8.5 Procedure to adjust bearings both in "X" and "O" position

INTERNAL ADJUSTMENT

CONICO
CONICO

[CONICAL – CONICAL
ALWAYS USE THE PRELOADING OF THE SMALLER BEARING]

TABLE N°1   LOADS TO BE APPLIED TO CONICAL BEARINGS DURING CONICAL-CONICAL ASSEMBLY

BEAR.	Kgcm.	BEAR.	Kgcm.
30.205	1.5÷5.5	30.305	3÷7
30.206	2.5÷6.5	30.306	5÷9
30.207	4÷8	30.307	6÷10
30.208	5÷9	30.308	8÷12
30.209	5÷9	30.309	11÷17
30.210	6÷10	30.310	14÷21
30.211	9÷14	30.311	18÷27
30.212	11÷17	30.312	24÷36
30.213	13.5÷20		
30.214	14÷21		
30.215	17÷26		
30.217	25÷35		

BEAR.	Kgcm.	BEAR.	Kgcm.
31.307	2÷6	32.005	1÷5
31.308	3÷7	32.007	2.5÷6.5
31.309	4÷8	32.008	4÷8
31.310	5÷9	32.009	4.5÷8.5
31.311	7÷11	32.010	5÷9
		32.011	7.5÷11.5
		32.012	8÷12
		32.013	8÷12
		32.018	23÷27

BEAR.	Kgcm.	BEAR.	Kgcm.
32.206	2.5÷6.5	32.307	9÷14
32.207	5÷9	32.308	11÷17
32.208	6÷10	32.309	15÷23
32.209	7÷11	32.310	20÷30
32.210	7÷11	32.311	25÷38
32.211	11÷17	32.312	31÷46
32.212	14÷21		
32.214	14÷21	33.110	6÷10
32.217	30÷45	33.209	9÷13
		33.212	14÷21

CONICO
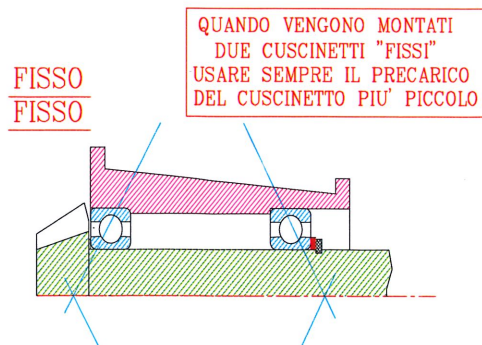FISSO

USARE IL PRECARICO
DEL CUSCINETTO FISSO

[CONICAL – FIXED
USE THE PRELOADING OF THE FIXED BEARING]

TABLE N°2   LOADS TO BE APPLIED TO FIXED BEARINGS WHEN COUPLED WITH CONICAL
BEARINGS

BEAR.	Kgcm.	BEAR.	Kgcm.
6204	0,3 ÷ 3,0	6305	0.7 ÷ 3.5
6205	0.4 ÷ 3.5	6306	1.0 ÷ 4
6206	0.7 ÷ 3.5	6307	2.5 ÷ 5
6207	1.0 ÷ 4	6308	1.8 ÷ 6
6208	1.2 ÷ 4.5	6309	2.7 ÷ 8.0
6209	1.5 ÷ 4.5	6310	3.5 ÷ 10.0
6210	1.7 ÷ 5.0	6311	4.3 ÷ 12.8
6211	2.3 ÷ 7.0	6312	5.4 ÷ 15.9
6212	2.8 ÷ 8.0	6313	6.4 ÷ 19.0
6213	3.5 ÷ 10.0	6314	7.8 ÷ 23.0
6214	4.0 ÷ 12.0		
6215	4.5 ÷ 13.5		

FISSO
FISSO

QUANDO VENGONO MONTATI
DUE CUSCINETTI "FISSI"
USARE SEMPRE IL PRECARICO
DEL CUSCINETTO PIU' PICCOLO

[FIXED - FIXED
WHEN TWO FIXED BEARINGS ARE ASSEMBLED, ALWAYS USE THE PRELOADING OF THE SMALLER
BEARING]

That is: BALL BEARINGS
6011-6012-6013-6014
6207-6208-6209-6210-6211-6212-6213-6214
6306-6307-6308-6309-6310-6311-6312-6313-6314
6404-6405-6406-6407-6048-6409-6410-6411-6412-6413-6414

ALL TAPER ROLLER BEARINGS
Excluding: 30302-30303

Both with caps and snap ring.

EXTERNAL ADJUSTMENT
(BEARINGS IN "X" POSITION)
FIXED - FIXED

In case of external adjustment with two fixed bearings on the same axis, bearings <u>shall not be preloaded</u>, but they shall be adjusted from:

PRELOADING = 0   ÷   PLAY 0.2 mm.
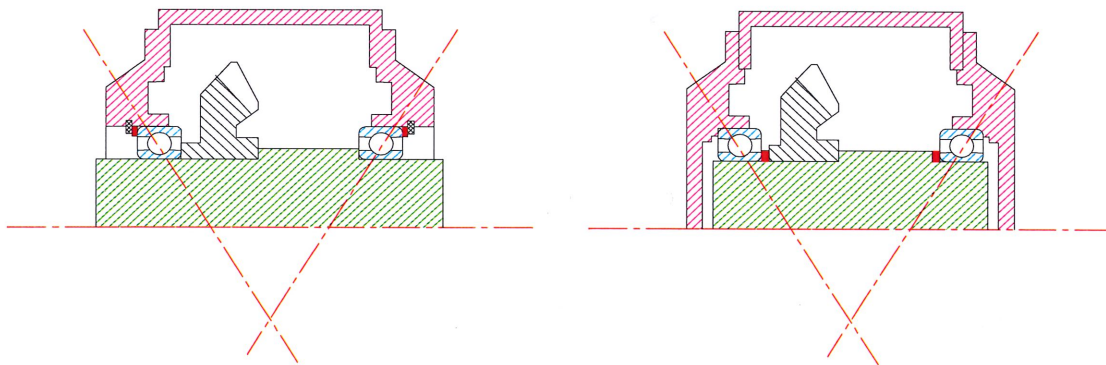
Operational procedure to adjust bearings both in "X" and "O" position

1. Before closing the cap with a snap ring or an adjustment ring nut, check the driving force (friction, grommets, etc…)

2. Close the cap with the snap ring or tighten the adjustment ring nut until reaching a value higher than required

3. Adjust so as to find the conditions in which bearings are most free

4. Check the preloading value, taking driving force into account

TABLE N°3 LOADS TO BE APPLIED TO FIXED BEARINGS IN A FIXED-FIXED ASSEMBLY

BEAR.	Kgcm.	BEAR.	Kgcm.
6007	0 ÷ 3.0	6305	0 ÷ 3.0
6205	0 ÷ 3.0	6306	0 ÷ 3.0
6206	0 ÷ 3.0	6307	0 ÷ 4.0
6207	0 ÷ 3.0	6308	0 ÷ 5.5
6208	0 ÷ 3.5	6309	0 ÷ 8.0
6209	0 ÷ 4.5	6310	0 ÷ 10.0
6210	0 ÷ 5.0	6311	0 ÷ 12.8
6211	0 ÷ 7.0	6312	0 ÷ 15.9
6212	0 ÷ 8.0	6313	0 ÷ 19.0
6213	0 ÷ 10.0	6314	0 ÷ 23.0
6214	0 ÷ 12.0		
6215	0 ÷ 13.5		

External adjustment
(Bearings in "X" position)

An external adjustment is recognizable, because it involves the bearing outer rings. Adjustment consists in drawing bearing outer rings closer to each other by using snap rings for external use or covers.

Conical bearings are assembled with a rotation of 180° compared to the internal adjustment.

In case of combination of CONICAL – CONICAL, CONICAL-FIXED bearings, the preloading to be considered for assembly is ALWAYS THE SAME, even though bearings of different sizes are used.

PRELOADING   0 ÷ 3 Kg*cm
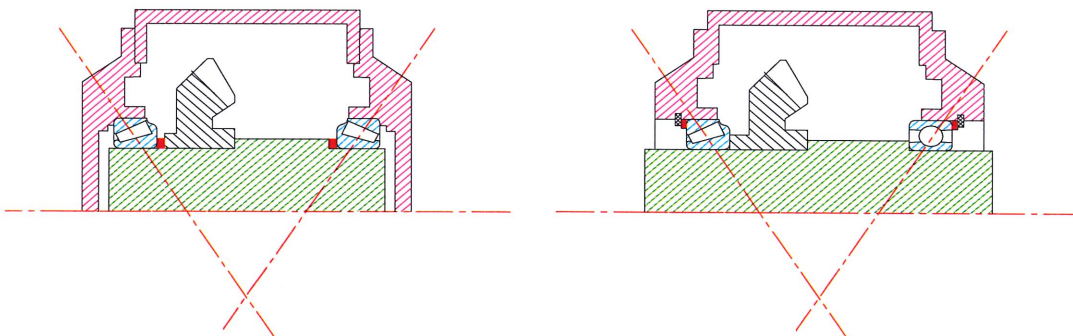
Exception to the above general rule :

- KEEP FROM "1" TO "7" KGCM

Only for the following families:
139 –140 –144 –149 –151 –190 –200 –220 –262 –267 –268 –290 –304 -310 –311-312 –317
Only if step 1 of the bearing adjustment procedure does not exceed 10 Kgcm
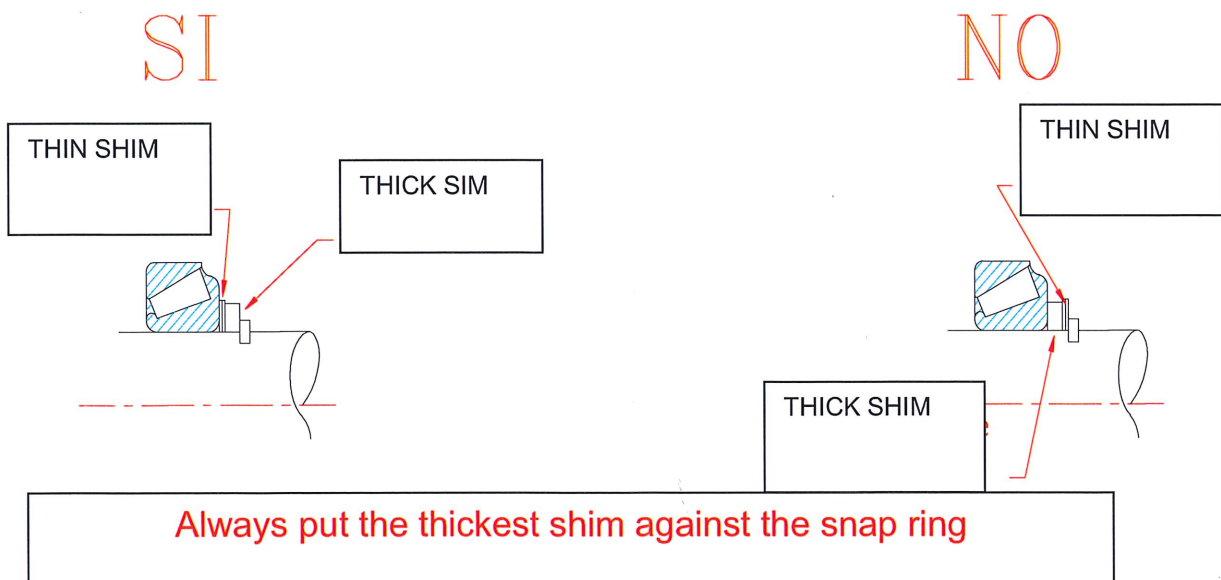Only if the axle involved rotates until 1000rpm MAX
Only when the extension axle is an integral part of the case
Only bearings with dynamic load coefficient exceeding 19600 n

- If the measured value is equal to the driving force: add shims

- If it exceeds by 1 Kgcm the table maximum value: it is acceptable

- If it exceeds by 2 Kgcm the table maximum value:
  remove 0.05 mm if possible, otherwise 0.1 mm

    - If you are adjusting with a crushing ring nut, keep the table values

8.6 Adjustment with standard or reinforced snap ring

- Put the two bearings into their seats
- Put closing shims
- Put snap ring
- Adjust on both sides so as to find the point where bearings are most free
- Check preloading with a torque-meter
- Repeat the sequence, adding or removing shims, until you obtain the required pre-loading

SI

NO

THIN SHIM

THICK SIM

THIN SHIM

THICK SHIM

Always put the thickest shim against the snap ring

8.7 Adjustment with crushing ring nut

- Put Loctite on the ring nut
- Screw the ring nut until preloading exceeds the maximum required
- Adjust on both sides so as to find the point where bearings are most free
- Check preloading with the torque-meter
- If the measured value exceeds the required one, gradually loosen adjusting on both sides, till you obtain the required preloading
- Check with the torque-meter
- Crush the ring nut without cracking it until you rich the bottom of the slot
- Remove any exceeding Loctite with a rag
- Check that crushing has taken place by painting it green

Note. If there are two operators, crushing has to be checked by the person who has not carried out the operation.

## CRUSHING RING NUTS MUST ALWAYS BE ASSEMBLED WITH LOCTITE "STRONG 270"
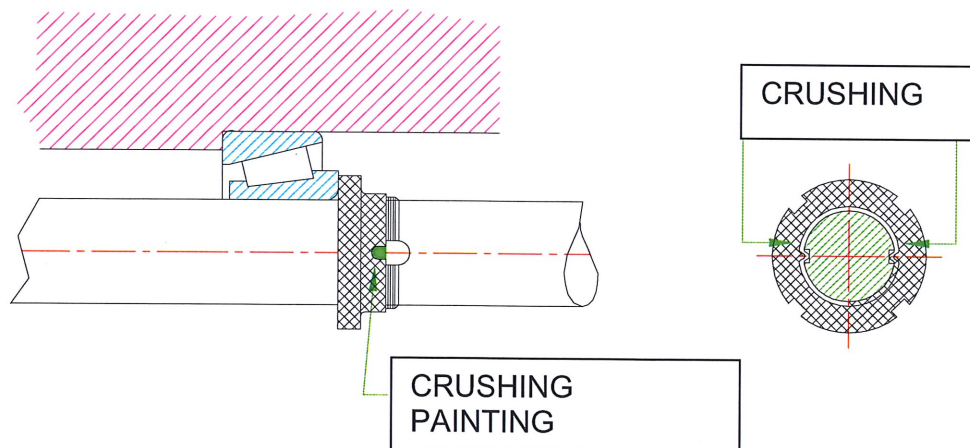
8.8 Adjustment with ring nut and washer

- Insert the washer with the anti-rotation tongue in the slot
- Put Loctite on the ring nut
- Screw the <u>ring nut with the chamfered part toward the washer</u> till preloading exceeds the maximum required
- The key for ring nut must not lean on the washer. IMPERATIVE!
- Adjust on both sides so as to find the point where bearings are most free
- Check preloading with the torque-meter
- If the measured value exceeds the required one, gradually loosen adjusting on both sides, till the required preloading is attained
- Rivet the washer tongue corresponding to one of the 4 millings on the ring nut
- Remove any exceeding Loctite with a rag
- Check that the washer tongue is riveted on the ring nut and paint it green

Note. If there are two operators, the tongue must be checked and painted by the one who has not carried out the operation.

ALWAYS ASSEMBLE RING NUTS WITH WASHER USING LOCTITE "STRONG 270"

CHECK AND PAINT THE RIVETED TONGUE

THE CHAMFERED PART MUST BE AGAINST THE WASHER
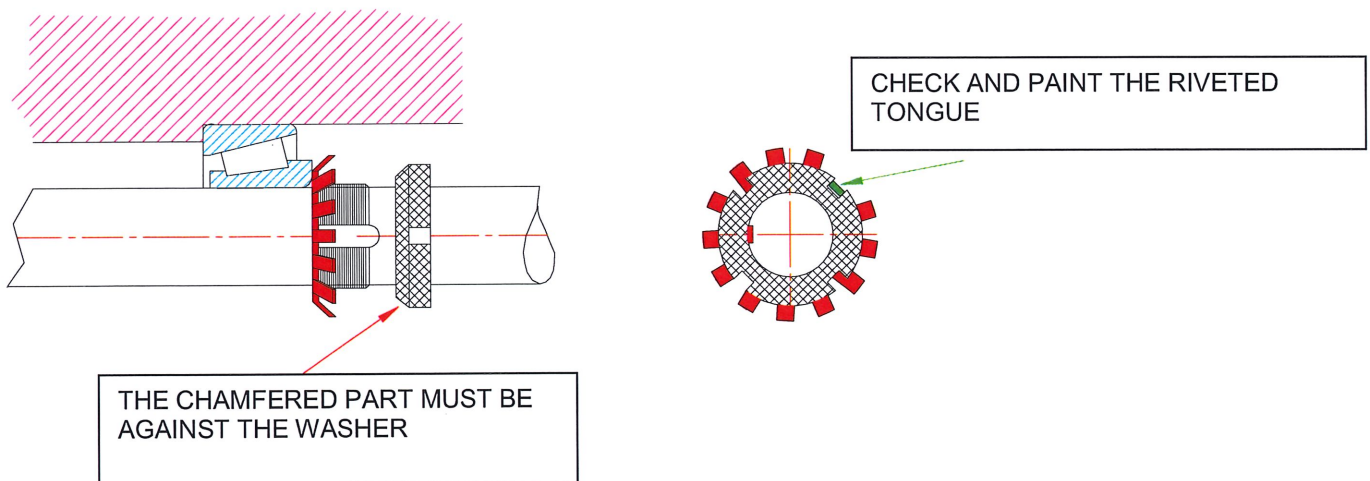
8.9 Adjustment with engraved nut and cotter

- Screw the engraved nut until preloading exceeds the maximum required
- Adjust on both sides so as to find the point where bearings are most free
- Check preloading with the torque-meter
- If the measured value exceeds the required one, gradually loosen, adjusting on both sides, until the required preloading is attained
- Insert the cotter
- Draw the engraved nut close to the cotter while unscrewing
- Adjust on the engraved nut side
- Check that preloading still falls within the required range
- Open the cotter
- Check cotter opening and paint the riveted tongue green

Note. If there are two operators, cotter opening has to be checked and painted by the person who has not carried out the operation.

THE ENGRAVED NUT WITH CUTTER <u>SHALL NOT BE ASSEMBLED</u> WITH LOCTITE.

Draw the ring nut close while unscrewing as last operation

Check and paint the cotter opening
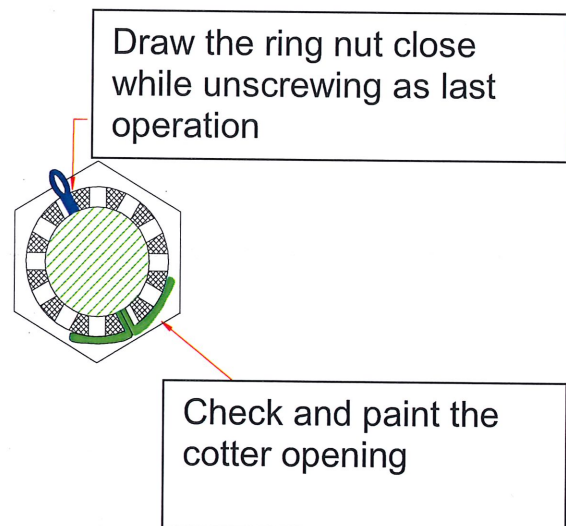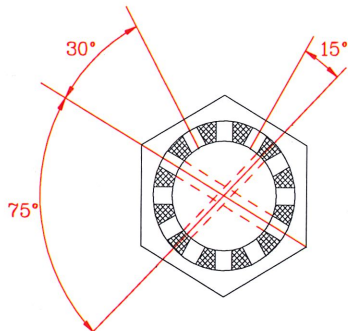
9. End-play or rotating shaft preloading

End-play or rotating shaft preloading on 2 or more bearings must be as set out in attachments 1 and 2 of this NSQ.