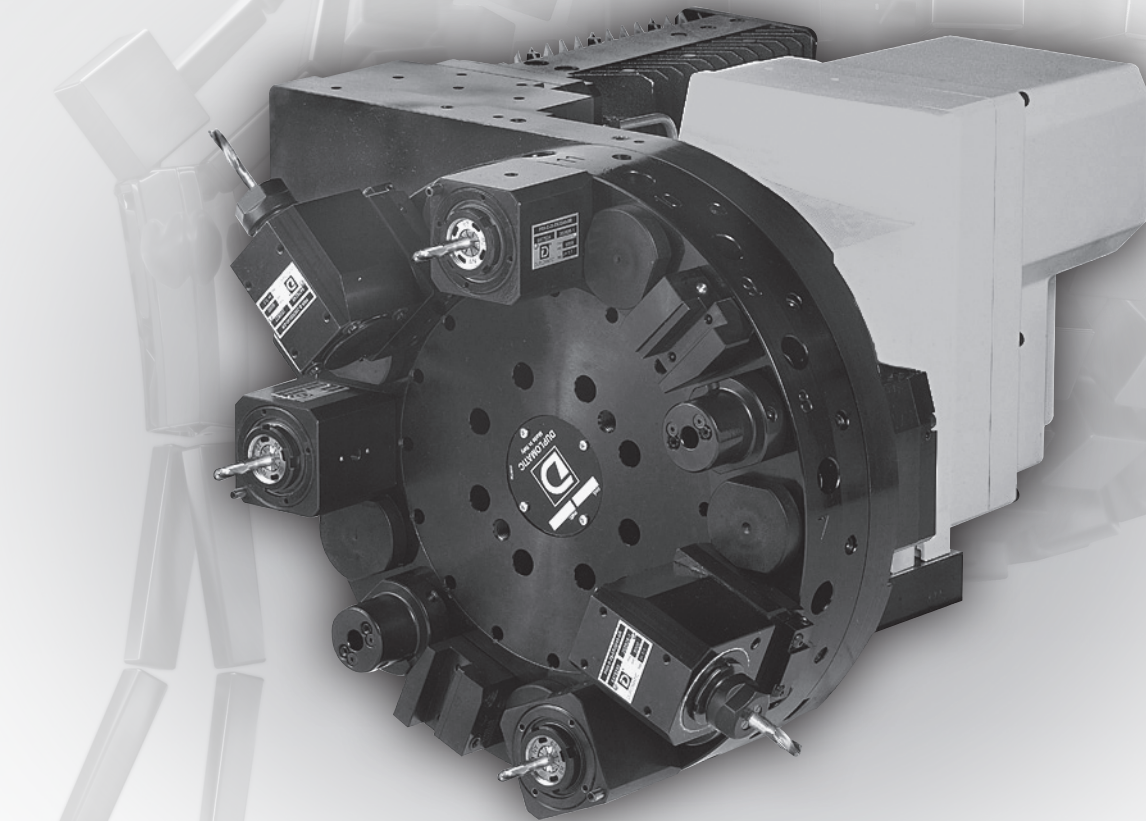




DIPLOMATIC
AUTOMATION



MDT * series 20

MODULAR DRIVEN TOOL DEVICE
FOR AXIAL SYSTEM
DIN 5480 / 5482 COUPLING

TECHNICAL INFORMATION



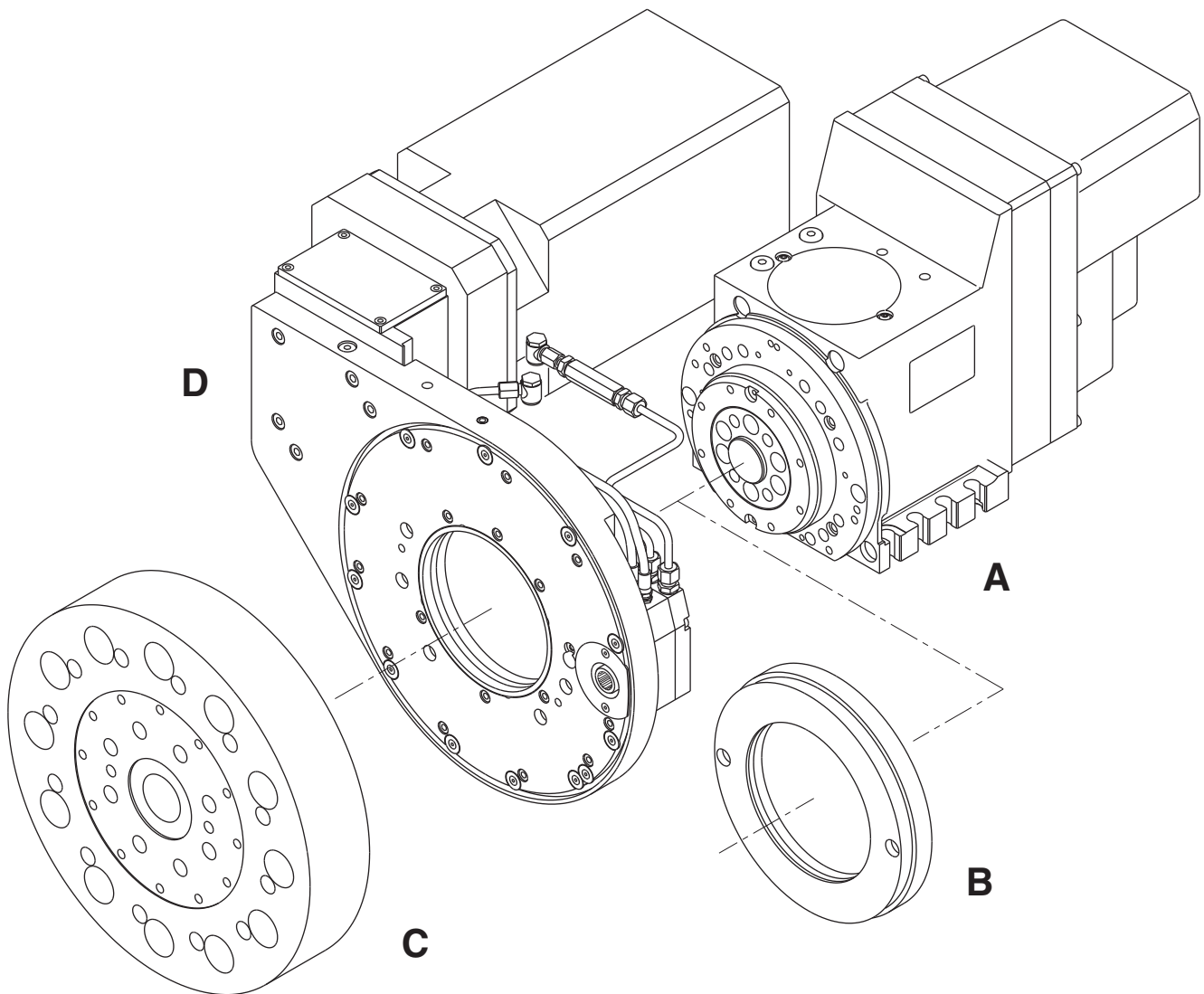
I.T. 6486

GB ISSUED **12-08**

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

MDT * / series 20 MODULAR PRINCIPLE

The MDT device is a module that can be applied externally to the DM, SM or BSV-N standard turrets, taking place in the space between disc and turret housing normally used for the coolant group.



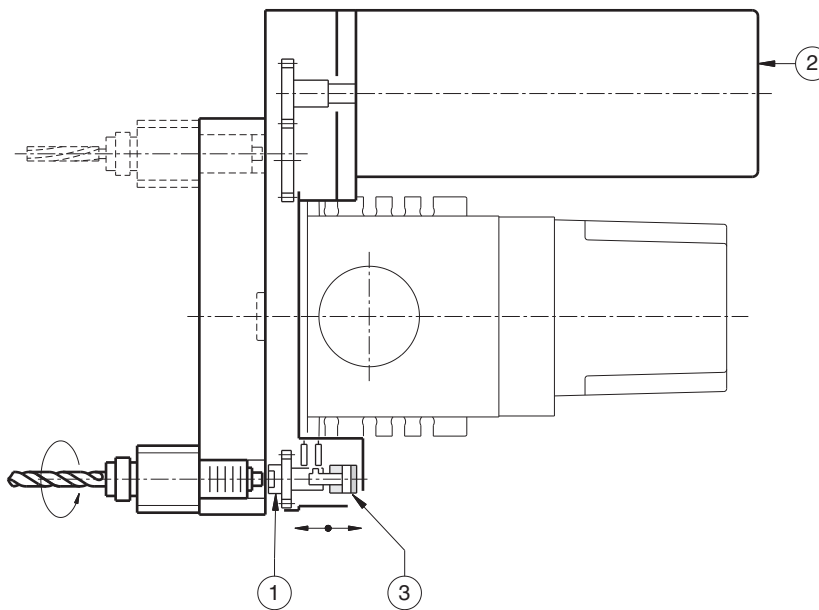
- A** Turret
- B** Coolant group
- C** Tool disc
- D** Driven tools device

	A	B	C	D
Static tools only	●	●	●	
Turn-mill applications	●		●	●

The **MDT/20 series** modular driven tool device, has been developed for supplying the best performances on CNC turning centers on which the servomotor turrets are usually fitted on. The tool engagement is driven by a direct hydraulic cylinder.

The main features are:

- For improving the transmission efficiency the motor is jointed directly on the main gear chain.
- Thank to the splined shaft coupling, MDT system allows heavy machining with a very accurate tool position control, i.e. rigid tapping.
- For prevent external contamination, a pressurizing air system can be supplied.



The **MDT** device is available in two different types:

“BR” TYPE

For toolholders with **DIN 5480** coupling (1) and **zero detent system**.

In this type it is necessary that the servomotor (2) is provided with **“orientation function”** by CNC, in order to stop the MDT device in “zero position”.

The MDT cylinder (3) can be directly driven by the same electrovalve already employed for the turret.

“PS” TYPE

For toolholders with **DIN 5480 / 5482** couplings (1). In this type no “zero setting” is required but the motor (2) must be managed, during the engagement phase, in order to ensure the correct coupling. An additional electrovalve must be foreseen for the MDT cylinder (3).

Important:

In the MDT/ series 20 the zero setting is managed directly by the servomotor, **that must be provided with “orientation function” by the CNC.**

The motor driver enable must always be “ON”, keeping the zero position to allow the turret rotation.

If servomotor with brake is used, the driver can be “dissable” at the end of orientation, always keeping the brake on and the motor position control.

TECHNICAL DATA

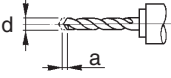
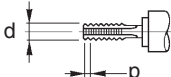
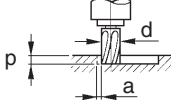
SIZE		MDT	12	16	20	25	32
For turret size	SM(A)-H / DM		12	16	20	25	32
Toolholder size	DIN 69880-ød1	mm	20 / 25	25 / 30	40	50	60
Max power	S3 - 40% - 10 min	kW	5	6	8	10	12,5
Max torque	(1)	Nm	15	28	40	66	130
Max speed at the spindle		RPM	6.000	5.000	4.000	3.500	3.200
Transmission ratio		τ	1:1	1:1	1:1	1:1	1:1
Optional : Siemens A.C. Motor	(2)	type	1FT 6064	1FT 6084	1FT 6086	1FT 6105	1FT 6132
— Torque	S1 S3 - 40% - 10 min		9 14	20 25	27 35	48 60	75 115
— Max speed		RPM	6.000	5.000	4.000	3.500	3.200
Fanuc A.C. Spindle motor	(2)	type	α 1,5	α 2	α 3	α 6	α 12/15
— Torque	S1 S3 - 40% - 10 min		7 15	14 20	23,5 35	35 48	70/95 95/120
— Max speed		RPM	6.000	5.000	4.000	3.500	3.200
Mass (motor excluded)		~ Kg	18	20	32	40	68

(1) These values are valid for shock-free operations.
In case of interrupted-cut (milling, etc.) or other shock-operations, a reduction of these values up to 50% must be considered.
For special executions please contact our Technical Dept.

(2) Protection on shaft side \geq IP65.

INDICATIVE CUTTING CAPACITY

for 600 N/mm² steel, HSS tools
(With fit motors)

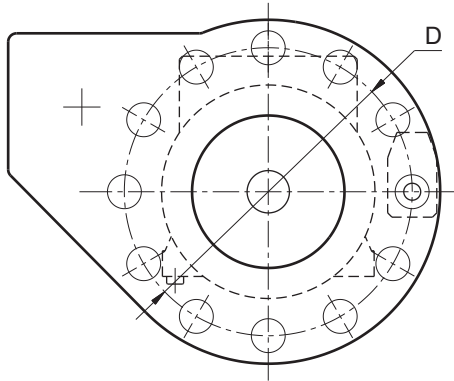
SIZE		MDT	12	16	20	25	32
Twist drilling	d x a [mm] x [mm/u]		10 x 0,20	14 x 0,15	20 x 0,20	22 x 0,20	30 x 0,20
Tapping	d x p [mm] x [mm]		M8 x 1,25 M12 x 1	M10 x 1,5 M24 x 1	M16 x 2 M24 x 1,5	M18 x 2 M27 x 1,5	M22 x 2,5 M33 x 2
Slot milling	d x p x a [mm] x [mm] x [mm/min]		12 x 8 x 45	20 x 10 x 40	25 x 14 x 40	25 x 20 x 40	40 x 20 x 35

MDT * / series 20

SIZES, DIMENSIONS

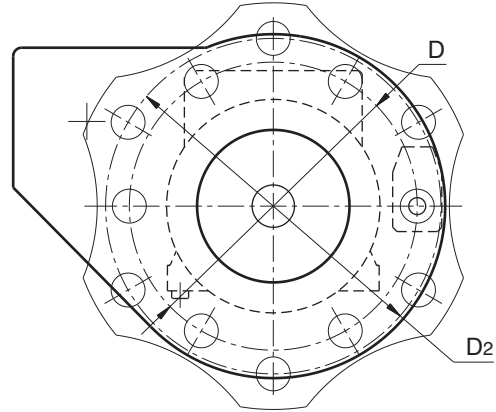
Toolholder locations on one pitch diameter

Disc DN



Toolholder locations on two pitch diameters

Disc DN 2





D for driven and static tools

D2 for static tools only

For MDT size	12		16				20			25	32
Toolholders size DIN 69880 ⁽¹⁾	20 / 25 / 30		30 / 40				40			50	60
Diameter "D" [mm]	240	270	240	270	300	340	310	340	370	420	460

For tool discs type:

	DN 12 Pos.	●	●		●	●	●		●	●	●	●
	DN 2 12 Pos.	○	○	●	○			●	○			

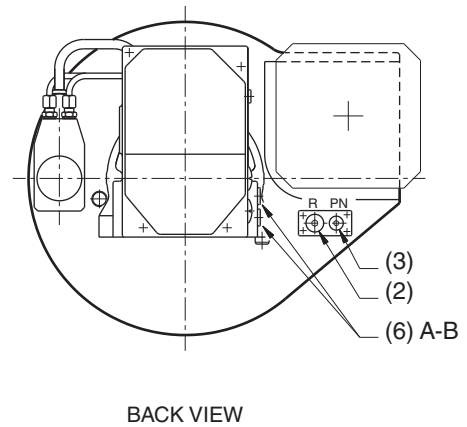
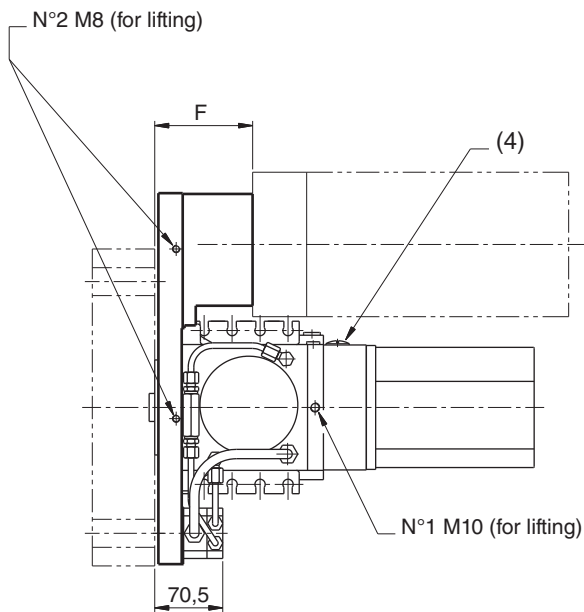
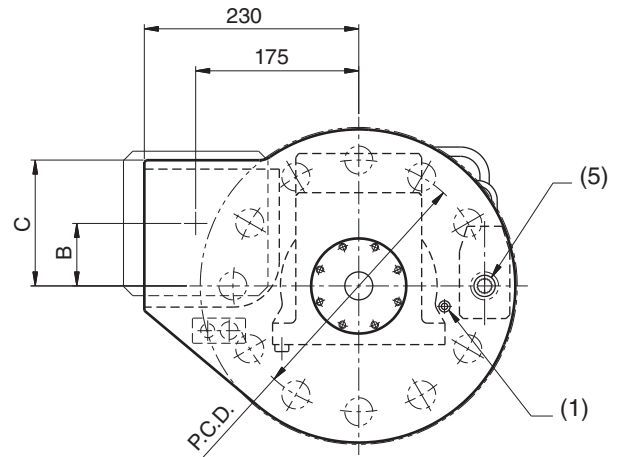
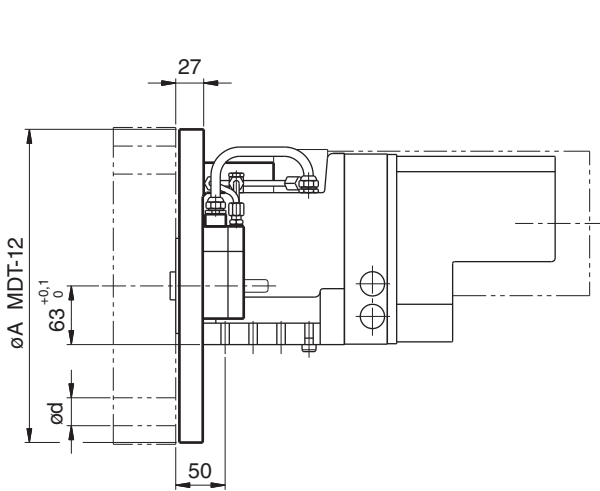
- Standard dimensions.
- Optional dimensions.
- Other dimensions on request.

Note:

1) Special version or different combinations between MDT size and toolholder size, on request.

MDT 12M-*/ series 20

OVERALL DIMENSIONS

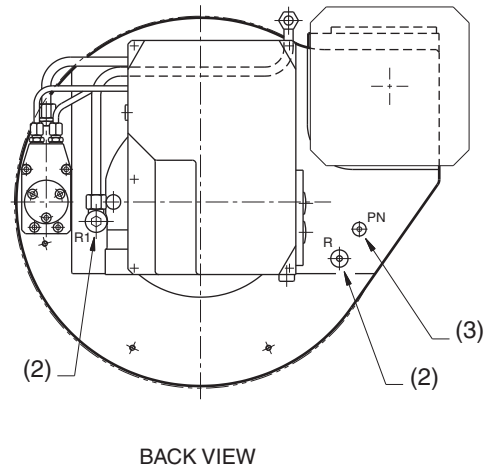
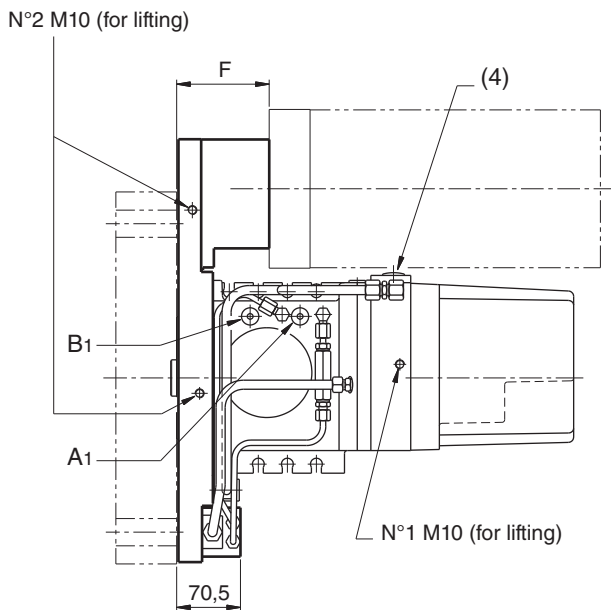
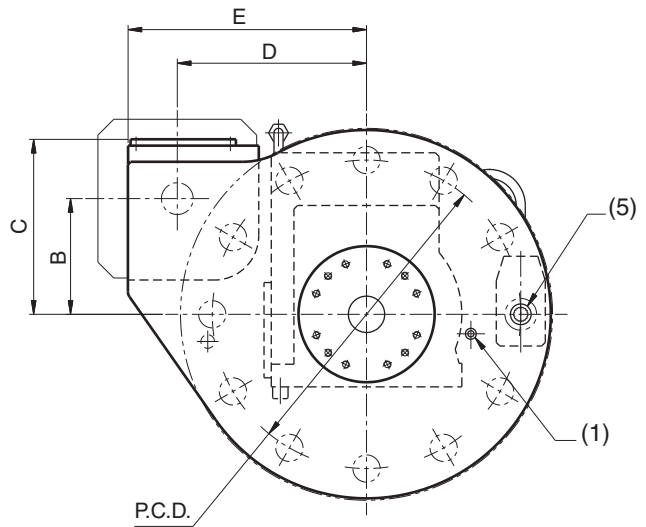
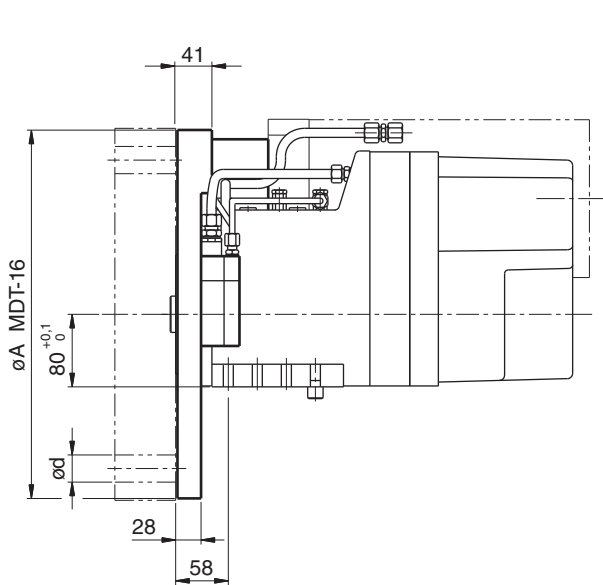


P.C.D.	ød	øA	B	C	F
240	25	305	90	152,5	81
270	30	336	67	135	102

- 1) Coolant outlet.
- 2) Coolant inlet 1/4" GAS.
- 3) Pressurizing air inlet 1/8" GAS.
- 4) 2 x PG13,5 Electrical connections.
(Both for turret and MDT).
- 5) Power intake.
- 6) Turret hydraulic connections : A-B = 1/4" GAS.

MDT 16M-*/ series 20

OVERALL DIMENSIONS

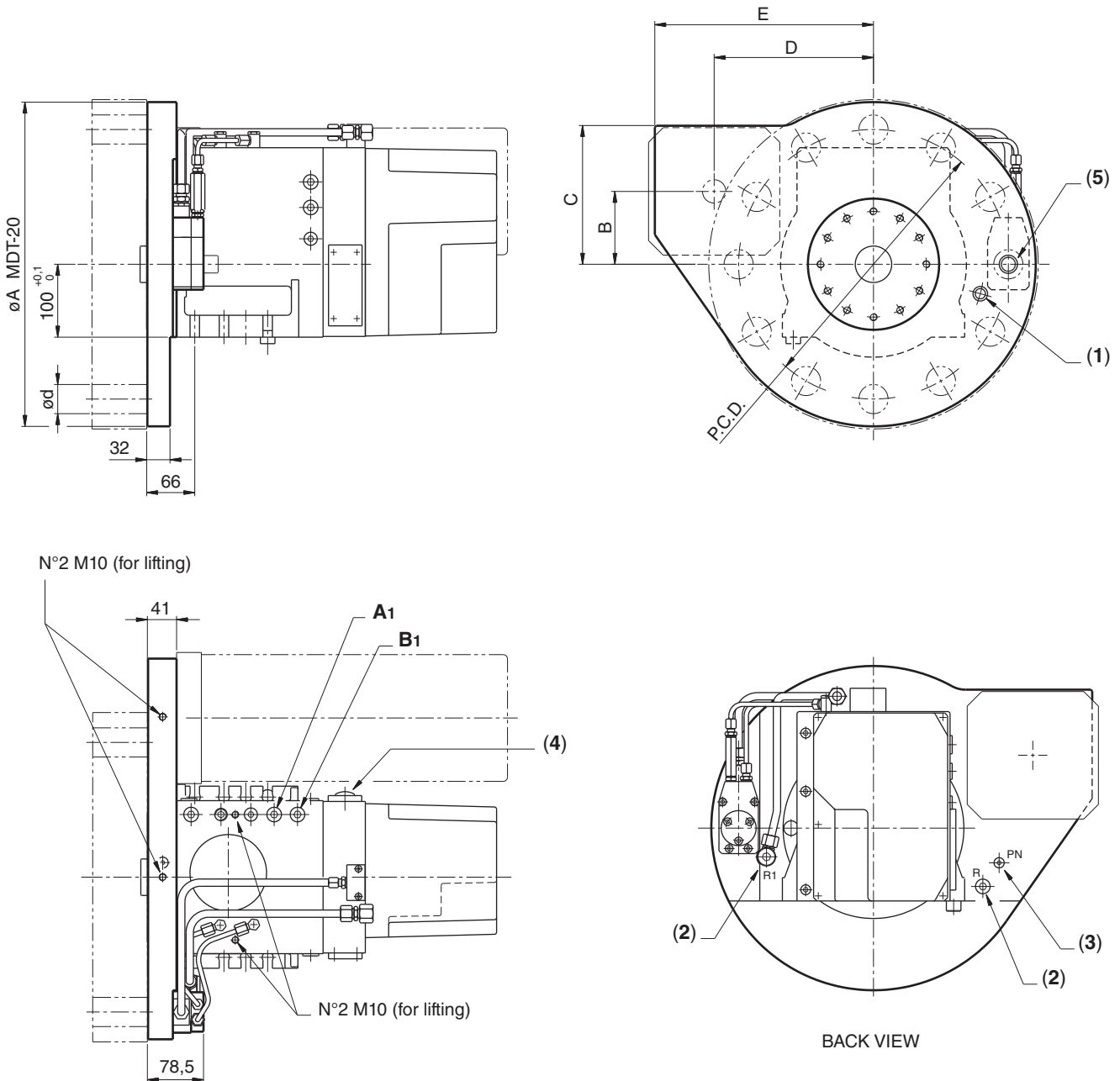


P.C.D.	ød	øA	B	C	D	E	F
240	30	306	90	156	174,5	230	103
270	30	336	127,5	193	208,5	263	102
300	30	364	114,5	182	209	268	103
340	30/40	406	127,5	193	208,5	263	102

- 1) Coolant outlet.
- 2) Coolant inlet R = 1/4" GAS.
(R1 for P.C.D. 340 only).
- 3) Pressurizing air inlet 1/8" GAS.
- 4) 2 x PG13,5 Electrical connections.
(Both for turret and MDT).
- 5) Power intake.
- 6) Turret hydraulic connections : A-B = 1/4" GAS.

MDT 20M-*/ series 20

OVERALL DIMENSIONS

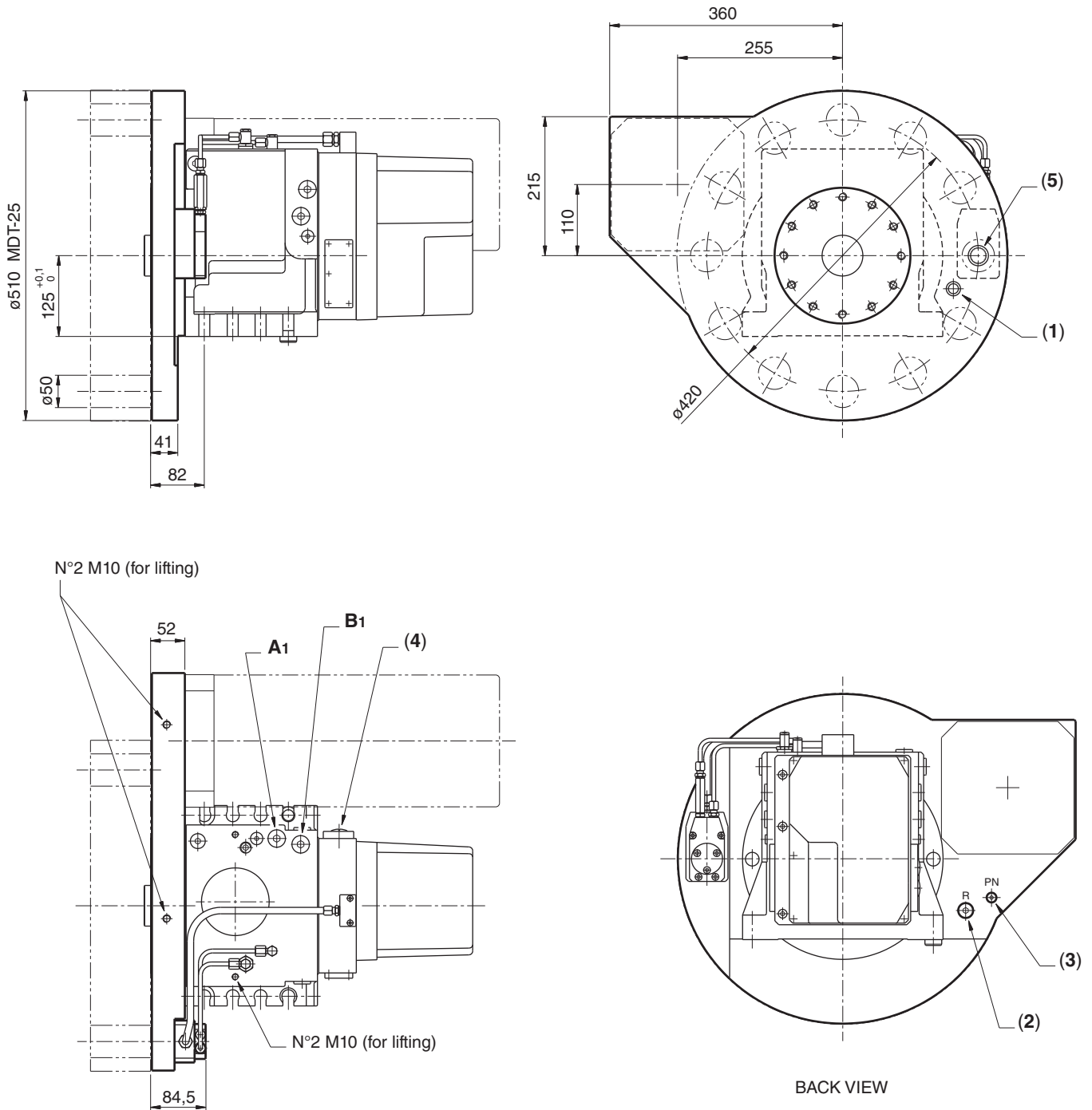


P.C.D.	ød	øA	B	C	D	E
310	40	385	100	192,5	224	305
370	40	445	100	190	218,5	300

- 1) Coolant outlet.
- 2) Coolant inlet R = 3/8" GAS.
(R1 for P.C.D. 370 only).
- 3) Pressurizing air inlet 1/8" GAS.
- 4) 2 x PG13,5 Electrical connections.
(Both for turret and MDT).
- 5) Power intake.
- 6) Turret hydraulic connections : A1-B1 = 3/8" GAS.

MDT 25M-*/ series 20

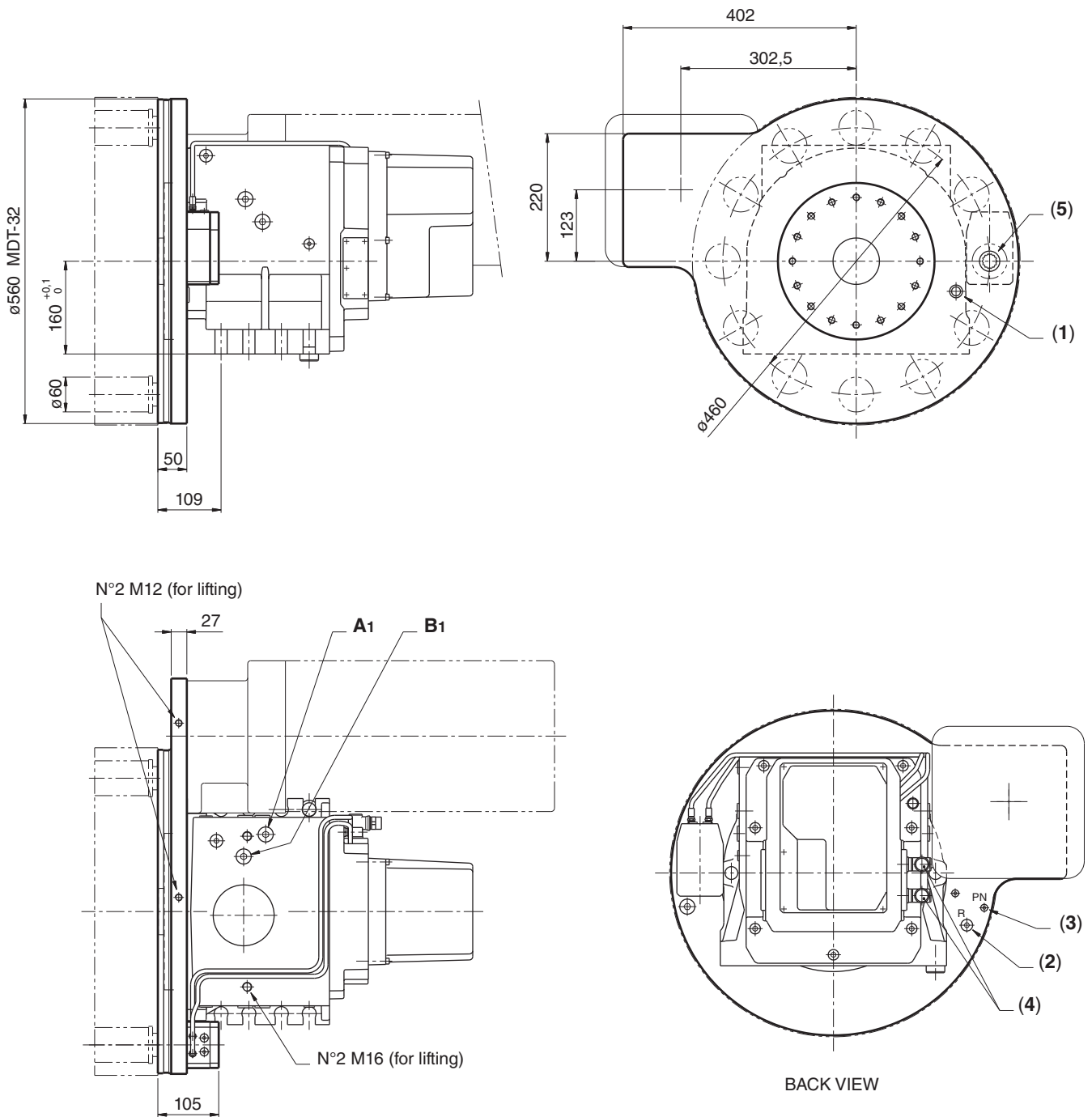
OVERALL DIMENSIONS



- 1) Coolant outlet.
- 2) Coolant inlet R = 3/8" GAS.
- 3) Pressurizing air inlet 1/8" GAS.
- 4) 2 x PG13,5 Electrical connections.
(Both for turret and MDT).
- 5) Power intake.
- 6) Turret hydraulic connections : A1-B1 = 1/2" GAS.

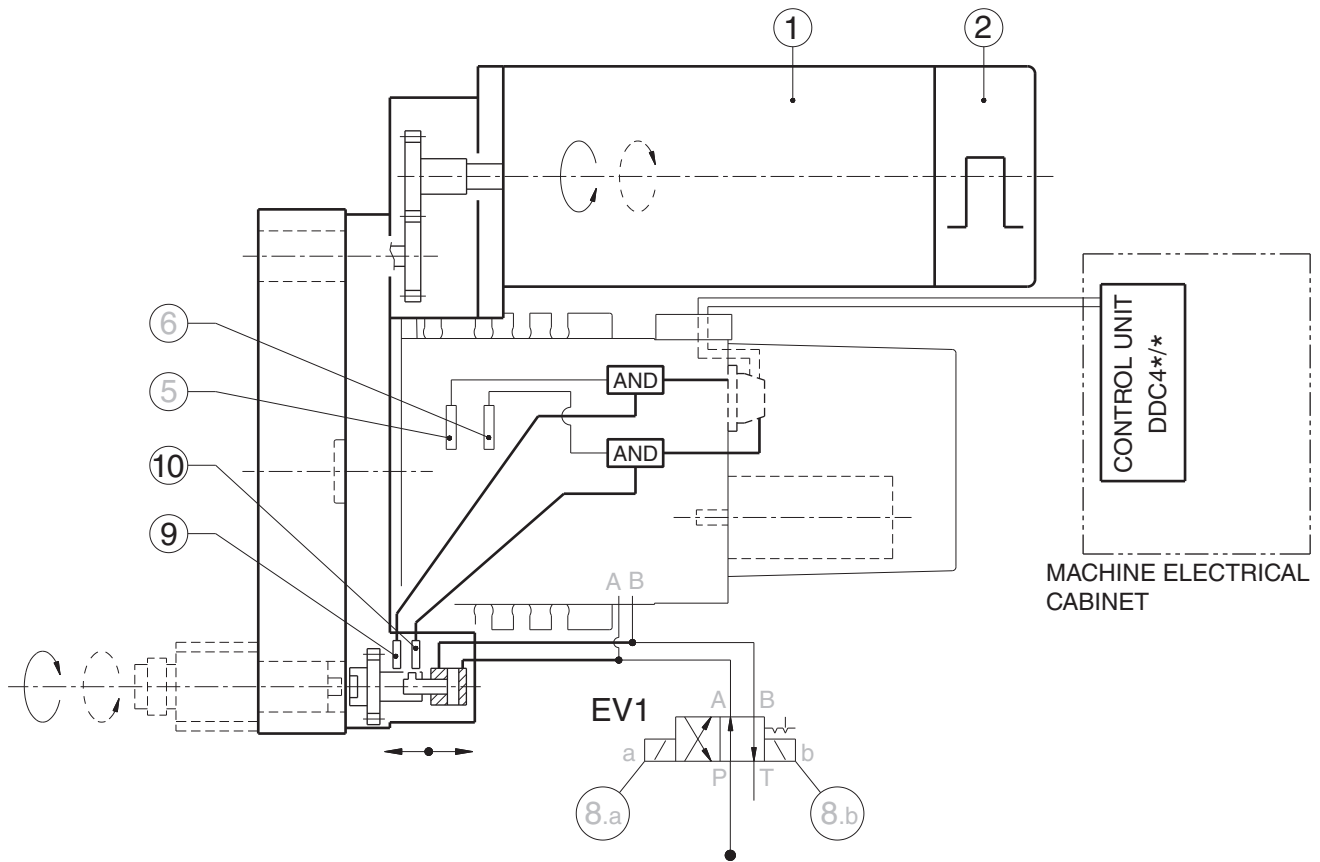
MDT 32M-*/ series 20

OVERALL DIMENSIONS



- 1) Coolant outlet.
- 2) Coolant inlet R = 3/8" GAS.
- 3) Pressurizing air inlet 1/8" GAS.
- 4) Electrical connectors.
(Both for turret and MDT).
- 5) Power intake.
- 6) Turret hydraulic connections : A1-B1 = 1/2" GAS.

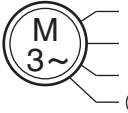

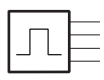
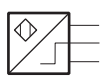
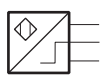
MDT * / series 20 type "BR" WIRING DIAGRAM



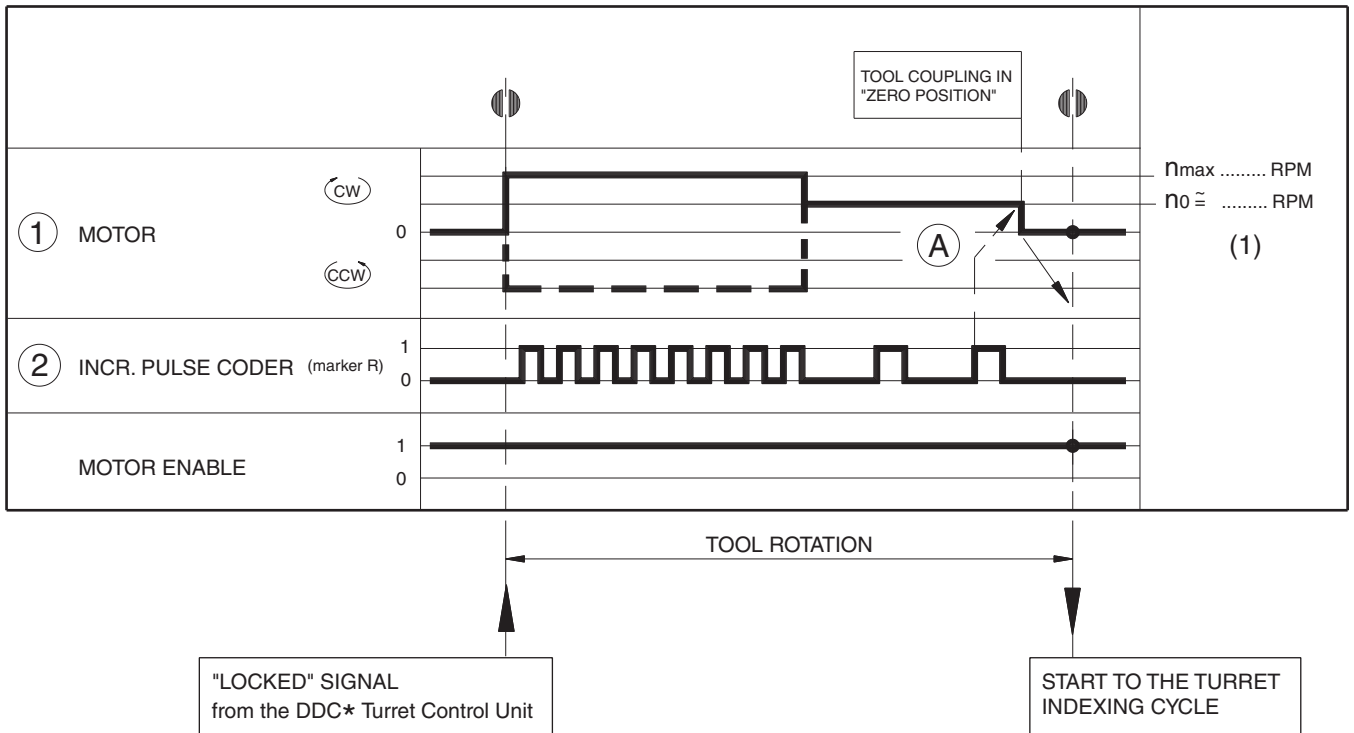
Functions	EV1	
	sol. a	sol. b
Turret clamped Tool engaged	-	+
Turret unclamped Tool not engaged	+	-

- Working pressure 50 ^{+5%} - 20% bar
- Filtering 20 µm

Important: The two switches (9) and (10) are series connected, respectively to the (5) and (6) Clamping / Unclamping switches of the SM*-H turret.

REF.	COMPONENT	CHARACTERISTICS	WIRING NUMBER		SIGNALS
			SYMBOLS	COLOUR	
①	MOTOR	See data sheet of select motor			
	THERMAL DETECTOR				
②	TRANSDUCER				
⑨	TOOL ENGAGED SWITCH	24V.D.C. ± 10% 200 mA (load) OUTPUT-PNP-NO		BROWN BLACK BLUE	FROM (5) LOCKSW 0 V D.C.
⑩	TOOL NOT ENGAGED SWITCH			BROWN BLACK BLUE	FROM (6) UNLCKSW 0 V D.C.

(1) The electrovalve EV1 is the same already employed for the SM*-H / DM turret.

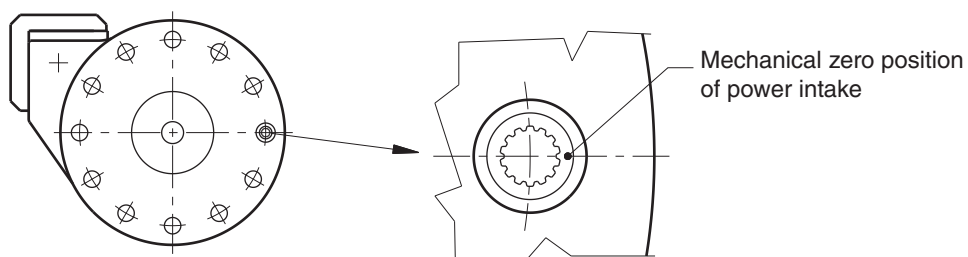


IMPORTANT:

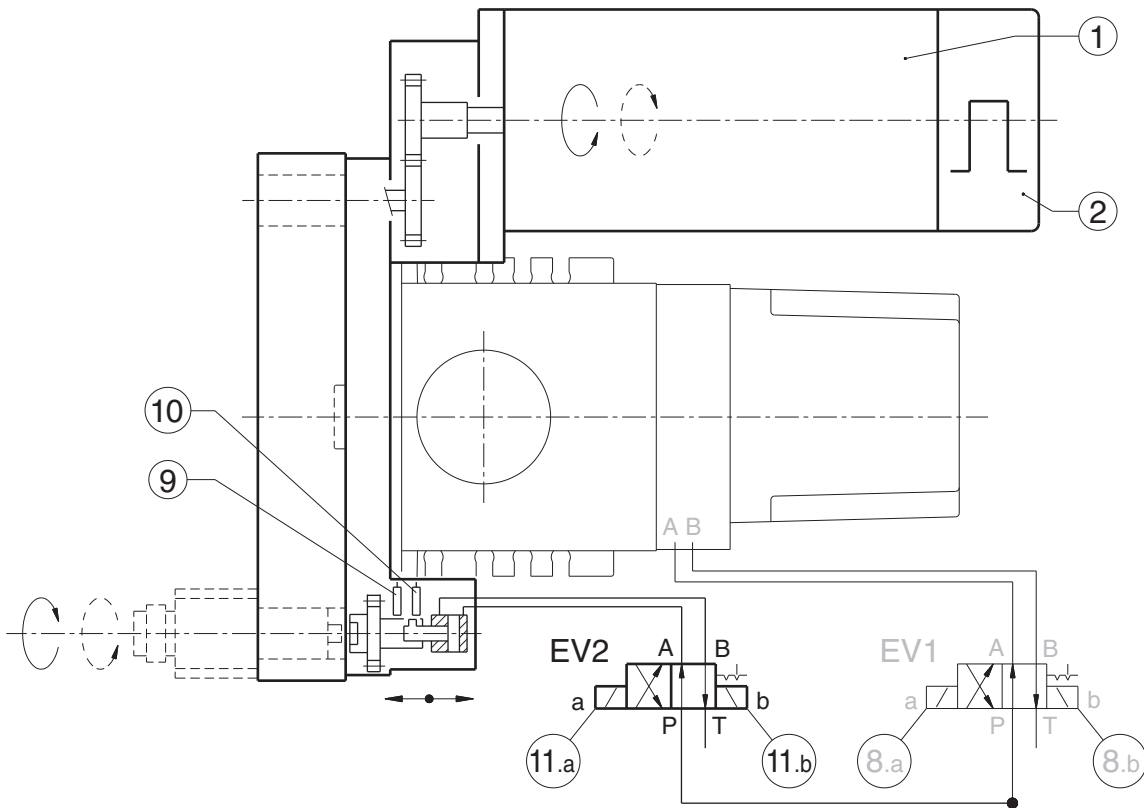
Servomotor with "orientation function" by CNC must be used.

- 1) • Max motor speed for tool rotation:
 - n_{max} = 6.000 RPM for MDT-12.
 - n_{max} = 5.000 RPM for MDT-16.
 - n_{max} = 4.000 RPM for MDT-20.
 - n_{max} = 3.500 RPM for MDT-25.
 - n_{max} = 3.200 RPM for MDT-32.
 - The motor speed n_0 for tool zero setting must be according to CN/ driver specs.
- 2) Motor driver enable must be always "ON" , keeping the zero position, to allow the turret rotation.

Ⓐ The distance between coder marker and MDT coupling zero position must be set.



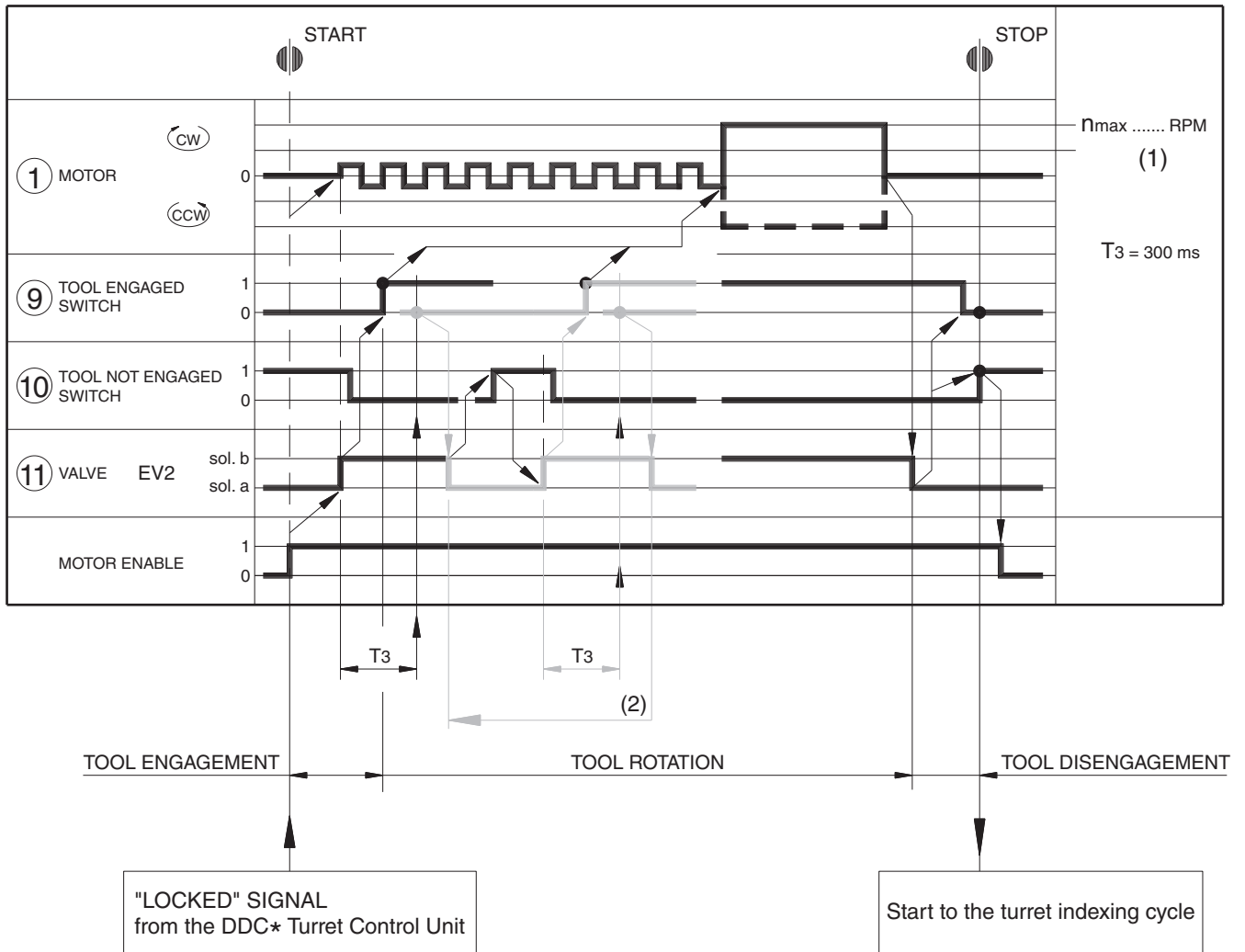
MDT * / series 20 type "PS" WIRING DIAGRAM



Functions	EV1		EV2	
	sol. a	sol. b	sol. a	sol. b
Turret clamped	-	+		
Turret unclamped	+	-		
Tool engaged			-	+
Tool not engaged			+	-

- Working pressure 50 ^{+5%} -20% bar
- Filtering 20 µm

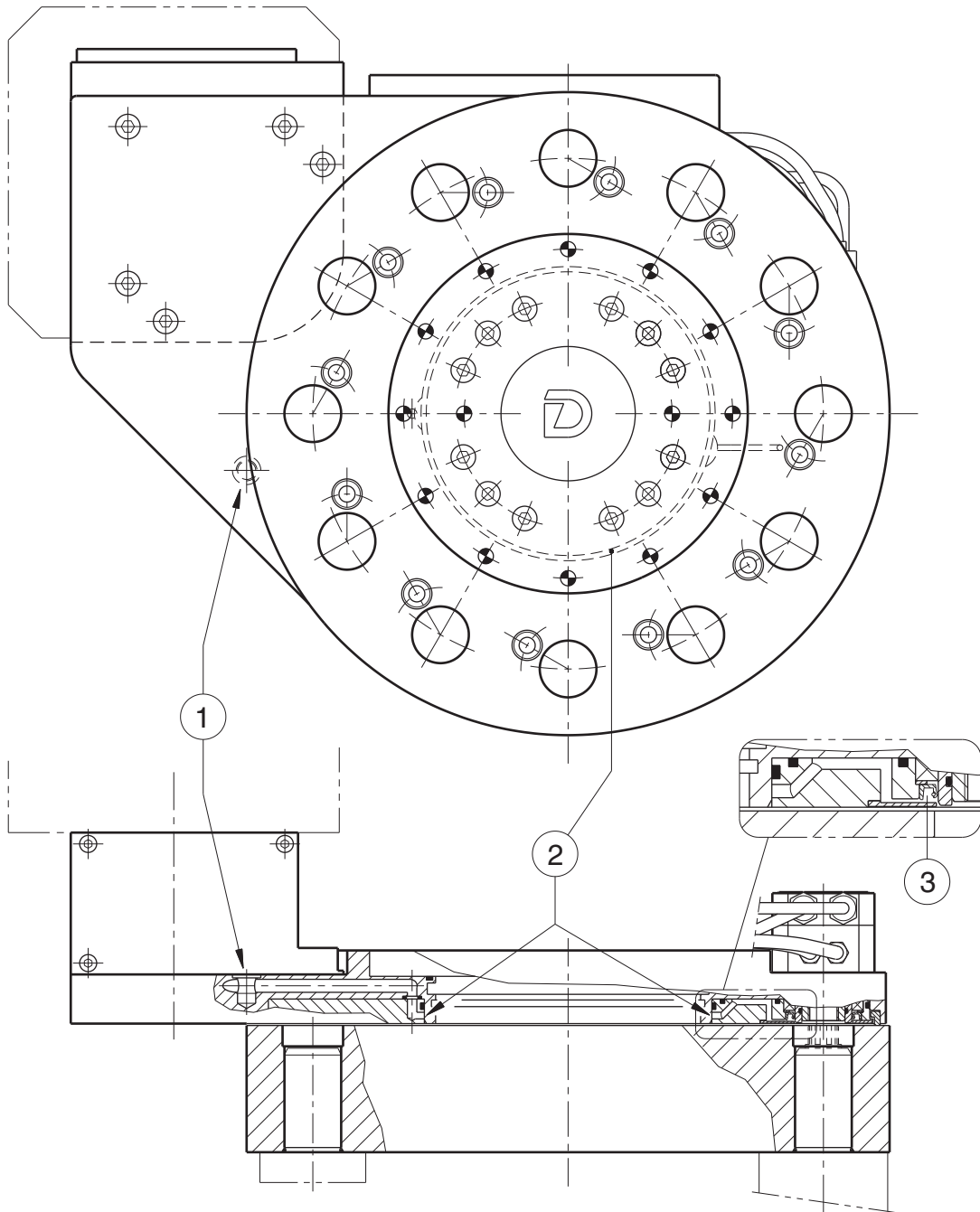
REF.	COMPONENT	CHARACTERISTICS	WIRING NUMBER		SIGNALS
			SYMBOLS	COLOUR	
①	MOTOR	See data sheet of select motor			
	THERMAL DETECTOR				
②	TRANSDUCER				
⑨	TOOL ENGAGED SWITCH	24V.D.C. ± 10% 200 mA (load) OUTPUT-PNP-NO		BROWN BLACK BLUE	+ V.D.C. OUTPUT 0 V.D.C.
⑩	TOOL NOT ENGAGED SWITCH			BROWN BLACK BLUE	+ V.D.C. OUTPUT 0 V.D.C.
⑪.a	HYDRAULIC VALVE EV2	See data sheet of select valve			+ COMMON
⑪.b					+ COMMON



- 1) • Max motor speed for tool rotation:
 - n_{max} = 6.000 RPM for MDT-12.
 - n_{max} = 5.000 RPM for MDT-16.
 - n_{max} = 4.000 RPM for MDT-20.
 - n_{max} = 3.500 RPM for MDT-25.
 - n_{max} = 3.200 RPM for MDT-32.
 - The value and frequency of the motor speed during the engagement phase, must be optimized.
- 2) If the tool is not engaged, the "tool engagement" phase must be repeated.

MDT * / series 20 PRESSURIZING AIR SYSTEM

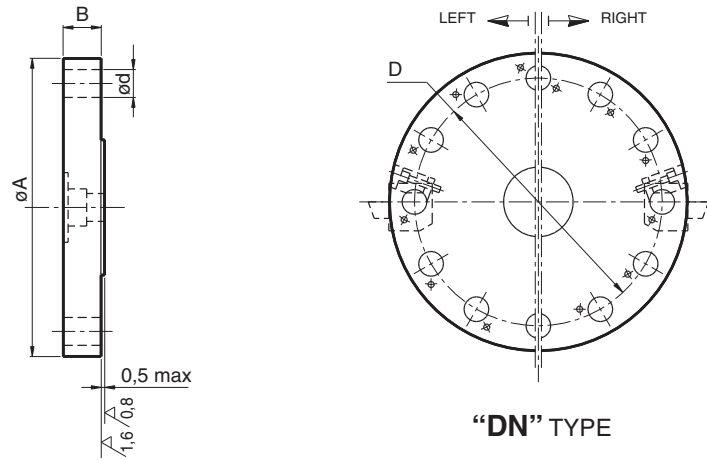
The **MDT*-A1** devices offer a pressurizing air function to prevent chip and water contamination in the rotary-seal area.



- ① Pressurization air inlet 1/8" GAS
(0,5 ÷ 0,8 bar - ~50 l/min).
- ② Air outlet positions
(between MDT housing and disc).
- ③ Air outlet in seal area.

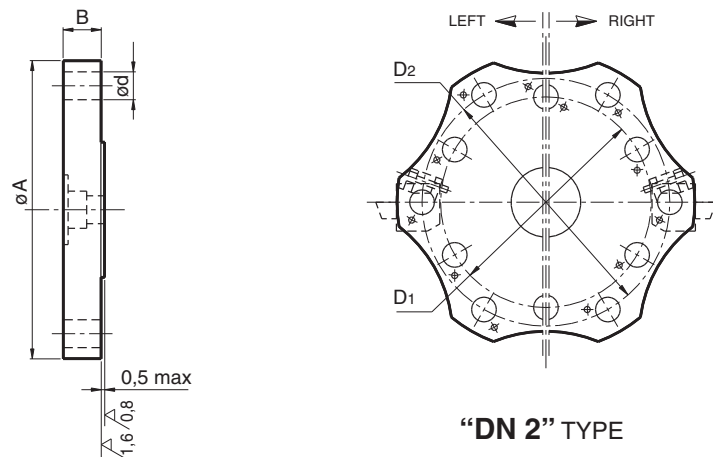
MDT * / series 20 TOOL DISCS SPECS

TOOLDISCS WITH 12 DIN 69880 SEATS ON ONE PITCH DIAMETER



For MDT size	12			16					20	25	32	
Toolholder size d	20	25	30	30					40	40	50	60
Type	PS	BR	BR	PS	BR	PS	BR	BR	BR	BR	BR	BR
$\varnothing A$ [mm]	310	310	340	340	340	370	370	410	420	452	512	565
B [mm]	51	58	67	56	67	56	67	67	75	75	93	109
D $\pm 0,02$	240	240	270	270	270	300	300	340	340	370	420	460

TOOLDISCS WITH 12 DIN 69880 SEATS ON TWO PITCH DIAMETERS

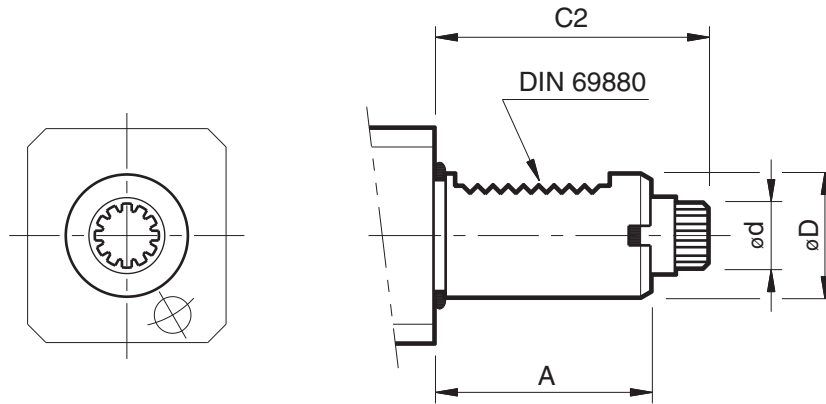


For MDT size	12	16	20	25	32
Toolholder size d	25	30	40	50	60
Type		BR	PS		
$\varnothing A$ [mm]		350	400	442	470
B [mm]		67	66		
D1 $\pm 0,02$ [mm]		240	240	310	340
D2 [mm]		300	340	370	400

MDT * / series 20

ROTATING TOOLHOLDERS COUPLING SPECS

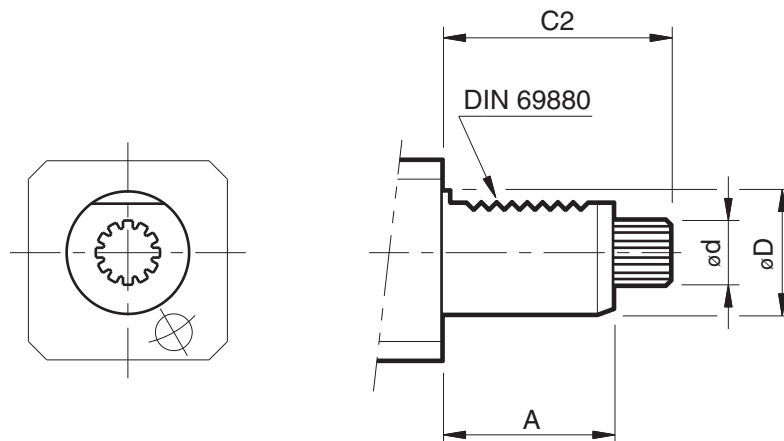
FOR "BR" TYPE : Coupling according to DIN 5480 and zero detent system



	$\varnothing D$	A	C 2	L	Z	$\varnothing d$
BR25	25 h6	48	57	62,5	50	DIN 5480 W14 x 0,8 x 30 x 16
BR30	30 h6	55	67	69,5	57	DIN 5480 W16 x 0,8 x 30 x 18
BR40	40 h6	63	75	77,5	65	DIN 5480 W20 x 0,8 x 30 x 24
BR50	50 h6	78	93	95	82,5	DIN 5480 W24 x 1,25 x 30 x 18

[mm]

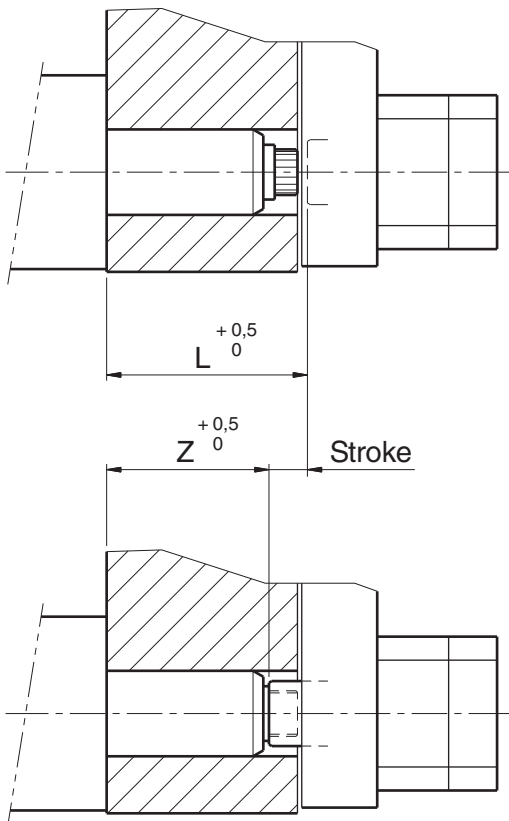
FOR "PS" TYPE : Coupling according to DIN 5480 / 5482



	$\varnothing D$	A	C 2	L	Z	$\varnothing d$
PS20	20 h6	40	51	54	41,5	DIN 5480 W10 x 0,8 x 30 x 11
PS30	30 h6	45	55	59,5	47	DIN 5482 B15 x 12
PS40	40 h6	53	63	67	54,5	DIN 5482 B17 x 14
PS50	50 h6	78	92	93,5	81	DIN 5482 B20 x 17
PS60	60 h6	94	108	111	96	DIN 5482 B25 x 22

[mm]

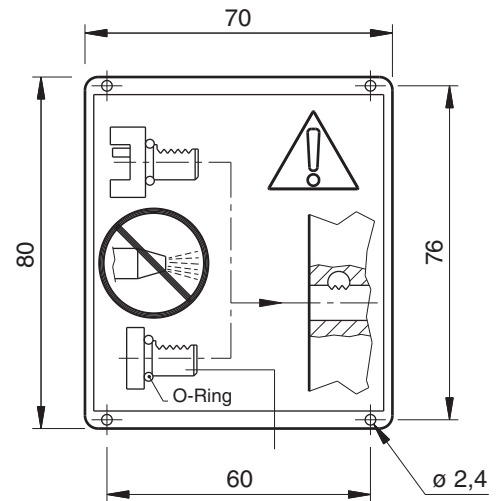
MDT * / series 20 ROTATING TOOLHOLDERS COUPLING SPECS



TOOL NOT ENGAGED
(Unclamped turret)

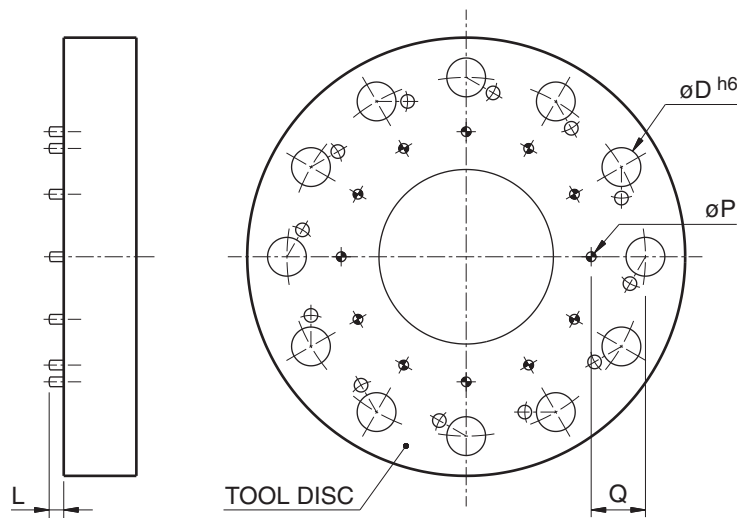
TOOL ENGAGED
(Clamped turret)

- This plate is supplied with the MDT device, and it must be fitted on the machine so as to be very clearly seen.



Note: Housing not engaged with toolholders must be properly plugged. (DIN 69880 Shape Z2).

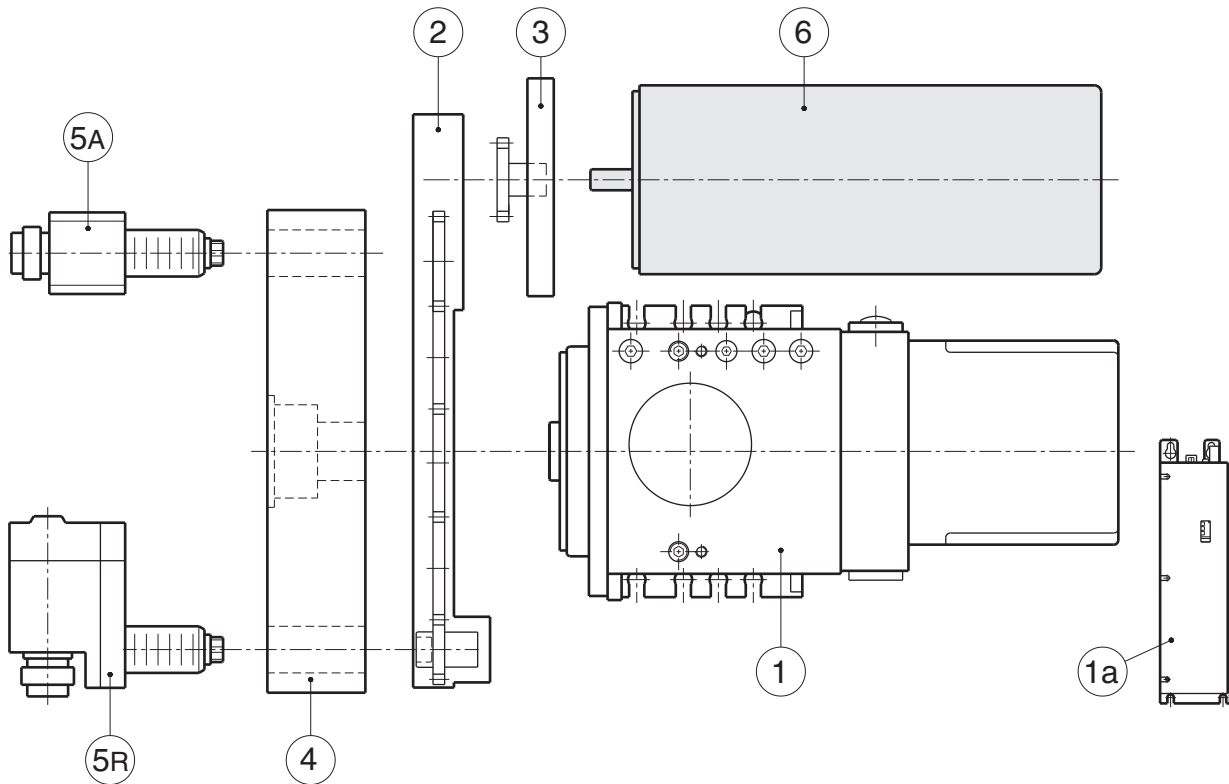
• **ANGULAR ADJUSTING PINS ON DISC (for radial rotating units)**



MDT Size	12		16		20		25		32
ø D	PS 20	BR 25	PS 30	BR 30	PS 40	BR 40	PS 50	BR 50	PS 60
ø P	8	8	8	8	10	10	10	10	16
Q	34,5	40	40	48	63	56	70	64	90
L	8	10	10	10	15	15	15	15	15

[mm]

Thanks to the modular concept of all its products and to a wide range of components, Diplomatic represents the one-source better partner for a “*complete turn-mill system*” supply.



SYSTEM COMPOSITION

(1) Turret:

- **SM** servomotor type, complete with **DDC4** control unit (1a) (see I.T. 6427)
- **DM** new direct drive type, complete with **TMC** control unit (1a) (see I.T. 6458)

(2) MDT/ series 20:

Modular driven tool device for axial applications (see I.T. 6486)

(3) Motor interface group:

Flange and gear according to Customer motor choice.
(The servomotor (6) is excluded from our supply.)

(4) DN tool disc, with DIN 69880 axial seats (see I.T. 6484)

(5) PR* rotating toolholders:

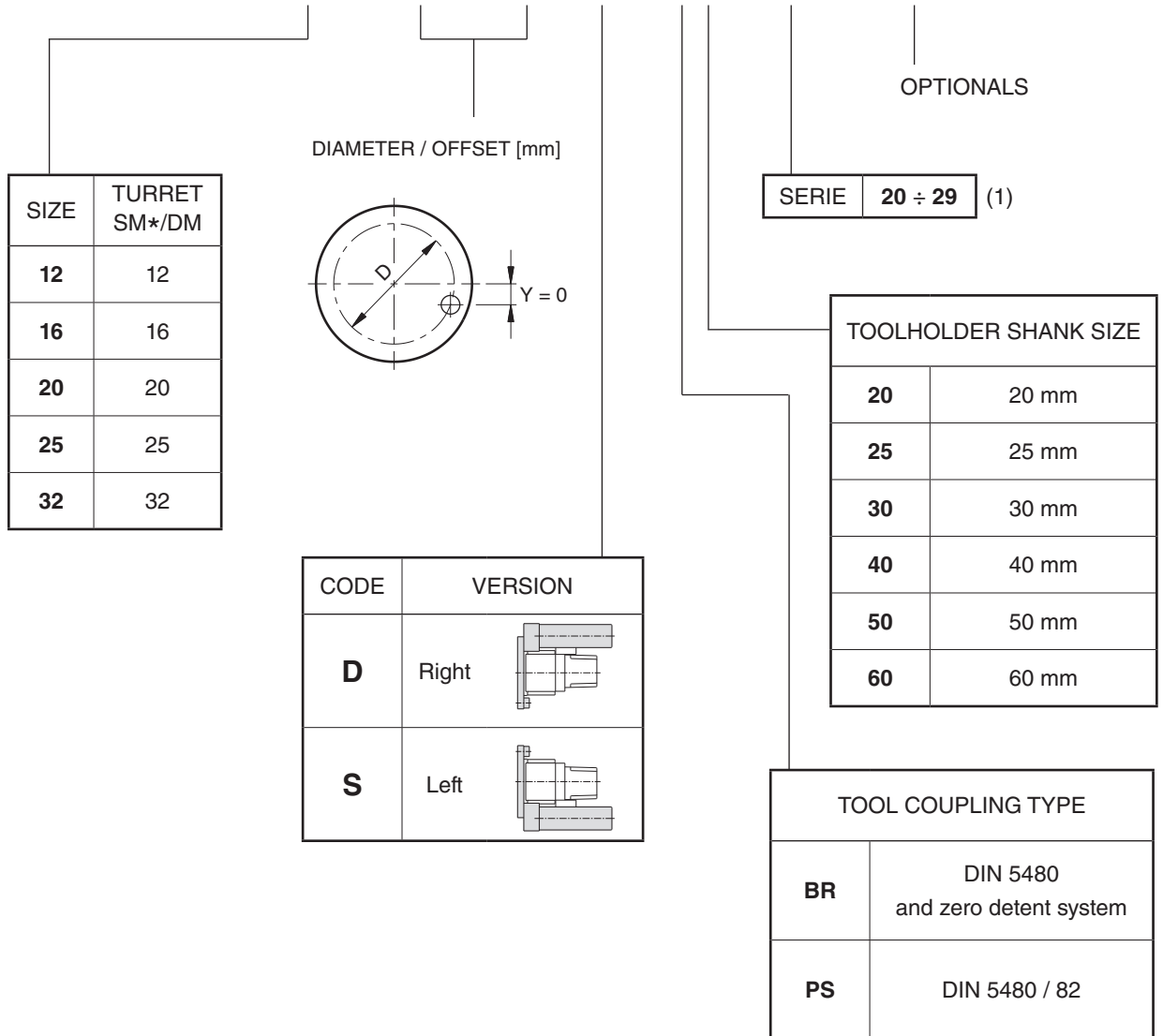
A wide range of versions, morphologies and tool mountings (see I.T. 6483)
(see I.T. 6483/BR)

Please contact our Sales Engineering Dept. for doing your best choice.

MDT * / series 20 IDENTIFICATION CODE

To be used for ordering the MDT modular device only, without turret.

MDT - *M - * / * - * - ** /20 - (*)



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

(2) The electrical motor is excluded from supply. The relevant interface group must be separately ordered.

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