



Coupling elements

built-in type and threaded-body type



1 Description of the product

Description

Coupling mechanism and coupling nipple are provided with axial seals.

This results in a very short coupling stroke as well as a smooth front face of the coupling mechanism and thereby only little area of attack by dirt and swarf. The built-in types are designed for mounting in plates and are particularly suitable for the use in multi-couplings.

The threaded-body types can be screwed in directly in the fixture body and are therefore optimum line connections between two components as e.g. basic fixture and changing fixture.

The fixture bodies which are to take up the coupling parts have to be guided 2-3 mm parallelly before they are coupled.

The axial forces generated in the coupling situation have to be compensated externally positively or non-positively.

According to the version the coupling elements can be coupled and uncoupled against pressure or only in depressurised mode (depending on the sealing material). In the decoupled state, the maximum operating pressure is permissible for coupling elements without preload valve.

The coupling nipple provided with a preloaded valve (VSV) can be installed in the return or unclamping line of a clamping fixture. The valve limits a possible pressure build up in uncoupled (static) condition to approx. 5 bar. In coupled mode the pre-loaded valve is not effective.

Application

Coupling elements are used in order to transmit liquid or gaseous media as hydraulic oil or compressed air e.g. in machine tool machines with pallet transfer systems from

the machine tool table to the fixture. Due to their compact exterior dimensions these couplings can very well be integrated in fixture designs.

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2 Validity of the documentation

This document applies to the following products:

Coupling elements of data sheet F 9.428. The following types or part numbers are concerned:

Coupling nipple can be coupled against pressure

Built-in type

- 0460-692, -691, -714

Built-in type / screw tool

- 0460-836 / 2010-905
- 0460-831 / 2010-904
- 0460-713 / 2010-903

Built-in type long

- 0460-814

Coupling nipple can only be coupled in depressurised mode

Built-in type

- 0460-743, -682, -841

Built-in type / screw tool

- 0460-838 / 2010-905
- 0460-751 / 2010-904
- 0460-772 / 2010-903

Built-in type long

- 0460-729

Coupling nipple with preloaded valve (VSV)

Threaded-body type with VSV / screw tool

- 0460-834 / 2010-905
- 0460-835 / 2010-904

Built-in type long

- 0460-837

Coupling mechanism can be coupled against pressure

Built-in type

- 0460-818, -656, -712

Threaded-body type / Additional bushing for threaded-body type / screw tool

- 0460-832 / 0460-884 / 2010-905
- 0460-830 / 0460-777 / 2010-904
- 0460-711 / 0460-847 / 2010-903

Coupling mechanism can only be coupled in depressurised mode

Built-in type

- 0460-819, -659, -839

Threaded-body type / Additional bushing for threaded-body type / screw tools

- 0460-833 / 0460-884 / 2010-905
- 0460-776 / 0460-777 / 2010-904
- 0460-771 / 0460-847 / 2010-903

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 Symbols and signal words

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.

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

The product was manufactured in accordance with the generally accepted rules of the technology.

Observe the safety instructions and the operating instructions given in this manual, in order to avoid personal damage or material damage.

- Read these operating instructions thoroughly and completely, before you work with the product.
- Keep these operating instructions so that they are accessible to all users at any time.
- Pay attention to the current safety regulations, regulations for accident prevention and environmental protection of the country in which the product will be used.
- Use the ROEMHELD product only in perfect technical condition.
- Observe all notes on the product.
- Use only accessories and spare parts approved by the manufacturer in order to exclude danger to persons because of not suited spare parts.
- Respect the intended use.
- You only may start up the product, when it has been found that the incomplete machine or machine, in which the product shall be mounted, corresponds to the country-specific provisions, safety regulations and standards.

- Perform a risk analysis for the incomplete machine, or the machine.

Due to the interactions between the product and the machine/fixture or the environment, risks may arise that only can be determined and minimized by the user, e.g. :

- generated forces,
- generated movements,
- Influence of hydraulic and electrical control,
- etc.

6 Application

6.1 Intended use

These products are used in the industrial sector, to transfer hydraulic oil or compressed air from the machine table to the fixture. An example would be a machine tool with palette changing systems.

Furthermore the following are intended uses:

- Use within the capacity indicated in the technical characteristics.
- 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!

Modifications can lead to weakening of the components, reduction in strength or malfunctions.

- Do not modify the product!

The use of these products is not permitted:

- For domestic use.
- For the use on fun fairs and in amusement parks.
- In food processing or in areas with special hygiene regulations.
- In mines.
- In ATEX areas (in explosive and aggressive environments. e.g. explosive gases and dusts).
- If chemically acting media damage the seals (seal material durability) or components and thereby functional failure or premature failure could occur.

Special solutions are available on request!

7 Installation

⚠ WARNING

Injury by high-pressure injection (squirting out of hydraulic oil under high pressure)!

Improper connection can lead to escapes of oil under high pressure at the connections.

- Mounting or dismounting of the element must only be made in depressurised mode of the hydraulic system.
- Connection of the hydraulic line as per DIN 3852/ISO 1179.
- Unused connections have to be locked professionally.
- Use all mounting holes.

Injury by high-pressure injection (squirting out of hydraulic oil under high pressure)!

Wear, damage of the seals, ageing and incorrect mounting of the seal kit by the operator can lead to escapes of oil under high pressure.

- Before using them make a visual control.

Poisoning due to contact with hydraulic oil.

Wear, damage of the seals, aging and incorrect mounting of the seal kit by the operator can lead to escapes of oil.

Incorrect connection can lead to escapes of oil at the ports.

- For handling with hydraulic oil consider the material safety data sheet.
- Wear protection equipment.

7.1 Design

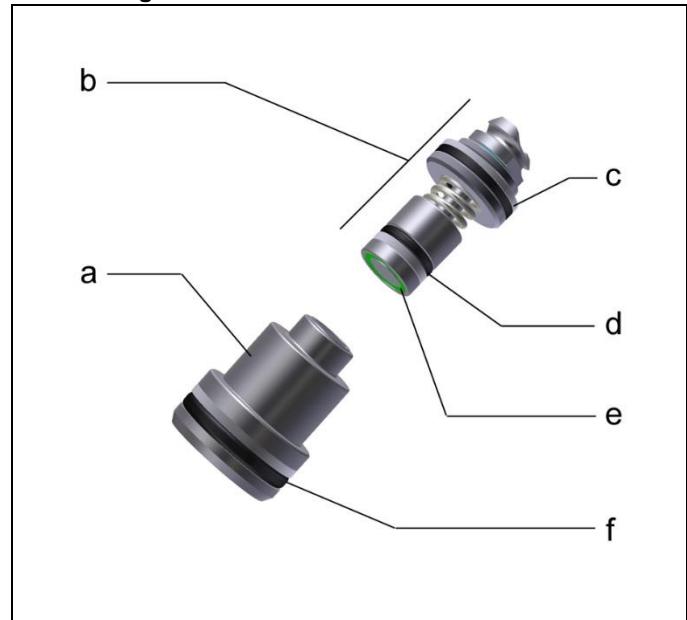


Figure 1: Built-in type

a	Built-in nipple	d	O-ring / back-up ring
b	Built-in mechanism	e	Sealing disk for coupling mechanism
c	O-ring / back-up ring	f	O-ring / back-up ring

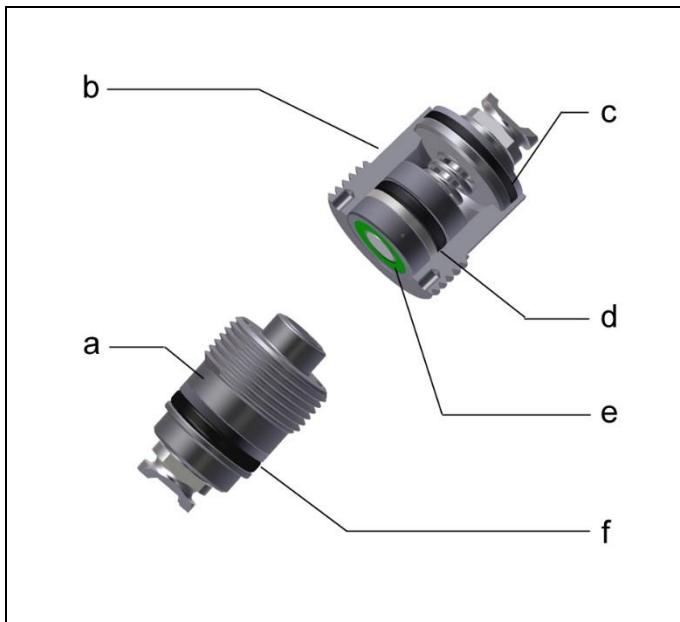


Figure 2: Threaded-body type

a Threaded-body nipple	d O-ring / back-up ring
b Threaded-body mechanism	e Sealing disk for coupling mechanism
c O-ring / back-up ring	f O-ring / back-up ring

7.2 Installation

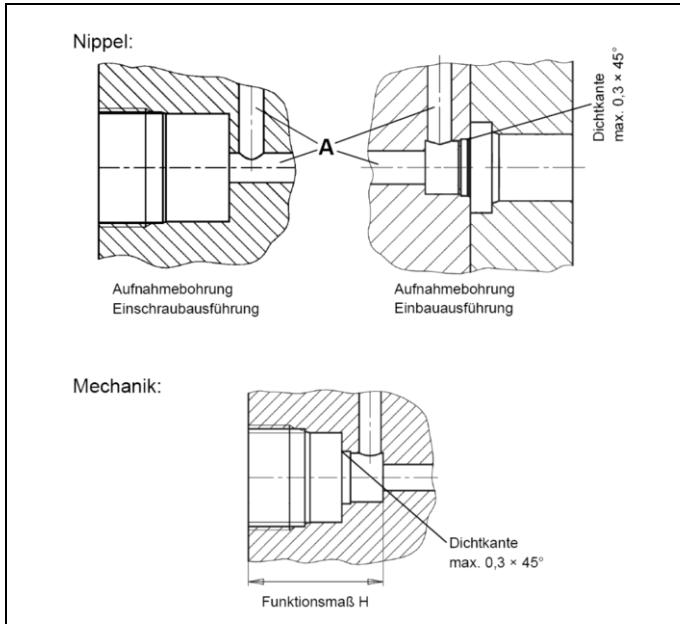


Figure 3: Location hole threaded-body and built-in type

Threaded-body type:

Machine the location hole with utmost accuracy (see also functional dimension H). Before screwing-in of the coupling, check that O-rings and back-up rings are in perfect condition.

Provide the threads in the fixture.

- Drill the holes for hydraulic oil supply (selectable ports A) in the fixture (see also ROEMHELD data sheet F 9.428).
- Clean the fixture.
- Mount threaded body into the fixture . Pay attention to the seating torque.

Built-in type:

Machine the location hole with utmost accuracy (see also functional dimension H). Before installation of the coupling, check that O-rings and back-up rings are in perfect condition.

- Drill the holes for hydraulic oil supply in the fixture (see also ROEMHELD data sheet F 9.428).
- Clean the fixture.
- Insert the coupling.
- Fix the coupling by a cover.

Note

Lubricate slightly the location hole, but do not lubricate O-rings and back-up rings!

8 Start up

Function

The coupling elements lock automatically during uncoupling. The built-in types are designed for mounting in plates. The threaded-body types can be screwed in directly in the fixture body and therefore optimum line connections between two components. For transmission of vacuum only coupling elements for depressurised coupling are to be used.

CAUTION

Injury due to bursting or malfunction

Exceeding the max. operating pressure (see technical data) can cause the product to burst or malfunction.

- The maximum operating pressure must not be exceeded.
- If necessary, avoid overpressure by using suitable valves.

Material damage!

If the coupling is not guided in parallel, coupling nipple and coupling mechanism will be damaged.

NOTE

Material damage

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

Sealing surfaces on the face

The sealing surfaces on the face of the coupling elements have to be cleaned before coupling, to ensure the tightness in coupled condition. We recommend to wash the elements and finally clean them with compressed air. Protection covers should be used as far as possible.

Mounting bodies of the coupling elements

The mounting bodies of the coupling elements must be guided 2-3 mm in parallel before they are coupled without exceeding the radial positioning tolerance.

The coupling elements installed in the coupling carrier and nipple carrier open each other. Therefore, the two halves have to effect the complete coupling stroke when moving together to guarantee the maximum flow.

9 Maintenance

9.1 Cleaning

WARNING

Burning due to hot surface!

During operation, surface temperatures on the product can exceed 70°C.

- Maintenance and repair work should only be performed in a cooled down condition and/or with protective gloves.

CAUTION

Material damage, damage to moving components

Damage to piston rods, plungers, bolts, etc., as well as wipers and seals can lead to leakage or premature failure!

- Do not use cleaning agents (steel wool or similar) that cause scratches, marks or the like.

Material damage, damage or functional failure

Aggressive cleaning agents can cause damage, especially to seals.

The product must not be cleaned with:

- corrosive or caustic substances or
- organic, solvents such as halogenated or aromatic hydrocarbons and ketones (cellulose thinner, acetone, etc.).

The sealing surfaces on the face of the coupling elements have to be cleaned before coupling, to ensure the tightness in coupled condition. We recommend to wash the elements and finally clean them with compressed air. Protection covers should be used as far as possible. Previous cleaning of the smooth sealing areas is possible by means of rubber wipers.

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

9.2 Regular checks

NOTE

Life

In order to obtain a long life, sealing surfaces should be free of contamination.

Swarf or contamination in the hydraulic oil lead to increased wear or damage at the guides, running surfaces and seals.

Position tolerances have to be kept (parallel working)!

CAUTION

Material damage!

If the coupling is not guided in parallel, coupling nipple and coupling mechanism will be damaged.

- The axial forces generated in the coupling situation have to be compensated externally positively or non-positively.
- According to the version the coupling elements can be coupled and uncoupled against pressure or only in depressurised mode.
- Use hydraulic oil as per ROEMHELD data sheet A 0.100.

9.3 Exchange seal kit

The exchange of the seal kit has to be made in case of external leakages. For high availability we recommend to regularly change the seals, but at least after 2 years.

The seal kit is available as spare part (see data sheet).

Procedure

- Remove old O-ring and back-up ring
- Clean the slot of contamination and swarf
- Insert O-ring and back-up ring. Pay attention to correct position.

Change system seal

The old, damaged system seal is to be pulled out from the guiding groove by a scriber.

The new system seal is inserted with the finger into the mounting tool (see Fig. 4) and positioned over the coupling mechanism.

By manual pressing the seal will be exactly inserted in the correct position into the axial groove of the coupling mechanism.

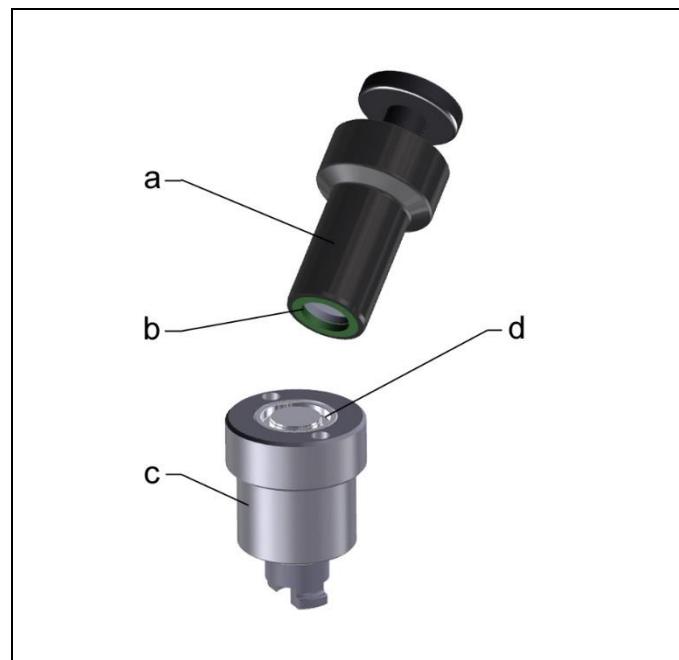


Fig. 4: Mounting tool equipped with the sealing ring, before pressing in into the coupling mechanism

a	Mounting tool	c	Coupling mechanism
b	Sealing ring	d	Groove for sealing ring

Mounting tool for system seals (Pos. a)	
NW3	0460 991
NW5	0460 873
NW8	0460 914

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
No flow	Functional dimension H is not correct	Correct installation situation
	Not sufficiently together	Correct coupling stroke
	Coupling lifts off	Axial or coupling force higher than the retention force of the system
Coupling is leaky	Flat seal defect	Knife edge not correctly made
		If possible exchange seal or return for repair
In uncoupled mode leaky	Internal seal defect due to swarf	Exchange element

11 Technical characteristics

General characteristics of threaded-body and built-in couplings

Type nominal diameter 3		Threaded-body	Built-in
Max. operating pressure	[bar]	350	300
Max. flow rate	[l/min]	8	8
Coupling stroke	[mm]	4.5	4.5
Axial coupling force under pressure per coupling point	[N]	$F = 7.9 \times p$ [bar]	
Axial coupling force at 0 bar approx.	[bar]	60	60
Max. positioning tolerance, radial	[mm]	± 0.1	± 0.1
Max. positioning tolerance, axial	[mm]	$+0.5$	$+0.5$
Adm. angular deviation	[°]	1	1
Max. seating torque	[Nm]	37	-

Type nominal diameter 5		Threaded-body	Threaded-body with nozzle	Built-in
Max. operating pressure	[bar]	500	500	300
Max. flow rate	[l/min]	12	12	12
Coupling stroke	[mm]	4.5	4.5	4.5
Axial coupling force under pressure per coupling point	[N]	$F = 15.4 \times p$ [bar]		
Axial coupling force at 0 bar approx.	[bar]	90	90	90
Max. positioning tolerance, radial	[mm]	± 0.25	± 0.20	± 0.20
Max. positioning tolerance, axial	[mm]	$+0.5$	$+0.5$	$+0.5$
Adm. angular deviation	[°]	1	1	1
Max. seating torque	[Nm]	56	56	-

Type nominal diameter 8		Threaded-body	Built-in
Max. operating pressure	[bar]	300	300
Max. flow rate	[l/min]	35	35
Coupling stroke	[mm]	7.4	7.4
Axial coupling force under pressure per coupling point	[N]	$F = 28.4 \times p$ [bar]	
Axial coupling force at 0 bar approx.	[bar]	105	105
Max. positioning tolerance, radial	[mm]	± 0.2	± 0.2
Max. positioning tolerance, axial	[mm]	$+0.5$	$+0.5$
Adm. angular deviation	[°]	1	1
Max. seating torque	[Nm]	128	-

Type nominal diameter 12		Threaded-body
Max. operating pressure	[bar]	250
Max. flow rate	[l/min]	70
Coupling stroke	[mm]	10
Axial coupling force under pressure per coupling point	[N]	$F = 71 \times p$ [bar]
Axial coupling force at 0 bar approx.	[bar]	180
Max. positioning tolerance, radial	[mm]	± 0.5
Max. positioning tolerance, axial	[mm]	$+0.5$
Adm. angular deviation	[°]	1
Max. seating torque	[Nm]	260

NOTE**Further information**

- For further technical data see ROEMHELD data sheet.

12 Accessory**NOTE****Accessories**

- See data sheet.

13 Storage**CAUTION****Damage due to incorrect storage of components**

In case of improper storage, the seals can embrittle and resinification of the anti-corrosive oil or corrosion on/in the element can occur.

- Storage in the packaging and moderate environmental conditions.
- The product must not be exposed to direct sunlight, since UV light may cause serious damage to the seals.

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

Römheld GmbH Friedrichshütte
Römheldstraße 1-5
35321 Laubach, Germany
Tel.: +49 (0) 64 05 / 89-0
Fax: +49 (0) 64 05 / 89-211
E-mail: info@roemheld.de
www.roemheld.com

Responsible person for the documentation:

Dipl.-Ing. (FH) Jürgen Niesner, Tel.: +49(0)6405 89-0.

Declaration of manufacture of the products

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, 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 hydraulic 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.

Laubach, 19.02.2024