



Automatic coupling system

for single and double acting elements, max. operating pressure 500 bar, ND 4



1 Description of the product

Description

Standard automatic coupling systems for single and double-acting elements are available. Each coupling system consists of a coupling unit and the corresponding coupling nipple unit. According to the application several components can be added to the coupling system that meet different safety requirements. The automatic coupling systems allow coupling against system pressure up to a max. operating pressure of 500 bar.

2 Validity of the documentation

This document applies to the following products:

Automatic coupling systems as per data sheet F 9:426. The following types or part numbers are concerned:

Automatic coupling system for single-acting elements

- 4606 130, 131, 132

Coupling nipple unit

- 4606 135

Automatic coupling system for double-acting elements

- 4606 230, 231, 232

Coupling nipple unit

- 4606 235

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.

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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

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 for automatic line connection between pressure generator and pallet. The automatic coupling systems allow coupling against system pressure up to a max. operating pressure of 500 bar and in uncoupled mode leakage-free.

- 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 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, ageing 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

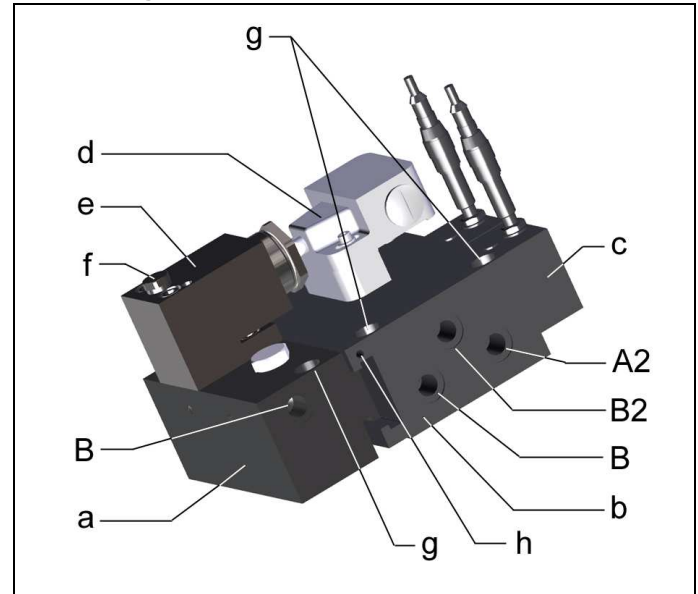


Figure 1: Components and accessories

a Coupling nipple unit	f Measuring port G1/8
b Automatic coupling unit	g Mounting holes
c Inductive position monitoring (pneumatic position monitoring see ROEMHELD data sheet F9.426)	h M5 on both sides, ports for cleaning the coupling units with compressed air
d Subassembly limit switch (accessory)	A2 Extend the coupling pistons
e Subassembly control cylinder (accessory)	B Oil supply
	B2 Uncouple coupling pistons

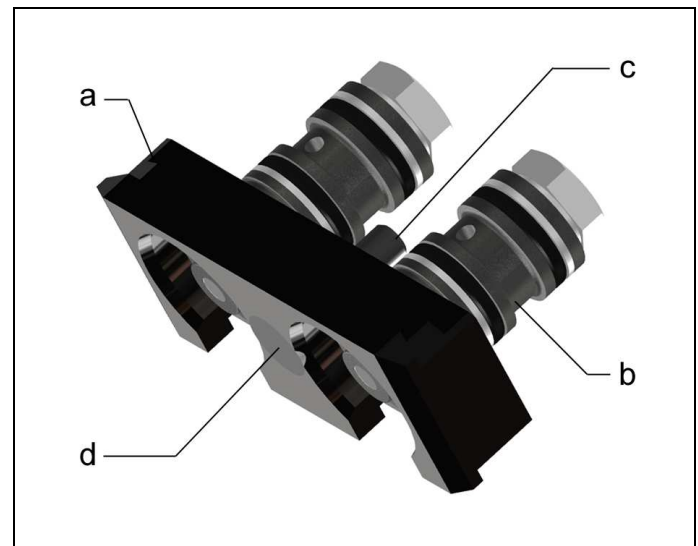


Figure 2: Coupling nipple, double

a Cover	c Fixing screw
b Coupling nipple	d Screw cap

7.2 Installation

Installation:

- Clean the fixture.
- Screw in coupling system in the fixture and fix by fixing screws.
- When installing, pay attention to the distance dimension of 115 mm (see ROEMHELD data sheet F 9.426).

Note

The insertion nipples in the nipple unit allow a radial misalignment adjustment of ± 0.5 mm and an axial misalignment adjustment of ± 1 mm.

8 Start up

CAUTION

Operating pressure of 500 bar does not exceed

The maximum operating pressure of 500 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").
- Bleed the hydraulic system.
- Start up of position monitoring.

Note

See operating instructions of the position monitoring.

8.1 Start up of the position monitoring

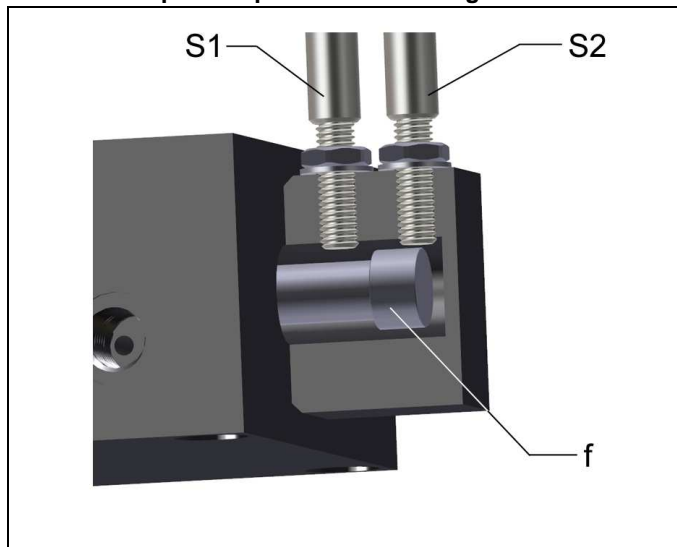


Figure 3: Design - Electrical position monitoring

Proximity switch S1	F Signalling disc
Proximity switch S2	

Electrical position monitoring

Condition for start up is that the magnetic sensors S1 and S2 are electrically wired as per circuit diagram and a correct supply voltage is available.

The electrical position monitoring will be delivered ready for connection. Position monitoring only has to be wired and connected.

The green LEDs signalize the corresponding mode.

- Piston unclamped.
- Screw in proximity switch S1 to the stop of the signal sleeve and turn back by 1/2 rotation. Fix S1 with the nut. The distance to the signal sleeve must be 0.5 mm.

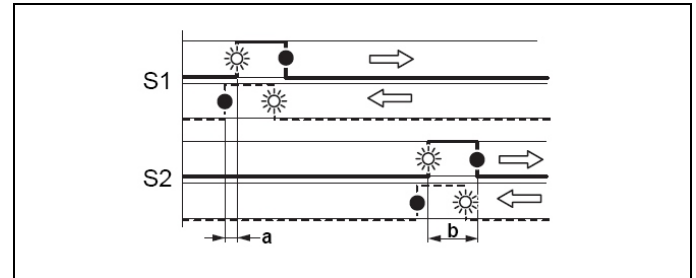


Fig. 4: fundamental signal course

☀ Signal on	a Hysteresis
● Signal off	b Overrunning distance

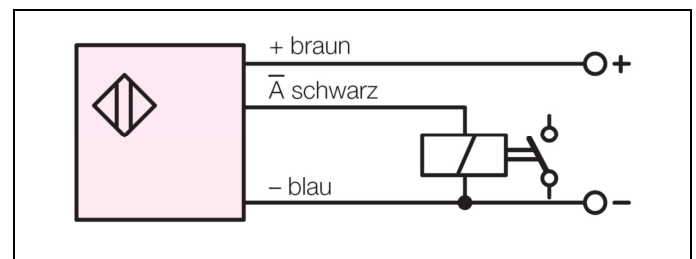


Figure 5: Wiring diagram

1 brown +
3 blue -
4 black

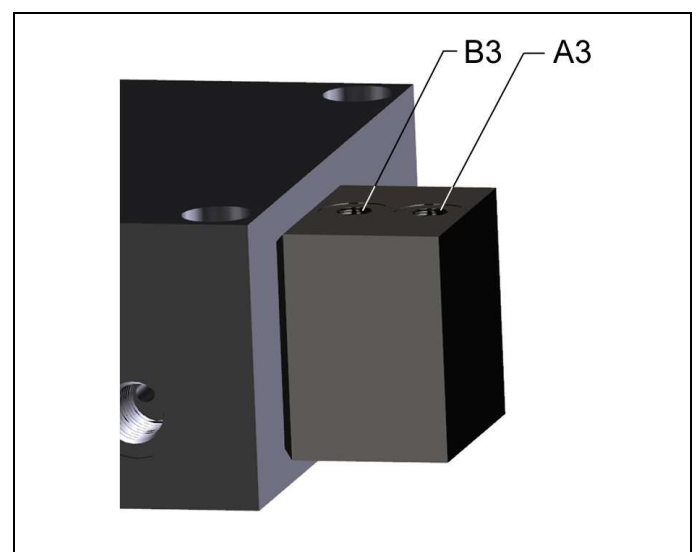


Figure 6: Design - Electrical position monitoring

B3 Pneumatic port, upper port (coupled)	A3 Pneumatic port, lower port (uncoupled)
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Pneumatic position monitoring

- Connect pneumatic pressure at the position monitoring.

- uncoupled position, port A3
- coupled position, port B3
- The piston position will be signalled by pressure build up at the upper or lower pneumatic port:

Pressure build-up	Piston is
B3 upper port	coupled
A3 lower port	uncoupled (retracted)

Note

For interpretation of the pneumatic pressure, we recommend to use the differential switches type PEL of the manufacturer Mawomatic.

8.1.1 Technical characteristics

8.1.2 Technical characteristics for proximity switches

Environmental temperature:	-25 °C to +70 °C
Code class:	IP 67 (DIN40050)
Duty cycle:	100%
Max. switching speed:	1 kHz
Edge steepness:	1 V/µs
Load	200 Ohm
No-load current	10-20 mA
incl. residual ripple	max. 15%
Nominal voltage	10-30 V DC

Note

Further information

- For further technical data see ROEMHELD data sheet.

8.2 Operation

WARNING

Injuries due to non-compliance of the operating instructions!

- The product may only be operated, if the operating instructions - especially the chapter "Safety instructions" have been read and understood.

CAUTION

Risk of injury!

Due to spring-loaded components hand or fingers can be squeezed.

- Wear personal protection equipment!

Material damage

Product and customer's installation can be damaged due to penetrating dirt.

- last clean the nipple with compressed air before coupling is made.

Function

Positioning of the coupling nipple unit is made by lateral insertion into the T-slot-type claw of the coupling unit. When port A1 and A2 are pressurised the coupling pistons extend. After the coupling pistons are extended the check valves in the coupling nipple unit and the coupling piston are opened. Both check valves can be opened against system pressure.

Oil supply is made through port A and B. In uncoupled mode, the coupling nipple in the B line is limited to 8 bar by a double

check valve. When using coupling systems for double-acting elements, port B must not be under pressure to disengage the coupling.

To disengage coupling ports B1 and if available B2 have to be pressurised. The optional proximity switches register the retracted position of the coupling positions.

Note

Material damage

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

9 Maintenance

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 smooth surfaces of the coupling unit allow a preliminary cleaning by elastic wipers. To improve cleaning of the sealing elements, jet holes with connecting thread M5 are integrated in the coupling nipple unit which allow blast cleaning or washing out of the seals.

For cleaning of the coupling nipple unit a cleaning device is available which cleans the coupling nipple by blast cleaning and washing out when passing through. We recommend to provide an additional protection cover adapted to the corresponding application.

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.

10 Trouble shooting

Trouble	Cause	Remedy
Leakage in coupled mode	Flat seal defect	If possible exchange seal or return for repair
Leakage in uncoupled mode	Internal sealing defect	Exchange coupling element
No flow	Coupling nipple unit not correctly positioned	Check positioning and effect coupling once again

11 Technical characteristics

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

DANGER



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

Automatic coupling systems as per data sheet F 9:426. The following types or part numbers are concerned:

Automatic coupling system for single-acting elements

- 4606 130, 131, 132

Coupling nipple unit

- 4606 135

Automatic coupling system for double-acting elements

- 4606 230, 231, 232

Coupling nipple unit

- 4606 235

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 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.

Responsible person for the documentation:

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**Römheld GmbH
 Friedrichshütte**

Laubach, 17.07.2013