damper could wear first. To prevent bumper to the impact object, replace the bumper often.
- 5. How to replace bumper**
 The bumper inserted into the piston rod can be removed easily by a small screwdriver. When reassembling, push the smaller end of the bumper inside the piston.



RE^A_B

REC

C□X

C□Y

MQ^Q_M

RHC

MK(2)

RS^Q_G

RS^H_A

RZQ

MI^W_S

CEP1

CE1

CE2

ML2B

C^J_{5-S}

CV

MVGQ

CC

RB

J

D-

-X

20-

Data

Series RB, RBL

Made to Order Specifications:

Foot Bracket for Shock Absorber

Available for the foot mounting bracket of Series RB.

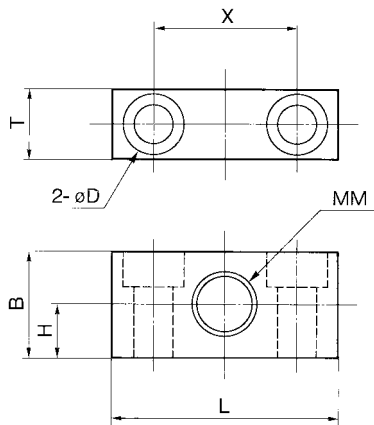


Part No.

Part no.	Applicable absorber
RB08-X331	RB□0805, 0806
RB10-X331	RB□1006, 1007
RB14-X331	RB□1411, 1412
RB20-X331	RB□2015
RB27-X331	RB□2725

* Order the foot bracket separately.

Dimensions



Part no.	B	D	H	L	MM	T	X	Mounting bolt
RB08-X331	15	4.5 drill, 8 counterbore depth 4.4	7.5	32	M8 x 1.0	10	20	M4
RB10-X331	19	5.5 drill, 9.5 counterbore depth 5.4	9.5	40	M10 x 1.0	12	25	M5
RB14-X331	25	9 drill, 14 counterbore depth 8.6	12.5	54	M14 x 1.5	16	34	M8
RB20-X331	38	11 drill, 17.5 counterbore depth 10.8	19	70	M20 x 1.5	22	44	M10
RB27-X331	50	13.5 drill, 20 counterbore depth 13	25	80	M27 x 1.5	34	52	M12