Documentation

033-7364

for

DEUBLIN

MULTIPASSAGE

SOFT SEAL

UNIONS

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DEUBLIN Italiana S.r.l.

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INDEX

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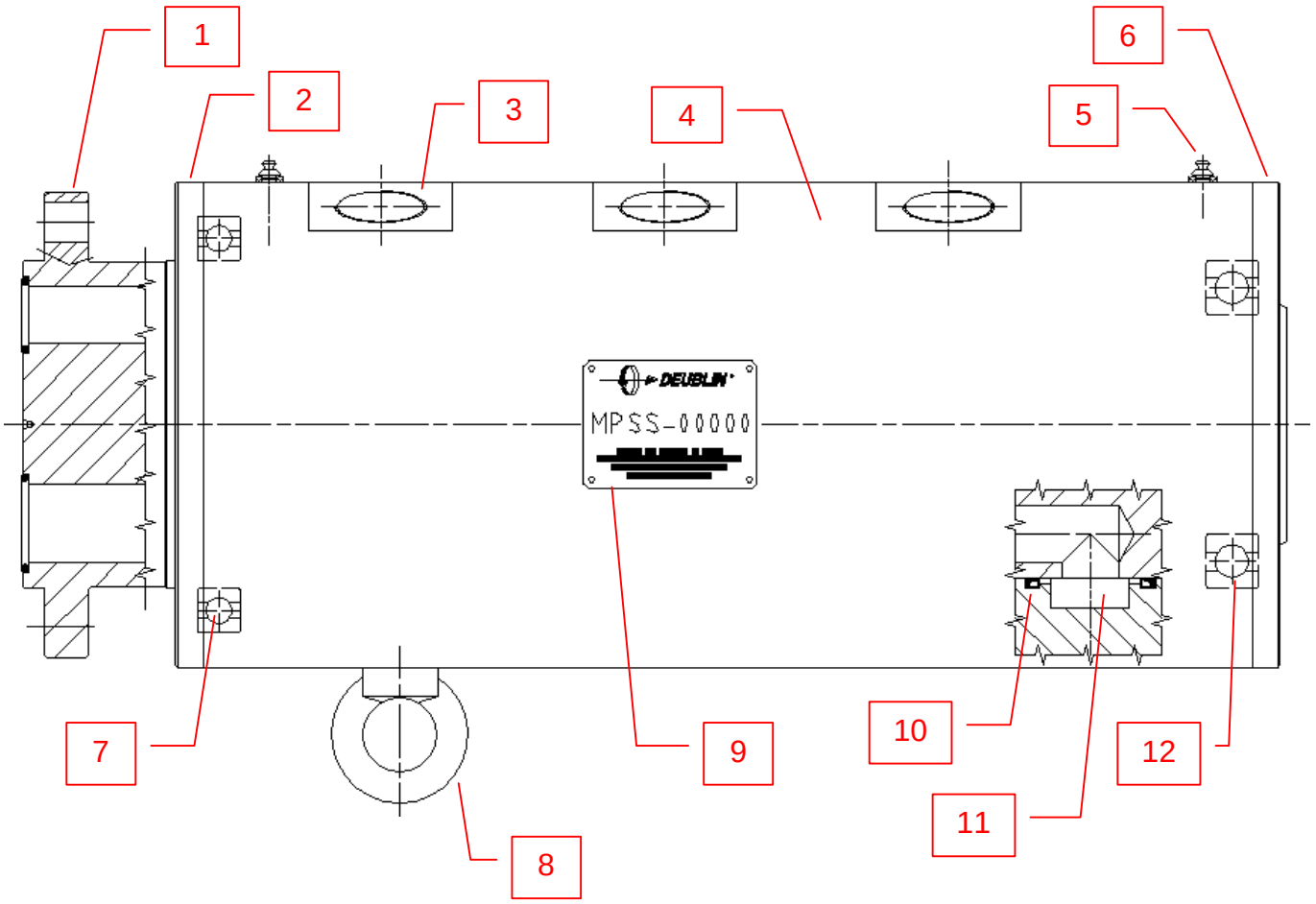
1. MPSS TECHNICAL SPECIFICATIONS

MPSS (Multi Passage Soft Seal) unions are designed for specific applications, therefore shape and dimensions can be different from the union example below.
Here below the main features of MPSS series unions; please identify all relevant parts.



1) ROTOR	7) FRONT BALL BEARING
2) FRONT COVER (IF ANY)	8) TORQUE RESTRAINT (IF ANY)
3) INLET PORT	9) NAME PLATE
4) HOUSING	10) SEAL RING
5) GREASE NIPPLE (IF ANY)	11) CHANNEL
6) REAR COVER (IF ANY)	12) REAR BALL BEARING

Specific operating parameters are specified on relevant Interface Control Drawing; Union Number is marked onto the name plate.

	CAUTION: In case of extreme operating conditions (max pressure combined with max speed) please contact our engineering department.

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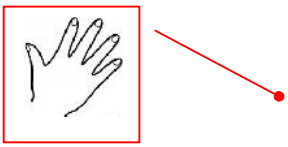
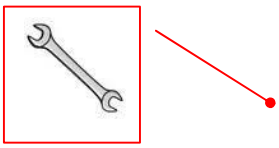
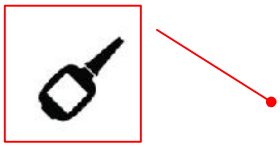
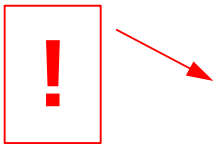
2. CAUTIONS

Proper installation of the Union is of utmost importance and is referred to throughout this manual in the form of Warning and Caution statements. The conditions outlined by these paragraphs must be thoroughly understood and followed when using these instructions. Description of each type of paragraph is given below.

	**WARNING:** Denotes an operating or service procedure or condition that can result serious injury to personnel

	CAUTION: Denotes service procedure or condition considered essential for expedient and efficient operation and service of the union

Moreover every single service step description is integrated with sketch and labels for easier understanding.
Here below description for each symbol or statement used:

 Indicates operation performed by hands	 Indicates operation performed by proper tools
 Indicates use of proper substance	 Indicates critical operation or check

Before performing the installation, we suggest to read the following instructions, identifying all the mentioned items “step by step” and verifying them on drawings and tables.

We further suggest to arrange a suitable clean space where to open the crates and separate all the contents.

All packaging / containers are marked with the codes of the item contained. These codes are listed on the relevant union drawings or on the included documentation.

Keep all the fasteners in their individual supplied packages, as far as these items are supplied in the exact quantities necessary for the installation of the union.
Contact the nearest Deublin representative should you find any discrepancy with the items. All parts are identified with their individual Part Number.
In case on any doubt, contact the DEUBLIN Customer Services. Details are available at the website: www.deublin.com

3. PREPARATION AND INSTALLATION

Note: These instructions should be utilized following the specific installation drawings provided with the product..

3.1. Preparation

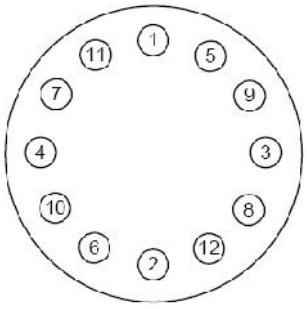
Remove existing multipassage union, journal flange and existing support, if necessary. Clean mounting surfaces on union and on machine.

Remove new multipassage union from the original package; obtain relevant drawings to identify components.

NOTE: we suggest to use an anti-seize compound on all bolts and screws of this installation. Any debris on the threads can affect the final clamping load. A minimum of three tightening passes should be used plus an additional pass in a clockwise sequence.

Nominal screw (Ømm)	Torque (Nm)	Torque (lbft)
6	8,8	6.5
8	21,6	15.9
10	44,2	32.6
12	73,6	54.3
14	120	88
16	206	152
18	255	188
20	363	268

Torque should be applied to the bolts using correctly calibrated torque wrench in a diametrically opposed sequence (star pattern).



Note: Any anti-seize compound should be applied as per the manufacturers recommendations.

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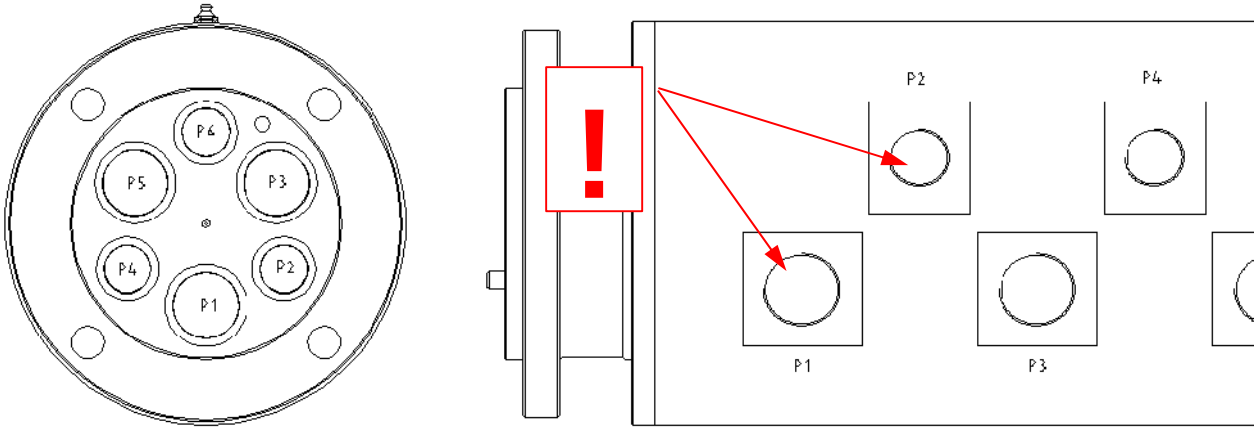
3.2. Installation

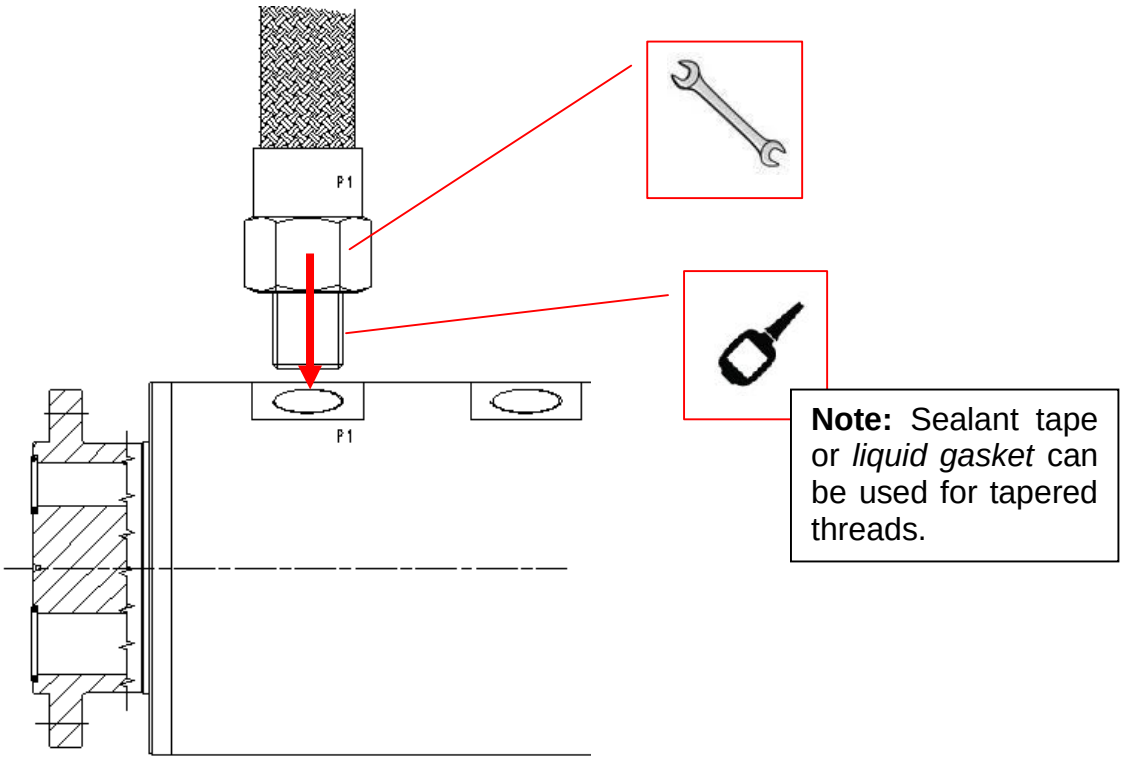
Installation procedure and union's shape could be slightly different from ones illustrated in the following: always refer to specific drawings.

3.2.1. Ports connection

I) Put the multipassage union in a proper space and hold it firmly (depending on multipassage's size, a bench vise can be used). Identify inlet ports on housing.



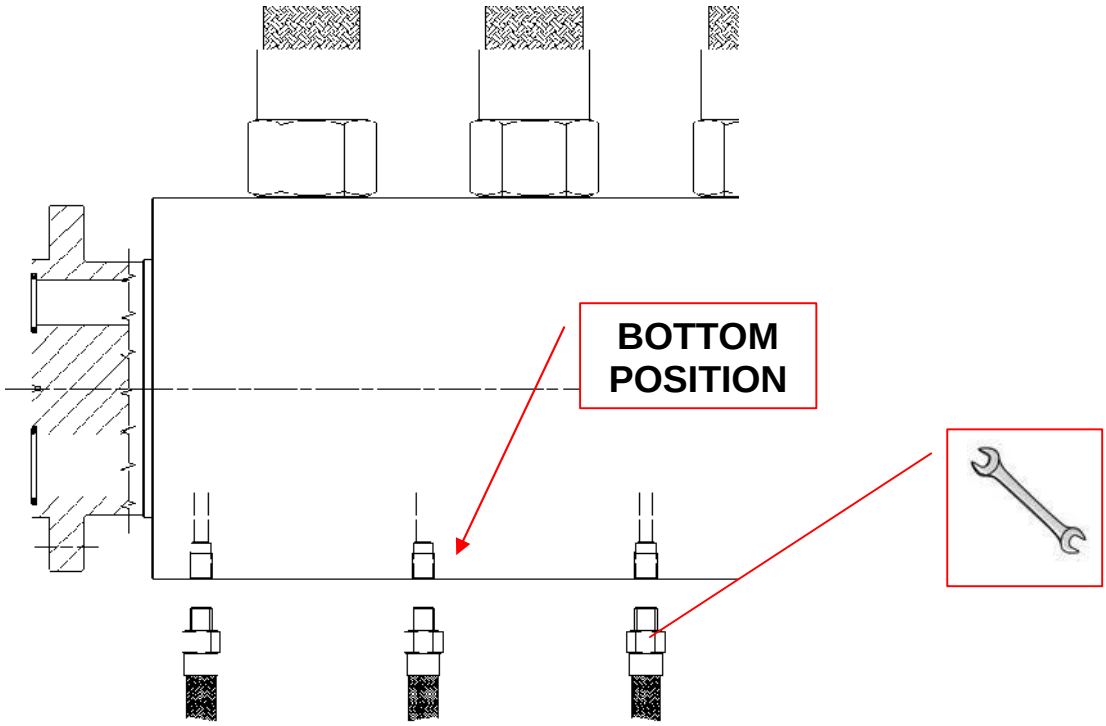
II) Connect hoses to relevant ports and apply proper tightening torque. Be sure that gaskets or O-Rings are use when requested.



Note: Sealant tape or *liquid gasket* can be used for tapered threads.

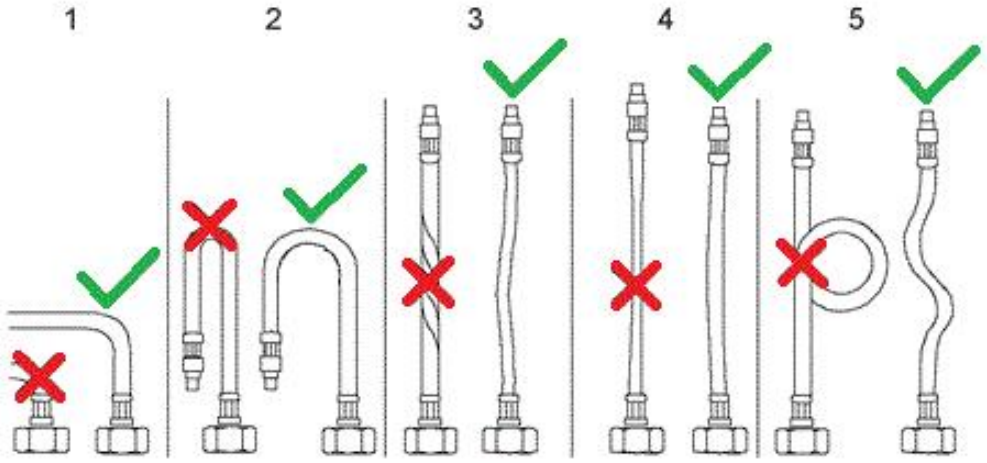
	CAUTION: Clean carefully port's thread and hose's thread. Do not allow dirt or particles to go inside the connection opening!

III) Connect hoses to drain ports, if it is necessary to collect the possible leak. Be sure that drain ports will be as close as possible to bottom position.



CAUTION: Drain lines have to face downward. The drain sink has to be installed LOWER than the union. The drain line must be pressure free!

NOTE: all hoses fitted to union must be flexible and long enough to avoid load transmission. Either rubber or metal hoses with rating able to sustain media flow, temperature and pressure are suitable. We suggest to support long hoses.



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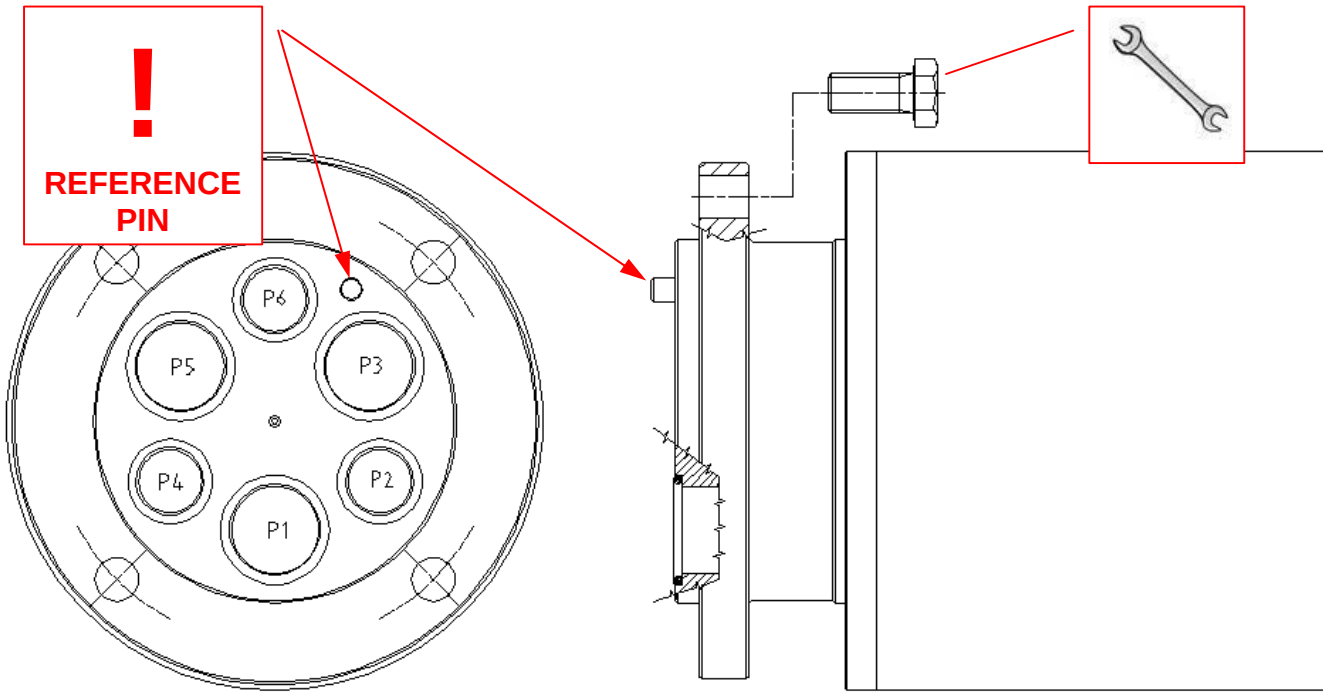
3.2.2. Multipassage flange connection

3.2.2.1. Flange coupling with O-ring seals

I) Check channel sequence on rotor's flange: verify it matches with machine journal. Verify the position of reference pin, if present.

⚠	CAUTION: Rotor's front surface and it's matching journal on machine are SEALING SURFACES: they must be carefully cleaned with denatured alcohol and a lint free tissue if necessary.



II) Verify all O-rings are present in their seats.
III) Position multipassage's flange into journal and fit reference pin into its hole (if present).
IV) Put fasteners on and tighten them in a star pattern

3.2.2.2. Flange coupling with threaded/ flanged ports on rotor

I) Install the flexible hoses to the threaded/flanged connection port of the rotor following steps illustrated in paragraph 3.2.1 " Ports connection".
II) Position multipassage's flange into journal and fit reference pin into its hole.
III) Put fasteners on and tighten them in a star pattern.

NOTE: Some journals have studs extending through rotor's flange. The flange connection sequence is the same explained above; tighten nuts in a star pattern with proper torque value.

⚠	CAUTION: Always refer to relevant drawing to identify Installation supports and tools.

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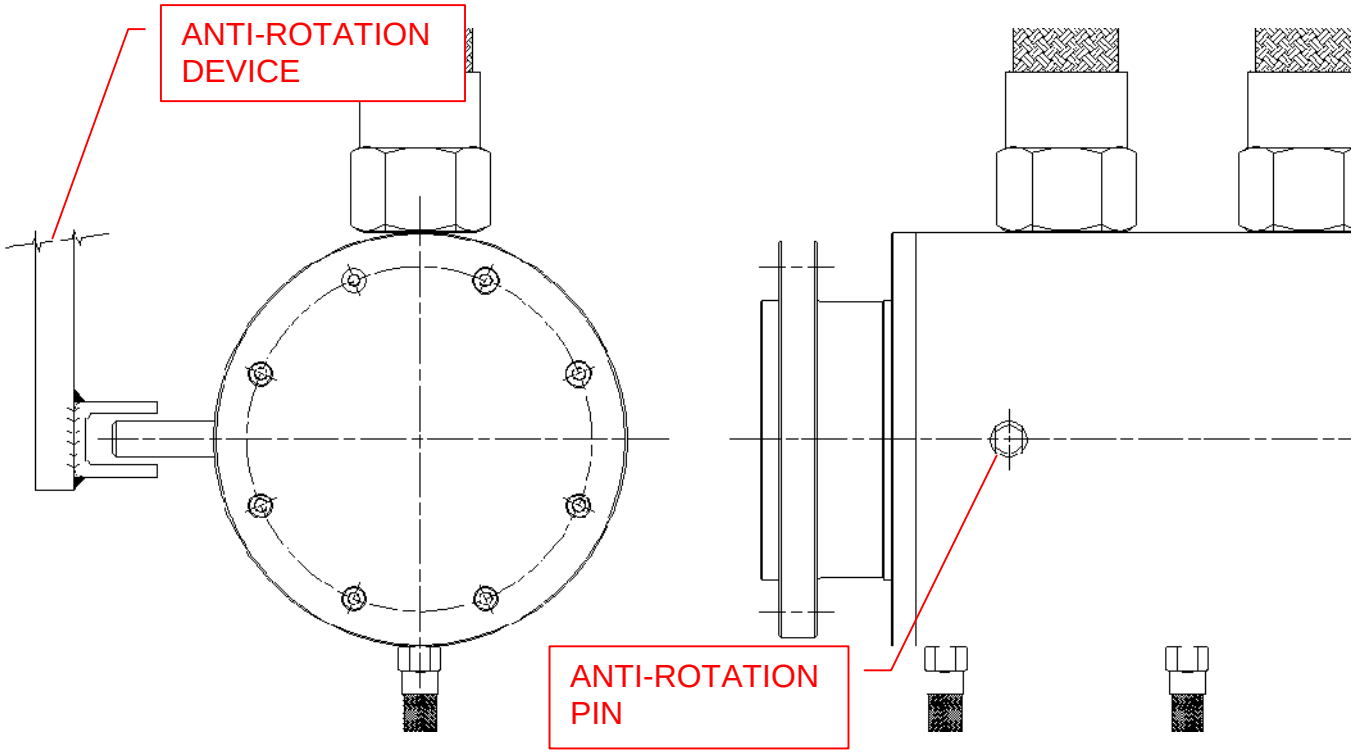
3.2.3. Torque restraint connection

For a correct installation it is necessary to provide an anti-rotation device so that the torque does not apply directly on hoses.

The anti-rotation device will interface with union anti-rotation pin; this will allow the union to maintain axial and radial movements.

A robust fork-shaped anti-rotation device is suitable for the application; provide for robust mechanical connecting device in the plant.



Anti-rotation device must allow the union to float radially and axially.
Be sure there is clearance between the anti-rotation lug and the anti-rotation device.

	CAUTION: Do not bolt union to anti-rotation fork!

NOTE: Some multipassage unions have threaded hole(s) instead of anti-rotation pin. Connect a suitable bolt or lug to the threaded hole(s) to obtain torque restraint.

	CAUTION: Always refer to relevant drawing to identify reciprocal positions of components

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3.3. Final check-list

If all the steps above have been followed correctly, the multipassage union is now firmly installed aligned with journal and no stresses are applied to it.

Conclude installation taking care of the final checks.

I) Check if rotor is free to rotate: to do this rotate slightly multipassage's housing by hand (there must be a little clearance between anti-rotation pin and anti-rotation device, as explained above).

II) Check that drain lines are facing downward.

III) Check if hose connections are correct.

IV) Check again that all coupling surfaces are completely in contact with each other.

4. START-UP AND SHUTDOWN PROCEDURES

Multipassage unions have a sturdy design and do not require special start-up or shut down procedure. However there are common practices that should be followed, as stated below:

- Check all bolts to ensure they are tight.

- Never run the seals dry without first consulting with Deublin Engineering.

- The seals may leak slightly for the first few hours of operation until the components wear in.

- Despite system piping cleaning (flushing) before start up, the presence of foreign particles (like solid oxides or abrasive particles) in the media during first working hours may significantly reduce seals life.

After the shut down: DO NOT USE A WATER HOSE TO COOL THE UNION.

By following these simple procedures should guarantee a long service trouble free service from your Deublin multipassage union.

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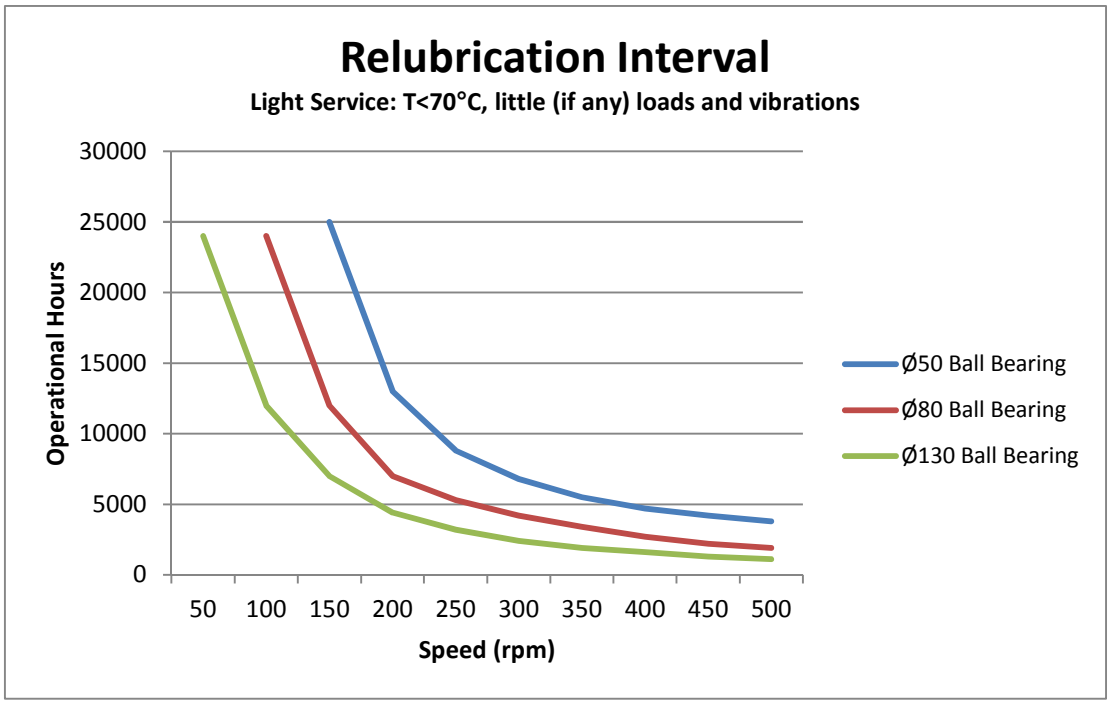
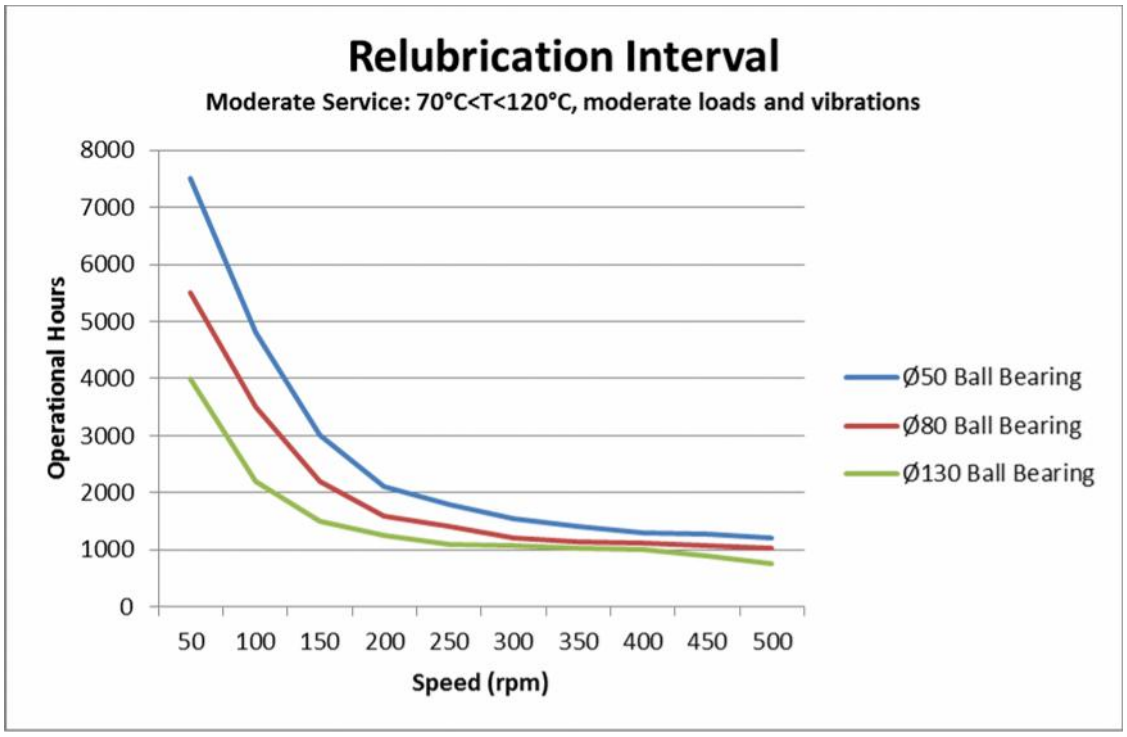
5. MAINTENANCE & REPAIR

5.1. Lubrication

To maintain a satisfactory reliability of the union it is imperative that ball bearings are lubricated at stated frequencies.
Identify ball bearings size (shaft Ø) and refer to charts below(*) to plan relubrication.





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(*): Users must make adjustments as experience dictates.

Refer to relevant drawing to identify the grease nipples.

Bearing chamber should be completely filled with new grease.

RECOMMENDED GREASE : ***KLUBER - PETAMO GHY 441***
(Consistency NLGI class DIN 51 818 : 1)

The Kluber Petamo GHY 441 is a *polyurea thickener / syntetic oil* grease; if such grease is not available please use compatible grease like CHEVRON SRI.

WARNING: Always check grease requirements on relevant labels close to grease nipples on multipassage's housing!

NOTE: multipassage unions can be equipped with sealed, lifetime lubricated ball bearings. No additional lubrication is requested in this case.

5.2. Repair

It is possible to verify seals wearing grade monitoring the amount of leakages from the drainage holes.

Small leakages are allowed; if leakage increases progressively until reaching a continuous flow, we recommend the multipassage maintenance activity because seals are probably worn.

In case of leakages caused by a premature Seal Ring failure depending by some type of impurities inside the media, the flow from the drainage holes would be high and immediate.

To carry out a repair it is necessary to disassemble the multipassage and proceed as explained. *(please see relevant drawings)*

WARNING: Always verify that multipassage union and hoses are completely cooled down and there is no pressure inside multipassage before starting maintenance operations.

5.2.1. Seal rings features

Specific seal rings are used in every multipassage union, depending on media and operating parameters.

The main types are listed in the chart below.

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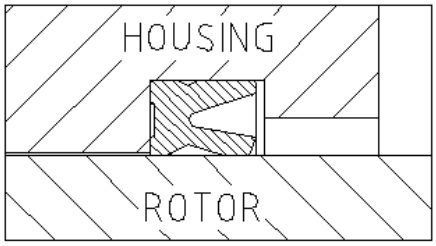
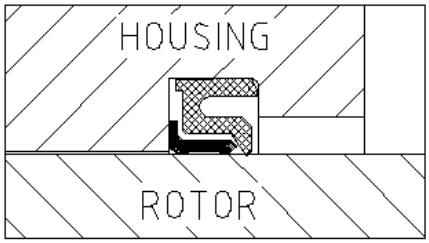
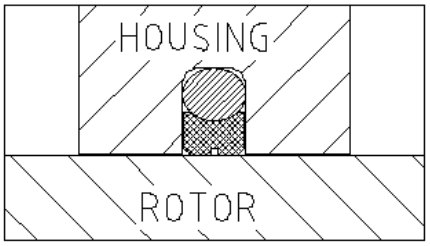
LIP seal	BI-MATERIAL seal	GLYD seal
		
Monodirectional seal	Monodirectional seal, Lip seal plus Sliding-Ring	Bidirectional seal, O-Ring plus GLYD-Ring
Deublin Plastomeric® seal type: A , B.	Deublin Plastomeric® seal type: C , D.	Deublin Plastomeric® seal type: E , F , G.

5.2.2. Seal rings replacement: ONE-PIECE HOUSING

I) Remove multipassage union from journal.

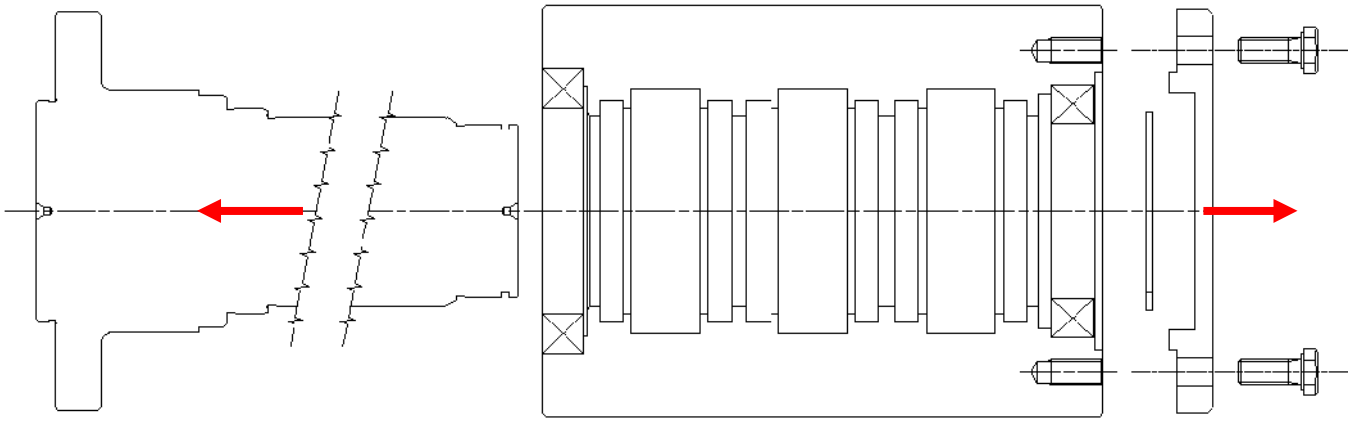
II) Remove all hoses from multipassage housing.

III) Remove the back cover (if present).

IV) Verify to have proper access to rotor's rear snap ring.

V) Remove rear snap ring.

VI) Slide carefully off the rotor from housing.



NOTE: Some multipassage union has a flange instead of snap ring to hold the rear ball bearing; in this case proceed removing relevant flange

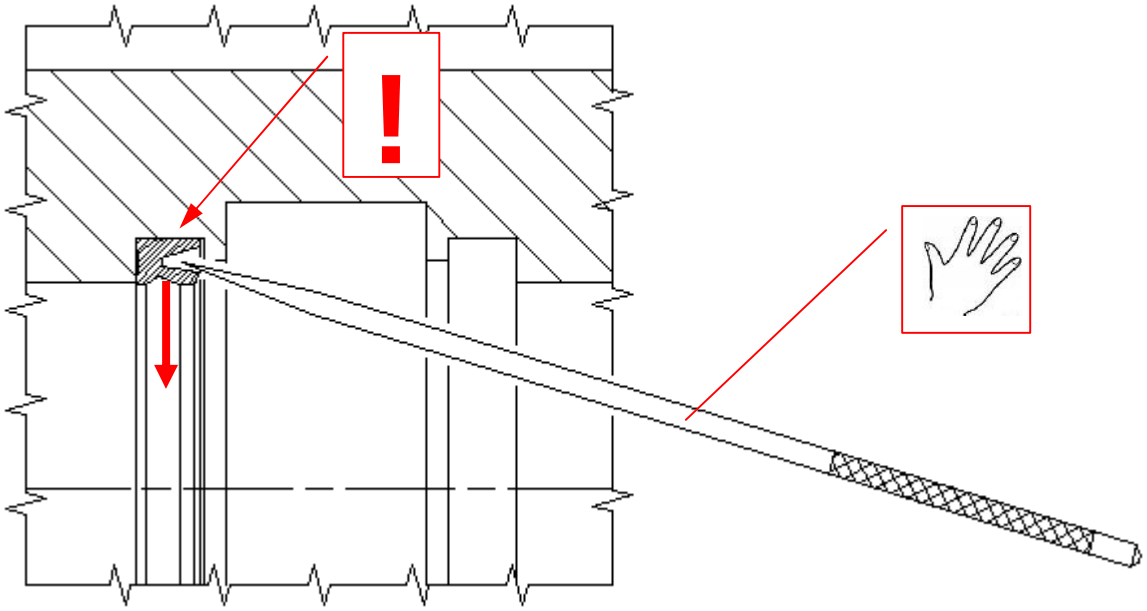
	CAUTION: Always refer to relevant drawing to identify reciprocal positions of components.

At this step seal rings can be easily reached; they are seated inside grooves into housing.

VII) Remove seal rings from housing.

	CAUTION: Before removing seal rings from housing, carefully identify seal ring types and features!

Use a thin tool to remove seal rings from their seats.



	CAUTION: When removing seal rings from housing, pay attention to avoid damages to the grooves!

VIII) Carefully clean the seal grooves with denatured alcohol or proper solvent, depending on media.

IX) Obtain new seal rings

X) Install new seal rings following proper procedure: see examples below.

LIP seal ring

Identify the groove where the seal ring has to be installed; check if the media in the relevant channel has a positive pressure (relative) or negative (relative).

New lip seal rings have to be installed ensuring they are facing the same way as old seal rings. Install seal rings in accordance with the following table:

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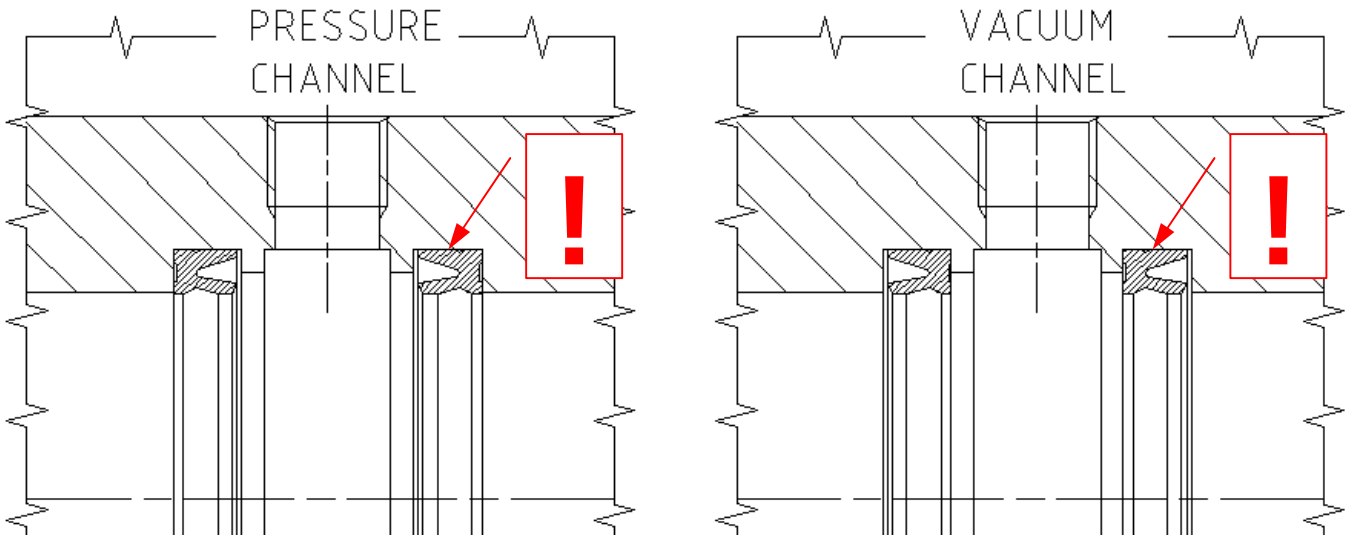
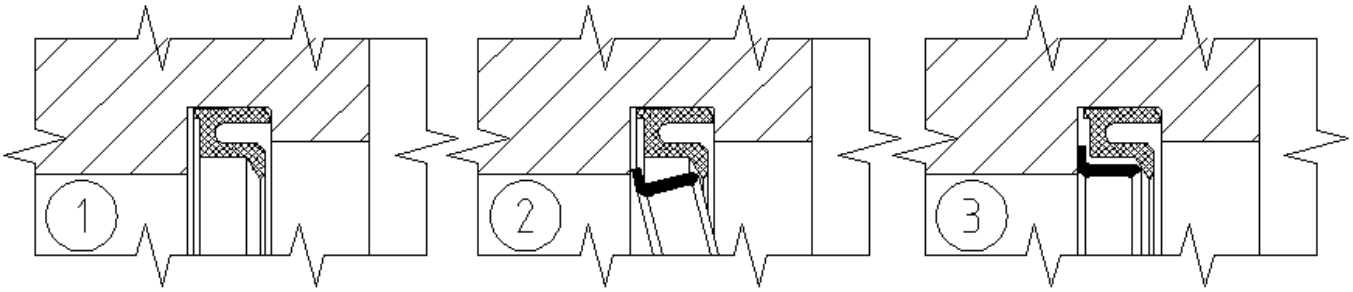


After having checked the lip seal is facing the right direction, check the lip seal is properly seated completely inside its groove.

BI-MATERIAL seal ring

Identify the groove where the seal ring has to be installed.
Install the outer lip as explained above, then install the inner sliding ring fitting the inner surface of lip. See sequence illustrated below.



Check the sliding ring is properly seated completely inside its groove, facing the right direction.

	CAUTION: Carefully check the lip seal and the sliding seal are perfectly clean. No dirt is allowed between them!

	CAUTION: Lip seal gasket are not design to withstand negative pressure!

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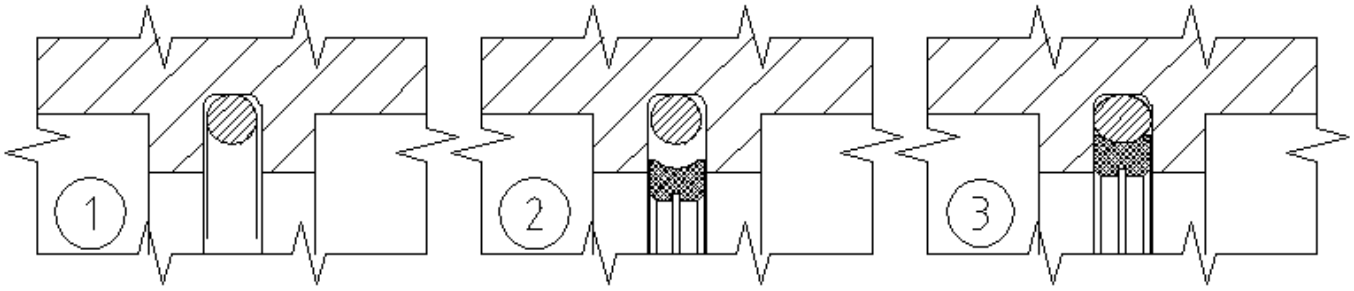
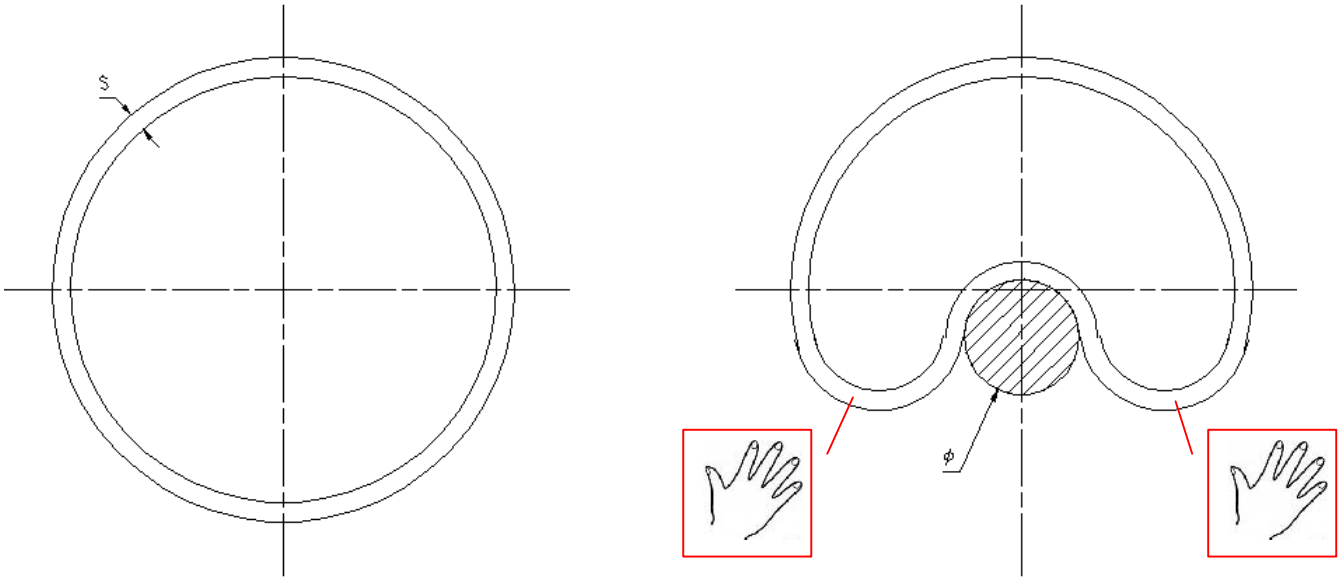
GLYD seal ring

Identify the groove where the seal ring has to be installed.
First install the O-Ring inside the groove; ensure the O-Ring is not twisted.
Then install the inner GLYD ring. See sequence illustrated below.



GLYD seal ring is a double-acting seal, so there is no preferred pressure direction.

NOTE: to re-assemble the GLYD ring we recommend to proceed as indicated in the following picture to create a hump that makes easier to insert the seal into the groove.



To deform the GLYD we suggest to use a cylinder having diameter at least 5 time bigger than seal's thickness (Ø ≥ 5S).

After proper positioning into relevant groove, attenuate the " hump " of the GLYD ring pushing on its inner diameter with clean fingers.

5.2.3. Seal rings replacement: MULTIPLE SECTORS HOUSING

Multiple sectors housing multipassage unions can be easily identified, as it is evident that the housing is composed by many sectors bolted in together. Proceed as explained in the following.

I) Remove multipassage's rotor as explained in the ONE-PIECE HOUSING paragraph.

At this step the housing has to be disassembled into its subcomponents.

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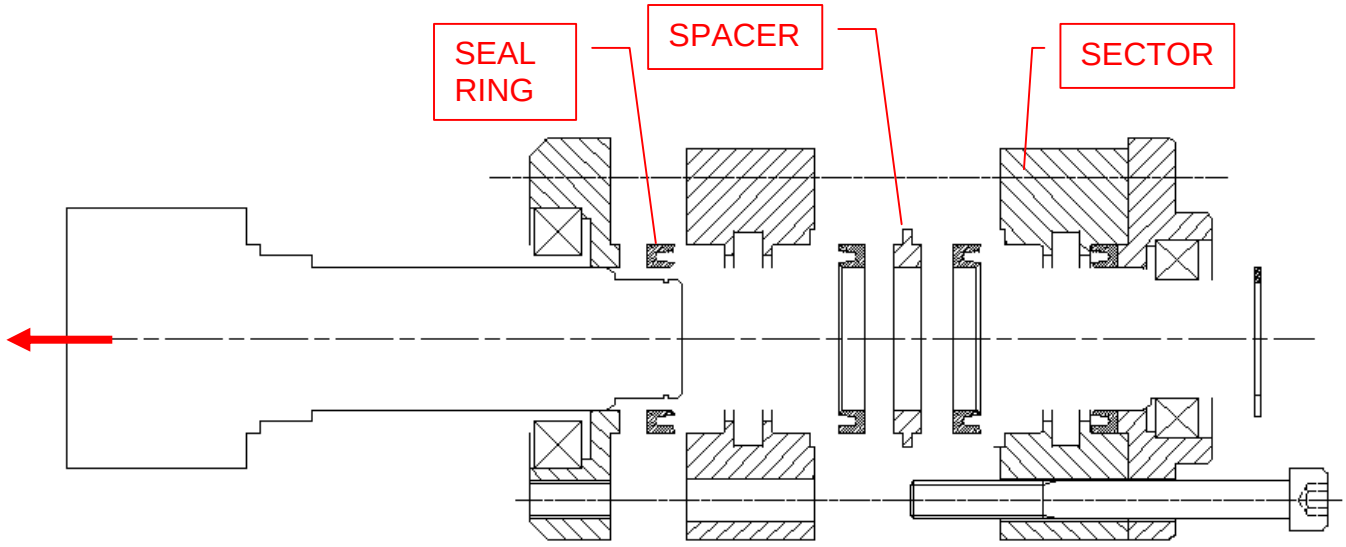
II) Identify and remove the long screws or studs extending through housing's sectors.



III) Remove sectors and spacers from each other.

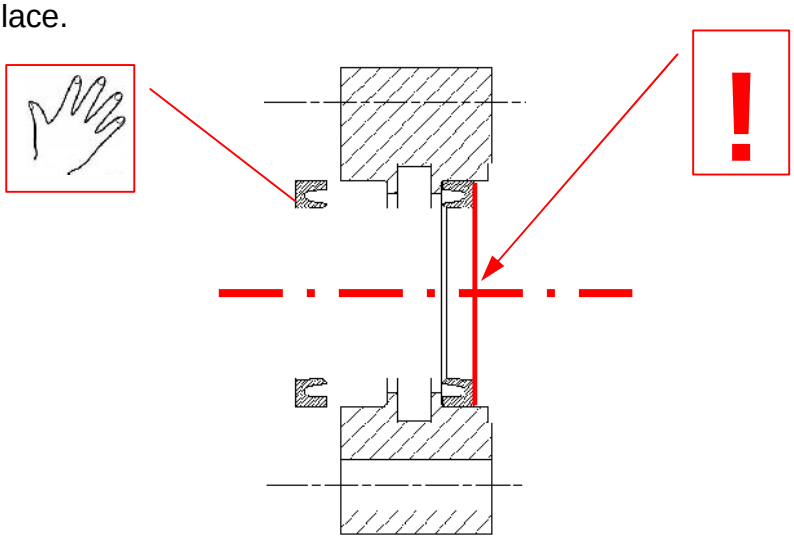
IV) Remove old seal rings from their seats.

V) Carefully clean all subcomponents.

VI) Replace seal rings with new ones.

	CAUTION: Carefully check the lip seal is facing the right direction! See previous paragraph.

NOTE: The seal ring must be installed perfectly perpendicular to the housing's centerline.
If the seal ring is angularly misaligned (*cocked*), the seal itself will be damaged by rotor when it will be slipped into place.



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5.2.4. Multipassage reassembling

After having installed all the seal rings in their seats, aplly a thin layer of grease OKS475.

NOTE: OKS 475 grease is a PTFE based grease classified NSF H2.
Any other greases belonging to the same family are suitable for the purpose.
Also a good silicone based grease having consistency grade NLGI 1 (ASTM 310-340) can be used.

Reassemble the multipassage union making sure that all screws are cleaned and coated with anti seize-compound. Proceed sliding rotor into housing (or housing onto rotor, depending upon the size and type of multipassage). Discard old retaining rings or snap rings and replace them with new ones.

5.3. Spare Parts

Components to repair the union are available in two kit forms:

MPSS-xxxxxxB “Service kit plus” (wearing parts plus structural parts)
MPSS-xxxxxxC “Service Kit” (wearing parts)

CAUTION: Use only genuine Deublin spare parts or Deublin approved standard norm parts for repairs.

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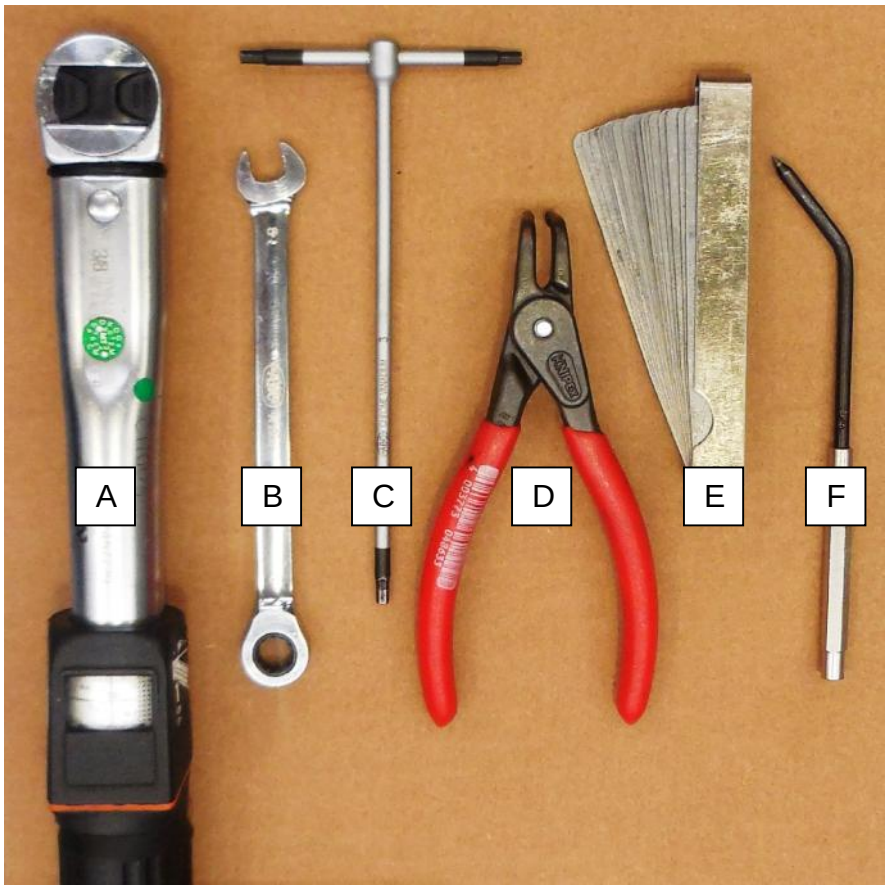
6. TOOLS

A torque wrench is required to apply the correct tightening torque values, as specified on page 6. The wrench's size may vary depending on the multipassage union's size. Identify the exact screws size on the set of drawings.



	TOOL	WHERE USED
A	Torque wrench	
B	Open-end wrench	Hexagonal headed screw
C	Allen key	Socket screw
D	Retaining ring pliers	Retaining ring, rotor
E	Feeler gauge	Parallelism between surfaces
F	Sharpened tool	Seal rings

Some kind of thin and long tool can be useful to remove seal rings from multipassage's housings.

7. HANDLING

Multipassage union's dimensions and weights can be very different from each other. We recommend handling multipassage unions during unpacking and maintenance activities using appropriate lifting equipment.

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8. MEDIA SPECIFICATION ADDENDA

The quality of medias affects multipassage's life.
We recommend to observe the general indications listed below for any specific media.
For any doubts, contact Deublin.

WATER

PH: 6÷8
Particle size: < 30 µm
Hardness: < 220 ppm $CaCO_3$
TDS*: < 500 ppm
(*)=Total Dissolved Solids.

CAUTION: Antifreeze and/or anticorrosion agents can be added to water only after checking compatibility with multipassage's materials.

HYDRAULIC/THERMAL OIL

Particles contamination: ISO 17/15/12* or better
(*)=ISO 11500 classification based on the counting of particles having size ≥4, ≥6, ≥14 µm.
Water contamination: < 0.05 % (< 500ppm)

DRY AIR

Moisture: < 1.7 g/m^3
Particle size: < 0.3 µm
Oil mist: < 1 mg/m^3 (< 0.8 ppm)
Dew point: -14°C÷-23°C (@ atmosferic pressure)
NOTE: "general pneumatic equipment" or "general painting" application.
Quality grade 2,4,3 / 2,5,3 / 2,6,3 (ISO8573-1:2001)

LUBRICATED AIR

Moisture: < 3 g/m^3
Particle size: < 3 µm
Oil mist: ≥ 30 mg/m^3 (≥ 24 ppm)
Dew point: < 6°C (@ atmosferic pressure)
NOTE: "general pneumatic tools" application.
Quality grade 3,-,- (ISO8573-1:2001)

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