



Pneumatic rotary valve couplings

Nominal diameter 3, max. operating pressure 10 bar



1 Description of the product

Description

Rotary couplings are generally made to transfer liquid or gaseous media from a stationary to a rotating component.

Due to its design the rotary valve coupling permits additional control functions, so that valves and electrical control can be reduced to a minimum.

These control functions are used in case of clock-pulse controlled rotary indexing tables.

Station 1 of these elements is used as load and unload station (clamping and unclamping) and all additional stations are continuously pressurised or discharged to the pressure of the atmosphere. The transfer of the pressure medium in the control stations is made leakage-free.

2 Validity of the documentation

This document applies to the following products:

Rotary valve couplings of the data sheet J 7.490. The following types or part numbers are concerned:

For single-acting cylinders:

- 9295 601, 9296 601, 9297 601, 9298 601

for double-acting cylinders:

- 9295 602, 9296 602, 9297 602, 9298 602

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3 Target group of this document

- Specialists, fitters and set-up men of machines and installations with hydraulic expert knowledge.

Qualification of the personnel

Expert knowledge means that the personnel must

- be in the position to read and completely understand technical specifications such as circuit diagrams and product-specific drawing documents,
- have expert knowledge (electric, hydraulic, pneumatic knowledge, etc.) of function and design of the corresponding components.

An **expert** is somebody who has due to its professional education and experiences sufficient knowledge and is familiar with the relevant regulations so that he

- can judge the entrusted works,
- can recognize the possible dangers,
- can take the required measures to eliminate dangers,
- knows the acknowledged standards, rules and guidelines of the technology.
- has the required knowledge for repair and mounting.

4 Safety instructions

DANGER

Danger of life / heavy health damages

Stands for an imminent danger.
If it is not avoided, death or very severe injuries will result.

WARNING

Person damage

Stands for a possibly dangerous situation.
If it is not avoided, death or very severe injuries will result.

CAUTION

Easy injuries / property damage

Stands for a possibly dangerous situation.
If it is not avoided, minor injuries or material damages will result.

Hazardous to the environment



The symbol stands for important information for the proper handling with materials that are hazardous to the environment.
Ignoring these notes can lead to heavy damages to the environment.



Mandatory sign!

The symbol stands for important information, necessary protection equipment, etc.

NOTE

This symbol stands for tips for users or especially useful information. This is no signal word for a dangerous or harmful situation.

5 For your safety

5.1 Basic information

The operating instructions serve for information and avoidance of dangers when installing the products into the machine as well as information and references for transport, storage and maintenance.

Only in strict compliance with these operating instructions, accidents and property damages can be avoided as well as trouble-free operation of the products can be guaranteed.

Furthermore, the consideration of the operating instructions will:

- avoid injuries
- reduce down times and repair costs,
- increase the service life of the products.

5.2 Safety instructions

WARNING

Injury by crushing!

Components of the product make a movement while they are in operation.

- This can cause injuries.
- Keep parts of the body and items out of the working area!

CAUTION

Operating pressure of 10 bar is not exceeded

The maximum operating pressure of 10 bar must not be exceeded.

High forces by pneumatic pressure

With pneumatic pressure very high forces are generated.
The fixture or machine must be in the position to compensate these forces.

NOTE

Qualification of personnel, pneumatic

All works may only be effected by qualified personnel familiar with the handling of hydraulic components.

6 Application

6.1 Intended use

The rotary couplings are used in industrial applications to transmit hydraulic or pneumatic pressure for one or several fixtures to rotating or swivelling equipments.

They are mounted in the centre of rotation of the equipment (e.g. rotary indexing tables).

Furthermore the following are possible uses:

- Use within the capacity indicated in the technical characteristics (see data sheet).
- Use as per operating instructions.
- Compliance with service intervals.
- Qualified and trained personnel for the corresponding activities.
- Mounting of spare parts only with the same specifications as the original part.

6.2 Misapplication

WARNING

Injuries, material damages or malfunctions!

- Do not modify the product!

The use of these products is not admitted:

- For domestic use.
- On pallets or machine tool tables in primary shaping and metal forming machine tools.
- If due to vibrations or other physical / chemical effects damages of the products or seals can be caused.
- In machines, on pallets or machine tool tables that are used to change the characteristics of the material (magnetise, radiation, photochemical procedures, etc.).
- In areas for which special guidelines apply, especially installations and machines:
 - For the use on fun fairs and in leisure parks.
 - In food processing or in areas with special hygiene regulations.
 - For military purposes.
 - In mines.
 - In explosive and aggressive environments (e.g. ATEX).
 - In medical engineering.
 - In the aerospace industry.
 - For passenger transport.
- For other operating and environmental conditions e.g.:
 - Higher operating pressures than indicated on the data sheet or installation drawing.
 - With hydraulic fluids that do not correspond to the specifications.

Special solutions are available on request!

7 Installation

WARNING

Injury by falling parts!

- Keep hands and other parts of the body out of the working area.
- Wear personal protection equipment!

CAUTION

Great weight may fall

Some product types have a considerable weight. These have to be secured against working free during transport. Weight specifications see chapter "Technical characteristics".

7.1 Design

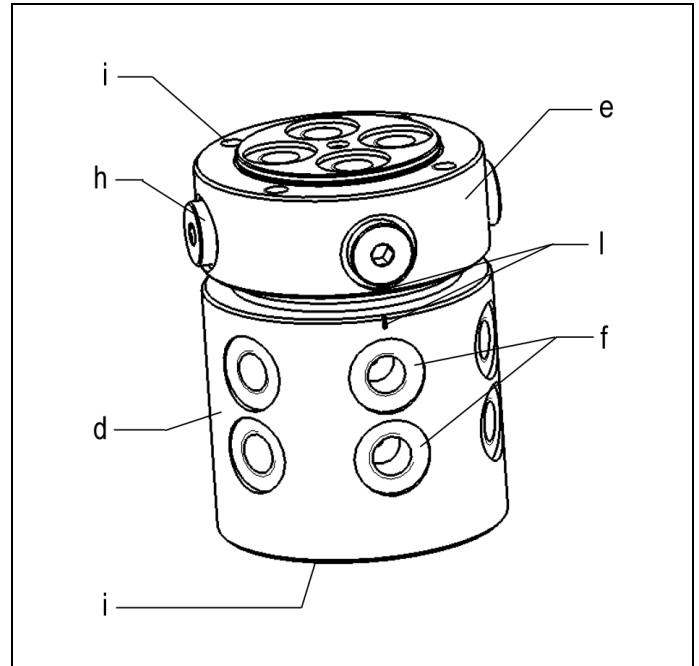


Figure 1: Components and accessories

d	Housing of rotary coupling	f	Pneumatic ports radial
e	Rotary piston	l	Marking (notches)
		h	Ports optionally axial or radial
		i	Threaded holes for fixing

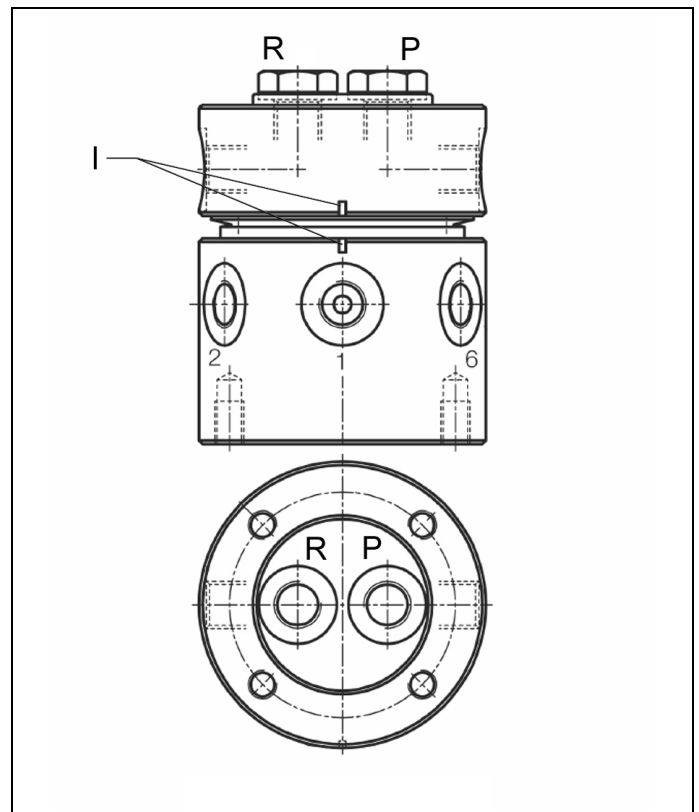


Figure 2: Example rotary coupling for 6 stations

R	Port for clamping - unclamping	l	Marking (notches) at the housing and the piston for station 1
P	Port for continuous clamping pressure		

Example for rotary valve coupling with single-acting cylinders

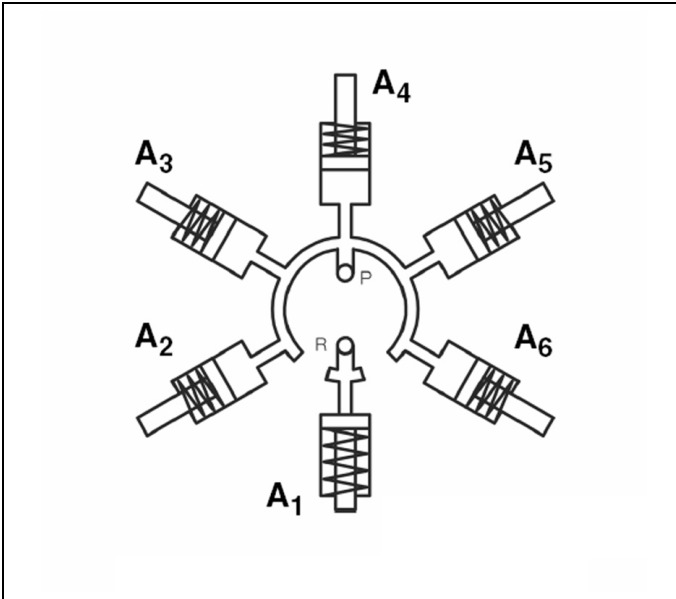


Figure 3: Example for rotary valve coupling with single-acting cylinders

A1 Port for loading and unloading station	B1 to Bn (according to the version) port for consumer elements Unclamping
A1 to An Port for consumer elements Clamping	

NOTE

- Fix rotary couplings only through the provided bore holes.
- An anti-rotation key must be mounted. It must be observed that no deformation will be introduced to the rotary coupling (see figure installation examples).

Fixing is made at the housing or at the flange of the rotary piston. It does not matter which component rotates or stands still.

It is important that the component has sufficient freedom of motion so that there will not be any forced conditions.

The screw-on or flange-mounting surface must be flat and square to the axis of rotation.

The transmission of the torque is made by an anti-rotation key that gives sufficient freedom of motion in case of unavoidable misalignments. If the direction of rotation changes, the clearance should not be larger than required.

The flange-mounted component of the rotary coupling is connected with pipes.

The other component must be connected with plastic hoses. There are two reasons:

- 1 Despite of the anti-rotation key forced conditions would be generated by the piping, i.e. the pipes would generate torsional stress and bending stress. The safety of pipe connections would not be guaranteed.
- 2 Because of the pipe lines side loads would be introduced into the bearing of the rotary piston, and this can lead to a reduced service life.

For safety reasons a fork-shaped anti-rotation key should be used (see fig. installation and connecting possibilities) to fix the

housing at the wrench flat. The connection of plastic hoses has to be preferred in any case to relieve the fittings.

Compensation of moments with minimum deformation:

Installation example for compensation of moments with minimum deformation at the rotary piston. Supply hydraulic oil or air through hoses.

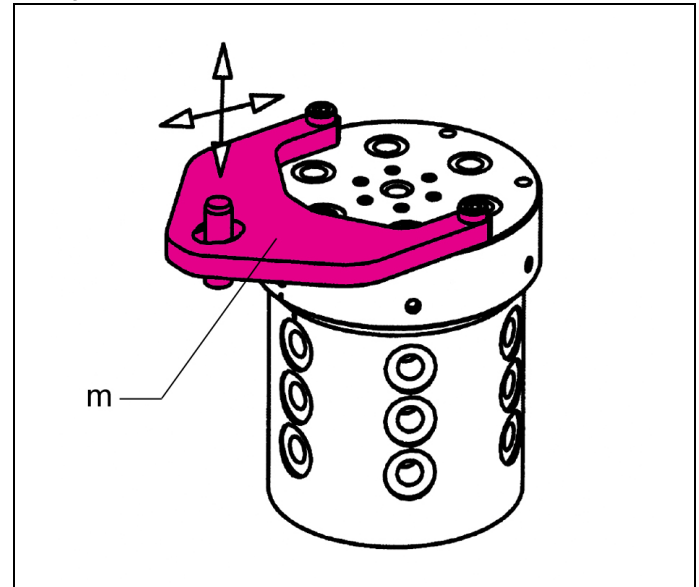


Figure 4: Installation and connecting possibilities

m Compensation of moments with screws (customer's accessory)	
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7.2 Connection of pneumatic equipment

1. Connect pneumatic lines to qualifying standards and pay attention to scrupulous cleanliness!
Accessories see also data sheet J 7.400.

8 Start up

CAUTION

Operating pressure of 10 bar is not exceeded

The maximum operating pressure of 10 bar must not be exceeded.

- Check tight seating (check tightening torque of the fixing screws, see chapter "Technical characteristics").
- Check tight seating of hydraulic connections (check tightening torque of the hydraulic connections, see chapter "Technical characteristics").

NOTE

For start up of rotary valve couplings the markings (notches) at the housing and the piston have to coincide, than A1 or A1/B1 is the loading and unloading station.

8.1 Operation

NOTE

The materials of the rotary valve coupling are designed for the use with lubricated air or non-lubricated air. In the case of other media an adaptation will possibly be required.

9 Maintenance

WARNING

Burning due to hot surface!

- In operating conditions, surface temperatures of more than 70 °C can appear at the product.
- All maintenance and repair works must only be effected in cooled mode or with safety gloves.

9.1 Cleaning

CAUTION

Avoid damages of the moved components

Avoid damages of the moved components (rods, plungers, bolts, etc.) as well as of wiper and seal.

Aggressive cleaning agents

The product must not be cleaned with:

- Corrosive or corroding components or
- Organic solvents as halogen or aromatic hydrocarbons and ketones (cellulose thinner, acetone, etc.), because this can destroy the seals.

The product must be cleaned at regular intervals, especially the area of the piston or the plunger housing has to be cleaned from swarf and other liquids.

In the case of heavy contamination, the cleaning has to be made in shorter intervals.

9.2 Regular checks

1. Check tightness of hydraulic connections.
2. Clamping force control by pressure control.
3. Check the observance of the maintenance intervals.

9.3 Exchange seal kit

The exchange of the seal kit is made in case of external leakages. For high availability, the seals have to be changed at the latest after 1,000,000 cycles or 2 years.

The seal kit is available as spare part. An instruction for the exchange of the seal kit is available on request.

NOTE

Seal Kits

- Do not install seal kits which were exposed to light for a longer time.
- Pay attention to the storage conditions (see chapter "Technical characteristics").
- Only use original seals.

10 Trouble shooting

Trouble	Cause	Remedy
Rotary piston does not rotate, or sluggish	Rotary (valve) coupling installed with deformation	correct installation situation
	no air pressure pressurised	pressurise all passages with air pressure
Pressure loss	Wear	Return for repair
	Rotary (valve) coupling installed with deformation	Check installation situation
Switching function incorrect	Wrong allocation of ports	Check allocation of ports
Pressure drop in the system	Sealing worn	Return for repair

11 Technical characteristics

Type	Maximum operating pressure [bar]	Weight [kg]
9295 601	10	3.7
9295 602		4.7
9296 601		3.5
9296 602		4.5
9297 601		3.4
9297 602		4.4
9298 601		3.3
9298 602		4.3

Technical characteristics see data sheet.

Proposal, tightening torques for screws of tensile strength 8.8, 10.9, 12.9

NOTE

The indicated values are approximate values and have to be interpreted according to the user's application!

See note!

Thread	Tightening torque [Nm]		
	8.8	10.9	12.9
M6	10	15	18
M8	25	36	45
M10	49	72	84
M12	85	125	145
M14	135	200	235
M16	210	310	365
M20	425	610	710
M24	730	1050	1220
M30	1,450	2100	2450

Note: Valid for workpieces and set screws made of steel with metric thread and connecting surface dimensions as per DIN 912, 931, 933, 934 / ISO 4762, 4014, 4017, 4032

In the table values for tightening torques the following is considered:

Design steel/steel, friction value $\mu_{ges} = 0.14$ - not oiled, utilisation of the minimum yield point = 90%.

NOTE

Further information

- For further technical data see ROEMHELD data sheet.

12 Accessory

NOTE

Accessories

- See data sheet.

13 Storage

CAUTION

Storage of components!

- The product may not be exposed to direct solar radiation, because the UV light can destroy the seals.
- A storage differing from the storage conditions is inadmissible.
- In case of improper storage, the seals can embrittle and resinification of the anti-corrosive oil or corrosion at the element can occur.

The elements are tested by default with mineral oil. The exterior of the elements is treated with a corrosion inhibitor.

The oil film remaining after the test provides for a six-month interior corrosion protection, if stored in dry and uniformly tempered rooms.

For longer storage times, the element has to be filled with a non-resinifying corrosion inhibitor and the outside surfaces must be treated.

14 Disposal



Hazardous to the environment

Due to possible environmental pollution, the individual components must be disposed only by an authorised expert company.

The individual materials have to be disposed as per the existing regulations and directives as well as the environmental conditions.

Special attention has to be drawn to the disposal of components with residual portions of hydraulic fluids. The instructions for the disposal at the material safety data sheet have to be considered.

For the disposal of electrical and electronic components (e.g. stroke measuring systems, proximity switches, etc.) country-specific legal regulations and specifications have to be kept.

15 Declaration of manufacture

Manufacturer

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Declaration of manufacture of the products

Rotary valve couplings of the data sheet J 7.490. The following types or part numbers are concerned:

For single-acting cylinders:

- 9295 601, 9296 601, 9297 601, 9298 601

for double-acting cylinders:

- 9295 602, 9296 602, 9297 602, 9298 602

They are designed and manufactured in line with the relevant versions of the directives **2006/42/EC**(EC MSRL) and in compliance with the valid technical rules and standards. In accordance with EC-MSRL and EN 982, these products are components, that are not yet ready for use and are exclusively designed for the installation in a machine, a fixture or a plant.

According to the pressure equipment directives the products are not to be classified as pressure reservoirs but as pneumatic placing devices, since pressure is not the essential factor for the design, but the strength, the inherent stability and solidity with regard to static or dynamic operating stress.

The products may only be put into operation after it was assessed that the incomplete machine / machine, in which the product shall be installed, corresponds to the machinery directives (2006/42/EC).

The manufacturer commits to transmit the special documents of the products to state authorities on request. The technical documentation as per appendix VII part B was prepared for the products.

Responsible person for the documentation:
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