



Operation Manual

PRODUCT NAME

One-touch Fitting

MODEL/ Series/ Product Number

KQ2 series

SMC Corporation

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Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)^{*1)}, and other safety regulations.

*1) ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots
etc.



Danger

Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.



Warning

Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



Caution

Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Warning

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

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

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

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. SMC products cannot be used beyond their specifications. They are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not allowed.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, combustion equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.



Safety Instructions

Caution

SMC develops, designs, and manufactures products to be used for automatic control equipment, and provides them for peaceful use in manufacturing industries.

Use in non-manufacturing industries is not allowed.

Products SMC manufactures and sells cannot be used for the purpose of transactions or certification specified in the Measurement Act of each country.

The new Measurement Act prohibits use of any unit other than SI units in Japan.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

***2) Vacuum pads are excluded from this 1 year warranty.**

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

2. Specific Product Precautions (1)

Design/Selection



Warning

(1) Confirm the specifications.

Products represented in this catalog are designed only for use in compressed air systems (including vacuum). Do not operate at pressures, temperatures, etc., beyond the range of specifications, as this can cause damage or malfunction. (Refer to the specifications.) We do not guarantee against any damage if the product is used outside of the specification range.

(2) Do not disassemble the product or make any modifications, including additional machining.

It may cause human injury and/or an accident.

(3) Check if PTFE can be used in application.

PTFE powder (Polytetrafluoroethylene resin) is included in the sealant. Confirm that the use of it will not cause any adverse affect on the system.



Caution

(1) Keep the connection part of fittings and tubing from rotating or oscillating movement. Use Rotary One-touch Fittings (KS or KX series) in these cases. The fittings may be damaged if they are used in the above manner.

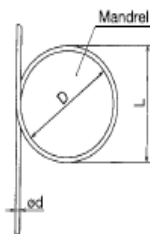
(2) The tubing bending radius in the vicinity of the fitting should be at least the minimum bending radius of the tubing.

If the bending radius is less than the minimum value, fittings may damage, or tubing may crack or be crushed. The minimum bending radius of the FR soft nylon tubing (TRS series), FR double layer tubing (TRB series), antistatic soft nylon tubing (TAS series), polyolefin tubing (TPH series), and soft polyolefin tubing (TPS series) is measured as following in accordance with JIS B 8381. Tubing deformation ratio at the minimum bending radius is obtained through the following formula, based on tubing diameter and mandrel diameter by winding the same radius mandrel tube.

$$\eta = \left(1 - \frac{L - D}{2d}\right) \times 100$$

Here, η : Deformation ratio [%]
 d : Tubing diameter [mm]
 L : Measured length [mm]
 D : Mandrel diameter [mm]
 (Twice against the minimum bending radius)
 Test temperature: $20 \pm 5^\circ\text{C}$
 Relative humidity: $65 \pm 5\%$

Tube deformation ratio at the minimum bending radius



Design/Selection



Caution

(3) Do not use fluids other than listed on the specifications.

(4) When used with liquid fluid, the fittings or tubing may be damaged depending on the surge pressure.

(5) Depending on the storage or operating environment and the period of storage or use, the surface of the brass (C3604) may blacken. If the discoloration of the brass is a problem, we recommend selecting electroless nickel-plated brass instead.

Example) KQ2H06-01 N S

(6) The dimensions shown in the dimension drawings are merely reference dimensions. The actual dimensions will vary depending on the tolerance. Be sure to provide sufficient clearance around the fitting for piping.

Mounting/ Piping



Warning

1. Operation manual

Install the products and operate them only after reading the operation manual carefully and understanding its contents. Also, keep the manual where it can be referred to as necessary.

2. Maintenance space

Allow sufficient space for maintenance and inspection.

3. Adhere to the thread tightening method.

Refer to "Connection Thread Tightening Method" when mounting the product.

4. There may be cases of the tubing detaching from the fitting and thrashing around uncontrollably due to tubing degradation or fitting breakage.

To prevent the situation from becoming uncontrollable, fit the tubing with a protective cover or fix it in place.



Caution

(1) Preparation before piping

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

2. Specific Product Precautions (2)

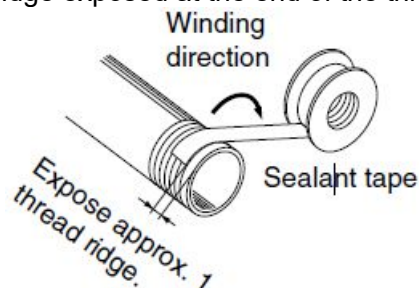
Mounting/ Piping



Caution

(2) Winding of sealant tape

When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealant do not get inside the pipe. Also, when the sealant tape is used, leave approx. 1 thread ridge exposed at the end of the threads.



(3) Check the model, type and size before installation. Also, confirm that there is no scratches, gouges or cracks on the product.

(4) When connecting the tubing, take pressure or possible changes to the tubing length into account, and allow a sufficient margin.

Failure to do so may result in fitting breakage or detachment of the tubing. Refer to the recommended piping conditions.

(5) Do not apply unnecessary forces such as twisting, pulling, moment loads, vibration and impact, etc. on fittings or tubing.

This will cause damage to fittings and will crush, burst or release tubing.

(6) Tubing, with the exception of coiled tubing, requires stationary installation. Do not use standard tubing (non-coiled) in applications where tubing is required to travel inside the flexible protection tube. Tubing that travels may sustain abrasion, extension, or severance due to tensile force, or may result in removal of tubing from fitting. Use caution prior to use for proper application.

(7) To install the fitting, screw the fitting into the hexagonal face of the body, and tighten with an appropriate wrench.

Affix the wrench at the base of the thread. If the size of hexagonal face and wrench do not match, or tightening takes place near the tube side, it may cause collapse or deformation of the hexagonal face, or damage to the equipment. After installing, confirm that there is no damage to the fitting, etc.

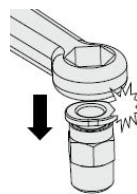
Mounting/ Piping



Caution

(8) Interference in oval type release button

The following models cannot be used if a box wrench or socket wrench is used.



KQ2 series

Model	Applicable tubing	Connection thread	Part No.
Male connector	φ 3.2	M3 x 0.5	KQ2H23-M3G1
	φ 3.2	M5 x 0.8	KQ2H23-M5□ 1
	φ 4	M3 x 0.5	KQ2H04-M3G1
	φ 4	M5 x 0.8	KQ2H04-M5□ 1
	φ 4	M6 x 1.0	KQ2H04-M6□ 1
	φ 6	M5 x 0.8	KQ2H06-M5□ 1
	φ 6	M6 x 1.0	KQ2H06-M6□ 1
	φ 6	R1/8	KQ2H06-01□ S1
	φ 1/8	10-32UNF	KQ2H01-32□ 1
	φ 3/16	10-32UNF	KQ2H05-32□ 1
	φ 5/32	NPT 1/16	KQ2H03-33□ S1
	φ 1/8	M5 x 0.8	KQ2H01-M5□ 1
	φ 3/16	M5 x 0.8	KQ2H05-M5□ 1
	φ 3/16	R1/8	KQ2H05-01□ S1
	φ 4	M3 x 0.5	KQ2F04-M3□ 1
	φ 4	M5 x 0.8	KQ2F04-M5□ 1
Female connector	φ 6	M5 x 0.8	KQ2F06-M5□ 1
	φ 1/8	10-32UNF	KQ2F01-32□ 1
	φ 5/32	10-32UNF	KQ2F03-32□ 1
	φ 1/8	M3 x 0.5	KQ2F23-M3□ 1
	φ 1/8	M5 x 0.8	KQ2F23-M5□ 1

□: A (Brass), N (Brass + Electroless nickel plating)

KQ2-G Stainless Steel Series

Model	Applicable tubing	Connection thread	Part No.
Male connector	φ 4	M5 x 0.8	KQ2H04-M5G1
	φ 6	M5 x 0.8	KQ2H06-M5G1
	φ 6	R1/8	KQ2H06-01GS1

Air Supply



Warning

(1) When there is a large amount of drainage.

Compressed air that contains a large amount of drainage can cause malfunction of pneumatic equipment. An air dryer or water droplet separator should be installed upstream from filters.

(2) Drain flushing

If condensation in the drain bowl is not emptied on a regular basis, the bowl will overflow and allow the condensation to enter the compressed air lines. It causes malfunction of pneumatic equipment. If the drain bowl is difficult to check and remove, installation of a drain bowl with an auto drain option is recommended.

For details on the above compressed air quality, refer to SMC's Best Pneumatics catalog.

(3) Use clean air.

Do not use compressed air that contains chemicals, synthetic oils including organic solvents, salt or corrosive gases, etc., as it can cause damage or malfunction.

2. Specific Product Precautions (3)

Air Supply



Caution

(1) Install an air filter.

Install an air filter at the upstream side of valve. Select an air filter with a filtration degree of 5µm or finer.

(2) Install an after cooler, air dryer or water droplet separator, etc.

Compressed air that contains a large amount of drainage can cause malfunction of pneumatic equipment. Therefore, take appropriate measures to ensure air quality, such as by providing an aftercooler, air dryer or water droplet separator.

(3) Ensure that the fluid and ambient temperature are within the specified range.

If the fluid temperature is 5°C or less, the moisture in the circuit could freeze, causing damage to the seals and leading to equipment malfunction. Therefore, take appropriate measures to prevent freezing.

Refer to "SMC Air Preparation System" for further details on compressed air quality.



Caution

(1) Do not use in an atmosphere having corrosive gases, chemicals, sea water, water, water steam, or where there is direct contact with any of these.

Refer to each construction drawing on the fittings and tubing material.

(2) Do not expose the product to direct sunlight for an extended period of time.

(3) Do not use in a place subject to heavy vibration and/or shock.

(4) Do not mount the product in locations where it is exposed to radiant heat.

(5) Do not use the ordinary fittings and tubing in locations where static electricity would be problematic.

It may result in the system failure and trouble. In such places, use of antistatic fittings (KA series) and antistatic tubing (TA series) are recommended.

(6) Do not use the ordinary fittings and tubing in locations where spatter is generated.

Spattering may result in a fire hazard. In such a place, use of flame resistant fittings (KR/KRM series) and flame resistant tubing (TRS/TRB/TRBU/TRTU series) are recommended.

(7) Do not use in an environment where the product is directly exposed to cutting oil, lubricant, coolant oil, etc.

Please contact SMC if using for an environment exposed to cutting oil, lubricant or coolant oil, etc.
nylon tubing may come off, thereby lowering the cleanliness level.

Operating Environment



Caution

(8) Take note that if nylon tubing and soft nylon tubing are used in a clean room.

The antioxidant on the surface of the soft nylon tubing may come off, thereby lowering the cleanliness level.

(9) Do not use in environments where foreign matter may stick to the product or get mixed in the product's interior.

This may cause leakage or disconnection of the tubing.

Maintenance



Warning

(1) Perform maintenance inspection according to the procedures indicated in the operation manual.

If handled improperly, malfunction and damage of machinery or equipment may occur.

(2) Maintenance work

If handled improperly, compressed air can be dangerous. Assembly, handling, repair and element replacement of pneumatic systems should be performed by a knowledgeable and experienced person.

(3) Drain flushing

Remove drainage from air filters regularly.

(4) Removal of equipment, and supply/exhaust of compressed air

When components are removed, first confirm that measures are in place to prevent workpiece from dropping, run-away equipment, etc. Then, cut the supply pressure and electric power, and exhaust all compressed air from the system using the residual pressure release function. When machinery is restarted, proceed with caution after confirming that appropriate measures are in place to prevent cylinders from sudden movement.



Caution

(1) Be certain to wear safety glasses at all times during periodical inspections.

(2) Replace fittings or tubing having the following problems.

- a) Cracks, gouges, wearing, corrosion
- b) Air leakage
- c) Twists or crushing of tubing
- d) Hardening, deterioration or softening of tubing

(3) When replacing tubes or fittings, do not try to mend or repair and then reuse them.

2. Specific Product Precautions(4)

One-touch Fitting
Mounting/Piping



Caution

(1) Installation and removal of tubing for One-touch fittings

1) Installation of tubing

- Cut the tubing perpendicularly, being careful not to damage the outside surface. Use an SMC tube cutter TK-1, 2, 3, 5 or 6. Do not cut the tubing with pliers, nippers, scissors, etc., otherwise, the tubing will be deformed and trouble may result.
- The outside diameter of the polyurethane tubing swells when internal pressure is applied to it. Therefore, it may be possible that the tubing cannot be re-inserted into the One-touch fitting. Check the tubing outside diameter, and when the accuracy of the outside diameter is +0.07 mm or larger for $\phi 2$, +0.15 mm or larger for other sizes, insert into the One-touch fitting again, without cutting the tubing to use it. When the tubing is re-inserted into the One-touch fitting, confirm that the tubing goes through the release button smoothly. 3. Grasp the tubing, slowly push it straight (0 to 5° into the One-touch fitting until it comes to a stop. Refer to the table below for the length for inserting the tube.
- Grasp the tubing, slowly push it straight (0 to 5° into the One-touch fitting until it comes to a stop. Refer to the table below for the length for inserting the tube.

Tubing size	Insertion length [mm]
$\phi 2$	11.9
$\phi 3.2, \phi 1/8"$	13.3
$\phi 4, \phi 5/32"$	13.3
$\phi 3/16"$	13.3
$\phi 6, \phi 1/4"$	13.3
$\phi 8, \phi 5/16"$	14.2
$\phi 10, \phi 3/8"$	15.6
$\phi 12, \phi 1/2"$	17
$\phi 16$	20.6

One-touch Fitting
Mounting/Piping



Caution

- Pull the tubing back gently to make sure it has a positive seal. Insufficient installation may cause air to leak or the tubing to release.

As a guide for checking the tubing is not pulled out, refer to the following table.

Tubing size	Tensile force of tubing [N]
$\phi 2, \phi 3.2, \phi 1/8"$	5
$\phi 4, \phi 5/32", \phi 3/16"$	8
$\phi 6, \phi 1/4"$	12
$\phi 8, \phi 5/16"$	20
$\phi 10, \phi 3/8"$	30
$\phi 12, \phi 1/2"$	35
$\phi 16$	50

2) Removal of tubing

- Push the release button flange evenly and sufficiently to release the tube. Do not push in the tubing before pressing the release button.
- Pull out the tubing while keeping the release button depressed. If the release button is not held down sufficiently, the tubing cannot be withdrawn.
- To reuse the tubing, remove the previously lodged portion of the tubing. If the lodged portion is left on without being removed, it may result in air leakage and removal of the tubing difficult.

(2) Connecting products with metal rods

Products with metal rods (KC series, previous KQ series, KN series, and KM series, etc.) cannot be connected to KQ2 series One-touch fittings. If connected, the metal rod cannot be retained by the chuck of the One-touch fitting and products with metal rods may project during pressurization, causing serious personal injury or accident. Even when products with metal rods can be connected to other One-touch fittings, do not use any tube, resin plug, or reducer after connection. This may cause releasing. For details about One-touch fittings that can connect products with metal rods, contact SMC.

2. Specific Product Precautions(5)

Connection Thread Tightening Method

(1) Connection thread: M3

First, tighten by hand, then use a wrench appropriate for the hexagon flats of the body to tighten an additional 1/4 turn. A reference value for the tightening torque is 0.4 to 0.5 N · m.

(2) Connection thread: M5 and 10-32UNF

First, tighten by hand, then use a wrench appropriate for the hexagon flats of the body to tighten an additional 1/6 to 1/4 turn. A reference value for the tightening torque is 1 to 1.5 N · m.

(3) Connection thread: M6

First, tighten by hand, then use a wrench appropriate for the hexagon flats of the body to tighten an additional 1/6 to 1/4 turn.

* Excessive tightening may damage the thread portion or deform the gasket and cause air leakage.

Insufficient tightening may loosen the thread, or cause air leakage.

(4) Fittings with sealant: R, NPT

a) First, tighten the fitting by hand, then use a wrench appropriate for the hexagon flats of the body to tighten it a further two or three turns. For a tightening torque guide, see the table below.

Connection thread size (R, NPT)	Tightening torque [N · m]
1/16, 1/8	3 to 5
1/4	8 to 12
3/8	15 to 20
1/2	20 to 25

b) If the fitting is tightened with excessive torque, a large amount of sealant will seep out. Remove the excess sealant.

c) Insufficient tightening may cause seal failure, or loosen the threads.

d) Reuse

1. Normally, fittings with a sealant can be reused 2 to 3 times.
2. To prevent air leakage through the sealant, remove any loose sealant stuck to the fitting by blowing air over the threaded portion.
3. If the sealant no longer provides effective sealing, wind sealing tape over the sealant before reusing. Do not use the sealant in any form other than a tape type.
4. Once the fitting has been tightened, backing it out to its original position often causes the sealant to become defective. Air leakage will occur.

Connection Thread Tightening Method

(5) Face seal fittings: R, NPT, G

a) Tighten fittings with sealant using the proper tightening torques in the table below.

Connection thread size (R, NPT, G)	Proper tightening torque [N · m]
1/16, 1/8	3 to 5
1/4	8 to 12
3/8	15 to 20
1/2	20 to 25

b) Insufficient tightening may cause seal failure, or loosen the threads.

c) Reuse

1. Normally, fittings with a sealant can be reused up to 6 to 10 times.
2. The seal ring cannot be replaced.

(6) Uni thread fittings

a) First, tighten the threaded portion by hand, then use a proper wrench, which could be suitable for the width across flats of the hexagon body, to tighten it further at a wrench tightening angle shown below. As a reference value for the tightening torque, refer to the table below.

Connection Female Thread: Rc, NPT, NPTF

Uni thread size	Wrench tightening angle after hand-tightening [deg]	Tightening torque [N · m]
1/8	30 to 60	3 to 5
1/4	30 to 60	8 to 12
3/8	15 to 45	14 to 16
1/2	15 to 30	20 to 22

Connection Female Thread: G

Uni thread size	Wrench tightening angle after hand-tightening [deg]	Tightening torque [N · m]
1/8	30 to 45	3 to 4
1/4	15 to 30	4 to 5
3/8	15 to 30	8 to 9
1/2	15 to 30	14 to 15

b) The gasket can be reused up to 6 to 10 times. It can be replaced easily when it has sustained damage. A broken gasket can be removed by holding it and then turning it in the same direction as loosening the thread. If gasket is difficult to remove, cut it with nippers, etc. In such a case, use caution not to scratch the seat face because the seat face of 45° gasket of fitting is the sealing face.

2. Specific Product Precautions(6)

Tightening tool

⚠ Caution

Use a wrench appropriate for the hexagon flats of the body to tighten the fitting.

Affix the wrench at the base of the thread. If the size of hexagonal face and wrench do not match, or tightening takes place near the tube side, it may cause collapse or deformation of the hexagonal face, or damage to the equipment.

After installing, confirm that there is no damage to the fitting, etc.

Recommended



Not recommended



Recommended



Not recommended



Not recommended

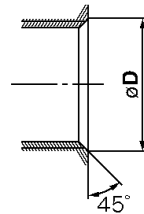


Chamfer Dimension for Female Thread

⚠ Caution

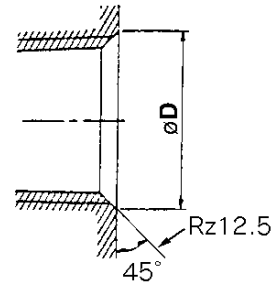
(1) Chamfer dimension for female thread of the connection thread M3, M5, 10-32UNF

Confirming to ISO 16030 (air pressure fluid dynamics - connection - ports and stud ends), the chamfer dimensions shown below are recommended. By chamfering as shown in the following table, machining of threads is easier and effective for burr prevention.



Connection thread size	Chamfer dimension øD (Recommended value) [mm]
M3	3.1 to 3.4
M5	5.1 to 5.4
10-32UNF	5.0 to 5.3

(2) Chamfer dimension of R and NPT thread with sealant, and Uni thread



Connection thread size	Chamfer dimension øD (Recommended value) [mm]		
	G	Rc	NPT, NPTF
1/16	-	-	8.2 to 8.4
1/8	10.2 to 10.6	10.2 to 10.4	10.5 to 10.7
1/4	13.6 to 14.0	13.6 to 13.8	14.1 to 14.3
3/8	17.1 to 17.5	17.1 to 17.3	17.4 to 17.6
1/2	21.4 to 21.8	21.4 to 21.6	21.7 to 21.9

* For Uni thread, Rz12.5 is necessary for sealing at the chamfered part.

2. Specific Product Precautions(7)

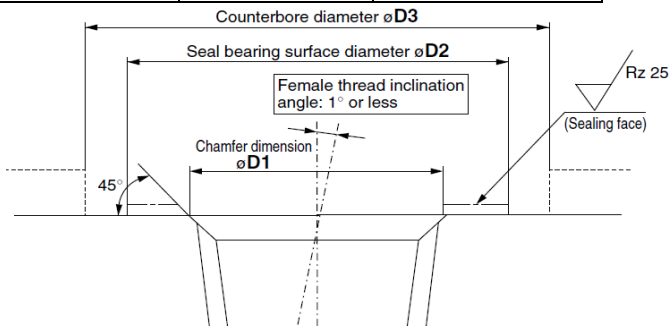
Chamfer Dimension for Female Thread

⚠ Caution

(3) Chamfer dimension for female thread of face seal fitting (R, NPT, G)

1. Surface roughness of bearing surface: Rz25 or less
2. Chamfer dimension: $\phi D1$, Seal bearing surface diameter: $\phi D2$
(Refer to the table below.)
3. Female thread inclination angle: 1° or less
4. Counterbore diameter when the female thread is counterbored: $\phi D3$.
 - Models with width across flats: Body width across flats x 1.1 or more
 - Models other than hexagon (Hexagon socket head male connector etc.): Body dimensions + 0.2 mm or more
5. If oil content or sealant is sticking to the female thread, this may cause damage of the product. Remove it before piping.

Connection thread size	Chamfer dimension $\phi D1$ [mm]	Seal bearing surface diameter $\phi D2$ [mm]
R1/8	10.2 to 10.4	12 or more
R1/4	13.6 to 13.8	17 or more
R3/8	17.1 to 17.3	21 or more
R1/2	21.4 to 21.6	27 or more
NPT 1/16	8.2 to 8.4	11.11 or more
NPT 1/8	10.5 to 10.7	12.7 or more
NPT 1/4	14.1 to 14.3	17.46 or more
NPT3/8	17.4 to 17.6	22 or more
NPT 1/2	21.7 to 21.9	28.7 or more
G1/8	10.2 to 10.6	12 or more
G1/4	13.6 to 14.0	17 or more
G3/8	17.1 to 17.5	21 or more
G1/2	21.4 to 21.8	27 or more



For products that do not satisfy the female thread conditions shown above and the piping with a piping pitch narrower than the product dimension, use the current sealant type.

- * The seal ring of the face seal cannot be replaced.
- * The seal ring of the face seal may fall off by the air blow and they cannot be mounted again. Be careful not to perform the air blow.

Recommended piping conditions

- 1) When connecting piping to the One-touch fitting, use pipe length with sufficient margin, in accordance with the piping conditions shown in Fig. 1.

Also, when using a tying band, etc., to bind the piping together, make sure that external force does not come to bear on the fitting (See Fig.2).

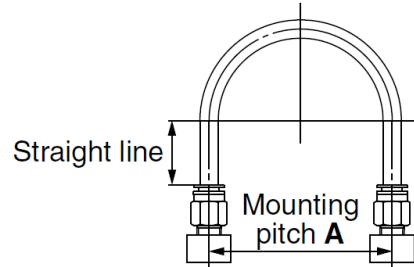


Fig. 1 Recommended piping

Unit: mm

Tubing size	Mounting pitch A			Straight line length
	Nylon tubing	Soft nylon tubing	Polyurethane tubing	
$\phi 2$	-	-	13 or more	10 or more
$\phi 3.2, \phi 1/8"$	44 or more	35 or more	25 or more	16 or more
$\phi 4, \phi 5/32"$	56 or more	44 or more	26 or more	20 or more
$\phi 3/16"$	67 or more	52 or more	38 or more	24 or more
$\phi 6$	84 or more	66 or more	39 or more	30 or more
$\phi 1/4"$	89 or more	70 or more	57 or more	32 or more
$\phi 8, \phi 5/16"$	112 or more	88 or more	52 or more	40 or more
$\phi 10$	140 or more	110 or more	69 or more	50 or more
$\phi 3/8"$	134 or more	105 or more	69 or more	48 or more
$\phi 12$	168 or more	132 or more	88 or more	60 or more
$\phi 1/2"$	178 or more	140 or more	93 or more	64 or more
$\phi 16$	224 or more	176 or more	114 or more	80 or more

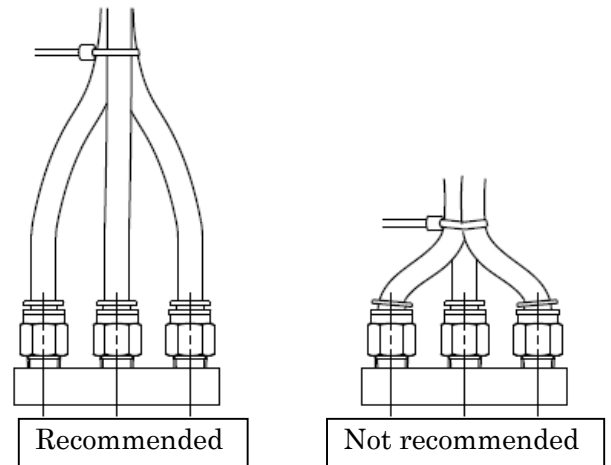


Fig. 2 When using a tying band to bind the piping together

2. Specific Product Precautions(8)

Tubing
Design/Selection



Caution

- (1) When using a tubing other than from SMC, be careful of the tolerance of the tubing O.D. and tubing material.**

- a) Nylon tubing Within +/-0.1 mm
- b) Soft nylon tubing Within +/-0.1 mm
- c) Polyurethane tubing Within +0.15 mm,
 Within -0.2 mm

Do not use the tubing which does not satisfy the specified tubing O.D. accuracy, or if the tubing has a different I.D., material, hardness, or surface roughness from those of SMC's tubing. Please consult with SMC if there is anything unclear.

It may cause difficulty in connecting the tubing, leakage, disconnection of the tubing, or fitting damage.

- (2) When using fittings other than those from SMC, be certain to confirm that operating conditions are such that no problems will arise.**

3. Specifications

Applicable tubing

Fluid	Air, Water	Tubing material ^{Note 1)}	Nylon, Soft nylon, Polyurethane
		Tubing O.D.	φ2, φ3.2, φ4, φ6, φ8, φ10, φ12, φ16, φ1/8", φ5/32", φ3/16", φ1/4", φ5/16", φ3/8", φ1/2"
	Coolant Note 7) , 8) , 9) , 10) , 11)	Tubing material	Nylon, Soft nylon
		Tubing O.D.	φ6, φ8, φ10, φ12

Specifications

Fluid	Air, Water ^{Note 2)} , Coolant ^{Note 2), 7), 8), 9), 10), 11)}
Operating pressure range ^{Note 3), Note 4)}	-100kPa to 1MPa
Proof pressure (at 23 °C)	3 MPa
Ambient and fluid temperature	-5 to 60°C, Water: 0 to 40°C (No freezing)
Seal on the threads ^{Note 5)}	Gasket seal, face seal, sealant, or no sealant

Note 1) Refer to the specifications in the catalog for other tube materials.

Note 2) The surge pressure must be under the maximum operating pressure.

Note 3) Check the operating pressure range of the tubing.

Note 4) Do not use the fittings with a leak tester or for vacuum retention because they are not guaranteed for zero leakage.

Note 5) Seal for taper thread (NPT, R)

- Face seal: Product number suffix "P"
- Sealant: Product number suffix "S"
- No sealant: No suffix to the product number

Note 7) Compatibility has not been verified with all types of coolant. For the coolants that have been verified by our company, please refer to the section "*Catalog: Tube Fittings & Tubing / General Precautions – Verified Coolants.*"

Note 8) Leakage and damage caused by the condition of the coolant (e.g., deterioration or contamination) are not covered under warranty.

Note 9) Performance may be affected by operating conditions such as coolant concentration, additives, impurities, temperature, and pressure fluctuations.

In general, chlorine and sulfur components may adversely affect NBR materials used in packings and O-rings.

Be sure to conduct prior evaluation on the actual equipment and determine performance and suitability before use.

Note 10) Thread seal: Applies to products with sealant applied. (Gasket seals and packing seals are not applicable.)

Note 11) Depending on the operating conditions, the use of an inner sleeve is recommended to improve sealing performance.

4. Troubleshooting

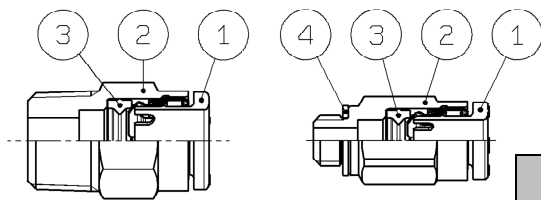
KQ2 series One-touch fitting cannot be disassembled or repaired in order to quality maintenance.

When failure such as "Non-removable tubing" occurs, please replace the whole product.

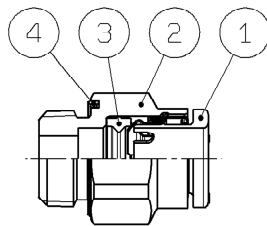
5. Construction

KQ2 series

Male connector



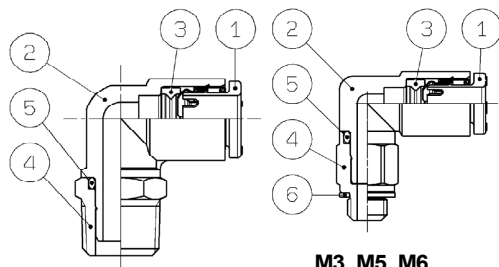
M3, M5, M6,
10-32UNF



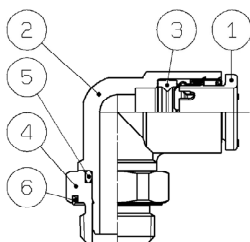
Face seal

No.	Part name	Material		
		Brass	Brass + Nickel plating	Stainless steel 303
1	Cassette	—	-	-
2	Male connector body	C3604	C3604 Electroless nickel plated	Stainless steel 303
3	Seal	NBR	NBR	NBR
4	Gasket	SUS304, NBR	SUS304, NBR	SUS304, NBR
	Seal ring	NBR	NBR	NBR

Male elbow



M3, M5, M6,
10-32UNF



Face seal

No.	Part name	Material		
		Brass	Brass + Nickel plating	Stainless steel 303
1	Cassette	—	-	-
2	Male elbow body	PBT	PBT	PBT
3	Seal	NBR	NBR	NBR
4	Stud	C3604	C3604 Electroless nickel plated	Stainless steel 303
5	O-ring	NBR	NBR	NBR
6	Gasket	SUS304, NBR	SUS304, NBR	SUS304, NBR
	Seal ring	NBR	NBR	NBR

6. Spare parts

Description	Part No.	Applicable thread
Gasket	M-3G2	M3
	M-5G2	M5, 10-32UNF
	M-6G	M6
	KQG-U01	Uni1/8
	KQG-U02	Uni1/4
	KQG-U03	Uni3/8
	KQG-U04	Uni1/2

KQ2 series (Brass)

Description	Part No.	Applicable model
Pipe nut	KQ01-P01AJ	KQ2E01-00AJ, KQ2E03-00AJ
	KQ02-P01AJ	KQ2E02-00AJ
	KQ23-P01AJ	KQ2E23-00AJ
	KQ04-P01AJ	KQ2E04-00AJ
	KQ06-P01AJ	KQ2E06-00AJ
	KQ07-P01AJ	KQ2E07-00AJ
	KQ01-P01A	KQ2E01-00A, KQ2E03-00A, KQ2E01-35A, KQ2E03-35A, KQ2LF01-00A, KQ2LE03-00A KQ2E01-00A1, KQ2E03-00A1, KQ2E01-35A1, KQ2E03-35A1, KQ2LE01-00A1, KQ2LE03-00A1
	KQ04-P01A	KQ2E23-00A, KQ2E04-00A, KQ2E23-02A, KQ2E04-01A, KQ2E04-02A, KQ2LE04-00A, KQ2E23-00A1, KQ2E04-00A1, KQ2E23-02A1, KQ2E04-01A1, KQ2E04-02A1, KQ2LE04-00A1, KQ2E04-G01A, KQ2E04-G02A, KQ2E04-G01A1, KQ2E04-G02A1
	KQ05-P01A	KQ2E05-00A, KQ2E07-00A, KQ2E05-34A KQ2E07-35A, KQ2LF05-00A, KQ2LE07-00A KQ2E05-00A1, KQ2E05-34A1, KQ2LE05-00A1
	KQ06-P01A	KQ2E06-00A, KQ2E06-01A, KQ2E06-02A KQ2E06-03A, KQ2LE06-00A, KQ2E05-01A KQ2E07-02A, KQ2E05-00MA, KQ2E07-00MA KQ2E06-00A1, KQ2E06-01A1, KQ2E06-02A1 KQ2E06-03A1, KQ2LE06-00A1, KQ2E05-01A1 KQ2E05-00MA1, KQ2E06-G01A, KQ2E06-G02A KQ2E06-G03A, KQ2E06-G01A1, KQ2E06-G02A1, KQ2E06-G03A1
	KQ08-P01A	KQ2E08-00A, KQ2E08-01A, KQ2E08-02A KQ2E08-03A, KQ2LE08-00A, KQ2E09-03A KQ2E09-00MA, KQ2E08-G01A, KQ2E08-G02A KQ2E08-G03A
	KQ09-P01A	KQ2E09-00A, KQ2E09-36A, KQ2LE09-00A
	KQ10-P01A	KQ2E10-00A, KQ2E10-02A, KQ2E10-03A KQ2LE10-00A, KQ2E11-03A, KQ2E11-00MA KQ2E10-G02A, KQ2E10-G03A
	KQ11-P01A	KQ2E11-00A, KQ2E11-36A, KQ2LE11-00A
	KQ12-P01A	KQ2E12-00A, KQ2E12-03A, KQ2E12-04A KQ2LE12-00A, KQ2E13-03A, KQ2E13-04A KQ2E13-00MA, KQ2E12-G03A, KQ2E12-G04A
	KQ13-P01A	KQ2E13-00A, KQ2E13-36A KQ2E13-37A, KQ2LE13-00A
	KQ16-P01A	KQ2E16-00A, KQ2E16-03A, KQ2E16-04A KQ2E16-G03A, KQ2E16-G04A

KQ2 series (Brass + Plating)

Description	Part No.	Applicable model
Pipe nut	KQ01-P01NJ	KQ2E01-00NJ, KQ2E03-00NJ
	KQ02-P01NJ	KQ2E02-00NJ
	KQ23-P01NJ	KQ2E23-00NJ
	KQ04-P01NJ	KQ2E04-00NJ
	KQ06-P01NJ	KQ2E06-00NJ
	KQ07-P01NJ	KQ2E07-00NJ
	KQ01-P01N	KQ2E01-00N, KQ2E03-00N, KQ2E01-35N, KQ2E03-35N, KQ2LF01-00N, KQ2LE03-00N KQ2E01-00N1, KQ2E03-00N1, KQ2E01-35N1, KQ2E03-35N1, KQ2LE01-00N1, KQ2LE03-00N1
	KQ04-P01N	KQ2E23-00N, KQ2E04-00N, KQ2E23-02N KQ2E04-01N, KQ2E04-02N, KQ2LE04-00N KQ2E23-00N1, KQ2E04-00N1, KQ2E23-02N1 KQ2E04-01N1, KQ2E04-02N1, KQ2LE04-00N1 KQ2E04-G01N, KQ2E04-G02N, KQ2E04-G01N1, KQ2E04-G02N1
	KQ05-P01N	KQ2E05-00N, KQ2E07-00N, KQ2E05-34N KQ2E07-35N, KQ2LF05-00N, KQ2LE07-00N KQ2E05-00N1, KQ2E05-34N1, KQ2LE05-00N1
	KQ06-P01N	KQ2E06-00N, KQ2E06-01N, KQ2E06-02N KQ2E06-03N, KQ2LE06-00N, KQ2E05-01N KQ2E07-02N, KQ2E05-00MN, KQ2E07-00MN KQ2E06-00N1, KQ2E06-01N1, KQ2E06-02N1 KQ2E06-03N1, KQ2LE06-00N1, KQ2E05-00MN1 KQ2E05-01N1, KQ2E06-G01N, KQ2E06-G02N KQ2E06-G03N, KQ2E06-G01N1, KQ2E06-G02N1, KQ2E06-G03N1
	KQ08-P01N	KQ2E08-00N, KQ2E08-01N, KQ2E08-02N KQ2E08-03N, KQ2LE08-00N, KQ2E09-03N KQ2E09-00MN KQ2E08-G01N, KQ2E08-G02N, KQ2E08-G03N
	KQ09-P01N	KQ2E09-00N, KQ2E09-36N, KQ2LE09-00N
	KQ10-P01N	KQ2E10-00N, KQ2E10-02N, KQ2E10-03N KQ2LE10-00N, KQ2E11-03N, KQ2E11-00MN KQ2E10-G02N, KQ2E10-G03N
	KQ11-P01N	KQ2E11-00N, KQ2E11-36N, KQ2LE11-00N
	KQ12-P01N	KQ2E12-00N, KQ2E12-03N, KQ2E12-04N KQ2LE12-00N, KQ2E13-03N, KQ2E13-04N KQ2E13-00MN, KQ2E12-G03N, KQ2E12-G04N
	KQ13-P01N	KQ2E13-00N, KQ2E13-36N KQ2E13-37N, KQ2LE13-00N
	KQ16-P01N	KQ2E16-00N, KQ2E16-03N, KQ2E16-04N KQ2E16-G03N, KQ2E16-G04N

KQ2 Series (Stainless steel 303)

Description	Part No.	Applicable model
Pipe nut	KQ04-P01G	KQ2E04-00G1, KQ2E04-01G1, KQ2E04-02G1
	KQ06-P01G	KQ2E06-00G1, KQ2E06-01G1 KQ2E06-02G1, KQ2E06-03G1
	KQ08-P01G	KQ2E08-00G, KQ2E08-01G KQ2E08-02G, KQ2E08-03G
	KQ10-P01G	KQ2E10-00G, KQ2E10-02G, KQ2E10-03G
	KQ12-P01G	KQ2E12-00G, KQ2E12-03G, KQ2E12-04G
	KQ16-P01G	KQ2E16-00G, KQ2E16-03G, KQ2E16-04G

Revision history

A:

- Safety Instructions revised
- Caution for oval type release button added
- Flame resistant tubing (TRBU, TRTU) added
- Tube cutter (TK-5, 6) added
- Table for tensile force of tubing added
- Construction of product made of stainless steel 303 added
- Spare parts for products with oval type release button and products made of stainless steel 303 added

B:

- Revision of safety precautions
- Addition of notes regarding external dimensions
- Addition of notes regarding female threads compatible with packing seals
- Deletion of notes regarding out-of-specification conditions
- Addition of coolant to applicable fluids
- Addition of notes regarding specifications

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
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