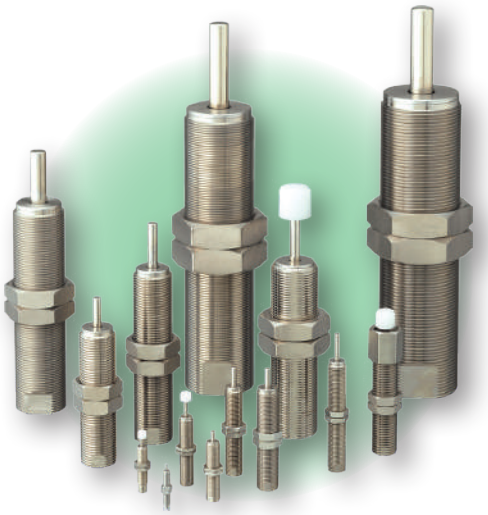
KOGANEI

https://www.koganeiasia.com

Catalog No.BK-A5050

NEW Products

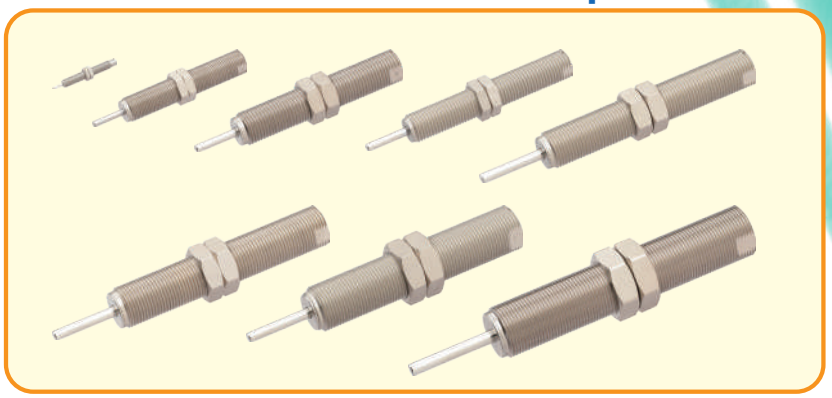
Linear Orifice®
Shock Absorber Series

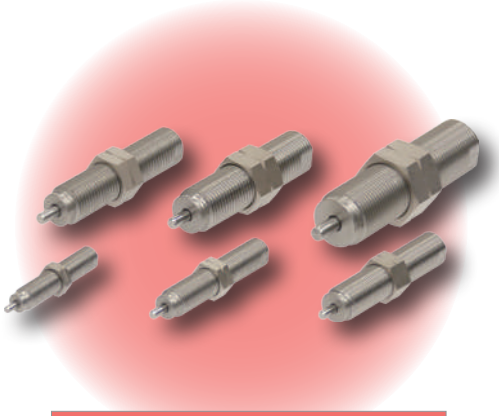


KSHJ (Fixed type)

NEW

Long stroke
High-speed, High-load type
Variation Up !

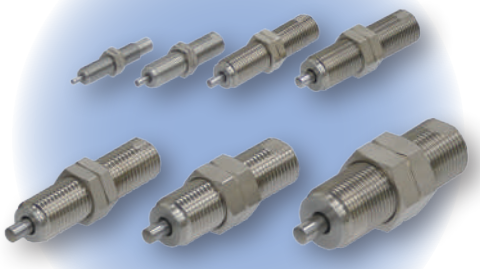




KSHW
(Protective type)

KSHP (Adjustment Type)

KSHC (Clean Specifications)



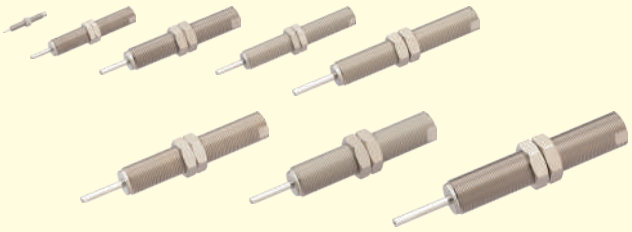
KSHY (Side load resistant)

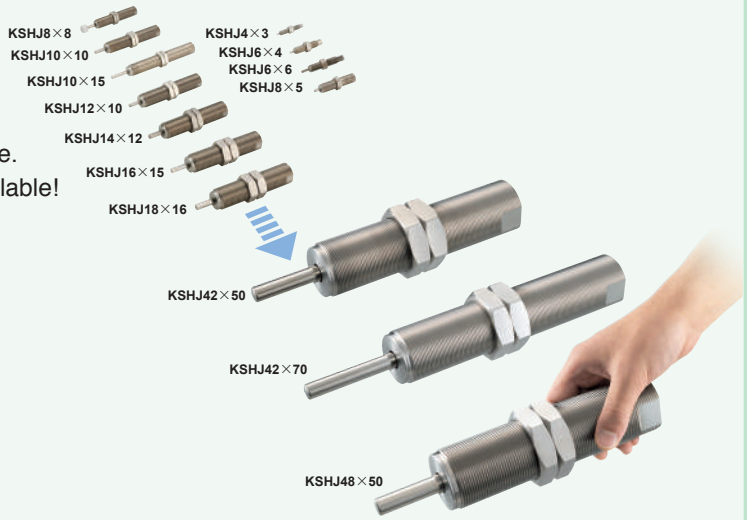
Linear Orifice® Shock Absorber Series Variations

KSHJ Series (Fixed type) ⑧ page

- Basic fixed absorbing capacity shock absorber. Available in 18 sizes and 176 models.
- Long life and low price reduces the burden of maintenance.
- Long stroke type for high speed and high load is now available!

NEW **Long stroke, High-speed, High-load type**

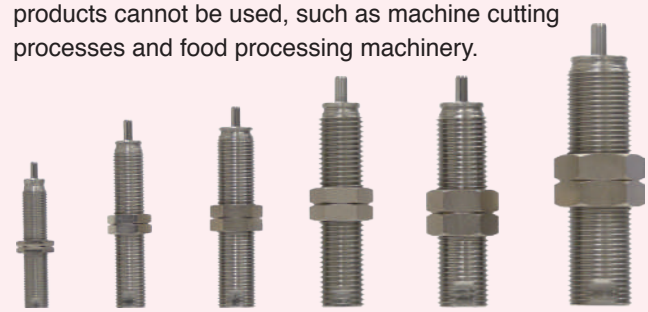


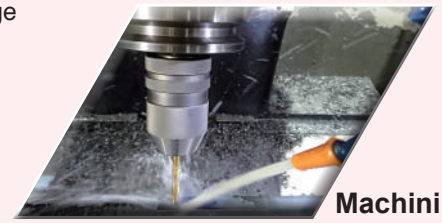


KSHW Series (Protective type)

㉚ page

- Environment resistant product that combines 4 functions: Drip-proof, dust-proof, rust-proof, and H1 oil specification.
- Improved resistance to environments where conventional products cannot be used, such as machine cutting processes and food processing machinery.



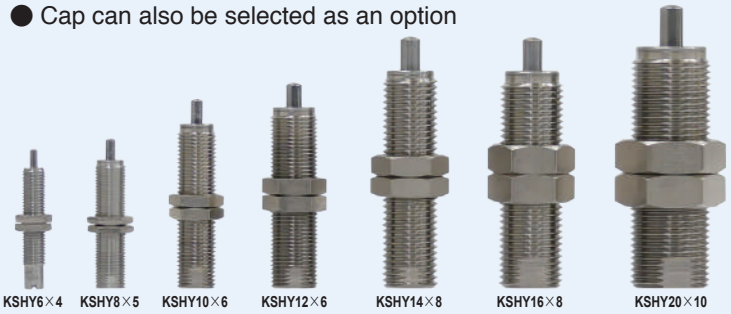


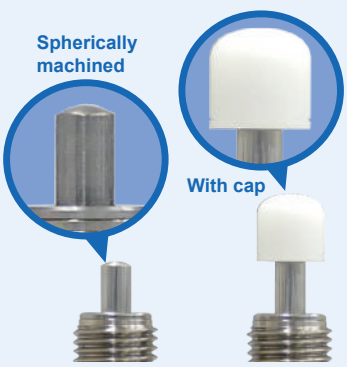
Machining Processes

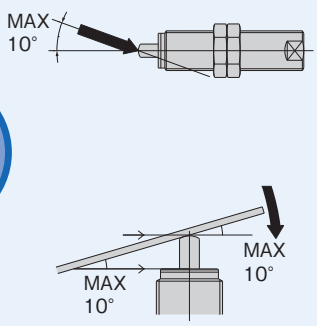
Food processing machinery

KSHY Series (Side load resistant) ㊵ page

- Specifically designed to absorb shocks from rotating or angularly deflected bodies.
- Each size can support angular declination up to 10°.
- Rod tips are spherical as standard.
- Cap can also be selected as an option







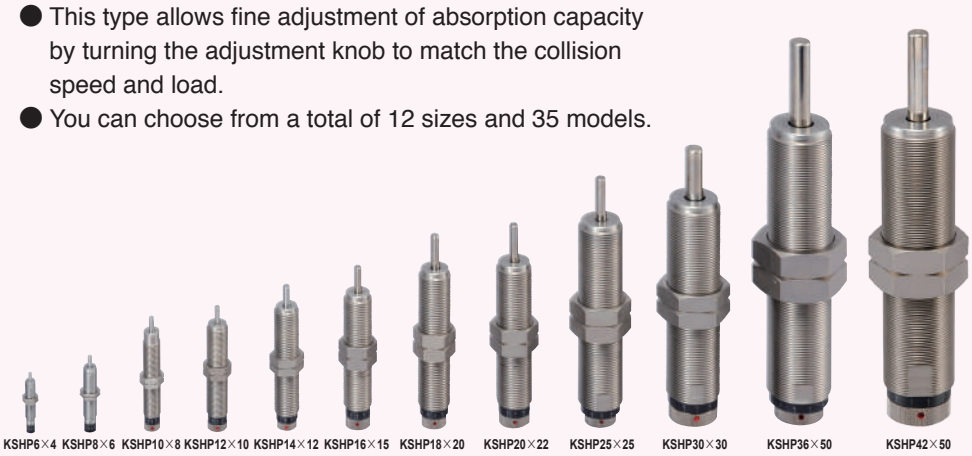
CAUTION Read the safety precautions on page 5 before using this product.

■ You can select the shock absorber that best suits your operating conditions.
For details, please visit Koganei's website.
http://www.koganei.co.jp

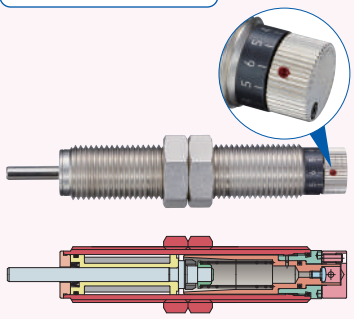
Shock Absorber Selection Guide
airpressure.jp

KSHP Series (Adjustment Type) 54 page

- This type allows fine adjustment of absorption capacity by turning the adjustment knob to match the collision speed and load.
- You can choose from a total of 12 sizes and 35 models.

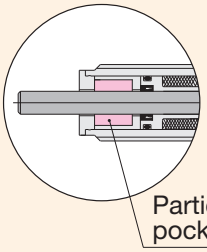


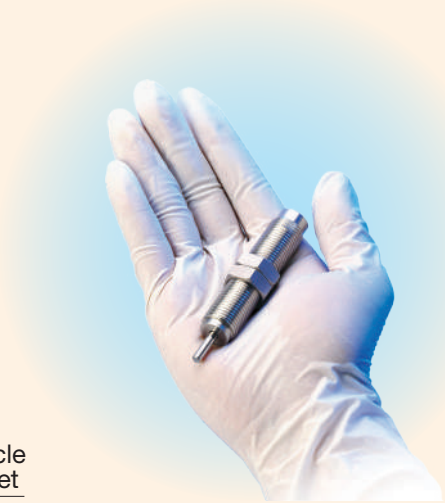
For KSHP6 and KSHP8



KSHC Series (Clean Specifications) 66 page

- This type can be used in clean rooms.
- Capable of JIS/ISO Class 5 equivalent cleanliness (FED–STD Class 100 equivalent) calculated within a 0.1 µm particle.
- A particle pocket structure is used to prevent the scattering of dust.
- Silicone is not used in the hydraulic oil or plastic.
- 40 models in 9 sizes from M4 to M25.

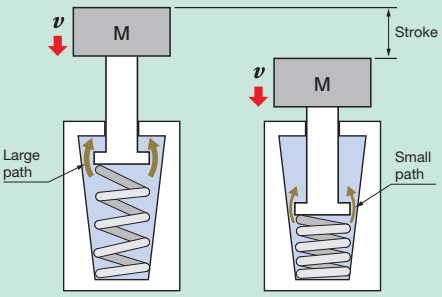


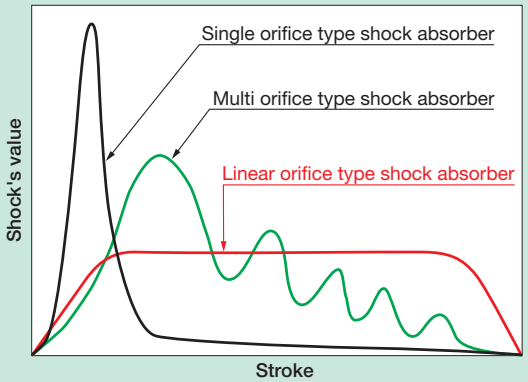


Linear orifice structure

These shock absorbers achieve their smooth shock absorption characteristics and a long service life thanks to the linear orifice structure that transforms the orifice linearly.
Since the linear orifice structure can increase the inner diameter of the shock absorbers without needing an inner tube, the shock absorbers demonstrate similar characteristics to shock absorbers one thread size larger, as well as reduce the vibrations and shocks to bases and equipment.

● Principles of operation
The piston stroke squeezes the oil's flow path steplessly to softly absorb shocks.





● "Linear Orifice" is a registered trademark of Koganei Corporation.

List of linear orifice shock absorber products

	Basic mounting type	withstand their environments	Durable angle of eccentricity	Adjustable type	Clean specification	Options		
Size	KSHJ	KSHW	KSHY	KSHP	KSHC	Cap	Stopper nut	Side mount
M4 × 0.5	●				●			
M6 × 0.75	●		●	●	●			
M8 × 0.75	●	●	●	●	●			
M8 × 1	●	●	●	●	●			
M10 × 1	●		●	●	●			
M12 × 1	●	●	●	●	●			
M14 × 1.5	●	●	●	●	●			
M16 × 1.5	●	●	●	●	●	 **Plastic cap** Note 1		
M18 × 1.5	●			●				
M20 × 1.5	●	●	●	●	●			
M22 × 1.5	●							
M25 × 1.5	●			●	●		 Note 3	
M25 × 2	●							
M27 × 1.5	●							
M27 × 3	●							
M30 × 1.5	●			●				
M33 × 1.5	●					 **Rubber cap** Note 2		
M36 × 1.5	●			●				
M42 × 1.5	●			●				
M45 × 1.5	●							
M48 × 2	●							

Note 1 : Not available for KSHW.
2 : Only for KSHP 12 to 42.
3 : The stopper nut is made of mild steel (nickel plated); KSHW is also available in stainless steel in addition to mild steel (nickel plated).

INDEX

Safety Precautions (shock absorber)

Always read these precautions carefully before use.

Before selecting and using the products, please read all the “Safety Precautions” carefully to ensure proper product use.
The Safety Precautions described below are to help you use the product safely and correctly, and to prevent injury or damage to you, other people, and assets.
Be sure to observe these safety precautions together with the following safety regulations of ISO4414 (Pneumatic fluid power - General rules and safety requirements for systems and their components), and JIS B 8370 (General rules relating to systems).

The directions are ranked according to degree of potential danger or damage: “DANGER”, “WARNING”, “CAUTION” and “ATTENTION.”

⚠ DANGER	Indicates situations that can be clearly predicted as dangerous. Death or serious injury may result if the situation is not avoided. It could also result in damage or destruction of assets.
⚠ WARNING	Indicates situations that, while not immediately dangerous, could become dangerous. Death or serious injury may result if the situation is not avoided. It could also result in damage or destruction of assets.
⚠ CAUTION	Indicates situations that, while not immediately dangerous, could become dangerous. Failure to avoid the situation creates the risk of minor or semi-serious injury. It could also result in damage or destruction of assets.
⚠ ATTENTION	It could also result in damage or destruction of assets. appropriate use of the product.

■This product was designed and manufactured for use in general industrial machinery.

- When selecting and handling equipment, the system designer or another person with sufficient knowledge and experience should always read the “Safety Precautions”, “catalog”, “instruction manual”, and other literature before commencing operation. Improper handling is dangerous.
- After reading the instruction manual, catalog, and other documentation, always place them in a location that allows easy availability for reference to users of this product.
- Whenever transferring or lending the product to another person, always attach the catalog, instruction manual, and other information to the product where they are easily visible in order to ensure that the new user can use the product safely and properly.
- The danger, warning and caution items listed under these “Safety Precautions” do not cover all possible contingencies. Read the catalog and instruction manual carefully, and always keep safety first.

⚠ DANGER

- Do not use the product for the purposes listed below:
  1. Medical equipment related to maintenance or management of human lives or bodies.
  2. Machines or equipment designed for the purpose of moving or transporting people.
  3. Critical safety components in mechanical devices.

  This product has not been planned or designed for purposes that require high levels of safety. Using the product in any of the ways described above creates the risk of loss of human life.
- Do not use the product in locations with or near dangerous substances such as flammable or ignitable substances. This product is not explosion-proof. It could ignite or burst into flames.
- When mounting the product and workpiece, always make sure they are firmly supported and secured in place. Ensure the mounting material is strong enough. If the product falls over, is dropped, or breaks, it may result in injury.
- Never attempt to modify the product in any way. Doing so can cause an abnormal operation and create the risk of injury, etc.
- Never attempt inappropriate disassembly, assembly or repair of the product relating to basic construction, or to its performance or to functions. This can lead to injury, etc.
- Do not splash water on the product. (excluding KSHW)
- Spraying it with water, washing it, or using it under water could result in malfunction leading to injury, etc.
- While the product is in operation, avoid touching it with your hands or otherwise approaching too close. Also, do not mount shock absorbers or make adjustments while the equipment is in operation. The equipment may move suddenly, possibly resulting in injury.

⚠ WARNING

- Do not use the product in excess of its specification range. Doing so creates the risk of product breakdown, loss of function, or damage. It could also drastically reduce operating life.
- The small screw on the back end of the shock absorber should never be loosened or removed. Oil may leak out of the shock absorber leading to a loss of functionality and resulting in injury.
- When conducting any kind of operation for the product, such as maintenance, inspection, repair, or replacement, always turn off the air supply and power to the equipment and make sure that the equipment is completely stopped.
- When mounting the product, always follow the handling instructions and precautions. Also when mounting the product, before operation, check that the mounting nut is tightened and not loose and then operate the product. If the mounting nut is loose, etc., this will result in damage to the equipment and accidents.
- Do not allow the product to be thrown into fire. The product could explode, ignite, and/or release toxic gases.
- Do not apply a load to the product, or place other objects on it. It could lead to damaged or broken products that result in degraded performance, function stops, etc.
- If the product has not been used for over 30 days, it is possible that the contacting parts may have become stuck, leading to abnormal operation at impact. Check for proper operation a minimum of once every 30 days.
- Do not use the product at the beach in direct sunlight, near mercury lamps, or near equipment that generates ozone. Ozone causes rubber components to deteriorate resulting in reduced performance, or a limitation or stop of functions.
- Since our products are used under a wide variety of conditions, the suitability of the system should be thoroughly evaluated by the person responsible for the system design. It is the responsibility of the designer to determine the suitability of the system to ensure the desired performance and safety of the system. Please fully review and evaluate the specifications using the latest catalogs and technical data, consider the possibility of equipment failure, and configure the system to ensure fail-safe and other safety and reliability features.

⚠ CAUTION

- Do not use in locations that are subject to direct sunlight (ultraviolet rays); locations with high humidity and temperature, dust, salt, or iron powder; or in locations with fluids and/or ambient atmosphere that include organic solvents, phosphate ester type hydraulic oil, sulfur dioxide, chlorine gas, acids, etc. It could lead to early shutdown of some functions, a sudden degradation of performance, and a reduced operating life. For information about materials, see Major Parts and Materials.
- When installing the product, be sure to allow adequate work space around it. Failure to do so will make it more difficult to conduct daily inspections or maintenance, which could eventually lead to system shutdown or damage to the product.
- When transporting or mounting a heavy product, firmly support the product using a lift or support, or use multiple people to ensure personal safety. Also, wear protective gloves and use safety shoes etc. for protection as necessary.
- Always post an “operations in progress” sign for installations, adjustments, or other operations, to avoid unintentional supplying of air or electrical power, etc. Unintentional supplying of air or electrical power can cause the equipment to operate and may result in injury.
- Never apply lubrication to the product sliding parts. This leads to changes in the physical properties and deterioration of the materials used, resulting in reduced functionality.

- Attempting to use the shock absorber with a cap over the specification range could result in damage to the cap or to its flying off and causing personal injury. Moreover, if cracks or fractures appear in the cap, replace it as quickly as possible.
- Always wash your hands thoroughly after touching the oil or grease used on the shock absorber. There is a danger that the grease or oil from your hands will get on the cigarette and burn, releasing toxic gases, as you smoke the cigarette.
- As a means to prevent vibration, do not use the product at a high frequency that exceeds the value in the catalog. It could drastically reduce the product's operating life.
- When using the shock absorber, gradually increase the speed of the impact object. Suddenly increasing the speed when using the shock absorber may damage the device or injure someone.

⚠ ATTENTION

- Whenever considering use of this product in situations or environments not specifically noted in the catalog or instruction manual, or in applications where safety is an important requirement such as in aircraft equipment, combustion equipment, leisure equipment, safety equipment, and other places where human life or assets may be greatly affected, take adequate safety precautions such as allowing plenty of margin for ratings and performance, or fail-safe measures. Contact the sales department of Koganei regarding use in such applications.
- When the product can no longer be used, or is no longer necessary, dispose of it appropriately, according to the "Law Regarding the Disposal and Cleaning of Waste" or other local governmental rules and regulations, as industrial waste. Incinerating the special oil in the KSHC series (clean specification) or the KSHJ series (short stroke type) generates hazardous fluorine (HF), which is corrosive and toxic. Because of this, incineration must be done in an incinerator that has neutralizing equipment that can handle acids. For large amounts, ask a registered waste disposal company.
- The product can exhibit degraded performance and function over its operating life. Always conduct daily inspections and confirm that all requisite system functions are satisfied, to prevent accidents from happening.
- When handling the product, wear protective gloves, safety glasses, safety shoes, and other protective clothing.
- The maximum absorption in the specifications are for a normal temperature (20 to 25°C [68 to 77°F]). Be aware that performance and characteristics change depending on the operating temperature.
- The shock absorber's absorption capacity changes depending on the speed of the impacting object. Use the product within the ranges of the selection graphs.
- For inquiries about the product, consult your nearest Koganei sales office or Koganei Overseas Department. The addresses and telephone numbers are shown on the back cover of this catalog.

⚠ Other

- Always observe the following items.

1. When using this product in a system, use only genuine Koganei parts or equivalent (recommended) parts.
When conducting maintenance and repairs, always use genuine Koganei parts or compatible parts (recommended parts).
Always observe the prescribed methods and procedures.
2. Never attempt unauthorized disassembly or assembly of the product relating to its basic construction, its performance, or its functions.

Koganei shall not be held responsible for any problems that occur as a result of these items not being properly observed.

Warranty and General Disclaimer

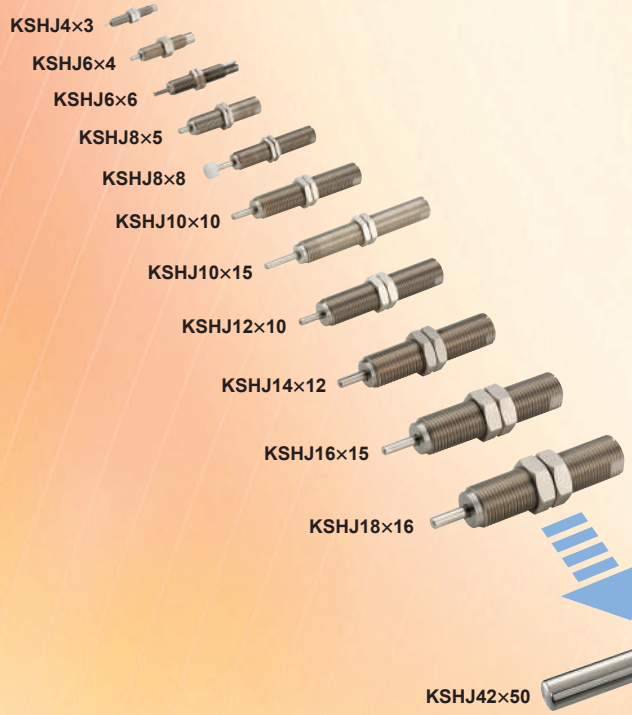
1. Warranty Period
Koganei warrants this product for a period of no more than 1 year from delivery.
* However, some products have a 2-year warranty; contact your nearest Koganei sales office or the Koganei Technical Service Center for details.
2. Scope of Warranty and General Disclaimer
(1) When a product purchased from Koganei or from an authorized Koganei distributor malfunctions during the warranty period in a way that is found to be attributable to Koganei responsibility, Koganei will repair or replace the product free of charge. Even if a product is still within the warranty period, its durability is determined by its operation cycles and other factors. Contact your nearest Koganei sales office or the Koganei overseas department for details.
(2) The Koganei product warranty covers only the product itself. Therefore, Koganei is not responsible for incidental losses (repair of the product, various expenses required for replacement, etc.) caused by breakdown, loss of function, or loss of performance of Koganei products.
(3) Koganei shall not be held responsible for any losses or for any damage to other machinery caused by breakdown, loss of function, or loss of performance of Koganei products.
(4) Koganei shall not be held responsible for any losses due to use or storage of the product in a way that is outside of the product specifications prescribed in Koganei catalogs and the instruction manual, and/or due to actions that violate the mounting, installation, adjustment, maintenance and other safety precautions.
(5) Koganei shall not be held responsible for any losses caused by breakdown of the product due to factors outside the responsibility of Koganei, including but not limited to fire, natural disaster, the actions of third parties, and intentional actions or errors by you.

Linear Orifice® Shock Absorbers
KSHJ Series

Shock absorbers designed by pneumatic cylinder engineers

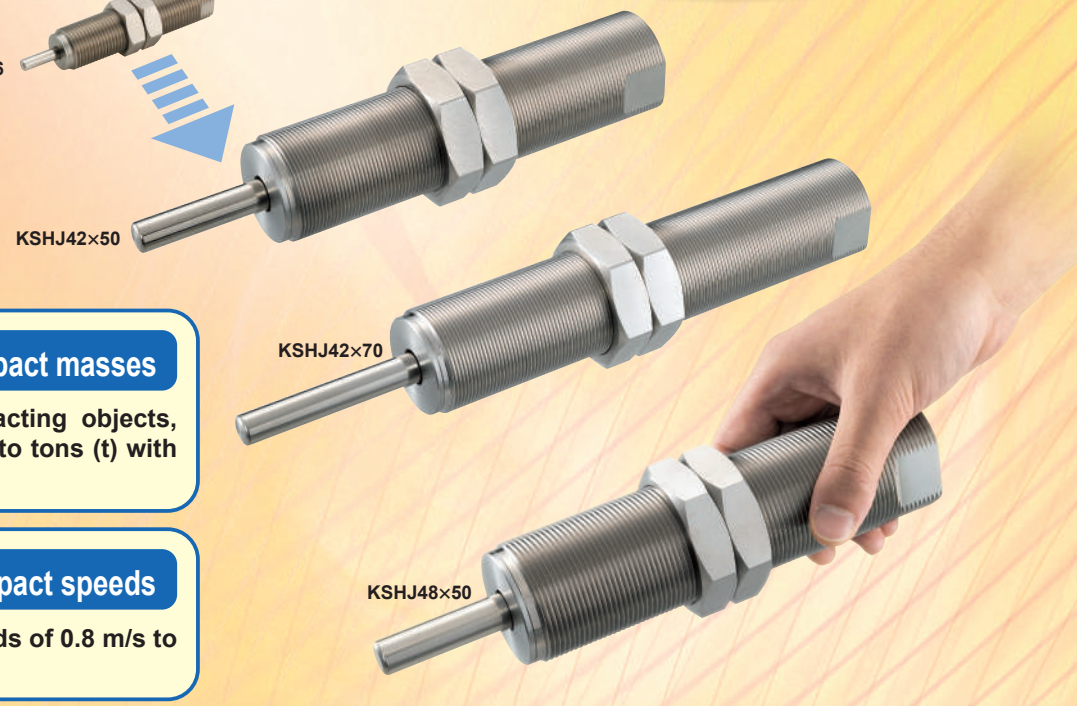
Linear Orifice® Shock Absorber
KSHJ Series (fixed type)

● "Linear Orifice" is a registered trademark of Koganei Corporation.



A wealth of variations with sizes from M4 to M48
18 sizes and 132 models

A wealth of variations with sizes from 10-32UNF to 1 3/4-12UN
12 sizes and 92 models



Supports a wide variety of impact masses

Supports a wide range of impacting objects, from grams (g) with the M4 size to tons (t) with the M48 size.

Supports a wide variety of impact speeds

Supports maximum impact speeds of 0.8 m/s to 3 m/s.

Stopper nut not needed

Workpieces directly contact the end of the body, so there is no need for mounting a stopper nut. Mounting is easy and saves space.

Body is entirely threaded

Entire body is threaded to maximize the range of installation positions and also improve heat dissipation.

Note: Except for M4 and M6 (10-32UNF, 1/4-32UNEF) sizes.

Supports high cycle times

Reduces the time from impact to end of operation. Even if the workpiece mass and speed changes, our original linear orifice construction automatically adjusts to prevent wasted operation time. Combined with reduced vibration, this contributes to improved productivity.

Silent design

Reducing the impact value at collision decreases the noise at workpiece impact.

Short stroke type

Perfect in low speed range for shock absorbing in limited spaces.

Long stroke type

Making the absorbing stroke longer allows for softer absorption of shocks.

⚠ CAUTION Read the safety precautions on page ⑤ before using this product.

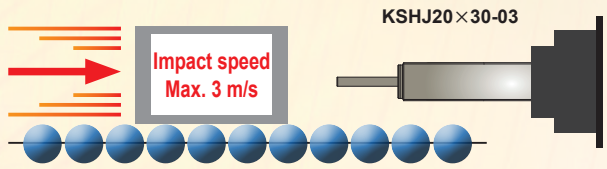
NEW Long stroke high speed and high load type
Variation Up !

Longer absorption stroke enables soft shock absorption. Compared to the standard type and short stroke type, it can handle higher speeds and loads!

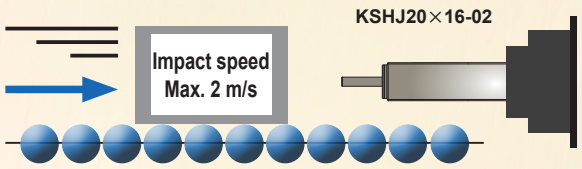
Long stroke high speed and high load type Additional size M4,M12 to M27

(Example ①)

For long stroke high speed and high load type

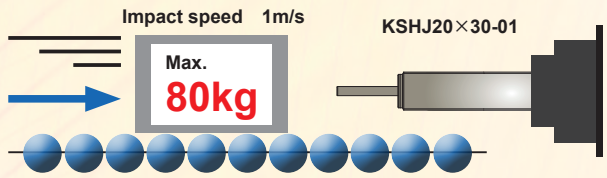


For Standard Type

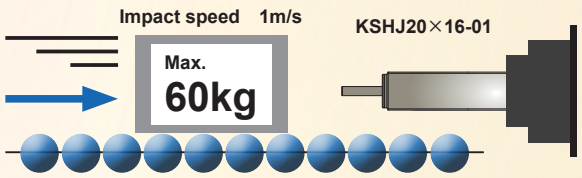


(Example ②)

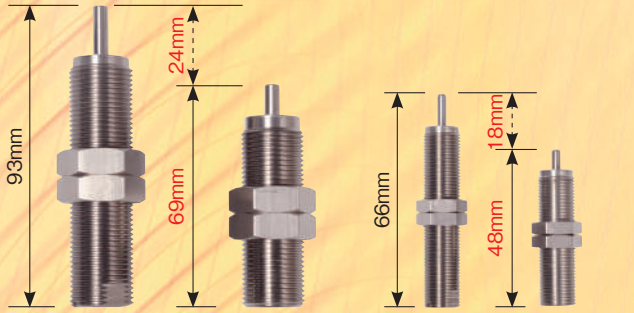
For long stroke high speed and high load type



For Standard Type



short stroke type (with hexagon socket)



Overall length reduced for shock absorbing in tight locations!

Up to 26% reduction in overall length compared to the same standard threaded body type (for M20). Excellent for absorbing shocks in tight locations as a stopper between 2 cylinder stroke ends because overall short length. Fine position adjustments are easy with more models available with hex sockets.

■ List of KSHJ body thread sizes [Specifications in mm]

Size	Model			Body thread size × pitch	
	Short stroke	Standard	Long stroke		
M4	—	KSHJ4×3	KSHJ4×5 NEW	M4×0.5	—
M6	—	KSHJ6×4	KSHJ6×6	M6×0.75	—
M8	KSHJ8×4	KSHJ8×5	KSHJ8×8	M8×0.75	M8×1
M10	KSHJ10×6	KSHJ10×10	KSHJ10×15	M10×1	—
M12	KSHJ12×6	KSHJ12×10	KSHJ12×15 NEW	M12×1	—
M14	KSHJ14×8	KSHJ14×12	KSHJ14×20 NEW	M14×1.5	—
M16	KSHJ16×8	KSHJ16×15	KSHJ16×20 NEW	M16×1.5	—
M18	—	KSHJ18×16	KSHJ18×30 NEW	M18×1.5	—
M20	KSHJ20×10	KSHJ20×16	KSHJ20×30 NEW	M20×1.5	—
M22	—	KSHJ22×25	KSHJ22×30 NEW	M22×1.5	—
M25	—	KSHJ25×25	KSHJ25×40 NEW	M25×1.5	M25×2
M27	—	KSHJ27×25	KSHJ27×40 NEW	M27×1.5	M27×3
M30	—	KSHJ30×30	—	M30×1.5	—
M33	—	KSHJ33×30	—	M33×1.5	—
M36	—	KSHJ36×50	—	M36×1.5	—
M42	—	KSHJ42×50	KSHJ42×70	M42×1.5	—
M45	—	KSHJ45×50	—	M45×1.5	—
M48	—	KSHJ48×50	—	M48×2	—

Option

● With cap

● With stopper nut

● With side mounting bracket

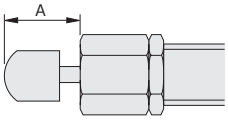
General precautions

Cover the unit when mounting it in locations where it might be subject to excessive dust, dripping water, dripping oil, etc. Dents, scratches, water, oil, or dust on the piston rod results in damage and decreases service life.

Mounting

1. Keep the angle of eccentricity, resulting from the load direction and the axis of the shock absorber, under the specified values on pages ⑰ to ⑲. If an eccentric load exceeding the specifications is applied, it could result in breakage or impaired returns. If there is concern that an eccentric load exceeding the specified values will be applied, install a guide, or similar mechanism.
2. Two or more shock absorbers can be mounted in parallel, to boost absorption capacity. In such an arrangement, however, be careful to ensure that the load is evenly distributed to each shock absorber.
3. To adjust the capacity with the stroke, adjust the stopper nut (-S) or add an external stopper.
4. If using with a cap, always mount a stopper nut (-S) or an external stopper to ensure that the cap is not subjected to loads at the stroke end. The stopper nut mounting position must not exceed the distance shown in the table below. You can use it without a stopper nut or external stopper, but over the long-term, the stop location changes due to cap deformation and wear.

Model	A	
	mm	in
KSHJ4×3C-01,-02 (-F11)	3	0.12
KSHJ6×4C-01,-02 (-F11)	4	0.16
KSHJ6×6C-01,-02 (-F11)	6	0.24
KSHJ8×4C-01,-02,-11,-12 (-F11)	4	0.16
KSHJ8×5C-01,-11 (-F11)	5	0.20
KSHJ8×8C-01,-02,-11,-12 (-F11)	8	0.31
KSHJ10×6C-01,-02 (-F11)	6	0.24
KSHJ11×6C-F11-01,-02	—	0.24
KSHJ10×10C-01,-02 (-F11)	10	0.40
KSHJ11×10C-F11-01,-02	—	0.40
KSHJ10×15C-01,-03 (-F11)	15	0.60
KSHJ11×15C-F11-01,-03	—	0.60
KSHJ12×6C-01,02 (-F11)	6	0.24
KSHJ12×10C-01,-02 (-F11)	10	0.40
KSHJ14×8C-01,02 (-F11)	8	0.31
KSHJ14×12C-01,-02 (-F11)	12	0.47
KSHJ16×8C-01,-02	8	—
KSHJ16×15C-01,-02	15	—
KSHJ18×16C-01,-02 (-F11)	16	0.63
KSHJ20×10C-01,-02	10	—
KSHJ20×16C-01,-02	16	—
KSHJ22×25C-01,-02	25	—
KSHJ25×25C-01,-11,-12 (-F11)	25	0.98
KSHJ27×25C-01,-02,-11,-12	25	—
KSHJ30×30C-01,-02,-03 (-F11)	30	1.18
KSHJ33×30C-01,-02,-03	30	—
KSHJ36×50C-01,-02,-03 (-F11)	50	1.97
KSHJ42×50C-01,-02 (-F11)	50	1.97
KSHJ42×70C-01,-02 (-F11)	70	2.76
KSHJ45×50C-01,-02	50	—
KSHJ48×50C-01,-02	50	—

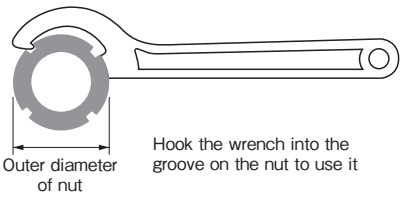


5. The small screw on the back end of the shock absorber should never be loosened or removed. Oil may leak out of the shock absorber leading to a loss of functionality and resulting in damage to the equipment and accidents.
6. When mounting the shock absorber, always use the following maximum tightening torque guidelines. Tightening using excessive force may result in damage.

Model	Maximum tightening torque	
	N・m	in・lbf
KSHJ4×3 (C)-01,-02 (-F11)	0.5	4.43
KSHJ6×4 (C)-01,-02 (-F11)	0.85	7.52
KSHJ6×6 (C)-01,-02 (-F11)	0.85	7.52
KSHJ8×4 (C)-01,-02,-11,-12 (-F11)	2.5	22.12
KSHJ8×5 (C)-01,-11 (-F11)	2.5	22.12
KSHJ8×8 (C)-01,-02,-11,-12 (-F11)	2.5	22.12
KSHJ10×6 (C)-01,-02 (-F11)	6.5	57.53
KSHJ11×6 (C)-01,-02	—	57.5
KSHJ10×10 (C)-01,-02 (-F11)	6.5	57.53
KSHJ11×10 (C)-01,-02	—	57.5
KSHJ10×15 (C)-01,-03 (-F11)	6.5	57.53
KSHJ11×15 (C)-01,-03	—	57.5
KSHJ12×6 (C)-01,02 (-F11)	8.0	70.80
KSHJ12×10 (C)-01,-02 (-F11)	8.0	70.80
KSHJ14×8 (C)-01,02 (-F11)	12.0	106.21
KSHJ14×12 (C)-01,-02 (-F11)	12.0	106.21
KSHJ16×8 (C)-01,-02	20.0	—
KSHJ16×15 (C)-01,-02	20.0	—
KSHJ18×16 (C)-01,-02 (-F11)	25.0	221.28
KSHJ20×10 (C)-01,-02	30.0	—
KSHJ20×16 (C)-01,-02	30.0	—
KSHJ22×25 (C)-01,-02	35.0	—
KSHJ25×25 (C)-01,-11,-12 (-F11)	42.0	371.74
KSHJ27×25 (C)-01,-02,-11,-12	42.0	—
KSHJ30×30 (C)-01,-02,-03 (-F11)	60.0	531.06
KSHJ33×30 (C)-01,-02,-03	60.0	—
KSHJ36×50 (C)-01,-02,-03 (-F11)	72.0	531.06
KSHJ42×50 (C)-01,-02 (-F11)	85.0	637.27
KSHJ42×70 (C)-01,-02 (-F11)	85.0	637.27
KSHJ45×50 (C)-01,-02	85.0	—
KSHJ48×50 (C)-01,-02	120.0	—

Note: The **KSHJ45×50(C)-01**, and **-02** use nominal number AN09 mounting nut prescribed in JIS B1554 (nuts for rolling bearings). Use a hook wrench (nominal 58 to 65 or 65 to 70) for tightening.

Hook wrench



7. Ensure that the hardness of the surface directly impacting the piston rod of the shock absorber is over HRc40 hardness (excluding models with cap).
8. Be aware that performance and characteristics change depending on the operating temperature.

■ How to select shock absorbers

1. Confirm the thrust

Confirm the thrust that is used, and then check the prospective shock absorbers from the table of recommended cylinder bore sizes on page ⑬. If a shock absorber that is smaller than the recommended shock absorber is used, the shock absorber being used may be damaged in fewer operation cycles than is guaranteed.

2. Confirm the kinetic energy

Confirm Ⅰ and Ⅱ below, and then check pages ⑭ to ⑯ for the selection graphs for prospective shock absorbers from [1. Confirm the thrust]. (*)

Ⅰ Impact object mass: m [kg]

Ⅱ Impact speed: v [m/s]

Because " v " is the impact speed, not the average speed, when using a cylinder,

v = m [cylinder stroke] ÷ s [operating time] × 2

Select a model in which Ⅰ and Ⅱ fit within the range enclosed by the capacity curves.

If multiple models are applicable, use the model that is closest to both the capacity curves and the operating conditions. The further the model you select is from the capacity curves and the operating conditions, the slower it will tend to be.

3. Confirm other specifications

Confirm that such specifications as the maximum operating frequency, maximum absorption capacity per unit of time, angle of eccentricity, and operating temperature range are within the range for the shock absorber that you selected.

* The value for the kinetic energy, E, can be found by doing the following calculation. However, the shock absorber's capacity for absorption changes depending on the impact speed. When the shock absorber is doing low-speed operations, it has less drag than when it is doing high-speed operations.

The maximum absorption capacity that is noted in the specifications is reached only at the maximum impact speed.

Therefore, do not choose a shock absorber by comparing E to the maximum absorption capacity; confirm the capacity using the selection graph.

$$E = \frac{1}{2} mv^2$$

E: Kinetic energy (J)

m: Impact object mass [kg]

v: Impact speed (m/s)

Range in the selection graph

Vertical axis range :

Maximum impact speed ≧ v Impact speed (operating condition)

Horizontal axis range :

Shock absorber's maximum absorption capacity at the impact speed (v = m/s) ≧ E Kinetic energy (operating condition)

Calculating the thrust energy is not necessary because the size of the shock absorber is limited by the thrust in step 1.

■ Koganei's selectable content

You can also select equipment from Koganei's homepage.

Visit http://www.koganei.co.jp.

The results of selections using the method above may differ from the results of selections for the selectable content on our homepage. If this happens, please contact us.

■ Example of selecting a shock absorber

[Operating conditions]

①Bore size of the cylinder being used: ϕ16

②Cylinder stroke: 100 mm = 0.1 m

③Pressure applied to the cylinder: 0.6 MPa

④Cylinder's operating time: 0.4 s

⑤Impact object mass: 7 kg

1. Confirm the thrust

Either calculate or find the thrust in the cylinder thrust table on page ⑬.

The cylinder thrust based on ① and ③ is about 121 N.

Cylinder thrust	100.5N	<	120.6N	<	126N
Cylinder bore size	ϕ16		ϕ16		ϕ20
Applied pressure	0.5MPa		0.6MPa		0.4MPa

As mentioned above, although the cylinder being used is ϕ16, the pressure applied to the cylinder exceeds 0.5 MPa, so consider the ϕ20 cylinder (lower than 0.4 MPa) and check the table of recommended cylinder bore sizes on page ⑬.

The following are prospective models.

- KSHJ10×6
- KSHJ10×10
- KSHJ10×15
- KSHJ12×6
- KSHJ12×10
- KSHJ14×8
- KSHJ14×12
- KSHJ16×15

2. Confirm the kinetic energy

Ⅰ The impact object mass m = 7 kg from ⑤

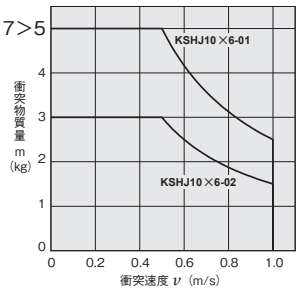
Ⅱ Find the impact speed, v, from ② and ④.

v = ② 0.1 m ÷ ④ 0.4 s × 2

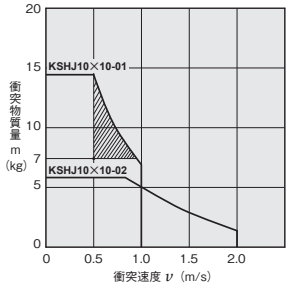
= 0.5 m/s

According to the selection graphs on pages ⑭ to ⑯, the shock absorber with the optimum absorption capacity for operating conditions is KSHJ12×6-02.

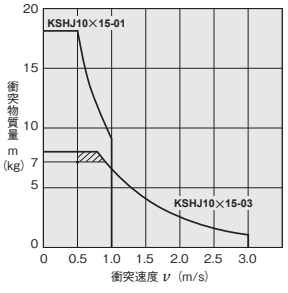
● **KSHJ10×6** (with hexagon socket)



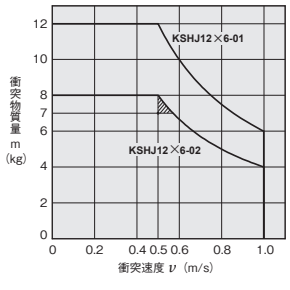
● **KSHJ10×10**



● **KSHJ10×15**



● **KSHJ12×6** (with hexagon socket)



・KSHJ10×6 and 10×10-02 have an insufficient absorption capacity.

・KSHJ10×15-03, 12×6-01….KSHJ12×6-02 come closer to the operating conditions and capacity curves.

・The absorption capacities for all of the other shock absorbers are higher than that of KSHJ12×6-02, so they do not fall within the operating conditions and capacity curves.

3. Confirm other specifications

Verify that other operating conditions, such as the maximum operating frequency, maximum absorption capacity per unit of time, angle of eccentricity, and operating temperature range, are within the specified ranges for KSHJ12×6-02.

■Recommended cylinder bore size

Model \ Cylinder bore	φ4	φ6	φ8	φ10	φ12	φ16	φ20	φ25	φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ160	φ180	φ200
KSHJ4×3 (-F11)	◇	◎	○																
KSHJ6×4 (-F11)		◇	◎	○															
KSHJ6×6 (-F11)		◇	◎	○															
KSHJ8×4 (-F11)(with hexagon socket)				◇	◎	◎	○												
KSHJ8×5 (-F11)			◇	◎	◎	○													
KSHJ8×8 (-F11)			◇	◎	◎	○													
KSHJ10×6 (-F11)(with hexagon socket)					◇	◎	◎	○											
KSHJ10×10 (-F11)				◇	◎	◎	○												
KSHJ10×15 (-F11)				◇	◎	◎	○												
KSHJ11×6-F11					◇	◎	◎	○											
KSHJ11×10-F11				◇	◎	◎	○												
KSHJ11×15-F11				◇	◎	◎	○												
KSHJ12×6 (-F11)(with hexagon socket)						◇	◎	◎	○										
KSHJ12×10 (-F11)					◇	◎	◎	○											
KSHJ14×8 (-F11)(with hexagon socket)							◇	◎	◎	○									
KSHJ14×12 (-F11)						◇	◎	◎	○										
KSHJ16×8 (with hexagon socket)								◇	◎	◎	○								
KSHJ16×15							◇	◎	◎	○									
KSHJ18×16 (-F11)								◇	◎	○									
KSHJ20×10 (with hexagon socket)									◇	◎	◎	○							
KSHJ20×16									◇	◎	○								
KSHJ22×25										◇	◎	○							
KSHJ25×25 (-F11)										◇	◎	◎	○						
KSHJ27×25										◇	◎	◎	○						
KSHJ30×30 (-F11)											◇	◎	◎	○					
KSHJ33×30											◇	◎	◎	○					
KSHJ36×50 (-F11)												◇	◎	◎	○	○			
KSHJ42×50 (-F11)												◇	◇	◎	◎	○	○		
KSHJ42×70 (-F11)												◇	◇	◎	◎	○	○		
KSHJ45×50												◇	◇	◎	◎	○	○		
KSHJ48×50													◇	◇	◎	◎	◎	○	○

◇ : 0.3 MPa or higher ◎ : 0.5 MPa or lower ○ : 0.4 MPa or lower

Note 1: If a shock absorber that is smaller than the recommended shock absorber is used, the shock absorber being used may be damaged in fewer operation cycles than the value that is guaranteed.

Note 2: KSHJ11×6, KSHJ11×10, and KSHJ11×15 have only inch specifications.

■ Cylinder thrust

N [lbf.]

Bore size mm [in.]	Pressure area mm² [in.²]	Air pressure MPa [psi.]								
		0.1 [15]	0.2 [29]	0.3 [44]	0.4 [58]	0.5 [73]	0.6 [87]	0.7 [102]	0.8 [116]	0.9 [131]
φ4	12.9 [0.01]	1.3 [0.2]	2.5 [0.6]	3.8 [0.9]	5 [1.1]	6.3 [1.4]	7.5 [1.7]	8.8 [2.0]	10.1 [2.3]	11.3 [2.5]
φ6	28.3 [0.04]	2.8 [0.6]	5.7 [1.3]	8.5 [1.9]	11.3 [2.5]	14.1 [3.2]	17.0 [3.8]	19.8 [4.5]	22.6 [5.1]	25.4 [5.7]
φ8	50.3 [0.08	5 [1.1]	10.1 [2.3]	15.1 [3.4]	20.1 [4.5]	25.1 [5.6]	30.2 [6.8]	35.2 [7.9]	40.2 [9.0]	45.2 [10.2]
φ10	78.5 [0.12]	7.9 [1.8]	15.7 [3.5]	23.6 [5.3]	31.4 [7.1]	39.3 [8.8]	47.1 [10.6]	55 [12.4]	62.8 [14.1]	70.7 [15.9]
φ12	113 [0.18]	11.3 [2.5]	22.6 [5.1]	33.9 [7.6]	45.2 [10.2]	56.5 [12.7]	67.9 [15.3]	79.2 [17.8]	90.5 [20.3]	101.8 [22.9]
φ16	201 [0.31]	20.1 [4.5]	40.2 [9.0]	60.3 [13.6]	80.4 [18.1]	100.5 [22.6]	121 [27.2]	141 [31.7]	161 [36.2]	181 [40.7]
φ20	314 [0.49]	31.4 [7.1]	62.8 [14.1]	94.2 [21.2]	126 [28.3]	157 [35.3]	188 [42.3]	220 [49.5]	251 [56.4]	283 [63.7]
φ25	491 [0.76]	49.1 [11.0]	98.2 [22.1]	147 [33.0]	196 [44.1]	245 [55.1]	295 [66.3]	344 [77.3]	393 [88.3]	442 [99.4]
φ32	804 [1.25]	80.4 [18.1]	161 [36.2]	241 [54.2]	322 [72.4]	402 [90.4]	483 [108.6]	563 [126.6]	643 [144.6]	724 [162.8]
φ40	1257 [1.95]	126 [28.3]	251 [56.4]	377 [84.8]	503 [113.1]	628 [141.2]	754 [169.5]	880 [197.8]	1005 [225.9]	1131 [254.3]
φ50	1963 [3.04]	196 [44.1]	393 [40.1]	589 [132.4]	785 [176.5]	982 [220.8]	1178 [264.8]	1374 [308.9]	1571 [353.2]	1767 [397.2]
φ63	3117 [4.83]	312 [70.1]	623 [63.5]	935 [210.2]	1247 [280.3]	1559 [350.5]	1870 [420.4]	2182 [490.5]	2494 [560.7]	2806 [630.8]
φ80	5027 [7.80]	503 [113.1]	1005 [102.5]	1508 [339.0]	2011 [452.1]	2513 [564.9]	3016 [678.0]	3519 [791.1]	4021 [904.0]	4524 [1017.0]
φ100	7854 [12.17]	785 [176.5]	1571 [160.2]	2356 [529.6]	3142 [706.3]	3927 [882.8]	4712 [1059.3]	5498 [1236.0]	6283 [1412.5]	7069 [1589.2]
φ125	12272 [19.02]	1227 [275.8]	2454 [250.2]	3682 [827.7]	4909 [1103.6]	6136 [1379.4]	7363 [1655.3]	8590 [1931.1]	9817 [2206.9]	11045 [2483.0]
φ140	15394 [23.86]	1539 [346.0]	3079 [314.0]	4618 [1038.2]	6158 [1384.4]	7697 [1730.4]	9236 [2076.3]	10776 [2422.5]	12315 [2768.5]	13854 [3114.5]
φ160	20106 [31.16]	2011 [452.1]	4021 [904.0]	6032 [1356.0]	8042 [1808.0]	10053 [2260.0]	12064 [2712.1]	14074 [3164.0]	16085 [3616.1]	18096 [4068.1]
φ180	25447 [39.44]	2545 [572.1]	5089 [1144.1]	7634 [1716.2]	10179 [2288.3]	12723 [2860.2]	15268 [3432.4]	17813 [4004.5]	20358 [4576.7]	22902 [5148.6]
φ200	31416 [48.69]	3142 [706.4]	6283 [1412.5]	9425 [2118.8]	12566 [2824.9]	15708 [3531.3]	18850 [4237.6]	21991 [4943.8]	25133 [5650.1]	28274 [6356.3]

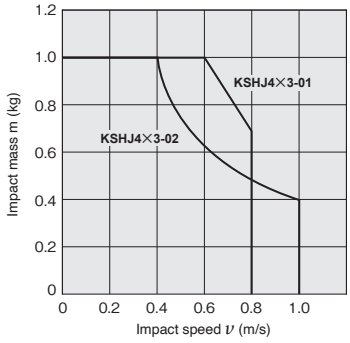
Selection Guidelines

Cautions for using the selection graphs

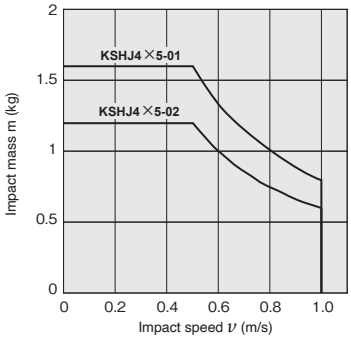
1. The selection graphs are calculated with a cylinder operating air pressure of 0.5 MPa.
2. The values in the selection graphs are for room temperature (20 to 25°). Be aware that performance and characteristics change depending on the operating temperature.
3. Select a shock absorber that is as close to, yet within, the capacity line(s).
4. You can select them on the Koganei home page. Go to http://www.koganei.co.jp
   The results of selections using our catalog may differ from the results of selections on our homepage.

■Selection graph

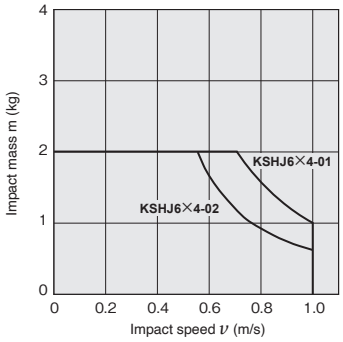
● **KSHJ4×3(-F11)**



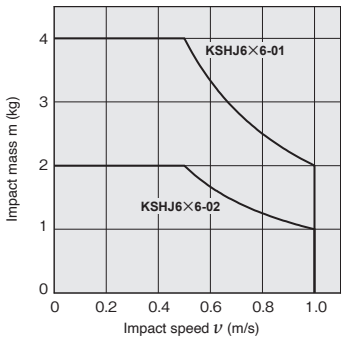
● **KSHJ4×5(-F11)**



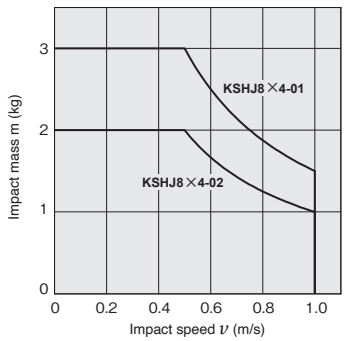
● **KSHJ6×4(-F11)**



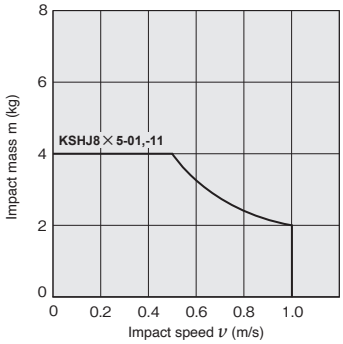
● **KSHJ6×6(-F11)**



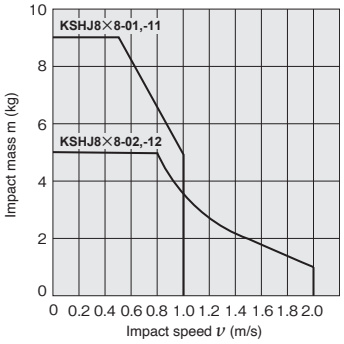
● **KSHJ8×4(-F11) (with hexagon socket)**



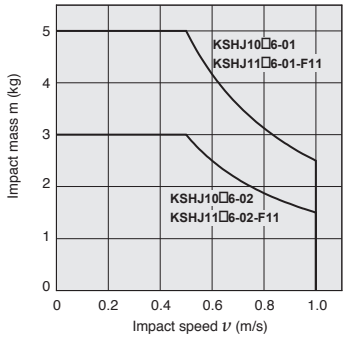
● **KSHJ8×5(-F11)**



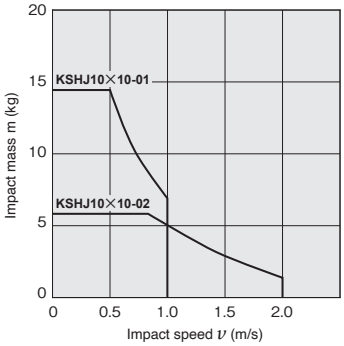
● **KSHJ8×8(-F11)**



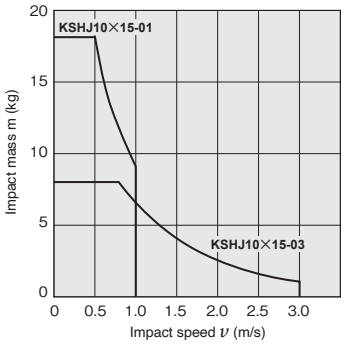
● **KSHJ10×6(-F11)(with hexagon socket)**
● **KSHJ11×6-F11**



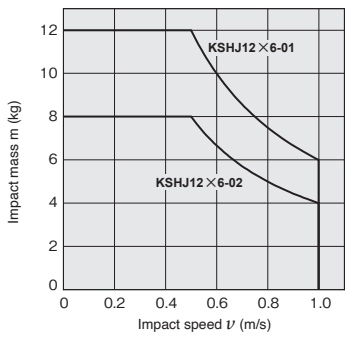
● **KSHJ10×10(-F11)**
● **KSHJ11×10-F11**



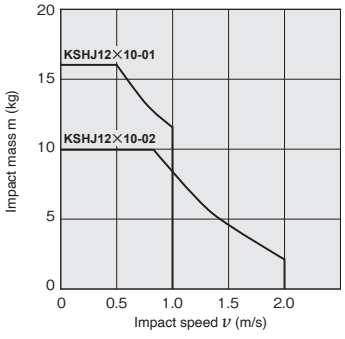
● **KSHJ10×15(-F11)**
● **KSHJ11×15-F11**



● **KSHJ12×6(-F11)(with hexagon socket)**

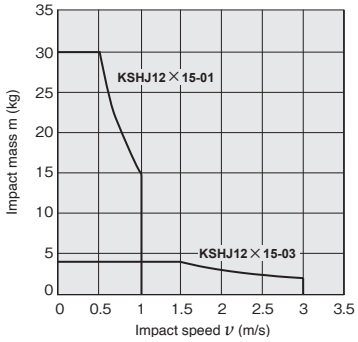


● **KSHJ12×10(-F11)**

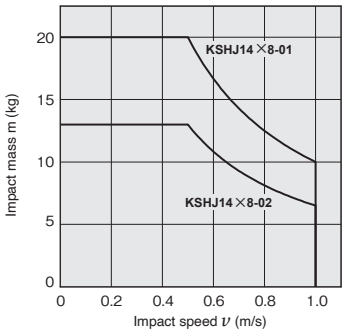


Selection Guidelines

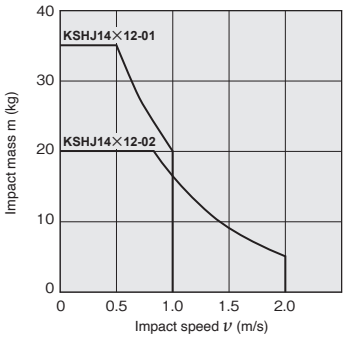
● **KSHJ12×15(-F11)**



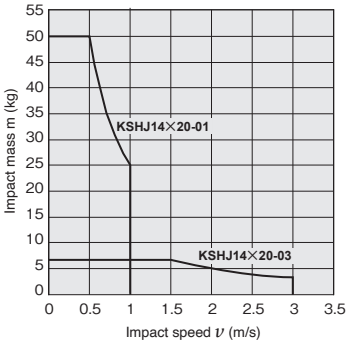
● **KSHJ14×8(-F11) (with hexagon socket)**



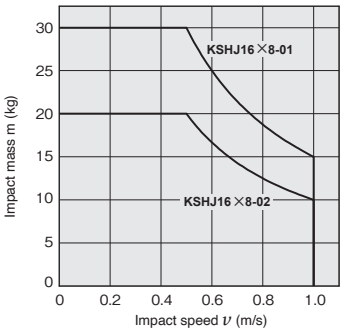
● **KSHJ14×12(-F11)**



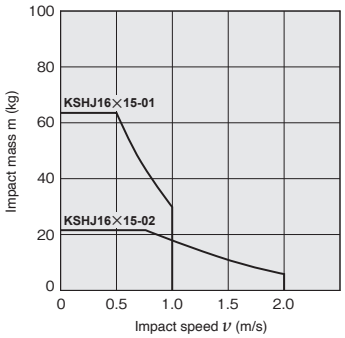
● **KSHJ14×20(-F11)**



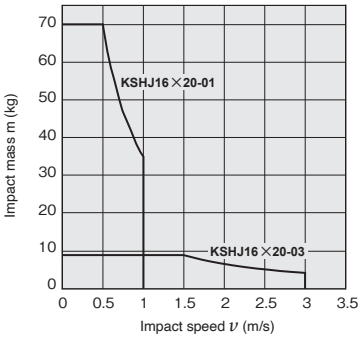
● **KSHJ16×8 (with hexagon socket)**



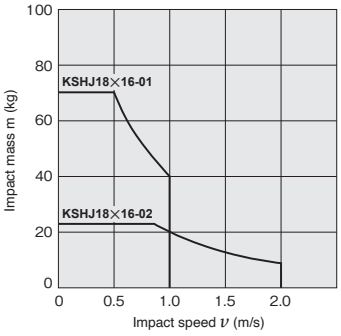
● **KSHJ16×15**



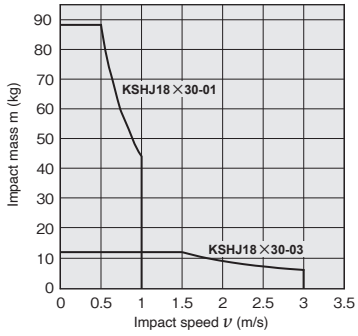
● **KSHJ16×20**



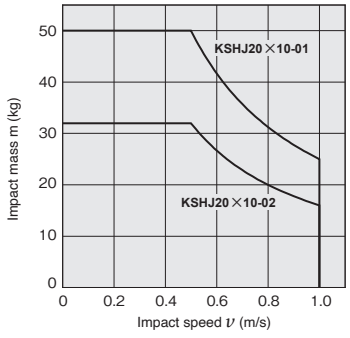
● **KSHJ18×16(-F11)**



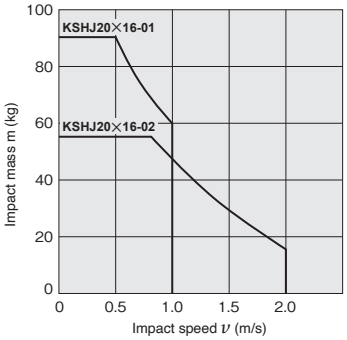
● **KSHJ18×30**



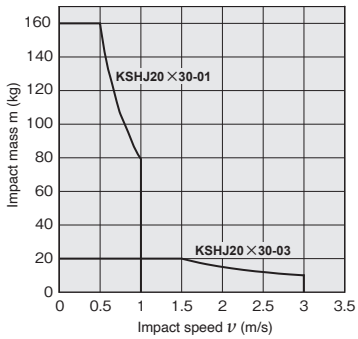
● **KSHJ20×10 (with hexagon socket)**



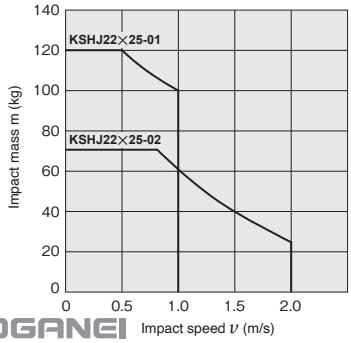
● **KSHJ20×16**



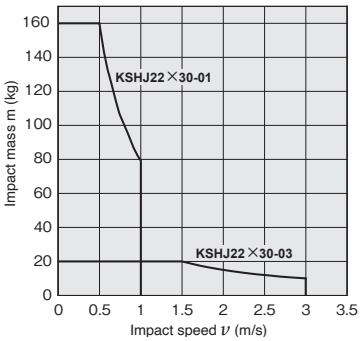
● **KSHJ20×30**



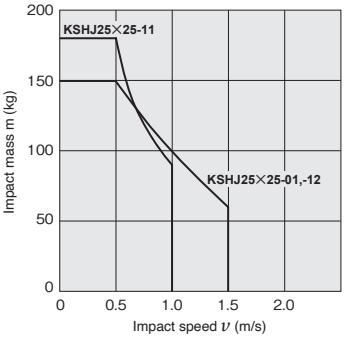
● **KSHJ22×25**



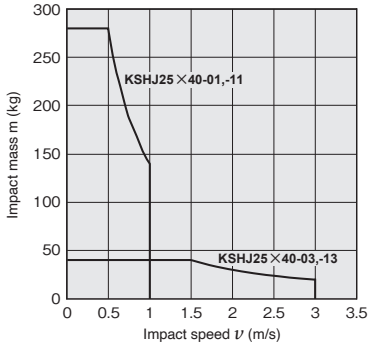
● **KSHJ22×30**



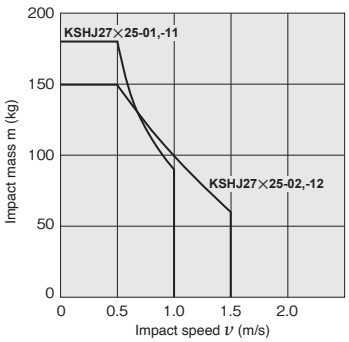
● **KSHJ25×25(-F11)**



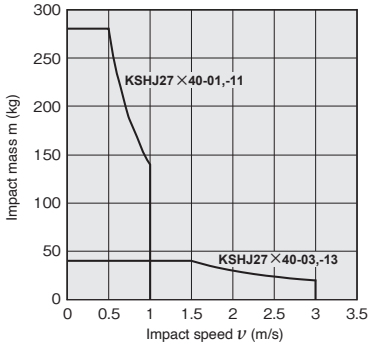
● KSHJ25×40



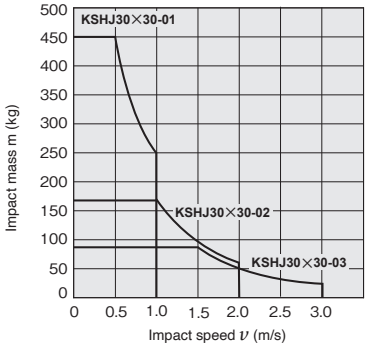
● KSHJ27×25



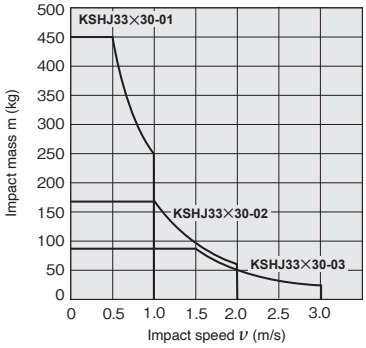
● KSHJ27×40



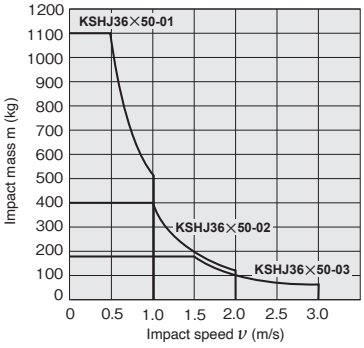
● KSHJ30×30(-F11)



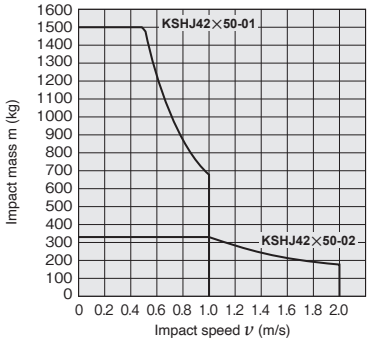
● KSHJ33×30



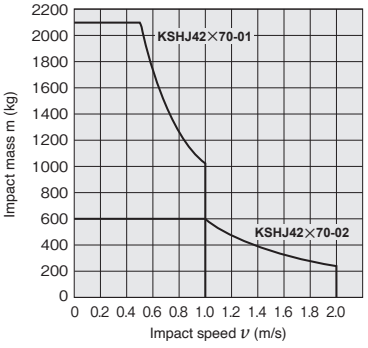
● KSHJ36×50(-F11)



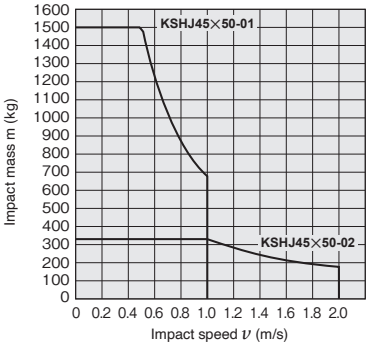
● KSHJ42×50(-F11)



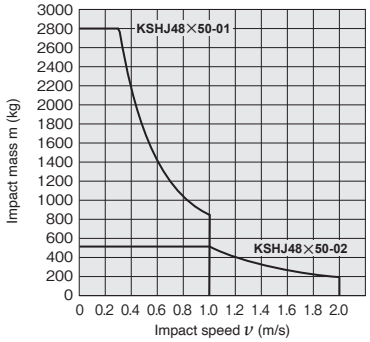
● KSHJ42×70(-F11)



● KSHJ45×50



● KSHJ48×50



Linear orifice shock absorber

KSHJ Series

Specifications

Item \ Model (in inches)		KSHJ4×3-01 (KSHJ4×3-01-F11)	KSHJ4×3-02 (KSHJ4×3-02-F11)	KSHJ4×5-01	KSHJ4×5-02	KSHJ6×4-01 (KSHJ6×4-01-F11)	KSHJ6×4-02 (KSHJ6×4-02-F11)
Maximum absorption capacity	J(in.lbs)	0.3 (2.7)	0.2 (1.8)	0.4 (3.5)	0.3 (2.7)	0.5 (4.4)	0.3 (2.7)
Absorption stroke	mm(in.)	3 (0.118)		5		4 (0.157)	
Impact speed range	m/s(ft/s)	0.1 to 0.8 (0.33 to 2.62)	0.1 to 1 (0.33 to 3.28)	0.1 to 1 (0.33 to 3.28)		0.1 to 1 (0.33 to 3.28)	
Maximum operating cycle	cycle/min	90					
Maximum absorption capacity per unit of time	J/min (in.lbs/min)	10 (88.6)		8 (70.8)		20 (177.1)	
Spring return force[Note1]	N	2		1.5		3	
Deflection angle		1° or less					
Operating temperature range[Note2]	℃(℉)	0 to 60 (32 to 140)					

Item \ Model (in inches)		KSHJ6×6-01 (KSHJ6×6-01-F11)	KSHJ6×6-02 (KSHJ6×6-02-F11)	KSHJ8×4-01, -11 (KSHJ8×4-01, -11-F11) (with hexagon socket)	KSHJ8×4-02, -12 (KSHJ8×4-02, -12-F11) (with hexagon socket)	KSHJ8×5-01, -11 (KSHJ8×5-01-F11)
Maximum absorption capacity	J(in.lbs)	1 (8.9)	0.5 (4.4)	0.75 (6.6)	0.5 (4.4)	1 (8.9)
Absorption stroke	mm(in.)	6 (0.236)		4 (0.157)		5 (0.197)
Impact speed range	m/s(ft/s)	0.1 to 1 (0.33 to 3.28)		0.1 to 1 (0.33 to 3.28)		0.1 to 1 (0.33 to 3.28)
Maximum operating cycle	cycle/min	30		60		90
Maximum absorption capacity per unit of time	J/min (in.lbs/min)	15 (132.8)		15 (132.8)		36 (318.8)
Spring return force[Note1]	N	4		6		6
Deflection angle		1° or less				
Operating temperature range[Note2]	℃(℉)	0 to 60 (32 to 140)				

Item \ Model (in inches)		KSHJ8×8-01, -11 (KSHJ8×8-01, -11-F11)	KSHJ8×8-02, -12 (KSHJ8×8-02,-12-F11)	KSHJ10×6-01 (KSHJ10×6-01-F11) (KSHJ11×6-01-F11) (with hexagon socket)	KSHJ10×6-02 (KSHJ10×6-02-F11) (KSHJ11×6-02-F11) (with hexagon socket)	KSHJ10×10-01 (KSHJ10×10-01-F11) (KSHJ11×10-01-F11)	KSHJ10×10-02 (KSHJ10×10-02-F11) (KSHJ11×10-02-F11)
Maximum absorption capacity	J(in.lbs)	2 (17.7)		1.25 (11.1)	0.75 (6.6)	3 (26.6)	
Absorption stroke	mm(in.)	8 (0.315)		6 (0.236)		10 (0.394)	
Impact speed range	m/s(ft/s)	0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)	0.1 to 1 (0.33 to 3.28)		0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)
Maximum operating cycle	cycle/min	90		60		90	
Maximum absorption capacity per unit of time	J/min (in.lbs/min)	60 (531.4)		45 (398.5)		120 (1062.7)	
Spring return force[Note1]	N	8.6		8		8	
Deflection angle		1° or less					
Operating temperature range[Note2]	℃(℉)	0 to 60 (32 to 140)					

Item \ Model (in inches)		KSHJ10×15-01 (KSHJ10×15-01-F11) (KSHJ11×15-01-F11)	KSHJ10×15-03 (KSHJ10×15-03-F11) (KSHJ11×15-02-F11)	KSHJ12×6-01 (KSHJ12×6-01-F11) (with hexagon socket)	KSHJ12×6-02 (KSHJ12×6-02-F11) (with hexagon socket)	KSHJ12×10-01 (KSHJ12×10-01-F11)	KSHJ12×10-02 (KSHJ12×10-02-F11)
Maximum absorption capacity	J(in.lbs)	5 (44.3)	6.5 (57.6)	3 (26.6)	2 (17.7)	6 (53.1)	
Absorption stroke	mm(in.)	15 (0.591)		6 (0.236)		10 (0.394)	
Impact speed range	m/s(ft/s)	0.1 to 1 (0.33 to 3.28)	0.1 to 3 (0.33 to 9.84)	0.1 to 1 (0.33 to 3.28)		0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)
Maximum operating cycle	cycle/min	90		60			
Maximum absorption capacity per unit of time	J/min (in.lbs/min)	200 (1771.2)		80 (708.5)		220 (1948.3)	
Spring return force[Note1]	N	9.8		8		7.6	
Deflection angle		1° or less					
Operating temperature range[Note2]	℃(℉)	0 to 60 (32 to 140)					

Item \ Model (in inches)		KSHJ12×15-01	KSHJ12×15-03	KSHJ14×8-01 (KSHJ14×8-01-F11) (with hexagon socket)	KSHJ14×8-02 (KSHJ14×8-02-F11) (with hexagon socket)	KSHJ14×12-01 (KSHJ14×12-01-F11)	KSHJ14×12-02 (KSHJ14×12-02-F11)
Maximum absorption capacity	J(in.lbs)	7.5	9	5 (44.3)	3.25 (28.8)	10 (88.6)	
Absorption stroke	mm(in.)	15 (0.591)		8 (0.315)		12 (0.472)	
Impact speed range	m/s(ft/s)	0.1 to 1 (0.33 to 3.28)	0.1 to 3 (0.33 to 9.84)	0.1 to 1 (0.33 to 3.28)		0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)
Maximum operating cycle	cycle/min	50		60		60	
Maximum absorption capacity per unit of time	J/min (in.lbs/min)	120 (1062.7)		100 (885.6)		240 (2125.4)	
Spring return force[Note1]	N	9		12.5		9.2	
Deflection angle		1° or less					
Operating temperature range[Note2]	℃(℉)	0 to 60 (32 to 140)					

Note1: The spring return force is the force of the piston rod when it returns from a full stroke. It is not stable, so cannot be used as other than rod return.

2: The shock absorber's shock absorbing capacity fluctuates based on speed and ambient temperature.

 Use the product within the ranges of the selection graphs (impact mass, impact speed diagram) on pages ⑭ to ⑯.

Specifications

Item \ Model (in inches)		KSHJ14×20-01	KSHJ14×20-03	KSHJ16×8-01 (with hexagon socket)	KSHJ16×8-02 (with hexagon socket)	KSHJ16×15-01	KSHJ16×15-02
Maximum absorption capacity	J(in.lbs)	12.5 (110.6)	15 (132.8)	7.5 (66.4)	5 (44.3)	15 (132.8)	
Absorption stroke	mm(in.)	20 (0.787)		8 (0.315)		15 (0.591)	
Impact speed range	m/s(ft/s)	0.1 to 1 (0.33 to 3.28)	0.1 to 3 (0.33 to 9.84)	0.1 to 1 (0.33 to 3.28)		0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)
Maximum operating cycle	cycle/min	40		40			
Maximum absorption capacity per unit of time	J/min (in.lbs/min)	140 (1239.1)		130 (1150.6)		280 (2478.2)	
Spring return force[Note1]	N	12		12.5		17.4	
Deflection angle		1° or less		3° or less			
Operating temperature range[Note2]	℃(℉)	0 to 60 (32 to 140)					

Item \ Model (in inches)		KSHJ16×20-01	KSHJ16×20-03	KSHJ18×16-01 (KSHJ18×16-01-F11)	KSHJ18×16-02 (KSHJ18×16-02-F11)	KSHJ18×30-01	KSHJ18×30-03
Maximum absorption capacity	J(in.lbs)	17.5 (154.9)	20 (177)	20 (177)		22 (194.7)	27 (239)
Absorption stroke	mm(in.)	20 (0.787)		16 (0.630)		30 (1.181)	
Impact speed range	m/s(ft/s)	0.1 to 1 (0.33 to 3.28)	0.1 to 3 (0.33 to 9.84)	0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)	0.1 to 1 (0.33 to 3.28)	0.1 to 3 (0.33 to 9.84)
Maximum operating cycle	cycle/min	30		40		25	
Maximum absorption capacity per unit of time	J/min (in.lbs/min)	160 (1416.1)		320 (2833.9)		200 (1771.2)	
Spring return force[Note1]	N	12		22		21	
Deflection angle		1° or less		3° or less		1° or less	
Operating temperature range[Note2]	℃(℉)	0 to 60 (32 to 140)					

Item \ Model (in inches)		KSHJ20×10-01 (with hexagon socket)	KSHJ20×10-02 (with hexagon socket)	KSHJ20×16-01	KSHJ20×16-02	KSHJ20×30-01	KSHJ20×30-03
Maximum absorption capacity	J(in.lbs)	12.5 (110.6)	8 (70.8)	30 (265.5)		40 (354)	45 (398.3)
Absorption stroke	mm(in.)	10 (0.394)		16 (0.630)		30 (1.181)	
Impact speed range	m/s(ft/s)	0.1 to 1 (0.33 to 3.28)		0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)	0.1 to 1 (0.33 to 3.28)	0.1 to 3 (0.33 to 9.84)
Maximum operating cycle	cycle/min	40		30		25	
Maximum absorption capacity per unit of time	J/min (in.lbs/min)	200 (1771.2)		450 (3982.8)		300 (2655.2)	
Spring return force[Note1]	N	15		22		21	
Deflection angle		3° or less				1° or less	
Operating temperature range[Note2]	℃(℉)	0 to 60 (32 to 140)					

Item \ Model (in inches)		KSHJ22×25-01	KSHJ22×25-02	KSHJ22×30-01	KSHJ22×30-03	KSHJ25×25-01
Maximum absorption capacity	J(in.lbs)	50 (442.5)		40 (354)	45 (398.3)	60 (531.0)
Absorption stroke	mm(in.)	25 (0.984)		30 (1.181)		25 (0.984)
Impact speed range	m/s(ft/s)	0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)	0.1 to 1 (0.33 to 3.28)	0.1 to 3 (0.33 to 9.84)	0.1 to 1.5 (0.33 to 4.92)
Maximum operating cycle	cycle/min	30		25		30
Maximum absorption capacity per unit of time	J/min (in.lbs/min)	500 (4425.3)		300 (2655.2)		700 (6195.5)
Spring return force[Note1]	N	28.5		21		28.5
Deflection angle		3° or less		1° or less		3° or less
Operating temperature range[Note2]	℃(℉)	0 to 60 (32 to 140)				

Item \ Model (in inches)		KSHJ25×25-11 (KSHJ25×25-01-F11)	KSHJ25×25-12 (KSHJ25×25-02-F11)	KSHJ25×40-01,-11	KSHJ25×40-03,-13	KSHJ27×25-01,-11	KSHJ27×25-02,-12
Maximum absorption capacity	J(in.lbs)	60 (531.0)		70 (619.6)	90 (796.6)	60 (531.0)	
Absorption stroke	mm(in.)	25 (0.984)		40 (1.575)		25 (0.984)	
Impact speed range	m/s(ft/s)	0.1 to 1 (0.33 to 3.28)	0.1 to 1.5 (0.33 to 4.92)	0.1 to 1 (0.33 to 3.28)	0.1 to 3 (0.33 to 9.84)	0.1 to 1 (0.33 to 3.28)	0.1 to 1.5 (0.33 to 4.92)
Maximum operating cycle	cycle/min	30		20		30	
Maximum absorption capacity per unit of time	J/min (in.lbs/min)	800 (7084.8)		400 (3540.3)		800 (7084.8)	
Spring return force[Note1]	N	28.5		42		28.5	
Deflection angle		3° or less		1° or less		3° or less	
Operating temperature range[Note2]	℃(℉)	0 to 60 (32 to 140)					

Note1: The spring return force is the force of the piston rod when it returns from a full stroke. It is not stable, so cannot be used as other than rod return.

2: The shock absorber's shock absorbing capacity fluctuates based on speed and ambient temperature.
Use the product within the ranges of the selection graphs (impact mass, impact speed diagram) on pages ⑭ to ⑯.

Specifications

Item \ Model (in inches)		KSHJ27×40-01,-11	KSHJ27×40-03,-13	KSHJ30×30-01 (KSHJ30×30-01-F11)	KSHJ30×30-02 (KSHJ30×30-02-F11)	KSHJ30×30-03 (KSHJ30×30-03-F11)
Maximum absorption capacity	J(in.lbs)	70 (619.6)	90 (796.6)	140 (1239.1)		
Absorption stroke	mm(in.)	40 (1.575)		30 (1.181)		
Impact speed range	m/s(ft/s)	0.1 to 1 (0.33 to 3.28)	0.1 to 3 (0.33 to 9.84)	0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)	0.1 to 3 (0.33 to 9.84)
Maximum operating cycle	cycle/min	20				
Maximum absorption capacity per unit of time	J/min (in.lbs/min)	400 (3540.3)		900 (7965.7)		
Spring return force[Note1]	N	42		41.5		
Deflection angle		1° or less		3° or less		
Operating temperature range[Note2]	℃(℉)	0 to 60 (32 to 140)				

Item \ Model (in inches)		KSHJ33×30-01	KSHJ33×30-02	KSHJ33×30-03	KSHJ36×50-01 (KSHJ36×50-01-F11)	KSHJ36×50-02 (KSHJ36×50-02-F11)	KSHJ36×50-03 (KSHJ36×50-03-F11)
Maximum absorption capacity	J(in.lbs)	140 (1239.1)			300 (2655.2)		
Absorption stroke	mm(in.)	30 (1.181)			50 (1.969)		
Impact speed range	m/s(ft/s)	0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)	0.1 to 3 (0.33 to 9.84)	0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)	0.1 to 3 (0.33 to 9.84)
Maximum operating cycle	cycle/min	20			20		
Maximum absorption capacity per unit of time	J/min (in.lbs/min)	900 (7965.7)			1800 (15931.3)		
Spring return force[Note1]	N	41.5			66.5		
Deflection angle		3° or less					
Operating temperature range[Note2]	℃(℉)	0 to 60 (32 to 140)					

Item \ Model (in inches)		KSHJ42×50-01 (KSHJ42×50-01-F11)	KSHJ42×50-02 (KSHJ42×50-02-F11)	KSHJ42×70-01 (KSHJ42×70-01-F11)	KSHJ42×70-02 (KSHJ42×70-02-F11)
Maximum absorption capacity	J(in.lbs)	400 (3540.3)		600 (5310.4)	
Absorption stroke	mm(in.)	50 (1.969)		70 (2.756)	
Impact speed range	m/s(ft/s)	0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)	0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)
Maximum operating cycle	cycle/min	15		15	
Maximum absorption capacity per unit of time	J/min (in.lbs/min)	2400 (21254.4)		2400 (21254.4)	
Spring return force[Note1]	N	85.0		68.0	
Deflection angle		3° or less		1° or less	
Operating temperature range[Note2]	℃(℉)	0 to 60 (32 to 140)			

Item \ Model (in inches)		KSHJ45×50-01	KSHJ45×50-02	KSHJ48×50-01	KSHJ48×50-02
Maximum absorption capacity	J(in.lbs)	400 (3540.3)		500 (4425.4)	
Absorption stroke	mm(in.)	50 (1.969)		50 (1.969)	
Impact speed range	m/s(ft/s)	0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)	0.1 to 1 (0.33 to 3.28)	0.1 to 2 (0.33 to 6.56)
Maximum operating cycle	cycle/min	15		15	
Maximum absorption capacity per unit of time	J/min (in.lbs/min)	2400 (21254.4)		3000 (26552.2)	
Spring return force[Note1]	N	85.0		86.0	
Deflection angle		3° or less			
Operating temperature range[Note2]	℃(℉)	0 to 60 (32 to 140)			

Note1: The spring return force is the force of the piston rod when it returns from a full stroke. It is not stable, so cannot be used as other than rod return.

2: The shock absorber's shock absorbing capacity fluctuates based on speed and ambient temperature.

Use the product within the ranges of the selection graphs (impact mass, impact speed diagram) on pages ⑭ to ⑯.

Mass

Specifications in mm

g

Model	Main unit[Note]	Additional mass	Additional parts' mass		
		With plastic cap	Mounting nut (1 ea.)	Stopper nut	Side mounting bracket
KSHJ4×3-01, -02	1.8	0.1	0.2	1	7
KSHJ4×5-01, -02	1.9	0.1	0.2	1	7
KSHJ6×4-01, -02	4	0.2	0.4	2	8
KSHJ6×6-01, -02	5	0.2	0.4	2	8
KSHJ8×4-01, -02, -11,-12 (with hexagon socket)	10	0.5	0.6(0.9)[Note2]	4	12
KSHJ8×5-01, -11	10	0.5	0.6(0.9)[Note2]	4	12
KSHJ8×8-01, -02, -11,-12	11.5	0.5	0.6(0.9)[Note2]	4	12
KSHJ10×6-01, -02 (with hexagon socket)	21	0.6	1.2	7	15
KSHJ10×10-01, -02	22	0.6	1.2	7	15
KSHJ10×15-01, -03	28	0.6	1.2	7	15
KSHJ12×6-01, 02 (with hexagon socket)	31	1.2	1.9	8	22
KSHJ12×10-01, -02	37	1.2	1.9	8	22
KSHJ12×15-01, -03	38.5	1.5	1.9	8	22
KSHJ14×8-01, 02 (with hexagon socket)	55	1.4	4	15	41
KSHJ14×12-01, -02	58	1.4	4	15	41
KSHJ14×20-01, -03	72	7.5	4	21	41
KSHJ16×8-01, -02 (with hexagon socket)	73	1.4	6.6	28	65
KSHJ16×15-01, -02	83	1.4	6.6	28	65
KSHJ16×20-01, -03	95	7.5	6.6	28	65
KSHJ18×16-01, -02	113	3.0	8.8	37	100
KSHJ18×30-01, -03	152	7.5	8.8	37	100
KSHJ20×10-01, -02 (with hexagon socket)	131	3.0	12.2	55	110
KSHJ20×16-01, -02	156	3.0	12.2	55	110
KSHJ20×30-01, -03	192	7.5	12.2	55	110
KSHJ22×25-01, -02	233	7.0	18.2	82	390
KSHJ22×30-01, -03	253	7.5	18.2	82	390
KSHJ25×25-01	307	7.0	23	95	360
KSHJ25×40-01, -03	362	23.5	23	95	360
KSHJ25×25-11, -12	300	7.0	24.5	95	360
KSHJ25×40-11, -13	352	23.5	24.5	95	360
KSHJ27×25-01, -02	415	7.0	42	180	460
KSHJ27×40-01, -03	475	23.5	42	180	460
KSHJ27×25-11, -12	395	7.0	54	180	460
KSHJ27×40-11, -13	458	23.5	54	180	460
KSHJ30×30-01, -02, -03	520	50	32.5	140	455
KSHJ33×30-01, -02, -03	675	50	47.5	390	2800
KSHJ36×50-01, -02, -03	1070	110	95.5	330	2650
KSHJ42×50-01, -02	1310	110	93	320	2400
KSHJ42×70-01, -02	1500	110	93	320	2400
KSHJ45×50-01, -02	1610	110	123	420	3400
KSHJ48×50-01, -02	1830	210	100	400	3400

Calculation example: The mass of KSHJ10×10C-01-S-2 (with cap, stopper, and side mount) is

22 + 0.6 + 7 + 15 = 44.6g

Note: The weight of the main unit includes the weight of 2 mounting nuts.

Specifications in inches

oz

Model	Main unit[Note1]	Additional mass	Additional parts' mass	
		With plastic cap	Mounting nut (1 ea.)	Stopper nut
KSHJ4×3-01, -02 -F11	0.1	0.004	0.01	0.04
KSHJ6×4-01, -02 -F11	0.2	0.007	0.04	0.1
KSHJ6×6-01, -02 -F11	0.2	0.007	0.04	0.1
KSHJ8×4-01, -02, -11,-12 -F11	0.4	0.02	0.06	0.2
KSHJ8×5-01-F11	0.4	0.02	0.06	0.2
KSHJ8×8-01, -02, -11,-12 -F11	0.5	0.02	0.06	0.2
KSHJ10×6-01, -02 -F11	0.7	0.02	0.07	0.4
KSHJ10×10-01, -02 -F11	0.8	0.02	0.07	0.4
KSHJ10×15-01, -03 -F11	1.0	0.02	0.07	0.4
KSHJ11×6-01, -02 -F11[Note2]	1.0	0.02	0.09	0.4
KSHJ11×10-01, -02-F11[Note2]	1.2	0.02	0.09	0.4
KSHJ11×15-01, -03-F11[Note2]	1.4	0.02	0.09	0.4
KSHJ12×6-01, 02 -F11	1.3	0.04	0.1	0.5
KSHJ12×10-01, -02 -F11	1.5	0.04	0.1	0.5
KSHJ14×8-01, 02 -F11	2.2	0.05	0.2	0.7
KSHJ14×12-01, -02 -F11	2.2	0.05	0.2	0.7
KSHJ18×16-01, -02 -F11	4.8	0.1	0.4	2.5
KSHJ25×25-11, -12 -F11	11.3	0.2	1.2	4.4
KSHJ30×30-01, -02, -03 -F11	20.6	1.8	1.3	5.5
KSHJ36×50-01, -02, -03 -F11	33.9	3.9	3.0	9.8
KSHJ42×50-01, -02 -F11	51.5	3.9	3.4	10.8
KSHJ42×70-01, -02 -F11	59.6	3.9	3.4	10.8

Calculation example: The mass of KSHJ10×10C-01-S-2 (with cap and stopper) is

0.8 + 0.02 + 0.4 = 1.58oz

Note1: The weight of the main unit includes the weight of 2 mounting nuts.

Note2: KSHJ11 has only inch specifications.

Order Codes (specifications in mm)

● **4×3**

KSHJ 4×3 □ - □ - □ - □

Linear orifice Shock absorber KSHJ Series

Cap
Blank: No cap
C : With cap

Impact speed range
01: 0.1 to 0.8m/s
02: 0.1 to 1m/s

Stopper nut
Blank: No stopper nut
S : With stopper nut

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

● **4×5**

KSHJ 4×5 □ - □ - □ - □

Linear orifice Shock absorber KSHJ Series

Cap
Blank: No cap
C : With cap

Impact speed range
01: 0.1 to 1m/s
02: 0.1 to 1m/s

Stopper nut
Blank: No stopper nut
S : With stopper nut

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

● **6×4**
6×6

KSHJ □ □ - □ - □ - □

Linear orifice Shock absorber KSHJ Series

Body thread size×stroke
6×4
6×6

Cap
Blank: No cap
C : With cap

Impact speed range
01: 0.1 to 1m/s
02: 0.1 to 1m/s

Stopper nut
Blank: No stopper nut
S : With stopper nut

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

● **8×5**

KSHJ 8×5 □ - □ - □ - □

Linear orifice Shock absorber KSHJ Series

Cap
Blank: No cap
C : With cap

Impact speed range
01: 0.1 to 1m/s (body thread size M8×0.75)
11: 0.1 to 1m/s (body thread size M8×1)

Stopper nut
Blank: No stopper nut
S : With stopper nut

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

● **8×8**

KSHJ 8×8 □ - □ - □ - □

Linear orifice Shock absorber KSHJ Series

Cap
Blank: No cap
C : With cap

Impact speed range
01: 0.1 to 1m/s (body thread size M8×0.75)
02: 0.1 to 2m/s (body thread size M8×0.75)
11: 0.1 to 1m/s (body thread size M8×1)
12: 0.1 to 2m/s (body thread size M8×1)

Stopper nut
Blank: No stopper nut
S : With stopper nut

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

Order Codes (specifications in mm)

M10～M22　Standard stroke type

● **10×10**
12×10
14×12
16×15
18×16
20×16
22×25

KSHJ □ - □ - □ - □

Linear orifice
Shock absorber
KSHJ Series

Body thread size×strok
10×10
12×10
14×12
16×15
18×16
20×16
22×25

Cap
Blank: No cap
C : With cap

Impact speed range
01: 0.1 to 1m/s
02: 0.1 to 2m/s

Stopper nut
Blank: No stopper nut
S : With stopper nut

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

M10～M22　Long stroke high speed and high load type

● **10×15**
12×15
14×20
16×20
18×30
20×30
22×30

KSHJ □ - □ - □ - □

Linear orifice
Shock absorber
KSHJ Series

Body thread size×strok
10×15
12×15
14×20
16×20
18×30
20×30
22×30

Cap
Blank: No cap
C : With cap

Impact speed range
01: 0.1 to 1m/s
03: 0.1 to 3m/s

Stopper nut
Blank: No stopper nut
S : With stopper nut

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

● **25×25**

KSHJ 25×25 □ - □ - □ - □

Linear orifice
Shock absorber
KSHJ Series

Cap
Blank: No cap
C : With cap

Impact speed range
01: 0.1 to 1.5m/s (body thread size M25×1.5)
11: 0.1 to 1m/s (body thread size M25×2)
12: 0.1 to 1.5m/s (body thread size M25×2)

Stopper nut
Blank: No stopper nut
S : With stopper nut

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

Order Codes (specifications in mm)

● 25×40

KSHJ 25×40 □ - □ - □ - □

Linear orifice Shock absorber KSHJ Series

Cap
Blank: No cap
C : With cap

Impact speed range
01: 0.1 to 1m/s (body thread size M25×1.5)
03: 0.1 to 3m/s (body thread size M25×1.5)
11: 0.1 to 1m/s (body thread size M25×2)
13: 0.1 to 3m/s (body thread size M25×2)

Stopper nut
Blank: No stopper nut
S : With stopper nut

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

● 27×25

KSHJ 27×25 □ - □ - □ - □

Linear orifice Shock absorber KSHJ Series

Cap
Blank: No cap
C : With cap

Impact speed range
01: 0.1 to 1m/s (body thread size M27×1.5)
02: 0.1 to 1.5m/s (body thread size M27×1.5)
11: 0.1 to 1m/s (body thread size M27×3)
12: 0.1 to 1.5m/s (body thread size M27×3)

Stopper nut
Blank: No stopper nut
S : With stopper nut

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

● 27×40

KSHJ 27×40 □ - □ - □ - □

Linear orifice Shock absorber KSHJ Series

Cap
Blank: No cap
C : With cap

Impact speed range
01: 0.1 to 1m/s (body thread size M27×1.5)
03: 0.1 to 3m/s (body thread size M27×1.5)
11: 0.1 to 1m/s (body thread size M27×3)
13: 0.1 to 3m/s (body thread size M27×3)

Stopper nut
Blank: No stopper nut
S : With stopper nut

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

● 30×30
33×30
36×50

KSHJ □ □ - □ - □ - □

Linear orifice Shock absorber KSHJ Series

Body thread size×stroke
30×30
33×30
36×50

Cap
Blank: No cap
C : With cap

Impact speed range
01: 0.1 to 1m/s
02: 0.1 to 2m/s
03: 0.1 to 3m/s

Stopper nut
Blank: No stopper nut
S : With stopper nut

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

Order Codes (specifications in mm)

● **42×50**
42×70
45×50
48×50

KSHJ □ - □ - □ - □

Linear orifice Shock absorber KSHJ Series

Body thread size×stroke
42×50
42×70
45×50
48×50

Cap
Blank: No cap
C : With cap

Impact speed range
01: 0.1 to 1m/s
02: 0.1 to 2m/s

Stopper nut
Blank: No stopper nut
S : With stopper nut

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

Short stroke type (with hexagon socket)

● **8×4**
10×6
12×6
14×8
16×8
20×10

KSHJ □ - □ - □ - □

Linear orifice Shock absorber KSHJ Series

Body thread size×stroke
8×4
10×6
12×6
14×8
16×8
20×10

Cap
Blank: No cap
C : With cap

Impact speed range
01: 0.1 to 1m/s
02: 0.1 to 1m/s
11: 0.1 to 1m/s (body thread size M8×1) only KSHJ8×4 supported
12: 0.1 to 1m/s (body thread size M8×1) only KSHJ8×4 supported

Stopper nut
Blank: No stopper nut
S : With stopper nut

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

Additional Parts (no specifications in inches)

●Mounting nut (M4 to M20: 1 pack has 10 units / M22 to M48: 1 pack has 2 units) Note1

N - KSH - M □

Thread size
4 : For KSHJ4
6 : For KSHJ6
8 : For KSHJ8(-01,02)
8-11 : For KSHJ8(-11,12)
10 : For KSHJ10
12 : For KSHJ12
14 : For KSHJ14
16 : For KSHJ16
18 : For KSHJ18
20 : For KSHJ20
22 : For KSHJ22
25 : For KSHJ25-01
25-11 : For KSHJ25(-11,12)
27 : For KSHJ27(-01,02)
27-11 : For KSHJ27(-11,12)
30 : For KSHJ30
33 : For KSHJ33
36 : For KSHJ36
42 : For KSHJ42
45 : For KSHJ45
48 : For KSHJ48

●Stopper nut

S - KSH - M □

Thread size
4 : For KSHJ4
6 : For KSHJ6
8 : For KSHJ8(-01,02)
8-11 : For KSHJ8(-11,12)
10 : For KSHJ10
12 : For KSHJ12
14 : For KSHJ14 Note2
14-L : For KSHJ14×20
16 : For KSHJ16
18 : For KSHJ18
20 : For KSHJ20
22 : For KSHJ22
25 : For KSHJ25-01
25-11 : For KSHJ25(-11,12)
27 : For KSHJ27(-01,02)
27-11 : For KSHJ27(-11,12)
30 : For KSHJ30
33 : For KSHJ33
36 : For KSHJ36
42 : For KSHJ42
45 : For KSHJ45
48 : For KSHJ48

●Side mounting bracket

2 - KSH - M □

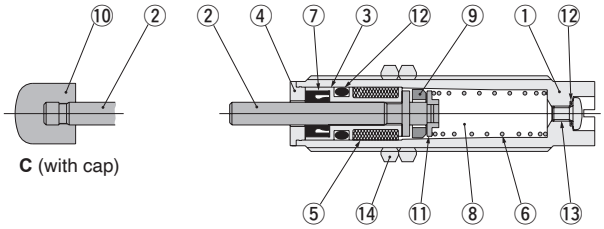
Thread size
4 : For KSHJ4
6 : For KSHJ6
8 : For KSHJ8(-01,02)
8-11 : For KSHJ8(-11,12)
10 : For KSHJ10
12 : For KSHJ12
14 : For KSHJ14
16 : For KSHJ16
18 : For KSHJ18
20 : For KSHJ20
22 : For KSHJ22
25 : For KSHJ25-01
25-11 : For KSHJ25(-11,12)
27 : For KSHJ27(-01,02)
27-11 : For KSHJ27(-11,12)
30 : For KSHJ30
33 : For KSHJ33
36 : For KSHJ36
42 : For KSHJ42
45 : For KSHJ45
48 : For KSHJ48

Note1 : The mounting nut for thread size M45 is nominal number AN09 prescribed in JIS B1554 (nuts for rolling bearings).
2 : S-KSH-M14 cannot be used when installing a stopper nut to KSHJ14×20(_C_).Please use S-KSH-M14-L.

* For the dimension diagrams of the additional parts, see pages ㊽ to ㊿.
* The stopper nut and side mount are made from mild steel (nickel plated).

Inner Construction and Major Parts and Materials

●**M4** to **M27** size (10-32UNF to 1-12UNF)
* The inch sizes are inside the ( ).



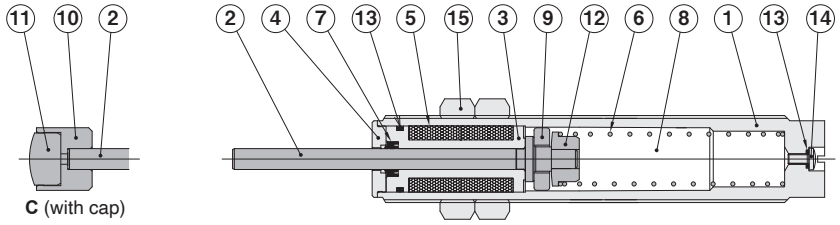
C (with cap)

Note: Some parts and interior shapes may vary depending on size.

No.	Name	Materials
①	Body[Note1]	Copper alloy (nickel plated)
②	Piston rod[Note2]	Steel (nickel plated)
③	Sleeve	Copper alloy
④	Plug	Stainless steel
⑤	Accumulator	Synthetic rubber
⑥	Spring	Spring steel
⑦	Rod seal	Synthetic rubber
⑧	Oil	Special oil
⑨	Piston ring[Note3]	Copper alloy
⑩	Cap	Plastic (POM)
⑪	Collar[Note4]	Stainless steel, copper alloy
⑫	O-ring	Synthetic rubber
⑬	Screw[Note5]	Mild steel (zinc plated)
⑭	Mounting nut	Mild steel (nickel plated)

Note1：KSHJ4, 6, and 8×4 are stainless steel
KSHJ12×15 uses free-cutting steel
2：KSHJ4×5, 8, 10×10, and 12×10 are stainless steel
3：KSHJ12×15 are stainless steel
4：KSHJ6 and 8 are copper alloy
KSHJ10 and 12, and 14×12 are sintered metal
5：KSHJ4, 6, and 8 are nickel plated

●**M14**～**M27** size　Long stroke high speed and high load type



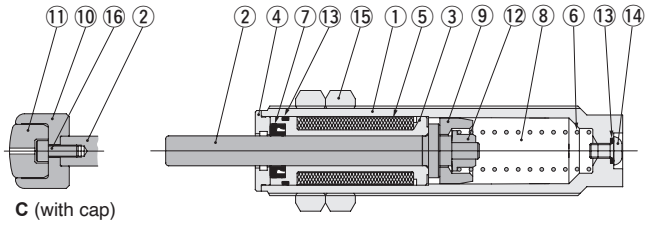
C (with cap)

Note: Some parts and interior shapes may vary depending on size

No.	Name	Materials
①	Body	Free-cutting steel (nickel plated)
②	Piston rod	Stainless steel
③	Sleeve	Copper alloy
④	Plug	Stainless steel
⑤	Accumulator	Synthetic rubber
⑥	Spring	Spring steel
⑦	Rod seal	Synthetic rubber
⑧	Oil	Special oil
⑨	Piston ring	Stainless steel
⑩	Metal cap	Stainless steel
⑪	Cap	Plastic (POM)
⑫	Collar	Stainless steel
⑬	O-ring	Synthetic rubber
⑭	Screw[Note]	Mild steel (zinc plated)
⑮	Mounting nut	Mild steel (nickel plated)

Note: KSHJ25x40, 27x40 are stainless steel

●**M30** to **M48** size (1 1/4-12UNF to 1 3/4-12UN)
* The inch sizes are inside the ( ).



C (with cap)

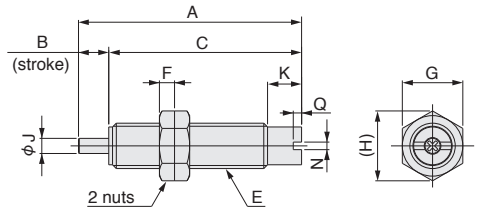
Note: Some parts and interior shapes may vary depending on size

No.	Name	Materials
①	Body	Free-cutting steel (nickel plated)
②	Piston rod	Steel (nickel plated)
③	Sleeve	Copper alloy
④	Plug	Stainless steel
⑤	Accumulator	Synthetic rubber
⑥	Spring	Spring steel
⑦	Rod seal	Synthetic rubber
⑧	Oil	Special oil
⑨	Piston ring[Note]	Copper alloy
⑩	Metal cap	Stainless steel
⑪	Cap	Plastic (POM)
⑫	Collar	Stainless steel
⑬	O-ring	Synthetic rubber
⑭	Button head screw	Stainless steel
⑮	Mounting nut	Mild steel (nickel plated)
⑯	Hexagon socket head screw	Mild steel (nickel plated)

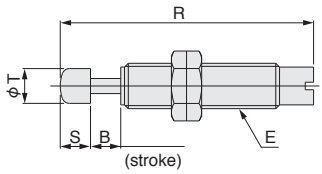
Note: KSHJ42, 45, and 48 are stainless steel

Dimensions (mm)

●**No rod end cap : KSHJ4×3, KSHJ4×5,KSHJ6×4, KSHJ6×6**

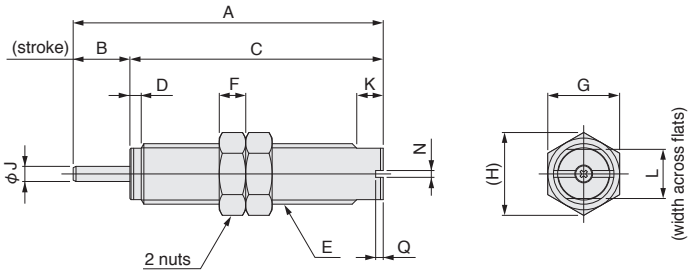


●**With rod end cap : KSHJ4×3C, KSHJ4×5C KSHJ6×4C, KSHJ6×6C**

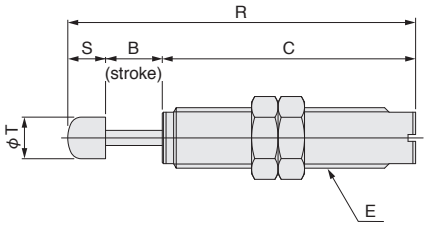


Model \ Symbol	A	B	C	E	F	G	H	J	K	N	Q	R	S	T
KSHJ4×3(C)-01,-02	25	3	22	M4×0.5	2	5.5	6.4	1.2	3	1	1.1	28.5	3.5	3.2
KSHJ4×5(C)-01,-02	32	5	27	M4×0.5	2	5.5	6.4	1.2	3	1	1.1	35.5	3.5	3.2
KSHJ6×4(C)-01,-02	29.5	4	25.5	M6×0.75	2	8	9.2	2	4.5	1	1	33.5	4	4.6
KSHJ6×6(C)-01,-02	35.5	6	29.5	M6×0.75	2	8	9.2	2	5.5	1	1	39.5	4	4.6

●**No rod end cap : KSHJ□×□-□**



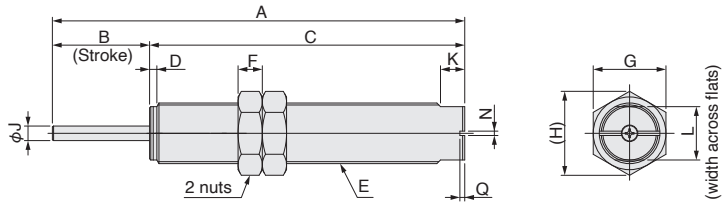
●**With rod end cap : KSHJ□×□C-□**



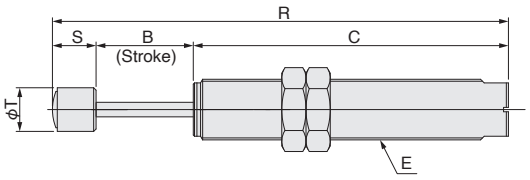
Model \ Symbol	A	B	C	D	E	F	G	H	J	K	L	N	Q	R	S	T
KSHJ8×5(C)-01	37	5	32	1.2	M8×0.75	2	10	11.5	2.5	3	7	1.3	1.5	42	5	6.5
KSHJ8×5(C)-11	37	5	32	1.2	M8×1	3	10	11.5	2.5	3	7	1.3	1.5	42	5	6.5
KSHJ8×8(C)-01,-02	46	8	38	1.2	M8×0.75	2	10	11.5	2.5	3	7	1.3	1.5	51	5	6.5
KSHJ8×8(C)-11,-12	46	8	38	1.2	M8×1	3	10	11.5	2.5	3	7	1.3	1.5	51	5	6.5
KSHJ10×10(C)-01,-02	60	10	50	2	M10×1	3	12	13.9	3	5	8.5	1.3	1.5	68	8	8
KSHJ10×15(C)-01,-03	77	15	62	2.3	M10×1	3	12	13.9	3	5	8.5	1.3	1.5	85	8	8
KSHJ12×10(C)-01,-02	66	10	56	2	M12×1	4	14	16.2	3	5	10.5	1.3	1.5	76	10	10
KSHJ12×15(C)-01,-03	77	15	62	2	M12×1	4	14	16.2	3	5	10.5	1.3	1.5	87	10	10
KSHJ14×12(C)-01,-02	72	12	60	2	M14×1.5	5	17	19.6	4	5	12	1.3	1.5	82	10	11
KSHJ16×15(C)-01,-02	82	15	67	3	M16×1.5	7	19	21.9	4	7	13	1.8	2	92	10	11
KSHJ18×16(C)-01,-02	88	16	72	3	M18×1.5	8	21	24.2	5	7	15	1.8	2	103	15	15
KSHJ20×16(C)-01,-02	93	16	77	3	M20×1.5	8	24	27.7	5	7	17	1.8	2	108	15	15
KSHJ22×25(C)-01,-02	125	25	100	3	M22×1.5	9	27	31.2	6	10	19	1.8	2	143	18	18
KSHJ25×25(C)-01	125	25	100	3	M25×1.5	10	30	34.6	6	10	22	1.8	2	143	18	18
KSHJ25×25(C)-11,-12	125	25	100	3	M25×2	10	30	34.6	6	10	22	1.8	2	143	18	18

Dimensions (mm)

●**No rod end cap : KSHJ□×□-□**

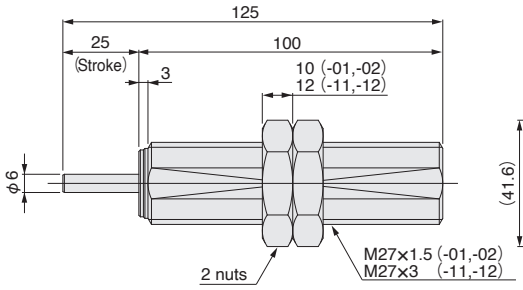


●**With rod end cap : KSHJ□×□C-□**

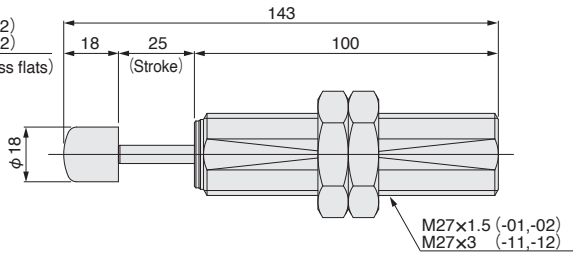


Model \ Symbol	A	B	C	D	E	F	G	H	J	K	L	N	Q	R	S	T
KSHJ14×20(C)-01,-03	103	20	83	1.8	M14×1.5	5	17	19.6	4	5	12	1.3	1.5	116	13	12
KSHJ16×20(C)-01,-03	103	20	83	3	M16×1.5	7	19	21.9	4	7	13	1.8	2	116	13	12
KSHJ18×30(C)-01,-03	137	30	107	3	M18×1.5	8	21	24.2	5	7	15	1.8	2	150	13	12
KSHJ20×30(C)-01,-03	137	30	107	3	M20×1.5	8	24	27.7	5	7	17	1.8	2	150	13	12
KSHJ22×30(C)-01,-03	137	30	107	3	M22×1.5	9	27	31.2	5	10	19	1.8	2	150	13	12
KSHJ25×40(C)-01,-03	170	40	130	3	M25×1.5	10	30	34.6	6	10	22	1.8	2	188	18	18
KSHJ25×40(C)-11,-13	170	40	130	3	M25×2	10	30	34.6	6	10	22	1.8	2	188	18	18
KSHJ27×40(C)-01,-03	170	40	130	3	M27×1.5	10	36	41.6	6	10	22	1.8	2	188	18	18
KSHJ27×40(C)-11,-13	170	40	130	3	M27×3	12	36	41.6	6	10	22	1.8	2	188	18	18

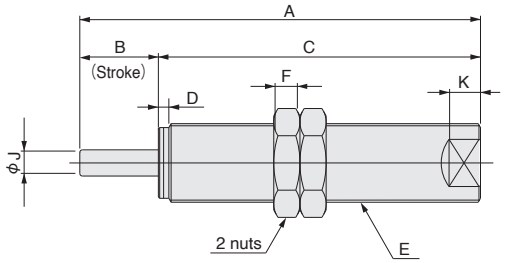
●**No rod end cap : KSHJ27×25-□**



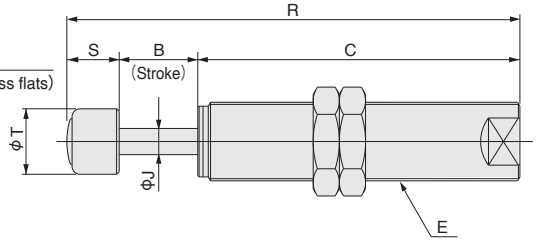
●**With rod end cap : KSHJ27×25C-□**



●**No rod end cap : KSHJ□×□-□**



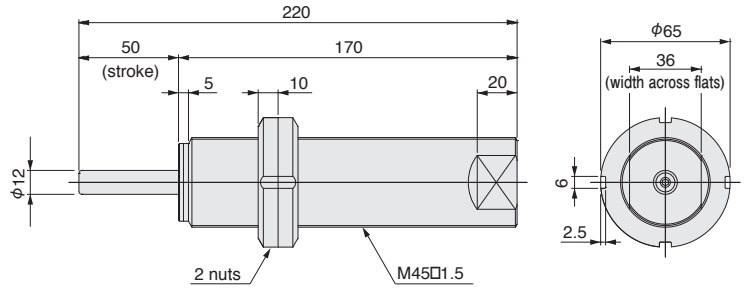
●**With rod end cap : KSHJ□×□C-□**



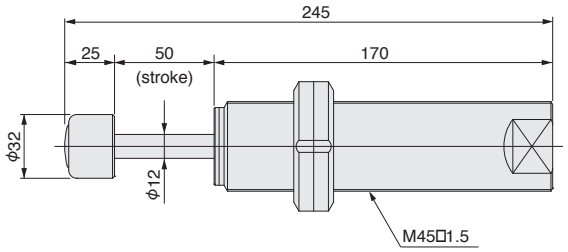
Model \ Symbol	A	B	C	D	E	F	G	H	J	K	L	R	S	T
KSHJ30×30(C)-01,-02,-03	153	30	123	4	M30×1.5	10	36	41.6	10	12	24	173	20	25
KSHJ33×30(C)-01,-02,-03	153	30	123	4	M33×1.5	10	41	47.3	10	12	27	173	20	25
KSHJ36×50(C)-01,-02,-03	218	50	168	5	M36×1.5	15	46	53.1	12	15	30	243	25	32
KSHJ42×50(C)-01,-02	220	50	170	5	M42×1.5	15	50	57.7	12	20	36	245	25	32
KSHJ42×70(C)-01,-02	275	70	205	5	M42×1.5	15	50	57.7	12	20	36	300	25	32
KSHJ48×50(C)-01,-02	230	50	180	6	M48×2	15	55	63.5	14	20	40	263	33	38

Dimensions (mm)

●No rod end cap : KSHJ45×50-01, -02

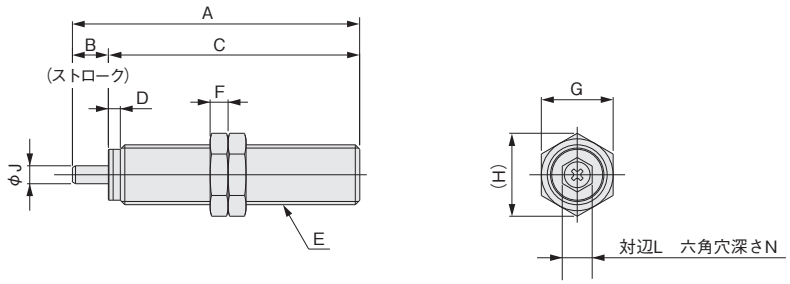


●With rod end cap : KSHJ45×50C-01, -02

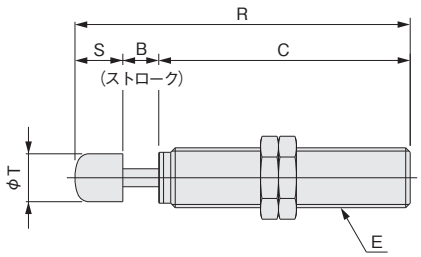


Short stroke type (with hexagon socket)

●No rod end cap : KSHJ□×□-□



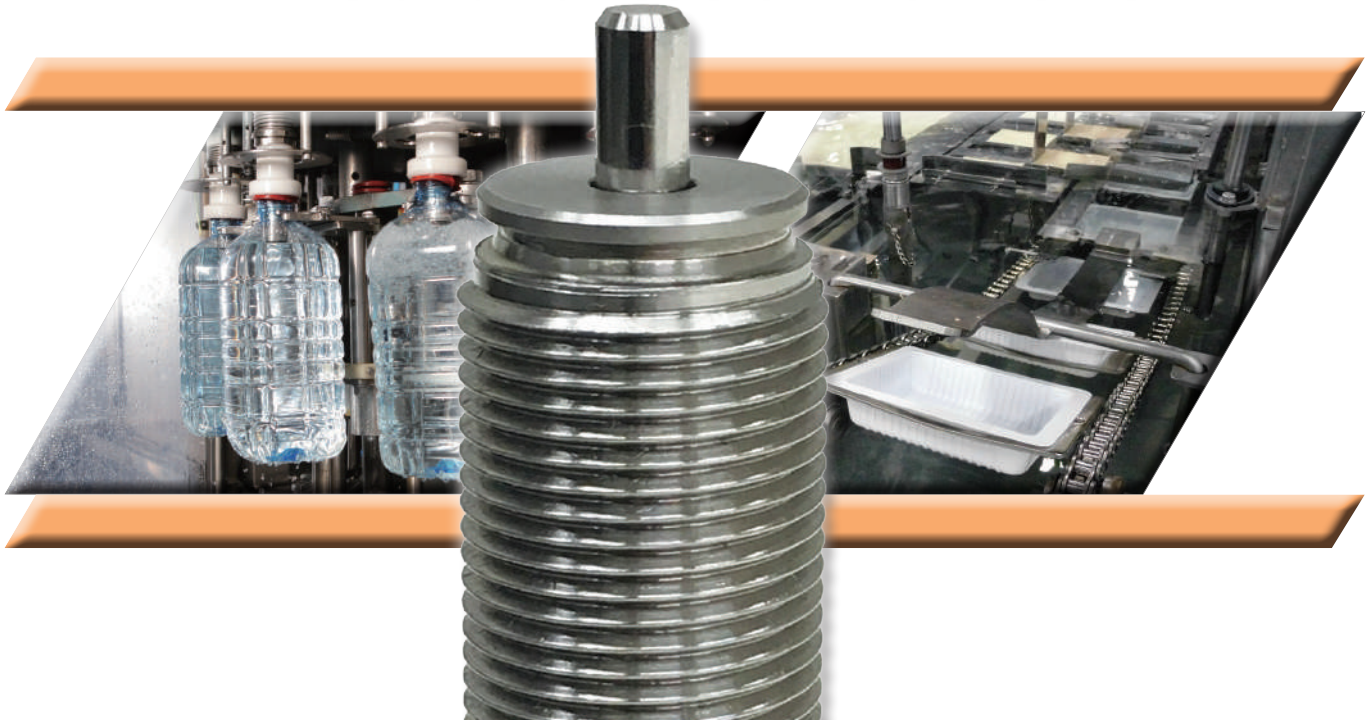
●With rod end cap : KSHJ□×□C-□



Model \ Symbol	A	B	C	D	E	F	G	H	J	L	N	R	S	T
KSHJ8×4(C)-01,-02	37	4	33	2.2	M8×0.75	2	10	11.5	2.5	4	2	42	5	6.5
KSHJ8×4(C)-11,-12	37	4	33	2.2	M8×1.0	3	10	11.5	2.5	4	2	42	5	6.5
KSHJ10×6(C)-01,-02	48	6	42	2	M10×1	3	12	13.9	3	5	3	56	8	8
KSHJ12×6(C)-01,-02	48	6	42	2	M12×1	4	14	16.2	3	6	3	58	10	10
KSHJ14×8(C)-01,-02	61	8	53	2	M14×1.5	5	17	19.6	4	6	3	71	10	11
KSHJ16×8(C)-01,-02	61	8	53	3	M16×1.5	7	19	21.9	4	6	4	71	10	11
KSHJ20×10(C)-01,-02	69	10	59	3	M20×1.5	8	24	27.7	5	6	4	84	15	15

Linear Orifice®
Protective shock absorbers
KSHW Series

Depend on Koganei shock absorbers to withstand various environments!



Linear Orifice® Protective shock absorbers KSHW series

* "Linear Orifice" is a registered trademark of Koganei Corporation.

Solve problems by absorbing impact in harsh environments, such as cutting oil, wet, or dusty conditions!

Machining Processes

Cutting oil countermeasures:
Fluorine packing

Machining chip countermeasures:
Equipped with filter

Food processing machinery

Sanitary countermeasures:
H1 oil specifications

Rust-proofing countermeasures:
Stainless steel specifications

Dust countermeasures:
Equipped with filter

Wide range of variations.
M8 to M20
6 sizes in 14 models

⚠ CAUTION Read the safety precautions on page ⑤ before using this product.

General precautions

1. The product is specified as dust-proof and drip-proof, however, the usage environment and conditions affect its service life. The expected durability may not be achieved, depending on the type and amount of dust and liquid to which the shock absorber is subjected. We recommend doing confirmation tests in advance.
2. Handle the shock absorbers so they are not scratched or dented. The drip-proof and dust-proof performance is reduced if the piston rod is scratched. Also, installing and removing the shock absorbers becomes more difficult if the body threads are scratched.
3. Shock absorbers have reached the end of their service life if the piston rod can no longer be pushed to the stroke end while in use. Stop using the shock absorber and replace it. Continuing to use a shock absorber while it cannot absorb shocks could damage it, as well as damage the base equipment itself.

Installation

1. Keep the angle of eccentricity, resulting from the load direction and the axis of the shock absorber, under the specified values on pages ㊱. If an eccentric load exceeding the specifications is applied, it could result in breakage or impaired returns. If there is concern that an eccentric load exceeding the specified values will be applied, install a guide, or similar mechanism.
2. Two or more shock absorbers can be mounted in parallel, to boost absorption capacity. In such an arrangement, however, be careful to ensure that the load is evenly distributed to each shock absorber.
3. To adjust the capacity with the stroke, adjust the stopper nut (-S) or add an external stopper.
4. The small screw on the back end of the shock absorber should never be loosened or removed. Oil may leak out of the shock absorber leading to a loss of functionality and resulting in damage to the equipment and accidents.
5. When mounting the shock absorber, always use the following maximum tightening torque guidelines. Tightening using excessive force may result in damage.

N•m [ft•lbf]

Model	Maximum tightening torque
KSHW8×5-01,-02,-11,-12	2.5 [1.844]
KSHW10×6-01,02	6.5 [4.794]
KSHW12×6-01,02	8.0 [5.901]
KSHW14×8-01,02	12.0 [8.851]
KSHW16×8-01,02	20.0 [14.752]
KSHW20×10-01,02	30.0 [22.128]

6. Ensure that the hardness of the surface directly impacting the piston rod of the shock absorber is over HRc40 hardness.
7. Be aware that performance and characteristics change depending on the operating temperature.

■ How to select shock absorbers

1. Confirm the thrust

Confirm the thrust to be used, and then check for prospective shock absorbers according to the recommended cylinder diameter chart on page ㉞ . If you use a shock absorber that is smaller than the recommended size, you many not get the expected operation cycles.

2. Confirm the kinetic energy

Confirm Ⅰ and Ⅱ below, and then check pages ㉟ for the selection graphs for prospective shock absorbers from [1. Confirm the thrust]. (*)

Ⅰ Impact object mass: m [kg [lb]]

Ⅱ Impact speed: v [m/s [ft/sec]]

Because " v " is the impact speed, not the average speed, when using a cylinder,

v = m [cylinder stroke] ÷ s [operating time] × 2

Select a model in which Ⅰ and Ⅱ fit within the range enclosed by the capacity curves.

If multiple models are applicable, use the model that is closest to both the capacity curves and the operating conditions. The further the model you select is from the capacity curves and the operating conditions, the slower it will tend to be.

3. Confirm other specifications

Confirm that such specifications as the maximum operating frequency, maximum absorption capacity per unit of time, angle of eccentricity, and operating temperature range are within the range for the shock absorber that you selected.

* The value for the kinetic energy, E, can be found by doing the following calculation. However, the shock absorber's capacity for absorption changes depending on the impact speed. When the shock absorber is doing low-speed operations, it has less drag than when it is doing high-speed operations.

The maximum absorption capacity that is noted in the specifications is reached only at the maximum impact speed. Therefore, do not choose a shock absorber by comparing E to the maximum absorption capacity; confirm the capacity using the selection graph.

$$E=\frac{1}{2}mv^2$$

E: Kinetic energy (J [ft・lbf])
m: Impact object mass [kg [lb]]
v: Impact speed (m/s [ft/sec])

Range in the selection graph

Vertical axis range :

Maximum impact speed ≧ v Impact speed (operating condition)

Horizontal axis range :

Shock absorber's maximum absorption capacity at the impact speed (v = m/s [ft/sec]) ≧ E Kinetic energy (operating condition)

Calculating the thrust energy is not necessary because the size of the shock absorber is limited by the thrust in step 1.

■ Example of selecting a shock absorber

[Operating conditions]

①Bore size of the cylinder being used: ϕ16 [0.630]
②Cylinder stroke: 100 mm [3.9 in.] = 0.1 m [0.328 ft]
③Pressure applied to the cylinder: 0.6 MPa [87 psi]
④Cylinder's operating time: 0.4 s
⑤Impact object mass: 7 kg [15.432 lb]

1. Confirm the thrust

Either calculate or find the thrust in the cylinder thrust table on page ㉞.

The cylinder thrust based on ① and ③ is about 121 N.

Cylinder thrust	100.5 N [22.6 lbf]	<	120.6 N [27.1 lbf]	<	126 N [28.3 lbf]
Cylinder bore size	ϕ16 [0.630]		ϕ16 [0.630]		ϕ20 [0.787]
Applied pressure	0.5 MPa [73 psi]		0.6 MPa [87 psi]		0.4 MPa [58 psi]

As mentioned above, although the cylinder being used is ϕ 16 [0.630], the pressure applied to the cylinder exceeds 0.5 MPa [73 psi], so consider the ϕ 20 [0.787] cylinder (lower than 0.4 MPa [58 psi]) and check the table of recommended cylinder bore sizes on page ㉞ .

The following are prospective models.

• KSHW10×6 • KSHW12×6 • KSHW14×8
• KSHW16×8

2. Confirm the kinetic energy

Ⅰ The impact object mass m = 7 kg [15.432 lb] from ⑤

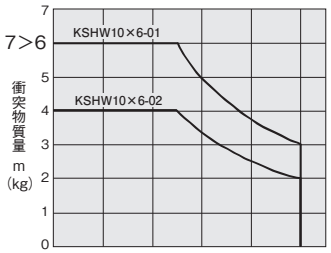
Ⅱ Find the impact speed, v, from ② and ④ .

v = ② 0.1 m [0.328 ft] ÷ ④ 0.4 s × 2
= 0.5 m/s [1.640 ft/sec]

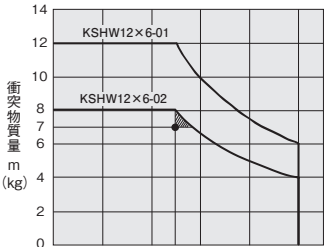
According to the selection graphs on pages ㉟ , the shock absorber with the optimum absorption capacity for operating conditions is KSHJ12×6-02.

1 kg = 35.274 oz
1 m/s = 3.280 ft/sec

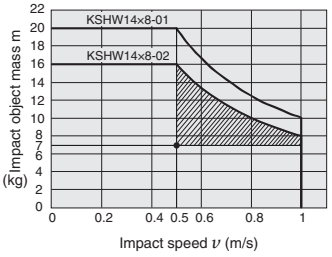
● **KSHW10×6**



● **KSHW12×6**



● **KSHW14×8**



• KSHW10×6 … Inadequate absorption capacity
• KSHW12×6-01 … KSHW12×6-02 is closer to the usage conditions and capacity curves.

• The absorption capacities for all of the other shock absorbers are higher than that of KSHW12×6-02, so they do not fall within the operating conditions and capacity curves.

3. Confirm other specifications

Verify that other operating conditions, such as the maximum operating frequency, maximum absorption capacity per unit of time, angle of eccentricity, and operating temperature range, are within the specified ranges for KSHW12×6-02.

■ Recommended cylinder bores

Model \ Cylinder bore size	φ8 [0.315]	φ10 [0.394]	φ12 [0.472]	φ16 [0.630]	φ20 [0.787]	φ25 [0.984]	φ32 [1.260]	φ40 [1.575]	φ50 [1.969]
KSHW8×5	◇	◎	◎	○					
KSHW10×6		◇	◎	◎	○				
KSHW12×6			◇	◎	◎	○			
KSHW14×8				◇	◎	◎	○		
KSHW16×8					◇	◎	◎	○	
KSHW20×10						◇	◎	◎	○

◇ : over 0.3 MPa [44 psi]　◎ : under 0.5 MPa [73 psi]　○ : under 0.4 MPa [58 psi]

Note: If you use a shock absorber that is smaller than the recommended size, it could be damaged and get fewer than the guaranteed operation cycles.

■ Cylinder thrust

Cylinder bore size	Pressure area mm² [in²]	Air pressure MPa [psi]								
		0.1 [15]	0.2 [29]	0.3 [44]	0.4 [58]	0.5 [73]	0.6 [87]	0.7 [102]	0.8 [116]	0.9 [131]
φ 8 [0.315]	50.3 [0.078]	5	10.1	15.1	20.1	25.1	30.2	35.2	40.2	45.2
φ 10 [0.394]	78.5 [0.122]	7.9	15.7	23.6	31.4	39.3	47.1	55	62.8	70.7
φ 12 [0.472]	113 [0.2]	11.3	22.6	33.9	45.2	56.5	67.9	79.2	90.5	101.8
φ 16 [0.630]	201 [0.3]	20.1	40.2	60.3	80.4	100.5	121	141	161	181
φ 20 [0.787]	314 [0.5]	31.4	62.8	94.2	126	157	188	220	251	283
φ 25 [0.984]	491 [0.8]	49.1	98.2	147	196	245	295	344	393	442
φ 32 [1.260]	804 [1.2]	80.4	161	241	322	402	483	563	643	724
φ 40 [1.575]	1257 [2]	126	251	377	503	628	754	880	1005	1131
φ 50 [1.969]	1963 [3]	196	393	589	785	982	1178	1374	1571	1767

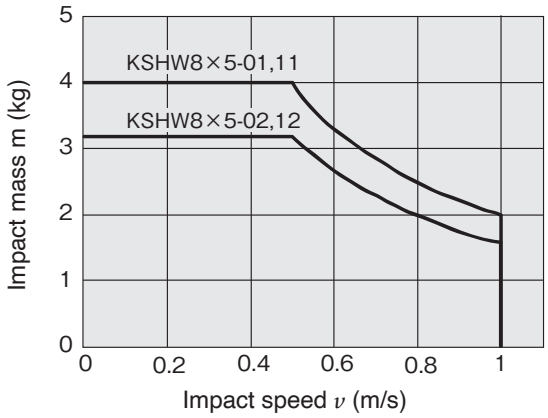
Precautions when using the selection graph

1. Selection graph data is calculated with 0.5 MPa [73 psi] for the air pressure used in cylinders.
2. The values on the selection graphs are for room temperature (20 to 25℃ [68 to 77°F]). Be aware that performance and characteristics change depending on the operating temperature.
3. Select a shock absorber that is under and near the capacity curve.

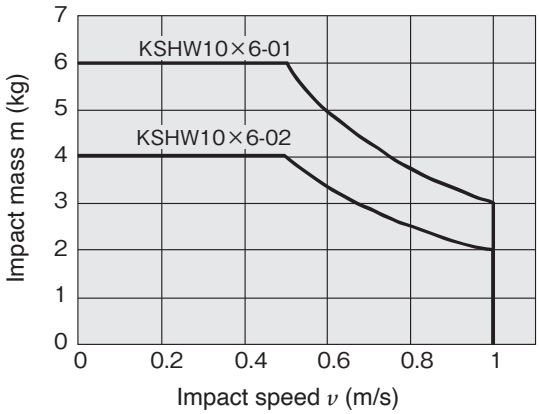
■ Selection graph

1 kg = 35.274 oz
1 m/s = 3.280 ft/sec

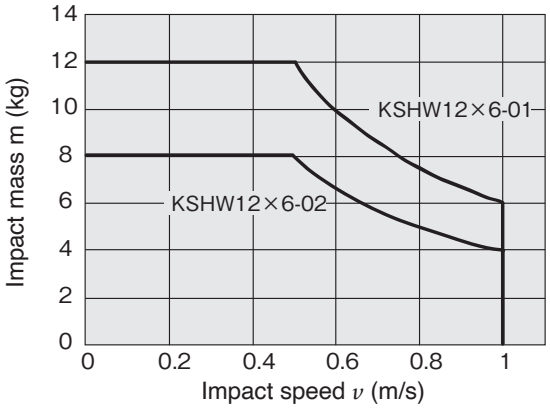
● KSHW8×5



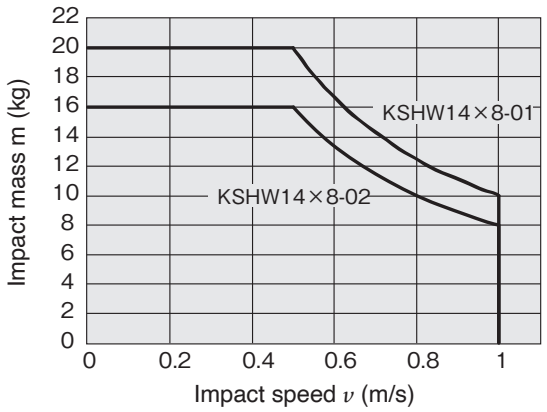
● KSHW10×6



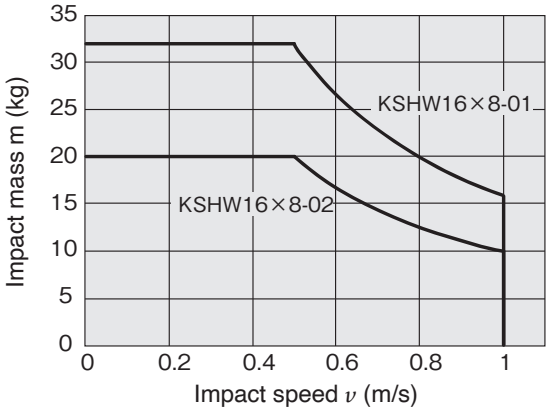
● KSHW12×6



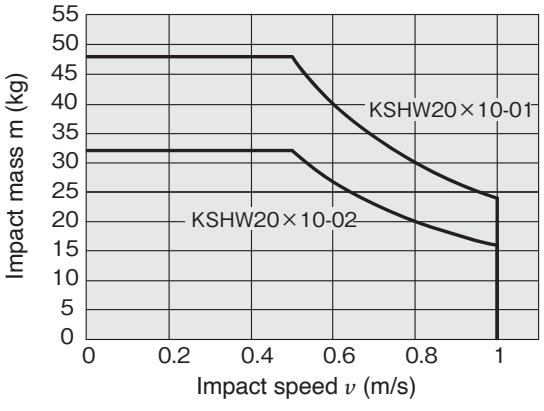
● KSHW14×8



● KSHW16×8

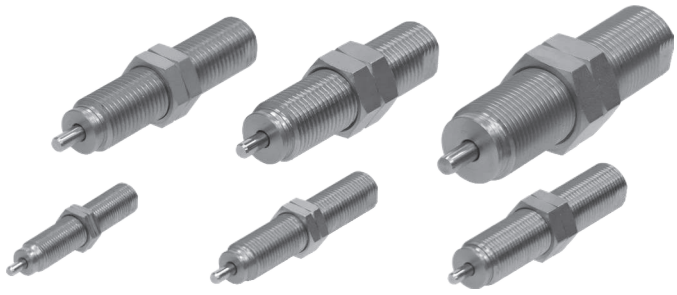


● KSHW20×10



Linear Orifice Protective Shock Absorbers

KSHW series



Specifications

Item \ Model	KSHW8×5-01,-11	KSHW8×5-02,12	KSHW10×6-01	KSHW10×6-02
Maximum absorption capacity J [ft•lbf]	1 [0.738]	0.8 [0.590]	1.5 [1.106]	1 [0.738]
Absorption stroke mm [in.]	5 [0.197]		6 [0.236]	
Impact speed range m/s [ft/sec]	0.1 to 1.0 [0.328 to 3.280]			
Maximum operating frequency cycle/min	60			
Maximum absorption per unit of time J/min	20		30	
Spring return force[Note 1] N [lbf]	9 [2.023]		11 [2.473]	
Deflection angle	1° or less			
Operating temperature range[Note 2] ℃ [°F]	0 to 60 [32 to 140]			

Item \ Model	KSHW12×6-01	KSHW12×6-02	KSHW14×8-01	KSHW14×8-02
Maximum absorption capacity J [ft•lbf]	3 [2.213]	2 [1.475]	5 [3.688]	4 [2.950]
Absorption stroke mm [in.]	6 [0.236]		8 [0.315]	
Impact speed range m/s [ft/sec]	0.1 to 1.0 [0.328 to 3.280]			
Maximum operating frequency cycle/min	60			
Maximum absorption per unit of time J/min	45		60	
Spring return force[Note 1] N [lbf]	10 [2.248]		13 [2.923]	
Deflection angle	1° or less			
Operating temperature range[Note 2] ℃ [°F]	0 to 60 [32 to 140]			

Item \ Model	KSHW16×8-01	KSHW16×8-02	KSHW20×10-01	KSHW20×10-02
Maximum absorption capacity J [ft•lbf]	8 [5.901]	5 [3.688]	12 [8.851]	8 [5.901]
Absorption stroke mm [in.]	8 [0.315]		10 [0.394]	
Impact speed range m/s [ft/sec]	0.1 to 1.0 [0.328 to 3.280]			
Maximum operating frequency cycle/min	40			
Maximum absorption per unit of time J/min	80		120	
Spring return force[Note 1] N [lbf]	13 [2.923]		21.5 [4.833]	
Deflection angle	1° or less			
Operating temperature range[Note 2] ℃ [°F]	0 to 60 [32 to 140]			

Note 1: The spring return force is the force of the piston rod returning after a full stroke, it is not consistent so cannot be used as a function.

2: The absorption capacity of shock absorbers increases and decreases depending on speed and ambient temperature. Always use one that is within the range shown by the capacity curve on the selection graphs on page ㉟.

Mass

g [oz]

Model	Body[Note 1]	Weight of additional parts			
		Mounting nut (per piece)		Stopper nut	
		Mild steel, nickel plated	Stainless steel	Mild steel, nickel plated	Stainless steel
KSHW8×5-01,-02,-11,-12	10 [0.353]	0.6 [0.021] (0.9 [0.032])[Note 2]	0.6 [0.021] (0.9 [0.032])	4 [0.141]	4 [0.141]
KSHW10×6-01.-02	21 [0.741]	1.2 [0.042]	1.2 [0.042]	7 [0.247]	7 [0.247]
KSHW12×6-01,-02	34 [1.199]	1.9 [0.067]	1.9 [0.067]	8 [0.282]	9 [0.317]
KSHW14×8-01,-02	52 [1.834]	4 [0.141]	4.5 [0.159]	15 [0.529]	16 [0.564]
KSHW16×8-01,-02	68 [2.399]	6.6 [0.233]	7.5 [0.265]	28 [0.988]	31 [1.093]
KSHW20×10-01,-02	139 [4.9]	12.2 [0.430]	13 [0.459]	55 [1.940]	57 [2.011]

Calculation example: The weight of the KSHW10×6-01-PS (with stainless steel mounting nut and stainless steel stopper nut) is
21 [0.741] + 1.2 [0.042] × 2 + 7 [0.247] = 30.4 g [1.072 oz].

Note 1: Body weight is the weight of the shock absorber only. The mounting nut weight is not included.

2: (0.9 [0.032]) is the weight of the mounting nut for the KSHW8×5-11 and -12.

Order Codes

KSHW □ - □ - □

KSHW Series
Linear Orifice
Protective Shock
Absorbers

Body thread size x Stroke

8×5 · · · **M8×0.75**
5 mm [0.197 in.] stroke

10×6 · · · **M10×1**
6 mm [0.236 in.] stroke

12×6 · · · **M12×1**
6 mm [0.236 in.] stroke

14×8 · · · **M14×1.5**
8 mm [0.315 in.] stroke

16×8 · · · **M16×1.5**
8 mm [0.315 in.] stroke

20×10 · · · **M20×1.5**
10 mm [0.394 in.] stroke

Thread pitch and absorption capacity
01: For heavy loads
02: For light loads
11: For heavy loads with different thread pitches
12: For light loads with different thread pitches
(11 and 12 are set for 8×5 only, M8×1)

Mounting nut and stopper nut
Blank: 2 mounting nuts (mild steel, nickel plated)
S : 2 mounting nuts + 1 stopper nut (mild steel, nickel plated)
P : 2 mounting nuts (stainless steel)
PS : 2 mounting nuts + 1 stopper nut (stainless steel)

Additional Parts

● Hex nut (stainless) (1 bag, 10 pcs.)

PN - KSH - M □ - □

Thread pitches applicable to M8 only
Blank: M8×0.75
11: M8×1.0

Body thread size
8: For KSHW8
10: For KSHW10
12: For KSHW12
14: For KSHW14
16: For KSHW16
20: For KSHW20

● Stopper nut (stainless)

PS - KSH - M □ - □

Thread pitches applicable to M8 only
Blank: M8×0.75
11: M8×1.0

Body thread size
8: For KSHW8
10: For KSHW10
12: For KSHW12
14: For KSHW14
16: For KSHW16
20: For KSHW20

● Hex nut (mild steel, nickel plated) (1 bag, 10 pcs.)

N - KSH - M □ - □

Thread pitches applicable to M8 only
Blank: M8×0.75
11: M8×1.0

Body thread size
8: For KSHW8
10: For KSHW10
12: For KSHW12
14: For KSHW14
16: For KSHW16
20: For KSHW20

● Stopper nut (mild steel, nickel plated)

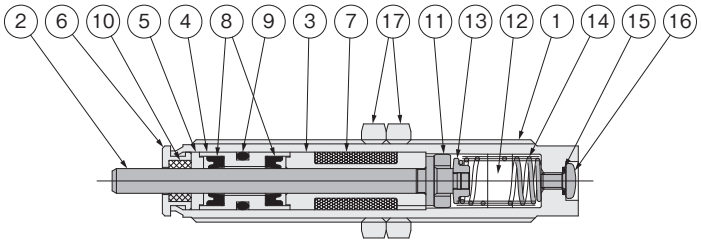
S - KSH - M □ - □

Thread pitches applicable to M8 only
Blank: M8×0.75
11: M8×1.0

Body thread size
8: For KSHW8
10: For KSHW10
12: For KSHW12
14: For KSHW14
16: For KSHW16
20: For KSHW20

*For the dimension diagrams of the additional parts, see pages ㊽ to ㊾.

Inner Construction and Major Parts

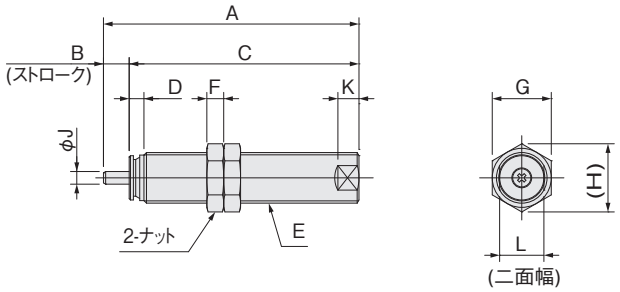


No.	Name	Material
①	Unit	Stainless steel
②	Piston rod	Special steel
③	Sleeve	Copper alloy
④	Seal	Copper alloy
⑤	Bearing	Copper alloy
⑥	Plug	Stainless steel
⑦	Accumulator	Fluoro rubber
⑧	Rod packing	Fluoro rubber

No.	Name	Material
⑨	O-ring	Fluoro rubber
⑩	Filter	Resin
⑪	Piston ring	Stainless steel
⑫	Oil	Special oil
⑬	Collar[Note 1]	Stainless steel
⑭	Spring	Spring steel
⑮	O-ring	Fluoro rubber
⑯	Screw	Mild steel (zinc plated)
⑰	Mounting nut[Note 2]	Mild steel (nickel plated) or stainless steel

Note 1: KSHW8 is copper alloy, KSHW10 and 12 are sintered metal
Note 2: The material can be selected.

Dimensions (mm [in.])



Model \ Symbol	A	B	C	D	E	F	G	H	J	K	L
KSHW8X5(C)-01,-02	44 [1.732]	5 [0.197]	39 [1.535]	3.5 [0.138]	M8×0.75	2 [0.079]	10 [0.394]	11.5 [0.453]	2.5 [0.098]	3 [0.118]	7 [0.276]
KSHW8X5(C)-11,-12	44 [1.732]	5 [0.197]	39 [1.535]	3.5 [0.138]	M8×1	3 [0.118]	10 [0.394]	11.5 [0.453]	2.5 [0.098]	3 [0.118]	7 [0.276]
KSHW10X6(C)-01,-02	56.5 [2.224]	6 [0.236]	50.5 [1.988]	3.5 [0.138]	M10×1	3 [0.118]	12 [0.472]	13.9 [0.547]	3 [0.118]	5 [0.197]	8.5 [0.335]
KSHW12X6(C)-01,-02	60.5 [2.382]	6 [0.236]	54.5 [2.146]	3.5 [0.138]	M12×1	4 (3)[Note] [0.157(0.118)]	14 [0.551]	16.2 [0.638]	3 [0.118]	5 [0.197]	10.5 [0.413]
KSHW14X8(C)-01,-02	70 [2.756]	8 [0.315]	62 [2.441]	4 [0.157]	M14×1.5	5 [0.197]	17 [0.669]	19.6 [0.772]	4 [0.157]	5 [0.197]	12 [0.472]
KSHW16X8(C)-01,-02	70 [2.756]	8 [0.315]	62 [2.441]	4 [0.157]	M16×1.5	7 [0.276]	19 [0.748]	21.9 [0.862]	4 [0.157]	7 [0.276]	13 [0.512]
KSHW20X10(C)-01,-02	86 [3.386]	10 [0.394]	76 [2.992]	4 [0.157]	M20×1.5	8 [0.315]	24 [0.945]	27.7 [1.091]	5 [0.197]	7 [0.276]	17 [0.669]

Note: Values in ( ) are dimensions of stainless steel mounting nut.

Evaluation of Drip-Proof and Dust-Proof Performance (KSHW Series Protective Shock Absorbers)

The product is specified as dust-proof and drip-proof, however, the usage environment and conditions affect its service life.
At Koganei, we have confirmed 1,000,000 operation cycles using the durability test described below.
The expected durability may not be achieved, depending on the type and amount of dust and liquid to which the shock absorber is subjected.
We recommend doing confirmation tests in advance.

● **Testing procedure**

As shown in the diagram on the right, a space was formed on the stroke end of the shock absorber to collect liquid or dust.
We confirmed that the damage or abnormalities listed below did not occur.

- Oil leakage
- Piston rod return failure
- Piston rod stroke abnormality (Stroke not reaching end)
- Loose plug or ejection of internal parts
- Extreme reduction in stroke due to occurrence of drag

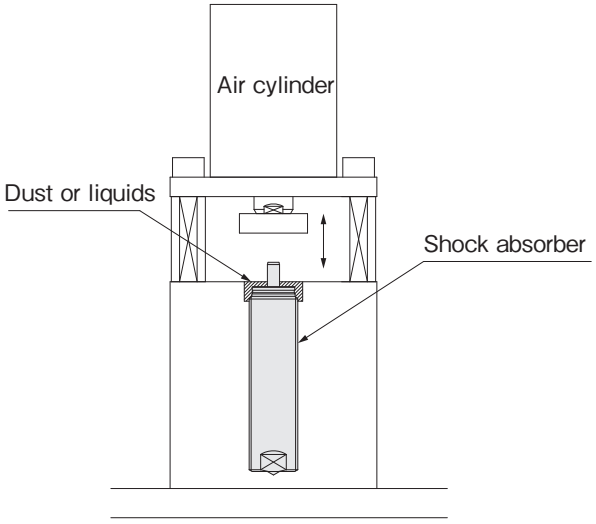
● **Testing conditions**

Operating frequency: 30 cycle/min

Types of liquid and dust

① Tap water
② Water-based cutting fluid: Daphne Alpha Cool EW (30x dilution)
③ Turbine oil: Mobile DTE Oil Light
④ Dust: JIS Test Powder 1 (1 type)

● **Overview of test equipment for drip-proof and dust-proof performance**



Side load resistant Linear Orifice® Shock Absorber
KSHY Series

The KSHY series eliminates concerns about
absorbing shocks from rotating loads!

Side load resistant Linear Orifice®
Shock Absorber NEW KSHY Series

* "Linear Orifice" is a registered trademark of Koganei Corporation.
* Specifications in inches are not available.

New release of our linear orifice models for shock absorbers with side load resistant!

This shock absorber lineup consists of 7 thread sizes from M6 to M20

Maximum of more than 2 million operation cycles!

The unique linear orifice structure, which is used in many applications, provides a long service life

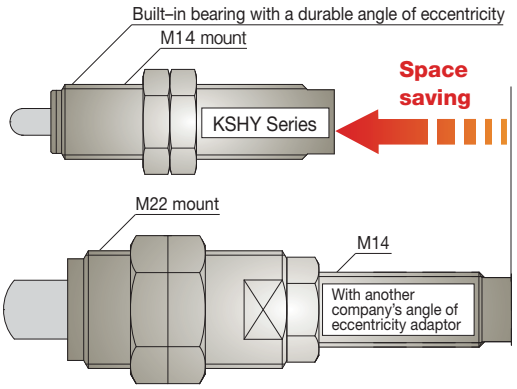
Cap can also be selected as an option

Compliant with H1 grade food equipment specifications!

Uses NSF H1 grade oil (non silicon).

Contributes to space saving!

Integrated a main unit and a side load bearing.
Can be used without an adaptor to handle rotary side load!



* Illustration

Since you do not need an adaptor, you can also save space with the mounting unit (screw hole)!

With cap

Wide range of variations
M6 to M20
7 sizes 132 models

With cap

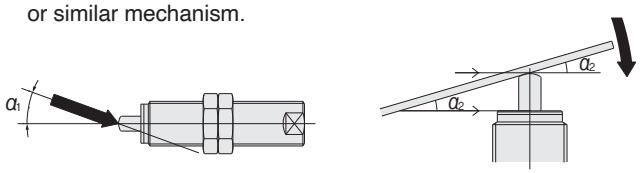
CAUTION Read the safety precautions on page ⑤ before using this product.

General precautions

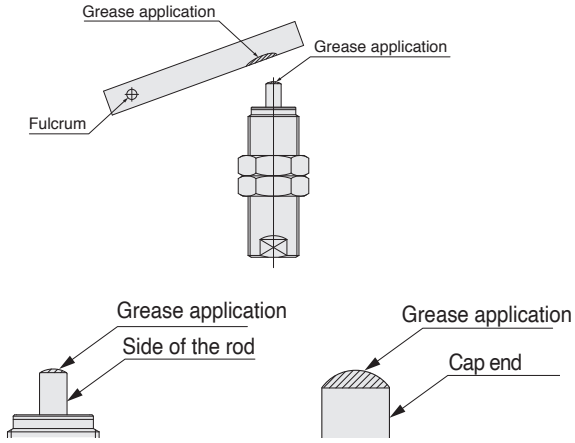
Cover the unit when mounting it in locations where it might be subject to excessive dust, dripping water, dripping oil, etc. Dents, scratches, water, oil, or dust on the piston rod results in damage and decreases service life.

Mounting

1. Keep the angle of eccentricity, resulting from the load direction and the axis of the shock absorber, under the specified values on page ㊿. If an eccentric load exceeding the specifications is applied, it could result in breakage or impaired returns. If there is concern that an eccentric load exceeding the specified values will be applied, install a guide, or similar mechanism.



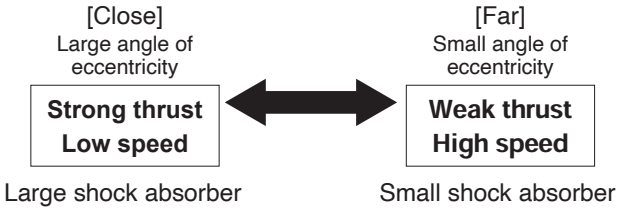
2. For swing impacts, the ends of the piston rod and the cap wear down due to the sliding between the contact area and the tip of the shock absorber. Although you can reduce wear by applying grease, observe the following precautions when applying grease.



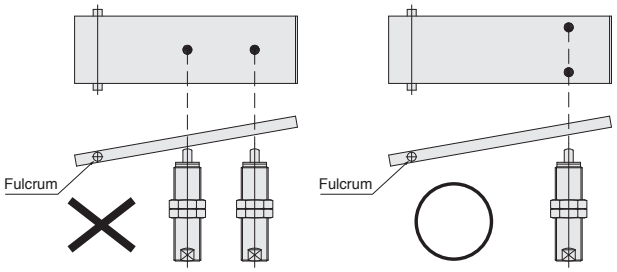
* Grease application: Apply a small amount and spread it thinly.
* Wipe off the grease if it gets stuck to the cap end or the side of the rod.
* If grease gets inside the body of the shock absorber and excessively increases its inner volume, the pressure inside the shock absorber will rise when absorbing an impact and cause damage due to the plug popping out, or other similar situations. Make sure not to apply grease excessively.

3. Ensure that the hardness of the surface directly impacting the piston rod of the shock absorber is over HRc40 hardness (excluding models with cap). We also recommend a surface roughness of Ry6.3 or less.

4. Angle of eccentricity specification shock absorbers can be used very effectively if they are mounted at a position far from the center of rotation. However, use shock absorbers with a thrust stronger than the returning force of the spring (return force of the piston rod).

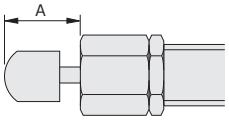


5. Two or more shock absorbers can be mounted in parallel, to boost absorption capacity. However, keep the distances from the center of rotation to each shock absorber equal. Also, have the load applied evenly between each shock absorber.



6. To adjust the capacity with the stroke, adjust the stopper nut (-S) or add an external stopper.

7. If using with a cap, always mount a stopper nut (-S) or an external stopper to ensure that the cap is not subjected to loads at the stroke end. Install the mounting position of the stopper nut such that A ≤ the stroke of the shock absorber. You can use it without a stopper nut or external stopper, but over the long-term, the stop location changes due to cap deformation and wear.



8. The small screw on the back end of the shock absorber should never be loosened or removed. Oil may leak out of the shock absorber leading to a loss of functionality and resulting in damage to the equipment and accidents.

9. When mounting the shock absorber, always use the following maximum tightening torque guidelines. Tightening using excessive force may result in damage.

Model	Maximum tightening torque
KSHY6 × 4 (C)-01,-02	0.85
KSHY8 × 5 (C)-01,-02,-11,-12	2.5
KSHY10 × 6 (C)-01,02	6.5
KSHY12 × 6 (C)-01,02	8.0
KSHY14 × 8 (C)-01,02	12.0
KSHY16 × 8 (C)-01,02	20.0
KSHY20 × 10 (C)-01,02	30.0

10. Be aware that performance and characteristics change depending on the operating temperature.

■ How to select durable angle of eccentricity shock absorbers

1. Confirm the thrust
   Choose a shock absorber from its allowable thrust.

2. Confirm the angle of eccentricity
   Confirm that the shock absorber selected in step 1 can be used under the allowable angle of eccentricity.

3. Confirm the absorption capacity
   Confirm that the absorption capacity of the shock absorber is sufficient.
   - 3-1. Confirm the impact speed
   - 3-2. Confirm the absorption capacity of the shock absorber
   - 3-3. Calculate the moment of inertia
   - 3-4. Calculate the kinetic energy

4. Confirm other specifications
   Confirm any specifications other than the angle of eccentricity and absorption capacity.

1. Confirm the thrust

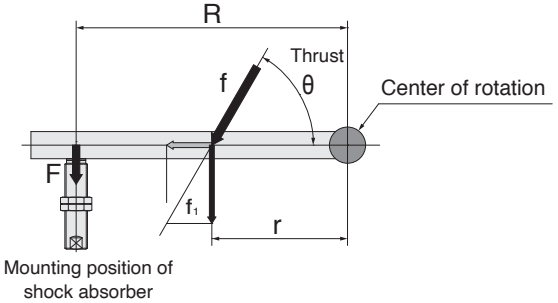
The thrust that is applied to the shock absorber (F) should be weaker than the allowable thrust. If a thrust stronger than the allowable thrust is used, the shock absorber may be damaged in fewer operation cycles than the guaranteed life. See page ㊿ for the values of allowable thrust.

● When using an rotating actuator

$F = T \div R$

T: Torque of the rotating actuator [N·m]
R: Shock absorber's mounting radius (the distance from the center of rotation to the shock absorber) [m]
F: Force at the point of distance Rm (thrust applied to the shock absorber) [N]

●When using a linear actuator



$f_1 = f \times \sin\theta$
$T = f_1 \times r = F \times R$
$F = (f \times \sin\theta \times r) \div R$

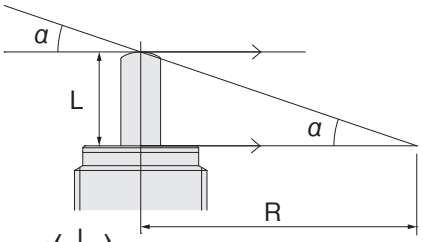
f : Thrust of linear actuator [N]
f_1: Force acting on the direction of rotation [N]
r : Mounting position of actuator's end [m]

If the value for F is greater than the allowable thrust, do the following countermeasures.
- Use a larger size shock absorber
- Make R, the mounting radius, larger

2. Confirm the angle of eccentricity

Confirm whether the approximate value for angle of eccentricity of the prospective shock absorbers may be less than 10°. Finally, you should check on the device's drawings since, in actuality, the angles for even the same radii may differ, depending on the shapes and the mounting methods.

If a workpiece is installed so that it contacts the plug of the shock absorber, in parallel, at the stroke end, its approximate angle of eccentricity and minimum mounting radius are as follows.
These are not the actual values because the rotating parts have some thickness.
These are reference values for when you are making a selection.



$10° \geqq \alpha = \tan^{-1}\left(\frac{L}{R}\right)$

L: Shock absorber's stroke [mm]
R: Shock absorber's mounting radius [mm]
α : Deflection angle [°]

Model	Stroke[mm]	Allowable angle of eccentricity	Minimum mounting radius [mm]
KSHY6 × 4 (C)	4	10° or less	22.7
KSHY8 × 5 (C)	5		28.4
KSHY10 × 6 (C)	6		34
KSHY12 × 6 (C)			
KSHY14 × 8 (C)	8		45.4
KSHY16 × 8 (C)			
KSHY20 × 10 (C)	10		56.7

If the allowable angle of eccentricity is exceeded, do the following countermeasures, and then do [1. Confirm the thrust] again.
- Make R, the mounting radius, larger
- Use a smaller size shock absorber

3. Confirm the absorption capacity

3-1. Confirm the impact speed

$$\text{Angular velocity } \omega \text{ [rad/s]} = \frac{\text{Swing angle [rad]}}{\text{Target swing time [s]}} \times 2^{\text{Note}}$$

Swing angle [°] $\times \pi \div 180$ = Swing angle [rad] ($90° \fallingdotseq 1.57$rad)

Velocity at the shock absorber's mounting position

$V[m/s] = R \times \omega \leqq$ Maximum impact speed (1 m/s)

Note: Because the impact speed, not the average speed, is needed, calculate with twice the value of this.

3-2. Confirm the absorption capacity of the shock absorber

If you are using the impact speed, V, found in step 3-1, confirm the exhibited absorption capacity of the shock absorber (e.g. [J]) on the selection graph on page ㊼. The maximum absorption capacity is reached only when used at the maximum impact speed. The absorption capacity of the shock absorber changes, depending on the operating speed, because the drag of the oil is strong when the flow rate is fast and weak when the flow rate is slow.

3-3. Calculate the moment of inertia

Find the moment of inertia for the impact object I [kg·m^2] to calculate the kinetic energy. If the impact object is rotating, you cannot make a selection by only using the impact object mass because the kinetic energy differs depending on the shape, even if the weight is the same. Calculate the approximate value by referring to the diagram for calculating the moment of inertia (pages ㊽ to ㊾).

3-4. Calculate the kinetic energy

Confirm that the kinetic energy of the impact object is less that the absorption capacity of the shock absorber.

$$\text{Kinetic energy of the impact object E [J]} = \frac{1}{2} I\omega^2 \leqq Ex$$

Calculating the thrust energy is not necessary because the shock absorber was selected from the allowable thrust in step 1. Assume that the absorption capacity = the allowable kinetic energy.

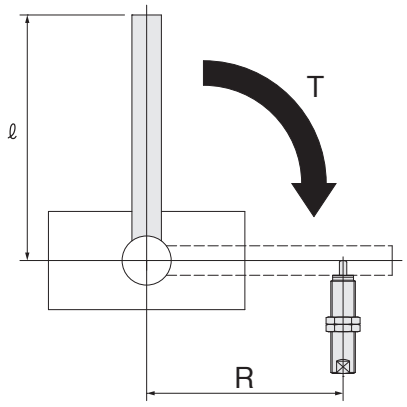
4. Confirm other specifications

Confirm such specifications as the maximum operating frequency, maximum absorption per unit of time, and operating temperature range.

Example selection 1: Using a rotary actuator

<Operating conditions>

When the impact object is a rod



① Torque of rotating actuator: T = 5[N·m]
② Absorber's mounting radius: R = 50[mm] = 0.05[m]
③ Impact object mass: m = 3[kg]
④ Length from the center of rotation to the end of the rod:
ℓ = 120[mm] = 0.12[m]
⑤ Angle of rotation: 90°
⑥ Target swing time: 0.5[s]

1. Confirm the thrust

Find the thrust, F, that is applied to the shock absorber.

F = T ÷ R

= ① 5[N・m] ÷ ② 0.05[m]

= 100[N]

Make a selection from a model (KSHY10 or higher) for an allowable thrust of 100 N or more.

(Refer to page ㊿ for specifications.)

2. Confirm the angle of eccentricity

Confirm whether the angle of eccentricity is less than the allowable angle of eccentricity (10°).

Assume that KSHY10×6 (body thread size: M10, stroke: 6 mm) is used.

$$\alpha = \tan^{-1}\left(\frac{L}{R}\right)$$

$$= \tan^{-1}\left(\frac{6[mm]}{② 50[mm]}\right)$$

≒6.84°<10°

3. Confirm the absorption capacity

3-1. Confirm the impact speed

Calculate the velocity at which the impact object impacts the shock absorber.

Swing angle [°] × π ÷ 180 = Swing angle [rad]

⑤ 90[°] × π ÷ 180≒1.57rad

$$\text{Angular velocity } \omega \text{ [rad/sec]} = \frac{\text{Swing angle [rad]}}{\text{Target swing time [s]}} \times 2$$

$$\omega = \frac{1.57[rad]}{⑥ 0.5[s]} \times 2$$

≒6.28[rad/s]

Velocity, V, of the shock absorber's mounting position [m/s]

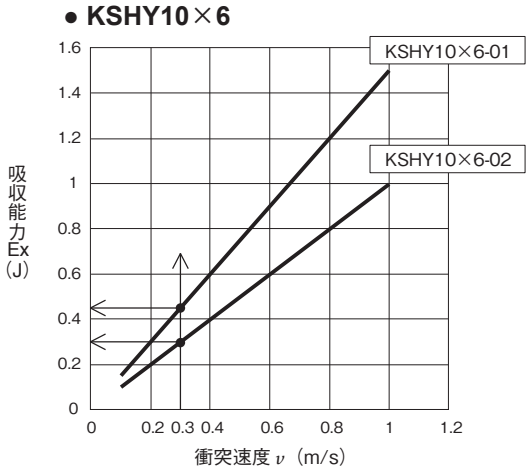
= R × ω

V = ② 0.05[m] × 6.28[rad/s]

≒0.31[m/s] < 1m/s

3-2. Confirm the absorption capacity of the shock absorber

Assume that you selected V = 0.31 m/s from the selection graph on page ㊼ and confirm the absorption capacity, Ex, that KSHY10×6 exhibits.



Values for Ex:

KSHY10×6-01: Approx. 0.45 J

KSHY10×6-02: Approx. 0.3 J

3-3. Calculate the moment of inertia

Find the moment of inertia for the impact object I [kg·m²] to calculate the kinetic energy.

According to "Rod (end is the center of rotation)", the diagram for calculating the moment of inertia (pages ㊽ to ㊾):

$$I = \frac{m\ell^2}{3}$$

$$= \frac{③ 3[kg] \times ④ 0.12[m]^2}{3}$$

= 0.0144[kg・m²]

3-4. Calculate the kinetic energy

Calculate the kinetic energy of the impact object to confirm whether it is less than the absorption capacity of the shock absorber.

Kinetic energy of the impact object E [J] = $\frac{1}{2} I\omega^2$

$$E = \frac{1}{2} \times 0.0144[kg \cdot m^2] \times (6.28[rad/s])^2$$

= 0.28[J]

Values for Ex found in step 3-2:

KSHY10×6-01: Approx. 0.45 J

KSHY10×6-02: Approx. 0.3 J

The shock absorber with the optimum absorption capacity is KSHY10×6-02 because the smaller the gap between the values for E and Ex is, the lower the impact value and the shorter the operating time.

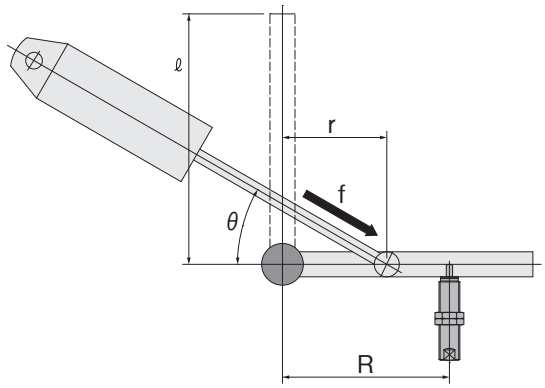
4. Confirm other specifications

Confirm that other operating conditions, such as the maximum operating frequency, maximum absorption capacity per unit of time, and operating temperature range, are within the specified ranges for KSHY10×6-02.

Example selection 2: Using an air cylinder

<Operating conditions>

When the impact object is a rod



① Cylinder thrust: Φ32(0.5MPa)→402[N]
② Cylinder thrust angle: $\theta = 30°$
③ Mounting position of cylinder's end: r = 30[mm] = 0.03[m]
④ Absorber's mounting radius: R = 50[mm] = 0.05[m]
⑤ Impact object mass: m = 3[kg]
⑥ Length from the center of rotation to the end of the rod:
ℓ = 120[mm] = 0.12[m]
⑦ Swing angle: 90°
⑧ Target swing time: 0.5[s]

1. Confirm the thrust

Find the thrust, F, that is applied to the shock absorber.

$F = (f \times \sin\theta \times r) \div R$

= ① 402[N] × ② sin30° × ③ 0.03[m] ÷ ④ 0.05[m]

= 120.6[N]

Make a selection from a model (KSHY12 or higher) for an allowable thrust of 120.6 N or more.

(Refer to page ㊿ for specifications.)

2. Confirm the angle of eccentricity

Confirm whether the angle of eccentricity is less than the allowable angle of eccentricity (10°).

Assume that KSHY12×6 (body thread size: M12, stroke: 6 mm) is used.

$$\alpha = \tan^{-1}\left(\frac{L}{R}\right)$$

$$= \tan^{-1}\left(\frac{6[mm]}{④\ 50[mm]}\right)$$

≒6.84°<10°

3. Confirm the absorption capacity

3-1. Confirm the impact speed

Calculate the velocity at which the impact object impacts the shock absorber.

Swing angle [°] × π ÷ 180 = Swing angle [rad]

⑦ 90[°] × π ÷ 180≒1.57rad

$$\text{Angular velocity } \omega \text{ [rad/sec]} = \frac{\text{Swing angle [rad]}}{\text{Target swing time [s]}} \times 2$$

$$\omega = \frac{1.57[rad]}{⑧\ 0.5[s]} \times 2$$

≒6.28[rad/s]

Velocity, V, of the shock absorber's mounting position [m/s]

$= R \times \omega$

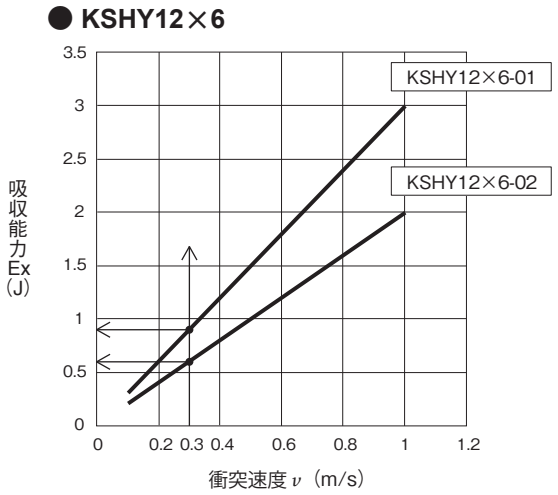
V = ④ 0.05[m] × 6.28[rad/s]

≒0.31[m/s] < 1m/s

3-2. Confirm the absorption capacity of the shock absorber

From the selection graph on page ㊼:

Assume that you selected V = 0.31 m/s and confirm the absorption capacity, Ex, that KSHY12×6 exhibits.



Values for Ex:

KSHY12×6-01: Approx. 0.9 J

KSHY12×6-02: Approx. 0.6 J

3-3. Calculate the moment of inertia

Find the moment of inertia for the impact object I [kg·m²] to calculate the kinetic energy.

According to "Rod (end is the center of rotation)", the diagram for calculating the moment of inertia (pages ㊽ to ㊾):

$$I = \frac{m\ell^2}{3}$$

$$= \frac{⑤\ 3[kg] \times ⑥\ 0.12[m]^2}{3}$$

$$= 0.0144[kg \cdot m^2]$$

3-4. Calculate the kinetic energy

Calculate the kinetic energy of the impact object to confirm whether it is less than the absorption capacity of the shock absorber.

Kinetic energy of the impact object E [J] = $\frac{1}{2} I \omega^2$

$$E = \frac{1}{2} \times 0.0144[kg \cdot m^2] \times 6.28[rad/s]^2$$

= 0.28[J]

Values for Ex found in step 3-2:

KSHY12×6-01: Approx. 0.9 J

KSHY12×6-02: Approx. 0.6 J

The shock absorber with the optimum absorption capacity is KSHY12×6-02 because the smaller the gap between the values for E and Ex is, the lower the impact value and the shorter the operating time.

4. Confirm other specifications

Confirm that other operating conditions, such as the maximum operating frequency, maximum absorption capacity per unit of time, and operating temperature range, are within the specified ranges for KSHY12×6-02.

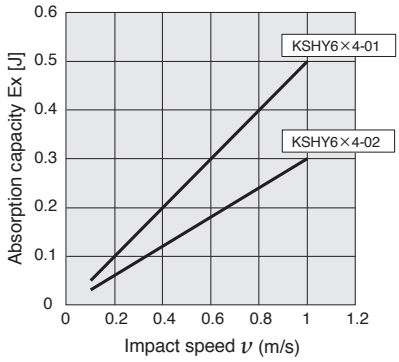
Selection guidelines

Cautions for using the selection graphs

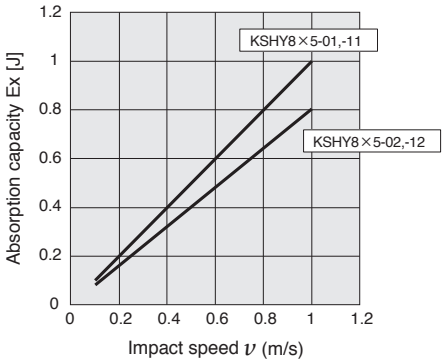
1. Use with an absorption capacity below the capacity curves.
2. The values in the selection graphs are for room temperature (20 to 25°). Be aware that performance and characteristics change depending on the operating temperature.

■Selection graph

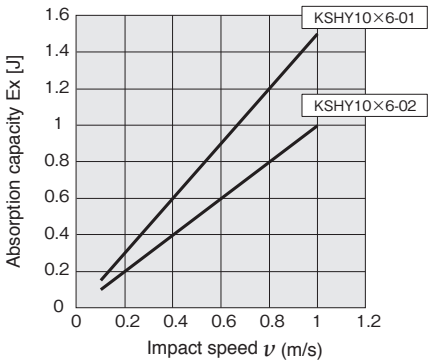
● KSHY6×4



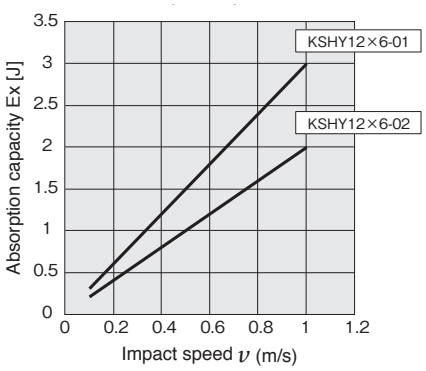
● KSHY8×5



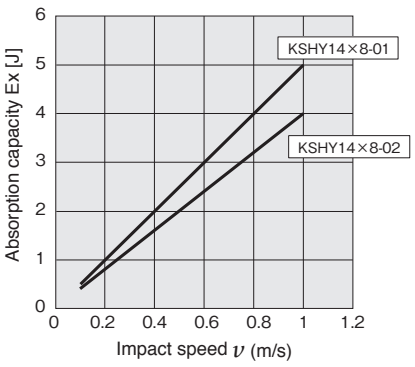
● KSHY10×6



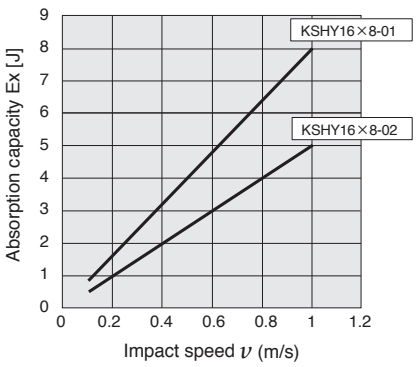
● KSHY12×6



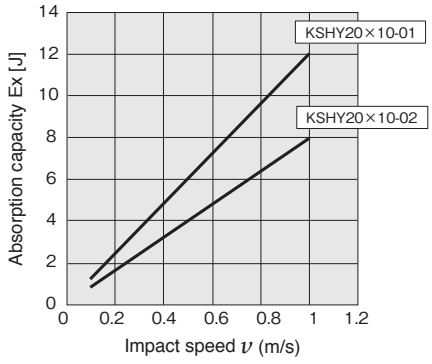
● KSHY14×8



● KSHY16×8



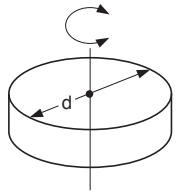
● KSHY20×10



■Diagram for calculating the moment of inertia

[When the rotation axis goes through the workpiece]

●Disk

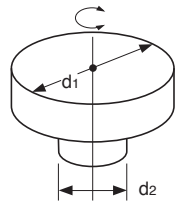


●Diameter d (m)
●Mass m (kg)

■Moment of inertia I [kg·m²]

$$I = \frac{md^2}{8}$$

●Stepped disk



●Diameter d_1 (m), d_2 (m)
●Mass $d_1$part m_1 (kg), $d_2$part m_2 (kg)

■Moment of inertia I [kg·m²]

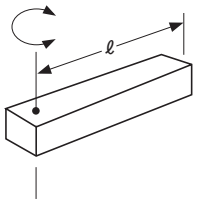
$$I = \frac{1}{8}(m_1 d_1^2 + m_2 d_2^2)$$

■Radius of rotation

$$\frac{d_1^2 + d_2^2}{8}$$

Remark: The d_2 part can be ignored if it is much smaller compared to the d_1 part.

●Rod (end is the center of rotation)

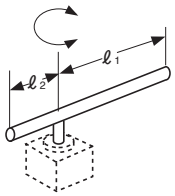


●Rod length ℓ (m)
●Mass m (kg)

■Moment of inertia I [kg·m²]

$$I = \frac{m\ell^2}{3}$$

●Fine rod

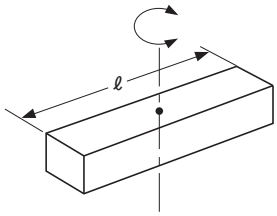


●Rod length ℓ_1 (m), ℓ_2 (m)
●Mass m_1(kg), m_2(kg)

■Moment of inertia I [kg·m²]

$$I = \frac{m_1 \cdot \ell_1^2}{3} + \frac{m_2 \cdot \ell_2^2}{3}$$

●Rod (center of gravity is the center of rotation)

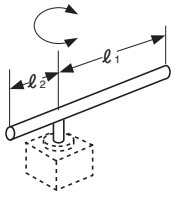


●Rod length ℓ (m)
●Mass m (kg)

■Moment of inertia I [kg·m²]

$$I = \frac{m\ell^2}{12}$$

●Thin, rectangular plate (rectangular parallelepiped)

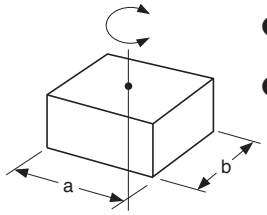


●Plate length a_1 (m), a_2 (m)
●Edge length b (m)
●Mass m_1 (kg), m_2(kg)

■Moment of inertia I [kg·m²]

$$I = \frac{m_1}{12}(4a_1^2 + b^2) + \frac{m_2}{12}(4a_2^2 + b^2)$$

●Rectangular parallelepiped

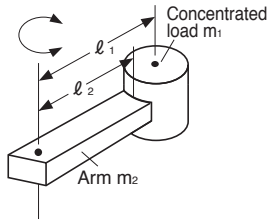


●Edge length a (m), b (m)
●Mass m (kg)

■Moment of inertia I [kg·m²]

$$I = \frac{m}{12}(a^2 + b^2)$$

●Concentrated load



●Shape of concentrated load
●Length to the concentrated load's center of gravity ℓ_1 (m)
●Arm length ℓ_2 (m)
●Mass of the concentrated load m_1 (kg)
●Mass of the arm m_2 (kg)

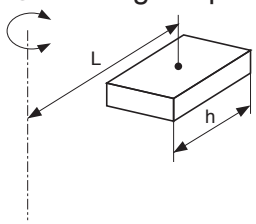
■Moment of inertia I [kg·m²]

$$I = m_1k^2 + m_1\ell_1^2 + \frac{m_2\ell_2^2}{3}$$

Radius of rotation: k^2 is calculated according to the shape of the concentrated load.
Remark: When m_2 is much smaller compared to m_1, it is okay to calculate $m_2 = 0$.

[When the rotation axis is off set from the workpiece]

●Rectangular parallelepiped



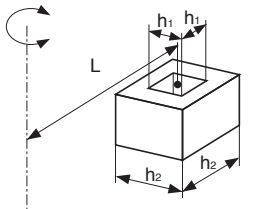
●Edge length h (m)
●Distance from the rotation axis to the center of the load L (m)
●Mass m (kg)

■Moment of inertia I [kg·m²]

$$I = \frac{mh^2}{12} + mL^2$$

Remark: Same as for cube

●Hollow rectangular parallelepiped



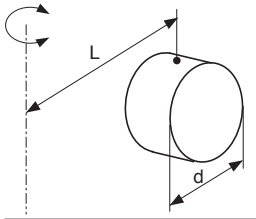
●Edge length h_1 (m), h_2 (m)
●Distance from the rotation axis to the center of the load L (m)
●Mass m (kg)

■Moment of inertia I [kg·m²]

$$I = \frac{m}{12}(h_2^2 + h_1^2) + mL^2$$

Remark: Cross-section is a cube only

●Cylinder

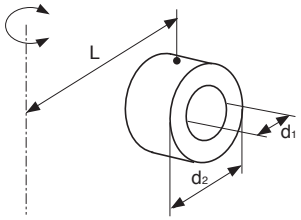


●Diameter d (m)
●Distance from the rotation axis to the center of the load L (m)
●Mass m (kg)

■Moment of inertia I [kg·m²]

$$I = \frac{md^2}{16} + mL^2$$

●Hollow cylinder



●Diameter d_1 (m), d_2 (m)
●Distance from the rotation axis to the center of the load L (m)
●Mass m (kg)

■Moment of inertia I [kg·m²]

$$I = \frac{m}{16}(d_2^2 + d_1^2) + mL^2$$

Linear orifice shock absorber

KSHY Series

Specifications

Item \ Model	KSHY6×4-01	KSHY6×4-02	KSHY8×5-01,-11	KSHY8×5-02,-12
Maximum absorption capacity J	0.5	0.3	1	0.8
Stroke mm	4		5	
Impact speed range m/s	0.1 to 1.0			
Allowable thrust	27.5N or less		60.3N or less	
Maximum operating cycle cycle/min	60			
Maximum absorption capacity per unit of time J/min	18		36	
Spring return force[Note1] N	3.5		6.5	
Deflection angle	10° or less			
Operating temperature range[Note2] ℃	0 to 60			

Item \ Model	KSHY10×6-01	KSHY10×6-02	KSHY12×6-01	KSHY12×6-02
Maximum absorption capacity J	1.5	1	3	2
Stroke mm	6			
Impact speed range m/s	0.1 to 1.0			
Allowable thrust	100N or less		157N or less	
Maximum operating cycle cycle/min	60			
Maximum absorption capacity per unit of time J/min	45		80	
Spring return force[Note1] N	8.5		15.5	
Deflection angle	10° or less			
Operating temperature range[Note2] ℃	0 to 60			

Item \ Model	KSHY14×8-01	KSHY14×8-02	KSHY16×8-01	KSHY16×8-02	KSHY20×10-01	KSHY20×10-02
Maximum absorption capacity J	5	4	8	5	12	8
Stroke mm	8		8		10	
Impact speed range m/s	0.1 to 1.0					
Allowable thrust	245N or less		402N or less		628N or less	
Maximum operating cycle cycle/min	60		40			
Maximum absorption capacity per unit of time J/min	100		130		200	
Spring return force[Note1] N	14.5		14.5		21.5	
Deflection angle	10° or less					
Operating temperature range[Note2] ℃	0 to 60					

Note 1: The spring return force cannot be used as a function because it is the return force of the piston rod at full stroke, making it unstable.

2: The shock absorbing capacity fluctuates based on speed and ambient temperature. Always use a product that is within the range shown by the solid lines in the graphs on pages ㊼.

Mass

g

Model	Body[Note1]	Additional mass	Additional parts' mass		
		With plastic cap	Mounting nut (1 ea.)	Stopper nut	Side mounting bracket
KSHY6×4-01, -02	4.5	0.2	0.4	3	8
KSHY8×5-01, -11	9	0.4	0.6(0.9)[Note2]	4	12
KSHY10×6-01, -02	20.1	0.8	1.2	7	15
KSHY12×6-01, 02	32	1.3	1.9	8	22
KSHY14×8-01, 02	53	2.3	4	15	41
KSHY16×8-01, -02	70	2.3	6.6	28	65
KSHY20×10-01, -02	129	5	12.2	55	110

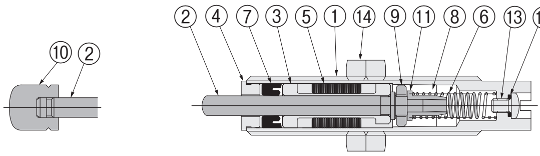
Calculation example: The mass of KSHY10×6C-01-S-2 (with cap, stopper, and side mount) is
20+1.3+7+15 = 43.3g

Note1 : The weight of the main unit includes the weight of 2 mounting nuts.

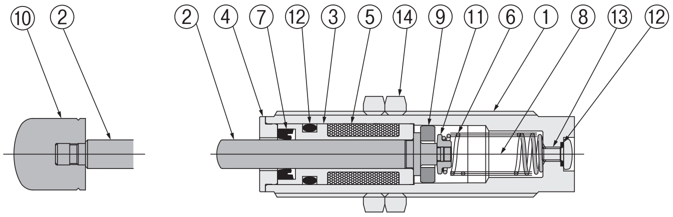
2 : Values in ( ) are the weight of mounting nut for KSHY8×5-11,-12.

Inner Construction and Major Parts and Materials

●KSHY6×4



●KSHY8 to 20



No.	Name	Materials
①	Body Note 1	Copper alloy (nickel plated)
②	Piston rod Note 2	Stainless steel,
③	Sleeve	Copper alloy
④	Plug	Stainless steel
⑤	Accumulator	Synthetic rubber
⑥	Spring	Spring steel
⑦	Rod seal	Synthetic rubber
⑧	Oil	Special oil
⑨	Piston ring	Stainless steel,
⑩	Cap	Plastic (POM)
⑪	Collar Note 3	Stainless steel,
⑫	O-ring	Synthetic rubber
⑬	Screw Note 4	Mild steel (zinc plated)
⑭	Mounting nut	Mild steel (nickel plated)

Note1: KSHY6 and 8 are stainless steel
2: Shock absorbers with no caps undergo a quenching treatment.
3: KSHY6 and 8 are copper alloy
KSHY10 and 12 are sintered metal
4: KSHY6 and 8 are nickel plated

Order Codes

KSHY [ ] [ ] - [ ] - [ ] - [ ]

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

Stopper nut
Blank: No stopper nut
S : With stopper nut

Thread pitch and absorption capacity
01: For heavy loads
02: For light loads
11: For heavy loads with different thread pitches
12: For light loads with different thread pitches
(11 and 12 set to 8×5 only, M8×1)

Cap
Blank: No cap
C : With cap

Body thread size × stroke
6×4
8×5
10×6
12×6
14×8
16×8
20×10

Durable angle of eccentricity specification
Linear orifice Shock absorber
KSHY Series

Additional Parts

●Mounting nut (1 pack has 10 units)

N - KSH - M [ ]

Thread size
6: KSHY6
8: KSHY8
8-11: KSHY8-11
10: KSHY10
12: KSHY12
14: KSHY14
16: KSHY16
20: KSHY20

●Stopper nut

S - KSH - M [ ]

Thread size
6-L: KSHY6
8: KSHY8
8-11: KSHY8-11
10: KSHY10
12: KSHY12
14: KSHY14
16: KSHY16
20: KSHY20

●Side mounting bracket

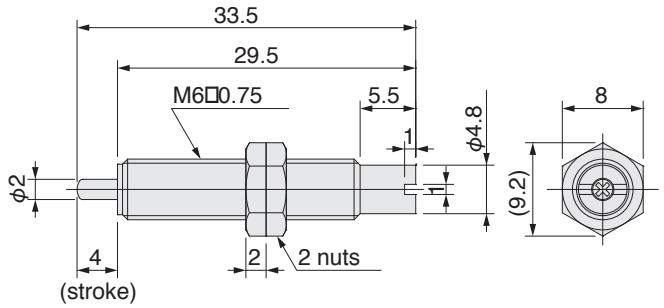
2 - KSH - M [ ]

Thread size
6: KSHY6
8: KSHY8
8-11: KSHY8-11
10: KSHY10
12: KSHY12
14: KSHY14
16: KSHY16
20: KSHY20

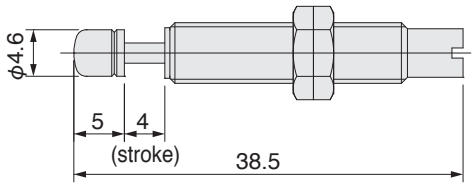
* For the dimension diagrams of the additional parts, see pages ㉛ to ㉝.
* The stopper nut and side mount are made from mild steel (nickel plated).

Dimensions (mm)

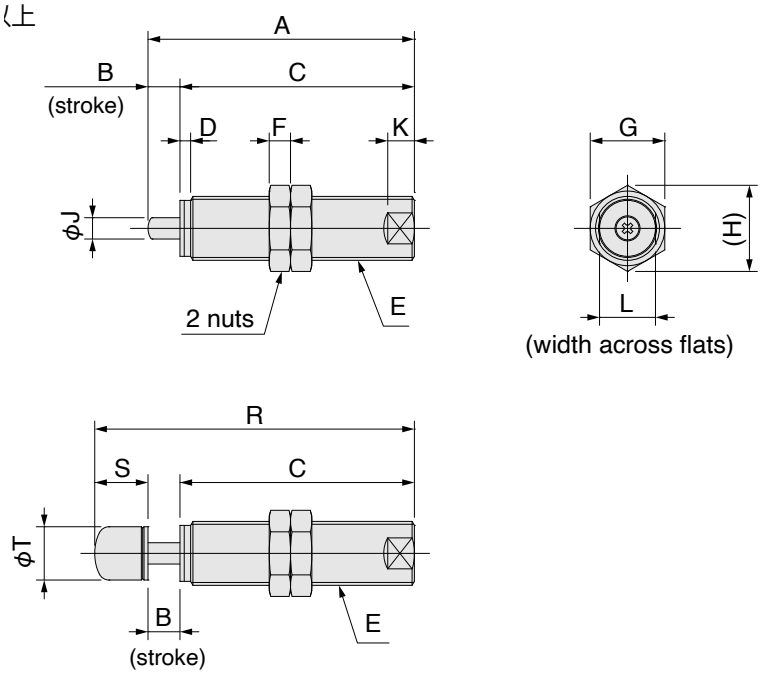
●**KSHY6×4-□**



●**KSHY6×4C-□**



●**KSHY8 to 20**



Model \ Symbol	A	B	C	D	E	F	G	H	J	K	L	R	S	T
KSHY8 × 5 (C)-01,-02	36	5	31	1.2	M8 × 0.75	2	10	11.5	2.5	3	7	42	6	6.5
KSHY8 × 5 (C)-11,-12	36	5	31	1.2	M8 × 1	3	10	11.5	2.5	3	7	42	6	6.5
KSHY10 × 6 (C)-01,-02	46	6	40	2	M10 × 1	3	12	13.9	3	5	8.5	55	9	8
KSHY12 × 6 (C)-01,-02	50	6	44	2	M12 × 1	4	14	16.2	4	5	10.5	60	10	10
KSHY14 × 8 (C)-01,-02	61	8	53	2	M14 × 1.5	5	17	19.6	5	5	12	72	11	11
KSHY16 × 8 (C)-01,-02	61	8	53	3	M16 × 1.5	7	19	21.9	5	7	13	72	11	11
KSHY20 × 10 (C)-01,-02	69	10	59	3	M20 × 1.5	8	24	27.7	6	7	17	84	15	15

Adjustment Type Linear Orifice® Shock Absorber

KSHP Series

KSHP series can solve the problems for users worried about fine tuning absorption of impacts!

Introducing the KSHP Series of Adjustment Type Linear Orifice® Shock Absorber

* "Linear Orifice" is a registered trademark of Koganei Corporation.

New release of our first adjustment type linear orifice models!

Shorten operation cycle times by adjusting the absorbing capacity of the end of strokes.

Possible to fine tune for both impact speed and load for proper shock absorption!

Our own construction makes fine tuning easy and **minimizes extreme changes** in shock absorbing capacity.

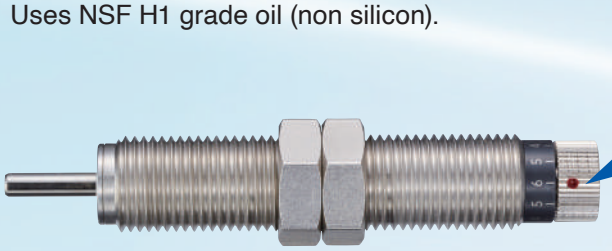
Maximum of more than 3 million operation cycles!

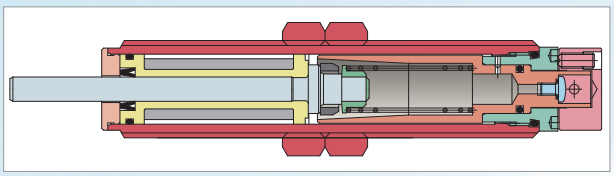
Linear orifice construction provides longer life.

* "M24" model 8 hundred thousand operation cycles.

Compliant with H1 grade food equipment specifications!

Uses NSF H1 grade oil (non silicon).





Scaled from 0 to 6
Numbers are easy to see and indelible

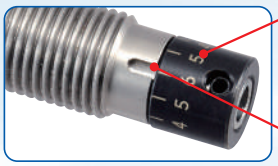
Set to 6 on the scale for maximum absorption
Set to 0 on the scale for minimum absorption

Adjusting knob
Can be rotated to the left or right

Red mark
Align the red mark to a value on the scale

Lock screw
Lock the adjusting knob in position by tightening the lock screw after completing adjustment (excluding KSHP6 and KSHP8)

For KSHP6 and KSHP8



Scaled from 0 to 6 (adjusting knob)
Set to 6 on the scale for maximum absorption
Set to 0 on the scale for minimum absorption

Key slot on body
Align a value on the scale to the key slot

Wide range of variations
M6 to M42
12 sizes 13 models

Wide range of variations
1/4-32 UNEF to 1 3/4-12UN
11 sizes 29 models

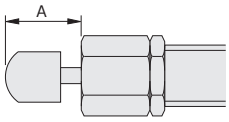
CAUTION Read the safety precautions on page ⑤ before using this product.

General precautions

Cover the unit when mounting it in locations where it might be subject to excessive dust, dripping water, dripping oil, etc. Dents, scratches, water, oil, or dust on the piston rod results in damage and decreases service life.

Mounting

1. Keep the angle of eccentricity, resulting from the load direction and the axis of the shock absorber, under the specified values on page ⑥⓪. If an eccentric load exceeding the specifications is applied, it could result in breakage or impaired returns. If there is concern that an eccentric load exceeding the specified values will be applied, install a guide, or similar mechanism.
2. You cannot mount two or more adjustable type shock absorbers in parallel to boost the absorption capacity (it is difficult to adjust the capacity evenly).
3. If using a shock absorber with a plastic or rubber cap, always mount a stopper nut (-S) or an external stopper to ensure that the cap is not subjected to loads at the stroke end. Install the stopper nut in a position such that A ≤ the stroke of the shock absorber. Furthermore, you can use a shock absorber that has a plastic cap without a stopper nut (-S) or external stopper, but, over the long-term, the stop location will change due to cap deformation and wear.



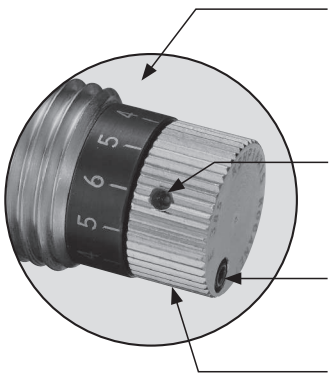
4. Rubber caps are consumable parts. The service life will vary depending on conditions of the application, replace these parts according to their condition.
5. If using a shock absorber with a rubber cap for lateral impacts, such as eccentric or swing impacts, note that the rubber cap may come off or be damaged.
6. When mounting the shock absorber, always use the following maximum tightening torque guidelines. Tightening using excessive force may result in damage.

Model	Maximum tightening torque	
	N・m	in・lbf
KSHP6×4 (C)(-F11)	0.85	7.523
KSHP8×6 (C)(-11)(-F11)	2.5	22.128
KSHP10×8 (C)(-F11)	6.5	57.532
KSHP11×8 (C)-F11	—	57.5
KSHP12×10 (C,R)(-F11)	8.0	70.808
KSHP14×12 (C,R)(-F11)	12.0	106.2
KSHP16×15 (C,R)	20.0	—
KSHP18×20 (C,R)(-F11)	25.0	221.3
KSHP20×22 (C,R)	30.0	—
KSHP25×25 (C,R)(-F11)	42.0	371.7
KSHP30×30 (C,R)(-F11)	60.0	531.1
KSHP36×50 (C,R)(-F11)	72.0	637.3
KSHP42×50 (C,R)(-F11)	85.0	752.3

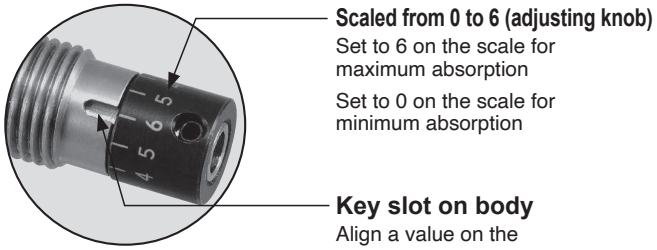
7. Ensure that the hardness of the surface directly impacting the piston rod of the shock absorber is over HRc40 hardness (excluding models with rubber or plastic caps).
8. Be aware that performance and characteristics change depending on the operating temperature.

Adjusting the shock absorbing capacity

1. For the **KSHP10** to **KSHP42** models, align the red mark on the adjusting knob to the 6 on the scale. For the **KSHP6** and **KSHP8** models, align the 6 on the scale to the key slot on the body.
2. For large impacts on collision or if a long time is required for a full stroke, reduce the value on the scale gradually.
3. Always tighten the lock screw to fix the knob in place after completing adjustment. (excluding **KSHP6** and **KSHP8**)

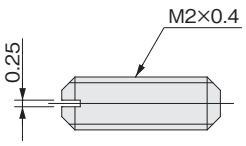


For **KSHP6** and **KSHP8**

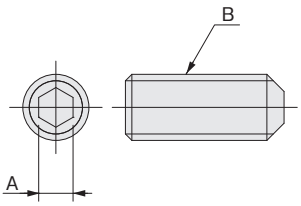


●Lock screw dimensions mm [in]

For **KSHP 10** to **14**



For **KSHP 16** to **42**



Model \ Symbol	A	B
KSHP16 to **18**	1.3	M2.5×0.45
KSHP20 to **42**	1.5	M3×0.5

* The selection guidelines are for millimeter specifications.

■ How to select shock absorbers

1. Confirm the thrust

Confirm the thrust that is used, and then check the prospective shock absorbers from the table of recommended cylinder bore sizes on page ㊽. If a shock absorber that is smaller than the recommended shock absorber is used, the shock absorber being used may be damaged in fewer operation cycles than is guaranteed.

2. Confirm the kinetic energy

Confirm Ⅰ and Ⅱ below, and then check page ㊾ for the selection graphs for prospective shock absorbers from [1. Confirm the thrust]. (*)

Ⅰ Impact object mass: m [kg]

Ⅱ Impact speed: v [m/s]

Because " v " is the impact speed, not the average speed, when using a cylinder,

v = m [cylinder stroke] ÷ s [operating time] × 2

Select a model in which Ⅰ and Ⅱ fit within the range enclosed by the capacity curves.

If multiple models are applicable, use the model that is closest to both the capacity curves and the operating conditions. The further the model you select is from the capacity curves and the operating conditions, the slower it will tend to be.

3. Confirm other specifications

Confirm that such specifications as the maximum operating frequency, maximum absorption capacity per unit of time, angle of eccentricity, and operating temperature range are within the range for the shock absorber that you selected.

* The value for the kinetic energy, E, can be found by doing the following calculation. However, the shock absorber's capacity for absorption changes depending on the impact speed. When the shock absorber is doing low-speed operations, it has less drag than when it is doing high-speed operations.

The maximum absorption capacity that is noted in the specifications is reached only at the maximum impact speed.

Therefore, do not choose a shock absorber by comparing E to the maximum absorption capacity; confirm the capacity using the selection graph.

$$E = \frac{1}{2} mv^2$$

E: Kinetic energy (J)

m: Impact object mass [kg]

v: Impact speed (m/s)

Range in the selection graph

Vertical axis range :

Maximum impact speed ≧ v Impact speed (operating condition)

Horizontal axis range :

Shock absorber's maximum absorption capacity at the impact speed (v = m/s) ≧ E Kinetic energy (operating condition)

Calculating the thrust energy is not necessary because the size of the shock absorber is limited by the thrust in step 1.

■ Koganei's selectable content

You can also select equipment from Koganei's homepage.

Visit http://www.koganei.co.jp.

The results of selections using the method above may differ from the results of selections for the selectable content on our homepage. If this happens, please contact us.

■ Example of selecting a shock absorber

[Operating conditions]

①Bore size of the cylinder being used: ϕ16

②Cylinder stroke: 100 mm = 0.1 m

③Pressure applied to the cylinder: 0.6 MPa

④Cylinder's operating time: 0.4 s

⑤Impact object mass: 10 kg

1. Confirm the thrust

Either calculate or find the thrust in the cylinder thrust table on page ㊽.

The cylinder thrust based on ① and ③ is about 121 N.

Cylinder thrust	100.5N	<	120.6N	<	126N
Cylinder bore size	ϕ16		ϕ16		ϕ20
Applied pressure	0.5MPa		0.6MPa		0.4MPa

As mentioned above, although the cylinder being used is ϕ16, the pressure applied to the cylinder exceeds 0.5 MPa, so consider the ϕ20 cylinder (lower than 0.4 MPa) and check the table of recommended cylinder bore sizes on page ㊽.

The following are prospective models.

・KSHP10×8 ・KSHP12×10 ・KSHP14×12

・KSHP16×15 ・KSHP18×20 ・KSHP20×22

2. Confirm the kinetic energy

Ⅰ The impact object mass m = 10 kg from ⑤

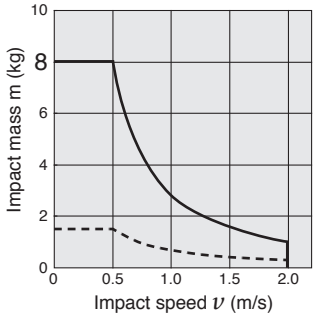
Ⅱ Find the impact speed, v, from ② and ④.

v = ② 0.1 m ÷ ④ 0.4 s × 2

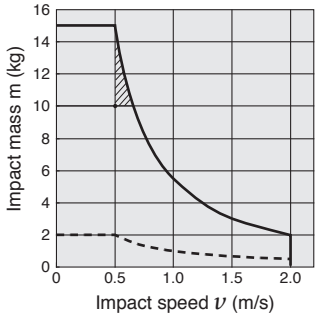
= 0.5 m/s

According to the selection graphs on page ㊾, the shock absorber with the optimum absorption capacity for operating conditions is KSHP12×10.

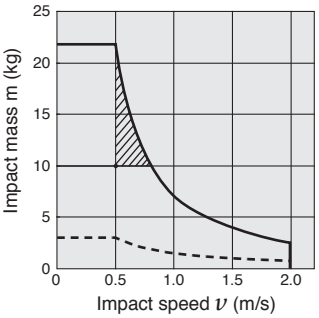
● **KSHP10×8**



● **KSHP12×10**



● **KSHP14×12**



・KSHP10×8 has an insufficient absorption capacity.

・The absorption capacities for all of the other shock absorbers are higher than that of KSHP12×10, so they do not fall within the operating conditions and capacity curves.

3. Confirm other specifications

Verify that other operating conditions, such as the maximum operating frequency, maximum absorption capacity per unit of time, angle of eccentricity, and operating temperature range, are within the specified ranges for KSHP12×10.

Selection Guidelines

■Recommended cylinder bore size

Model \ Cylinder bore	φ4	φ6	φ8	φ10	φ12	φ16	φ20	φ25	φ32	φ40	φ50	φ63	φ80	φ100	φ125
KSHP6×4 (-F11)	◇	◇	◎	◎	○										
KSHP8×6 (-11)(-F11)		◇	◇	◎	◎	○									
KSHP10×8 (-F11)			◇	◇	◎	◎	○								
KSHP11×8-F11			◇	◇	◎	◎	○								
KSHP12×10 (-F11)				◇	◇	◎	◎	○							
KSHP14×12 (-F11)					◇	◇	◎	◎	○						
KSHP16×15						◇	◇	◎	◎	○					
KSHP18×20 (-F11)							◇	◇	◎	○					
KSHP20×22							◇	◇	◎	◎	○				
KSHP25×25 (-F11)								◇	◇	◎	◎	○			
KSHP30×30 (-F11)									◇	◇	◎	◎	○		
KSHP36×50 (-F11)										◇	◇	◎	◎	○	
KSHP42×50 (-F11)											◇	◇	◎	◎	○

◇ : 0.3 MPa or higher ◎ : 0.5 MPa or lower ○ : 0.4 MPa or lower

Note 1: If a shock absorber that is smaller than the recommended shock absorber is used, the shock absorber being used may be damaged in fewer operation cycles than the value that is guaranteed.

Note 2: KSHP11×8 has only inch specifications.

■ Cylinder thrust

N [lbf.]

Bore size mm [in.]	Pressure area mm² [in.²]	Air pressure MPa [psi.]								
		0.1 [15]	**0.2 [29]**	**0.3 [44]**	**0.4 [58]**	**0.5 [73]**	**0.6 [87]**	**0.7 [102]**	**0.8 [116]**	**0.9 [131]**
φ4	12.6 [0.020]	1.3 [0.292]	2.5 [0.562]	3.8 [0.854]	5 [1.124]	6.3 [1.416]	7.5 [1.686]	8.8 [1.978]	10.1 [2.270]	11.3 [2.540]
φ6	28.3 [0.044]	2.8 [0.629]	5.7 [1.281]	8.5 [1.911]	11.3 [2.540]	14.1 [3.170]	17.0 [3.822]	19.8 [4.451]	22.6 [5.080]	25.4 [5.710]
φ8	50.3 [0.078]	5 [1.124]	10.1 [2.270]	15.1 [3.394]	20.1 [4.518]	25.1 [5.642]	30.2 [6.789]	35.2 [7.913]	40.2 [9.037]	45.2 [10.161]
φ10	78.5 [0.122]	7.9 [1.776]	15.7 [3.529]	23.6 [5.305]	31.4 [7.059]	39.3 [8.835]	47.1 [10.588]	55 [12.364]	62.8 [14.117]	70.7 [15.893]
φ12	113 [0.175]	11.3 [2.540]	22.6 [5.080]	33.9 [7.621]	45.2 [10.161]	56.5 [12.701]	67.9 [15.264]	79.2 [17.804]	90.5 [20.344]	101.8 [22.885]
φ16	201 [0.312]	20.1 [4.518]	40.2 [9.037]	60.3 [13.555]	80.4 [18.074]	100.5 [22.592]	121 [27.201]	141 [31.697]	161 [36.193]	181 [40.689]
φ20	314 [0.487]	31.4 [7.059]	62.8 [14.117]	94.2 [21.176]	126 [28.325]	157 [35.294]	188 [42.262]	220 [49.456]	251 [56.425]	283 [63.618]
φ25	491 [0.761]	49.1 [11.038]	98.2 [22.075]	147 [33.046]	196 [44.061]	245 [55.076]	295 [66.316]	344 [77.331]	393 [88.346]	442 [99.362]
φ32	804 [1.246]	80.4 [18.074]	161 [36.193]	241 [54.177]	322 [72.386]	402 [90.370]	483 [108.6]	563 [126.6]	643 [144.5]	724 [162.8]
φ40	1257 [1.948]	126 [28.325]	251 [56.425]	377 [84.750]	503 [113.1]	628 [141.2]	754 [169.5]	880 [197.8]	1005 [225.9]	1131 [254.2]
φ50	1963 [3.043]	196 [44.061]	393 [88.346]	589 [132.4]	785 [176.5]	982 [220.8]	1178 [264.8]	1374 [308.9]	1571 [353.2]	1767 [397.2]
φ63	3117 [4.831]	312 [70.138]	623 [140.1]	935 [210.2]	1247 [280.3]	1559 [350.5]	1870 [420.4]	2182 [490.5]	2494 [560.7]	2806 [630.8]
φ80	5027 [7.792]	503 [113.1]	1005 [225.9]	1508 [339.0]	2011 [452.1]	2513 [564.9]	3016 [678.0]	3519 [791.1]	4021 [903.9]	4524 [1017]
φ100	7854 [12.174]	785 [176.5]	1571 [353.2]	2356 [529.6]	3142 [706.3]	3927 [882.8]	4712 [1059]	5498 [1236]	6283 [1412]	7069 [1589]
φ125	12272 [19.022]	1227 [275.8]	2454 [551.7]	3682 [827.7]	4909 [1104]	6136 [1379]	7363 [1655]	8590 [1931]	9817 [2207]	11045 [2483]

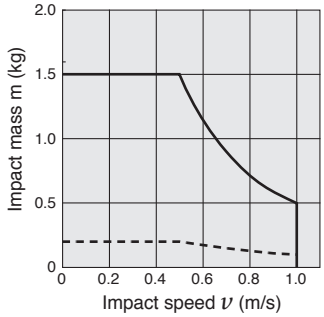
Cautions for using the selection graphs

1. The selection graphs are calculated with a cylinder operating air pressure of 0.5 MPa.
2. The values in the selection graphs are for room temperature (20 to 25°). Be aware that performance and characteristics change depending on the operating temperature.
3. Select a shock absorber that is as close to, yet within, the capacity line(s).
4. You can select them on the Koganei home page. Go to http://www.koganei.co.jp
   The results of selections using our catalog may differ from the results of selections on our homepage.

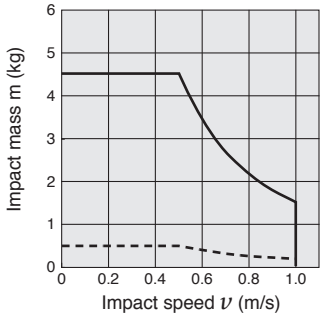
■Selection graph

——— Graph when calibrated to 6
- - - - - - - - Graph when calibrated to 0 (guideline)

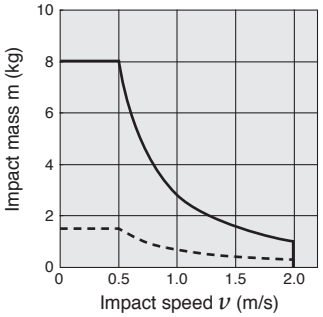
● KSHP6×4 (-F11)



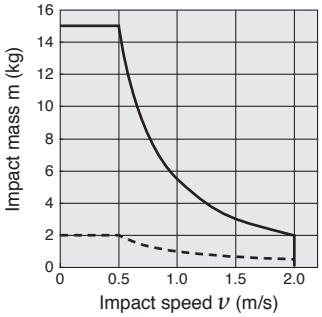
● KSHP8×6 (-F11)



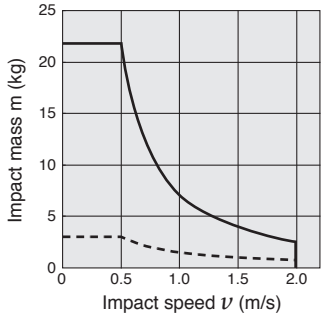
● KSHP10×8 (-F11)
● KSHP11×8-F11



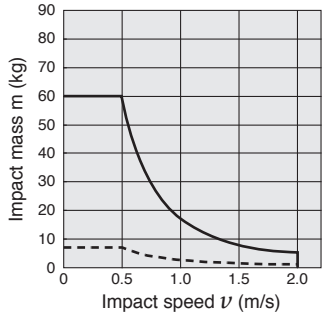
● KSHP12×10 (-F11)



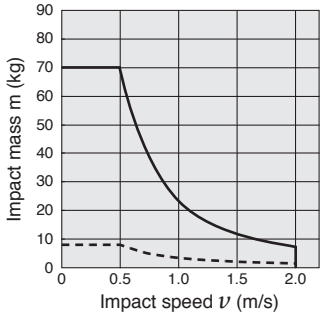
● KSHP14×12 (-F11)



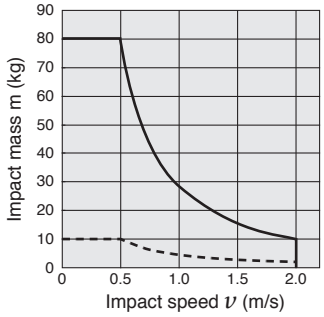
● KSHP16×15



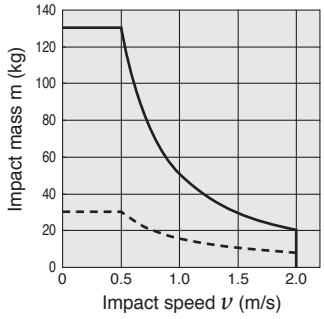
● KSHP18×20 (-F11)



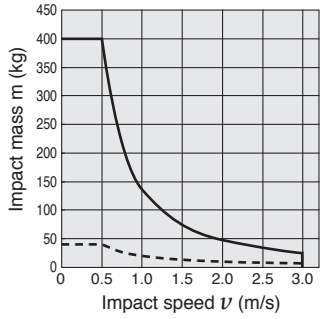
● KSHP20×22



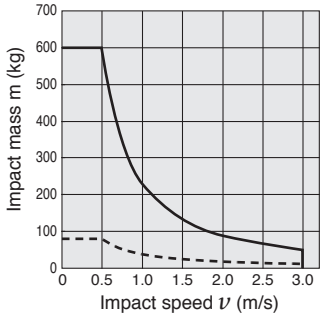
● KSHP25×25 (-F11)



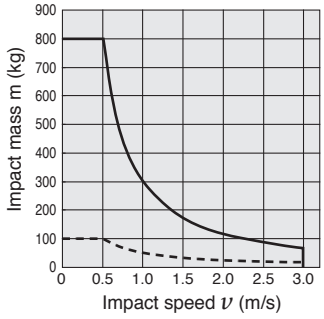
● KSHP30×30 (-F11)



● KSHP36×50 (-F11)

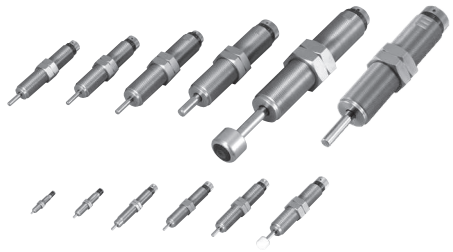


● KSHP42×50-F11



Linear orifice shock absorber

KSHP Series



Specifications

Item \ Model (in inches)	KSHP6×4 (KSHP6×4-F11)	KSHP8×6, KSHP8×6-11 (KSHP8×6-F11)
Maximum absorption capacity J(in.lbs)	0.25 (2.213)	0.75 (6.638)
Absorption stroke mm(in.)	4 (0.157)	6 (0.236)
Impact speed range m/s(ft/s)	0.1 to 1 (0.33 to 3.28)	
Maximum operating cycle cycle/min	50	
Maximum absorption capacity per unit of time J/min (in.lbs/min)	7.5 (66.4)	22.5 (199.3)
Spring return force[Note1] N	2.6	2.9
Deflection angle	1° or less	
Operating temperature range[Note2] ℃(°F)	0 to 60 (32 to 140)	

Item \ Model (in inches)	KSHP10×8 (KSHP10×8-F11, KSHP11×8-F11)	KSHP12×10 (KSHP12×10-F11)	KSHP14×12 (KSHP14×12-F11)
Maximum absorption capacity J(in.lbs)	2 (17.701)	4 (35.403)	5 (44.254)
Absorption stroke mm(in.)	8 (0.315)	10 (0.394)	12 (0.472)
Impact speed range m/s(ft/s)	0.1 to 2 (0.33 to 6.56)		
Maximum operating cycle cycle/min	50		
Maximum absorption capacity per unit of time J/min (in.lbs/min)	60 (531.4)	120 (1062.7)	150 (1328.4)
Spring return force[Note1] N	6.5	9.6	9.0
Deflection angle	1° or less		
Operating temperature range[Note2] ℃(°F)	0 to 60 (32 to 140)		

Item \ Model (in inches)	KSHP16×15	KSHP18×20 (KSHP18×20-F11)	KSHP20×22
Maximum absorption capacity J(in.lbs)	10	15 (132.8)	20
Absorption stroke mm(in.)	15	20 (0.787)	22
Impact speed range m/s(ft/s)	0.1 to 2 (0.33 to 6.56)		
Maximum operating cycle cycle/min	40		30
Maximum absorption capacity per unit of time J/min (in.lbs/min)	240	360 (3188.2)	360
Spring return force[Note1] N	20.5	23.0	18.4
Deflection angle	3° or less		
Operating temperature range[Note2] ℃(°F)	0 to 60 (32 to 140)		

Item \ Model (in inches)	KSHP25×25 (KSHP25×25-F11)	KSHP30×30 (KSHP30×30-F11)	KSHP36×50 (KSHP36×50-F11)
Maximum absorption capacity J(in.lbs)	40 (354.0)	110 (973.6)	200 (1770)
Absorption stroke mm(in.)	25 (0.984)	30 (1.181)	50 (1.969)
Impact speed range m/s(ft/s)	0.1 to 2 (0.33 to 6.56)	0.1 to 3 (0.33 to 9.84)	
Maximum operating cycle cycle/min	30	20	15
Maximum absorption capacity per unit of time J/min (in.lbs/min)	720 (6376.3)	1320 (11690)	1800 (15940.8)
Spring return force[Note1] N	32.3	42.3	65.8
Deflection angle	3° or less		
Operating temperature range[Note2] ℃(°F)	0 to 60 (32 to 140)		

Item \ Model (in inches)	KSHP42×50 (KSHP42×50-F11)
Maximum absorption capacity J(in.lbs)	300 (2655)
Absorption stroke mm(in.)	50 (1.969)
Impact speed range m/s(ft/s)	0.1 to 3 (0.33 to 9.84)
Maximum operating cycle cycle/min	10
Maximum absorption capacity per unit of time J/min (in.lbs/min)	2000 (17712.0)
Spring return force[Note1] N	64.2
Deflection angle	3° or less
Operating temperature range[Note2] ℃(°F)	0 to 60 (32 to 140)

Note1: The spring return force is the force of the piston rod when it returns from a full stroke. It is not stable, so cannot be used as other than rod return.

2: The shock absorber's shock absorbing capacity fluctuates based on speed and ambient temperature.
Use the product within the ranges of the selection graphs (impact mass, impact speed diagram) on page ⑲.

3: KSHP11 has only inch specifications.

* The maximum tightening torque of KSHP11 is different from that of KSHP10. See page ⑯ for details on the maximum tightening torque.

4: KSHP16×15 and KSHP20×22 do not have inch specifications.

Mass (Specifications in mm)

g

Model	Main unit[Note]	Additional mass		Additional parts' mass		
		With plastic cap	With rubber cap	Mounting nut (1 ea.)	Stopper nut	Side mounting bracket
KSHP6×4	5.1	0.2	—	0.4	2	8
KSHP8×6 (-11)	11.3(11.5)	0.5	—	0.6(0.9)	4	12
KSHP10×8	26.5	0.7	—	1.2	7	15
KSHP12×10	43.5	1.1	1.2	1.9	8	22
KSHP14×12	66.5	1.1	1.8	4.0	15	41
KSHP16×15	98.5	1.6	3.4	6.6	28	65
KSHP18×20	144	4.1	5.3	8.8	37	100
KSHP20×22	186	5.4	6.9	12.2	55	110
KSHP25×25	360	5.3	5.7	23.0	95	360
KSHP3×30	569	50	49	32.5	140	455
KSHP36×50	1130	110	109	95.5	330	2650
KSHP42×50	1515	110	109	93.0	320	2400

Calculation example: The mass of KSHP10×8C-S-2 (with cap, stopper, and side mount) is
26.5 + 0.7 + 7 + 15 = 49.2g

Note: The weight of the main unit includes the weight of 2 mounting nuts.

Order Codes (specifications in mm)

KSHP □ - □ - □ - □

Mounting bracket
Blank: No mounting bracket
2 : With side mounting bracket (side mounting type)

Stopper nut
Blank: No stopper nut
S : With stopper nut

Body thread size (selectable only for 8×6)
Blank: Body thread size M8×0.75
11 : Body thread size M8×1

Cap
Blank: No cap
C : With plastic cap
R : With rubber cap[Note]
Note: Rubber cap is not available with the **6×4**, **8×6**, and **10×8**.

Body thread size×stroke
6×4
8×6
10×8
12×10
14×12
16×15
18×20
20×22
25×25
30×30
36×50
42×50[Note]

Adjustment type linear orifice shock absorber KSHP series

Note: **KSHP42×50** is a built-to-order product. Contact us about turnaround times, prices, or other information.

Additional Parts (no specifications in inches)

●Rubber cap

R - KSH - M □

Thread size
12: For KSHP12
14: For KSHP14
16: For KSHP16
18: For KSHP18
20: For KSHP20
25: For KSHP25
30: For KSHP30
36: For KSHP36
42: For KSHP42

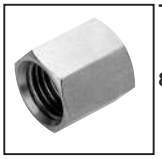
●Mounting nut (M4 to M20: 1 pack has 10 units / M25 to M42: 1 pack has 2 units)

N - KSH - M □

Thread size
6: For KSHP6
8: For KSHP8
8-11: For KSHP8-11
10: For KSHP10
12: For KSHP12
14: For KSHP14
16: For KSHP16
18: For KSHP18
20: For KSHP20
25: For KSHP25
30: For KSHP30
36: For KSHP36
42: For KSHP42

●Stopper nut

S - KSH - M □



Thread size
6: For KSHP6
8: For KSHP8
8-11: For KSHP8-11
10: For KSHP10
12: For KSHP12
14: For KSHP14
16: For KSHP16
18: For KSHP18
20: For KSHP20
25: For KSHP25
30: For KSHP30
36: For KSHP36
42: For KSHP42

●Side mounting bracket

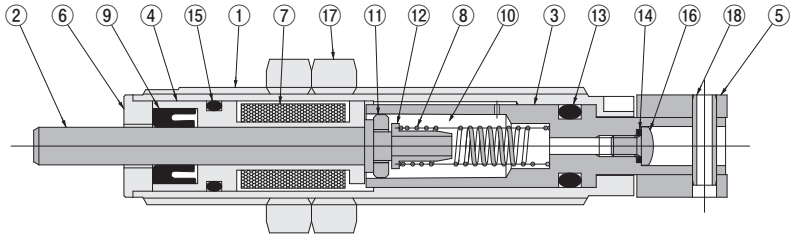
2 - KSH - M □

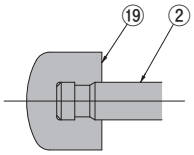
Thread size
6: For KSHP6
8: For KSHP8
8-11: For KSHP8-11
10: For KSHP10
12: For KSHP12
14: For KSHP14
16: For KSHP16
18: For KSHP18
20: For KSHP20
25: For KSHP25
30: For KSHP30
36: For KSHP36
42: For KSHP42

* For the dimension diagrams of the additional parts, see pages ㉛ to ㉝.
* The stopper nut and side mount are made from mild steel (nickel plated).

Inner Construction and Major Parts and Materials

●**M6**,**M8** size (11/4-32 UNEF, 5/16-32 UNEF **)** * The inch sizes are inside the ( ).



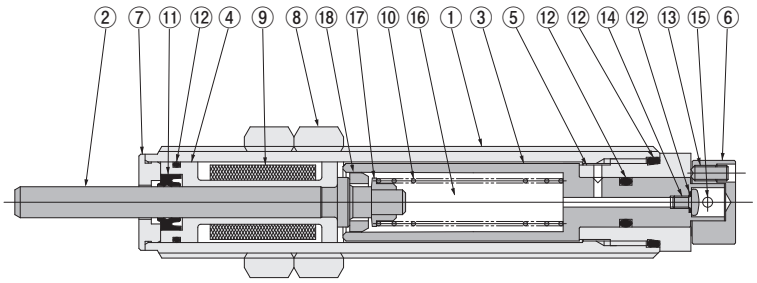


With plastic cap (C)

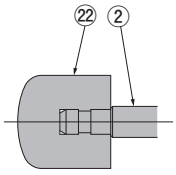
No	Name	Materials
①	Body	Stainless steel
②	Piston rod	Stainless steel
③	Inner tube	Stainless steel
④	Sleeve	Copper alloy
⑤	Adjusting knob	Copper alloy (black electroplated)
⑥	Plug	Stainless steel
⑦	Accumulator	Synthetic rubber
⑧	Spring	Spring steel
⑨	Rod seal	Synthetic rubber
⑩	Oil	Special oil (H1 compliant)
⑪	Piston ring	Copper alloy
⑫	Collar	Copper alloy
⑬	O-ring	Synthetic rubber
⑭	O-ring	Synthetic rubber
⑮	O-ring[Note]	Synthetic rubber
⑯	Screw	Mild steel (nickel plated)
⑰	Mounting nut	Mild steel (nickel plated)
⑱	Spring pin	Steel (oxide film)
⑲	Cap	Plastic (POM)

Note: Not available for KSHP6×4.

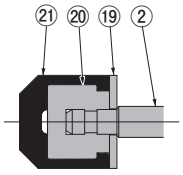
●**M10** to **M42** size (3/8-32 UNEF to 1 3/4-12 UN) * The inch sizes are inside the ( ).



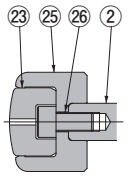
For KSHP 30 □30 and KSHP 42 □50



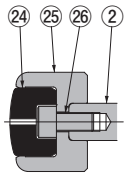
With plastic cap (C)



With rubber cap (R)



With plastic cap (C)



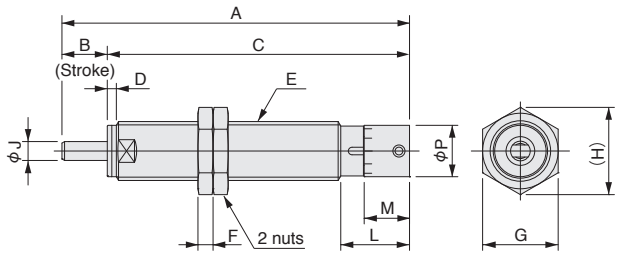
With rubber cap (R)

No.	Name	Materials
①	Body	Free-cutting steel (nickel plated)
②	Piston rod[Note1]	Steel (nickel plated)
③	Inner tube	Stainless steel
④	Sleeve	Copper alloy
⑤	Housing	Mild steel (black electroplated)
⑥	Adjusting knob	Copper alloy (nickel plated)
⑦	Plug	Stainless steel
⑧	Mounting nut	Mild steel (nickel plated)
⑨	Accumulator	Synthetic rubber
⑩	Spring	Spring steel
⑪	Rod seal	Synthetic rubber
⑫	O-ring	Synthetic rubber
⑬	Lock screw[Note2]	Steel (oxide film)
⑭	Screw[Note3]	Mild steel (zinc plated)
⑮	Spring pin	Steel (oxide film)
⑯	Oil	Special oil (H1 compliant)
⑰	Collar[Note4]	Stainless steel
⑱	Piston ring	Stainless steel
⑲	Washers[Note 5]	Stainless steel
⑳	Cap	Plastic (POM)
㉑	Rubber cap	Urethane rubber
㉒	Cap	Plastic (POM)
㉓	Cap	Plastic (POM)
㉔	Rubber cap	Urethane rubber
㉕	Metal cap	Stainless steel
㉖	Hexagon socket head screw	Stainless steel

Note 1: KSHP 10 to 12 are stainless steel
2: KSHP 10 to 14 are slotted lock screws.
3: KSHP 30 to 42 are stainless steel with button head screw
4: KSHP 10 are copper alloy and KSHP 12 to 14 are sintered metal
5: KSHP 18 to 20 only

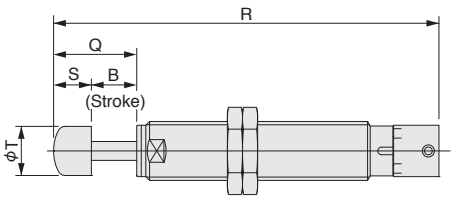
Dimensions (mm)

●No rod end cap: **KSHP**□×□



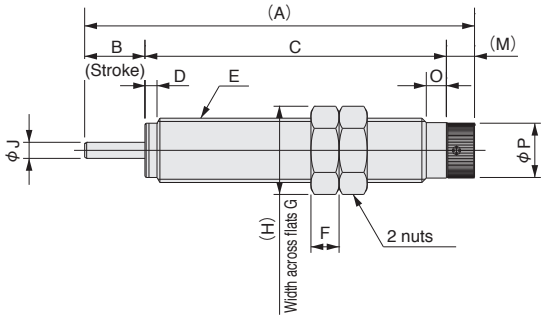
●With rod end cap

With plastic cap: **KSHP**□×□**C**



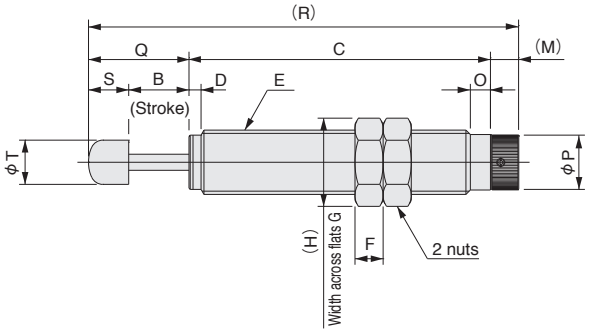
Model \ Symbol	A	B	C	D	E	F	G	H	J	L	M	P	Q	R	S	T
KSHP6×4 (C)	36	4	32	0.5	M6×0.75	2	8	9.2	2	6.5	5.4	5	8	40	4	4.6
KSHP8×6 (C)	46	6	40	1.2	M8×0.75	2	10	11.5	2.5	9	6	6.8	11	51	5	6.5
KSHP8×6 (C)-11	46	6	40	1.2	M8×1	3	10	11.5	2.5	9	6	6.8	11	51	5	6.5

●No rod end cap: **KSHP**□×□

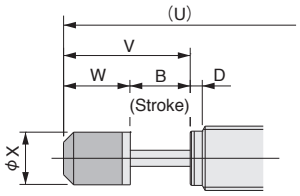


●With rod end cap

With plastic cap: **KSHP**□×□**C**

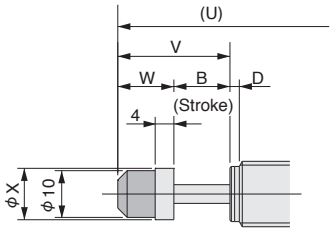


With rubber cap: **KSHP**□×□**R**



Note: Rubber cap is not available with the **KSHP10×8**

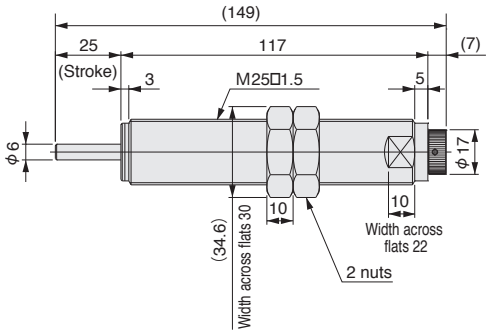
With rubber cap: For the **KSHP14×12R**



Model \ Symbol	A	B	C	D	E	F	G	H	J	M	O	P	Q	R	S	T	U	V	W	X
KSHP10×8 (C)	69	8	56	6	M10×1	3	12	13.9	3	5	4	8.7	16	77	8	8	–	–	–	–
KSHP12×10 (C,R)	75	10	60	2	M12×1	4	14	16.2	3	5	4	10.7	20	85	10	10	85	20	10	10
KSHP14×12 (C,R)	87	12	70	2	M14×1.5	5	17	19.6	4	5	4	10.7	22	97	10	11	99	24	12	11
KSHP16×15 (C,R)	97	15	75	3	M16×1.5	7	19	21.9	4	7	5	13.5	25	107	10	11	113.5	31.5	16.5	13
KSHP18×20 (C,R)	116	20	89	3	M18×1.5	8	21	24.2	5	7	5	13.5	35	131	15	15	131.7	35.7	15.7	15
KSHP20×22 (C,R)	121	22	92	3	M20×1.5	8	24	27.7	5	7	5	17	40	139	18	16	139.2	40.2	18.2	16

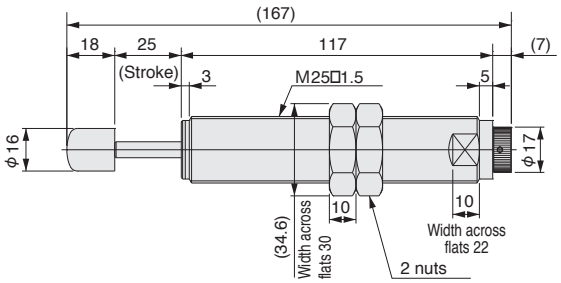
Dimensions (mm)

●No rod end cap: **KSHP25×25**

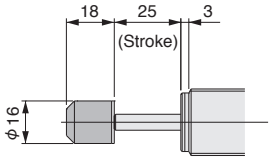


●With rod end cap

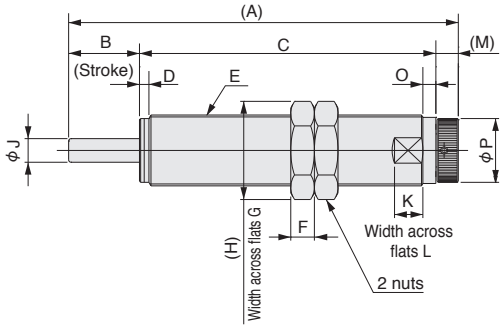
With plastic cap: **KSHP25×25C**



With rubber cap: **KSHP25×25R**

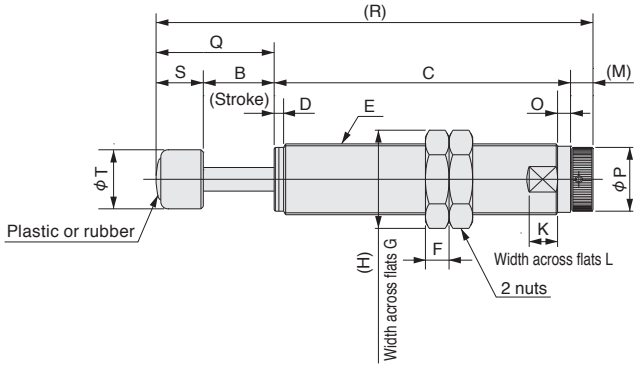


●No rod end cap: **KSHP□×□**



●With rod end cap

With plastic cap: **KSHP□×□C**
With rubber cap: **KSHP□×□R**



Model \ Symbol	A	B	C	D	E	F	G	H	J	K	L	M	O	P	Q	R	S	T
KSHP30×30 (C,R)	165	30	125.5	4	M30×1.5	10	36	41.6	10	12	28	9.5	5.5	27	50	185	20	25
KSHP36×50 (C,R)	229	50	169.5	5	M36×1.5	15	46	53.1	12	12	33	9.5	6	27	55	254	25	32
KSHP42×50 (C,R)	235.5	50	173	5	M42×1.5	15	50	57.7	12	20	38	12.5	7	38	75	260.5	25	32

Mass (Specifications in inches)

oz

Model	Main unit[Note1]	Additional mass		Additional parts' mass	
		With plastic cap	With rubber cap	Mounting nut (1 ea.)	Stopper nut
KSHP6×4 -F11	0.2	0.007	—	0.04	0.1
KSHP8×6 -11-F11	0.5	0.02	—	0.06	0.2
KSHP10×8 -F11	0.9	0.02	—	0.07	0.4
KSHP11×8 -F11	1.2	0.02	—	0.08	0.4
KSHP12×10 -F11	1.7	0.04	0.04	0.1	0.5
KSHP14×12 -F11	2.6	0.04	0.06	0.2	0.7
KSHP18×20 -F11	5.9	0.1	0.2	0.4	2.5
KSHP25×25 -F11	13.2	0.2	0.2	1.1	4.4
KSHP30×30 -F11	22.2	1.8	1.7	1.3	5.5
KSHP36×50 -F11	35.3	3.9	3.8	3.0	9.8
KSHP42×50 -F11	63.0	3.9	3.8	3.4	10.8

Calculation example: The mass of KSHP10×8C-S-2 (with cap and stopper) is

0.9 + 0.02 + 0.4 = 1.32oz

Note1: The weight of the main unit includes the weight of 2 mounting nuts.

Note2: KSHP11×8 has only inch specifications.

Order Codes (specifications in inches)

KSHP ☐ ☐ **- F11 -** ☐

Stopper nut
Blank: No stopper nut
S : With stopper nut

Cap
Blank: No cap
C : With plastic cap
R : With rubber cap[Note]
Note: Rubber cap is not available with the **6×4**, **8×6**, and **10×8**.

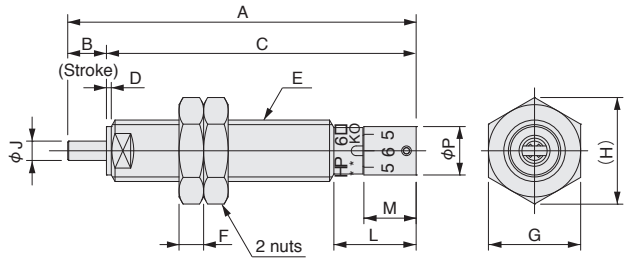
Body thread size×stroke
6×4
8×6
10×8
11×8
12×10
14×12
18×20
25×25
30×30
36×50
42×50[Note]

Adjustment type linear orifice shock absorber KSHP series

Note: **KSHP42×50** is a built-to-order product. Contact us about turnaround times, prices, or other information.

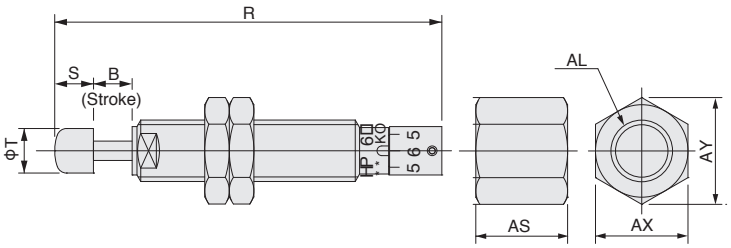
Dimensions (in)

●No rod end cap: **KSHP**□×□



●With rod end cap

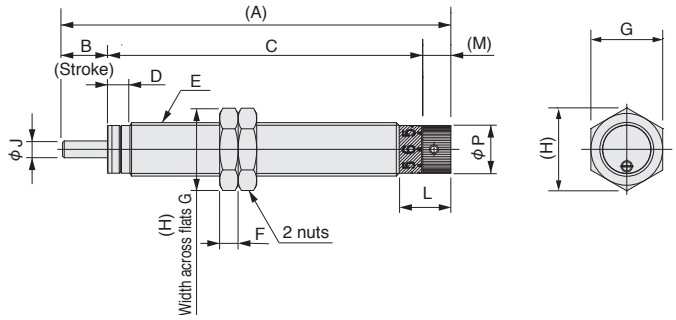
With plastic cap: **KSHP**□×□**C**



Model \ Symbol	A	B	C	D	E	F	G	H	J	L	M	P	R	S
KSHP6×4 (C)-F11	1.417	0.157	1.26	0.02	1/4-32 UNEF	0.1	3/8	0.433	0.079	0.335	0.213	0.197	1.575	0.157
KSHP8×6 (C)-F11	1.811	0.236	1.575	0.047	5/16-32 UNEF	0.13	7/16	0.505	0.098	0.358	0.236	0.268	2.008	0.197

Model \ Symbol	T	AL	AS	AX	AY
KSHP6×4 (C)-F11	0.181	1/4-32 UNEF	0.4	3/8	0.433
KSHP8×6 (C)-F11	0.256	5/16-32 UNEF	7/16	7/16	0.505

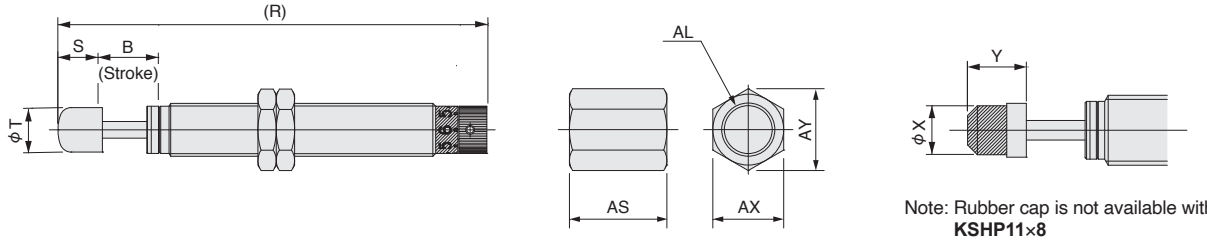
●No rod end cap: **KSHP**□×□



●With rod end cap

With plastic cap: **KSHP**□×□**C**

With rubber cap: **KSHP**□×□**R**



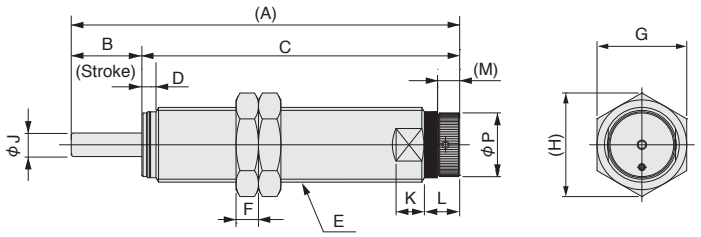
Note: Rubber cap is not available with the **KSHP10×8**, **KSHP11×8**

Model \ Symbol	A	B	C	D	E	F	G	H	J	L	M	P	R	S
KSHP10×8 (C)-F11	2.724	0.315	2.409	0.157	3/8-32 UNEF	0.13	1/2	0.577	0.118	0.362	0.197	0.335	3.039	0.315
KSHP11×8 (C)-F11	2.724	0.315	2.409	0.157	7/16-28 UNEF	0.15	9/16	0.65	0.118	0.362	0.197	0.343	3.039	0.315
KSHP12×10 (C,R)-F11	2.961	0.394	2.567	0.157	1/2-20 UNF	0.15	5/8	0.722	0.118	0.362	0.197	0.421	3.354	0.394
KSHP14×12 (C,R)-F11	3.433	0.472	2.961	0.157	9/16-18 UNF	7/32	11/16	0.794	0.157	0.362	0.197	0.421	3.827	0.394
KSHP18×20 (C,R)-F11	4.575	0.787	3.787	0.197	3/4-16 UNF	1/4	15/16	1.082	0.197	0.48	0.276	0.531	5.165	0.591
KSHP25×25 (C,R)-F11	5.874	0.984	4.89	0.197	1-12 UNF	3/8	1 1/4	1.443	0.236	0.48	0.276	0.669	6.583	0.709

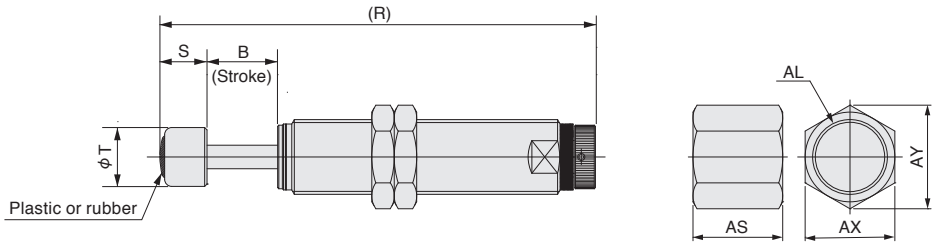
Model \ Symbol	T	X	Y	AL	AS	AX	AY
KSHP10×8 (C)-F11	0.315	–	–	3/8-32 UNEF	11/16	1/2	0.577
KSHP11×8 (C)-F11	0.315	–	–	7/16-28 UNEF	11/16	9/16	0.65
KSHP12×10 (C,R)-F11	0.394	0.394	0.394	1/2-20 UNF	11/16	5/8	0.722
KSHP14×12 (C,R)-F11	0.433	0.433	0.472	9/16-18 UNF	3/4	11/16	0.794
KSHP18×20 (C,R)-F11	0.591	0.591	0.618	3/4-16 UNF	1 1/2	15/16	1.082
KSHP25×25 (C,R)-F11	0.63	0.63	0.709	1-12 UNF	1 1/2	1 1/4	1.443

Dimensions (in)

●No rod end cap: **KSHP**□×□



●With rod end cap
With plastic cap: **KSHP**□×□**C**
With rubber cap: **KSHP**□×□**R**



Model \ Symbol	A	B	C	D	E	F	G	H	J	K	L	M	P	R	S
KSHP30×30 (C,R)-F11	6.496	1.181	5.315	0.236	1 1/4-12 UNF	3/8	1 1/2	1.732	0.394	0.472	0.591	0.354	1.063	7.283	0.787
KSHP36×50 (C,R)-F11	9.016	1.969	7.047	0.276	1 3/8-12 UNF	5/8	1 11/16	1.948	0.472	0.472	0.61	0.354	1.063	10	0.984
KSHP42×50 (C,R)-F11	9.272	1.969	7.303	0.276	1 3/4-12 UN	5/8	2	2.309	0.472	0.787	0.768	0.472	1.496	10.256	0.984

Model \ Symbol	T	AL	AS	AX	AY
KSHP30×30 (C,R)-F11	0.984	1 1/4-12 UNF	1 1/2	1 1/2	1.732
KSHP36×50 (C,R)-F11	1.26	1 3/8-12 UNF	2	1 11/16	1.948
KSHP42×50 (C,R)-F11	1.26	1 3/4-12 UN	2	2	2.309

Linear Orifice Type KSHC Series

Clean Room Specification Shock Absorbers

Low dust emissions | Softened shocks | Silicone–free

Shock Absorbers with Clean Specifications

Linear orifice type **KSHC series** (fixed type)

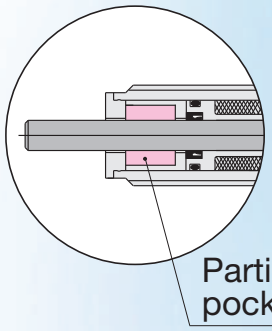
* "Linear Orifice" is a registered trademark of Koganei Corporation.

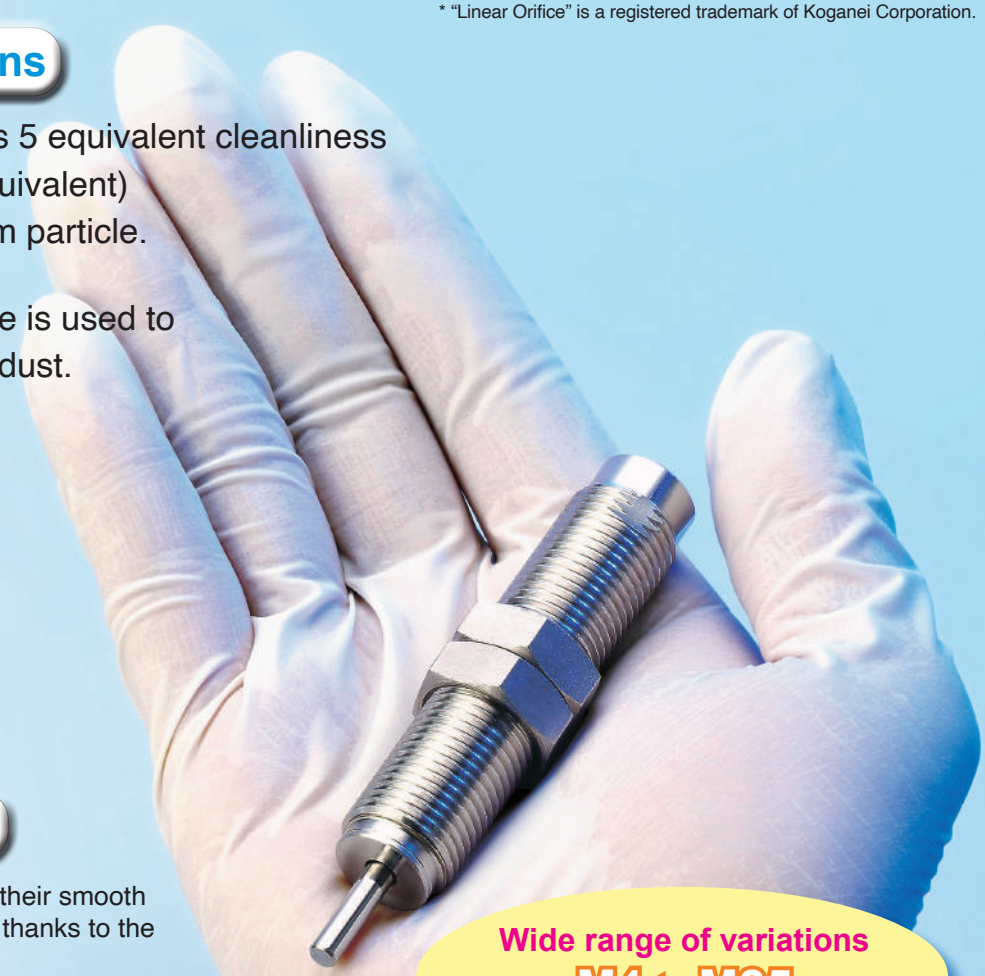
Low dust emissions

Capable of JIS/ISO Class 5 equivalent cleanliness (FED–STD Class 100 equivalent) calculated within a 0.1 µm particle. (Koganei standard)Note 1

A particle pocket structure is used to prevent the scattering of dust.

Note 1: Refer to page 59 for the Koganei standard.
2: Packaged in single layer packaging.





Softened shocks

These shock absorbers achieve their smooth shock absorption characteristics thanks to the linear orifice structure.
Reduces vibrations and shocks to bases and equipment.

Silicone–free

Silicone is not used in the hydraulic oil or plastic.

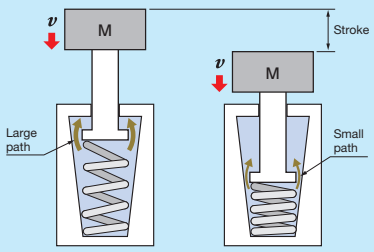
Wide range of variations
M4 to M25
9 sizes and 40 models

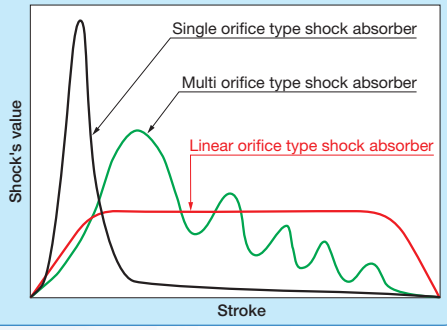
Wide range of variations
10-32 UNF to 1-12 UNF
9 sizes and 36 models

Linear orifices' long service life and softened shocks

These shock absorbers achieve their smooth shock absorption characteristics and a long service life thanks to the linear orifice structure that transforms the orifice linearly.
Since the linear orifice structure can increase the inner diameter of the shock absorbers without needing an inner tube, the shock absorbers demonstrate similar characteristics to shock absorbers one thread size larger, as well as reduce the vibrations and shocks to bases and equipment.

• **Principles of operation**
The piston stroke squeezes the oil's flow path steplessly to softly absorb shocks.





CAUTION Read the safety precautions on page ⑤ before using this product.

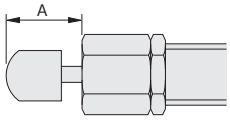
General precautions

Cover the unit when mounting it in locations where it might be subject to excessive dust, dripping water, dripping oil, etc. Dents, scratches, water, oil, or dust on the piston rod results in damage and decreases service life.

Mounting

1. Keep the angle of eccentricity, resulting from the load direction and the axis of the shock absorber, under the specified values on pages ⑭. If an eccentric load exceeding the specifications is applied, it could result in breakage or impaired returns. If there is concern that an eccentric load exceeding the specified values will be applied, install a guide, or similar mechanism.
2. Two or more shock absorbers can be mounted in parallel, to boost absorption capacity. In such an arrangement, however, be careful to ensure that the load is evenly distributed to each shock absorber.
3. To adjust the capacity with the stroke, adjust the stopper nut (-S) or add an external stopper.
4. If using with a cap, always mount a stopper nut (-S) or an external stopper to ensure that the cap is not subjected to loads at the stroke end. The stopper nut mounting position must not exceed the distance shown in the table below.
   You can use it without a stopper nut or external stopper, but over the long-term, the stop location changes due to cap deformation and wear.

Model	A	
	mm	in
CS-KSHC3×3(C)(-F11)	3	0.118
CS-KSHC4×4(C)(-F11)	4	0.157
CS-KSHC5×5(C)(-11)**(-F11)**	5	0.197
CS-KSHC6×8(C)(-F11)	8	0.315
CS-KSHC7×8C-F11	—	0.315
CS-KSHC8×8(C)(-F11)	8	0.315
CS-KSHC9×10(C)(-F11)	10	0.394
CS-KSHC11×15(C)(-F11)	15	0.591
CS-KSHC14×16C	16	0.630
CS-KSHC18×25C(-F11)	25	0.984



5. The small screw on the back end of the shock absorber should never be loosened or removed. Oil may leak out of the shock absorber leading to a loss of functionality and resulting in damage to the equipment and accidents.
6. When mounting the shock absorber, always use the following maximum tightening torque guidelines. Tightening using excessive force may result in damage.

Model	Maximum tightening torque	
	N・m	in・lbf
CS-KSHC3×3(C)(-F11)	0.5	4.426
CS-KSHC4×4(C)(-F11)	0.85	7.523
CS-KSHC5×5(C)(-11)(-F11)	2.5	22.128
CS-KSHC6×8(C)(-F11)	6.5	57.532
CS-KSHC7×8C-F11	—	57.5
CS-KSHC8×8(C)(-F11)	12.0	106.2
CS-KSHC9×10(C)(-F11)	12.0	106.2
CS-KSHC11×15(C)(-F11)	20.0	177.0
CS-KSHC14×16(C)	30.0	265.5
CS-KSHC18×25(C)(-F11)	42.0	371.7

7. Ensure that the hardness of the surface directly impacting the piston rod of the shock absorber is over HRc40 hardness (excluding models with cap).
8. Be aware that performance and characteristics change depending on the operating temperature.

■How to select shock absorbers

1. Confirm the thrust

Confirm the thrust that is used, and then check the prospective shock absorbers from the table of recommended cylinder bore sizes on page ⑫. If a shock absorber that is smaller than the recommended shock absorber is used, the shock absorber being used may be damaged in fewer operation cycles than is guaranteed.

2. Confirm the kinetic energy

Confirm I and II below, and then check page ⑬ for the selection graph for prospective shock absorbers from [1. Confirm the thrust]. (*)

Ⅰ Impact object mass: m [kg]

Ⅱ Impact speed: v [m/s]

Because " v " is the impact speed, not the average speed, when using a cylinder,

v = m [cylinder stroke] ÷ s [operating time] × 2

Select a model in which Ⅰ and Ⅱ fit within the range enclosed by the capacity curves.

If multiple models are applicable, use the model that is closest to both the capacity curves and the operating conditions. The further the model you select is from the capacity curves and the operating conditions, the slower it will tend to be.

3. Confirm other specifications

Confirm that such specifications as the maximum operating frequency, maximum absorption capacity per unit of time, angle of eccentricity, and operating temperature range are within the range for the shock absorber that you selected.

* The value for the kinetic energy, E, can be found by doing the following calculation. However, the shock absorber's capacity for absorption changes depending on the impact speed. When the shock absorber is doing low-speed operations, it has less drag than when it is doing high-speed operations.

The maximum absorption capacity that is noted in the specifications is reached only at the maximum impact speed.

Therefore, do not choose a shock absorber by comparing E to the maximum absorption capacity; confirm the capacity using the selection graph.

$$E=\frac{1}{2}mv^2$$

E : Kinetic energy (J)

m: Impact object mass [kg]

v : Impact speed (m/s)

Range in the selection graph

Vertical axis range :

Maximum impact speed ≧ v Impact speed (operating condition)

Horizontal axis range :

Shock absorber's maximum absorption capacity at the impact speed (v = m/s) ≧ E Kinetic energy (operating condition)

Calculating the thrust energy is not necessary because the size of the shock absorber is limited by the thrust in step 1.

■ Example of selecting a shock absorber

[Operating conditions]

①Bore size of the cylinder being used: ϕ16

②Cylinder stroke: 100 mm = 0.1 m

③Pressure applied to the cylinder: 0.6 MPa

④Cylinder's operating time: 0.4 s

⑤Impact object mass: 10 kg

1. Confirm the thrust

Either calculate or find the thrust in the cylinder thrust table on page ⑫.

The cylinder thrust based on ① and ③ is about 121 N.

Cylinder thrust	100.5N	<	120.6N	<	126N
Cylinder bore size	ϕ 16		ϕ 16		ϕ 20
Applied pressure	0.5MPa		0.6MPa		0.4MPa

As mentioned above, although the cylinder being used is ϕ16, the pressure applied to the cylinder exceeds 0.5 MPa, so consider the ϕ20 cylinder (lower than 0.4 MPa) and check the table of recommended cylinder bore sizes on page ⑫.

The following are prospective models.

・CS-KSHC6×8　・CS-KSHC8×8

・CS-KSHC9×10　・CS-KSHC11×15

2. Confirm the kinetic energy

Ⅰ The impact object mass m = 10 kg from ⑤

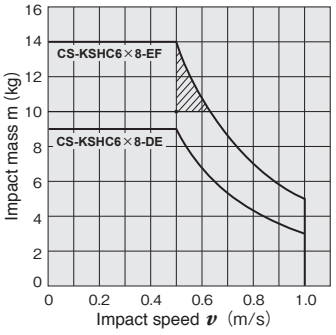
Ⅱ Find the impact speed, v, from ② and ④.

v = ② 0.1 m ÷ ④ 0.4 s ×2

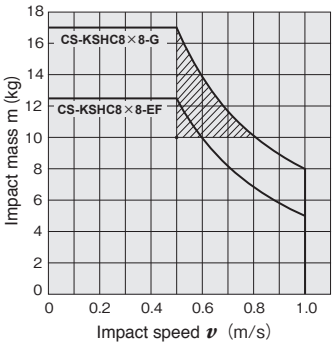
=0.5 m/s

According to the selection graph on page ⑭, the shock absorber with the optimum absorption capacity for operating conditions is CS-KSHC8×8-EF.

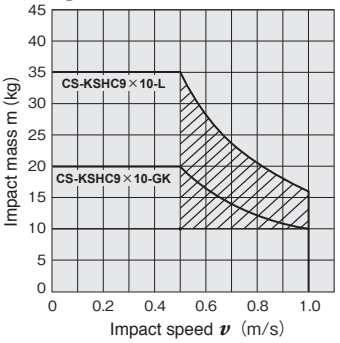
●CS-KSHC6×8



●CS-KSHC8×8



●CS-KSHC9×10



・CS-KSHC6×8-DE has an insufficient absorption capacity.

・The absorption capacities for all of the other shock absorbers are higher than that of CS-KSHC8×8-EF, so they do not fall within the operating conditions and capacity curves.

3. Confirm other specifications

Verify that other operating conditions, such as the maximum operating frequency, maximum absorption capacity per unit of time, angle of eccentricity, and operating temperature range, are within the specified ranges for CS-KSHC8×8-EF.

Selection guidelines

■Recommended cylinder bore size

Model \ Cylinder bore	ϕ 4	ϕ 6	ϕ 8	ϕ 10	ϕ 12	ϕ 16	ϕ 20	ϕ 25	ϕ 32	ϕ 40	ϕ 50	ϕ 63	ϕ 80	ϕ 100
CS-KSHC3×3(-F11)	◇	◎	◎	○										
CS-KSHC4×4(-F11)		◇	◎	○										
CS-KSHC5×5(-F11)			◇	◎	◎	○								
CS-KSHC6×8(-F11)				◇	◎	◎	○							
CS-KSHC7×8-F11					◎	◎	○							
CS-KSHC8×8(-F11)						◇	◎	○						
CS-KSHC9×10(-F11)						◇	◎	◎	○					
CS-KSHC11×15(-F11)							◇	◎	◎	○				
CS-KSHC14×16									◇	◎	◎	○		
CS-KSHC18×25(-F11)										◇	◎	◎	○	○

◇ : 0.3 MPa or higher ◎ : 0.5 MPa or lower ○ : 0.4 MPa or lower

Note1: If a shock absorber that is smaller than the recommended shock absorber is used, the shock absorber being used may be damaged in fewer operation cycles than the value that is guaranteed.

Note2: CS-KSHC7×8 has only inch specifications.

■Cylinder thrust

N [lbf.]

Bore size mm [in.]	Pressure area mm^2 [in.^{2}]	Air pressure MPa [psi.]								
		0.1 [15]	**0.2 [29]**	**0.3 [44]**	**0.4 [58]**	**0.5 [73]**	**0.6 [87]**	**0.7 [102]**	**0.8 [116]**	**0.9 [131]**
ϕ4	12.6 [0.020]	1.3 [0.292]	2.5 [0.562]	3.8 [0.854]	5 [1.124]	6.3 [1.416]	7.5 [1.686]	8.8 [1.978]	10.1 [2.270]	11.3 [2.540]
ϕ6	28.3 [0.044]	2.8 [0.629]	5.7 [1.281]	8.5 [1.911]	11.3 [2.540]	14.1 [3.170]	17.0 [3.822]	19.8 [4.451]	22.6 [5.080]	25.4 [5.710]
ϕ8	50.3 [0.078]	5 [1.124]	10.1 [2.270]	15.1 [3.394]	20.1 [4.518]	25.1 [5.642]	30.2 [6.789]	35.2 [7.913]	40.2 [9.037]	45.2 [10.161]
ϕ10	78.5 [0.122]	7.9 [1.776]	15.7 [3.529]	23.6 [5.305]	31.4 [7.059]	39.3 [8.835]	47.1 [10.588]	55 [12.364]	62.8 [14.117]	70.7 [15.893]
ϕ12	113 [0.175]	11.3 [2.540]	22.6 [5.080]	33.9 [7.621]	45.2 [10.161]	56.5 [12.701]	67.9 [15.264]	79.2 [17.804]	90.5 [20.344]	101.8 [22.885]
ϕ16	201 [0.312]	20.1 [4.518]	40.2 [9.037]	60.3 [13.555]	80.4 [18.074]	100.5 [22.592]	121 [27.201]	141 [31.697]	161 [36.193]	181 [40.689]
ϕ20	314 [0.487]	31.4 [7.059]	62.8 [14.117]	94.2 [21.176]	126 [28.325]	157 [35.294]	188 [42.262]	220 [49.456]	251 [56.425]	283 [63.618]
ϕ25	491 [0.761]	49.1 [11.038]	98.2 [22.075]	147 [33.046]	196 [44.061]	245 [55.076]	295 [66.316]	344 [77.331]	393 [88.346]	442 [99.362]
ϕ32	804 [1.246]	80.4 [18.074]	161 [36.193]	241 [54.177]	322 [72.386]	402 [90.370]	483 [108.6]	563 [126.6]	643 [144.5]	724 [162.8]
ϕ40	1257 [1.948]	126 [28.325]	251 [56.425]	377 [84.750]	503 [113.1]	628 [141.2]	754 [169.5]	880 [197.8]	1005 [225.9]	1131 [254.2]
ϕ50	1963 [3.043]	196 [44.061]	393 [88.346]	589 [132.4]	785 [176.5]	982 [220.8]	1178 [264.8]	1374 [308.9]	1571 [353.2]	1767 [397.2]
ϕ63	3117 [4.831]	312 [70.138]	623 [140.1]	935 [210.2]	1247 [280.3]	1559 [350.5]	1870 [420.4]	2182 [490.5]	2494 [560.7]	2806 [630.8]
ϕ80	5027 [7.792]	503 [113.1]	1005 [225.9]	1508 [339.0]	2011 [452.1]	2513 [564.9]	3016 [678.0]	3519 [791.1]	4021 [903.9]	4524 [1017]
ϕ100	7854 [1.217]	785 [176.5]	1571 [353.2]	2356 [529.6]	3142 [706.3]	3927 [882.8]	4712 [1059]	5498 [1236]	6283 [1412]	7069 [1589]

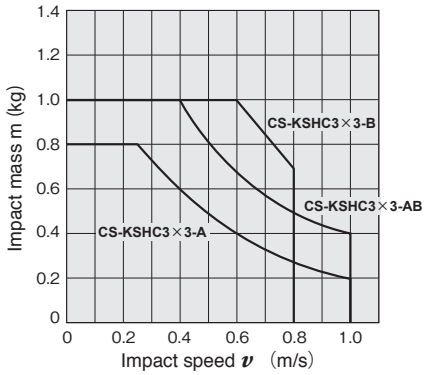
Selection guidelines

Cautions for using the selection graphs

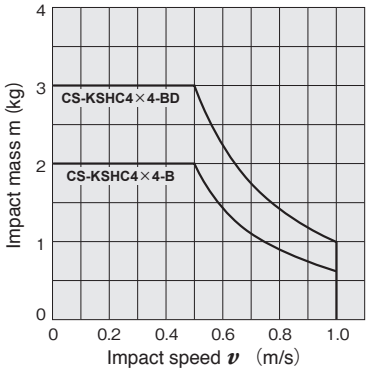
1. The selection graphs are calculated with a cylinder operating air pressure of 0.5 MPa.
2. The values in the selection graphs are for room temperature (20 to 25°). Be aware that performance and characteristics change depending on the operating temperature.
3. Select a shock absorber that is as close to, yet within, the capacity line(s).

■Selection graph

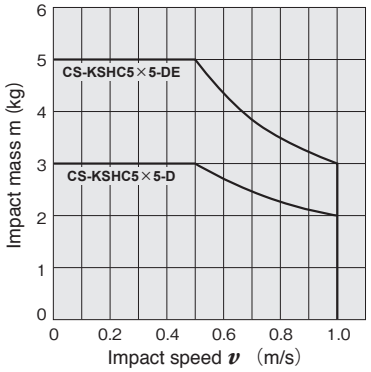
●CS-KSHC3×3 (-F11)



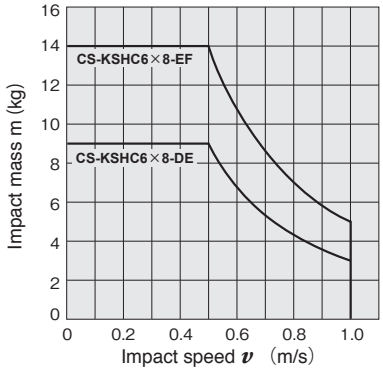
●CS-KSHC4×4 (-F11)



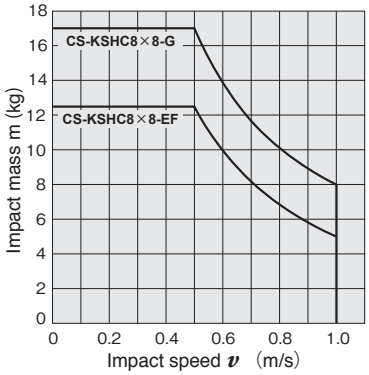
●CS-KSHC5×5 (-F11)



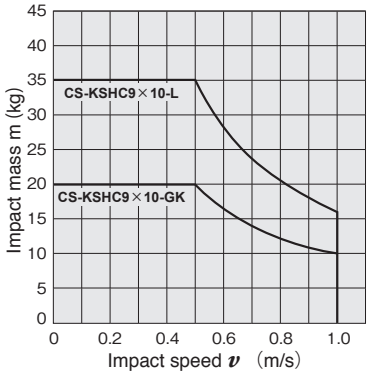
●CS-KSHC6×8 (-F11)
●CS-KSHC7×8-F11



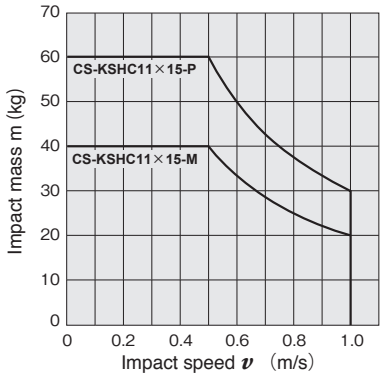
●CS-KSHC8×8 (-F11)



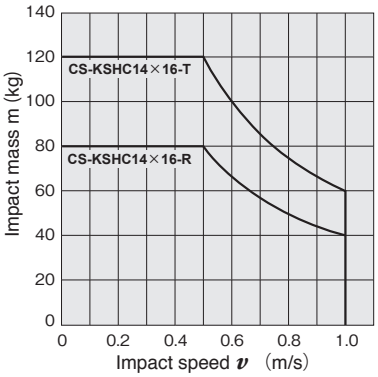
●CS-KSHC9×10 (-F11)



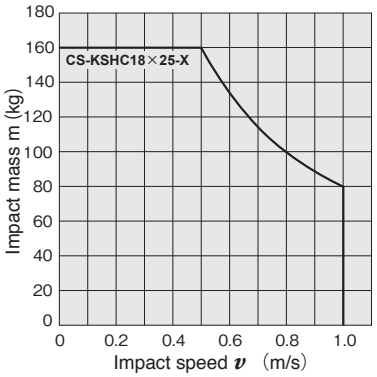
●CS-KSHC11×15 (-F11)



●CS-KSHC14×16



●CS-KSHC18×25 (-F11)



Clean room specifications

Shock absorber

Linear orifice type

KSHC Series

Specifications

Item \ Model (in inches)	CS-KSHC3×3-A (CS-KSHC3×3-A-F11)	CS-KSHC3×3-AB (CS-KSHC3×3-AB-F11)	CS-KSHC3×3-B (CS-KSHC3×3-B-F11)
Maximum absorption capacity J(in.lbs)	0.1 (0.885)	0.2 (1.770)	0.3 (2.655)
Absorption stroke mm(in.)	3 (0.118)		
Impact speed range m/s(ft/s)	0.1 to 1.0 (0.33 to 3.28)		0.1 to 0.8 (0.33 to 2.62)
Maximum operating cycle cycle/min	60		
Maximum absorption capacity per unit of time J/min (in.lbs/min)	10 (88.6)		
Spring return force[Note 1] N	2.0		
Deflection angle	1° or less		
Operating temperature range[Note 2] ℃(℉)	0 to 60 (32 to 140)		

Item \ Model (in inches)	CS-KSHC4×4-B (CS-KSHC4×4-B-F11)	CS-KSHC4×4-BD (CS-KSHC4×4-BD-F11)	CS-KSHC5×5-D-11 (CS-KSHC5×5-F11-D)	CS-KSHC5×5-DE-11 (CS-KSHC5×5-F11-DE)
Maximum absorption capacity J(in.lbs)	0.3 (2.655)	0.5 (4.425)	1.0 (8.851)	1.5 (13.276)
Absorption stroke mm(in.)	4 (0.157)		5 (0.197)	
Impact speed range m/s(ft/s)	0.1 to 1.0 (0.33 to 3.28)			
Maximum operating cycle cycle/min	60			
Maximum absorption capacity per unit of time J/min (in.lbs/min)	15 (132.8)		45 (398.5)	
Spring return force[Note 1] N	3.0		6.0	
Deflection angle	1° or less			
Operating temperature range[Note 2] ℃(℉)	0 to 60 (32 to 140)			

Item \ Model (in inches)	CS-KSHC6×8-DE (CS-KSHC6×8-DE-F11) (CS-KSHC7×8-F11)	CS-KSHC6×8-EF (CS-KSHC6×8-EF-F11) (CS-KSHC7×8-F11)	CS-KSHC8×8-EF (CS-KSHC8×8-EF-F11)	CS-KSHC8×8-G (CS-KSHC8×8-G-F11)
Maximum absorption capacity J(in.lbs)	1.5 (13.276)	2.5 (22.127)	2.5 (22.127)	4.0 (35.403)
Absorption stroke mm(in.)	8 (0.315)		8 (0.315)	
Impact speed range m/s(ft/s)	0.1 to 1.0 (0.33 to 3.28)			
Maximum operating cycle cycle/min	60			
Maximum absorption capacity per unit of time J/min (in.lbs/min)	75 (664.2)		120 (1062.7)	
Spring return force[Note 1] N	8.5			
Deflection angle	1° or less			
Operating temperature range[Note 2] ℃(℉)	0 to 60 (32 to 140)			

Item \ Model (in inches)	CS-KSHC9×10-GK (CS-KSHC9×10-GK-F11)	CS-KSHC9×10-L (CS-KSHC9×10-L-F11)	CS-KSHC11×15-M (CS-KSHC11×15-M-F11)	CS-KSHC11×15-P (CS-KSHC11×15-P-F11)
Maximum absorption capacity J(in.lbs)	5.0 (44.254)	8.0 (70.806)	10 (88.507)	15 (132.8)
Absorption stroke mm(in.)	10 (0.394)		15 (0.591)	
Impact speed range m/s(ft/s)	0.1 to 1.0 (0.33 to 3.28)			
Maximum operating cycle cycle/min	60		40	
Maximum absorption capacity per unit of time J/min (in.lbs/min)	240 (2125.4)		300 (2656.8)	
Spring return force[Note 1] N	8.5		18	
Deflection angle	1° or less			
Operating temperature range[Note 2] ℃(℉)	0 to 60 (32 to 140)			

Note1: The spring return force is the force of the piston rod when it returns from a full stroke. It is not stable, so cannot be used as other than rod return.

2: The shock absorbing capacity fluctuates based on speed and ambient temperature. Always use a product that is within the range shown by the solid lines in the graphs on pages ⑬.

* CS-KSHC7 has only inch specifications.

* The maximum tightening torque of CS-KSHC7 is different from that of CS-KSHC6. See page ⑬ for details on the maximum tightening torque.

Specifications

Item \ Model (in inches)	CS-KSHC14×16-R	CS-KSHC14×16-T	CS-KSHC18×25-X (CS-KSHC18×25-F11-X)
Maximum absorption capacity J(in.lbs)	20	30	40 (354.0)
Absorption stroke mm(in.)	16		25 (0.984)
Impact speed range m/s(ft/s)	0.1 to 1.0 (0.33 to 3.28)		
Maximum operating cycle cycle/min	40		
Maximum absorption capacity per unit of time J/min (in.lbs/min)	600		800 (7084.8)
Spring return force[Note 1] N	18.6		32
Deflection angle	1° or less		
Operating temperature range[Note 2] ℃(℉)	0 to 60 (32 to 140)		

*CS-KSHC14 does not have inch specifications.

Order Codes (specifications in mm)

CS — KSHC □ □ - □ - □

Clean specifications

Shock absorber Linear orifice type KSHC series

Cap
Blank: No cap
C : With plastic cap

Stopper nut
Blank: No stopper nut
S : With stopper nut

Piston diameter × absorption stroke	Maximum absorption capacity
3×3	A : 0.1J
	AB : 0.2J
	B : 0.3J
4×4	B : 0.3J
	BD : 0.5J
5×5	D : 1.0J
	DE : 1.5J
6×8	DE : 1.5J
	EF : 2.5J
8×8	EF : 2.5J
	G : 4.0J
9×10	GK : 5.0J
	L : 8.0J
11×15	M : 10J
	P : 15J
14×16	R : 20J
	T : 30J
18×25	X : 40J

● CS-KSHC5×5 Order code for thread size M8×1

CS-KSHC5×5 □ - □ - □ - 11

Body thread size
11 : M8×1

Shape of rod end
Blank: No cap
C : With plastic cap

Stopper nut
Blank: No stopper nut
S : With stopper nut

Maximum absorption capacity
D : 1.0J
DE: 1.5J

Additional Parts (no specifications in inches)

●Stopper nut

S - KSH - M □

Thread size
4 : For CS-KSHC3×3
6 : For CS-KSHC4×4
8 : For CS-KSHC5×5
8-11: For CS-KSHC5×5-11
10 : For CS-KSHC6×8
12 : For CS-KSHC8×8
14 : For CS-KSHC9×10
16 : For CS-KSHC11×15
20 : For CS-KSHC14×16
25 : For CS-KSHC18×25

●Mounting nut (M4 to M20 : 1 pack has 10 pieces; M25 : 1 pack has 2 pieces)

N - KSH - M □

Thread size
4 : For CS-KSHC3×3
6 : For CS-KSHC4×4
8 : For CS-KSHC5×5
8-11: For CS-KSHC5×5-11
10 : For CS-KSHC6×8
12 : For CS-KSHC8×8
14 : For CS-KSHC9×10
16 : For CS-KSHC11×15
20 : For CS-KSHC14×16
25 : For CS-KSHC18×25

* For the dimension diagrams of the additional parts, see page ㊽ to ㊾.
* The stopper nut is made from mild steel (nickel plated).

Mass (specifications in mm)

g

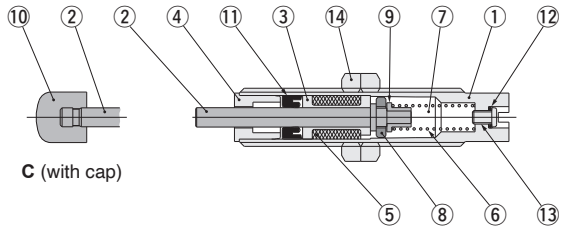
Model	Main unit[Note]	Additional mass	Additional parts' mass	
		With plastic cap	Mounting nut (1 ea.)	Stopper nut
CS-KSHC3×3	1.8	0.1	0.2	0.8
CS-KSHC4×4	4.8	0.1	0.4	2
CS-KSHC5×5-01,-11	9.2	0.3	0.6(0.9)	4
CS-KSHC6×8	21	1	1.2	7
CS-KSHC8×8	32	1	1.9	8
CS-KSHC9×10	58	2	4	15
CS-KSHC11×15	94	2	6.6	29
CS-KSHC14×16	172	3	12.2	50
CS-KSHC18×25	350	7	23	100

Calculation example: The mass of CS-KSHC6×8 (with cap and stopper) is
21 + 1 + 7 = 29g

Note: The weight of the main unit includes the weight of 2 mounting nuts.

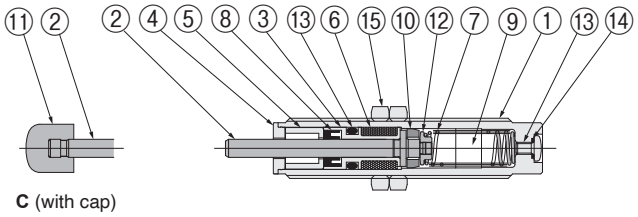
Inner Construction and Major Parts and Materials

●CS-KSHC3×3
●CS-KSHC4×4
●CS-KSHC5×5



C (with cap)

●CS-KSHC6×8
●CS-KSHC8×8
●CS-KSHC9×10



C (with cap)

●CS-KSHC11×15
●CS-KSHC14×16
●CS-KSHC18×25

Note: Depending on size, some part shapes and configurations may differ.

●CS-KSHC3×3, 4×4, 5×5

No.	Name	Materials
①	Body[Note 1]	Copper alloy (nickel plated)
②	Piston rod[Note 2]	Steel (nickel plated)
③	Sleeve	Copper alloy
④	Plug	Stainless steel
⑤	Accumulator	Synthetic rubber
⑥	Spring	Spring steel
⑦	Oil	Special oil
⑧	Piston ring	Copper alloy
⑨	Collar[Note 3]	Copper alloy
⑩	Cap	Plastic (POM)
⑪	Rod seal	Synthetic rubber
⑫	O-ring	Synthetic rubber
⑬	Screw	Mild steel (nickel plated)
⑭	Mounting nut[Note 4]	Mild steel (nickel plated)

Note1: CS-KSHC3, 4 are stainless steel
2: CS-KSHC5 is stainless steel
3: CS-KSHC3 is stainless steel
4: CS-KSHC3 is stainless steel

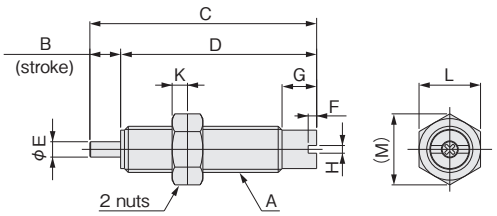
●CS-KSHC6×8, 8×8, 9×10, 11×15, 14×16, 18×25

No.	Name	Materials
①	Body	Copper alloy (nickel plated)
②	Piston rod[Note 1]	Steel (nickel plated)
③	Sleeve	Copper alloy
④	Plug	Stainless steel
⑤	Spacer	Stainless steel
⑥	Accumulator	Synthetic rubber
⑦	Spring	Spring steel
⑧	Rod seal	Synthetic rubber
⑨	Oil	Special oil
⑩	Piston ring	Copper alloy
⑪	Cap	Plastic (POM)
⑫	Collar[Note 2]	Sintered metal
⑬	O-ring	Synthetic rubber
⑭	Screw	Mild steel (zinc plated)
⑮	Mounting nut	Mild steel (nickel plated)

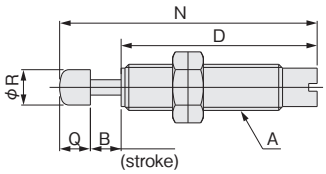
Note1: CS-KSHC6, 8 are stainless steel
2: CS-KSHC11, 14, 18 are stainless steel

Dimensions (mm)

●**No rod end cap: CS-KSHC3×3, CS-KSHC4×4**

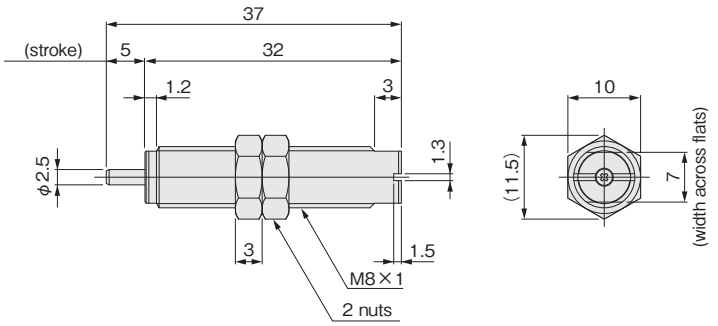


●**With rod end cap: CS-KSHC3×3C, CS-KSHC4×4C**

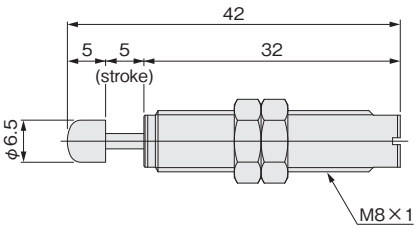


Model / Symbol	A	B	C	D	E	F	G	H	K	L	M	N	Q	R
CS-KSHC3×3□	M4×0.5	3	25	22	1.2	1.1	3	1	2	5.5	6.4	28.5	3.5	3.2
CS-KSHC4×4□	M6×0.75	4	33.5	29.5	2	1	5.5	1	2	8	9.2	37.5	4	4.6

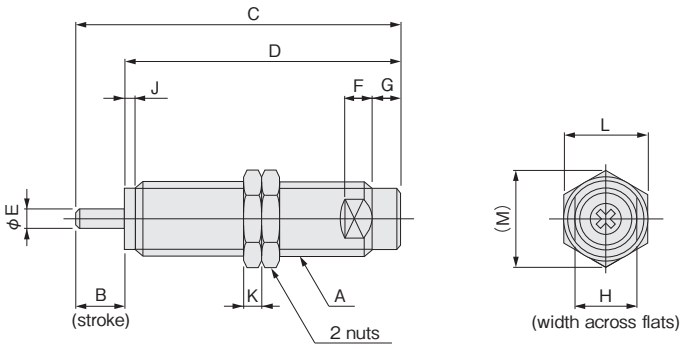
●**No rod end cap: CS-KSHC5×5-11**



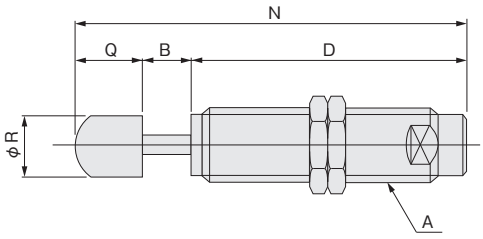
●**With rod end cap: CS-KSHC5×5C-11**



●**No rod end cap: CS-KSHC□×□**

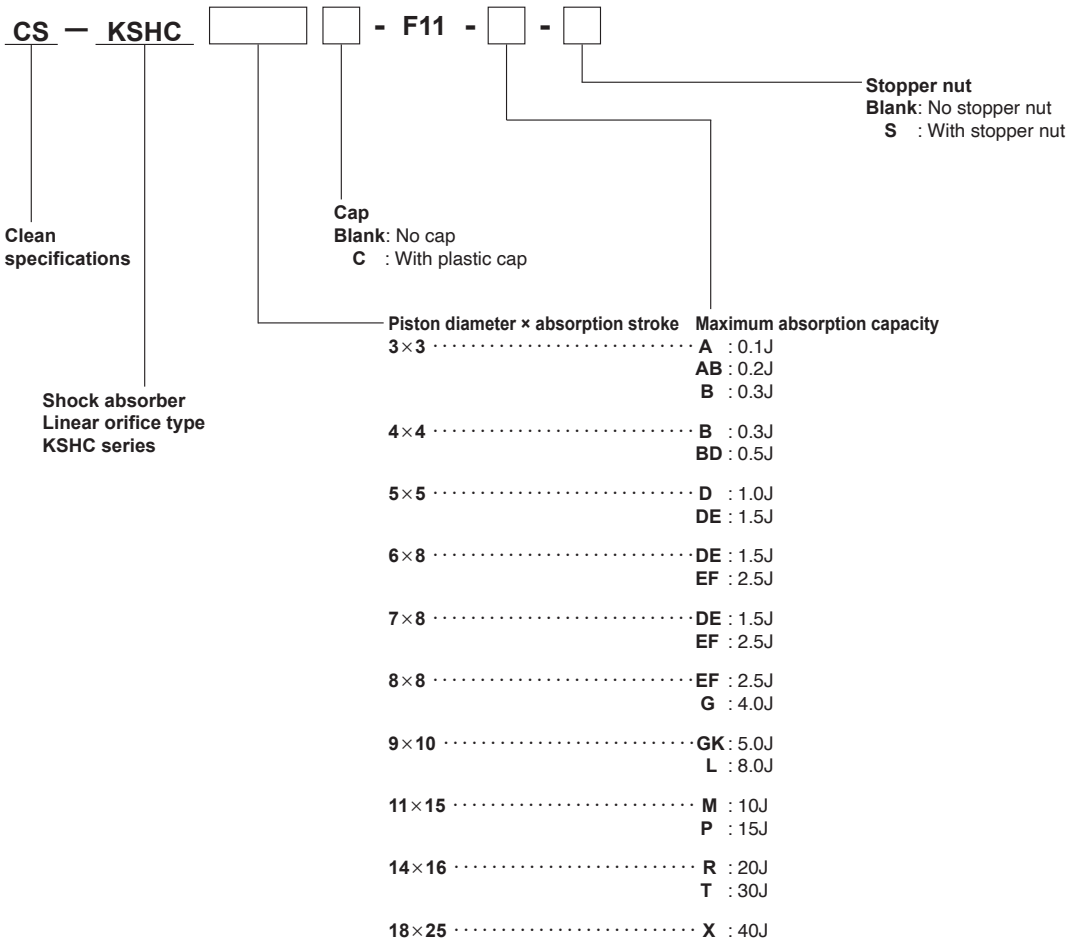


●**With rod end cap: CS-KSHC□×□C**



Model / Symbol	A	B	C	D	E	F	G	H	J	K	L	M	N	Q	R
CS-KSHC5×5□	M8×0.75	5	36	31	2.5	3	5	7	1.2	2	10	11.5	41	5	6.5
CS-KSHC6×8□	M10×1	8	53	45	3	4	5	9	2	3	12	13.9	61	8	8
CS-KSHC8×8□	M12×1	8	53	45	3	5	5.5	11	2	4	14	16.2	63	10	10
CS-KSHC9×10□	M14×1.5	10	70	60	4	5	5.5	12	2	5	17	19.6	80	10	11
CS-KSHC11×15□	M16×1.5	15	87	72	4	5	6	14	3	7	19	21.9	97	10	11
CS-KSHC14×16□	M20×1.5	16	98	82	5	6	6	18	3	8	24	27.7	113	15	15
CS-KSHC18×25□	M25×1.5	25	135	110	6	7	6	23	3	10	30	34.6	153	18	18

Order Codes (specifications in inches)



Mass (specifications in inches)

oz

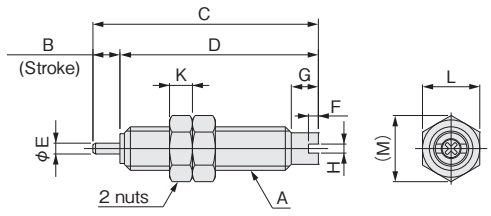
Model	Main unit[Note1]	Additional mass	Additional parts' mass	
		With plastic cap	Mounting nut (1 ea.)	Stopper nut
CS-KSHC3×3-F11	0.1	0.004	0.01	0.04
CS-KSHC4×4-F11	0.2	0.004	0.04	0.1
CS-KSHC5×5-F11-D,DE	0.4	0.01	0.06	0.2
CS-KSHC6×8-F11	0.7	0.04	0.07	0.4
CS-KSHC7×8-F11	1.0	0.04	0.09	0.4
CS-KSHC8×8-F11	1.3	0.04	0.1	0.5
CS-KSHC9×10-F11	2.2	0.07	0.2	0.7
CS-KSHC11×15-F11	5.1	0.07	0.4	2.5
CS-KSHC18×25-F11	12.7	0.2	1.1	4.8

Calculation example: The mass of CS-KSHC6×8 (with cap and stopper) is
0.7 + 0.04 + 0.4 = 1.14oz

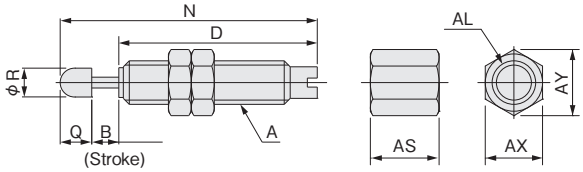
Note1: The weight of the main unit includes the weight of 2 mounting nuts.
Note2: CS-KSHC7×8 has only inch specifications.

Dimensions (in)

●**No rod end cap: CS-KSHC3×3,CS-KSHC4×4**



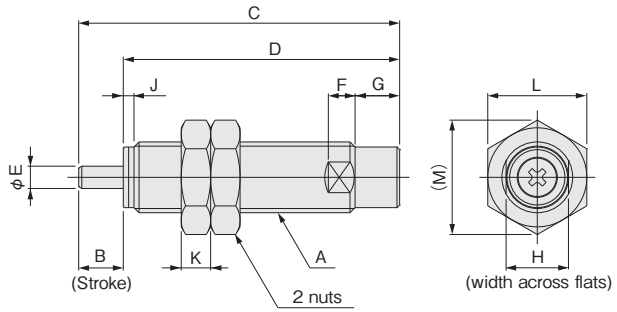
●**With rod end cap: CS-KSHC3×3C,CS-KSHC4×4C**



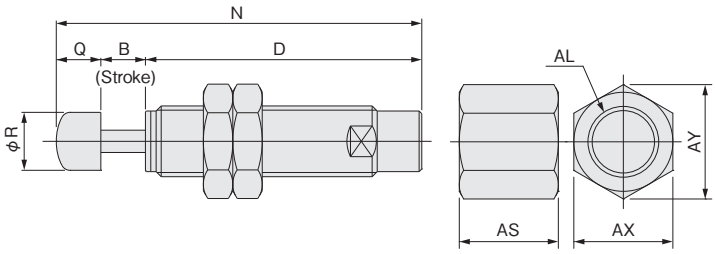
Model \ Symbol	A	B	C	D	E	F	G	H	K	L	M	N	Q
CS-KSHC3×3(C)-F11	#10-32 UNF	0.118	0.984	0.866	0.047	0.043	0.118	0.039	0.1	1/4	0.289	1.122	0.138
CS-KSHC4×4(C)-F11	1/4-32 UNEF	0.157	1.319	1.161	0.079	0.039	0.217	0.039	0.1	3/8	0.433	1.476	0.157

Model \ Symbol	R	AL	AS	AX	AY
CS-KSHC3×3(C)-F11	0.126	#10-32 UNF	0.3	1/4	0.289
CS-KSHC4×4(C)-F11	0.181	1/4-32 UNEF	0.4	3/8	0.433

●**No rod end cap: CS-KSHC□×□**



●**With rod end cap: CS-KSHC□×□C**



Model \ Symbol	A	B	C	D	E	F	G	H	J	K	L	M	N	Q
CS-KSHC5×5(C)(-11)-F11	5/16-32 UNEF	0.197	1.417	1.22	0.098	0.118	0.197	0.276	0.047	0.13	7/16	0.505	1.614	0.197
CS-KSHC6×8(C)-F11	3/8-32 UNEF	0.315	2.087	1.772	0.118	0.157	0.197	0.354	0.079	0.13	1/2	0.577	2.401	0.315
CS-KSHC7×8(C)-F11	7/16-28 UNEF	0.315	2.087	1.772	0.118	0.157	0.197	3/8	0.079	0.15	9/16	0.65	2.401	0.315
CS-KSHC8×8(C)-F11	1/2-20 UNF	0.315	2.087	1.772	0.118	0.197	0.217	7/16	0.079	0.15	5/8	0.722	2.48	0.394
CS-KSHC9×10(C)-F11	9/16-18 UNF	0.394	2.756	2.362	0.157	0.197	0.217	1/2	0.079	7/32	11/16	0.794	3.15	0.394
CS-KSHC11×15(C)-F11	3/4-16 UNF	0.591	3.425	2.835	0.157	0.276	0.236	5/8	0.118	1/4	15/16	1.082	3.819	0.394
CS-KSHC18×25(C)-F11	1-12 UNF	0.984	5.315	4.331	0.236	0.276	0.236	0.875	0.118	3/8	1 1/4	1.443	6.024	0.709

Model \ Symbol	R	AL	AS	AX	AY
CS-KSHC5×5(C)(-11)-F11	0.256	5/16-32 UNEF	7/16	7/16	0.505
CS-KSHC6×8(C)-F11	0.315	3/8-32 UNEF	11/16	1/2	0.577
CS-KSHC7×8(C)-F11	0.315	7/16-28 UNEF	11/16	9/16	0.65
CS-KSHC8×8(C)-F11	0.394	1/2-20 UNF	11/16	5/8	0.722
CS-KSHC9×10(C)-F11	0.433	9/16-18 UNF	3/4	11/16	0.794
CS-KSHC11×15(C)-F11	0.433	3/4-16 UNF	1 1/2	15/16	1.082
CS-KSHC18×25(C)-F11	0.709	1-12 UNF	1 1/2	1 1/4	1.443

About the evaluation of cleanliness (shock absorber KSHC series)

Currently, methods for evaluating the degree of cleanliness of shock absorbers are not defined by JIS or other standards. Because of this, Koganei devises its own independent measurement methods for cleanliness and does evaluations accordingly.

●Measurement method

1. We measure particles in the clean bench (Figure 1) without activating the shock absorber for measurements and the load driving cylinder in the clean bench (background measurement).Note

Note: Under the background measurement conditions, the number of particles measures zero.

2. We start driving a load to activate the shock absorber under the measurement conditions, and then measure the particles.

●Measurement conditions

Load impact speed	: 300mm/s
Shock absorber operating frequency	: 30cycle/minNote
Particle measurement time	: 1 minute
Suction rate	: 1cf/min
Measured particles	: 0.1μm or greater

For reference, a graph of actual values is shown in Figure 2. The number of particles is the average value of the test samples. Also, the smaller the angle of eccentricity when mounting the shock absorber, the lower the number of particles is likely to be. We recommend mounting the shock absorber so that its angle of eccentricity to the workpiece is as small as possible.

Note1: The number of particles is based on 30 operation cycles. When using the shock absorbers, the customer's evaluation should be based on the customer's own operation frequency.
2: FED-STD Class 1 equivalent.
3: The numbers of particles in the graph are actual values measured under Koganei standards, and are not intended to be guaranteed values.

●Outline of particle measuring device

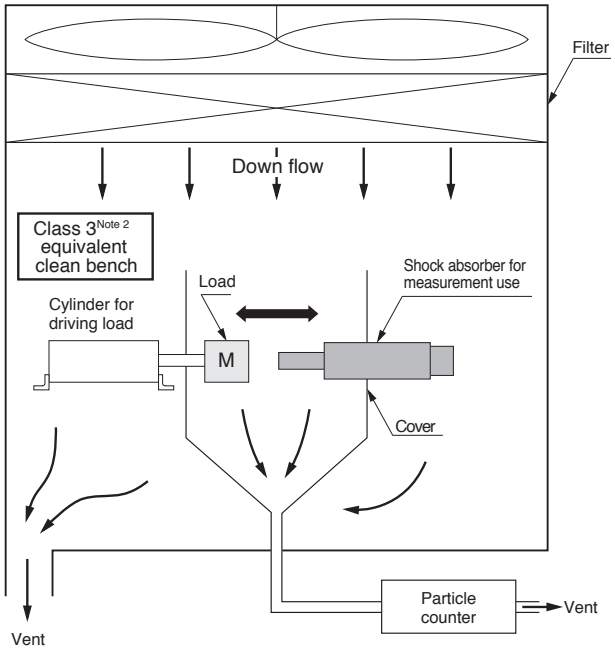


Figure 1

● Number of particles (measured value)Note 3

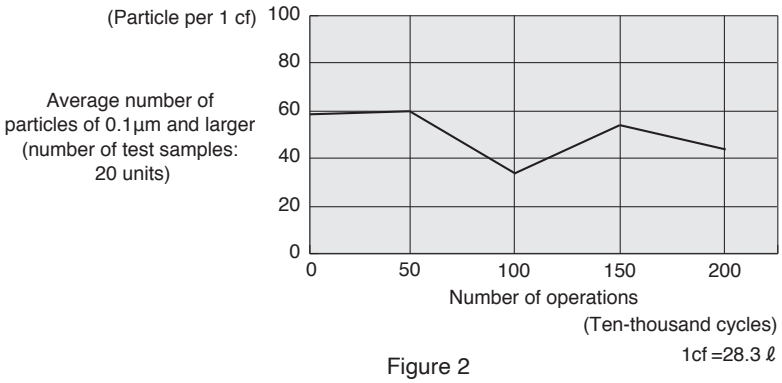
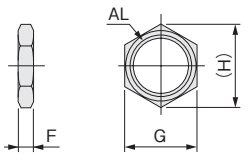


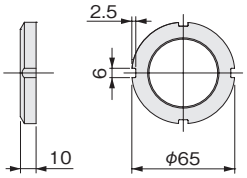
Figure 2

Dimensions of Additional Parts (mm)

●**Mounting nut**：**N-KSH-M□-□**
PN-KSH-M□-□



N-KSH-M45（for **KSHJ45**）



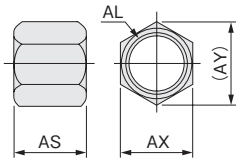
Symbol / Model	AL	F	G	H	Applicable shock absorbers				
					KSHJ	KSHW	KSHY	KSHP	CS-KSHC
N-KSH-M4	M4×0.5	2	5.5	6.4	KSHJ4	–	–	–	CS-KSHC3
N-KSH-M6	M6×0.75	2	8	9.2	KSHJ6	–	KSHY6	KSHP6	CS-KSHC4
PN-KSH-M8	M8×0.75	2	10	11.5	KSHJ8(-01,02)	KSHW8(-01,02)	KSHY8(-01,02)	KSHP8	CS-KSHC5
N-KSH-M8	M8×0.75	2	10	11.5	KSHJ8(-01,02)	KSHW8(-01,02)	KSHY8(-01,02)	KSHP8	CS-KSHC5
PN-KSH-M8-11	M8×1	3	10	11.5	KSHJ8(-11,12)	KSHW8(-11,12)	KSHY8(-11,12)	KSHP8-11	CS-KSHC5-11
N-KSH-M8-11	M8×1	3	10	11.5	KSHJ8(-11,12)	KSHW8(-11,12)	KSHY8(-11,12)	KSHP8-11	CS-KSHC5-11
PN-KSH-M10	M10×1	3	12	13.9	KSHJ10	KSHW10	KSHY10	KSHP10	CS-KSHC6
N-KSH-M10	M10×1	3	12	13.9	KSHJ10	KSHW10	KSHY10	KSHP10	CS-KSHC6
PN-KSH-M12	M12×1	3	14	16.2	KSHJ12	KSHW12	KSHY12	KSHP12	CS-KSHC8
N-KSH-M12	M12×1	4	14	16.2	KSHJ12	KSHW12	KSHY12	KSHP12	CS-KSHC8
PN-KSH-M14	M14×1.5	5	17	19.6	KSHJ14	KSHW14	KSHY14	KSHP14	CS-KSHC9
N-KSH-M14	M14×1.5	5	17	19.6	KSHJ14	KSHW14	KSHY14	KSHP14	CS-KSHC9
PN-KSH-M16	M16×1.5	7	19	21.9	KSHJ16	KSHW16	KSHY16	KSHP16	CS-KSHC11
N-KSH-M16	M16×1.5	7	19	21.9	KSHJ16	KSHW16	KSHY16	KSHP16	CS-KSHC11
N-KSH-M18	M18×1.5	8	21	24.2	KSHJ18	–	–	KSHP18	–
PN-KSH-M20	M20×1.5	8	24	27.7	KSHJ20	KSHW20	KSHY20	KSHP20	CS-KSHC14
N-KSH-M20	M20×1.5	8	24	27.7	KSHJ20	KSHW20	KSHY20	KSHP20	CS-KSHC14
N-KSH-M22	M22×1.5	9	27	31.2	KSHJ22	–	–	–	–
N-KSH-M25	M25×1.5	10	30	34.6	KSHJ25-01	–	–	KSHP25	CS-KSHC18
N-KSH-M25-11	M25×2	10	30	34.6	KSHJ25(-11,12)	–	–	–	–
N-KSH-M27	M27×1.5	10	36	41.6	KSHJ27(-01,02)	–	–	–	–
N-KSH-M27-11	M27×3	12	36	41.6	KSHJ27(-11,12)	–	–	–	–
N-KSH-M30	M30×1.5	10	36	41.6	KSHJ30	–	–	KSHP30	–
N-KSH-M33	M33×1.5	10	41	47.3	KSHJ33	–	–	–	–
N-KSH-M36	M36×1.5	15	46	53.1	KSHJ36	–	–	KSHP36	–
N-KSH-M42	M42×1.5	15	50	57.7	KSHJ42	–	–	KSHP42	–
N-KSH-M48	M48×2	15	55	63.5	KSHJ48	–	–	–	–

※**N-KSH-□** Material：steel (nickel plated)

※**PN-KSH-□** Material：Stainless steel

Dimensions of Additional Parts (mm)

●**Stopper nut：S-KSH-M□-□（-S）**
PS-KSH-M□-□



記号 / 形式	AL	AS	AX	AY	Applicable shock absorbers				
					KSHJ	KSHW	KSHY	KSHP	CS-KSHC
S-KSH-M4	M4×0.5	7.5	5.5	6.4	KSHJ4	–	–	–	CS-KSHC3
S-KSH-M6	M6×0.75	7	8	9.2	KSHJ6	–	–	KSHP6	CS-KSHC4
S-KSH-M6-L	M6×0.75	10	8	9.2	–	–	KSHY6	–	–
PS-KSH-M8	M8×0.75	11	10	11.5	KSHJ8(-01,02)	KSHW8(-01,02)	KSHY8(-01,02)	KSHP8	CS-KSHC5
S-KSH-M8	M8×0.75	11	10	11.5	KSHJ8(-01,02)	KSHW8(-01,02)	KSHY8(-01,02)	KSHP8	CS-KSHC5
PS-KSH-M8-11	M8×1	11	10	11.5	KSHJ8(-11,12)	KSHW8(-11,12)	KSHY8(-11,12)	KSHP8-11	CS-KSHC5-11
S-KSH-M8-11	M8×1	11	10	11.5	KSHJ8(-11,12)	KSHW8(-11,12)	KSHY8(-11,12)	KSHP8-11	CS-KSHC5-11
PS-KSH-M10	M10×1	17	12	13.9	KSHJ10	KSHW10	KSHY10	KSHP10	CS-KSHC6
S-KSH-M10	M10×1	17	12	13.9	KSHJ10	KSHW10	KSHY10	KSHP10	CS-KSHC6
PS-KSH-M12	M12×1	17	14	16.2	KSHJ12	KSHW12	KSHY12	KSHP12	CS-KSHC8
S-KSH-M12	M12×1	17	14	16.2	KSHJ12	KSHW12	KSHY12	KSHP12	CS-KSHC8
PS-KSH-M14	M14×1.5	18	17	19.6	KSHJ14	KSHW14	KSHY14	KSHP14	CS-KSHC9
S-KSH-M14注	M14×1.5	18	17	19.6	KSHJ14	KSHW14	KSHY14	KSHP14	CS-KSHC9
S-KSH-M14-L	M14×1.5	25	17	19.6	KSHJ14×20(C)	–	–	–	–
PS-KSH-M16	M16×1.5	30	19	21.9	KSHJ16	KSHW16	KSHY16	KSHP16	CS-KSHC11
S-KSH-M16	M16×1.5	30	19	21.9	KSHJ16	KSHW16	KSHY16	KSHP16	CS-KSHC11
S-KSH-M18	M18×1.5	35	21	24.2	KSHJ18	–	–	KSHP18	–
PS-KSH-M20	M20×1.5	35	24	27.7	KSHJ20	KSHW20	KSHY20	KSHP20	CS-KSHC14
S-KSH-M20	M20×1.5	35	24	27.7	KSHJ20	KSHW20	KSHY20	KSHP20	CS-KSHC14
S-KSH-M22	M20×1.5	40	27	31.2	KSHJ22	–	–	–	–
S-KSH-M25	M25×1.5	40	30	34.6	KSHJ25-01	–	–	KSHP25	CS-KSHC18
S-KSH-M25-11	M25×2	40	30	34.6	KSHJ25(-11,12)	–	–	–	–
S-KSH-M27	M27×1.5	40	36	41.6	KSHJ27(-01,02)	–	–	–	–
S-KSH-M27-11	M27×3	40	36	41.6	KSHJ27(-11,12)	–	–	–	–
S-KSH-M30	M30×1.5	40	36	41.6	KSHJ30	–	–	KSHP30	–
S-KSH-M33	M33×1.5	40	41	47.3	KSHJ33	–	–	–	–
S-KSH-M36	M36×1.5	50	46	53.1	KSHJ36	–	–	KSHP36	–
S-KSH-M42	M42×1.5	50	50	57.7	KSHJ42	–	–	KSHP42	–
S-KSH-M45	M45×1.5	60	55	63.5	KSHJ45	–	–	–	–
S-KSH-M48	M48×2	60	55	63.5	KSHJ48	–	–	–	–

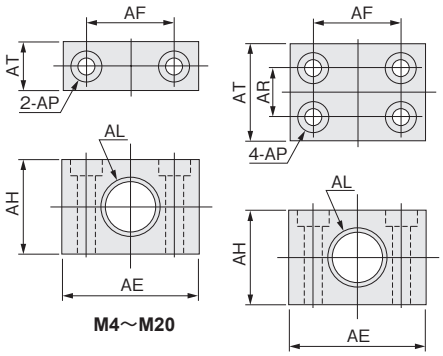
Note: S-KSH-M14 cannot be installed on KSHJ14X20(C).

※**S-KSH-□** Material：steel (nickel plated)

※**PS-KSH-□** Material：Stainless steel

Dimensions of Additional Parts (mm)

●**Side mounting bracket：2-KSH-□-□（-2）**



Symbol / Model	AE	AF	AH	AL	AP		AR	AT	Applicable shock absorbers			
									KSHJ	KSHY	KSHP	CS-KSHC
2-KSH-M4	18	12	8	M4×0.5	φ3.4、φ6.5	Counter bore depth3.3	—	8	KSHJ4	—	—	CS-KSHC3
2-KSH-M6	18	12	10	M6×0.75	φ3.4、φ6.5	Counter bore depth3.3	—	8	KSHJ6	KSHY6	KSHP6	CS-KSHC4
2-KSH-M8	19	13	13	M8×0.75	φ3.4、φ6.5	Counter bore depth3.3	—	9	KSHJ8(-01,02)	KSHY8(-01,02)	KSHP8	CS-KSHC5
2-KSH-M8-11	19	13	13	M8×1	φ3.4、φ6.5	Counter bore depth3.3	—	9	KSHJ8(-11,12)	KSHY8(-11,12)	KSHP8-11	CS-KSHC5-11
2-KSH-M10	22	14	14	M10×1	φ3.4、φ6.5	Counter bore depth3.3	—	9	KSHJ10	KSHY10	KSHP10	CS-KSHC6
2-KSH-M12	25	16	18	M12×1	φ3.4、φ6.5	Counter bore depth3.3	—	9	KSHJ12	KSHY12	KSHP12	CS-KSHC8
2-KSH-M14	34	22	22	M14×1.5	φ4.5、φ8	Counter bore depth4.5	—	10	KSHJ14	KSHY14	KSHP14	CS-KSHC9
2-KSH-M16	38	25	25	M16×1.5	φ4.5、φ8	Counter bore depth4.5	—	12	KSHJ16	KSHY16	KSHP16	CS-KSHC11
2-KSH-M18	50	34	30	M18×1.5	φ6.5、φ11	Counter bore depth6.5	—	12	KSHJ18	—	KSHP18	—
2-KSH-M20	50	34	30	M20×1.5	φ9、φ14	Counter bore depth8.5	—	16	KSHJ20	KSHY20	KSHP20	CS-KSHC14
2-KSH-M22	60	44	35	M22×1.5	φ9、φ14	Counter bore depth8.5	19	35	KSHJ22	—	—	—
2-KSH-M25	60	44	35	M25×1.5	φ9、φ14	Counter bore depth8.5	19	35	KSHJ25-01	—	KSHP25	CS-KSHC18
2-KSH-M25-11	60	44	35	M25×2	φ9、φ14	Counter bore depth8.5	19	35	KSHJ25(-11,12)	—	—	—
2-KSH-M27	60	44	44	M27×1.5	φ9、φ14	Counter bore depth8.5	19	35	KSHJ27(-01,02)	—	—	—
2-KSH-M27-11	60	44	44	M27×3	φ9、φ14	Counter bore depth8.5	19	35	KSHJ27(-11,12)	—	—	—
2-KSH-M30	60	44	46	M30×1.5	φ9、φ14	Counter bore depth8.5	19	35	KSHJ30	—	KSHP30	—
2-KSH-M33	100	70	62	M33×1.5	φ18、φ26	Counter bore depth18	50	80	KSHJ33	—	—	—
2-KSH-M36	100	70	62	M36×1.5	φ18、φ26	Counter bore depth18	50	80	KSHJ36	—	KSHP36	—
2-KSH-M42	100	70	62	M42×1.5	φ18、φ26	Counter bore depth18	50	80	KSHJ42	—	KSHP42	—
2-KSH-M45	120	85	70	M45×1.5	φ22、φ32	Counter bore depth22	45	80	KSHJ45	—	—	—
2-KSH-M48	120	85	70	M48×2	φ22、φ32	Counter bore depth22	45	80	KSHJ48	—	—	—

※Material：steel (nickel plated)

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Limited Warranty

KOGANEI CORP. warrants its products to be free from defects in material and workmanship subject to the following provisions.

Warranty Period The warranty period is 180 days from the date of delivery.

Koganei Responsibility If a defect in material or workmanship is found during the warranty period, KOGANEI CORP. will replace any part proved defective under normal use free of charge and will provide the service necessary to replace such a part.

Limitations

- This warranty is in lieu of all other warranties, expressed or implied, and is limited to the original cost of the product and shall not include any transportation fee, the cost of installation or any liability for direct, indirect or consequential damage or delay resulting from the defects.
- KOGANEI CORP. shall in no way be liable or responsible for injuries or damage to persons or property arising out of the use or operation of the manufacturer's product.
- This warranty shall be void if the engineered safety devices are removed, made inoperative or not periodically checked for proper functioning.
- Any operation beyond the rated capacity, any improper use or application, or any improper installation of the product, or any substitution upon it with parts not furnished or approved by KOGANEI CORP., shall void this warranty.
- This warranty covers only such items supplied by KOGANEI CORP. The products of other manufacturers are covered only by such warranties made by those original manufacturers, even though such items may have been included as the components.

The specifications are subject to change without notice.

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