



The railway product range by SERTO



SERTO, a corporate group with headquarters in Switzerland and several subsidiaries, is an internationally successful manufacturer and supplier of tube fitting systems.

With many years of experience and vast know-how in the development and production of unions and tube systems, we work together with the customer to find the right solution for almost any challenge.

Thanks to a sophisticated logistics system, the parts are delivered to the required location at the required time, individually or in kits according to customer specifications.

We will be happy to provide you with the right solution to meet your needs. Test us.



Extract from the range of services of the SERTO Group

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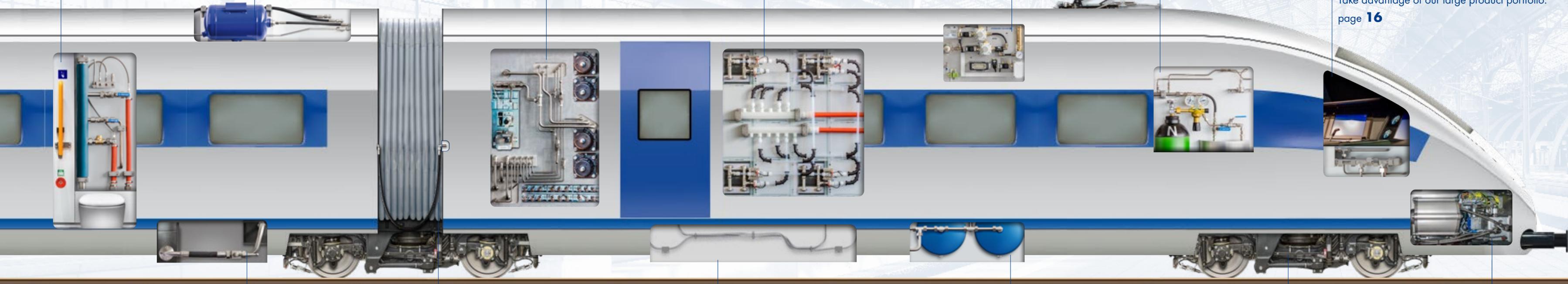
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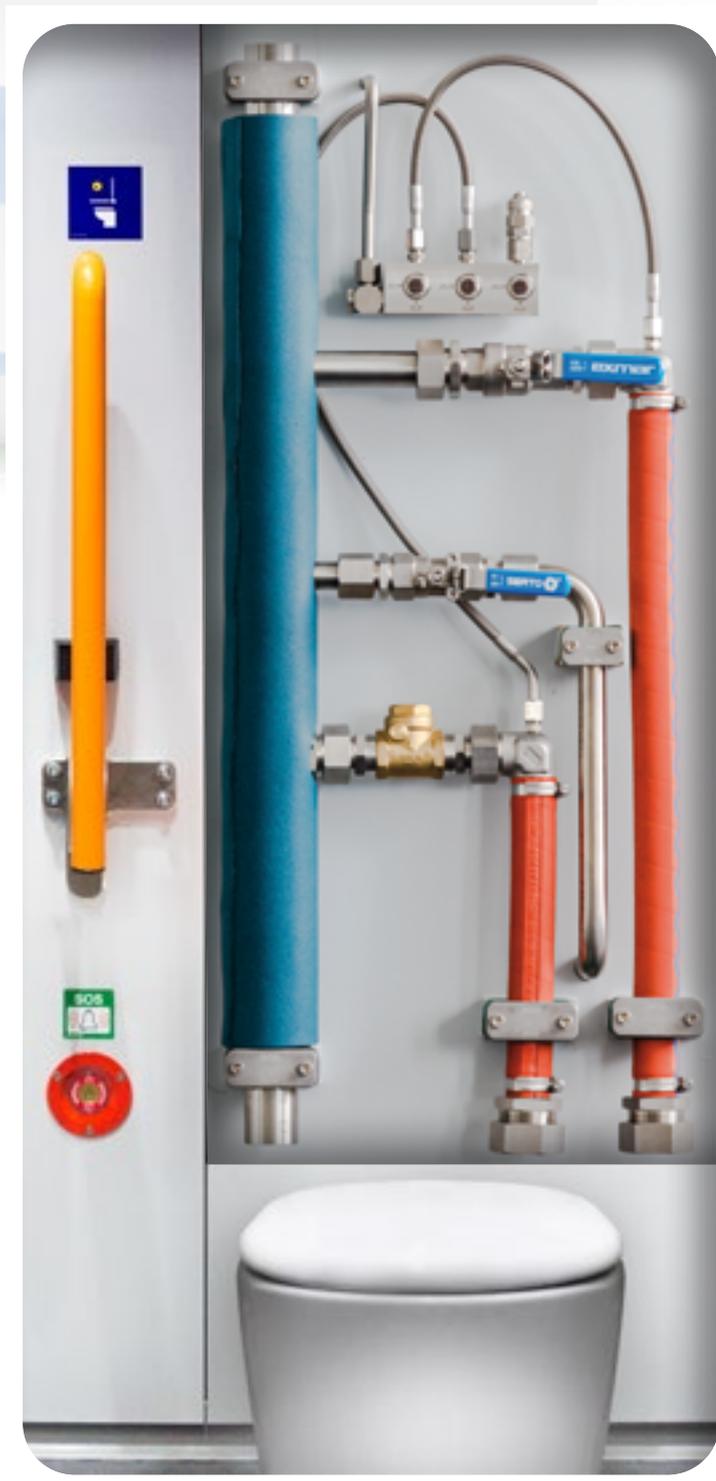
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Plumbing units



Cut your expenses

Products are pre-assembled, tested, cleaned and delivered ready to install. The bundling of kits minimizes the work for ordering and preparation before assembly.

Application/place of use Lavatory facilities in coaches

The challenge

- Use and combine different materials
- Totally leakproof system, easy installation

The SERTO solution

Systems ready to install, tested, cleaned and delivered as a kit.

Everything delivered on time and in one consignment from a single supplier for rapid installation on site.

Technical parameters *

Pressure: in this application up to 10 bar
Temperature: in this application -40°C to +60°C
Medium: water and other liquids

Products used

- Stainless steel cutting ring and compression ferrule unions
- Stainless steel ball valves and stop valves
- Bent, pre-assembled stainless steel tubes
- Hydraulic hoses in accordance with DIN EN 45545-2
- Coated tubes to protect from cold
- Tube clamps in accordance with DIN 3015

* depending on the material and tube diameter used, pressures up to 800 bar and temperatures from -60°C to +300°C are possible.

Pressure vessels



Save components and costs

Special parts, like special reducers, have potential for saving space, weight and costs while minimizing assembly work and the number of potential leakage points.

Application/place of use Brake system, brake lines and air tank tubing inside and outside the vehicle

The challenge

- Air tanks from most manufacturers are designed with a large connecting thread, as this is simpler and therefore cheaper when manufacturing the vessel
- However, the thread has to be reduced several times before it can be connected using the screw-in union when connecting the lines to brake line systems
- With standard parts, such a reduction cannot be made without using multiple components

The SERTO solution

Custom reduction based on the standard screw-in union from, for example, 1" to 10L/15L/18L or 2" to 15L/18L/22L.

**Fewer interfaces, fewer potential leakage points.
Cost savings in procurement and storage, as only one part has to be managed.**

Technical parameters*

Pressure: in this application max. 16 bar test pressure,
10 bar working pressure
Temperature: in this application -40°C to +60°C
Medium: dry, compressed air

Products used

- Stainless steel cutting ring unions in accordance with ISO 8434-1/DIN 2353 from the standard product range
- Stainless steel or steel parts made to customer specifications
- Galvanised stainless steel or steel tubes, pre-assembled and ready for installation
- Hydraulic hoses in accordance with DIN EN 45545-2, pre-assembled and ready for installation
- Standard or fire retardant pipe clamps in accordance with DIN 3015

* depending on the material and tube diameter used, pressures up to 800 bar and temperatures from -60°C to +300°C are possible.

Pneumatic lines



Trust our expertise

The latest production systems and know-how in bending, pressing, turning, soldering, welding and surface refining form the basis for the success of the SERTO Group.

Application/place of use Pneumatic tubing in brake systems

- The challenge**
- The most important property of a brake system – it must be leaktight
 - The system may consist of several hundred metres of tubes and it must always function reliably along its entire length

The SERTO solution High-quality, seamlessly drawn stainless steel tubes assembled with stainless steel cutting ring fittings.

Complete brake panel mounted and tested for direct installation. Simple assembly ensures transitions are leaktight and will pass acceptance testing without problems.

Technical parameters *

Pressure: in this application max. 16 bar test pressure, 10 bar working pressure

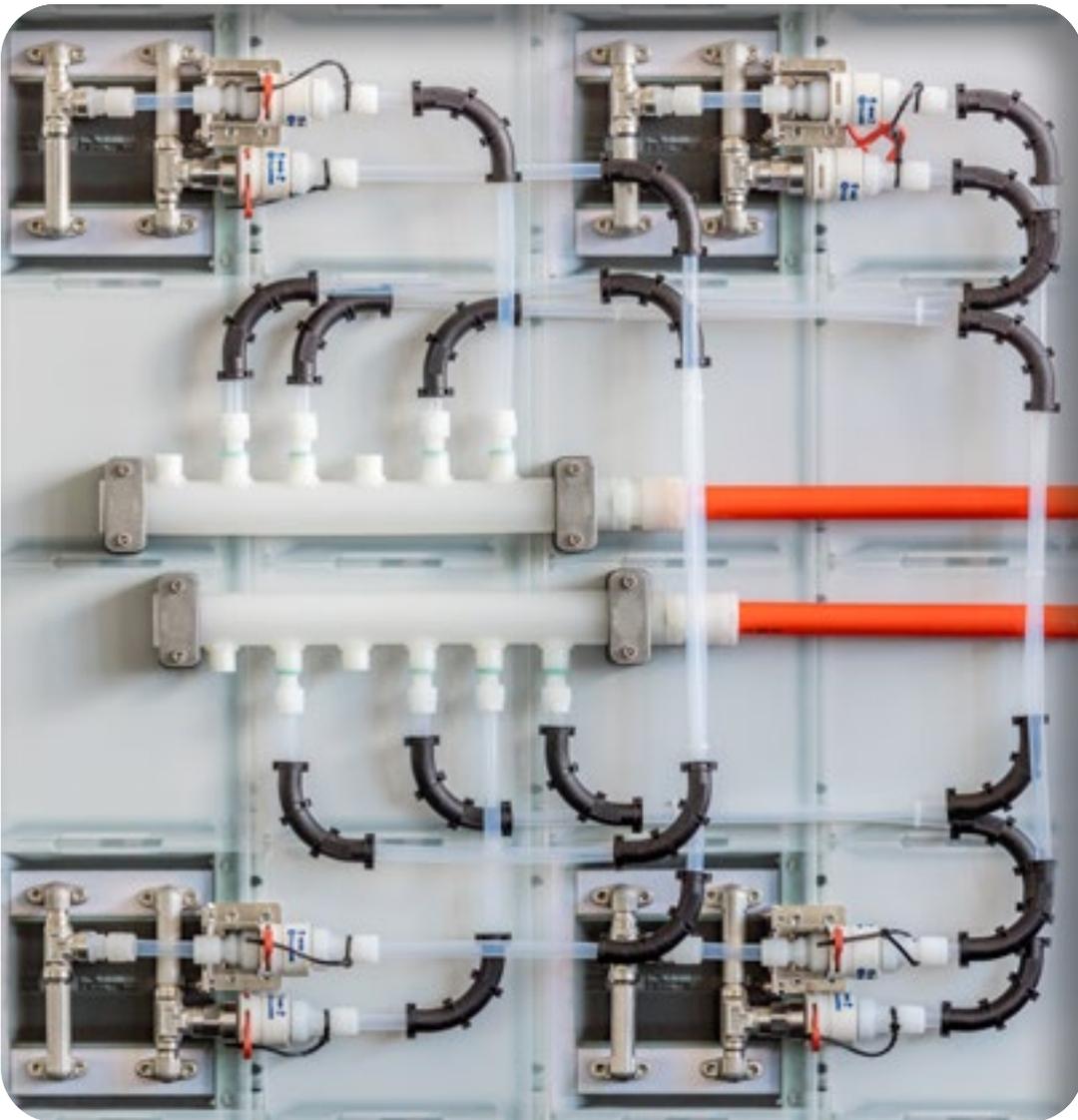
Temperature: in this application -10°C to +60°C

Medium: dry, compressed air

- Products used**
- Stainless steel cutting ring fittings in accordance with ISO 8434-1/DIN 2353 from the standard product range
 - Stainless steel NC clamping ring fittings based on ISO 8434-1/DIN 2353 from the standard product range
 - Stainless steel valves and stop valves from the standard product range
 - Special designs made of stainless steel according to specifications
 - Seamlessly drawn stainless steel tubes, assembled and ready to install
 - Assembled hydraulic hoses

* depending on the material and tube diameter used, pressures up to 800 bar and temperatures from -60°C to +300°C are possible.

Cooling for power electronics and batteries



Choose the right material

Whether non-ferrous metal, stainless steel, steel, aluminium or plastics, the SERTO Group has the experience needed for processing and putting to use these materials.

Application/place of use Electronic switch cabinet and battery cooling in locomotive and carriage interiors

- The challenge**
- Supply and exhaust for several cooling units in medium- and high-voltage frequency converters
 - Installation-ready distributor solutions for connection to the cooling plates of battery modules

The SERTO solution PVDF and stainless steel distributor strips made to customer specifications, pre-assembled and ready for installation.

High-quality materials for reliable cooling produced according to the customer's requirements.

Technical parameters*

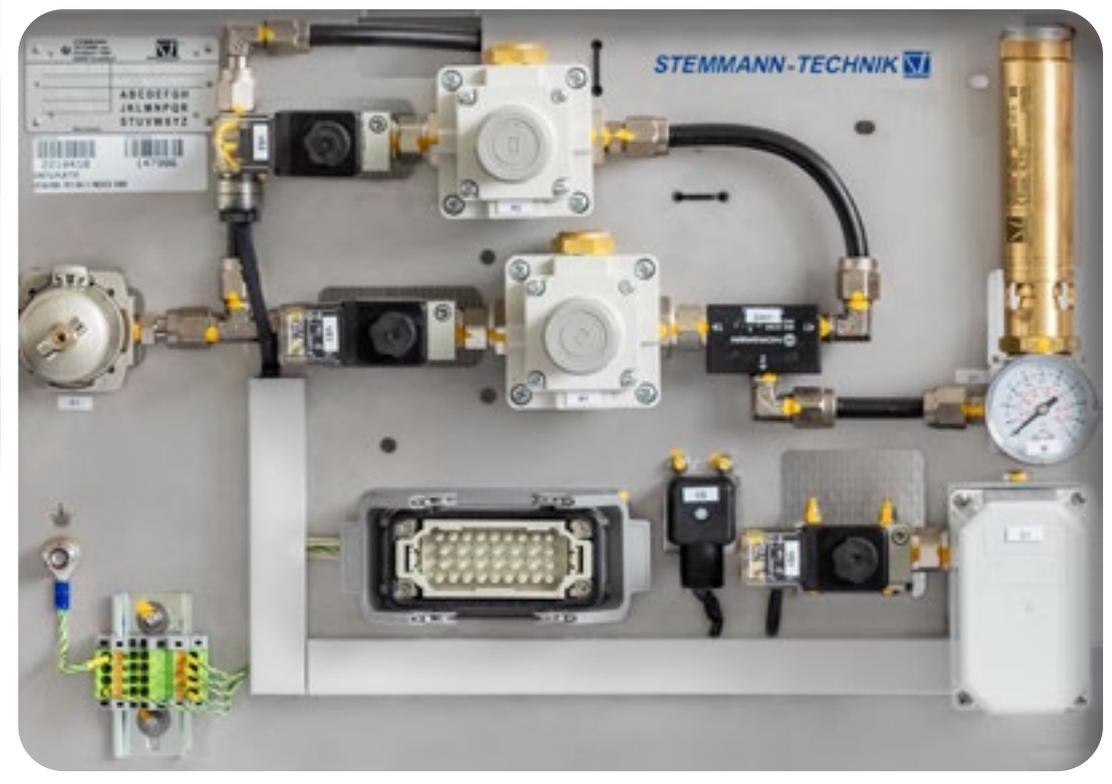
Pressure: in this application up to 10 bar
Temperature: in this application -10°C to +75°C
Medium: coolant water, with additives for temperatures below 0°C if required, DI water

- Products used**
- Ready to install water distributors with connections for the cooling plates made of PVDF, stainless steel or aluminium
 - Orbitally welded tubes
 - Ready-to-install FEP hoses with fire retardant bend clips
 - PVDF coupling PLUS from the standard product range
 - Stainless steel and PVDF unions from the standard product range
 - Tube clamps in accordance with DIN 3015 standard or fire retardant

* depending on the material and tube diameter used, pressures up to 800 bar and temperatures from -60°C to +300°C are possible.



Pantograph control



Expect reliability

Ready-to-install modules simplify planning, logistics and warehouse management significantly. A final inspection assures the customer that the products are fully functional.

Application/place of use Pantograph raising mechanism

The challenge

- The parts used must be small, lightweight and easy to install
- The pantograph must work reliably at all times

The SERTO solution Compression ferrule unions from the standard product range.

Simple, reliable installation.

Technical parameters*

Pressure: in this application up to 10 bar
Temperature: in this application -40°C to +150°C
Medium: Compressed air

Products used

- NC clamping ring fittings based on ISO 8434-1/DIN 2353 made of stainless steel or compression ferrule unions made of chemically nickel-plated brass or aluminium from the standard product range
- Hoses according to the customer's requirement, e.g. SERTOflex
- Distributor made of aluminium
- PTFE hoses assembled with aluminium fittings
- Hoses assembled with SÜM/ESA hose connector

* depending on the material and tube diameter used, pressures up to 800 bar and temperatures from -60°C to +300°C are possible.

Fire extinguisher systems



Find your ideal solution

Tailor-made products, developed together with the customer on request, are tested efficiently in the internal test lab and produced in our production facilities with a quick turnaround time.

Application/place of use

Lines, distributors and sprinklers in the machine room or passenger carriages

The challenge

- Materials that comply with the fire protection standards, withstand high pressures and do not rust
- System reliability must satisfy strict standards

The SERTO solution

NC clamping ring fittings, delivered tested and ready to install.

High quality, rust-proof connections for easy installation from the standard product range.

Technical parameters*

Pressure: in this application up to 200 bar
Temperature: in this application -40°C to +60°C
with stainless steel connections,
-196°C to +400°C is possible
Medium: water/gas mixture

Products used

- Ready to install tubes assembled with NC clamping ring fittings based on ISO 8434-1/DIN 2353, made entirely of stainless steel
- High quality hoses assemblies
- Distributor rails according to customer specifications
- Extinguishing nozzles according to customer specifications
- Tube clamps in accordance with DIN 3015 standard or fire retardant

* depending on the material and tube diameter used, pressures up to 800 bar and temperatures from -60°C to +300°C are possible.

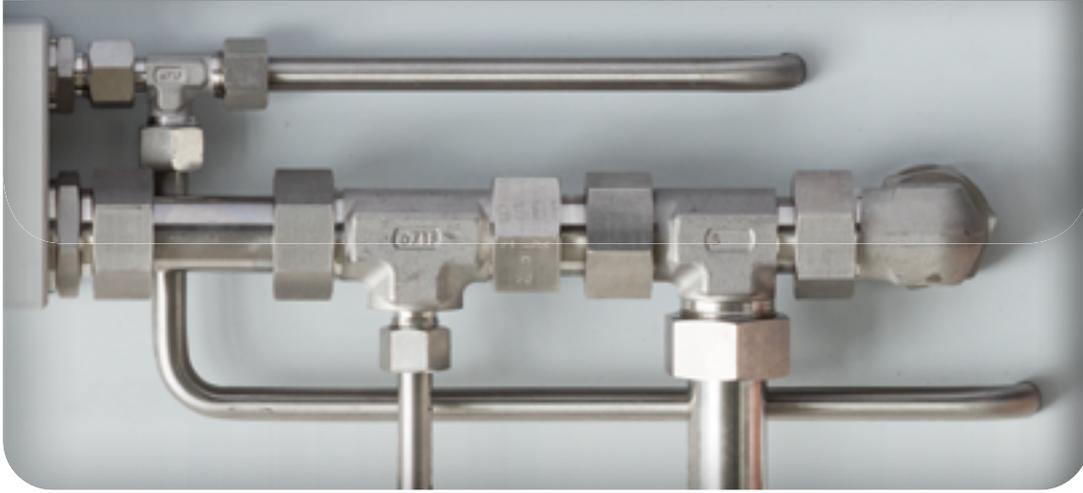


NC clamping ring
stainless steel non-corrosive,
not hardened



Cutting ring
stainless steel hardened

Driver's compartment



Take advantage of our large product portfolio

All products of our extensive standard product range are available from stock.

Radial mounting and dismounting of SERTO unions is indispensable in confined spaces.

Application/place of use Brake lines to the driver's cab

The challenge Constricted installation conditions and close tolerance compensation requirements

The SERTO solution Cutting ring fittings from the standard product range with precisely and tightly bent tubes or corrugated tubes. Tube compensation connections for tolerance compensation and simple, compact and secure tube connection.

Our own products manufactured with end-to-end quality assurance; assembly with small, standard commercial tools (e.g. Allen keys).

Technical parameters*

Pressure: in this application max. 16 bar test pressure,
10 bar working pressure

Temperature: in this application -40°C to +60°C

Medium: dry, compressed air

Products used

- Ready to install lines made from high-quality stainless steel for the pneumatic system
- Stainless steel cutting ring fittings in accordance with ISO 8434-1/DIN 2353 from the standard product range
- Assembled hydraulic hoses in accordance with DIN EN 45545-2
- Assembled corrugated tubes
- Tube compensation connections

* depending on the material and tube diameter used, pressures up to 800 bar and temperatures from -60°C to +300°C are possible.



Coolant water systems



Relieve purchasing and warehouse management

Pre-fabricated, in-stock and ready-to-install components allow for orders at short notice through Kanban or just-in-time deliveries, blanket orders for better prices.

Application/place of use Underfloor in the transformer car

The challenge To eliminate individual parts and so reduce installation costs

The SERTO solution Reduction of the number of parts through custom-made products.

Reduction of potential leakage points and savings in installation time and weight. Moreover, routing could be optimised with custom-made parts.

Technical parameters*

Pressure:	in this application 6 to 8 bar
Temperature:	in this application up to +60°C
Medium:	coolant water with glycol

- Products used**
- Assembled stainless steel tubes
 - Hoses with fire protection conforming to DIN EN 45545-2
 - Stainless steel ball valves and cutting ring fittings in accordance with ISO 8434-1/DIN 2353 from the standard product range
 - Specially developed stainless steel flanges

* depending on the material and tube diameter used, pressures up to 800 bar and temperatures from -60°C to +300°C are possible.



Carriage connections



Enjoy our quality assurance

Regular certifications and industry-standard approvals certify a high standard of quality; the ISO 9001 certificate confirms process-oriented work throughout the SERTO Group.

Application/place of use

Flexible connection of pneumatic and hydraulic lines for the brake systems between the carriages

The challenge

Reliable, durable connection

The SERTO solution

High-quality flexible hoses conforming to railway standard with bulkhead couplings for fastening and passage through the end wall of the carriage body.

Secure connection produced to customer specification and ready to install.

Technical parameters

Pressure: in this application max. 16 bar test pressure, 10 bar working pressure
Temperature: in this application -40°C to +60°C
Medium: dry, compressed air, water, hydraulic oil

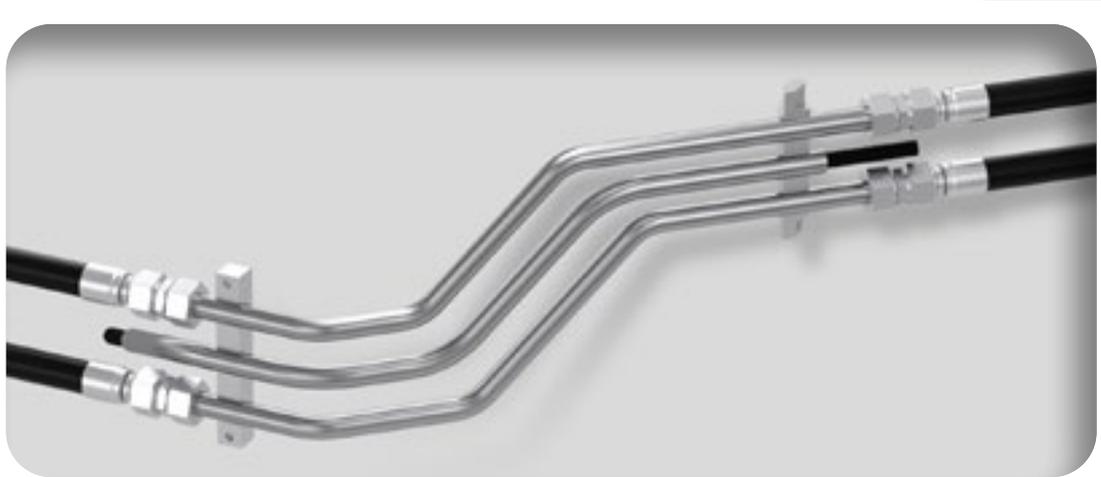
Products used:

- Ready-to-install flexible lines conforming to fire protection standard EN 45545-2
- Stainless steel cutting ring fittings in accordance with ISO 8434-1/DIN 2353 from the standard product range
- Stainless steel hose fittings from the standard product range
- Aluminium tube unions

* depending on the material and tube diameter used, pressures up to 800 bar and temperatures from -60°C to +300°C are possible.



Protective tubes



Gain safety in use

Reliable protection and guidance of different cables or lines on the bogie or other exposed positions.

Application/place of use Cable guides, protective tubes for emergency release as well as transitions from hoses to tubes

The challenge Security in all parts, particularly for the transitions from hoses to tubes

The SERTO solution Depending on the requirements and installation location, tubes are crimped or profiled to guarantee the highest level of safety in the system.

All work is carried out in-house, allowing inspections throughout the entire process.

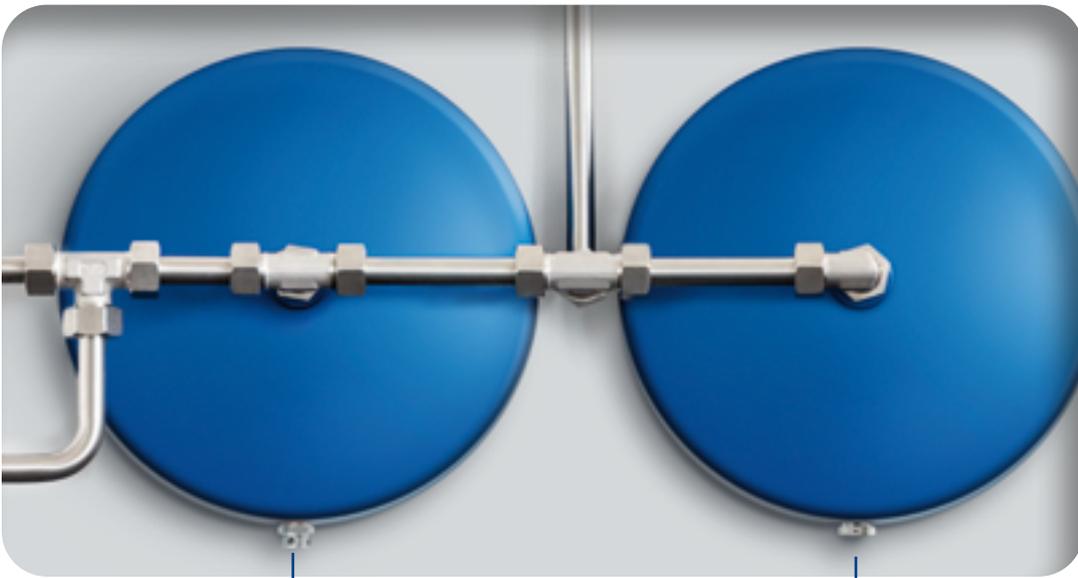
Technical parameters*
Pressure: in this application unpressurised
Temperature: in this application -40 °C to +60 °C

- Products used**
- Bent and flared stainless steel or aluminium tubes
 - Stainless steel or aluminium bent and profiled tubes
 - Stainless steel or aluminium unions
 - Stainless steel or aluminium tube compensation connections

* depending on the material and tube diameter used, pressures up to 800 bar and temperatures from -60 °C to +300 °C are possible.



Pressure vessels



Take advantage of our options

Reductions and intelligent drain systems ensure reliable operation and a reduction in potential leakage points. Alternative shapes and materials are also available.

Application/place of use Brake system, brake lines and air tank tubing inside and outside the vehicle

The challenge

- To reduce parts
- To gain installation space and reduce weight

The SERTO solution Depending on requirements and installation location, use of straight or bent tubes with elbow unions or T unions and specialised reductions for direct connection of the tanks with no need for intermediate pieces.

Fewer potential leak points and space-saving installation.

Technical parameters*

Pressure: in this application max. 16 bar test pressure,
10 bar working pressure

Temperature: in this application -40°C to +60°C

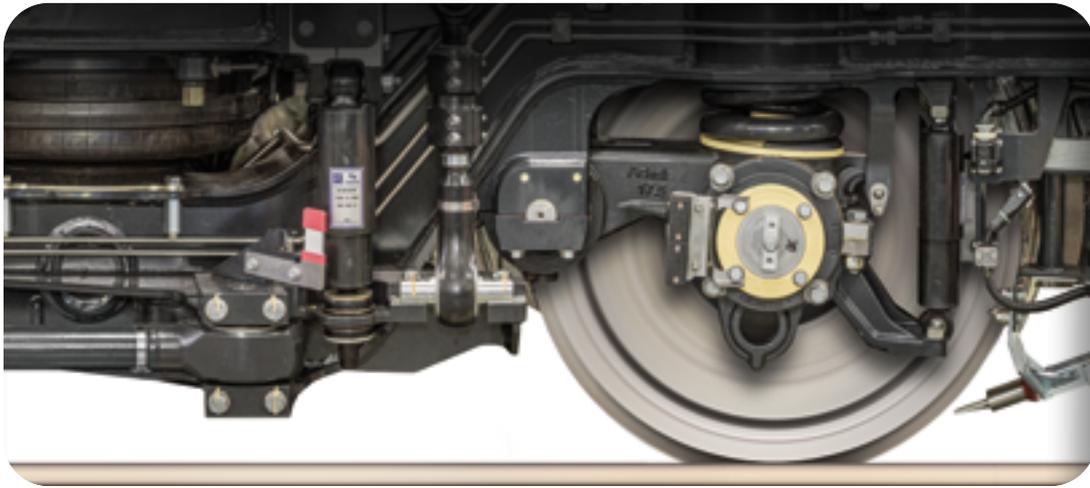
Medium: dry, compressed air

Products used

- Specially developed stainless steel, aluminium or steel discharge valves
- Ready-to-install stainless steel tubes with cutting ring fittings in accordance with ISO 8434-1/DIN 2353
- Special reductions for direct connection to the tanks

* depending on the material and tube diameter used, pressures up to 800 bar and temperatures from -60°C to +300°C are possible.

Bogies



Rely on us completely

After professional consultation, the SERTO Group accompanies the project from A-Z, taking over design, production, assembly and the entire logistics up to installation if required.

Application/place of use	Pneumatic tubing or hoses in the bogie, cable guides and sand feeding systems
The challenge	<ul style="list-style-type: none">• Complete tube/hose systems, ready to install and tested• Ready for use at the right time in the manufacturing process
The SERTO solution	Precise, tightly bent stainless steel tubes with unions or flared connection, welded assemblies with customer-specified connecting parts. Supplied as a complete kit for easy installation on site.

All parts delivered just-in-time from a single source.

Technical parameters	Pressure: in this application up to 10 bar
	Temperature: in this application -40 °C to +60 °C
	Medium: compressed air and hydraulic oil

Products used:	<ul style="list-style-type: none">• Bent stainless steel tubes, flared or pre-assembled with unions• Assembled hydraulic hoses• Stainless steel cutting ring fittings, steel or aluminium compression ferrule unions• Milled connecting parts according to the customer's specifications• Milled assemblies, assembled ready-to-install• Tube compensation connections
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* depending on the material and tube diameter used, pressures up to 800 bar and temperatures from -60 °C to +300 °C are possible.

Train coupling



Optimise your products

Project managers of the SERTO Group assist customers with analysis and optimisation of their products to simplify manufacturing processes and reduce costs.

Application/place of use Pneumatic tubing for railway couplings

The challenge

- Space is very limited in the area of railway couplings
- It must be possible to remove lines easily during maintenance and repairs

The SERTO solution

SERTO compression ferrule unions are smaller than traditional cutting ring fittings and can be installed and dismantled radially. Precisely bent tubes and flexible hoses with stainless steel wire braid save more space.

Space-saving, ready-to-install systems offering the highest degree of operational reliability.

Technical parameters

Pressure: up to 10 bar
Temperature: -40°C to +60°C
Medium: compressed air

Products used:

- Bent tube systems with SERTO or EXMAR DIN unions
- Ready-to-install assembled Jacoflon hoses - flexible PTFE hoses with stainless steel wire braid

* depending on the material and tube diameter used, pressures up to 800 bar and temperatures from -60°C to +300°C are possible.

Overview



EXMAR cutting ring fittings

- stainless steel 1.4571
- straight, elbow, T and cross fittings
- adjustable fittings
- sizes 4LL to 42L, 6S to 38S



SERTO compression ferrule unions

- stainless steel 1.4571
- aluminium
- brass and brass chemically nickel plated
- steel
- PVDF, PA
- straight, elbow, T and cross unions
- adjustable unions
- sizes 1.59 to 60 mm



Ball valves

- stainless steel 1.4571, 1.4408
- low pressure and high pressure versions
- sizes 1/8" to 2", 6L to 42L, 6S to 38S



Non-return valves

- stainless steel 1.4571
- brass
- PVDF
- PA
- cutting or compression ferrule connection
- sizes 6L to 42L, 6S to 38S, 1/8" to 1 1/2"



Safety coupling "Plus"

- screw coupling made of PVDF
- size 12 mm

High-grade coupling, ideal for the cooling of high-performance electronics with deionised water.



Quick couplings

- stainless steel
- brass
- PVDF
- sizes 4 to 12 mm, 1/8" to 1"



Discharge valves

- stainless steel, steel or aluminium
- sizes 1/2" to 1", or customer-specific



Drain screws

- stainless steel, steel, aluminium
- sizes 1/2" to 2"



Screw plugs with venting gap

- stainless steel, steel or aluminium
- sizes 1/4" to 2", or customer-specific



Reducers

- stainless steel, steel or aluminium
- reductions from 1" to 10L/15L/18L or from 2" to 15L/18L/22L



Distributors

- stainless steel, aluminium or PVDF

Size, length as well as number and type of connections according to customer specifications.

Components



Stainless steel tubes

- 1.4571, 1.4301, 1.4404
- sizes 1.59 to 60 mm



Pre-assembled tubes

- 1.4571, 1.4301, 1.404
- steel, aluminium, copper, etc.
- bent and assembled according to customer specifications



Plastic tubes

- PTFE, PVDF, FEP, PFA, etc.
- sizes 2 to 16 mm



Pre-assembled plastic tubes

- PTFE, PVDF, FEP, PFA, etc.
- hot-formed and assembled according to customer specifications



Hydraulic hoses

- with fire protection standard according to EN 45545-2
- assembled according to customer specifications



Jacoflon hoses

- PTFE hoses with stainless steel braid
- assembled according to customer specifications



Tube compensators

- stainless steel or aluminium
- sizes 10 to 28 mm or customer-specific

For simple tube connections with tolerance compensation, even in tight installation conditions, as only a small assembly tool is required (Allen key)



Tube clamps according to DIN 3015

- series A in PP, PA, PA flame retardant
- aluminium
- series B in PP, PA, PA flame retardant
- sizes 0 to 7
- various accessories such as weld-on plates, etc.



Bend clips

- flame retardant PA, 90° or 45° curved
- sizes 6 to 12 mm

Guidance and protection for tightly curved plastic tubes.



Sealing materials

- according to operating parameters (e.g. temperature from -60° to +300°C)
- selection of the appropriate material such as FKM, FFKM, NBR, NBR low-temp, VMQ, etc.

Expertise

Bending excellence



A large tube inventory housing over 60 tons of 6 metre tubes made of stainless steel, aluminium, copper, steel and custom materials with diameters from 1.59 to 60 mm.



Modern, fully automatic tube saw for up to 3,000 cuts per hour with accuracy of ± 0.2 mm.



Using different bending procedures and techniques, the ultra-modern 10-axis bending centres and our many years of experience enable us to implement virtually all bending geometries, and that includes the bending of internally electropolished stainless steel tubes.

Bending and welding tubes

Welding excellence

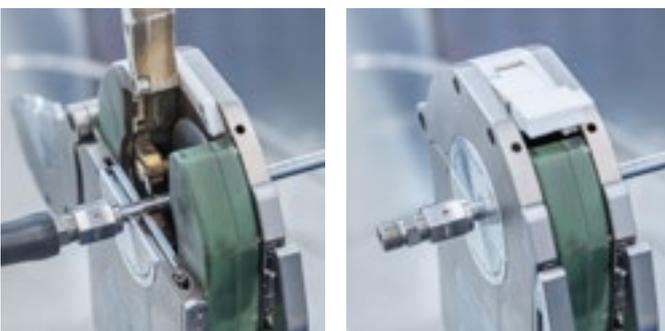


All welding work is carried out with certification in accordance with levels CL1 and CL2 as per DIN EN 15085. We are thus compliant with all requirements regarding safety and quality for the work we carry out.

Orbital welding excellence



Orbital welding of tubes or of entire assemblies is also part of the range of in-house services provided by SERTO. Welding is performed automatically with a supply of inert gas with residual oxygen measurement in order to ensure the flawless quality of the welding seam.



Expertise

Tube assembly



SERTO's skills in the field of assembly begin with the provision of suitable tubes, and continue through the use of optimal processing and bending machines and quality control, to finishing of the tubes with SERTO or EXMAR components or other parts entirely according to the customer's requirements.

The bent tubes can also be delivered as kits and can thus be incorporated in the production process in a just-in-time program.



The tubes are bent and assembled in economical lot sizes. Delivery is made on time and in the agreed quantities directly to the customer, and can be incorporated in the production cycle there.



Assembling tubes and assemblies

Assembly mounting



Bent tubes can be mounted together with other components to produce complete assemblies. We are also very happy to undertake the procurement, planning and logistics for additional components.



Simple or complex parts are milled on modern CNC automatic milling machine in accordance with the customer's specification. The parts are then processed further (e.g. thread tapping) and fully assembled according to the application.



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