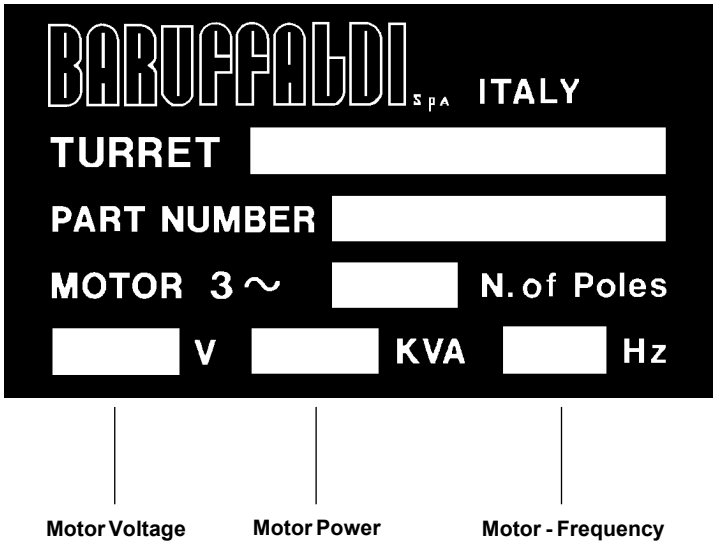
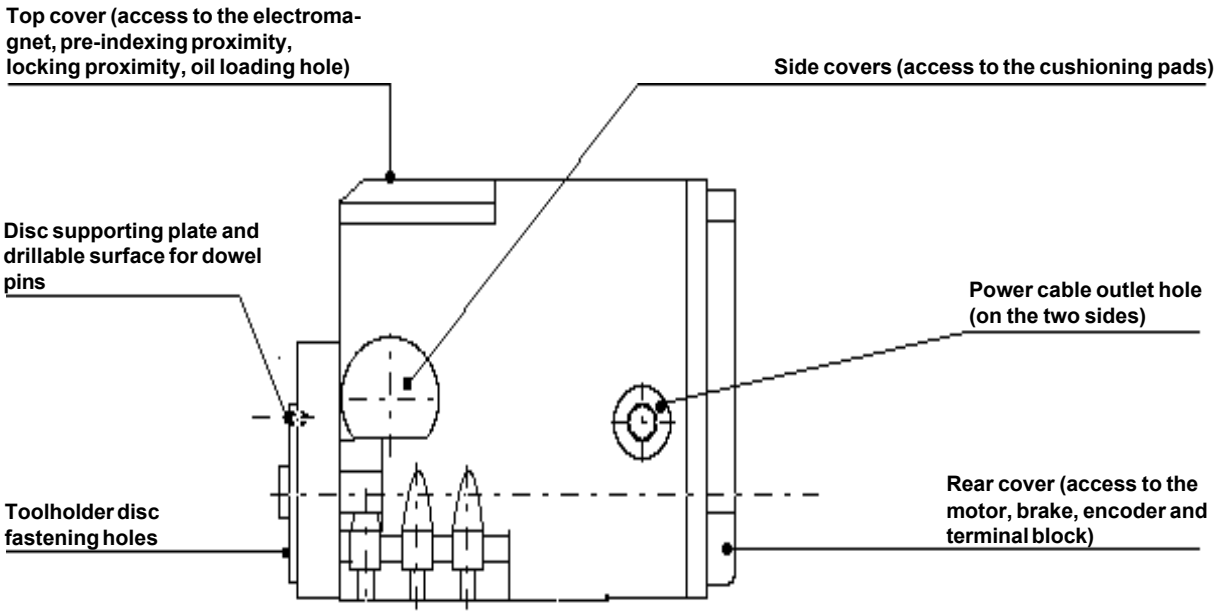
TOE 100
TURRET

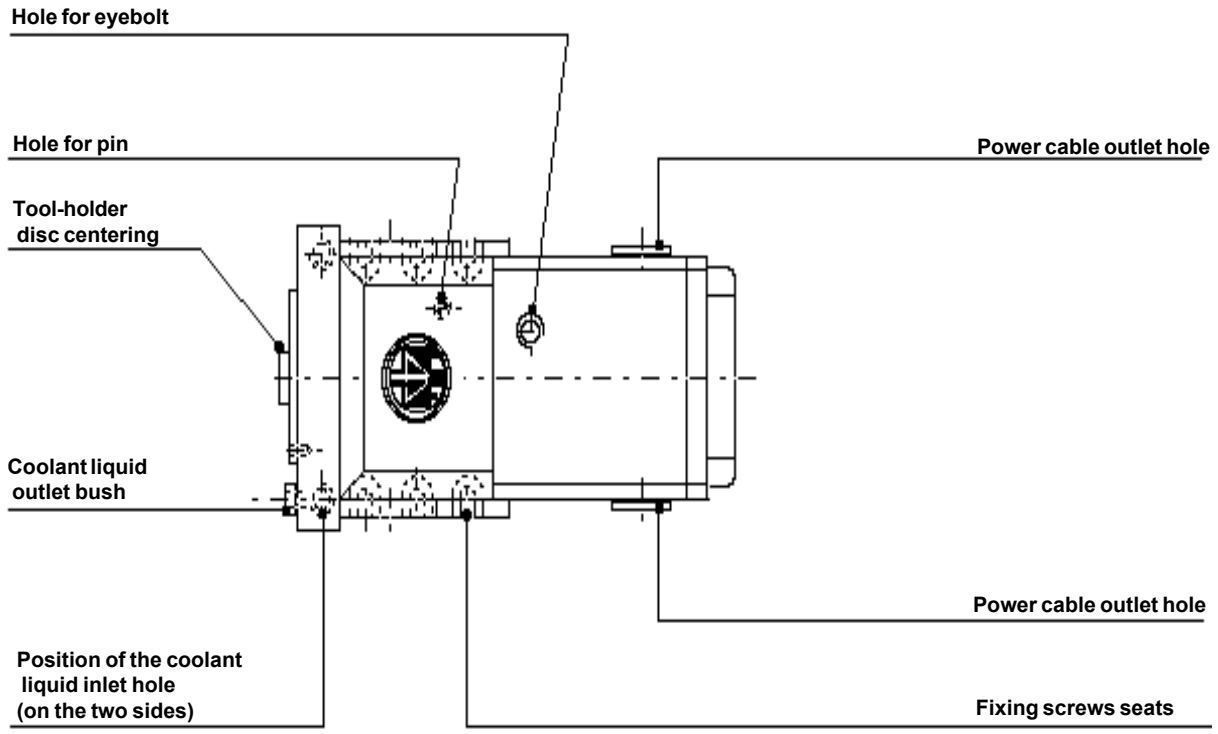
USE AND MAIN TECHNICAL GUIDE

PAGE


BARUFFALDI SpA ITALY
TURRET
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. The disc rotation axis is parallel to the casing mounting face. Turrets series TOE 100, generally provided with 6, 8 or 12 positions, change from a position to the following one, rotating both in counterclockwise and clockwise direction.



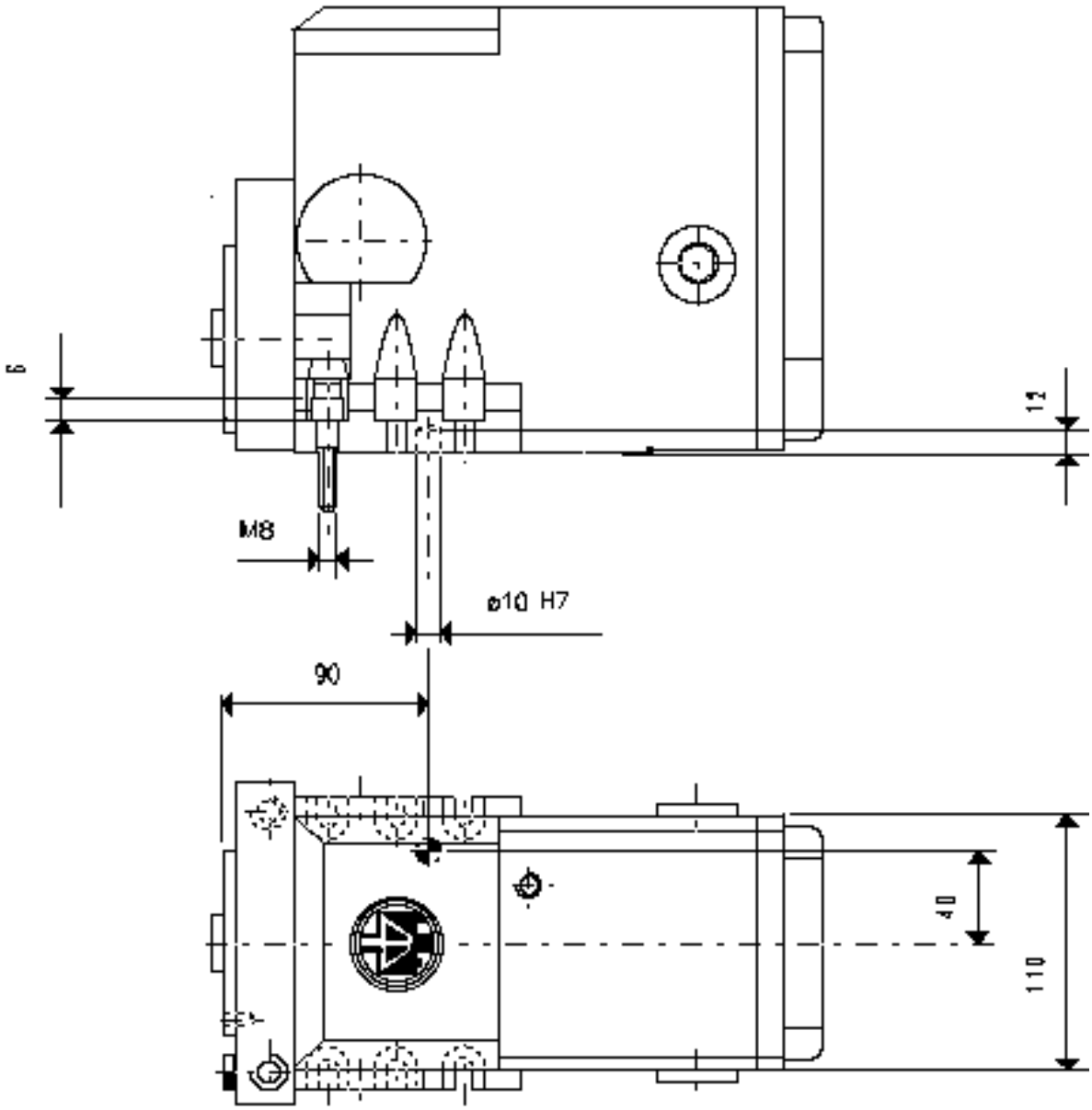


Diameter hole for eyebolt	Diameter cable outlet holes
M 8 x 15	PG 16

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.

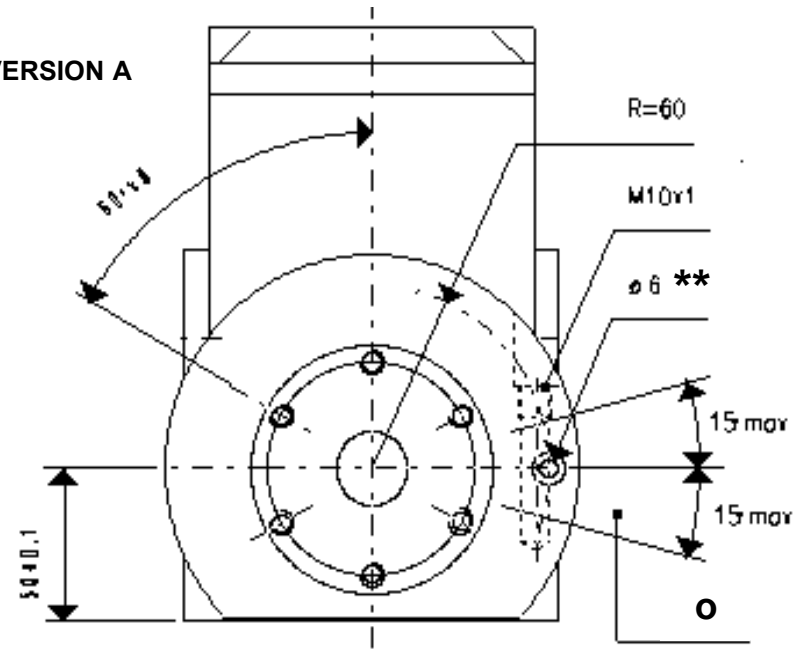


It is possible to make coolant liquid feed holes on both sides of the turret (if required by the customer); connect the feed pipe to the chosen hole through a leakproof connector.
The 033 bush has to be installed as shown in the picture. A spring presses the 033 bush against the rear plate of the toolholder-disc, where the interception hole is:

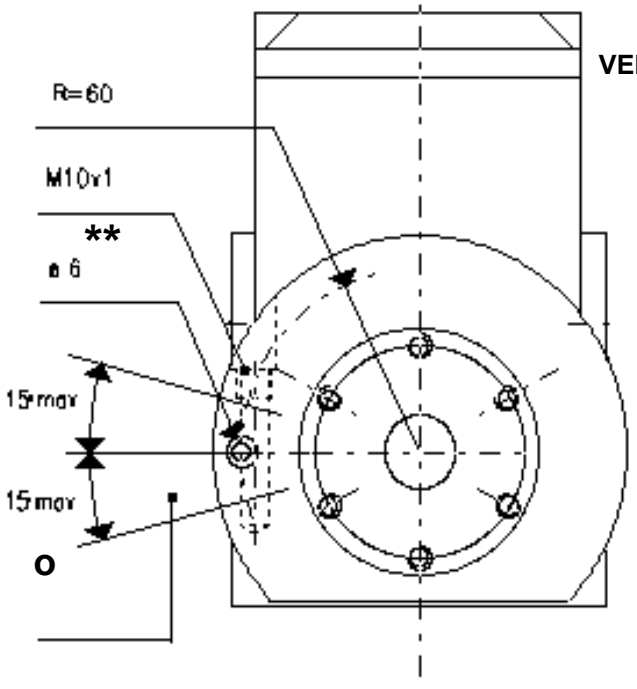
****** **Coolant liquid inlet hole position (if required by the customer)**

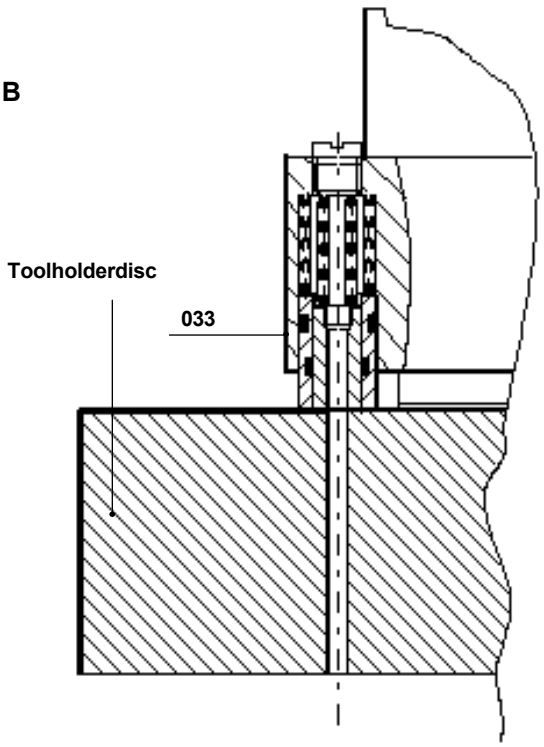
O **Area in which it is possible to position the hole for interception of the coolant liquid in "model A" or in "model B" on the 8 or 12 position faceplate.**

VERSION A

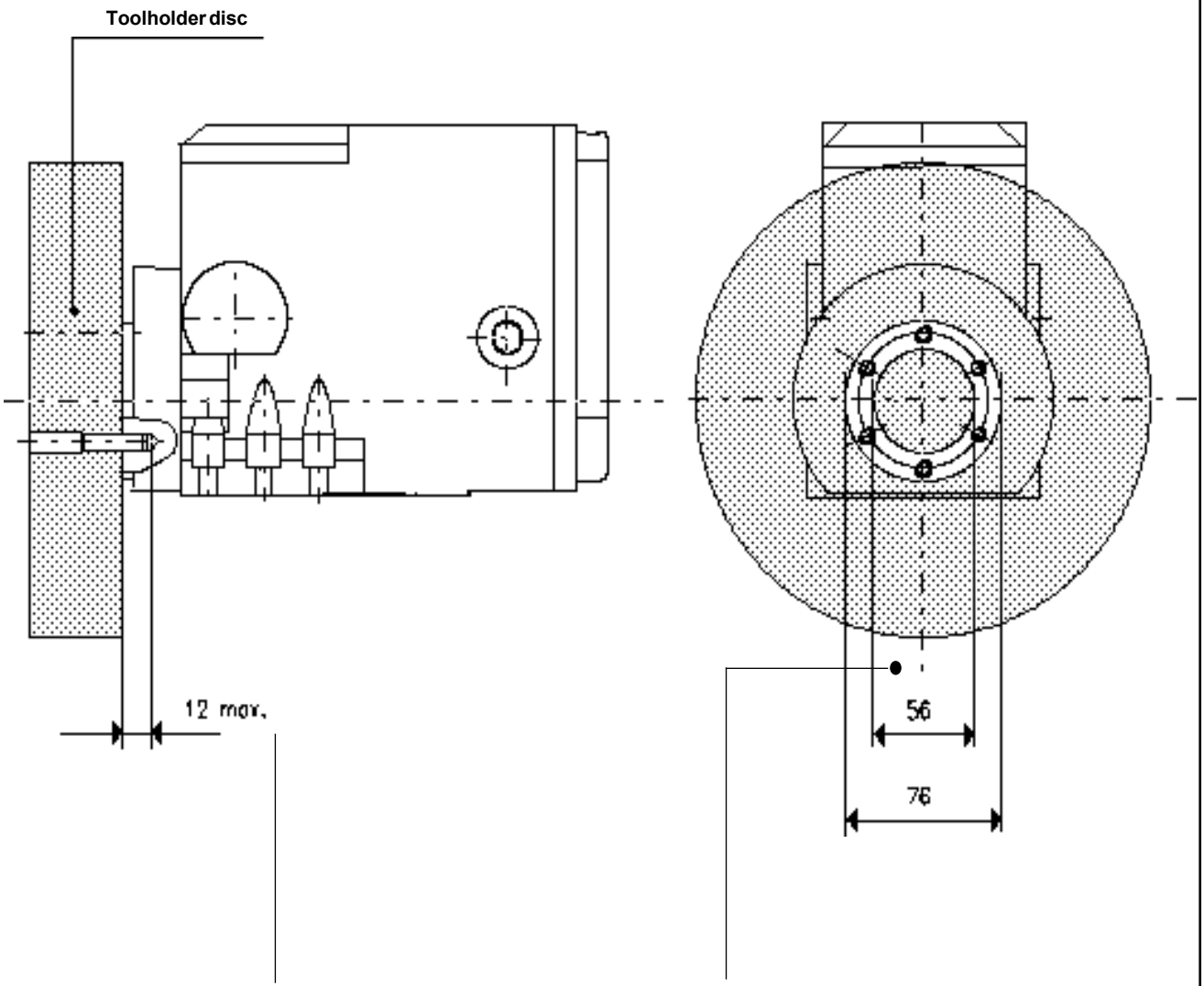


VERSION B





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 alowable depth of holes; on the rotating ring gear, and the areas where they can be made.



Maximum depth of the drillable holes on the rotating ring gear

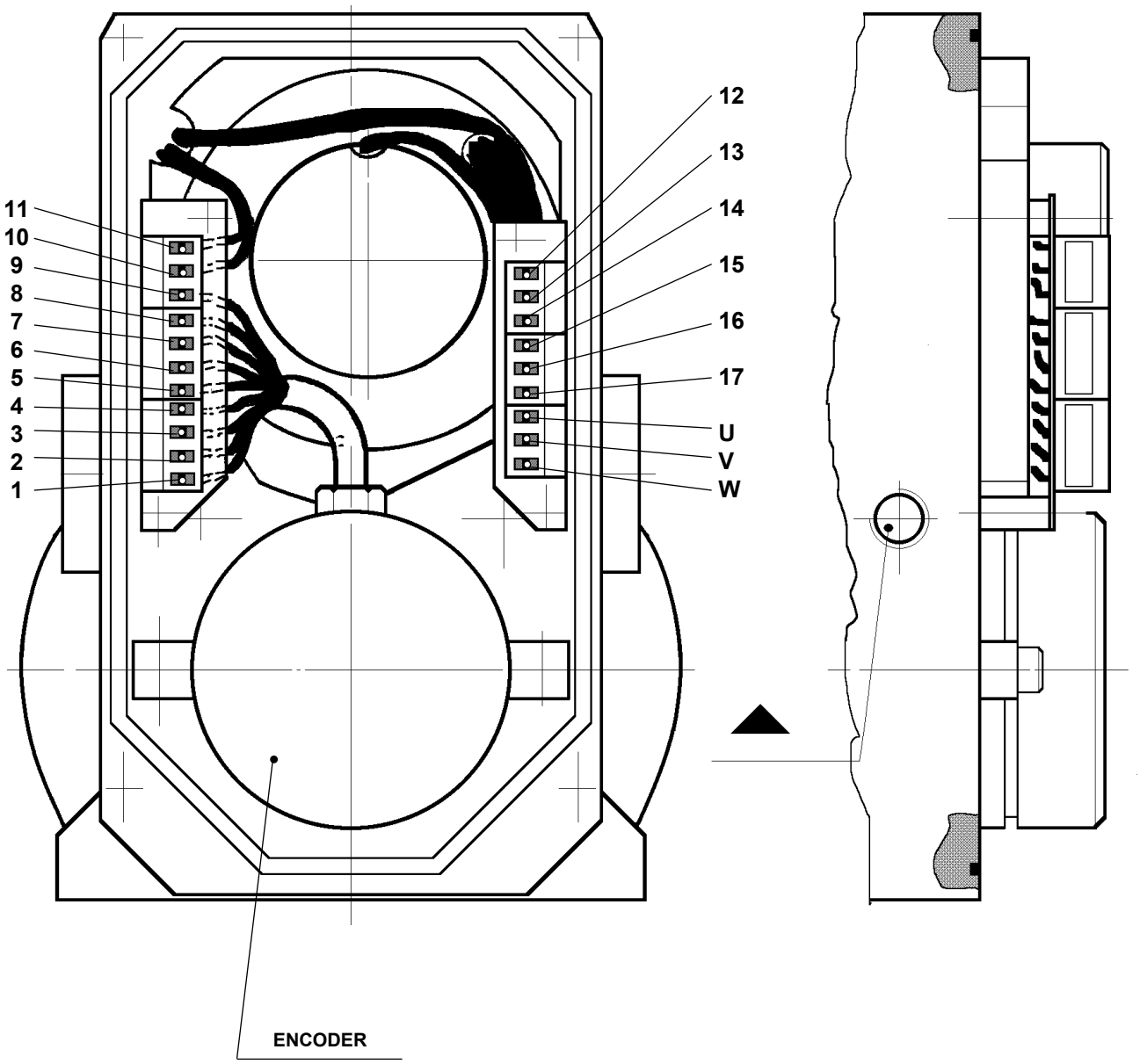
Area in which holes are drillable

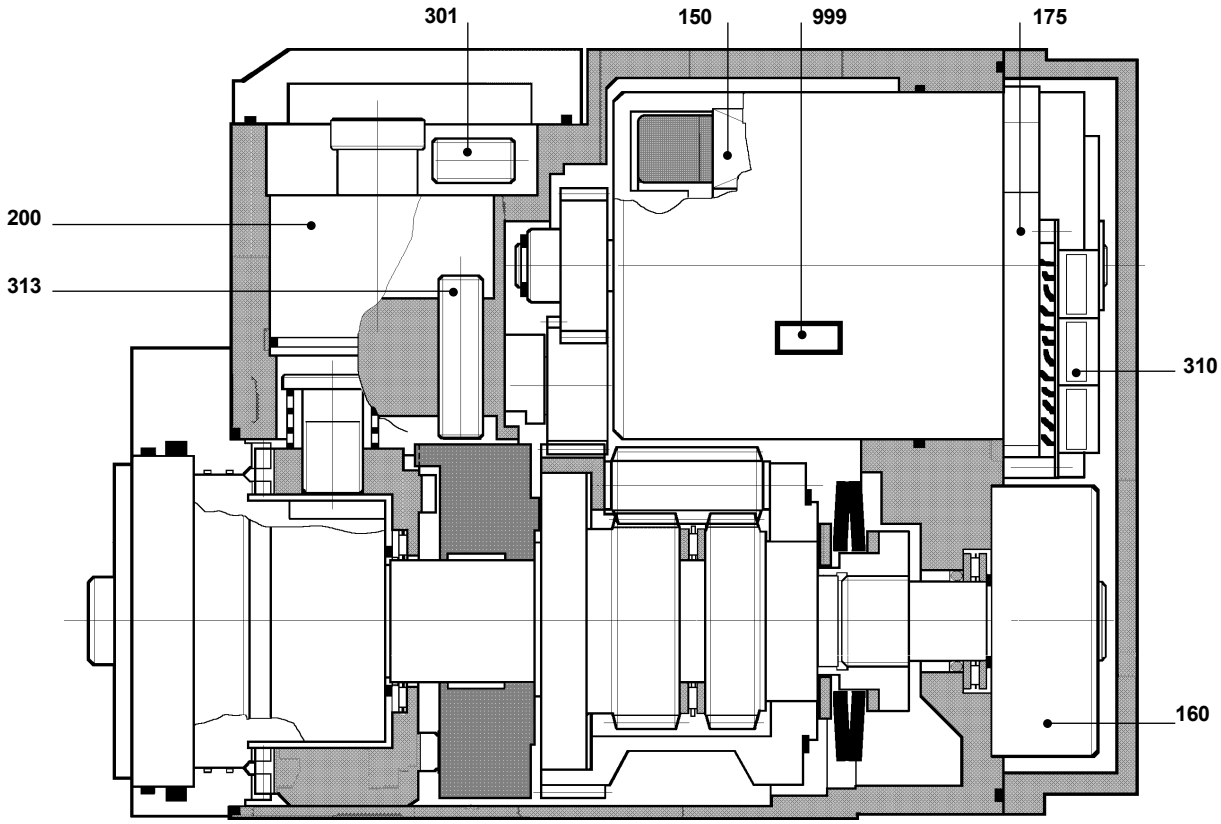
The wire assembly inside the turret has to be made according to the electrical chart (see page 8).

The cables must be arranged so as to prevent them from being squashed when the rear cover 011 is installed. The cables have to be kept tight; any slacckness has to be tucked away in a non dangerous area.

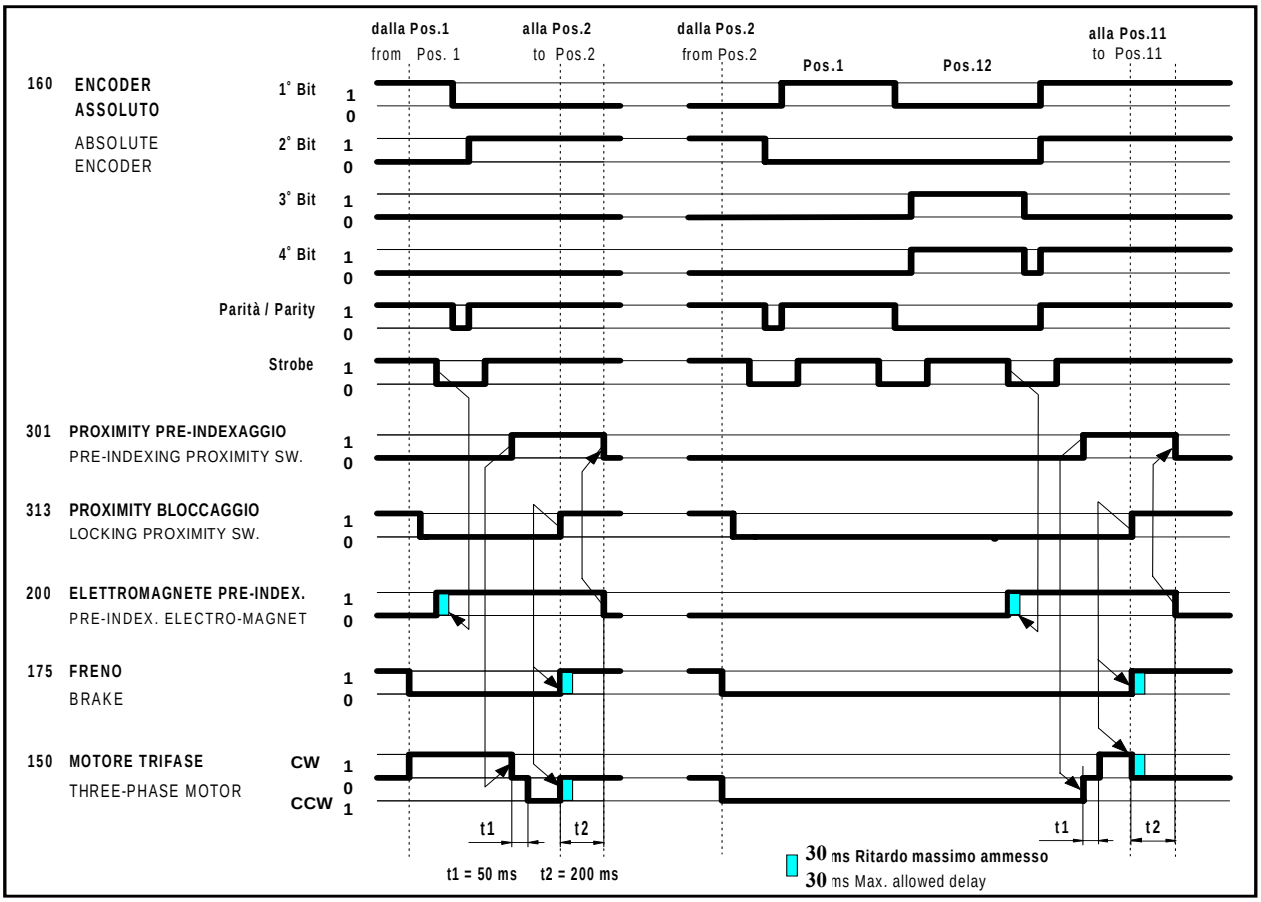
A PG 16 threaded hole for the supply cable outlet is provided on the turret sides.
The connector, the over braided water tight cable, the application and the set up must prevent the coolant liquid from leaking into the turret.

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





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 Yellow Green Violet Red Black Brown Blue Yellow/Green	**1** **2** **3** **4** **5** **6** **7** **8** **9**	**Encoder type 60**
301	PRE-INDEX. PROXIMITY SWITCH	**+ 24 Volt** **0 Volt** **Output**	Brown Blue Black	**7** **8** **10**	**Diam. 12 mm L= 45 mm** **Ripple 10 %** **Output PNP-NO** **max. 300 mA** **Short circuit protection**
313	LOCKING PROXIMITY SWITCH	**+ 24 Volt** **0 Volt** **Output**	Brown Blue Black	**7** **8** **11**	
200	PRE-INDEX. ELECTROMAGNET	**24 Volt DC**	Orange Orange	**12** **13**	**24 Volt 60 Watt** **50 % ED**
999	THERMOSTATIC SWITCH		White White	**14** **15**	**Normally closed type contact (until 120°C)**
175	BRAKE	**24 Volt DC**	Black Black	**16** **17**	
150	THREE PHASE MOTOR		Black X Y Z Red Red Red Yellow / Green	**18** **U** **V** **W**	**110 Volt 50/60 Hz** **220/380 Volt 50/60 Hz** **Ground**
310	TERMINAL BLOCK				



CYCLE DESCRIPTION

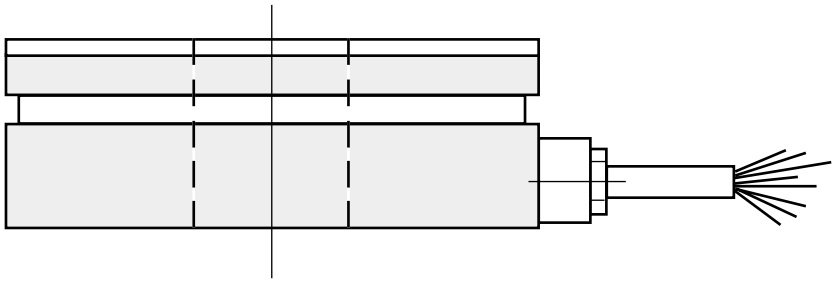
• The above operation diagram shows the sequence to be followed in order to move from position 1 to position 2, in clockwise rotation (with the turret tool-holder disk in front), and from position 2 to position 11 in anti-clockwise rotation.

• The brake is first de-energised and the motor feed for rotation in the direction selected. When the falling wavefront of the STROBE signal for the previous station is arrived at, the pre-indexing electromegnet is energised as quickly as possible (within the maximum permitted delay time).

• With the electromagnet energised, the pre-indexing proximity switch signal is awaited, which confirms that rotation has been halted by means of the index key. Upon reception of this signal the motor is immediately halted and the rotation sense is reversed after a 50 ms pause.
• The locking proximity switch signal is then awaited, before halting the motor as rapidly as possible and energising the brake (within the maximum permitted delay time).
• A safety check can be carried out at this point and consent for machining can be given, followed by electromagnet de-energising after a 200 ms pause.

NOTE: The maximum care should be taken regarding the permitted delays, particulary their repeatibility. (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

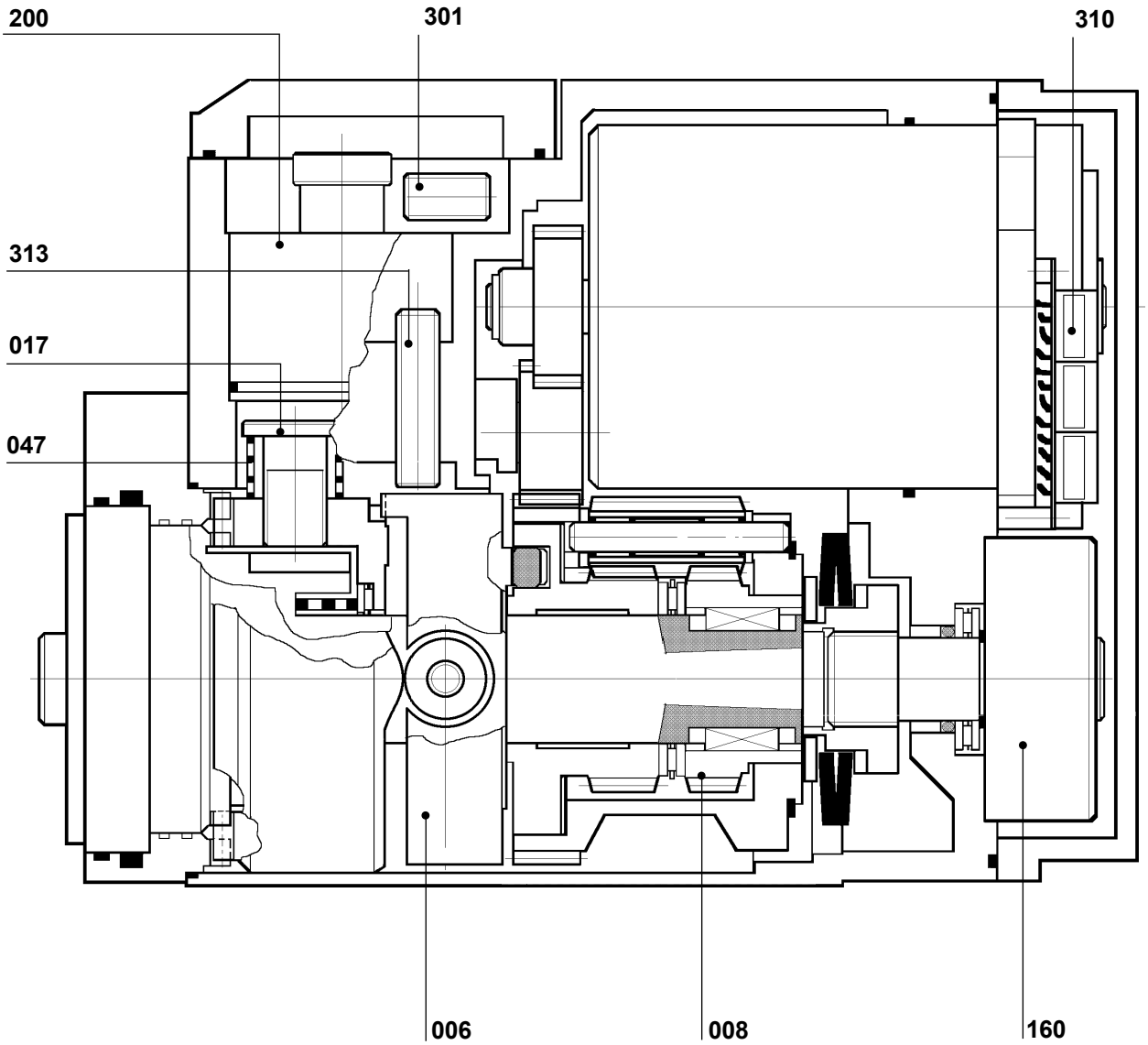
STARTING CONDITIONS

Turret closed - the motor brake is energized and the mobile ring gear 003 is engaged with stationary toothed ring gear 002 and the short-circuiting gear 004.

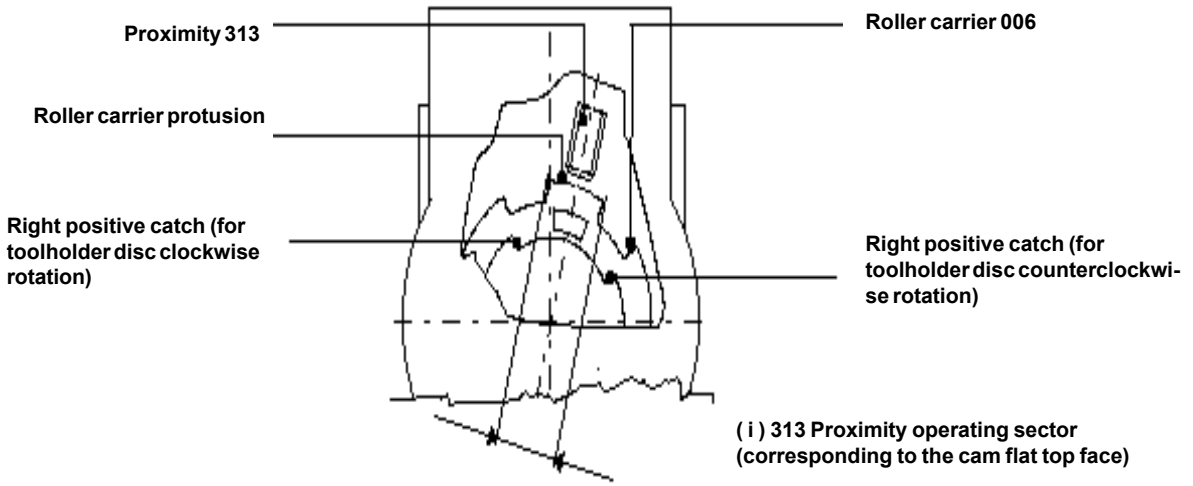
NEW POSITION RESEARCH

The motor brake is de - energized - power is feed to the motor 150, driving pinion 015, which rotates gear wheel and spiders 007 causing planitary gears to rotate the roller carrier 006. When the rollers engage in cam detents in short circuiting ring gear 004, at this stage spring 034 pushes short circuiting ring 004 backwards, disengaging the Hirth coupling. At this point the indexing head 005 rotates through the gear 008.
The encoder 160 feeds back to the NC control system the indexing head absolute position - once the NC system receives the falling strobe signal of the previous to the required indexing position - the electromagnet 200 is energized, this pushes lock 017 into the next indexing head 005 detent allowing preindexing proximity switch 301 signal to be made - the motor is reversed, driving pinion 015 which rotates gear wheel and spiders 007 causing planitary gears 456 to rotate driving rollers to push short circuiting ring 004 into, mobile ring gear 003 and stationary toothed ring gear 002 firmly locking Hirth coupling together at which time the stop proximity switch 313 signal is made, signaling motor 150 to stop and the motor brake to be energized. This compleats the indexing cycle.

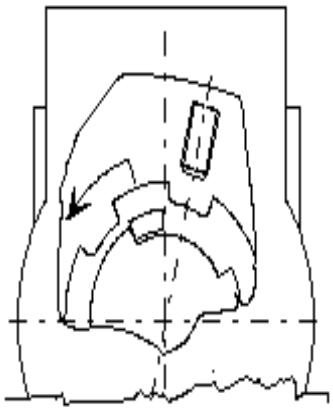
Note: please refer to pages 13, 14, 15 for the part numbers.



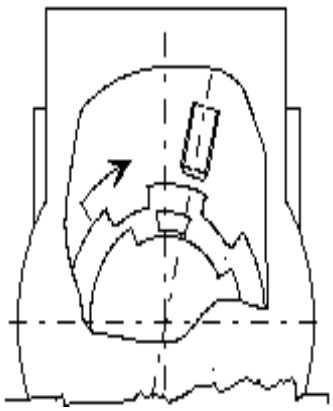
Locked turret (rollers on the cam top central part)



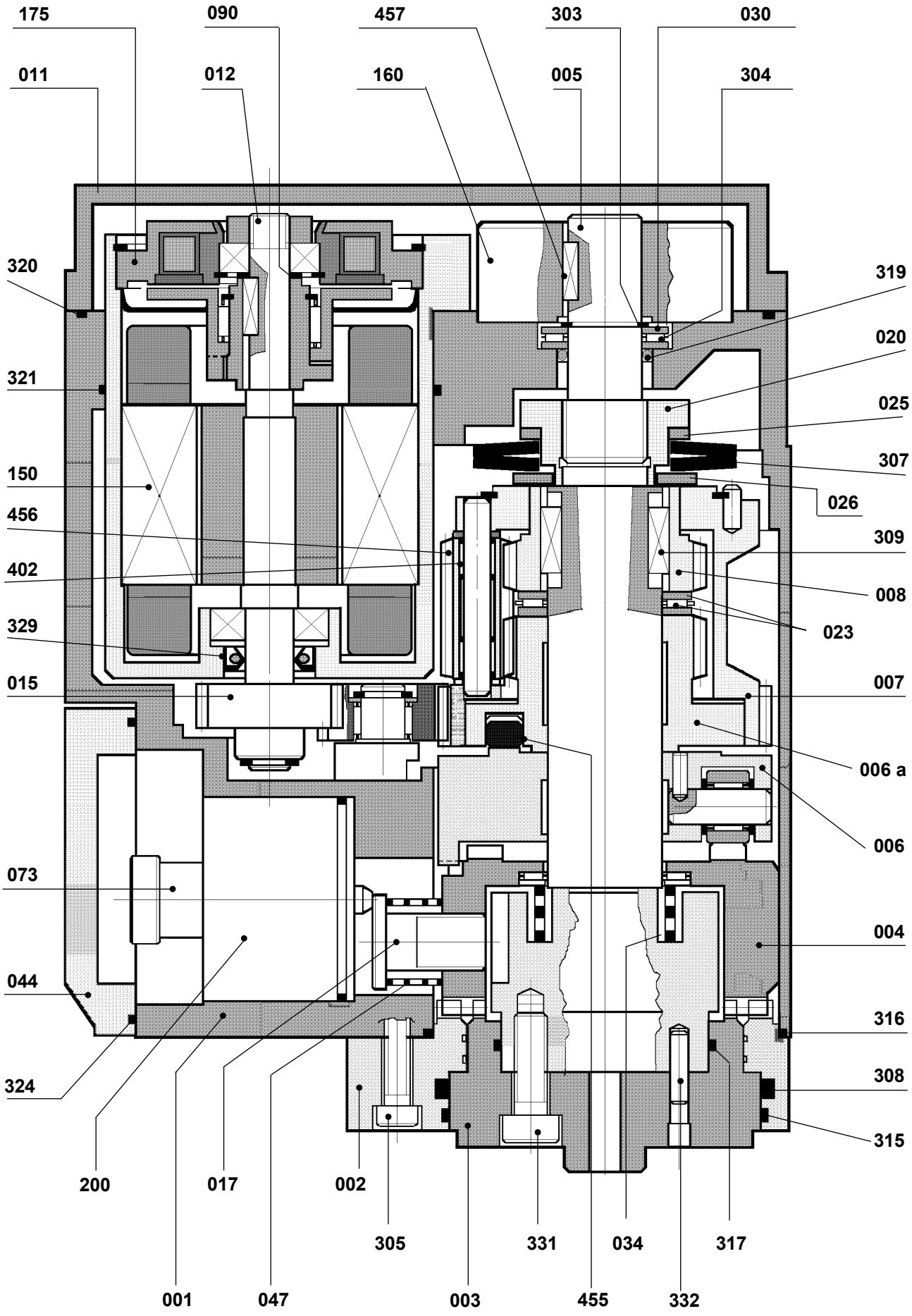
Released turret (the rollers are at the bottom of the cams - the Hirth coupling are released)



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.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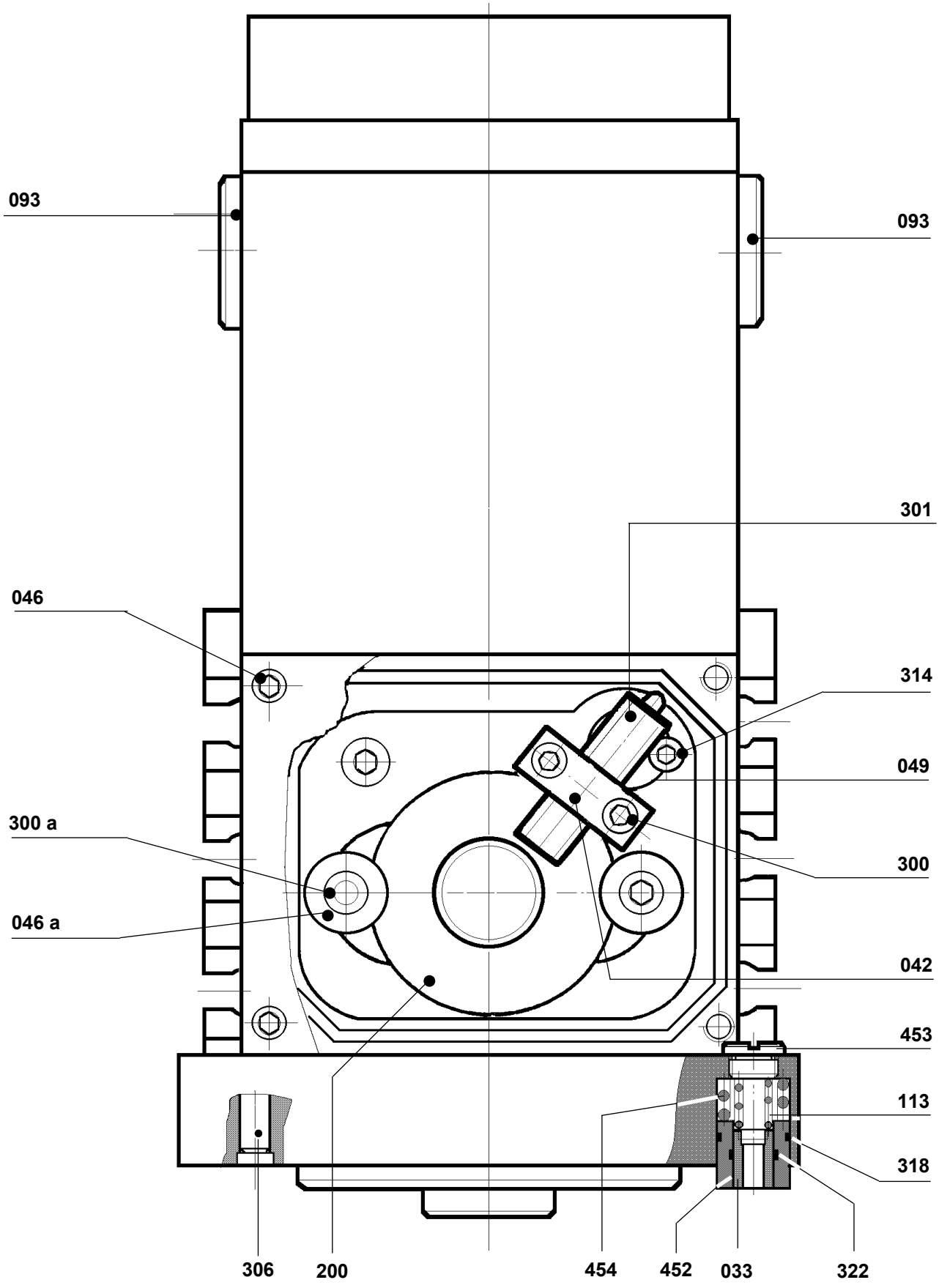
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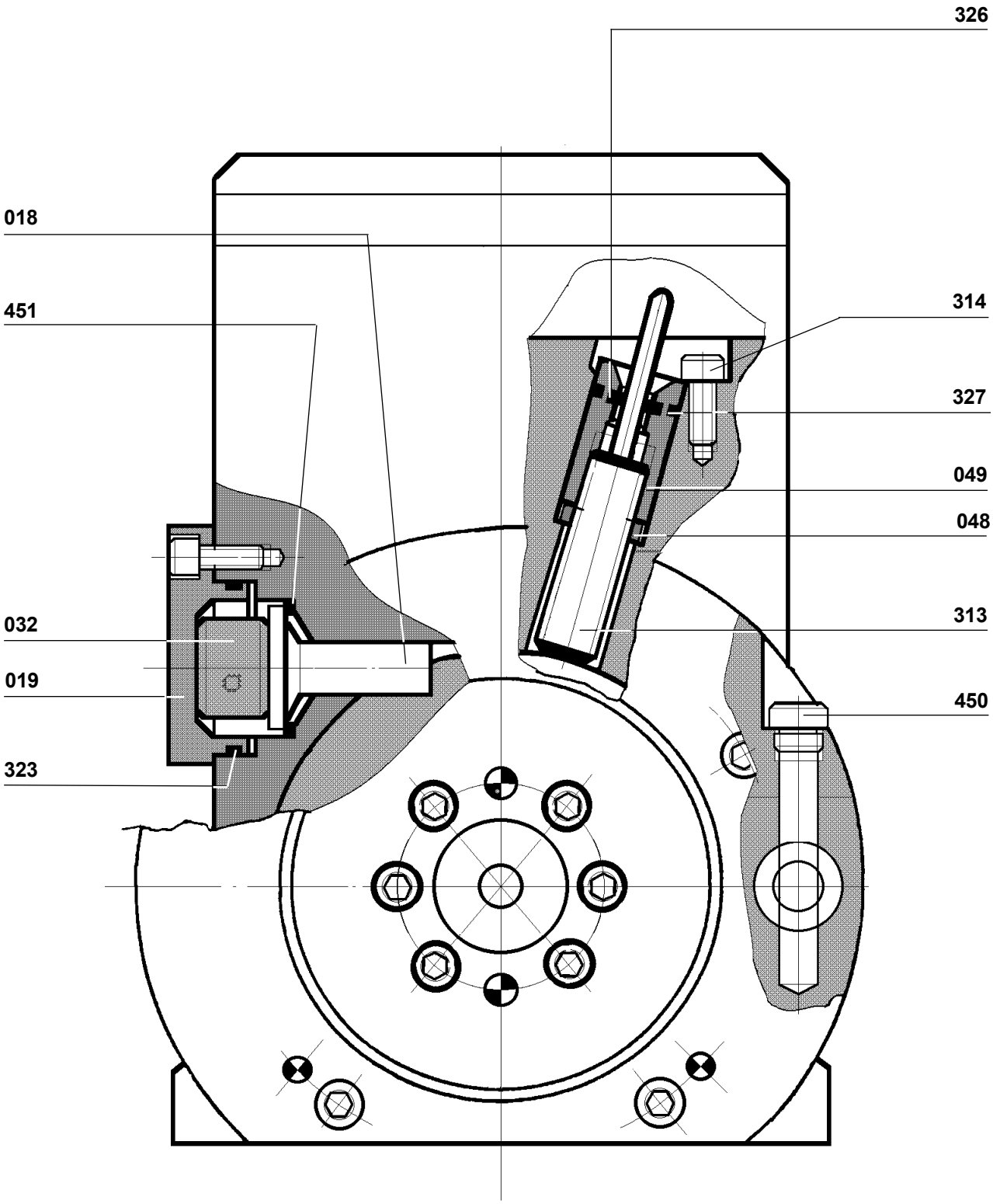
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