

SERTO®

uptodate

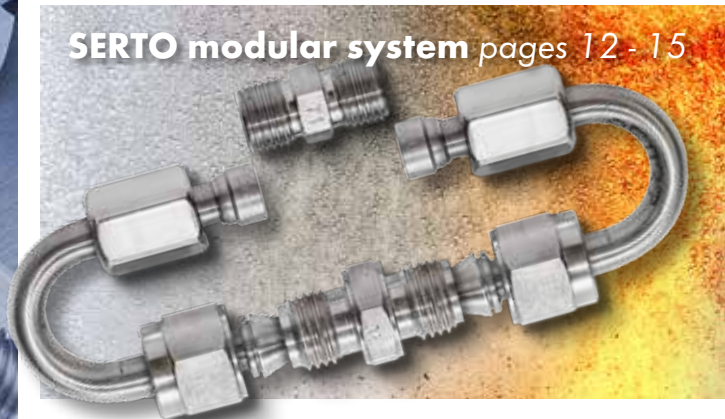
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Special edition

SERTO



a success story

The SERTO Group is based in Switzerland and has several European subsidiaries. SERTO is a successful manufacturer and international supplier of tube union systems. SERTO is also the brand name for a metallic flat sealing compression ferrule union that was developed back in 1956.

From simple tube unions to complex system solutions, SERTO has been developing products in its own laboratories and production facilities for over 60 years. Over the years, this has given rise to a comprehensive range of tube unions, valves, couplings, tubes, hoses and accessories for the transport, distribution and regulation of all sorts of media.

The SERTO union is a metallic flat sealing compression ferrule union which enables a radial assembly and disassembly. It was developed and patented by SERTO in 1956. Since then it has been used in a wide variety of industries and for an enormous variety of applications across the globe. The unique radial system makes installation and removal impressively easy, quick and safe.

In addition to this clever system with a wide product range and extensive know-how, SERTO also offers outstanding availability and efficient logistics. SERTO plans, optimises and manufactures assemblies and ready-to-fit tubes with a consistent customer focus and

guarantees that products will be delivered on time in excellent condition. SERTO's complete commitment to quality and implementing quality standards throughout the group is reflected by the testimony of several of its customers and the fact that it has industry-standard certification. As a manufacturer, SERTO knows exactly how its products can be used. Because of this, it can provide quick advice about potential applications with a firm technological basis.

SERTO has its own production facilities in Switzerland, the Czech Republic and Italy, guaranteeing a high level of transparency at every stage of production. SERTO is able to continuously monitor and evaluate the manufacturing process for outstanding production lots as well as during technical innovations.

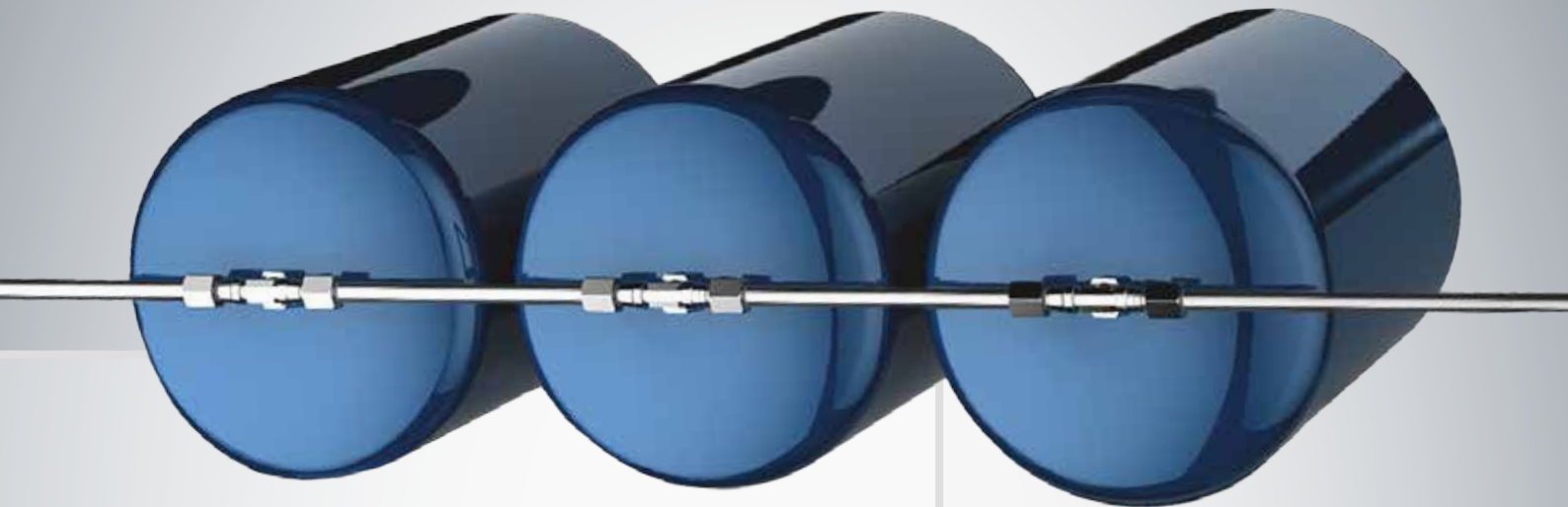
Sales companies in Switzerland, Germany, France, Italy and China form a global and efficient distribution network along with over 40 distribution partners. This ensures that customers are provided with the best possible advice and support by local staff.



Your benefit

- Safety with proven and tested products and reliable technology
- A partner with extensive knowledge of practical applications
- A high level of commitment to quality, proven by the company's industry-standard certification
- A one-stop shop: a complete range of unions, valves and couplings in six different materials

Radial (dis)assembly



① Removable tube system with SERTO fittings.

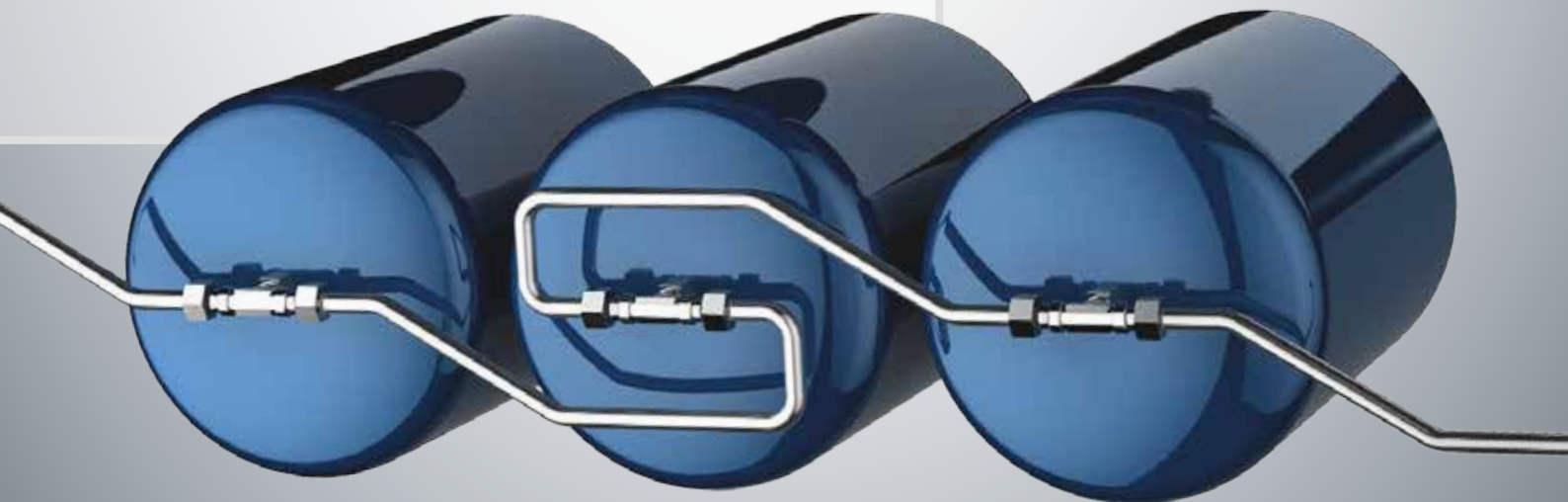
Your benefit:

- shortest possible connection
- minimum costs
- optimum KV value

② Removable tube system with conical fittings.

Disadvantages:

- costs for tube bending
- longer tubes
- reduced KV value



for efficient applications

SERTO compression ferrule unions enable radial assembly and disassembly and therefore reduce installation and maintenance effort. There is no need to bend out or cut through tubes, and both – tubes and unions – can be reused. This saves you time and money.

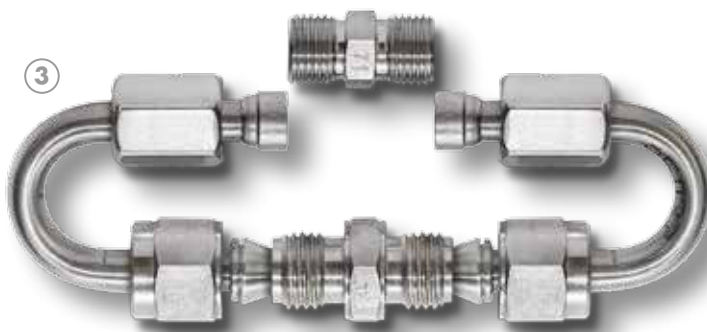
With other common tube unions, the tube is inserted into the base part and is sealed with a cone-shaped clamping/cutting ring. The fundamental difference of the radial SERTO compression ferrule union is that the cone is located in the nut instead (fig. 3). As a result the sealing surface between the clamping ring and the base of the union body is plane. This offers a great technical advantage as unions and valves can be positioned radially for installation or removed from the system.

For dismantling, only the nuts of the relevant union need to be loosened. The component can be removed without having to bend the tube or loosen other sealing points. This means that SERTO can save you an enormous amount of time. Production processes are interrupted for a much shorter amount of time when exchanging a filter or valve, for example. SERTO components and tubes can also be reused, which saves you money. In contrast, with conical unions, the tubes are inserted into the union body, which prevents easy radial removal. To get hold of a part it is necessary to either open several sealing points which will later have to be tightened and sealed again or to bend or cut the tubes.

To speed up the assembly, nut and ferrule can be pre-mounted on the tube and then inserted radially into the pipe network for final tightening of the nut. This is also not possible with a conical screw union.

The differences are particularly striking when it comes to connecting containers in a multi-tank system: The SERTO union is the quickest way to connect them to straight tubes (fig. 1). This means shorter tubes, no bending work involved and better flow rates. It is also a lot easier to acquire a replacement length of straight tubing than a bent tube, which requires more work. If the same containers are connected with cone unions, individual tubes can only be removed if they are bent multiple times (fig. 2).

The greatest saving can be achieved if design engineers already consider the advantages of the radial system during the planning phase. At the SERTO CAD library 3-D models of the products are available for download free of charge.



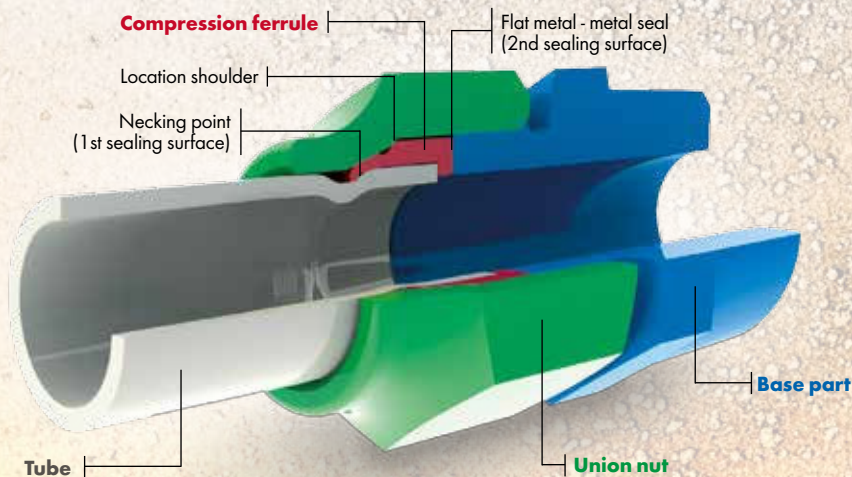
Your benefit

- Save time by using unions which can be removed radially
- Reduced maintenance costs: no need to bend and replace tubes for reinstallation
- Increased safety, fewer sealing points have to be opened
- Simplified construction thanks to the free 3-D CAD library

Metal to metal sealing



SERTO unions in applications with extreme temperatures



for extreme applications

Unions which operate with a metal to metal sealing enhance safety: SERTO does not use any elastomeric sealing materials which degrade or become porous – this maximises the safety and long-term functionality of your tube connections also in harsh environments.

SERTO provides a metallic seal when connecting tubes, regardless of the material that they are made of. SERTO unions achieve extremely high leak rates no matter what temperature and media you have because they do not use elastomeric sealing materials which can harden or settle. This is a particular advantage over longer periods. SERTO unions are therefore the correct choice for many applications.

The metallic compression ferrule is deformed while tightening the nut and grips the tube firmly with equal pressure over the entire circumference. The deforming force is distributed because of the cone in the nut. The radial (circular) component guarantees an ideal crimping (1st sealing surface) and gripping of the tube. With reaching the mechanical stop (location shoulder), the axial component creates the necessary surface pressure between the face of the compression ferrule and base part for a tight metal-to-metal seal (2nd sealing surface).

The SERTO union can be assembled and disassembled practically forever because the deformation of the clamping ring is complete with the first installation. The clamping ring does not deform any further.

The ability of the SERTO union to provide a fully functioning seal even after being installed and uninstalled a number of times is due to the elastic behaviour of the clamping ring. This makes the unions resistant to vibration, temperature and pressure fluctuations, which is particularly useful in extreme conditions:

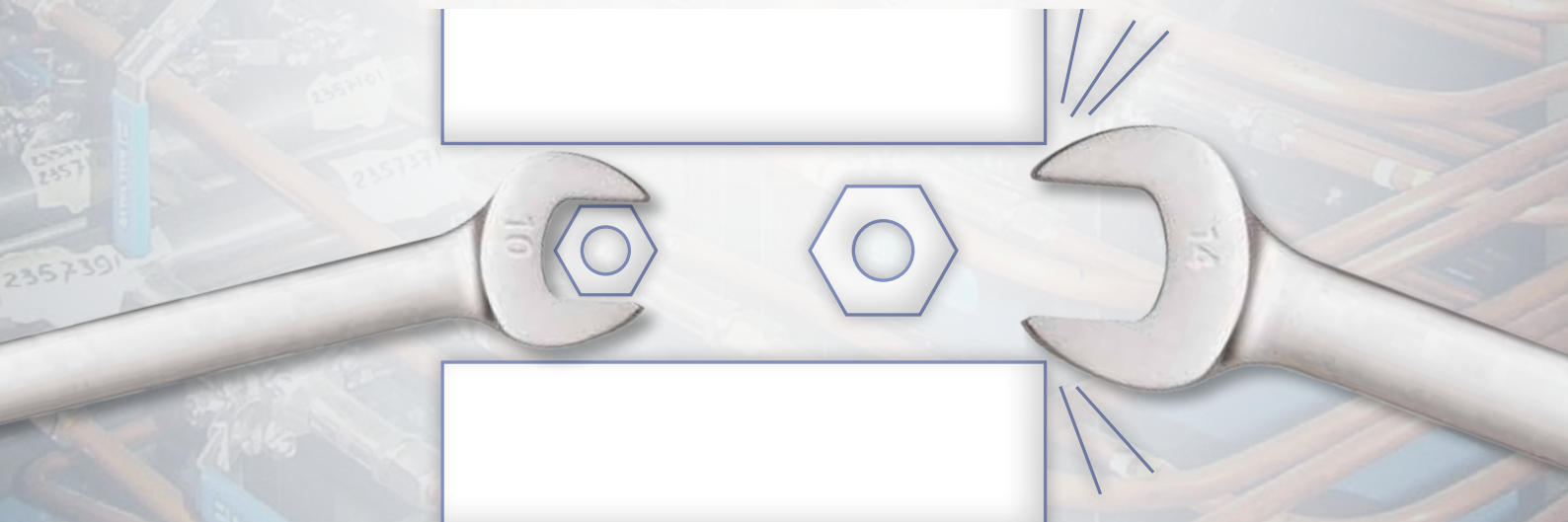
- Temperature sensors on engines or exhaust pipes have to be capable of resisting a wide range of media and temperature cycles. Temperatures of up to +950°C are not uncommon.
- In cryogenic systems, which are commonly used for research, medical technology or pharmaceuticals, all the components are subjected to extremely low temperatures down to -196°C.

The metallic seal of the SERTO unions really shows off its advantages in both of these applications. The industrial tightness is defined with a leak rate of 10^{-6} mbar l/s. All of SERTO's metallic products achieve a much higher level of 10^{-8} mbar l/s. When all of the individual components are perfectly matched and tubes are properly processed, handled and installed in accordance with instructions. SERTO unions can exceed the required industrial tightness by a factor of 1000.

Your benefit

- Increased safety due to metallic sealing, no risk with aging elastomeric sealings
- Increased vibration resistance thanks to the elastic and non-cutting behaviour of the ferrule
- High reliability, tight seal, especially over longer periods
- High resistance to temperature and media
- Cost savings because the union can be reinstalled

A smaller width across flats



for applications in tight spaces

SERTO unions with radial assembly have a smaller wrench width than other competing products. This means that more tubes will fit in the same tight area without changing the dimensions – giving you clarity and space.

A lot of technical products are developing quickly and providing users with an increasing number of additional options:

- Modern coffee machines can be used for cappuccinos, lattes, macchiatos and espressos, unlike older models which were limited to plain coffee. This means the choice is a lot wider than it used to be. Each speciality has its own feed which has to be fitted into the device.
- If you look under the bonnet of a 30-year-old car and compare it to a modern one, it is clear that the number of systems has increased. New options with lines and sensors mean that space is so tight underneath the bonnet that even changing a bulb has to be done by a specialist.

Both of these examples show that options are expanding even though the amount of space available is not. This means that all of the additional lines have to be accommodated into the existing area so that they can be installed and removed again for servicing. This increase in functionality has also affected the products of most of SERTO's customers.

This is where the advantages of using SERTO come into full effect: SERTO unions are one or two spanner sizes smaller than the competition. It's not just the unions that are smaller; the tools required to install them are smaller as well. You need a size 10 spanner with a width of 22 mm to install a 6 mm SERTO union, while you would need a size 14 spanner with a width of 31.5 mm to install a similar union from one of our competitors. This is equivalent to 50 % less space for you.

Even the base sections of SERTO unions are smaller than those of cone unions because tubes do not go into the base section of a SERTO union; they stop before it instead. As a result, the nuts are also smaller. Saving just a few millimetres can make a big difference, and can be particularly important in cramped conditions. This means that more tubes can be installed in parallel in the same space.

In addition to the dimensions, weight can also play an important role. Smaller unions are lighter. This is a significant advantage for applications involving acceleration, e.g. robotics.

Your benefit

- Extra space due to smaller product dimensions
- More tubes in the same space
- Lower weight, lower costs
- Unions are easier to access when performing maintenance on existing pipe systems

SERTO unions

Easy installation



for safe applications

SERTO unions are easy to install and do not require any specialised tools. All that you need is a spanner or the SERTO-tool or SERTOmatic pre-assembly equipment for large-scale work – this increases your efficiency and ensures that all unions are installed with the same level of quality.

All unions provide an outstanding seal if installed properly. SERTO delivers its unions preassembled and ready for installation. The tube is cut to size, fed into the union until it reaches the stop and tightened 1¾ rotations with a standard spanner - ready to go! Installers will be able to feel when the required number of rotations has been reached without having to count along. Pre-assembly is especially valuable when space is at a premium, e.g. using assembly stud in a vice. The union is then installed at the final location.

The fine thread of the union nut minimises torque during assembly. Excessively long spanners or extensions are not required.

Because the front faces of the tube ends are not directly involved in the seal, they don't need to be completely flat. Normal cutting and deburring are enough.

All SERTO plastic and metal unions are assembled the same way, regardless of the size: 1¾ rotations of the union nut. The fact that this is the only work required simplifies the process for the user and, most importantly, provides safety. Simple assembly instructions are included in every package, and an animated version is available on the SERTO website.

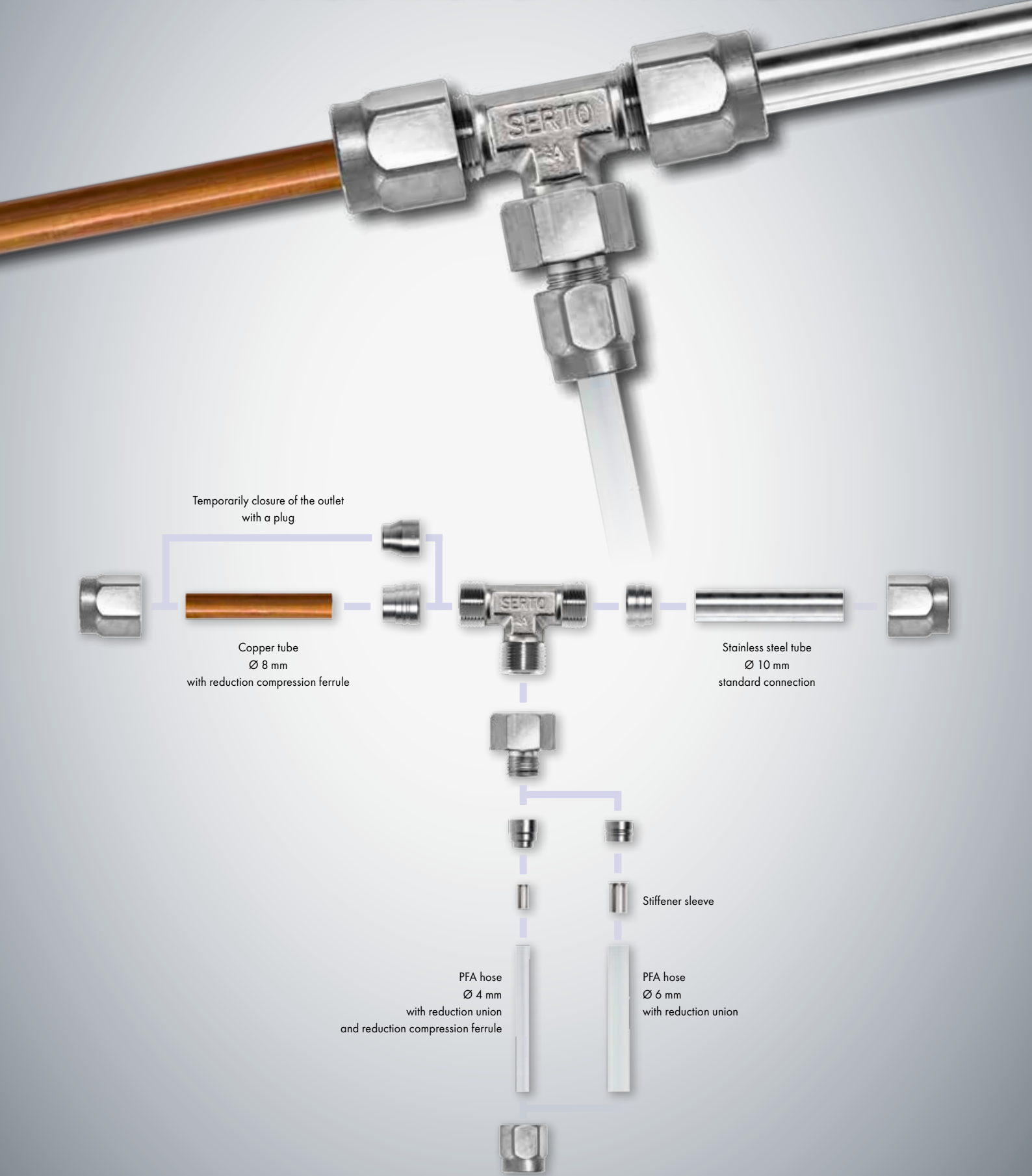
The SERTO pre-assembly equipment allows you to create safe connections quickly and with precision: finely tuned parameters are used for an optimal connection between the tube and the clamping ring. The advantages are clear: a product that is safe and easy to use, short production cycles even when large quantities are required and consistent quality make pre-assembly equipment quick and valuable helpers wherever they go. SERTO offers two different devices:

- The SERTOtool for tube diameters of up to 10 mm uses compressed air and can be set up pretty much anywhere due to its small footprint and lightweight design. This is a cost-effective solution because all of the necessary tools are included in the package.
- We recommend using the SERTOmatic pre-assembly device with an electro-hydraulic pump for tube diameters of between 10 and 35 mm.

Your benefit

- Easy assembly with a normal spanner, no special tools required
- A single easily understood assembly instruction for all ranges and sizes included in every pack
- Increased efficiency through the use of the SERTOtool/ SERTOmatic pre-assembly equipment
- On-site assembly training

Flexible with SERTO



Temporarily closure of the outlet
with a plug



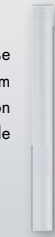
Copper tube
Ø 8 mm
with reduction compression ferrule



Stainless steel tube
Ø 10 mm
standard connection



PFA hose
Ø 4 mm
with reduction union
and reduction compression ferrule



Stiffener sleeve

PFA hose
Ø 6 mm
with reduction union



different tube dimensions

Do you want to connect tubes with different diameters? Or a metal tube with a plastic hose? Or install a measuring line temporarily? – No problem with the SERTO modular system!

A tee union usually connects three tubes of identical sizes to one another. What alternative connection options do you have? Competing products deal with size differences by using special parts or combining multiple unions together. SERTO provides safe and cost-effective solutions which save space:

The standard clamping ring in the nut can be exchanged for a reduction clamping ring so that you can connect tubes with a smaller diameter using the existing union. This makes it easy to switch a 10-10-10 tee union to 10-8-10, 8-10-8 or 8-8-10. The installation dimensions are identical to the standard union. Compared to the alternative, which uses additional unions, the solution with the reduction clamping ring has some other advantages: it involves fewer sealing points and takes up much less space.

SERTO also provides a reduction union to create a metallic seal with tubes with even smaller diameters. And if you fit this with another reduction clamping ring, you can

use the tee union with dimensions of 10-8-4. The smallest line could be used as an intake for a measurement instrument.

A plug can be inserted into any union instead of a clamping ring of the same size to close off the outlet in question. This is particularly useful if lines are only going to be used for a limited amount of time, e.g. the cleaning or measuring purposes.

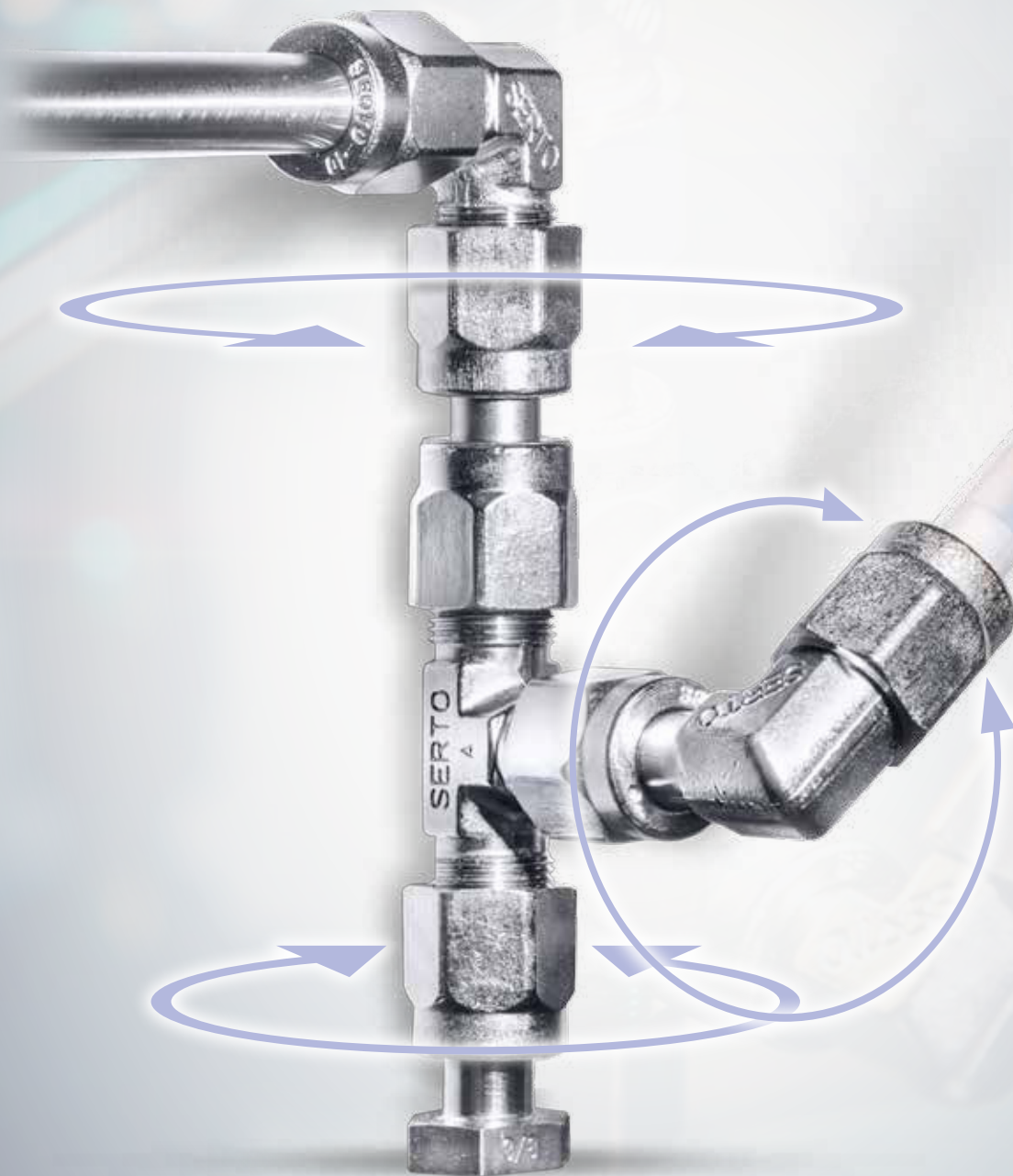
SERTO unions sit securely on metal tubes because the compression ferrule gently grips the tube when crimped without damaging it. Stiffener sleeves stabilise the inner wall of thin tubes and plastic hoses to provide enough resistance for pressure resistance.

The SERTO modular system provides an extremely flexible range of solutions which only require a small number of parts. Instead of three different complete fittings, all you need are a few reduction compression ferrules. This results in extremely low storage costs and does not use up much space, e.g. in a service vehicle.

Your benefit

- A high level of flexibility when connecting tubes of different diameters together using reduction clamping rings
- A reduced number of sealing points and reduced costs and space requirements through the use of a single union
- Easy and quick to assemble
- Standard parts are readily available from SERTO and low storage costs for users

Flexible with SERTO



different threads and directions

Are you building a prototype or revising your existing tube system? Do you need a wide range of threaded connections? Or are you looking for the most efficient way to connect branches going in different directions while saving space? – No problem with the SERTO modular system!

Base parts of SERTO unions have metric cylindrical threads. What alternative connection options do you have?

SERTO provides a wide range of female adaptors and nipples to combine a variety of thread types together. These are available in inch, NPT and metric threads and are screwed on instead of nuts to form a metallic seal without PTFE tape or other sealing materials. These adaptors provide the advantages of SERTO unions (the metallic seal, the radial system and the reduction options) and the same benefits (saved costs and space requirements, optimised storage and no loss of stability compared to the standard union).

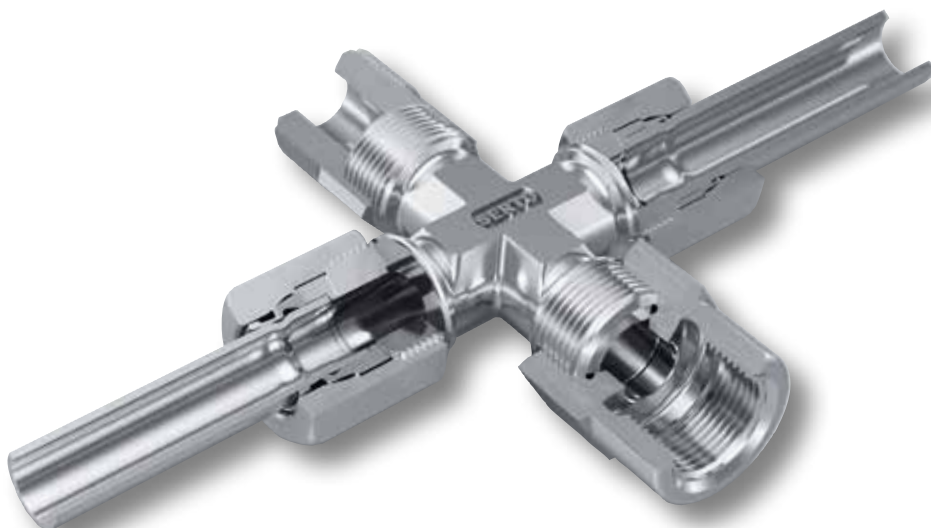
SERTO provides connection options which are not available anywhere else, such as a cross union with four different connections: one inch based female thread, one NPT external thread, one metric tube connection, one reduced inch-based tube connection. This cost-effective combination is available directly from SERTO.

Do you need to lay rigid tubes at a variety of individually adjustable angles? Do you need to make unions go around corners?

An adjustable male adaptor with a plug function is like an extremely short connection with an adjustable direction. When screwed into a component, it can be used to align the installed union.

Tube stubs are the shortest possible connection between two unions and can be used as a replacement of a tube that has been cut to size. When combined with a standard elbow union, they provide a connection which can be realigned.

Even more efficient than the option above is to use a single union: the adjustable unions. They are available in a number of different dimensions.



Your benefit

- Flexibility for unique combinations of threads and dimensions
- High level of product availability and lower storage costs
- Fewer sealing points, and saves space
- Adaptor function with metallic seal without using additional sealing materials

Not just clean



but pure

Above all in the semiconductor industry, for applications with pure oxygen, paints and lacquers, tube unions must be free of oil and grease. To ensure this, the components pass through a cleaning system and are assembled and individually packed in the SERTO ISO Class 8 clean room.

Some fields of application for SERTO tube unions and valves are subject to high cleanliness requirements. For many years, SERTO has provided the options US (cleaned with ultrasound and not lubricated), OX (in oxygen systems) and SI (silicon-free for use in combination with paints and lacquers).

The SERTO cleaning system

To achieve the required high level of cleanliness of surfaces which are in contact with media, SERTO developed a multi-stage process in cooperation with specialists. The components which are to be cleaned are placed in special baskets, adapted to their size. This ensures proper drainage of the cleaning and rinsing media.

In total, the cleaning plant consists of 9 sections, which include an ultrasound cleaning bath with alkali, with acid and with de-ionised water. These are separated by rinsing baths with osmotic water and completed with two drying sections. Over the last sections, a so-called air curtain prevents contamination of the cleaned components by dirt from the air. The 600 l of rinsing water is continuously treated in our cleaning plant. Every week we use about 25 kg of regenerating salt for this purpose. The slight loss of water is continuously topped up with tap water.

The material – brass or stainless steel – determines the sequence of the baths which are passed through. The quality is monitored according to ASTM (American Society for Testing and Materials) and each cleaning order is documented.

The SERTO clean room

To ensure that components are not subsequently contaminated after cleaning, assembly and packaging of the individual components into separate bags is carried out in an air-conditioned clean room directly next to the cleaning plant. The SERTO clean room complies with ISO Class 8, which means that a specified number of particles in the air must not be exceeded.

People are the largest source of particles and other contamination. Therefore, suitable work clothes (hoods, galoshes and a lock for changing clothes), special equipment and tools (lint-free cleaning cloths) as well as appropriate working methods are prescribed. Our clean room has a 3-stage pressure cascade system with an excess pressure of 30 Pa so that no dust can enter the room when the door is opened.

The cleaned US-components form the basis of SERTO options with special lubricants (OX and SI) and are the right solution of customers who use their own lubricants.

Your benefit

- Union components including cleaning process and packaging in an ISO 8 clean room, all from the same provider
- Advice and expertise to help you use unions securely with extreme media, e.g. oxygen
- Third-party components can be cleaned under contract

Tube systems



the service package

SERTO's competence in the production department starts with the purchasing and storage of the tubes, and expands to the use of optimal processing and bending machines, quality control to the completion of the tubes with fittings or installation of assemblies – according to the customer's wishes.

1. Intelligent warehousing

Over 60 tonnes of untreated, 6 m long tubes of stainless steel, aluminium, copper and steel with outer diameters of 1.59 to 60 mm are stored in the SERTO warehouse in Frauenfeld.

2. Surface treatment

Even before the first stress handling, the surfaces are galvanised, chromed, matte/shiny nickel plated, bonded, galvanised or electroplated.

3. Cutting to length

The fully automatic saw cuts the tubes sections to a maximum output of 3000 cuts per hour at an accuracy of ± 0.2 mm. SERTO is perfectly equipped for longer tube sections as well.

4. Machining steps

Depending on the demand, machining steps occur for threads, punches, inside threads or side drilled holes. For better assembly of the screws, the tube ends are manually or automatically deburred and smoothed, up to 2000 pieces per hour.

5. Cleaning

A first cleaning of the interior of the tube is done before bending. If needed, tubes can be treated in cleaning baths to make sure they have an oil-free surface.

6. Bending

SERTO has its own well equipped fleet of machines for the bending of tubes. The fully-automatic CNC controlled bending machines are optimally set up for diameter ranges up to 60 mm. The production of 6 m long tubes requires a large action radius, for which the new production facilities in Frauenfeld are perfectly suited. SERTO has its own facilities for the production of tools, equipment and jigs for challenging bending geometries.

7. Surface refining

SERTO is able to galvanise, nickel plate or chrome bent tubes. A powder coating or corrosion protection with paint are also on offer, as well as soldering and welding of the tubes.

8. Quality assurance

The heart of bending competency is the touchless measuring system, with an accuracy of 0.1 mm. It can also measure unusually long bent tubes. The system is used for first sampling, as well as for series production monitoring. The measurement and geometric data are automatically translated into machine commands. Thus the bending machines can also be realigned during production.

9. Assembly mounting

The bent tubes are usually installed to assemblies and are delivered as a kit; they work both with SERTO as well as outside components.

Your benefit

- Many years of expertise related to planning and manufacturing customised, tailor-made pipe sections which are ready for installation
- Assemblies are tested for safety
- Optimisation of pipe routing in cooperation with the customer
- Cost savings thanks to significantly simplified planning, logistics and warehouse management



Stainless steel



Plastics



Brass



Ready-to-fit tubes



Steel



Pre-assembled kits



Aluminium



Consulting

OXYGEN



Cleaning options



Valves, shut-off valves