



DIPLOMATIC
AUTOMATION



TRM-N series 2*

ELECTROMECHANICAL

VERTICAL AXIS TURRETS

TOOLHOLDERS CLAMPING DIN 69881-1

TECHNICAL INFORMATION

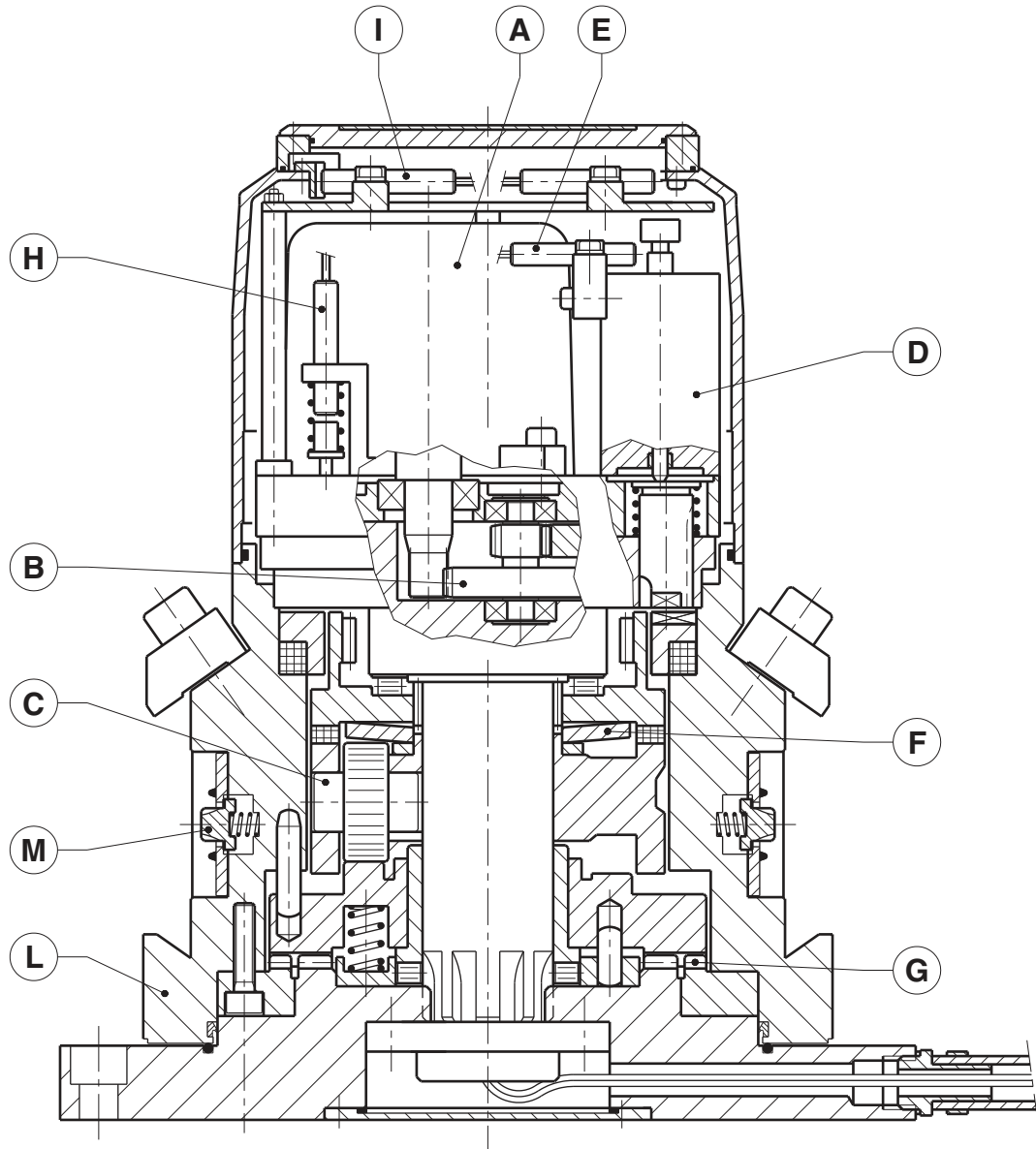


I.T. 6440

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TRM-N / series 2*

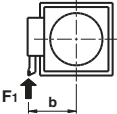
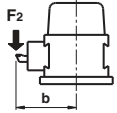
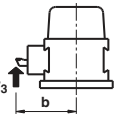
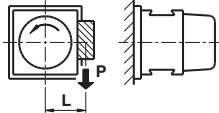
INTERNAL KINEMATIC MOTION



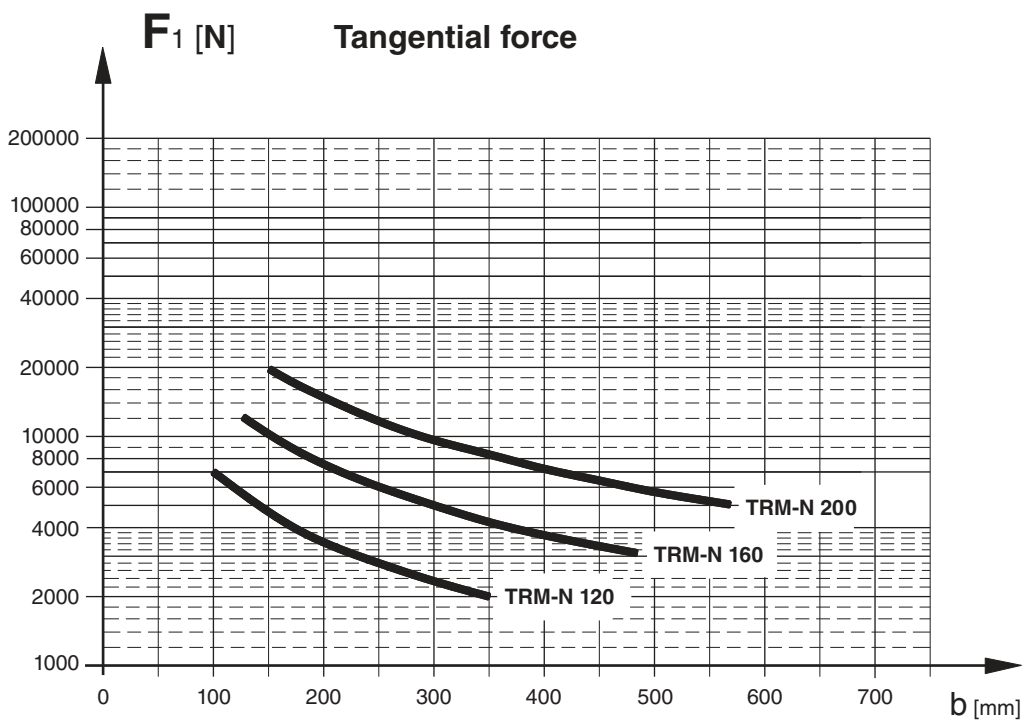
- | | |
|---------------------------------------|--------------------------------|
| A) Electric motor (three phase) | G) Front coupling |
| B) Reducing gearbox | H) Locking control switch |
| C) Rotation and cam locking mechanism | I) Position proximity switches |
| D) Indexing solenoid | L) Tool post |
| E) Indexing control switch | M) Coolant valves (optional) |
| F) Preloaded locking springs | |

Size		TRM-N 120	TRM-N 160	TRM-N 200
Tool post size DIN 69881 sheet 1 (ex VDI 3425 sheet 5)	mm	120	160	200
Tool stations	standard	N°	4	4
	optional	N°	–	6
Tool section	mm	16 x 16	20 x 20	25 x 25
Moment of inertia of transportable mass	Kgm ²	0,5	1	3
Direction of rotation	Counterclockwise			
Indexing time for 90° (unclap. - rot. - clamp.)	s	1,15	1,4	1,6
Rotation time for 90°	s	0,6	0,7	0,85
Indexing frequency	$\alpha = 90^\circ$ cycle/min	14	12	10
Indexing accuracy	Deg°	± 4"	± 4"	± 4"
Repeatability accuracy	Deg°	± 1,6"	± 1,6"	± 1,6"
Mass	~ Kg	20	42	70
Ambient temperature range	°C	5 ÷ 40	5 ÷ 40	5 ÷ 40
Coolant supply: (Filtering ≤ 150 µm)				
	• Costant flow	bar	7	7
	• Pressure cut-off during turret rotation	bar	14	14
Protection degree (DIN 40050)		IP65	IP65	IP65

Loading capacity

				TRM-N		
				120	160	200
	Max. tangential torque	F1xb	Nm	700	1.500	2.900
	Max. tilting torque (to push)	F2xb	Nm	1.100	1.600	2.800
	Max. tilting torque (to lift)	F3xb	Nm	550	900	1.750
	Unbalancing torque with horizontal axis	PxL	Nm	10	25	45
Transportable mass with vertical axis and load gravity centre on the rotation axis			Kg	30	50	90

Duty performances (F1)

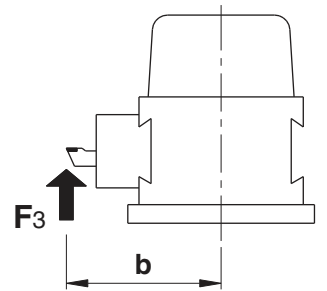
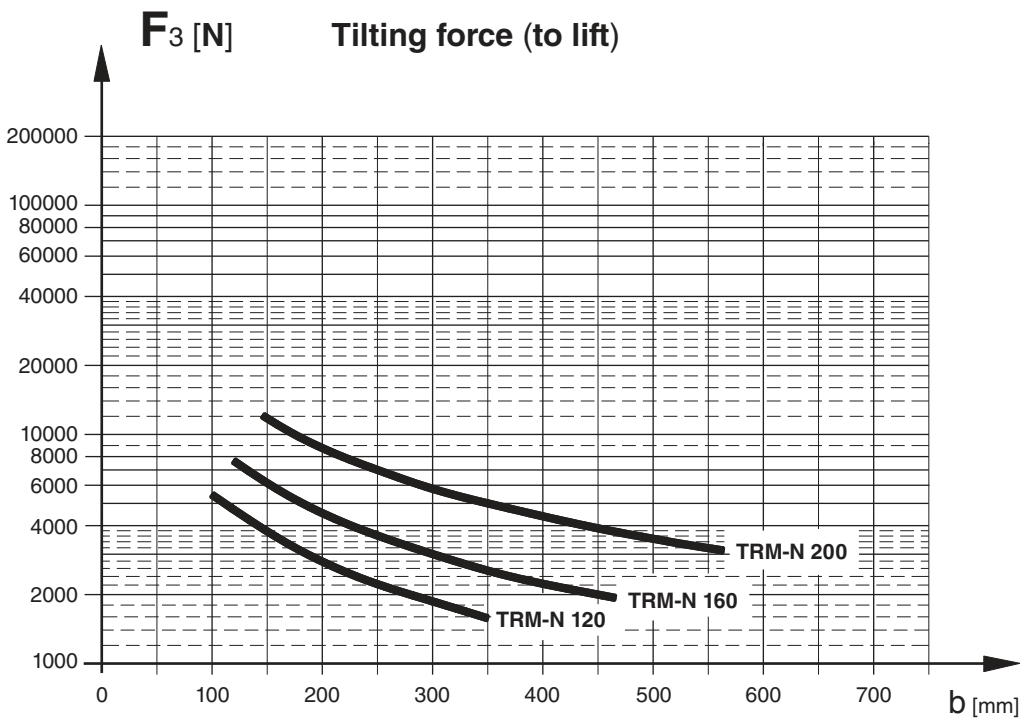
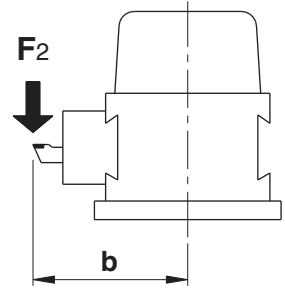
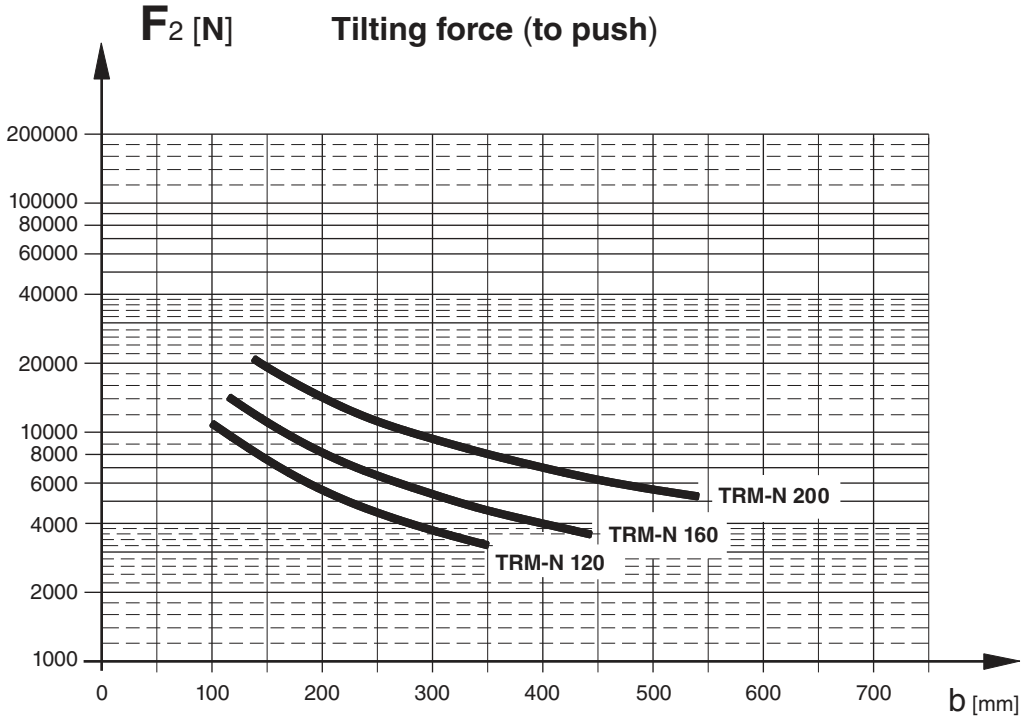




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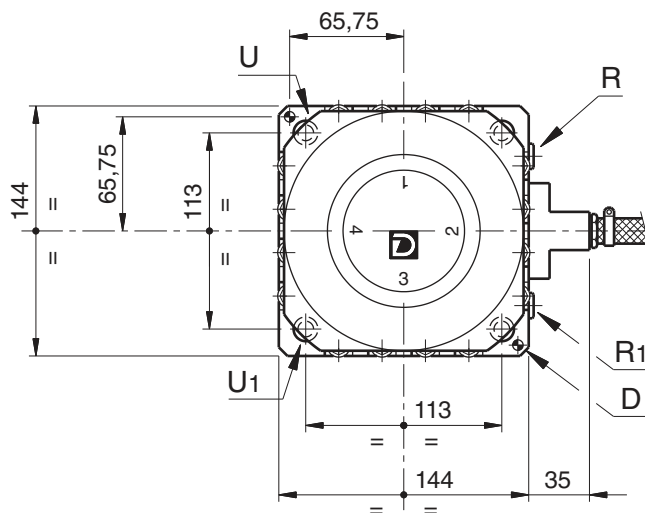
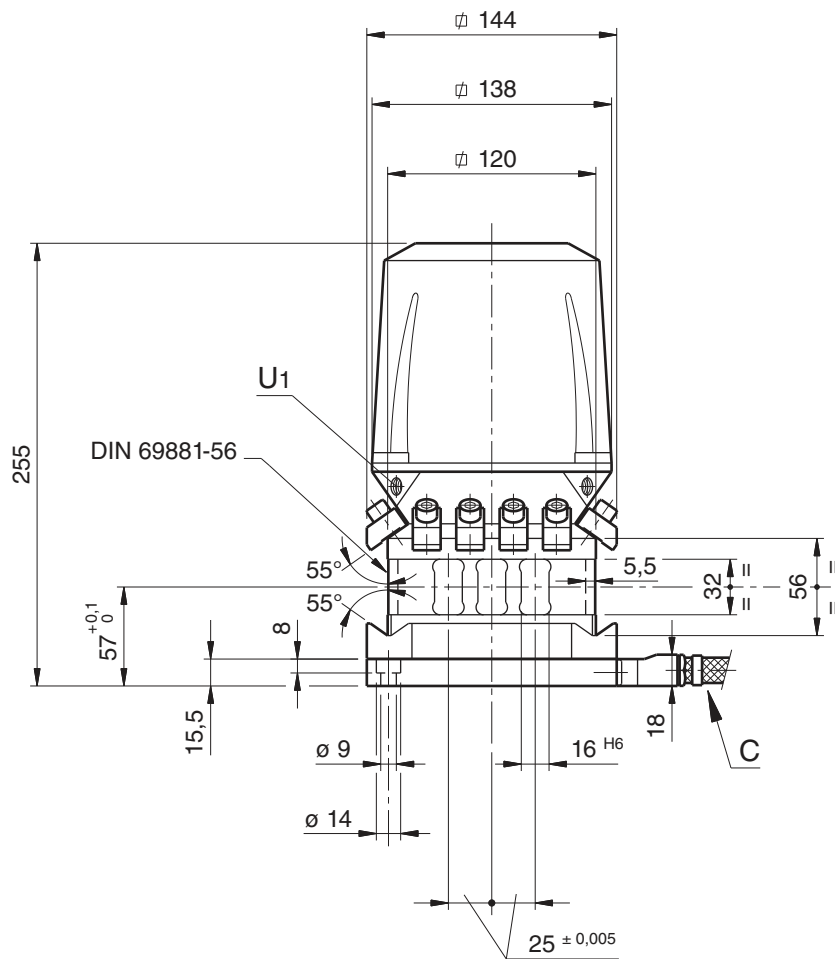
TRM-N / series 2*

Duty performances (F2-F3)



TRM-N 120 / series 22

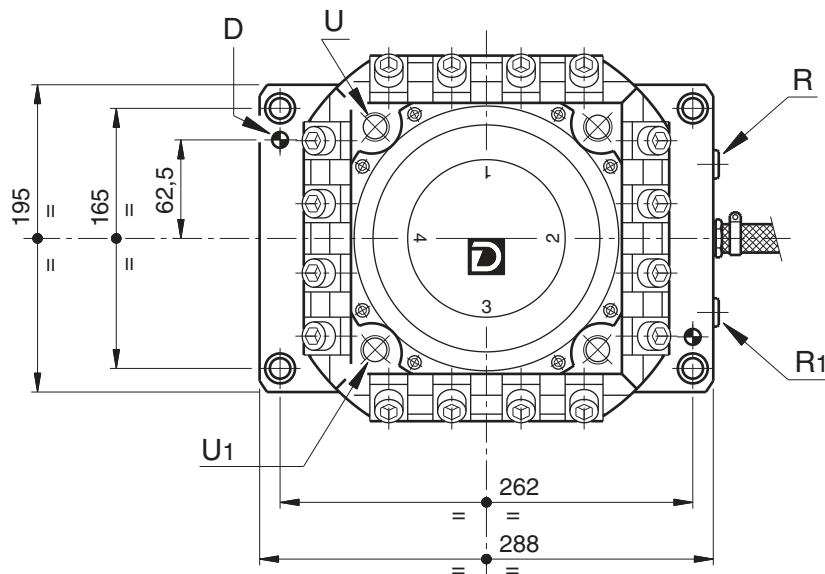
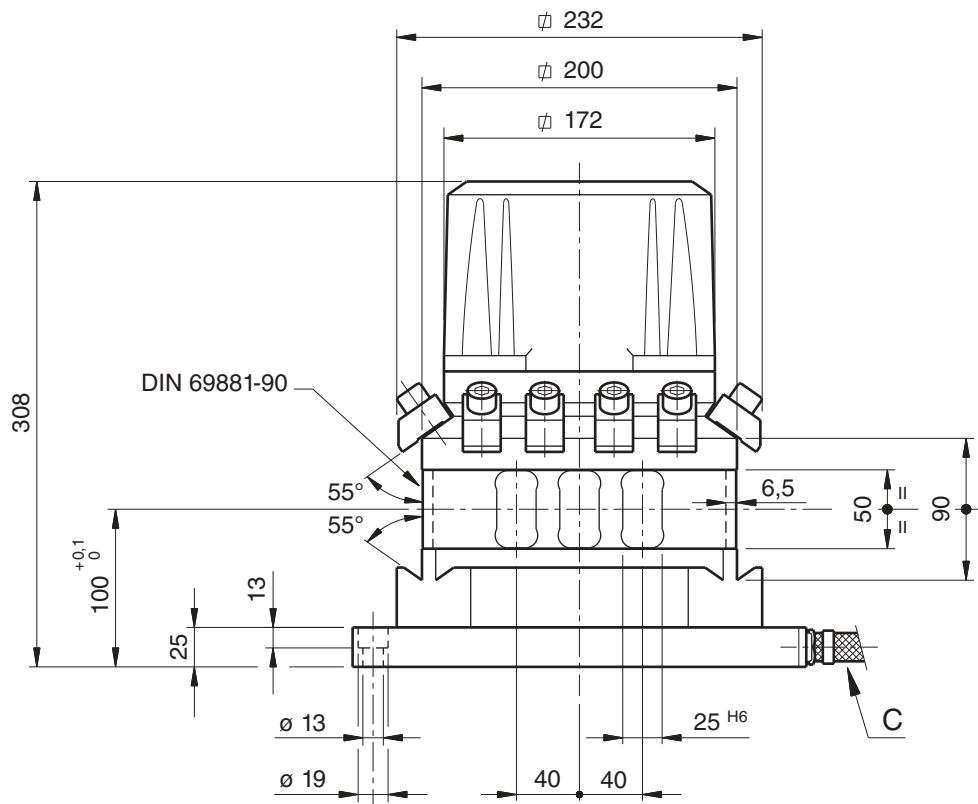
OVERALL DIMENSIONS



- R** — (or **R1**) Coolant inlet 1/8" GAS
- U** — (or **U1**) Coolant outlet 1/8" GAS
- C** — Electrical cable length 2.000 mm \varnothing 15
- D** — Holes for pins \varnothing 6

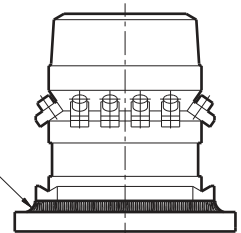
TRM-N 200-4 pos. / series 23

OVERALL DIMENSIONS



- R** — (or **R1**) Coolant inlet 1/4" GAS
- U** — (or **U1**) Coolant outlet 1/4" GAS
- C** — Electrical cable length 2.000 mm \varnothing 15
- D** — Holes for pins \varnothing 10

Turrets are supplied with protection wire brushes between and housing



TRM-N - 4 pos. / series 2* COOLANT CIRCUIT

STANDARD VERSION

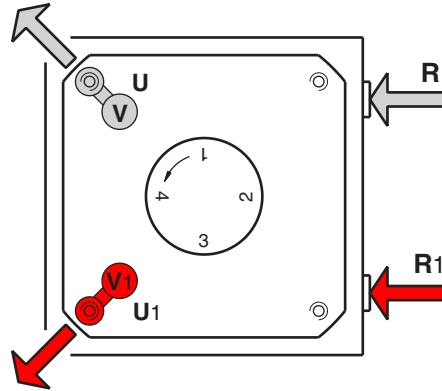


fig. 1

Each turret has two inlets for the coolant, respectively **R** and **R1**, fitted on the base plate.
The coolant passes from the base to the turret housing through the two valves **V** and **V1** fed by inlets **R** and **R1**.
A coolant outlets are, on the top of tool post:
R → U ; R1 → U1.

OPTIONAL VERSION

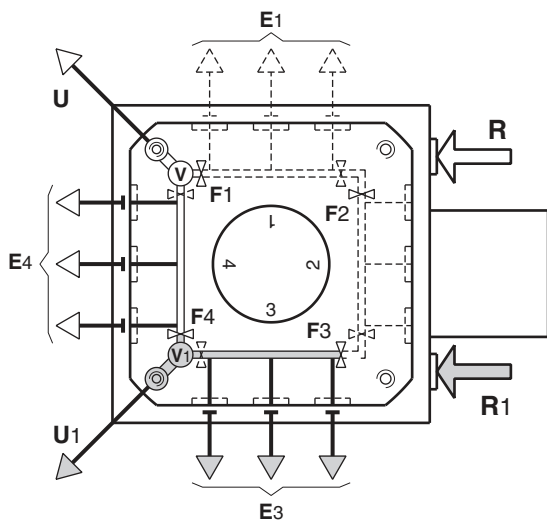


fig. 2

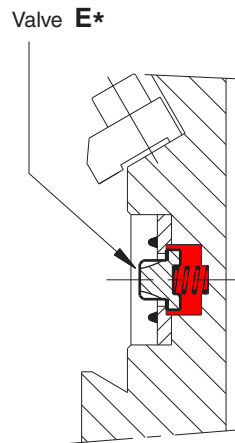


fig. 3

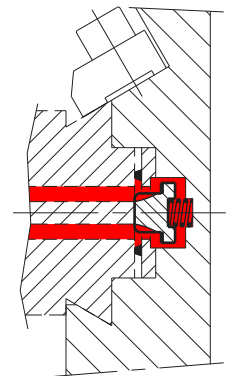


fig. 4

As optional the TRM-N 160/200 turrets can be equipped with "E" valves (three valves for each turret side), for the outlet of coolant directly on the toolholder (fig. 2).

The working of the valve "E" is sketched on the fig. 3 and 4.

Fig. 3 without toolholders (closed valve)

Fig. 4 with toolholders (open valve)

By changing the position of the intercepting valves F1,F2,F3,F4 is possible to variate the coolant outlet obtaining the follow configurations:

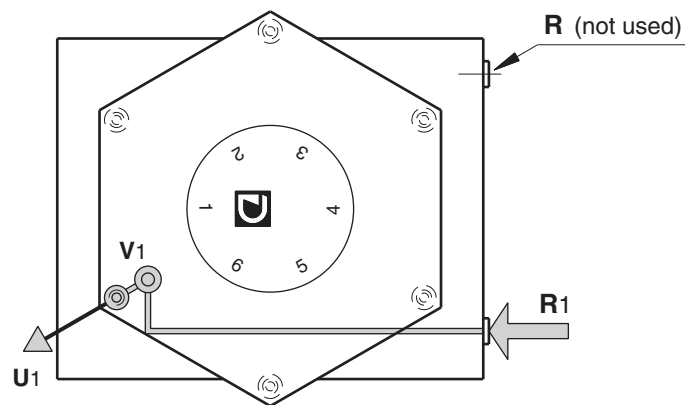
R → E4 R1 → E3 R → E1 R1 → E4

The turrets are normally delivered with the scheme shown in fig. 2.

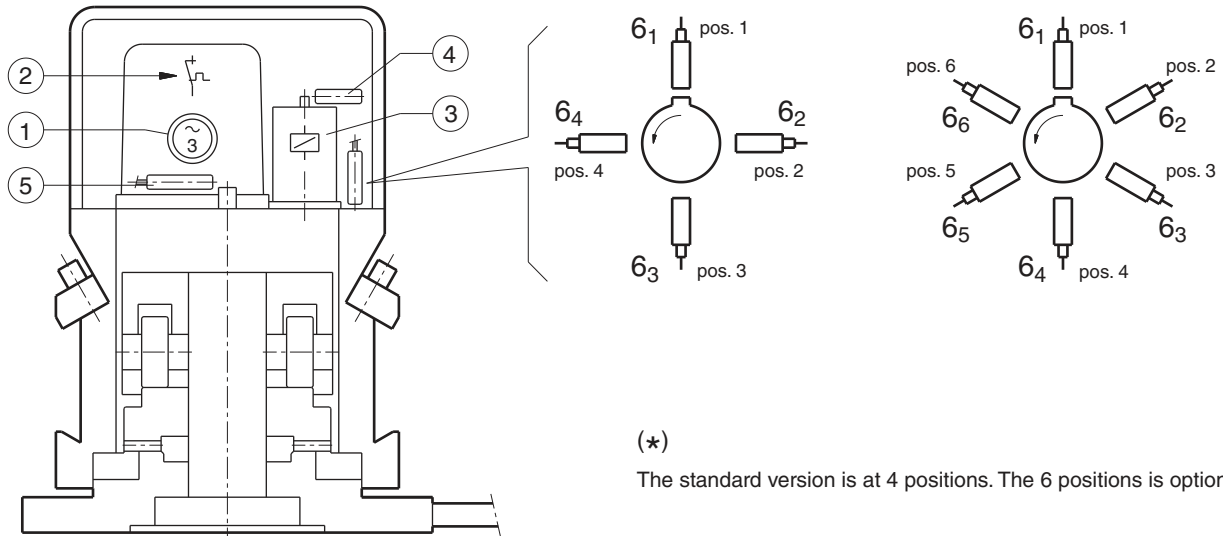
TRM-N - 6 pos. / series 2* COOLANT CIRCUIT

STANDARD VERSION

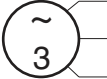











The TRM-N-6 position turrets have one only inlet for the coolant (**R1**) fitted on the base plate.
The (**R**) position is plugged and must not be used.
The coolant pass through the base to the turret housing through the valve **V1**.
The coolant outlet **U1** is on the top of tool post.



TRM-N - 4 pos. / series 2* WIRING DIAGRAM

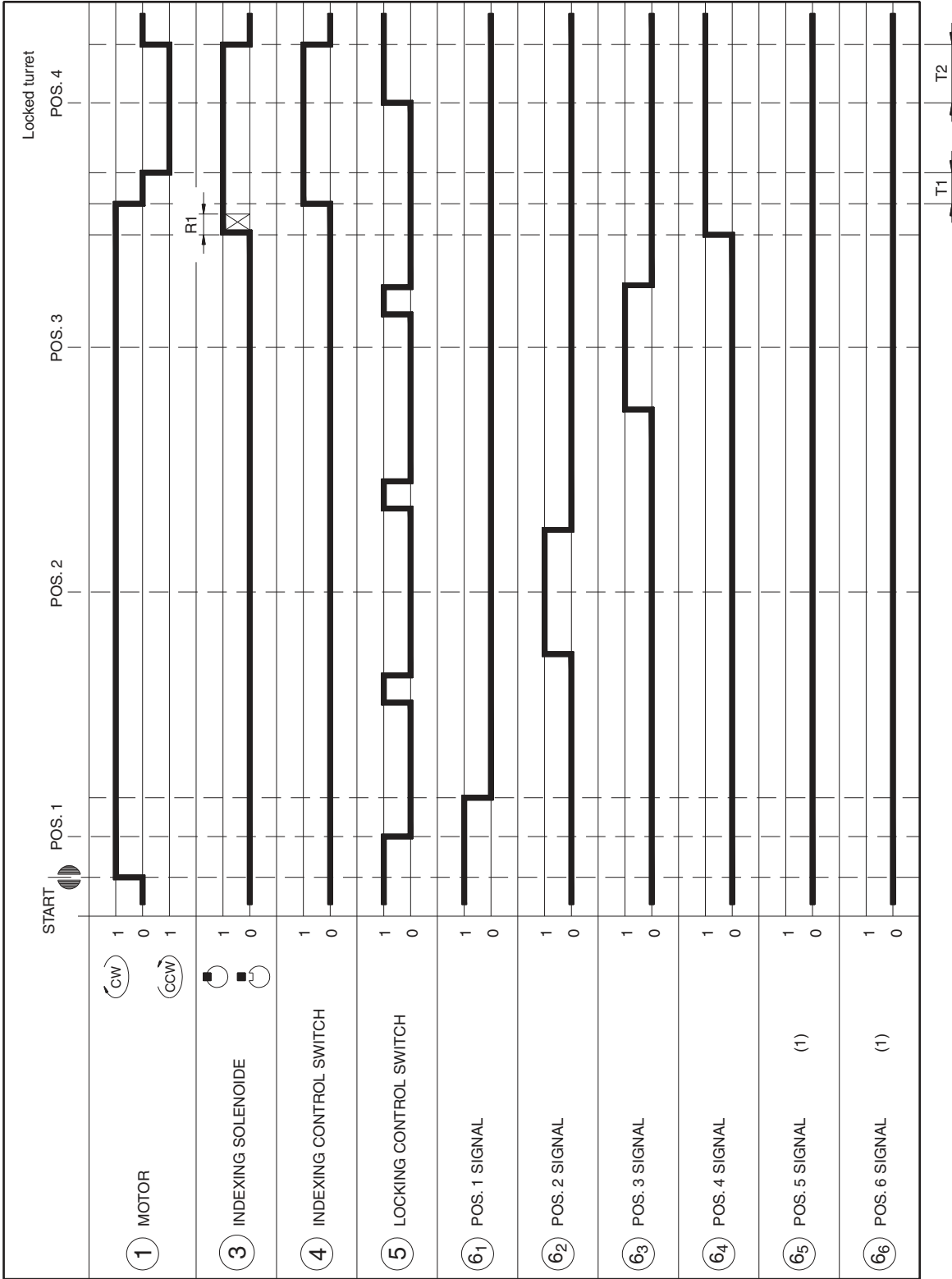


(*)
The standard version is at 4 positions. The 6 positions is optional.

REF.	COMPONENT	CHARACTERISTICS	WIRING NUMBER		SIGNALS
			SYMBOLS	COLOUR	
1	Electric motor (three phase)	(1) 400 V 50/60 Hz For other characteristics see tab. 1.		U BLACK V BLACK W BLACK	
2	Thermal detector	135 C 1,5A 250V		1 GREY 2 VIOLET	(2)
3	Indexing solenoid	TRM-N 120-160-200 24 V d.c. 44 W		3 RED 41 BLUE	
4	Indexing control switch	24V D.C. ± 10% 200 mA (load) OUTPUT-PNP-NO		4 BLUE 5 BLACK 11 BROWN	0 V d.c. EXIT + V d.c.
5	Locking control switch			4 BLUE 6 BLACK 11 BROWN	0 V d.c. EXIT + V d.c.
6 ₁	Pos. 1 signal			4 BLUE 7 BLACK 11 BROWN	0 V d.c. EXIT + V d.c.
6 ₂	Pos. 2 signal			4 BLUE 8 BLACK 11 BROWN	0 V d.c. EXIT + V d.c.
6 ₃	Pos. 3 signal			4 BLUE 9 BLACK 11 BROWN	0 V d.c. EXIT + V d.c.
6 ₄	Pos. 4 signal			4 BLUE 10 BLACK 11 BROWN	0 V d.c. EXIT + V d.c.
6 ₅	Pos. 5 signal			4 BLUE 12 BLACK 11 BROWN	0 V d.c. EXIT + V d.c.
6 ₆	Pos. 6 signal			4 BLUE 13 BLACK 11 BROWN	0 V d.c. EXIT + V d.c.
				GREEN / YELLOW	PE

ELECTRIC MOTOR CHARACTERISTICS		Tab. 1	
Turret size		TRM-N 120	TRM-N 160/200
Rated power	KVA	0,15	0,2
Short circuit power	KVA	0,3	0,5

NOTE:
(1) Other voltages on request.
(2) The thermal detector gives a signal only motor overheating.



1) The signals 6₅, 6₆ are available only for 6 positions (optional).

Time to be programmed	T1 (ms)	50
	T2 (ms)	150
Allowed lag time max	R1 (ms)	80

1. – Signals

To get a change of positions on the TRM-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 14).

- Motor (1)
- Indexing solenoid (3)

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

- Angular position given by the proximity switch (61,62...)
- Indexing control switch (4)
- Locking control switch (5)

2. – Description of the operating sequence

This description referring to the diagram on page 15, gives the sequence to pass from position 1 to position 4 with counter-clockwise rotation.

As indicated by the cycle on page 15 the controls are to be performed according with the following sequence:

- a) Starting of motor rotation in the unlocking direction
- b) The turret disc rotating, when the proximity switch (6) of the pos.4 gives the signal, energize the solenoid (3).

N.B.: Between the reading signal and the energizing of the solenoid (3) the maximum lag time have not to exceed the value R1.

- c) The turret goes on rotating until the indexing pin, pushed by the solenoid (3), enters into the mechanical stop slot. This movement is detected by the sensor (4) which must immediatly stop the motor (1) that, once expired the T1 time will re-start rotating in the opposite direction.

- d) During this phase the turret is locking and it's locked position is detected by the proximity switch (5).

N.B.: The signal of the proximity switch (5) can be used to supply the start to the machine.

- e) After the programmed time T2, the motor and the solenoid are to be de-energized.

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

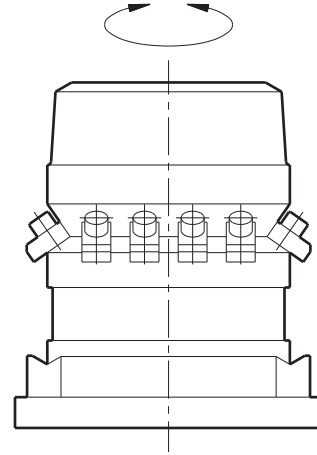
For an accurate detection and measurement of the above mentioned values it's advisable to use an adequate instrumentation such as an oscilloscope with memory and current sensing devices.

TRM-NB BIDIRECTIONAL VERSION

The TRM-N turret, in the 200 size, is available, on request, in the "**B version**" with bidirectional rotation.

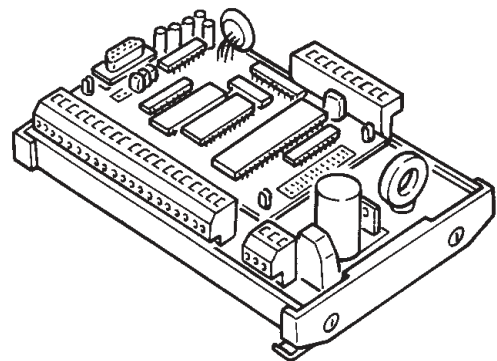
Features and performances as per equivalent standard model.

For more details, please contact our Technical Office.



UCN-40 CONTROL UNIT

The UCN-40 control unit manages the moving cycle of TRM-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*/30.

TRM-N * - * - * /2* - * - (*)

VERSION	CODE
STANDARD	—
BIDIRECTIONAL	B

(1)

SIZE	CODE
120	120
160	160
200	200

POSITIONS	CODE
Nr. 4 Pos.	4
Nr. 6 Pos. (2)	6

CODE	OPTIONALS
R	Coolant outlet directly on the toolholder (only for TRM-N 160/200 turrets)

COD.	MOTOR VOLTAGE AND FREQUENCY
110-50	V 110 Hz 50
110-60	V 110 Hz 60
220-50	V 220 Hz 50
220-60	V 220 Hz 60
380-50	V 380 Hz 50
380-60	V 380 Hz 60
400-50	V 400 Hz 50
400-60	V 400 Hz 60
440-50	V 440 Hz 50
440-60	V 440 Hz 60

SERIE	20 ÷ 29

(3)

(1) Only for size 200.

(2) Optional, only for sizes 160 and 200.

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

DIPLOMATIC AUTOMATION S.r.l.
20025 LEGNANO (MI) - ITALY
P.LE BOZZI, 1
PHONE 0331/472111
FAX 0331/455161



DIPLOMATIC
AUTOMATION

e-mail: info@diplomatic.it

come visit Diplomatic homepage:
www.diplomaticautomation.com