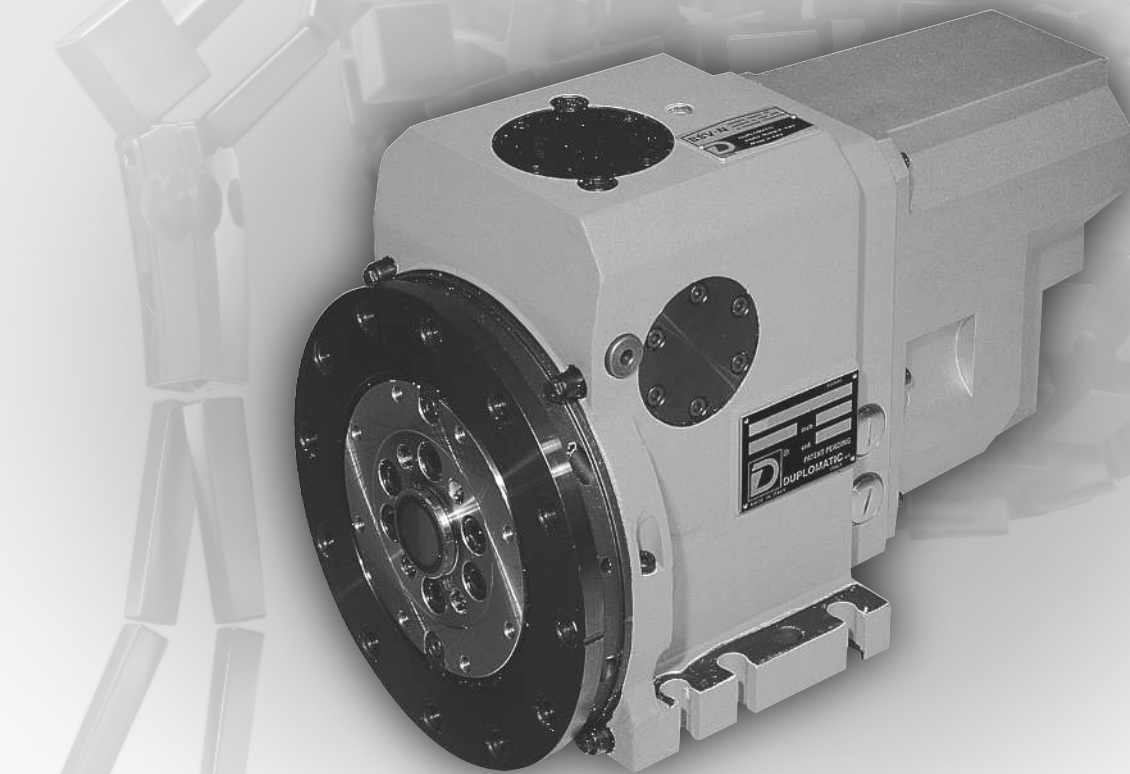




**DIPLOMATIC**  
AUTOMATION



## BSV-N series 25

### ELECTROMECHANICAL TURRETS



TECHNICAL INFORMATION

**I.T. 6430**

**GB** ISSUED **09-08**

The data given in the I.T. are subject to technical modifications without notice.

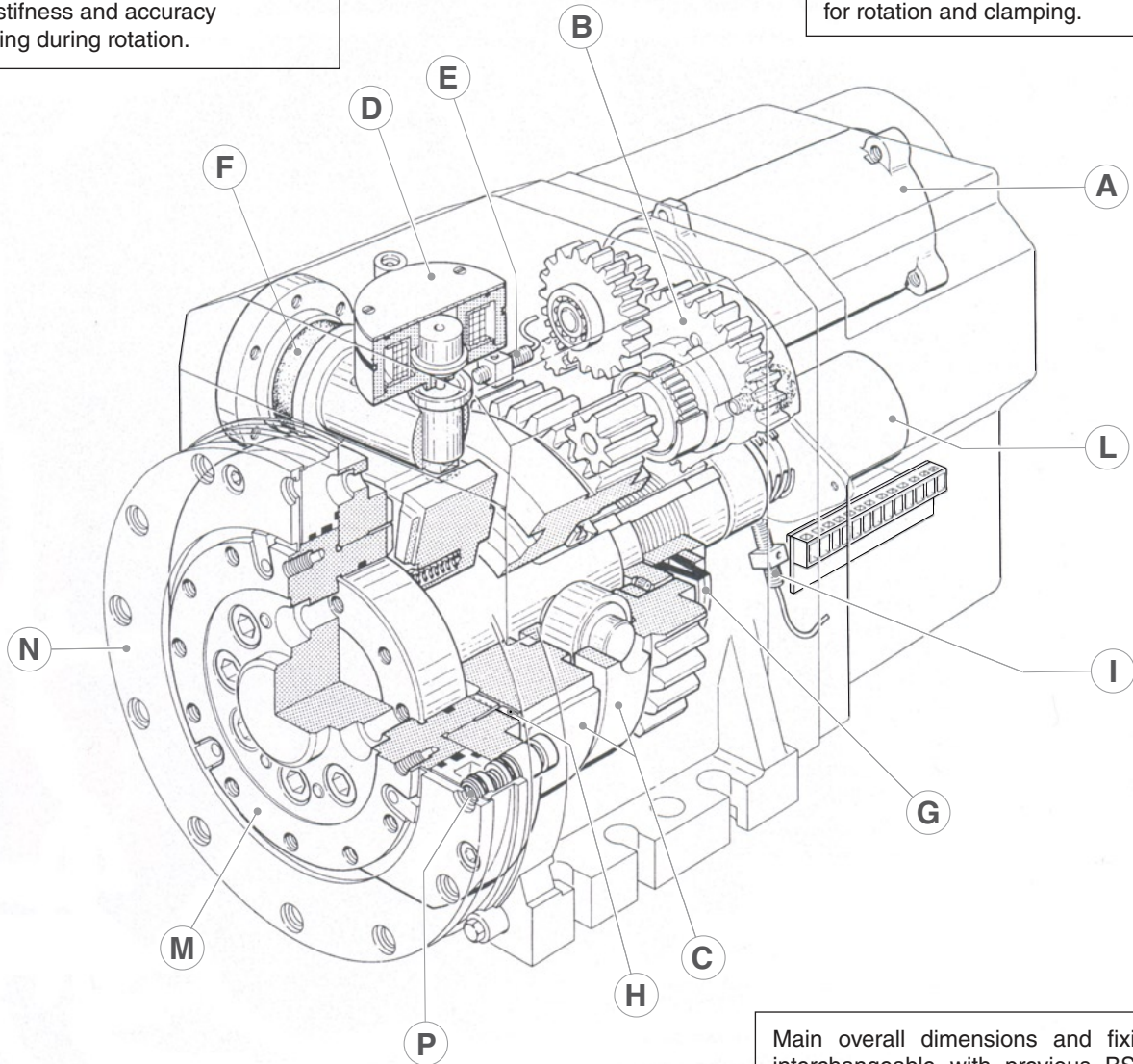
# BSV-N

## WORKING PRINCIPLE

Water-proof housing with oil immersed mechanism, life lubricated.

Clamping on 3-part Hirth front tothing  
– High stiffness and accuracy  
– No lifting during rotation.

Single three-phase electric motor for rotation and clamping.



Main overall dimensions and fixings interchangeable with previous BSV-N series and SM turrets.

- |                                       |  |
|---------------------------------------|--|
| A) Electrical motor (three-phase)     | H) 3-parts front coupling                  |
| B) Gearbox                            | I) Locking control switch                  |
| C) Rotation and cam locking mechanism | L) Angular position transmitter (absolute) |
| D) Pre-indexing solenoid              | M) Rotating plate                          |
| E) Pre-indexing control switch        | N) Coolant flange                          |
| F) Shock-absorber system              | P) Quick change coolant valve              |
| G) Preloaded locking spring           |  |

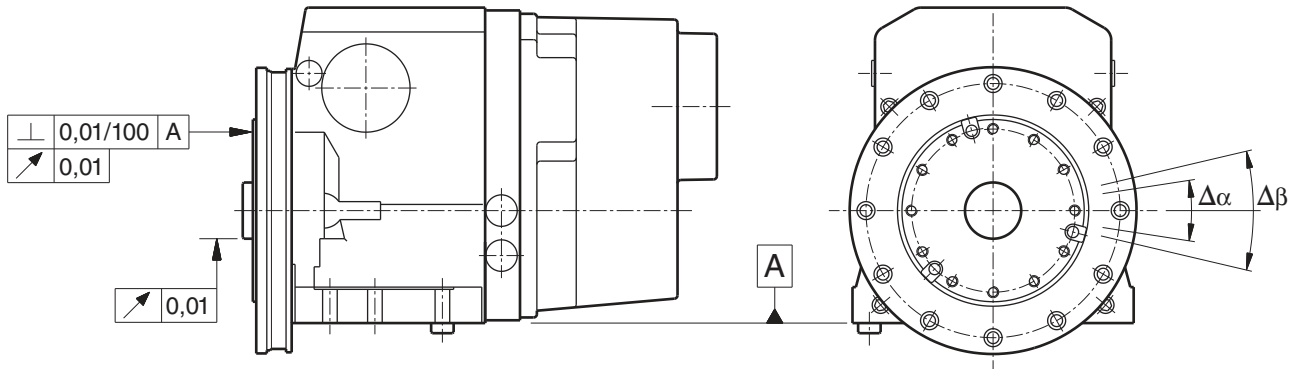
### Technical data

Size		BSV-N 120/25			BSV-N 160/25			BSV-N 200/25			BSV-N 250/25		BSV-N 320/24		BSV-N 400/20			
Tool stations	N°	8÷12			8÷12			8÷12			8÷12		8÷12		8÷12			
Version (1)		std	slow	very slow	fast	std	slow	std	slow	very slow	std	slow	std	slow	std	slow	very slow	
Inertia of transportable mass	Kgm <sup>2</sup>	0,45	0,8	1,2	0,55	0,9	1,8	3	4,5	8	5	9	15	22	22	32	70	
Indexing time (including locking)	30°	s	0,41	0,48	0,58	0,41	0,48	0,58	0,65	0,78	1	0,78	1	1,10	1,25	1,25	1,45	2,05
	45°	s	0,48	0,57	0,69	0,48	0,57	0,69	0,78	0,94	1,18	0,94	1,18	1,25	1,45	1,45	1,65	2,50
	180°	s	1,16	1,38	1,65	1,16	1,38	1,65	1,83	2,23	2,80	2,23	2,80	2,71	3,18	3,18	3,66	5,53
Rotating time only	30°	s	0,15	0,18	0,21	0,15	0,18	0,21	0,24	0,30	0,36	0,30	0,36	0,33	0,38	0,38	0,45	0,68
	45°	s	0,23	0,27	0,32	0,23	0,27	0,32	0,36	0,45	0,54	0,45	0,54	0,49	0,58	0,58	0,67	1
Indexing frequency $\alpha=90^\circ$	cycle/min	16	14	11	14	12	10	11	9	7	9	7	6	5	5	4	3	
Electric supply		See wiring diagram																
Mass (without disc)	~ Kg	40			52			92			120		240		420			
Ambient temperature range	°C	5 ÷ 40			5 ÷ 40			5 ÷ 40			5 ÷ 40		5 ÷ 40		5 ÷ 40			
Coolant supply: (2)																		
	• Costant flow	bar	7			7			7			7		7		7		
• Pressure cut-off during turret rotation	bar	14			14			14			14		14		14			
Protection degree (DIN 40050)		IP65			IP65			IP65			IP65		IP65		IP65			

(1) Other versions on request.

(2) Filtering  $\leq 150 \mu\text{m}$ .

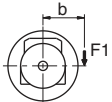
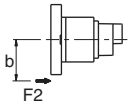
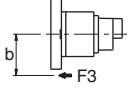

### Accuracy

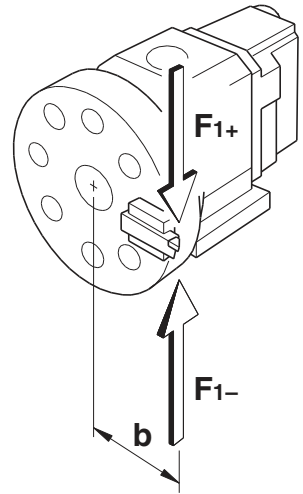
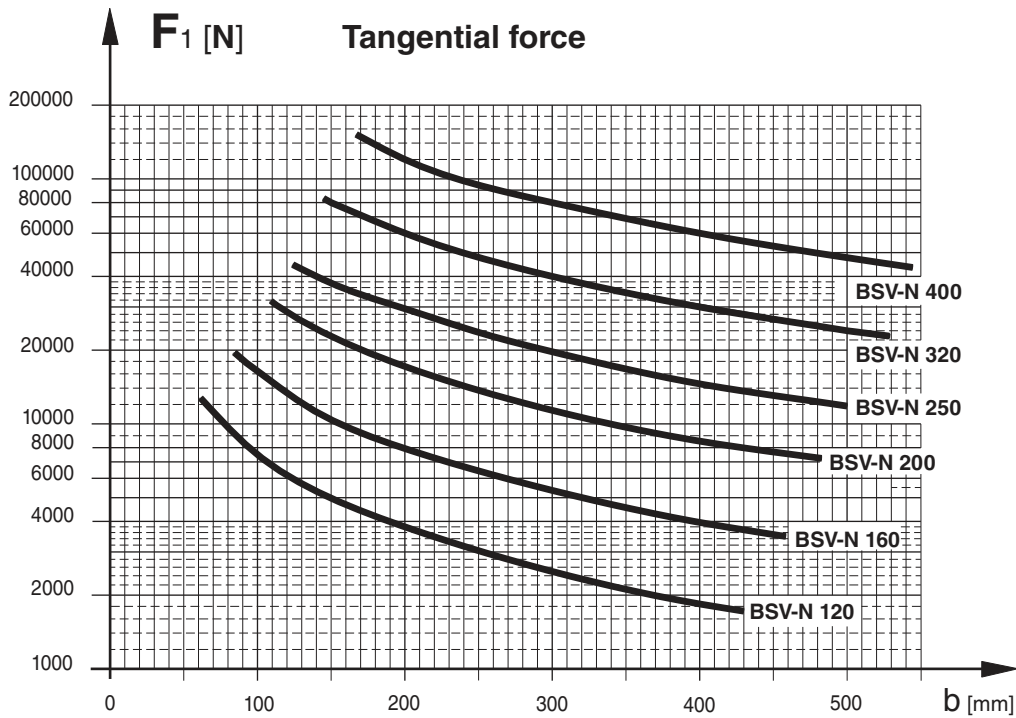


Repeatability accuracy  $\Delta\alpha = \pm 1,6''$  ( 0,78  $\mu\text{m}/100\text{ mm}$ )

Indexing accuracy  $\Delta\beta = \pm 4''$  ( 1,9  $\mu\text{m}/100\text{ mm}$ )

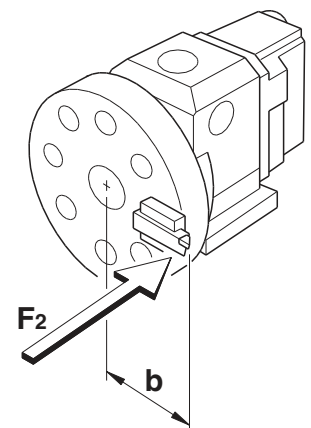
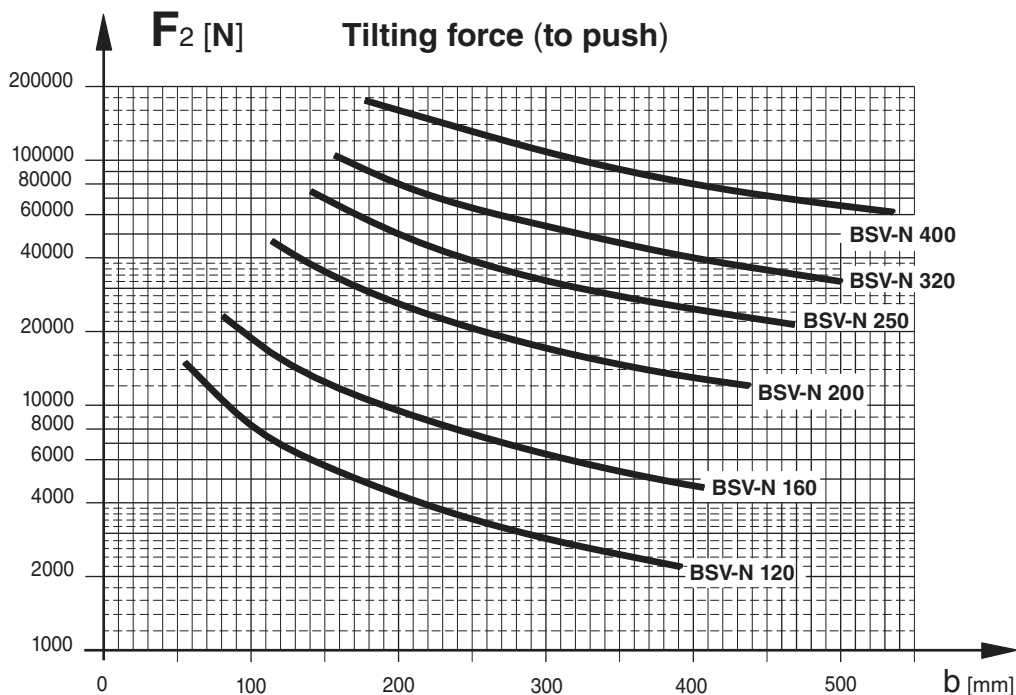
### Loading capacity

				BSV-N 120	BSV-N 160	BSV-N 200	BSV-N 250	BSV-N 320	BSV-N 400
	Max. tangential torque	F1xb	Nm	750	1.600	3.500	6.000	12.000	24.000
	Max. tilting torque (to push)	F2xb	Nm	850	1.900	5.200	10.000	16.000	32.000
	Max. tilting torque (to lift)	F3xb	Nm	400	800	2.500	4.000	7.000	15.000
	Unbalancing torque	P x b	Nm	10	12	40	60	120	400



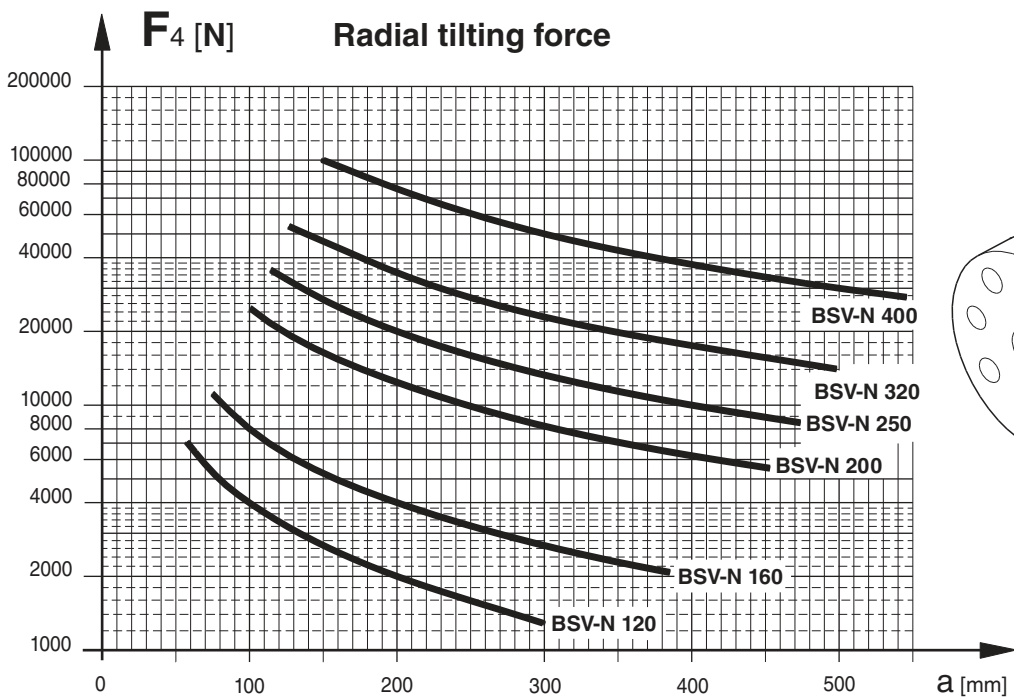
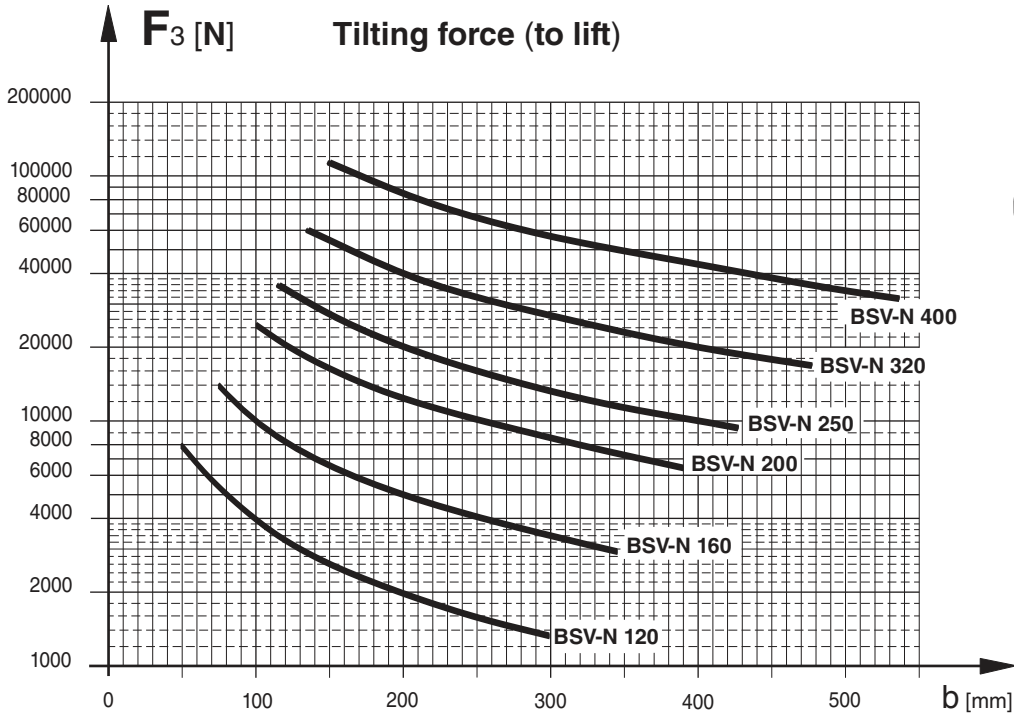
The diagram refers to F<sub>1</sub> values which cause elastic yielding within the rates shown in the schedule.

Turret size		120	160	200	250	320	400
Max. elastic yielding	mm	0,05	0,07	0,08	0,14	0,12	0,16
Distance from centre of measuring point	mm	140	170	220	270	330	350



# BSV-N

## DUTY PERFORMANCES

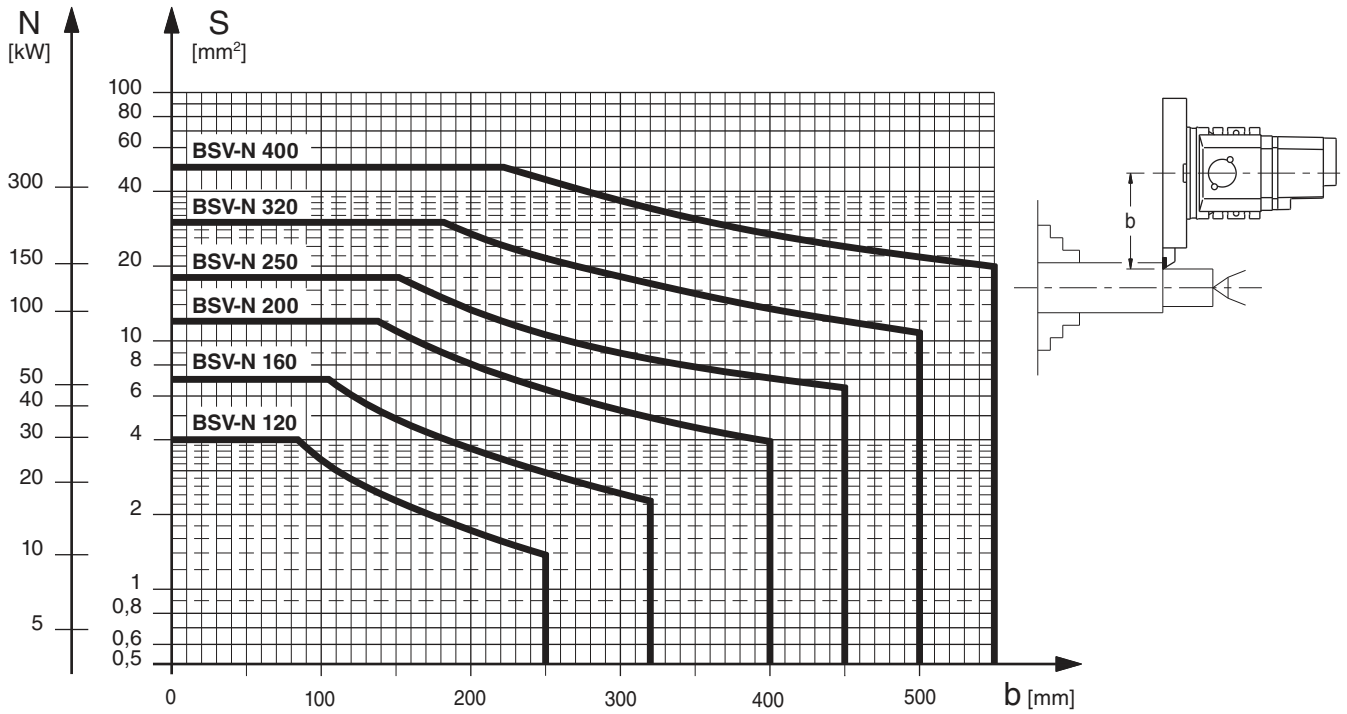


# BSV-N

## PARAMETERS FOR TURRET SELECTION

**S: CHIP CROSS-SECTION** (max) for steel R = 600 N/mm<sup>2</sup> K<sub>s</sub> = 2.200 N/mm<sup>2</sup>

**N: POWER** (max) for V<sub>t</sub> = 200 m/min

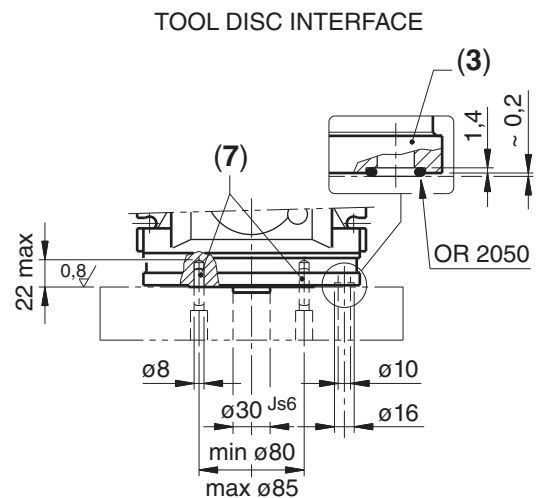
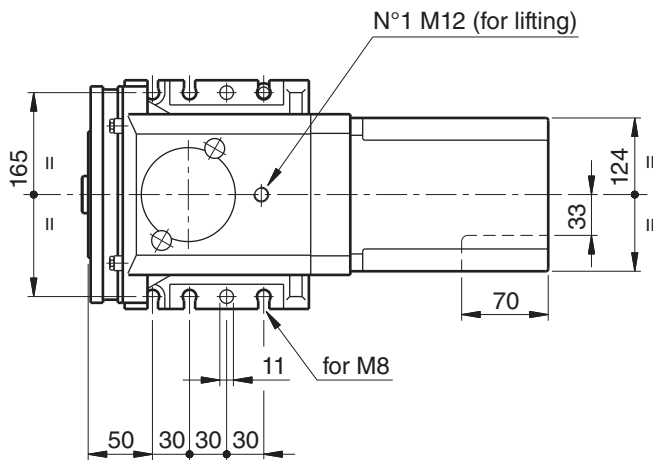
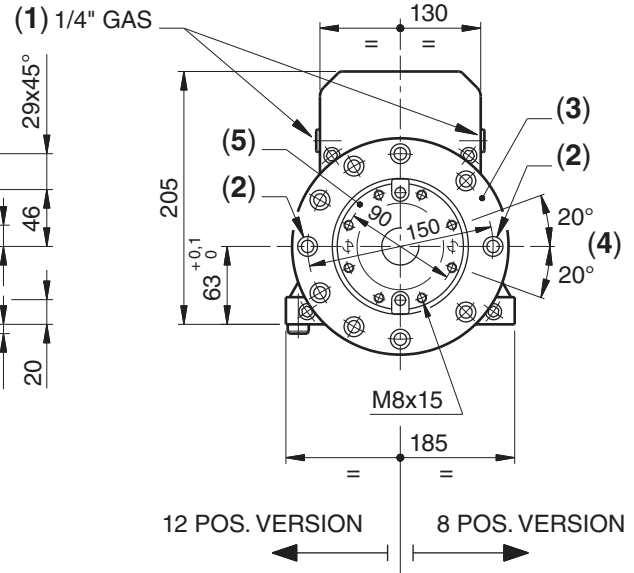
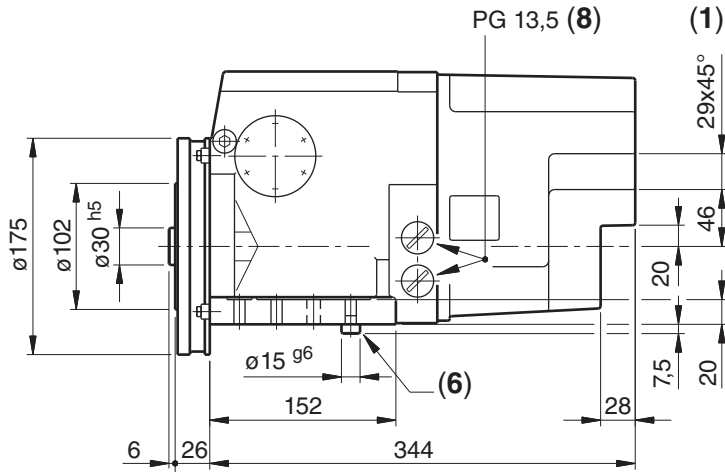


- For any material with different K<sub>s</sub>: 
$$S_x = \frac{S \times 2.200}{K_x}$$

- For different cutting speeds: 
$$N_x = N \times \frac{V_{tx}}{200}$$

# BSV-N 120/25

## OVERALL DIMENSIONS



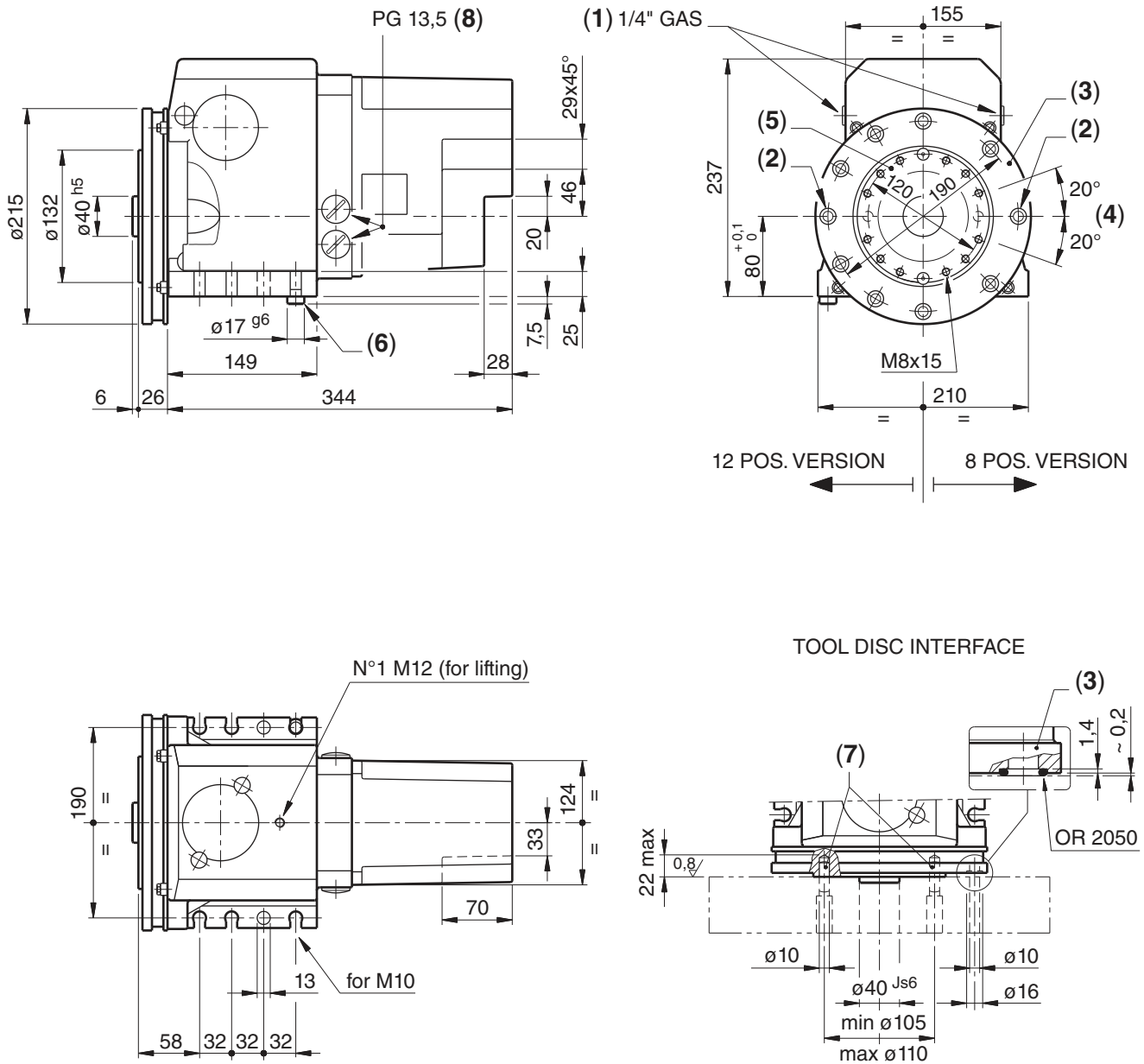
- 1) Inlet coolant position, at choice.
- 2) Right or left coolant outlet position.
- 3) Adjustable coolant ring.
- 4) Coolant outlet displacement range.
- 5) Soft surface for boring the disc reference pins.
- 6) Reference pin to be positioned on both side, at choice.
- 7) Reference pins between tool disc and turret.

- 8) Electrical connections on both side, at choice.
- Important:** The connection cable must be provided with fittings and gaskets in order to avoid penetration of water into the turret.



# BSV-N 160/25

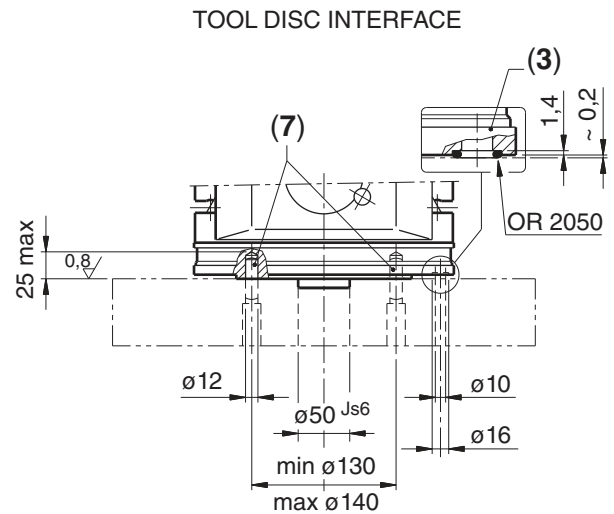
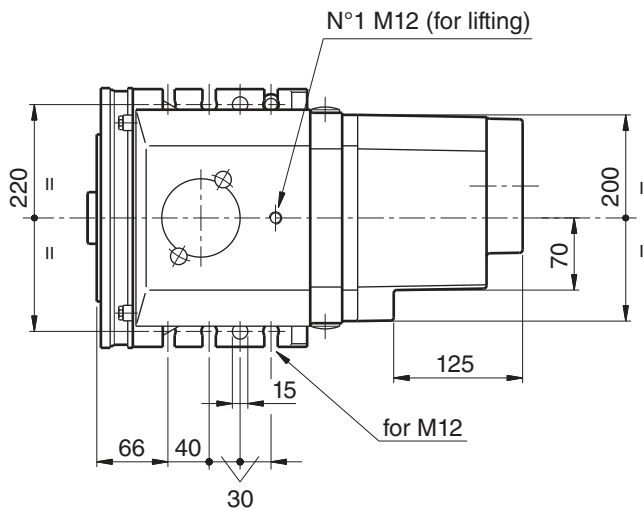
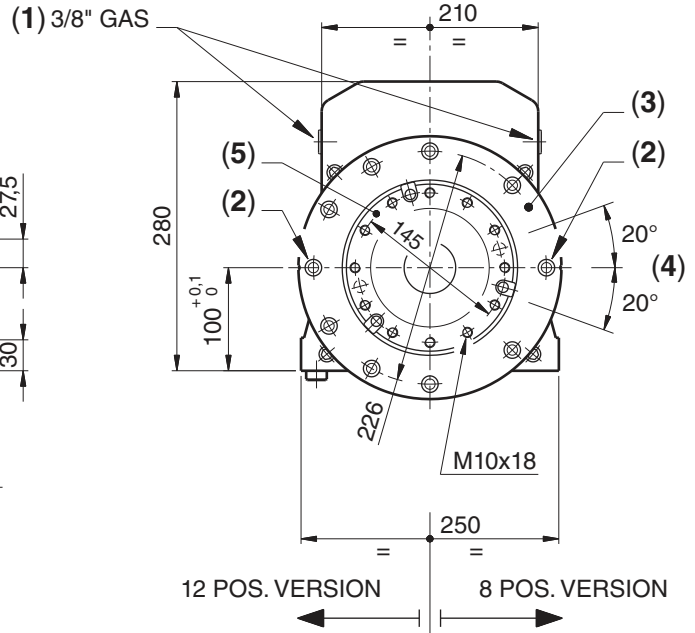
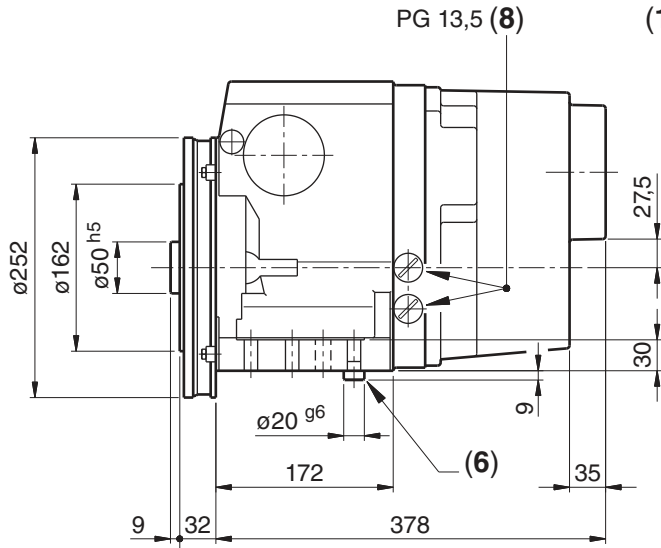
## OVERALL DIMENSIONS



- 1) Inlet coolant position, at choice.
  - 2) Right or left coolant outlet position.
  - 3) Adjustable coolant ring.
  - 4) Coolant outlet displacement range.
  - 5) Soft surface for boring the disc reference pins.
  - 6) Reference pin to be positioned on both side, at choice.
  - 7) Reference pins between tool disc and turret.
  - 8) Electrical connections on both side, at choice.
- Important:** The connection cable must be provided with fittings and gaskets in order to avoid penetration of water into the turret.

# BSV-N 200/25

## OVERALL DIMENSIONS



1) Inlet coolant position, at choice.

2) Right or left coolant outlet position.

3) Adjustable coolant ring.

4) Coolant outlet displacement range.

5) Soft surface for boring the disc reference pins.

6) Reference pin to be positioned on both side, at choice.

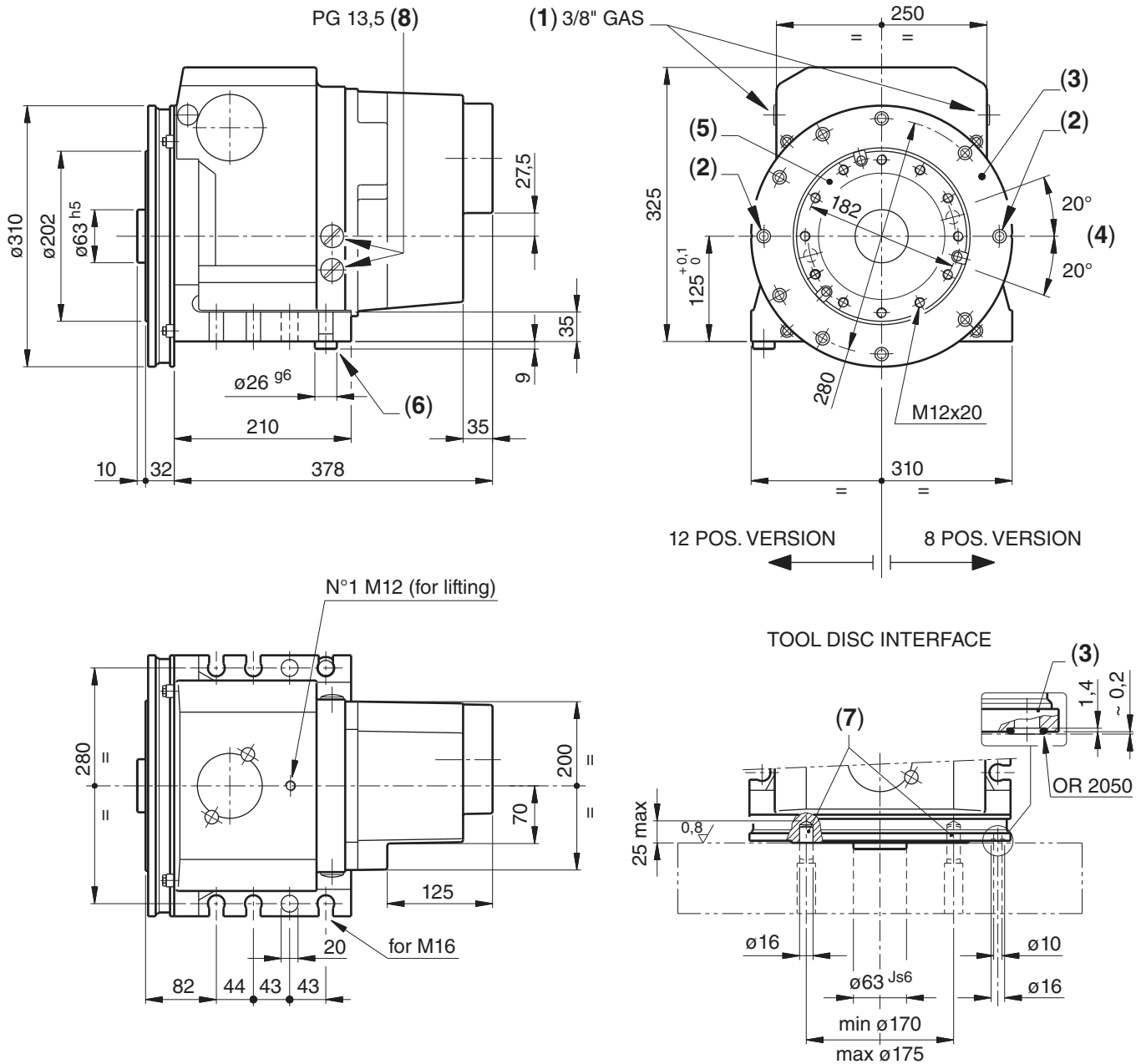
7) Reference pins between tool disc and turret.

8) Electrical connections on both side, at choice.

**Important:** The connection cable must be provided with fittings and gaskets in order to avoid penetration of water into the turret.

# BSV-N 250/25

## OVERALL DIMENSIONS



1) Inlet coolant position, at choice.

2) Right or left coolant outlet position.

3) Adjustable coolant ring.

4) Coolant outlet displacement range.

5) Soft surface for boring the disc reference pins.

6) Reference pin to be positioned on both side, at choice.

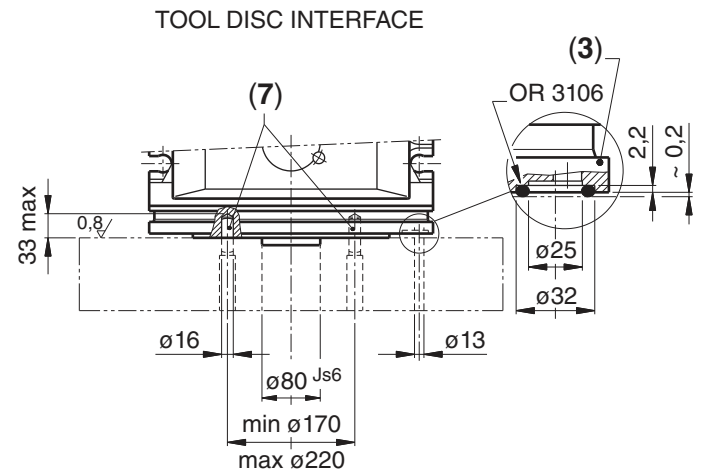
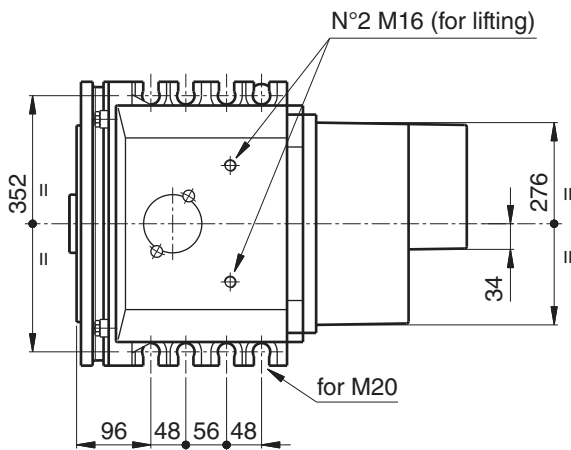
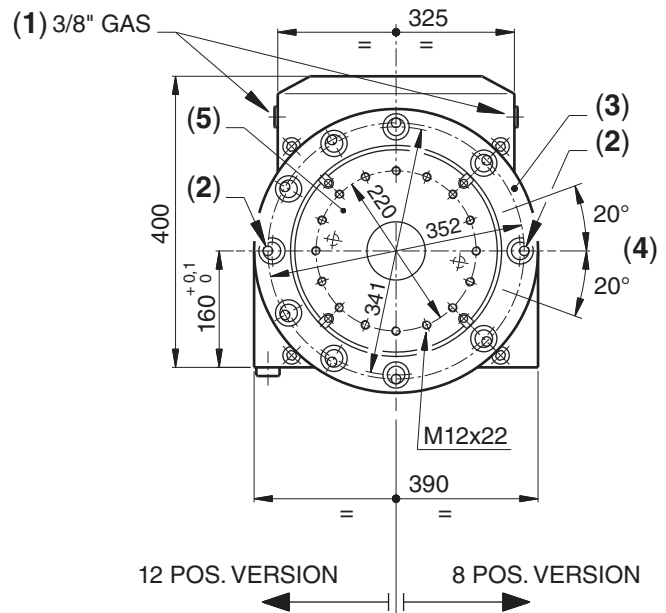
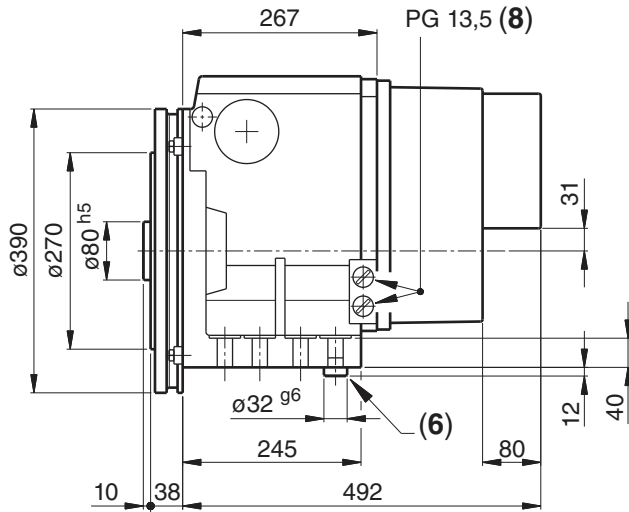
7) Reference pins between tool disc and turret.

8) Electrical connections on both side, at choice.

**Important:** The connection cable must be provided with fittings and gaskets in order to avoid penetration of water into the turret.

# BSV-N 320/24

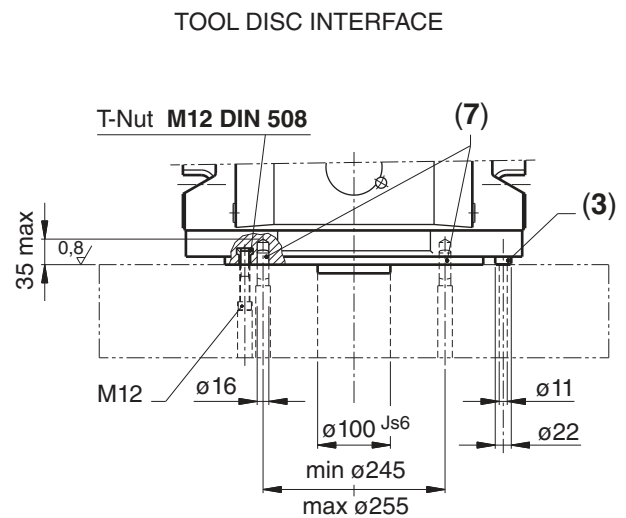
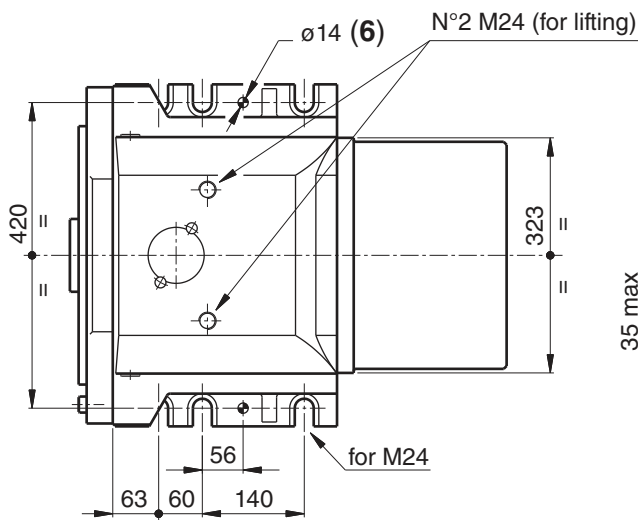
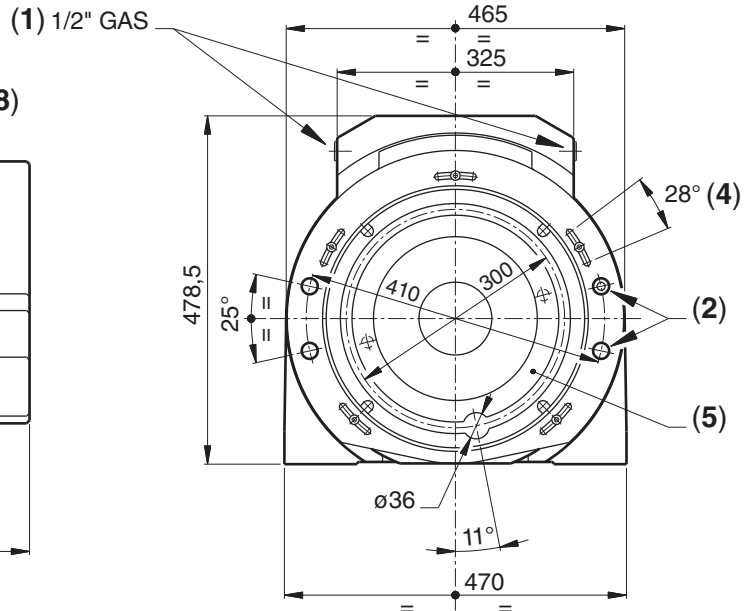
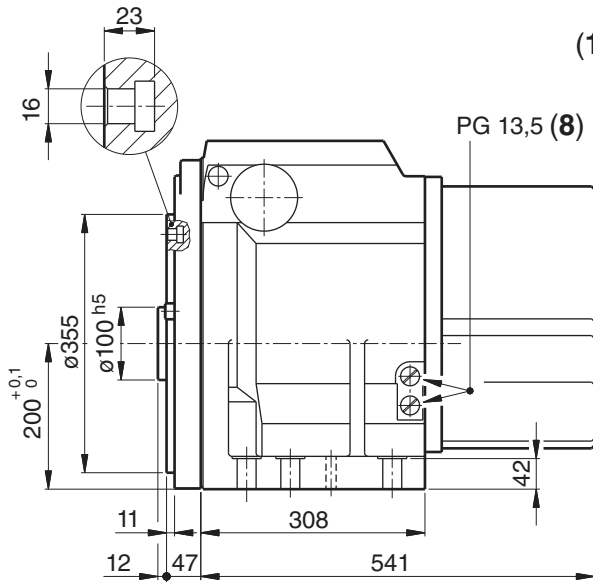
## OVERALL DIMENSIONS



- 1) Inlet coolant position, at choice.
  - 2) Right or left coolant outlet position.
  - 3) Adjustable coolant ring.
  - 4) Coolant outlet displacement range.
  - 5) Soft surface for boring the disc reference pins.
  - 6) Reference pin to be positioned on both side, at choice.
  - 7) Reference pins between tool disc and turret.
  - 8) Electrical connections on both side, at choice.
- Important:** The connection cable must be provided with fittings and gaskets in order to avoid penetration of water into the turret.

# BSV-N 400/20

## OVERALL DIMENSIONS

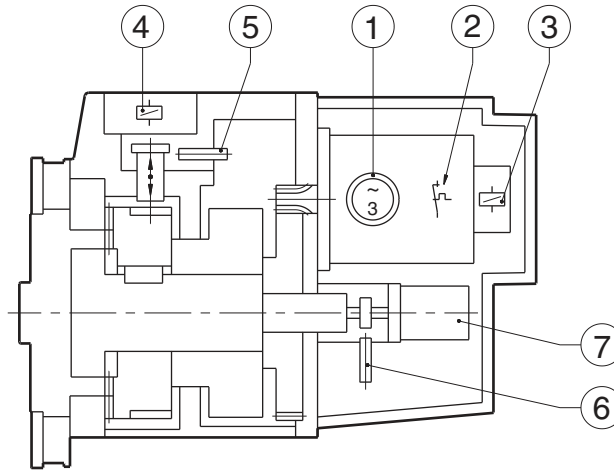


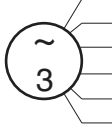






- 1) Inlet coolant position, at choice.
- 2) 4 coolant outlet position.
- 3) Coolant valve. The valve can be fitted on one of the 4 coolant outlet position. The drawing represents how the valve is positioned when the disc is mounted. Without the disc, the valve produces by  $2 \div 3$  mm is comparison with the position indicated.
- 4) Coolant outlet displacement range.
- 5) Soft surface for boring the disc reference pins.
- 6) Reference pin to be positioned on both side, at choice.
- 7) Reference pins between tool disc and turret.
- 8) Electrical connections on both side, at choice.  
**Important:** The connection cable must be provided with fittings and gaskets in order to avoid penetration of water into the turret.

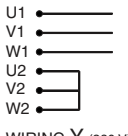
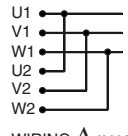


# BSV-N

## WIRING DIAGRAM



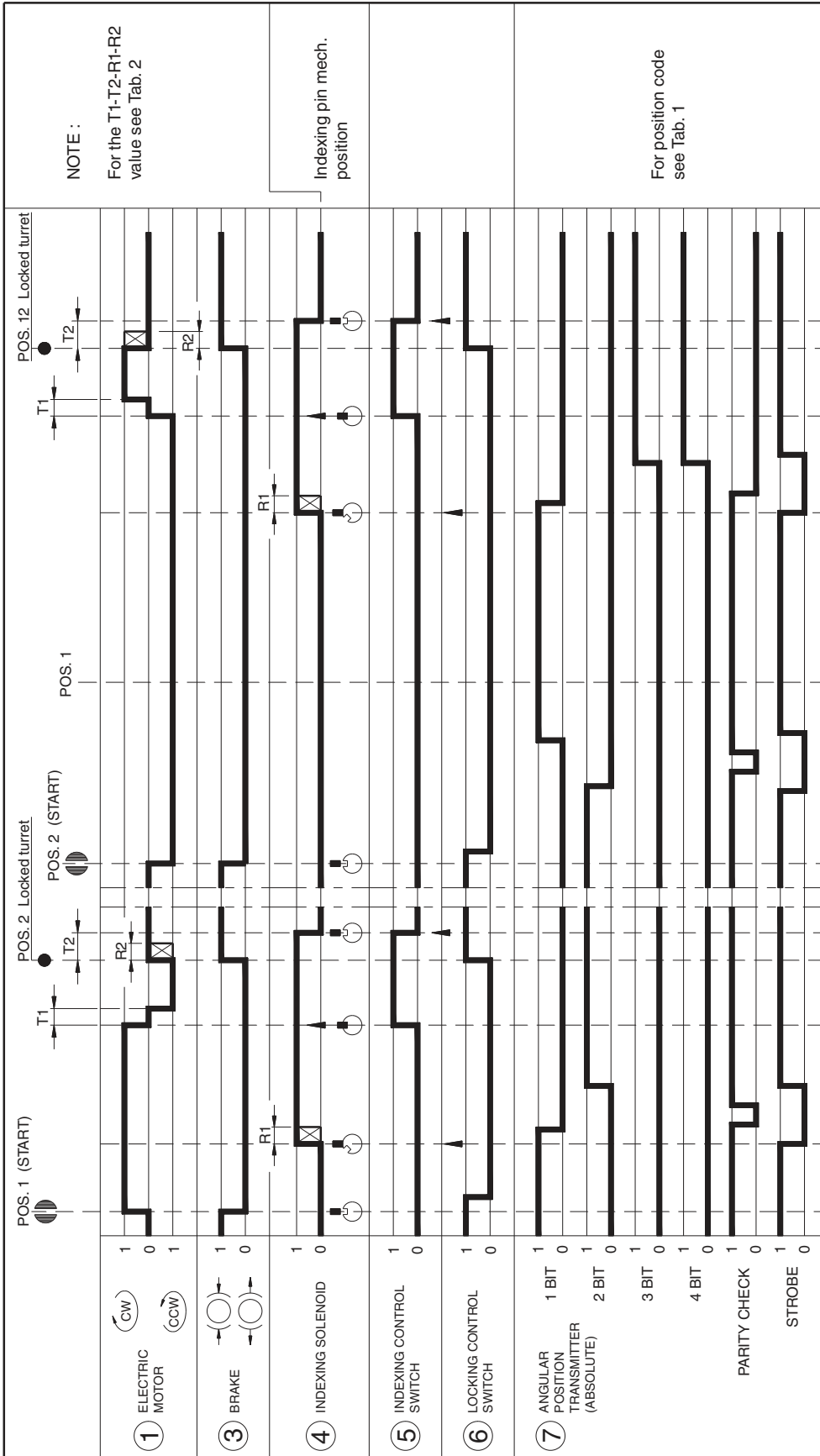
REF.	COMPONENT	CHARACTERISTICS	WIRING NUMBER		SIGNALS
			SYMBOLS	COLOUR	
1	ELECTRIC MOTOR (three-phase)	(1) 220-380 V 50/60 Hz For other characteristics see Tab. 1		U1 WHITE V1 GREEN W1 BLACK U2 WHITE V2 GREEN W2 BLACK	See Tab. 2
2	THERMAL DETECTOR	135 °C 1,5A 250V		1 BROWN 2 BROWN	(2)
3	BRAKE	24 V D.C. BSV-N 120/160 = 8 W BSV-N 200/400 = 12 W		3 GREEN 4 GREEN	
4	INDEXING SOLENOID	24V D.C. 44 W		5 BLUE 6 BROWN	
5	INDEXING CONTROL SWITCH	24V D.C. ± 10% 200 mA (load) OUTPUT-PNP-NO		7 BROWN 8 BLACK 9 BLUE	+ V D.C. EXIT 0 V D.C.
6	LOCKING CONTROL SWITCH			7 BROWN 10 BLACK 9 BLUE	+ V D.C. EXIT 0 V D.C.
7	ANGULAR POSITION TRANSMITTER (ABSOLUTE)	24 V D.C. ± 10% 350 mA (supply) 50 mA/exit (load) OUTPUT-PNP		7 BROWN 9 BLUE 11 WHITE 12 YELLOW 13 GREEN 14 VIOLET 15 BLACK 16 PINK	+ V D.C. 0 V D.C. Bit 1 Bit 2 Bit 3 Bit 4 Strobe Parity check
				GREEN / YELLOW	PE

ELECTRIC MOTOR CHARACTERISTICS			Tab. 1	ELECTRIC MOTOR'S WIRING (1)		Tab. 2
Turret size	Minimum required power	Short circuit power				
<b>BSV-N 120/160</b>	KVA 1,10	KVA 1,60		U1 V1 W1 U2 V2 W2	U1 V1 W1 U2 V2 W2	
<b>BSV-N 200/250</b>	KVA 1,80	KVA 2,80		WIRING Y (380 V)	WIRING Δ (220 V)	
<b>BSV-N 320/400</b>	KVA 2,60	KVA 3,80				

(1) Other voltages on request.

(2) The thermal detector gives a signal only motor overheating.

# BSV-N CYCLE



Tab. 2

TURRET SIZE	TURRET SIZE							
	120	160	200	250	320	400	120	160
	T1 (ms)	50	50	50	50	100	100	50
PROGRAMMING TIME	200		200		200		200	
ALLOWED LAG TIME MAX	Standard and fast		Standard		Slowed		Slow and very slow	
R1 (ms)	40	40	40	40	70	70	40	40
R2 (ms)	40	40	40	40	80	80	40	40

Tab. 1

FUNCTION	POSITIONS											
	1	2	3	4	5	6	7	8	9	10	11	12
1 BIT	1	0	1	0	1	0	1	0	1	0	1	0
2 BIT	0	1	1	0	0	1	1	0	0	1	1	0
3 BIT	0	0	0	1	1	1	1	0	0	0	0	1
4 BIT	0	0	0	0	0	0	0	1	1	1	1	1
PARITY CHECK	1	1	0	1	0	0	1	1	0	0	1	0
STROBE	1	1	1	1	1	1	1	1	1	1	1	1

CW → ← CCW



### 1. – Signals

To get a change of positions on the BSV-N turrets, the control equipment (usually a N.C. equipment) must control the components mentioned below according to a well defined sequence (see wiring diagram on page 15).

- Motor (1)
- Brake (3)
- Indexing solenoid (4)

The following output signals from the turret are provided for driving the positioning cycle:

- Angular position given by the angular position transmitter (7)
- Indexing control switch (5)
- Locking control switch (6).

### 1. – Description of the operating sequence

This description refers to sequence cycle: the first part gives the sequence to pass from position 1 to position 2 with clockwise rotation, the second part gives the sequence to pass from position 2 to position 12 with counterclockwise rotation.

As indicated by the cycle, the controls are to be performed according with the following sequence:

- De-energize the brake (3) and start motor rotation in the desired direction.

- If, as in the case shown by the diagram, the next position (pos. 2) is the Stop position, when the strobe signal reached a zero level, the solenoid (4) is to be energized.

In case of passage from position 2 to position 12, wait for the reading signaling the passage on pos. 1 then, since the next one is the Stop position, wait until the next strobe signal reaches a zero level and (at that time only) energize the solenoid (4).

**N.B.:** The maximum lag time between the reading of the strobe signal and the excitation of the solenoid (4) cannot exceed the R1 values indicated in the table.

- The turret goes on rotating until the indexing pin, pushed by the solenoid (4), enters into the mechanical stop slot.

This movement is detected by the sensor (5) which must immediately stop the motor that, once expired the T1 time will re-start rotating in the opposite direction.

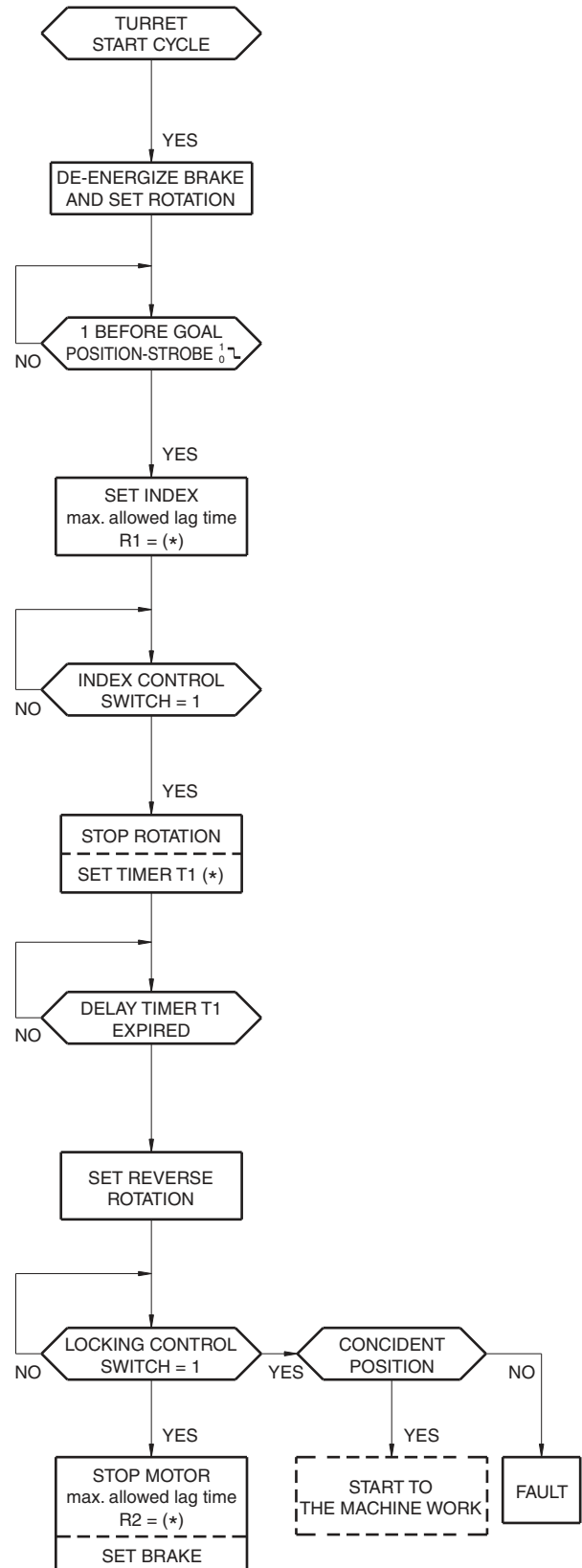
- During this phase the turret is locking and its locked position is detected by the sensor (6) and this signal is used to stop the motor (1). The maximum lag time between the signal of the sensor and the stopping of the motor must never exceed the R2 value shown in the table. At this point the machine can be started, in order to go on working.

- The solenoid (4) is to be de-energized after the expiration of the T2 lag time starting from the moment when the sensor (6) signal is read.

**N.B.:** The T1, T2, R1, R2 times must be understood as real times execution of the controls and the signals checked on the terminal board of the turret.

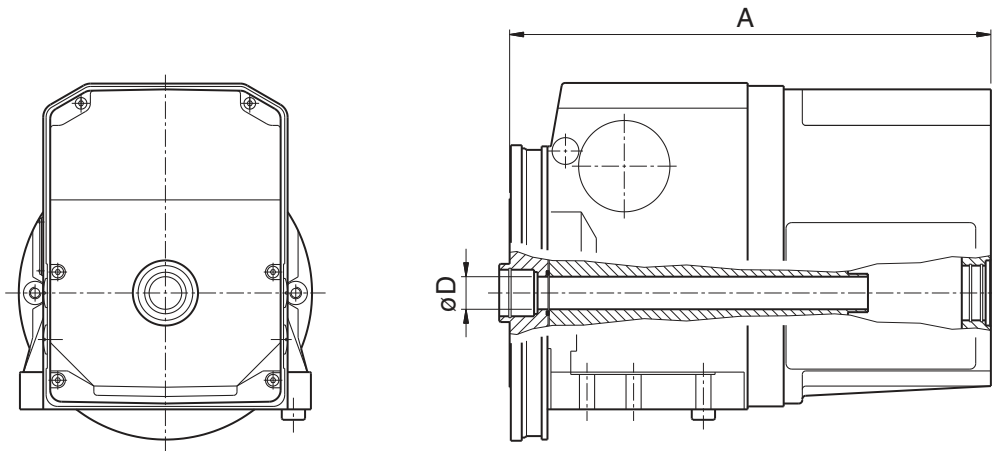
For an accurate detection and measurement of the above mentioned values it is advisable to use adequate instrumentation such as an oscilloscope with memory and current sensing devices.

### Flow chart



(\*) See tab. 2 sheet 16 (Cycle).

## "PA" VERSION TURRETS (with axial through-bore)



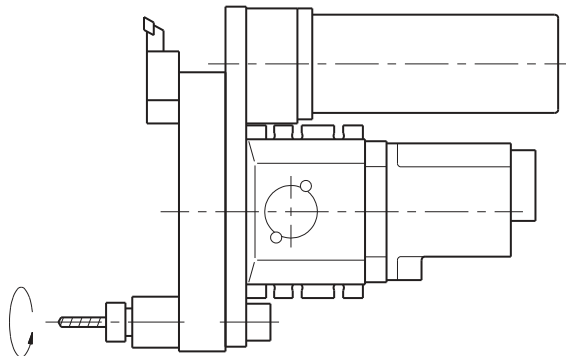
Turret size	BSV-N 120	BSV-N 160	BSV-N 200	BSV-N 250	BSV-N 320	BSV-N 400
ø D	20	20	28	28	28	60
A	370	370	413	413	530	588

## DRIVEN TOOLS SYSTEM

"BSV-N\*" turrets have been designed for modular fitting onto the different driven tool systems.

### BS\*-DT

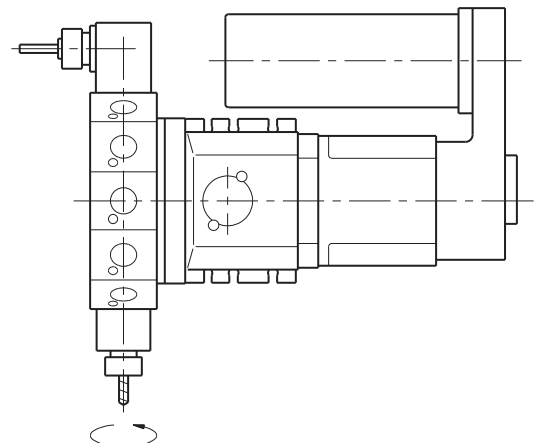
- With **ODT-N** driven tool device.
- Tool coupling according to DIN 1809.
- Tool disc with **axial** seats.
- Front machining.



### BS\*-TR

- With **IDT-R** driven tool device.
- Tool disc with **radial** seats.
- Front machining.

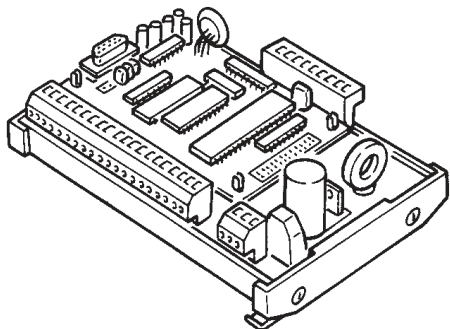
NOTE: Front and **back machining** for **sub-splinde** machines is also available on request.



For further information please contact our Technical Dept.

## UCN CONTROL UNIT

The UCN control unit manages the moving cycle of BSV-N turret in a simple and optimized way: simple and optimized software; no memory positions are occupied in the machine control; automatic chose of the shortest path; steady monitored for faults.



For other information see the Technical Information UCN-\*

## IDENTIFICATION CODE

# BSV-N \* - \* - \* /2\* - \* - \* - ( \* )

SIZE	CODE
120	<b>120</b>
160	<b>160</b>
200	<b>200</b>
250	<b>250</b>
320	<b>320</b>
400	<b>400</b>

AXIAL THROUGH BORE	CODE
Without (Standard)	—
With (Optional)	<b>PA</b>

POSITIONS	CODE
Nr. 8 Pos.	<b>8</b>
Nr. 12 Pos.	<b>12</b>

SERIE **20 ÷ 29** (1)

### OPTIONALS

CODE	FREQUENCY and INERTIA
<b>50 H</b>	50 Hz Fast
<b>60 H</b>	60 Hz Fast
<b>50</b>	50 Hz Standard
<b>60</b>	60 Hz Standard
<b>50 L</b>	50 Hz Slow
<b>60 L</b>	60 Hz Slow
<b>50 LL</b>	50 Hz Very slow
<b>60 LL</b>	60 Hz Very slow

MOTOR VOLT. and FREQUENCY	
<b>220-380</b>	220-380 V - 50/60 Hz
<b>230-400</b>	230-400 V - 50/60 Hz
<b>400-440</b>	400-440 V - 50/60 Hz

(1) From 20 to 29 the performance and the overall dimensions do not change.

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