



*Advanced Components
for Automation*
tecnomors



indexing chucks

**engineering manual
& design guide**



MD/MDE

MD4x90° / MDE8x45°
- Automatic indexing power chuck.
Hydraulic feed.

E.13 - E.32



MADV

Manual self-centering power chuck.
Manual clamping and manual indexing.

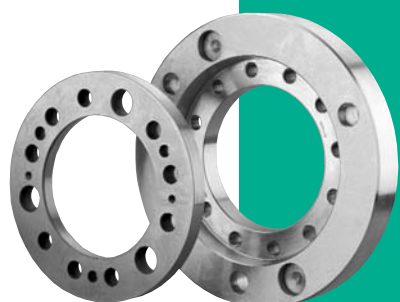
E.35 - E.38



MADT

Semi-automatic self-centering power chuck.
Draw rod clamping and manual indexing.

E.39 - E.42



EQUIPMENT

Adapter plate for machine spindle.

E.43

INDEXING CHUCKS

Mechanical indexing power chucks are used by industries to work pieces with faces at right and axial angles using single loading and blockage.

To work these profiles with traditional chucks every side needs a new clamping and a replacement : this causes precision and time lost.

The complete working with indexing power chucks is made with only a rotation clamping, during rotation and indexing processes the workpiece is closed in the chuck.

With the automatic version it is happend without stopping chuck on the lathe.

Initially conceived to work crosspieces and valve bodies, over the last years constant improvements have been made to their construction and quality; this has led to a vaster application in the automobile, aeronautical, industrial components and in all industrial sectors needing to work pieces with a crossed axis in a single hold.

Automatic and semi-automatic indexing chucks are a good alternative to expensive special working machine or transfert machine with rotary table.

Manual power chucks are the best solution to work small series, prototype and equipment on lathe and on milling machines.

Very precise references and technical specifications adopted permit fast retooling of the power chuck between jobs and fast mounting and dismounting on the machine.

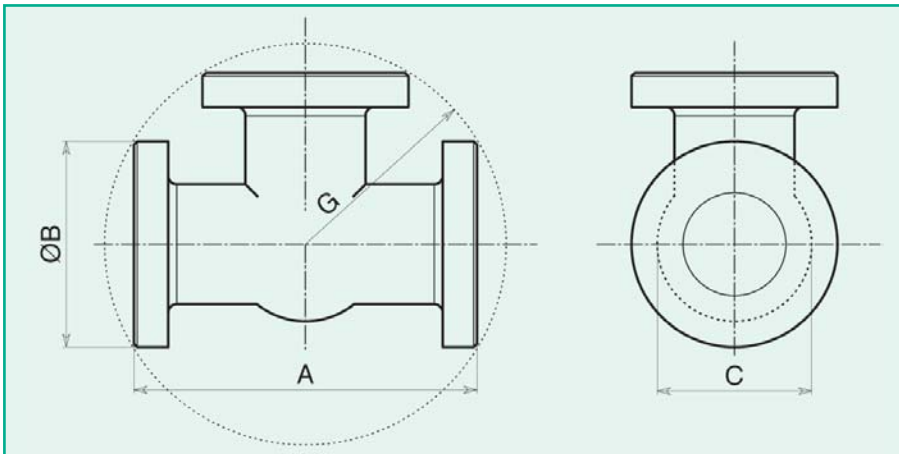
With this catalog we would help our customers giving all the tecnical informations and specifications they need about our indexing power chucks production.

Special chucks can be designed and manufactured on customer request.

This photo shows some pieces which can be worked with indexing chucks



Workpiece sample scheme



For a first chuck selection it is most important to check the following dimensions:

- **G** = the biggest diagonal of the raw component.
- **C** = clamping area thickness + jaws thickness.

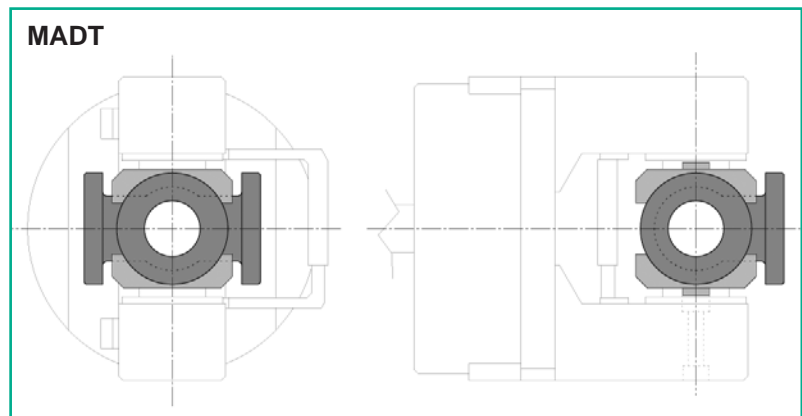
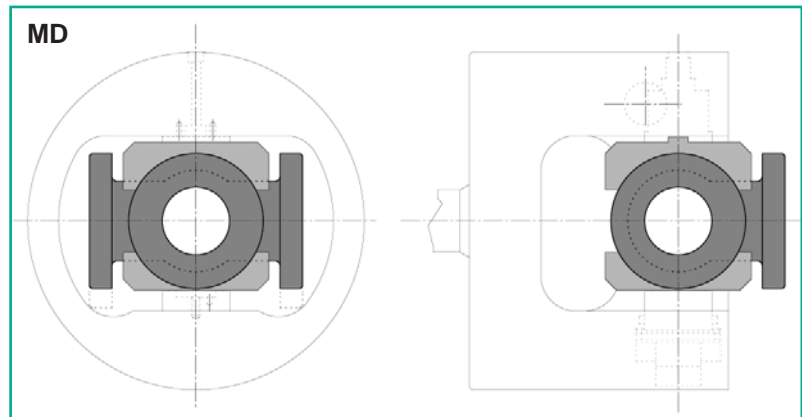
In the first following drawing it is represented a valve clamped in an automatic not self-centering power chuck MD.

In the second one a manual self-centering power chuck MADT (or MADV).

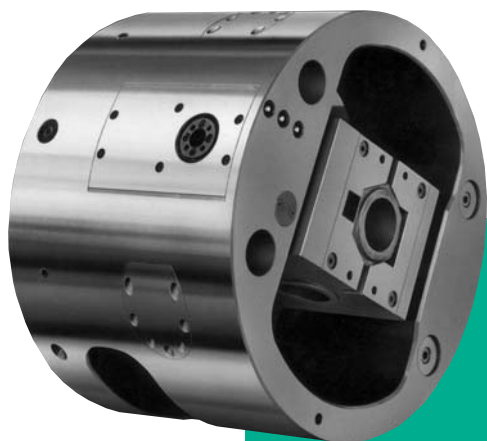
Other parameters to select the chuck are :

- profile shape
- working
- workpiece loading
- clamping stroke
- tools accessibility
- rotation speeds
- clamping force
- and other.

The experience of Tecnomors technicians can help you in this decision process; please contact them for every information you need.



MD 300 power chuck jaws set photograph



MD/MDE

MD is an automatic indexing chuck with hydraulic clamping and indexing. It is not self-centering.

tecnomors is backed in the design and manufacture of MD indexing chucks by its exceptional experience matured in the construction of this specific product over last thirty years.

Unique MD tecnomors automatic indexing chucks features :

- 1.1 - made in special high resistance hardened and cementing 60HRC steel UNI18NiCrMo5, to maintain a high degree of precision, reliability and quality.
- 1.2 - indexing movement (tecnomors patent) simple and reliable with only a piston that works in rotation and in clamping position. Indexing precision $\pm 1'$.
- 1.3 - guiding system of clamping and of the indexing mechanism.





- This system uses 2 pre-loaded solid straight roller radially and 1 axial bearing.

1.4 - seals against contamination by coolant, chips or dust.

1.5 - constant and long lasting precision.

1.6 - easy installation to the machine.

1.7 - the chuck is connected to the rear rotating oil manifold thanks to the nest tube. This tube system is supplied with grinding hardened steel clutches.

1.8 - centrifugal force compensation system for parts susceptible to deformations to obtain an higher productivity performance.

1.9 - indexing control device.

1.10 - a good automation system level grows using robot to load and to unload workpieces.

tecnomors co-operates with anthropomorphic and/or cartesian robot manufacturers also in grippers supply.

Other MD automatic indexing chuck technical features:

2.1 - indexing process is possible also in rotation position to allow a fast indexing position passage. The rotation speed has to be not at the maximum power.

2.2 - indexing takes, with position control, approx. 2-4 seconds per 90°, depending on the size of the chuck.

2.3 - very simple hydraulic system based on 2 indexing mechanism ports, 2 clamping pistons ports and 1 manifold drain.

2.4 - the chucking piston is connected to a safety device and keeps the working securely gripped in the jaws even in the event of a complete pressure loss.

2.5 - constant and automatic control of the indexing position and other working parameters by a separate electronic interface (not supplied) by the machine CNC.

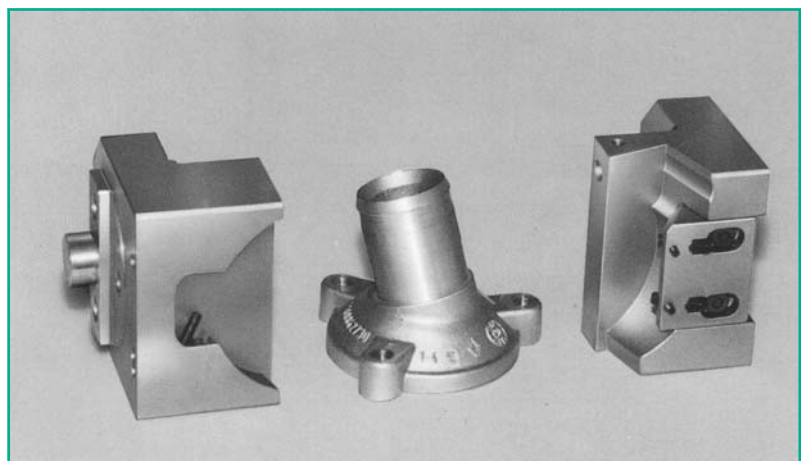
2.6 - Optional:

- Retractable Locator see (pag. E.30)

2.7 - Complete "Operating Manual" is supplied with the chuck.

2.8 - The MDE 8x45° chucks are supplied on request.

Photo shaped grips for special chuck



Indexing system 4x90°

A single hydraulic piston, fed from the rotating oil manifold and the tube nest, rotates and locks the indexing gear.

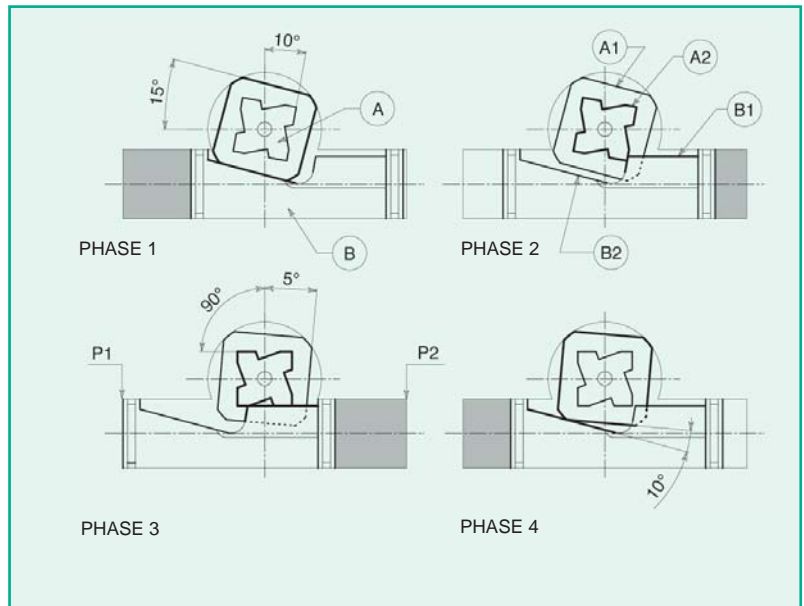
This device (tecnomors patent) with only one piston guarantees higher reliability than the two synchronized pistons that usually the other constructors apply.

The main parts of this system are the following :

- **A** = indexing shaft (driven by two pre-loaded cylindrical roller lines and supported by an axial ball bearing).
- **A1** = indexing square.
- **A2** = rotation square.
- **B** = indexing and rotation piston.
- **B1** = finger
- **B2** = locater

The drawings show the different phases of the rotation and of the indexing:

- phase 1 = indexed chuck (pressure in **P1**).
- phase 2 = turning operation (pressure in **P2**) : piston **B** advances and the finger **B1** moves the rotation square **A2**.
- phase 3 = rotation phase completion:



piston **B** advances, finger **B1** acts on rotation square **A2** and determines a rotation of 80°.

- phase 4 = indexing (pressure in **P1**): piston **B** reverses the movement, locater

B2 act on indexing square **A1** and completes the rotation of 10° indexing and blocking the head pin.

Indexing precision = 0°01'.

Clamping system

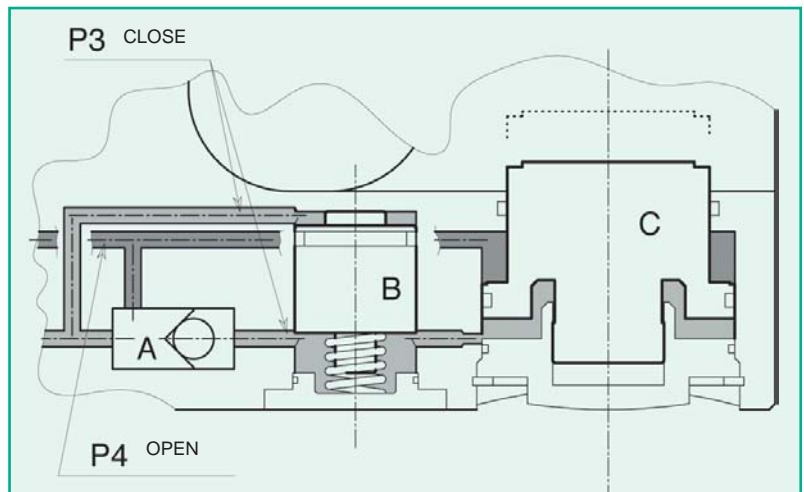
The main parts of the locking device are :

- the closing piston **C**
- the pilot operated non-return valve **A**
- the compensating piston **B**.

The rotation shaft enclosed in the clamping piston is driven by two pre-loaded cylindrical roller lines and is supported by an axial ball bearing.

Work system :

- pressure in **P3** = clamping piston **C**.
- pressure in **P4** = The oil drives the non-return valve **A** opening that allows piston **C** opening.



Safety device :

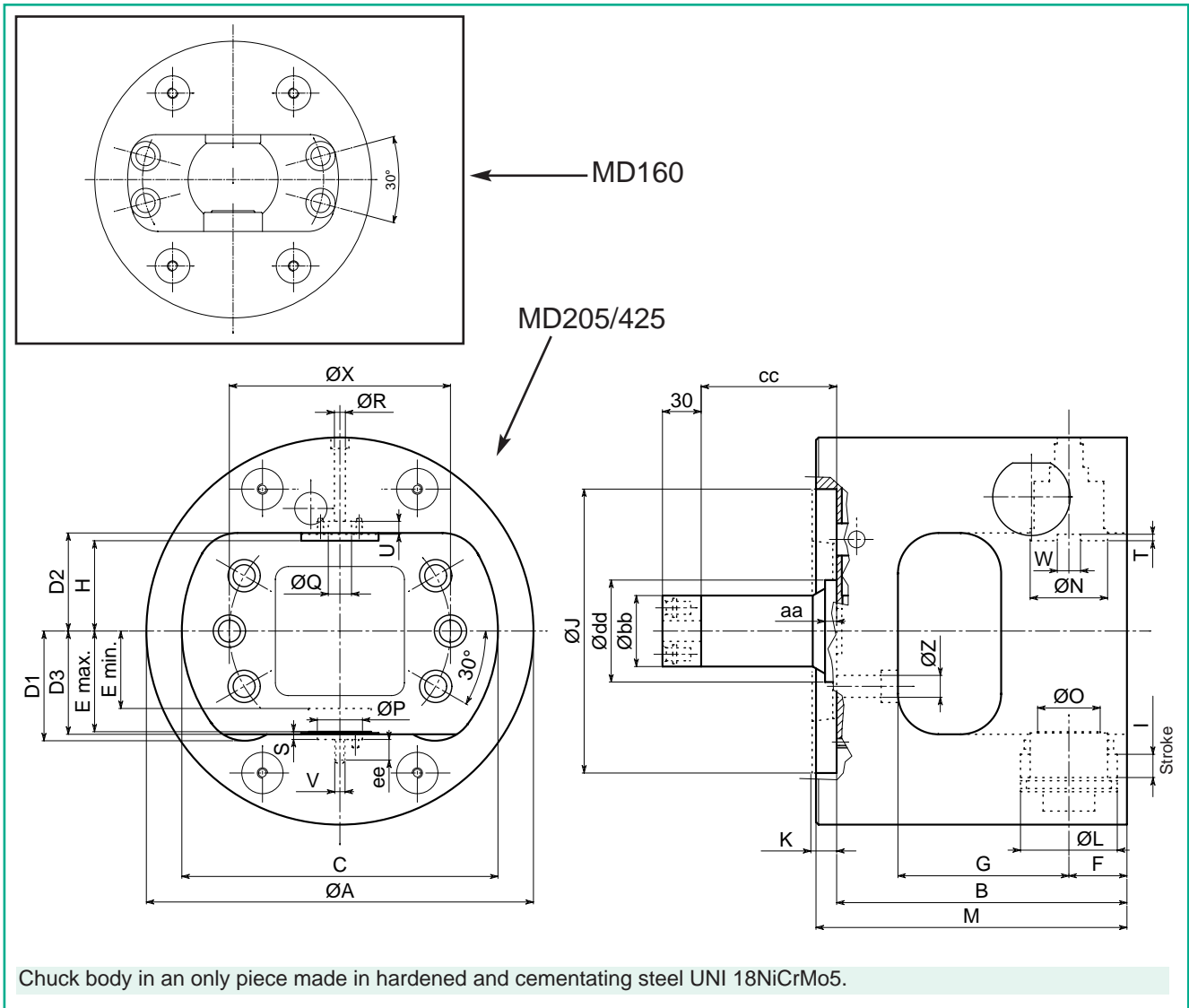
The chucking piston **C** is connected to a non-return valve **A** and keeps the workpiece securely gripped in the jaws even in the event of a complete pressure lost.

Centrifugal force compensation system :

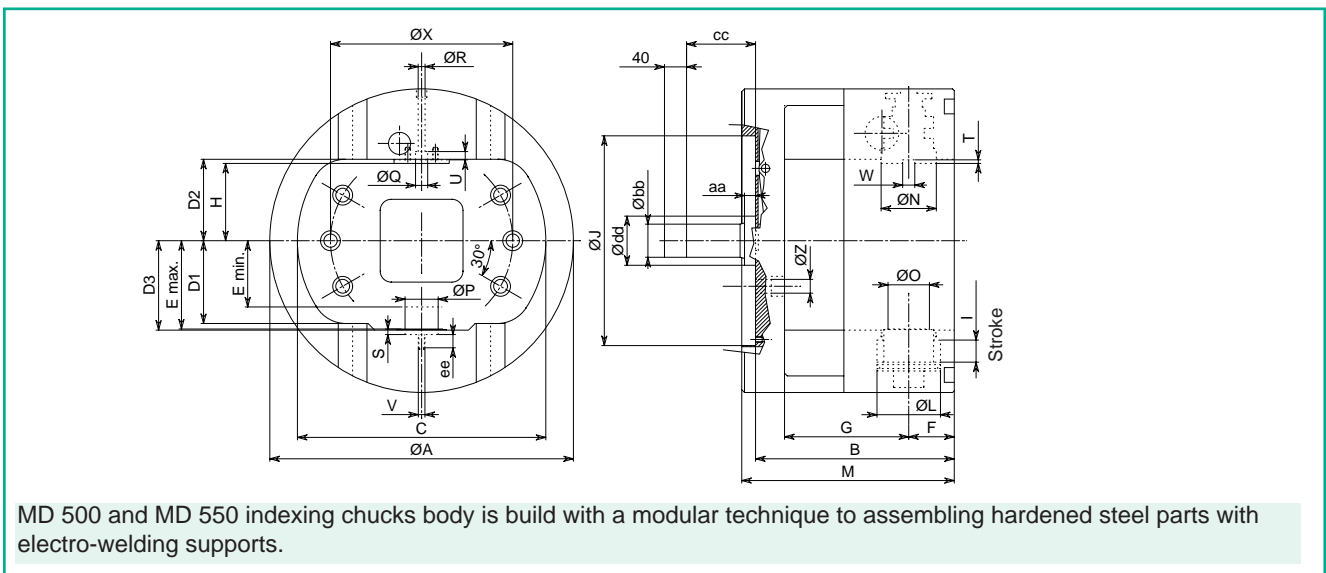
This hydraulic device cuts the clamping power loss that comes to the centrifugal force of the piston and the jaw mass.

During rotation, the pressure created by the clamping piston **B** and valve action **A** increases the pressure on the circuit **P3** and compensates for the loss of gripping force due to the centrifugal force.

Chuck size MD 160 - MD 425



Chuck size MD 500 - MD 550



Dimensions - 4x90°

Code	MD160	MD 205	MD235	MD260	MD285	MD300	MD315	MD350	MD400	MD425	MD500	MD550
Ø A	160	205	235	260	285	300	315	350	400	425	500	550
B	137,5	180	195	207.5	220	225	237.5	255	285	297.5	350	370
C	122	165	195	210	235	245	255	290	330	355	410	450
D1	-	47	62	65	77.5	85	82	99.5	111	123.5	125	150
D2	26	38	53	56	68.5	76	71	88.5	96.5	109	122.5	147.5
D3	30	43	58	60	72.5	80	77	94.5	105.5	118	137	162
E min.	18	27	42	40	52.5	60	52	69.5	73.5	86	95	120
E max.	28	41	56	58	70.5	78	75	92.5	103.5	116	135	160
F	27,5	35	35	45	45	45	52.5	52.5	62.5	62.5	82.5	82.5
G	60	92.5	107.5	115	127.5	132.5	137.5	155	175	187.5	215	235
H ± 0.010	21	32.5	47.5	50	62.5	70	65	82.5	90	102.5	115	140
I stroke	10	14	14	18	18	18	23	23	30	30	40	40
Ø J H6	140	140	170	220	220	220	220	220	300	300	300	380
K *	-	"Adapter Plate"										
Ø L	42	55	55	75	75	75	90	90	105	105	115	115
M	151,5	194	210	223.5	236	241	255.5	273	303	315.5	370	395
Ø N	32	50.4	50.4	60	60	60	70	70	85	85	100	100
Ø O	25	31.5	31.5	48.5	48.5	48.5	60	60	73	73	80	80
Ø P H7	16	22	22	35	35	35	45	45	55	55	60	60
Q H7	10	12	12	18	18	18	22	22	22	22	22	22
Ø R	M5	6.5	6.5	8.5	8.5	8.5	10.5	10.5	10.5	10.5	12.5	12.5
S	2,5	3	3	6	6	6	7	7	10	10	10	10
T	3,5	4	4	4.5	4.5	4.5	5	5	5.5	5.5	6.5	6.5
U	8	8	8	10	10	10	12	12	12	12	15	15
V	M5	M6	M6	M8	M8	M8	M10	M10	M10	M10	M12	M12
W H7	10	12	12	18	18	18	22	22	22	22	22	22
X	104,80	104.8	133.4	171.4	171.4	171.4	171.4	171.4	235	235	235	330.2
Y	-	-	-	-	-	-	-	-	-	-	-	-
Z	11	11	13	17	17	17	17	17	21	21	21	25
aa	0	0	0	9	9	9	9	9	9	9	20	20
Ø bb	44	50	50	55	55	55	55	55	55	55	60	60
cc	95	95	95	105	105	105	105	105	105	105	125	125
Ø dd	0	0	0	79	79	79	79	79	79	79	89	89
ee	10	12	12	16	16	16	20	20	20	20	24	24

ARTICLE CODE	MD160MAA	MD205MBA	MD235MCA	MD260MDA	MD285MEA	MD300MNA	MD315MFA	MD350MGA	MD400MHA	MD425MIA	MD500MLA	MD550MMA
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- Note :

All the dimensions are in millimeter.

* For K level in relation to the spindle nose see "Adapter Plate" section.

Specifications

Code	MD160	MD 205	MD235	MD260	MD285	MD300	MD315	MD350	MD400	MD425	MD500	MD550
Weight Chuck kg.	20	29	39	50	60	70	84	104	148	169	260	340
Max. speed rotat. g/1	4750	4200	3650	3500	3300	2900	2600	2200	2000	1800	1300	1000
Weight clamp.jaw kg.	0,2	0,5	0,5	1,2	1,2	1,2	2	2	4	4,5	5	5,5
Max. pressure bar.	55	55	55	55	55	55	55	55	55	55	55	55
Mom. of inertia kgm2	-	0.18	0.33	0.52	0.85	1.10	1.50	2.10	3.90	5	11	17.30
Clamp pist. area cm2	13,85	23.7	23.7	44.1	44.1	44.1	63.6	63.6	86.5	86.5	103.8	103.8

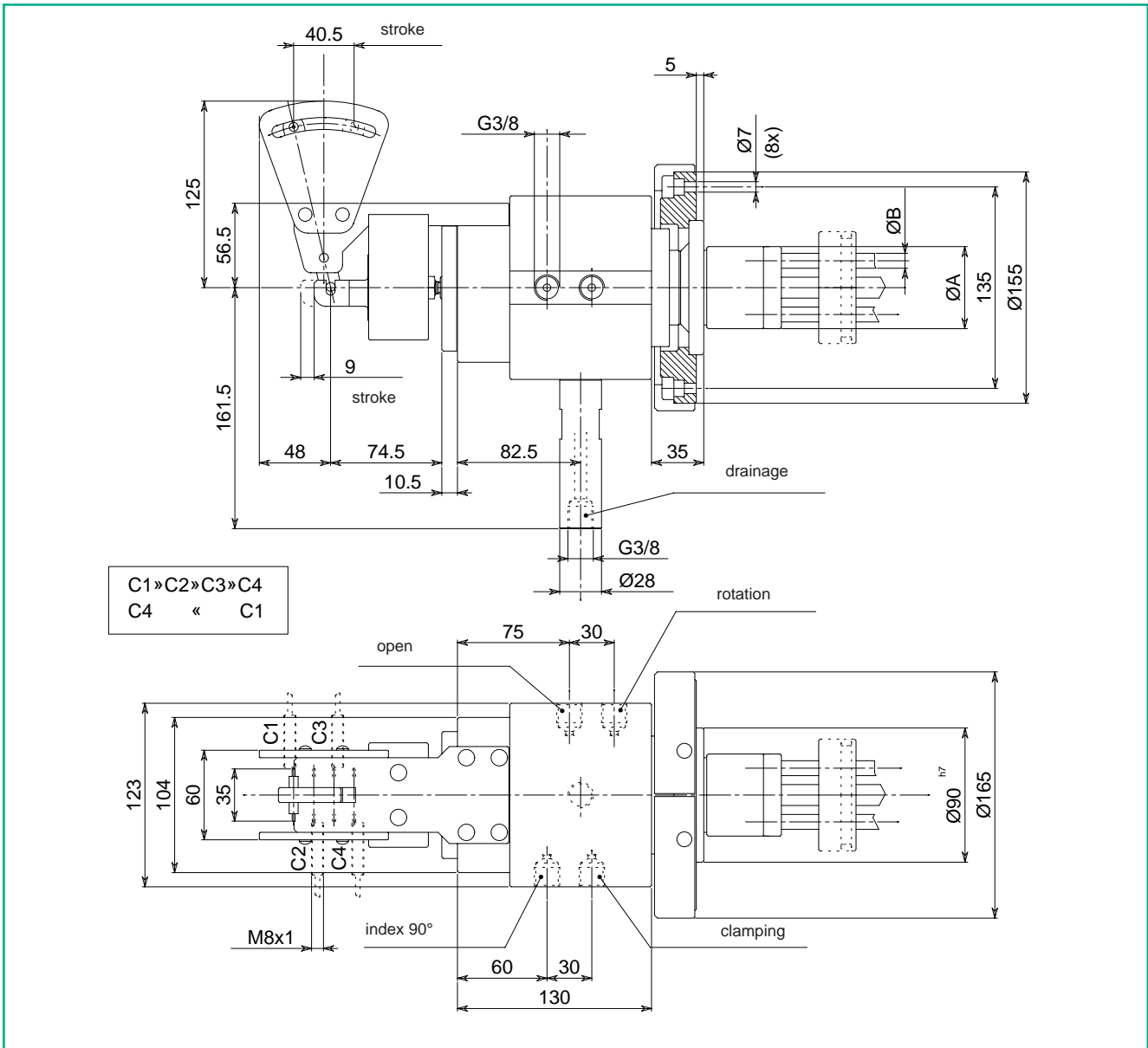
- Note :

• Important : max. rotation speed you find in the schedule can be reached only at max. operating pressure using a clamping jaw with a mass not exceeding the values shown for each model.
If the pressure is not at the max. power or the clamping jaw mass exceeds the schedule values you have to reduce the speed.

• It is advisable to reduce speed about 30 - 50 % during indexing and rotation operations to avoid vibrations due to the unbalance of masses while the piece is in an intermediate position.

• All dimensions are indicative and subject to variation for technical upgrading. We reserve the right to make alterations without prior notification.

MD Rotating oil manifold - 4x90°

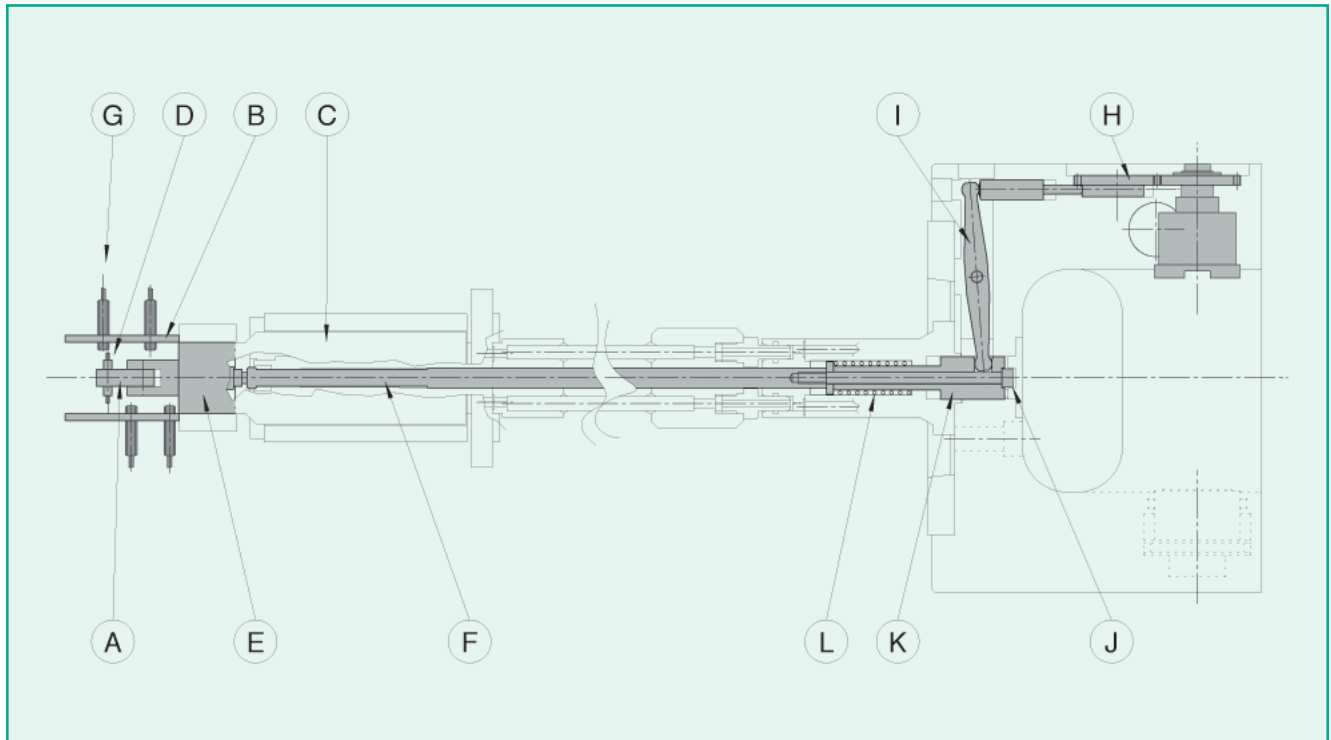


Dimintions

Code	Ø A	Ø B
MD 160	44	8
MD 205 - MD 235	50	8
MD 260 - MD 425	55	10
MD 500 - MD 550	65	12

- **T**he rear hydraulic unit has:
 - steel nest tube connected to the chuck.
 - rotating oil manifold.
 - indexing position control
 - chuck connection rod.
- **L**etters C1 » C2 » C3 » C4 are the lever movements control system in comparison to the 4 proximity switches.
- **S**ee the paragraph “ Indexing position control system” for details.

Construction diagram - 4x90°



The indexing position control system allows to check the right working of the 4 indexing position interfaced with the machine.

So it is possible to verify if the angular position obtained corresponds to that set by the CNC program.

The drawing shows the complete indexing position control mechanism.

The main parts of this mechanism are the followings :

- Front indexing position control (chuck body side) :
Cam "H" drives the rotary movement of the indexing shaft in a rectilinear movement that through lever "I" is put off the central cursor "K".
Spring "L" assures the right power and the return of the cursor.
- Rear indexing position control (rotating oil manifold side) :
The rectilinear movement of the rod "F", connected to the cursor "K" throught the screw "J", is amplified (relation 4.5/1) with a special device "E" fixed to the rotating oil manifold "C".

The movement produced to the lever "A" is brought up on the pin "D" by nr. 4 proximity

switches "G" fixed on the plate "B".

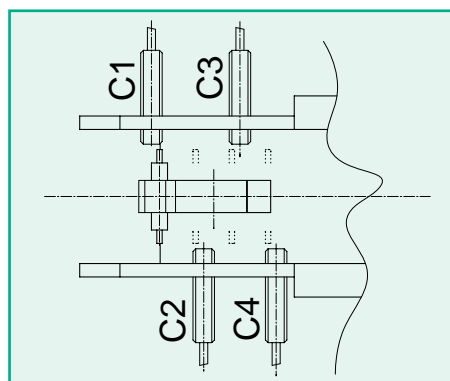
The originally of the indexing position control by **tecnomors** is the amplify mechanism over described.

This solution make the device sensitiver giving the right identification of the 4 indexing position and recognising the eventually anomalies (incomplete

rotation).

The 4 proximity switches are schematized in the technical drawing ; the 4 proximity switches giving signals corresponding to the 4 indexing positions :

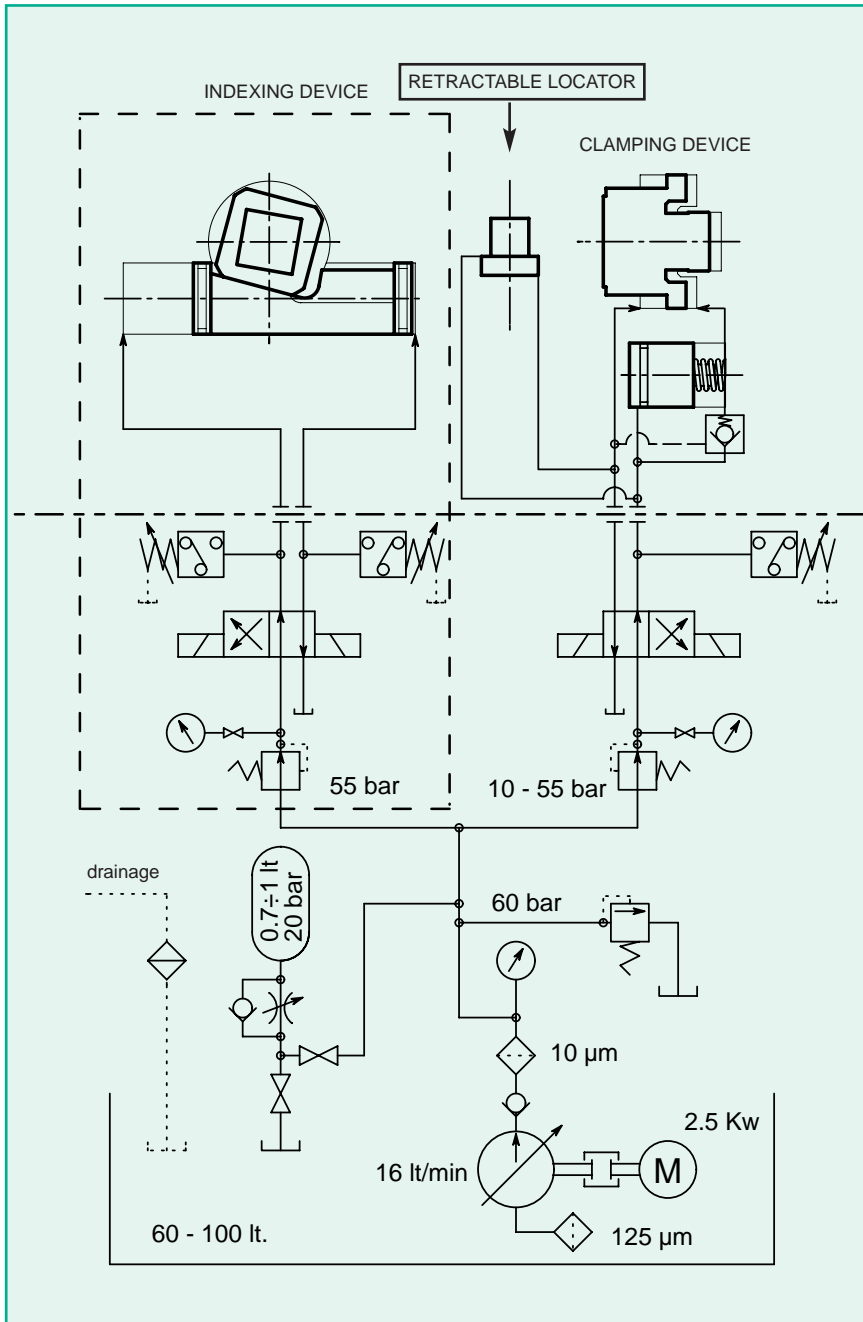
- C1 = pos. 0° - 360°
- C2 = pos. 90°
- C3 = pos. 180°
- C4 = pos. 270°



! DANGER

Hydraulic and connecting schemes, technical data and assembly instructions included in the present catalogue are supplied as information only. Please, refer to "Operating Instruction Manual - Indexing power chucks MD" for correct instruction about setting, connections, functioning, use, maintenance and safety indications.

Diagram hydraulic system 4x90°



Sideways to power chuck MD hydraulic system.

--- = add to change the existing circuit.

Suggested hydraulic circuit specifications:

- tank with approx. 60 - 100 l capacity.
- system pressure minimum 60 bar.
- variable pump capacity of 16 lt/min.
- accumulator capacity 0.7 - 1.1 litres, pre-load with 20 bar
- double oil filtering.
- nr. 2 electro-valves systems with double solenoid with fixed positions.
- nr. 2 pressure reducing valves for indexing and clamping systems.
- nr. 3 pressure switch: (nr.1 for clamping, nr.2 for indexing circuit)

Optionals :

- hydraulic oil cooling system.
- double pressure clamping drive for parts susceptible to deformations (contact our technical staff for information to unlock the pilot operated non-return valve incorporated).

Note:

- The hydraulic oil manifold system of the chuck shall be ventilate.
- Hydraulic seat valves are very sensitive against contamination (recommended filtering BS5540/4 10 µm).
- OIL type HLP32 / DIN51524 - ISOVG32 / DIN51519 (32 cSt at 40°C).
- Only clean and recommended oil shall be used.
- Therefore an oil change every six months is recommended.

MDE 8x45° • Indexing - Clamping system

Indexing system 8x45°

A couple of hydraulic pistons, feeded from the rotating oil manifold and the tube nest, rotate and lock the indexing gear.

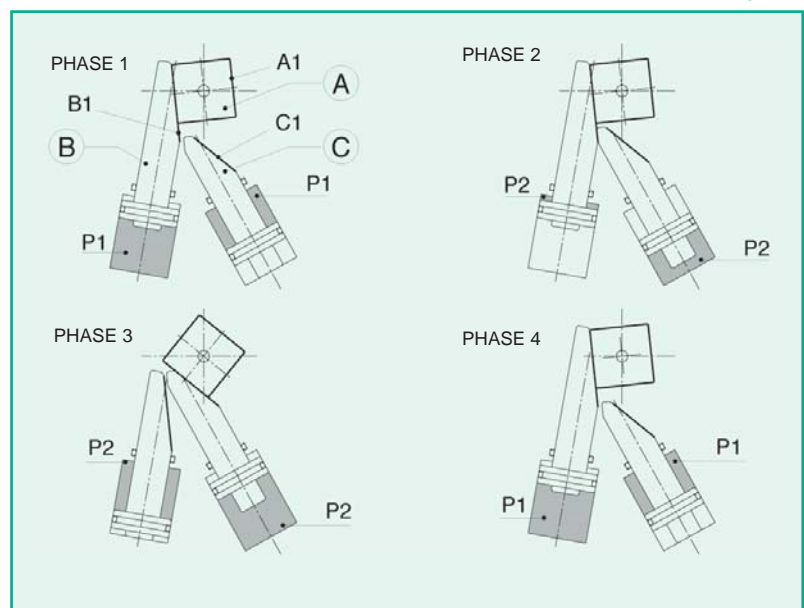
This device uses two pistons, designed synchronized, which guarantee high reliability in the positioning and gentleness motion.

The main parts of this system are the following:

- A = indexing shaft (driven by two pre-loaded cylindrical roller lines and supported by an axial ball bearing).
- A1 = rotation and indexing square
- B = rotation and indexing piston at 90°
- B1 = indexing plane at 90°
- C = rotation and indexing piston at 45°
- C1 = indexing plane at 45°

The drawing shows the different phases of the rotation and of the indexing:

- phase 1 = indexed chuck at 90° (pressure in P1)
- phase 2 = turning and indexing operations at 45°, piston C advances (pressure in P2)
- phase 3 = C1 plane acts on A1 square, it turns and index at 45°



- phase 4 = turning and indexing operation at 90°, piston B advance (pressure in P1) B1 plane acts on A1 square, it turns and index at 90° (increase of 45° from the previous position).

Indexing precision = 0°001'.

Clamping system

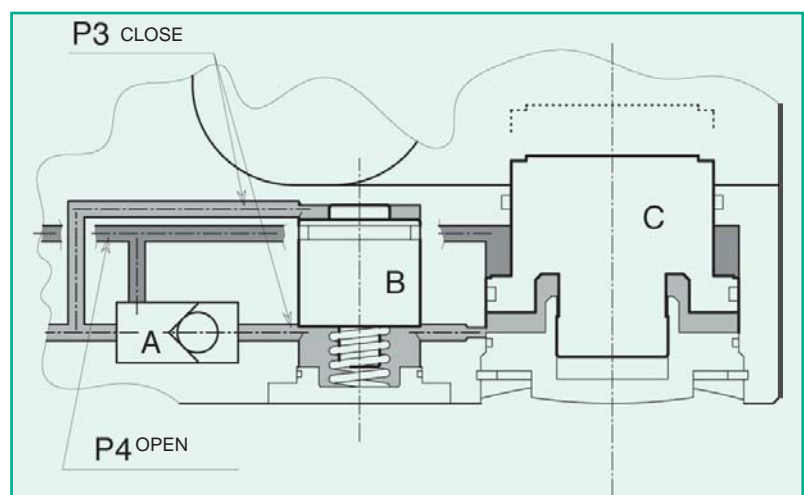
The main parts of the locking device are :

- the closing piston **C**
- the pilot operated non-return valve **A**
- the compensating piston **B**.

The rotation shaft enclosed in the clamping piston is driven by two pre-loaded cylindrical roller lines and is supported by an axial ball bearing.

Work system :

- pressure in **P3** = clamping piston **C**.
- pressure in **P4** = The oil drives the non-return valve **A** opening that allows piston **C** opening.



Safety device :

The chucking piston **C** is connected to a non-return valve **A** and keeps the workpiece securely gripped in the jaws even in the event of a complete pressure lost.

Centrifugal force compensation system :

This hydraulic device cuts the clamping power loss that comes to the centrifugal force of the piston and the jaw mass.

During rotation, the pressure created by the clamping piston **B** and valve action **A** increases the pressure on the circuit **P3** and compensates for the loss of gripping force due to the centrifugal force.

Dimensions - 8x45°

Code	MDE160	MDE 205	MDE 235	MDE 260	MDE 285	MDE 300
Ø A	160	205	235	260	285	300
B	145	185	200	207.5	220	225
C	122	165	195	210	235	245
D1	-	47	62	65	77.5	85
D2	26	38	53	56	68.5	76
D3	30	43	58	60	72.5	80
E min.	18	27	42	40	52.5	60
E max.	28	41	56	58	70.5	78
F	27,5	35	35	45	45	45
G	60	92.5	107.5	115	127.5	132.5
H ± 0.010	21	32.5	47.5	50	62.5	70
I stroke	10	14	14	18	18	18
Ø J H6	140	140	170	220	220	220
K *	"Adapter Plate"					
Ø L	42	55	55	75	75	75
M	159	199	215	223.5	236	241
Ø N	32	50.4	50.4	60	60	60
Ø O	25	31.5	31.5	48.5	48.5	48.5
Ø P H7	16	22	22	35	35	35
Q H7	10	12	12	18	18	18
Ø R	M5	6.5	6.5	8.5	8.5	8.5
S	2,5	3	3	6	6	6
T	3,5	4	4	4.5	4.5	4.5
U	8	8	8	10	10	10
V	M5	M6	M6	M8	M8	M8
W H7	10	12	12	18	18	18
X	104,80	104.8	133.4	171.4	171.4	171.4
Y	-	-	-	-	-	-
Z	11	11	13	17	17	17
aa	0	0	0	9	9	9
Ø bb	44	50	50	55	55	55
cc	95	95	95	105	105	105
Ø dd	0	0	0	79	79	79
ee	10	12	12	16	16	16

ARTICLE CODE	MD160EBB	MD205EBB	MD235ECB	MD260EDB	MD285EEB	MD300ENB
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- Note :

All the dimensions are in millimeter.

* For K level in relation to the spindle nose see "Adapter Plate" section.

Specifications

Code	MDE160	MDE 205	MDE235	MDE260	MDE285	MDE300	
Weight	kg.	22	32	42	50	60	70
Max. speed rotat.	g/1	4750	4200	3650	3500	3300	2900
Weight clamp.jaw	kg.	0,2	0.5	0.5	1.2	1.2	1.2
Max pressure	bar.	55	55	55	55	55	55
Mom. of Inertia	kgm2	-	0.18	0.33	0.52	0.85	1.10
Clamp pist. area	cm2	13.85	23.7	23.7	44.1	44.1	44.1

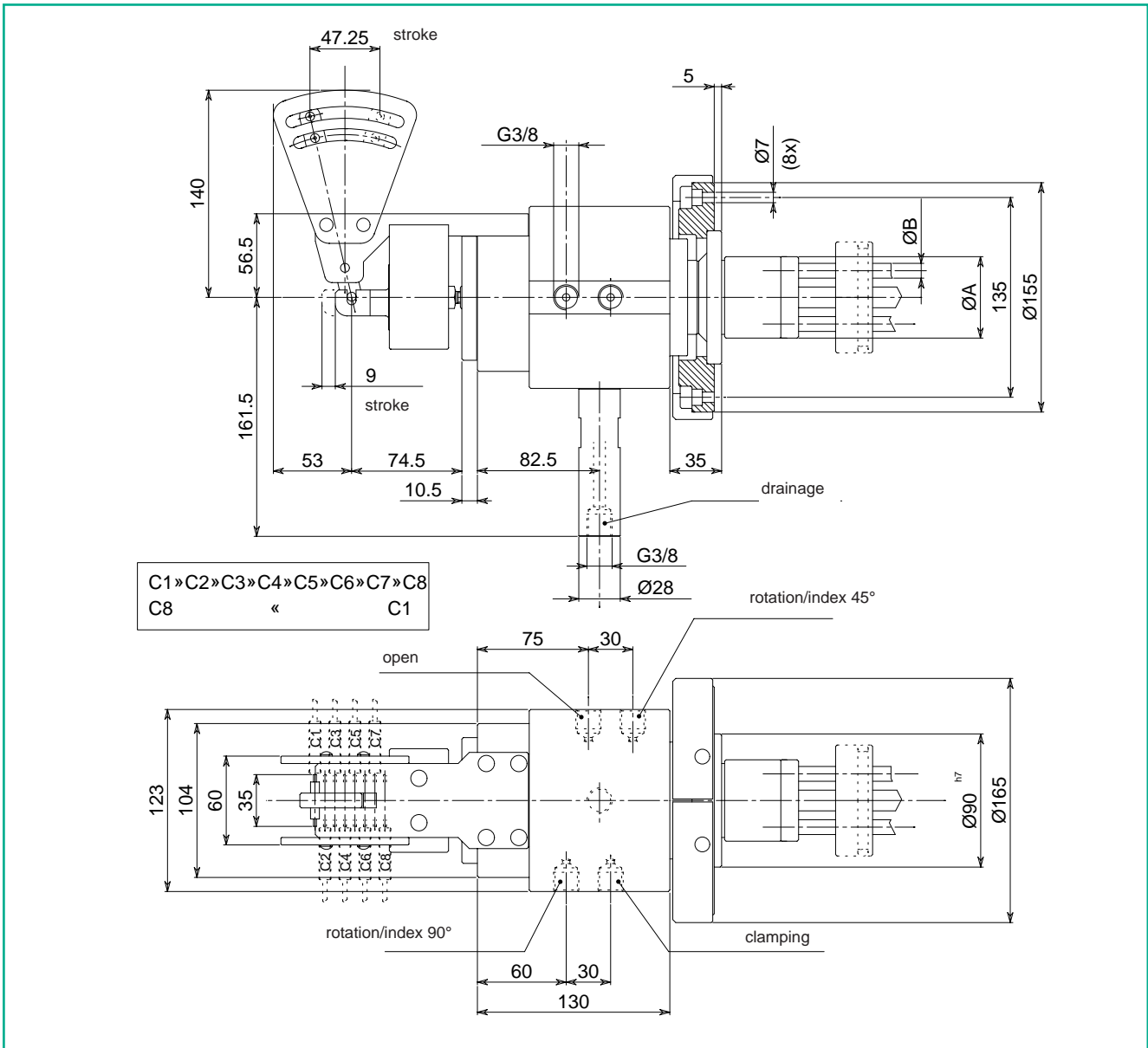
- Note :

• Important : max. rotation speed you find in the schedule can be reached only at max. operating pressure using a clamping jaw with a mass not exceeding the values shown for each model.
If the pressure is not at the max. power or the clamping jaw mass exceeds the schedule values you have to reduce the speed.

• It is advisable to reduce speed about 30 - 50 % during indexing and rotation operations to avoid vibrations due to the unbalance of masses while the piece is in an intermediate position.

• All dimensions are indicative and subject to variation for technical upgrading. We reserve the right to make alterations without prior notification.

MDE Rotating oil manifold - 8x45°

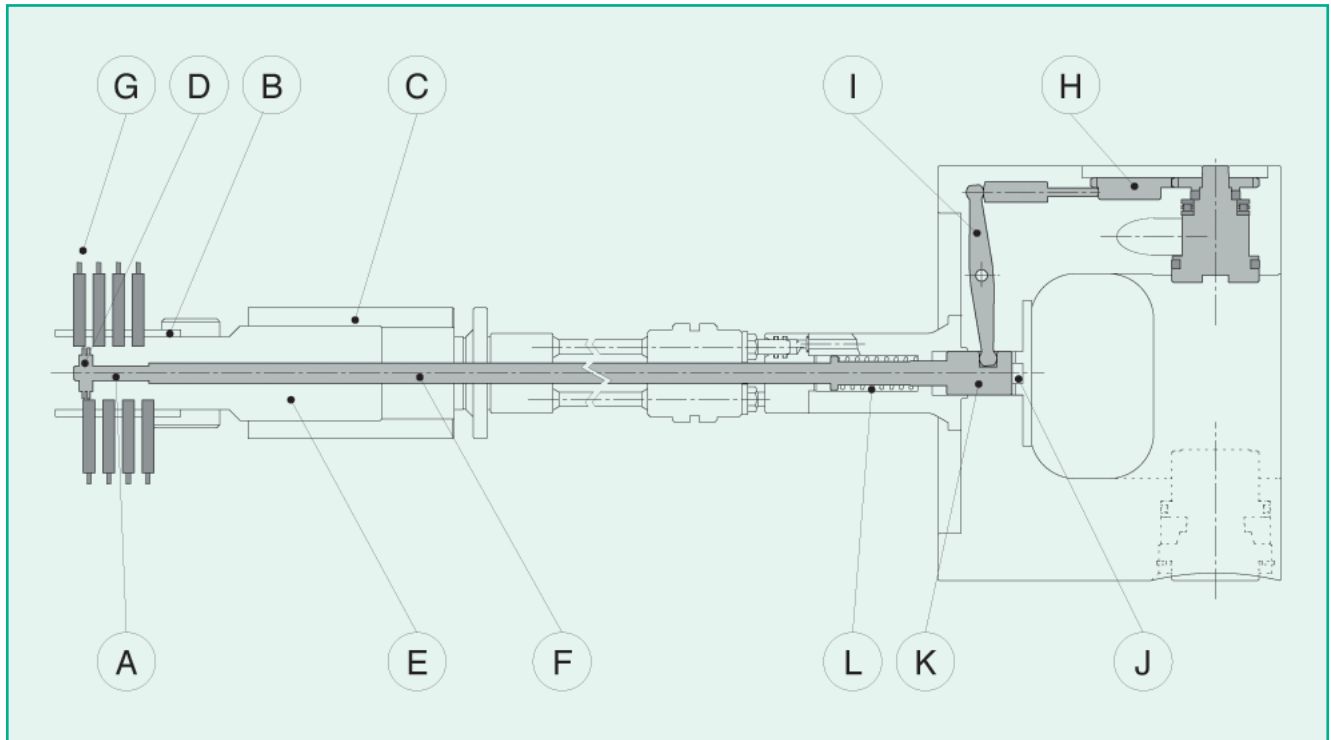


Dimensions

Code	Ø A	Ø B
MDE 160	44	8
MDE 205 - MDE 235	50	8
MDE 260 - MDE 300	55	10

- The rear hydraulic unit has:
 - steel nest tube connected to the chuck.
 - rotating oil manifold.
 - indexing position control
 - chuck connection rod.
- Letters C1 » C2 » C3 » C4 » C5 » C6 » C7 » C8 are the lever movements control system in comparison to the 8 proximity switches.
- See the paragraph “ Indexing position control system” for details.

Construction diagram - 8x45°



The indexing position control system allows to check the right working of the 8 indexing position interfaced with the machine.

So it is possible to verify if the angular position obtained corresponds to that set by the CNC program.

The drawing shows the complete indexing position control mechanism.

The main parts of this mechanism are the followings :

- Front indexing position control (chuck body side) :
Cam "H" drives the rotary movement of the indexing shaft in a rectilinear movement that through lever "I" is put off the central cursor "K".
Spring "L" assures the right power and the return of the cursor.
- Rear indexing position control (rotating oil manifold side) :
The rectilinear movement of the rod "F", connected to the cursor "K" through the screw "J", is amplified (relation 4.5/1) with a special device "E" fixed to the rotating oil manifold "C".

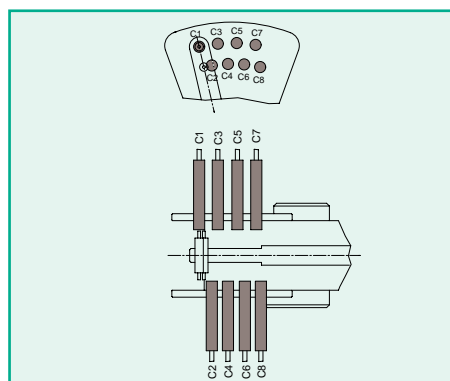
The movement produced to the lever "A" is brought up on the pin "D" by nr. 8 proximity switches "G" fixed on the plate "B".

The originally of the indexing position control by **tecnomors** is the amplify mechanism over described.

This solution make the device sensitiver giving the right identification of the 8 indexing position and recognising the eventually anomalies (incomplete rotation).

The 8 proximity switches are schematized in the technical drawing ; the 8 proximity switches giving signals corresponding to the 8 indexing positions :

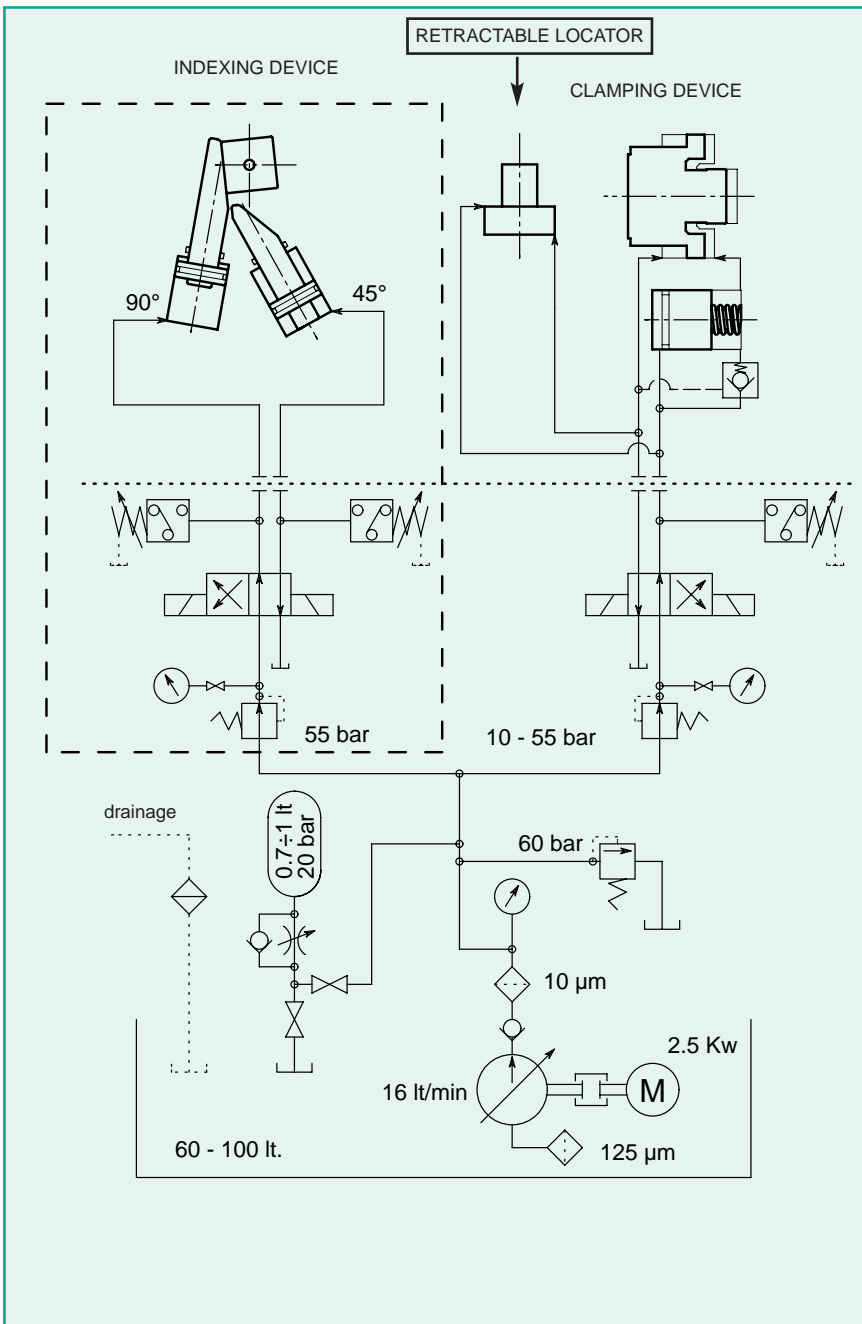
- C1 = pos. 0° - 360°
- C2 = pos. 45°
- C3 = pos. 90°
- C4 = pos. 135°
- C5 = pos. 180°
- C6 = pos. 225°
- C7 = pos. 270°
- C8 = pos. 315°



! DANGER

Hydraulic and connecting schemes, technical data and assembly instructions included in the present catalogue are supplied as information only. Please, refer to "Operating Instruction Manual - Indexing power chucks MD" for correct instruction about setting, connections, functioning, use, maintenance and safety indications.

Diagram hydraulic system 8x45°



Sideways to power chuck MDE hydraulic system.

--- = add to change the existing circuit.

Suggested hydraulic circuit specifications:

- tank with approx. 60 - 100 l capacity.
- system pressure minimum 60 bar.
- variable pump capacity of 16 lt/min.
- accumulator capacity 0.7 - 1.1 litres, pre-load with 20 bar
- double oil filtering.
- nr. 2 electro-valves systems with double solenoid with fixed positions.
- nr. 2 pressure reducing valves for indexing and clamping systems.
- nr. 3 pressure switch: (nr.1 for clamping, nr.2 for indexing circuit)

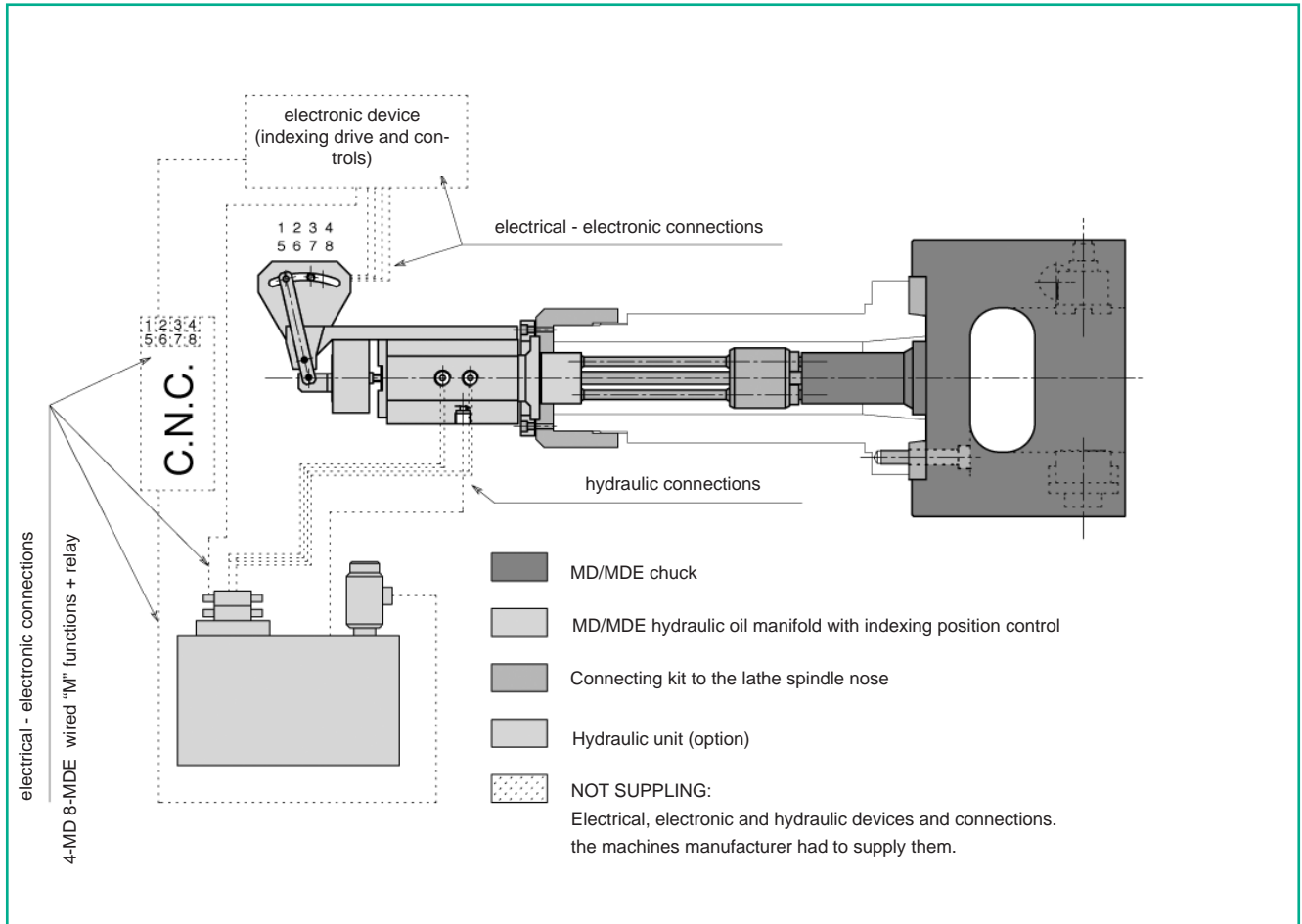
Optionals :

- hydraulic oil cooling system.
- double pressure clamping drive for parts susceptible to deformations (contact our technical staff for information to unlock the pilot operated non-return valve incorporated).

Note:

- The hydraulic oil manifold system of the chuck shall be ventilate.
- Hydraulic seat valves are very sensitive against contamination (recommended filtering BS5540/4 10 µm).
- OIL type HLP32 / DIN51524 - ISOVG32 / DIN51519 (32 cSt at 40°C).
- Only clean and recommended oil shall be used.
- Therefore an oil change every six months is recommended.

General connecting supply diagram



The standars MD/MDE power chuck includes:

- chuck
- hydraulic rear oil manifold
- tube nest
- indexing control predisposition (proximity switches not included)
- connecting flange to the lather spindle nose.

When ordering send us a drawing with the spindle lathe dimentions and specification to do the correct choice for you.

Components supplied only on request :

- M8x1 proximity switches (specify the type) to fix on the indexing control system.
- hydraulic unit with pipings (flexibility pipe length must be specified).
- shaped grips *.

*For this option we need a workpiece and the drawings of the raw part with working specifications.

We can't supply the following parts:

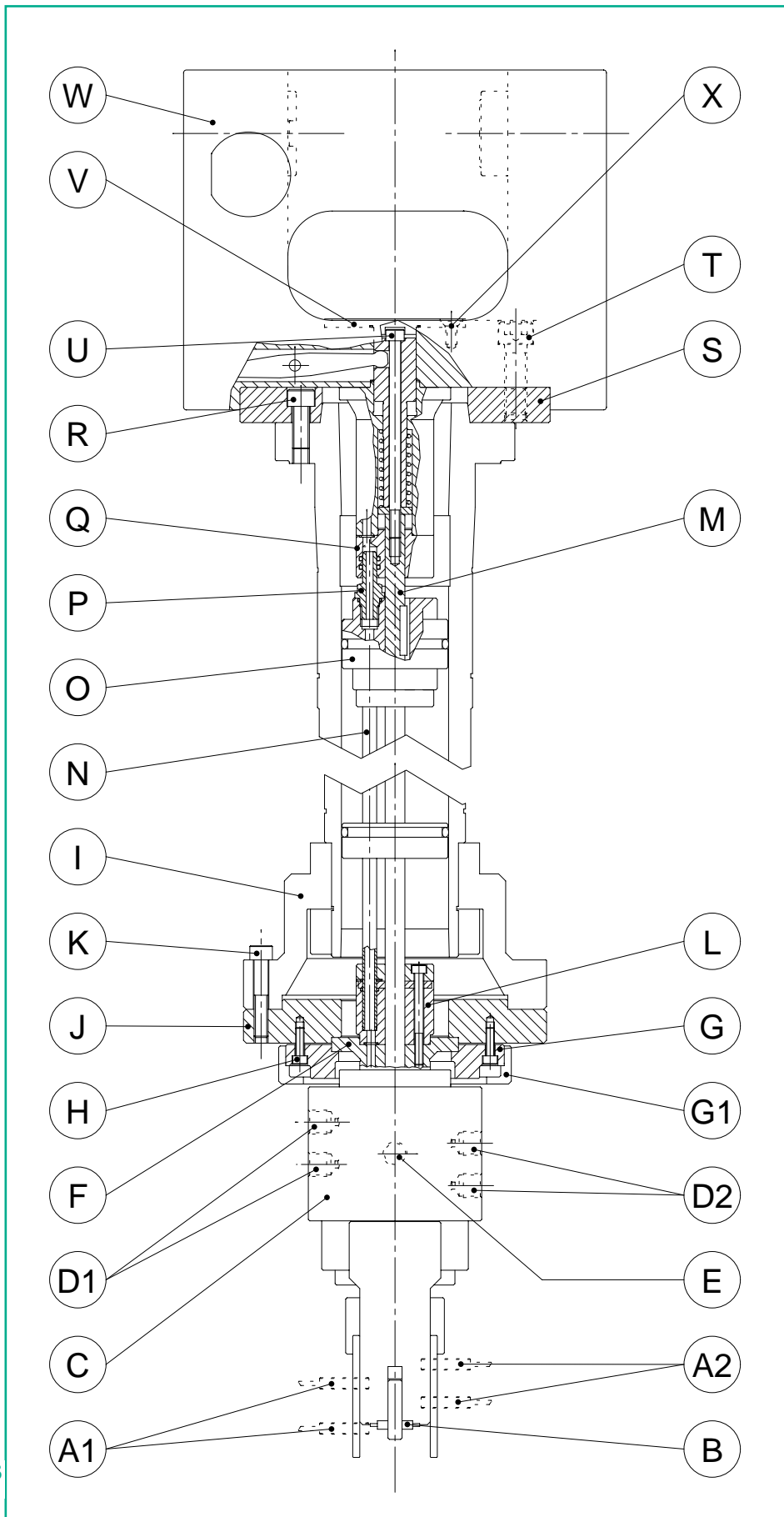
- the first installation on the lathe
- the electrical and electronic devices to interface the hydraulic unit and the proximity switches to the electrical cabinet and the machine CNC (indexing drive & controls).
- the hydraulic, electrical and electronic connection between chuck and machine tool.

See instruction enclosed with the furniture "Operating Manual".

For the correct working the CNC control unit needs to have auxiliary functions "M" wired to their respective relays.

The machines manufacturer had to supply them.

Mounting diagram



Forwarding :

The packing-case includes :

- MD/MDE power chuck
- ASA chuck adapter plate
- oil manifold + tube nest + control road
- rear lathe adapter plate
- fixing screw
- layout assembling drawing
- operating manual

When supplied our MD power chucks are already adapted to the application; no adjustments are usually required.

See the following chapter for mounting instructions details.

Mounting instructions (extract from Operating Manual)

See the mounting diagram at page E.28, (and the assembling drawing and the Operating manual enclosed with the furniture for specific details).

01 Flange ASA

(see Adapter Plate description at page E.43):

- 01A = Direct flange fixing :
Fix the flange "S" on the MD body.
- 01B = Fixing with reduction or augmentation flange:
Mount the flange "S" on the lathe spindle nose (the flange has to coincide with the reference pin) and fix with the screws "R".

02 Set MD chuck body "W" on lathe spindle nose and fix the supplied screws "T".

03 Rear flange "J" :

- 03 A = The front support "O" passes through the flange hole (around "L") :
Fix flange "J" on the rear chuck side "I" and fix with screws "K".
- 03 B = The front support "O" doesn't pass through the flange hole (around "L").
In this case flange "J" is supplied introduced in the tube nest "N"; to put in the tube nest to fix it at the flange "J" with screws "K".

04 To align tally mark on the oil manifold "F" in the same radial position as the one marked on the chuck body "W".

To put in the rotary union "C" kindly until clutch terminals "P" that are on the seats "Q" on the chuck body.

Lubricate clutches "P" for a good sliding.

05 Fix flange "G" of the oil manifold "C" with screws "H". Mount and fix the cover "G1".

06 Connect control road "M" using screw "U" (do not tighten them excessively); fix bottom plate "V" with screws "X".

07 Connect hydraulic piping to D1 and D2.

Connect drain pipe to "E" to recover oil (approx. 1.5 lt/min, it is dipent to the pressure

and to the temperature).

IMPORTANT: Not rotate the lathe without pressure in the hydraulic circuit to avoid distributor damaging.

08 Fix proximity switches A1 and A2 and adjust its 4 indexing positions with led control.

Regulate the proximity switches off-center respect the sensor pin "B" to increase their sensibility (see indexing control system chapter) and to prevent their switch on incomplete rotation (80°) or not indexing position.

With adjusting screw it is possible regulate the rod.

09 General features for the first starting ignition:

- before start ignition test the pressure setting.
- acting the elettro-valves, with working chuck not in rotation, and effect some working cycles to bleed pipes.
- at the first starting ignition wait always for a shortly warming up phase, than it is possible to work

at the maximum power.

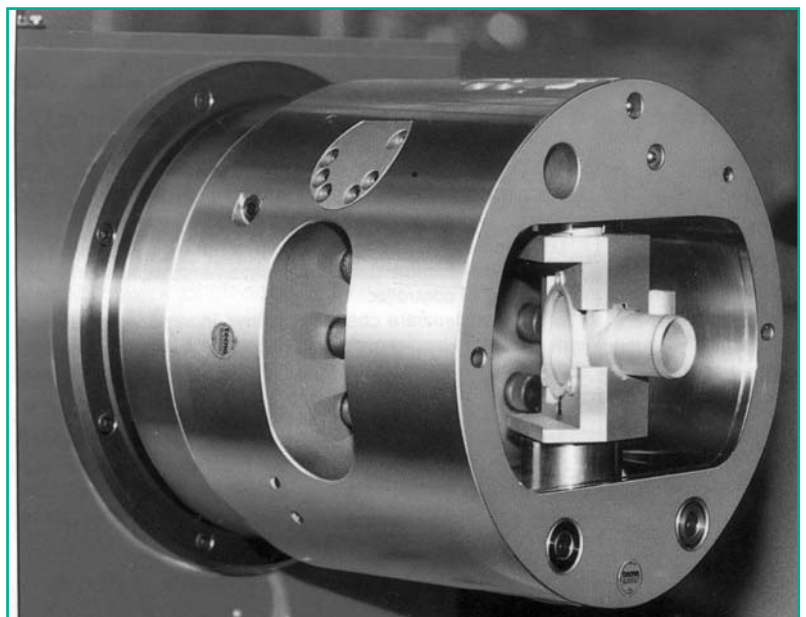
- hydraulic, electric and electronic connections have to be conforming to the laws in force.

- mount an antirotation bracket on the manifold that does not create axial or radial forces.

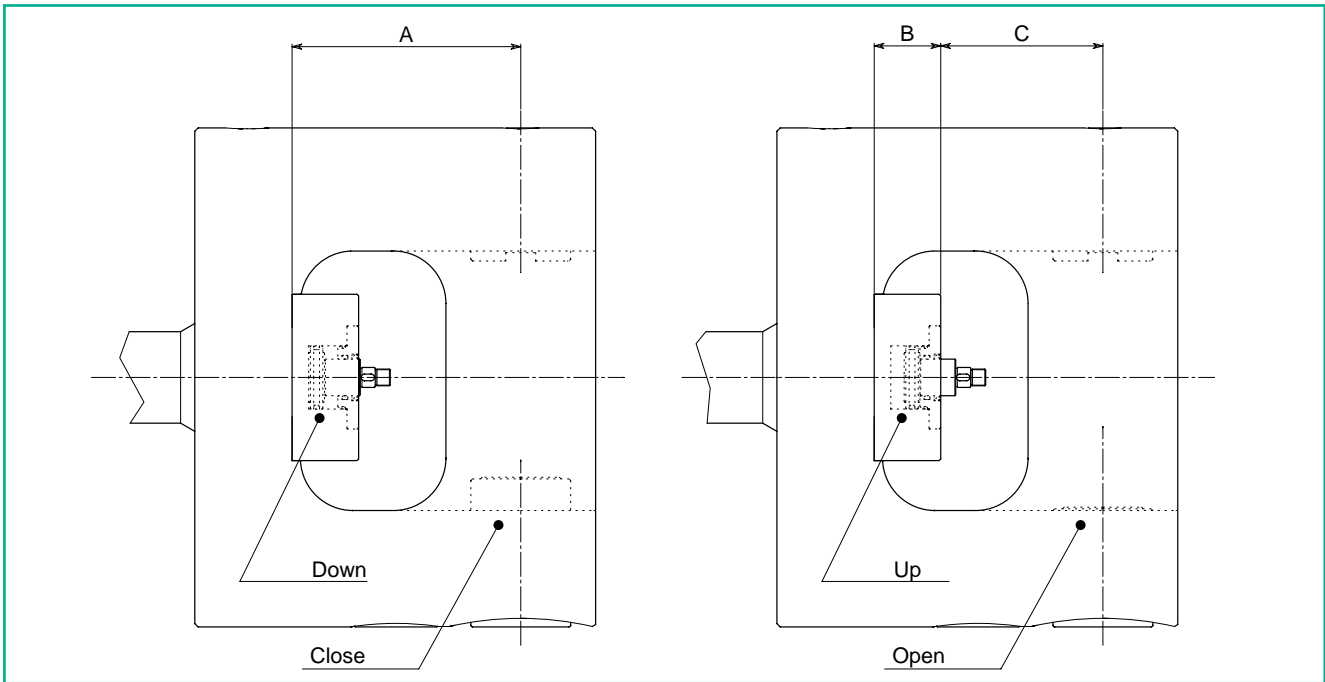
- if it is necessary balance, after jaws set mounting, the chuck acting on either jaws or chuck body.

- during indexing process reduce speed as it is shown in specifical chapter.

Photograph MD with shaped grips



Dimensions



MD Automatic Indexing Chuck+Retractable Locator										
Code	MD/MDE 235	MD/MDE 260	MD/MDE 285	MD/MDE 300	MD 315	MD 350	MD 400	MD 425	MD 500	MD 550
A	107.5	115	127.5	132.5	137.5	155	175	187.5	215	235
B	35	35	35	35	40	40	45	45	45	45
C	72.5	80	92.5	97.5	97.5	115	130	142.5	170	190

For special applications, where the loading operation needs a phase positioning of the workpiece, a special hydraulically operated unit has been designed and built.

The name of this component (optional) is "Hydraulic Retractable Locator".

The functioning of the Retractable Locator is made in sequence respect the clamping piston movement, thanks to the use of a couple of incorporated sequence valves (adjustable). Setting depended to the oil pressure and to the temperature.

Supplementary hydraulic supplies are not needed because it has a direct supply from the hydraulic circuit.

This part is applied after market too in all the chuck models able to received this accessory in specifying the chuck part number.

Functioning sequence (in reference with the drawing):

Phase 1 : when the clamping piston is opening, the Retractable Locator piston feed in giving a fix axial reference.

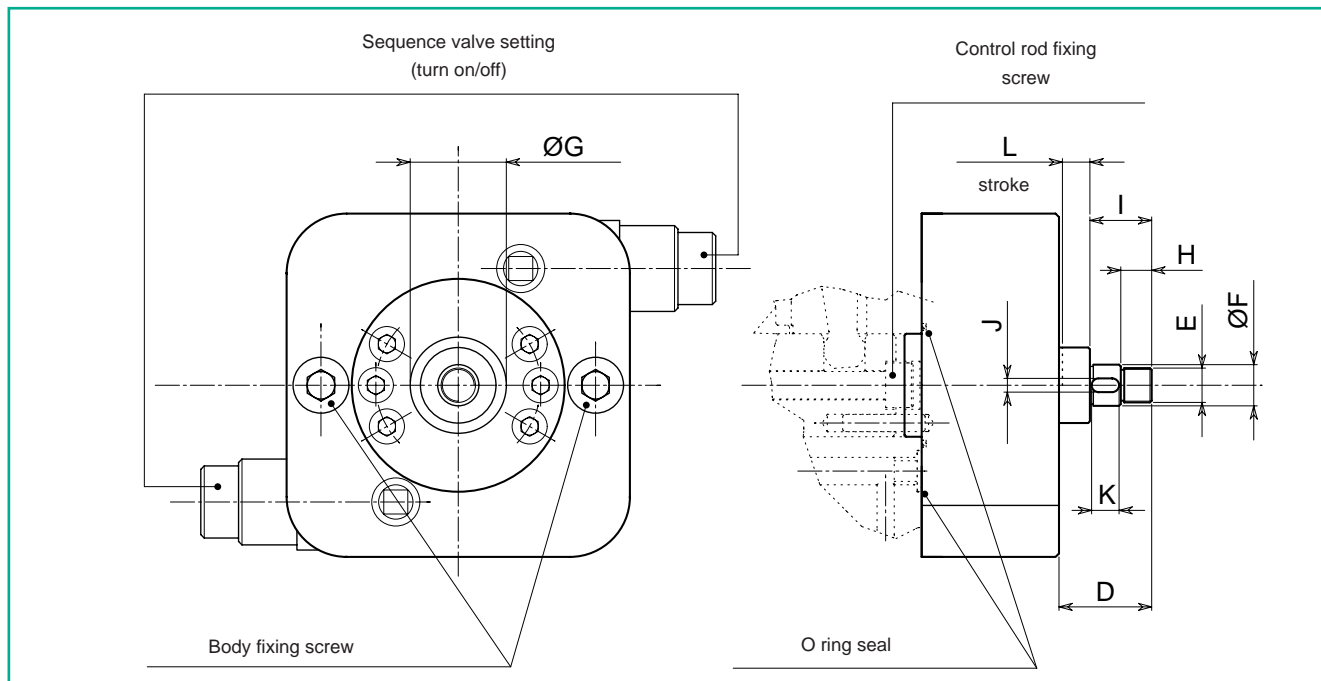
Phase 2 : when the clamping piston is closing, the Retractable Locator piston come back permitting next rotation and indexing phases.

NOTE:

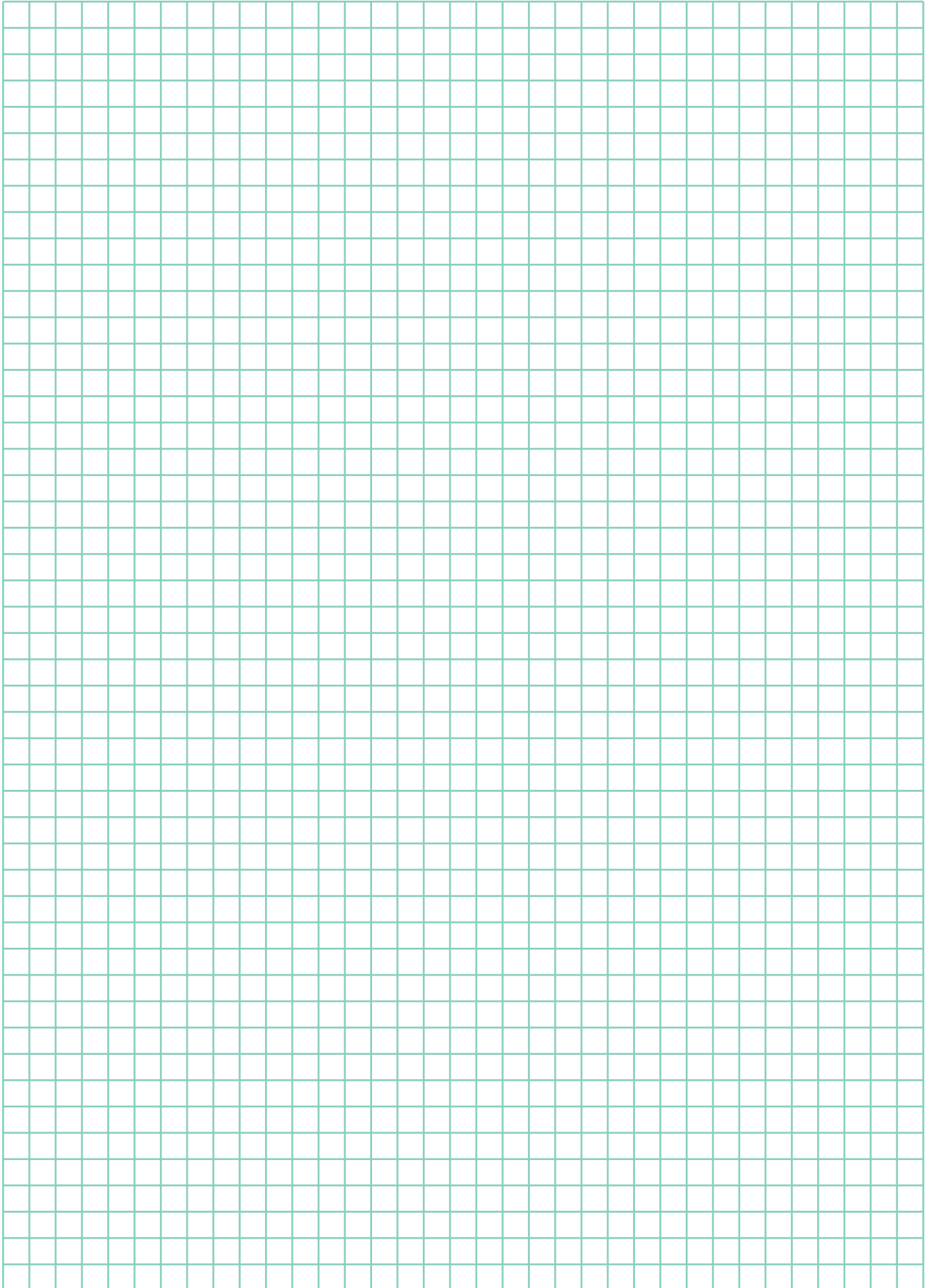
Retractable Locator reduce chuck's capacity.

This option is not available for the chuck size MD160 and MD205.

During the first chuck mounting phase on the lathe it's necessary remove the hydraulic Retractable Locator group to reach the fixing screw of the indexing position reading rod.



Retractable Locator											
Code	MD/MDE 205	MD/MDE 235	MD/MDE 260	MD/MDE 285	MD/MDE 300	MD 315	MD 350	MD 400	MD 425	MD 500	MD 550
D	-	27	27	27	27	31	31	36	36	40	40
E	-	10x0.75	10x0.75	10x0.75	10x0.75	12x1	12x1	12x1	12x1	17x1	17x1
F - h8	-	12	12	12	12	14	14	14	14	20	20
G	-	18	22	22	22	28	28	28	28	40	40
H	-	9	9	9	9	9	9	9	9	9	9
I	-	18	18	18	18	20	20	20	20	24	24
J	-	4	4	4	4	5	5	5	5	6	6
K	-	8	8	8	8	10	10	10	10	12	12
L	-	8	8	8	8	10	10	15	15	15	15
area cm2	-	7.1	11.3	11.3	11.3	24.6	24.6	24.6	24.6	38.5	38.5





MADV/MADT

Chucks serie MAD are self-centering.

In version MADT jaws clamping is automatic trough a draw rod and a rear cylinder, in version MADV jaws clamping is manual thanks to an operating key.

Chucks MADT and MADV have booth manual indexing system.

In MADT and MADV power chucks manufacture and design we have applied the experience and the technology matured in particular in indexing power chuck design.

The originality of these indexing self-centering power chucks comes to the costant improvements **tecnomors** done since the early 1960's after the first chuck prototype realisation.

The main MAD power chucks features are:



1.1 - made in special high resistance hardened and cementing 60HRC steel UNI18NiCrMo5, to maintain a high degree of precision, reliability and quality.

1.2 - jaws slideways execution with gib allows a good sliding surface finish with possibility to recover clearances consequent to wear.

1.3 - indexing movement simple and reliable: a conical shutter guarantees the mechanical indexing. Indexing precision $\pm 1'30''$.

1.4 - shaft guide system with two lines of big filled cylindrical pre-loaded roller radially and with a strong axial ball bearing axially.

1.5 - seals against contamination by coolant, chips and dust.

1.6 - constant and long lasting precision.

1.7 - easy installation to the machine.

1.8 - standard with 4 indexing 90° + 1 indexing 45° .

On request special indexing positions available ($8 \times 45^\circ$, $6 \times 60^\circ$).

2.1 - MADT specifications :

- self-centering clamping.
- big clamping capacity.
- versions with long jaw for workpieces that need a big radius of revolution.
- quick and easy installation to the machine, it is request only the connection to the hydraulic cylinder on the lathe.

2.2 - MADT benefits:

- manufacturing of different pieces and also of small series.
- workpieces with big radius of revolution and flanges with big diameter.
- could be apply in the same machine with a conventional 3 jaws power chuck thanks to the quick retooling increasing unit flexibility and productivity.
- the indexing device allowing a quick change between the multiple working axes.
- good tools accessibility thanks to the chuck shape.

2.3 - a special tecnomors device with titled plane transmits the clamping force to the jaws.

2.4 - Chuck is supplied without driving cylinder. See the specific chapter to check cylinder and chuck size.

3.1 - MADV specifications:

- self-centering clamping.
- big clamping capacity.
- versions with long jaw for workpieces that need a big radius of revolution.
- it can be used on every tools machine (lathe, fresatrice, etc.)

3.2 - MADV benefits:

- the big jaws stroke makes really the clamping of complex profiles that couldn't be good clamping with an automatic chuck.
- prototypes, samples and series also of big pieces realisation.

3.3 - a central screw supported by axial sliding bearing transmits the clamping force to the jaws.

MADV jaws set photograph



Indexing system

In MADV chucks to obtain shaft revolution it is necessary to stop chuck rotation.

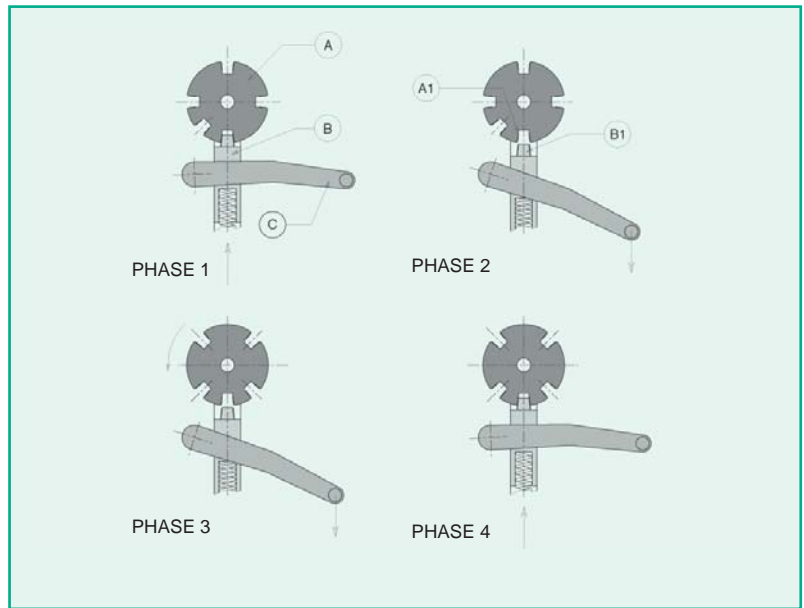
The main parts of this device are:

- **A** = indexing shaft (driven by 2 lines of cylindrical pre-loaded rollers supported by an axial ball bearing).
- **A1** = indexing notch.
- **B** = indexing shutter with spring.
- **B1** = conical tooth.
- **C** = shutter stop lever.

The mechanism is in each jaw. The particular releasing lever allows to pilot the two shutters at the same time.

Rotation and indexing in the following diagram described:

- phase 1 = indexed chuck : the shutter tooth is connected in the shaft notch.
- stop of the rotation of the chuck
- phase 2 = shutter release: let the releasing



- lever to disconnect the shutter.
- phase 3 = rotation: the rotation is manual working on the piece in the jaws.
- phase 4 = indexing: lever release allows spring shutter connection.

The releasing lever device is designed to use the centrifugal force in rotation as indexing force.

Indexing precision 0°01'30".

Clamping system

The main parts of the blocking device are:

- lead screw **A**
- jaws **B**
- the chuck body **C**
- axial unit of centering **D**
- safety pins **E**.

The chucks MADV are manual clamped.

The opening and the clamping of the jaws is allowed rotating the lead screw with a key or with a screw driver.

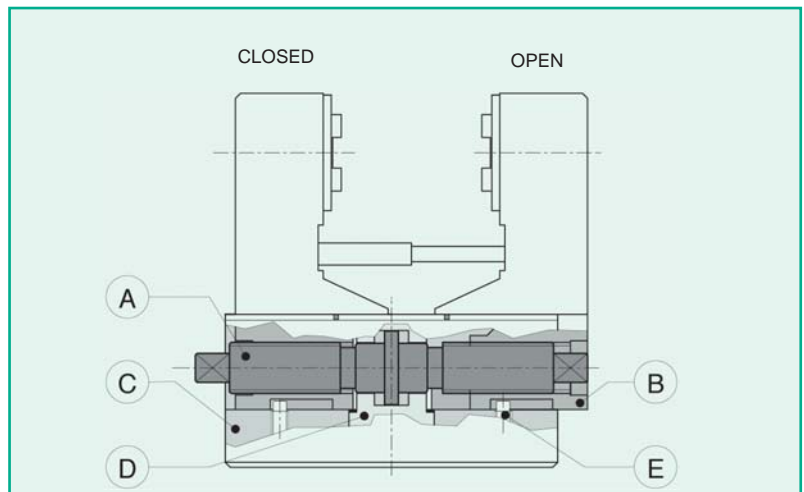
Respect the clamping couple values you find in the specifications.

The screw **A** is fixed with the centering unit **D** that contains the axial ball bearing.

The torque applied to the drilled screw **A**, gives the movement and the clamping of the jaws **B**.

Safety device :

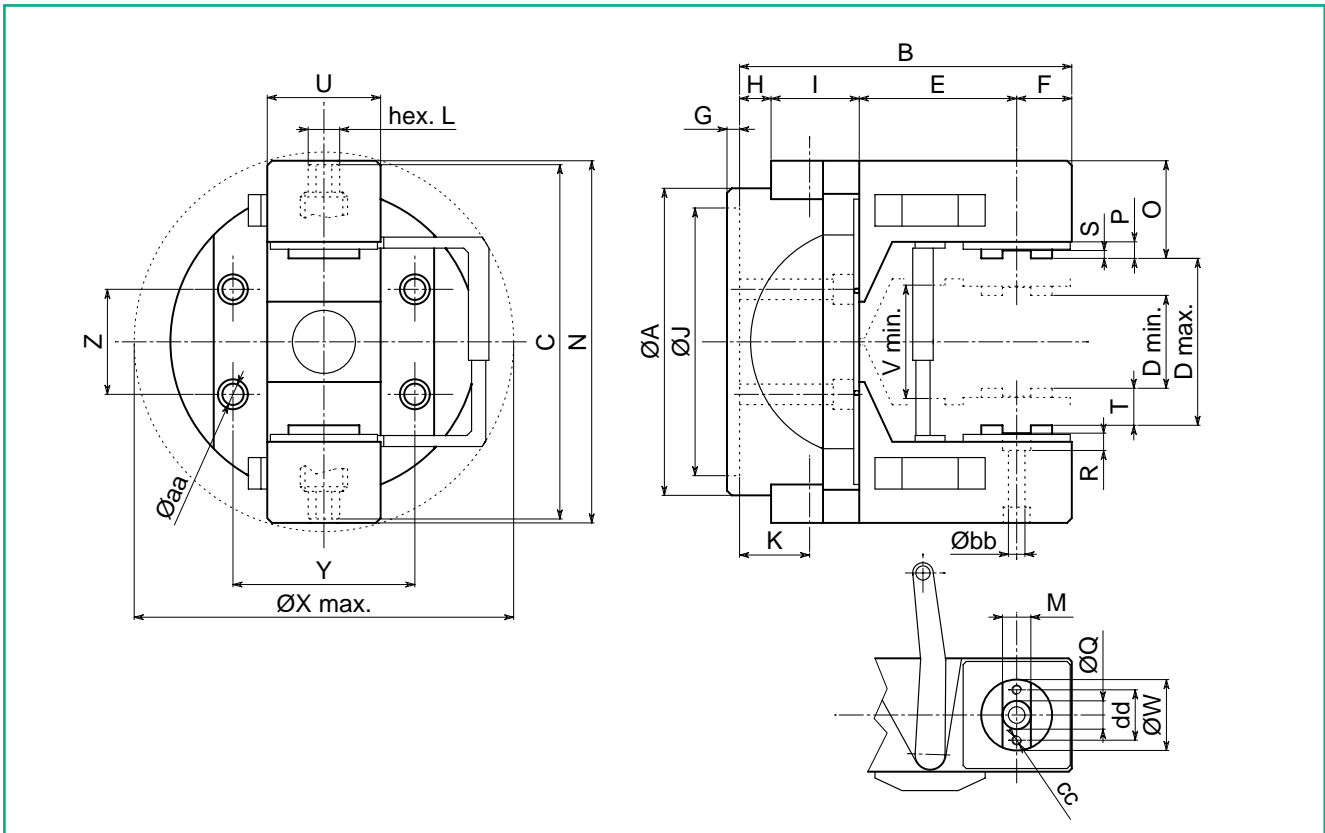
The safety screws **E** keep the jaws securely in the chuck body in the eventually event of a lead screw broken.



Normally these screws are used to reduce the opening stroke of the jaws.

Never remove these screws.

Chuck size MADV 170 - MADV 450



Specifications

Code	MADV 170	MADV 180	MADV 195	MADV 230	MADV 250	MADV 275	MADV 315	MADV 350	MADV 425	MADV 450
Stroke per jaw mm	23.5	22.5	23.5	32	33	40.5	45	51	66	70
Max. couple to clamping screw Nm	60	80	90	95	115	120	120	140	145	185
Real static clamping force per jaw * daN	900	1200	1350	1450	1750	1800	1800	2100	2200	2800
Ripetibility ± mm	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Max. speed rotation g/1	1700	1550	1500	1300	1100	1000	850	750	550	450
Moment of Inertia J Kgm2	0.07	0.13	0.16	0.29	0.55	0.70	0.90	1.40	2.90	9.80
Weight version C Kg	16	21	23	30	44	51	64	76	110	165
Weight version L kg	-	-	-	32	46	54	69	80	115	180

- Note :

- * The real clamping force is taken with a load cell between the jaws during a non rotation period.
- All dimentions are indicative and subject to variation for technical upgrading. We reserve the right to make alterations without prior notification.

Dimentions

Code Version *	MADV 170		MADV 180		MADV 195		MADV 230		MADV 250		MADV 275		MADV 315		MADV 350		MADV 425		MADV 450	
	C	L	C	L	C	L	C	L	C	L	C	L	C	L	C	L	C	L	C	L
Ø A	170		184		195		230		248		275		315		350		425		445	
B	180	-	199	-	211	-	221	241	254	279	266	301	282	322	319	354	346	396	435	470
C	198		222		228		262		290		315		345		385		455		525	
D min (closed)	48		55		59		74		89		99		120		138		178		180	
D max (open)	95		100		106		138		155		180		210		240		310		320	
E	85	-	90	-	100	-	105	125	125	150	135	170	145	185	175	210	190	240	240	275
F	27		35		35		35		44		44		44		48		55		65	
G	8		8		8		10		10		10		10		10		12		12	
H	20		20		20		25		25		25		28		30		35		45	
I	48		54		56		56		60		62		65		66		66		85	
Ø J H6	140		170		170		220		220		220		220		220		300		300	
K	41		44.5		44.5		49.5		52		52		55		58		63		80	
L	15		17		17		17		17		17		17		19		19		21	
M H7	16		18		18		18		22		22		22		22		25		25	
N (open)	198		224		230		262		295		320		350		395		470		510	
O	51.5		62		62		62		70		70		70		77.5		80		95	
P	9.5		10.5		10.5		10.5		12		12		12		13.5		14		14	
Ø Q H7	16		18		18		18		22		22		22		22		25		25	
R	10.5		11		11		11		12.5		12.5		12.5		14		14.5		14	
S	4.5		5		5		5		5.5		5.5		5.5		5.5		6		6	
T (stroke)	23.5		22.5		23.5		32		33		40.5		45		51		66		70	
U	58		72		72		72		90		90		90		98		110		130	
V min	55		64		68		83		99		109		130		149		190		194	
Ø W	35		45		45		45		63		63		63		70		80		85	
X	206	-	235	-	241	-	272	278	308	328	333	373	360	415	407	477	483	560	575	630
Y	90.76		115.53		115.53		148.44		148.44		148.44		148.44		148.44		203.52		203.52	
Z	52.40		66.70		66.70		85.70		85.70		85.70		85.70		85.70		117.50		117.50	
aa	11		13		13		17		17		17		17		17		21		21	
bb	8.50		10.50		10.50		10.50		12.50		12.50		12.50		14.50		14.50		14.50	
cc	-		M6		M6		M6		M8		M8		M8		M10		M10		M10	
dd	-		32		32		32		45		45		45		50		60		60	

ARTICLE CODE	DV170VBA	DV180VCA	DV195VDA	DV230VEA DV230VFA	DV250VGA DV250VHA	DV275VIA DV275VLA	DV315VRA DV315VSA	DV350VMA DV350VNA	DV425VOA DV425VPA	DV450VTA DV450VUA
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- Note :

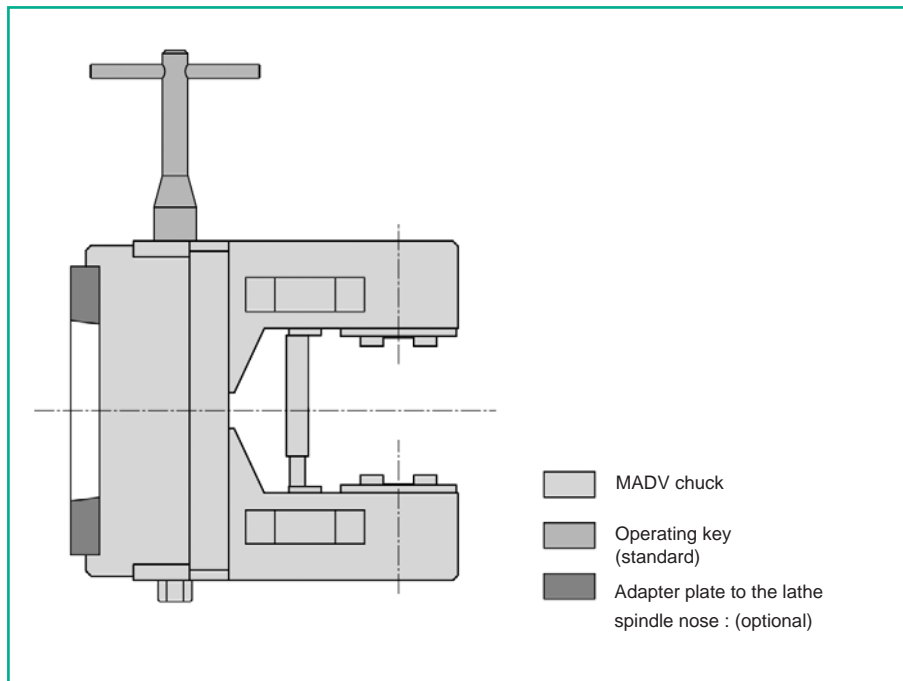
All the dimentions are in millimeter.

* Version : C = Standard Jaw / L = Long Jaw (Long jaw up size MADV 230).

X = overall dimentions during rotation with max. jaw opening.

All dimentions are indicative and subject to variation for technical upgrading. We reserve the right to make alterations without prior notification.

Supply diagram



Standard supply includes:

- MADV chuck.
- Operating key.
- Clamping screws.

Components supplied on request:

- Adapter plate to the lathe spindle nose.
- Clamping rough jaws.
- Clamping shaped grips.

Photograph of MADV with jaws and operating key.



Indexing system

In MADT chucks to obtain shaft revolution it is necessary to stop chuck rotation.

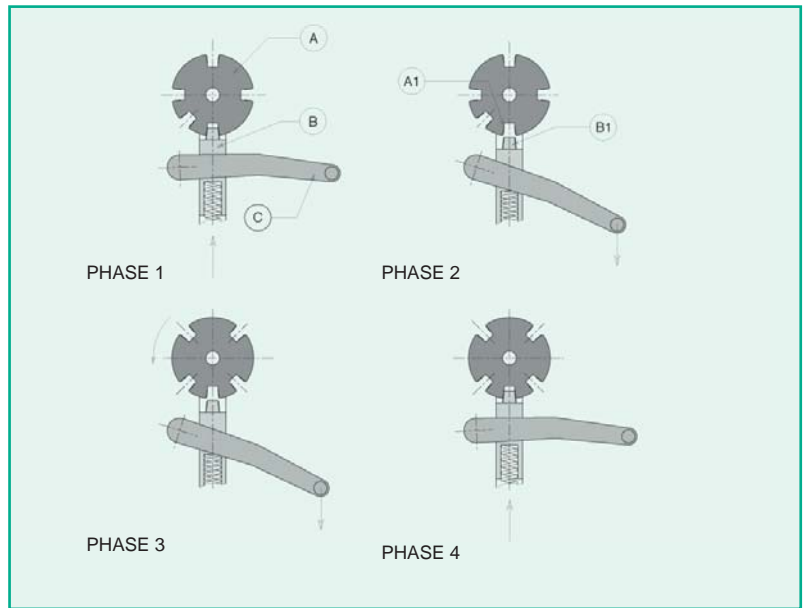
The main parts of this device are:

- **A** = indexing shaft (driven by 2 lines of cylindrical pre-loaded rollers supported by an axial ball bearing).
- **A1** = indexing notch.
- **B** = indexing shutter with spring.
- **B1** = conical tooth.
- **C** = shutter stop lever.

The mechanism is in each jaw. The particular releasing lever allows to pilot the two shutters at the same time.

Rotation and indexing in the following diagram described:

- phase 1 = indexed chuck : the shutter tooth is connected in the shaft notch.
- stop of the rotation of the chuck
- phase 2 = shutter realase: let the releasing



- phase 3 = rotation: the rotation is manual working on the piece in the jaws.
- phase 4 = indexing: lever release allows spring shutter connection.

The realasing lever device is designed to use the centrifugal force in rotation as indexing force.

Indexing precision 0°01'30".

Clamping system

The main parts of the blocking device are:

- driving hub with inclined plane **A**
- jaws **B**
- the chuck body **C**
- safety pin **D**.

The chucks model MADT are automatic clamped.

The driving hub **A** allows the opening and the clamping of the jaws through a draw rod connected to an hydraulic cylinder behind the lathe shaft.

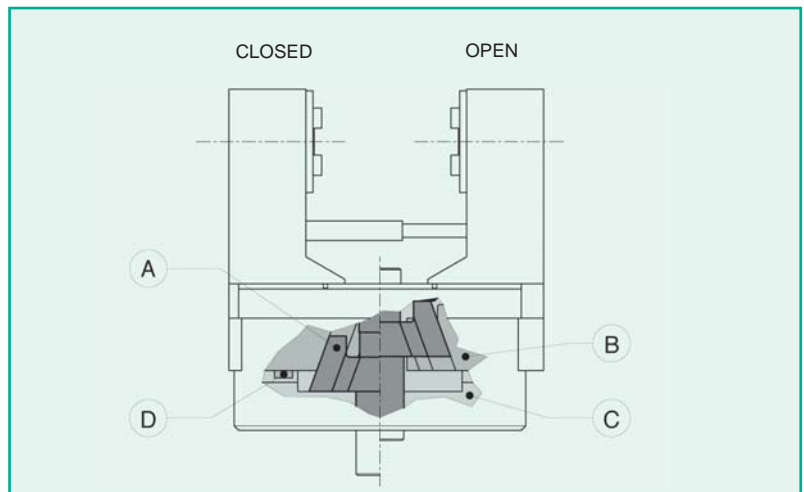
Respect the max. power traction values you find in the specifications.

Traction applied to the hub **A** produces thanks to inclinad plane:

- jaws movement **B**
- clamping force increase.

Safety device:

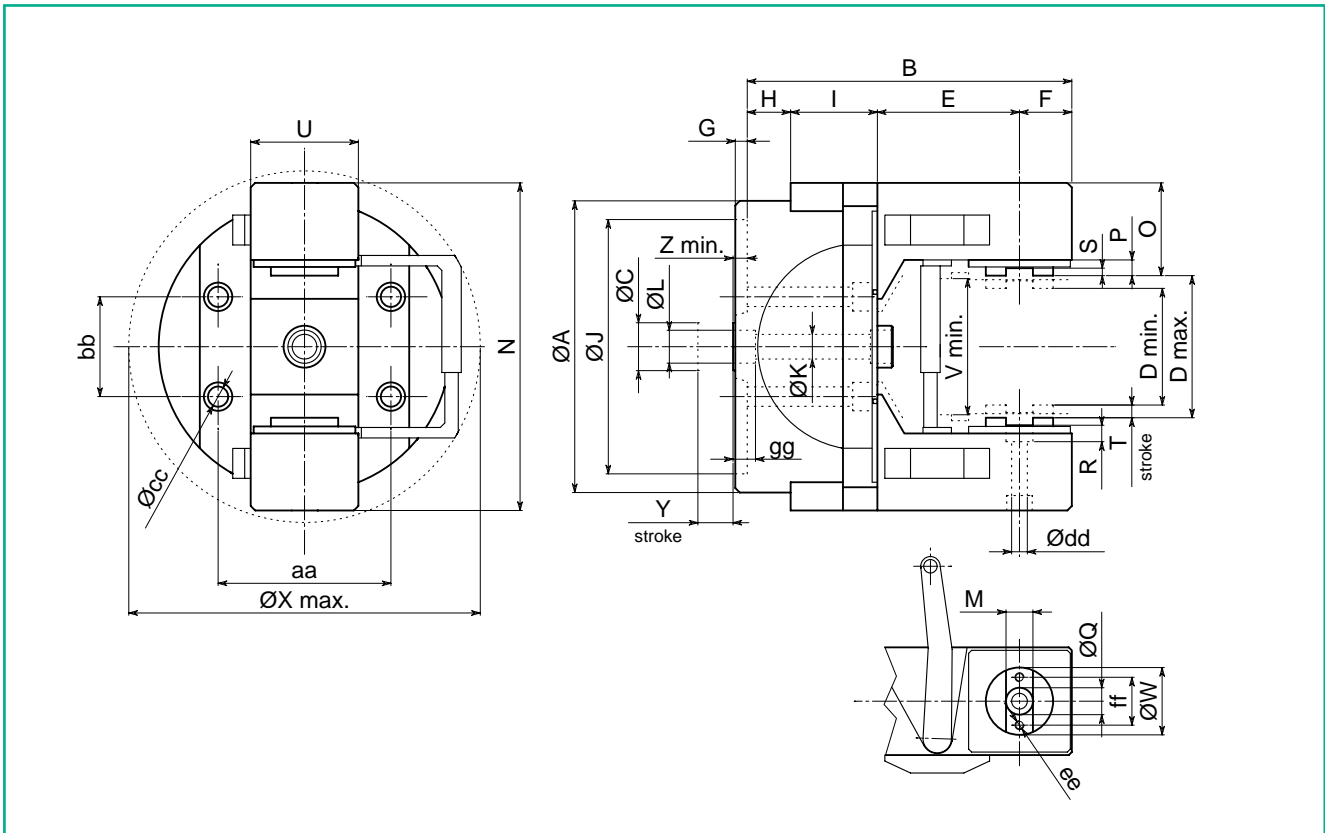
The safety pins **D** keeps the jaws securely in the chuck body in the eventually event of a inclined



planes coupler broken.

These pins are the bottom plates of the indexing device.

Chuck size MADT 165 - MADT 450



Specifications

Code	MADT 165	MADT 195	MADT 220	MADT 230	MADT 250	MADT 275	MADT 315	MADT 350	MADT 400	MADT 450
Stroke per jaw	8	8.5	9	12.5	13	14	15	16	16	21
mm										
Piston stroke	22	23.5	25	27	29	30	32.2	34.5	34.5	45
mm										
Real static clamping force per jaw *	900	1400	1400	1400	1750	1750	1750	2200	2200	2800
daN										
Ripetibility ±	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
mm										
Max. speed rotation	1800	1600	1450	1400	1200	1100	950	850	650	500
g/1										
Moment of inertia J	0.05	0.16	0.25	0.30	0.56	0.82	0.98	1.60	2.15	8.5
Kgm2										
Weight version C	17	24	30	36	45	59	65	76	90	175
Kg										
Weight version L	-	-	32	38	47	62	70	80	95	190
kg										

- Note :

- * The real clamping force is taken with a load cell between the jaws during a non rotation period.
- For the correct hydraulic actuating cylinder choice see chapter “ MADT • Standard supply”.
- All dimentions are indicative and subject to variation for technical upgrading. We reserve the right to make alterations without prior notification.

Dimentions

Code	MADT 165		MADT 195		MADT 220		MADT 230		MADT 250		MADT 275		MADT 315		MADT 350		MADT 400		MADT 450	
	C	L	C	L	C	L	C	L	C	L	C	L	C	L	C	L	C	L	C	L
Ø A	165		195		220		230		248		275		315		350		400		445	
B	186	-	217	-	220	245	223	243	261	286	274	304	295	335	326	356	368	418	465	500
Ø C	28		32		32		32		40		40		40		45		45		55	
D min (closed)	59		78		102		115		123		147		180		198		233		278	
D max (open)	75		95		120		140		150		175		210		230		265		320	
E	80	-	95	-	95	120	100	120	120	145	130	160	145	185	170	200	190	240	240	275
F	27		35		35		35		44		44		44		48		55		65	
G	8		8		8		10		10		10		10		10		12		12	
H	27		29		32		30		35		38		39		40		43		55	
I	52		58		58		58		62		62		67		68		80		105	
Ø J H6	140		170		170		220		220		220		220		220		300		300	
Ø K	13		17		17		17		17		17		17		23		23		25	
Ø L H8	18		22		22		22		24		24		24		30		30		35	
M H7	16		18		18		18		22		22		22		22		25		25	
N (open)	178		219		244		264		290		315		350		385		425		510	
O	51.5		62		62		62		70		70		70		77.5		80		95	
P	9.5		10.5		10.5		10.5		12		12		12		13.5		14		14	
Ø Q H7	16		18		18		18		22		22		22		22		25		25	
R	10.5		11		11		11		12.5		12.5		12.5		14		14.5		14	
S	4.5		5		5		5		5.5		5.5		5.5		5.5		6		6	
T (stroke)	8		8.5		9		12.5		13.5		14		15		16		16		21	
U	58		72		72		72		90		90		90		98		110		130	
V min	66		90		115		128		137		160		190		209		245		292	
Ø W	35		45		45		45		63		63		63		70		80		85	
X	187	-	231	-	255	280	274	284	304	320	326	355	360	415	398	454	439	560	575	630
Y (draw rod stroke)	22		23.4		24.8		26.8		29		30		32.2		34.4		34.4		45	
Z	9		9.5		8		10		13		10		12		16		11		11	
aa	90.76		115.53		115.53		148.44		148.44		148.44		148.44		148.44		203.52		203.52	
bb	52.4		66.7		66.70		85.70		85.70		85.70		85.70		85.70		117.50		117.50	
Ø cc	11		13		13		17		17		17		17		17		21		21	
Ø dd	8.5		10.5		10.5		10.5		12.5		12.5		12.5		14.5		14.5		14.5	
ee	-		M6		M6		M6		M8		M8		M8		M10		M10		M10	
ff	-		32		32		32		45		45		45		50		60		60	
gg	15		15		15		15		15		15		15		16		16		16	

ARTICLE CODE	DT165TBA	DT195TCA	DT220TDA	DT220TEA	DT230TFA	DT230TGA	DT250THA	DT250TIA	DT275TLA	DT275TMA	DT315TRA	DT315TSA	DT350TNA	DT350TOA	DT400TPA	DT400TQA	DT450TTA	DT450TUA
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- Note :

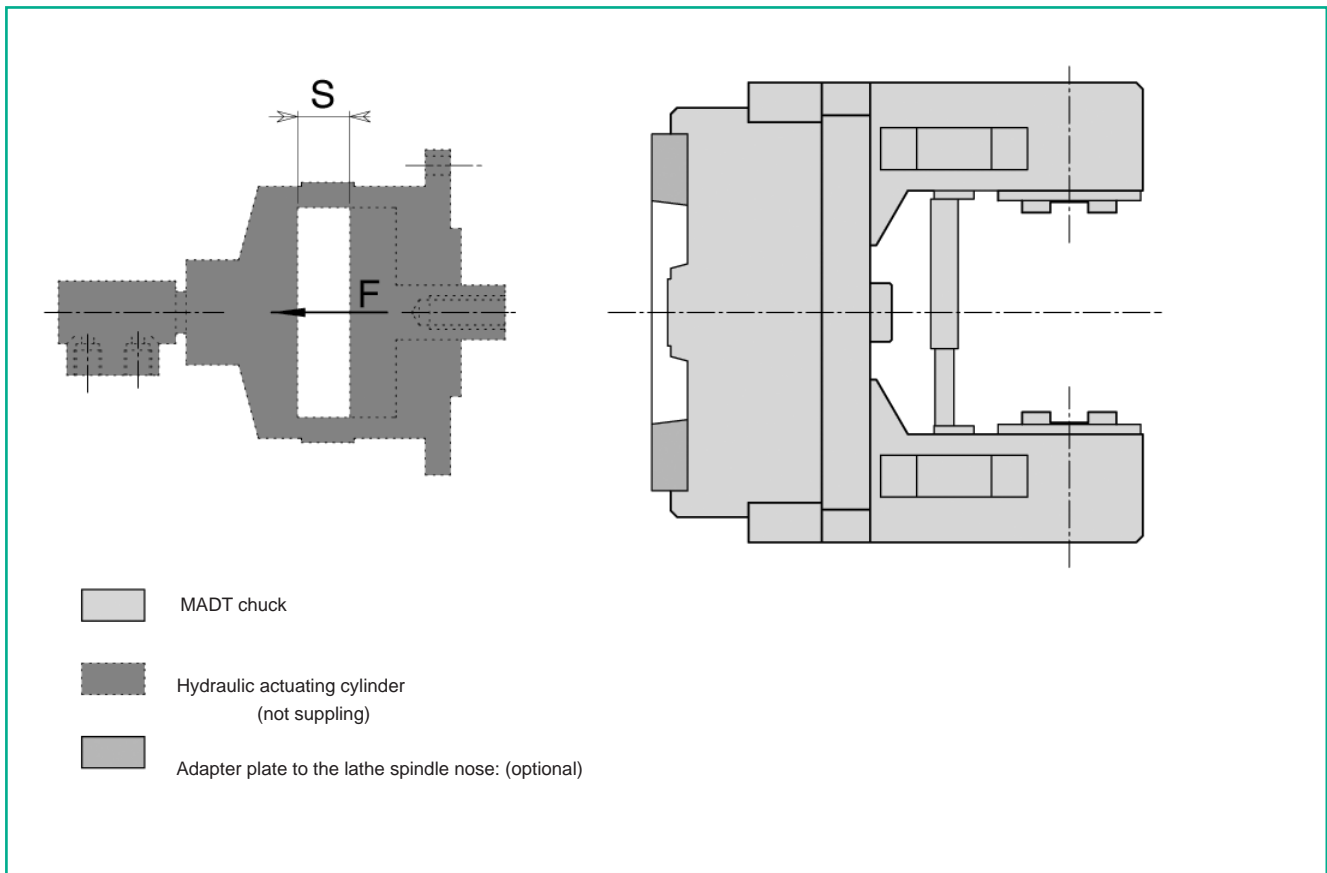
All the dimentions are in millimeter.

* Version : C = Standard Jaw / L = Long Jaw (Long jaw up size MADT220).

X = overall dimentions during rotation with max. jaw opening.

All dimentions are indicative and subject to variation for technical upgrading. We reserve the right to make alterations without prior notification.

Supply diagram



The standard supply includes :

- MADT chuck.
- Clamping screws.

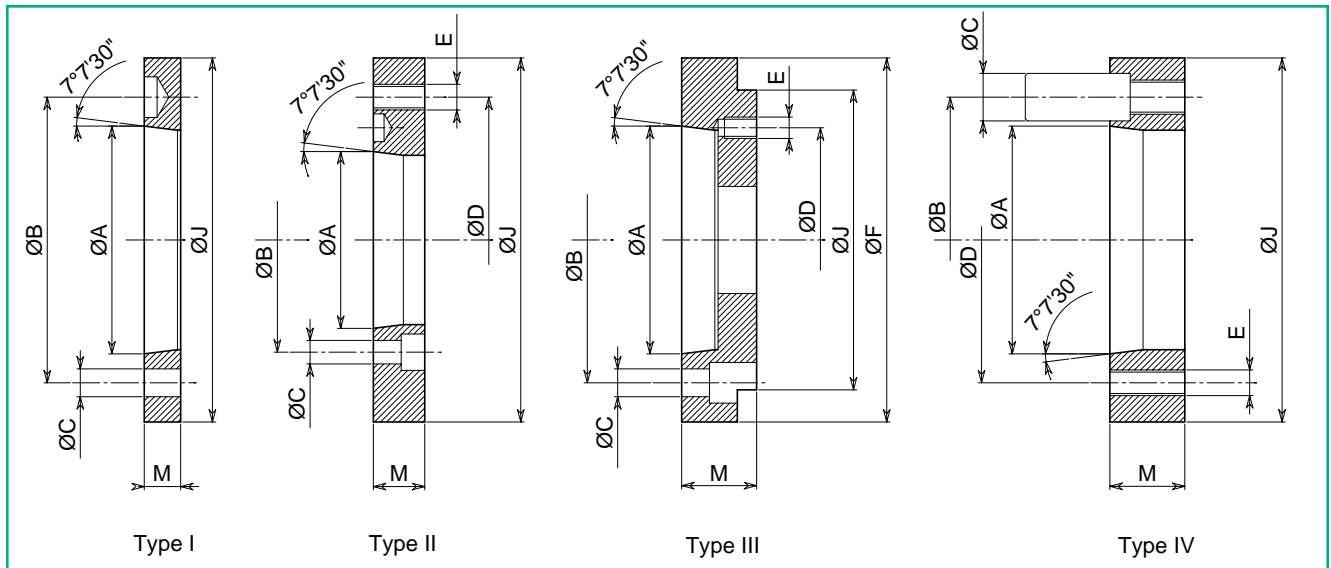
- Adapter plate to the lathe spindle nose.
- Clamping rough jaws.
- Clamping shaped jaws.
(in this case we need the drawings and the workpiece).

Components supplied on request:

Scheme for the correct hydraulic cylinder choice.

Code	MADT 165	MADT 195	MADT 220	MADT 230	MADT 250	MADT 275	MADT 315	MADT 350	MADT 400	MADT 450
S least stroke - mm.	22	24	25	27	29	30	33	35	35	45
F max.power - daN	1470	2300	2300	2900	3620	3620	3620	4550	4550	5800

Adapter plate to the late spindle nose - DIN55026 / ISO-A 702/1



Dimintions

ARTICLE CODE	Spindle nose	ØA	ØB	ØC	ØD	E	ØF	ØJ h7	M	Type	PD2 kgm2	Weight Kg
FA 145 ABA	ASA 5"	82.563	104.8	11.5	-	-	-	140	15	I	0.003	1
FA 175 BCA	ASA 5"	82.563	104.8	11.5	133.4	M12	-	170	24	II	0.012	2.7
FA 225 BDA	ASA 5"	82.563	104.8	11.5	171.4	M16	-	220	24	II	0.038	5.5
FA 176 AEA	ASA6"	106.375	133.4	13.5	-	-	-	170	17	I	0.007	1.5
FA 226 BFA	ASA 6"	106.375	133.4	13.5	171.4	M16	-	220	24	II	0.035	5
FA 306 BGA	ASA 6"	106.375	133.4	13.5	235	M20	-	300	30	II	0.135	11
FA 146 CHA	ASA 6"	106.375	133.4	13.5	104.8	M10	165	140	35	III	0.018	3.7
FA 228 AIA	ASA 8"	139.719	171.4	17	-	-	-	220	19	I	0.022	2.7
FA 308 BLA	ASA 8"	139.719	171.4	17	235	M20	-	300	30	II	0.16	11.5
FA 178 CMA	ASA 8"	139.719	171.4	17	133.4	M12	210	170	40	III	0.038	6.2
FA 301 ANA	ASA 11"	196.869	235	21	-	-	-	300	21	I	0.09	5.5
FA 221 COA	ASA 11"	196.869	235	21	171.4	M16	280	220	45	III	0.13	11.8
FC 145 DPA	Cam Lock 5"	82.563	104.8	19	104.8	M10	-	140	30	IV	0.007	2.2
FC 175 DQA	Cam Lock 5"	82.563	104.8	19	133.4	M12	-	170	30	IV	0.016	3.7
FC 176 DRA	Cam Lock 6"	106.375	133.4	22.2	133.4	M12	-	170	35	IV	0.020	3.9
FC 226 DSA	Cam Lock 6"	106.375	133.4	22.2	171.4	M16	-	220	35	IV	0.055	7.5
FC 306 DTA	Cam Lock 6"	106.375	133.4	22.2	235	M20	-	300	35	IV	0.20	15
FC 228 DUA	Cam Lock 8"	139.719	171.4	25.4	171.4	M16	-	220	40	IV	0.06	7.2
FC 308 DVA	Cam Lock 8"	139.719	171.4	25.4	235	M20	-	300	40	IV	0.22	16
FC 301 DZA	Cam Lock 11"	196.869	235	30.2	235	M20	-	300	45	IV	0.22	14.5

Note :

- Type I = adapter plate with direct fixing (the chuck boring is like that on the lather spindle nose). The adapter plate is fixed on the chuck that is connected direct to the lathe spindle nose with screws.
- Type II = reduction adapter plate, indirect fixing (the lathe spindle nose dimention is smaller that the standard of the chuck).
- Type III = augmentation adapter plate, indirect fixing (the lathe spindle nose dimention is bigger that the standard of the chuck). In these cases (type II and type III) the adapter plate is fixed on the machine spindle nose. The chuck is connected after to the adapter plate.
- Type IV = cam-lock adapter plate (special on request)
- We supply adapter plate with clamping screws.

- All dimintions are indicative and subject to variation for technical upgrading. We reserve the right to make alterations without prior notification.

