Garlock
an EnPro Industries family of companies

Garlock Rubber Expansion Joints

Safe – Reliable – Durable

Europe, Middle East and Africa

Leaders in Sealing Integrity

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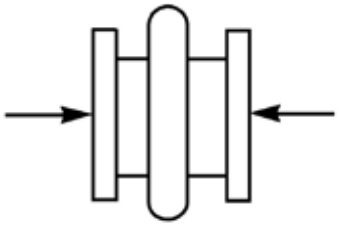
Garlock Rubber Expansion Joints

Dependable absorption of movements and vibrations in piping system

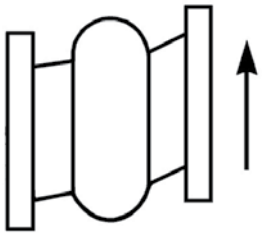
An expansion joint is a specially engineered product inserted in a piping system in order to protect it. For example, movements due to thermal expansion, vibrations of pumps and misalignments due to installation tolerances can be compensated by expansion joints. Therefore they must be resistant to the process conditions and the external influences.
Due to many years of experience, Garlock offers solutions for various areas. Garlock rubber expansion joints have been successfully used in the various industries (chemical, petrochemical, water / wastewater, power plants, etc.) for many years.

Movements within the piping system

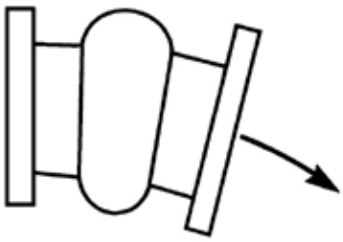
Axial Movement
The axial movement of the pipe changes the distance between the two flanges.



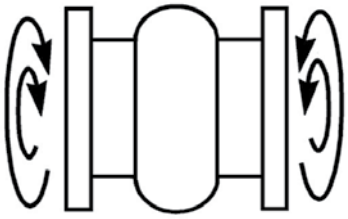
Lateral Movement
Lateral movements generate an axial offset of the pipeline components.



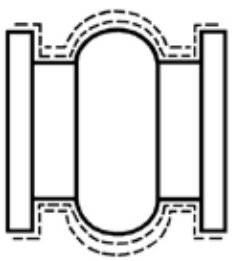
Angular Movement
Angular changes of the flange surfaces to each other are generated in the piping system by a combination of length changes, bearings and axis offset.



Torsional Movement
Torsion movements are caused by simultaneous rotation of both flanges in opposing motion due to manufacturing tolerances of the pipe sections or by unfavorable arrangements of the pipe guides.



Vibrations / Oscillations / Noises
Vibrations, oscillations and noises can be brought into the system by pumps and other components. Expansion joints prevent vibrations, oscillations and noise from spreading in the piping system.



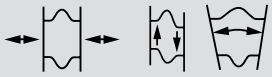
Garlock Rubber Expansion Joints

Our styles

Garlock offers a variety of different expansion joints as well as accessories (UV protection panels / flange protection hoods, etc.). Also the design / calculation of expansion joints (as soft as possible and as stable as necessary) is part of our portfolio. This brochure is giving an overview of the most common styles of our product range.

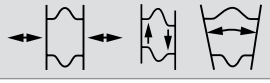
Universal expansion joints with abrupt arch

Universal compensators, which are characterized by a short design with simultaneous good longitudinal changes in the axial direction. The permissible movement can be adapted to the required range by the number of arches.

Style	Special Feature	 Benefits
204 (-EUD)	Standard design	
204 HP (-EUD)	High pressure design	Stiffer design
204 EVS (-EUD)	Extreme vacuum design	Internal back-up rings
404 (-EUD)	High abrasive resistance	
404-HP (-EUD)	High pressure design	Stiffer design

Universal expansion joints with flowing arch

This design can be used as a universal, lateral and angular compensator. Its self-flushing arch design eliminates media build up and reduces turbulence. The permissible movement can be adapted to the required range by the number of arches. The pressure range can be extended by the use of inner or outer back-up rings.

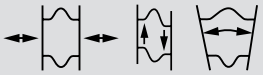
Style	Special Feature	 Benefits
206 EZ-FLO / 206-EUD	Standard design	
306 EZ-FLO / 306-EUD	FEP-Liner	The inner seamless FEP liner extends to the outer edge of the flange and is completely fused with the compensator body
406 EZ-FLO / 406-EUD	High abrasive resistance	

Garlock Rubber Expansion Joints

Our styles

Universal expansion joints with rotary flanges

These joints are characterized by rotatable flanges, whereby the hole patterns of the two flanges can be offset. They can be used as an universal or lateral compensator. The streamlined flowing arch design reduces turbulence and allows smooth, quiet flow. The permissible movement can be adapted to the required range by the number of arches.

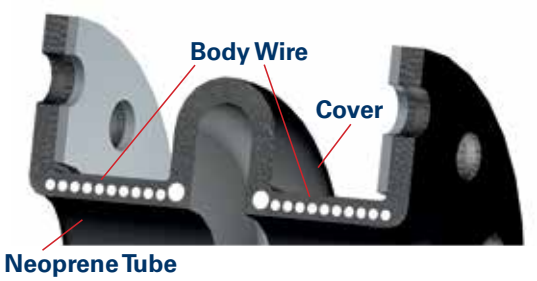
Style	Special Feature	 Benefits
8100 (-EUE)	Standard design	Available in standardized lengths
8100 (-EUD)	Special design	Available lengths according to customer requirements

Specials

Garlock Rubber Expansion Joints

Basic Design

The different applications, as well as the operating conditions for the rubber compensators, make it necessary to adapt the bellows according to the application. The inside area comes into contact with the medium and must therefore be chemically resistant to them.
The compensator absorbs the forces caused by the process pressure and the movements. The outer shell is exposed to environmental influences. Depending on the application, different materials are combined.



Tube / Cover Material	**Tube / Cover** Temperature	**Tube** Variations	**Tube / Cover** Characteristics
EPDM	- 40 °C to + 150 °C	» Conductive » Food suitable » Abrasion resistant	» Very good chemical resistance, weather-resistant, thus covering a wide range of applications
CIR	- 20 °C to + 150 °C	» Abrasion resistant	» Very good chemical resistance, weather-resistant
FKM	- 20 °C to + 205 °C	» Food suitable	» Very good general resistance, especially against mineral oils, fuels, animal and vegetable fats, chlorinated, aromatic and aliphatic solvents
CR	- 20 °C to + 82 °C		» Good resistance to grease, ozone, weathering, light and flame
CSM	- 20 °C to + 100 °C		» Very good resistance to strong oxidizing agents, sea water, salt solutions and alcohols, as well as good resistance to many oils
NBR	- 30 °C to + 100 °C		» Good resistance to oils, animal and vegetable fats, hydrocarbons and gas
NR	- 20 °C to + 82 °C		» High combination of tensile strength / elasticity is possible » Very good abrasion resistance » Medium resistance to sea water, acid

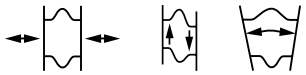
Body Wire Fabric	**Temperature**	**Characteristics**
Glass	- 40 °C to +205 °C	» Particularly stable and temperature resistant
Steel	- 40 °C to +205 °C	» Particularly stable and temperature resistant
Aramid	- 40 °C to +180 °C	» Excellent shock absorption, tensile, abrasion and tear strength
Polyester	- 40 °C to +120 °C	» Low-cost, high durability
Nylon	- 40 °C to +120 °C	» Low-cost alternative

Piping Examples

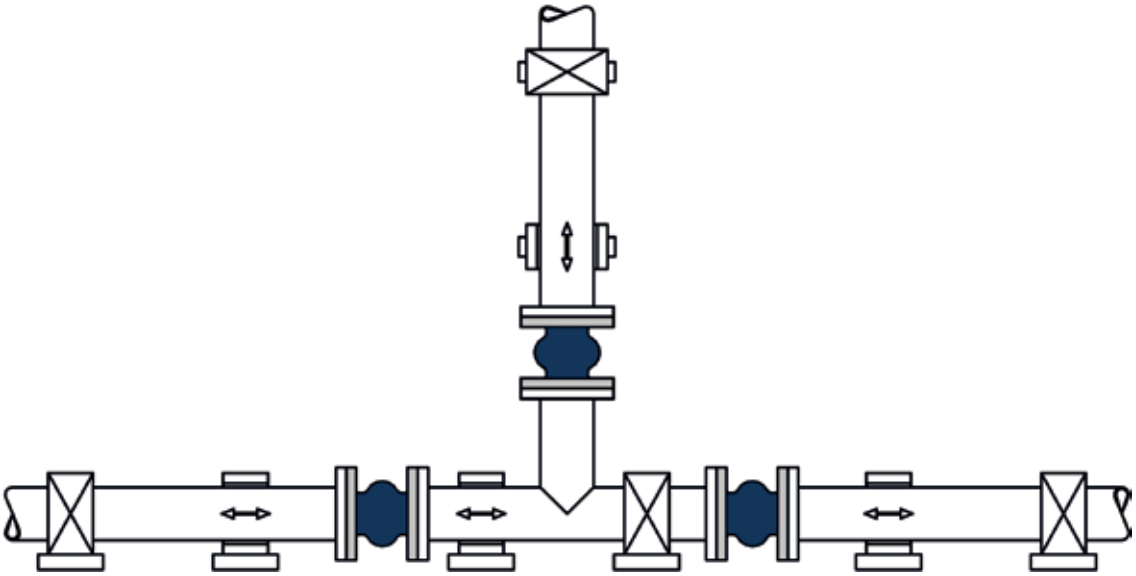
Types of Pipe Movements

When designing a piping system, the piping system should not provide a statically rigid system. Combinations of anchor, pipe guides and expansion joints give the system the necessary adaptability to movements of the piping system. The different combinations of anchor, pipe guides and pipeline layouts lead to necessary requirements for the expansion joint. With these requirements, the joints can be better adapted to the required movements.

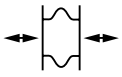
Universal expansion joint



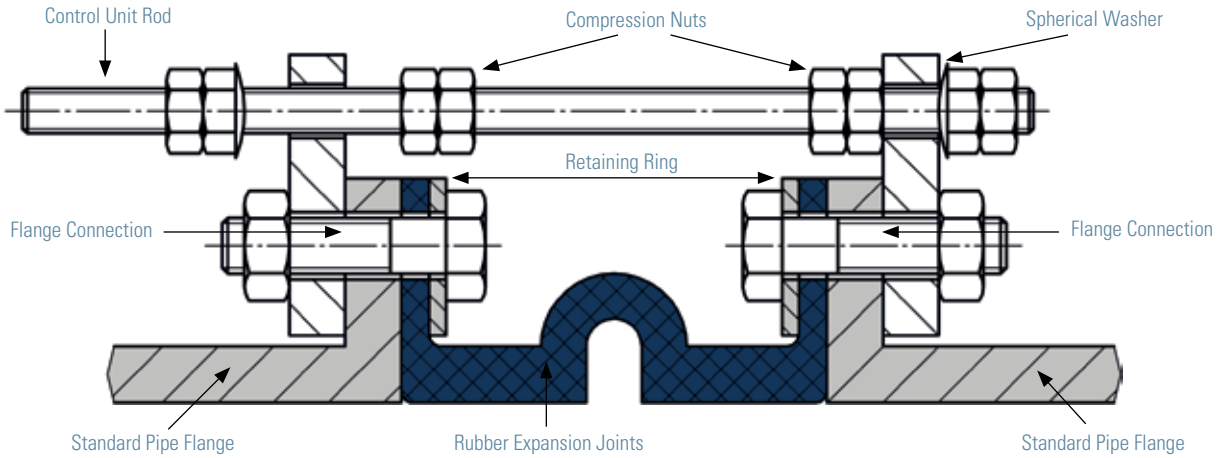
Universal expansion joints can handle different movements at the same time.
In the shown installation layout, the pipe guides only allow an axial movement.



Axial expansion joint with limited axial movement



To protect the joint against excessive motion or damage, control units are always recommended.



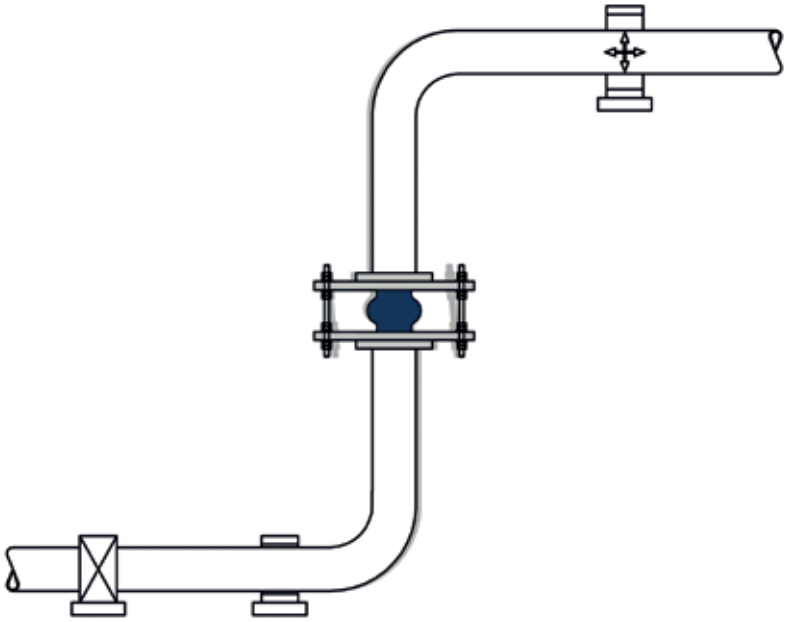
Piping Examples

Types of Pipe Movements

Lateral expansion joint

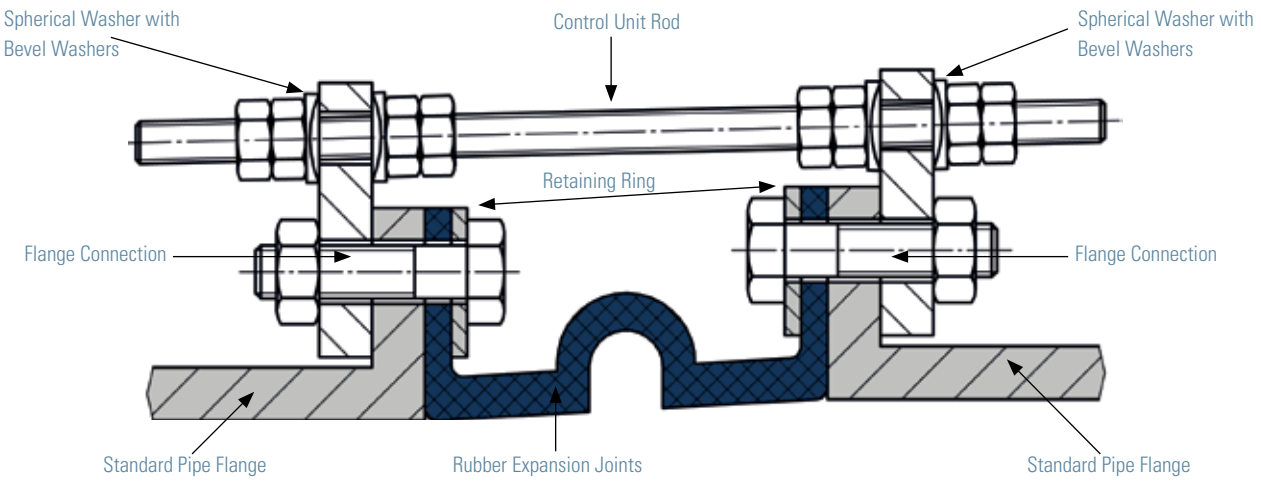
Lateral expansion joints can handle movements crosswise to the piping system. In this case, the control units are supplied with spherical washers and bevel washers.

In the shown installation layout, the pipe guides only allow a lateral movement.



Due to the operating pressure and the active joint cross-section, the compensator generates axial forces. These are absorbed by the control unit and are not transmitted to the pipeline.

The lateral flexibility of the control unit is ensured by the use of spherical washers and bevel washers.

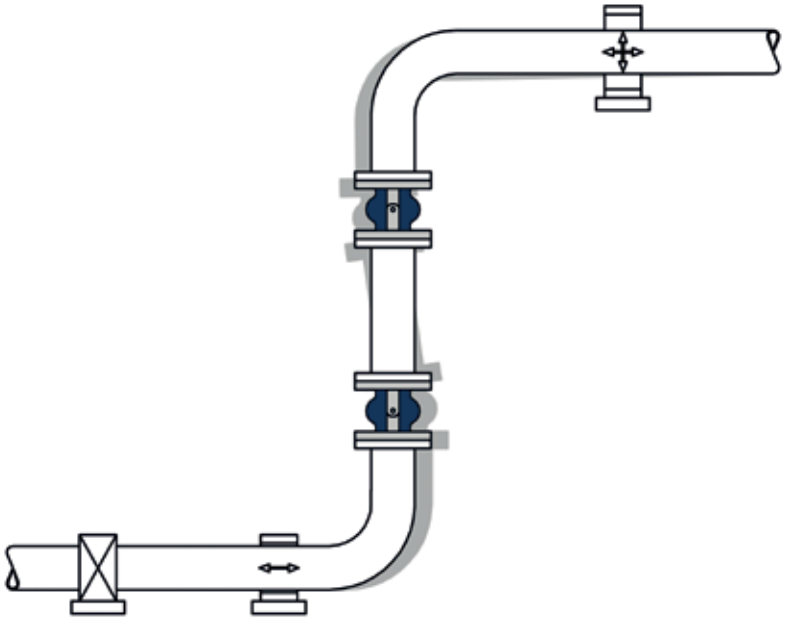


Piping Examples

Types of Pipe Movements

Angular expansion joint

Angular expansion joints absorb only angular movements. Special control units with a fixed pivot point support this movement.
In the shown installation layout, with the installed pipe guides and angular expansion joints, both joints only allow an angular movement.



The pivot ensures that the resulting axial forces of the expansion joint are not passed on to the pipeline.

Installation

Guideline for installation

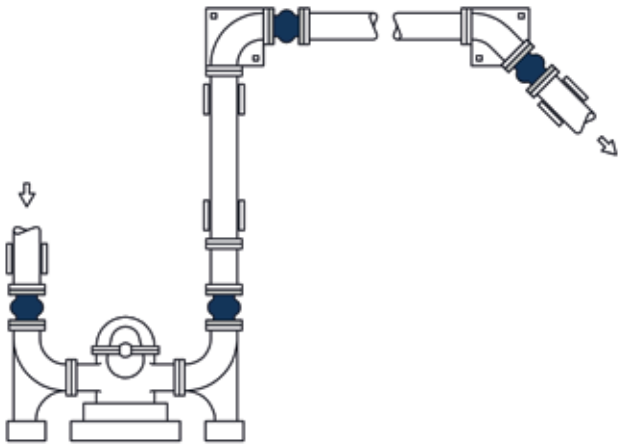
Preparation

Check compensator
» Check outside joint cover for damage

Check alignment
» Check the piping system for misalignment, as misalignment reduces the working range of the expansion joint

Check support
» Weight must not be carried by joint
» Support with hangers or anchors

Check flanges
» Clean all mating flanges surfaces
» Do not scratch or damage surfaces during cleaning



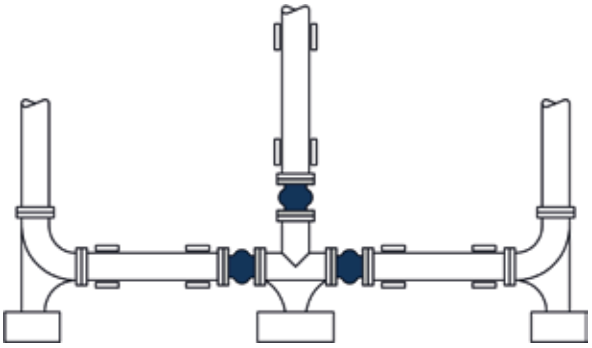
Typical Piping Layout

Installation

Lubricants
» There is no lubricant needed

Insert bolts from arch side
» Set bolt heads next to the arch
» The bolts must not have contact to the arch of the joint

Tighten bolts
» Tighten gradually and equally in a star-like crossing patterns around flange
» The tightening torque must not exceed the maximum allowed torque of the joint or flange.



Proper use of Anchors in Branch Connections

Life expectancy of rubber expansion joints

The service life of rubber expansion joints depends on process conditions as well as environmental influences. If the expansion joint demonstrates signs of external damage, deformations or visible alteration, replace it as soon as possible. To check natural aging, the Shore hardness of the joints can be used as an indicator.

Application Data Sheet

Service

Of course you can contact Garlock for an application-specific construction any time. To get this service as fast as possible, please order our application data sheet, which also can be found on our website www.garlock.com.

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Application Data Sheet: Rubber Expansion Joints

Name:
Company:
Phone:
Date:
Address:
E-Mail:

Technical Specification

Tube	ID. mm:		Design Pressure bar:		Operating Pressure bar:		Environment:	
	Media:		Design Temperature °C:		Operating Temperature °C:		Flow Rate m/s:	

Design Parameters		**Movements**		**Material**		**additional**	
Overall Length:		Axial mm:		Tube:		Control Unit:	
mm:		Lateral mm:		Body wire:		Guide Tube:	
		Angle deg.:		Cover:		In frame for:	

Flange	**Entering**	**Leakage**	**Draft Drawing**
Outer diameter Flange mm:			
Outer diameter contact surface mm:			
Inner diameter mm:			
Flange thickness mm:			
Bold circle diameter mm:			
Number and diameter of the bolt holes:			
Material:			

Date: Signature:

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