



### FROM THE TOP SIDE

Take off the 044 top cover. Unscrew the 042 nut, extract the 042a washer and unscrew the 313 proximity. Remove the 046 a washers, extract the 200 electromagnet, extract the 017 lock and its 047 springs.

### FROM THE TWO SIDES

Unscrew the 019 covers from the two sides, extract the 018 shock absorbing pins provided with the 032 pads.

### FROM THE REAR SIDE

Remove the 011 cover, untighten the 067a screws and the 067 holder, extract the 160 encoder, pay attention to the nut, take off the 303 circlip.

### FROM THE FRONT SIDE

Take off the toolholder disc, untighten the screws 305, take off the dowels 306, extract the entire central body composed by 003 mobile ring gear, 002 fixed ring gear, 005 indexing head, 006 roller carrier set, 007 helicoidal wheel. If dismantling this gear set too, were necessary, take off the 020 circlip, the 030 stepbush, the 319 gaskets, take off the screws 331 and the dowels 332, take off the 463 circlip, the 025 spacer, the 307 Belleville washers, the 026 washer and the 023 roller cage.

### FROM THE MOTOR SIDE

Untighten the screws 321 which fix the 150 motor, take off the 320 O-ring.  
Disconnect the cables of the terminal block on the top side of the turret. Thus take off the turret motor.  
Unscrew the 468 ring nut, extract the 015 gear wheel, take off the 461 circlip, extract the 462 worm screw and the 469 cushion pad.

#### NOTE:

whenever the turret is disassembled check the state of the following elements which will have to be replaced in case of a negative result:

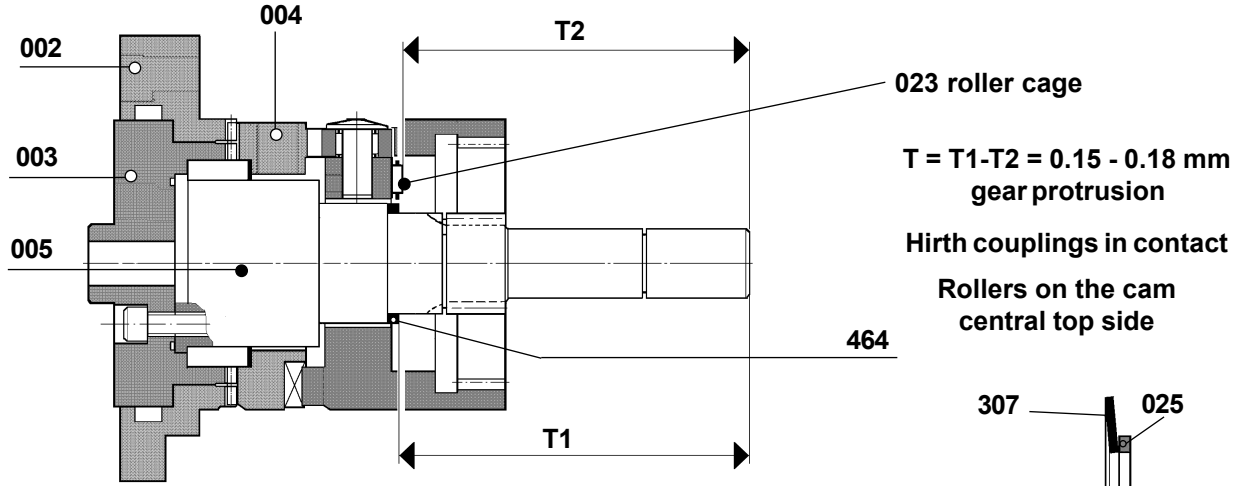
- 308 principal gasket
- all the grommets type O-ring
- 032 cushioning pads

and the following elements (only when the central body has been completely disassembled):

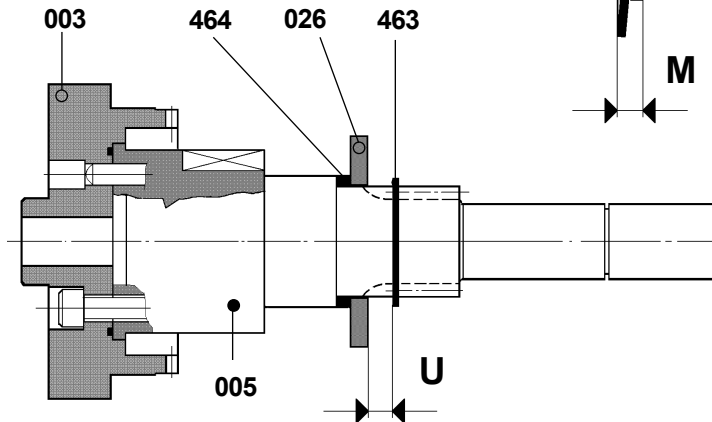
- cam surface
- rollers
- Hirth coupling
- all gears
- supporting plate of the 003 ring gear with the 002 one
- 007 helicoidal wheel
- 462 worm screw



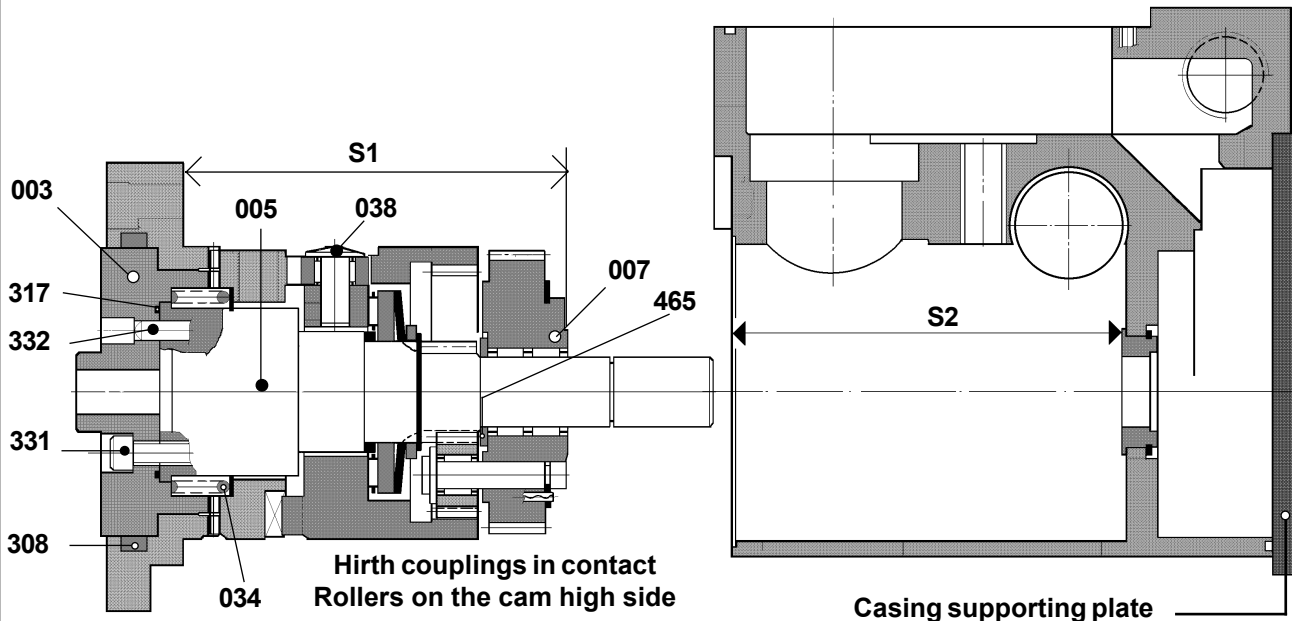
If one of the particular elements of the central body is replaced, before assembling it again, the values T and U, which determine the right load of the spring 307, will have to be checked and set up:  
- assemble the elements as shown in the picture with the Hirth couplings touching, and the rollers on the cam top side. Make sure that the value T is between 0.15 - 0.18 mm. If it is not, grind new 464 spacer so that the recommended values include the T one.



- assemble the elements as shown in the picture; measure the U and M values, calculate the value M according to the following formula:  $M = U - (0.65 - T)$  a value previously calculated), in case it is not grind the 025 spacer so that the recommended values include the M one.



In case of replacement of the 007 helicoidal wheel and/or 465 spacer: assemble the elements as shown in the picture, check if the S value is included in the values  $S = S2 - S1 = 0.2 - 0.3$  mm. If it is not, grind the 465 spacer; if there is a higher value, shim with washers.

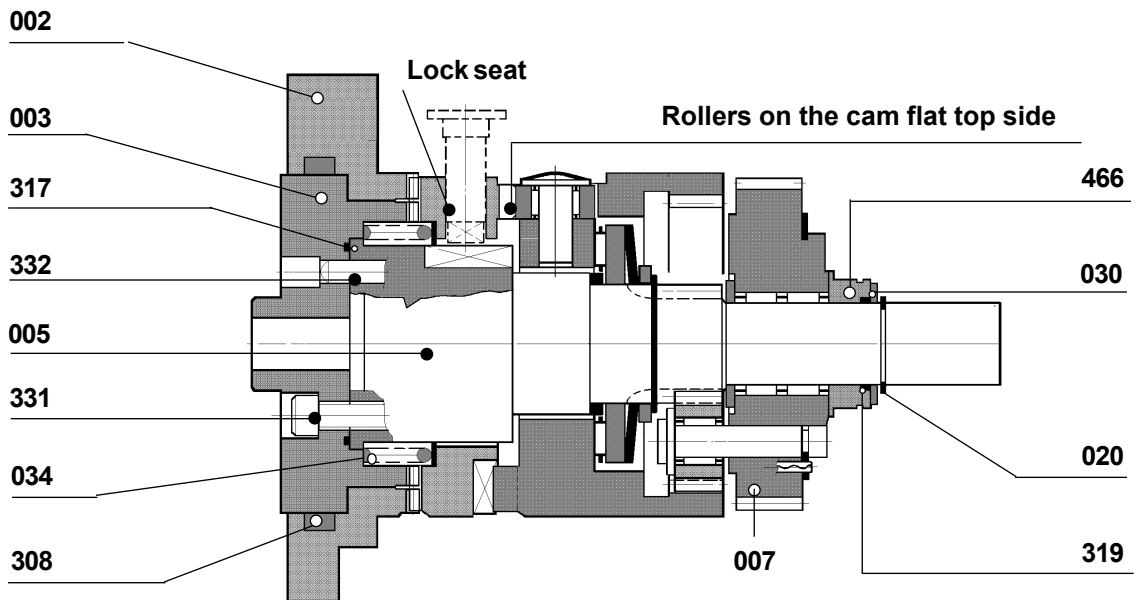
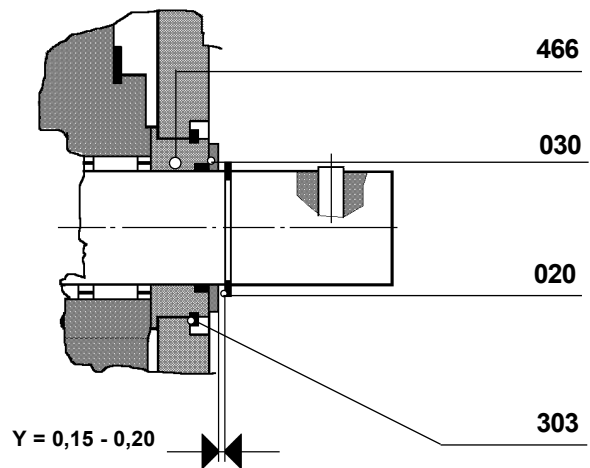




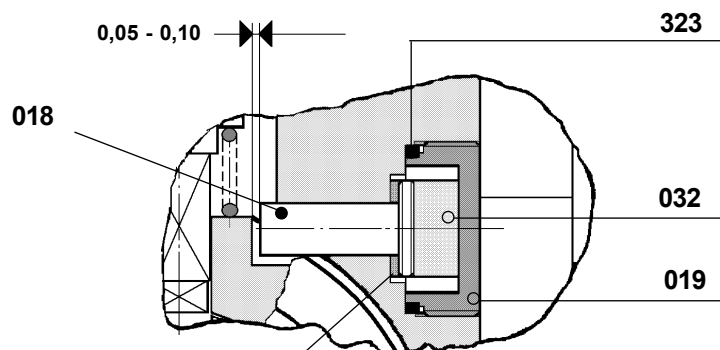
**WHEN RE-ASSEMBLING EVERYTHING:**

Before inserting the central body in the casing rotate the 007 helicoidal wheel to the point in which the lock seat is perpendicular to the milling plane of the 002 fixed tooth ring gear; insert the 017 lock, rotate by hand the helicoidal wheel 007 spider set until the Hirth couplings are locked. (rollers placed on the cams plane). Extract the lock. At this point put the quality and quantity of lubricant in the casing and in the spider hollow as shown on page 19.

- After assembling the rot-index unit in the casing, check the 030 washer clearance and the 466 hub clearance  $Y = 0.15 - 0.20$  mm



Assemble the 018 pins complete with the cushioning pads and screw the 019 covers complete with gaskets.





The turret mechanical elements are lubricated for life.

The lubricant must be replaced only in case the turret has been completely disassembled.  
The lubricant (viscosity 80 SW 90) must be compatible with rubbers and teflon.  
The table below indicates the right amounts to use:

**LUBRICANT AMOUNT**

**0.06 Kg.**

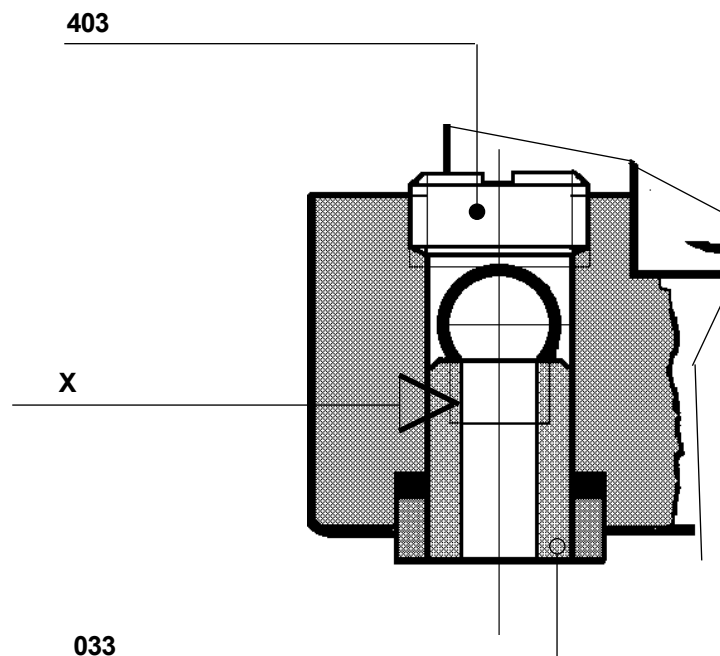
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## REPLACEMENT OF THE COOLANT BUSH

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Take off the 403 threaded spring, then extract the 033 bush by using the proper thread. Scrape off the scale from the seat; grease the outside of the new bush then insert it in its seat.

**X = M 6**  
**Depth = 5 mm**





Take off the 044 top cover. Disconnect the feeding cables of the motor and of the thermostat from the terminal block. Release the screws 321, extract the 150 motor set.  
Install the new motor set on the casing, connect the cables to the terminal block. Check the correct connection of the motor feeding stages: from the console carry out a tool change calling up the nearest station. If the motor stages have been properly connected, the change of station should follow the shortest way; if they have not, invert two motor feeding cables on the terminal block. Install the top cover again.

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## **PRE - INDEXING ELECTROMAGNET REPLACEMENT**

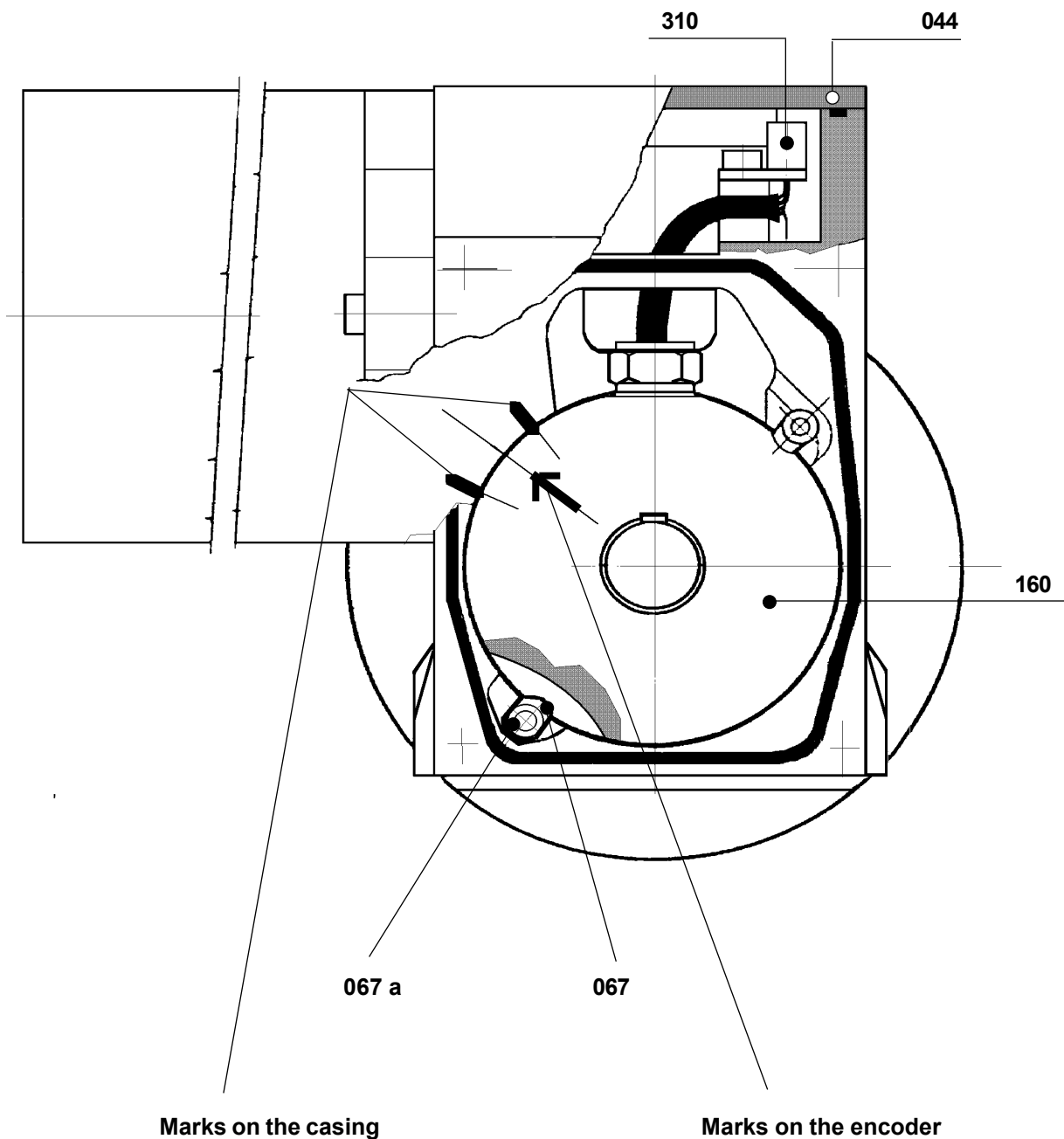
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Take off the 044 cover top, remove the 046a washers, extract the 200 electromagnet, disconnect the electromagnet feeding cables.  
Install the new electromagnet in the casing seat and lock it with the two washers.  
Connect the electromagnet cables to the terminal block (see the electrical diagram), install the top cover again.



Remove the 011 rear cover and the 044 top cover, disconnect the encoder cables from the 310 terminal block, take off the 067 holders and extract the encoder paying attention to the encoder nut. Assemble the encoder in the opposite order, and connect it to the terminal block. Before fixing the encoder permanently, set it:

stop the turret in any locked position, slowly rotate the encoder until the strobe signal (detectable both by instrument and voltmeter) disappears. Mark the encoder position with respect to the support. Slowly rotate the encoder in the opposite direction until the strobe signal disappears again; mark the new position on the support. In this way the strobe signal area is spotted. Rotate the encoder backwards so that the mark is half way between the two marks on the casing. Block the 067 holders, install the rear and top covers again.

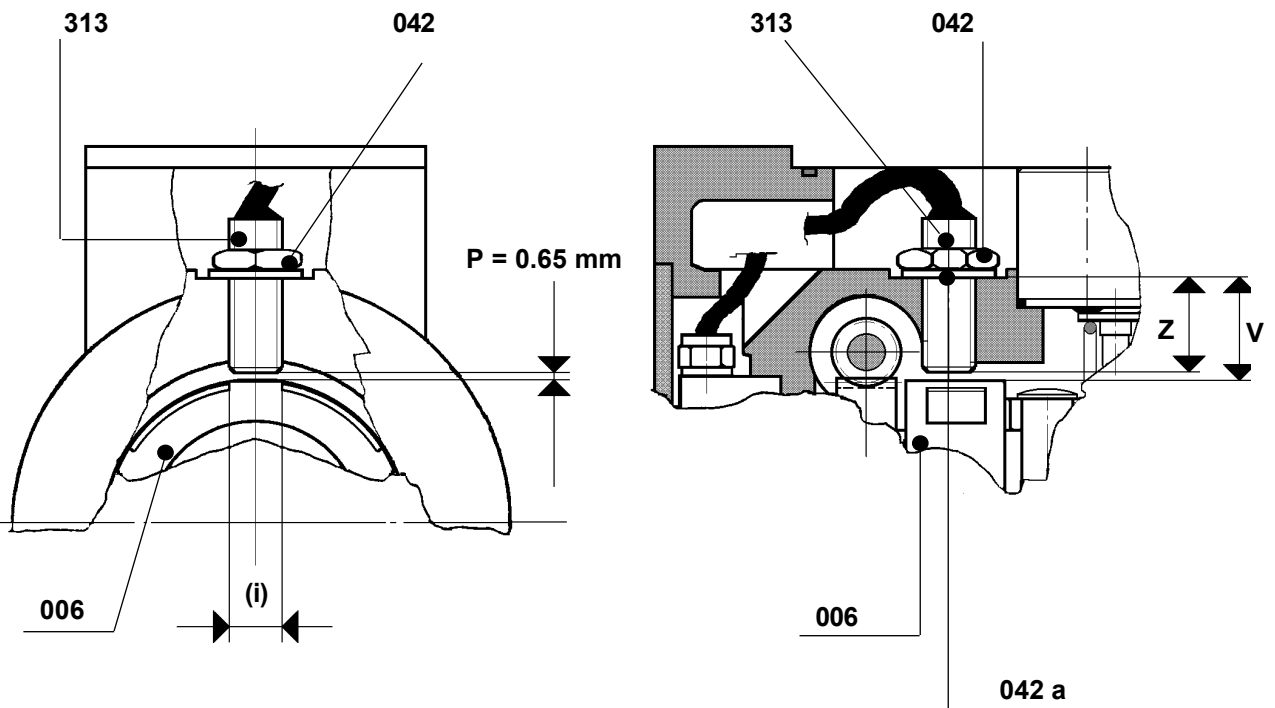




Remove the 044 top cover, untighten the 042 nut, extract the 042a washer, unscrew the 313 proximity and disconnect the proximity cables from the terminal block.  
Screw the proximity to the casing, the set up of the operating reach result from the difference:

$$P = 0,65 \text{ mm} = V - Z$$

where V and Z are calculated real values. To measure V the closing sector (i) of the 006 roller carrier must be against the proximity, that is to say with the turret locked. If the turret is not locked, lock it by hand (see page 23). After setting up the value P of the operating distance screw the 042 nut (3Nm tightening torque). Connect the proximity cables to the terminal block (see in the electrical diagram). With the proximity energized, the (red) pilot lamp on the proximity end will be visible: the enlightened red lamp indicates that the turret is locked. Install again the top cover.



006 Roller carrier  
(i) Closing sector



### What to do if the positioning cycle is uncomplete (due to an emergency or casual stop)

Act on the motor casing top side, extract the 451 circlip (by using the M6 extraction hole depth 7) take off the 450 cover.

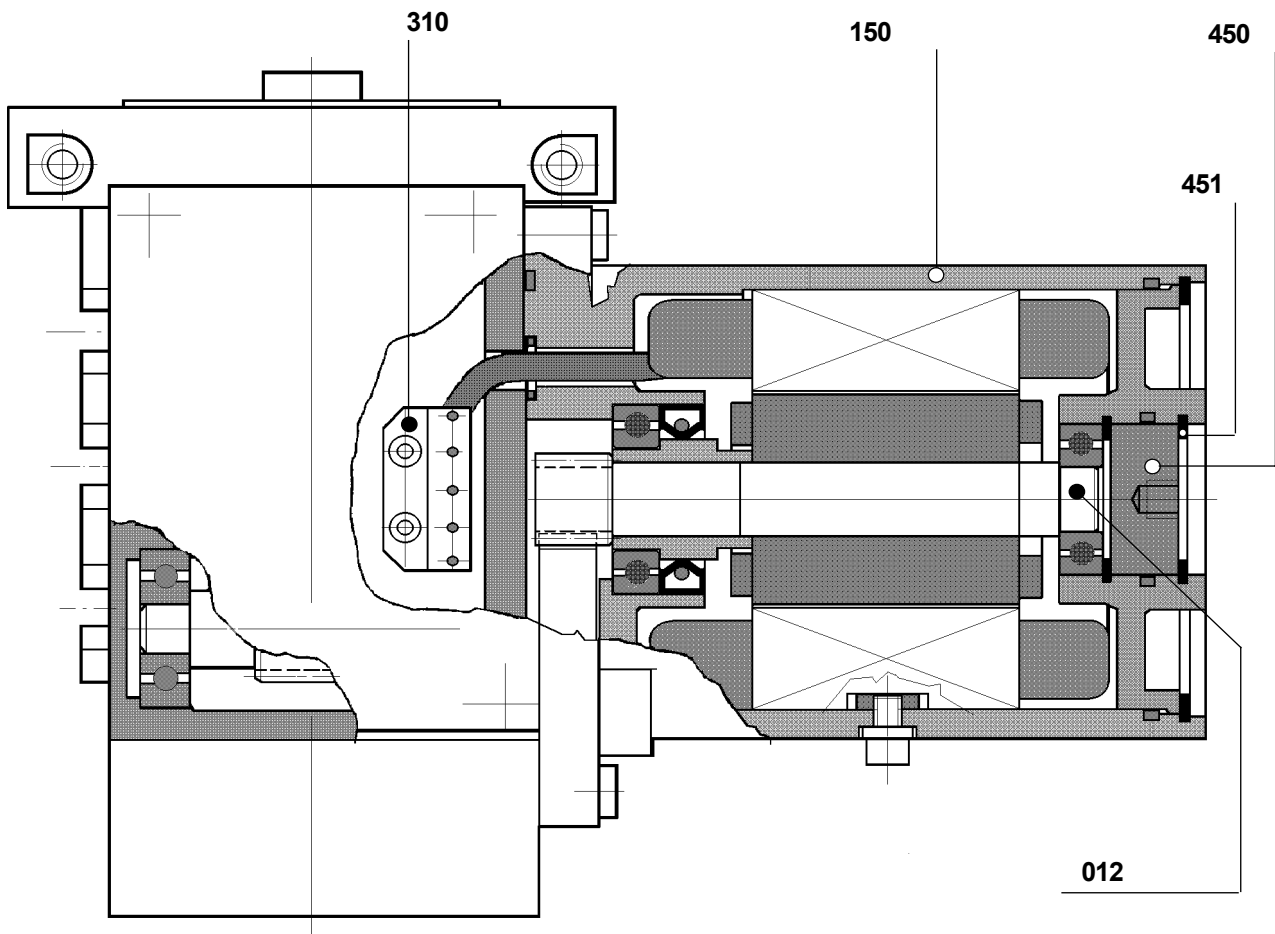
Take off the 044 top cover, disconnect from the 310 block the motor feeding cables (but keeping the proximity fed). Extract the 200 electromagnet. By using a hexagonal spanner (see the table) rotate the 012 motor shaft so that the toolholder disc rotates in the same direction as it did when stopped. At the same time push the 017 lock of the 200 electromagnet until enters a hole in the 006 indexing head. Keeping the lock pushed, reverse the motor shaft rotation until the (red) pilot lamp of the 313 proximity (visible on the control board) lights up. Rotate the shaft again of a further turn, making sure that the pilot lamp is still on. The motor shaft will have to rotate in the same direction as the one before the reversal in the following cases:

- if the disc direction when it stopped is unknown
- if there is a mechanical stop after the reversal without succeeding in locking the turret.

Reconnect the cables to the terminal block, install the 450 cap cover.

**IMPORTANT:** for an automatic positioning, please refer to the electrical manual

Spanner Size = 5 mm





**After around 400.000 manoeuvres:**

- check the sliding of the 073 core of the 200 electromagnet.. To do this take off the security cap of the electromagnet. Push the core end many times and by letting it recover through the 047 spring effect; then rotate it some turns. Remove any possible partbreak of contamination from the core and the nearby parts. Oil the core external surface which penetrates into the electromagnet.

- Check the wear - rate of the 033 coolant bush and replace it if necessary.

- Check the 308 gasket state; if they are deteriorated or clearly worn out, they must be replaced.

- To check the gaskets: release the screws 331, extract the dowels 332 and the 003 mobile ring gear. If a large amount of oil leaks out, load it again.



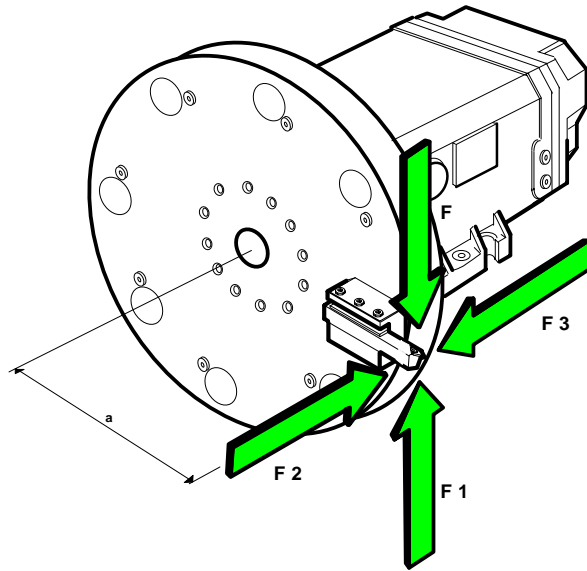
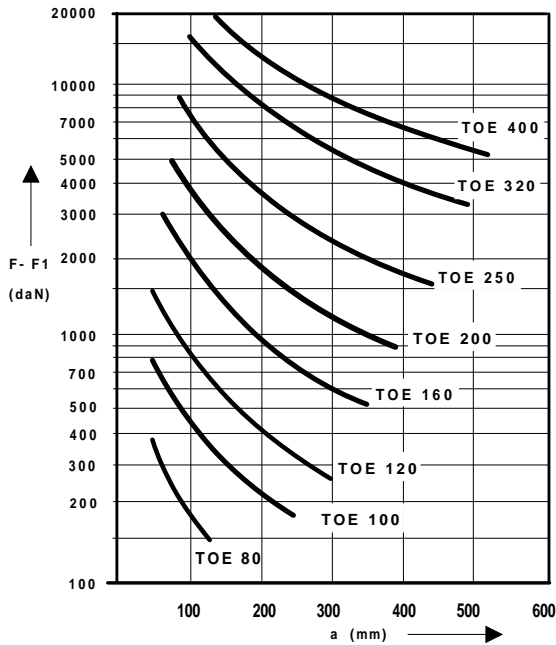
|            |                                      |
|------------|--------------------------------------|
| <b>032</b> | <b>Pads (n. 2)</b>                   |
| <b>033</b> | <b>On - off coolant liquid valve</b> |
| <b>150</b> | <b>Motorset</b>                      |
| <b>160</b> | <b>Encoder set</b>                   |
| <b>200</b> | <b>Electromagnet</b>                 |
| <b>308</b> | <b>Gasket</b>                        |
| <b>313</b> | <b>Locking proximity</b>             |
| <b>316</b> | <b>O - ring</b>                      |
| <b>317</b> | <b>O - ring</b>                      |
| <b>319</b> | <b>O - ring</b>                      |
| <b>321</b> | <b>O - ring</b>                      |
| <b>322</b> | <b>O - ring</b>                      |
| <b>323</b> | <b>O - ring</b>                      |
| <b>324</b> | <b>O - ring</b>                      |



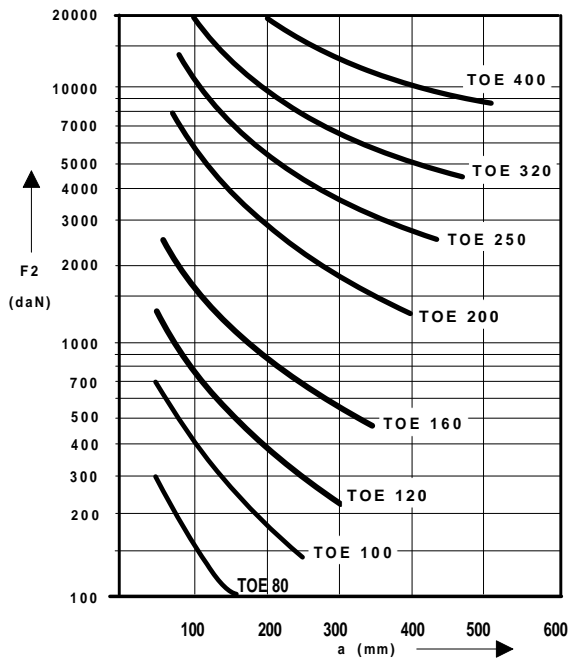
| <b>TURRET SIZE</b>  |                        | <b>TOE 80</b>     |                   |
|---|------------------------|-------------------|-------------------|
| <b>Ratio code</b>   |                        | <b>TOE 80/..0</b> | <b>TOE 80/..1</b> |
| <b>Maximum moment of inertia of carriable masses</b>  | <b>Kgm<sup>2</sup></b> | <b>0.11</b>       | <b>0.07</b>       |
| <b>Tangential torque</b>  | <b>Nm</b>              | <b>120</b>        | <b>120</b>        |
| <b>Max. out of balance torque by weight carried when turning axis of the turret is in horizontal position</b> | <b>Nm</b>              | <b>2</b>          | <b>2</b>          |
| <b>Accuracy of repeatibility (Degr)<sup>o</sup></b>   |                        | <b>+/- 6"</b>     | <b>+/- 6"</b>     |
| <b>Weight of standard turret</b>  | <b>Kg</b>              | <b>9.6</b>        | <b>9.6</b>        |
| <b>Manoeuver</b>  | <b>N° p/h</b>          | <b>1080</b>       | <b>1200</b>       |



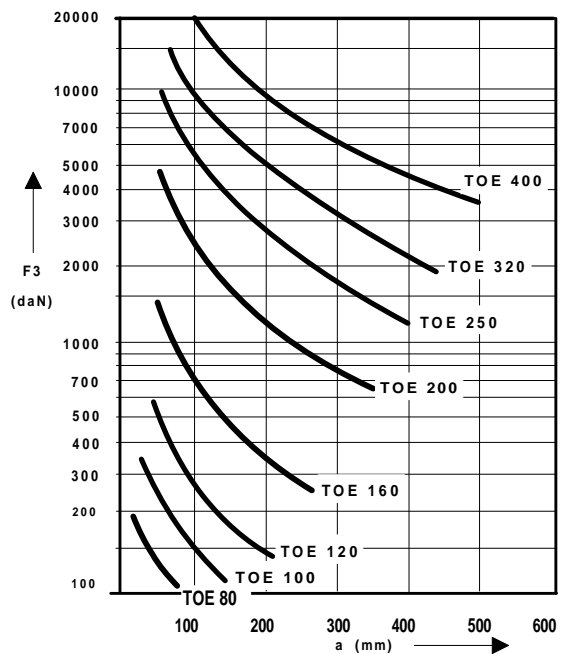
As a function of the tangential thrust F and F1



As a function of the pressing axial force F2



As a function of the lifting axial force F3





| <b>PROBLEM</b>  | <b>REASON</b>   | <b>SOLUTION</b>   |
|---|---|---|
| The turret does not start   | There is no motor rotation<br>Damaged motor<br>Thermostat emergency switch in function  | Reset the motor feeding<br>Replace the motor (see page 20)<br>See next point  |
| The turret does not complete the indexing cycle due to the thermostat, emergency switch or to uncomplete cycle signal | Higher number of indexes/hour than is permitted<br>With released turret in selected station and energised motor, there is no 313 proximity signal<br>Locking proximity damaged<br>The locking proximity is not properly set<br>Restart after an emergency or casual stop in the opposite direction with respect to the proper one<br>Electromagnet core jamming | Reduce the number of manoeuvres (see the technical data table on page 25)<br>Replace the locking proximity (see page 22)<br>Set the locking proximity (see page 22)<br>See page 23<br>See page 24 |
| The turret goes further than the selected station   | Delay in the electromagnet energizing   | Reset the control equipment   |
|   |   |   |



| <b>PROBLEM</b>   | <b>REASON</b>  | <b>SOLUTION</b>   |
|--|--|---|
| The turret does not remain locked                                  | Delay in motor de-energizing   | Reset the control equipment   |
| The turret keeps rotating without stopping at the selected station | Damaged angular encoder<br>Damaged electromagnet<br>The electromagnet is de-energised or the voltage is lower than necessary<br>Power cable continuity faulty                                  | Replace the angular encoder (see page 21)<br>Replace the electromagnet (see page 20)<br>Reset the voltage in the suggested value<br>Reset the continuity  |
| The turret approaches the called station through the longest route | Inverted motor phases  | Reconnect the phases properly (see page 20)   |
| Excessive impact during the pre-indexing                           | Excessive elasticity of the cushioning pads<br>Higher moment of inertia of the applied masses than the permitted one<br>Higher unbalancing moment of the applied masses than the permitted one | Replace the cushioning pads<br>Reset the moment of inertia of the applied masses till the permitted one (see page 25)<br>Reset the applied unbalanced masses till the permitted one (see page 25) |
| Disk stick-slip-motion   | Higher unbalancing moment than the permitted one   | Reset the applied unbalanced masses till the permitted one (see page 25)  |
|  |  |   |