



BARUFFALDI S.p.A

TITLE

Pagina N°.
Page Nr.

Edizione **1-92**
Edition

TOE 80
TURRET

USE AND MAIN TECHNICAL
GUIDE

All informations in this catalogue might be changed with no previous warning



| | PAGE |
|---|---------------------|
| Index | 1 |
| Identification label | 2 |
| Main characteristics of the turret | 3 |
| Application of the turret on the machine | 4 |
| Coolant liquid feed | 5 |
| Application of the tool-holder disc on the turret | 6 |
| Wire assembly | 7 |
| Electrical components, links and layout | 8 |
| Operation chart | 9 |
| Encoder wiring | 10 |
| Electromechanical functioning of the turret | 11 - 12 |
| Sectional view of the assembly | 13 - 14 - 15 |
| Total disassembly of the turret | 16 - 17 |
| Advice for the assembly | 18 |
| Lubrication and replacement of the coolant bush | 19 |
| Replacement of the motor, electromagnet | 20 |
| Angular encoder replacement and setting | 21 |
| Locking proximity replacement and setting | 22 |
| What to do if the positioning cycle is uncomplete (due to an emergency or casual stop) | 23 |
| Periodical check-up | 24 |
| Recommended spares | 25 |
| Data table | 26 |
| Diagrams-performances | 27 |
| Problems and solutions | 28 - 29 |



BARUFFALDI S.p.A.

IDENTIFICATION LABEL

Pagina N°. 2
Page Nr.

Edizione 1-92
Edition

BARUFFALDI S.P.A.
ITALY **TOE 80**

PART NUMBER

MOTOR 3~ **N. of Poles**

V **KVA** **Hz**

_____ Turret type and size

_____ Part number

_____ Motor Pole number

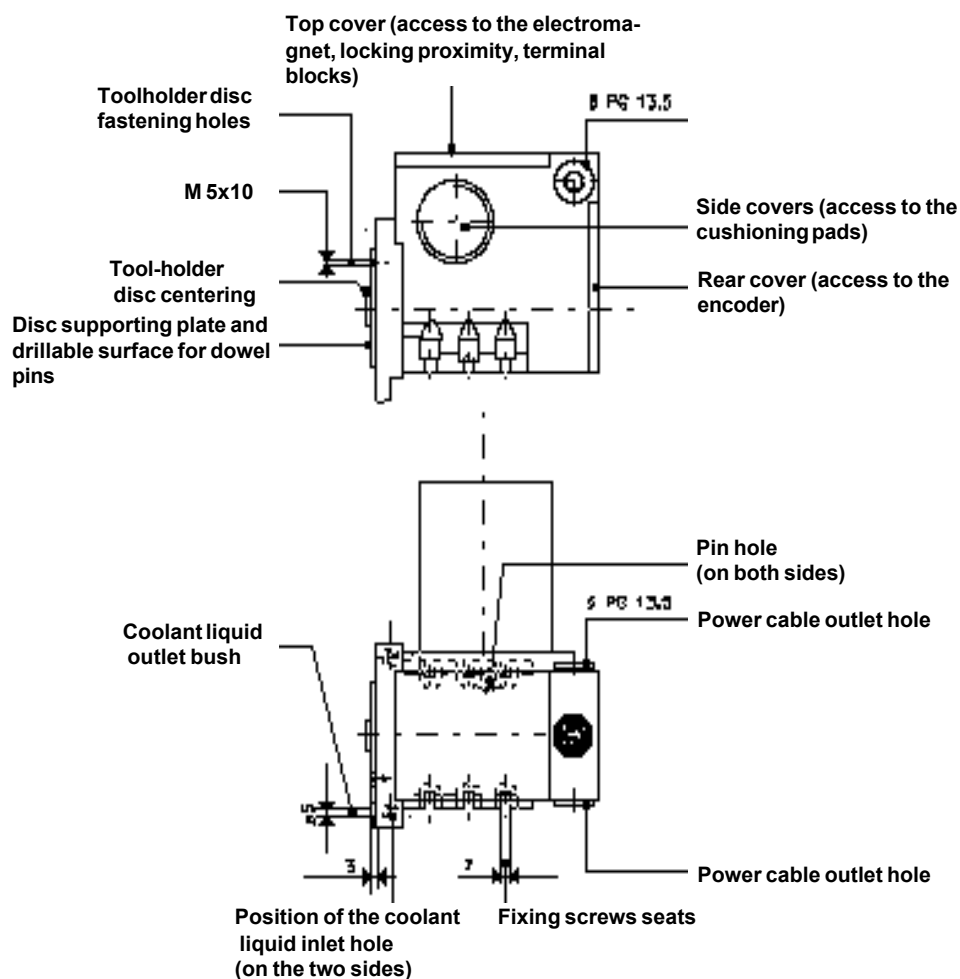
Motor Voltage

Motor Power

Motor - Frequency



The turret consists of a fixed part (casing) containing all the elements for indexing, and a moving part where the toolholder disc is installed and an electric motor assembly that is mounted onto either right face or left face (version "A" or version "B"). The disc rotation axis is parallel to the casing mounting face. Turrets series TOE 80, generally provided with 6 or 8 positions, change from a position to the following one, rotating both in counterclockwise and clockwise direction.



The picture represents the motor position (version A), it is possible to have the motor in the opposite position (version B).

Diameter cable outlet holes

PG 13,5



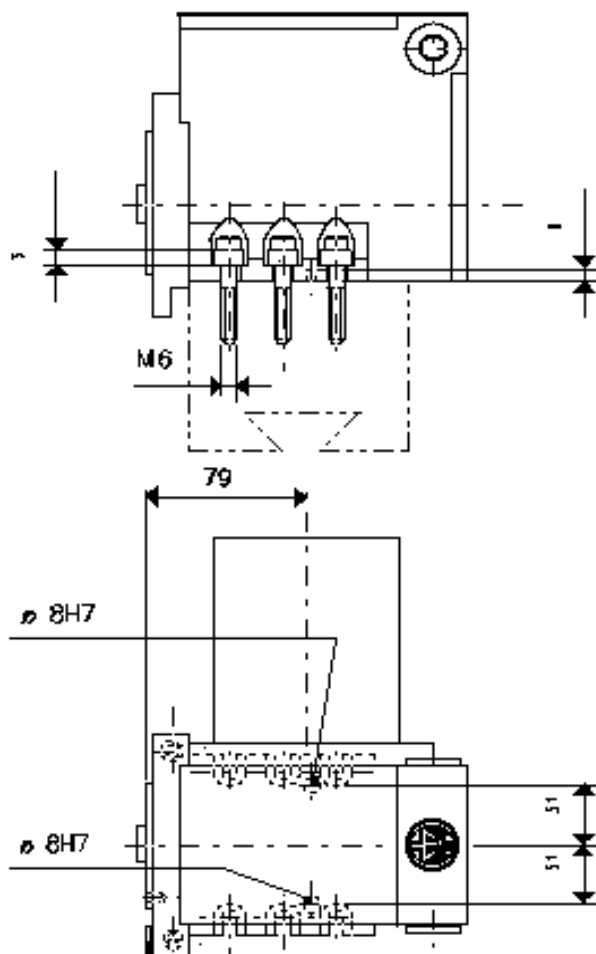
The mounting surface where the turret has to be installed must be clean and not damaged, its flatness error must be within 0.01/100 mm. If necessary adapt the height by inserting a packing plate under the base of the turret.

Pre-dowel the pin on the machine slide where the dowel seat in the turret base is placed.

By using fixing screws almost fully tightened, line up the turret, or rather the toolholder disc with the spindle axis, then tighten the screws. It is even possible not to install the dowel in order to allow the turret to slip with respect to the slide (if there is an impact). Then the dowel can be lined up again.

IMPORTANT NOTE

Whenever checking the lining up and the center height of the turret or of the toolholder on it, the turret must be in a locked condition. If this rule is not followed, problems in the setting up will arise.





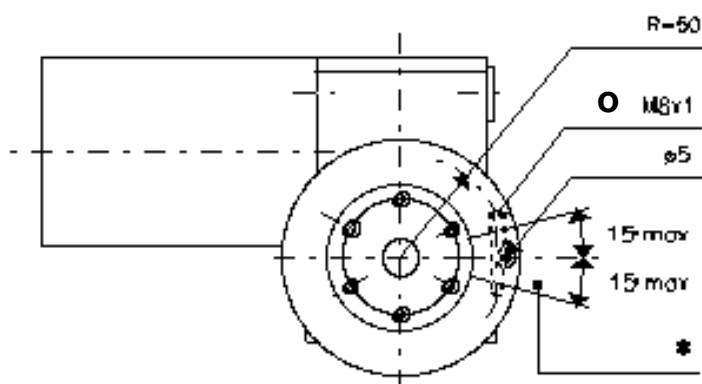
On the turret side there is a hole for the coolant liquid inlet; placed just at the opposite part of the motor (version A or version B); connect the coolant liquid feed pipe with the inlet hole through aleakproof connector.

The perforated bush (033) has to be installed as shown in the picture. The 033 bush rubs against the rear plate of the toolholder disk where the interception hole is placed.

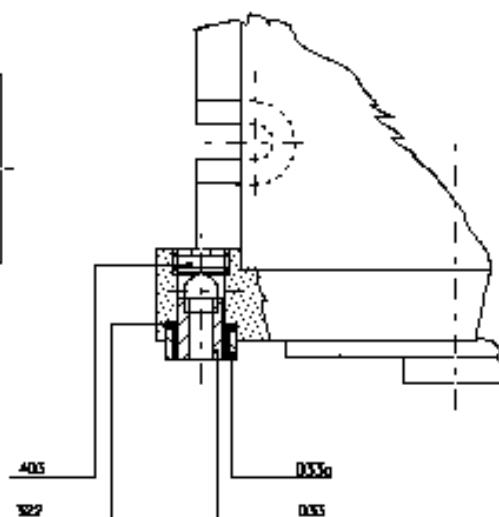
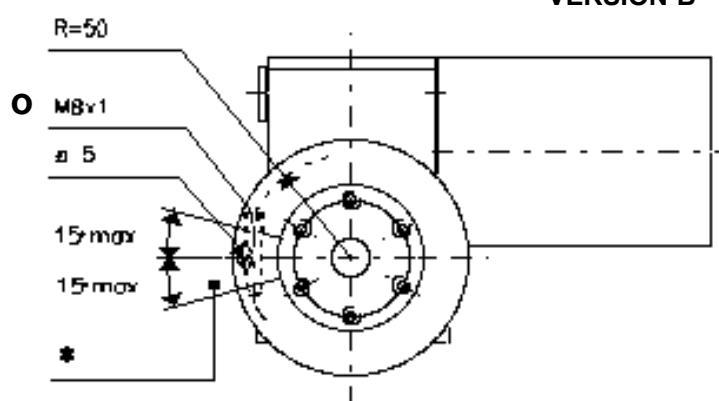
○ Coolant liquid inlet hole position

* Area in which it is possible to position the hole for interception of the coolant liquid in "model A" or in "model B" on the 6 or 8 position faceplate.

VERSION A



VERSION B





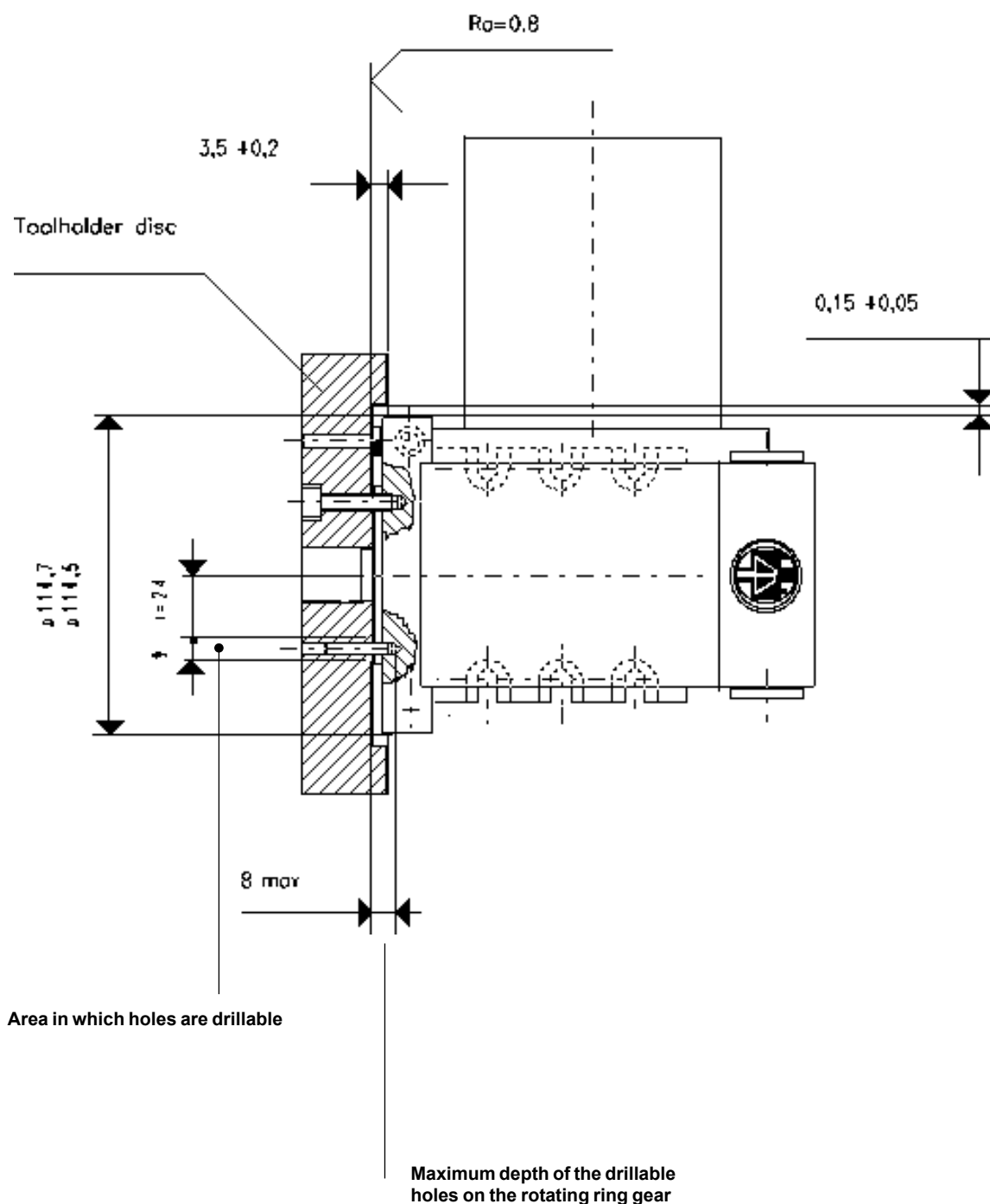
The toolholder disc is installed and fixed on the turret with screws, while its orientation is determined by suitable drilling and pinning.

It is even possible not to install the dowels in order to allow the toolholder disc to slip with respect to the rotating ring gear (if there is an impact). Then the dowels can be lined up again.

The picture represents the maximum allowable depth of holes; on the rotating ring gear, and the areas where they can be made.

The tool-holder disk must be designed with an empty space to create a labyrinth in order to protect the bush from swarf (respect the values shown in the picture).

The slipping surface of the bush must have a roughness of $R_a = 0.8$





The wire assembly inside the turret has to be made according to the electrical chart (see page 8).

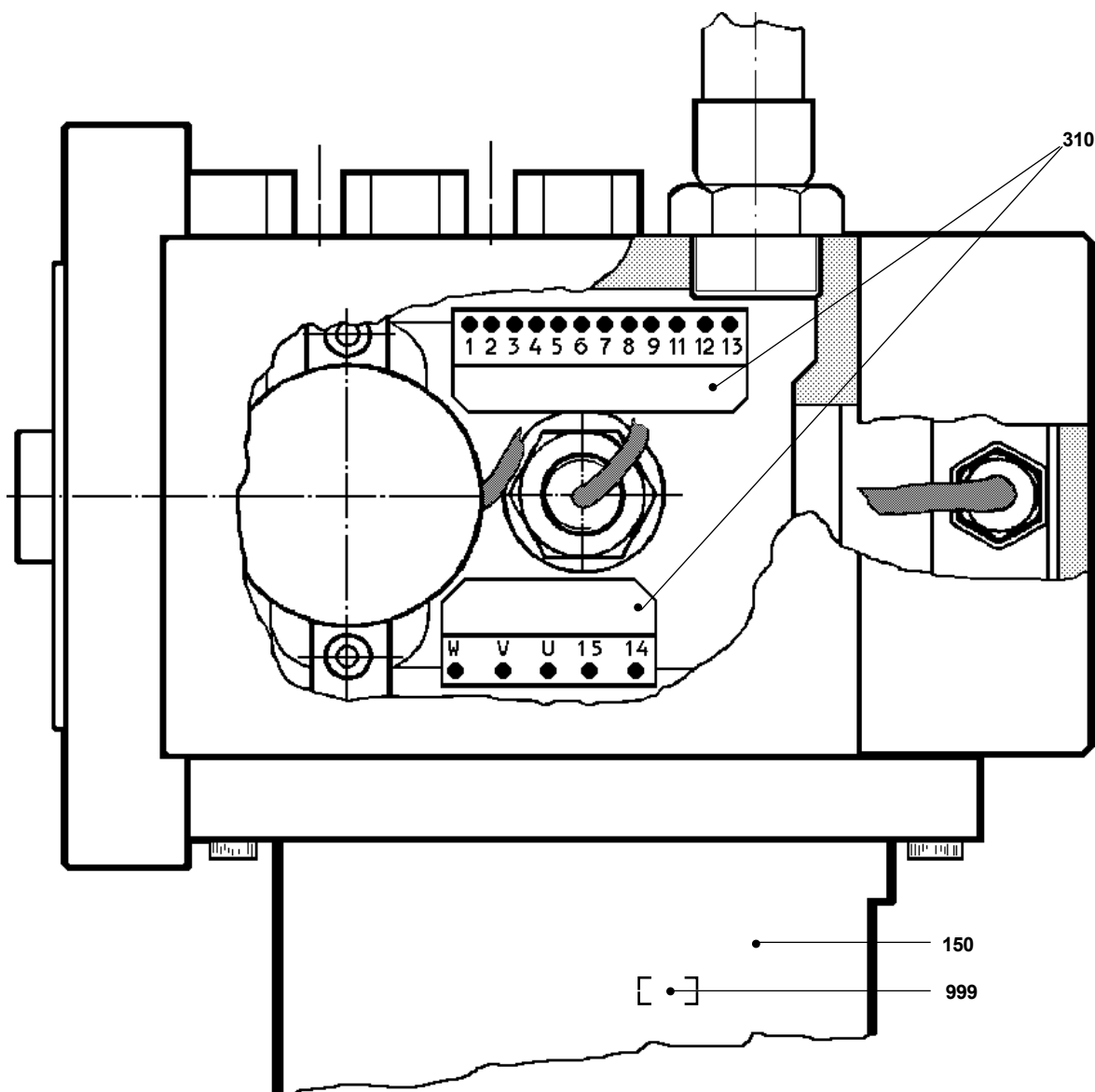
The cables must be arranged so as to prevent them from being squashed when the top cover 044 is installed. The cables have to be kept tight; any slackness has to be tucked away in a non dangerous area.

A PG 13,5 threaded hole for the supply cable outlet is provided on the turret sides.

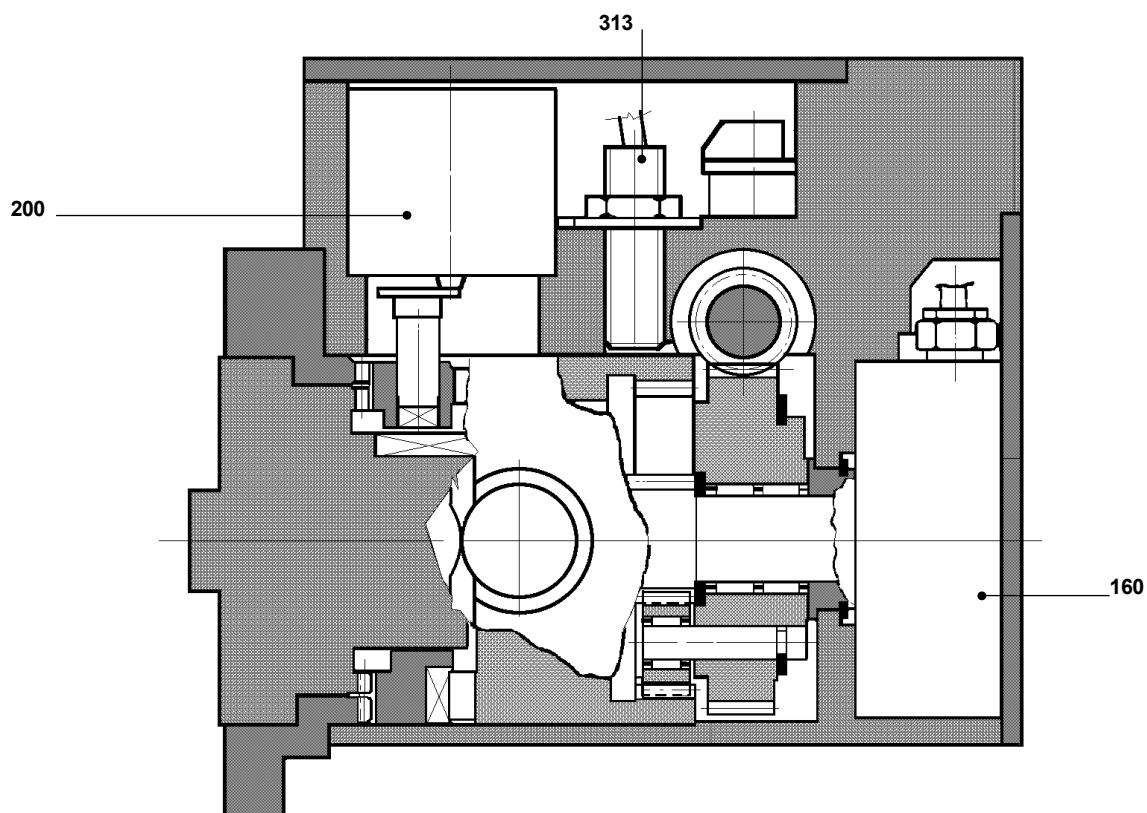
The connector, the over braided water tight cable, the application and the set up must prevent the coolant liquid from leaking into the turret.



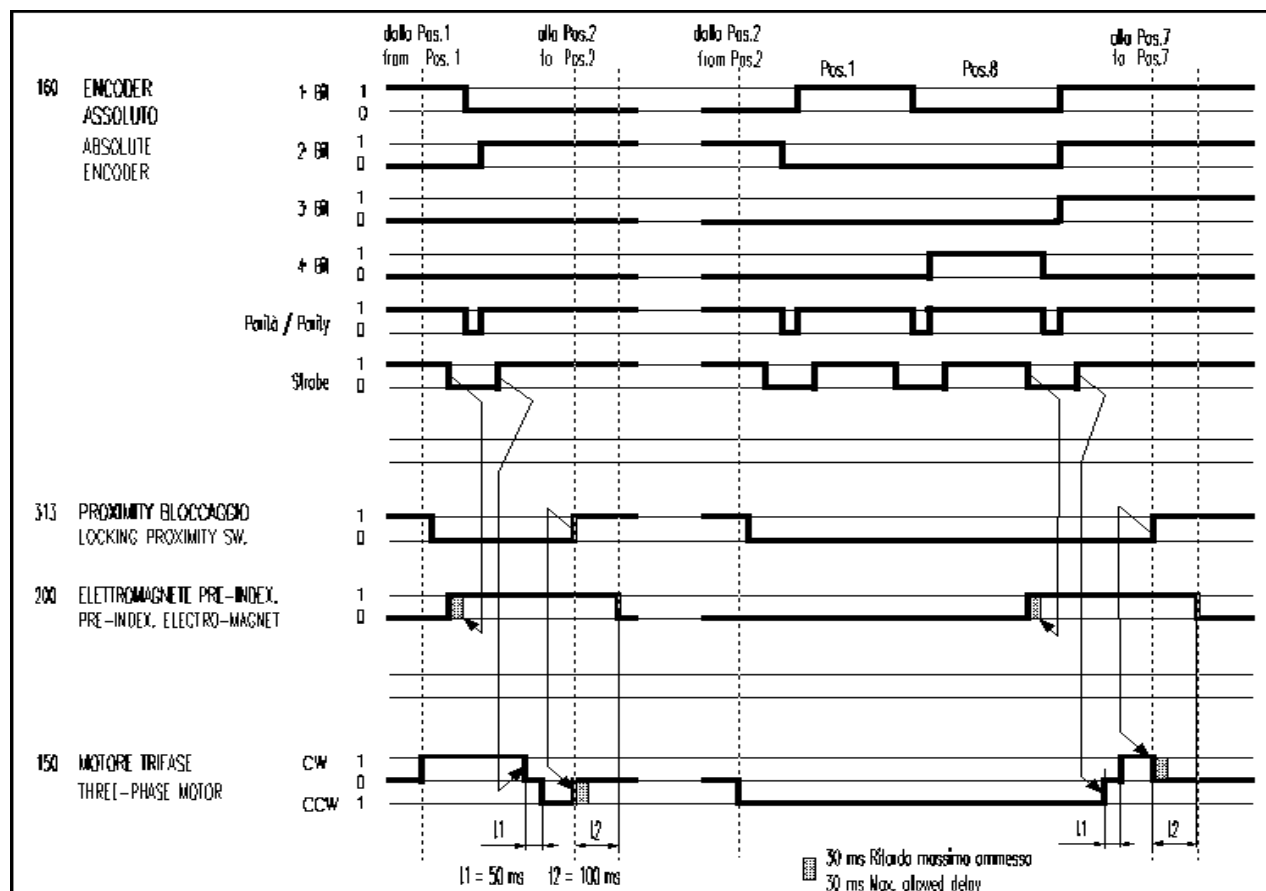
The hole not used for the outlet of the power cables must remain hermetically sealed.



The picture represents the version B (motor placed on the right side). In the version A (motor placed on the left side) the wire assembly is specular.



| Ref. | Component - Specification | Colours/Connections | Type/Notes |
|------|---|---|---|
| 160 | ABSOLUT ENCODER BINARY code 1° BIT 2° BIT 3° BIT 4° BIT PARITY STROBE + 24 Volt 0 Volt Screen | White 1 Yellow 2 Green 3 Violet 4 Red 5 Black 6 Brown 7 Blue 8 Yellow/Green 9 | Encoder type 60 |
| 301 | LOCKING PROXIMITY SWITCH + 24 Volt 0 Volt Output | Brown 7 Blue 8 Black 11 | Diam. 12 mm L= 45 mm Ripple 10 % Output PNP-NO max. 300 mA Short circuit protection |
| 200 | PRE-INDEX. ELECTROMAGNET 24 Volt DC | Orange 12 Orange 13 | 24 Volt 60 Watt 50 % ED |
| 999 | THERMOSTATIC SWITCH | Gray 14 Gray 15 | Normally closed type contact (until 120°C) |
| 150 | THREE PHASE MOTOR | Black X Y Z Red U Red V Red W Yellow / Green | 110 Volt 50/60 Hz 220/380 Volt 50/60 Hz Ground |
| 310 | TERMINAL BLOCK | | |

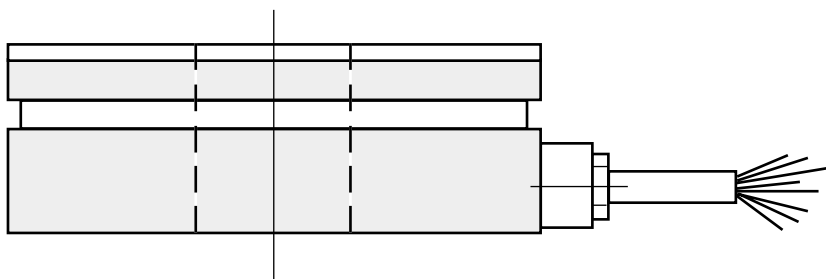
**CYCLE DESCRIPTION**

- The above operation diagram shows the sequence to be followed in order to move from position 1 into 2 in a clockwise direction (with the turret tool-holder disk in front), and from position 2 into 7 in a counterclockwise rotation.
- As first operation the motor is fed for rotation in the direction selected. Wait for the falling wavefront of the STROBE signal for the previous station is arrived at, the pre-indexing electromagnet is energised as quickly as possible (within the maximum permitted delay time).
- With the electromagnet energised, the raising wavefront of the STROBE signal of the required position is awaited; upon reception of this signal the motor is immediately halted and the rotation direction is reversed after 50 ms pause.
- Wait for the locking proximity signal then halt the motor as quick as possible (maximum delay permitted: 30 ms).
- At this point a safety check of the position can be carried out, and consent for machining can be given, followed by electromagnet de-energizing after 100 ms pause.

NOTE: The maximum care should be taken regarding the permitted delays, particularly their repeatability. (delays should be measured directly on the turret component devices).



TYPE 60
(TOE 80 — 100)



| | |
|-------------------|--------|
| A (1° BIT) | WHITE |
| B (2° BIT) | YELLOW |
| C (3° BIT) | GREEN |
| D (4° BIT) | VIOLET |
| PARITY | RED |
| STROBE | BLACK |
| + 24 VOLT | BROWN |
| 0 VOLT | BLUE |

Screen YELLOW - GREEN

ENCODER CODE TABLE

| POSITION | A | B | C | D | PARITY | STROBE |
|----------|---|---|---|---|--------|--------|
| 1 | ● | | | | ● | ● |
| 2 | | ● | | | ● | ● |
| 3 | ● | ● | | | | ● |
| 4 | | | ● | | ● | ● |
| 5 | ● | | ● | | | ● |
| 6 | | ● | ● | | | ● |
| 7 | ● | ● | ● | | ● | ● |
| 8 | | | | ● | ● | ● |
| 9 | ● | | | ● | | ● |
| 10 | | ● | | ● | | ● |
| 11 | ● | ● | | ● | ● | ● |
| 12 | | | ● | ● | | ● |

SPECIFICATIONS

- Power supply DC 24 Volt +/- 10% RIPPLE 10%
- PNP outputs (max. load 50 mA) in BINARY code
- PARITY Check and STROBE signal
- Reverse polarity protected
- Output short-circuit protected
- Connection to be made with 8-pole screened cable



STARTING CONDITIONS

- turret closed
- de-energised motor
- de-energised electromagnet 200
- the mobile ring gear 003 is engaged with stationary toothed ring gear 002 and the short-circuiting gear 004.

NEW POSITION RESEARCH

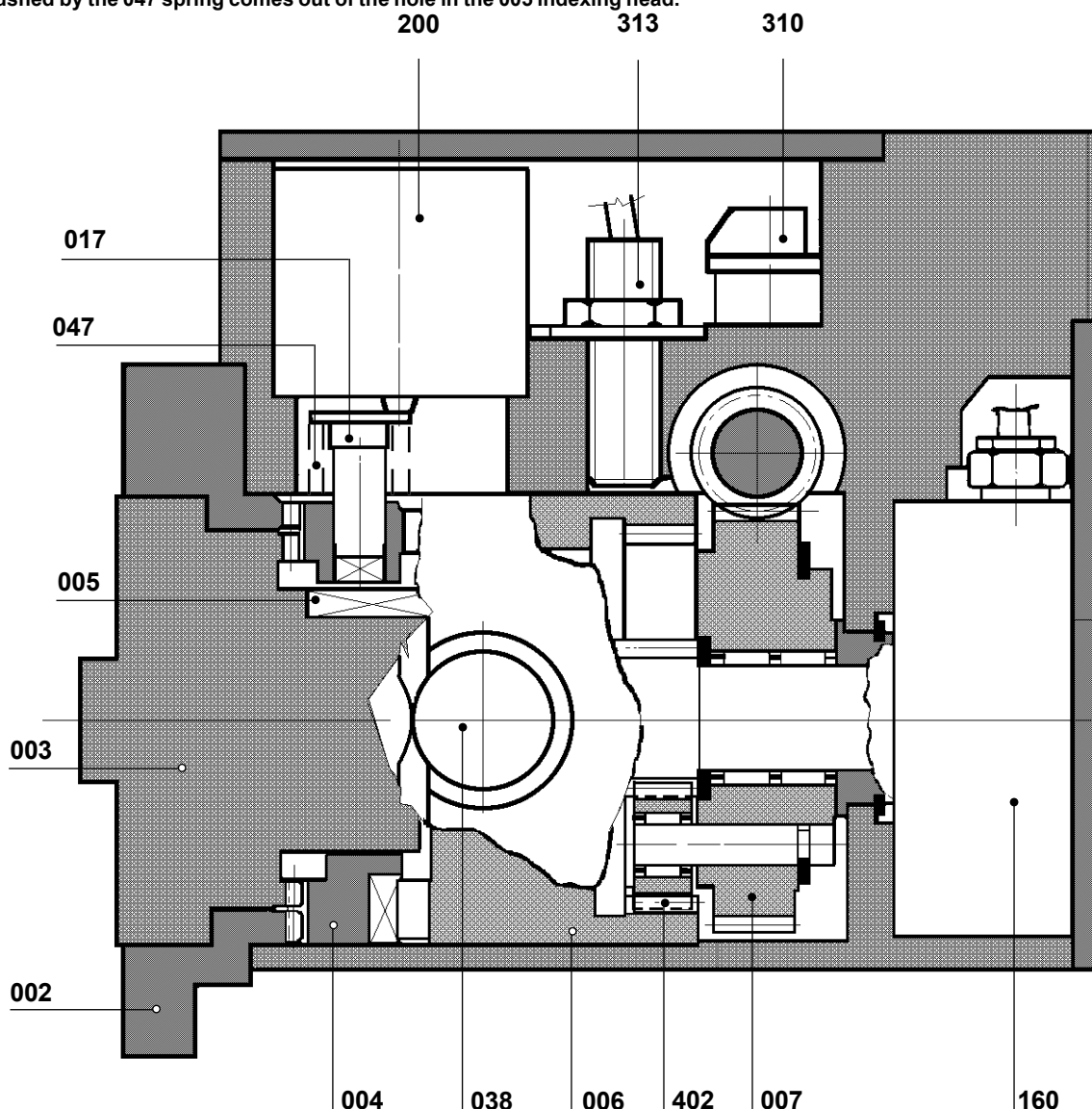
Energize the motor which through the reduction stages starts the rotation of the 006 roller carrier crown gear whose movement is stopped against a positive catch after an established angle. During this stage the 034 central spring pushes the short circuiting ring gear back, causing the cam top sides to descend from the rollers 038. Thus the mobile ring gear whose rotation is started by the planetary gears 402 is released.

Near the arrival station (upon reception of the signal of the 160 angular encoder) the 200 electromagnet is energised. This pushes the 017 lock into the proper pre-positioning hole of the 005 indexing head thus causing the ring gear and its toolholder disk to stop rotating.

The consequent impact is cushioned by the 032 pads. The motor rotation is reversed. The motor starts the satellite and the 007 roller guide crown gear rotation in the opposite direction compared to the previous one.

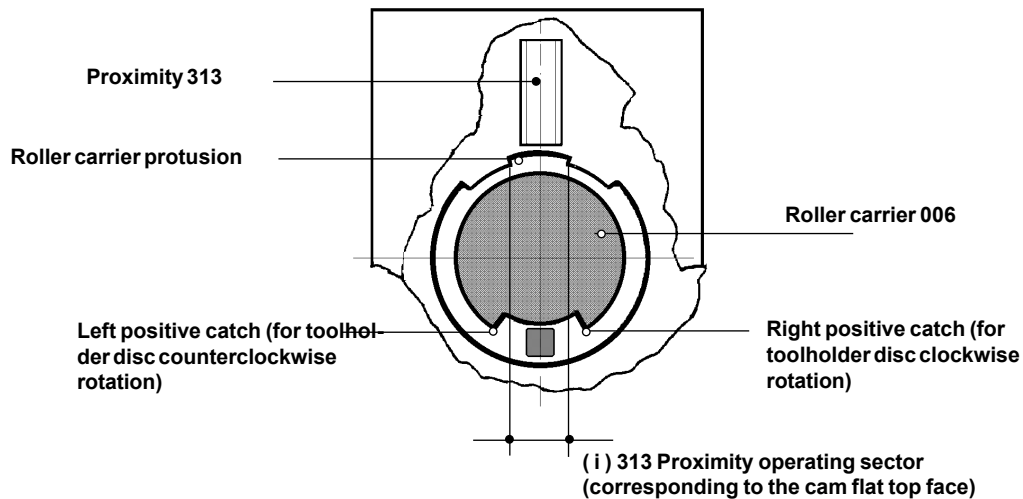
Therefore, the rollers by climbing the cam top sides push the short circuiting ring gear forward so meshing Hirth teeth. The nose of the outside (i) of the 006 roller carrier activates the locking proximity indicating that the turret is locked. That is to say that the rollers are on the cam top side.

Upon receipt of this signal the motor is de-energized. Soon afterwards the electromagnet is de-energized; therefore the lock pushed by the 047 spring comes out of the hole in the 005 indexing head.

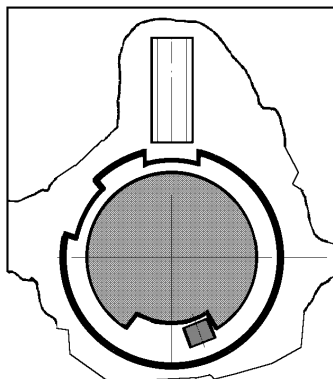




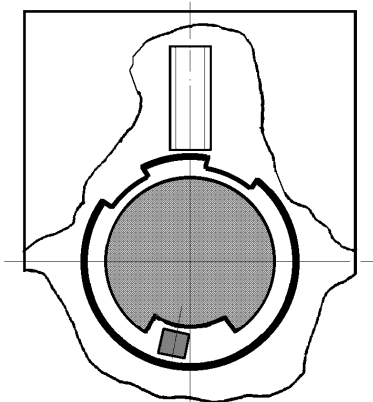
Locked turret (rollers on the cam top central part)



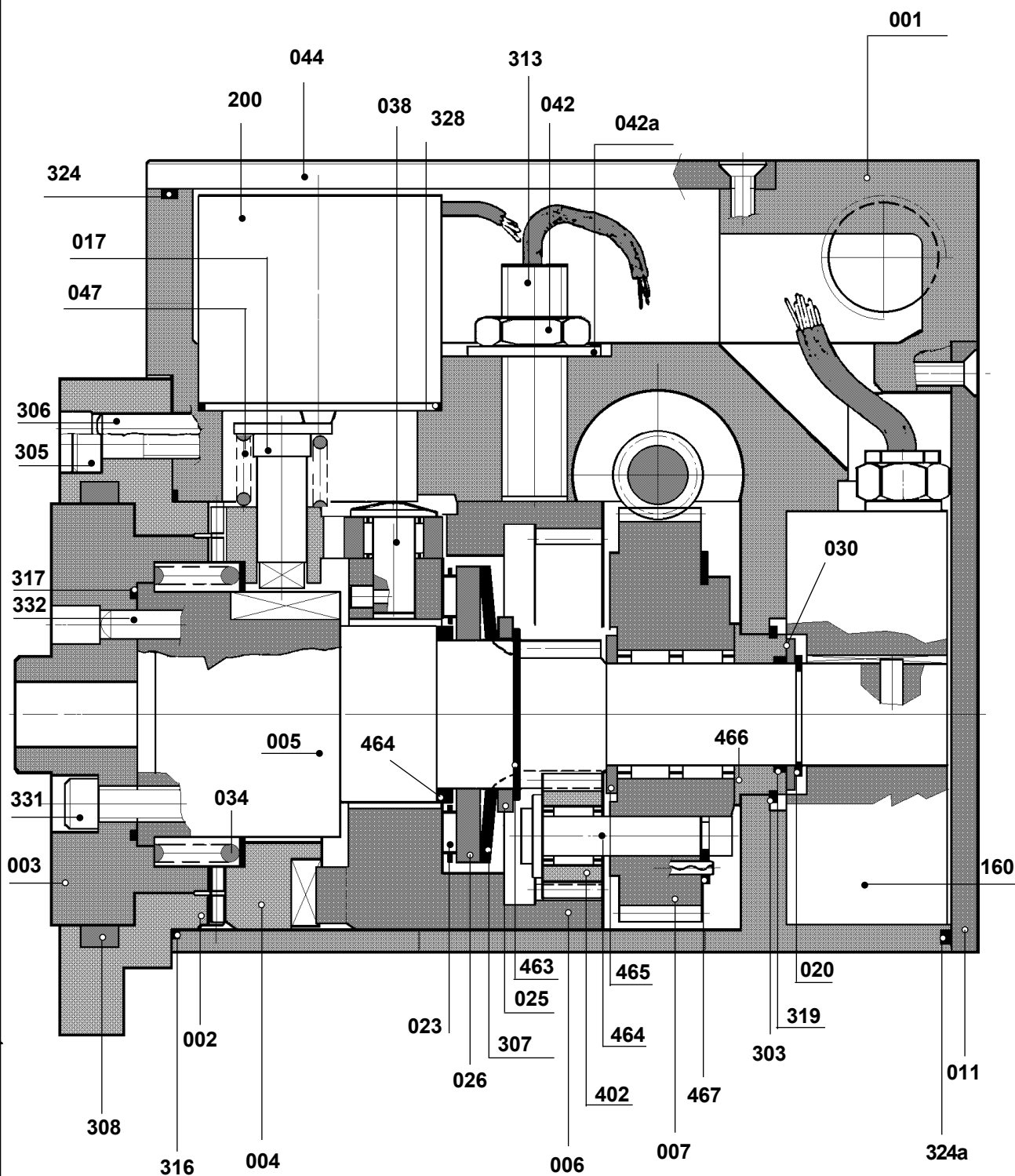
Released turret (the rollers are at the bottom of the cams - the Hirth coupling are released)

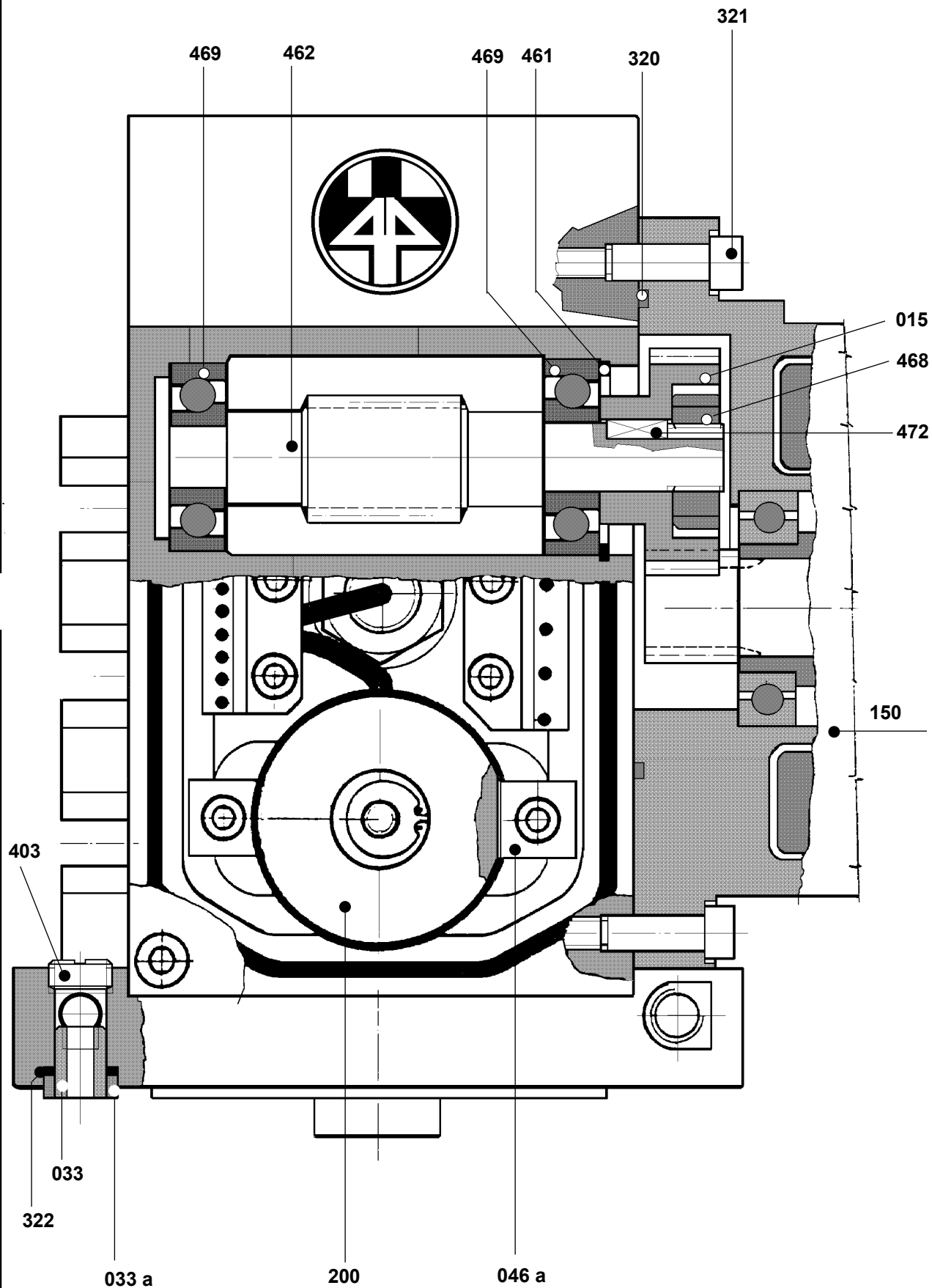


Locked turret (rollers at the beginning of the cam top face (313 proximity operating))



The pictures represent the stages corresponding to the toolholder disc clockwise rotation; for the counterclockwise rotation, movements are reversed.







0.05 / 0.10

