

Smallest Lightest Compact Basic Cylinders

BC Cylinders

**Direct Mounting, Smallest & Lightest
Possible to create all assembly processes with
just BC cylinders**

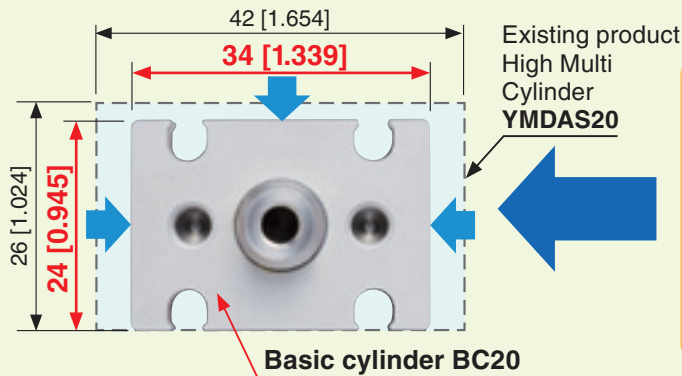


**Wide range of variations from
 $\phi 6$ [0.236 in] to $\phi 125$ [4.921 in]**

Basic Cylinders

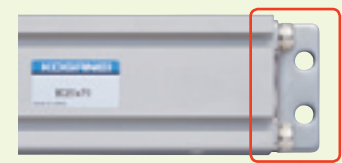
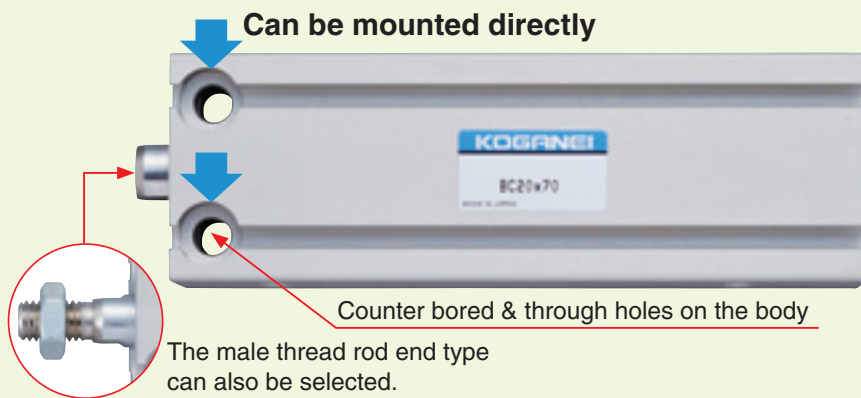
BASIC CYLINDERS

Lightweight & Compact



Cross section is
25% smaller
Total length is
30% shorter
40% less mass
* Comparison of 10 mm stroke

Direct mounting



Bracket can be mounted on the head side of $\phi 10$ [0.394 in] to $\phi 125$ [4.921 in] models (except when guide is attached)
Bracket material
 $\phi 10$ [0.394 in] to $\phi 32$ [1.260 in] : Stainless steel
 $\phi 40$ [1.575 in] to $\phi 125$ [4.921 in] : Aluminum alloy

Excellent series ranging from $\phi 6$ [0.236 in] to $\phi 125$ [4.921 in] (Double acting type and double rod cylinders)

H1 grease compatible as standard

(Compliant with H1 grade food equipment specifications)

Uses NSF H1 grade grease.



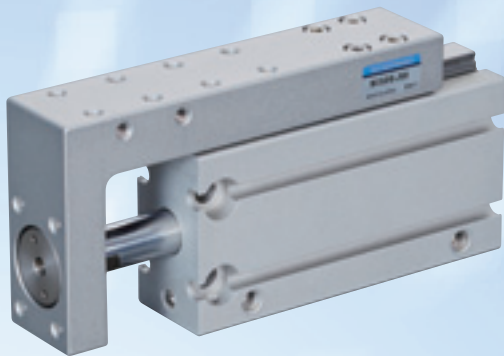
CAUTION Read the safety precautions on page 5 before using this product.

Cylinder with guide

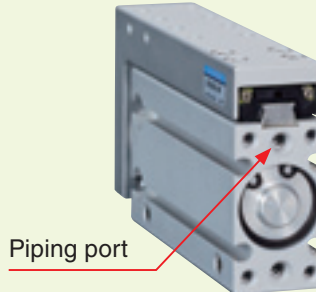
$\phi 8$ [0.315], $\phi 12$ [0.472], $\phi 16$ [0.630], $\phi 20$ [0.787],
 $\phi 25$ [0.984], $\phi 32$ [1.260], $\phi 40$ [1.575]

mm [in]

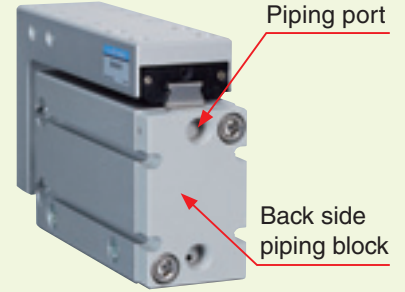
Linear guide is mounted to save space and for non-rotating accuracy



Back side piping is possible



Piping port



Piping port

Back side piping block

Back side piping is possible as standard for $\phi 8$ [0.315 in] to $\phi 25$ [0.984 in] models.

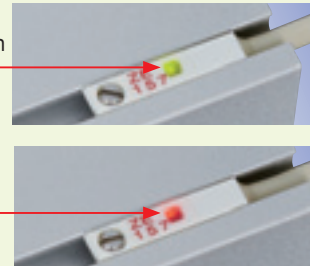
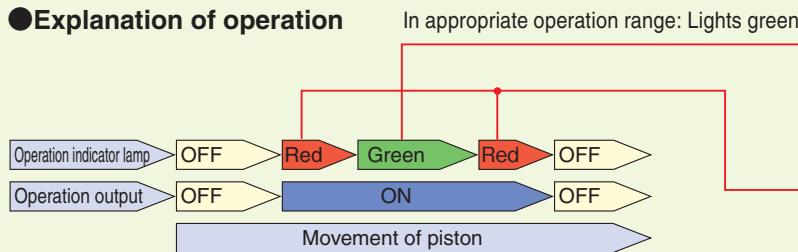
Back side piping is possible for $\phi 32$ [1.260 in] and $\phi 40$ [1.575 in] models by selecting back side piping block.

Note: Linear guides use low dust grease.

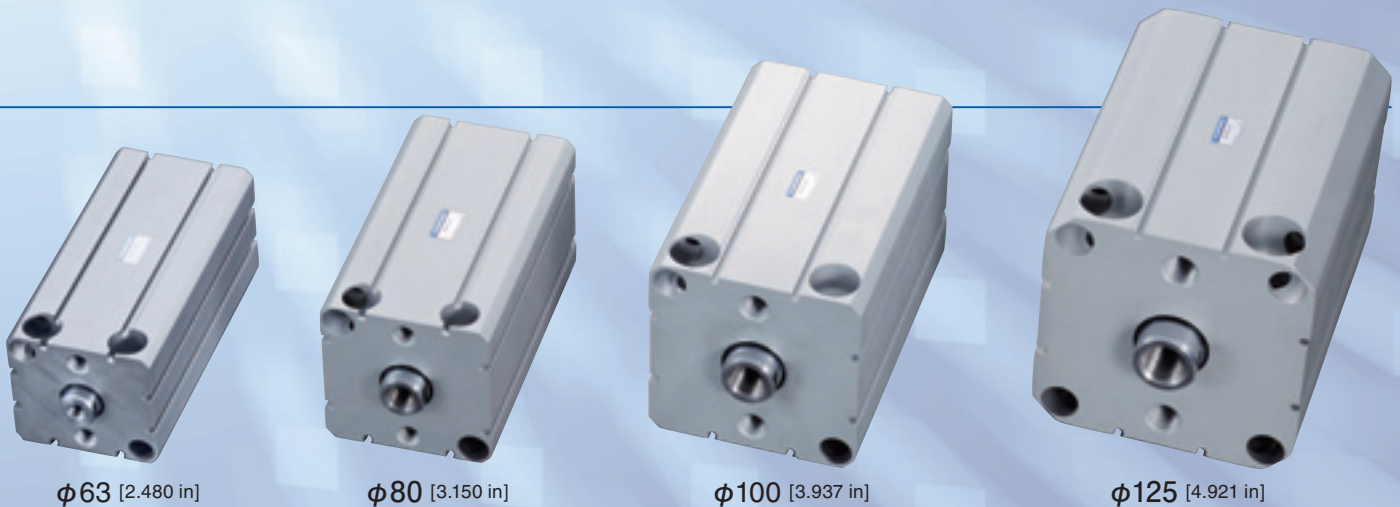
Two-color LED sensor switches can be mounted

Possible to mount two-color LED sensor switches which can be easily positioned and adjusted. Appropriate operation range can be determined by the color of the LED indicator.

● Explanation of operation



Note: Operation output ranges all indicated as red for sensor switches other than the two-color LED sensor switches.



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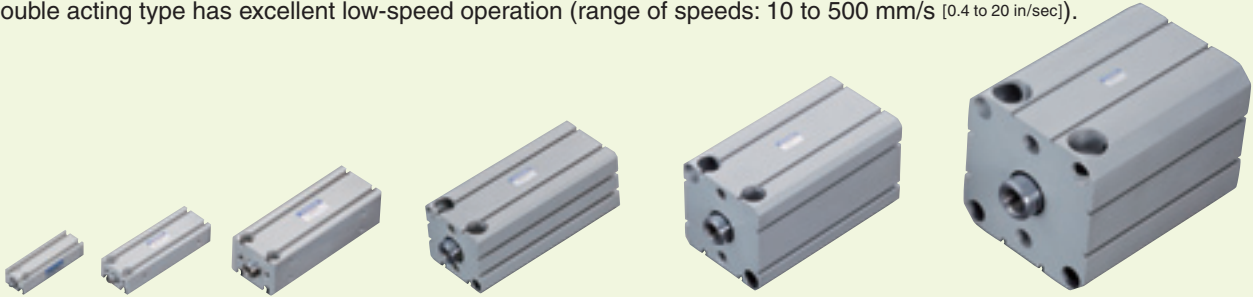
Step 1 variations

mm [in]

Double acting type Page 17

$\phi 6$ [0.236] to $\phi 125$ [4.921] ($\phi 6$ [0.236], $\phi 8$ [0.315], $\phi 10$ [0.394], $\phi 12$ [0.472], $\phi 16$ [0.630], $\phi 20$ [0.787], $\phi 25$ [0.984], $\phi 32$ [1.260], $\phi 40$ [1.575], $\phi 50$ [1.969], $\phi 63$ [2.480], $\phi 80$ [3.150], $\phi 100$ [3.937], $\phi 125$ [4.921])

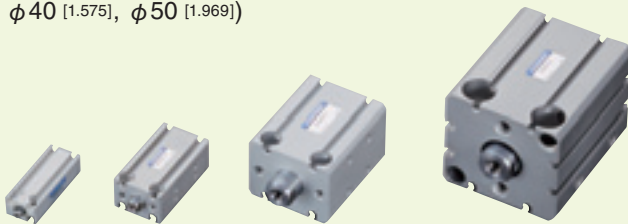
*Double acting type has excellent low-speed operation (range of speeds: 10 to 500 mm/s [0.4 to 20 in/sec]).



Single acting push type Page 17

$\phi 6$ [0.236] to $\phi 50$ [1.969]

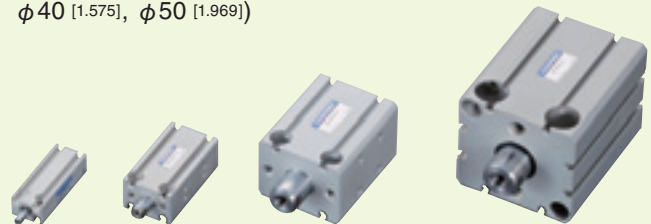
($\phi 6$ [0.236], $\phi 8$ [0.315], $\phi 10$ [0.394], $\phi 12$ [0.472], $\phi 16$ [0.630], $\phi 20$ [0.787], $\phi 25$ [0.984], $\phi 32$ [1.260], $\phi 40$ [1.575], $\phi 50$ [1.969])



Single acting pull type Page 17

$\phi 6$ [0.236] to $\phi 50$ [1.969]

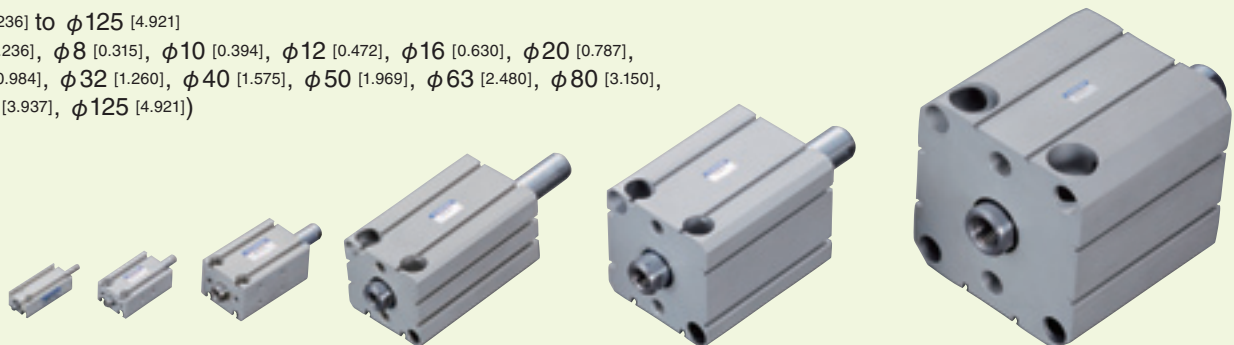
($\phi 6$ [0.236], $\phi 8$ [0.315], $\phi 10$ [0.394], $\phi 12$ [0.472], $\phi 16$ [0.630], $\phi 20$ [0.787], $\phi 25$ [0.984], $\phi 32$ [1.260], $\phi 40$ [1.575], $\phi 50$ [1.969])



Double rod end cylinders Page 56

$\phi 6$ [0.236] to $\phi 125$ [4.921]

($\phi 6$ [0.236], $\phi 8$ [0.315], $\phi 10$ [0.394], $\phi 12$ [0.472], $\phi 16$ [0.630], $\phi 20$ [0.787], $\phi 25$ [0.984], $\phi 32$ [1.260], $\phi 40$ [1.575], $\phi 50$ [1.969], $\phi 63$ [2.480], $\phi 80$ [3.150], $\phi 100$ [3.937], $\phi 125$ [4.921])



Cylinders with guides Page 73

$\phi 8$ [0.315] to $\phi 40$ [1.575] ($\phi 8$ [0.315], $\phi 12$ [0.472], $\phi 16$ [0.630], $\phi 20$ [0.787], $\phi 25$ [0.984], $\phi 32$ [1.260], $\phi 40$ [1.575])



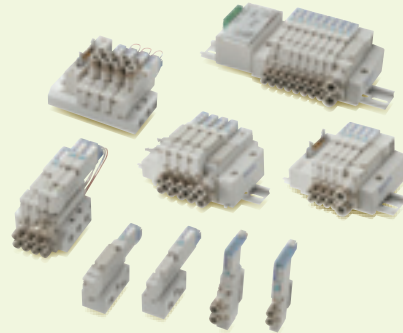
Guide to recommended related products!

For details, see our homepage. <http://www.koganei.co.jp>

Solenoid Valve F Series (F10•F15•F18)

Low-current type and single/double dual-use valves offer energy savings and a low price.

- Switch the manual override button to select single solenoid valve or double solenoid valve functions on the 2-position valve of the F series.
- Different tube sizes for piping are possible with dual-use different size fittings.



Downsized FRZB Filter Regulator

FRZB Filter Regulator with moisture and fluid removal function!

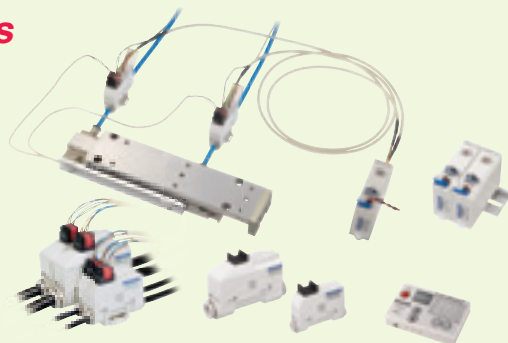
- Compact size with short face-to-face dimensions.
- With drain cock and easy to use moisture and fluid removal function.
- Auto drain function (NC and NO) available.
- Bowl guard available.



iB-Flow Digital Flow Controller

Constantly monitors cylinder tact times and adjusts automatically!

- Digitally set cylinder tact times (operation cycle times).
- Tact time controller is always monitoring and adjusting.
- Safety mechanism prevents needle from loosening.
- Numeric setting of needle opening (0 to 100%).



Quick fitting series

Wide range of variations such as many types of quick fittings and speed controllers with quick fittings!





- Standard types, mini types, and SUS specifications available.
- Diverse variations available such as quick fittings with stop valves, hand valves, check valves, throttle valves, and power reducers.



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.

Always observe these safety precautions and the following safety regulations: 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	While there is little chance of injury, this content refers to points that should be observed for 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, and other literature before commencing operation. Improper handling is dangerous.
- After reading the 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, 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 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. Doing so creates the risk of ignition and fire.
- When mounting the product and workpiece, always make sure they are firmly supported and secured in place. Falling, dropping, or abnormal operation of the product creates the risk of personal injury.
- Persons using a pacemaker or other similar medical devices should maintain a distance of at least one meter [3.28 ft] away from the product. Getting too close to the product creates the risk of malfunction of a pacemaker due to the strong magnet built into the product.
- Never attempt to modify the product in any way. Doing so creates the risk of injury, electric shock, fire, etc. due to abnormal operations.
- Never attempt inappropriate disassembly, assembly or repair of the product relating to basic construction, or to its performance or to functions. Doing so creates the risk of injury, electric shock, fire, etc.
- Do not allow water to splash on the product. Water spraying on the product, washing the product, or using the product under water creates the risk of malfunction, leading to injury, electric shock, fire, etc.
- While the product is in operation, avoid touching it with your hands or otherwise approaching too close. Also, do not attempt to make any adjustments to internal or attached mechanisms (sensor switch mounting location, disconnection of piping tubes or plugs, etc.) while the product is in operation. This may cause an unintended cylinder movement resulting in injury.
- When operating the product, always install speed controllers, and gradually loosen the needle valve from a choked state to adjust the increase in speed. Failure to make this adjustment could result in the air supply causing sudden movements, which may put human lives at risk.

- Do not apply excess bending or buckling force to the piston rod. Doing so may cause abnormal wear or damage to the rod or tube and reduce the product's operating life.
- Always link the direction of motion of the load with the axis of the piston rod. If they are not the same, the undue force on the tube and piston rod may cause abnormal wear or damage.

 **WARNING**

- Do not use the product in excess of its specification ranges. Doing so creates the risk of product breakdown, loss of function, or damage. It could also drastically reduce the product's operating life.
- Before supplying air or electricity to the device and before starting operation, always conduct a safety check of the area where the machine is operating. Unintentional supply of air or electricity creates the risk of electric shock or injury due to contact with moving parts.
- Do not touch terminals or switches while power is turned on. Doing so creates the risk of electric shock and abnormal operation.
- Always check the catalog and other reference materials for correct product wiring and piping. Improper wiring and piping creates the risk of abnormal operation of the cylinder.
- Do not allow the product to be thrown into fire. Doing so creates the risk of explosion and the release of toxic gases.
- Do not sit on the product, place your foot on it, or place other objects on it. Doing so creates the risk of injury due to tripping or the product tipping over or falling, resulting in product damage, malfunction or runaway operation.
- Before conducting maintenance, inspection, repair, replacement, or any other similar procedure, always completely cut off all air supply and confirm that residual pressure inside the product or in piping connected to the product is zero. In particular, be aware that residual air will still be in the air compressor or storage tank. The cylinder may move abruptly, if residual air pressure remains inside the piping, causing injury.
- Do not use the cylinder as a device to absorb the shock or vibration of machinery. Doing so may create the risk of injury or the breakdown of the machinery.

Safety precautions (basic cylinders)

Always read these precautions carefully before use.

- Do not allow lead wires of sensor switches or other cords to become damaged.
Allowing a cord to become damaged, bent excessively, pulled, rolled up, placed under heavy objects, or squeezed between two objects creates the risk of current leaks or defective continuity that can lead to fire, electric shock, or abnormal operation.
- Do not apply external magnetic field to sensor switches while the cylinder is in operation. Unintended operations could damage equipment or cause injury.
- Use the product within the recommended load and operating speed specifications. Using the cylinder in excess of the recommended load and operating speed specifications could damage the cylinder causing damage to equipment or injury.
- Use safety circuits or design a system that prevents damage to machinery and personal injury when the machine is shut down due to an emergency stop or electrical power failure, etc.
- Install relief valves or other devices to ensure that the cylinder does not exceed its rated pressure when the pressure is increased by external forces on the cylinder.
Excessive pressure could lead to a breakdown and damage.
- When the product has been idle for over 48 hours or has been in storage, it is possible that the contacting parts may have become stuck leading to operating delays or sudden movements. Before initial operations, always run a test to check that operating performance is normal.
- Do not use the product near the ocean, in direct sunlight, near mercury vapor lamps, or near equipment that generates ozone. Deterioration of rubber parts caused by ozone may reduce performance and functions or stop functions.
- Because Koganei products may be used under a wide variety of conditions, decisions concerning conformance with a particular system should be made upon the careful evaluation by the person in charge of system design. Assurances concerning expected system performance and safety are the responsibility of the designer who decides system conformity. Be sure to use the latest catalogs and technical materials to study and evaluate specification details, to consider the possibility of machine breakdown, and to configure a system that ensures fail-safe safety and reliability.

CAUTION

- Do not use the product in locations subject to direct sunlight (ultraviolet radiation), in locations with dust, salt, or iron particles, or in locations with media and/or ambient atmosphere that include organic solvents, phosphate ester type hydraulic oil, sulfur dioxide gas, chlorine gas, acids, etc. Such uses could lead to loss of functions within a short period, sudden degradation in performance, or reduced operating life. For details on materials used in the product, refer to the description of materials used in major parts.
- When mounting the product, leave room for adequate working 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.
- Do not bring any magnetic media or memory within one meter [3.28 ft] of the product. Doing so creates the risk of damage to data on the magnetic media due to magnetism.
- Do not use the sensor switch in locations subject to large electrical currents or strong magnetic fields. It could result in erratic operation.
Also avoid using magnetic material for any parts used for mounting. Doing so creates the risk of magnetism leakage that causes malfunctions.
- Do not bring the product too close to magnetic material. The sensor switch may malfunction or operate erratically if the product is located near a magnet or where a magnetic field is generated.
- Never use another companies' sensor switches with these products.
Doing so may cause malfunctions or runaway operation.

- Do not scratch, dent, or deform the actuator by sitting or standing on the product, or by placing objects on it. Doing so creates the risk of damage to or breakage of the product, resulting in operational shutdown or degraded performance.
- Always post an "operations in progress" sign for installations, adjustments, or other operations, to avoid unintentional supplying of air or electrical power, etc. Unintended power or air supply can cause electric shock and sudden cylinder movement, creating the risk of personal injury.
- Do not subject any cords, such as the sensor switch lead wires, to excessive loads by pulling on them, lifting the product by them, or placing heavy objects on them. Doing so may cause current leakage or defective continuity leading to fire, electric shock, or abnormal operation.
- Using extremely dry air, with a dew point more than 20 degrees below zero Celsius [-4°F], may affect the quality of the lubricating oil used. This may cause loss of functions, shorter operating life, degraded performance or other problems.

ATTENTION

- Whenever considering use of this product in situations or environments not specifically noted in the catalog, or in applications where safety is an important requirement such as in aircraft facilities, 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.
Be sure to contact Koganei before use in such applications.
- Moving parts of machinery should be isolated with protective covers so as not to come into direct contact with human bodies.
- Do not configure controls that would allow workpieces to fall if power fails.
Configure the control system to prevent workpieces or tables from falling if the machinery stops during an emergency stop or power outage.
- When handling the product, wear protective gloves, safety glasses, safety shoes, and other protective clothing whenever necessary.
- When the product can no longer be used or is no longer necessary, dispose of it appropriately as industrial waste.
- Pneumatic equipment can exhibit degraded performance and function over its operating life. Always conduct daily inspections of the pneumatic equipment, and confirm that all requisite system functions are satisfied, to prevent accidents from happening.
- 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 pneumatic systems, always use genuine Koganei parts or compatible parts (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 inappropriate disassembly or assembly of the product relating to basic construction, or its performance or functions.

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



Design and selection

WARNING

1. Check the specifications.

Read the specifications carefully to ensure correct use within the product's specified voltage, current, temperature, and maximum impact etc., failure to do so could result in a breakdown or defective operation.

2. Be careful when mounting cylinders in close proximity to each other.

Refer to page 93 if you are mounting more than two cylinders, with sensor switches, in parallel. The magnetic field interference may cause the sensor switches to malfunction.

3. Be careful of how long the sensor switch is on when detecting the position in mid-stroke.

Be aware that, when the sensor switch is mounted at an intermediate point of the cylinder stroke to detect the passing of the piston, if the piston is moving too fast, the length of time the sensor switch operates is too short to achieve its function (so programmable controllers etc. are not operated).

The highest detectable cylinder speed is

$$V \text{ mm/s [in/sec]} = \frac{\text{Sensor switch operating range mm [in]}}{\text{Time required for load operation [ms]}} \times 1000$$

4. Keep wiring as short as possible.

The wiring for solid state sensor switches must be 30 m [98 ft] or shorter, as stipulated by EN standards. For reed sensor switches, longer wiring (10 m [33 ft] or longer) will lead to a larger capacitive surge, which reduces the operating life of sensor switches. When longer wiring cannot be avoided, provide the protective circuit described in the catalog. For details, see page 91.

If the load is inductive or capacitive, provide the appropriate protective circuit as described in the catalog. For details, see page 91.

5. Avoid repeated bending or excessive pulling of lead wires.

Applying repeated bending stress or tension force on the lead wires could break them.

6. Check for leakage current.

2-lead wire solid state sensor switches produce a current (leakage current) even when turned off, to activate their internal circuit. Ensure that your application satisfies the following inequality:

Input off current of programmable controller > Leakage current
If the above inequality cannot be satisfied, select a 3-lead wire solid state sensor switch. And, if n sensor switches are connected in parallel, the leakage current increases by n times.

7. Do not use reed sensor switches at low speeds below 30 mm/s [1.2 in/sec]. Doing so may cause erratic operation or loss of functions.

CAUTION

1. Check for internal voltage drop of sensor switches.

When reed sensor switches with indicator lamps or 2-lead wire solid state sensor switches are connected in series, internal voltage drop increases and the load cycle may fail to activate. Connecting n switches will drop the internal voltage by n times as much.

Ensure that the circuit satisfies the following inequality:

$$\text{Supply voltage} - \text{Internal voltage drop} \times n > \text{Minimum operating voltage of the load}$$

In relays with rated voltage of less than 24 VDC, check that the above inequality is satisfied even when n=1.

If the above inequality cannot be satisfied, select a reed sensor switch without an indicator lamp.

2. Do not use Koganei sensor switches with other companies' cylinders.

The sensor switches are designed for use with Koganei cylinders only. They may not function correctly if used with other companies' cylinders.



Installation and adjustment

WARNING

1. Do not apply an external magnetic field to the sensor switch while the cylinder is in operation.

This may cause unintended operation, thereby damaging the device or causing injury.

CAUTION

1. Be aware of the environment in which you install the sensors and cylinders.

Do not use sensor switches in locations subject to large electrical currents or strong magnetic fields. It could result in erratic operation.

Also avoid using magnetic material for any parts used for mounting. It could result in erratic operation.

2. Install sensor switches in the center of their operating range.

Adjust the mounting position of a sensor switch so that the piston stops in the center of its operating range (the sensor turned-on range). Operations will be unstable if mounted at the end of the operating range (at the boundary near on and off). Also be aware that the operating range will vary with changes in temperature.

3. Follow the tightening torque guidelines for mounting sensor switches.

Over-tightening beyond the allowed tightening torque may damage the mounting screws, mounting brackets, sensor switches or other components. However, insufficient tightening torque may cause the sensor switch position to change, resulting in unstable operation. For details about tightening torque, refer to page 91.

4. Do not carry the cylinder by its mounted sensor switch's lead wires.

After mounting a sensor switch on the cylinder, do not carry the cylinder by grabbing the lead wires. Never do this, as it may damage not only the lead wires but may also apply stress to the inside of the sensor switch that may damage internal elements.

5. Do not drop the sensor switches or bump them against other objects.

While handling sensor switches, do not subject them to excessive shock (more than 294.2 m/s² [30 G]) by hitting, dropping or bumping them.

In the case of reed sensor switches, such behavior may cause the contact to malfunction, thereby giving a signal or turning off the signal instantaneously. And, this may change the contact interval, thereby deteriorating the sensor switch's sensitivity. As such, this may cause the device to malfunction. Even if the sensor switch case is not damaged, the inside of the sensor switch may be damaged, causing erratic operation.

Safety precautions (Sensor Switches)



Wiring

DANGER

1. Prevent nearby moving objects from coming into contact with sensor switches.

When cylinders equipped with sensor switches are moving or when moving objects are nearby, do not let them come into contact with each other. In particular, lead wires may become worn or damaged causing unstable operation of the sensor switch. In the worst case, this may result in current leaks or electrical shock.

2. Always turn off the power before doing wiring work.

Doing wiring work while the power is on may result in electric shock. Also, incorrect wiring could damage the sensor switch in an instant. Turn on the power only after the wiring work is complete.

WARNING

1. Check the catalog and other materials to ensure that the sensor switch is wired correctly.

Incorrect wiring may result in abnormal operation.

2. Do not share wiring with power or high voltage lines.

Avoid wiring in parallel to or in the same conduit with power lines and high-voltage lines. Noise from such wiring could cause the sensor switch and control circuit to operate erratically.

3. Avoid repeated bending or excessive pulling of lead wires.

Applying repeated bending stress or tension force on the lead wires could break them.

4. Check the wiring polarity.

Be sure that the wiring connections are correct for sensor switches that specify polarity (+, -, output). Incorrect polarity could result in damage to sensor switches.

CAUTION

1. Avoid short circuiting loads.

Turning on the sensor switch while the load is short-circuited causes overcurrent, which will damage the sensor switch in an instant.

Example of short-circuit load: Sensor switch's output lead wire is directly connected to the power supply.

2. Position sensor switches in the center of their operating range.

The operating output may become unstable, depending on the operating environment, if positioned at the edge of the operating range.

3. Solid state type sensor switches compliant with EMC standards (EN61000-6-2, EN60947-5-2) are not equipped with surge protection against lightning. Protection against lightning surge, take measures on the equipment side.

4. When directly driving a load generating surge voltage, use sensor switches with built-in surge absorption elements.

Handling Instructions and Precautions



General precautions

Piping

Before installing piping to the cylinder, thoroughly flush the inside of the pipes (with compressed air). Machining chips, sealing tape, rust and other debris remaining from the piping work may result in air leaks and malfunctions.

Air supply

1. Use air as the medium. For the use of any other media, consult the nearest Koganei sales office.
2. Air used for the cylinder should be clean air that contains no degraded compressor oil, etc. Install an air filter (filtration of 40 μm or less) near the cylinder or valve to remove dust and accumulated liquid. Also drain the air filter periodically. If liquid or dust gets into the cylinder, it may cause defective operation.

Lubrication

The cylinder can be used without lubrication, however, if lubrication, such as a lubricator, is used, use turbine oil type 1 (ISO VG32) or an equivalent. Avoid using spindle oil or machine oil.

Environment

1. Cover the unit when using it in locations where it might be subject to excessive dust, dripping water, dripping oil, etc.
2. Do not use the cylinder in environments which may be corrosive. Using the cylinder in these types of environments may result in damage or defective operation.
3. Do not use the cylinder in excessively dry conditions.
4. Do not use the cylinder if the ambient temperature is over 60°C [140°F], doing so may result in damage or defective operation. Also, consider anti-freezing measures if the temperature is less than 5°C [41°F], because moisture may freeze and result in damage or defective operation.

Handling

1. Do not place your hands in the way of the cylinder when it is operating.
2. Be careful that no part of your body is pinched between the end plate and the cylinder body when the cylinder is retracting.
3. Confirm that there is no residual pressure in the cylinder before starting maintenance work.
4. Use the cylinder within its operating speed range. Even if the speed is within the allowable range, install an external stopper to prevent directly impacting the cylinder, if the load is large or the allowable kinetic energy is exceeded.
5. Use a separate cushioning device, such as a shock absorber, if noise or vibration is an issue.

Warranty and General Disclaimer

1. Warranty Period

The warranty period for KOGANEI products is 180 days from the date of delivery.

2. Scope of Warranty and General Disclaimer

(1) The KOGANEI product warranty covers individual products. When a product purchased from KOGANEI or from an authorized KOGANEI distributor malfunctions during the warranty period in a way that is 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) 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.

(3) 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.

(4) 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.

Handling Instructions and Precautions



General precautions

Other

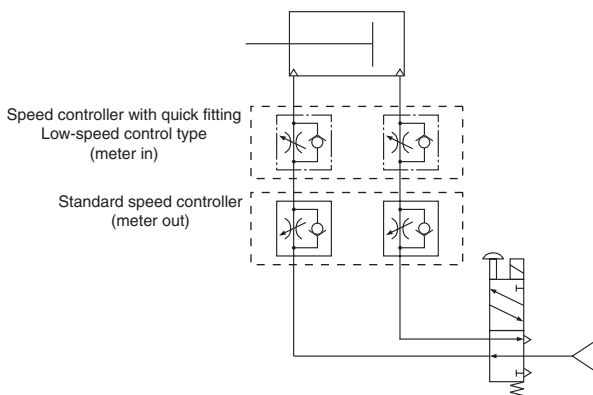
The piston of the single acting type may not retract (return) even when the air is exhausted if air is continuously supplied to the piping port so that its spring is left compressed for a long period (more than 48 hours).

Use a double acting cylinder if it will be left unused for long periods such as this.

About the circuit to prevent rod pop-out

Rod pop-out prevention circuit

Using the cylinder in combination with the speed controller shown in the following diagram is effective for controlling speed and preventing rod pop-out.



Note: Install the speed controller as close as possible to the cylinder.



Mounting

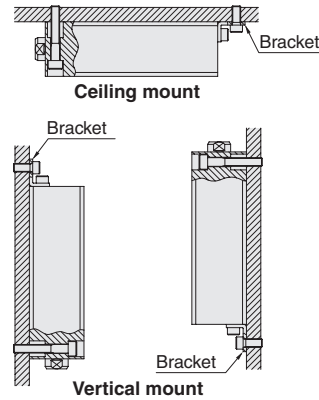
Mounting

- The cylinder can be mounted in any orientation, but the mounting surface must be flat. If the cylinder twists or bends when mounted, not only will it be inaccurate, but there may be air leaks and defective operation.
- Note that a mounting surface that is scratched or dented can adversely affect flatness.
- If the cylinder is subject to large impacts, use a support structure, such as brackets, to hold the cylinder body in addition to the mounting bolts.
- Be sure that the cylinder body and the mounting bolts are of sufficient strength.
- In cases where loosening of bolts due to impact and/or vibration may be a factor, consider looseness prevention measures.
- Do not scratch or dent the sliding parts of the piston rod. Doing so could damage the packing and cause air leaks.
- The piston rod and linear guides are coated with grease, do not wipe it off. Doing so may cause defective operation. If you cannot see the lubricant, apply some grease.
Cylinder: Koganei's recommended grease (refer to page 85)
Guide rails: No. 2 lithium type grease
- Note that you cannot use the tapped holes on the front-surface (rod side) of the cylinder if you mount it using the counterbored holes on the cylinder body.
(Double acting type, single acting push type, single acting pull type, and double acting double rod end type from $\phi 10$ [0.394 in] to $\phi 32$ [1.260 in])
- If you are using a combination of a cylinder and guide, use cylinder joints for flexible connections.

Mounting with brackets

We recommend using brackets for mounting if you are using the cylinder in the following conditions. (BCZ-BK□ or -BK)

- Stroke : If using a cylinder with a longer than standard stroke.
- Mounting: If using a vertical or ceiling mount for a cylinder with a long stroke (guideline: Products with bore of $\phi 20$ [0.787 in] or greater and stroke of 50 mm [1.97 in] or longer).
- Process : If using a cylinder for large static loads, such as for pressing processes.
- Other : If using a cylinder in a location subject to extreme vibrations.



Tightening torque

●Fittings

Screw size	N·m [in·lbf]	
	Tightening Torque	
M3×0.5	0.7	[6.2]
M5×0.8	1.0 to 1.5	[8.9 to 13.3]
R1/8	7 to 9	[62 to 80]
R1/4	12 to 14	[106 to 124]
R3/8	22 to 24	[195 to 212]

●Workpiece mounting

(Cylinder with guide)		N·m [in·lbf]	
Screw size	Tightening Torque		
M3×0.5	0.63	[5.58]	
M4×0.7	1.5	[13.3]	
M5×0.8	3.0	[26.6]	
M6×1	5.2	[46.0]	

●Plugs (Cylinder with guide)

N·m [in·lbf]	
Screw size	Tightening Torque
M3×0.5	0.3 [2.7]
M5×0.8	0.4 [3.5]

●Cylinder & bracket mounting

Screw size	N·m [in·lbf]	
	Cylinder	Bracket
M3×0.5	1.2	[10.6]
M4×0.7	2.7	[23.9]
M5×0.8	5.4	[47.8]
M6×1	9.2	[81.4]
M8×1.25	22	[195]
M10×1.5	44	[389]
M12×1.75	76	[673]
M16×2	190	[1682]
M20×2.5	370	[3275]

*For both mounting to cylinder or to a mating surface

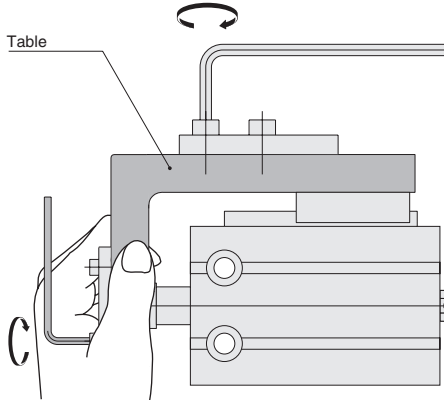
●Sensor switch mounting

The tightening torque for the screws is 0.1 N·m to 0.2 N·m [0.9 in·lbf to 1.8 in·lbf]

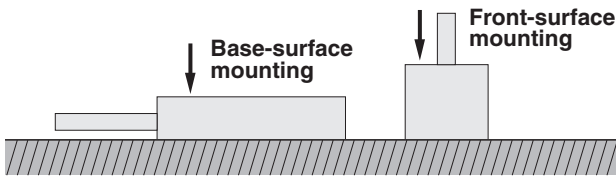
Handling Instructions and Precautions

Mounting workpiece to cylinder with guide

- Note**
- The table is supported by the linear guide, so be careful to avoid strong impact and excess moment when mounting workpieces.
 - Hold the table when securing the workpiece to the table with bolts. If you hold the body when tightening the bolts, it reduces the precision by applying too large moment on the guide.



List of recommended mounting bolts



Base-surface mounting

- Double acting type ● Single acting type (push, pull)
- Double rod end ● With guide

Cylinder bore mm [in]	Recommended mounting bolts
6 [0.236]	M3 × 12 [0.472]
8 [0.315]	M3 × 12 [0.472]
10 [0.394]	M3 × 16 [0.630]
12 [0.472]	M4 × 16 [0.630]
16 [0.630]	M4 × 20 [0.787]
20 [0.787]	M5 × 25 [0.984]
25 [0.984]	M5 × 30 [1.181]
32 [1.260]	M6 × 35 [1.378]
40 [1.575]	M8 × 45 [1.772]
50 [1.969]	M10 × 55 [2.165]
63 [2.480]	M12 × 65 [2.559]
80 [3.150]	M12 × 80 [3.150]
100 [3.937]	M16 × 110 [4.331]
125 [4.921]	M20 × 130 [5.118]

Use bolts longer than those in the table above when securing the cylinder.

Front-surface mounting

- Double acting type ● Single acting type (push, pull)
- Double rod end

Cylinder bore mm [in]	Recommended mounting bolts		
	Double acting type	Single acting type	Double rod end
50 [1.969]	M6 × 35 [1.378] + stroke	M6 × 55 [2.165] + stroke	M6 × 45 [1.772] + stroke
63 [2.480]	M8 × 40 [1.575] + stroke	—	M8 × 50 [1.969] + stroke
80 [3.150]	M10 × 45 [1.772] + stroke	—	M10 × 55 [2.165] + stroke
100 [3.937]	M10 × 55 [2.165] + stroke	—	M10 × 55 [2.165] + stroke
125 [4.921]	M12 × 55 [2.165] + stroke	—	M12 × 55 [2.165] + stroke

Use bolts longer than those in the table above when securing the cylinder.

Allowable kinetic energy

Use the cylinder with less kinetic energy than indicated in the table below.

Cylinder bore mm [in]	Allowable kinetic energy J [in · lbf]	
	Double acting, double rod end, with guide	Single acting (push & pull)
6 [0.236]	0.008 [0.071]	0.004 [0.035]
8 [0.315]	0.014 [0.124]	0.007 [0.062]
10 [0.394]	0.022 [0.195]	0.012 [0.106]
12 [0.472]	0.032 [0.283]	0.017 [0.150]
16 [0.630]	0.057 [0.505]	0.03 [0.27]
20 [0.787]	0.09 [0.80]	0.05 [0.44]
25 [0.984]	0.14 [1.24]	0.08 [0.71]
32 [1.260]	0.23 [2.04]	0.13 [1.15]
40 [1.575]	0.36 [3.19]	0.21 [1.86]
50 [1.969]	0.56 [4.96]	0.32 [2.83]
63 [2.480]	0.89 [7.88]	—
80 [3.150]	1.4 [12.4]	—
100 [3.937]	2.2 [19.5]	—
125 [4.921]	3.5 [31.0]	—

- Use the following equation to calculate the kinetic energy of loads.

$$E_x = \frac{m}{2} v^2$$

Ex: Kinetic energy (J)

m: Mass of load (kg)

v: Piston speed (m/s)

$$E'x = \frac{w'}{2g'} v'^2$$

E'x: Kinetic energy [ft · lbf]

w': Load weight [lb]

v': Piston speed [ft/sec]

g': Gravity acceleration 32.2 [ft/sec²]

Allowable lateral load (except cylinder with guide)

Apply less than the maximum lateral load to the cylinder than indicated in the table below.

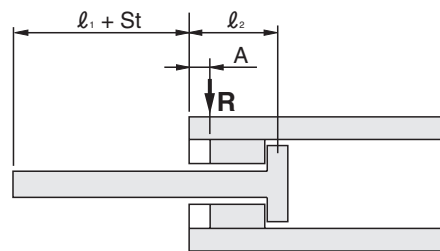
Equation

- $\phi 6 [0.236]$ to $\phi 10 [0.394]$, $\phi 50 [1.969]$ to $\phi 125 [4.921]$

$$\text{Maximum allowable lateral load } W \leq \frac{l_2 - A}{l_1 + l_2 + St} \cdot R$$

- $\phi 16 [0.630]$ to $\phi 40 [1.575]$

$$\text{Maximum allowable lateral load } W \leq \frac{l_2}{l_1 + l_2 + St} \cdot R$$

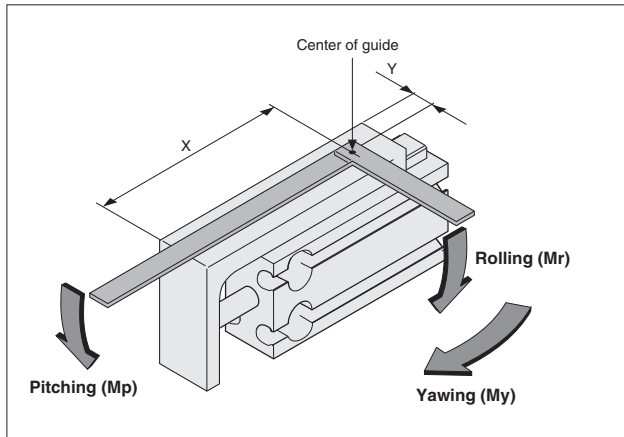


Cylinder bore mm [in]	Allowable lateral load R N [lbf]	l ₁ mm [in]	l ₂ mm [in]	A mm [in]
6 [0.236]	1.0 [0.22]	4.0 [0.157]	12.9 [0.508]	3.8 [0.150]
8 [0.315]	1.8 [0.40]	4.0 [0.157]	13.35 [0.526]	4.3 [0.170]
10 [0.394]	2.7 [0.61]	4.0 [0.157]	13.35 [0.526]	4.3 [0.170]
12 [0.472]	4.0 [0.90]	5.0 [0.197]	14.0 [0.551]	3.5 [0.138]
16 [0.630]	7.0 [1.57]	5.0 [0.197]	15.0 [0.591]	—
20 [0.787]	11.0 [2.47]	6.0 [0.236]	17.5 [0.689]	—
25 [0.984]	17.2 [3.87]	6.0 [0.236]	18.0 [0.709]	—
32 [1.260]	28.1 [6.32]	7.0 [0.276]	18.5 [0.728]	—
40 [1.575]	44.0 [9.89]	7.0 [0.276]	23.0 [0.906]	—
50 [1.969]	68.7 [15.44]	8.0 [0.315]	19.35 [0.762]	8.0 [0.315]
63 [2.480]	109.1 [24.53]	8.0 [0.315]	25.0 [0.984]	8.0 [0.315]
80 [3.150]	175.9 [39.54]	10.0 [0.394]	24.5 [0.965]	8.0 [0.315]
100 [3.937]	274.9 [61.80]	12.0 [0.472]	35.5 [1.398]	9.0 [0.354]
125 [4.921]	429.5 [96.55]	16.0 [0.630]	41.5 [1.634]	9.0 [0.354]

Handling Instructions and Precautions

Allowable bending moment for cylinder with guide

Applying more than the allowable bending moment causes the guide to rattle, reduces precision, and has a bad effect on operating life.



● Use the center of the guide as shown in the diagram as the reference for the center of moment.

● Dimensions of center of guide

mm [in]				mm [in]			
Model	Stroke	X	Y	Model	Stroke	X	Y
BCG8	5	31.5	6 [0.236]	BCG25	5	47.5	14.5 [0.571]
	10	[1.240]			10	[1.870]	
	15	41.5			15	57.5	
	20	[1.634]			20	[2.264]	
	25	51.5			25	67.5	
	30	[2.028]			30	[2.657]	
	35	61.5			35	77.5	
	40	[2.421]			40	[3.051]	
	45	71.5			45	87.5	
	50	[2.815]			50	[3.445]	
BCG12	5	32.5	7.5 [0.295]	BCG32	10	57	18 [0.709]
	10	[1.280]			15	67	
	15	42.5			20	[2.638]	
	20	[1.673]			25	77	
	25	52.5			30	[3.031]	
	30	[2.067]			35	87	
	35	62.5			40	[3.425]	
	40	[2.461]			45	97	
	45	72.5			50	[3.819]	
	50	[2.854]			55	107	
BCG16	5	37.5	9.5 [0.374]	BCG40	10	70.5	23 [0.906]
	10	[1.476]			15	[2.776]	
	15	47.5			20	80.5	
	20	[1.870]			25	[3.170]	
	25	57.5			30	90.5	
	30	[2.264]			35	[3.563]	
	35	67.5			40	100.5	
	40	[2.657]			45	[3.957]	
	45	77.5			50	110.5	
	50	[3.051]			55	[4.350]	
BCG20	5	44	11.5 [0.453]		60		
	10	[1.732]					
	15	54					
	20	[2.126]					
	25	64					
	30	[2.520]					
	35	74					
	40	[2.913]					
	45	84					
	50	[3.307]					
55	94						
60	[3.701]						

Allowable bending moment

N·m [in·lbf]

Model	Mp (pitching)	Mr (rolling)	My (yawing)
BCG8, BCG12	0.12 [1.06]	0.12 [1.06]	0.21 [1.86]
BCG16	0.4 [3.54]	0.4 [3.54]	0.68 [6.02]
BCG20	1.5 [13.28]	1.8 [15.93]	2.2 [19.47]
BCG25	2.18 [19.30]	2.18 [19.30]	4.18 [37.00]
BCG32	4.46 [39.48]	4.46 [39.48]	7.31 [64.70]
BCG40	6.7 [59.3]	8 [70.8]	13.7 [121.3]

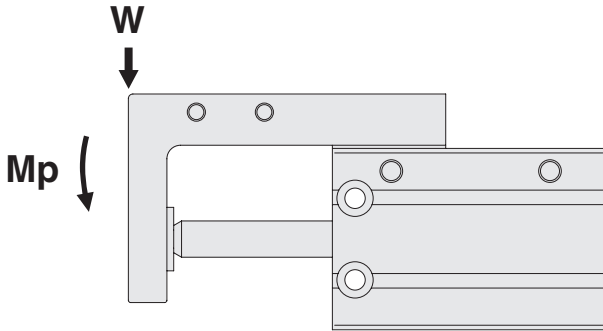
Handling Instructions and Precautions

Displacement of table due to bending moment for cylinder with guide (reference values)

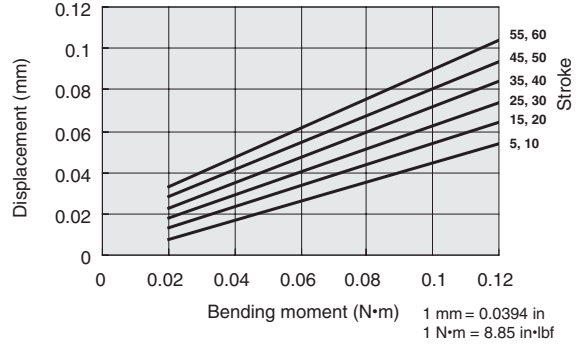
● Pitching (Mp)

Displacement of edge of table (arrow) when load W is applied at arrow

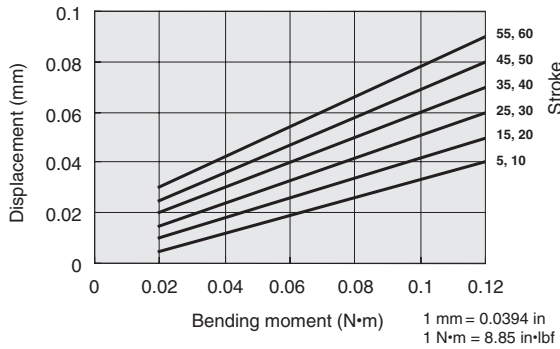
(Precaution: There may be a large increase in the displacement after a large impact load is applied to the table)



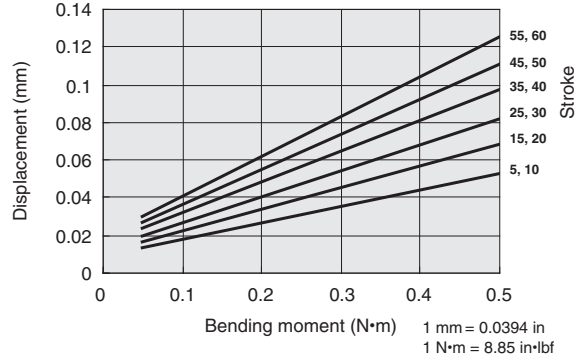
● BCG8



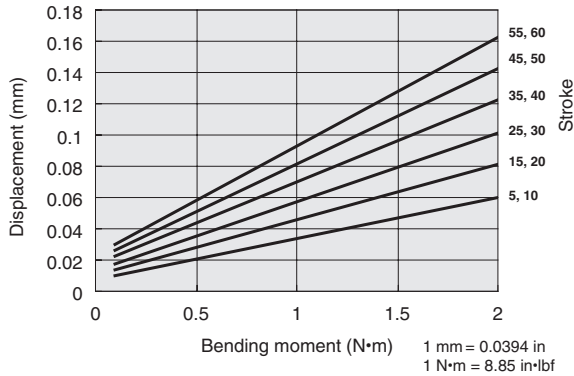
● BCG12



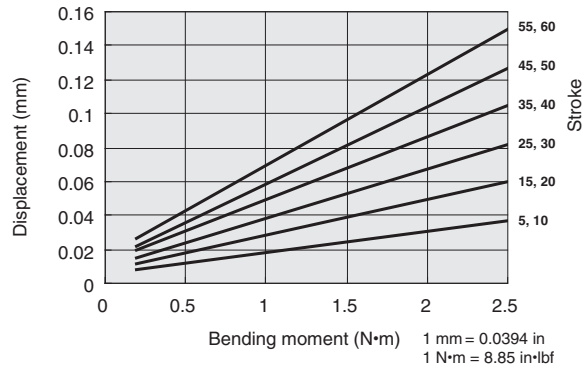
● BCG16



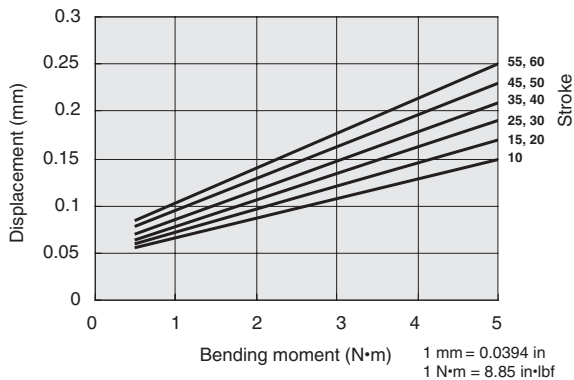
● BCG20



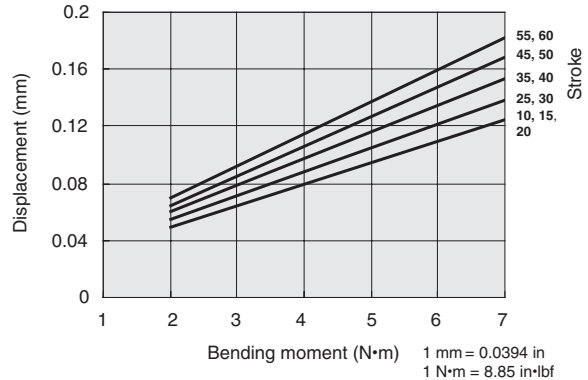
● BCG25



● BCG32



● BCG40



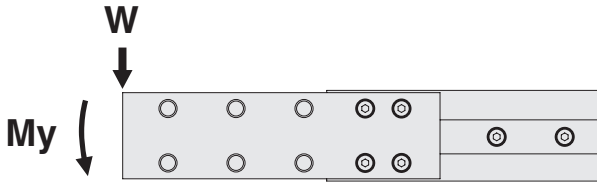
Handling Instructions and Precautions

Displacement of table due to bending moment for cylinder with guide (reference values)

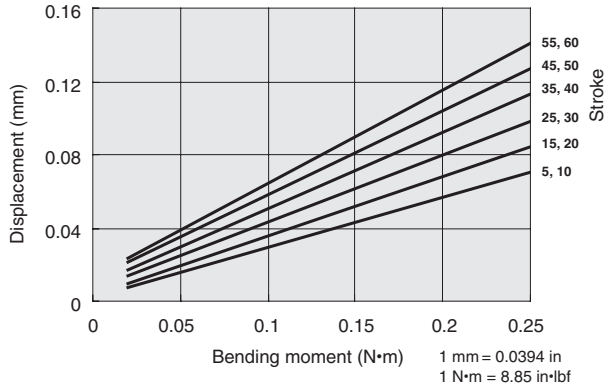
● Yawing (My)

Displacement of edge of table (arrow) when load W is applied at arrow

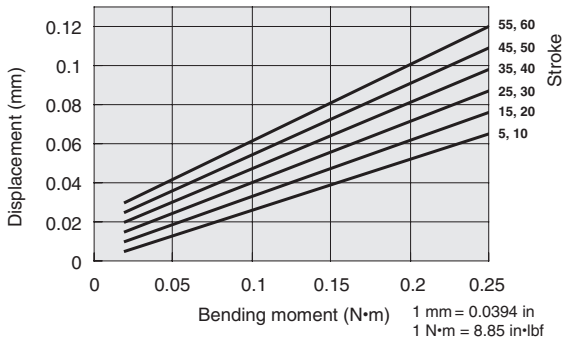
(Precaution: There may be a large increase in the displacement after a large impact load is applied to the table)



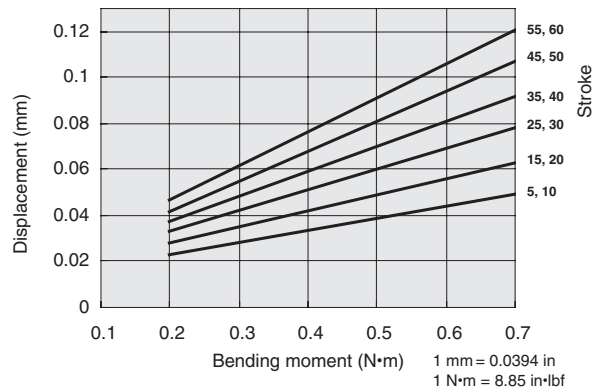
● BCG8



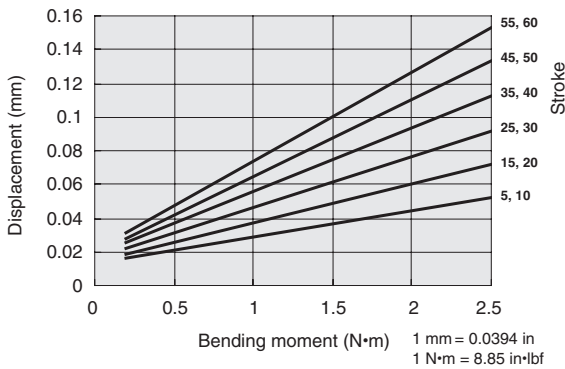
● BCG12



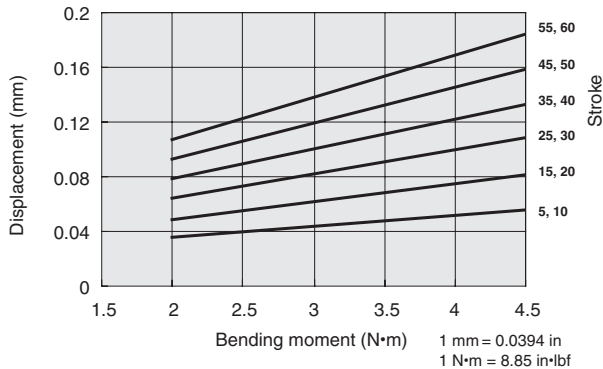
● BCG16



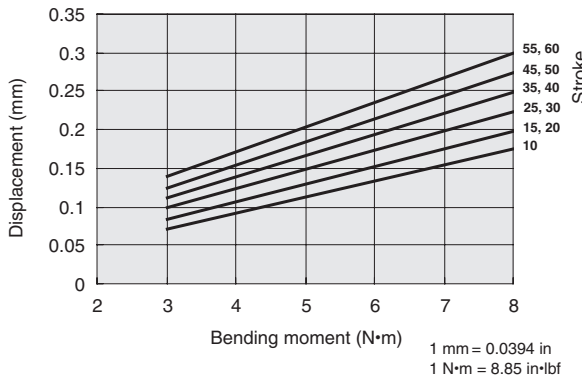
● BCG20



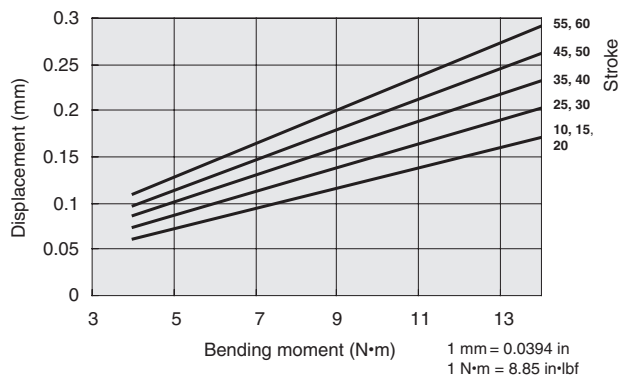
● BCG25



● BCG32



● BCG40



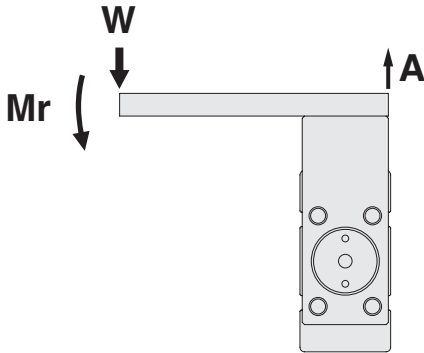
Handling Instructions and Precautions

Displacement of table due to bending moment for cylinder with guide (reference values)

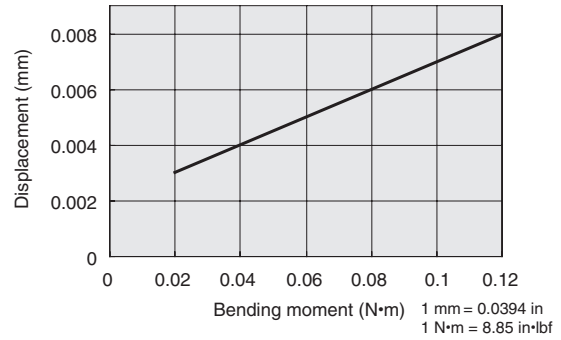
● Rolling (Mr)

Displacement of edge of table (arrow A) when load W is applied at arrow

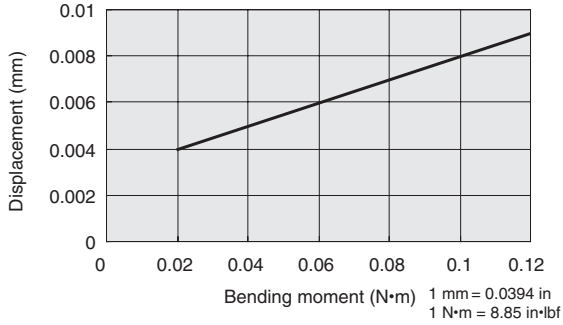
(Precaution: There may be a large increase in the displacement after a large impact load is applied to the table)



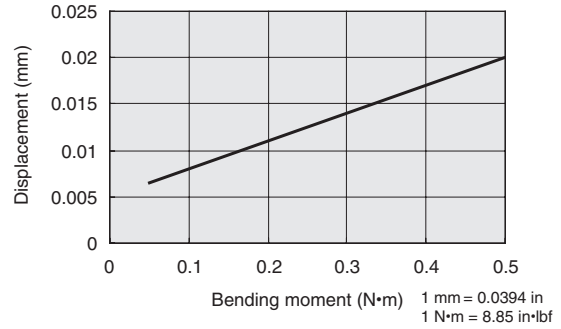
● BCG8



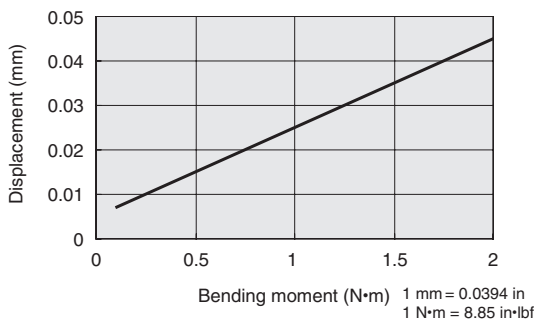
● BCG12



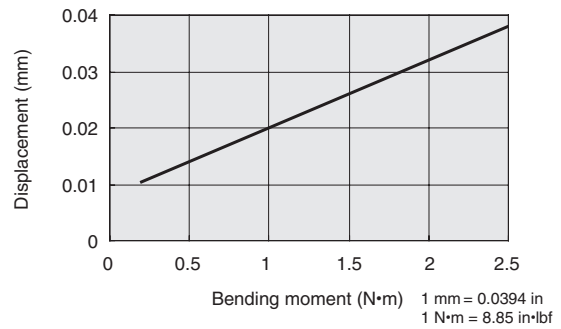
● BCG16



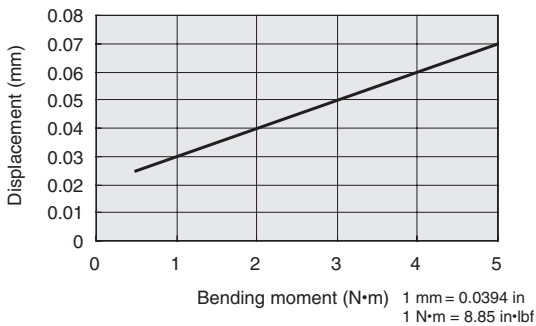
● BCG20



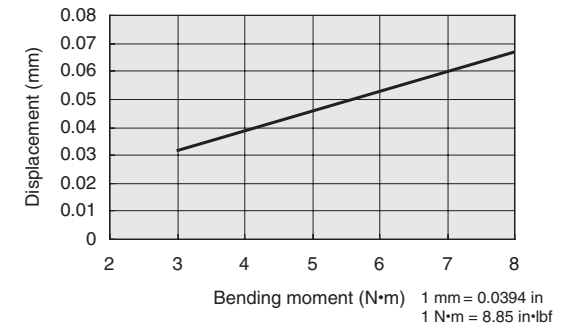
● BCG25



● BCG32



● BCG40



Handling Instructions and Precautions

Thrust

● Double acting type

unit: N

Cylinder bore mm	Piston rod diameter mm	Operation	Pressure area mm ²	Air pressure MPa						
				0.1	0.2	0.3	0.4	0.5	0.6	0.7
6	4	Push side	28.3	2.8	5.7	8.5	11.3	14.2	17.0	19.8
		Pull side	15.7	1.6	3.1	4.7	6.3	7.9	9.4	11.0
8	5	Push side	50.3	5.0	10.1	15.1	20.1	25.2	30.2	35.2
		Pull side	30.6	3.1	6.1	9.2	12.2	15.3	18.4	21.4
10	5	Push side	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
		Pull side	58.9	5.9	11.8	17.7	23.6	29.5	35.3	41.2
12	6	Push side	113.0	11.3	22.6	33.9	45.2	56.5	67.8	79.1
		Pull side	84.8	8.5	17.0	25.4	33.9	42.4	50.9	59.4
16	8	Push side	201.0	20.1	40.2	60.3	80.4	100.5	120.6	140.7
		Pull side	150.0	15.0	30.0	45.0	60.0	75.0	90.0	105.0
20	10	Push side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
		Pull side	235.5	23.6	47.1	70.7	94.2	117.8	141.3	164.9
25	12	Push side	490.6	49.1	98.1	147.2	196.2	245.3	294.4	343.4
		Pull side	377.6	37.8	75.5	113.3	151.0	188.8	226.6	264.3
32	16	Push side	803.8	80.4	160.8	241.1	321.5	401.9	482.3	562.7
		Pull side	602.9	60.3	120.6	180.9	241.2	301.5	361.7	422.0
40	16	Push side	1256.0	125.6	251.2	376.8	502.4	628.0	753.6	879.2
		Pull side	1055.0	105.5	211.0	316.5	422.0	527.5	633.0	738.5
50	20	Push side	1962.5	196.3	392.5	588.8	785.0	981.3	1177.5	1373.8
		Pull side	1648.5	164.9	329.7	494.6	659.4	824.3	989.1	1154.0
63	20	Push side	3115.7	311.6	623.1	934.7	1246.3	1557.9	1869.4	2181.0
		Pull side	2801.7	280.2	560.3	840.5	1120.7	1400.9	1681.0	1961.2
80	25	Push side	5024.0	502.4	1004.8	1507.2	2009.6	2512.0	3014.4	3516.8
		Pull side	4533.4	453.3	906.7	1360.0	1813.4	2266.7	2720.0	3173.4
100	30	Push side	7850.0	785.0	1570.0	2355.0	3140.0	3925.0	4710.0	5495.0
		Pull side	7143.5	714.4	1428.7	2143.1	2857.4	3571.8	4286.1	5000.5
125	35	Push side	12265.6	1226.6	2453.1	3679.7	4906.3	6132.8	7359.4	8585.9
		Pull side	11304.0	1130.4	2260.8	3391.2	4521.6	5652.0	6782.4	7912.8

● Single acting type

unit: N

Operating type	Cylinder bore mm	Piston rod diameter mm	Pressure area mm ²	Air pressure MPa						Spring return force (at end of stroke)
				0.2	0.3	0.4	0.5	0.6	0.7	
Single acting push type	6	4	28.3	2.5	5.3	8.1	11.0	13.8	16.6	3.16
	8	5	50.3	3.6	8.6	13.6	18.7	23.7	28.7	6.5
	10	5	78.5	8.5	16.4	24.2	32.1	39.9	47.8	7.17
	12	6	113.0	12.7	24.0	35.3	46.6	57.9	69.2	9.9
	16	8	201.0	23.8	43.9	64.0	84.1	104.2	124.3	16.4
	20	10	314.0	46.4	77.8	109.2	140.6	172.0	203.4	16.4
	25	12	490.6	77.8	126.9	175.9	225.0	274.1	323.1	20.3
	32	16	803.8	127.8	208.1	288.5	368.9	449.3	529.7	33
	40	16	1256.0	211.7	337.3	462.9	588.5	714.1	839.7	39.5
Single acting pull type	6	4	15.7	–	1.3	2.8	4.4	6.0	7.5	3.45
	8	5	30.6	–	2.0	5.1	8.1	11.2	14.3	7.17
	10	5	58.9	4.6	10.5	16.4	22.3	35.3	34.2	7.17
	12	6	84.8	7.1	15.5	24.0	32.5	41.0	49.5	9.9
	16	8	150.0	13.6	28.6	43.6	58.6	73.6	88.6	16.4
	20	10	235.5	30.7	54.3	77.8	101.4	124.9	148.5	16.4
	25	12	377.6	55.2	93.0	130.7	168.5	206.3	244.0	20.3
	32	16	602.9	87.6	147.9	208.2	268.5	328.7	389.0	33
	40	16	1055.0	171.5	277.0	382.5	488.0	593.5	699.0	39.5
50	20	1648.5	276.0	440.9	605.7	770.6	935.4	1100.3	53.7	

Handling Instructions and Precautions

● Double acting type

unit: lbf

Cylinder bore in	Piston rod diameter in	Operation	Pressure area in ²	Air pressure psi						
				15	29	44	58	73	87	102
0.236	0.157	Push side	0.0439	0.63	1.28	1.91	2.54	3.19	3.82	4.45
		Pull side	0.0243	0.36	0.70	1.06	1.42	1.78	2.11	2.47
0.315	0.197	Push side	0.0780	1.12	2.27	3.39	4.52	5.66	6.79	7.91
		Pull side	0.0474	0.70	1.37	2.07	2.74	3.44	4.14	4.81
0.394	0.197	Push side	0.1217	1.78	3.53	5.31	7.06	8.83	10.59	12.36
		Pull side	0.0913	1.33	2.65	3.98	5.31	6.63	7.94	9.26
0.472	0.236	Push side	0.1752	2.54	5.08	7.62	10.16	12.70	15.24	17.78
		Pull side	0.1314	1.91	3.82	5.71	7.62	9.53	11.44	13.35
0.630	0.315	Push side	0.3116	4.52	9.04	13.56	18.07	22.59	27.11	31.63
		Pull side	0.2325	3.37	6.74	10.12	13.49	16.86	20.23	23.60
0.787	0.394	Push side	0.4867	7.06	14.12	21.18	28.23	35.29	42.35	49.41
		Pull side	0.3650	5.31	10.59	15.89	21.18	26.48	31.76	37.07
0.984	0.472	Push side	0.7604	11.04	22.05	33.09	44.11	55.14	66.18	77.20
		Pull side	0.5853	8.50	16.97	25.47	33.94	42.44	50.94	59.41
1.260	0.630	Push side	1.2459	18.07	36.15	54.20	72.27	90.35	108.42	126.50
		Pull side	0.9345	13.56	27.11	40.67	54.22	67.78	81.31	94.87
1.575	0.630	Push side	1.9468	28.23	56.47	84.70	112.94	141.17	169.41	197.65
		Pull side	1.6353	23.72	47.43	71.15	94.87	118.58	142.30	166.02
1.969	0.787	Push side	3.0419	44.13	88.23	132.36	176.47	220.60	264.71	308.83
		Pull side	2.5552	37.07	74.12	111.19	148.23	185.30	222.35	259.42
2.480	0.787	Push side	4.8293	70.05	140.07	210.12	280.17	350.22	420.24	490.29
		Pull side	4.3426	62.99	125.96	188.94	251.93	314.92	377.89	440.88
3.150	0.984	Push side	7.7872	112.94	225.88	338.82	451.76	564.70	677.64	790.58
		Pull side	7.0268	101.90	203.83	305.73	407.65	509.55	611.46	713.38
3.937	1.181	Push side	12.1675	176.47	352.94	529.40	705.87	882.34	1058.81	1235.28
		Pull side	11.0724	160.60	321.17	481.77	642.34	802.94	963.52	1124.11
4.921	1.378	Push side	19.0117	275.74	551.46	827.20	1102.94	1378.65	1654.39	1930.11
		Pull side	17.5212	254.11	508.23	762.34	1016.46	1270.57	1524.68	1778.80

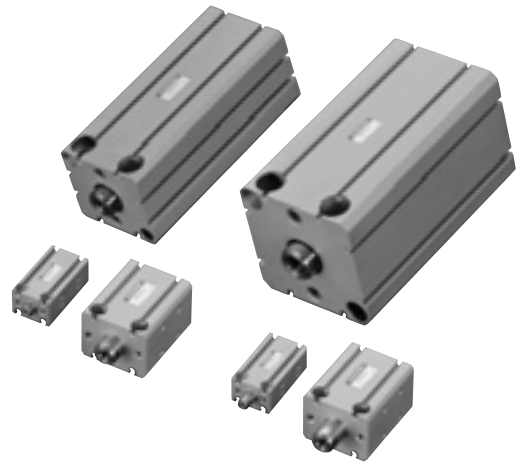
● Single acting type

unit: lbf

Operating type	Cylinder bore in	Piston rod diameter in	Pressure area in ²	Air pressure psi						Spring return force (at end of stroke)
				29	44	58	73	87	102	
Single acting push type	0.236	0.157	0.0439	0.56	1.19	1.82	2.47	3.10	3.73	0.710
	0.315	0.197	0.0780	0.81	1.93	3.06	4.20	5.33	6.45	1.46
	0.394	0.197	0.1217	1.91	3.69	5.44	7.22	8.97	10.75	1.612
	0.472	0.236	0.1752	2.85	5.40	7.94	10.48	13.02	15.56	2.23
	0.630	0.315	0.3116	5.35	9.87	14.39	18.91	23.42	27.94	3.69
	0.787	0.394	0.4867	10.43	17.49	24.55	31.61	38.67	45.72	3.69
	0.984	0.472	0.7604	17.49	28.53	39.54	50.58	61.62	72.63	4.56
	1.260	0.630	1.2459	28.73	46.78	64.85	82.93	101.00	119.08	7.42
	1.575	0.630	1.9468	47.59	75.83	104.06	132.29	160.53	188.76	8.88
Single acting pull type	0.236	0.157	0.0243	–	0.29	0.63	0.99	1.35	1.69	0.776
	0.315	0.197	0.0474	–	0.45	1.15	1.82	2.52	3.21	1.612
	0.394	0.197	0.0913	1.03	2.36	3.69	5.01	6.38	7.76	1.612
	0.472	0.236	0.1314	1.60	3.48	5.40	7.31	9.22	11.13	2.23
	0.630	0.315	0.2325	3.06	6.43	9.80	13.17	16.55	19.92	3.69
	0.787	0.394	0.3650	6.90	12.21	17.49	22.79	28.08	33.38	3.69
	0.984	0.472	0.5853	12.41	20.91	29.38	37.89	46.38	54.85	4.56
	1.260	0.630	0.9345	19.69	33.25	46.80	60.36	73.89	87.45	7.42
	1.575	0.630	1.6353	38.55	62.27	85.99	109.70	133.42	157.14	8.88
1.969	0.787	2.5552	62.04	99.11	136.16	173.23	210.28	247.35	12.07	

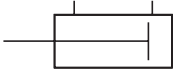
Basic Cylinders

Double acting type, single acting push type,
single acting pull type

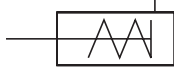


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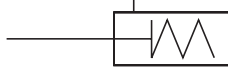
● Double acting type



● Single acting push type



● Single acting pull type



Specifications

● Double acting type

Item	Cylinder bore	6	8	10	12	16	20	25	32	40	50	63	80	100	125	
		[0.236]	[0.315]	[0.394]	[0.472]	[0.630]	[0.787]	[0.984]	[1.260]	[1.575]	[1.969]	[2.480]	[3.150]	[3.937]	[4.921]	
Operating type		Double acting type														
Medium		Air														
Operating pressure range	MPa [psi]	0.12 to 0.7 [17 to 102]			0.06 to 0.7 [9 to 102]			0.05 to 0.7 [7 to 102]								
Proof pressure	MPa [psi]	1.05 [152]														
Operating temperature range	°C [°F]	0 to 60 [32 to 140]														
Operating speed range	mm/s [in/sec]	10 to 500 [0.4 to 20]										10 to 300 [0.4 to 12]				
Cushion		Rubber bumper														
Lubrication		Not required (if lubricated, use turbine oil class 1 (ISO VG32) or equivalent)														
Port size		M3×0.5			M5×0.8			Rc1/8			Rc1/4		Rc3/8			

● Single acting type

Item	Cylinder bore	6	8	10	12	16	20	25	32	40	50
		[0.236]	[0.315]	[0.394]	[0.472]	[0.630]	[0.787]	[0.984]	[1.260]	[1.575]	[1.969]
Operating type		Single acting push and pull type									
Medium		Air									
Operating pressure range	Single acting push type	0.2 to 0.7 [29 to 102]			0.15 to 0.7 [22 to 102]						
	Single acting pull type	0.3 to 0.7 [44 to 102]			0.2 to 0.7 [29 to 102]			0.15 to 0.7 [22 to 102]			
Proof pressure	MPa [psi]	1.05 [152]									
Operating temperature range	°C [°F]	0 to 60 [32 to 140]									
Operating speed range	mm/s [in/sec]	50 to 500 [2 to 20]									
Cushion		Rubber bumper									
Lubrication		Not required (if lubricated, use turbine oil class 1 (ISO VG32) or equivalent)									
Port size		M3×0.5			M5×0.8			Rc1/8			

Cylinder bore and stroke

● Double acting type

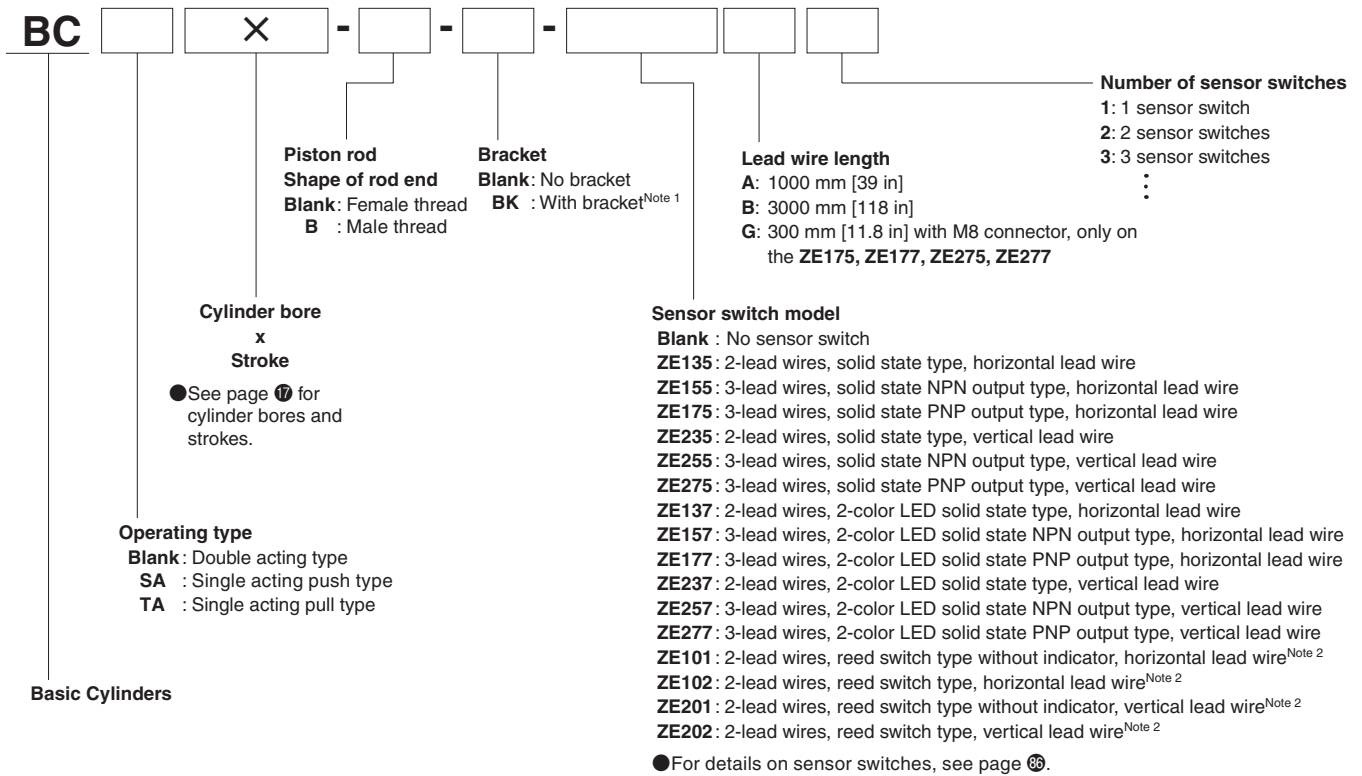
Cylinder bore	Standard stroke	Maximum available stroke
		mm [in]
6, 8, 10 [0.236, 0.315, 0.394]	5, 10, 15, 20, 25, 30	50 [1.97]
12, 16 [0.472, 0.630]	5, 10, 15, 20, 25, 30, 35, 40, 45, 50	100 [3.94]
20, 25 [0.787, 0.984]	5 ^{Note} , 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 70, 75, 80, 90, 100	125 [4.92]
32, 40 [1.260, 1.575]	10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 70, 75, 80, 90, 100	200 [7.87]
50, 63, 80, 100, 125 [1.969, 2.480, 3.150, 3.937, 4.921]	10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 70, 75, 80, 90, 100	200 [7.87]

Note: Collar stopper is used in this stroke.

● Single acting type

Cylinder bore	Standard stroke	mm [in]
6, 8, 10 [0.236, 0.315, 0.394]	5, 10, 15	
12, 16, 20, 25 [0.472, 0.630, 0.787, 0.984]	5, 10, 15, 20, 25, 30	
32, 40, 50 [1.260, 1.575, 1.969]	10, 15, 20, 25, 30	

Order Codes



- Note 1: Brackets cannot be attached to cylinders that have $\phi 6$ [0.236] or $\phi 8$ [0.315] cylinder bores.
 2: Reed type sensor switches cannot be attached to cylinders that have $\phi 6$ [0.236], $\phi 8$ [0.315], $\phi 10$ [0.394], or $\phi 12$ [0.472] cylinder bores.
 3: When using reed switch type sensor switches, operates at cylinder speed of 30 mm/s [1.2 in/sec] or higher.

Mass

● Double acting type

unit: g

Model	Stroke																
	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100
BC6	13 (15)	16 (18)	20 (22)	23 (25)	27 (29)	30 (32)	-	-	-	-	-	-	-	-	-	-	-
BC8	19 (21)	21 (23)	24 (26)	27 (29)	31 (32)	32 (34)	-	-	-	-	-	-	-	-	-	-	-
BC10	21 (23)	23 (25)	26 (28)	29 (31)	32 (34)	34 (36)	-	-	-	-	-	-	-	-	-	-	-
BC12	29 (32)	33 (36)	38 (41)	42 (45)	46 (49)	50 (53)	55 (58)	59 (62)	63 (66)	67 (70)	-	-	-	-	-	-	-
BC16	44 (49)	49 (54)	55 (60)	61 (66)	67 (72)	72 (77)	78 (83)	84 (89)	90 (95)	95 (100)	-	-	-	-	-	-	-
BC20	86 (96)	84 (94)	93 (103)	102 (112)	111 (121)	120 (130)	129 (139)	137 (147)	146 (156)	155 (165)	164 (174)	173 (183)	190 (200)	199 (209)	208 (218)	226 (236)	243 (253)
BC25	126 (142)	122 (138)	134 (150)	146 (162)	159 (175)	171 (187)	183 (199)	195 (211)	207 (223)	219 (235)	231 (247)	243 (259)	267 (283)	280 (296)	292 (308)	316 (332)	340 (356)
BC32	-	222 (262)	242 (282)	262 (302)	283 (323)	303 (343)	323 (363)	343 (383)	363 (403)	383 (423)	403 (443)	423 (463)	464 (504)	484 (524)	504 (544)	544 (584)	584 (624)
BC40	-	316 (356)	339 (379)	362 (402)	386 (426)	409 (449)	433 (473)	456 (496)	479 (519)	502 (542)	526 (566)	549 (589)	596 (636)	619 (659)	642 (682)	689 (729)	735 (775)
BC50	-	545 (640)	580 (675)	614 (709)	649 (744)	683 (778)	718 (813)	752 (847)	786 (881)	820 (915)	855 (950)	889 (984)	958 (1053)	993 (1088)	1027 (1122)	1096 (1191)	1164 (1259)
BC63	-	832 (927)	872 (967)	912 (1007)	952 (1047)	991 (1086)	1031 (1126)	1071 (1166)	1111 (1206)	1150 (1245)	1190 (1285)	1230 (1325)	1310 (1405)	1350 (1445)	1389 (1484)	1469 (1564)	1548 (1643)
BC80	-	1254 (1434)	1306 (1486)	1358 (1538)	1410 (1590)	1462 (1642)	1514 (1694)	1566 (1746)	1618 (1798)	1670 (1850)	1723 (1903)	1775 (1955)	1879 (2059)	1931 (2111)	1983 (2163)	2087 (2267)	2191 (2371)
BC100	-	2448 (2748)	2532 (2832)	2615 (2915)	2699 (2999)	2782 (3082)	2866 (3166)	2949 (3249)	3033 (3333)	3116 (3416)	3200 (3500)	3284 (3584)	3451 (3751)	3535 (3835)	3618 (3918)	3785 (4085)	3952 (4252)
BC125	-	4591 (5132)	4675 (5216)	4758 (5299)	4842 (5383)	4925 (5466)	5009 (5550)	5092 (5633)	5176 (5717)	5259 (5800)	5343 (5884)	5427 (5968)	5594 (6135)	5678 (6219)	5761 (6302)	5928 (6469)	6095 (6636)

Values in () parentheses are masses for male thread specifications

● Single acting push type

unit: g

Model	Stroke					
	5	10	15	20	25	30
BCSA6	22 (24)	25 (27)	28 (30)	-	-	-
BCSA8	30 (32)	33 (35)	36 (38)	-	-	-
BCSA10	34 (36)	37 (39)	40 (42)	-	-	-
BCSA12	49 (52)	53 (56)	57 (60)	61 (64)	65 (68)	69 (72)
BCSA16	73 (78)	79 (84)	85 (90)	91 (96)	97 (102)	103 (108)
BCSA20	110 (120)	119 (129)	128 (138)	137 (147)	146 (156)	155 (165)
BCSA25	160 (176)	173 (189)	186 (202)	199 (215)	212 (228)	225 (241)
BCSA32	-	289 (329)	318 (358)	347 (387)	376 (416)	405 (445)
BCSA40	-	426 (466)	458 (498)	490 (530)	522 (562)	554 (594)
BCSA50	-	750 (845)	786 (881)	822 (917)	858 (953)	894 (989)

Values in () parentheses are masses for male thread specifications

● Single acting pull type

unit: g

Model	Stroke					
	5	10	15	20	25	30
BCTA6	20 (22)	23 (25)	26 (28)	-	-	-
BCTA8	26 (28)	29 (31)	32 (34)	-	-	-
BCTA10	29 (31)	32 (34)	35 (37)	-	-	-
BCTA12	43 (46)	47 (50)	51 (54)	55 (58)	59 (62)	63 (66)
BCTA16	63 (68)	69 (74)	75 (80)	81 (86)	87 (92)	93 (98)
BCTA20	98 (108)	107 (117)	116 (126)	125 (135)	134 (144)	143 (153)
BCTA25	144 (160)	157 (173)	170 (186)	183 (199)	196 (212)	209 (225)
BCTA32	-	260 (300)	281 (321)	302 (342)	323 (363)	344 (384)
BCTA40	-	404 (444)	428 (468)	452 (492)	476 (516)	500 (540)
BCTA50	-	720 (815)	756 (851)	792 (887)	828 (923)	864 (959)

Values in () parentheses are masses for male thread specifications

● Additional mass of sensor switches

ZE□□□□A, ZE□□□□G : 15 g ZE□□□□B : 35 g

Mass

● Double acting type

unit: oz

Model	Stroke																
	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100
BC6	0.46 (0.53)	0.56 (0.63)	0.71 (0.78)	0.81 (0.88)	0.95 (1.02)	1.06 (1.13)	-	-	-	-	-	-	-	-	-	-	-
BC8	0.67 (0.74)	0.74 (0.81)	0.85 (0.92)	0.95 (1.02)	1.09 (1.13)	1.13 (1.20)	-	-	-	-	-	-	-	-	-	-	-
BC10	0.74 (0.81)	0.81 (0.88)	0.92 (0.99)	1.02 (1.09)	1.13 (1.20)	1.20 (1.27)	-	-	-	-	-	-	-	-	-	-	-
BC12	1.02 (1.13)	1.16 (1.27)	1.34 (1.45)	1.48 (1.59)	1.62 (1.73)	1.76 (1.87)	1.94 (2.05)	2.08 (2.19)	2.22 (2.33)	2.36 (2.47)	-	-	-	-	-	-	-
BC16	1.55 (1.73)	1.73 (1.90)	1.94 (2.12)	2.15 (2.33)	2.36 (2.54)	2.54 (2.72)	2.75 (2.93)	2.96 (3.14)	3.17 (3.35)	3.35 (3.53)	-	-	-	-	-	-	-
BC20	3.03 (3.39)	2.96 (3.32)	3.28 (3.63)	3.60 (3.95)	3.92 (4.27)	4.23 (4.59)	4.55 (4.90)	4.83 (5.19)	5.15 (5.50)	5.47 (5.82)	5.78 (6.14)	6.10 (6.46)	6.70 (7.05)	7.02 (7.37)	7.34 (7.69)	7.97 (8.32)	8.57 (8.92)
BC25	4.44 (5.01)	4.30 (4.87)	4.73 (5.29)	5.15 (5.71)	5.61 (6.17)	6.03 (6.60)	6.46 (7.02)	6.88 (7.44)	7.30 (7.87)	7.72 (8.29)	8.15 (8.71)	8.57 (9.14)	9.42 (9.98)	9.88 (10.44)	10.30 (10.86)	11.15 (11.71)	11.99 (12.56)
BC32	-	7.83 (9.24)	8.54 (9.95)	9.24 (10.65)	9.98 (11.39)	10.69 (12.10)	11.39 (12.80)	12.10 (13.51)	12.80 (14.22)	13.51 (14.92)	14.22 (15.63)	14.92 (16.33)	16.37 (17.78)	17.07 (18.48)	17.78 (19.19)	19.19 (20.60)	20.60 (22.01)
BC40	-	11.15 (12.56)	11.96 (13.37)	12.77 (14.18)	13.62 (15.03)	14.43 (15.84)	15.27 (16.68)	16.08 (17.50)	16.90 (18.31)	17.71 (19.12)	18.55 (19.96)	19.37 (20.78)	21.02 (22.43)	21.83 (23.25)	22.65 (24.06)	24.30 (25.71)	25.93 (27.34)
BC50	-	19.22 (22.57)	20.46 (23.81)	21.66 (25.01)	22.89 (26.24)	24.09 (27.44)	25.33 (28.68)	26.53 (29.88)	27.72 (31.08)	28.92 (32.28)	30.16 (33.51)	31.36 (34.71)	33.79 (37.14)	35.03 (38.38)	36.23 (39.58)	38.66 (42.01)	41.06 (44.41)
BC63	-	29.35 (32.70)	30.76 (34.11)	32.17 (35.52)	33.58 (36.93)	34.96 (38.31)	36.37 (39.72)	37.78 (41.13)	39.19 (42.54)	40.56 (43.92)	41.98 (45.33)	43.39 (46.74)	46.21 (49.56)	47.62 (50.97)	48.99 (52.35)	51.82 (55.17)	54.60 (57.95)
BC80	-	44.23 (50.58)	46.07 (52.42)	47.90 (54.25)	49.74 (56.08)	51.57 (57.92)	53.40 (59.75)	55.24 (61.59)	57.07 (63.42)	58.91 (65.26)	60.78 (67.13)	62.61 (68.96)	66.28 (72.63)	68.11 (74.46)	69.95 (76.30)	73.62 (79.96)	77.28 (83.63)
BC100	-	86.35 (96.93)	89.31 (99.89)	92.24 (102.82)	95.20 (105.78)	98.13 (108.71)	101.09 (111.68)	104.02 (114.60)	106.98 (117.57)	109.91 (120.49)	112.87 (123.46)	115.84 (126.42)	121.73 (132.31)	124.69 (135.27)	127.63 (138.20)	133.51 (144.09)	139.40 (149.98)
BC125	-	161.94 (181.02)	164.90 (183.99)	167.83 (186.91)	170.79 (189.88)	173.72 (192.80)	176.68 (195.77)	179.61 (198.69)	182.57 (201.66)	185.50 (204.59)	188.47 (207.55)	191.43 (210.51)	197.32 (216.40)	200.28 (219.37)	203.21 (222.29)	209.10 (228.18)	214.99 (234.07)

Values in () parentheses are masses for male thread specifications

● Single acting push type

unit: oz

Model	Stroke					
	5	10	15	20	25	30
BCSA6	0.78 (0.85)	0.88 (0.95)	0.99 (1.06)	-	-	-
BCSA8	1.06 (1.13)	1.16 (1.23)	1.27 (1.34)	-	-	-
BCSA10	1.20 (1.27)	1.31 (1.38)	1.41 (1.48)	-	-	-
BCSA12	1.73 (1.83)	1.87 (1.98)	2.01 (2.12)	2.15 (2.26)	2.29 (2.40)	2.43 (2.54)
BCSA16	2.57 (2.75)	2.79 (2.96)	3.00 (3.17)	3.21 (3.39)	3.42 (3.60)	3.63 (3.81)
BCSA20	3.88 (4.23)	4.20 (4.55)	4.51 (4.87)	4.83 (5.19)	5.15 (5.50)	5.47 (5.82)
BCSA25	5.64 (6.21)	6.10 (6.67)	6.56 (7.13)	7.02 (7.58)	7.48 (8.04)	7.94 (8.50)
BCSA32	-	10.19 (11.60)	11.22 (12.63)	12.24 (13.65)	13.26 (14.67)	14.29 (15.70)
BCSA40	-	15.03 (16.44)	16.16 (17.57)	17.28 (18.69)	18.41 (19.82)	19.54 (20.95)
BCSA50	-	26.46 (29.81)	27.72 (31.08)	28.99 (32.35)	30.26 (33.62)	31.53 (34.89)

Values in () parentheses are masses for male thread specifications

● Single acting pull type

unit: oz

Model	Stroke					
	5	10	15	20	25	30
BCTA6	0.71 (0.78)	0.81 (0.88)	0.92 (0.99)	-	-	-
BCTA8	0.92 (0.99)	1.02 (1.09)	1.13 (1.20)	-	-	-
BCTA10	1.02 (1.09)	1.13 (1.20)	1.23 (1.31)	-	-	-
BCTA12	1.52 (1.62)	1.66 (1.76)	1.80 (1.90)	1.94 (2.05)	2.08 (2.19)	2.22 (2.33)
BCTA16	2.22 (2.40)	2.43 (2.61)	2.65 (2.82)	2.86 (3.03)	3.07 (3.25)	3.28 (3.46)
BCTA20	3.46 (3.81)	3.77 (4.13)	4.09 (4.44)	4.41 (4.76)	4.73 (5.08)	5.04 (5.40)
BCTA25	5.08 (5.64)	5.54 (6.10)	6.00 (6.56)	6.46 (7.02)	6.91 (7.48)	7.37 (7.94)
BCTA32	-	9.17 (10.58)	9.91 (11.32)	10.65 (12.06)	11.39 (12.80)	12.13 (13.54)
BCTA40	-	14.25 (15.66)	15.10 (16.51)	15.94 (17.35)	16.79 (18.20)	17.64 (19.05)
BCTA50	-	25.40 (28.75)	26.67 (30.02)	27.94 (31.29)	29.21 (32.56)	30.48 (33.83)

Values in () parentheses are masses for male thread specifications

● Additional mass of sensor switches

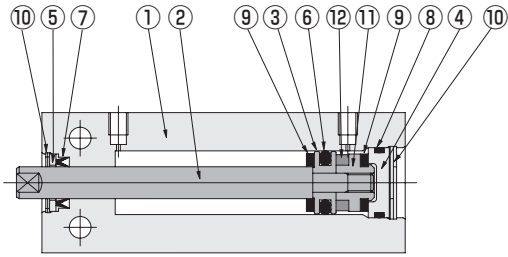
ZE□□□A, ZE□□□G : 0.53 oz ZE□□□B : 1.23 oz

Inner construction

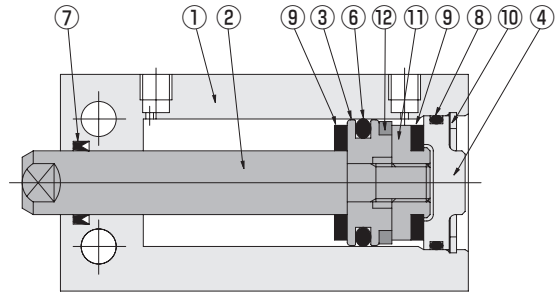
Double acting type

mm [in]

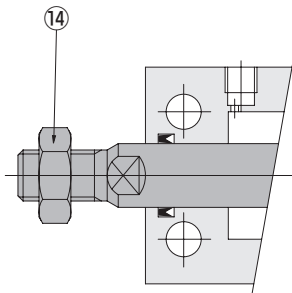
● $\phi 6$ [0.236] to $\phi 10$ [0.394]



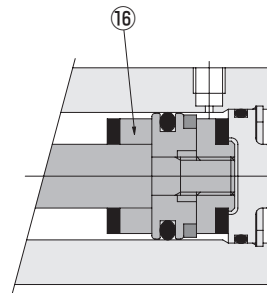
● $\phi 12$ [0.472] to $\phi 125$ [4.921]



● Male thread specifications



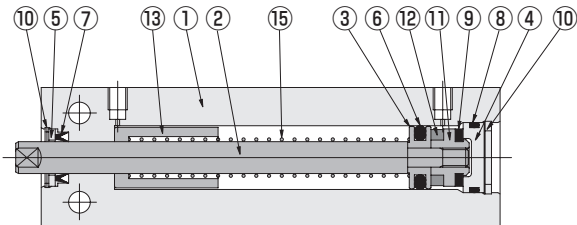
● 5 stroke for BC20 and BC25



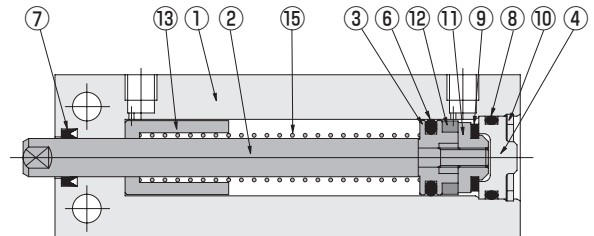
Single acting push type

mm [in]

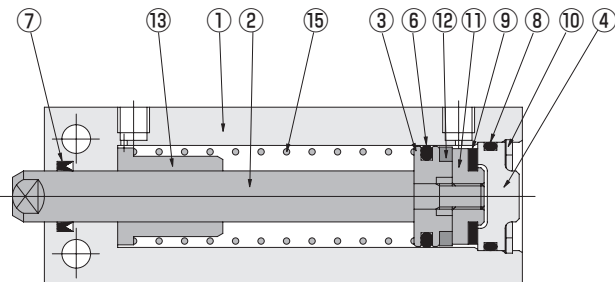
● $\phi 6$ [0.236] to $\phi 10$ [0.394]



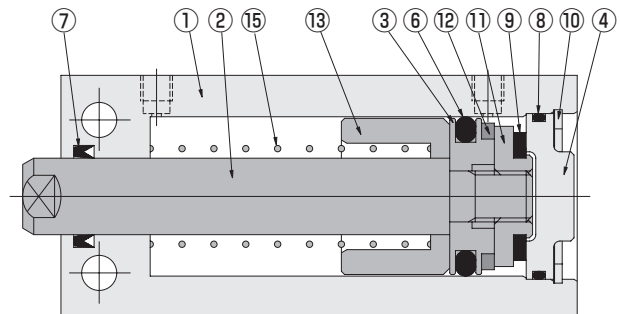
● $\phi 12$ [0.472]



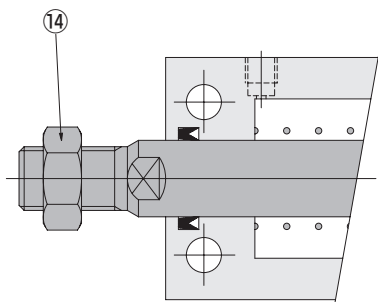
● $\phi 16$ [0.630]



● $\phi 20$ [0.787] to $\phi 50$ [1.969]



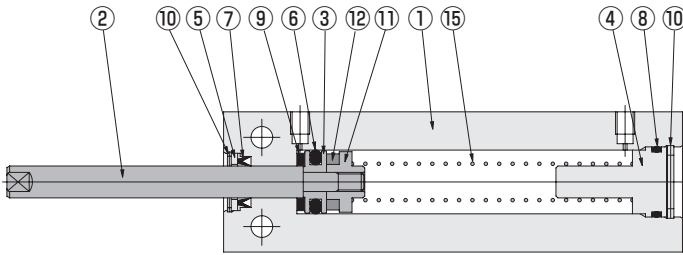
● Male thread specifications



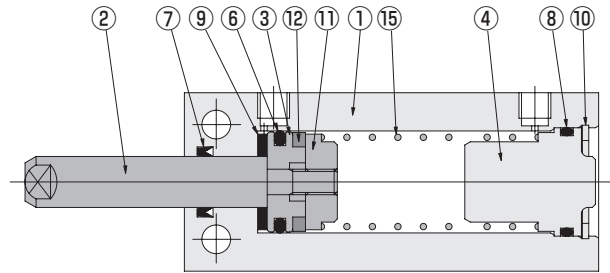
Single acting pull type

mm [in]

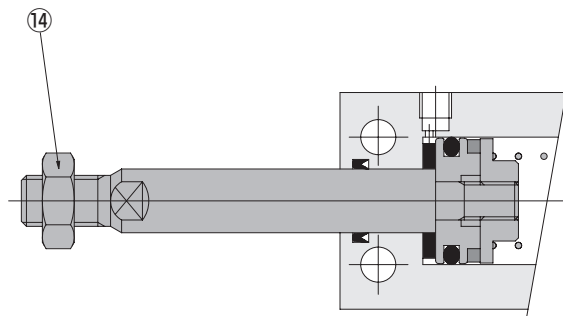
● $\phi 6$ [0.236] to $\phi 10$ [0.394]



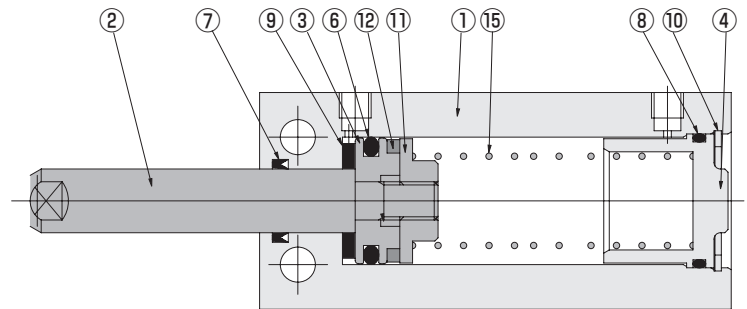
● $\phi 16$ [0.630]



● Male thread specifications



● $\phi 12$ [0.472] and $\phi 20$ [0.787] to $\phi 50$ [1.969]



Major parts and materials

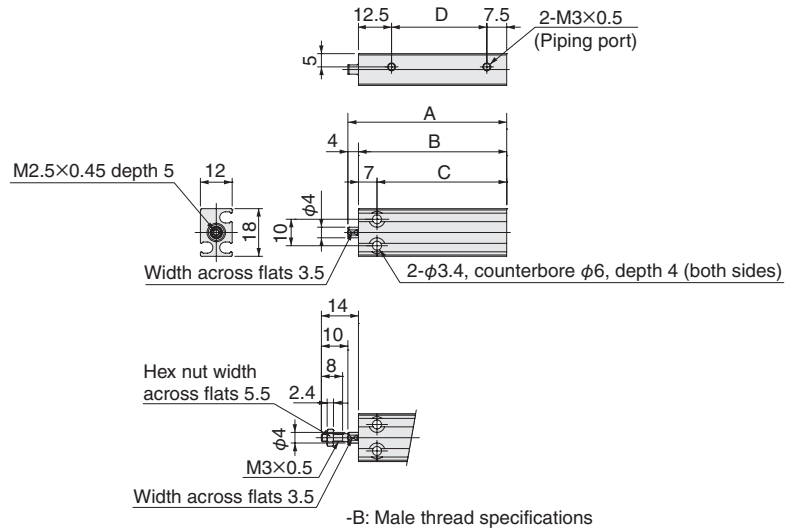
No	Name	$\phi 6$ [0.236]	$\phi 8$ [0.315]	$\phi 10$ [0.394]	$\phi 12$ [0.472]	$\phi 16$ [0.630]	$\phi 20$ [0.787]	$\phi 25$ [0.984]	$\phi 32$ [1.260]	$\phi 40$ [1.575]	$\phi 50$ [1.969]	$\phi 63$ [2.480]	$\phi 80$ [3.150]	$\phi 100$ [3.937]	$\phi 125$ [4.921]	
①	Cylinder body	Aluminum alloy (special anti-abrasion treated)														
②	Piston rod	Stainless steel							Carbon steel							
③	Piston	Stainless steel					Aluminum alloy (anodized)									
④	Head cover	Aluminum alloy (anodized)														
⑤	Seal holder	Aluminum alloy (anodized)	—	—	—	—	—	—	—	—	—	—	—	—	—	
⑥	★Piston seal	Synthetic rubber (NBR)														
⑦	★Rod seal	Synthetic rubber (NBR)														
⑧	★O-ring	Synthetic rubber (NBR)														
⑨	Bumper	Urethane rubber	Synthetic rubber (NBR)													
⑩	★Retaining ring	Stainless steel ^{Note 1}				Steel										
⑪	Support	Stainless steel				Aluminum alloy (anodized)										
⑫	Magnet	Neodymium magnet							Plastic magnet							
⑬	Spring support	Stainless steel					Aluminum alloy (anodized)					—	—	—	—	
⑭	Rod end nut	Carbon steel														
⑮	★Spring	Piano wire														
⑯	Collar stopper ^{Note 2}	—	—	—	—	—	Aluminum alloy (anodized)	—	—	—	—	—	—	—	—	

Items indicated by a ★ are available as additional parts or in packing sets. For order codes, see page 55.

Note 1: Head cover side of $\phi 6$ [0.236] cylinders is steel.

2: Only stroke 5 has a collar stopper.

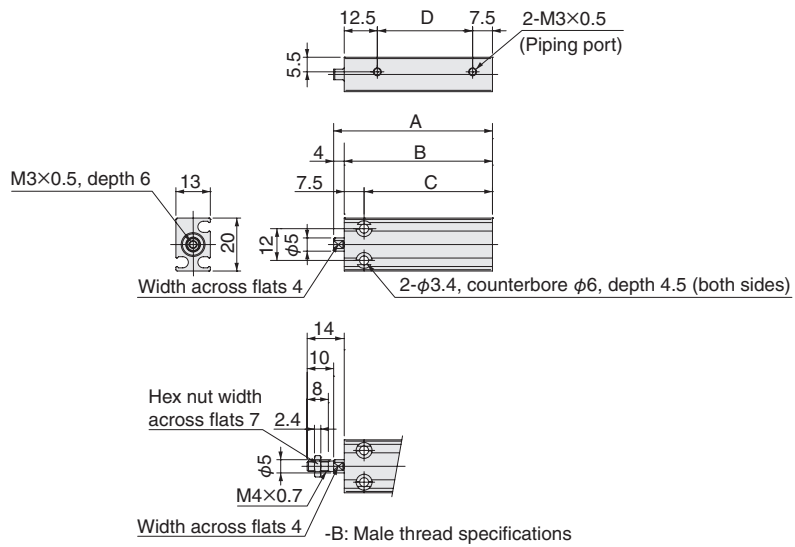
● BC6



Stroke	A	B	C	D
5	35	31	24	11
10	40	36	29	16
15	45	41	34	21
20	50	46	39	26
25	55	51	44	31
30	60	56	49	36

Note: This product cannot use reed switch type sensor switches.

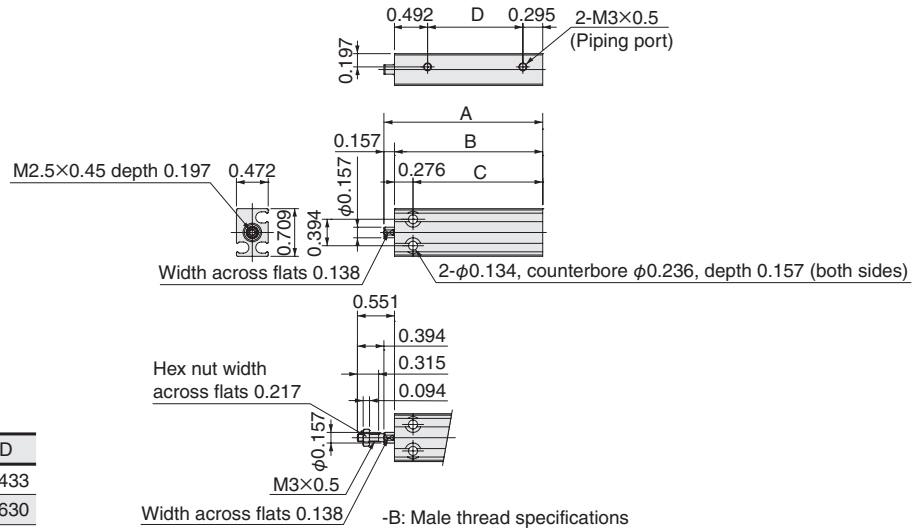
● BC8



Stroke	A	B	C	D
5	35	31	23.5	11
10	40	36	28.5	16
15	45	41	33.5	21
20	50	46	38.5	26
25	55	51	43.5	31
30	60	56	48.5	36

Note: This product cannot use reed switch type sensor switches.

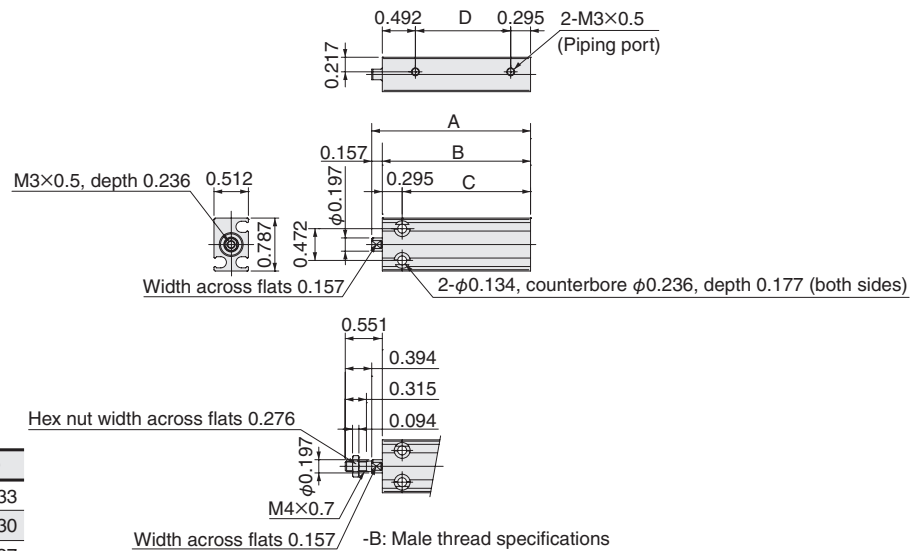
● BC6



Stroke	A	B	C	D
5 mm [0.197]	1.378	1.220	0.945	0.433
10 mm [0.394]	1.575	1.417	1.142	0.630
15 mm [0.591]	1.772	1.614	1.339	0.827
20 mm [0.787]	1.969	1.811	1.535	1.024
25 mm [0.984]	2.165	2.008	1.732	1.220
30 mm [1.181]	2.362	2.205	1.929	1.417

Note: This product cannot use reed switch type sensor switches.

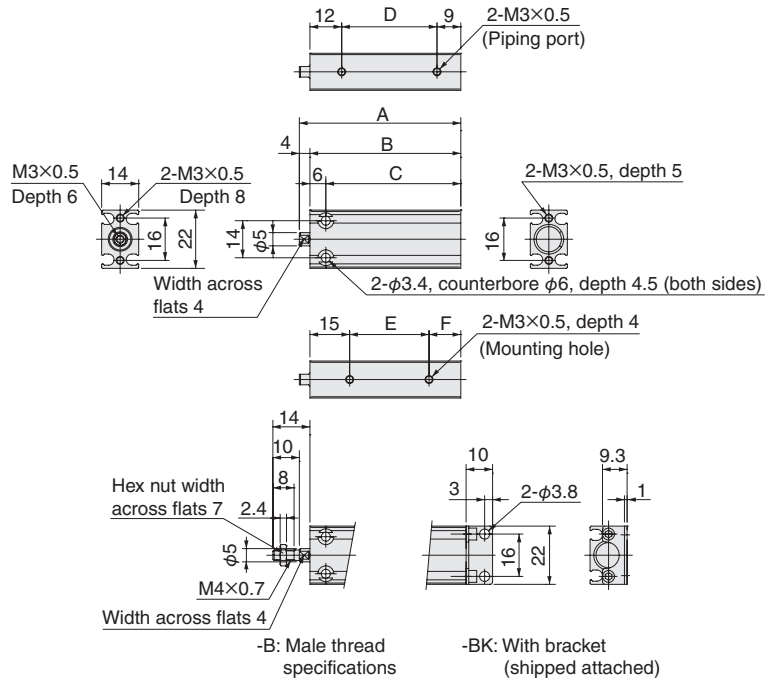
● BC8



Stroke	A	B	C	D
5 mm [0.197]	1.378	1.220	0.925	0.433
10 mm [0.394]	1.575	1.417	1.122	0.630
15 mm [0.591]	1.772	1.614	1.319	0.827
20 mm [0.787]	1.969	1.811	1.516	1.024
25 mm [0.984]	2.165	2.008	1.713	1.220
30 mm [1.181]	2.362	2.205	1.909	1.417

Note: This product cannot use reed switch type sensor switches.

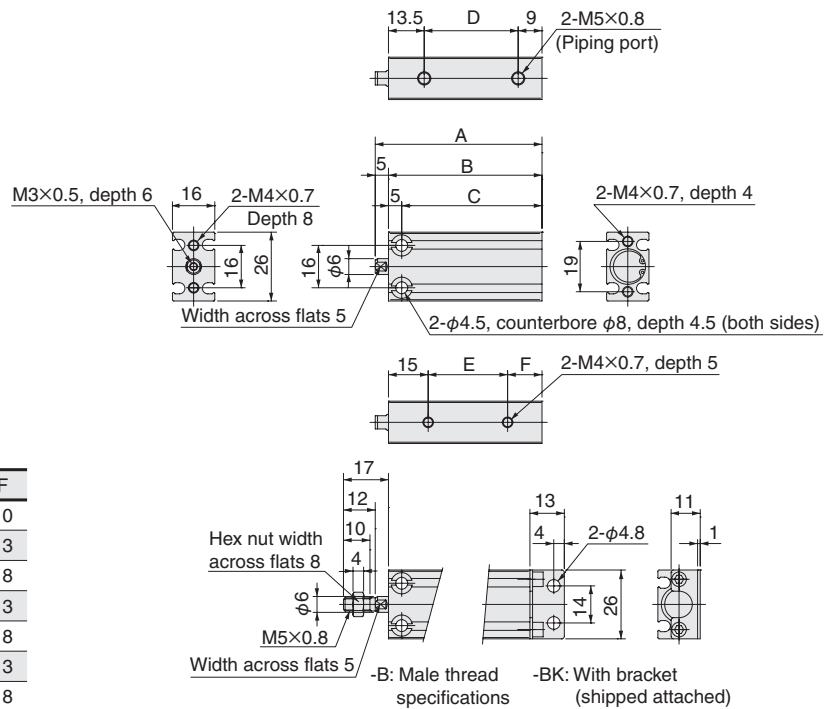
● BC10



Stroke	A	B	C	D	E	F
5	36	32	26	11	8	9
10	41	37	31	16	10	12
15	46	42	36	21	10	17
20	51	47	41	26	20	12
25	56	52	46	31	20	17
30	61	57	51	36	30	12

Note: This product cannot use reed switch type sensor switches.

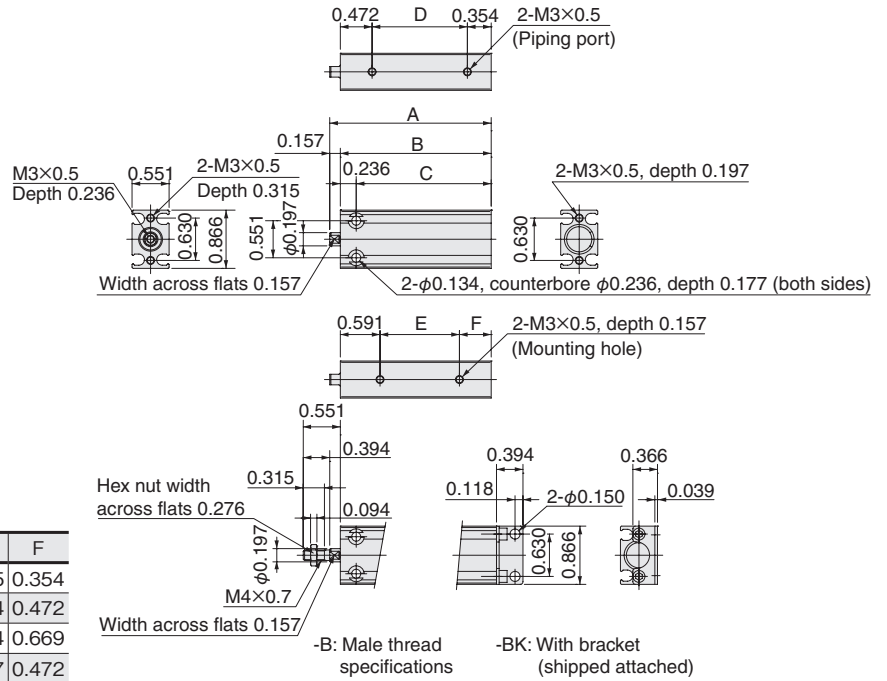
● BC12



Stroke	A	B	C	D	E	F
5	38	33	28	10.5	8	10
10	43	38	33	15.5	10	13
15	48	43	38	20.5	10	18
20	53	48	43	25.5	20	13
25	58	53	48	30.5	20	18
30	63	58	53	35.5	30	13
35	68	63	58	40.5	30	18
40	73	68	63	45.5	40	13
45	78	73	68	50.5	40	18
50	83	78	73	55.5	50	13

Note: This product cannot use reed switch type sensor switches.

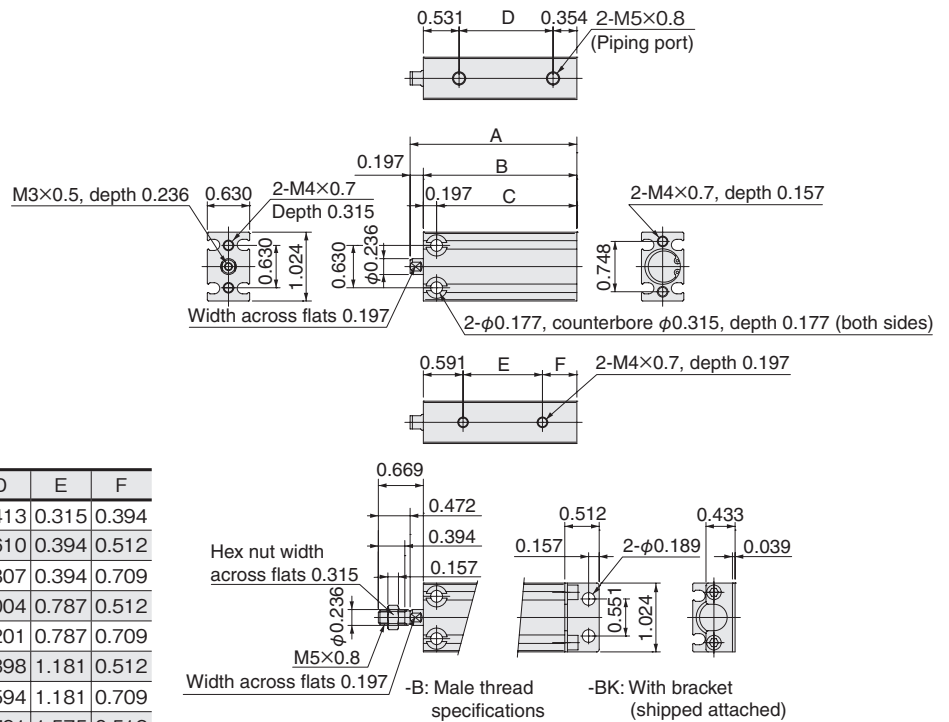
● BC10



Stroke	A	B	C	D	E	F
5 mm [0.197]	1.417	1.260	1.024	0.433	0.315	0.354
10 mm [0.394]	1.614	1.457	1.220	0.630	0.394	0.472
15 mm [0.591]	1.811	1.654	1.417	0.827	0.394	0.669
20 mm [0.787]	2.008	1.850	1.614	1.024	0.787	0.472
25 mm [0.984]	2.205	2.047	1.811	1.220	0.787	0.669
30 mm [1.181]	2.402	2.244	2.008	1.417	1.181	0.472

Note: This product cannot use reed switch type sensor switches.

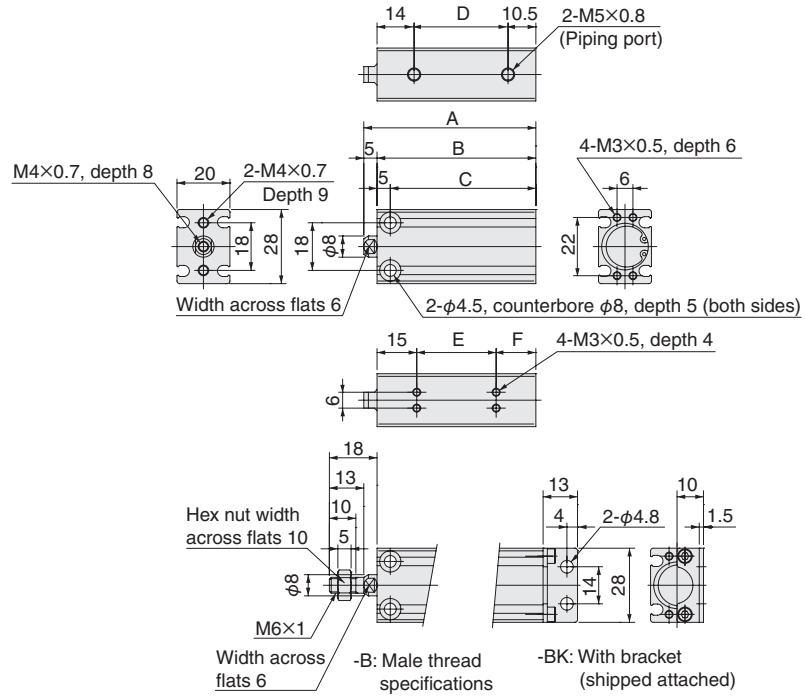
● BC12



Stroke	A	B	C	D	E	F
5 mm [0.197]	1.496	1.299	1.102	0.413	0.315	0.394
10 mm [0.394]	1.693	1.496	1.299	0.610	0.394	0.512
15 mm [0.591]	1.890	1.693	1.496	0.807	0.394	0.709
20 mm [0.787]	2.087	1.890	1.693	1.004	0.787	0.512
25 mm [0.984]	2.283	2.087	1.890	1.201	0.787	0.709
30 mm [1.181]	2.480	2.283	2.087	1.398	1.181	0.512
35 mm [1.378]	2.677	2.480	2.283	1.594	1.181	0.709
40 mm [1.575]	2.874	2.677	2.480	1.791	1.575	0.512
45 mm [1.772]	3.071	2.874	2.677	1.988	1.575	0.709
50 mm [1.969]	3.268	3.071	2.874	2.185	1.969	0.512

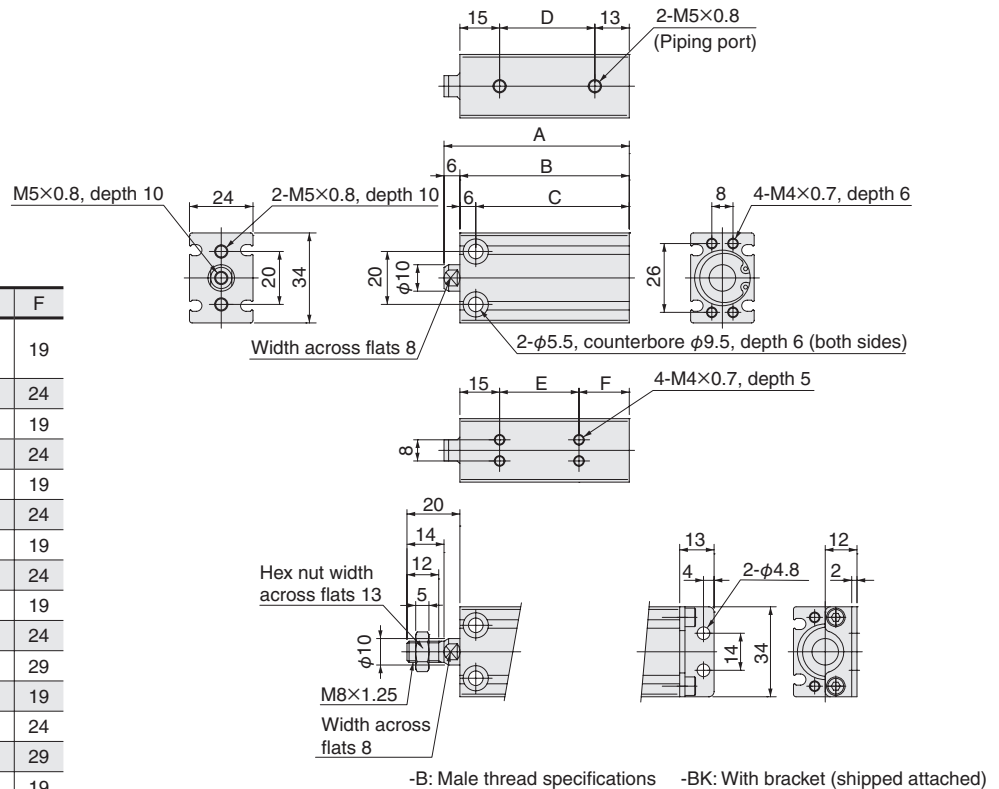
Note: This product cannot use reed switch type sensor switches.

● BC16



Stroke	A	B	C	D	E	F
5	40	35	30	10.5	10	10
10	45	40	35	15.5	10	15
15	50	45	40	20.5	10	20
20	55	50	45	25.5	20	15
25	60	55	50	30.5	20	20
30	65	60	55	35.5	30	15
35	70	65	60	40.5	30	20
40	75	70	65	45.5	40	15
45	80	75	70	50.5	40	20
50	85	80	75	55.5	50	15

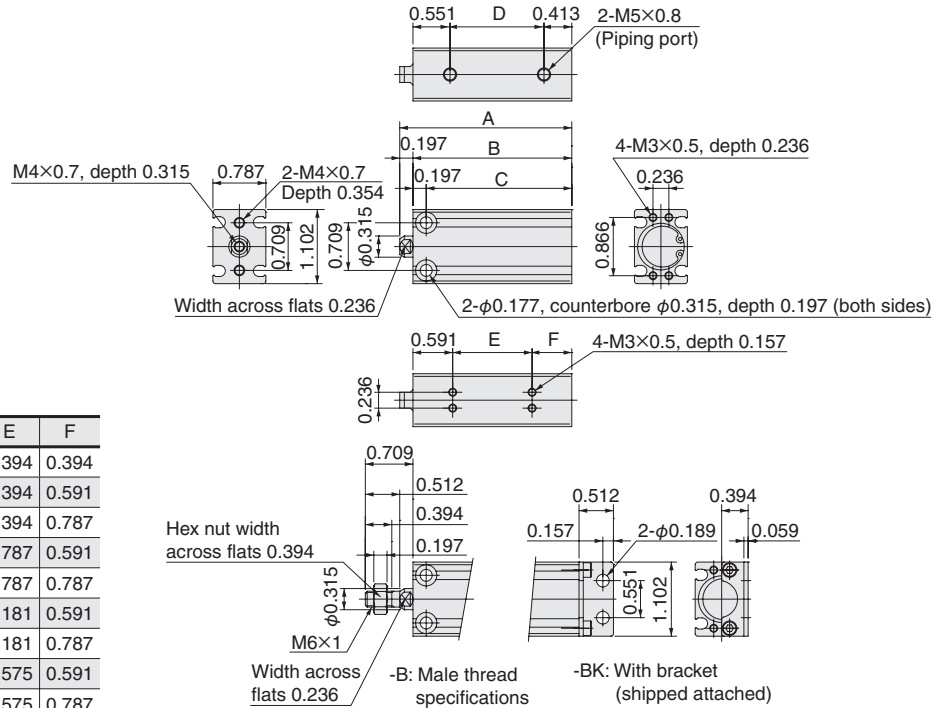
● BC20



Stroke	A	B	C	D	E	F
5						
10	50	44	38	16	10	19
15	55	49	43	21	10	24
20	60	54	48	26	20	19
25	65	59	53	31	20	24
30	70	64	58	36	30	19
35	75	69	63	41	30	24
40	80	74	68	46	40	19
45	85	79	73	51	40	24
50	90	84	78	56	50	19
55	95	89	83	61	50	24
60	100	94	88	66	50	29
70	110	104	98	76	70	19
75	115	109	103	81	70	24
80	120	114	108	86	70	29
90	130	124	118	96	90	19
100	140	134	128	106	90	29

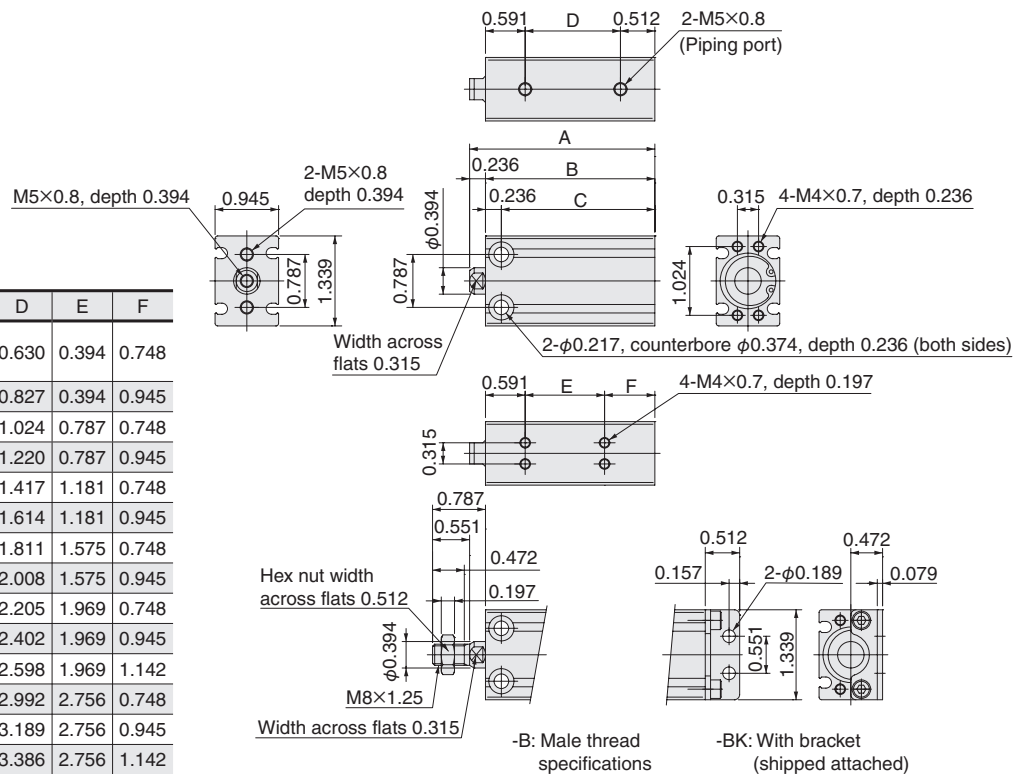
Note: 5 stroke has a collar stopper.

● BC16



Stroke	A	B	C	D	E	F
5 mm [0.197]	1.575	1.378	1.181	0.413	0.394	0.394
10 mm [0.394]	1.772	1.575	1.378	0.610	0.394	0.591
15 mm [0.591]	1.969	1.772	1.575	0.807	0.394	0.787
20 mm [0.787]	2.165	1.969	1.772	1.004	0.787	0.591
25 mm [0.984]	2.362	2.165	1.969	1.201	0.787	0.787
30 mm [1.181]	2.559	2.362	2.165	1.398	1.181	0.591
35 mm [1.378]	2.756	2.559	2.362	1.594	1.181	0.787
40 mm [1.575]	2.953	2.756	2.559	1.791	1.575	0.591
45 mm [1.772]	3.150	2.953	2.756	1.988	1.575	0.787
50 mm [1.969]	3.346	3.150	2.953	2.185	1.969	0.591

● BC20

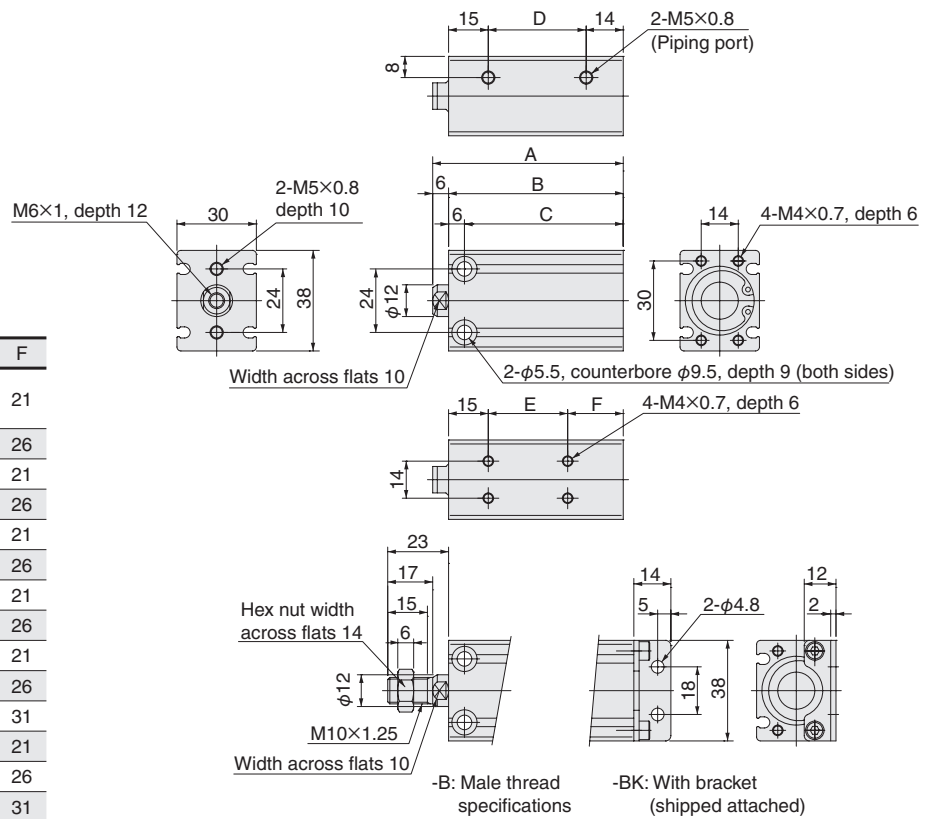


Stroke	A	B	C	D	E	F
5 mm [0.197]	1.969	1.732	1.496	0.630	0.394	0.748
10 mm [0.394]	2.165	1.929	1.693	0.827	0.394	0.945
15 mm [0.591]	2.362	2.126	1.890	1.024	0.787	0.748
20 mm [0.787]	2.559	2.323	2.087	1.220	0.787	0.945
25 mm [0.984]	2.756	2.520	2.283	1.417	1.181	0.748
30 mm [1.181]	2.953	2.717	2.480	1.614	1.181	0.945
35 mm [1.378]	3.150	2.913	2.677	1.811	1.575	0.748
40 mm [1.575]	3.346	3.110	2.874	2.008	1.575	0.945
45 mm [1.772]	3.543	3.307	3.071	2.205	1.969	0.748
50 mm [1.969]	3.740	3.504	3.268	2.402	1.969	0.945
55 mm [2.165]	3.937	3.701	3.465	2.598	1.969	1.142
60 mm [2.362]	4.134	3.898	3.662	2.795	2.362	0.945
65 mm [2.559]	4.331	4.094	3.859	2.992	2.559	1.142
70 mm [2.756]	4.528	4.291	4.056	3.189	2.756	0.945
75 mm [2.953]	4.724	4.488	4.252	3.386	2.756	1.142
80 mm [3.150]	4.921	4.685	4.449	3.583	3.150	0.945
85 mm [3.346]	5.118	4.882	4.646	3.780	3.346	1.142
90 mm [3.543]	5.315	5.079	4.843	3.977	3.543	0.945
95 mm [3.740]	5.512	5.276	5.040	4.174	3.740	1.142
100 mm [3.937]	5.709	5.473	5.237	4.371	3.937	0.945

Note: 0.197 stroke has a collar stopper.

● BC25

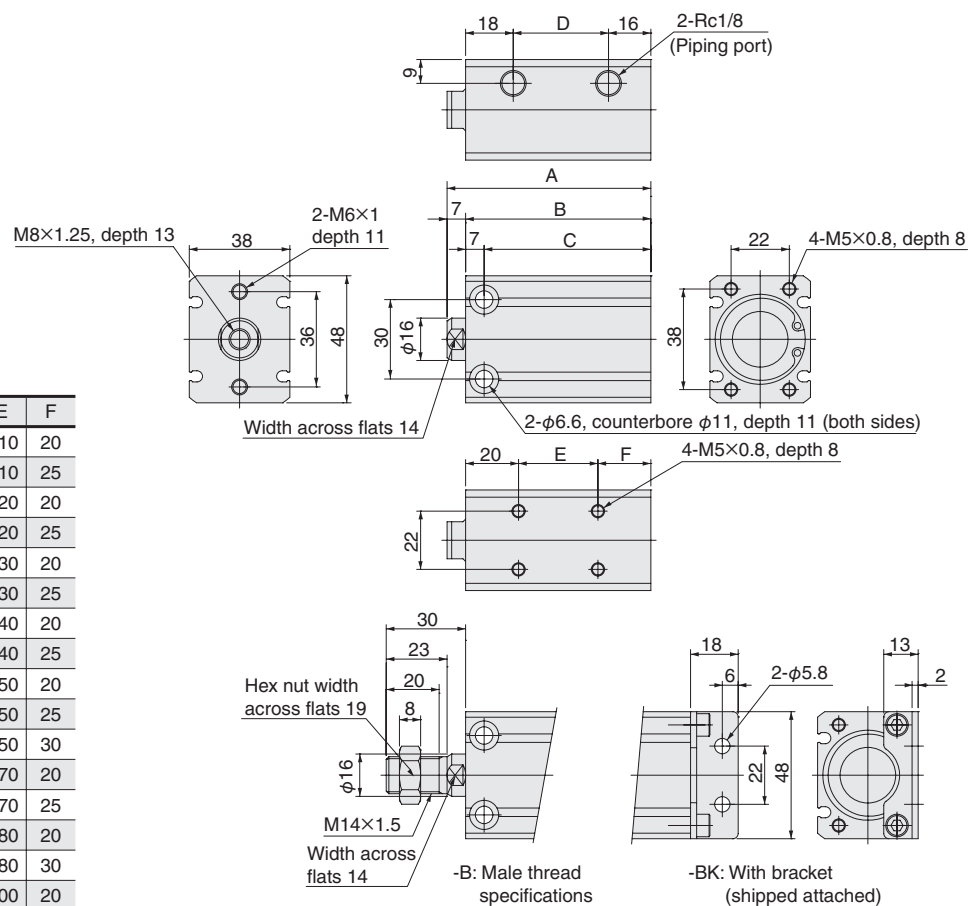
Stroke	A	B	C	D	E	F
5						
10	52	46	40	17	10	21
15	57	51	45	22	10	26
20	62	56	50	27	20	21
25	67	61	55	32	20	26
30	72	66	60	37	30	21
35	77	71	65	42	30	26
40	82	76	70	47	40	21
45	87	81	75	52	40	26
50	92	86	80	57	50	21
55	97	91	85	62	50	26
60	102	96	90	67	50	31
70	112	106	100	77	70	21
75	117	111	105	82	70	26
80	122	116	110	87	70	31
90	132	126	120	97	90	21
100	142	136	130	107	90	31



Note: 5 stroke has a collar stopper.

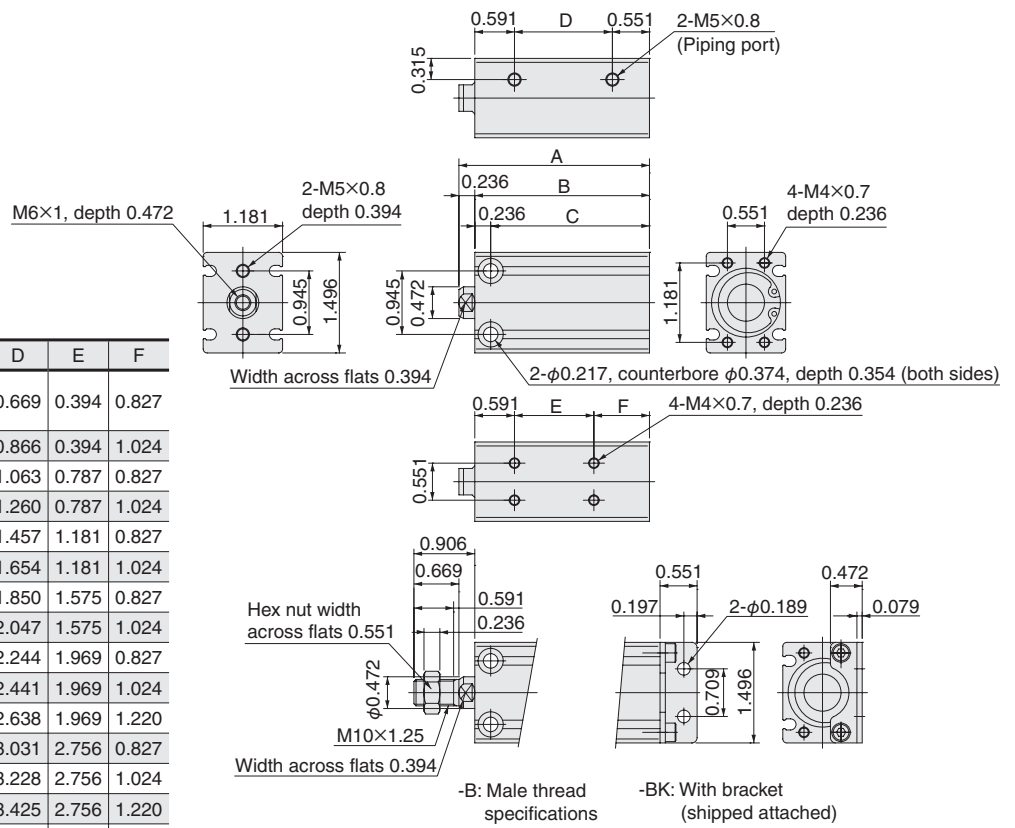
● BC32

Stroke	A	B	C	D	E	F
10	57	50	43	16	10	20
15	62	55	48	21	10	25
20	67	60	53	26	20	20
25	72	65	58	31	20	25
30	77	70	63	36	30	20
35	82	75	68	41	30	25
40	87	80	73	46	40	20
45	92	85	78	51	40	25
50	97	90	83	56	50	20
55	102	95	88	61	50	25
60	107	100	93	66	50	30
70	117	110	103	76	70	20
75	122	115	108	81	70	25
80	127	120	113	86	80	20
90	137	130	123	96	80	30
100	147	140	133	106	100	20



● BC25

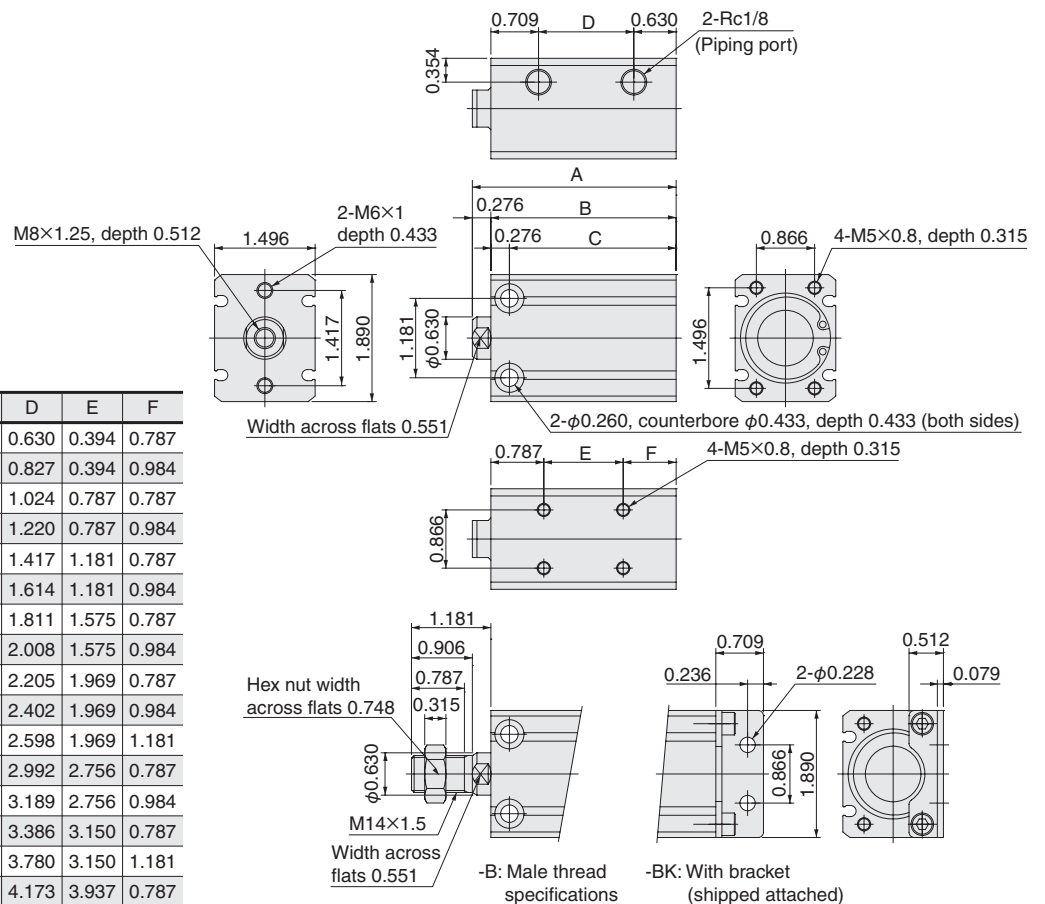
Stroke	A	B	C	D	E	F
5 mm [0.197]	2.047	1.811	1.575	0.669	0.394	0.827
10 mm [0.394]	2.244	2.008	1.772	0.866	0.394	1.024
15 mm [0.591]	2.441	2.205	1.969	1.063	0.787	0.827
20 mm [0.787]	2.638	2.402	2.165	1.260	0.787	1.024
25 mm [0.984]	2.835	2.598	2.362	1.457	1.181	0.827
30 mm [1.181]	3.031	2.795	2.559	1.654	1.181	1.024
35 mm [1.378]	3.228	2.992	2.756	1.850	1.575	0.827
40 mm [1.575]	3.425	3.189	2.953	2.047	1.575	1.024
45 mm [1.772]	3.622	3.386	3.150	2.244	1.969	0.827
50 mm [1.969]	3.819	3.583	3.346	2.441	1.969	1.024
55 mm [2.165]	4.016	3.780	3.543	2.638	1.969	1.220
60 mm [2.362]	4.213	3.977	3.740	2.835	2.756	0.827
65 mm [2.559]	4.410	4.174	3.937	3.031	2.756	1.024
70 mm [2.756]	4.606	4.370	4.133	3.228	2.756	1.220
75 mm [2.953]	4.803	4.567	4.331	3.425	2.756	1.417
80 mm [3.150]	5.000	4.764	4.489	3.622	2.756	1.614
85 mm [3.347]	5.197	4.961	4.646	3.819	2.756	1.811
90 mm [3.543]	5.394	5.158	4.804	4.016	2.756	2.008
95 mm [3.740]	5.591	5.355	4.961	4.213	2.756	2.205
100 mm [3.937]	5.787	5.551	5.118	4.410	2.756	2.402



Note: 0.197 stroke has a collar stopper.

● BC32

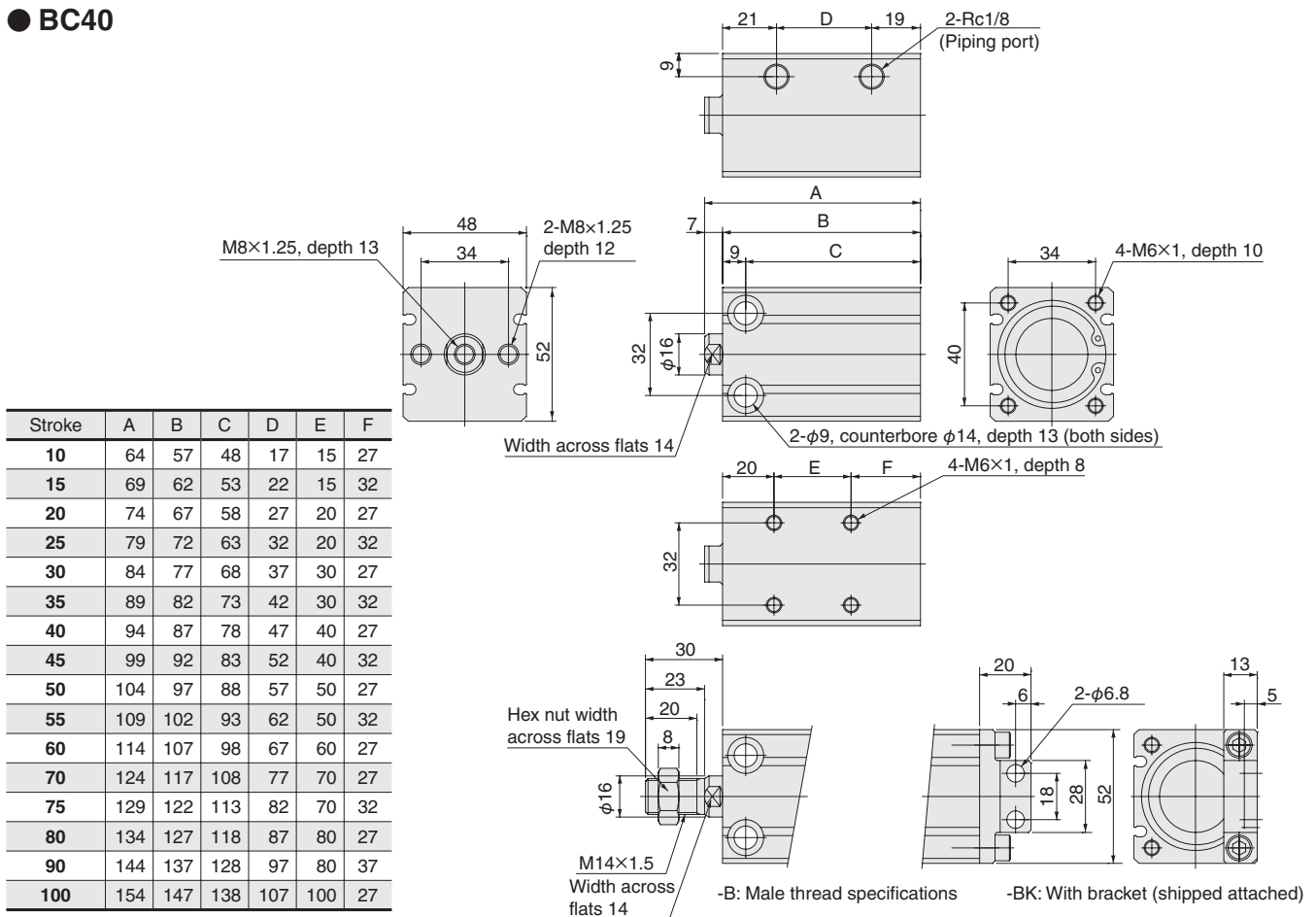
Stroke	A	B	C	D	E	F
10 mm [0.394]	2.244	1.969	1.693	0.630	0.394	0.787
15 mm [0.591]	2.441	2.165	1.890	0.827	0.394	0.984
20 mm [0.787]	2.638	2.362	2.087	1.024	0.787	0.787
25 mm [0.984]	2.835	2.559	2.283	1.220	0.787	0.984
30 mm [1.181]	3.031	2.756	2.480	1.417	1.181	0.787
35 mm [1.378]	3.228	2.953	2.677	1.614	1.181	0.984
40 mm [1.575]	3.425	3.150	2.874	1.811	1.575	0.787
45 mm [1.772]	3.622	3.346	3.071	2.008	1.575	0.984
50 mm [1.969]	3.819	3.543	3.268	2.205	1.969	0.787
55 mm [2.165]	4.016	3.740	3.465	2.402	1.969	0.984
60 mm [2.362]	4.213	3.937	3.661	2.598	1.969	1.181
65 mm [2.559]	4.410	4.133	3.858	2.795	1.969	0.787
70 mm [2.756]	4.606	4.331	4.055	2.992	2.756	0.984
75 mm [2.953]	4.803	4.528	4.252	3.189	2.756	1.181
80 mm [3.150]	5.000	4.724	4.449	3.386	3.150	0.787
85 mm [3.347]	5.197	4.921	4.646	3.583	3.150	0.984
90 mm [3.543]	5.394	5.118	4.843	3.780	3.150	1.181
95 mm [3.740]	5.591	5.315	5.040	3.977	3.150	1.378
100 mm [3.937]	5.787	5.512	5.236	4.173	3.937	1.575



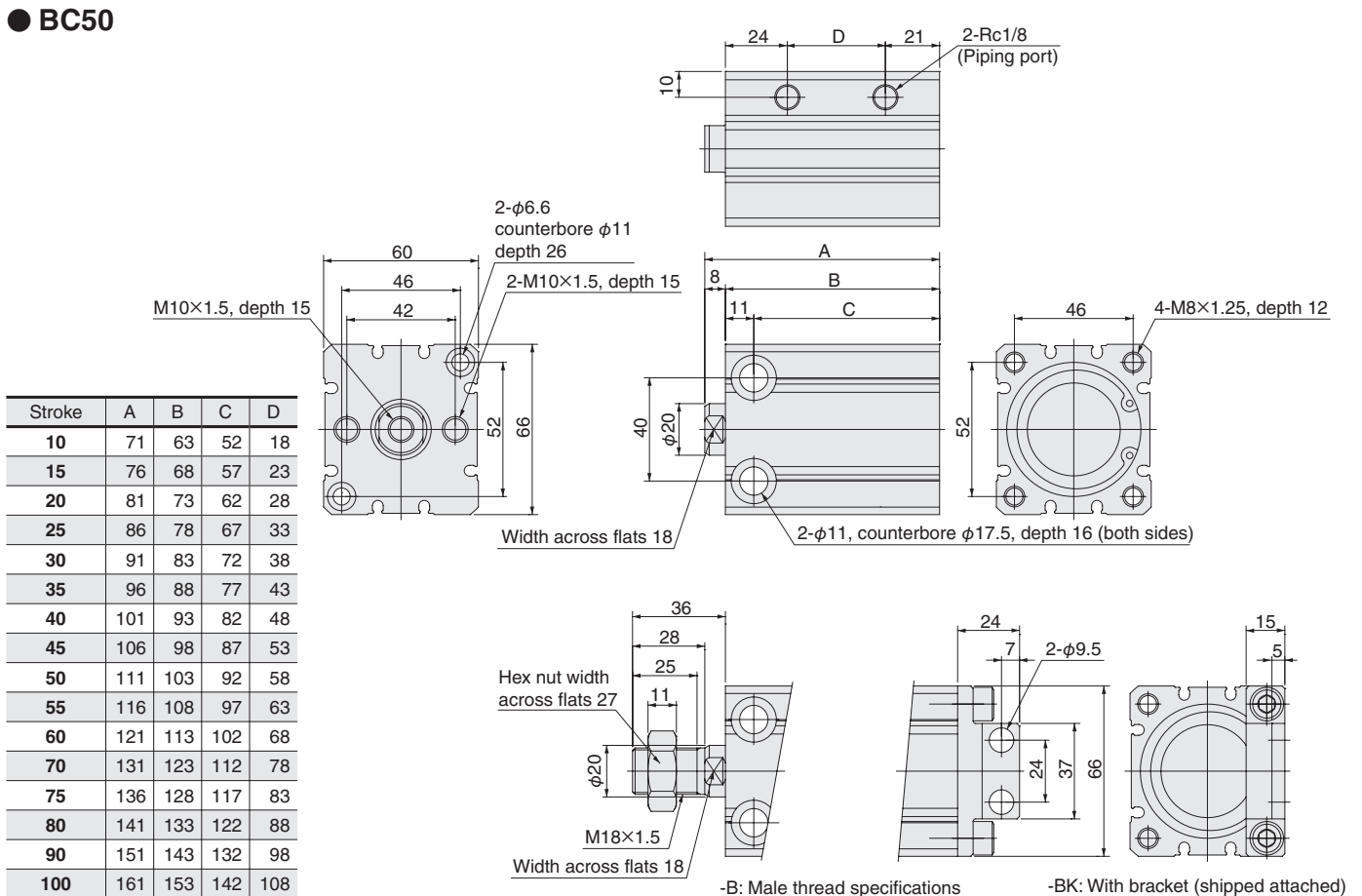
Double acting type dimensions

unit: mm

BC40

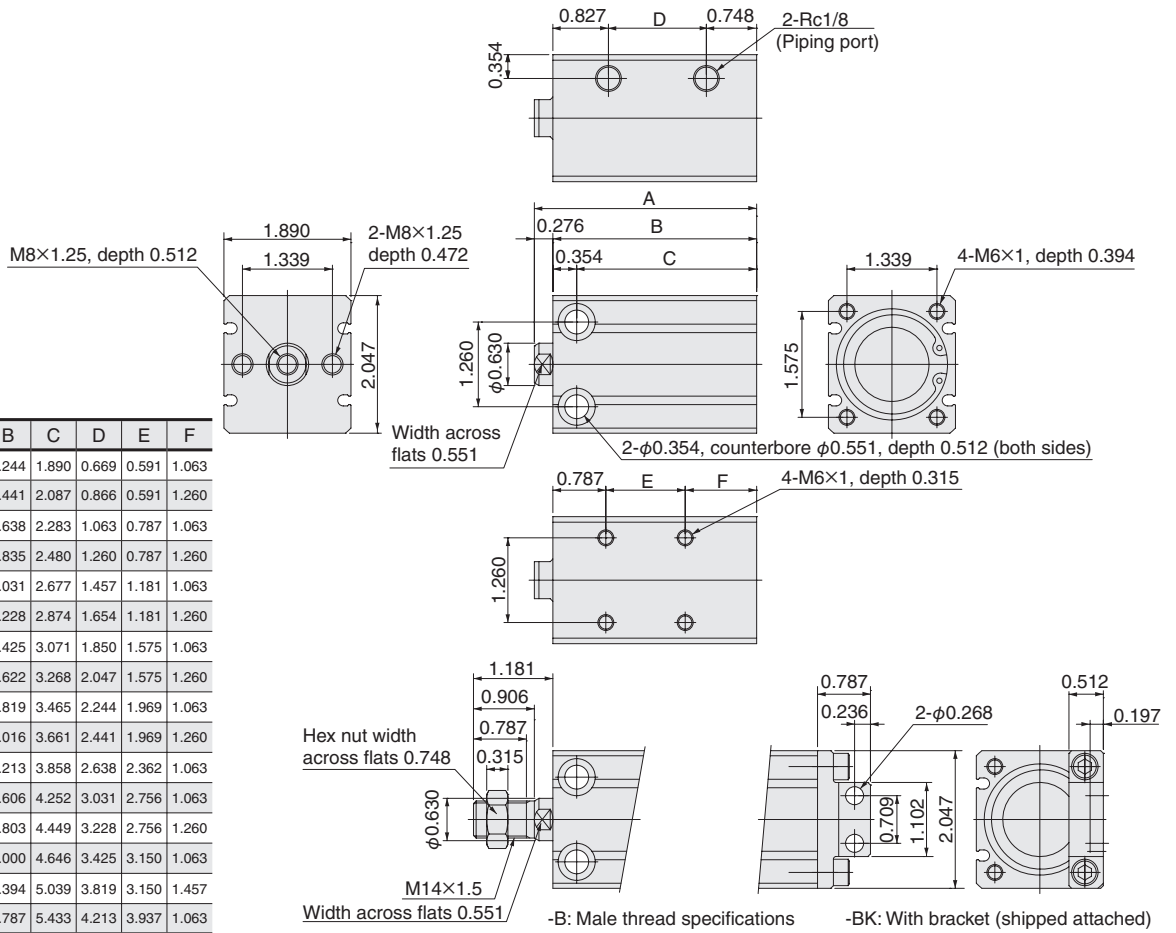


BC50



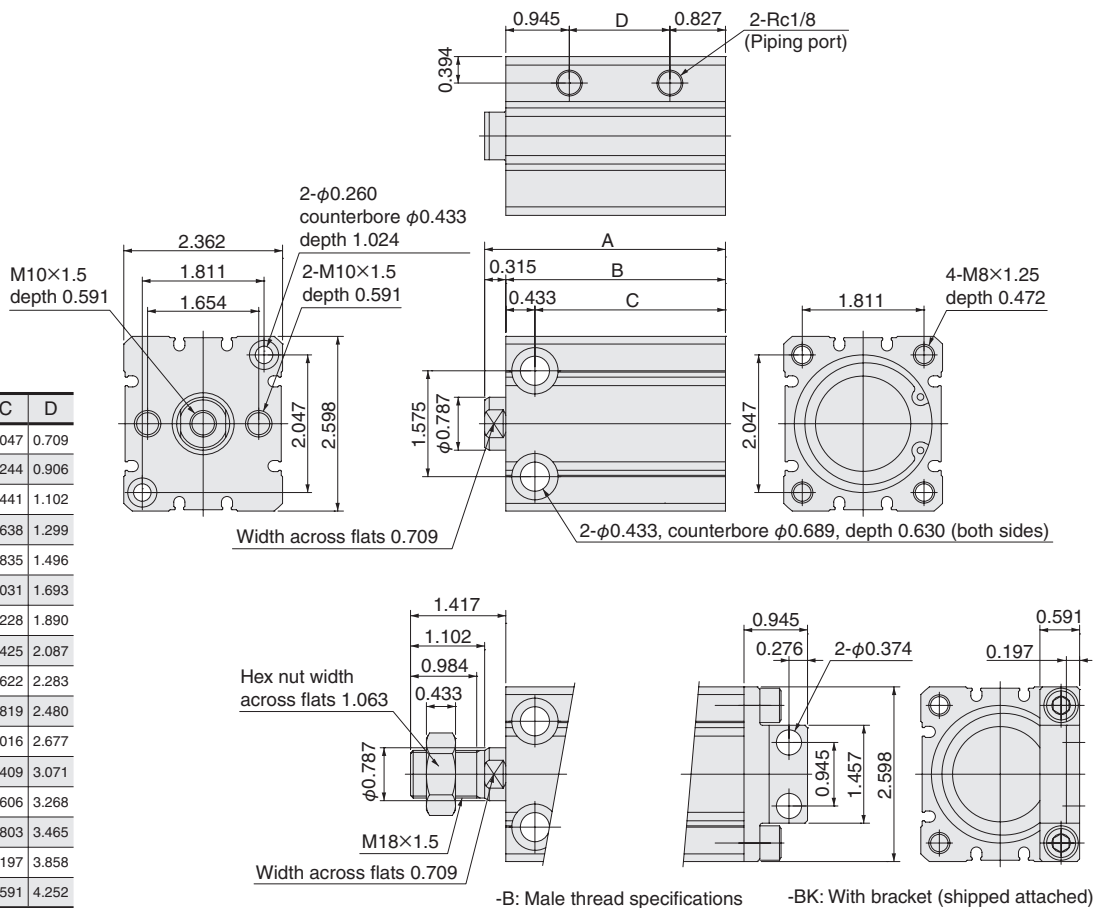
● BC40

Stroke	A	B	C	D	E	F
10 mm [0.394]	2.520	2.244	1.890	0.669	0.591	1.063
15 mm [0.591]	2.717	2.441	2.087	0.866	0.591	1.260
20 mm [0.787]	2.913	2.638	2.283	1.063	0.787	1.063
25 mm [0.984]	3.110	2.835	2.480	1.260	0.787	1.260
30 mm [1.181]	3.307	3.031	2.677	1.457	1.181	1.063
35 mm [1.378]	3.504	3.228	2.874	1.654	1.181	1.260
40 mm [1.575]	3.701	3.425	3.071	1.850	1.575	1.063
45 mm [1.772]	3.898	3.622	3.268	2.047	1.575	1.260
50 mm [1.969]	4.094	3.819	3.465	2.244	1.969	1.063
55 mm [2.165]	4.291	4.016	3.661	2.441	1.969	1.260
60 mm [2.362]	4.488	4.213	3.858	2.638	2.362	1.063
70 mm [2.756]	4.882	4.606	4.252	3.031	2.756	1.063
75 mm [2.953]	5.079	4.803	4.449	3.228	2.756	1.260
80 mm [3.150]	5.276	5.000	4.646	3.425	3.150	1.063
90 mm [3.543]	5.669	5.394	5.039	3.819	3.150	1.457
100 mm [3.937]	6.063	5.787	5.433	4.213	3.937	1.063



● BC50

Stroke	A	B	C	D
10 mm [0.394]	2.795	2.480	2.047	0.709
15 mm [0.591]	2.992	2.677	2.244	0.906
20 mm [0.787]	3.189	2.874	2.441	1.102
25 mm [0.984]	3.386	3.071	2.638	1.299
30 mm [1.181]	3.583	3.268	2.835	1.496
35 mm [1.378]	3.780	3.465	3.031	1.693
40 mm [1.575]	3.976	3.661	3.228	1.890
45 mm [1.772]	4.173	3.858	3.425	2.087
50 mm [1.969]	4.370	4.055	3.622	2.283
55 mm [2.165]	4.567	4.252	3.819	2.480
60 mm [2.362]	4.764	4.449	4.016	2.677
70 mm [2.756]	5.157	4.843	4.409	3.071
75 mm [2.953]	5.354	5.039	4.606	3.268
80 mm [3.150]	5.551	5.236	4.803	3.465
90 mm [3.543]	5.945	5.630	5.197	3.858
100 mm [3.937]	6.339	6.024	5.591	4.252

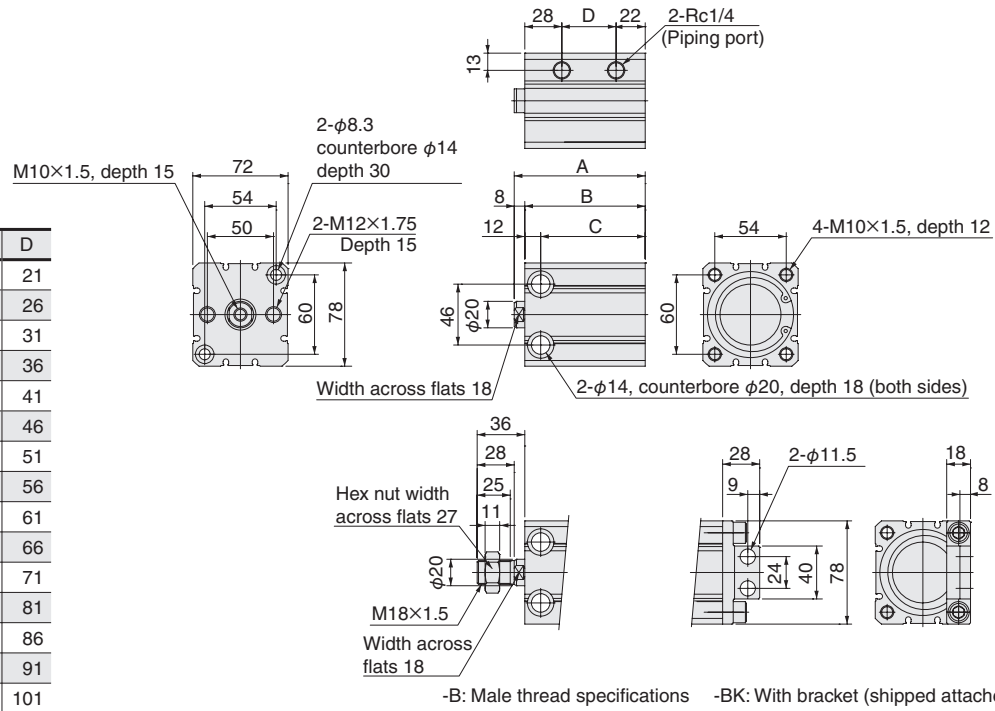


Double acting type dimensions

unit: mm

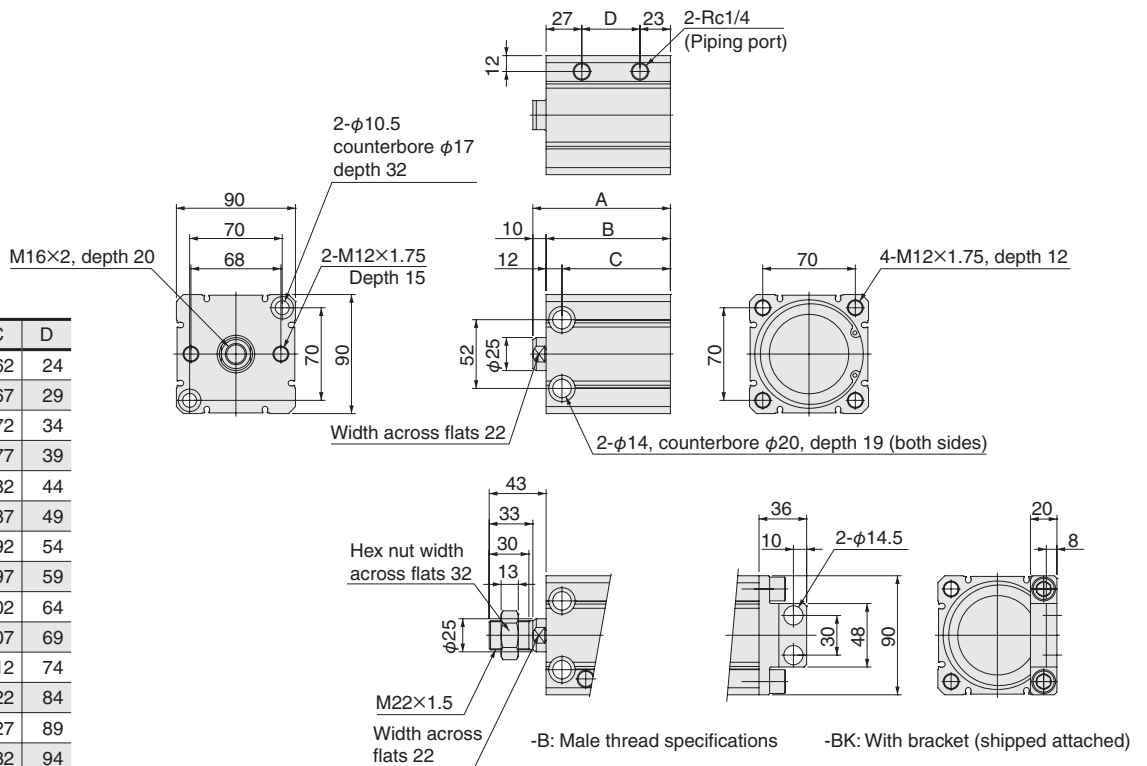
● BC63

Stroke	A	B	C	D
10	79	71	59	21
15	84	76	64	26
20	89	81	69	31
25	94	86	74	36
30	99	91	79	41
35	104	96	84	46
40	109	101	89	51
45	114	106	94	56
50	119	111	99	61
55	124	116	104	66
60	129	121	109	71
70	139	131	119	81
75	144	136	124	86
80	149	141	129	91
90	159	151	139	101
100	169	161	149	111

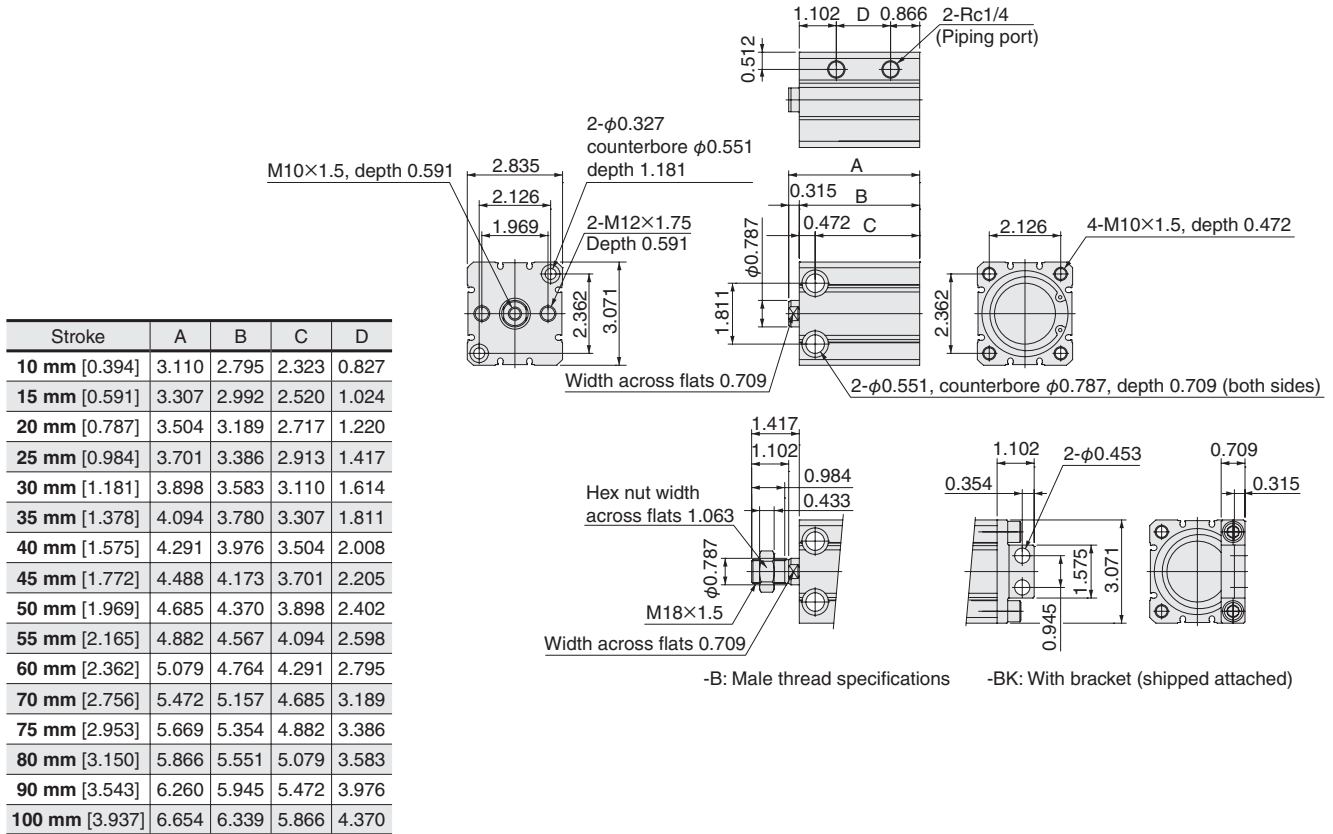


● BC80

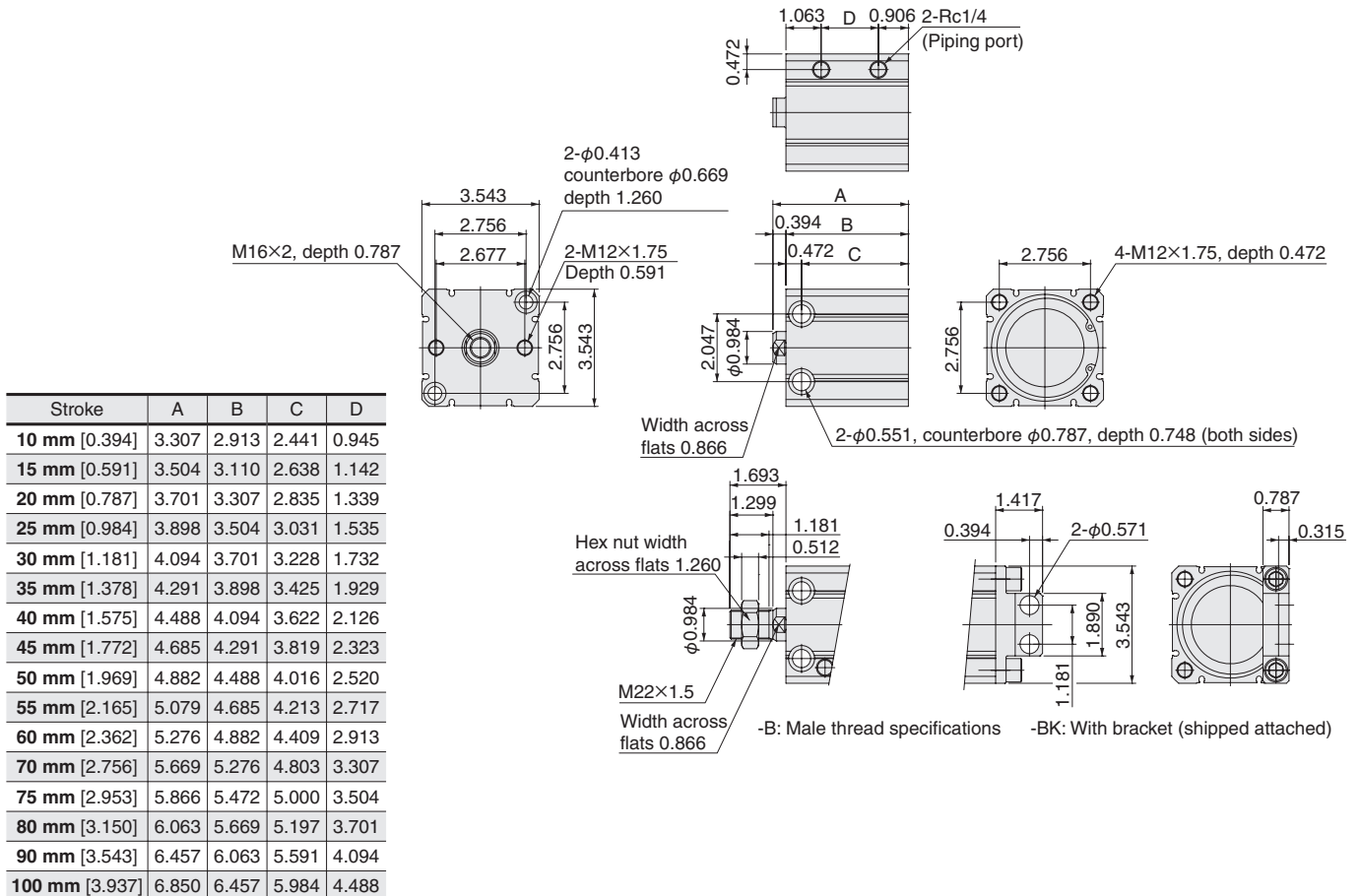
Stroke	A	B	C	D
10	84	74	62	24
15	89	79	67	29
20	94	84	72	34
25	99	89	77	39
30	104	94	82	44
35	109	99	87	49
40	114	104	92	54
45	119	109	97	59
50	124	114	102	64
55	129	119	107	69
60	134	124	112	74
70	144	134	122	84
75	149	139	127	89
80	154	144	132	94
90	164	154	142	104
100	174	164	152	114



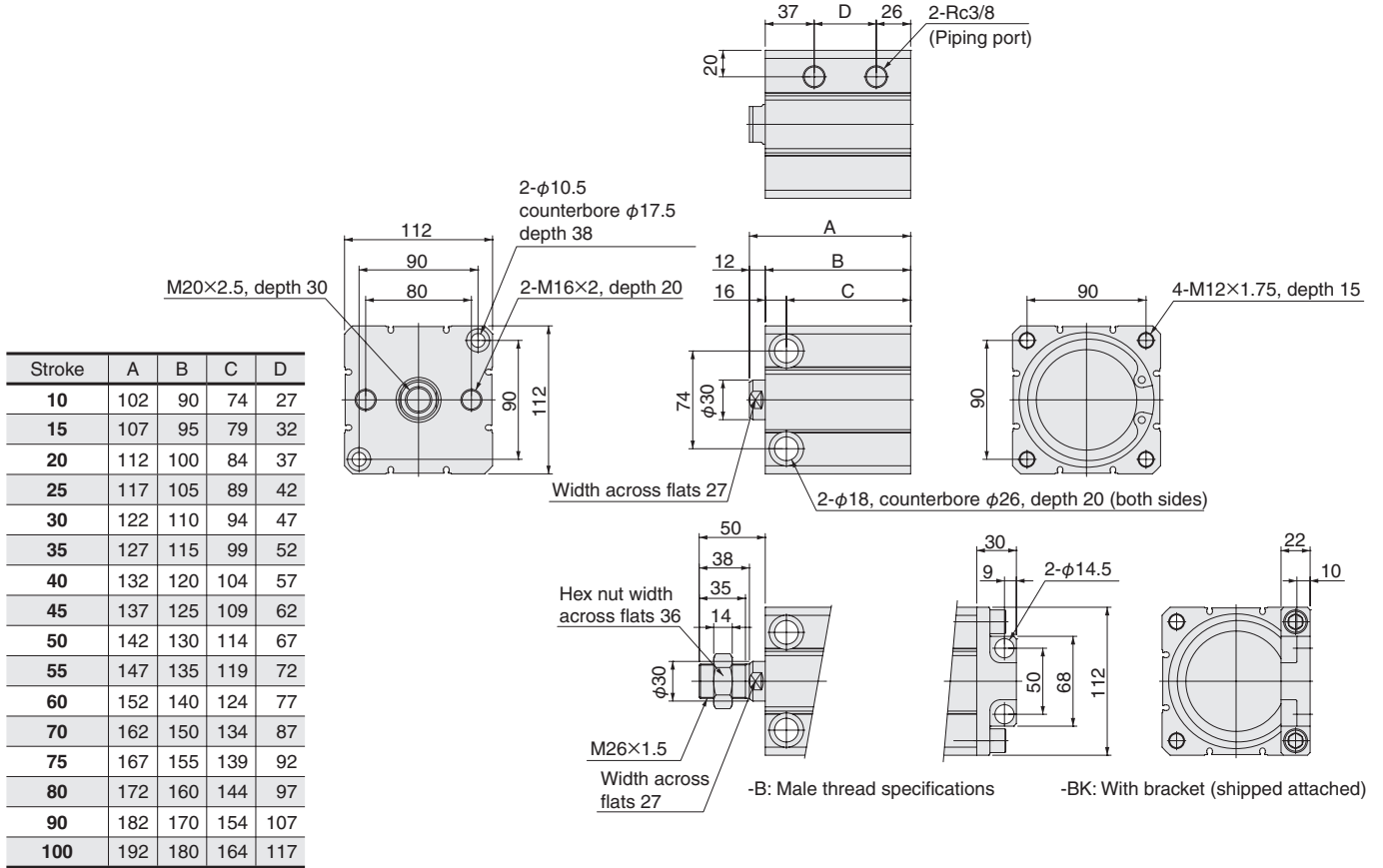
● BC63



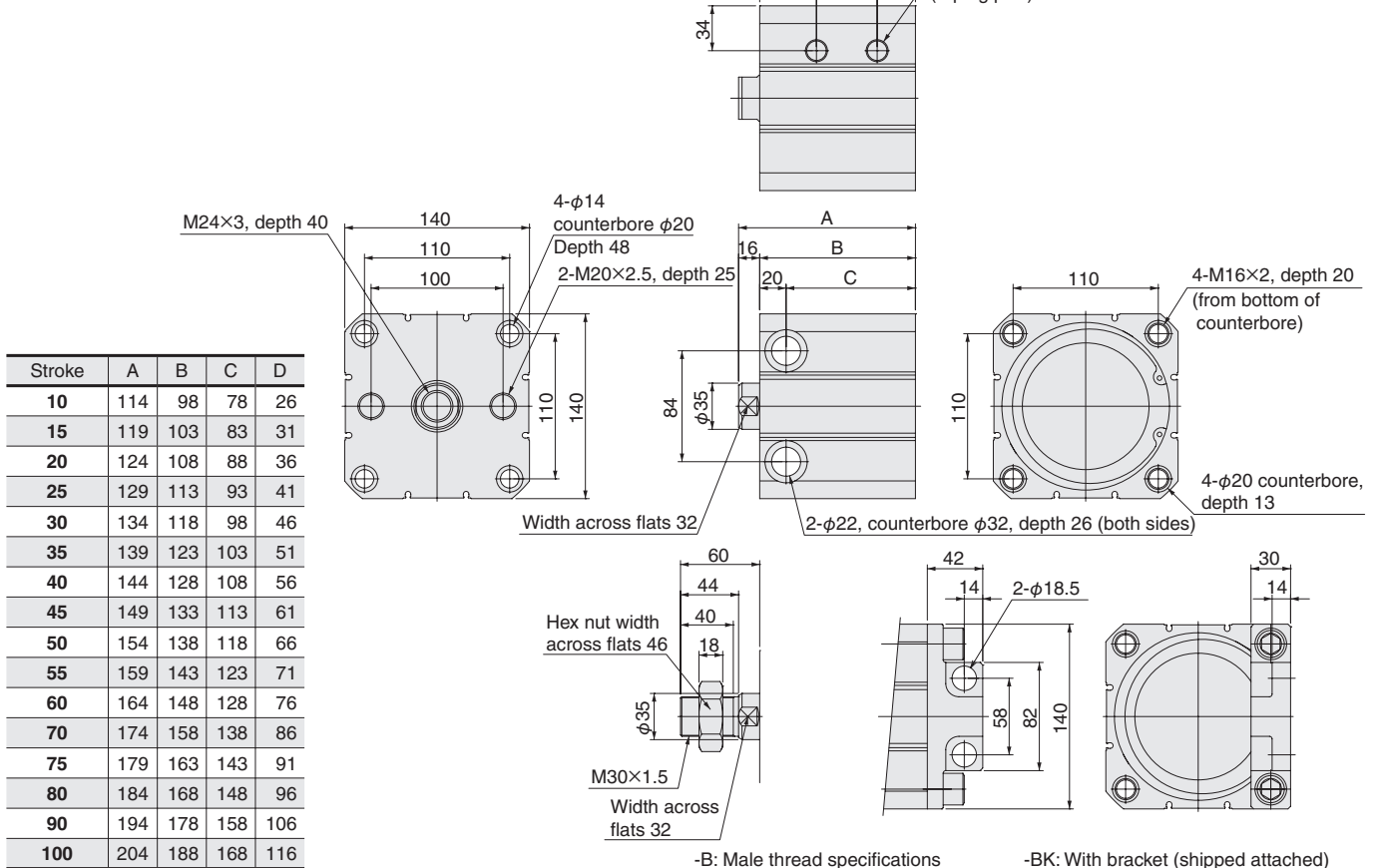
● BC80



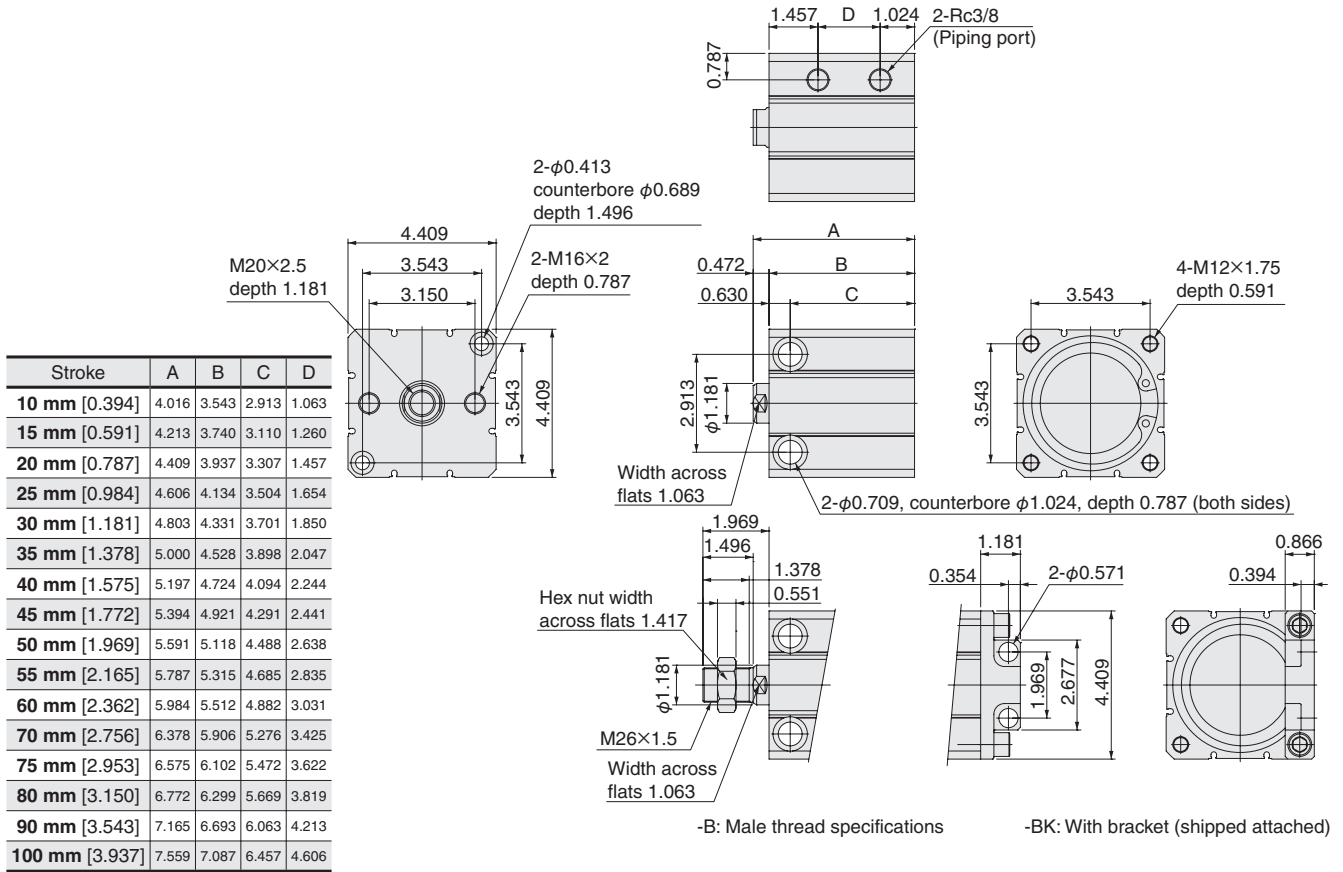
● BC100



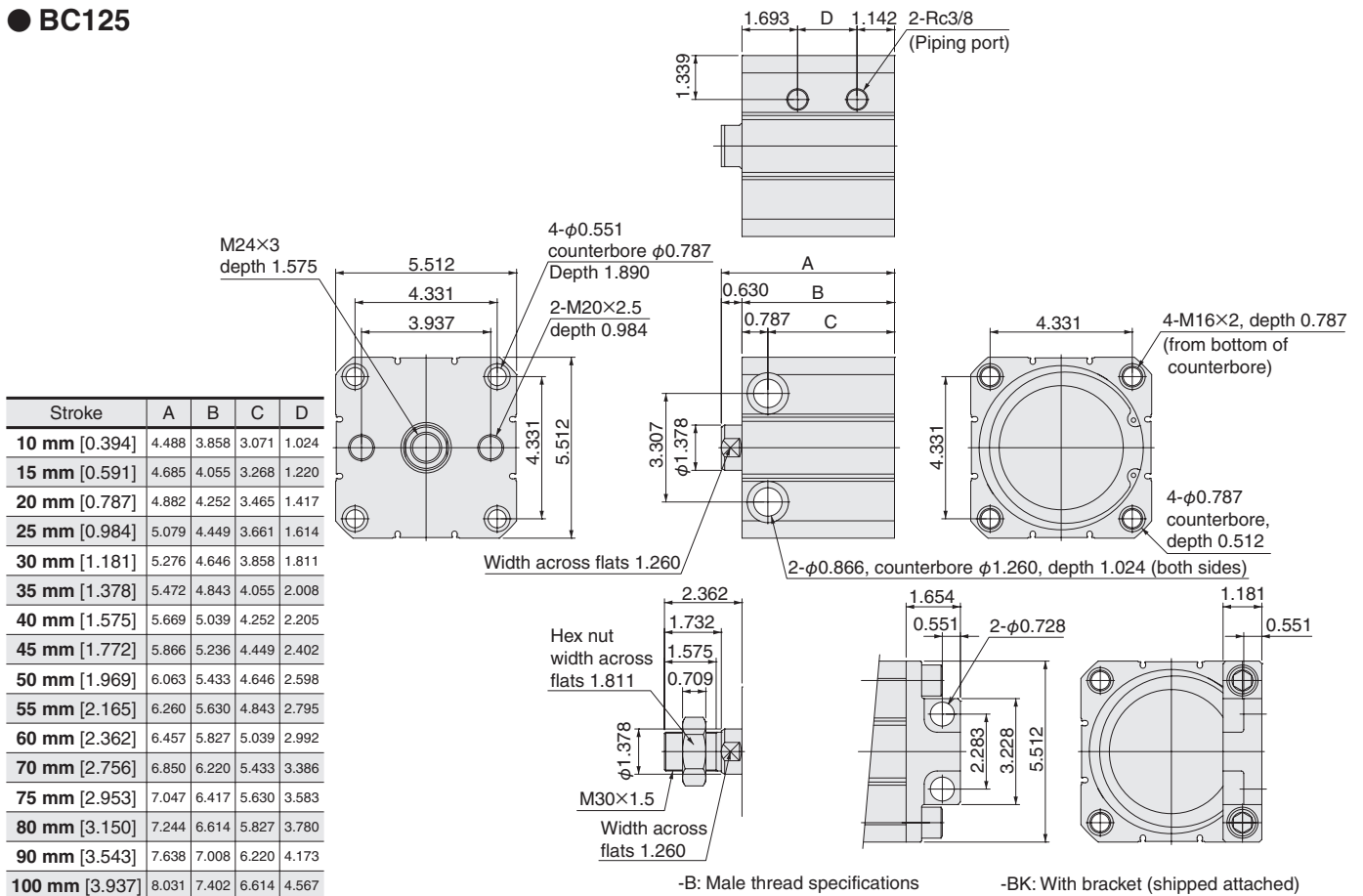
● BC125



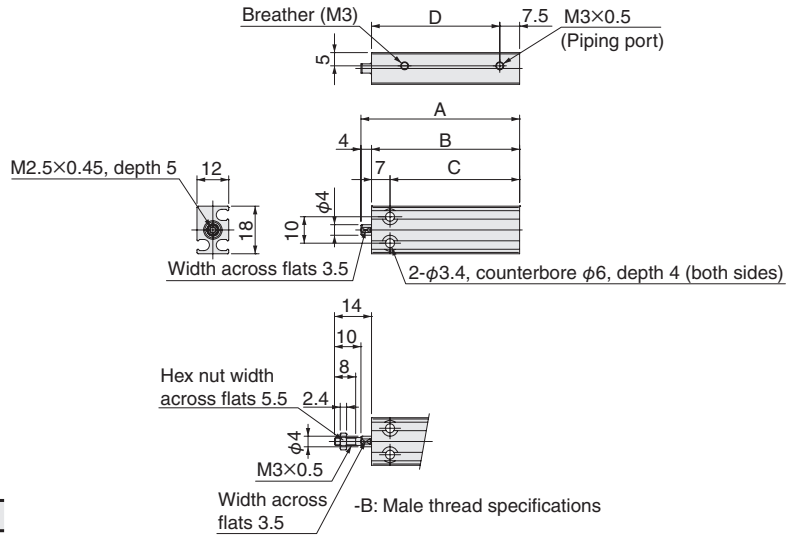
● BC100



● BC125



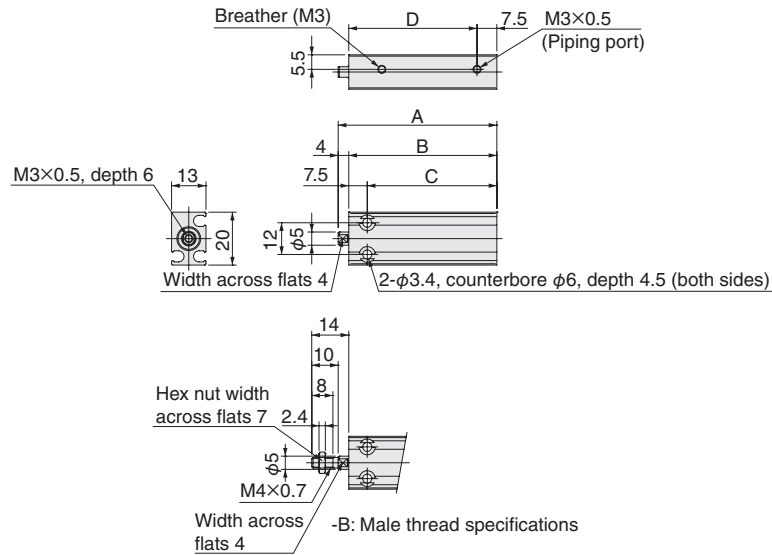
● BCSA6



Stroke	A	B	C	D
5	50	46	39	38.5
10	55	51	44	43.5
15	60	56	49	48.5

Note: This product cannot use reed switch type sensor switches.

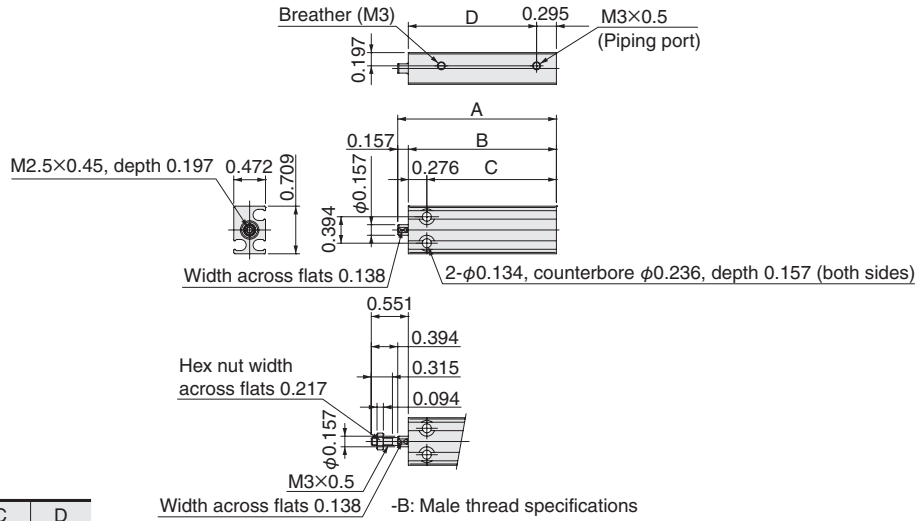
● BCSA8



Stroke	A	B	C	D
5	50	46	38.5	38.5
10	55	51	43.5	43.5
15	60	56	48.5	48.5

Note: This product cannot use reed switch type sensor switches.

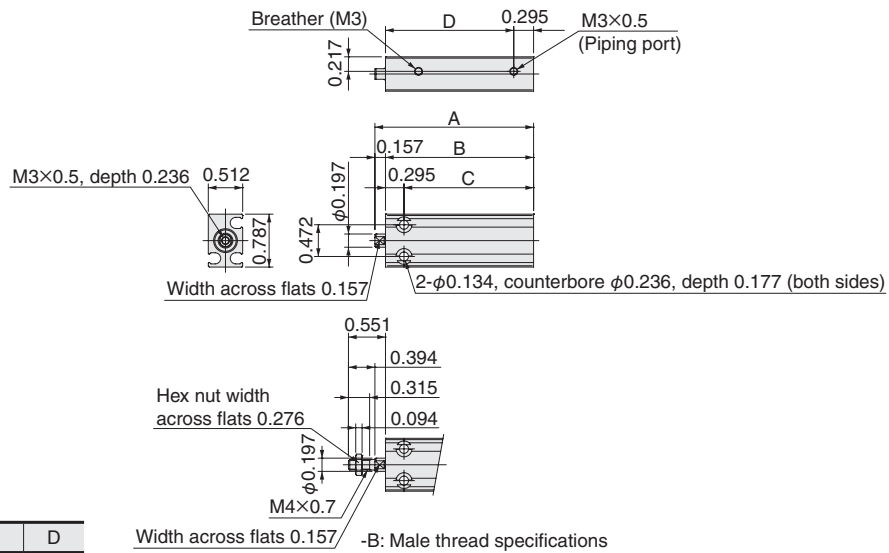
● BCSA6



Stroke	A	B	C	D
5 mm [0.197]	1.969	1.811	1.535	1.516
10 mm [0.394]	2.165	2.008	1.732	1.713
15 mm [0.591]	2.362	2.205	1.929	1.909

Note: This product cannot use reed switch type sensor switches.

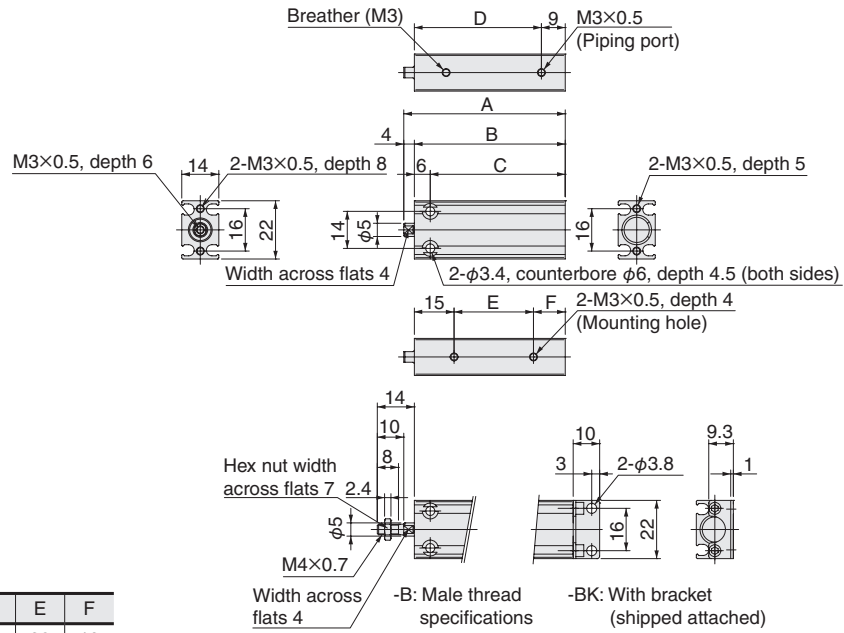
● BCSA8



Stroke	A	B	C	D
5 mm [0.197]	1.969	1.811	1.516	1.516
10 mm [0.394]	2.165	2.008	1.713	1.713
15 mm [0.591]	2.362	2.205	1.909	1.909

Note: This product cannot use reed switch type sensor switches.

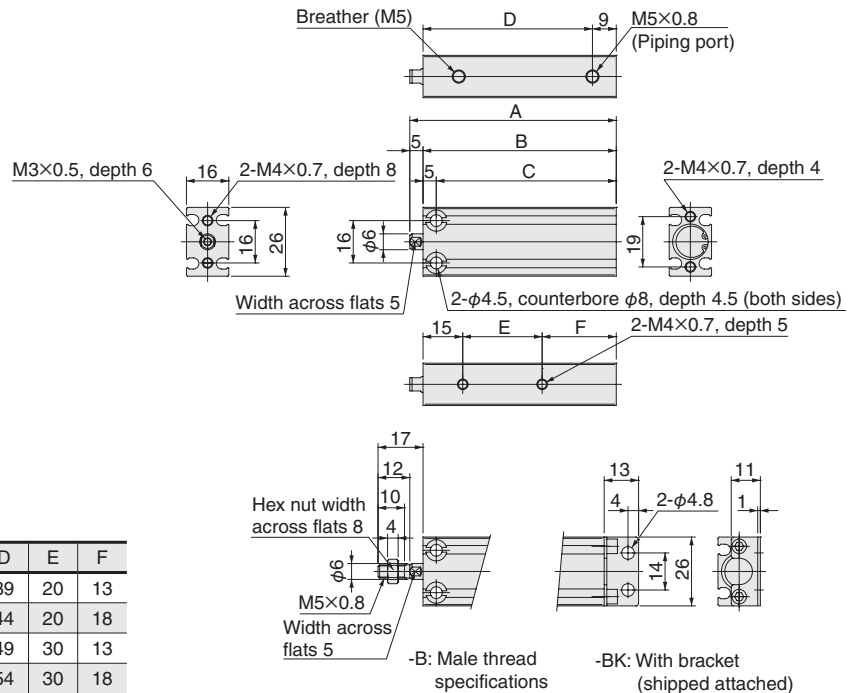
● BCSA10



Stroke	A	B	C	D	E	F
5	51	47	41	38	20	12
10	56	52	46	43	20	17
15	61	57	51	48	30	12

Note: This product cannot use reed switch type sensor switches.

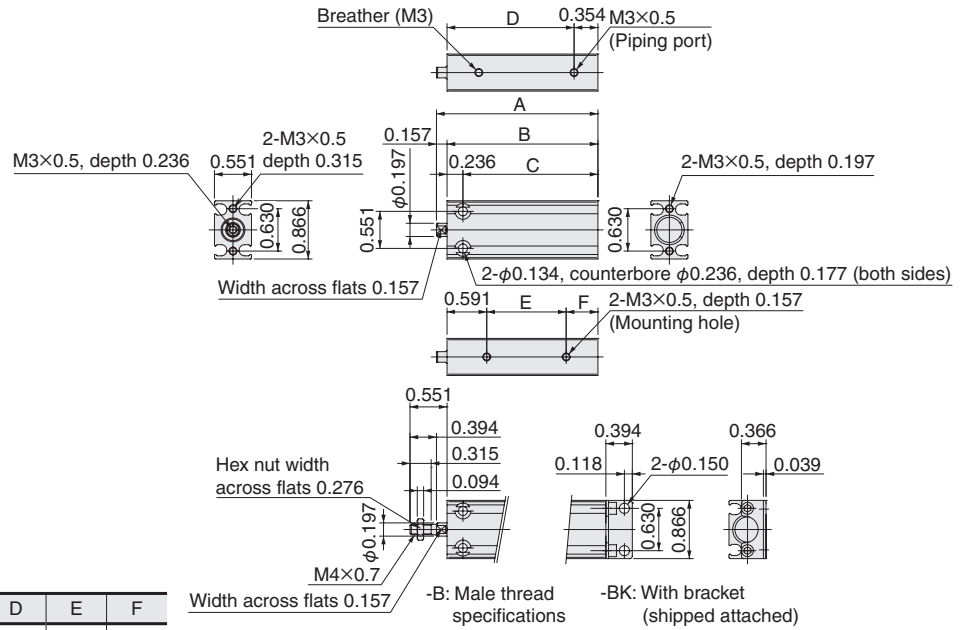
● BCSA12



Stroke	A	B	C	D	E	F
5	53	48	43	39	20	13
10	58	53	48	44	20	18
15	63	58	53	49	30	13
20	68	63	58	54	30	18
25	73	68	63	59	40	13
30	78	73	68	64	40	18

Note: This product cannot use reed switch type sensor switches.

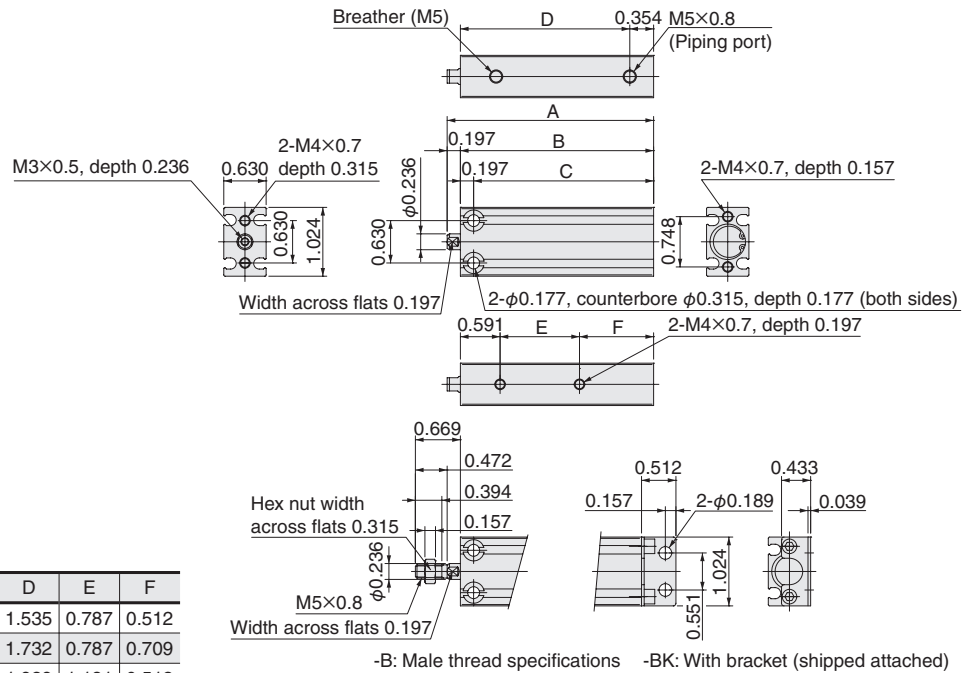
● BCSA10



Stroke	A	B	C	D	E	F
5 mm [0.197]	2.008	1.850	1.614	1.496	0.787	0.472
10 mm [0.394]	2.205	2.047	1.811	1.693	0.787	0.669
15 mm [0.591]	2.402	2.244	2.008	1.890	1.181	0.472

Note: This product cannot use reed switch type sensor switches.

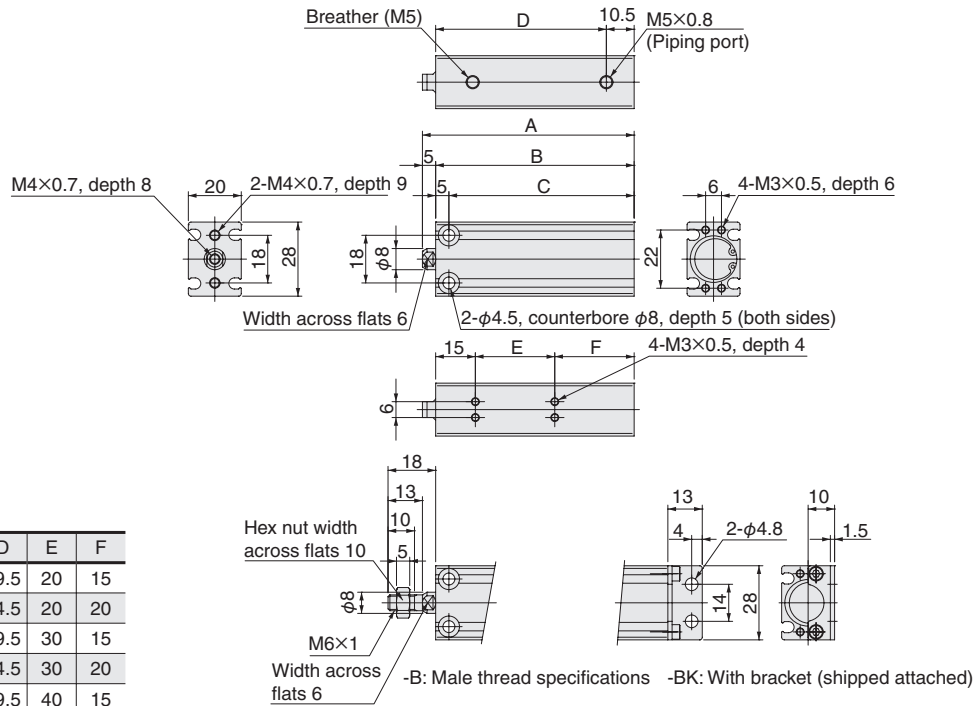
● BCSA12



Stroke	A	B	C	D	E	F
5 mm [0.197]	2.087	1.890	1.693	1.535	0.787	0.512
10 mm [0.394]	2.283	2.087	1.890	1.732	0.787	0.709
15 mm [0.591]	2.480	2.283	2.087	1.929	1.181	0.512
20 mm [0.787]	2.677	2.480	2.283	2.126	1.181	0.709
25 mm [0.984]	2.874	2.677	2.480	2.323	1.575	0.512
30 mm [1.181]	3.071	2.874	2.677	2.520	1.575	0.709

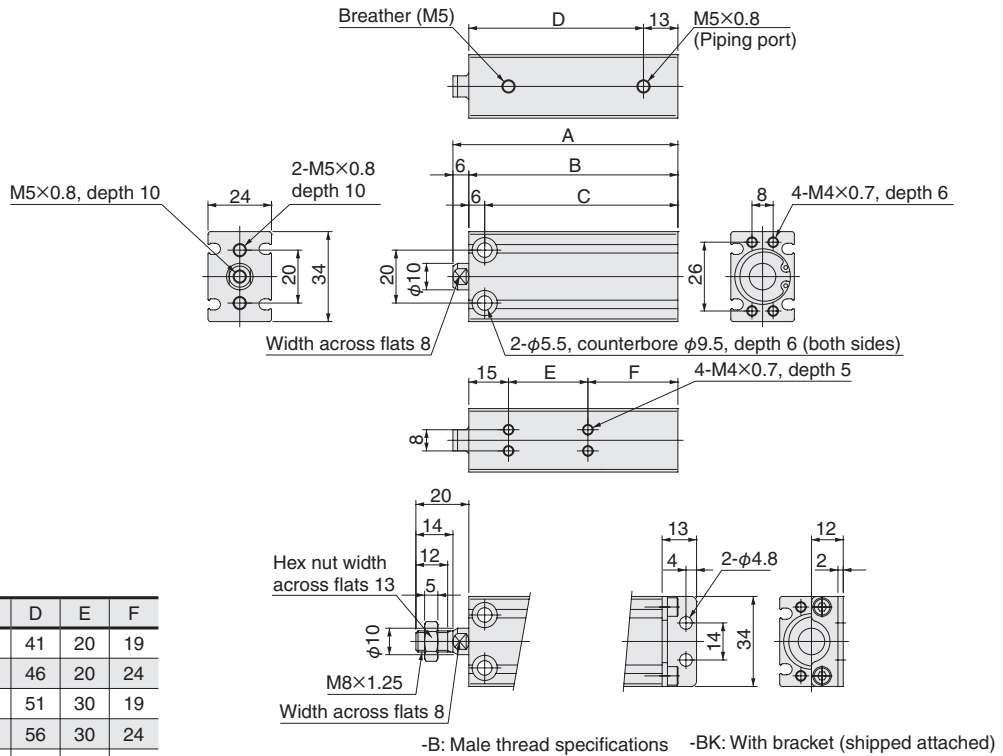
Note: This product cannot use reed switch type sensor switches.

● BCSA16



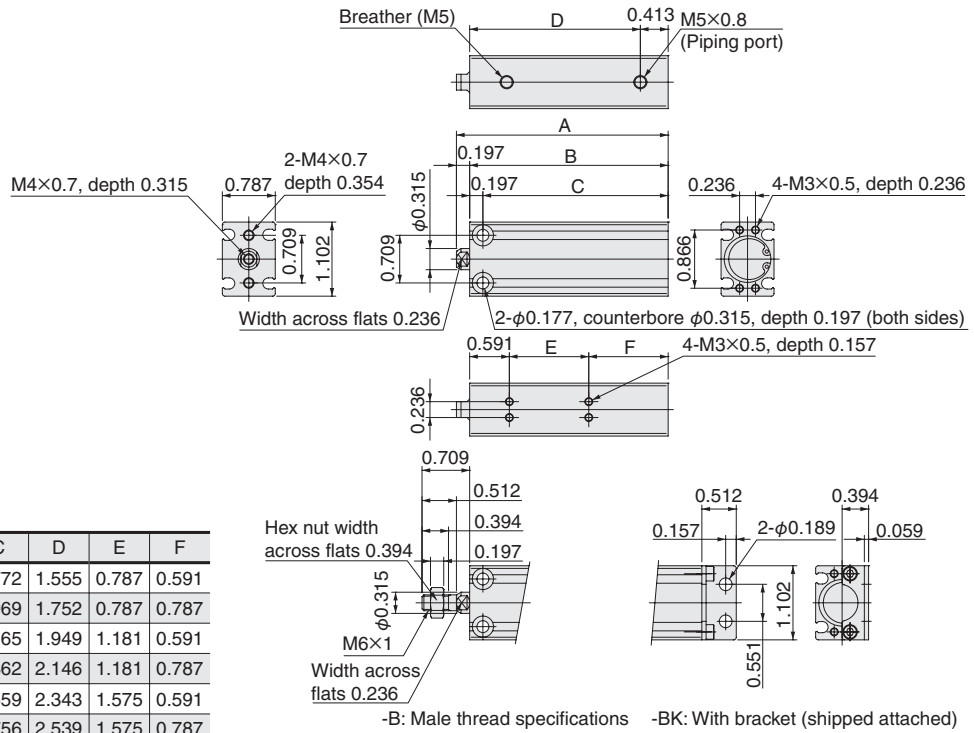
Stroke	A	B	C	D	E	F
5	55	50	45	39.5	20	15
10	60	55	50	44.5	20	20
15	65	60	55	49.5	30	15
20	70	65	60	54.5	30	20
25	75	70	65	59.5	40	15
30	80	75	70	64.5	40	20

● BCSA20



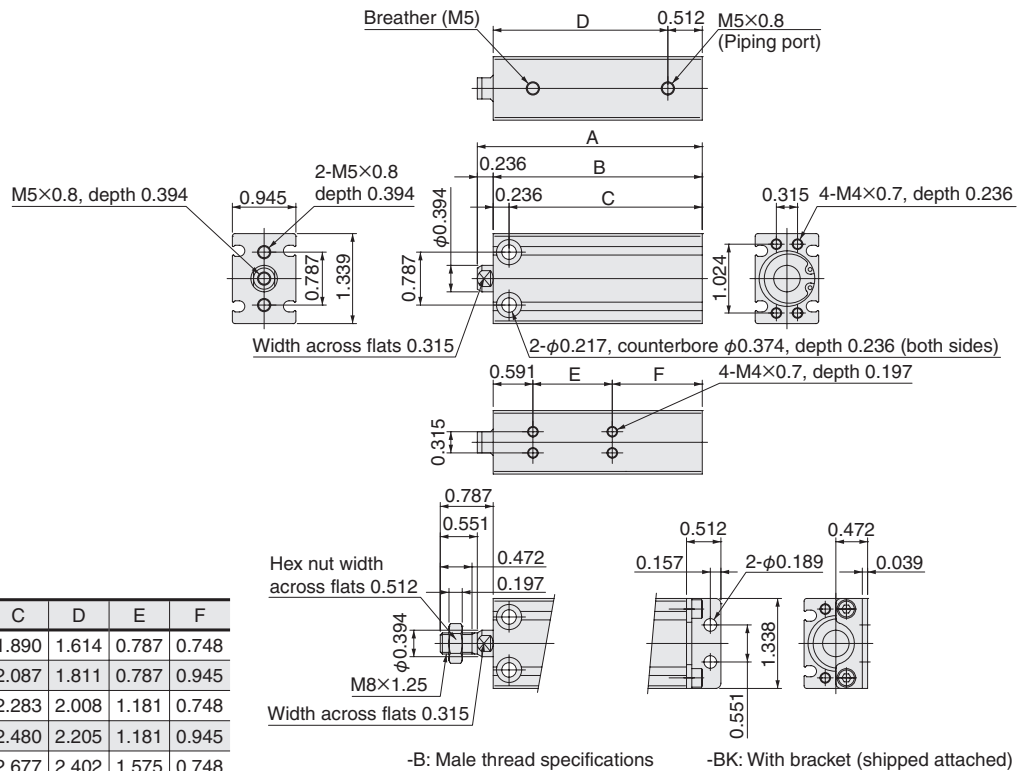
Stroke	A	B	C	D	E	F
5	60	54	48	41	20	19
10	65	59	53	46	20	24
15	70	64	58	51	30	19
20	75	69	63	56	30	24
25	80	74	68	61	40	19
30	85	79	73	66	40	24

● BCSA16



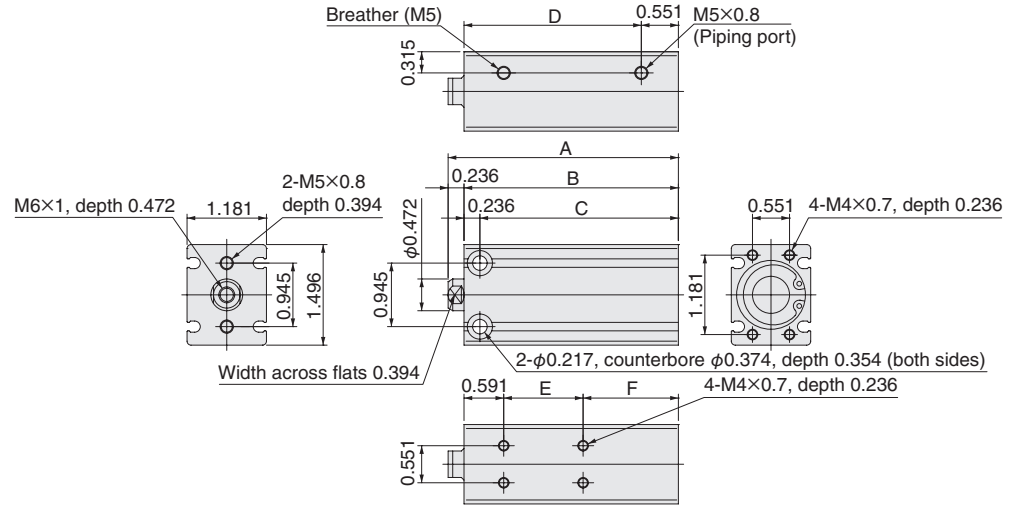
Stroke	A	B	C	D	E	F
5 mm [0.197]	2.165	1.969	1.772	1.555	0.787	0.591
10 mm [0.394]	2.362	2.165	1.969	1.752	0.787	0.787
15 mm [0.591]	2.559	2.362	2.165	1.949	1.181	0.591
20 mm [0.787]	2.756	2.559	2.362	2.146	1.181	0.787
25 mm [0.984]	2.953	2.756	2.559	2.343	1.575	0.591
30 mm [1.181]	3.150	2.953	2.756	2.539	1.575	0.787

● BCSA20

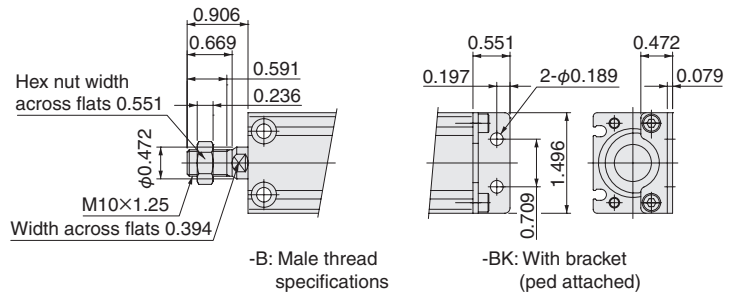


Stroke	A	B	C	D	E	F
5 mm [0.197]	2.362	2.126	1.890	1.614	0.787	0.748
10 mm [0.394]	2.559	2.323	2.087	1.811	0.787	0.945
15 mm [0.591]	2.756	2.520	2.283	2.008	1.181	0.748
20 mm [0.787]	2.953	2.717	2.480	2.205	1.181	0.945
25 mm [0.984]	3.150	2.913	2.677	2.402	1.575	0.748
30 mm [1.181]	3.346	3.110	2.874	2.598	1.575	0.945

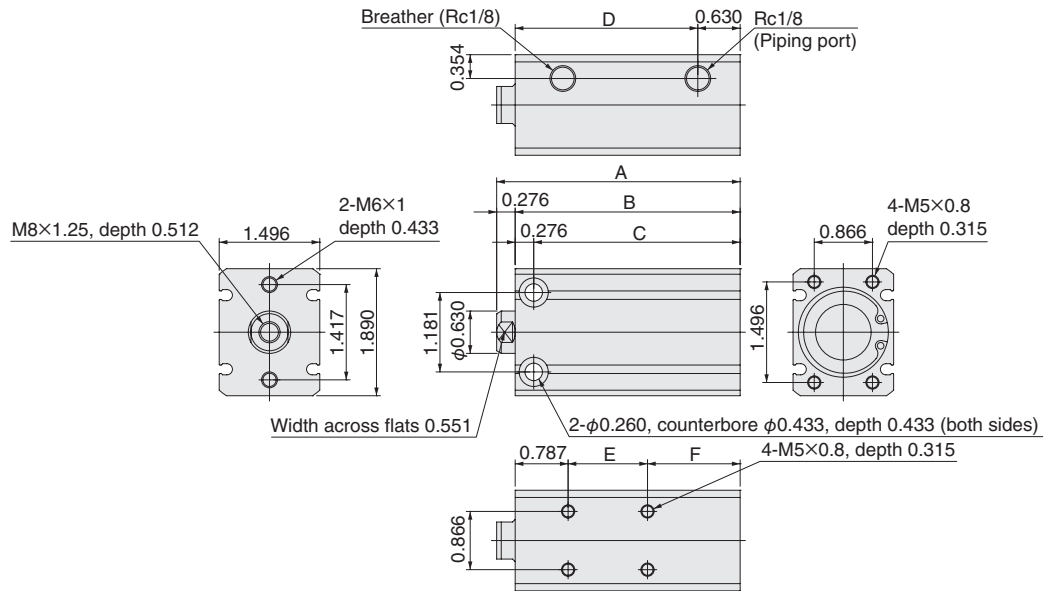
● BCSA25



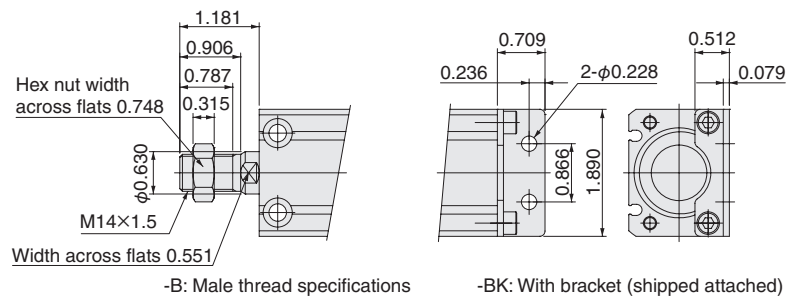
Stroke	A	B	C	D	E	F
5 mm [0.197]	2.441	2.205	1.969	1.654	0.787	0.827
10 mm [0.394]	2.638	2.402	2.165	1.850	0.787	1.024
15 mm [0.591]	2.835	2.598	2.362	2.047	1.181	0.827
20 mm [0.787]	3.031	2.795	2.559	2.244	1.181	1.024
25 mm [0.984]	3.228	2.992	2.756	2.441	1.575	0.827
30 mm [1.181]	3.425	3.189	2.953	2.638	1.575	1.024



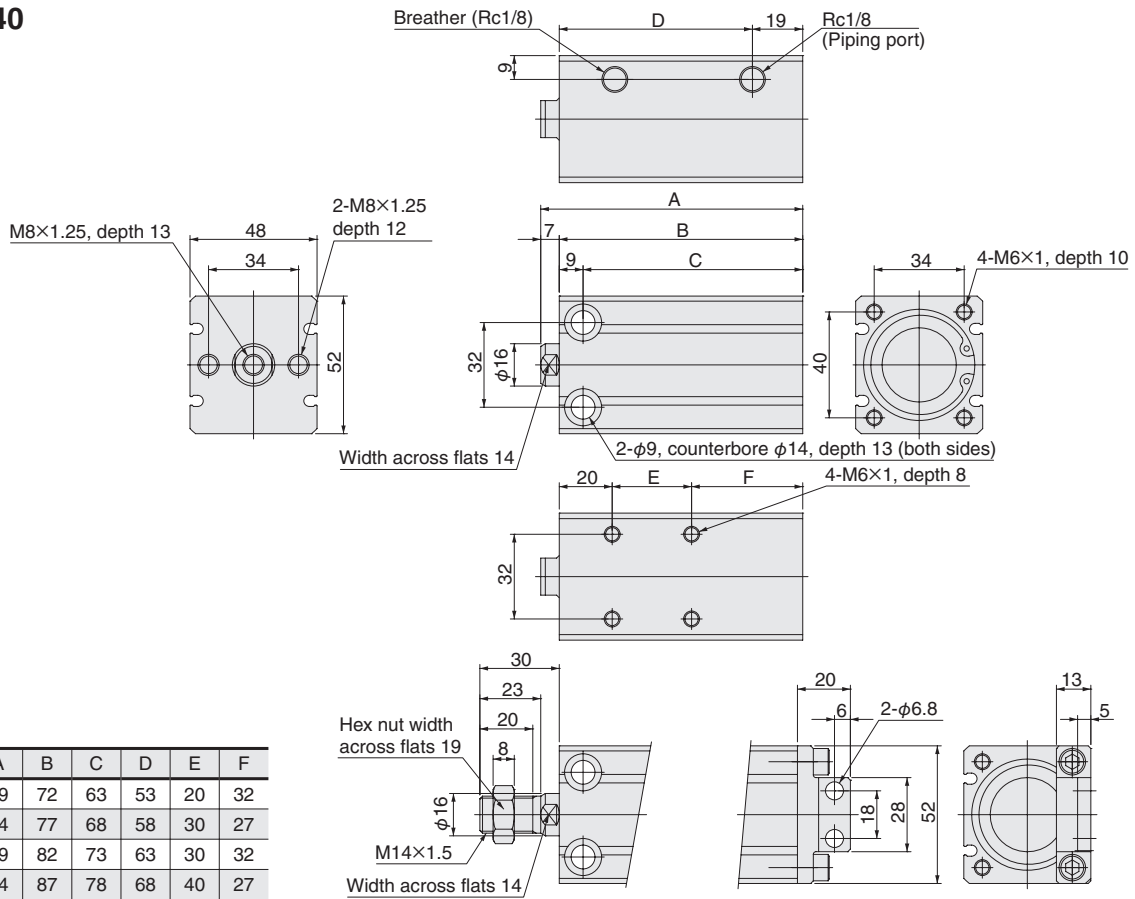
● BCSA32



Stroke	A	B	C	D	E	F
10 mm [0.394]	2.835	2.559	2.283	1.929	0.787	0.984
15 mm [0.591]	3.031	2.756	2.480	2.126	1.181	0.787
20 mm [0.787]	3.228	2.953	2.677	2.323	1.181	0.984
25 mm [0.984]	3.425	3.150	2.874	2.520	1.575	0.787
30 mm [1.181]	3.622	3.346	3.071	2.717	1.575	0.984



● BCSA40

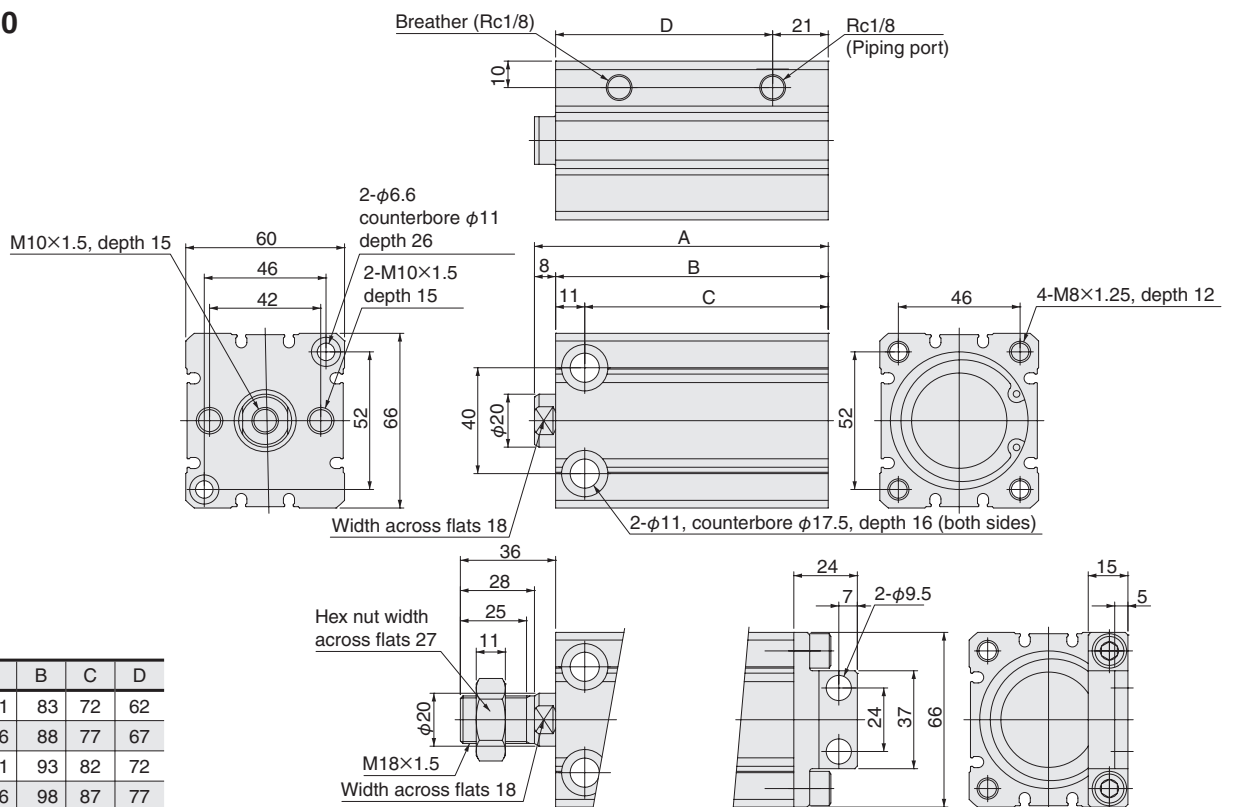


Stroke	A	B	C	D	E	F
10	79	72	63	53	20	32
15	84	77	68	58	30	27
20	89	82	73	63	30	32
25	94	87	78	68	40	27
30	99	92	83	73	40	32

-B: Male thread specifications

-BK: With bracket (shipped attached)

● BCSA50

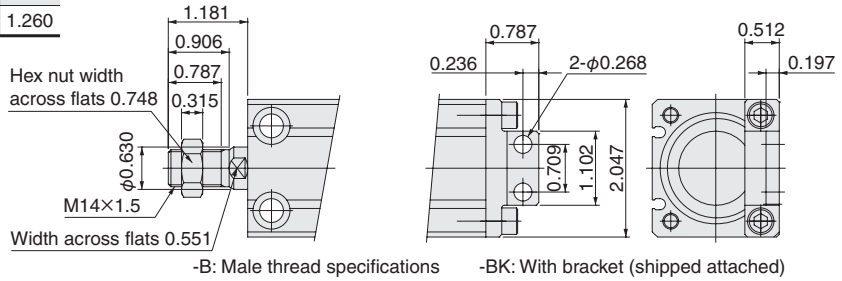
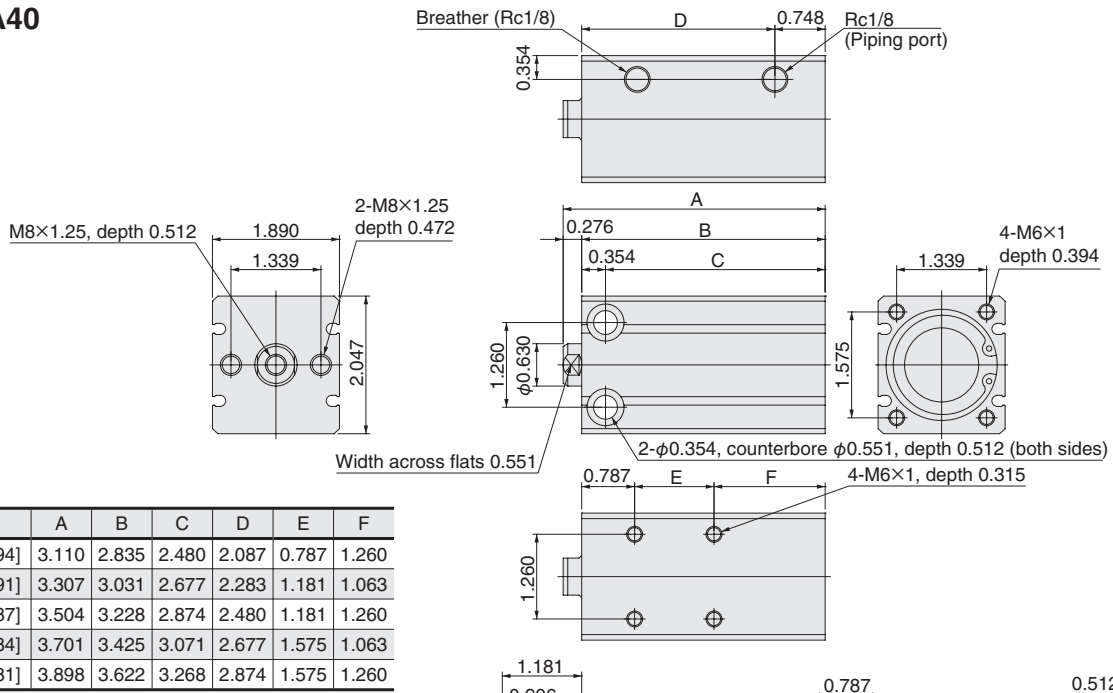


Stroke	A	B	C	D
10	91	83	72	62
15	96	88	77	67
20	101	93	82	72
25	106	98	87	77
30	111	103	92	82

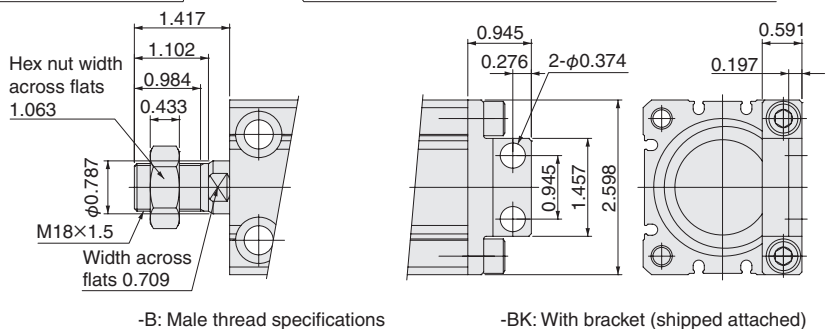
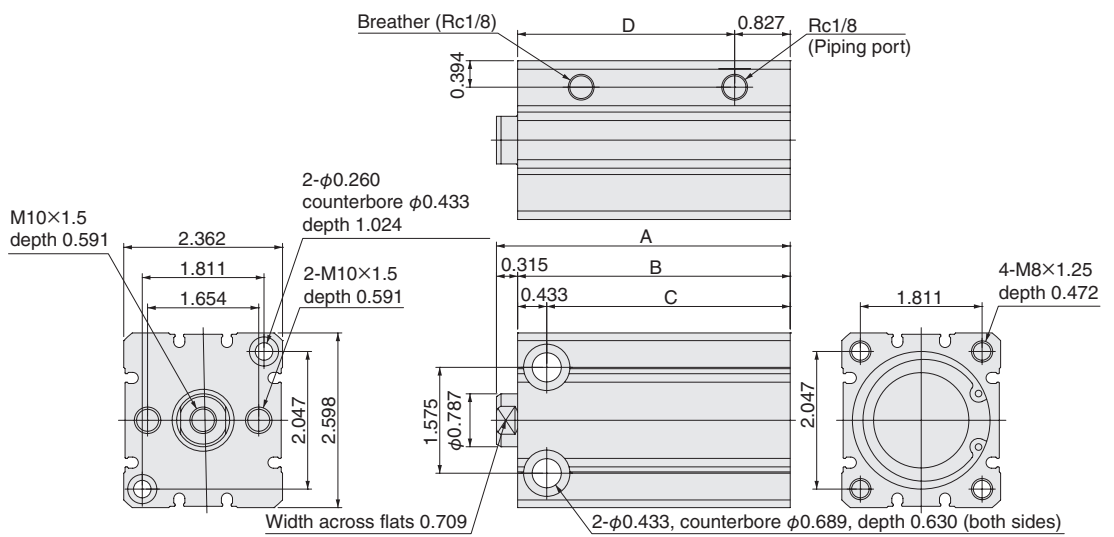
-B: Male thread specifications

-BK: With bracket (shipped attached)

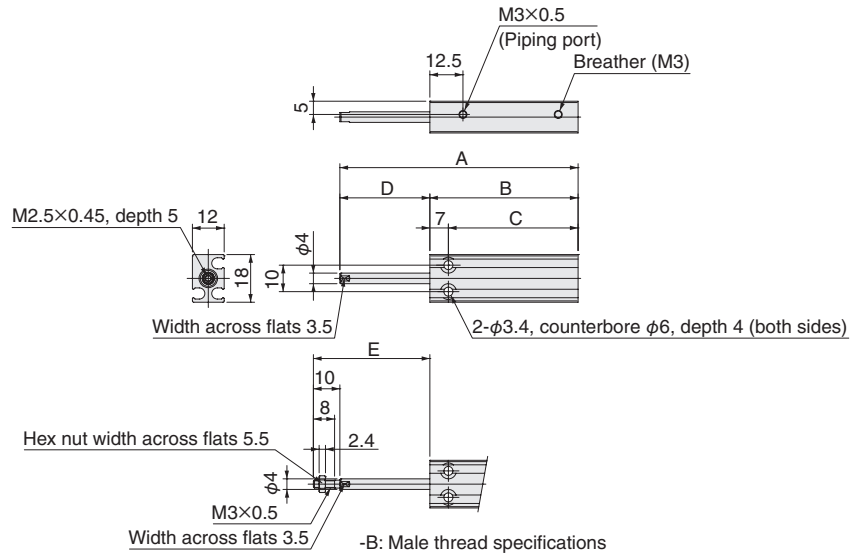
● BCSA40



● BCSA50



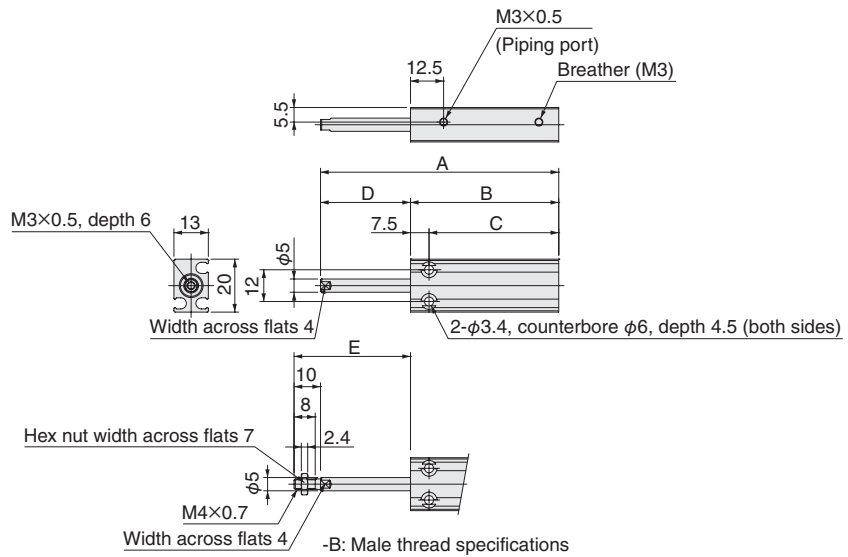
● BCTA6



Stroke	A	B	C	D	E
5	55	46	39	9	19
10	65	51	44	14	24
15	75	56	49	19	29

Note: This product cannot use reed switch type sensor switches.

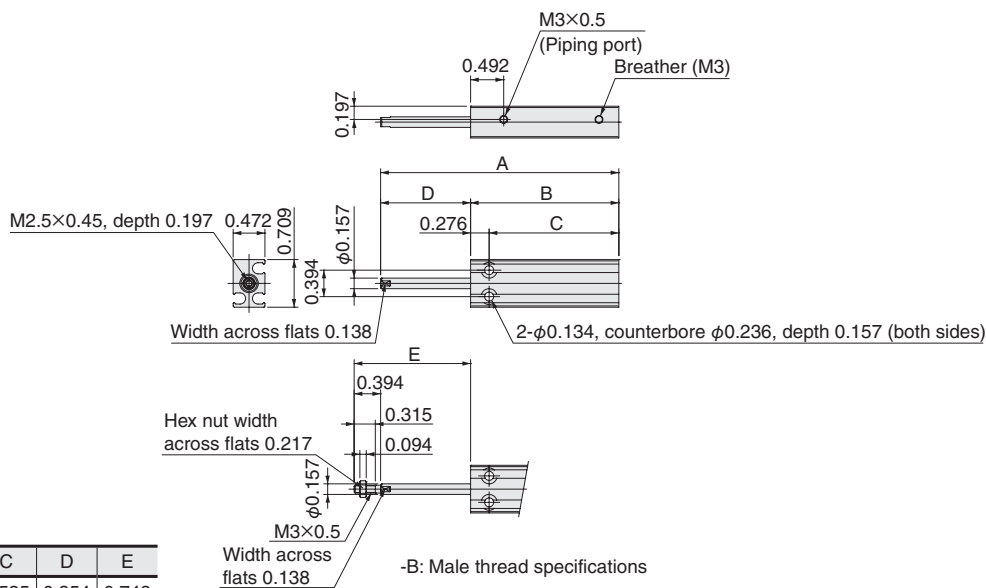
● BCTA8



Stroke	A	B	C	D	E
5	55	46	38.5	9	19
10	65	51	43.5	14	24
15	75	56	48.5	19	29

Note: This product cannot use reed switch type sensor switches.

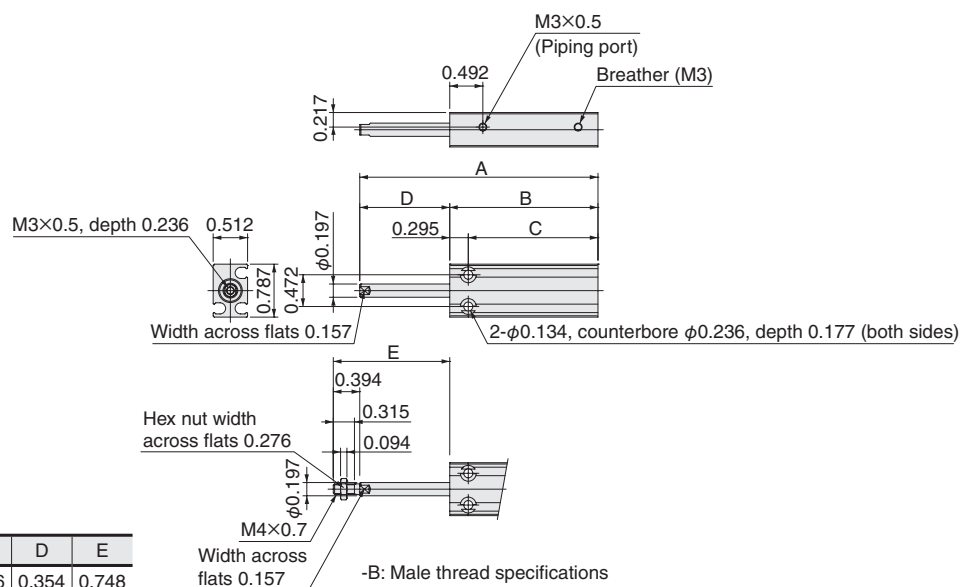
● BCTA6



Stroke	A	B	C	D	E
5 mm [0.197]	2.165	1.811	1.535	0.354	0.748
10 mm [0.394]	2.559	2.008	1.732	0.551	0.945
15 mm [0.591]	2.953	2.205	1.929	0.748	1.142

Note: This product cannot use reed switch type sensor switches.

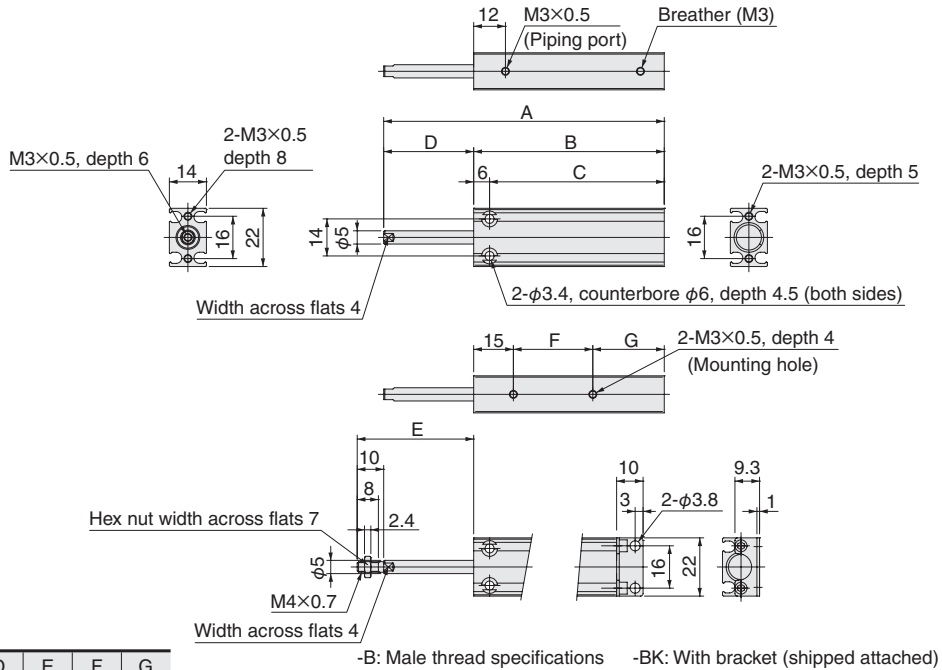
● BCTA8



Stroke	A	B	C	D	E
5 mm [0.197]	2.165	1.811	1.516	0.354	0.748
10 mm [0.394]	2.559	2.008	1.713	0.551	0.945
15 mm [0.591]	2.953	2.205	1.909	0.748	1.142

Note: This product cannot use reed switch type sensor switches.

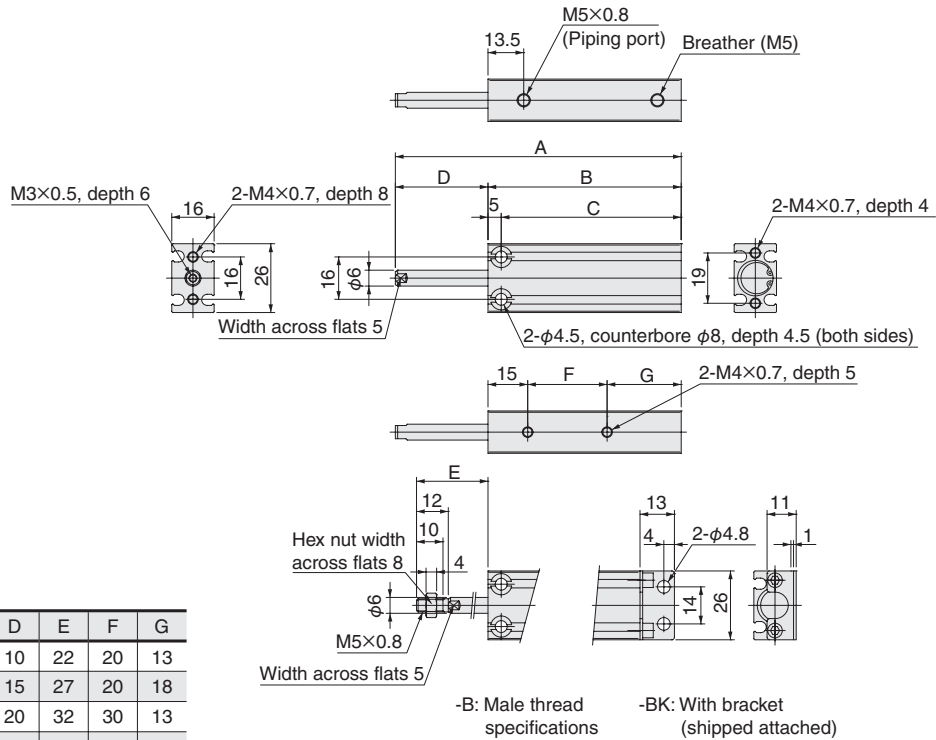
● BCTA10



Stroke	A	B	C	D	E	F	G
5	56	47	41	9	19	20	12
10	66	52	46	14	24	20	17
15	76	57	51	19	29	30	12

Note: This product cannot use reed switch type sensor switches.

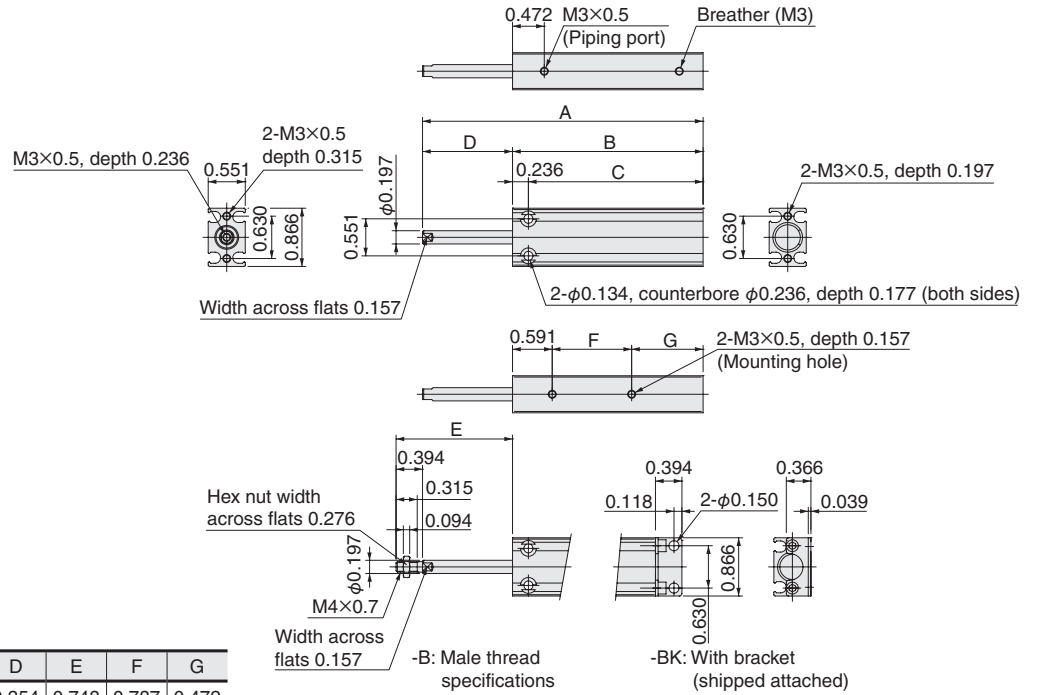
● BCTA12



Stroke	A	B	C	D	E	F	G
5	58	48	43	10	22	20	13
10	68	53	48	15	27	20	18
15	78	58	53	20	32	30	13
20	88	63	58	25	37	30	18
25	98	68	63	30	42	40	13
30	108	73	68	35	47	40	18

Note: This product cannot use reed switch type sensor switches.

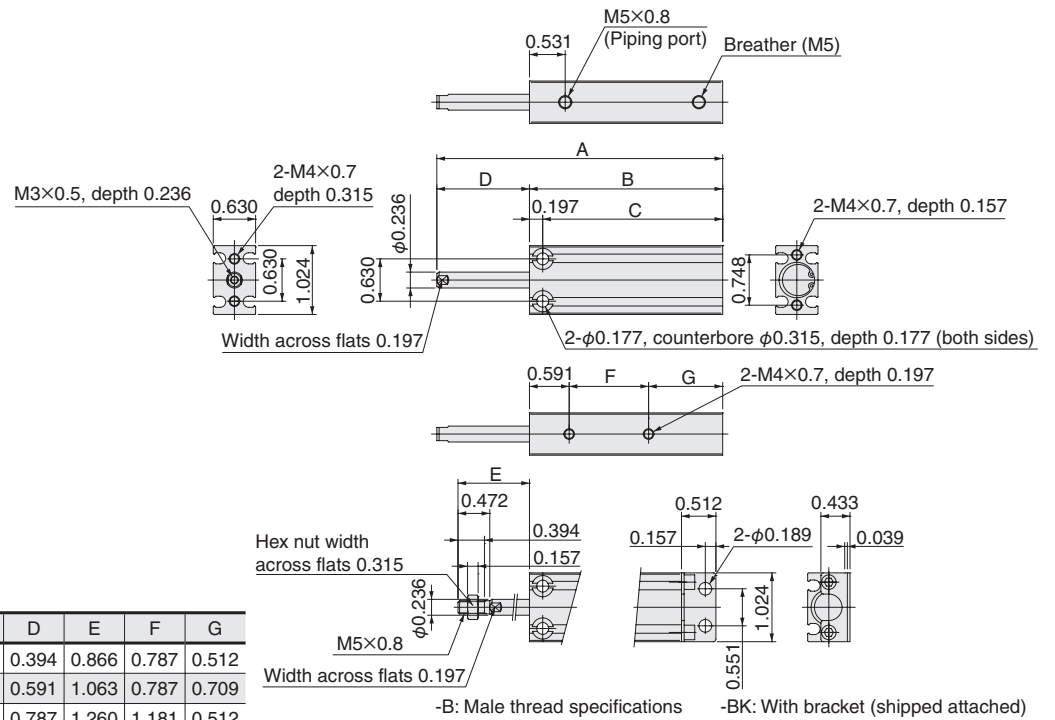
● BCTA10



Stroke	A	B	C	D	E	F	G
5 mm [0.197]	2.205	1.850	1.614	0.354	0.748	0.787	0.472
10 mm [0.394]	2.598	2.047	1.811	0.551	0.945	0.787	0.669
15 mm [0.591]	2.992	2.244	2.008	0.748	1.142	1.181	0.472

Note: This product cannot use reed switch type sensor switches.

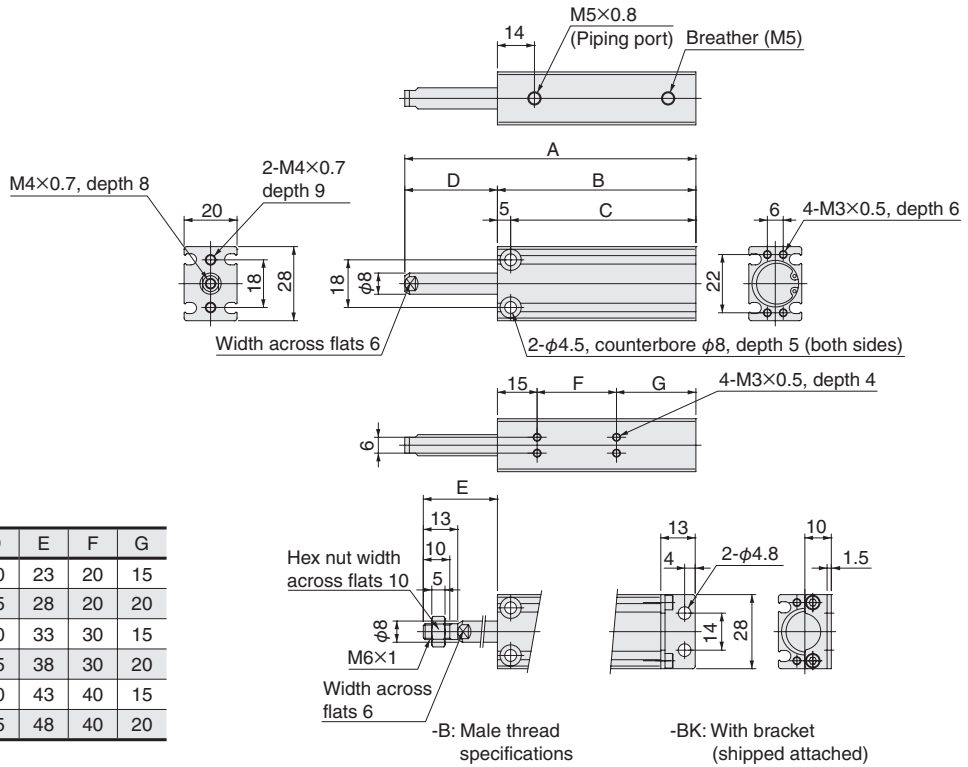
● BCTA12



Stroke	A	B	C	D	E	F	G
5 mm [0.197]	2.283	1.890	1.693	0.394	0.866	0.787	0.512
10 mm [0.394]	2.677	2.087	1.890	0.591	1.063	0.787	0.709
15 mm [0.591]	3.071	2.283	2.087	0.787	1.260	1.181	0.512
20 mm [0.787]	3.465	2.480	2.283	0.984	1.457	1.181	0.709
25 mm [0.984]	3.858	2.677	2.480	1.181	1.654	1.575	0.512
30 mm [1.181]	4.252	2.874	2.677	1.378	1.850	1.575	0.709

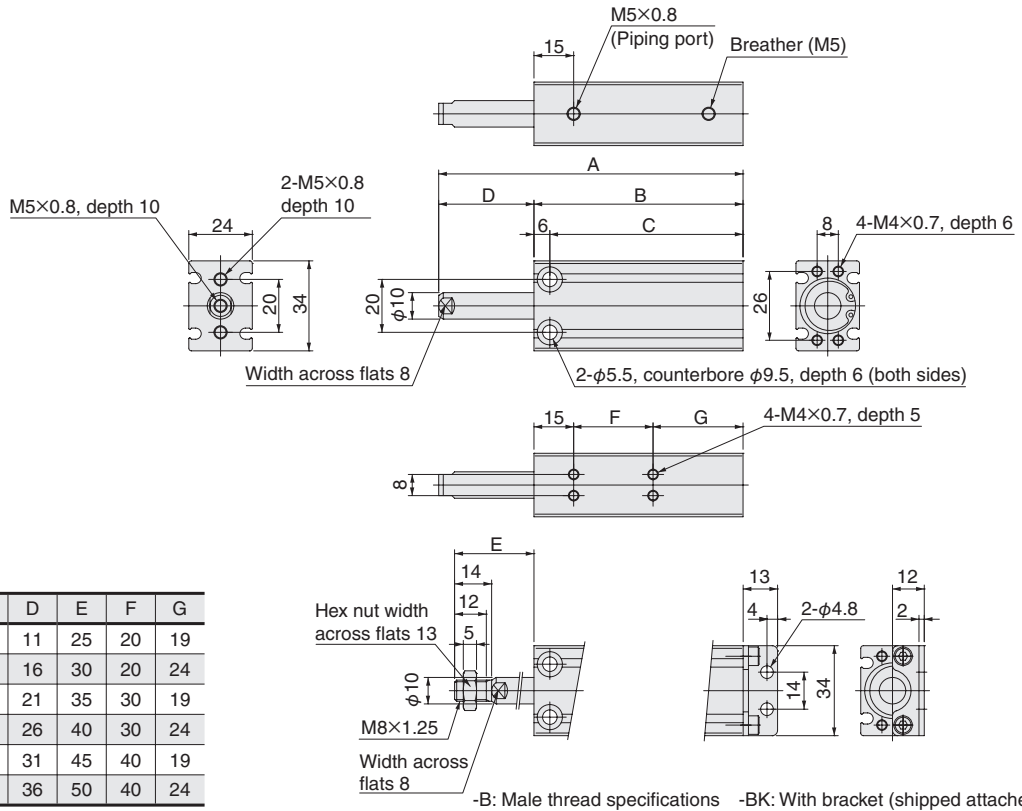
Note: This product cannot use reed switch type sensor switches.

● BCTA16



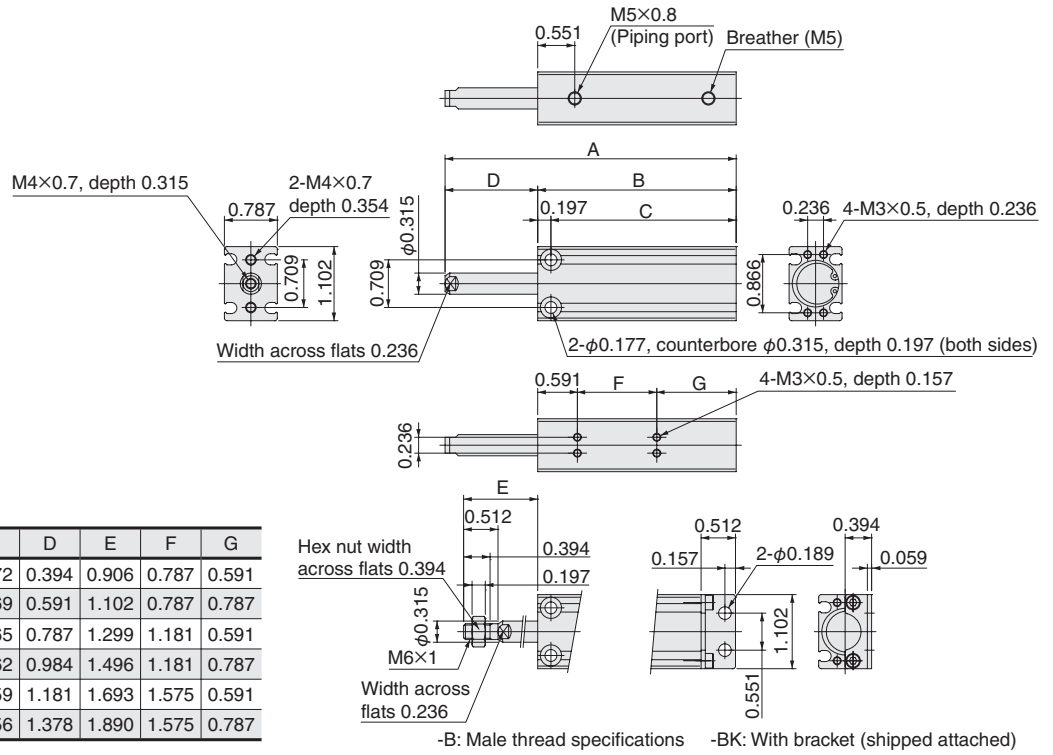
Stroke	A	B	C	D	E	F	G
5	60	50	45	10	23	20	15
10	70	55	50	15	28	20	20
15	80	60	55	20	33	30	15
20	90	65	60	25	38	30	20
25	100	70	65	30	43	40	15
30	110	75	70	35	48	40	20

● BCTA20



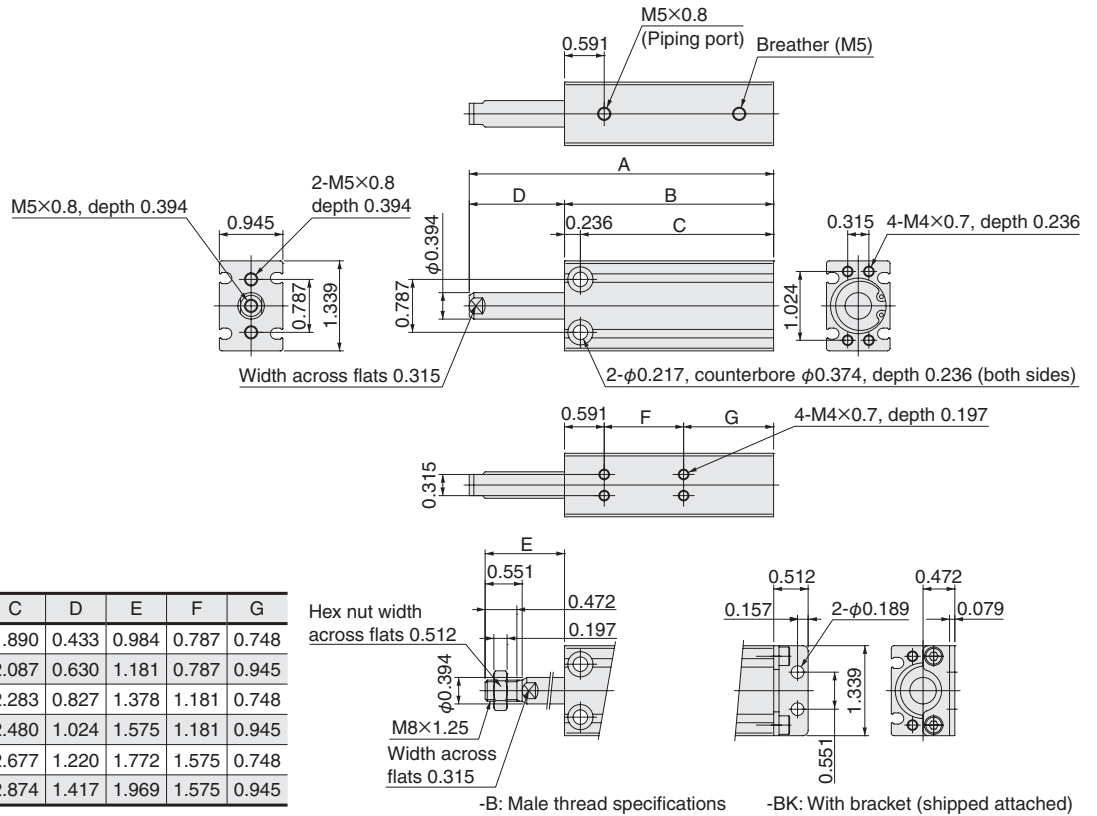
Stroke	A	B	C	D	E	F	G
5	65	54	48	11	25	20	19
10	75	59	53	16	30	20	24
15	85	64	58	21	35	30	19
20	95	69	63	26	40	30	24
25	105	74	68	31	45	40	19
30	115	79	73	36	50	40	24

● BCTA16



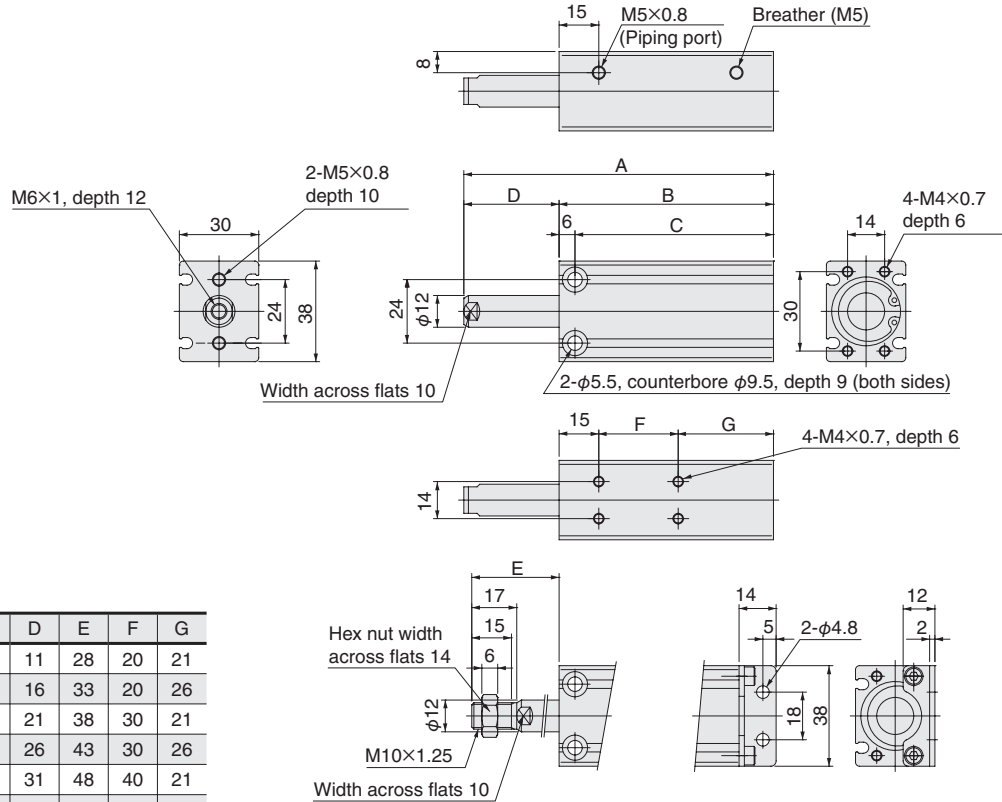
Stroke	A	B	C	D	E	F	G
5 mm [0.197]	2.362	1.969	1.772	0.394	0.906	0.787	0.591
10 mm [0.394]	2.756	2.165	1.969	0.591	1.102	0.787	0.787
15 mm [0.591]	3.150	2.362	2.165	0.787	1.299	1.181	0.591
20 mm [0.787]	3.543	2.559	2.362	0.984	1.496	1.181	0.787
25 mm [0.984]	3.937	2.756	2.559	1.181	1.693	1.575	0.591
30 mm [1.181]	4.331	2.953	2.756	1.378	1.890	1.575	0.787

● BCTA20



Stroke	A	B	C	D	E	F	G
5 mm [0.197]	2.559	2.126	1.890	0.433	0.984	0.787	0.748
10 mm [0.394]	2.953	2.323	2.087	0.630	1.181	0.787	0.945
15 mm [0.591]	3.346	2.520	2.283	0.827	1.378	1.181	0.748
20 mm [0.787]	3.740	2.717	2.480	1.024	1.575	1.181	0.945
25 mm [0.984]	4.134	2.913	2.677	1.220	1.772	1.575	0.748
30 mm [1.181]	4.528	3.110	2.874	1.417	1.969	1.575	0.945

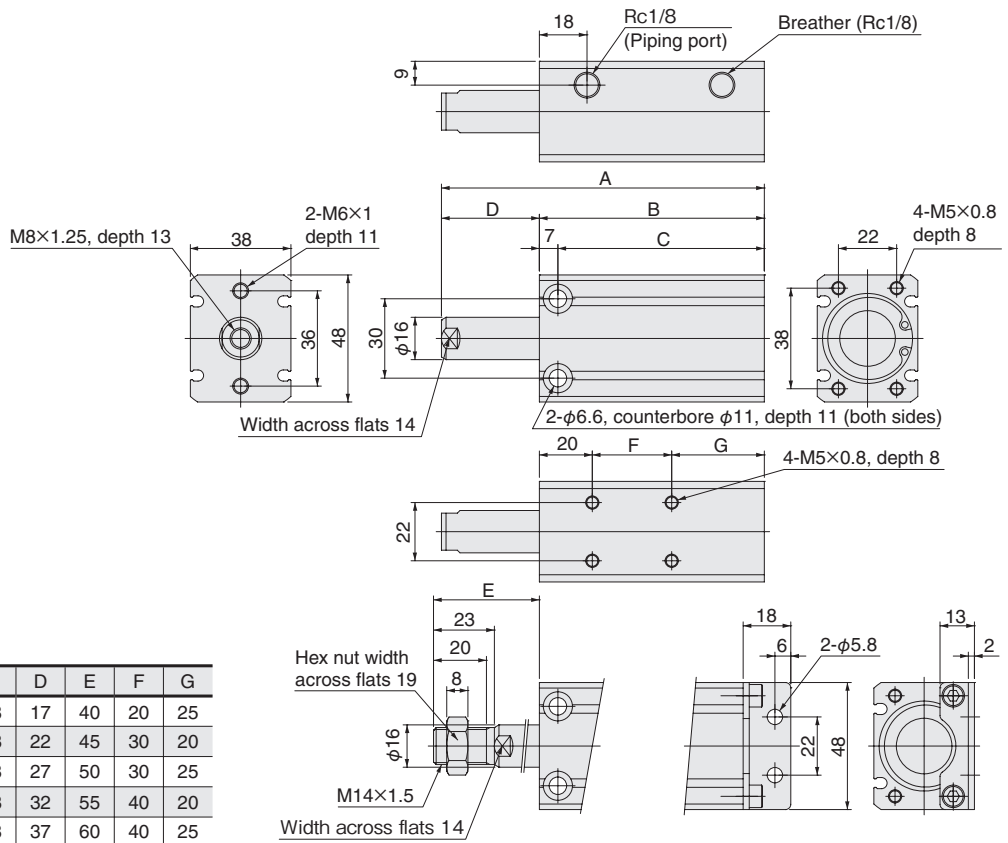
● BCTA25



Stroke	A	B	C	D	E	F	G
5	67	56	50	11	28	20	21
10	77	61	55	16	33	20	26
15	87	66	60	21	38	30	21
20	97	71	65	26	43	30	26
25	107	76	70	31	48	40	21
30	117	81	75	36	53	40	26

-B: Male thread specifications -BK: With bracket (shipped attached)

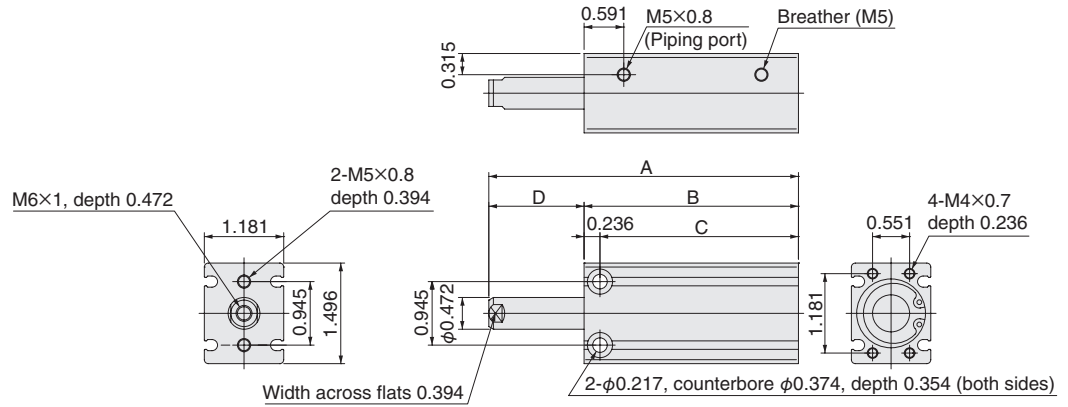
● BCTA32



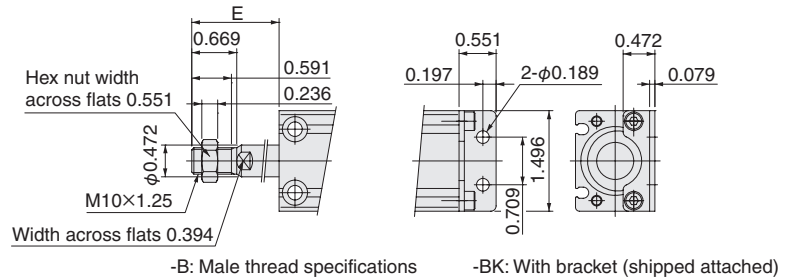
Stroke	A	B	C	D	E	F	G
10	82	65	58	17	40	20	25
15	92	70	63	22	45	30	20
20	102	75	68	27	50	30	25
25	112	80	73	32	55	40	20
30	122	85	78	37	60	40	25

-B: Male thread specifications -BK: With bracket (shipped attached)

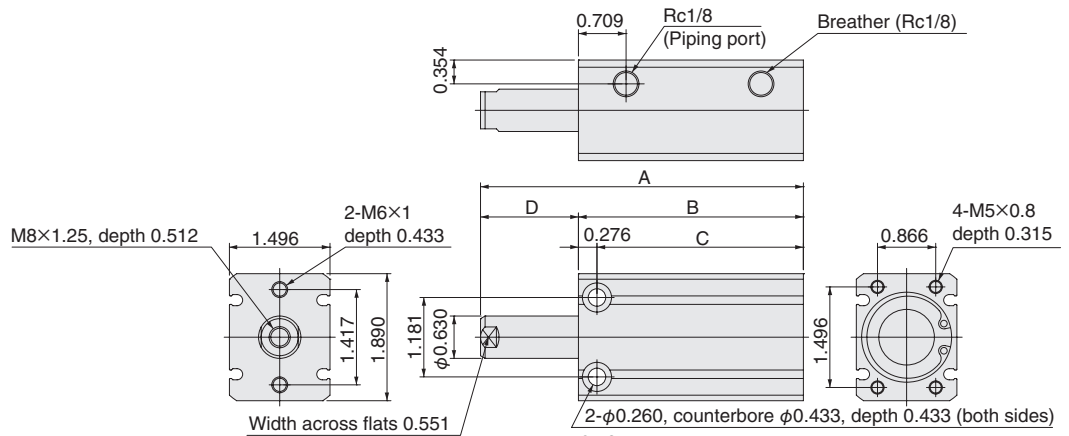
● BCTA25



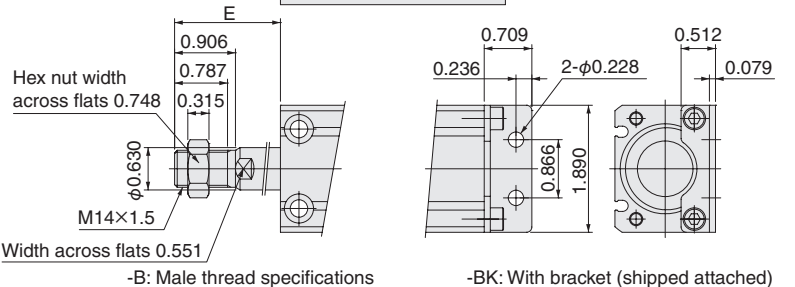
Stroke	A	B	C	D	E	F	G
5 mm [0.197]	2.638	2.205	1.969	0.433	1.102	0.787	0.827
10 mm [0.394]	3.031	2.402	2.165	0.630	1.299	0.787	1.024
15 mm [0.591]	3.425	2.598	2.362	0.827	1.496	1.181	0.827
20 mm [0.787]	3.819	2.795	2.559	1.024	1.693	1.181	1.024
25 mm [0.984]	4.213	2.992	2.756	1.220	1.890	1.575	0.827
30 mm [1.181]	4.606	3.189	2.953	1.417	2.087	1.575	1.024



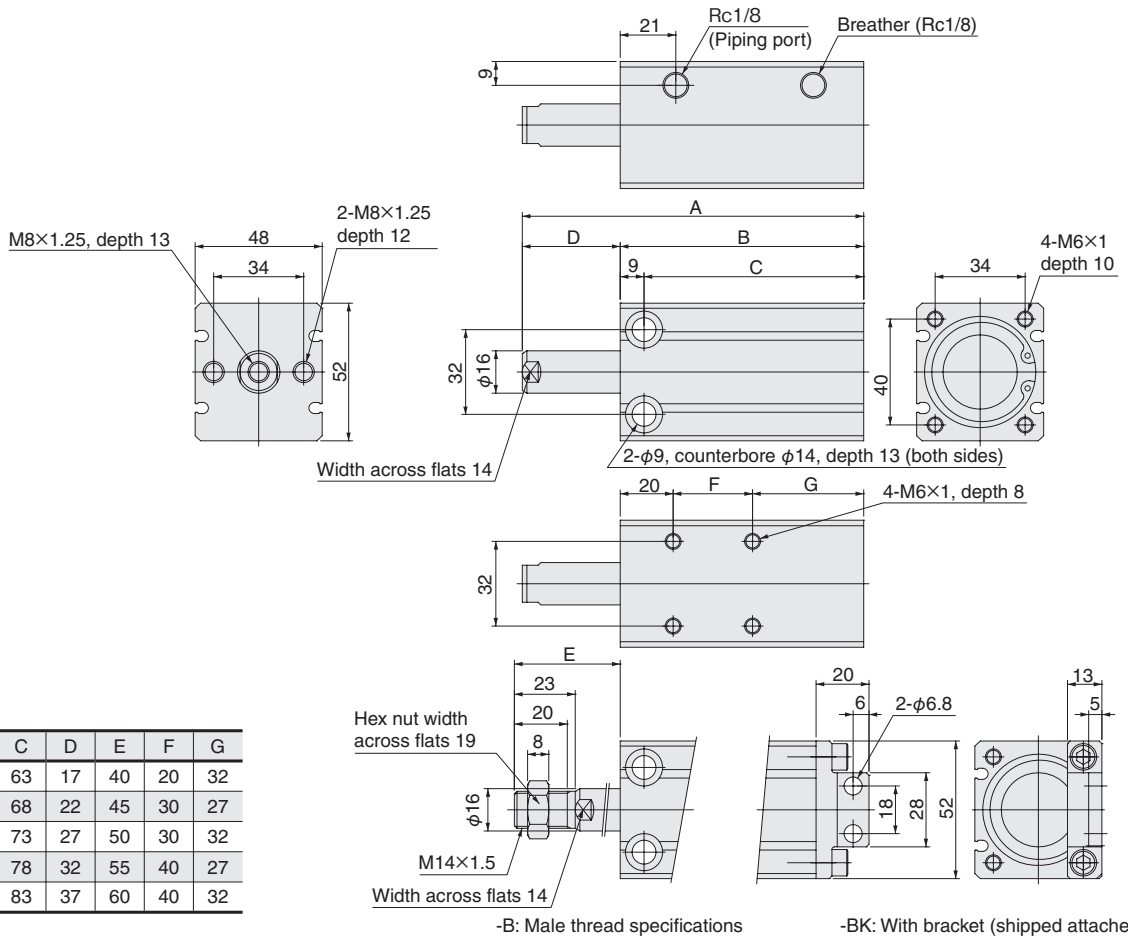
● BCTA32



Stroke	A	B	C	D	E	F	G
10 mm [0.394]	3.228	2.559	2.283	0.669	1.575	0.787	0.984
15 mm [0.591]	3.622	2.756	2.480	0.866	1.772	1.181	0.787
20 mm [0.787]	4.016	2.953	2.677	1.063	1.969	1.181	0.984
25 mm [0.984]	4.409	3.150	2.874	1.260	2.165	1.575	0.787
30 mm [1.181]	4.803	3.346	3.071	1.457	2.362	1.575	0.984

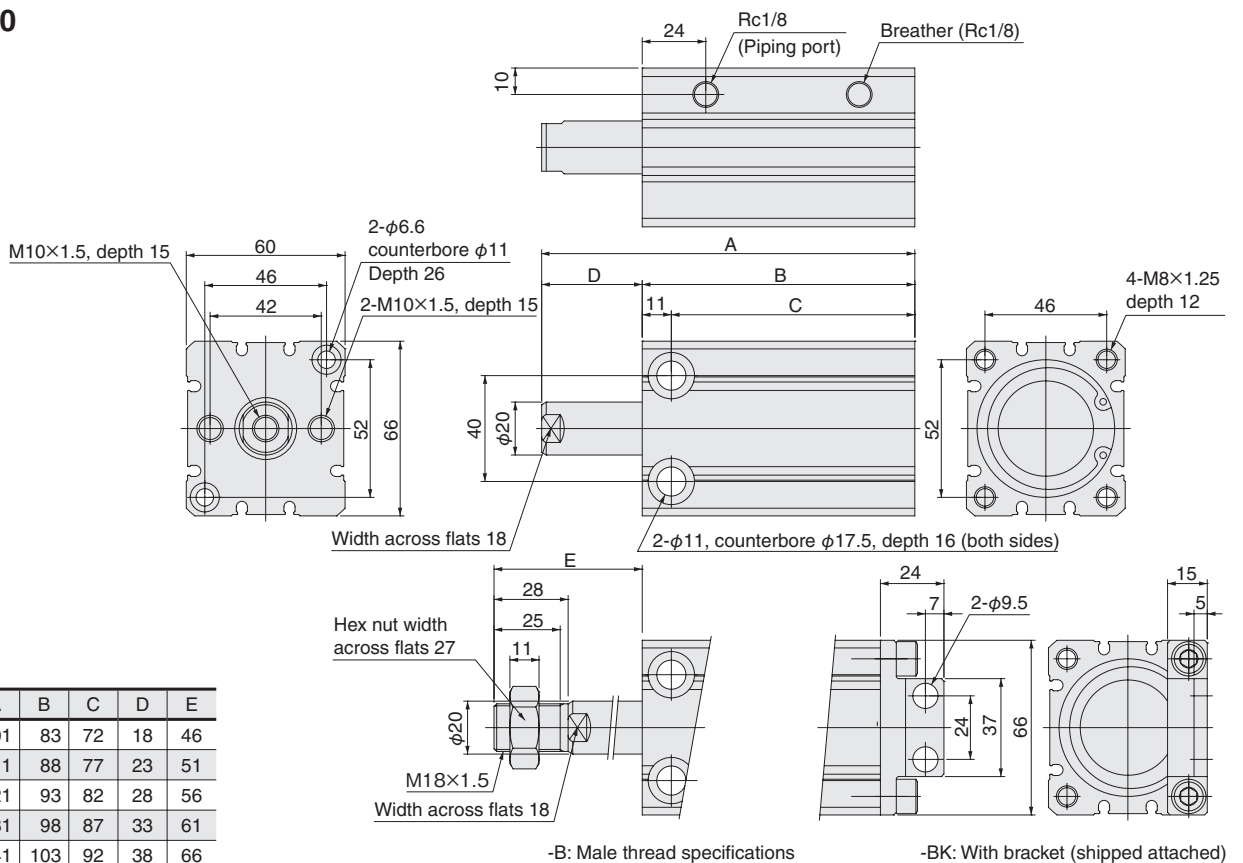


● BCTA40



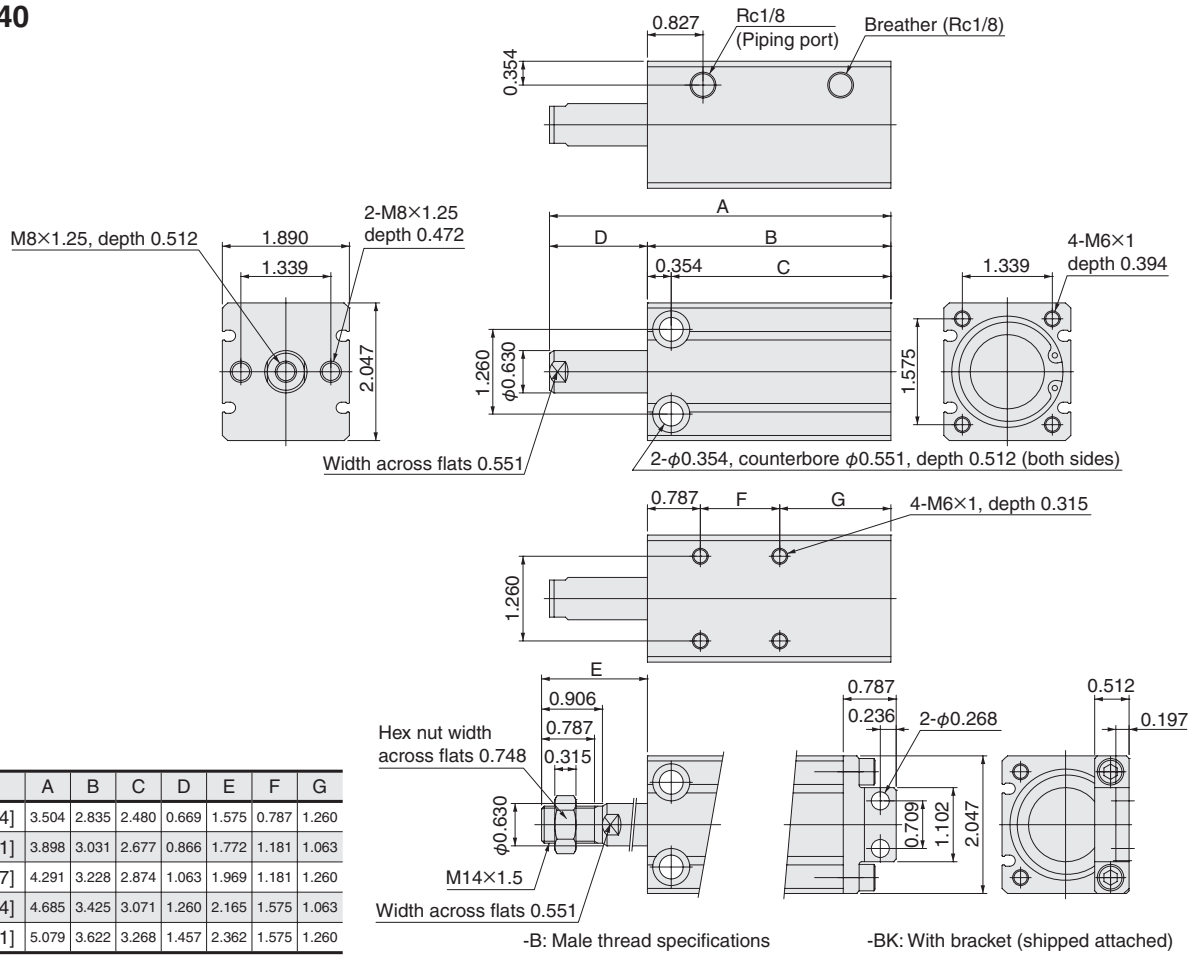
Stroke	A	B	C	D	E	F	G
10	89	72	63	17	40	20	32
15	99	77	68	22	45	30	27
20	109	82	73	27	50	30	32
25	119	87	78	32	55	40	27
30	129	92	83	37	60	40	32

● BCTA50

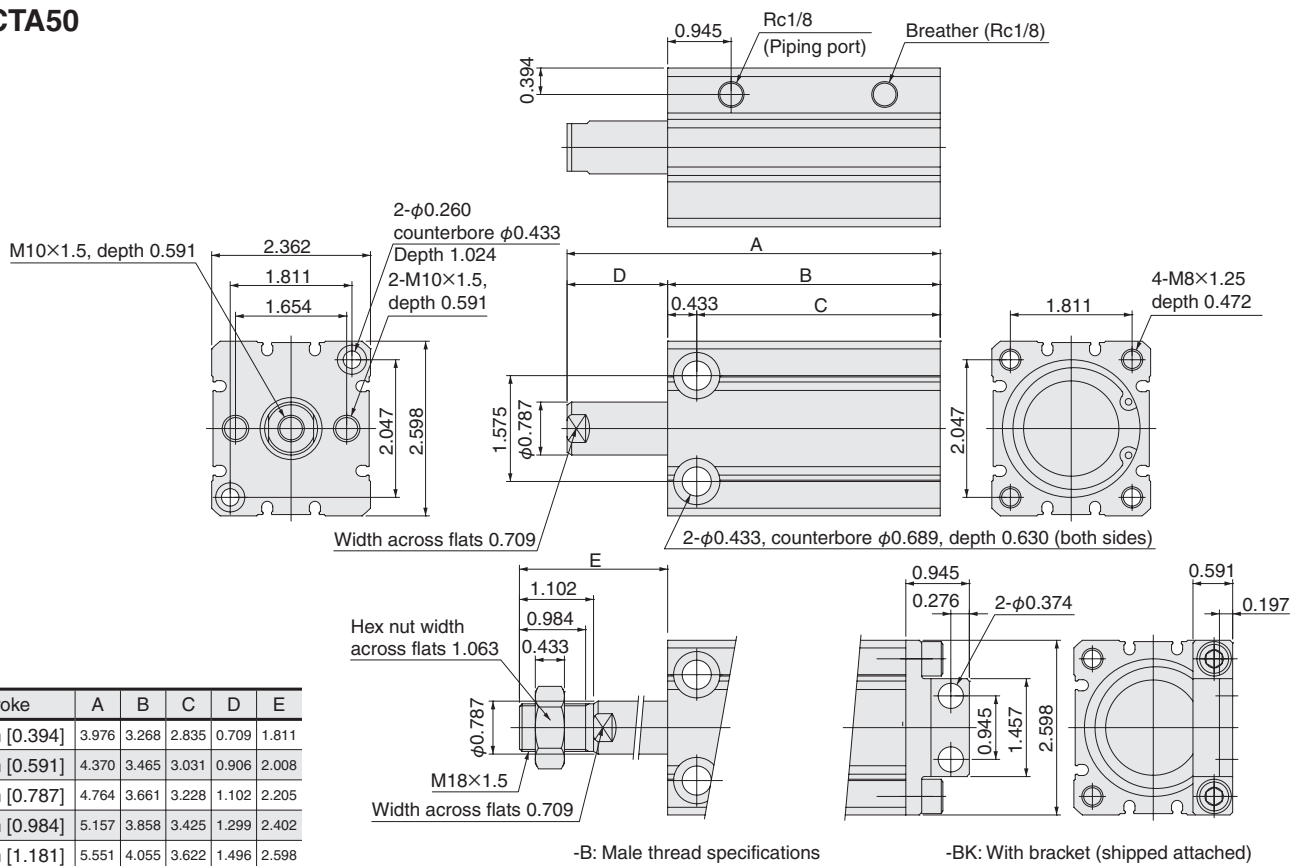


Stroke	A	B	C	D	E
10	101	83	72	18	46
15	111	88	77	23	51
20	121	93	82	28	56
25	131	98	87	33	61
30	141	103	92	38	66

● BCTA40



● BCTA50



Basic Cylinders

Double rod end cylinders



Symbol



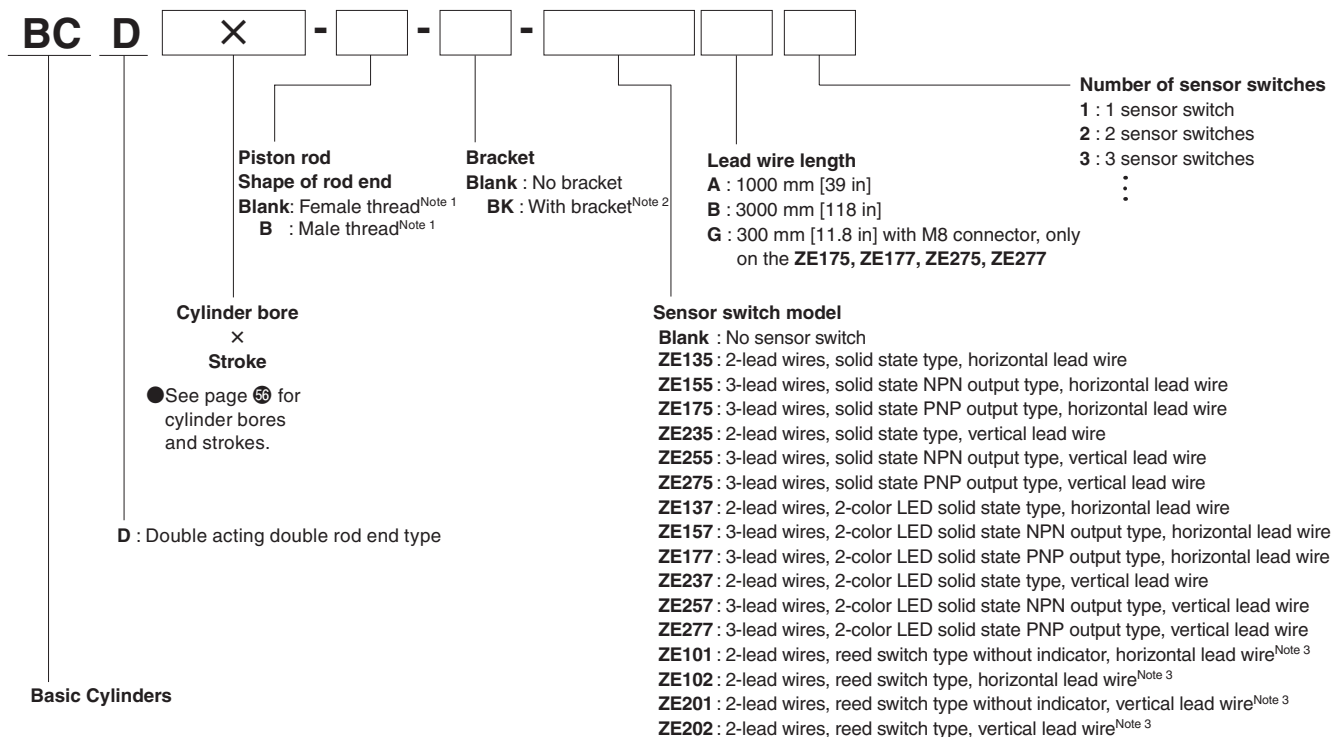
Specifications

Item	Cylinder bore	6	8	10	12	16	20	25	32	40	50	63	80	100	125
		[0.236]	[0.315]	[0.394]	[0.472]	[0.630]	[0.787]	[0.984]	[1.260]	[1.575]	[1.969]	[2.480]	[3.150]	[3.937]	[4.921]
Operating type		Double acting type													
Medium		Air													
Operating pressure range	MPa [psi]	0.2 to 0.7 [29 to 102]			0.1 to 0.7 [15 to 102]			0.08 to 0.7 [12 to 102]							
Proof pressure	MPa [psi]	1.05 [152]													
Operating temperature range	°C [°F]	0 to 60 [32 to 140]													
Operating speed range	mm/s [in/sec]	50 to 500 [2 to 20]										50 to 300 [2 to 12]			
Cushion		Rubber bumper													
Lubrication		Not required (if lubricated, use turbine oil class 1 (ISO VG32) or equivalent)													
Port size		M3×0.5			M5×0.8			Rc1/8			Rc1/4		Rc3/8		

Cylinder bore and stroke

		mm [in]	
Cylinder bore		Standard stroke	
6, 8, 10, 12, 16	[0.236, 0.315, 0.394, 0.472, 0.630]	5, 10, 15, 20, 25, 30	
20, 25	[0.787, 0.984]	5, 10, 15, 20, 25, 30, 40, 50	
32, 40, 50, 63, 80, 100, 125	[1.260, 1.575, 1.969, 2.480, 3.150, 3.937, 4.921]	10, 20, 30, 40, 50, 60, 70, 75, 80, 90, 100	

Order Codes



● For details on sensor switches, see page 56

Note 1: The both rod ends are the same shape.

2: Brackets cannot be attached to cylinders that have $\phi 6$ [0.236] or $\phi 8$ [0.315] cylinder bores.

3: Reed type sensor switches cannot be attached to cylinders that have $\phi 6$ [0.236], $\phi 8$ [0.315], $\phi 10$ [0.394], or $\phi 12$ [0.470] cylinder bores.

Mass

● Double rod end cylinders

unit: g

Model	Stroke													
	5	10	15	20	25	30	40	50	60	70	75	80	90	100
BCD6	16 (20)	19 (23)	22 (26)	25 (29)	28 (32)	31 (35)	–	–	–	–	–	–	–	–
BCD8	23 (27)	27 (31)	31 (35)	35 (39)	39 (43)	43 (47)	–	–	–	–	–	–	–	–
BCD10	25 (29)	29 (33)	33 (37)	37 (41)	41 (45)	45 (49)	–	–	–	–	–	–	–	–
BCD12	36 (42)	42 (48)	48 (54)	54 (60)	60 (66)	66 (72)	–	–	–	–	–	–	–	–
BCD16	55 (65)	63 (73)	71 (81)	79 (89)	87 (97)	95 (105)	–	–	–	–	–	–	–	–
BCD20	94 (114)	107 (127)	120 (140)	133 (153)	146 (166)	159 (179)	185 (205)	211 (231)	–	–	–	–	–	–
BCD25	137 (169)	154 (186)	171 (203)	188 (220)	205 (237)	222 (254)	256 (288)	290 (322)	–	–	–	–	–	–
BCD32	–	277 (357)	–	334 (414)	–	391 (471)	448 (528)	505 (585)	562 (642)	619 (699)	648 (728)	676 (756)	733 (813)	790 (870)
BCD40	–	383 (463)	–	446 (526)	–	509 (589)	572 (652)	635 (715)	698 (778)	761 (841)	793 (873)	824 (904)	887 (967)	950 (1030)
BCD50	–	690 (880)	–	786 (976)	–	882 (1072)	978 (1168)	1074 (1264)	1170 (1360)	1266 (1456)	1314 (1504)	1362 (1552)	1458 (1648)	1554 (1744)
BCD63	–	1016 (1206)	–	1122 (1312)	–	1228 (1418)	1334 (1524)	1440 (1630)	1546 (1736)	1652 (1842)	1705 (1895)	1758 (1948)	1864 (2054)	1970 (2160)
BCD80	–	1526 (1886)	–	1672 (2032)	–	1818 (2178)	1964 (2324)	2110 (2470)	2256 (2616)	2402 (2762)	2475 (2835)	2548 (2908)	2694 (3054)	2840 (3200)
BCD100	–	2520 (3120)	–	2745 (3345)	–	2970 (3570)	3195 (3795)	3420 (4020)	3645 (4245)	3870 (4470)	3983 (4583)	4095 (4695)	4320 (4920)	4545 (5145)
BCD125	–	4070 (5152)	–	4380 (5462)	–	4690 (5772)	5000 (6082)	5310 (6392)	5621 (6703)	5932 (7014)	6088 (7170)	6243 (7325)	6554 (7636)	6865 (7947)

Values in () parentheses are masses for male thread specifications

unit: oz

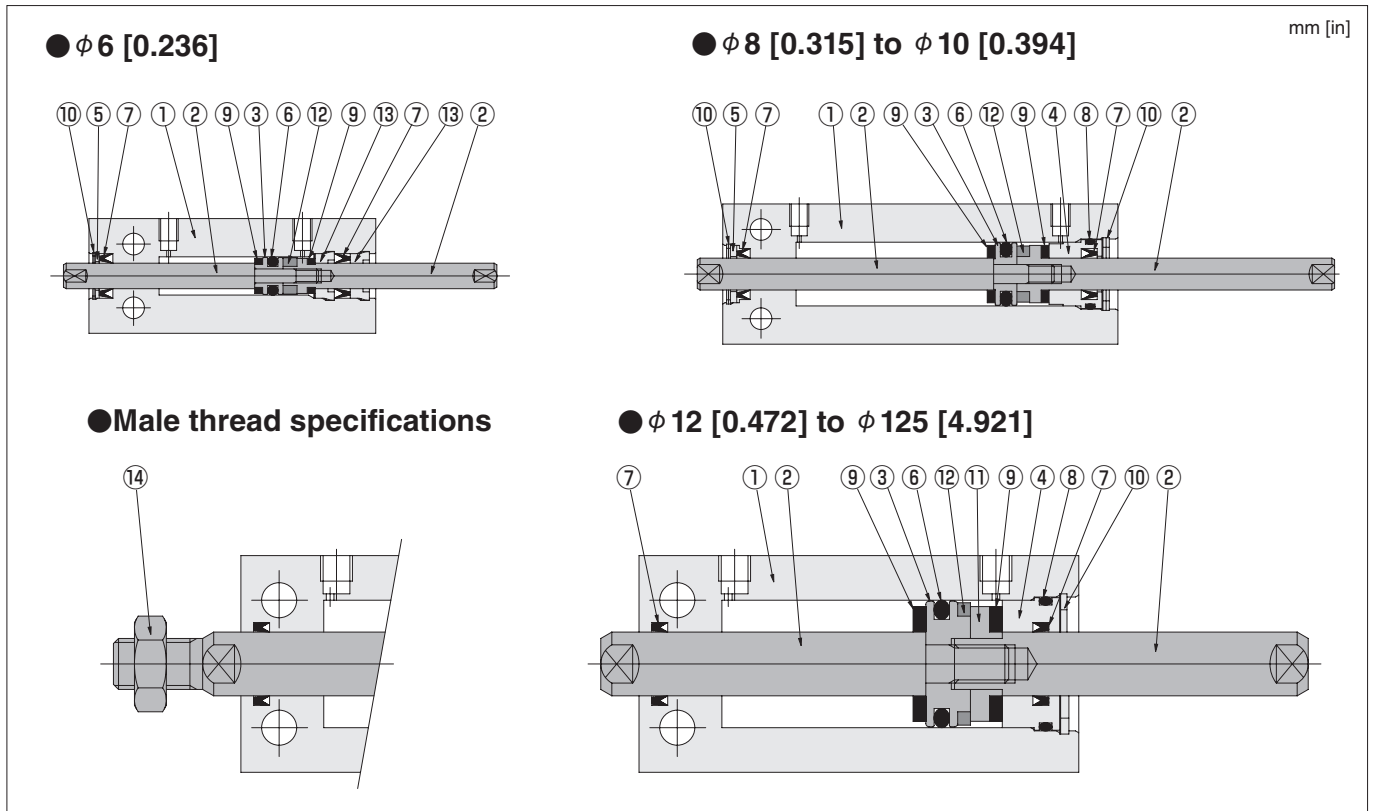
Model	Stroke													
	5	10	15	20	25	30	40	50	60	70	75	80	90	100
BCD6	0.56 (0.71)	0.67 (0.81)	0.78 (0.92)	0.88 (1.02)	0.99 (1.13)	1.09 (1.23)	–	–	–	–	–	–	–	–
BCD8	0.81 (0.95)	0.95 (1.09)	1.09 (1.23)	1.23 (1.38)	1.38 (1.52)	1.52 (1.66)	–	–	–	–	–	–	–	–
BCD10	0.88 (1.02)	1.02 (1.16)	1.16 (1.31)	1.31 (1.45)	1.45 (1.59)	1.59 (1.73)	–	–	–	–	–	–	–	–
BCD12	1.27 (1.48)	1.48 (1.69)	1.69 (1.90)	1.90 (2.12)	2.12 (2.33)	2.33 (2.54)	–	–	–	–	–	–	–	–
BCD16	1.94 (2.29)	2.22 (2.57)	2.50 (2.86)	2.79 (3.14)	3.07 (3.42)	3.35 (3.70)	–	–	–	–	–	–	–	–
BCD20	3.32 (4.02)	3.77 (4.48)	4.23 (4.94)	4.69 (5.40)	5.15 (5.86)	5.61 (6.31)	6.53 (7.23)	7.44 (8.15)	–	–	–	–	–	–
BCD25	4.83 (5.96)	5.43 (6.56)	6.03 (7.16)	6.63 (7.76)	7.23 (8.36)	7.83 (8.96)	9.03 (10.16)	10.23 (11.36)	–	–	–	–	–	–
BCD32	–	9.77 (12.59)	–	11.78 (14.60)	–	13.79 (16.61)	15.80 (18.62)	17.81 (20.63)	19.82 (22.65)	21.83 (24.66)	22.86 (25.68)	23.84 (26.67)	25.86 (28.68)	27.87 (30.69)
BCD40	–	13.51 (16.33)	–	15.73 (18.55)	–	17.95 (20.78)	20.18 (23.00)	22.40 (25.22)	24.62 (27.44)	26.84 (29.66)	27.97 (30.79)	29.07 (31.89)	31.29 (34.11)	33.51 (36.33)
BCD50	–	24.34 (31.04)	–	27.72 (34.43)	–	31.11 (37.81)	34.50 (41.20)	37.88 (44.59)	41.27 (47.97)	44.66 (51.36)	46.35 (53.05)	48.04 (54.74)	51.43 (58.13)	54.81 (61.52)
BCD63	–	35.84 (42.54)	–	39.58 (46.28)	–	43.32 (50.02)	47.05 (53.76)	50.79 (57.50)	54.53 (61.23)	58.27 (64.97)	60.14 (66.84)	62.01 (68.71)	65.75 (72.45)	69.49 (76.19)
BCD80	–	53.83 (66.53)	–	58.98 (71.68)	–	64.13 (76.83)	69.28 (81.98)	74.43 (87.13)	79.58 (92.28)	84.73 (97.43)	87.30 (100.00)	89.88 (102.57)	104.55 (107.72)	100.18 (112.87)
BCD100	–	88.89 (110.05)	–	96.83 (117.99)	–	104.76 (125.93)	112.70 (133.86)	120.63 (141.80)	128.57 (149.74)	136.51 (157.67)	140.49 (161.66)	144.44 (165.61)	152.38 (173.54)	160.32 (181.48)
BCD125	–	143.56 (181.73)	–	154.50 (192.66)	–	165.43 (203.60)	176.37 (214.53)	187.30 (225.47)	198.27 (236.44)	209.24 (247.41)	214.74 (252.91)	220.21 (258.38)	231.18 (269.35)	242.15 (280.32)

Values in () parentheses are masses for male thread specifications

● Additional mass of sensor switches

ZE□□□A, ZE□□□G :15 g [0.53 oz] **ZE□□□B** :35 g [1.23 oz]

Inner construction

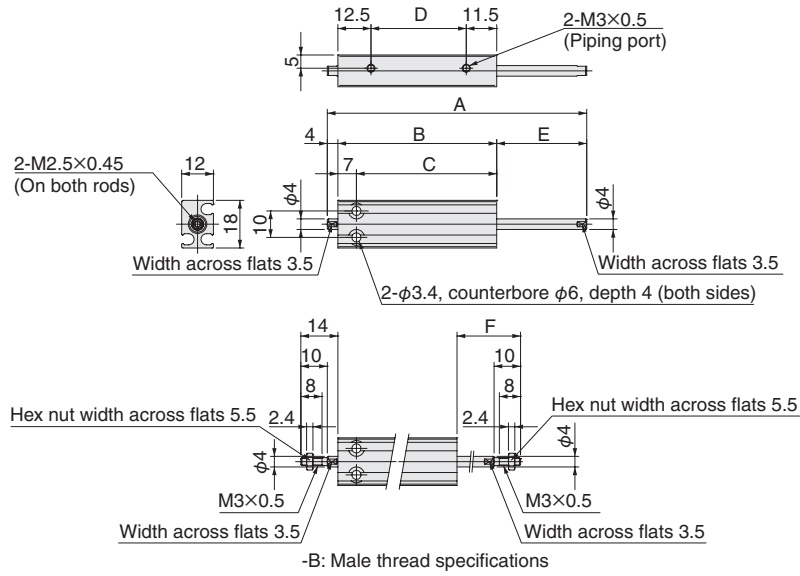


Major parts and materials

No	Name	φ 6 [0.236]	φ 8 [0.315]	φ 10 [0.394]	φ 12 [0.472]	φ 16 [0.630]	φ 20 [0.787]	φ 25 [0.984]	φ 32 [1.260]	φ 40 [1.575]	φ 50 [1.969]	φ 63 [2.480]	φ 80 [3.150]	φ 100 [3.937]	φ 125 [4.921]
①	Cylinder body	Aluminum alloy (special anti-abrasion treated)													
②	Piston rod	Stainless steel							Carbon steel						
③	Piston	Stainless steel				Aluminum alloy (anodized)									
④	Head cover	Aluminum alloy (anodized)													
⑤	Seal holder	Aluminum alloy (anodized)	—	—	—	—	—	—	—	—	—	—	—	—	—
⑥	★ Piston seal	Synthetic rubber (NBR)													
⑦	★ Rod seal	Synthetic rubber (NBR)													
⑧	★ O-ring	Synthetic rubber (NBR)													
⑨	Bumper	Urethane rubber	Synthetic rubber (NBR)												
⑩	★ Retaining ring	Stainless steel				Steel									
⑪	Support	Aluminum alloy (anodized)													
⑫	Magnet	Neodymium magnet							Plastic magnet						
⑬	Rod cap	Polyacetal	—	—	—	—	—	—	—	—	—	—	—	—	—
⑭	Rod end nut	Carbon steel													

Items indicated by a ★ are available as additional parts or in packing sets. For order codes, see page 65.

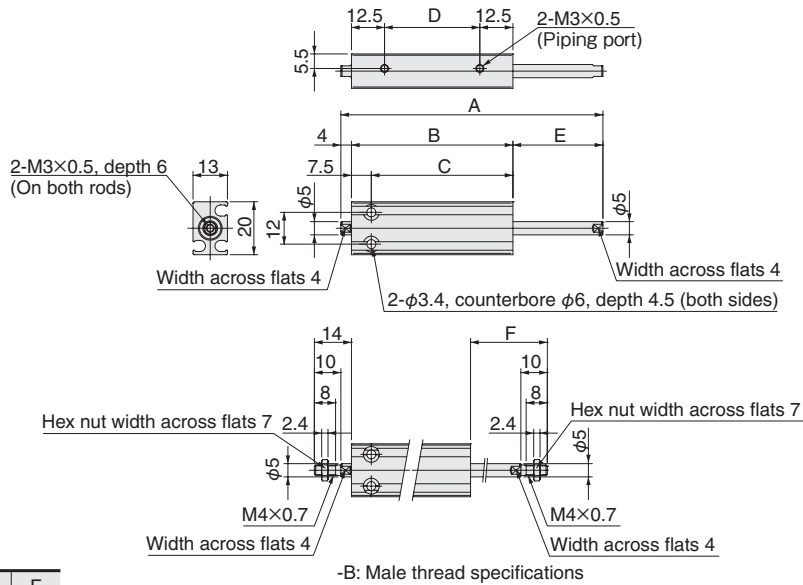
● BCD6



Stroke	A	B	C	D	E	F
5	48	35	28	11	9	19
10	58	40	33	16	14	24
15	68	45	38	21	19	29
20	78	50	43	26	24	34
25	88	55	48	31	29	39
30	98	60	53	36	34	44

Note: This product cannot use reed switch type sensor switches.

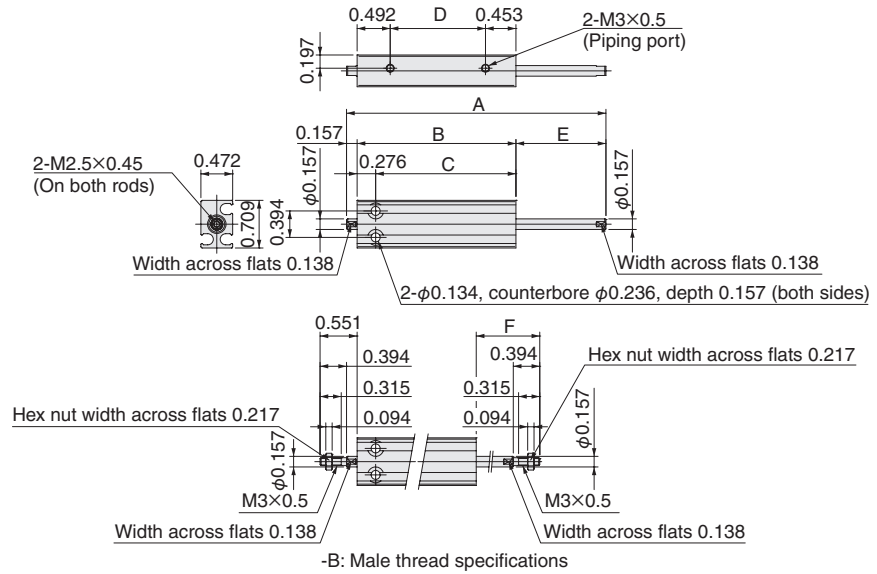
● BCD8



Stroke	A	B	C	D	E	F
5	49	36	28.5	11	9	19
10	59	41	33.5	16	14	24
15	69	46	38.5	21	19	29
20	79	51	43.5	26	24	34
25	89	56	48.5	31	29	39
30	99	61	53.5	36	34	44

Note: This product cannot use reed switch type sensor switches.

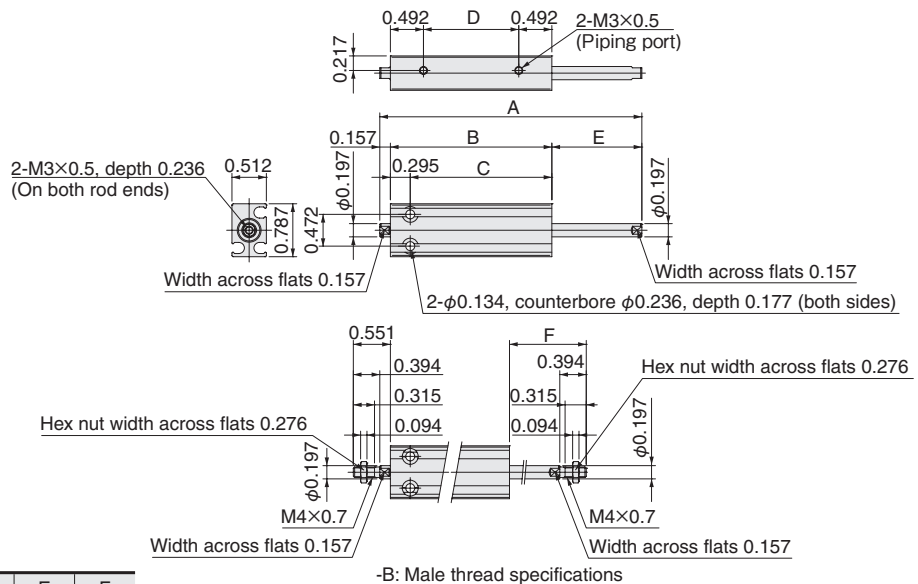
● BCD6



Stroke	A	B	C	D	E	F
5 mm [0.197]	1.890	1.378	1.102	0.433	0.354	0.748
10 mm [0.394]	2.283	1.575	1.299	0.630	0.551	0.945
15 mm [0.591]	2.677	1.772	1.496	0.827	0.748	1.142
20 mm [0.787]	3.071	1.969	1.693	1.024	0.945	1.339
25 mm [0.984]	3.465	2.165	1.890	1.220	1.142	1.535
30 mm [1.181]	3.858	2.362	2.087	1.417	1.339	1.732

Note: This product cannot use reed switch type sensor switches.

● BCD8



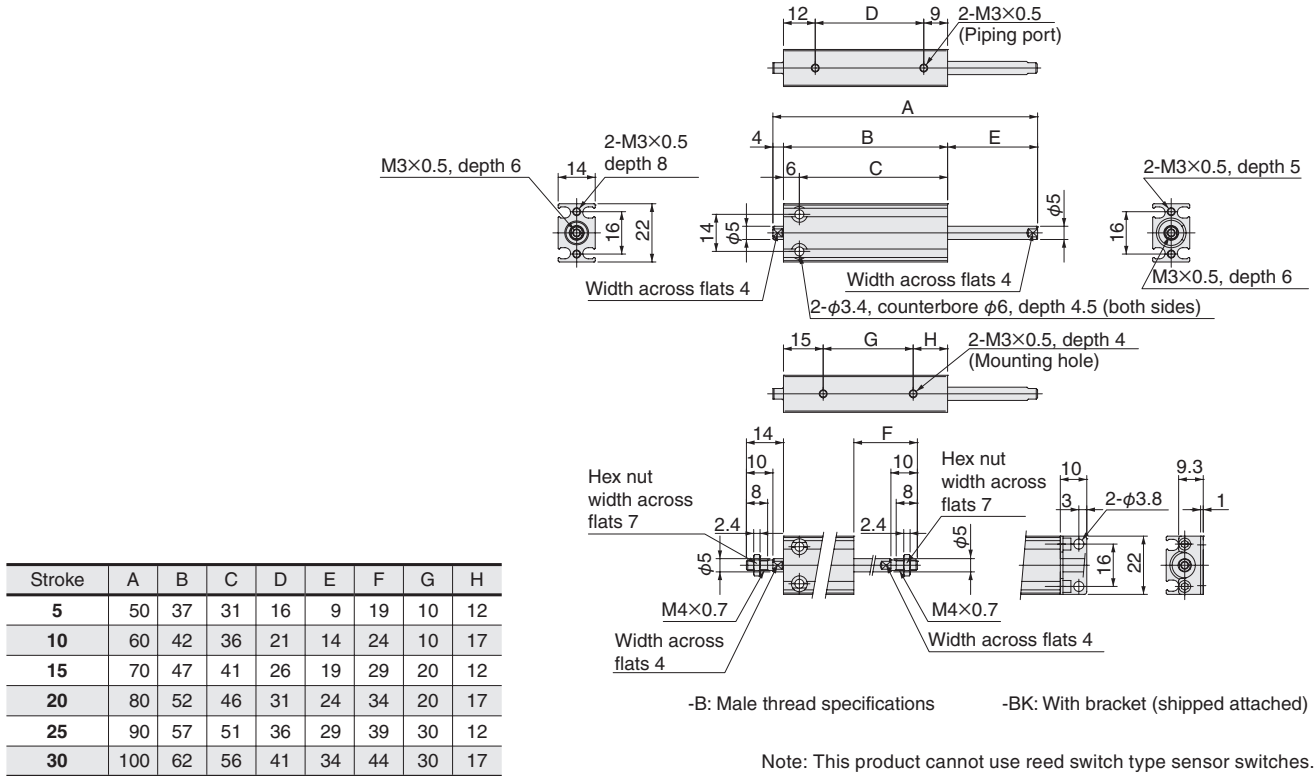
Stroke	A	B	C	D	E	F
5 mm [0.197]	1.929	1.417	1.122	0.433	0.354	0.748
10 mm [0.394]	2.323	1.614	1.319	0.630	0.551	0.945
15 mm [0.591]	2.717	1.811	1.516	0.827	0.748	1.142
20 mm [0.787]	3.110	2.008	1.713	1.024	0.945	1.339
25 mm [0.984]	3.504	2.205	1.909	1.220	1.142	1.535
30 mm [1.181]	3.898	2.402	2.106	1.417	1.339	1.732

Note: This product cannot use reed switch type sensor switches.

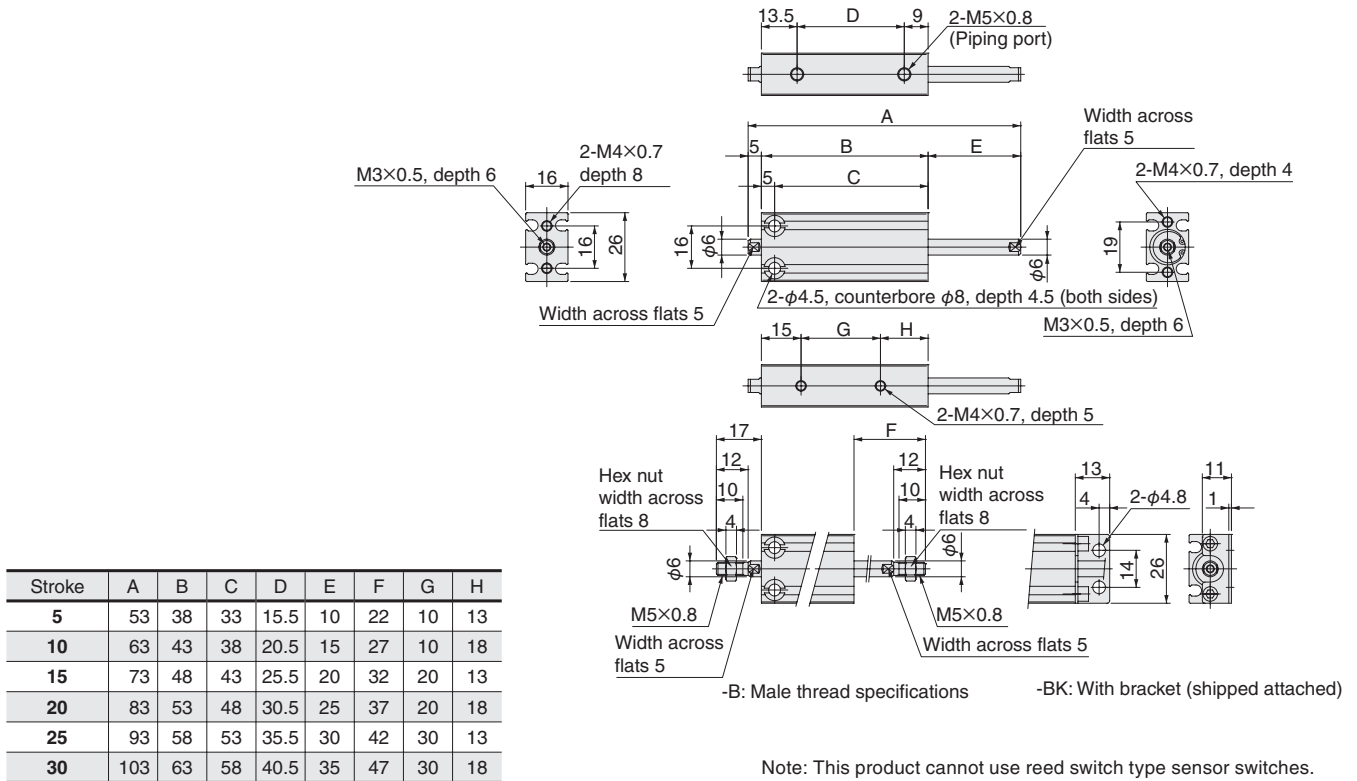
Double acting double rod end type dimensions

unit: mm

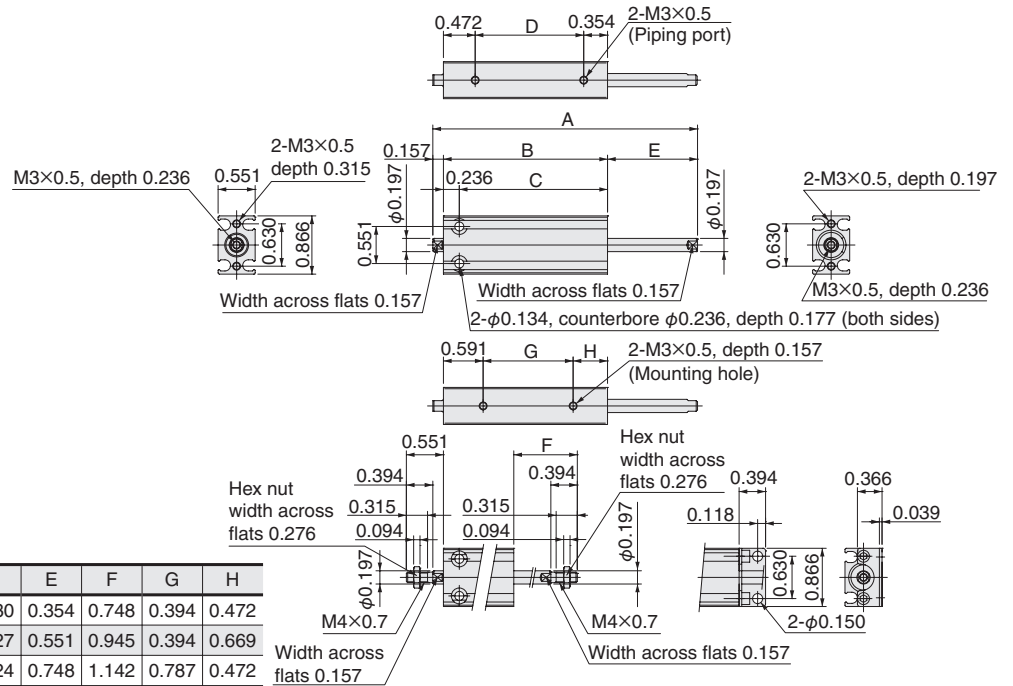
BCD10



BCD12



● BCD10

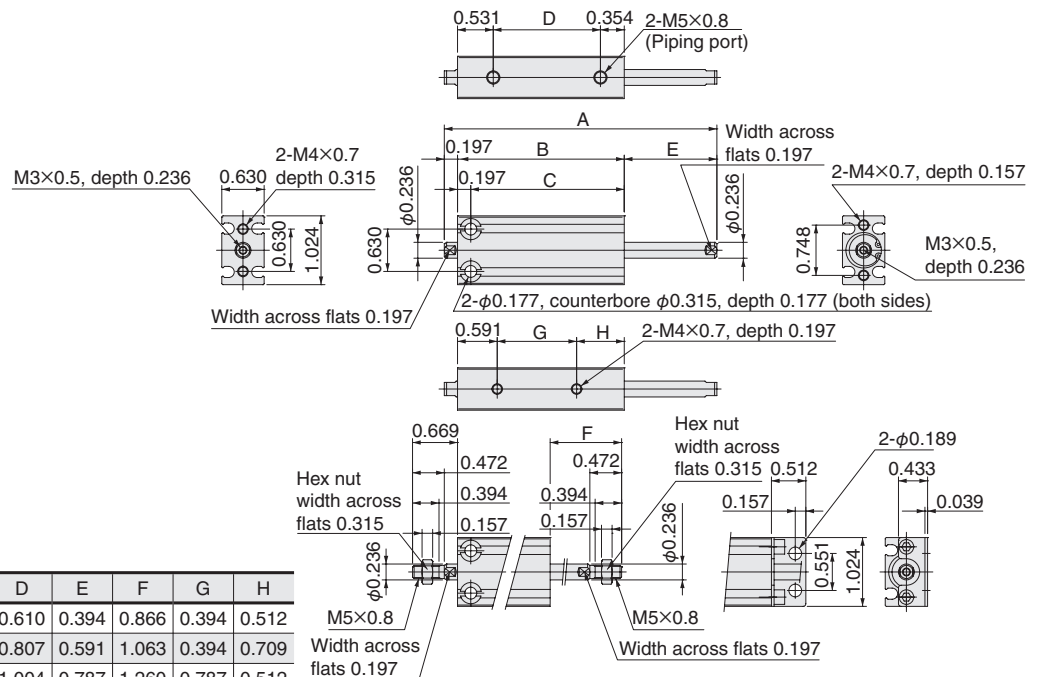


Stroke	A	B	C	D	E	F	G	H
5 mm [0.197]	1.969	1.457	1.220	0.630	0.354	0.748	0.394	0.472
10 mm [0.394]	2.362	1.654	1.417	0.827	0.551	0.945	0.394	0.669
15 mm [0.591]	2.756	1.850	1.614	1.024	0.748	1.142	0.787	0.472
20 mm [0.787]	3.150	2.047	1.811	1.220	0.945	1.339	0.787	0.669
25 mm [0.984]	3.543	2.244	2.008	1.417	1.142	1.535	1.181	0.472
30 mm [1.181]	3.937	2.441	2.205	1.614	1.339	1.732	1.181	0.669

-B: Male thread specifications -BK: With bracket (shipped attached)

Note: This product cannot use reed switch type sensor switches.

● BCD12

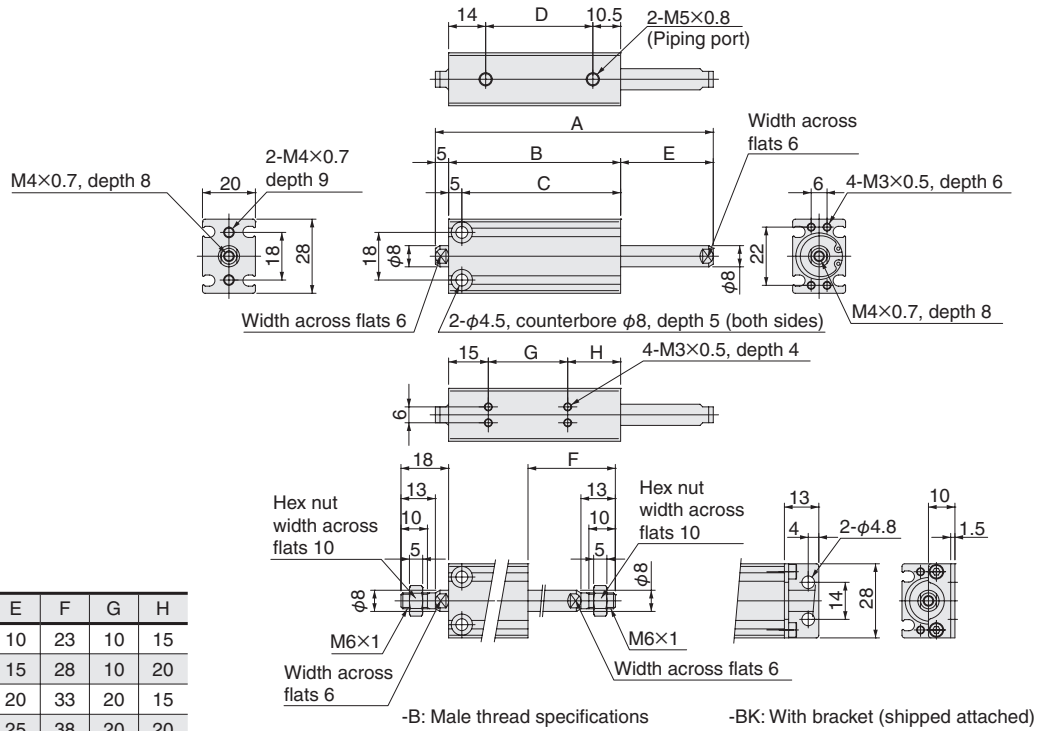


Stroke	A	B	C	D	E	F	G	H
5 mm [0.197]	2.087	1.496	1.299	0.610	0.394	0.866	0.394	0.512
10 mm [0.394]	2.480	1.693	1.496	0.807	0.591	1.063	0.394	0.709
15 mm [0.591]	2.874	1.890	1.693	1.004	0.787	1.260	0.787	0.512
20 mm [0.787]	3.268	2.087	1.890	1.201	0.984	1.457	0.787	0.709
25 mm [0.984]	3.661	2.283	2.087	1.398	1.181	1.654	1.181	0.512
30 mm [1.181]	4.055	2.480	2.283	1.594	1.378	1.850	1.181	0.709

-B: Male thread specifications -BK: With bracket (shipped attached)

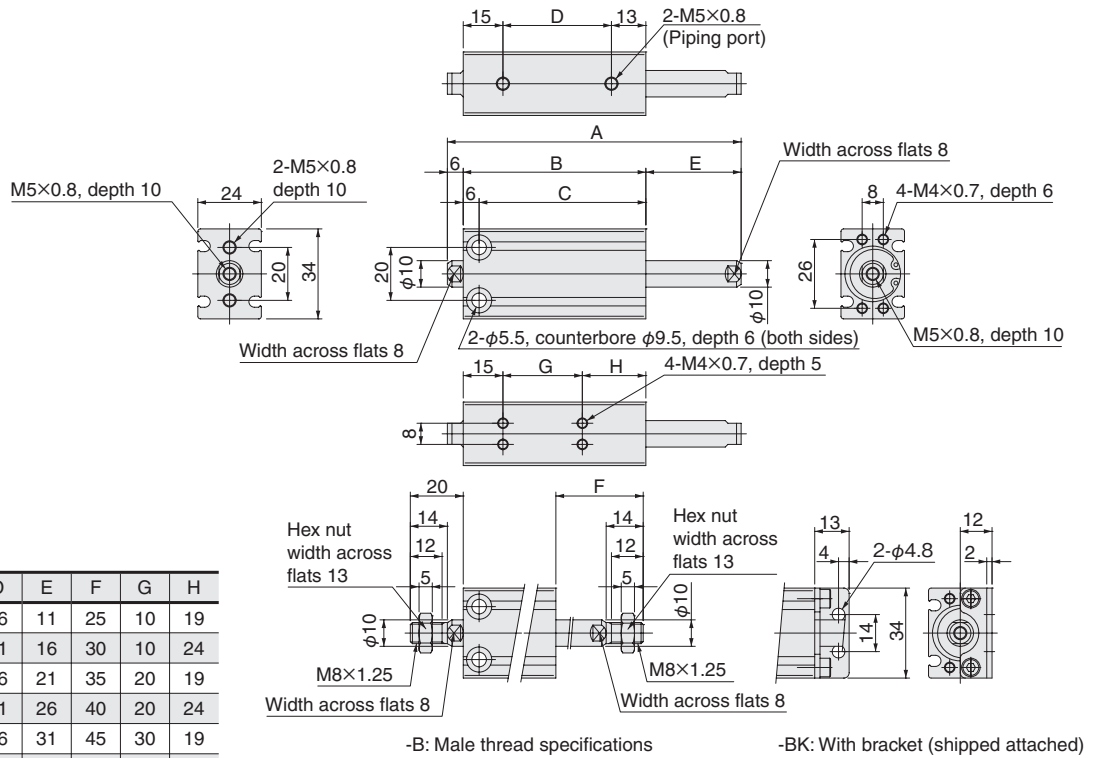
Note: This product cannot use reed switch type sensor switches.

● BCD16



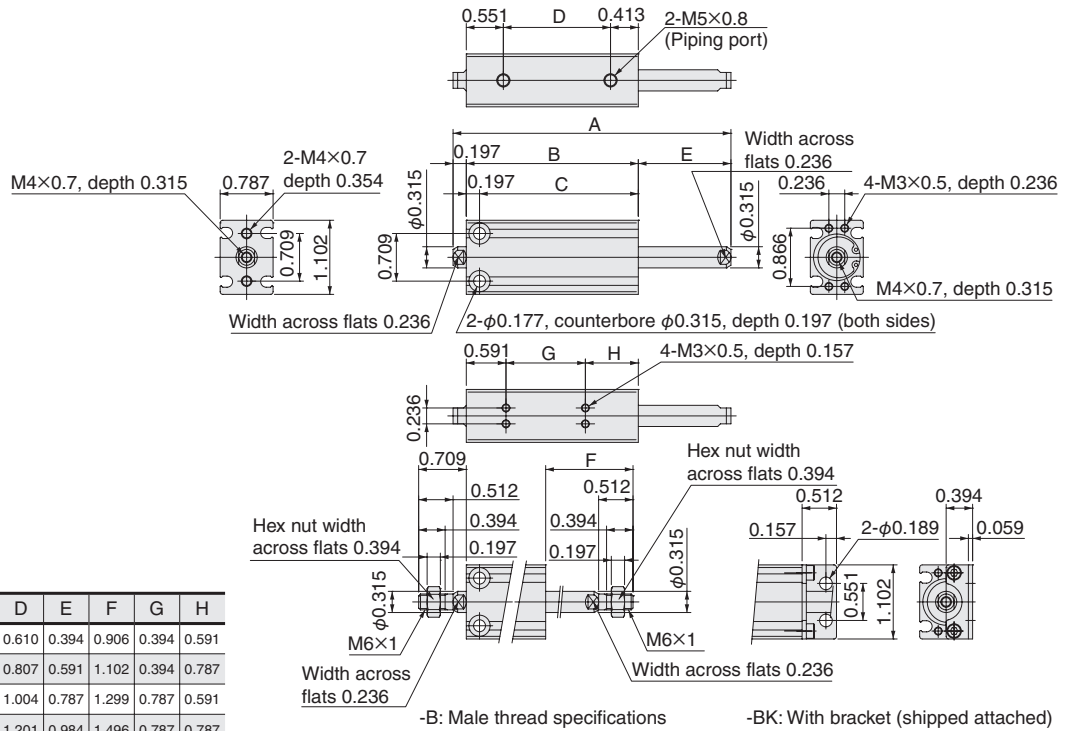
Stroke	A	B	C	D	E	F	G	H
5	55	40	35	15.5	10	23	10	15
10	65	45	40	20.5	15	28	10	20
15	75	50	45	25.5	20	33	20	15
20	85	55	50	30.5	25	38	20	20
25	95	60	55	35.5	30	43	30	15
30	105	65	60	40.5	35	48	30	20

● BCD20

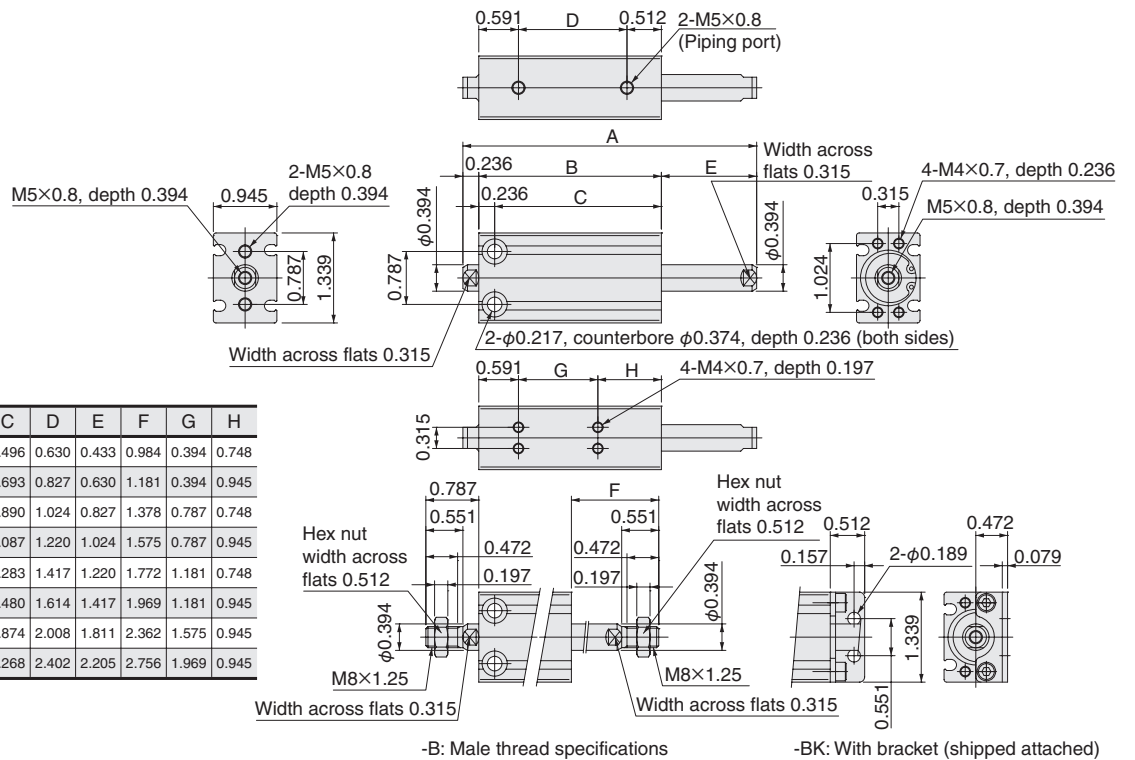


Stroke	A	B	C	D	E	F	G	H
5	61	44	38	16	11	25	10	19
10	71	49	43	21	16	30	10	24
15	81	54	48	26	21	35	20	19
20	91	59	53	31	26	40	20	24
25	101	64	58	36	31	45	30	19
30	111	69	63	41	36	50	30	24
40	131	79	73	51	46	60	40	24
50	151	89	83	61	56	70	50	24

● BCD16



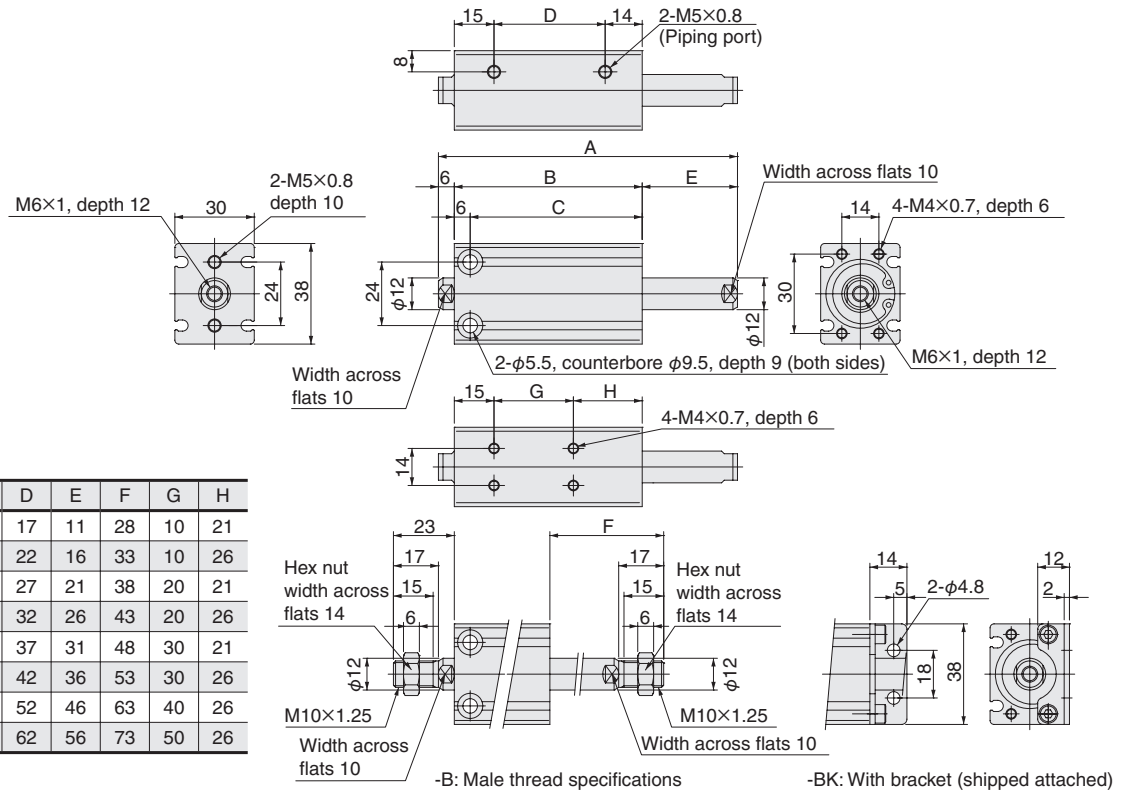
● BCD20



Double acting double rod end type dimensions

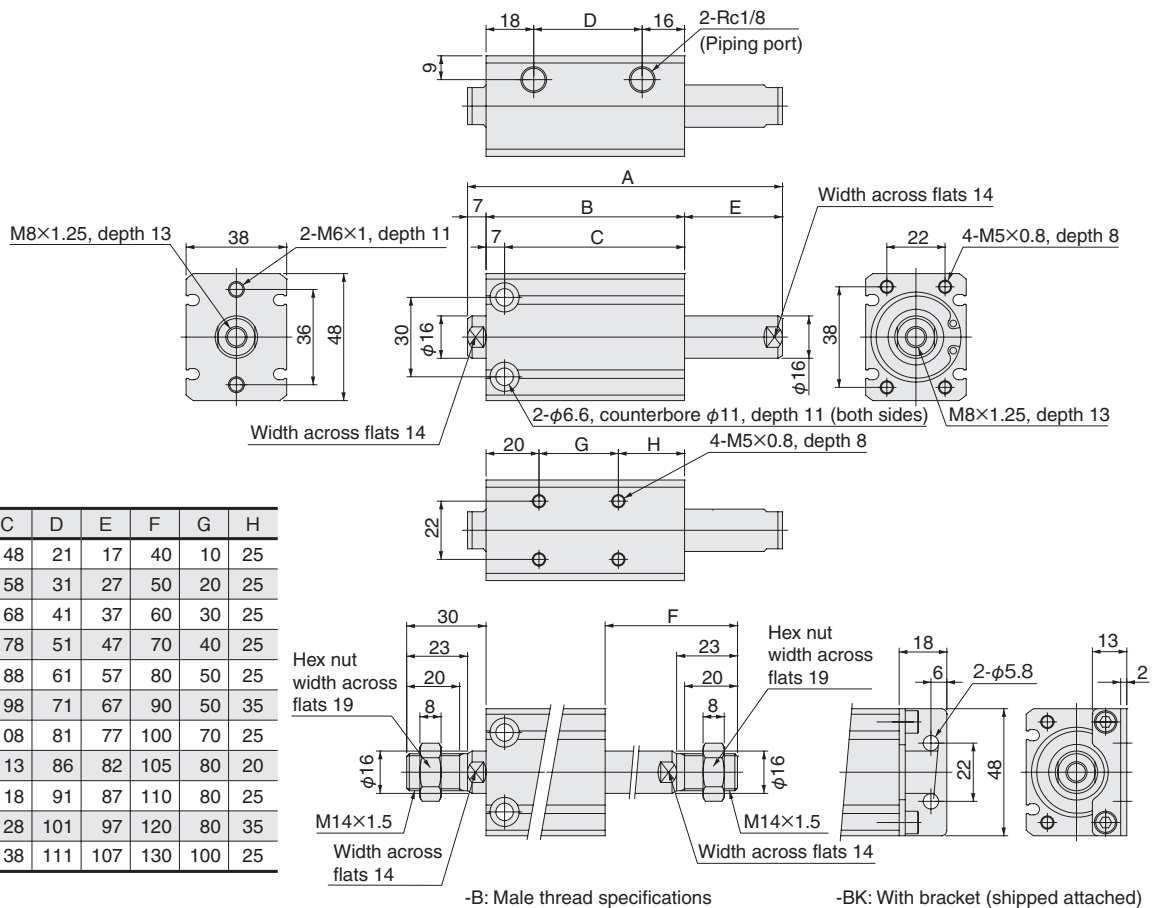
unit: mm

BCD25



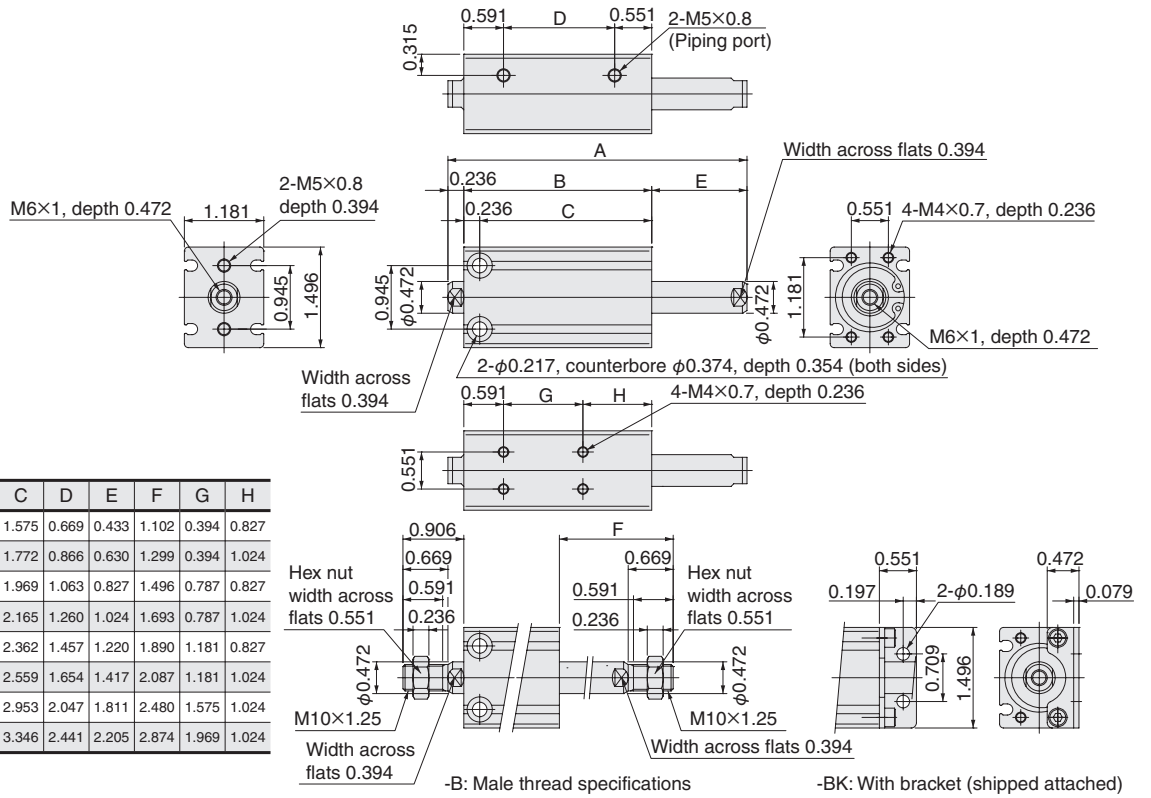
Stroke	A	B	C	D	E	F	G	H
5	63	46	40	17	11	28	10	21
10	73	51	45	22	16	33	10	26
15	83	56	50	27	21	38	20	21
20	93	61	55	32	26	43	20	26
25	103	66	60	37	31	48	30	21
30	113	71	65	42	36	53	30	26
40	133	81	75	52	46	63	40	26
50	153	91	85	62	56	73	50	26

BCD32



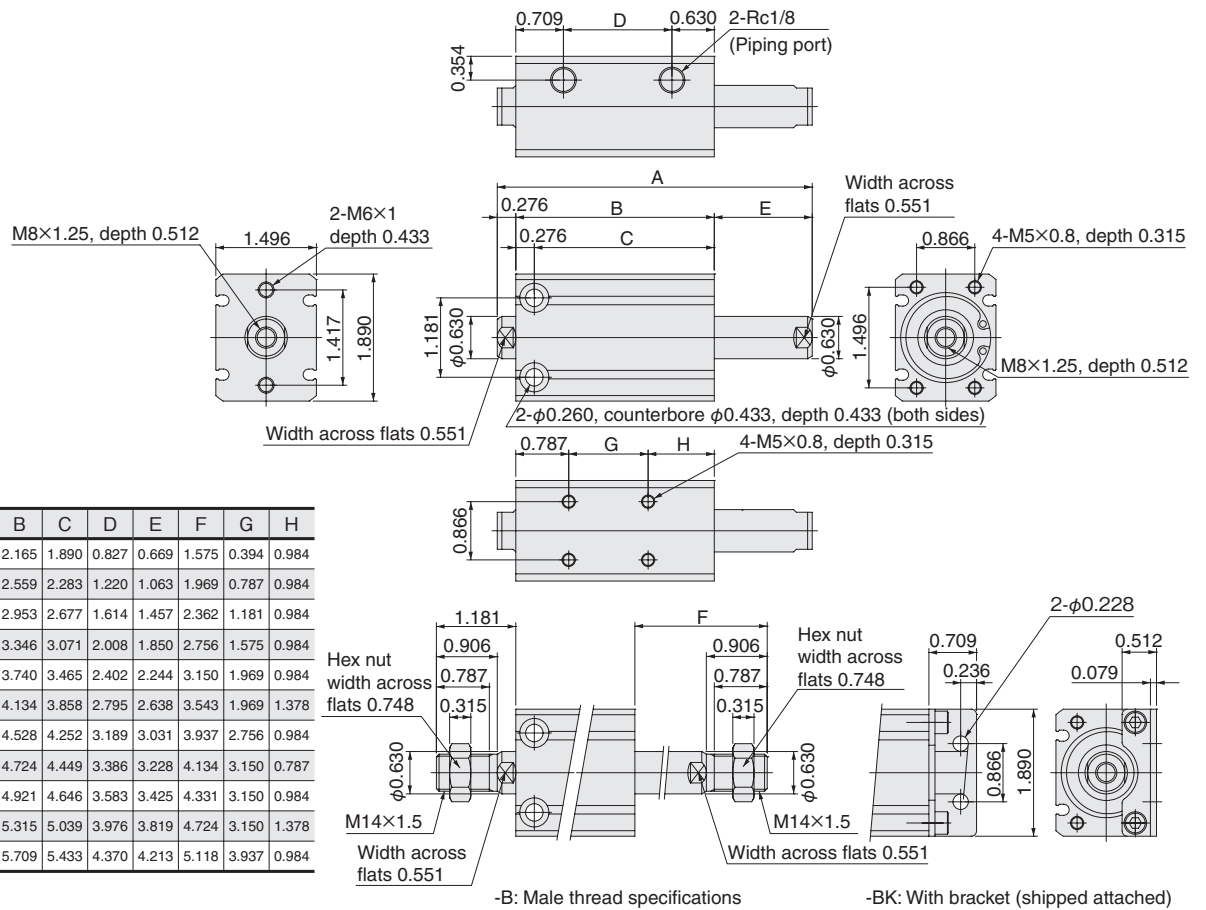
Stroke	A	B	C	D	E	F	G	H
10	79	55	48	21	17	40	10	25
20	99	65	58	31	27	50	20	25
30	119	75	68	41	37	60	30	25
40	139	85	78	51	47	70	40	25
50	159	95	88	61	57	80	50	25
60	179	105	98	71	67	90	50	35
70	199	115	108	81	77	100	70	25
75	209	120	113	86	82	105	80	20
80	219	125	118	91	87	110	80	25
90	239	135	128	101	97	120	80	35
100	259	145	138	111	107	130	100	25

● BCD25



Stroke	A	B	C	D	E	F	G	H
5 mm [0.197]	2.480	1.811	1.575	0.669	0.433	1.102	0.394	0.827
10 mm [0.394]	2.874	2.008	1.772	0.866	0.630	1.299	0.394	1.024
15 mm [0.591]	3.268	2.205	1.969	1.063	0.827	1.496	0.787	0.827
20 mm [0.787]	3.661	2.402	2.165	1.260	1.024	1.693	0.787	1.024
25 mm [0.984]	4.055	2.598	2.362	1.457	1.220	1.890	1.181	0.827
30 mm [1.181]	4.449	2.795	2.559	1.654	1.417	2.087	1.181	1.024
40 mm [1.575]	5.236	3.189	2.953	2.047	1.811	2.480	1.575	1.024
50 mm [1.969]	6.024	3.583	3.346	2.441	2.205	2.874	1.969	1.024

● BCD32

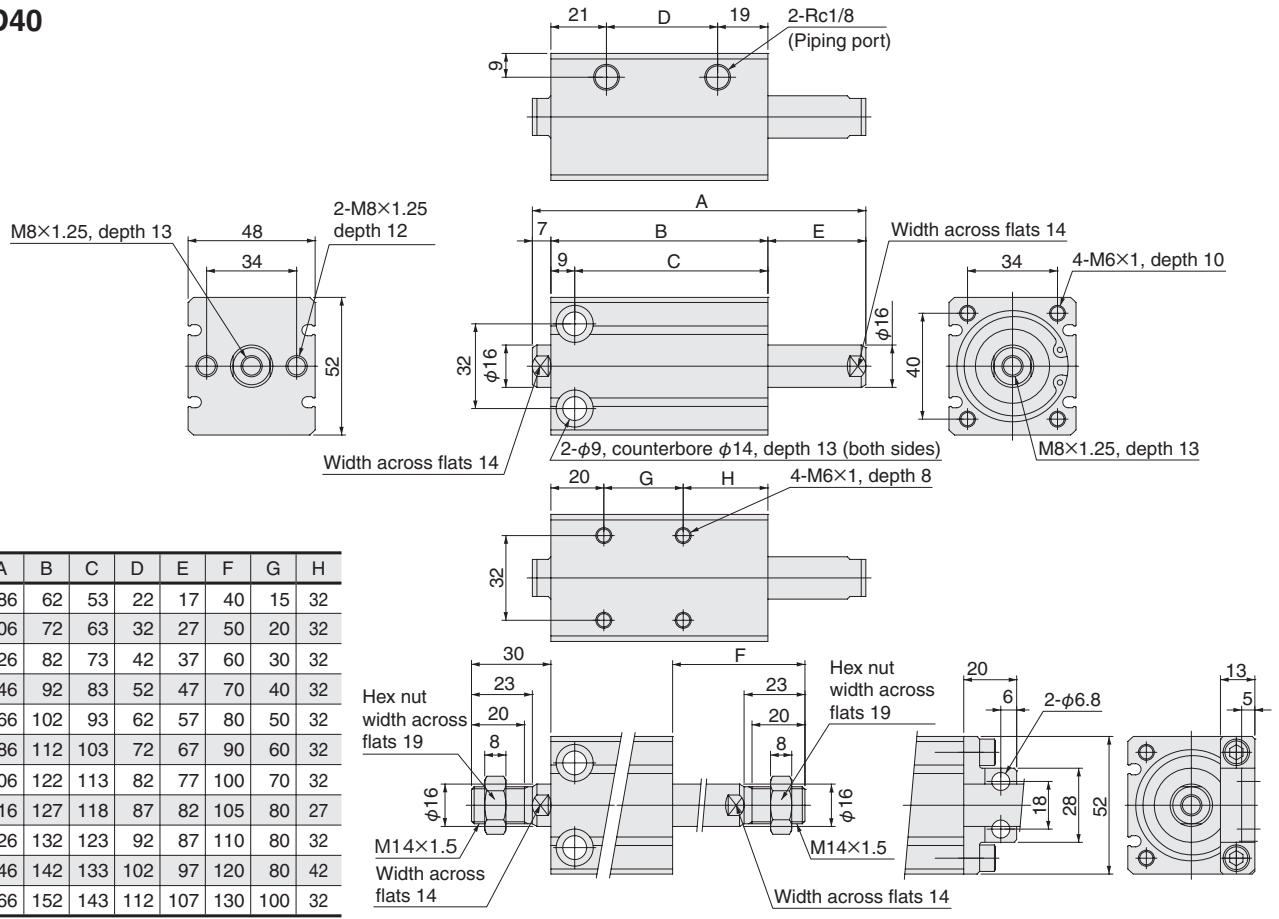


Stroke	A	B	C	D	E	F	G	H
10 mm [0.394]	3.110	2.165	1.890	0.827	0.669	1.575	0.394	0.984
20 mm [0.787]	3.898	2.559	2.283	1.220	1.063	1.969	0.787	0.984
30 mm [1.181]	4.685	2.953	2.677	1.614	1.457	2.362	1.181	0.984
40 mm [1.575]	5.472	3.346	3.071	2.008	1.850	2.756	1.575	0.984
50 mm [1.969]	6.260	3.740	3.465	2.402	2.244	3.150	1.969	0.984
60 mm [2.362]	7.047	4.134	3.858	2.795	2.638	3.543	1.969	1.378
70 mm [2.756]	7.835	4.528	4.252	3.189	3.031	3.937	2.756	0.984
75 mm [2.953]	8.228	4.724	4.449	3.386	3.228	4.134	3.150	0.787
80 mm [3.150]	8.622	4.921	4.646	3.583	3.425	4.331	3.150	0.984
90 mm [3.543]	9.409	5.315	5.039	3.976	3.819	4.724	3.150	1.378
100 mm [3.937]	10.197	5.709	5.433	4.370	4.213	5.118	3.937	0.984

Double acting double rod end type dimensions

unit: mm

BCD40

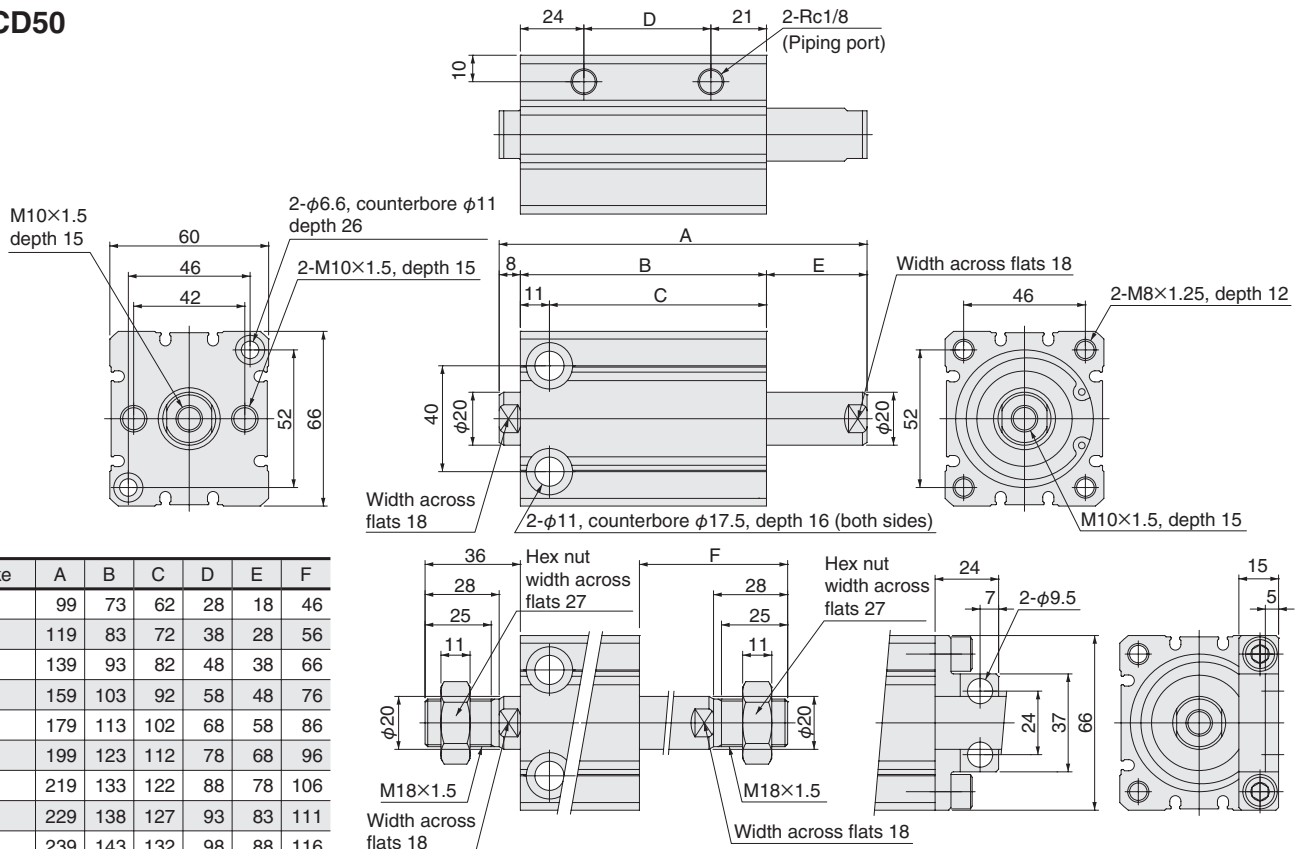


Stroke	A	B	C	D	E	F	G	H
10	86	62	53	22	17	40	15	32
20	106	72	63	32	27	50	20	32
30	126	82	73	42	37	60	30	32
40	146	92	83	52	47	70	40	32
50	166	102	93	62	57	80	50	32
60	186	112	103	72	67	90	60	32
70	206	122	113	82	77	100	70	32
75	216	127	118	87	82	105	80	27
80	226	132	123	92	87	110	80	32
90	246	142	133	102	97	120	80	42
100	266	152	143	112	107	130	100	32

-B: Male thread specifications

-BK: With bracket (shipped attached)

BCD50



Stroke	A	B	C	D	E	F
10	99	73	62	28	18	46
20	119	83	72	38	28	56
30	139	93	82	48	38	66
40	159	103	92	58	48	76
50	179	113	102	68	58	86
60	199	123	112	78	68	96
70	219	133	122	88	78	106
75	229	138	127	93	83	111
80	239	143	132	98	88	116
90	259	153	142	108	98	126
100	279	163	152	118	108	136

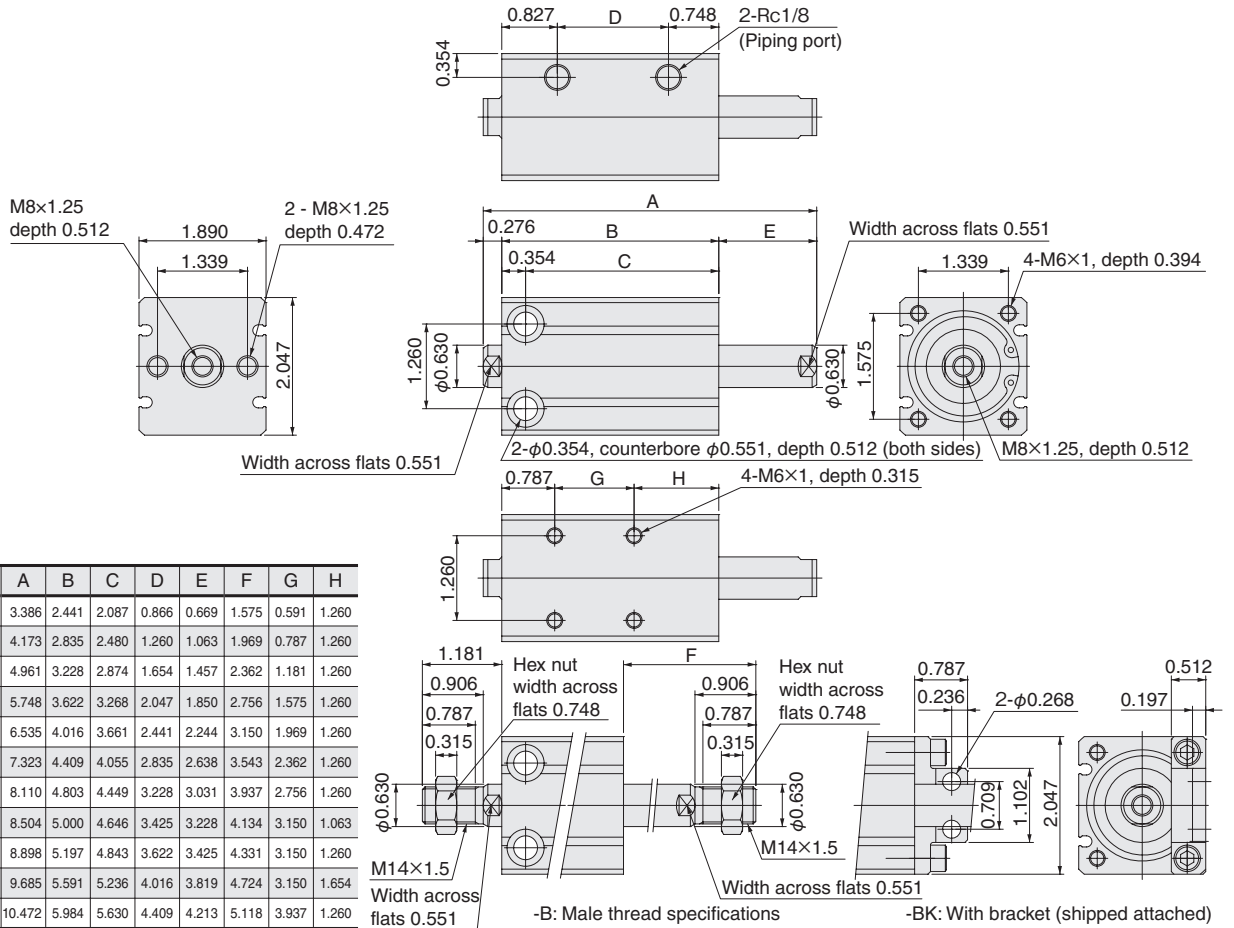
-B: Male thread specifications

-BK: With bracket (shipped attached)

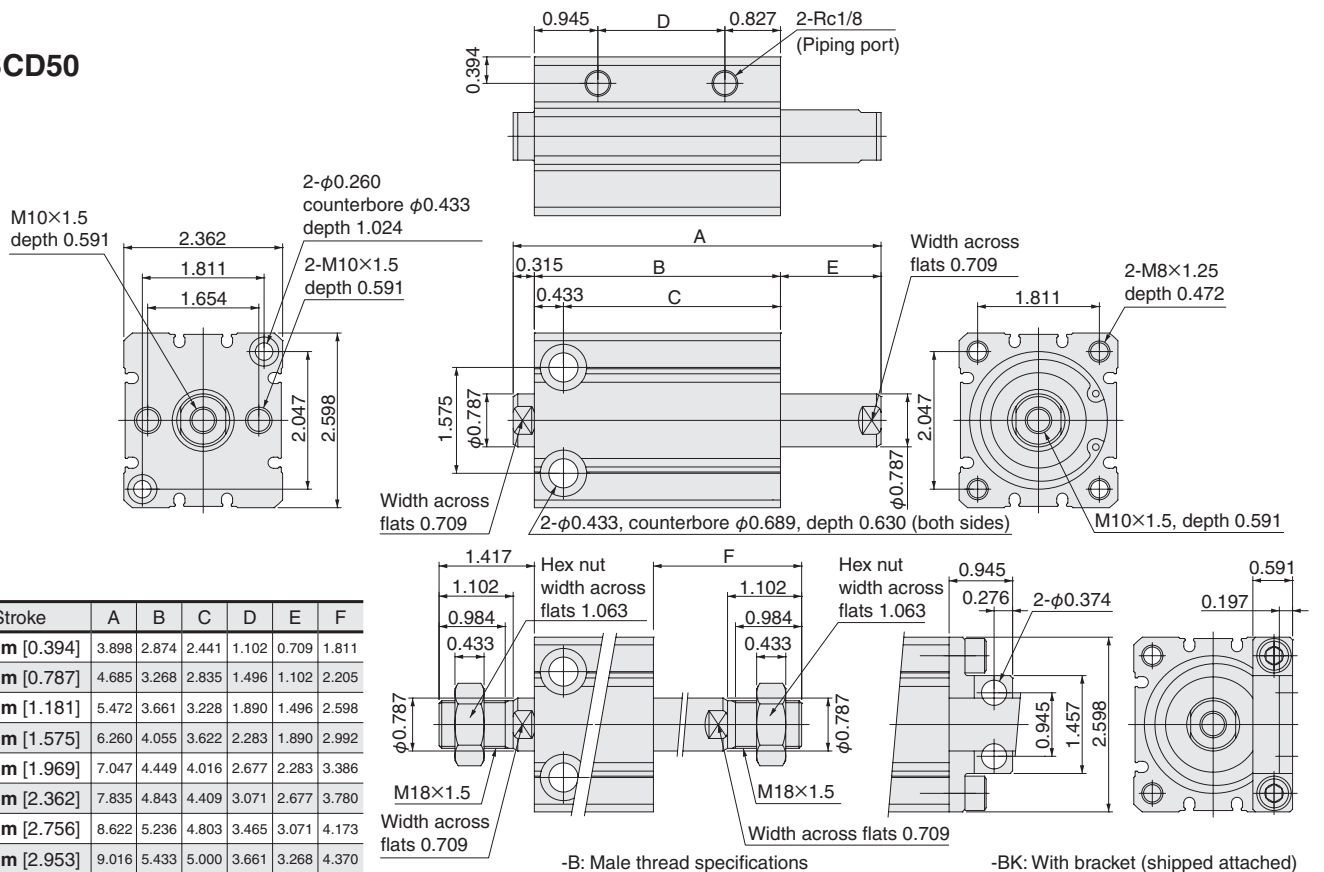
Double acting double rod end type dimensions

unit: in

BCD40



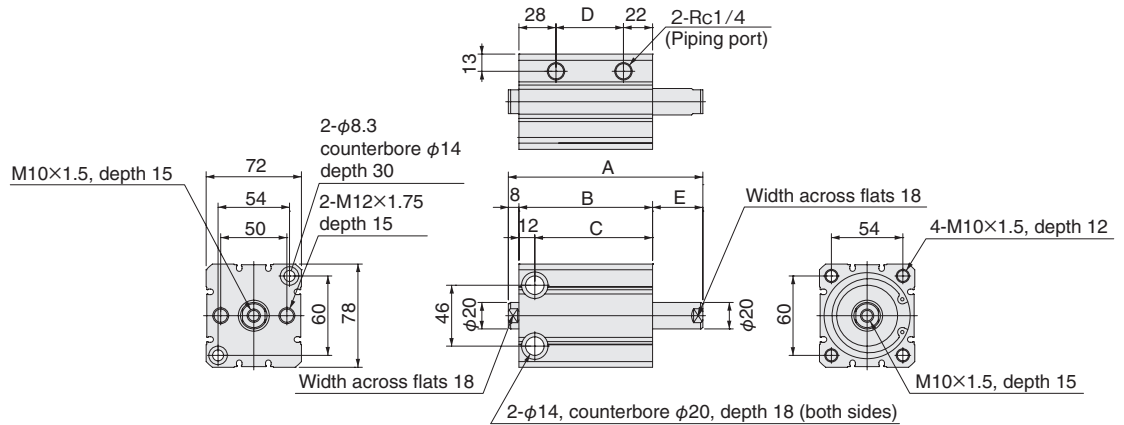
BCD50



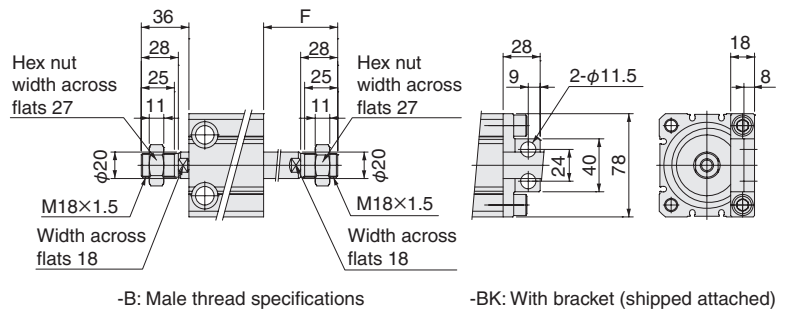
Double acting double rod end type dimensions

unit: mm

BCD63



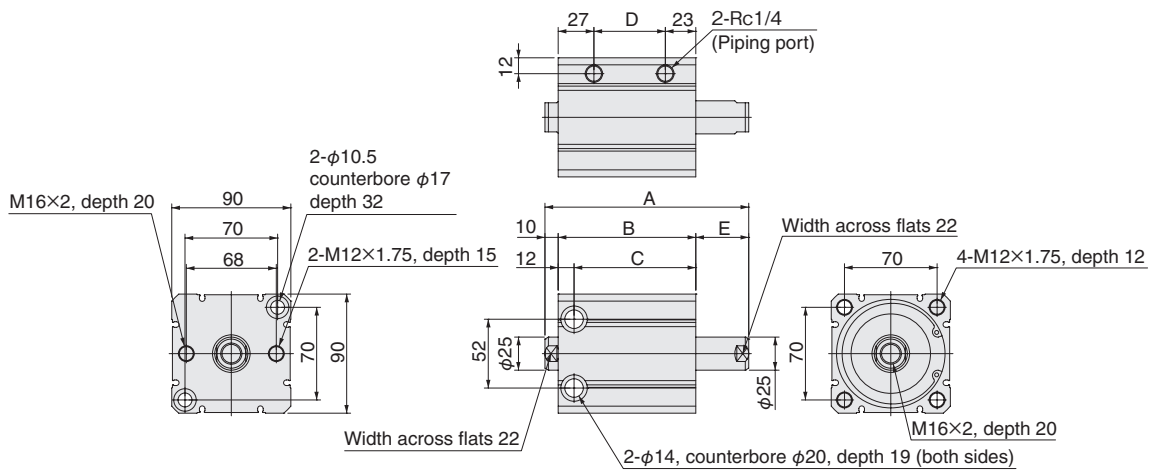
Stroke	A	B	C	D	E	F
10	107	81	69	31	18	46
20	127	91	79	41	28	56
30	147	101	89	51	38	66
40	167	111	99	61	48	76
50	187	121	109	71	58	86
60	207	131	119	81	68	96
70	227	141	129	91	78	106
75	237	146	134	96	83	111
80	247	151	139	101	88	116
90	267	161	149	111	98	126
100	287	171	159	121	108	136



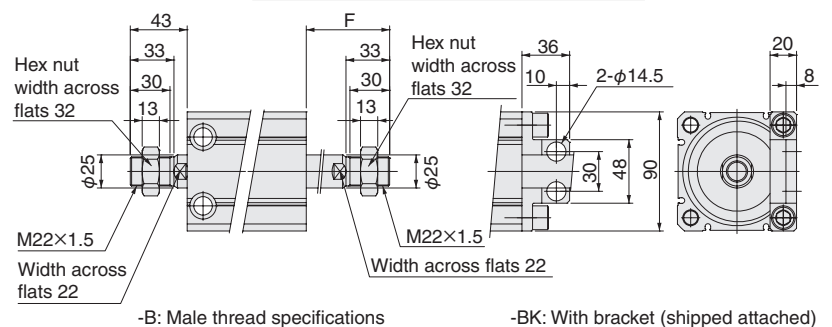
-B: Male thread specifications

-BK: With bracket (shipped attached)

BCD80



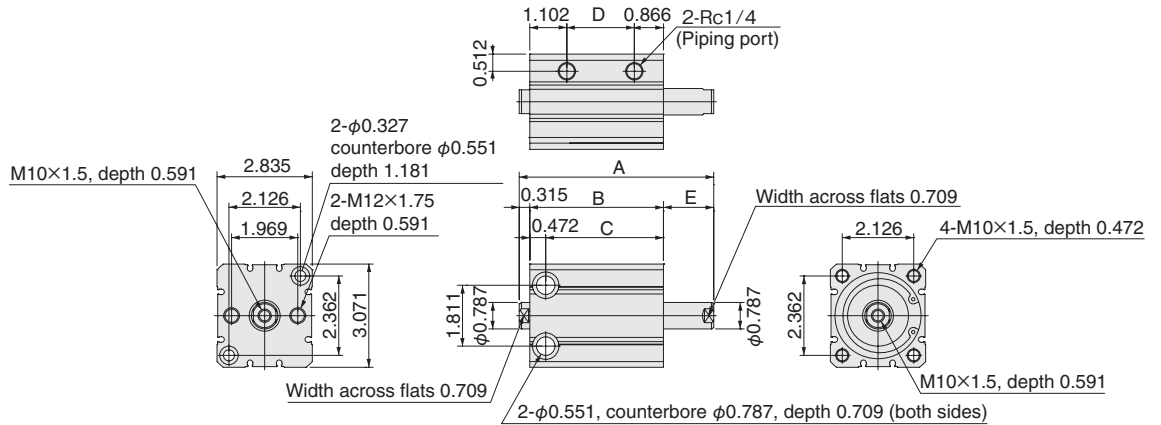
Stroke	A	B	C	D	E	F
10	114	84	72	34	20	53
20	134	94	82	44	30	63
30	154	104	92	54	40	73
40	174	114	102	64	50	83
50	194	124	112	74	60	93
60	214	134	122	84	70	103
70	234	144	132	94	80	113
75	244	149	137	99	85	118
80	254	154	142	104	90	123
90	274	164	152	114	100	133
100	294	174	162	124	110	143



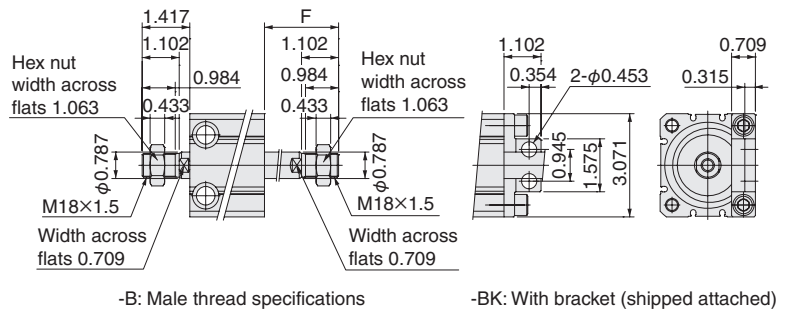
-B: Male thread specifications

-BK: With bracket (shipped attached)

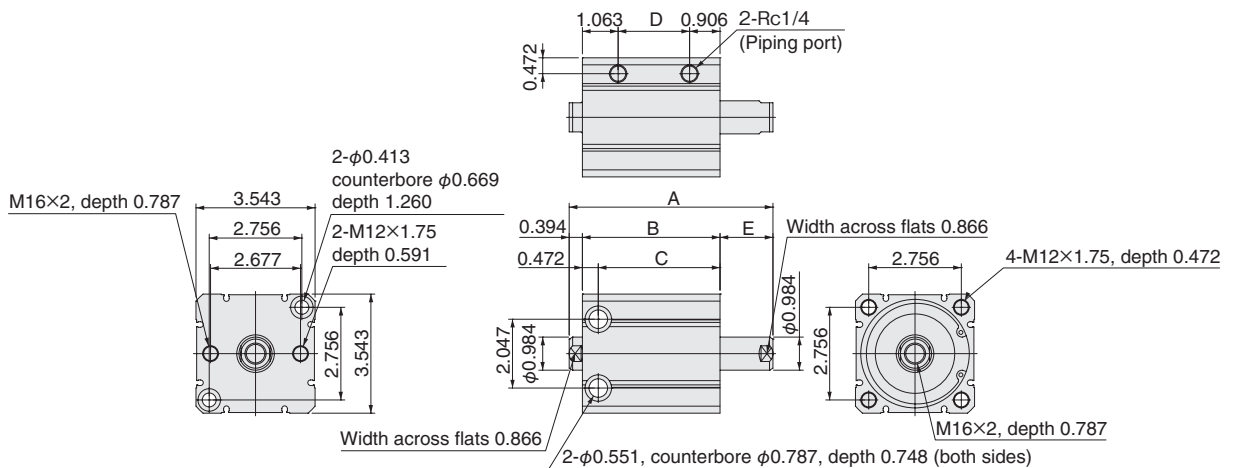
BCD63



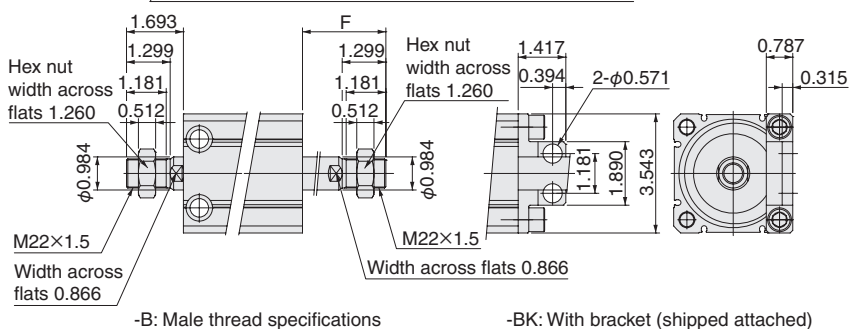
Stroke	A	B	C	D	E	F
10 mm [0.394]	4.213	3.189	2.717	1.220	0.709	1.811
20 mm [0.787]	5.000	3.583	3.110	1.614	1.102	2.205
30 mm [1.181]	5.787	3.976	3.504	2.008	1.496	2.598
40 mm [1.575]	6.575	4.370	3.898	2.402	1.890	2.992
50 mm [1.969]	7.362	4.764	4.291	2.795	2.283	3.386
60 mm [2.362]	8.150	5.157	4.685	3.189	2.677	3.780
70 mm [2.756]	8.937	5.551	5.079	3.583	3.071	4.173
75 mm [2.953]	9.331	5.748	5.276	3.780	3.268	4.370
80 mm [3.150]	9.724	5.945	5.472	3.976	3.465	4.567
90 mm [3.543]	10.512	6.339	5.866	4.370	3.858	4.961
100 mm [3.937]	11.299	6.732	6.260	4.764	4.252	5.354



BCD80



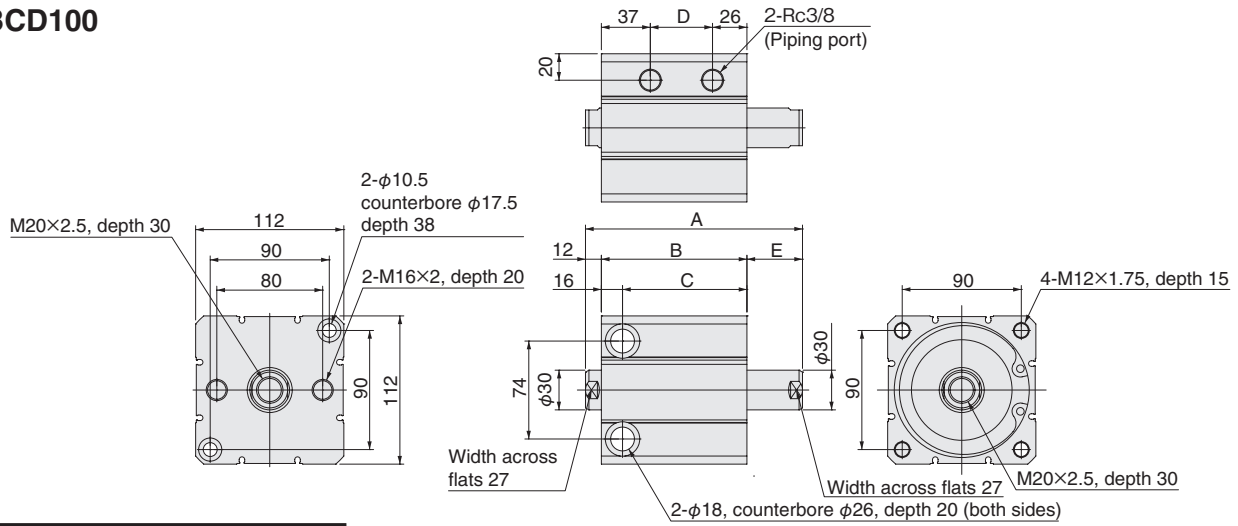
Stroke	A	B	C	D	E	F
10 mm [0.394]	4.488	3.307	2.835	1.339	0.787	2.087
20 mm [0.787]	5.276	3.701	3.228	1.732	1.181	2.480
30 mm [1.181]	6.063	4.094	3.622	2.126	1.575	2.874
40 mm [1.575]	6.850	4.488	4.016	2.520	1.969	3.268
50 mm [1.969]	7.638	4.882	4.409	2.913	2.362	3.661
60 mm [2.362]	8.425	5.276	4.803	3.307	2.756	4.055
70 mm [2.756]	9.213	5.669	5.197	3.701	3.150	4.449
75 mm [2.953]	9.606	5.866	5.394	3.898	3.346	4.646
80 mm [3.150]	10.000	6.063	5.591	4.094	3.543	4.843
90 mm [3.543]	10.787	6.457	5.984	4.488	3.937	5.236
100 mm [3.937]	11.575	6.850	6.378	4.882	4.331	5.630



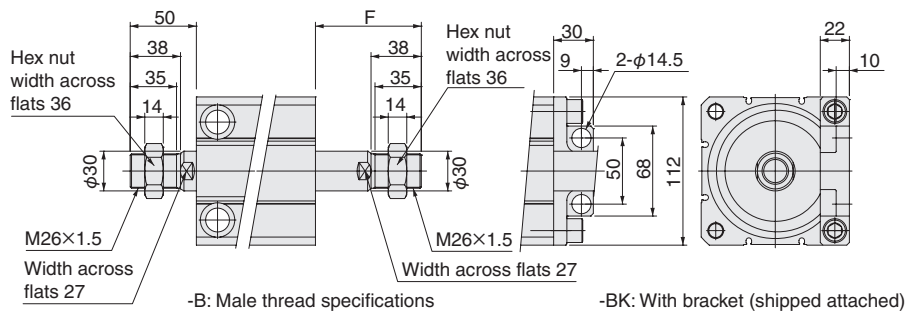
Double acting double rod end type dimensions

unit: mm

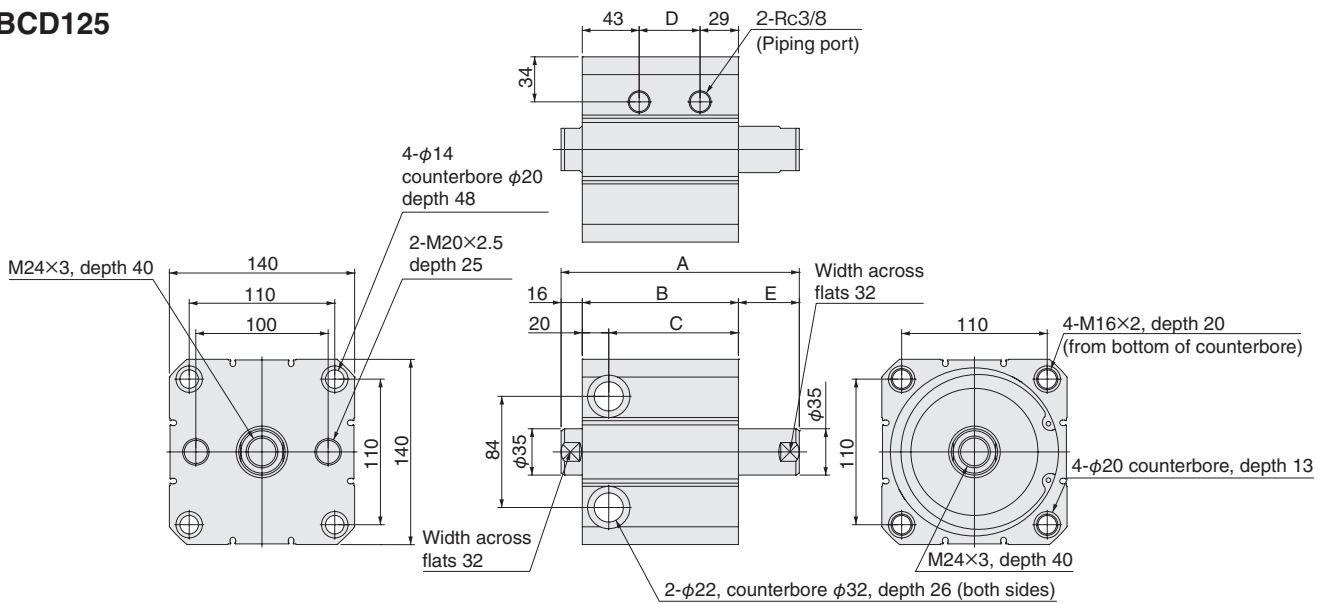
BCD100



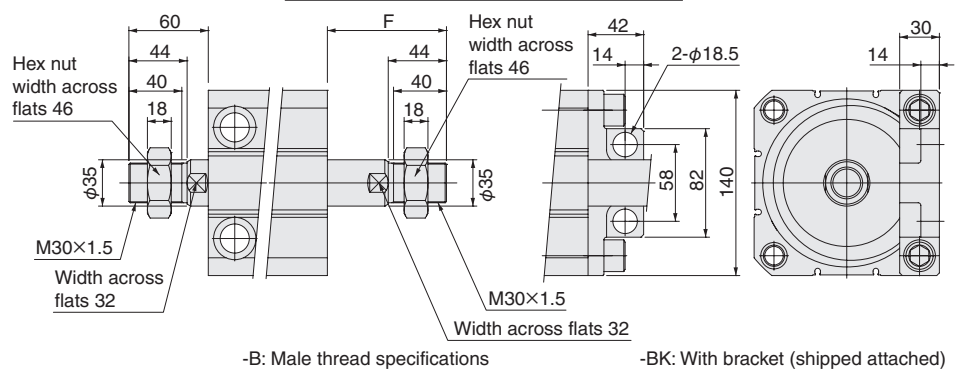
Stroke	A	B	C	D	E	F
10	124	90	74	27	22	60
20	144	100	84	37	32	70
30	164	110	94	47	42	80
40	184	120	104	57	52	90
50	204	130	114	67	62	100
60	224	140	124	77	72	110
70	244	150	134	87	82	120
75	254	155	139	92	87	125
80	264	160	144	97	92	130
90	284	170	154	107	102	140
100	304	180	164	117	112	150



BCD125



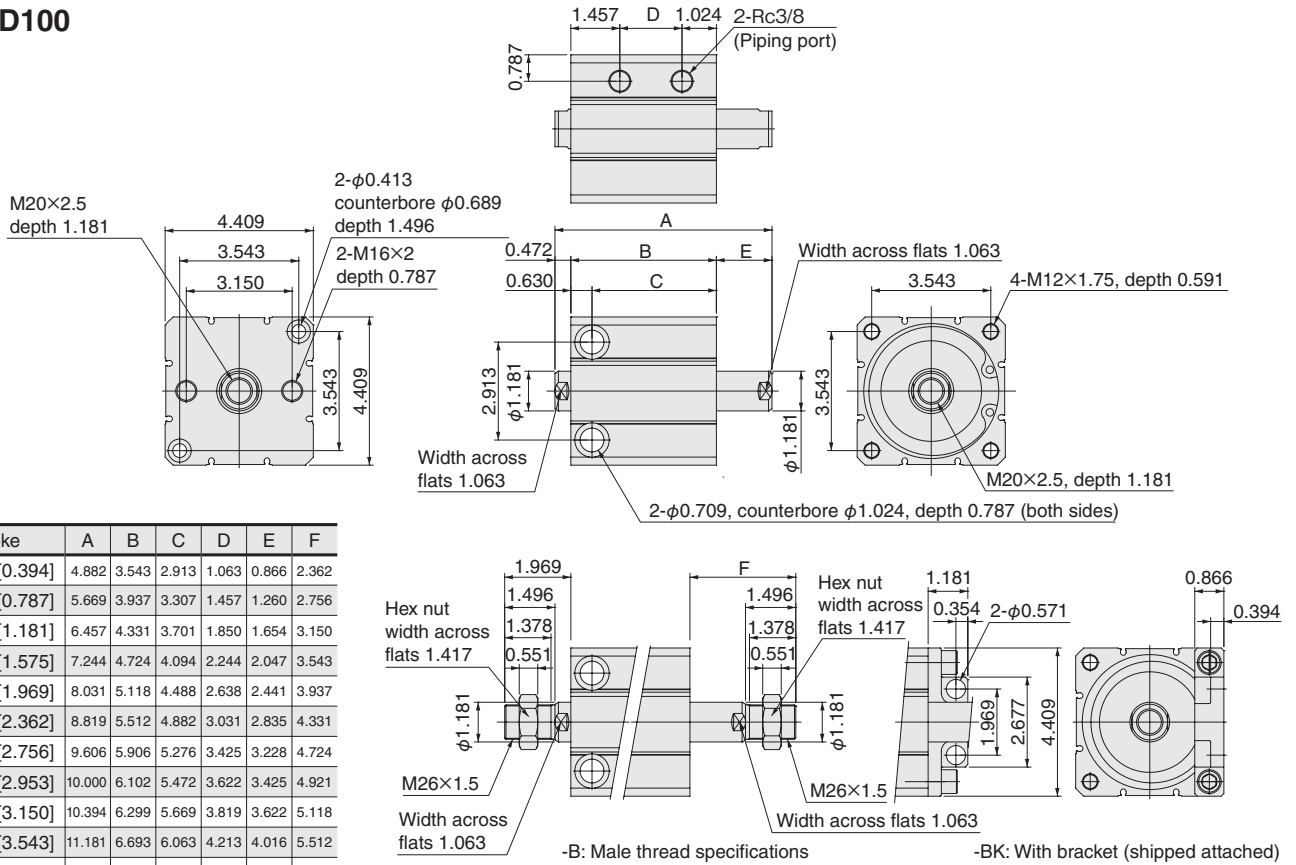
Stroke	A	B	C	D	E	F
10	140	98	78	26	26	70
20	160	108	88	36	36	80
30	180	118	98	46	46	90
40	200	128	108	56	56	100
50	220	138	118	66	66	110
60	240	148	128	76	76	120
70	260	158	138	86	86	130
75	270	163	143	91	91	135
80	280	168	148	96	96	140
90	300	178	158	106	106	150
100	320	188	168	116	116	160



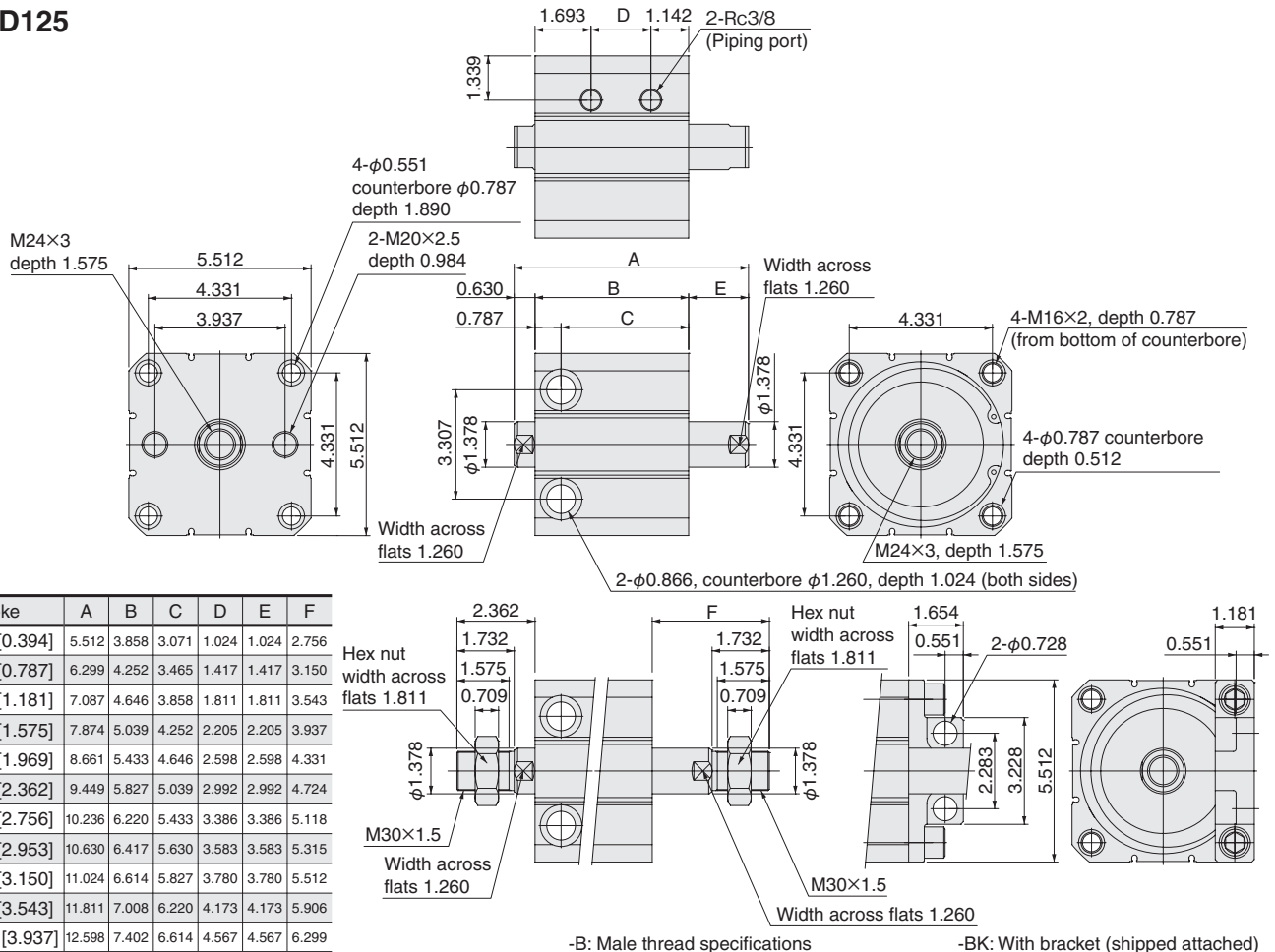
Double acting double rod end type dimensions

unit: in

BCD100



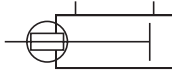
BCD125



Basic Cylinders

Cylinder with guide

Symbol



Specifications

Item	Cylinder bore	8 [0.315]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Operating type		Double acting type						
Medium		Air						
Operating pressure range	MPa [psi]	0.2 to 0.7 [29 to 102]	0.1 to 0.7 [15 to 102]		0.08 to 0.7 [12 to 102]			
Proof pressure	MPa [psi]	1.05 [152]						
Operating temperature range	°C [°F]	0 to 60 [32 to 140]						
Operating speed range	mm/s [in/sec]	50 to 500 [2 to 20]						
Cushion		Rubber bumper						
Lubrication		Not required (if lubricated, use turbine oil class 1 (ISO VG32) or equivalent)						
Port size		M3×0.5	M5×0.8				Rc1/8	
Running parallelism	mm [in]	0.1 [0.004] or less						
Allowable moment N·m [in·lbf]	Pitching	0.12 [1.06]	0.40 [3.54]	1.50 [13.28]	2.18 [19.30]	4.46 [39.48]	6.70 [59.30]	
	Rolling	0.12 [1.06]	0.40 [3.54]	1.80 [15.93]	2.18 [19.30]	4.46 [39.48]	8.00 [70.80]	
	Yawing	0.21 [1.86]	0.68 [6.02]	2.20 [19.47]	4.18 [37.00]	7.31 [64.70]	13.70 [121.26]	

Linear guide being used

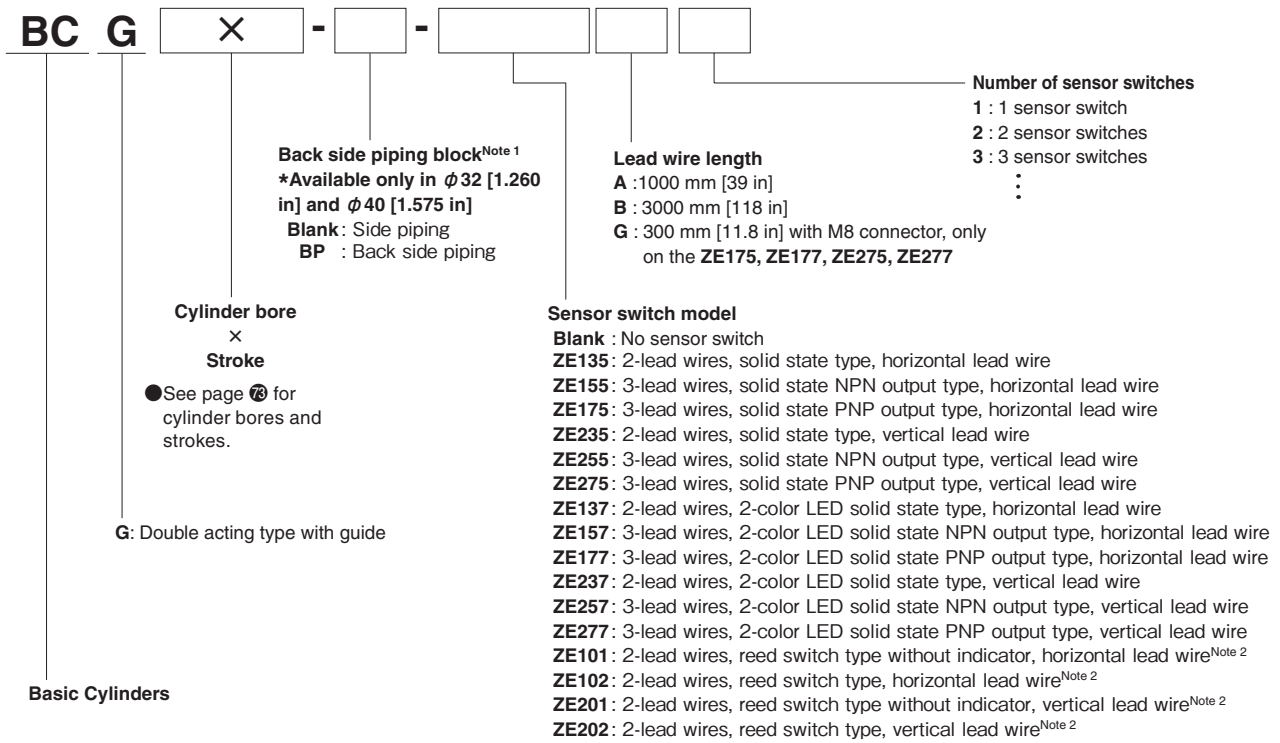
Cylinder bore	Rail width mm [in]	Manufacturer
φ 8 [0.315], φ 12 [0.472]	5 [0.197]	THK
φ 16 [0.630]	7 [0.276]	
φ 20 [0.787]	9 [0.354]	
φ 25 [0.984]	12 [0.472]	
φ 32 [1.260]	15 [0.591]	
φ 40 [1.575]	20 [0.787]	

Cylinder bore and stroke

Cylinder bore	Standard stroke
8, 12, 16, 20, 25 [0.315, 0.472, 0.630, 0.787, 0.984]	5 ^{Note} , 10, 15 ^{Note} , 20, 25 ^{Note} , 30, 35 ^{Note} , 40, 45 ^{Note} , 50, 55 ^{Note} , 60
32 [1.260]	10, 15 ^{Note} , 20, 25 ^{Note} , 30, 35 ^{Note} , 40, 45 ^{Note} , 50, 55 ^{Note} , 60
40 [1.575]	10 ^{Note} , 15 ^{Note} , 20, 25 ^{Note} , 30, 35 ^{Note} , 40, 45 ^{Note} , 50, 55 ^{Note} , 60

Note: This stroke has a collar stopper.

Order Codes



● For details on sensor switches, see page 69.

Note 1: Only $\phi 32$ [1.260] and $\phi 40$ [1.575] bore cylinders can be mounted with back side piping blocks. Back side and side piping is possible as standard for $\phi 8$ [0.315] to $\phi 25$ [0.984] models.

2: Reed switch type sensor switches cannot be attached to $\phi 8$ [0.315] and $\phi 12$ [0.472] bore cylinder.

Mass

● Cylinder with guide

g [oz]

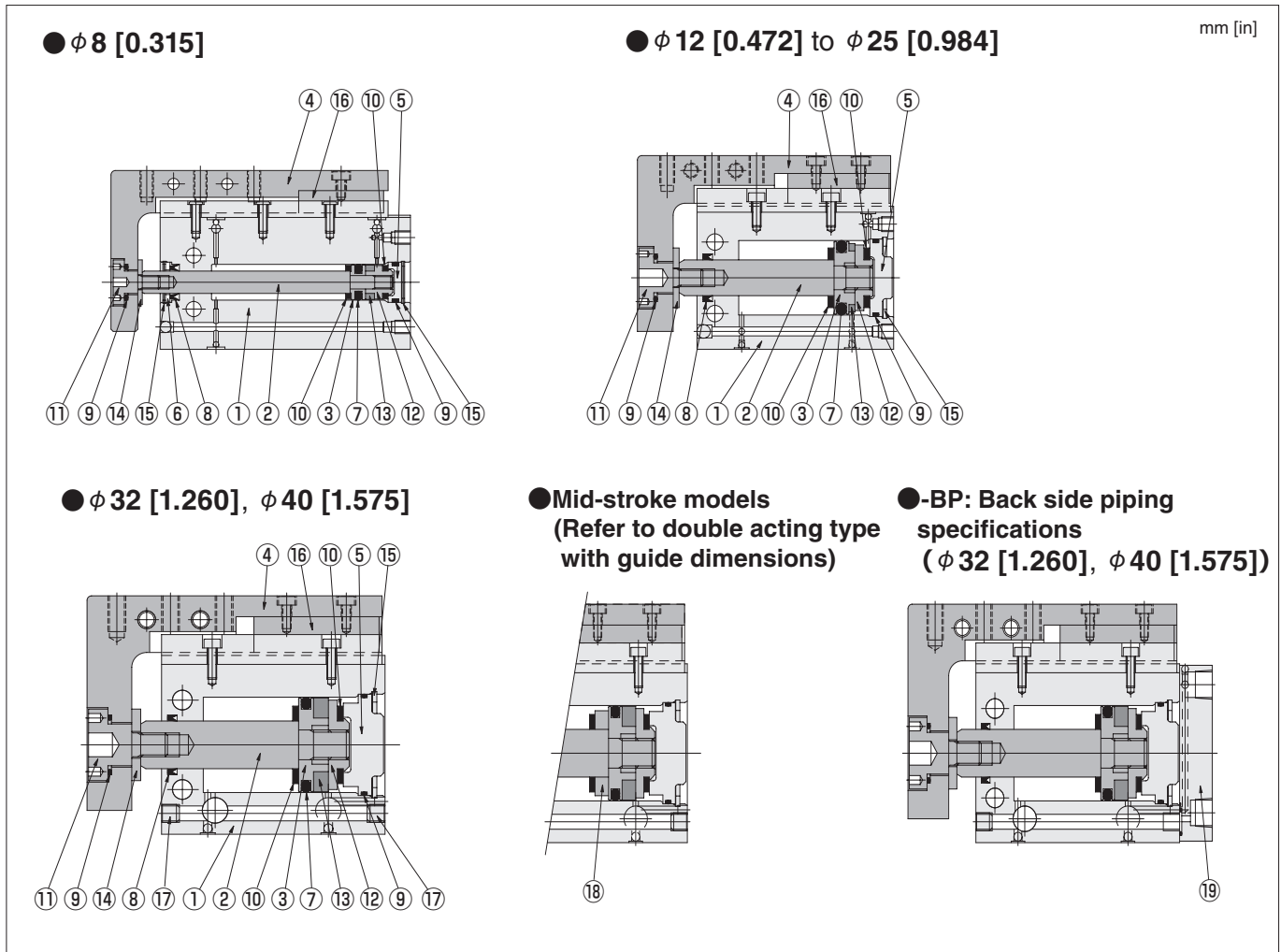
Model	Stroke											
	5	10	15	20	25	30	35	40	45	50	55	60
BCG8	56 [1.98]	54 [1.90]	68 [2.40]	66 [2.33]	80 [2.82]	78 [2.75]	92 [3.25]	90 [3.17]	104 [3.67]	102 [3.60]	116 [4.09]	114 [4.02]
BCG12	82 [2.89]	81 [2.86]	96 [3.39]	95 [3.35]	110 [3.88]	109 [3.84]	124 [4.37]	123 [4.34]	138 [4.87]	137 [4.83]	152 [5.36]	151 [5.33]
BCG16	133 [4.69]	131 [4.62]	155 [5.47]	153 [5.40]	178 [6.28]	176 [6.21]	200 [7.05]	198 [6.98]	222 [7.83]	220 [7.76]	245 [8.64]	243 [8.57]
BCG20	207 [7.30]	205 [7.23]	236 [8.32]	234 [8.25]	265 [9.35]	263 [9.28]	294 [10.37]	292 [10.30]	323 [11.39]	321 [11.32]	352 [12.41]	350 [12.35]
BCG25	321 [11.32]	317 [11.18]	366 [12.91]	362 [12.77]	411 [14.50]	407 [14.36]	456 [16.08]	452 [15.94]	501 [17.67]	497 [17.53]	546 [19.26]	542 [19.12]
BCG32	–	597 [21.06]	675 [23.81]	669 [23.60]	746 [26.31]	740 [26.10]	818 [28.85]	812 [28.64]	889 [31.36]	883 [31.15]	961 [33.90]	955 [33.69]
BCG40	–	1031 [36.37]	1025 [36.16]	1019 [35.94]	1122 [39.58]	1116 [39.37]	1219 [43.00]	1213 [42.79]	1316 [46.42]	1310 [46.21]	1413 [49.84]	1407 [49.63]

● Additional mass of sensor switches

ZE□□□A, ZE□□□G : 15 g [0.53 oz]

ZE□□□B : 35 g [1.23 oz]

Inner construction

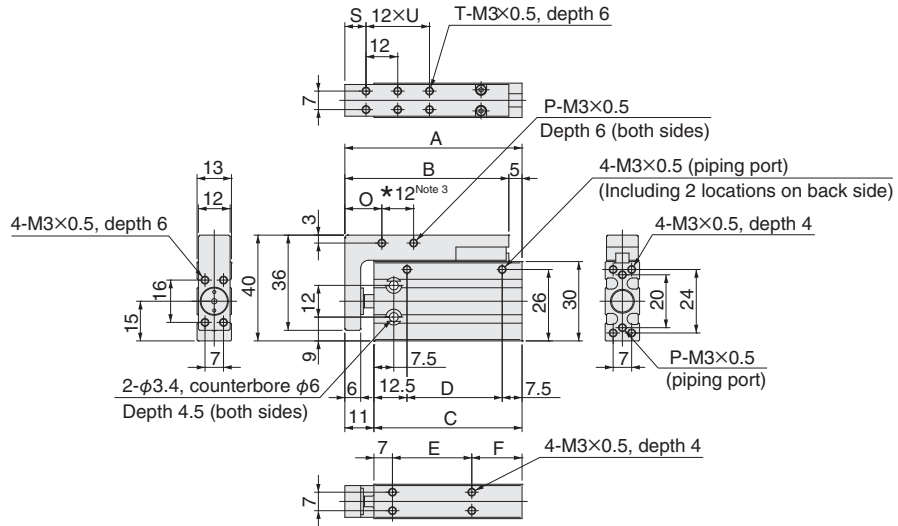


Major parts and materials

		mm [in]						
No	Name	$\phi 8$ [0.315]	$\phi 12$ [0.472]	$\phi 16$ [0.630]	$\phi 20$ [0.787]	$\phi 25$ [0.984]	$\phi 32$ [1.260]	$\phi 40$ [1.575]
①	Cylinder body	Aluminum alloy (special anti-abrasion treated)						
②	Piston rod	Stainless steel						Carbon steel
③	Piston	Stainless steel			Aluminum alloy (anodized)			
④	Table	Aluminum alloy (anodized)						
⑤	Head cover	Aluminum alloy (anodized)						
⑥	Seal holder	Aluminum alloy (anodized)	-	-	-	-	-	-
⑦	★ Piston seal	Synthetic rubber (NBR)						
⑧	★ Rod seal	Synthetic rubber (NBR)						
⑨	★ O-ring	Synthetic rubber (NBR)						
⑩	Bumper	Synthetic rubber (NBR)						
⑪	End bolt	Stainless steel						
⑫	Support	Aluminum alloy (anodized)						
⑬	Magnet	Neodymium magnet						Plastic magnet
⑭	Bolt retainer	Stainless steel						
⑮	★ Retaining ring	Stainless steel	Steel					
⑯	Linear guide	Stainless steel						
⑰	Plug	-	-	-	-	-	Stainless steel	Stainless steel
⑱	Collar stopper	Aluminum alloy (anodized)						
⑲	★ Back side piping block	-	-	-	-	-	Aluminum alloy (anodized)	Aluminum alloy (anodized)

Items indicated by a ★ are available as additional parts or in packing sets. For order codes, see page 68.

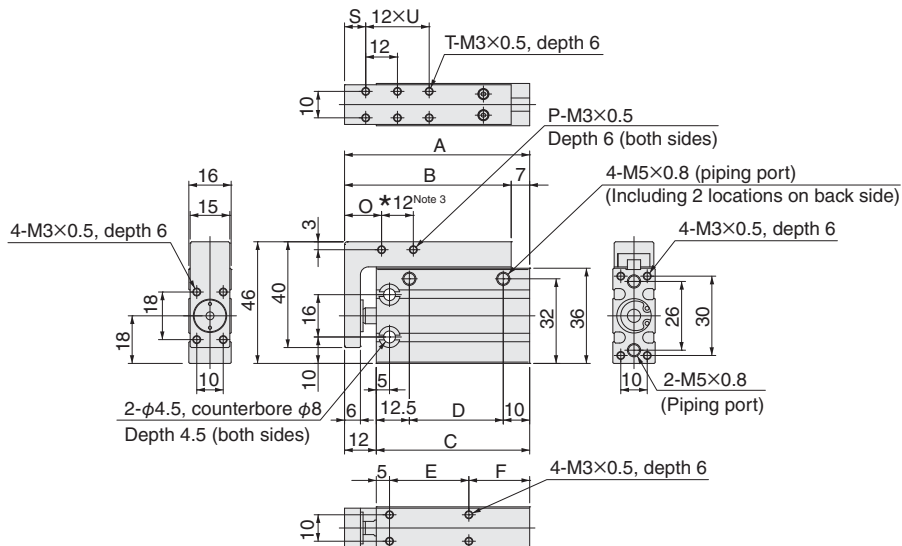
● BCG8



Stroke	A	B	C	D	E	F	O	P	S	T	U
5, 10	47	42	36	16	15	14	10	2	5	4	—
15, 20	57	52	46	26	20	19	14	4	8	4	—
25, 30	67	62	56	36	30	19	14	4	8	6	2
35, 40	77	72	66	46	40	19	14	4	8	8	3
45, 50	87	82	76	56	50	19	14	4	8	10	4
55, 60	97	92	86	66	60	19	14	4	8	12	5

- Note 1: This product cannot use reed switch type sensor switches.
- Note 2: 5, 15, 25, 35, 45, and 55 stroke has a collar stopper.
- Note 3: Dimensions indicated by * are for strokes longer than 15.
- Note 4: All piping ports are assembled with plugs, except those indicated by * (plug assemblies can be changed)
- Note 5: Apply grease to o-rings when changing plug assemblies.

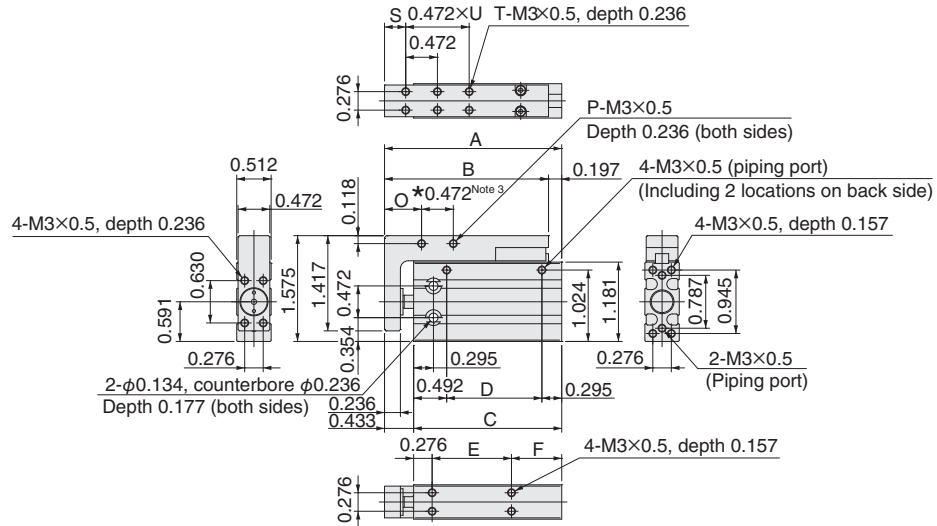
● BCG12



Stroke	A	B	C	D	E	F	O	P	S	T	U
5, 10	50	43	38	15.5	15	18	10	2	5	4	—
15, 20	60	53	48	25.5	20	23	14	4	8	4	—
25, 30	70	63	58	35.5	30	23	14	4	8	6	2
35, 40	80	73	68	45.5	40	23	14	4	8	8	3
45, 50	90	83	78	55.5	50	23	14	4	8	10	4
55, 60	100	93	88	65.5	60	23	14	4	8	12	5

- Note 1: This product cannot use reed switch type sensor switches.
- Note 2: 5, 15, 25, 35, 45, and 55 stroke has a collar stopper.
- Note 3: Dimensions indicated by * are for strokes longer than 15.
- Note 4: All piping ports are assembled with plugs, except those indicated by * (plug assemblies can be changed)
- Note 5: Apply grease to o-rings when changing plug assemblies.

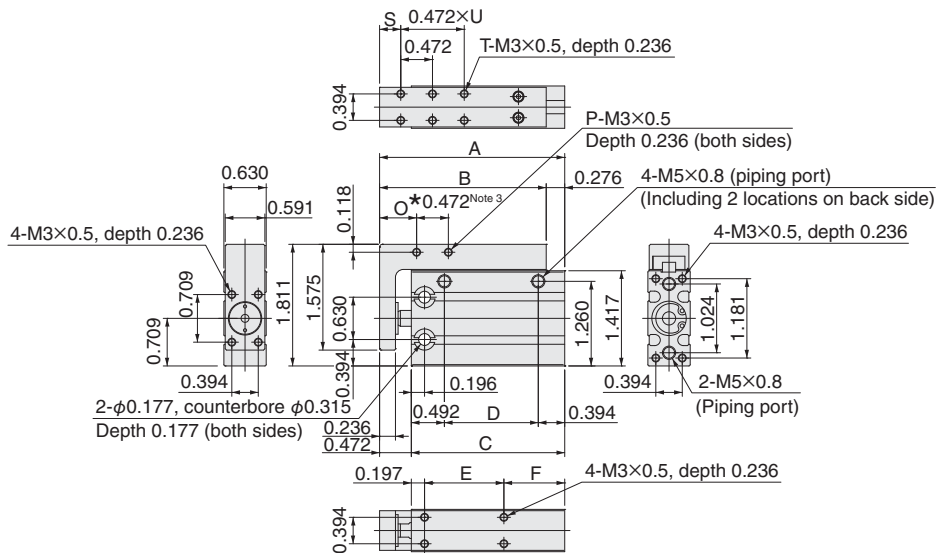
● BCG8



Stroke	A	B	C	D	E	F	O	P	S	T	U
5 mm, 10 mm [0.197, 0.394]	1.850	1.654	1.417	0.630	0.591	0.551	0.394	0.079	0.197	0.157	—
15 mm, 20 mm [0.591, 0.787]	2.244	2.047	1.811	1.024	0.787	0.748	0.551	0.157	0.315	0.157	—
25 mm, 30 mm [0.984, 1.181]	2.638	2.441	2.205	1.417	1.181	0.748	0.551	0.157	0.315	0.236	0.079
35 mm, 40 mm [1.378, 1.575]	3.031	2.835	2.598	1.811	1.575	0.748	0.551	0.157	0.315	0.315	0.118
45 mm, 50 mm [1.772, 1.969]	3.425	3.228	2.992	2.205	1.969	0.748	0.551	0.157	0.315	0.394	0.157
55 mm, 60 mm [2.165, 2.362]	3.819	3.622	3.386	2.598	2.362	0.748	0.551	0.157	0.315	0.472	0.197

- Note 1: This product cannot use reed switch type sensor switches.
- Note 2: 0.197, 0.591, 0.984, 1.378, 1.772, and 2.165 stroke has a collar stopper.
- Note 3: Dimensions indicated by * are for strokes longer than 0.591.
- Note 4: All piping ports are assembled with plugs, except those indicated by * (plug assemblies can be changed)
- Note 5: Apply grease to o-rings when changing plug assemblies.

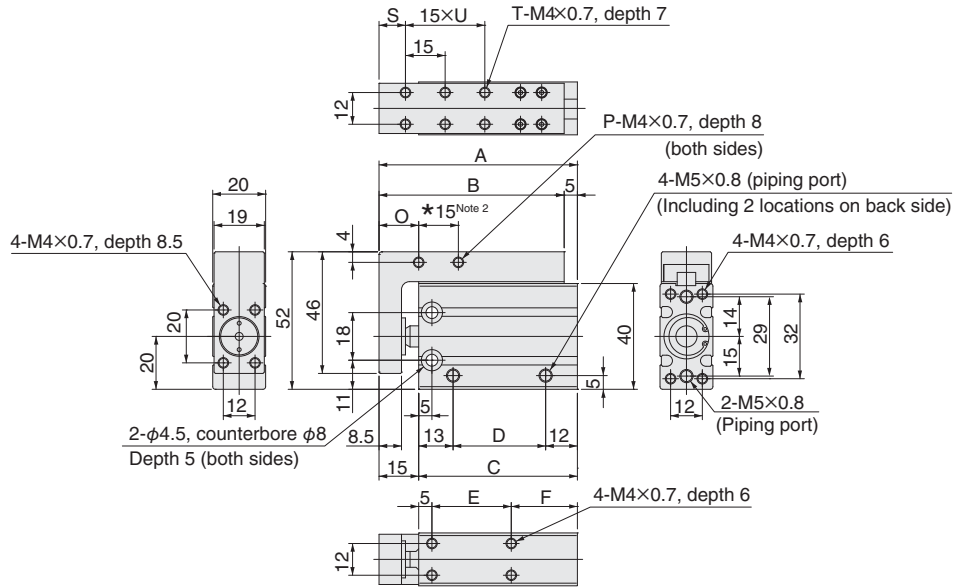
● BCG12



Stroke	A	B	C	D	E	F	O	P	S	T	U
5 mm, 10 mm [0.197, 0.394]	1.969	1.693	1.496	0.610	0.591	0.709	0.394	0.079	0.197	0.157	—
15 mm, 20 mm [0.591, 0.787]	2.362	2.087	1.890	1.004	0.787	0.906	0.551	0.157	0.315	0.157	—
25 mm, 30 mm [0.984, 1.181]	2.756	2.480	2.283	1.398	1.181	0.906	0.551	0.157	0.315	0.236	0.079
35 mm, 40 mm [1.378, 1.575]	3.150	2.874	2.677	1.791	1.575	0.906	0.551	0.157	0.315	0.315	0.118
45 mm, 50 mm [1.772, 1.969]	3.543	3.268	3.071	2.185	1.969	0.906	0.551	0.157	0.315	0.394	0.157
55 mm, 60 mm [2.165, 2.362]	3.937	3.661	3.465	2.579	2.362	0.906	0.551	0.157	0.315	0.472	0.197

- Note 1: This product cannot use reed switch type sensor switches.
- Note 2: 0.197, 0.591, 0.984, 1.378, 1.772, and 2.165 stroke has a collar stopper.
- Note 3: Dimensions indicated by * are for strokes longer than 0.591.
- Note 4: All piping ports are assembled with plugs, except those indicated by * (plug assemblies can be changed)
- Note 5: Apply grease to o-rings when changing plug assemblies.

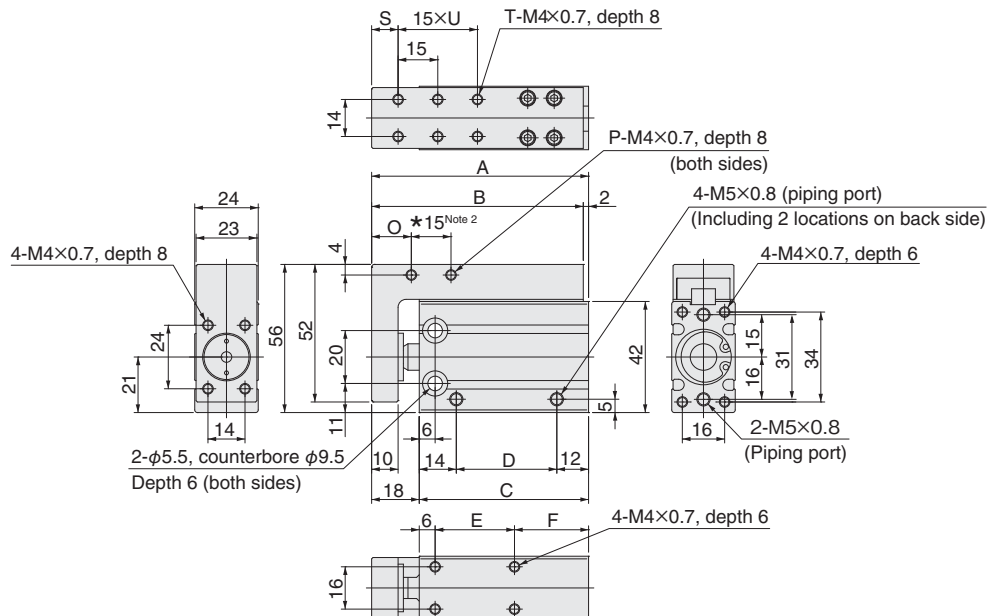
● BCG16



Stroke	A	B	C	D	E	F	O	P	S	T	U
5, 10	55	50	40	15	15	20	12	2	5	4	—
15, 20	65	60	50	25	20	25	15	4	10	4	—
25, 30	75	70	60	35	30	25	15	4	10	6	2
35, 40	85	80	70	45	40	25	15	4	10	6	2
45, 50	95	90	80	55	50	25	15	4	10	8	3
55, 60	105	100	90	65	60	25	15	4	10	10	4

Note 1: 5, 15, 25, 35, 45, and 55 stroke has a collar stopper.
 Note 2: Dimensions indicated by * are for strokes longer than 15.
 Note 3: All piping ports are assembled with plugs, except those indicated by ★. (plug assemblies can be changed)
 Note 4: Apply grease to o-rings when changing plug assemblies.

● BCG20



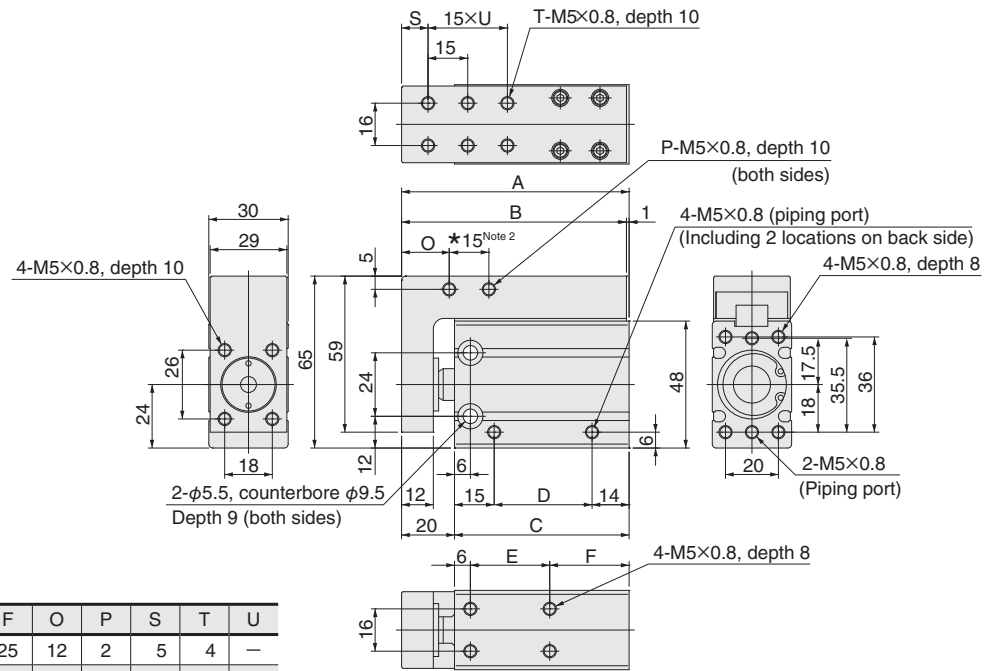
Stroke	A	B	C	D	E	F	O	P	S	T	U
5, 10	62	60	44	18	15	23	12	2	5	4	—
15, 20	72	70	54	28	20	28	15	4	10	4	—
25, 30	82	80	64	38	30	28	15	4	10	6	2
35, 40	92	90	74	48	40	28	15	4	10	6	2
45, 50	102	100	84	58	50	28	15	4	10	8	3
55, 60	112	110	94	68	60	28	15	4	10	10	4

Note 1: 5, 15, 25, 35, 45, and 55 stroke has a collar stopper.
 Note 2: Dimensions indicated by * are for strokes longer than 15.
 Note 3: All piping ports are assembled with plugs, except those indicated by ★. (plug assemblies can be changed)
 Note 4: Apply grease to o-rings when changing plug assemblies.

Double acting type with guide dimensions

unit: mm

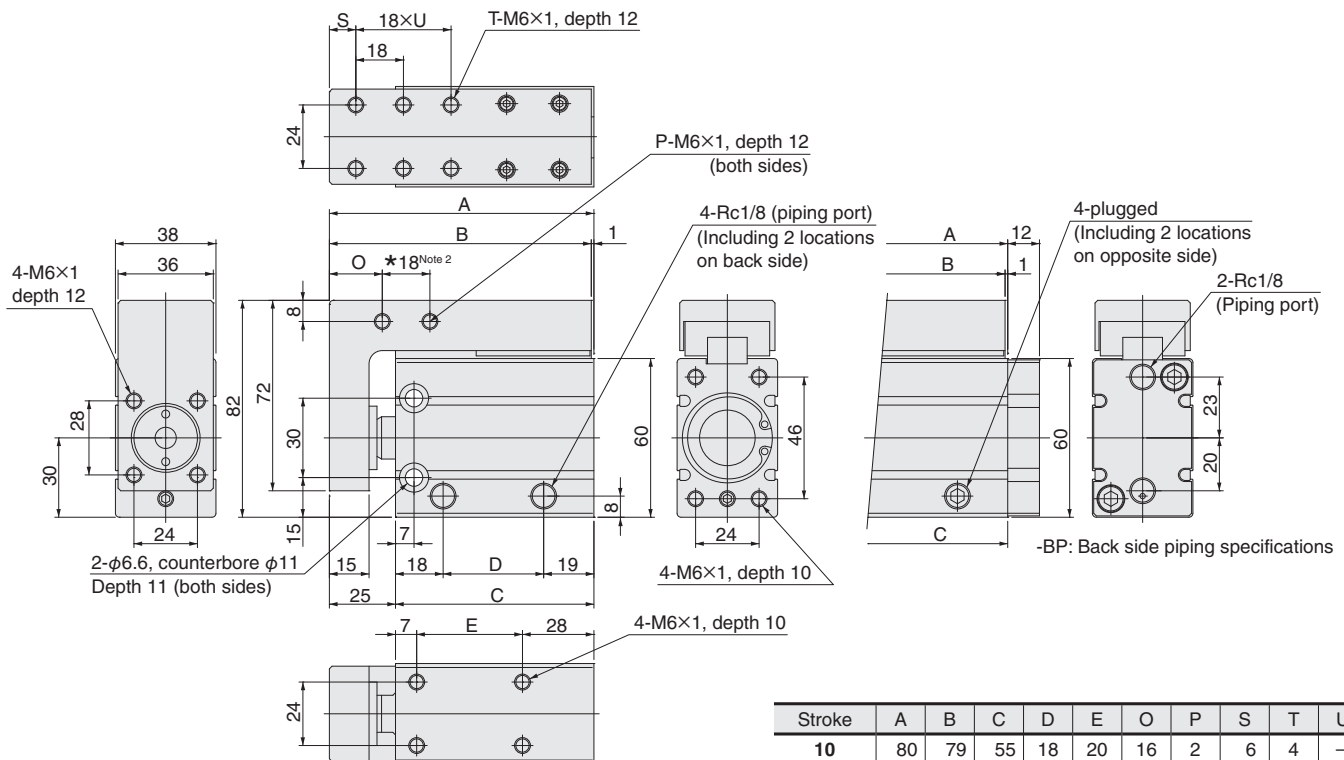
BCG25



Stroke	A	B	C	D	E	F	O	P	S	T	U
5, 10	66	65	46	17	15	25	12	2	5	4	—
15, 20	76	75	56	27	20	30	18	4	10	4	—
25, 30	86	85	66	37	30	30	18	4	10	6	2
35, 40	96	95	76	47	40	30	18	4	10	6	2
45, 50	106	105	86	57	50	30	18	4	10	8	3
55, 60	116	115	96	67	60	30	18	4	10	10	4

- Note 1: 5, 15, 25, 35, 45, and 55 stroke has a collar stopper.
- Note 2: Dimensions indicated by * are for strokes longer than 15.
- Note 3: All piping ports are assembled with plugs, except those indicated by ★. (plug assemblies can be changed)
- Note 4: Apply grease to o-rings when changing plug assemblies.

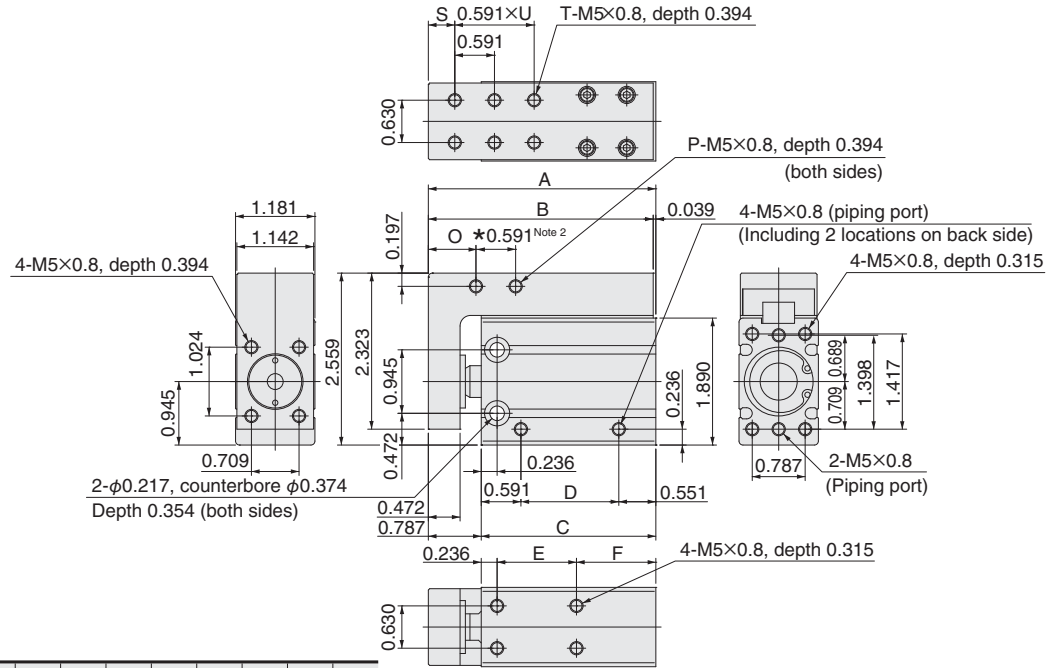
BCG32



Stroke	A	B	C	D	E	O	P	S	T	U
10	80	79	55	18	20	16	2	6	4	—
15, 20	90	89	65	28	30	20	2	10	4	—
25, 30	100	99	75	38	40	20	4	10	6	2
35, 40	110	109	85	48	50	20	4	10	6	2
45, 50	120	119	95	58	60	20	4	10	8	3
55, 60	130	129	105	68	70	20	4	10	8	3

- Note 1: 15, 25, 35, 45, and 55 stroke has a collar stopper.
- Note 2: Dimensions indicated by * are for strokes longer than 25.
- Note 3: All piping ports are assembled with plugs, except those indicated by ★. (plug assemblies can be changed)

● BCG25



Stroke	A	B	C	D	E	F	O	P	S	T	U
5 mm, 10 mm [0.197, 0.394]	2.598	2.559	1.811	0.669	0.591	0.984	0.472	0.079	0.197	0.157	—
15 mm, 20 mm [0.591, 0.787]	2.992	2.953	2.205	1.063	0.787	1.181	0.709	0.157	0.394	0.157	—
25 mm, 30 mm [0.984, 1.181]	3.386	3.346	2.598	1.457	1.181	1.181	0.709	0.157	0.394	0.236	0.079
35 mm, 40 mm [1.378, 1.575]	3.780	3.740	2.992	1.850	1.575	1.181	0.709	0.157	0.394	0.236	0.079
45 mm, 50 mm [1.772, 1.969]	4.173	4.134	3.386	2.244	1.969	1.181	0.709	0.157	0.394	0.315	0.118
55 mm, 60 mm [2.165, 2.362]	4.567	4.528	3.780	2.638	2.362	1.181	0.709	0.157	0.394	0.394	0.157

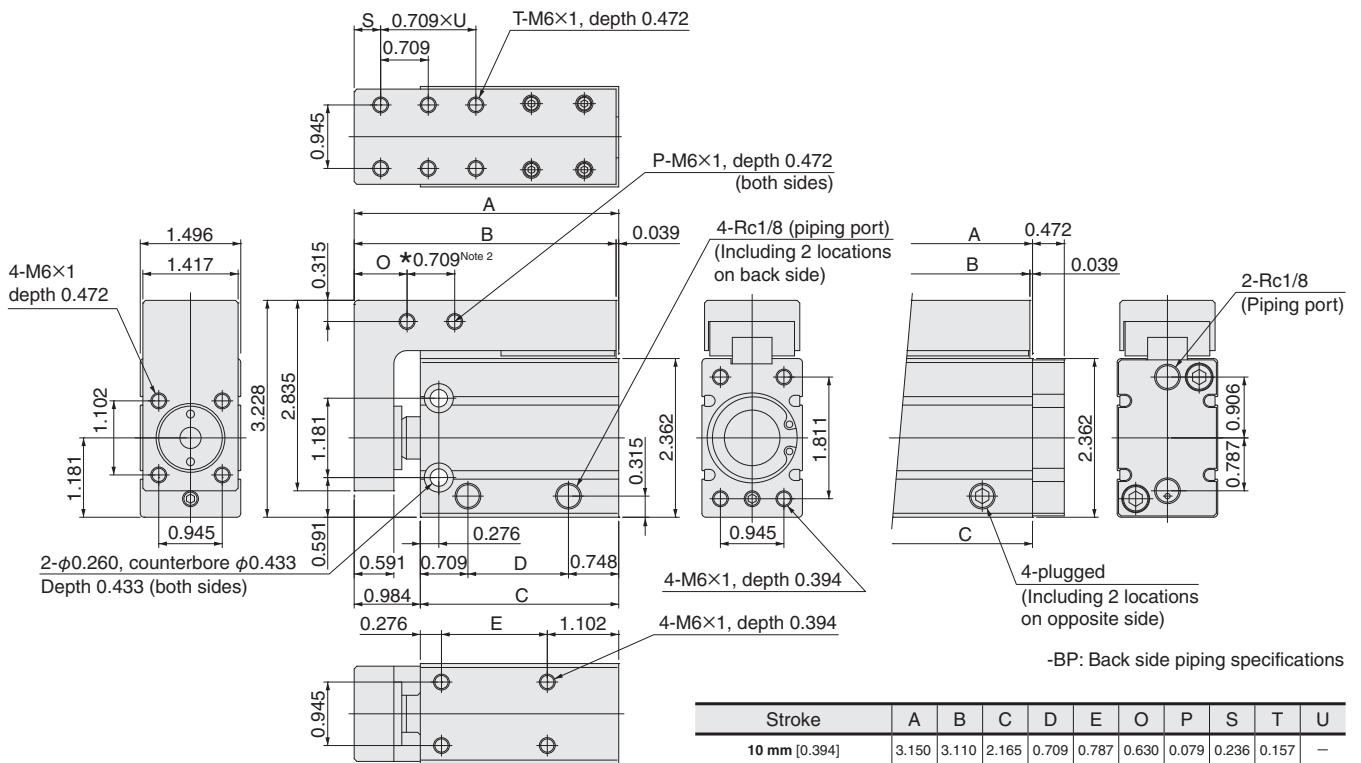
Note 1: 0.197, 0.591, 0.984, 1.378, 1.772, and 2.165 stroke has a collar stopper.

Note 2: Dimensions indicated by * are for strokes longer than 0.591.

Note 3: All piping ports are assembled with plugs, except those indicated by ★. (plug assemblies can be changed)

Note 4: Apply grease to o-rings when changing plug assemblies.

● BCG32



Note 1: 0.591, 0.984, 1.378, 1.772, and 2.165 stroke has a collar stopper.

Note 2: Dimensions indicated by * are for strokes longer than 0.984.

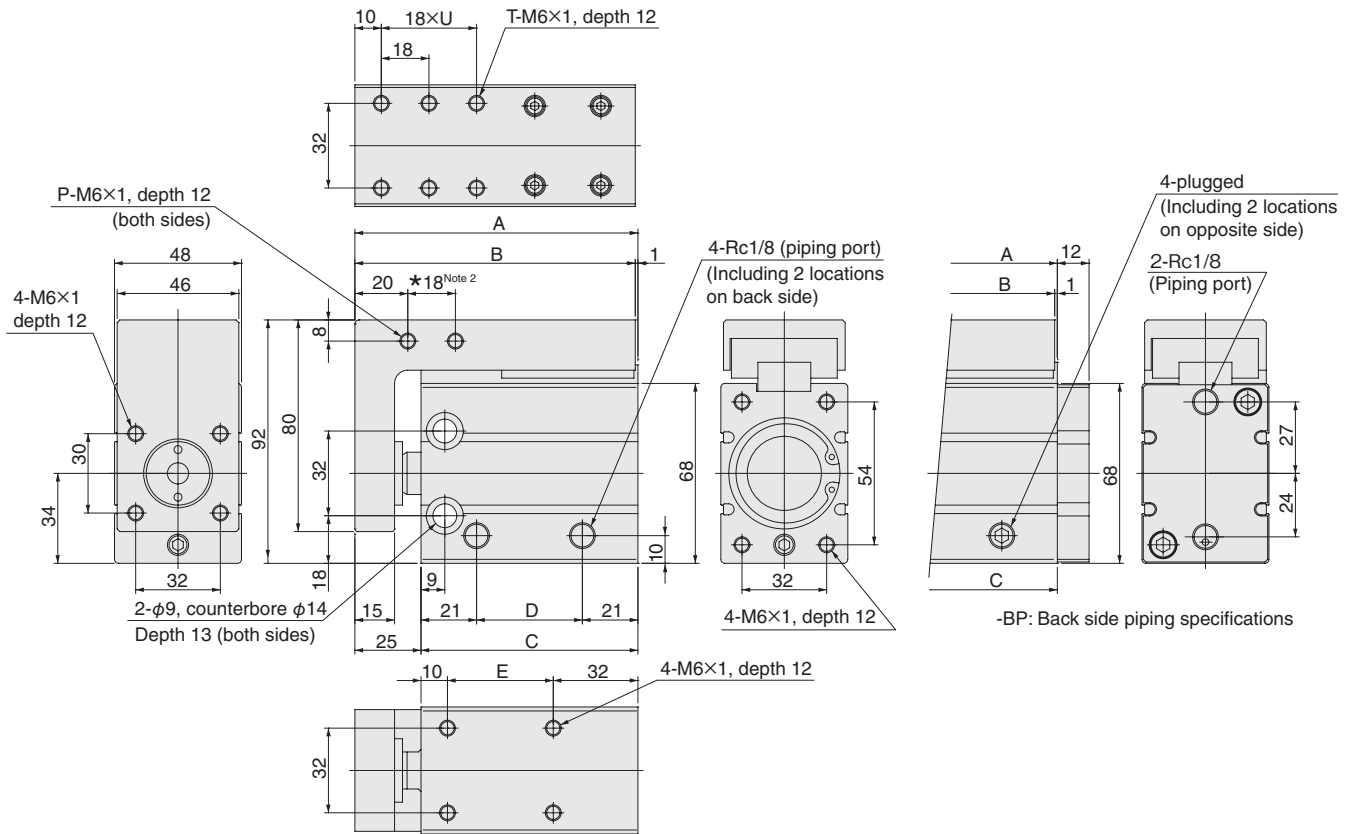
Note 3: All piping ports are assembled with plugs, except those indicated by ★. (plug assemblies can be changed)

Stroke	A	B	C	D	E	O	P	S	T	U
10 mm [0.394]	3.150	3.110	2.165	0.709	0.787	0.630	0.079	0.236	0.157	—
15 mm, 20 mm [0.591, 0.787]	3.543	3.504	2.559	1.102	1.181	0.787	0.079	0.394	0.157	—
25 mm, 30 mm [0.984, 1.181]	3.937	3.898	2.953	1.496	1.575	0.787	0.157	0.394	0.236	0.079
35 mm, 40 mm [1.378, 1.575]	4.331	4.291	3.346	1.890	1.969	0.787	0.157	0.394	0.236	0.079
45 mm, 50 mm [1.772, 1.969]	4.724	4.685	3.740	2.283	2.362	0.787	0.157	0.394	0.315	0.118
55 mm, 60 mm [2.165, 2.362]	5.118	5.079	4.134	2.677	2.756	0.787	0.157	0.394	0.315	0.118

Double acting type with guide dimensions

unit: mm

● BCG40



Stroke	A	B	C	D	E	P	T	U
10, 15, 20	97	96	72	30	30	2	4	—
25, 30	107	106	82	40	40	4	6	2
35, 40	117	116	92	50	50	4	6	2
45, 50	127	126	102	60	60	4	8	3
55, 60	137	136	112	70	70	4	8	3

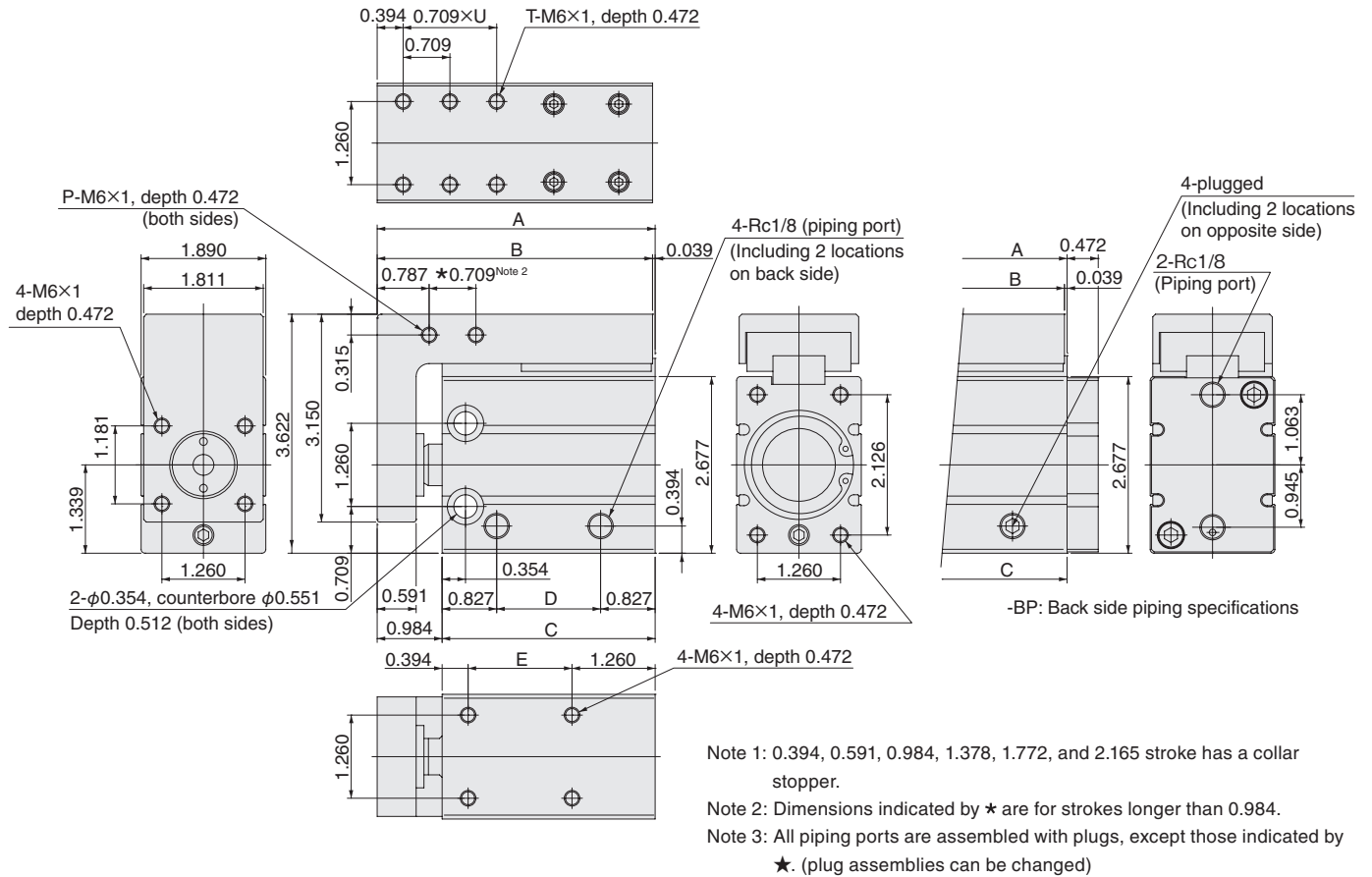
Note 1: 10, 15, 25, 35, 45, and 55 stroke has a collar stopper.

Note 2: Dimensions indicated by * are for strokes longer than 25.

Note 3: All piping ports are assembled with plugs, except those indicated by

★. (plug assemblies can be changed)

● BCG40



Stroke	A	B	C	D	E	P	T	U
10 mm, 15 mm, 20 mm [0.394, 0.591, 0.787]	3.819	3.780	2.835	1.181	1.181	0.079	0.157	—
25 mm, 30 mm [0.984, 1.181]	4.213	4.173	3.228	1.575	1.575	0.157	0.236	0.079
35 mm, 40 mm [1.378, 1.575]	4.606	4.567	3.622	1.969	1.969	0.157	0.236	0.079
45 mm, 50 mm [1.772, 1.969]	5.000	4.961	4.016	2.362	2.362	0.157	0.315	0.118
55 mm, 60 mm [2.165, 2.362]	5.394	5.354	4.409	2.756	2.756	0.157	0.315	0.118

Bracket

Order codes for brackets only

BCZ-BK

Cylinder bore mm [in]

10 : For ϕ 10 [0.394] 40: For ϕ 40 [1.575]
 12 : For ϕ 12 [0.472] 50: For ϕ 50 [1.969]
 16 : For ϕ 16 [0.630] 63: For ϕ 63 [2.480]
 20 : For ϕ 20 [0.787] 80: For ϕ 80 [3.150]
 25 : For ϕ 25 [0.984] 100: For ϕ 100 [3.937]
 32 : For ϕ 32 [1.260] 125: For ϕ 125 [4.921]

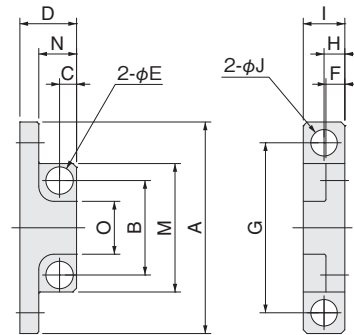
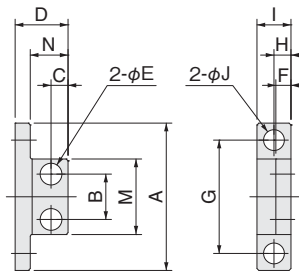
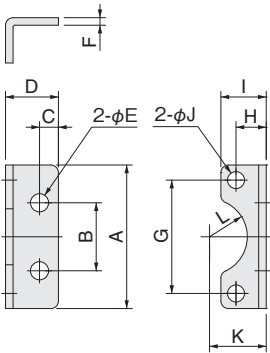
Note: Cannot be mounted on cylinders with guides (BCG□).

Bracket dimensions mm [in]

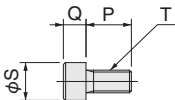
● ϕ 10 [0.394] to ϕ 32 [1.260]

● ϕ 40 [1.575] to ϕ 80 [3.150]

● ϕ 100 [3.937] to ϕ 125 [4.921]



● Mounting bolt (2)



Material: Stainless steel (only M16 is steel)

Symbol Bore	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	S	T	Materials	Mass g [oz]
10 [0.394]	22 [0.866]	16 [0.630]	3 [0.118]	10 [0.394]	3.8 [0.150]	1 [0.039]	16 [0.630]	7 [0.276]	9.3 [0.366]	3.4 [0.134]	8 [0.315]	R5 [0.197]	-	-	-	5 [0.197]	3 [0.118]	4.5 [0.177]	M3×0.5	Stainless steel	4 [0.14]
12 [0.472]	26 [1.024]	14 [0.551]	4 [0.157]	13 [0.512]	4.8 [0.189]	1 [0.039]	19 [0.748]	8 [0.315]	11 [0.433]	4.5 [0.177]	8 [0.315]	R5 [0.197]	-	-	-	4 [0.157]	4 [0.157]	5.5 [0.217]	M4×0.7	Stainless steel	6 [0.21]
16 [0.630]	28 [1.102]	14 [0.551]	4 [0.157]	13 [0.512]	4.8 [0.189]	1.5 [0.059]	22 [0.866]	7 [0.276]	10 [0.394]	3.5 [0.138]	11 [0.433]	R7 [0.276]	-	-	-	5 [0.197]	3 [0.118]	5.5 [0.217]	M3×0.5	Stainless steel	7 [0.25]
20 [0.787]	34 [1.339]	14 [0.551]	4 [0.157]	13 [0.512]	4.8 [0.189]	2 [0.079]	26 [1.024]	8 [0.315]	12 [0.472]	4.5 [0.177]	13 [0.512]	R8 [0.315]	-	-	-	8 [0.315]	4 [0.157]	7 [0.276]	M4×0.7	Stainless steel	12 [0.42]
25 [0.984]	38 [1.496]	18 [0.709]	5 [0.197]	14 [0.551]	4.8 [0.189]	2 [0.079]	30 [1.181]	8 [0.315]	12 [0.472]	4.5 [0.177]	15 [0.591]	R10 [0.394]	-	-	-	8 [0.315]	4 [0.157]	7 [0.276]	M4×0.7	Stainless steel	14 [0.49]
32 [1.260]	48 [1.890]	22 [0.866]	6 [0.236]	18 [0.709]	5.8 [0.228]	2 [0.079]	38 [1.496]	8 [0.315]	13 [0.512]	5.5 [0.217]	19 [0.748]	R12 [0.472]	-	-	-	8 [0.315]	5 [0.197]	8.5 [0.335]	M5×0.8	Stainless steel	24 [0.85]
40 [1.575]	52 [2.047]	18 [0.709]	6 [0.236]	20 [0.787]	6.8 [0.268]	5 [0.197]	40 [1.575]	7 [0.276]	13 [0.512]	6.5 [0.256]	-	-	28 [1.102]	14 [0.551]	-	12 [0.472]	6 [0.236]	10 [0.394]	M6×1	Aluminum alloy	25 [0.88]
50 [1.969]	66 [2.598]	24 [0.945]	7 [0.276]	24 [0.945]	9.5 [0.374]	5 [0.197]	52 [2.047]	7 [0.276]	15 [0.591]	9 [0.354]	-	-	37 [1.457]	18 [0.709]	-	12 [0.472]	8 [0.315]	13 [0.512]	M8×1.25	Aluminum alloy	45 [1.59]
63 [2.480]	78 [3.071]	24 [0.945]	9 [0.354]	28 [1.102]	11.5 [0.453]	8 [0.315]	60 [2.362]	9 [0.354]	18 [0.709]	11 [0.433]	-	-	40 [1.575]	20 [0.787]	-	16 [0.630]	10 [0.394]	16 [0.630]	M10×1.5	Aluminum alloy	80 [2.82]
80 [3.150]	90 [3.543]	30 [1.181]	10 [0.394]	36 [1.417]	14.5 [0.571]	8 [0.315]	70 [2.756]	10 [0.394]	20 [0.789]	14 [0.551]	-	-	48 [1.890]	28 [1.102]	-	20 [0.787]	12 [0.472]	18 [0.709]	M12×1.75	Aluminum alloy	128 [4.51]
100 [3.937]	112 [4.409]	50 [1.969]	9 [0.354]	30 [1.181]	14.5 [0.571]	10 [0.394]	90 [3.543]	11 [0.433]	22 [0.866]	14 [0.551]	-	-	68 [2.677]	20 [0.787]	28 [1.102]	20 [0.787]	12 [0.472]	18 [0.709]	M12×1.75	Aluminum alloy	167 [5.89]
125 [4.921]	140 [5.512]	58 [2.283]	14 [0.551]	42 [1.654]	18.5 [0.728]	14 [0.551]	110 [4.331]	15 [0.591]	30 [1.181]	18 [0.709]	-	-	82 [3.228]	30 [1.181]	30 [1.181]	35 [1.378]	16 [0.630]	24 [0.945]	M16×2	Aluminum alloy	410 [14.46]

Note: Mass includes mass of 2 supplied bolts

Additional Parts

Note 1: $\phi 6$ [0.236 in], $\phi 8$ [0.315 in], and $\phi 10$ [0.394 in] cannot be disassembled.

2: Be careful that the steel balls do not fall out from the linear guide when doing maintenance on cylinders with guides.

●Packing set for double acting type (including models with guides)

BCZ-PK-

Cylinder bore
 12: For BC12, BCG12
 16: For BC16, BCG16
 20: For BC20, BCG20
 25: For BC25, BCG25
 32: For BC32, BCG32
 40: For BC40, BCG40
 50: BC50
 63: BC63
 80: BC80
 100: BC100
 125: BC125

*1 rod seal, 1 piston seal, 1 o-ring and retaining ring

●Packing set for double acting double rod end type

BCZ-PK-D

Cylinder bore
 12: For BCD12
 16: For BCD16
 20: For BCD20
 25: For BCD25
 32: For BCD32
 40: For BCD40
 50: For BCD50
 63: For BCD63
 80: For BCD80
 100: For BCD100
 125: For BCD125

*2 rod seals, 1 piston seal, 1 o-ring and retaining ring

●Packing set for single acting push and pull type

BCZ-PK-S

Cylinder bore
 12: For BCSA12, BCTA12
 16: For BCSA16, BCTA16
 20: For BCSA20, BCTA20
 25: For BCSA25, BCTA25
 32: For BCSA32, BCTA32
 40: For BCSA40, BCTA40
 50: For BCSA50, BCTA50

*1 rod seal, 1 piston seal, 1 o-ring, retaining ring and 1 spring

●Piping port plugs for cylinders with guides

BCZ-PM

Thread size
 3: For M3 (for BCG8)
 5: For M5 (for BCG12, BCG16, BCG20, BCG25)

*4 plugs assembled with o-rings in each bag

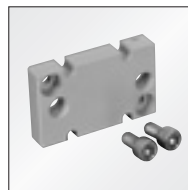


●Back side piping block for cylinders with guides

BCZ-BP

Cylinder bore
 32: For BCG32
 40: For BCG40

*1 back side piping block with press fitted steel balls
 1 each of two types of o-rings, 2 mounting bolts




●Grease (30 cc)

GR-HA-030

*Contains 30 cc [1.83 in³] of NSF standard H1 certified grease

Note: Use this grease if you purchase a packing set and then disassemble and reassemble a cylinder.



 Products that have been disassembled and reassembled are not covered by the warranty.

Sensor switches

Solid state type, reed switch type

● Robot cable is standard equipment

Flexibility is excellent because the conductor used is the same as for robot cables.

Specifications

● Solid State Type

Item	Model	ZE135□	ZE155□	ZE175□	ZE235□	ZE255□	ZE275□
Wiring method		2-lead wire	3-lead wire with NPN output	3-lead wire with PNP output	2-lead wire	3-lead wire with NPN output	3-lead wire with PNP output
Lead wire direction		Horizontal			Vertical		
Power supply voltage		—	4.5 to 28 VDC		—	4.5 to 28 VDC	
Load voltage		10 to 28 VDC			4.5 to 28 VDC		
Load current		2.5 to 20 mA (at 25°C [77°F], and 10 mA at 60°C [140°F])	40 mA max.		2.5 to 20 mA (at 25°C [77°F], and 10 mA at 60°C [140°F])	40 mA max.	
Consumption current		—	8 mA max. (24 VDC)	10 mA max. (24 VDC)	—	8 mA max. (24 VDC)	10 mA max. (24 VDC)
Internal voltage drop ^{Note 1}		4 V max.	2 V max. (0.8 V max when load is less than 10 mA)		4 V MAX.	2 V max. (0.8 V max when load is less than 10 mA)	
Leakage current		0.7 mA max. (24 VDC, 25°C [77°F])	50 μA max. (24 VDC)		0.7 mA max. (24 VDC, 25°C [77°F])	50 μA max. (24 VDC)	
Response time		1 ms max.					
Insulation resistance		100 MΩ min. (at 500 VDC megger, between case and lead wire terminal)					
Dielectric strength		500 VAC (50/60 Hz) 1 minute (between case and lead wire terminal)					
Shock resistance ^{Note 2}		294.2 m/s ² [30 G] (non-repeated)					
Vibration resistance ^{Note 2}		88.3 m/s ² [9 G] (total amplitude 1.5 mm [0.059 in], 10 to 55 Hz)					
Environmental protection		IP67 (IEC standard), JIS C0920 (water-proof type)					
Operation indicators		Red LED indicator lit when on					
Lead wires		PCCV 0.2 SQ × 2-wire (brown and blue) × ℓ ^{Note 3}	PCCV 0.15 SQ × 3-wire (brown, blue, and black) × ℓ ^{Note 3}		PCCV 0.2 SQ × 2-wire (brown and blue) × ℓ ^{Note 3}	PCCV 0.15 SQ × 3-wire (brown, blue, and black) × ℓ ^{Note 3}	
Ambient temperature		0 to 60°C [32 to 140°F]					
Storage temperature range		-10 to 70°C [14 to 158°F]					
Mass		15 g [0.53 oz] (for lead wire length A: 1000 mm [39 in]), 35 g [1.23 oz] (for lead wire length B: 3000 mm [118 in]), 15 g [0.53 oz] (for lead wire length 300 mm [11.8 in] with M8 connector)					

Note 1: Internal voltage drop changes with the load current.

2: According to Koganei test standards.

3: Lead wire length ℓ : A; 1000 mm [39 in], B; 3000 mm [118 in], G; 300 mm [11.8 in] with M8 connector only on the ZE175□ and ZE275□

● Reed Switch Type

Item	Model	ZE101□	ZE102□	ZE201□	ZE202□
Wiring method		2-lead wire			
Lead wire direction		Horizontal		Vertical	
Load voltage		5 to 28 VDC	85 to 115 VAC (r.m.s)	5 to 28 VDC	85 to 115 VAC (r.m.s)
Load current		40 mA max.	20 mA max.	5 to 40 mA	5 to 20 mA
Internal voltage drop ^{Note 1}		0.1 V max. (at load current of 40 mA DC)		0.1 V max. (at load current of 40 mA DC)	
Leakage current		0 mA			
Response time		1 ms max.			
Insulation resistance		100 MΩ min. (at 500 VDC megger, between case and lead wire terminal)			
Dielectric strength		1500 VAC (50/60 Hz) 1 minute (between case and lead wire terminal)			
Shock resistance ^{Note 2}		294.2 m/s ² [30 G] (non-repeated)			
Vibration resistance ^{Note 2}		88.3 m/s ² [9 G] (total amplitude of 1.5 mm [0.059 in], 10 to 55 Hz), resonance frequency 2570 ± 250 Hz			
Environmental protection		IP67 (IEC standard), JIS C0920 (water-proof type)			
Operation indicators		None	Red LED indicator lit when on	None	Red LED indicator lit when on
Lead wires		PCCV 0.2 SQ × 2-wire (brown and blue) × ℓ ^{Note 3}			
Ambient temperature		0 to 60°C [32 to 140°F]			
Storage temperature range		-10 to 70°C [14 to 158°F]			
Contact protection measure		Required (see page 91 under contact protection.)			
Mass		15 g [0.53 oz] (for lead wire length A: 1000 mm [39 in]), 35 g [1.23 oz] (for lead wire length B: 3000 mm [118 in])			

Note 1: Internal voltage drop changes with the load current.

2: According to Koganei test standards.

3: Lead wire length ℓ : A; 1000 mm [39 in], B; 3000 mm [118 in]

Sensor switch

Two-color LED solid state type

● Robot cable is standard equipment

Flexibility is excellent because the conductor used is the same as for robot cables.

Specifications

● Two-color LED solid state type

Item	Model	ZE137□	ZE157□	ZE177□	ZE237□	ZE257□	ZE277□
Wiring method		2-lead wire	3-lead wire with NPN output	3-lead wire with PNP output	2-lead wire	3-lead wire with NPN output	3-lead wire with PNP output
Lead wire direction		Horizontal			Vertical		
Power supply voltage		—	4.5 to 28 VDC		—	4.5 to 28 VDC	
Load voltage		10 to 28 VDC	4.5 to 28 VDC		10 to 28 VDC	4.5 to 28 VDC	
Load current		2.5 to 20 mA (at 25°C [77°F], and 10 mA at 60°C [140°F])	40 mA max.		2.5 to 20 mA (at 25°C [77°F], and 10 mA at 60°C [140°F])	40 mA max.	
Consumption current		—	8 mA max. (24 VDC)	10 mA max. (24 VDC)	—	8 mA max. (24 VDC)	10 mA max. (24 VDC)
Internal voltage drop ^{Note 1}		4 V max.	2 V max. (0.8 V max when load is less than 10 mA)		4 V max.	2 V max. (0.8 V max when load is less than 10 mA)	
Leakage current		0.7 mA max. (24 VDC, 25°C [77°F])	50 μA max. (24 VDC)		0.7 mA max. (24 VDC, 25°C [77°F])	50 μA max. (24 VDC)	
Response time		1 ms max.					
Insulation resistance		100 MΩ min. (at 500 VDC megger, between case and lead wire terminal)					
Dielectric strength		500 VAC (50/60 Hz) 1 minute (between case and lead wire terminal)					
Shock resistance ^{Note 2}		294.2 m/s ² [30 G] (non-repeated)					
Vibration resistance ^{Note 2}		88.3 m/s ² [9 G] (total amplitude 1.5 mm [0.059 in], 10 to 55 Hz)					
Environmental protection		IP67 (IEC standard), JIS C0920 (water-proof type)					
Operation indicators		Appropriate operation range: Green LED indicator lit when on, operation range: Red LED indicator lit when on					
Lead wires		PCCV 0.2 SQ × 2-wire (brown and blue) × ℓ ^{Note 3}	PCCV 0.15 SQ × 3-wire (brown, blue, and black) × ℓ ^{Note 3}	PCCV 0.2 SQ × 2-wire (brown and blue) × ℓ ^{Note 3}	PCCV 0.15 SQ × 3-wire (brown, blue, and black) × ℓ ^{Note 3}		
Ambient temperature		0 to 60°C [32 to 140°F]					
Storage temperature range		-10 to 70°C [14 to 158°F]					
Mass		15 g [0.53 oz] (for lead wire length A: 1000 mm [39 in]), 35 g [1.23 oz] (for lead wire length B: 3000 mm [118 in]), 15 g [0.53 oz] (for lead wire length 300 mm [11.8 in] with M8 connector)					

Note 1: Internal voltage drop changes with the load current.

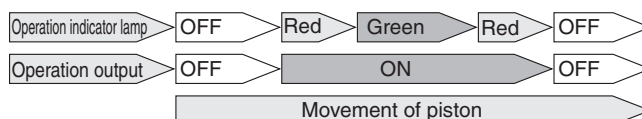
2: According to Koganei test standards.

3: Lead wire length ℓ : A: 1000 mm [39 in], B: 3000 mm [118 in], G: 300 mm [11.8 in] with M8 connector only on the ZE177□ and ZE277□

Operation

● Explanation of operation of two-color LED solid state type

ZE137□, ZE157□, ZE177□, ZE237□, ZE257□, ZE277□

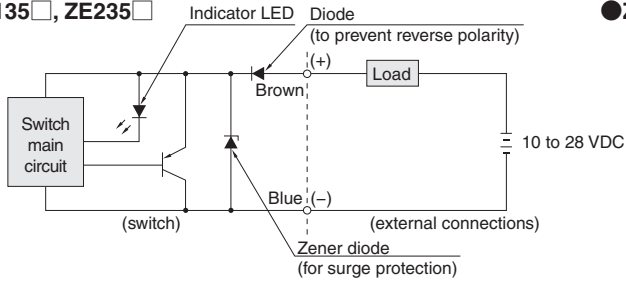


Note: The operating output may become unstable, due to the effects of the operation and installation environments, even if the appropriate operating range (green LED indicator lit) is fixed.

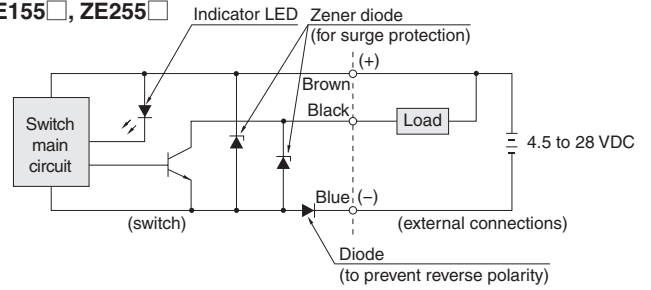
Diagram of inner circuits

● Solid State Type

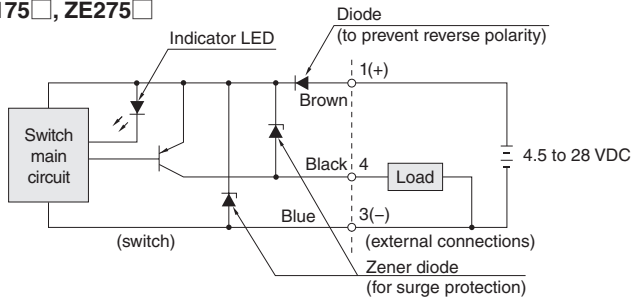
● ZE135□, ZE235□



● ZE155□, ZE255□

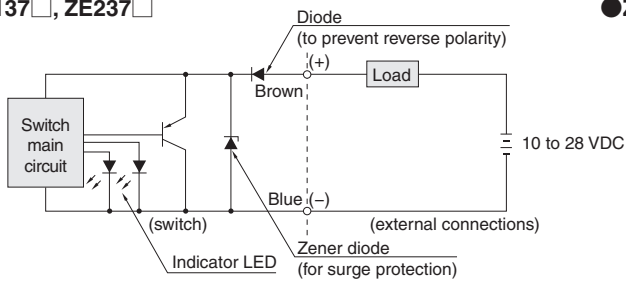


● ZE175□, ZE275□

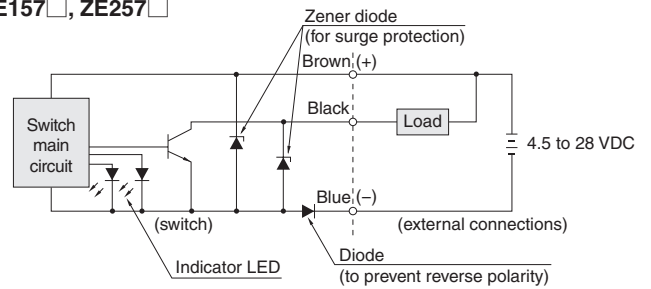


● Two-color LED solid state type

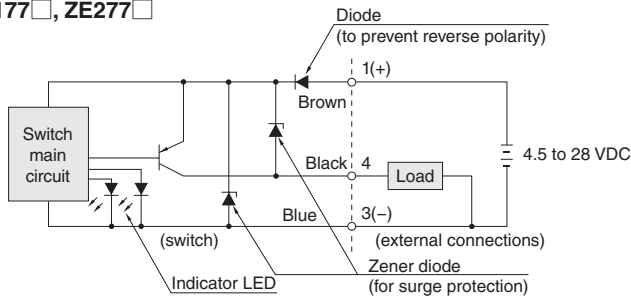
● ZE137□, ZE237□



● ZE157□, ZE257□

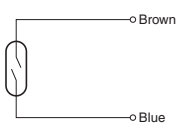


● ZE177□, ZE277□

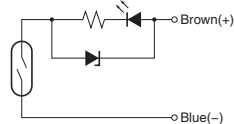


● Reed Switch Type

● ZE101□, ZE201□

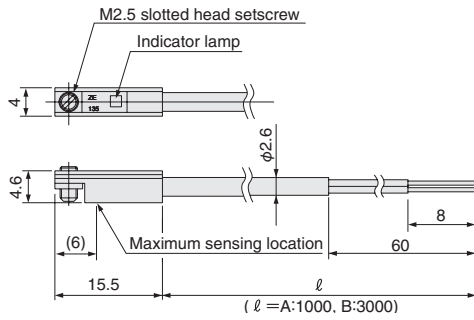


● ZE102□, ZE202□

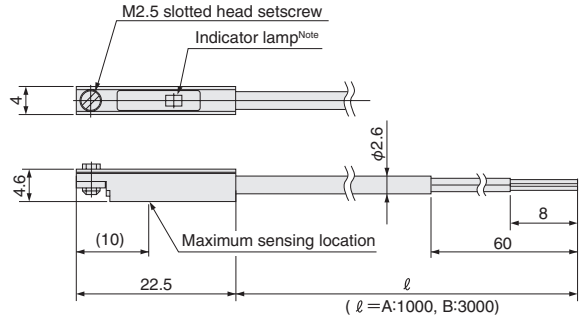


● Horizontal lead wire

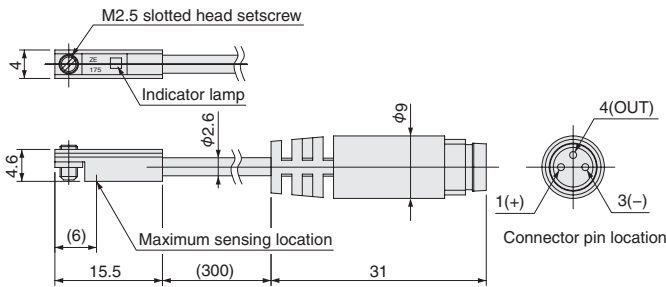
● Solid state type (ZE135□, ZE155□, ZE175□, ZE137□, ZE157□, ZE177□)



● Reed switch type (ZE101□, ZE102□)



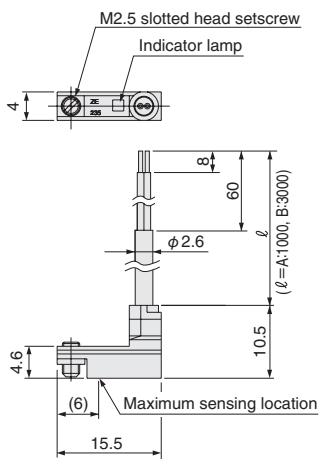
● Solid state type (ZE175G, ZE177G)



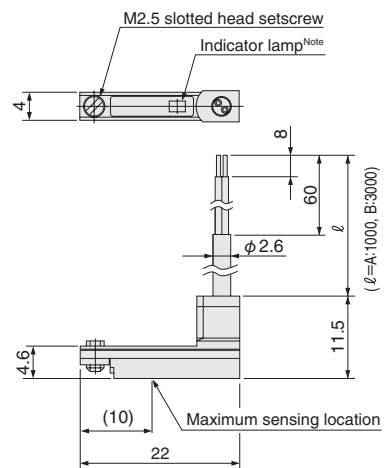
Note: Not available with the ZE101□.

● Vertical lead wire

● Solid state type (ZE235□, ZE255□, ZE275□, ZE237□, ZE257□, ZE277□)

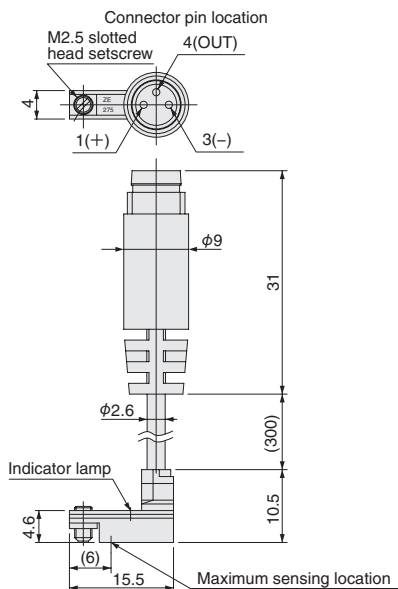


● Reed switch type (ZE201□, ZE202□)



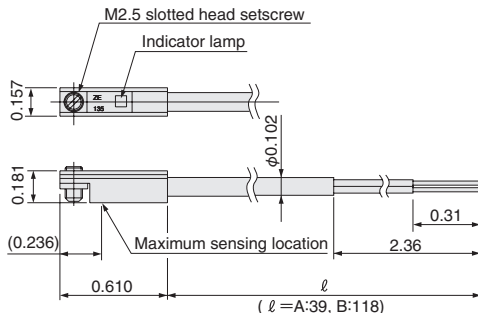
● Solid state type (ZE275G, ZE277G)

Note: Not available with the ZE201□.

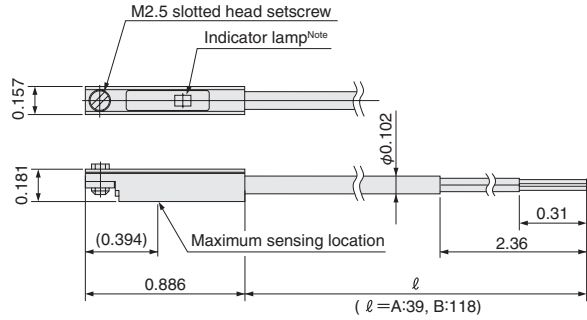


● Horizontal lead wire

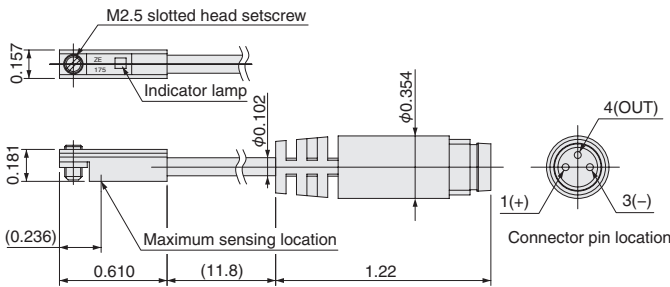
● Solid state type (ZE135□, ZE155□, ZE175□, ZE137□, ZE157□, ZE177□)



● Reed switch type (ZE101□, ZE102□)



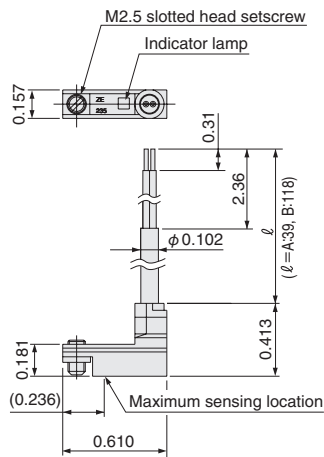
● Solid state type (ZE175G, ZE177G)



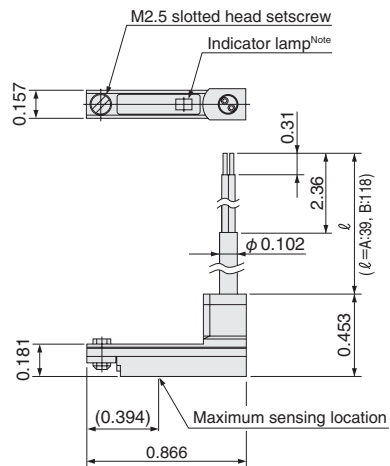
Note: Not available with the ZE101□.

● Vertical lead wire

● Solid state type (ZE235□, ZE255□, ZE275□, ZE237□, ZE257□, ZE277□)

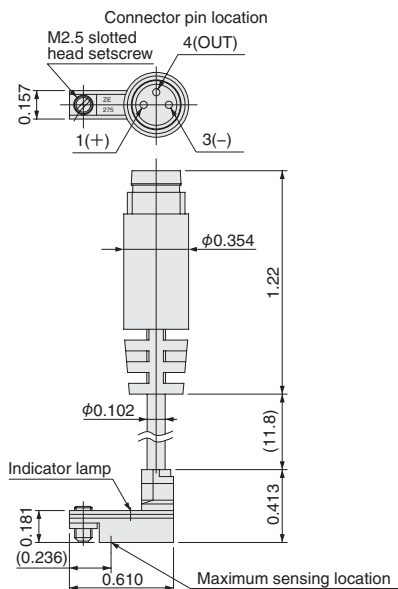


● Reed switch type (ZE201□, ZE202□)



● Solid state type (ZE275G, ZE277G)

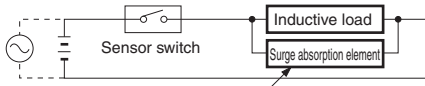
Note: Not available with the ZE201□.



Contact Protection for Reed Switch Type Sensor Switch

In order to use the reed switch type sensor switch safely, take the contact protection measures listed below.

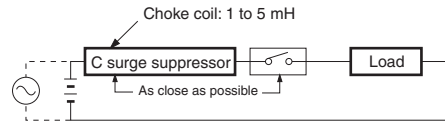
● For connecting an inductive load (electromagnetic relay)



For DC: Diode or CR, etc.
 For AC: CR etc.
 Diode: Forward current should be more than the circuit current, and for reverse direction, dielectric strength should be 10 times greater or more than the circuit voltage.
 C: 0.01 to 0.1 μF
 R: 1 to 4 k Ω

● For capacitive surges

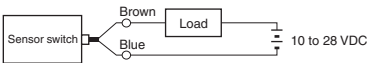
(When the lead wire length exceeds 10 m [32.8 ft])



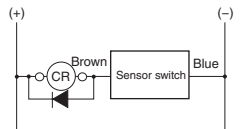
Wiring instructions for the solid state type sensor switches

● 2-lead wire type

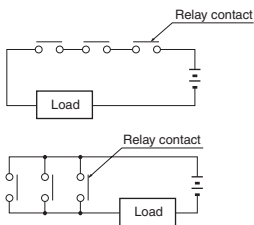
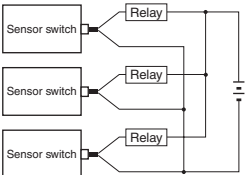
● Basic connection



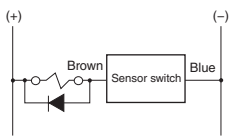
● Connecting with relays



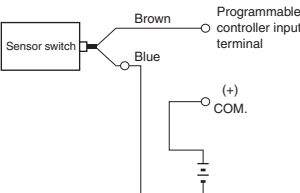
AND (series) connection and OR (parallel) connection



● Connecting with a solenoid valve

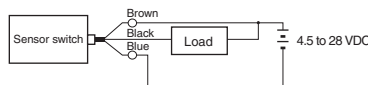


● Connecting with a programmable controller

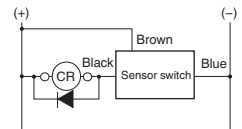


● 3-lead wire with NPN output type

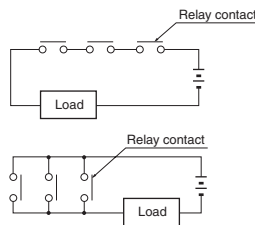
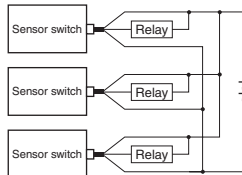
● Basic connection



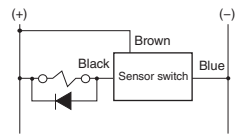
● Connecting with relays



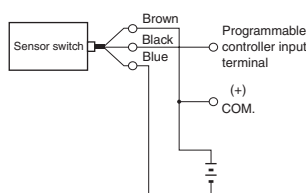
AND (series) connection and OR (parallel) connection



● Connecting with a solenoid valve

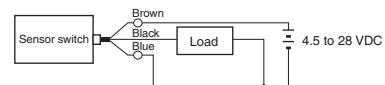


● Connecting with a programmable controller

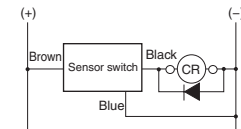


● 3-lead wire with PNP output type

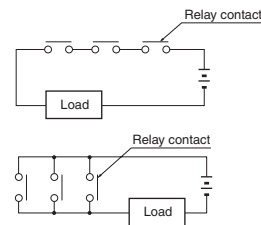
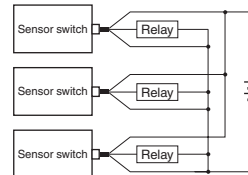
● Basic connection



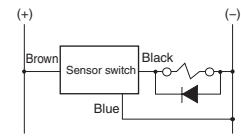
● Connecting with relays



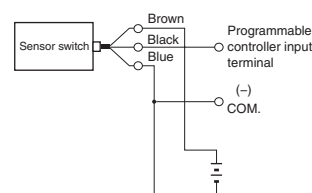
AND (series) connection and OR (parallel) connection



● Connecting with a solenoid valve



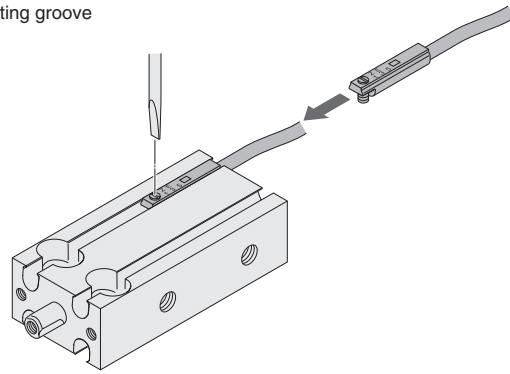
● Connecting with a programmable controller



1. Connect lead wires according to their color. Incorrect wiring will cause damage to the sensor switch.
2. The use of a surge protection diode is recommended with the inductive load of an electromagnetic relay etc.
3. Avoid the use of AND (series) connections, because the circuit voltage will drop in proportion to the number of sensor switches.
4. When using an OR (parallel) connection, it is possible to connect sensor switch outputs directly (ex: using corresponding black lead wires). Be aware of load return errors since current leakage increases with the number of switches.
5. Because the sensor switches are magnetically sensitive, avoid using them in locations subject to strong external magnetic fields or bringing them in close proximity to power lines and areas where large electric currents are present. Also avoid using magnetic material for any parts used for mounting. It could result in erratic operation.
6. Do not pull or bend the lead wires with excessive force.
7. Avoid using the switches in environments where chemicals or gas are present.
8. Consult the nearest Koganei sales office for use in environments subject to water or oil.

Moving Sensor Switch

- Loosening the screw allows the sensor switch to be moved along the switch mounting groove of the cylinder tube.
- The tightening torque for the screws is 0.1 to 0.2 N·m [0.9 to 1.8 in·lbf].



Sensor Switch Operating Range, Response Differential, and Maximum Sensing Location

- **Operating range : ℓ**
The range from where the piston turns the switch on and the point where the switch is turned off as the piston travels in the same direction.
- **Response differential : C**
The distance between the point where the piston turns the switch on and the point where the switch is turned off as the piston travels in the opposite direction.

● Solid State Type unit: mm

Item \ Diameter	6	8	10	12	16	20	25	32	40	50	63	80	100	125
Operating range: ℓ	1.5 to 5		2 to 5			2 to 6			3 to 7		3 to 11			
Response differential: C	0.3 or less													
Maximum sensing location ^{Note}	6													

Remark: The values in the table above are reference values. Note: The value from the opposite end of the lead wire. (shown by arrow)

Item \ Diameter	0.236	0.315	0.394	0.472	0.630	0.787	0.984	1.260	1.575	1.969	2.480	3.150	3.937	4.921
Operating range: ℓ	0.059 to 0.197		0.079 to 0.197			0.079 to 0.236			0.118 to 0.276		0.118 to 0.433			
Response differential: C	0.012 or less													
Maximum sensing location ^{Note}	0.236													

Remark: The values in the table above are reference values. Note: The value from the opposite end of the lead wire. (shown by arrow)

● Reed Switch Type unit: mm

Item \ Diameter	16	20	25	32	40	50	63	80	100	125	
Operating range: ℓ	3 to 9		4 to 12			6 to 14		7 to 18		8 to 24	
Response differential: C	0.3 or less										
Maximum sensing location ^{Note}	10										

Remark: The values in the table above are reference values. Note: The value from the opposite end of the lead wire. (shown by arrow)

Item \ Diameter	0.630	0.787	0.984	1.260	1.575	1.969	2.480	3.150	3.937	4.921	
Operating range: ℓ	0.118 to 0.354		0.157 to 0.472			0.236 to 0.551		0.276 to 0.709		0.315 to 0.945	
Response differential: C	0.012 or less										
Maximum sensing location ^{Note}	0.394										

Remark: The values in the table above are reference values. Note: The value from the opposite end of the lead wire. (shown by arrow)

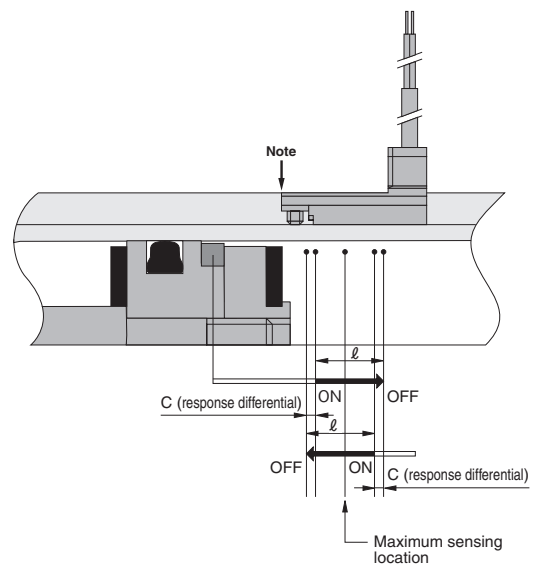
● Two-color LED solid state type unit: mm

Item \ Diameter	6	8	10	12	16	20	25	32	40	50	63	80	100	125
Operating range: ℓ	1.5 to 5		2 to 6			3 to 8			4 to 12		5 to 12			
Response differential: C	0.5 or less													
Maximum sensing location ^{Note}	6													

Remark: The values in the table above are reference values. Note: The value from the opposite end of the lead wire. (shown by arrow)

Item \ Diameter	0.236	0.315	0.394	0.472	0.630	0.787	0.984	1.260	1.575	1.969	2.480	3.150	3.937	4.921
Operating range: ℓ	0.059 to 0.197		0.079 to 0.236			0.118 to 0.315			0.157 to 0.472		0.197 to 0.472			
Response differential: C	0.020 or less													
Maximum sensing location ^{Note}	0.236													

Remark: The values in the table above are reference values. Note: The value from the opposite end of the lead wire. (shown by arrow)



When Mounting the Cylinders with Sensor Switches in Close Proximity

When using cylinders next to each other, use under conditions using values greater than in the table below.

● Reed Switch Type

unit: mm

Cylinder bore	A	B
16	12	0
20		
25		
32		
40		
50		
63		
80		
100		
125		

● Solid State Type

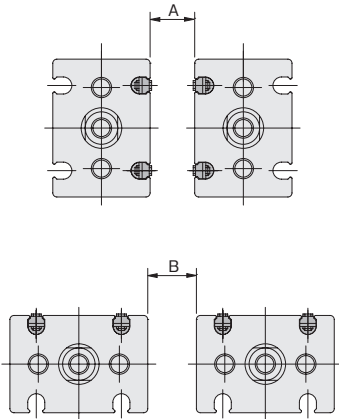
unit: mm

Cylinder bore	A	B
6	14	0
8		
10		
12		
16		
20		
25		
32		
40		
50		
63		
80		
100		
125		

● Two-color LED solid state type

unit: mm

Cylinder bore	A	B
6	23	0
8		
10		
12		
16		
20		
25		
32		
40		
50		
63		
80		
100		
125		



Note: Install a shield plate (at least 1 mm [0.039 in] thick magnetic material) between two cylinders to use them in close proximity. However, magnetic materials cannot be used in magnetized environments.

unit: in

Cylinder bore	A	B
0.630	0.472	0
0.787		
0.984		
1.260		
1.575		
1.969		
2.480		
3.150		
3.937		
4.921		

unit: in

Cylinder bore	A	B
0.236	0.551	0
0.315		
0.394		
0.472		
0.630		
0.787		
0.984		
1.260		
1.575		
1.969		
2.480		
3.150		
3.937		
4.921		

unit: in

Cylinder bore	A	B
0.236	0.906	0
0.315		
0.394		
0.472		
0.630		
0.787		
0.984		
1.260		
1.575		
1.969		
2.480		
3.150		
3.937		
4.921		

● For cylinder with guide

● Reed Switch Type

unit: mm

Cylinder bore	A	B
16	11	0
20		
25		
32		
40		

● Solid State Type

unit: mm

Cylinder bore	A	B
8	23	0
12		
16		
20		
25		
32		
40		

● Two-color LED solid state type

unit: mm

Cylinder bore	A	B
8	15	0
12		
16		
20		
25		
32		
40		

unit: in

Cylinder bore	A	B
0.630	0.433	0
0.787		
0.984		
1.260		
1.575		

unit: in

Cylinder bore	A	B
0.315	0.906	0
0.472		
0.630		
0.787		
0.984		
1.260		
1.575		

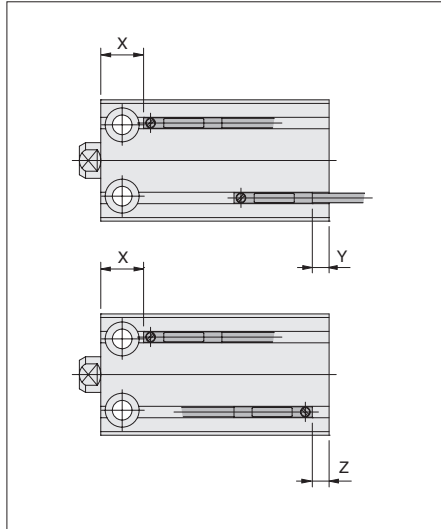
unit: in

Cylinder bore	A	B
0.315	0.591	0
0.472		
0.630		
0.787		
0.984		
1.260		
1.575		

Mounting Position of the End of Stroke Detection Sensor Switch

Mounting the sensor switch in the locations shown (values in diagram are reference values), the sensor magnet comes to the maximum sensing location of the sensor switch at the end of the stroke.

- Double acting type
- Single acting push type
- Single acting pull type



* If the Y dimension is negative, the sensor switch protrudes from the cylinder body.

Solid state type (2-color LED included) unit: mm

Item	Bore	6	8	10	12	16	20	25	32	40	50	63	80	100	125
Double acting type	X	10.5	11	11	11	12	15 (20)	16 (21)	17.5	22.5	27.5	33.5	34.5	46.5	53
	Y	0	-0.5	0.5	1.5	2.5	3.5	4.5	7	9	10	12	14	18	19.5
	Z	3.5	3	4	5	6	7	8	10.5	12.5	13.5	15.5	17.5	21.5	23
Single acting push type	X	25.5	26	26	26	27	30	31	32.5	37.5	47.5	-	-	-	-
	Y	0	-0.5	0.5	1.5	2.5	3.5	4.5	7	9	10	-	-	-	-
	Z	3.5	3	4	5	6	7	8	10.5	12.5	13.5	-	-	-	-
Single acting pull type	X	25.5	26	26	26	27	30	31	32.5	37.5	47.5	-	-	-	-
	Y	0	-0.5	0.5	1.5	2.5	3.5	4.5	7	9	10	-	-	-	-
	Z	3.5	3	4	5	6	7	8	10.5	12.5	13.5	-	-	-	-

Note: Dimensions in () parentheses are for 5-mm stroke models.

Reed Switch Type unit: mm

Item	Bore	6	8	10	12	16	20	25	32	40	50	63	80	100	125
Double acting type	X	-	-	-	-	8	11 (16)	12 (17)	13.5	18.5	23.5	29.5	30.5	42.5	49
	Y	-	-	-	-	-0.5	0.5	1.5	4	6	7	9	11	15	16.5
	Z	-	-	-	-	2	3	4	6.5	8.5	9.5	11.5	13.5	17.5	19
Single acting push type	X	-	-	-	-	23	26	27	28.5	33.5	43.5	-	-	-	-
	Y	-	-	-	-	-0.5	0.5	1.5	4	6	7	-	-	-	-
	Z	-	-	-	-	2	3	4	6.5	8.5	9.5	-	-	-	-
Single acting pull type	X	-	-	-	-	8	11	12	13.5	18.5	23.5	-	-	-	-
	Y	-	-	-	-	14.5	10.5	11.5	14	16	27	-	-	-	-
	Z	-	-	-	-	17	13	14	16.5	18.5	29.5	-	-	-	-

Note: Dimensions in () parentheses are for 5-mm stroke models.

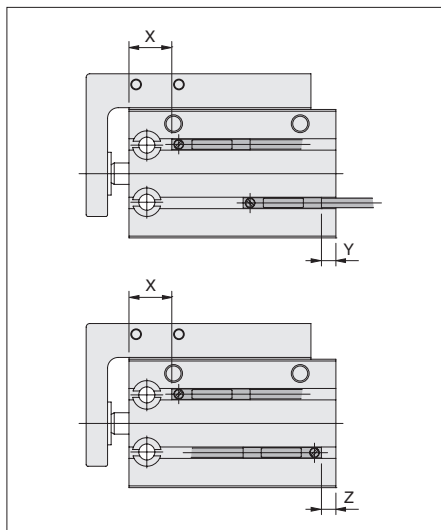
● Double acting double rod end type

Solid state type (2-color LED included) unit: mm

Item	Bore	6	8	10	12	16	20	25	32	40	50	63	80	100	125
Double acting type	X	10.5	11	11	11	12	15	16	17.5	22.5	27.5	33.5	34.5	46.5	53
	Y	4	4.5	5.5	6.5	7.5	8.5	9.5	12	14	20	22	24	18	19.5
	Z	7.5	8	9	10	11	12	13	15.5	17.5	23.5	25.5	27.5	21.5	23

Reed Switch Type unit: mm

Item	Bore	6	8	10	12	16	20	25	32	40	50	63	80	100	125
Double acting type	X	-	-	-	-	8	11	12	13.5	18.5	23.5	29.5	30.5	42.5	49
	Y	-	-	-	-	4.5	5.5	6.5	9	11	17	19	21	15	16.5
	Z	-	-	-	-	7	8	9	11.5	13.5	19.5	21.5	23.5	17.5	19



* If the Y dimension is negative, the sensor switch protrudes from the cylinder body.

● Double acting type with guide

Solid State Type unit: mm

Item	Bore	8	12	16	20	25	32	40
Double acting type	X	11 (16)	11 (16)	12 (17)	15 (20)	16 (21)	17.5 (22.5)	22.5 (27.5) (32.5 for stroke 10 only)
	Y	-0.5	1.5	2.5	3.5	4.5	12	14
	Z	3	5	6	7	8	15.5	17.5

Note: Dimensions in () parentheses are for mid-stroke models (stroke of 5, 15, 25, 35, 45, and 55).

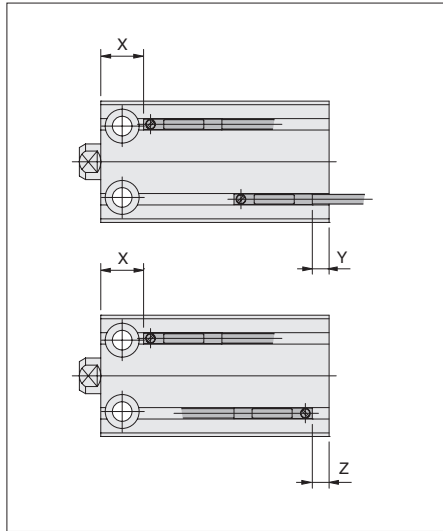
Reed Switch Type unit: mm

Item	Bore	8	12	16	20	25	32	40
Double acting type	X	-	-	8 (13)	11 (16)	12 (17)	13.5 (18.5)	18.5 (23.5) (28.5 for stroke 10 only)
	Y	-	-	-0.5	0.5	1.5	9	11
	Z	-	-	2	3	4	11.5	13.5

Note: Dimensions in () parentheses are for mid-stroke models (stroke of 5, 15, 25, 35, 45, and 55).

Mounting Position of the End of Stroke Detection Sensor Switch

Mounting the sensor switch in the locations shown (values in diagram are reference values), the sensor magnet comes to the maximum sensing location of the sensor switch at the end of the stroke.



* If the Y dimension is negative, the sensor switch protrudes from the cylinder body.

- Double acting type
- Single acting push type
- Single acting pull type

Solid state type (2-color LED included) unit: in

Item	Bore	0.236	0.315	0.394	0.472	0.630	0.787	0.984	1.260	1.575	1.969	2.480	3.150	3.937	4.921
Double acting type	X	0.413	0.433	0.433	0.433	0.472	0.591 (0.787)	0.630 (0.827)	0.689	0.886	1.083	1.319	1.358	1.831	2.087
	Y	0	-0.020	0.020	0.059	0.098	0.138	0.177	0.276	0.354	0.394	0.472	0.551	0.709	0.768
	Z	0.138	0.118	0.157	0.197	0.236	0.276	0.315	0.413	0.492	0.531	0.610	0.689	0.846	0.906
Single acting push type	X	1.004	1.024	1.024	1.024	1.063	1.181	1.220	1.280	1.476	1.870	-	-	-	-
	Y	0	-0.020	0.020	0.059	0.098	0.138	0.177	0.276	0.354	0.394	-	-	-	-
	Z	0.138	0.118	0.157	0.197	0.236	0.276	0.315	0.413	0.492	0.531	-	-	-	-
Single acting pull type	X	1.004	1.024	1.024	1.024	1.063	1.181	1.220	1.280	1.476	1.870	-	-	-	-
	Y	0	-0.020	0.020	0.059	0.098	0.138	0.177	0.276	0.354	0.394	-	-	-	-
	Z	0.138	0.118	0.157	0.197	0.236	0.276	0.315	0.413	0.492	0.531	-	-	-	-

Note: Dimensions in () parentheses are for 5 mm [0.197 in] stroke models.

Reed Switch Type unit: in

Item	Bore	0.236	0.315	0.394	0.472	0.630	0.787	0.984	1.260	1.575	1.969	2.480	3.150	3.937	4.921
Double acting type	X	-	-	-	-	0.315	0.433 (0.630)	0.472 (0.669)	0.531	0.728	0.925	1.161	1.201	1.673	1.929
	Y	-	-	-	-	-0.020	0.020	0.059	0.157	0.236	0.276	0.354	0.433	0.591	0.650
	Z	-	-	-	-	0.079	0.118	0.157	0.256	0.335	0.374	0.453	0.531	0.689	0.748
Single acting push type	X	-	-	-	-	0.906	1.024	1.063	1.122	1.319	1.713	-	-	-	-
	Y	-	-	-	-	-0.020	0.020	0.059	0.157	0.236	0.276	-	-	-	-
	Z	-	-	-	-	0.079	0.118	0.157	0.256	0.335	0.374	-	-	-	-
Single acting pull type	X	-	-	-	-	0.315	0.433	0.472	0.531	0.728	0.925	-	-	-	-
	Y	-	-	-	-	0.571	0.413	0.453	0.551	0.630	1.063	-	-	-	-
	Z	-	-	-	-	0.669	0.512	0.551	0.650	0.728	1.161	-	-	-	-

Note: Dimensions in () parentheses are for 5 mm [0.197 in] stroke models.

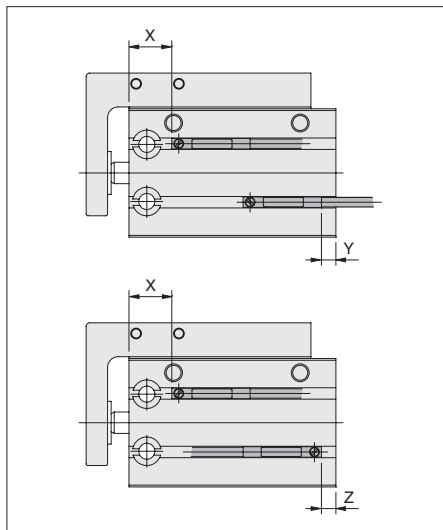
- Double acting double rod end type

Solid state type (2-color LED included) unit: in

Item	Bore	0.236	0.315	0.394	0.472	0.630	0.787	0.984	1.260	1.575	1.969	2.480	3.150	3.937	4.921
Double acting type	X	0.413	0.433	0.433	0.433	0.472	0.591	0.630	0.689	0.886	1.083	1.319	1.358	1.831	2.087
	Y	0.157	0.177	0.217	0.256	0.295	0.335	0.374	0.472	0.551	0.787	0.866	0.945	0.709	0.768
	Z	0.295	0.315	0.354	0.394	0.433	0.472	0.512	0.610	0.689	0.925	1.004	1.083	0.846	0.906

Reed Switch Type unit: in

Item	Bore	0.236	0.315	0.394	0.472	0.630	0.787	0.984	1.260	1.575	1.969	2.480	3.150	3.937	4.921
Double acting type	X	-	-	-	-	0.315	0.433	0.472	0.531	0.728	0.925	1.161	1.201	1.673	1.929
	Y	-	-	-	-	0.177	0.217	0.256	0.354	0.433	0.669	0.748	0.827	0.591	0.650
	Z	-	-	-	-	0.276	0.315	0.354	0.453	0.531	0.768	0.846	0.925	0.689	0.748



* If the Y dimension is negative, the sensor switch protrudes from the cylinder body.

- Double acting type with guide

Solid State Type unit: in

Item	Bore	0.315	0.472	0.630	0.787	0.984	1.260	1.575
Double acting type	X	0.433 (0.630)	0.433 (0.630)	0.472 (0.669)	0.591 (0.787)	0.630 (0.827)	0.689 (0.886)	0.886 (1.083) (1.280 for stroke 10 mm [0.394 in] only)
	Y	-0.020	0.059	0.098	0.138	0.177	0.472	0.551
	Z	0.118	0.196	0.236	0.276	0.315	0.610	0.689

Note: Dimensions in () parentheses are for mid-stroke models (stroke of 5, 15, 25, 35, 45 and 55 mm [0.197, 0.591, 0.984, 1.378, 1.772, and 2.165]).

Reed Switch Type unit: in

Item	Bore	0.315	0.472	0.630	0.787	0.984	1.260	1.575
Double acting type	X	-	-	0.315 (0.512)	0.433 (0.630)	0.472 (0.669)	0.531 (0.728)	0.728 (0.925) (1.122 for stroke 10 mm [0.394 in] only)
	Y	-	-	-0.020	0.020	0.059	0.354	0.433
	Z	-	-	0.079	0.118	0.157	0.453	0.531

Note: Dimensions in () parentheses are for mid-stroke models (stroke of 5, 15, 25, 35, 45 and 55 mm [0.197, 0.591, 0.984, 1.378, 1.772, and 2.165]).

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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