ETRON®

BARREL COUPLING NOVOTON®

“NT” & “NTR”

SETTING UP AND MAINTENANCE

INSTRUCTIONS

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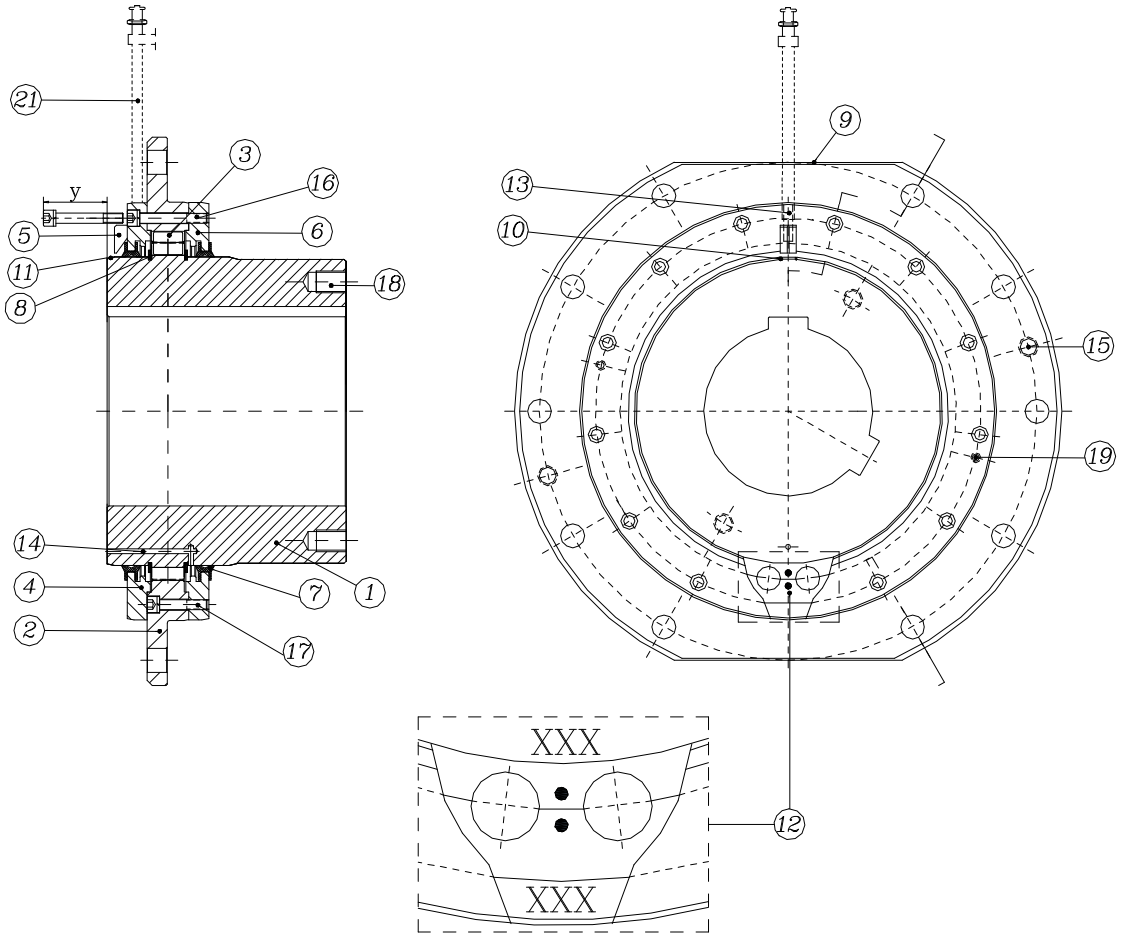
BARREL COUPLING "NT" & "NTR"

SETTING UP AND MAINTENANCE INSTRUCTIONS

0) Design and Part List



1 Hub	8 Retainer ring	15 Flange pulling hole
2 Sleeve-Flange	9 Carrier face	16 External fixing screw
3 Barrel	10 Wear control marks	17 Internal fixing screw
4 External cover	11 Axial adjustment mark	18 Hub pulling hole (for sizes ≥20)
5 Pointer	12 Pair numbers and assembly points	19 Cover pulling hole
6 Internal cover	13 Lubricant filler	21 Lubricant adaptor (only on request)
7 Joint	14 Lubricant overflow hole	

(Fig. 4)

1) Initial considerations

-The barrel coupling is supplied as a whole unity, ready to be mounted, but not provided with lubricant. Therefore, before putting into service it must be lubricated in the required quantity with the appropriate lubricant, as it is indicated at the corresponding paragraph.
-Fixing screws of the coupling to the drum must have a minimum quality 8.8 for NT...models and 10.9 for NTR...models. See values of the tightening torque for the screws quality 8.8 on table Nr.13 and for the quality 10.9 on table Nr.14.

-In case it is necessary to dismantle the coupling supplied (i.e. for the machining of the housing when this one has been supplied in pilot bored condition or for the shrink fit setting-up) it is very important to make sure that when setting it up again the hub and the sleeve-flange pair off without taking place a possible mixture between different unities and it will also have to be done in the same relative position as it was supplied. This is achieved by matching the marked tooth of the hub with the corresponding marked tooth of the sleeve-flange (reference Fig. 4, item 12).
-The bearing-support of the drum at the opposite side of the coupling must absorb the axial efforts generated during the service and must convey them to the structure. If this one suffered a bending deformation, the axial component must not surpass the acceptable maximum axial displacement for the coupling as indicated on table Nr.11. (valid values for coupling supposed angularly aligned).

Table Nr.11.- Max. axial displacement (valid values for coupling supposed angularly aligned)

NT&NTR	2.5	5	7.5	10	13	16	20	30	40	50	60	100	150	260	340	420	620
± mm.	3	3	4	4	4	4	4	4	4	6	6	6	6	6	8	8	8

Table Nr.13.- Tightening torque for screws quality 8.8

Screw	M8	M10	M12	M16	M20	M24
Torque (Nm)	26	51	89	215	420	725

Table Nr.14.- Tightening torque for screws quality 10.9

Screw	M8	M10	M12	M16	M20	M24
Torque (Nm)	37	75	130	310	620	1060

2) Setting-up on the Reducer shaft

Hub-shaft connections by means of keys, splines, etc.

Case a.- Coupling supplied complete finish bored:

-Clean the surfaces of the housing and the shaft.
-Pre-heat the whole coupling by putting it into a bath of hot oil at a temperature which can not exceed 80°C so that the joints are not damaged. The oil of the said bath must not attack those components manufactured with a Nitrile base.
-Mount the hub in the shaft avoiding to bump it.
-Check the free axial displacement of the sleeve-flange.

Case b.-Coupling supplied unbored:

-In this case it is necessary to separate the hub from the rest of coupling parts. (Refer to figure Nr. 4 for Item Nrs.). For specific steps to dismount and mount again, please refer to and apply necessary explanations taken from the next paragraph.

Hub-shaft connection by means of interference without keys

In this case it is necessary to separate the hub from the rest of coupling parts. (Refer to figure Nr. 4 for items Nrs).
-Unfasten screws, item 16, and remove external cover, item 4 together with joint, item 7, on this side.
-Generally if doing in vertical position be aware that sleeve, item 2, together with internal cover, item6, could now fall down so put if necessary some spacers to hold the position.
-**Remove** retainer ring, item 8, on this side towards item 4, being aware that afterwards the space to mount will be, generally, very limited towards the gearbox once the hub is mounted into the shaft. In case expected heating temperature for short period does not exceed 270ºC, it is not necessary to remove this ring from the groove.
-Unfasten screws, item 17, and remove internal cover, item 6, together with joint, item 7, on this side.
-Remove this time retainer ring, item 8, of this side towards item 6.
Generally if doing in vertical position be aware that barrels, item 3, become now free to fall down.
-Now you can remove the barrels, item 3, and then the sleeve, item 2.

-Now you can proceed to heat the hub, item 1, alone or may be, as described above, together with one retainer ring, item 8, mounted in its groove depending on the expected maximum temperature. No matter what the heating method applied is, this one must be progressive along the whole surface, avoiding any localized heating spots. The maximum hub heating temperature must not exceed 320÷350ºC. If higher thermal heat is required it would be necessary to cool the shaft (eventually in liquid nitrogen).
-Before you start mounting the heated hub into the shaft, do not forget to insert and hold carefully in place, to avoid contact with the mentioned hub coming later, the external cover, item 4 with joint item 7, together with screws & washers, item 16 and the retainer ring item 8 (in case it was removed). Check the distance "y" (fig. 4 and table Nr. 5) existing. In case is less, the said screws must come already inserted into the cover.
-Mount the heated hub, item 1, in the shaft until reaching a reference-mark previously set or until the hub face matches the shaft end. At this stage it is crucial to avoid any contact between the hot hub and the joint seal, item 7.
-Before continuing with the procedure, wait until it cools down and reaches room temperature.
-In case it was removed, mount the retainer ring, item 8, on this side towards item 4.
-Mount the corresponding pair sleeve-flange, item 2, over the hub, checking that the matching position reference, item 12, of both is the correct one. (See Fig. 4). It is a good suggestion that the screws & washer, item 17, are coming with the sleeve properly inserted in their place.
-House the barrels, item 3, in their cavities.
-Mount properly in place the retainer ring, item 8, on this side towards item 6.
-Mount the internal cover, item 6, with joint item 7 centered into the sleeve flange, item 2, and fit it by the screws, item 17.
-Mount the external cover, item 4, with joint, item 7, centered into the sleeve flange, item 2, and fit it by the screws, item 16. Be aware that this cover has one specific position in the circle given by the position of wear-index, item 5, to be in the area of wear control marks, item 10, in the hub, item 1. When tightening the mentioned screws, do it first alternatively over opposite positions to guarantee good centered location of cover. Then, tighten, **one by one, all the screws around** to the specified torque according to the corresponding values Nr. 13 or Nr. 14.
-Check the free axial displacement of the sleeve flange.

Table Nr.5.- Gap place for screws item 16

NT&NTR	2.5÷5	7.5÷30	40÷100	150	210÷620
"y"	50	60	70	80	90

Case c.-Coupling supplied as separate parts unmounted and without wear marks item 10 and axial adj. mark, item 11: (How to proceed to assemble the coupling itself).

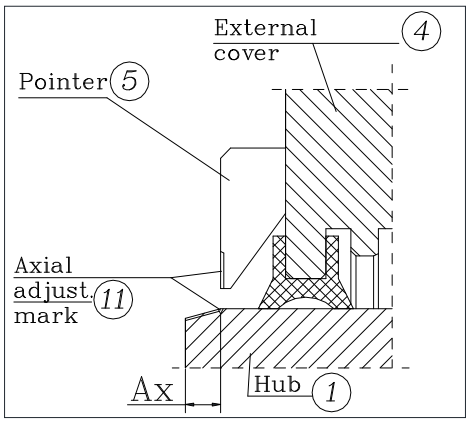
-Refer to fig. Nr. 4 for Item Nrs.
-It is supposed that the hub, item 1, alone will follow the corresponding bore machining, either for keyway, shrink fit, spline…
-Now we proceed to assemble the coupling parts. **If there are several couplings to mount be aware to separate and make pairs with same stamped serial number of hubs item 1 and sleeves item 2.**
-Insert one retainer ring, item 8, into the corresponding groove of the hub, item 1, towards the internal cover item 6.
-Insert the internal cover item 6, with joint, item 7, into the hub item 1. It is recommended to put the cover, around the circle, roughly to the final position to be fitted later to the sleeve, item 2, and external cover, item 4. **Be aware and control that lip seal remains in correct position not strangled.**
-Put the hub, with already inserted parts, vertically over the floor or mounting table, with overflow hole, item 14, face up.
-Insert the selected pair sleeve, item 2, turning around the circle up to the position of coincidence of assembly pair mark, item 12. Put if necessary some spacers to hold the position.
-Insert screw & washers, item 17, and fit them to the internal cover, item 6, centered male-female.
-Insert the barrels, item 3, in the circular toothing gaps between hub and sleeve.
-Insert the second retainer ring, item 8, into the corresponding groove of hub, item 1, towards the external cover, item 4.
-Insert the external cover, item 4, turning around the circle up to the position of coincidence of fitting holes with the sleeve **and being the index, item 5, roughly opposite to the overflow hole, item 14.**
-Fit the external cover, item 4, to the package (sleeve, item 2, + internal cover, item 6), centered male-female by using the screws & washers, item 16. When tightening the mentioned screws, do it first alternatively over opposite positions to guarantee good centered location of cover. Then tighten, **one by one, all the screws around** to the specified torque. **Be aware and control that lip seal remains in correct position not strangled.**

-Now being everything mounted, **take into account that "package"** composed by sleeve and covers is free to move axially a certain value.
-Now it is time to make in the hub, item 1, the axial adj. mark, item 11 (Fig. 8) in a distance "Ax" from the face according to table Nr. 15.1 and the wear marks, item 10, (Fig. 9) in a distance **"m/2"** according to the table Nr. 12, left and right from reference center line in the index, item 5.
Before making the said wear marks, please read carefully the paragraph of **"internal wear of teeth"** in chapter **5) Maintenance**, related to the values "m/2" depending on the application.

3) Axial adjustment and Alignment

Once the coupling has been fixed to the drum flange, its correct axial position is indicated by the coincidence of the face of the index, item 5, with the mark of the hub, item 11 (Fig. 8). At that position (see values "Ax" in the table Nr. 15.1), the setting of the opposite support of the drum to the base is defined. See table Nr. 15.2 for maximum recommended deviation during setting of axial position.
Afterwards, the angle alignment is checked by measuring the gap "X", Fig. 10 at four points with a separation of 90° by using a reference ruler. As an indication, the following maximum difference between the 4 measurements to the height of the external part of the sleeve-flange can be considered as acceptable:

0,3 mm, for sizes ≤ NT-60
0,6 mm, for sizes ≥ NT-100



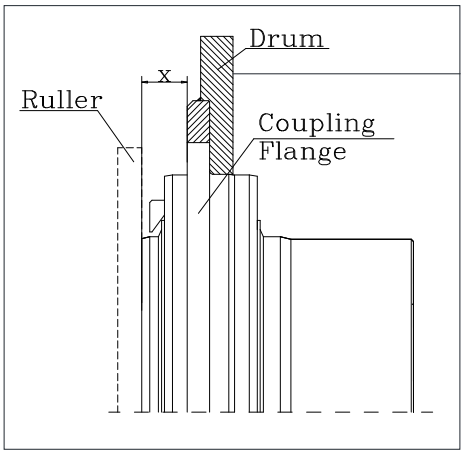
(Fig. 8)

Table Nr.15.1.- Axial adj. mark

NT&NTR	2.5	5	7.5	10	13	16	20	30	40	50	60	100	150	210	260	340	420	620
"Ax"	5	5	5	5	5	5	5	5	9	7	7	7	7	7	7	13	13	13

Table Nr. 15.2-Maximun deviation for axial position setting related to "Ax"

NT&NTR	2.5	5	7.5	10	13	16	20	30	40	50	60	100	150	210	260	340	420	620
± mm.	0,3		0,4							0,6						0,8		



(Fig. 10)

4) Lubrication

Once coupling setting-up has been done and before putting it into service, the internal chamber has to be filled with lubricant, EP2 (Extreme Pressure additive and consistency NLGI-2). The inlet at the external cover, item 13, is suitable for placing a tubular extension item 21 up to the external part of the drum, making access easier to connect a hand pump or a low pressure pneumatic pump. Inlet hole dimension is G1/8" until size 30 included and G1/4" for bigger. As standard execution, position of inlet hole in the cover item 4 is radial up to the size 260 included and in front face for bigger. In practice, lubricant must be fed until this one comes out of the overflow hole, item 14, at the opposite part of the hub. Do the last grease pumping by turning the drum one half revolution.
As an indication, Table Nr. 16 shows the approximate amount depending on the different sizes.
Table Nr. 17 shows certain references of appropriate lubricants for temperatures of -20 and up to 80°C. Please ask for advice if temperatures are out of that range.

Table Nr.16.- Grease quantity

NT&NTR	2.5	5	7.5	10	13	16	20	30	40	50	60	100	150	210	260	340	420	620
dm^3	0,08	0,10	0,12	0,14	0,15	0,17	0,19	0,23	0,45	0,47	0,57	0,72	1,04	1,35	1,32	1,69	2,03	2,26

Table Nr.17.- Greases (-20ºC ÷ +80ºC)

Reference	Producer
CENTOPLEX 2 EP	KLÜBER LUBRICATION
VERKOL EP2	VERKOL, S.A.
AGUILA Nº 850 EP-2	BRUGAROLAS
BP Energrease LS-EP 2	B.P.
SHELL alvania EP-2	SHELL
MOBILUX EP2	MOBIL
BEACON EP2	ESSO
MULTIS EP 2	TOTAL

5) Maintenance

Lubrication periodicity

This depends on the operating conditions which are resumed by the Working Group classification for the machine. See table Nr. 18 for recommended periods.
For its renewal, feed the lubricant through the inlet hole, item 13, ejecting the used lubricant through the overflow hole, item 14. When new lubricant starts being ejected out of this overflow hole it will mean that the operation has been completed. Do the last grease pumping by turning the drum one half revolution.

Table Nr.18.

Working Group			Period to re-grease	
DIN 15020	FEM (1970)	FEM 1.001 (1998) BS466 (1984)	Service hours	Time
1Bm, 1Am, 2m, 3m	IB, IA, II, III	M1, M2, M3, M4, M5, M6	2000	Al least once per year
4m, 5m	IV, V	M7, M8	1000	At least twice per year

Periodical inspections

At least once a year the following checking must be carried out:

-**Tightening of all the screws** up to the recommended values and replacement of the damaged ones.

-Check that carrier faces, item 9, are in a good condition and the contact is correct.

-**Internal wear of the teeth**.- The position of the mark over the index, item 5, in relation to the marks, item 10, over the hub, item 1, Fig. 9, will be an indicator of the state of the flanks wear. When the equipment is new, the pointer mark is centered (case a). When it reaches the limit (case b) the whole coupling has to be replaced.

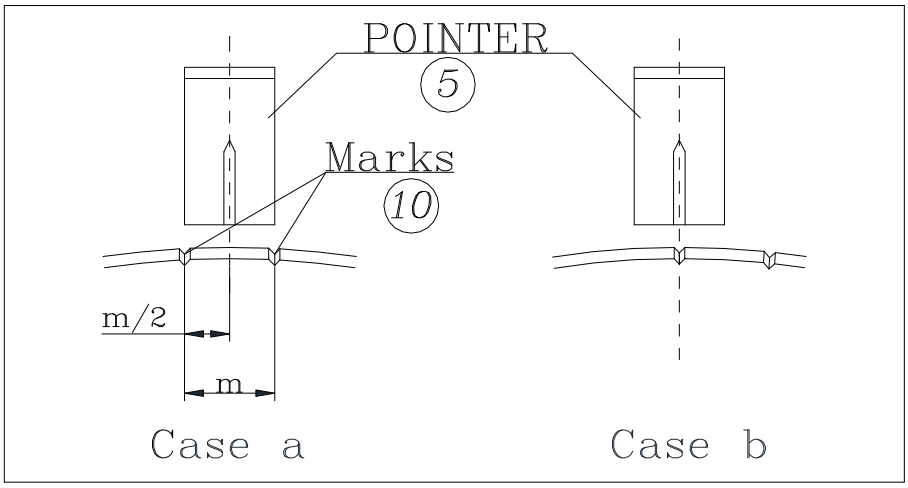
Table Nr. 12 shows the maximum permissible wear values,"m/2", for applications which imply one only sense of loading (typical case of the hoisting in cranes). With applications of reversible loading sense, the amplitude between the marks must be divided by 2. Unless it is expressly asked for, couplings are standardly supplied with the marks according to the aforementioned table and therefore, it is advisable to modify them, if the application requires so, in order to correctly asses the wear evolution.

-**Axial adjustment**-Check the position of index, item 5, according to Fig. 8 and recommendations on chapter 3. If necessary try to readjust up to values in table Nr. 15.2.

-**Seals control.-**If any deterioration appears on the sealing lips, item 7, these ones must be replaced.

Table Nr.12.- Wear control

NT&NTR	2,5	5	7,5	10	13	16	20	30	40	50	60	100	150	210	260	340	420	620
"m/2" (mm)	4	4	4	4	6	6	6	6	6	8	8	8	8	8	8	8	8	8



a) **Between marks → OK** b) **Wear limit**
(Fig. 9)

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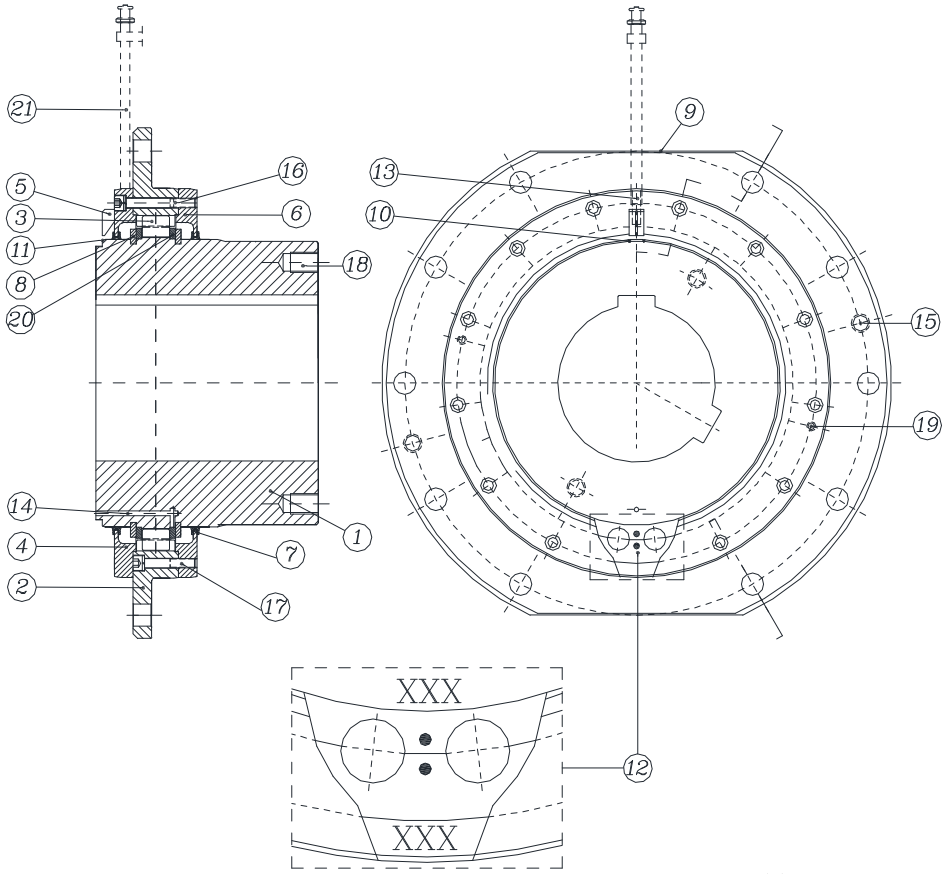
0) Design and Part List



(*) - For sizes >620, only in one side
(**) - Not for sizes >620

1 Hub	8 Retainer ring (*)	15 Flange pulling hole
2 Sleeve-Flange	9 Carrier face	16 External fixing screw
3 Barrel	10 Wear control marks	17 Internal fixing screw (**)
4 External cover	11 Axial adjustment step	18 Hub pulling hole
5 Pointer	12 Pair numbers and assembly points	19 Cover pulling hole
6 Internal cover (**)	13 Lubricant filler	20 Thrust ring (*)
7 Joint	14 Lubricant overflow hole	21 Lubricant adaptor (only on request)

(Fig. 4)

1) Initial considerations

-The barrel coupling is supplied as a whole unity, ready to be mounted, but not provided with lubricant. Therefore, before putting into service it must be lubricated in the required quantity with the appropriate lubricant, as it is indicated at the corresponding paragraph.
-Fixing screws of the coupling to the drum must have a minimum quality 8.8 for NTSG...models and 10.9 for NTRSG...models. See values of the tightening torque for the screws quality 8.8 on table Nr.13 and for the quality 10.9 on table Nr.14.
-In case it is necessary to dismantle the coupling supplied (i.e. for the machining of the housing when this one has been supplied in pilot bored condition or for the shrink fit setting-up) it is very important to make sure that when setting it up again the hub and the sleeve-flange pair off without taking place a possible mixture between different unities and it will also have to be done in the same relative position as it was supplied. This is achieved by matching the marked tooth of the hub with the corresponding marked tooth of the sleeve-flange (reference Fig. 4, item 12).

-The bearing-support of the drum at the opposite side of the coupling must absorb the axial efforts generated during the service and must convey them to the structure. If this one suffered a bending deformation, the axial component must not surpass the acceptable maximum axial displacement for the coupling as indicated on table Nr.11. (valid values for coupling supposed angularly aligned).

Table Nr.11.- Max. axial displacement (valid values for coupling supposed angularly aligned)

												Only NTRSG		
NTSG&NTRSG	20	30	40	50	60	100	150	260	340	420	620	820	920	1020
± mm.	4	4	4	6	6	6	6	6	8	8	8	10	10	10

Table Nr.13.- Tightening torque for screws quality 8.8

Screw	M8	M10	M12	M16	M20	M24
Torque (Nm)	26	51	89	215	420	725

Table Nr.14.- Tightening torque for screws quality 10.9

Screw	M8	M10	M12	M16	M20	M24	M30
Torque (Nm)	37	75	130	310	620	1060	2100

2) Setting-up on the Reducer shaft

Hub-shaft connections by means of keys, splines, etc.

Case a.- Coupling supplied complete finish bored:

-Clean the surfaces of the housing and the shaft.
-Pre-heat the whole coupling by putting it into a bath of hot oil at a temperature which can not exceed 80°C so that the joints are not damaged. The oil of the said bath must not attack those components manufactured with a Nitrile base.
-Mount the hub in the shaft avoiding to bump it.
-Check the free axial displacement of the sleeve-flange.

Case b.-Coupling supplied unbored:

-In this case it is necessary to separate the hub from the rest of coupling parts. (Refer to figure Nr. 4 for Item Nrs.). For specific steps to dismount and mount again, please refer to and apply necessary explanations taken from the next paragraph.

Case b.1.-Hub-shaft connection by means of interference without keys (For sizes ≤ 620)

In this case it is necessary to separate the hub from the rest of coupling parts. (Refer to figure Nr. 4 for items Nrs).
-Unfasten screws, item 16, and remove external cover, item 4 together with joint, item 7, on this side.
-Generally if doing in vertical position be aware that sleeve, item 2, together with internal cover, item6, could now fall down so put if necessary some spacers to hold the position.
-**Remove** retainer ring, item 8, and thrust ring, item20, on this side towards item 4, being aware that afterwards the space to mount will be, generally, very limited towards the gearbox once the hub is mounted into the shaft. In case expected heating temperature for short period does not exceed 270ºC, it is not necessary to remove these rings item 8 and item 20.
-Unfasten screws, item 17, and remove internal cover, item 6, together with joint, item 7, on this side.
-Remove this time retainer ring, item 8, and thrust ring, item 20, of this side towards item 6.
-Now you can remove the sleeve, item 2, upwards or downwards, and then collect the barrels, item 3.
- Now you can proceed to heat the hub, item 1, alone or may be, as described above, together with one retainer ring, item 8, and a thrust ring, item 20, mounted in their position depending on the expected maximum temperature. No matter what the heating method applied is, this one must be progressive along the whole surface, avoiding any localized heating spots. The maximum hub heating temperature must not exceed 320÷350ºC. If higher thermal heat is required it would be necessary to cool the shaft (eventually in liquid nitrogen).
-Before you start mounting the heated hub into the shaft, do not forget to insert and hold carefully in place, to avoid contact with the mentioned hub coming later, the external cover, item 4 with joint item 7, together with screws &

washers, item 16 and the retainer ring item 8 as well as the thrust ring item 20 (in case they were removed). Check the distance "y" (fig. 4 and table Nr. 5) existing. In case is less, the said screws must come already inserted into the cover.
-Mount the heated hub, item 1, in the shaft until reaching a reference-mark previously set or until the hub face matches the shaft end. At this stage it is crucial to avoid any contact between the hot hub and the joint seal, item 7.
-Before continuing with the procedure, wait until it cools down and reaches room temperature.
-In case they were removed, mount the thrust ring, item 20, and the retainer ring, item 8, on this side towards item 4.
-Mount the corresponding pair sleeve-flange, item 2, over the hub, checking that the matching position reference, item 12, of both is the correct one. (See Fig. 4). It is a good suggestion that the screws & washer, item 17, are coming with the sleeve properly inserted in their place.
-House the barrels, item 3, in their cavities.
-Mount properly in place the thrust ring, item 20, and the retainer ring, item 8, on this side towards item 6. When mounting the thrust ring, item 20, be aware that one of its radial holes have to match with the lubricant overflow hole, item 14.
-Mount the internal cover, item 6, with joint item 7 centered into the sleeve flange, item 2, and fit it by the screws, item 17. **Be aware and control that lip seal remains in correct position not strangled.**
-Mount the external cover, item 4, with joint, item 7, centered into the sleeve flange, item 2, and fit it by the screws, item 16. Be aware that this cover has one specific position in the circle given by the position of wear-index, item 5, to be in the area of wear control marks, item 10, in the hub, item 1. When tightening the mentioned screws, do it first alternatively over opposite positions to guarantee good centered location of cover. Then, tighten, **one by one, all the screws around** to the specified torque according to the corresponding values Nr. 13 or Nr. 14. **Be aware and control that lip seal remains in correct position not strangled.**
-Check the free axial displacement of the sleeve flange.

Case b.2.-Hub-shaft connection by means of interference without keys (For sizes ≥ 820)

-Unfasten screws, tem 16, and remove external cover, item 4, together with joint, item 7, on this side.
-Generally if doing in vertical position be aware that sleeve, item 2, could now fall down so put if necessary some spacers to hold the position.
-**Remove** retainer ring, item 8, and thrust ring, item 20, on this side towards item 4, being aware that afterwards the space to mount will be, generally, very limited towards the gearbox once the hub is mounted into the shaft.
-Now you can remove the barrels, item 3, upwards, or let falling down carefully the sleeve, item 2, and the collect the said barrels.
-Now you can proceed to heat the hub, item 1, to the appropriate temperature for its mounting. No matter what the heating method applied is, this one must be progressive along the whole surface, avoiding any localized heating spots. The maximum hub heating temperature must not exceed 320÷350ºC. If higher thermal heat is required it would be necessary to cool the shaft (eventually in liquid nitrogen).
-Before you start mounting the heated hub into the shaft, do not forget to insert and hold carefully in place, to avoid contact with the mentioned hub coming later, the external cover, item 4, with joint, item 7, together with screws & washers, item 16, and the retainer ring, item 8, as well as the thrust ring, item 20 (in case they were removed). Check the distance "y" (fig. 4 and table Nr 5) existing. In case is less, the said screws must come already inserted into the cover.
-Mount the heated hub, item 1, in the shaft until reaching a reference-mark previously set or until the hub face matches the shaft end. At this stage it is crucial to avoid any contact between the hot hub and the joint seal, item 7.
-Before continuing with the procedure, wait until it cools down and reaches room temperature.
-Mount the corresponding pair sleeve-flange, item 2, over the hub checking that the matching position reference, item 12, of both is the correct one (see Fig. 4). **Be aware and control that lip seal remains in correct position not strangled.**
-House the barrels, item 3, in their cavities (in this case the direction to insert them is only from the side of reducer).
-Mount the external cover, item 4, with joint, item 7, centered into the sleeve flange, item 2, and fit it by the screws, item 16. Be aware that this cover has one specific position in the circle given by the position of wear-index, item 5, to be in the area of wear control marks, item 10, in the hub, item 1. When tightening the mentioned screws, do it first alternatively over opposite positions to guarantee good centered location of cover. Then, tighten, **one by one, all the screws around** to the specified torque according to the corresponding values Nr. 13 or Nr. 14. **Be aware and control that lip seal remains in correct position not strangled.**
-Check the free axial displacement of the sleeve flange.

Table Nr.5.- Gap place for screws item 16

					Only NTRSG
NTSG&NTRSG	20÷30	40÷100	150	210÷620	820÷1020
"y"	60	70	80	90	95

Case c.-Coupling supplied as separate parts unmounted and without wear marks item 10: (How to proceed to assemble the coupling itself)

Case c.1.-Coupling sizes ≤ 620

-Refer to fig. Nr. 4 for Item Nrs.
-It is supposed that the hub, item 1, alone will follow the corresponding bore machining, either for keyway, shrink fit, spline…
-Now we proceed to assemble the coupling parts. **If there are several couplings to mount be aware to separate and make pairs with same stamped serial number of hubs item 1 and sleeves item 2.**
-Insert the thrust ring, item 20, located towards the internal cover, item 6. Be aware that one of its radial holes have to match with the lubricant overflow hole, item 14.
-Insert one retainer ring, item 8, into the corresponding groove of the hub, item 1, towards the internal cover item 6.
-Insert the internal cover item 6, with joint, item 7, into the hub item 1. It is recommended to put the cover, around the circle, roughly to the final position to be fitted later to the sleeve, item 2, and external cover, item 4. **Be aware and control that lip seal remains in correct position not strangled.**
-Put the hub, with already inserted parts, vertically over the floor or mounting table, with overflow hole, item 14, face up.
-Insert the selected pair sleeve, item 2, turning around the circle up to the position of coincidence of assembly pair mark, item 12. Put if necessary some spacers to hold the position.
-Insert screw & washers, item 17, and fit them to the internal cover, item 6, centered male-female.
-Insert the barrels, item 3, in the circular toothing gaps between hub and sleeve.
-Insert the second thrust ring, item 20, and the second retainer ring, item 8, into the corresponding groove of hub, item 1, towards the external cover, item 4.
-Insert the external cover, item 4, with his seal, item 7, turning around the circle up to the position of coincidence of fitting holes with the sleeve **and being the index, item 5, roughly opposite to the overflow hole, item 14.**
-Fit the external cover, item 4, to the package (sleeve, item 2, + internal cover, item 6), centered male-female by using the screws & washers, item 16. When tightening the mentioned screws, do it first alternatively over opposite positions to guarantee good centered location of cover. Then tighten, **one by one, all the screws around** to the specified torque. **Be aware and control that lip seal remains in correct position not strangled.**
-Now being everything mounted, **take into account that "package"** composed by sleeve and covers is free to move axially a certain value.
-Now it is time to make in the hub, item 1, the wear marks, item 10, (Fig. 9) in a distance **"m/2"** according to the table Nr. 12, left and right from reference center line in the index, item 5.
Before making the said wear marks, please read carefully the paragraph of **"internal wear of teeth"** in chapter **5) Maintenance**, related to the values "m/2" depending on the application.

Case c.2-Coupling sizes ≥ 820

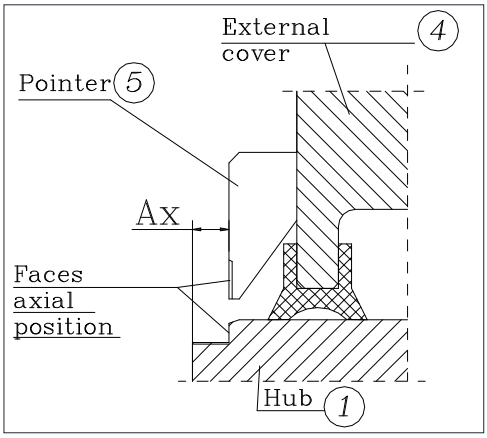
-Refer to fig Nr 4 for Item Nrs.
-It is supposed that the hub, item 1, alone will follow the corresponding bore machining, either for keyway, shrink fit, spline...
-Now we proceed to assemble the coupling parts. **If there are several couplings to mount be aware to separate and make pairs with same stamped serial number of hubs, item 1, and sleeves, item 2.**
-To continue mounting, it is suggested to put vertically the hub, item 1, and the sleeve-flange, item 2, over the floor or mounting table with overflow hole, item 14, face up.
-Insert the selected pair sleeve, item 2, together with his joint, item 7, into the hub, item 1, turning around the circle up to the position of coincidence of assembly pair mark, item 12. **Be aware and control that lip seal remains in correct position not strangled.** Put if necessary some spacers to hold the position.
-Insert the barrels, item 3, in the circular toothing gaps between hub, item 1, and sleeve, item 2.
-Insert the thrust ring, item 20, up to contact with hub's teeth.

-Insert the retainer ring, item 8, in he corresponding groove of hub, item 1, towards the external cover, item 4.
-Insert the external cover, item 4, with his seal, item 7, turning around the circle up to the position of coincidence of fitting holes with the sleeve **and being the index, item 5, roughly opposite to the overflow hole, item 14.**
-Fit the external cover, item 4, to the sleeve, item 2, centered male female by using the screws & washers, item 16. When tightening the mentioned screws, do it first alternatively over opposite positions to guarantee good centered location of cover. Then tighten, **one by one, all the screws around** to the specified torque. **Be aware and control that lip seal remains in correct position not strangled.**
-Now being everything mounted, **take into account that "package"** composed by sleeve, item 2, and external cover, item 4, is free to move axially a certain value.
-Now it is time to make in the hub, item 1, the wear marks, item 10, (Fig. 9) in a distance **"m/2"** according to the table Nr. 12, left and right from refrence center line in the index, item 5.

3) Axial adjustment and Alignment

Once the coupling has been fixed to the drum flange, its correct axial position is indicated by the coincidence of the face of the index, item 5, with the step face of the hub, item 11 (Fig. 8). At that position (see values "Ax" in the table Nr. 15.1), the setting of the opposite support of the drum to the base is defined. See table Nr. 15.2 for maximum recommended deviation during setting of axial position.
Afterwards, the angle alignment is checked by measuring the gap "X", Fig. 10 at four points with a separation of 90° by using a reference ruler. As an indication, the following maximum difference between the 4 measurements to the height of the external part of the sleeve-flange can be considered as acceptable:

0,3 mm, for sizes ≤ NTSG/NTRSG-60
0,6 mm, for sizes ≥ NTSG/NTRSG-100 and ≤ NTSG/NTRSG-620
0,8 mm, for sizes ≥ NTRSG-820



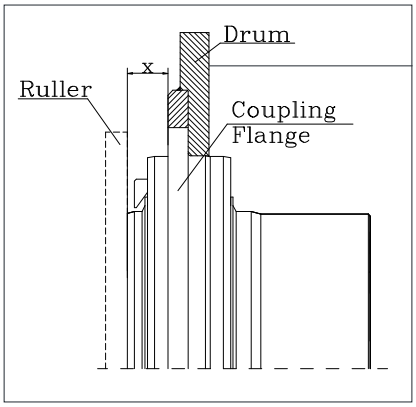
(Fig. 8)

Table Nr.15.1.- Axial adj. step

													Only NTRSG		
NTSG&NTRSG	20	30	40	50	60	100	150	210	260	340	420	620	820	920	1020
"Ax"	4	5	9	7	7	7	7	6	6	10	10	10	10	10	10

Table Nr. 15.2-Maximun deviation for axial position setting related to "Ax"

													Only NTRSG		
NTSG&NTRSG	20	30	40	50	60	100	150	210	260	340	420	620	820	920	1020
± mm.	0,4			0,6						0,8			0,8		



(Fig. 10)

4) Lubrication

Once coupling setting-up has been done and before putting it into service, the internal chamber has to be filled with lubricant, EP2 (Extreme Pressure additive and consistency NLGI-2). The inlet at the external cover, item 13, is suitable for placing a tubular extension item 21 up to the external part of the drum, making access easier to connect a hand pump or a low pressure pneumatic pump. Inlet hole dimension is G1/8" until size 30 included and G1/4" for bigger. As standard execution, position of inlet hole in the cover item 4 is radial up to the size 260 included and in front face for bigger. In practice, lubricant must be fed until this one comes out of the overflow hole, item 14, at the opposite part of the hub. Do the last grease pumping by turning the drum one half revolution.
As an indication, Table Nr. 16 shows the approximate amount depending on the different sizes.
Table Nr. 17 shows certain references of appropriate lubricants for temperatures of -20 and up to 80°C. Please ask for advice if temperatures are out of that range.

Table Nr.16.- Grease quantity

													Only NTRSG		
NTSG&NTRSG	20	30	40	50	60	100	150	210	260	340	420	620	820	920	1020
dm³	0,26	0,27	0,39	0,75	0,77	0,82	0,88	1,57	1,43	1,69	2,58	2,33	2,14	2,38	2,70

Table Nr.17.- Greases (-20ºC ÷ +80ºC)

Reference	Producer
CENTOPLEX 2 EP	KLÜBER LUBRICATION
VERKOL EP2	VERKOL, S.A.
AGUILA Nº 850 EP-2	BRUGAROLAS
BP Energrease LS-EP 2	B.P.
SHELL alvania EP-2	SHELL
MOBILUX EP2	MOBIL
BEACON EP2	ESSO
MULTIS EP 2	TOTAL

5) Maintenance

Lubrication periodicity

This depends on the operating conditions which are resumed by the Working Group classification for the machine. See table Nr. 18 for recommended periods.
For its renewal, feed the lubricant through the inlet hole, item 13, ejecting the used lubricant through the overflow hole, item 14. When new lubricant starts being ejected out of this overflow hole it will mean that the operation has been completed. Do the last grease pumping by turning the drum one half revolution.

Table Nr.18.

Working Group			Period to re-grease	
DIN 15020	FEM (1970)	FEM 1.001 (1998) BS466 (1984)	Service hours	Time
1Bm, 1Am, 2m, 3m	IB, IA, II, III	M1, M2, M3, M4, M5, M6	2000	Al least once per year
4m, 5m	IV, V	M7, M8	1000	At least twice per year

Periodical inspections

At least once a year the following checking must be carried out:

-**Tightening of all the screws** up to the recommended values and replacement of the damaged ones.

-Check that carrier faces, item 9, are in a good condition and the contact is correct.

-**Internal wear of the teeth**.- The position of the mark over the index, item 5, in relation to the marks, item 10, over the hub, item 1, Fig. 9, will be an indicator of the state of the flanks wear. When the equipment is new, the pointer mark is centered (case a). When it reaches the limit (case b) the whole coupling has to be replaced.

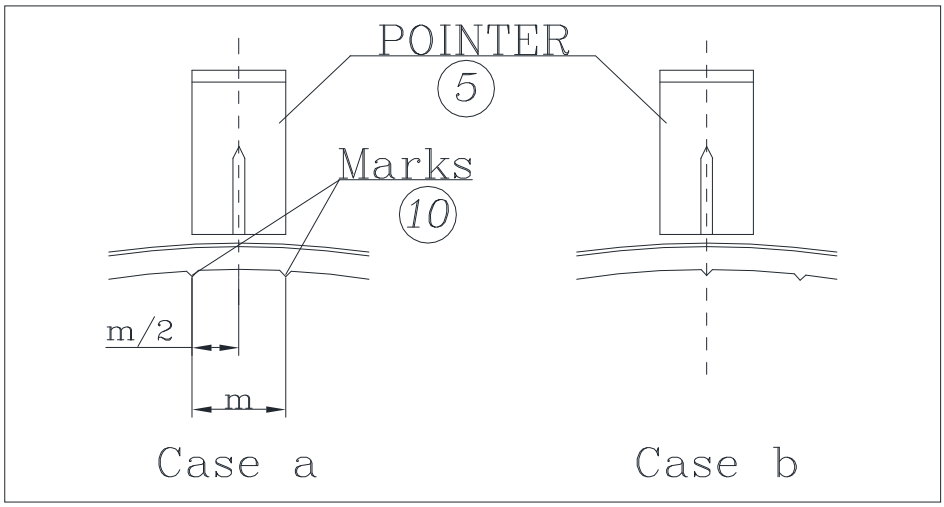
Table Nr. 12 shows the maximum permissible wear values,"m/2", for applications which imply one only sense of loading (typical case of the hoisting in cranes). With applications of reversible loading sense, the amplitude between the marks must be divided by 2. Unless it is expressly asked for, couplings are standardly supplied with the marks according to the aforementioned table and therefore, it is advisable to modify them, if the application requires so, in order to correctly asses the wear evolution.

-**Axial adjustment**-Check the position of index, item 5, according to Fig. 8 and recommendations on chapter 3. If necessary try to readjust up to values in table Nr. 15.2.

-**Seals control.-**If any deterioration appears on the sealing lips, item 7, these ones must be replaced.

Table Nr.12.- Wear control

NTSG&NTRSG	20	30	40	50	60	100	150	210	260	340	420	620	820	920	1020
"m/2" (mm)	6	6	6	8	8	8	8	8	8	8	8	8	8	10	10



a) **Between marks → OK** b) **Wear limit**
(Fig. 9)