

DEUBLIN

HOERBIGER Rotary Solutions



ROTATING UNIONS

High Pressure Hydraulic Unions
for Wind Energy Applications

www.deublin.com

Helping Realize the Promise of Wind Energy

Wind energy is a rapidly-growing option to traditional utility scale power generation alternatives, which are increasingly challenged by environmental, geopolitical and economic issues. The potential is enormous.

In the United States, as public demand for clean energy grows, and as the cost of producing energy from the wind continues to decline, it is likely that wind energy will provide a significant and growing portion of the nation's energy supply.

To realize these goals, problems must be solved – among them, improved reliability and operability of wind systems.



Unparalleled Functionality and Reliability

As the proven leader for the manufacture of precision rotary unions for wind turbine hydraulic pitch control, DEUBLIN Engineering continues to focus on reliability and performance.

Our hydraulic rotary unions for wind energy applications are available in configurations ranging from monoflow to four-passage designs, with central passages for cableconnection to electrical slip rings. Each DEUBLIN rotary union employs a proprietary, controlled leakage sealing technology. Durability features such as water resistant construction and hardened stainless steel rotors provide unparalleled lifecycle reliability over millions of cycles. This significantly reduces downtime and maintenance costs for both on- and off-shore operations.

All unions are 100% factory tested under operating pressures to ensure that each union is completely operational upon receipt and ready to install. But testing is just the beginning of DEUBLIN's commitment to quality.

Quality Credentials

DEUBLIN pursues its design and manufacturing missions with a passionate belief in the premise that quality is designed-in, not inspected in – a philosophy that is at the heart of its independently registered ISO 9001 compliant Quality Management System. This recognition offers assurance that our customers' end-use environment, performance requirements and reliability

expectations are always captured and expressed in our product designs, as well as at every stage of development and manufacture. It means that "lessons learned" in hundreds of product applications are projected forward into continual improvement of both our product and processes. Our ISO 9001 recognition is therefore simply more evidence of DEUBLIN's unmatched reputation for customer satisfaction and product quality.

In addition, DEUBLIN is certified as an Authorized Economic Operator (AEO), which provides assurance that DEUBLIN's supply chain is approved as both secure and customs-reliable. This recognition fast-tracks the flow of goods and materials worldwide – a customer service advantage for all of our supply chain partners.



Electrical Slip Rings Now Available

DEUBLIN provides Slip Rings for the demanding requirements of electric or hydraulic wind turbine pitch control applications.

DEUBLIN Slip Rings deliver an integrated and optimized system with special material configurations that are rated for millions of cycles, and years of trouble-free operation. Request Brochure SR102 US.

DEUBLIN

Rotating Union for Wind turbines, DN 15 – 40, 1 - 4 Passages

7100-733

- monoflow design
- self-supported rotating union
- threaded type rotor
- hydrostatic bearing design
- wear-resistant bearing
- vent for controlled leakage, depending on pressure
- shaft seal for secondary sealing
- stainless steel housing
- hardened steel rotor

7100-376 / 7100-730 / 7100-741

- duoflow design
- flange rotor
- coaxial media passage

7100-700

- duoflow design
- flange rotor
- parallel media passage
- central passage for cable
- connection for electrical slip ring

Special designs:

- three passage design
- eccentric cable passage
- drain line in rotor
- SAE housing connection

7100-736 / 7100-1001

- four passage design
- flange rotor
- parallel media passage
- central passage for cable
- connection for electrical slip ring

7100-1005

- four passage design
- flange rotor
- parallel media passage
- central passage for cable
- connection for electrical slip ring
- single piece housing

Following are some additional typical hydraulic unions for wind energy applications:

7100-970

899-200-201

899-221-201

7100-1018

899-210-201

SP0037

DEUBLIN

Rotating Union 7100 Series

DN 8, 1 - 4 passages



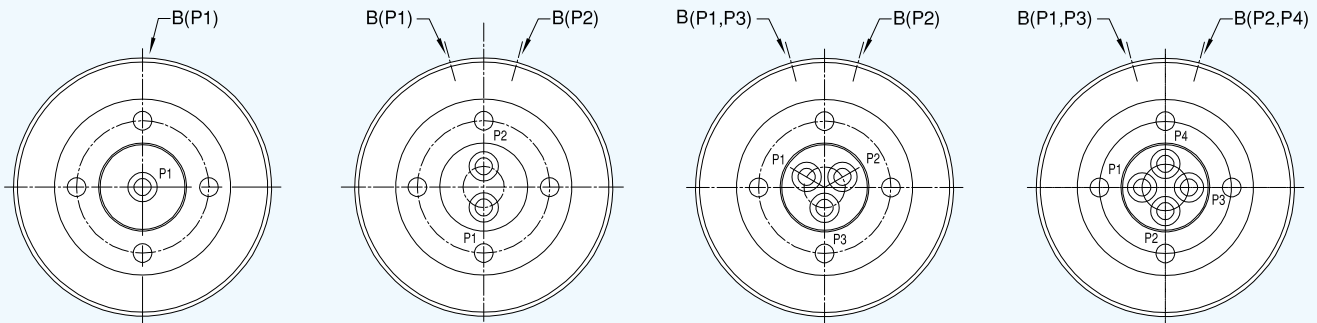
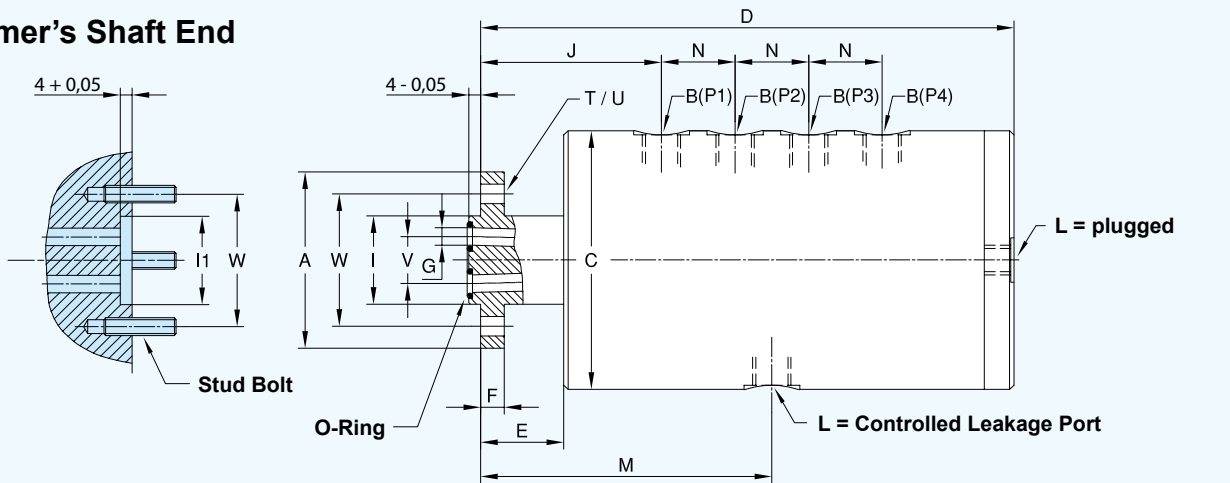
- 1-4 passages
- self-supported rotating union
- hydrostatic bearing design
- ball bearing supported
- vent for controlled leakage, depending on pressure
- shaft seal for secondary sealing
- aluminium housing
- steel rotor, coated
- special designs for higher speeds

For further information please contact Deublin.

Operating Data

| | | |
|--|-----------|-------------------------|
| Max. Hydraulic Pressure | 2,900 PSI | 200 bar |
| Min. Hydraulic Pressure | 40 PSI | 3 bar |
| Max. Speed | 3,000 RPM | 3 000 min ⁻¹ |
| Max. Temperature | 60 °C | > 60°C consult DEUBLIN |
| Required Oil Cleanliness: class 17/15/12, ISO 4406 | | |

Customer's Shaft End



| DN | B | Ordering No. | A Rotor Connections | C ø | D | E | F | G ø | I ø | I1 ø | J | L | M | N | T | U ø | V ø | W ø | kg |
|-------|-----------|--------------|------------------------|--------|-----|----|---|--------|--------|---------|------|-------|------|--------|-------|--------|--------|--------|-----|
| 1 x 8 | 1 x G 1/4 | 7100-737 | Flange Ø 60 | 88 | 110 | 28 | 8 | 1 x 6 | 30 f7 | 30 H7 | 61,5 | G 1/4 | 74,5 | - | 4x90° | 6,6 | 14 | 45 | 2,0 |
| 2 x 8 | 2 x G 1/4 | 7100-739 | Flange Ø 60 | 88 | 135 | 28 | 8 | 2 x 6 | 30 f7 | 30 H7 | 61,5 | G 1/4 | 99 | 1 x 25 | 4x90° | 6,6 | 14 | 45 | 2,6 |
| 3 x 8 | 3 x G 1/4 | 7100-740 | Flange Ø 60 | 88 | 160 | 28 | 8 | 3 x 6 | 30 f7 | 30 H7 | 61,5 | G 1/4 | 74 | 2 x 25 | 4x90° | 6,6 | 14 | 45 | 3,1 |
| 4 x 8 | 4 x G 1/4 | 7100-900 | Flange Ø 60 | 88 | 185 | 28 | 8 | 4 x 6 | 30 f7 | 30 H7 | 61,5 | G 1/4 | 99 | 3 x 25 | 4x90° | 6,6 | 14 | 45 | 3,6 |

DEUBLIN

Rotating Union 7100 Series

DN 8 - 20, Duoflow

- duoflow design
- self-supported rotating union
- hydrostatic bearing design
- wear-resistant bearing
- vent for controlled leakage, depending on pressure
- shaft seal for secondary sealing
- stainless steel housing
- hardened steel rotor

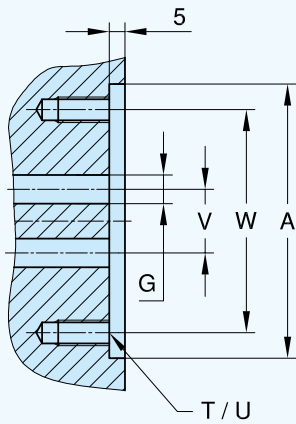
For further information please contact Deublin.



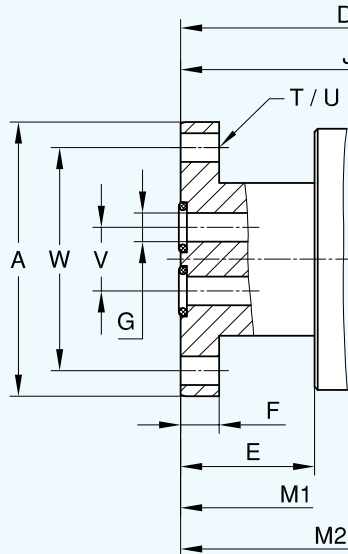
Operating Data

| | | |
|--|-----------|------------------------|
| Max. Hydraulic Pressure | 3,630 PSI | 250 bar |
| Min. Hydraulic Pressure | 40 PSI | 3 bar |
| Max. Speed | 500 RPM | 500 min ⁻¹ |
| Max. Temperature | 60 °C | > 60°C consult DEUBLIN |
| Required Oil Cleanliness: class 17/15/12, ISO 4406 | | |

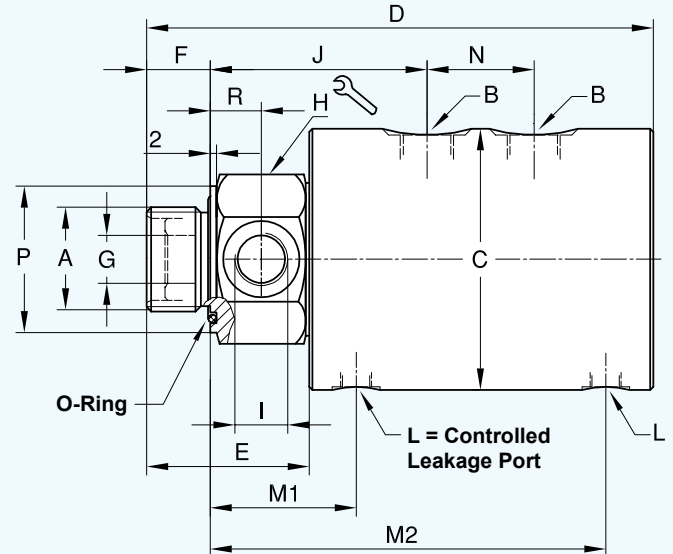
Customer's Shaft End



Flange Rotor



Threaded Rotor



| DN | B | Ordering No. | A Rotor Connections | C ø | D | E | F | G ø | H | I | J | L | M1/M2 | N | P ø | R | T | U ø | V ø | W ø | Weight kg |
|--------|-----------|--------------|---------------------|-----|-----|----|----|------|----|-------|-----|----------|------------|----|-----|----|-------|----------|------|-----|-----------|
| 2 x 8 | 2 x G 1/4 | 7100-773 | G 3/4 RH | 82 | 176 | 46 | 17 | 6,4 | 46 | G 1/4 | 76 | G 1/8 | 49,5/137,5 | 36 | 46 | 15 | - | - | - | - | 4,5 |
| 2 x 8 | 2 x G 1/4 | 7100-852 | Flange ø 86 g6/H7 | 82 | 172 | 42 | 12 | 9 | - | - | 89 | G 1/8 | 63/151 | 36 | - | - | 4x90° | 9 M8 | 20 | 70 | 4,5 |
| 2 x 10 | 2 x G 3/8 | 7100-777 | G 1 RH | 82 | 181 | 51 | 20 | 8 | 46 | G 3/8 | 78 | G 1/8 | 52/140 | 36 | 46 | 16 | - | - | - | - | 4,4 |
| 2 x 10 | 2 x G 3/8 | 7100-853 | Flange ø 86 g6/H7 | 82 | 172 | 42 | 12 | 9 | - | - | 89 | G 1/8 | 63/151 | 36 | - | - | 4x90° | 9 M8 | 20 | 70 | 4,4 |
| 2 x 15 | 2 x G 1/2 | 7100-711 | G 1 1/4 RH | 109 | 244 | 70 | 26 | 15 | 55 | G 1/2 | 101 | G 1/4 | 70,5/180,5 | 50 | 55 | 18 | - | - | - | - | 11 |
| 2 x 15 | 2 x G 1/2 | 7100-854 | Flange ø 108 g6/H7 | 109 | 230 | 56 | 16 | 12,5 | - | - | 113 | G 1/4 | 82,5/192,5 | 50 | - | - | 4x90° | 11 M10 | 20,5 | 88 | 11 |
| 2 x 20 | 2 x G 3/4 | 7100-713 | G 1 1/2 RH | 109 | 249 | 75 | 28 | 17,5 | 65 | G 3/4 | 106 | G 1/4 | 73,5/183,5 | 50 | 65 | 20 | - | - | - | - | 12 |
| 2 x 20 | 2 x G 3/4 | 7100-855 | Flange ø 148 g6/H7 | 148 | 288 | 78 | 25 | 19 | - | - | 153 | 2x G 1/2 | 110,5/253 | 60 | - | - | 6x60° | 13,5 M12 | 33 | 126 | 28 |



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Rotating Union 20504 Series

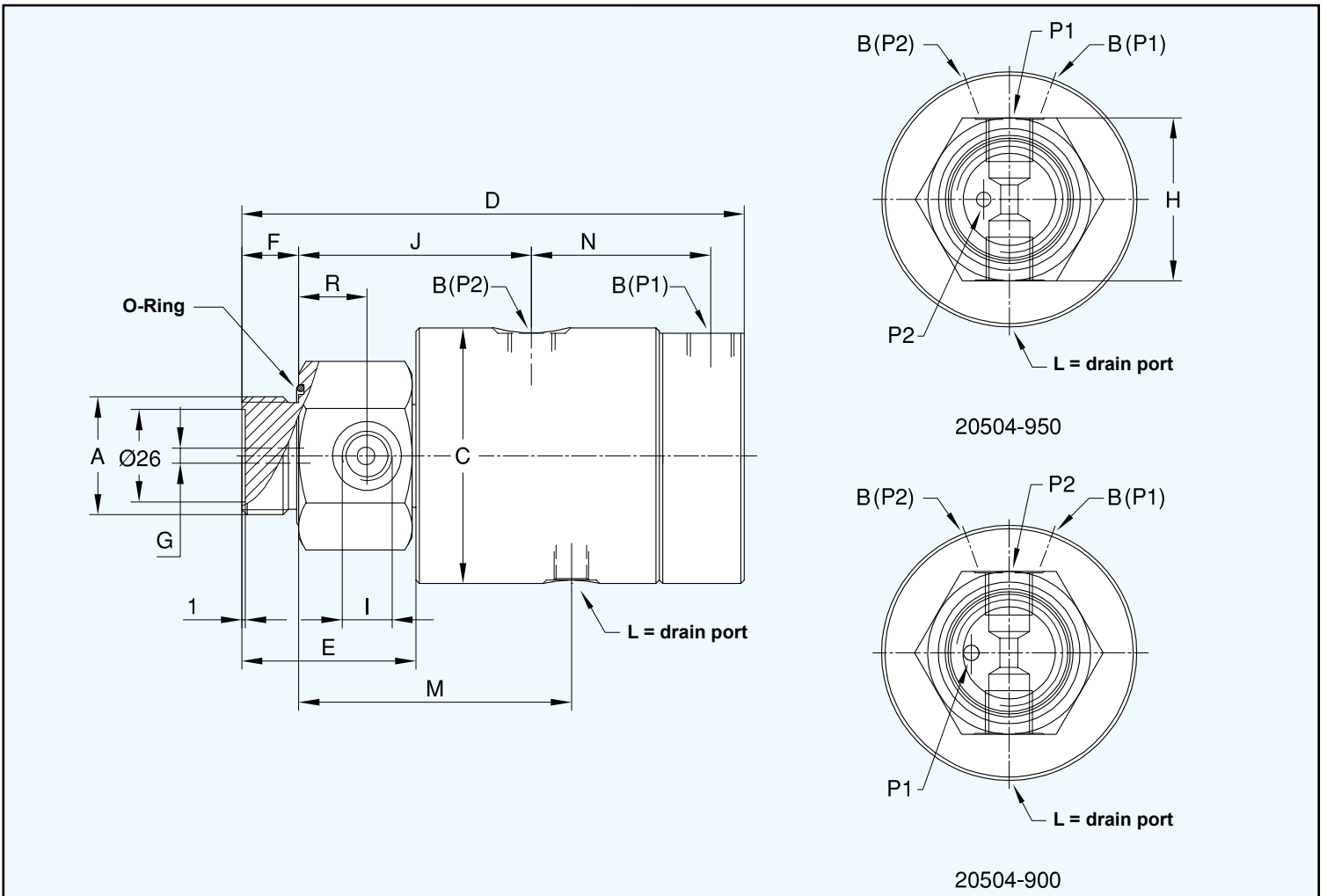
DN 8, Duoflow

- duoflow design
- self-supported rotating union
- P1 pressure channel
- high-wear resistant balanced mechanical seal
Silicon Carbide/Silicon Carbide for high pressure passage (P1)
- P2 channel for release, during standstill
- carbon-filled PTFE seals
- shaft seal in seal cavity
- drain passage prevents interpassage leakage
- housing connections radial
- aluminium housing
- stainless steel rotor, hardened
- Main application: Coil Winding

Operating Data

| | | |
|--|-----------|------------------------|
| Max. Hydraulic Pressure | 3,050 PSI | 210 bar |
| Max. Speed | 250 RPM | 250 min ⁻¹ |
| Max. Temperature | 60 °C | > 60°C consult DEUBLIN |
| Required Oil Cleanliness: class 17/15/12, ISO 4406 | | |

For further information please contact Deublin.



| DN | B | Ordering No. | A Rotor Connections | | C ø | D | E | F | G ø | H | I | J | L | M | N | R | kg |
|-------|-----------|--------------|---------------------|----|-----|-------|----|----|-----|----|-------|------|-------|----|------|----|-----|
| 2 x 8 | 2 x G 1/4 | 20504-900 | G 1 | RH | 72 | 141,5 | 49 | 16 | 4,3 | 46 | G 1/4 | 65,5 | G 1/8 | 77 | 50,5 | 19 | 1,7 |
| 2 x 8 | 2 x G 1/4 | 20504-950 | G 1 | RH | 72 | 141,5 | 49 | 16 | 4,3 | 46 | G 1/4 | 65,5 | G 1/8 | 77 | 50,5 | 19 | 1,7 |

Important Information

A Deublin union is a precision-made piece of equipment and must be handled accordingly. Sealing between the rotating device - rotor - and the static device - stator - is mainly accomplished via floating seals. Improper use could result in premature leakage or failure.

Although Deublin unions are of the highest quality and precision they are, by their very nature, a "wear and tear" product. It's important that they should be inspected periodically. Moreover, when seals wear out, the rotating union must be replaced or repaired to avoid subsequent leakage. Once a union begins to leak, it is paramount that the union be repaired immediately. Never work with leaking unions!

Deublin unions must never be used for applications other than those specified in the catalogue. It is strictly prohibited to use Deublin unions with hydrocarbons or other flammable media as leakage may result in a fire or explosion. The use of our product on exotic or corrosive media is strictly prohibited without our prior approval. For applications other than those stated in the catalogue, the Deublin Engineering Department should be contacted for proper instructions. These instructions are provided by Deublin as general guidelines and do not contain exhaustive information about the installation, use or maintenance of unions.

Operating instructions and installation manuals are available in the German and English languages for the greater part of Deublin products. Buyers and users of Deublin unions should be certain that they have reviewed all of Deublin's product information. The operating and installation instructions must be strictly adhered to when installing Deublin unions.

Factory Testing

All Deublin unions are factory-tested under pressure prior to shipment. This thorough check ensures that each single Deublin union is completely operational when you receive it and can - in most cases - be installed with no further consideration.

Warranty

The buyer's warranty rights assume that the product shipped be inspected upon receipt and all defects reported to Deublin in writing immediately or for no longer than a period of 2 weeks. Defects must be reported to Deublin in writing immediately upon detection. The warranty is void when the Deublin Rotating Union is tampered with or misused in any way. Otherwise, our General Terms of Sale and Delivery are valid. It cannot be emphasised enough that all dynamic seal components are wear parts.

Deublin will not be held liable for damage resulting from improper use, incorrect warehousing, incorrect transport, faulty assembly, faulty operation, insufficient maintenance, incorrect handling, improper installation by the customer, the use of inappropriate accessories or spare parts and natural abrasion. Please request our General Terms of Sale and Delivery.

Lubrication and Maintenance

Depending on the Deublin product series and the operating parameters all Deublin unions are lubricated for life.

The unions equipped with oil cups should be lubricated periodically with 4 to 5 drops of high quality SAE 30 motor oil, approximately once a month or in extreme severe conditions (high RPM's) once a week.

Filtering

The service life of the seal is largely determined by filter quality and thus of vital importance for the perfect operation of the rotating union. We recommend a filtering of min. 60 µm. It goes without saying that all installation and operating instructions must be carefully reviewed and strictly adhered to.

Repair Service and Maintenance of DEUBLIN Unions by DEUBLIN

Use only DEUBLIN spare parts for repair of the Deublin rotating unions. Prior to repair contact Deublin or any authorised Deublin representative. You can find a local Deublin representative at the following internet site: www.deublin.com.

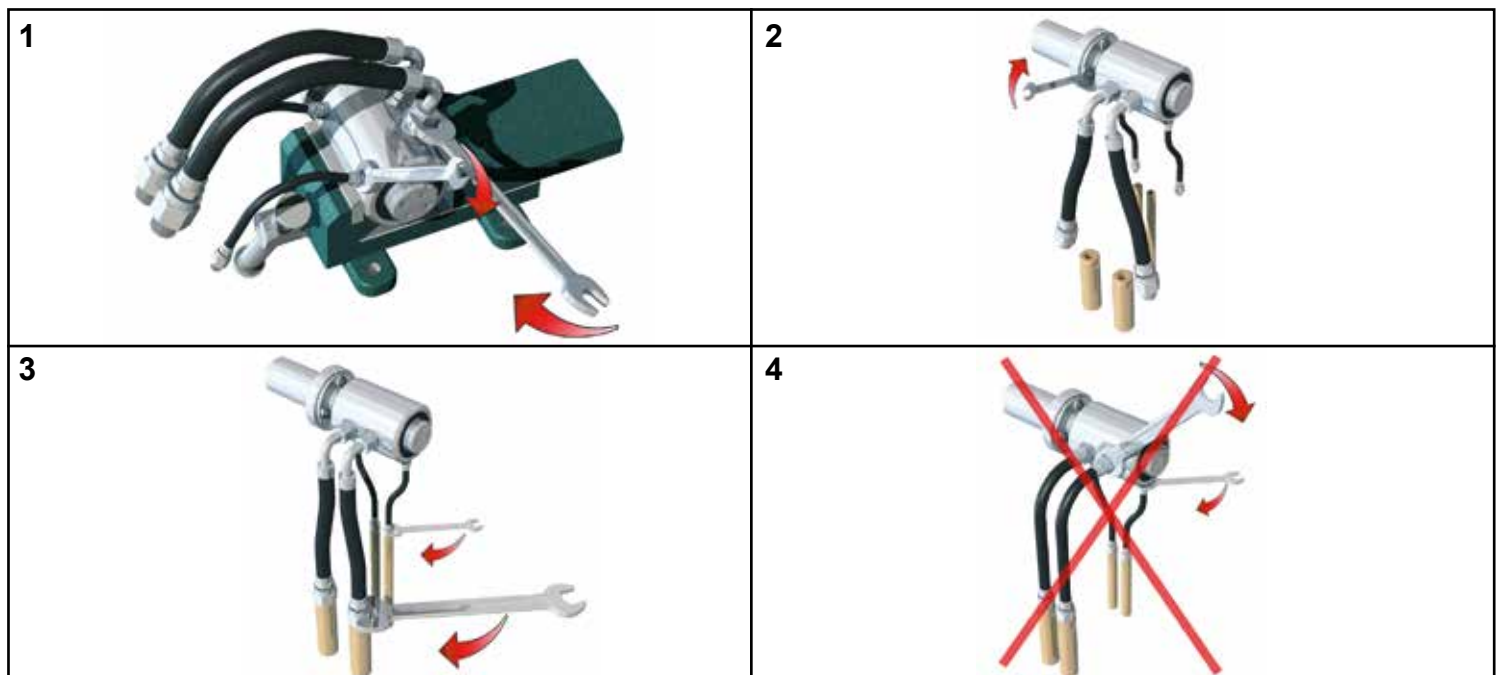
Most unions can be reconditioned in the field by use of Deublin repair or rebuilding kits. Generally, we recommend having the Deublin rotating unions repaired by Deublin. Repair service is available at all DEUBLIN factories. Factory rebuilt unions carry a "New-Union-Warranty".

Tension-free Installation

When installing rotating unions, special attention has to be paid to a flexible and tension-free hose connection. For further suggestions please refer to our installation instructions.

WARNING DEUBLIN unions should not be used to convey flammable media (flash point $\leq 140^{\circ}\text{F}$ or 60°C) as leakage may result in explosions or fires. DEUBLIN unions should be used in accordance with standard safety guidelines for the media, and in a well-ventilated area. The use of our product on hazardous or corrosive media is strictly forbidden.

Instructions for Hose Installation and Assembly of DEUBLIN Rotating Unions - see example 7100 series below



Since its founding in 1945 as a small, family-owned business, Deublin consistently has adhered to a policy of designing and building the best products of their kind in the world. The result of this policy has been constant growth through the years, and for this we are grateful to our many loyal customers.

Today, Deublin is the world's largest manufacturer of rotating unions, with state-of-the-art factories, technical sales and service, and local stocking in 15 countries on four continents, as well as a worldwide distribution network operating from more than 60 countries. Our global organization and extensive catalog of field-tested products ensure a precise match between each customer's requirements and an engineered solution.

We cordially invite you to visit our modern manufacturing facilities in Waukegan, Illinois, USA; Mainz, Germany; Monteveglio, Italy; Dalian, China; and Sao Paulo, Brazil.



Global Headquarters in Waukegan, Illinois, U.S.A.



Mainz, Germany



Monteveglio, Italy



Dalian, China



Deublin products & services are available throughout the world.

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