



MultibroX®



Low Cost Range **ROTARY BROACHING – GEAR**

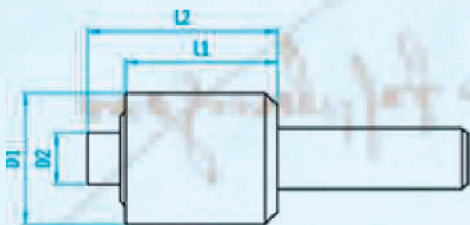


50 years of Italian Technology at your service

ATTENTION: **MultibroX** Toolholder is not recommended and warranted for a production over 1.000 pcs in a row .



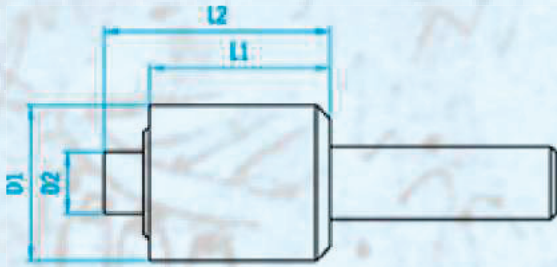
Internal Broaching Toolholders



MODEL	MX02	
Max capacity for hexagonal profiles	≤ 8	
Max capacity for square profiles	≤ 8	
Max capacity for torx profiles	≤ T20	
Max working depth	≤ 12	
Overall dimensions (mm)	D1	32
	D2	16
	L1	27
	L2	36,5
Cylindrical shank DIN 1835	Ø	10
		12
		16
		3/4"
		20-22
		25-1"
shank Weldon DIN 1835-1	Ø	¾-16-20-25-1"
shank M.T. DIN 228		1-2
Tool shank	NG08	



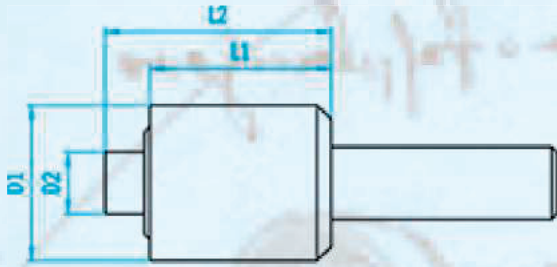
Internal Broaching Toolholders



MODEL	MX05	
Max capacity for hexagonal profiles	≤ 10	
Max capacity for square profiles	≤ 8	
Max capacity for torx profiles	≤ T20	
Max working depth	≤ 22	
Overall dimensions (mm)	D1	42
	D2	20
	L1	50,5
	L2	69,5
shank M.T. DIN 228		2
Cylindrical shank DIN 1835		16
		3/4"
		20
	∅	22
		25-1"
		32
shank Weldon DIN 1835-1	∅	¾-16-20-25-1"
shank VDI DIN 69880	∅	20
shank BT MAS 403	∅	BT30
shank ISO-DIN69871/DIN2080	∅	ISO30
shank HSK-DIN69893	∅	50-63
Tool shank	NG12	



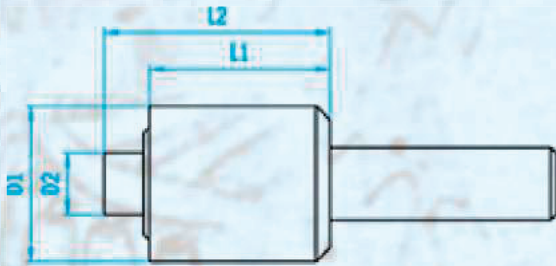
Internal Broaching Toolholders



MODEL	MX11	
Max capacity for hexagonal profiles	≤ 14	
Max capacity for square profiles	≤ 10	
Max capacity for torx profiles	≤ T30	
Max working depth	≤ 20	
Overall dimensions (mm)	D1	55
	D2	21
	L1	62
	L2	76
shank M.T. DIN 228		2
Cylindrical shank DIN 1835		16
		3/4"
		20
	∅	25
		1"
		32
shank Weldon DIN 1835-1	∅	¾-16-20-25-32-1"
shank VDI DIN 69880	∅	20-30
shank BT MAS 403	∅	BT30
shank ISO-DIN69871/DIN2080	∅	ISO30
shank HSK-DIN69893	∅	50-63
Tool shank	NG12	



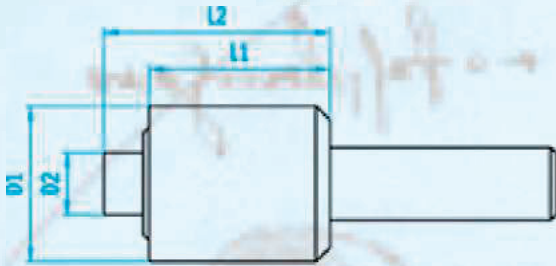
Internal Broaching Toolholders



MODEL		MX21
Max capacity for hexagonal profiles		≤ 17
Max capacity for square profiles		≤ 12
Max capacity for torx profiles		≤ T50
Max working depth		≤ 20
Overall dimensions (mm)	D1	70
	D2	30
	L1	78
	L2	90,5
shank M.T. DIN 228		3
Cylindrical shank DIN 1835		20
		22
		25
	∅	1"
		32
		40
shank Weldon DIN 1835-1		∅ 20-25-32-40-1"
shank VDI DIN 69880		∅ 30-40
shank BT MAS 403		∅ BT40
shank ISO-DIN69871/DIN2080		∅ ISO40
shank HSK-DIN69893		∅ 63
Tool shank		NG16



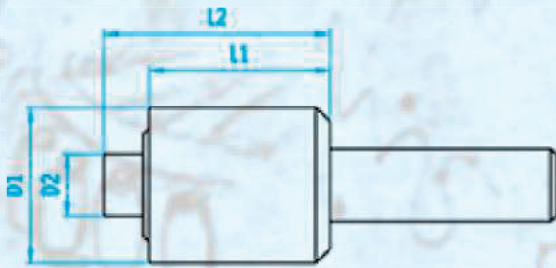
Internal Broaching Toolholders



MODEL	MX31	
Max capacity for hexagonal profiles	≤ 24	
Max capacity for square profiles	≤ 20	
Max capacity for torx profiles	≤ T60	
Max working depth	≤ 21	
Overall dimensions (mm)	D1	90
	D2	42
	L1	91,5
	L2	104,5
shank M.T. DIN 228	3-4'	
Cylindrical shank DIN 1835	∅	25
		1"
		32
		40
		-
shank Weldon DIN 1835-1	∅	25-32-40-1"
shank VDI DIN 69880	∅	30-40
shank BT MAS 403	∅	BT40-50
shank ISO-DIN69871/DIN2080	∅	ISO40-50
shank HSK-DIN69893	∅	80-100
Tool shank	NG16	



Internal Broaching Toolholders



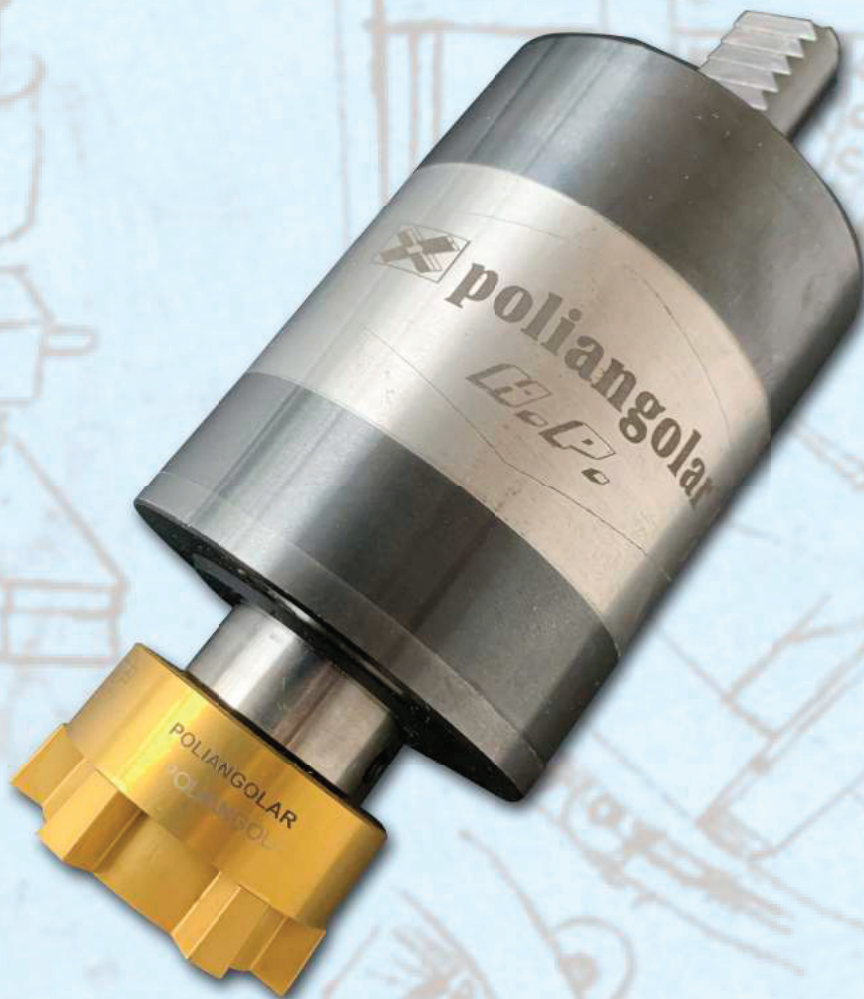
MODEL	MX31S	
Max capacity for hexagonal profiles	≤ 40	
Max capacity for square profiles	≤ 25	
Max capacity for torx profiles	≤ T60	
Max working depth	≤ 42	
Overall dimensions (mm)	D1	90
	D2	42
	L1	92,5
	L2	105,5
shank M.T. DIN 228	3-4'	
Cylindrical shank DIN 1835	Ø	25
		1"
		32
		40
		-
shank Weldon DIN 1835-1	Ø	25-32-40-1"
shank VDI DIN 69880	Ø	30-40
shank BT MAS 403	Ø	BT40-50
shank ISO-DIN69871/DIN2080	Ø	ISO40-50
shank HSK-DIN69893	Ø	80-100
Tool shank	SG16	



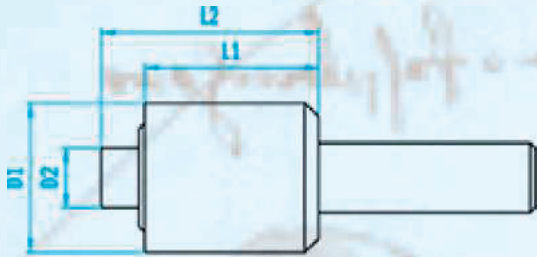


poliangolar[®] **H.P.**
rotary broaching

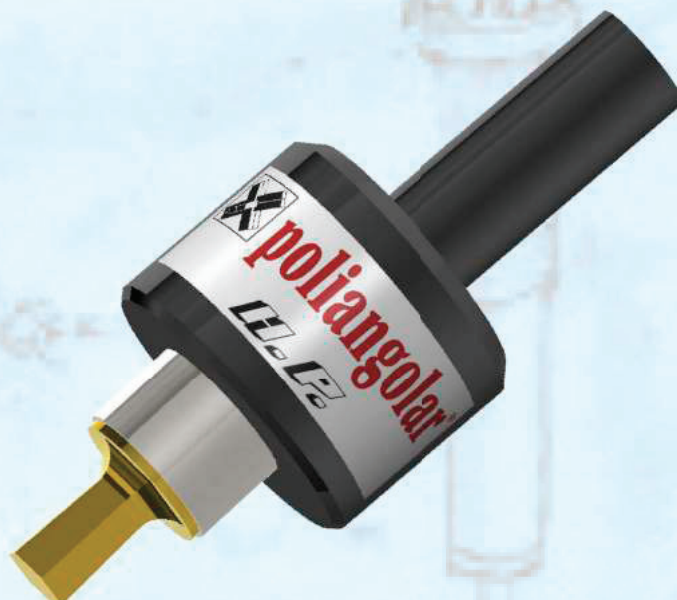
High Performance Range



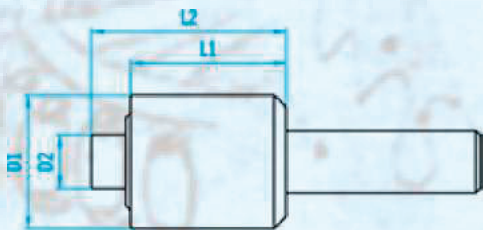
Internal Broaching Toolholders



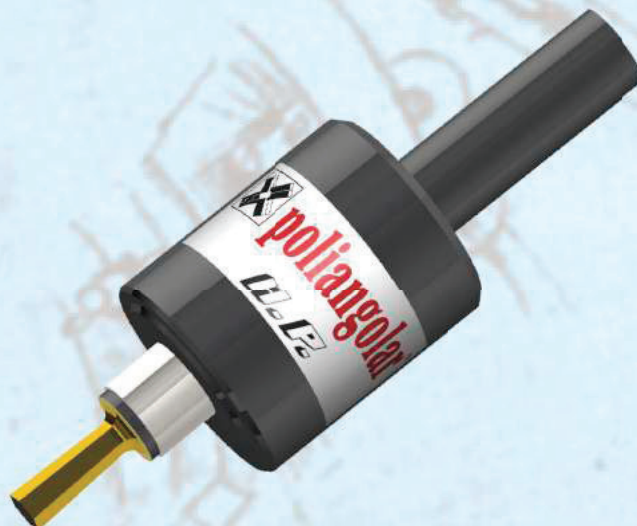
MODEL	0200HP	
Max capacity for hexagonal profiles	≤ 10	
Max capacity for square profiles	≤ 8	
Max capacity for torx profiles	≤ 40	
Max working depth	≤ 13	
Tool shank	NG08	
Overall dimensions (mm)	D1	32
	D2	16
	L1	27
	L2	36,5
Cylindrical shank DIN 1835	Ø	10
		12
		16
		3/4"
		20-22
		25-1"
shank Weldon DIN 1835-1	Ø	3/4-16-20-25-1"
shank ISO-DIN69871/DIN2080	Ø	ISO20



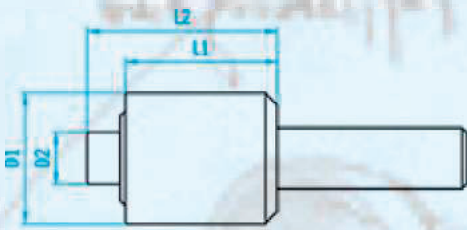
Internal Broaching Toolholders



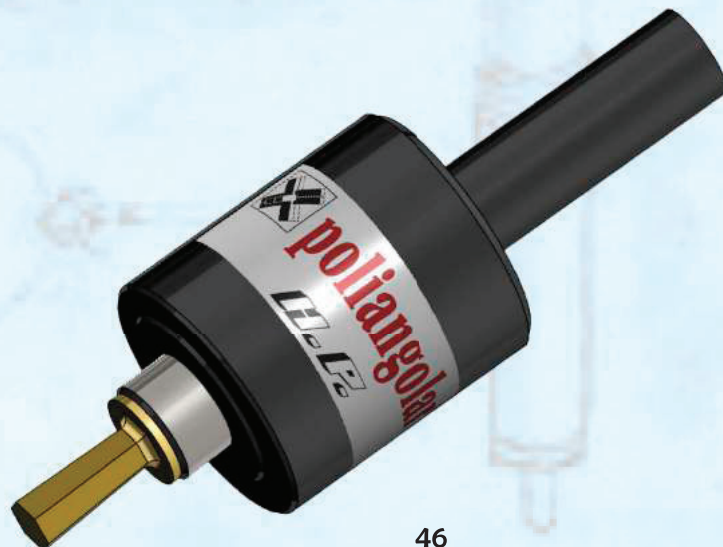
MODEL	0500HP	
Max capacity for hexagonal profiles	≤ 12	
Max capacity for square profiles	≤ 10	
Max capacity for torx profiles	≤ T50	
Max working depth	≤ 25	
Tool shank	NG12	
Overall dimensions (mm)	D1	42
	D2	20
	L1	50,5
	L2	69,5
Cylindrical shank DIN 1835	Ø	16
		¾
		20
		22
		25-1"
		32
shank Weldon DIN 1835-1	Ø	¾-16-20-25-1"
shank VDI DIN 69880	Ø	20
shank BT MAS 403	Ø	BT30
shank M.T. DIN 228		2
shank ISO-DIN69871/DIN2080	Ø	ISO30
shank HSK-DIN69893	Ø	50-63



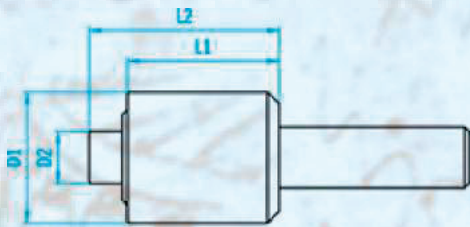
Internal Broaching Toolholders



MODEL	1100HP	
Max capacity for hexagonal profiles	≤ 14	
Max capacity for square profiles	≤ 12	
Max capacity for torx profiles	≤ T60	
Max working depth	≤ 25	
Tool shank	NG12	
Overall dimensions (mm)	D1	55
	D2	21
	L1	62
	L2	76
Cylindrical shank DIN 1835	Ø	16
		3/4"
		20
		25
		1"
32		
shank Weldon DIN 1835-1	Ø	¾-16-20-25-32-1"
shank VDI DIN 69880	Ø	20-30
shank BT MAS 403	Ø	BT30
shank M.T. DIN 228		2
shank ISO-DIN69871/DIN2080	Ø	ISO30
shank HSK-DIN69893	Ø	50-63



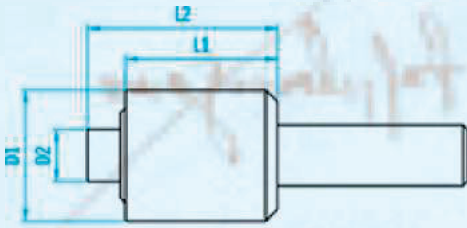
Internal Broaching Toolholders



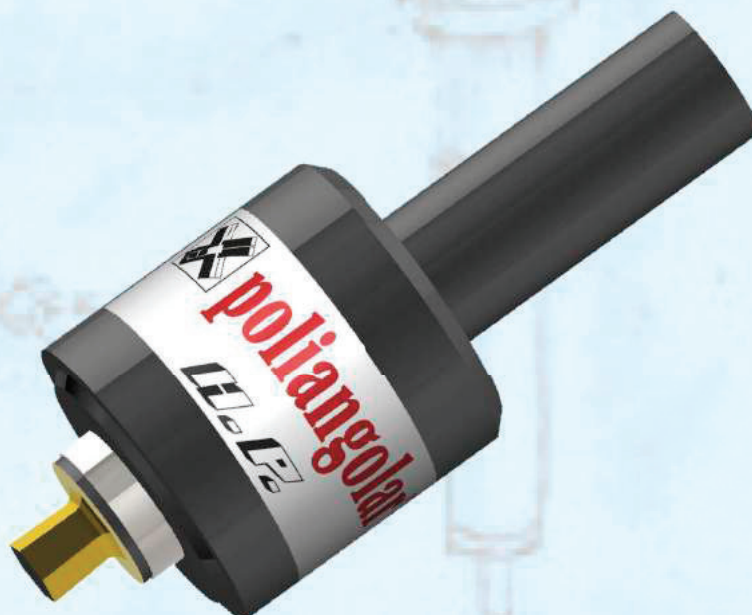
MODEL	2100HP	
Max capacity for hexagonal profiles	≤ 24	
Max capacity for square profiles	≤ 16	
Max capacity for torx profiles	≤ T70	
Max working depth	≤ 25	
Tool shank	NG16	
Overall dimensions (mm)	D1	70
	D2	30
	L1	78
	L2	90,5
Cylindrical shank DIN 1835	Ø	20
		22
		25
		¾-1"
		32
		40
shank Weldon DIN 1835-1	Ø	¾-20-25-32-40-1"
shank VDI DIN 69880	Ø	30-40
shank BT MAS 403	Ø	BT40
shank M.T. DIN 228		3
shank ISO-DIN69871/DIN2080	Ø	ISO40
shank HSK-DIN69893	Ø	63



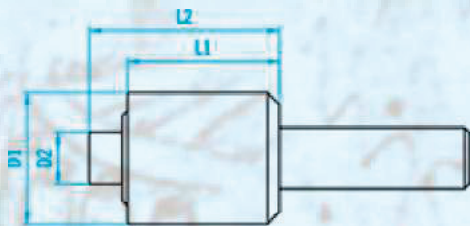
Internal Broaching Toolholders



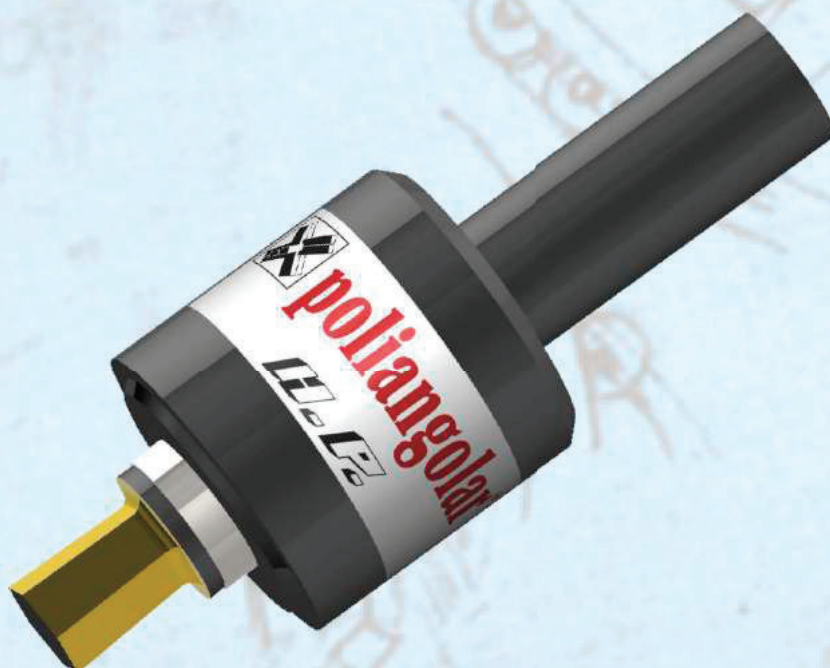
MODEL		3100HP
Max capacity for hexagonal profiles		≤ 40
Max capacity for square profiles		≤ 30
Max capacity for torx profiles		≤ T100
Max working depth		≤ 25
Tool shank		NG16
Overall dimensions (mm)	D1	90
	D2	42
	L1	91,50
	L2	104,5
Cylindrical shank DIN 1835	Ø	25
		1"
		32
		40
		-
		-
shank Weldon DIN 1835-1	Ø	25-32-40-1"
shank VDI DIN 69880	Ø	30-40
shank BT MAS 403	Ø	BT40-50
shank M.T. DIN 228		3 - 4
shank ISO-DIN69871/DIN2080	Ø	ISO40-50
shank HSK-DIN69893	Ø	80-100

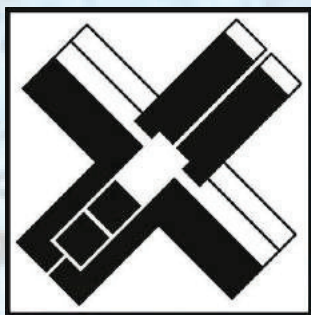


Internal Broaching Toolholders



MODEL	3100SHP	
Max capacity for hexagonal profiles	≤ 40	
Max capacity for square profiles	≤ 30	
Max capacity for torx profiles	≤ T100	
Max working depth	≤ 45	
Tool shank	SG16	
Overall dimensions (mm)	D1	90
	D2	42
	L1	92,5
	L2	105,5
Cylindrical shank DIN 1835	Ø	25
		1"
		32
		40
		-
		-
shank Weldon DIN 1835-1	Ø	25-32-40-1"
shank VDI DIN 69880	Ø	30-40
shank BT MAS 403	Ø	BT40-50
shank M.T. DIN 228		3 - 4
shank ISO-DIN69871/DIN2080	Ø	ISO40-50
shank HSK-DIN69893	Ø	80-100





polikey®

slotting

Slotting tools program



GARANZIA ITALIA



Program for Conventional slotting machine

mono cutting edge



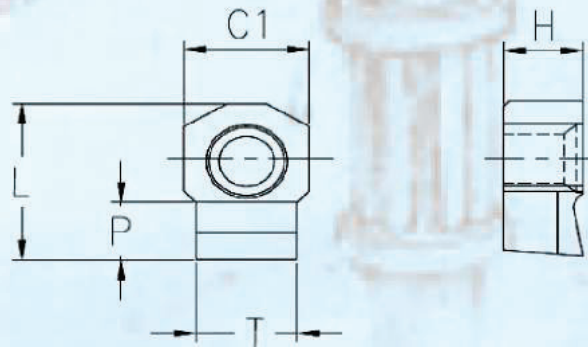
Toolholders :

PLKS

Cod.	H	H3	S	S1	L1	L4	T	DIAM.	P	Torx	Ref. Insert
								min			
PLKS1603	12	9,3	12	8,2	40	160	3	9,9	2	2,5X10	PLKIN30
PLKS160	12	10	12	7	60	160	4	10,4	3	2,5X10	PLKIN40
							5	10,8	3,2	2,5X10	PLKIN50
PLKS220	15,5		12			220	6	17,9	4,9	4X15	PLKIN60
							8	18,4	5,2	4X15	PLKIN80
PLKS250	20,6		14			250	10	23,8	6,2	6X18	PLKIN100
							12	24,2	7,2	6X18	PLKIN120

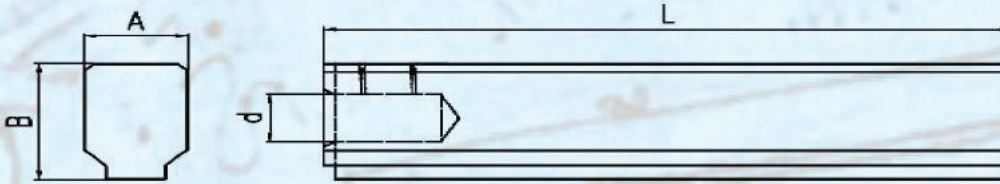
Inserts :

PLKIN



Cod.	C1	H	L	P	T	Tolerance	Packing Qty	Ref. Toolholder
						T		
PLKIN30	6	4,7	7	2	3	H7/C11	2	PLKS1603
PLKIN40	6	4,7	8	3	4	H7/C11	2	PLKS160
PLKIN50	6	4,7	8	3,2	5	H7/C11	2	PLKS160
PLKIN60	10	6,3	13,8	4,9	6	H7/C11	2	PLKS220
PLKIN80	10	6,3	13,8	5,2	8	H7/C11	2	PLKS220
PLKIN100	13	9,4	18,5	6,2	10	H7/C11	2	PLKS250
PLKIN120	13	9,4	18,5	7,2	12	H7/C11	2	PLKS250

Program for double cutting edge



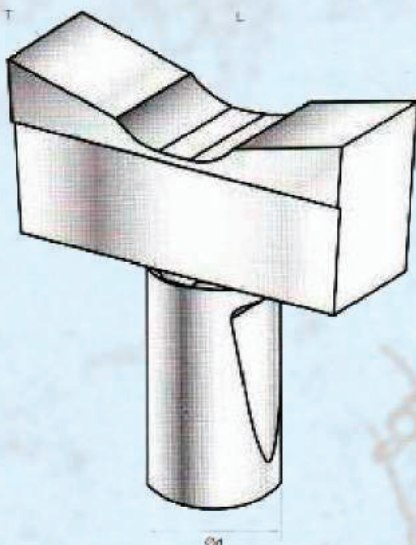
Toolholders :

PLKS

PLKS4040	14	19	200	4	M5	PLKDB04
PLKS5050	14	19	200	5	M5	PLKDB05
PLKS6060	14	19	220	6	M6	PLKDB06
PLKS8080	14	19	220	8	M8	PLKDB08
PLKS1010	18	28	250	10	M10	PLKDB10
PLKS1212	22	34	250	12	M10	PLKDB12
PLKS1414	22	34	300	14	M12	PLKDB14
PLKS1616	24	39	350	16	M12	PLKDB16
PLKS1818	29	45	375	18	M14	PLKDB18
PLKS2020	35	54	430	20	M14	PLKDB20
				22	M14	PLKDB22

Tools :

PLKDB

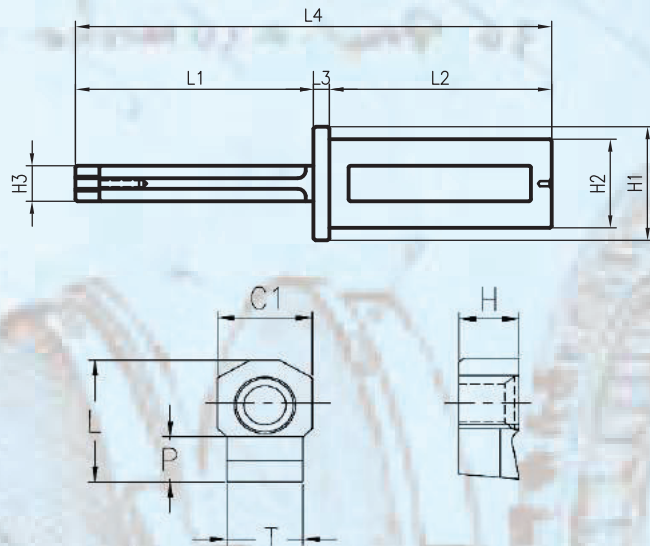
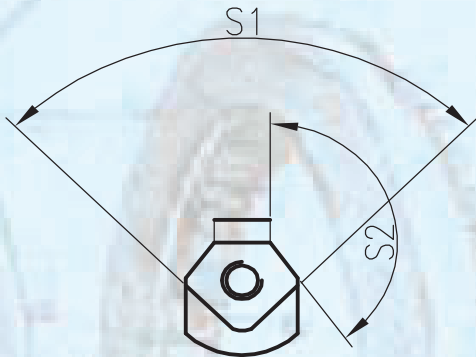


Cod.	T	L	d	Tolerance
PLKDB04	4	11	4	H7-C11
PLKDB05	5	12	5	H7-C11
PLKDB06	6	18	6	H7-C11
PLKDB08	8	21	8	H7-C11
PLKDB10	10	30	10	H7-C11
PLKDB12	12	38	12	H7-C11
PLKDB14	14	40	14	H7-C11
PLKDB16	16	45	16	H7-C11
PLKDB18	18	55	18	H7-C11
PLKDB20	20	65	20	H7-C11
PLKDB22	22	65	20	H7-C11

CNC lathe machine tools mono cutting edge

Toolholders :

PLKT



Cod.	L1	L2	L3	L4	H1	H2	H3	S1	S2	Torx	Ref.
										screw	Insert
PLKT50	50	56	5	111	35	25	9,2	90°	135°	2,5X10	PLKIN30
PLKT60	60	56	5	121	35	25	10	90°	135°	2,5X10	PLKIN40
										2,5X10	PLKIN50
PLKT100	100	56	5	161	35	25	14	120°	135°	4X15	PLKIN60
										4X15	PLKIN80
PLKT140	140	56	5	201	35	25	20	120°	135°	6X18	PLKIN100
										6X18	PLKIN120

KIT :

PLKSKIT (slotting machine)



List Item	Qty
PLKS1603	1
PLKS160	1
PLKS220	1
PLKS250	1
PLKIN30	2
PLKIN40	2
PLKIN50	2
PLKIN60	2
PLKIN80	2
PLKIN100	2
PLKIN120	2

PLKTKIT (CNC machine tools)

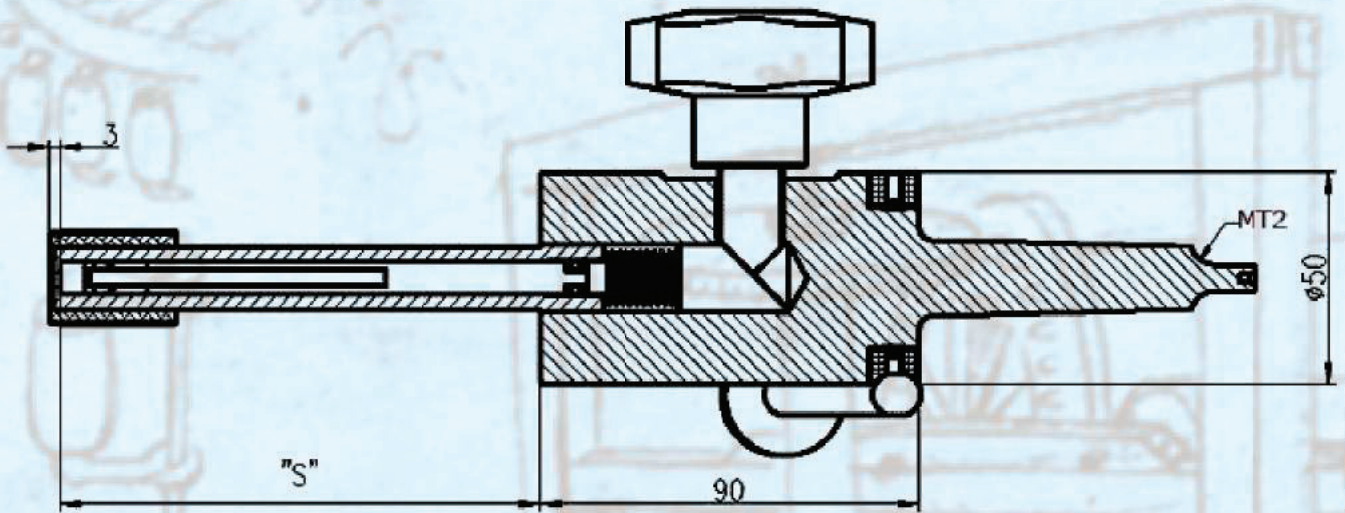


List Item	Qty
PLKT50	1
PLKT60	1
PLKT100	1
PLKT140	1
PLKIN30	2
PLKIN40	2
PLKIN50	2
PLKIN60	2
PLKIN80	2
PLKIN100	2
PLKIN120	2



MANUAL

TECHNICAL DATA



TOOLBAR								
Model	S3	S4	S5	S6	S8	S10	S12	S14
Keyway size mm	3	4	5	6	8	10	12	14
Ø Diam.STD guide Bush	8	10	15	20	25	32	40	45
Ø Diam. Other guide bush****	9<->10	11<->12	12<->17	17<->22	22<->30	30<->38	38<->44	44<->52
Working depth "S"	50	50	50	85	105	105	140	140
Weight Kgs	1,3	1,4	1,5	1,65	1,8	2	2,2	2,5
**** from keyway S3 up to keyway S8 entire toolbar								
**** from keyway S10 up to keyway S14 interchangeable guide bush								





polikey[®]
slotting

KIT :

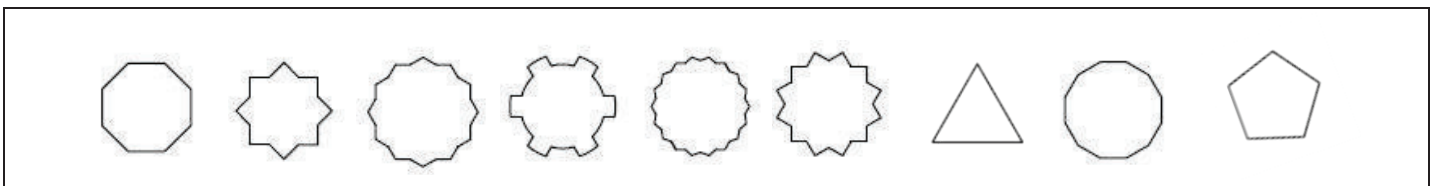
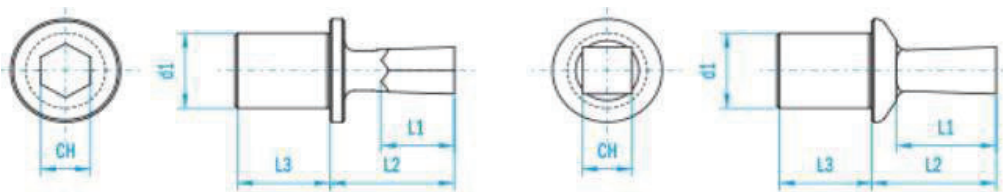
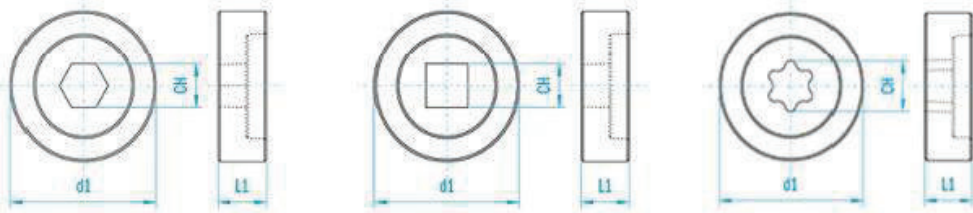
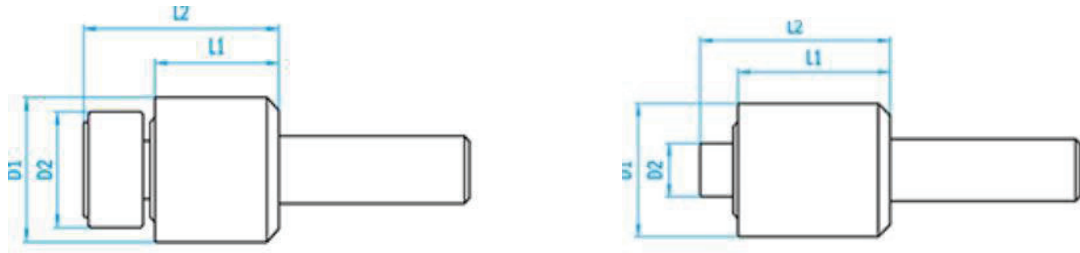
Ref.	Description
<u>PLK 1</u>	<i>Kit composed by : universal body with STD shank M.T.2, n.1 tool's bar completed with guide bush, tool's feed rod, n. 1 tool at your choice.</i>
<u>PLK 5</u>	<i>Kit composed by : universal body with STD shank M.T.2, n.5 tool's bar completed with guide bush, tool's feed rod, n. 5 tools at your choice.</i>
<u>PLK 8</u>	<i>Kit composed by : universal body with STD shank M.T.2, n.8 tool's bar completed with guide bush, tool's feed rod, n. 8 tools at your choice</i>

Spare parts :

Ref.	Description
S3	<i>Tool bar key mm 3</i>
S4	<i>Tool bar key mm 4</i>
S5	<i>Tool bar key mm 5</i>
S6	<i>Tool bar key mm 6</i>
S8	<i>Tool bar key mm 8</i>
S10	<i>Tool bar key mm 10 with interchangeable guide bush</i>
S12	<i>Tool bar key mm 12 with interchangeable guide bush</i>
S14	<i>Tool bar key mm 14 with interchangeable guide bush</i>
PLKBUS	<i>Guide bush for key mm 10/12/14</i>
PLKUT	<i>Tool for key from mm.3 to mm 14</i>



TECHNICAL SUPPORT



ROTARY BROACHING INSTRUCTION MANUAL

Recommendations and Part Preparation

This guide provides some basic rules and tips for successfully producing forms using the rotary broaching process.

Rotary broaching requires two components: a rotary broach tool holder and a rotary broach. Rotary Broaching can be performed in almost any turning center: lathe (manual or CNC) or mill. The only difference is that in a lathe the tool holder is stationary and the part is turning whereas in a mill, the rotary broach tool holder is rotated in the machine spindle and the part is stationary.

Tool Holder Set-up

The Poliangular tool holders have completely sealed bearings. Therefore, there is no need for constant greasing.

Poliangular tool holders are completely adjustment-free. Alignment between the rotary broach to the center of the workpiece is extremely important. Broken rotary broaches or uneven form configuration can result from improperly centered broaching. As long as the toolholder block on your turret (or machine spindle on a mill) is centered with your workpiece, simply insert the tool holder and clamp it down.

Coolant & Fluids:

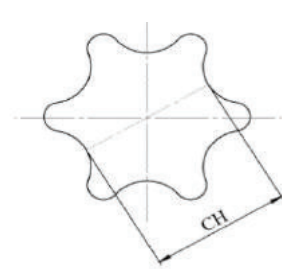
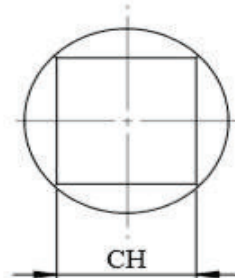
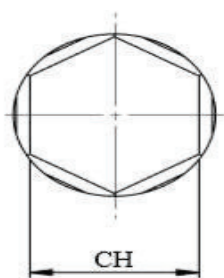
Fluids play a minor role in rotary broaching being, generally, a low heat operation. However, it is recommended that cutting oil be used, or conventional water-based coolant.

INTERNAL BROACHING PART PREPARATION GUIDE

Pre-Drill Hole Diameter:

A pre-broach drill hole is required for Internal rotary broaching. It is strongly recommended to make hole diameter larger than the minor diameter of the form being broached. See below the formulas for recommended pre-broach drill hole diameters for hex, square and torx forms. When broaching forms with serrations or splines, it is recommended to pre-drill a hole 2-3% larger than the minor diameter of the form. These percentages may be reduced for free cutting material and increased in materials with tougher machinability.

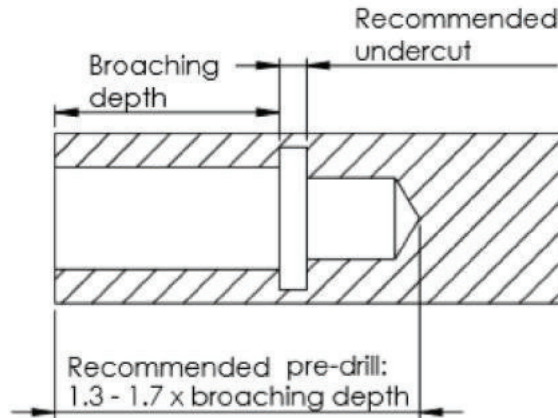
Hexagon Forms Pre-Drill Hole $\varnothing = CH \times 1.03$	Square Forms Pre-Drill Hole $\varnothing = CH \times 1.10$	Torx Forms Pre-Drill Hole $\varnothing = CH \times 1.03$
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Pre-Drill Hole Depth:

The depth of the pre-drill hole must be greater than the broaching depth to allow for swarf to accumulate and avoid excess build up.

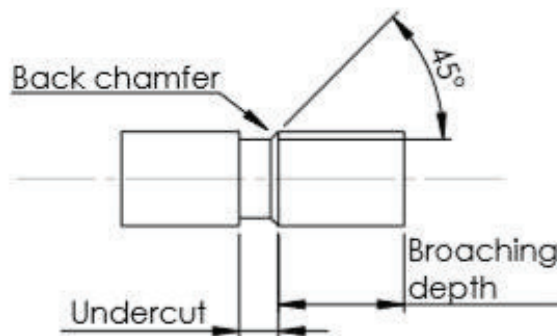
It is recommended to have a pre-drill depth of 1.3 - 1.7 times the depth of broached area. If swarf must be removed after broaching, it can be done by drilling out. If possible, an undercut at the bottom of the pre-broach drill hole will allow the swarf to break cleanly. The undercut diameter should be larger than the major diameter of the broach.



EXTERNAL BROACHING PART PREPARATION

Pre-Turn Diameter:

Pre-turning the diameter of the workpiece is required for external broaching. The pre-turned diameter must be smaller than the major diameter of the broach. It is recommended to turn the workpiece diameter to the smallest allowable diameter so the broach will clear on the major diameter. Allowing for more clearance will reduce the required broaching pressure and increase tool life.



External Form Depth:

A back-chamfer or undercut will allow swarf to break cleanly. The undercut should be approximately 10-20 mm wide.

ROTARY BROACHING ORIENTATION LEVER

The Rotary Broaching orientation lever is used to orientate or align the broach to the workpiece in milling application. This equipment holds the spindle of the rotary broach tool holder stationary against the stop rod as the tool holder body rotates.



SPEEDS & FEEDS

Many factors affect speeds and feeds, including material, pre-broach drill diameter and form being broached.

It is a good practice to slow the RPM to 50 -100 when first engaging the part until you reach a depth of about 1 mm. After that, you can speed up to your recommended RPM and feed accordingly. This will prevent skipping around on the face of the workpiece and reduce the risk of chipping or breaking the broach tool also it can reduce tool life.

Contact Poliangular for the best solution on your specific application.

In all materials, the smaller the broach diameter, the lighter the feed should be.

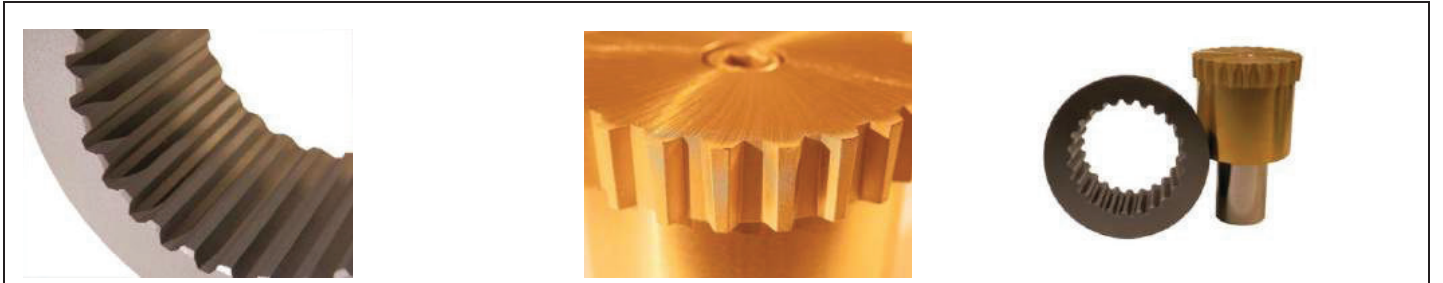
Lower feed rates give better workpiece finish. However, feed rates under 0,1 mm per revolution can cause swarf to loose the flowing motion, causing excessive end loading pressure.

Use rapid movement when retracting off or out of a part, keeping the same RPM.

TROUBLESHOOTING SOLUTIONS

<u>ISSUE</u>	<u>POSSIBLE CAUSES</u>	<u>RECOMMENDATIONS</u>
Machine is alarming or stalling	1. Broach Holder is off-center 2. Excessive swarf accumulation	1. Make sure the Tool Holder is centered correctly. 2. Solutions to reduce swarf accumulation: <ul style="list-style-type: none"> • For Internal Broaches, increase pre-drill size (larger workpiece I.D.) • For External Broaches, pre-turn dia. smaller (smaller workpiece O.D.)

<u>ISSUE</u>	<u>POSSIBLE CAUSES</u>	<u>RECOMMENDATIONS</u>
Witness marks or skid on workpiece	1. Broach is bouncing off the face of the workpiece at initial contact	1. Reduce the speed to approx. 50-100 RPM during initial contact into the part (maintaining feed rate) Then, increase the speed back to the recommended RPMs once tool is about 1 mm into part. Consider leaving extra stock on workpiece and clean-off after broaching
Spiraling form / form is getting smaller towards bottom	1. Excessive swarf accumulation	1. Solutions to reduce swarf accumulation: <ul style="list-style-type: none"> • For Internal Broaches, increase pre-drill size (larger workpiece I.D.) • For External Broaches, pre-turn dia. smaller (smaller workpiece O.D.) To prevent spiraling use the orientation lever.
Workpiece is pushing back into the machine	1. Workpiece not held tight	1. Use a serrated collet to hold the workpiece.
Broach tool chipping / poor tool life	1. Broach Holder is off-center 2. Improper workpiece preparation 3. Inaccurate speeds and feeds	1. Make sure the Tool Holder is centered correctly. 2. Be sure that pre-drill is large and deep enough. 3. Slow down your speeds and feeds especially at initial contact with the workpiece
Form not centered/teeth larger on one side	1. Broach Holder is off-center 2. Workpiece deflection	1. Poliangular Tool holders are adjustment-free. 2. Reduce speed during initial contact (maintain feed rate). Support the workpiece to ensure there is no deflection.
Swarf remain in the bottom of the part	1. Missing undercut	1. Swarf may be cleared out from the bottom of the part by going back in with the same drill used to pre-drill the pilot hole. A small undercut may be added at the end of the broaching depth prior to broaching the form.



GENERAL CONDITIONS OF SALES :

- 01)** The code: essential to mention it on all the orders; in absence of it, we don't take the responsibility for any miscarriages.
- 02)** The showed prices are indicative and not binding: the value will be the one in force at the moment of the sending. Anyway, every price variation will be communicated.
- 03)** Minimum value of order: Euro 155 net. For any exception, it will be charged Euro 25 + VAT as management expenses. Not taken into account request of sending for less than Euro 50.
- 04)** The parcels are always sent, in every case, at your own risk (also for free carriage)
- 05)** Carriage: ex-factory Settimo Milanese (MI) Italy
- 06)** Packing: free of charge (if normal)
- 07)** Payments: they must be executed at our headquarters in Settimo Milanese at the agreed conditions.
- 08)** Times of delivery: they are indicatives and not binding. They are subordinated to the normal supplying of raw material as well as to production impediments in case of force majeure (strikes, lockout, natural calamity, ecc.). The delivery are intended working days and run from the date of our acceptance of the order. No delay can become reason of cancellation of order or any compensation. So we are not accountable for any damage depending on our delay and the goods cannot be refused for this reason.
- 09)** Every complaint for shortage or defect of the tools will be taken into account only if reached us within 8 days from the receipt of the goods.
- 10)** Every return of material for ordering error (or any other motivation not due to us) will be accepted only if preventively authorized and returned without carriage expenses. The returned material, if founded in perfect condition, will be credit for the invoiced amount, minus the 10% as expenses for control, re-storage and administrative operations. In any case we don't accept any returning after 6 months from the date of purchase.
- 11)** All the items are guaranteed for quality and manufacture. Their substitution or, in our opinion, their repair, are subordinate to this conditions:
 - A** - The goods have to be returned in free port without carriage expenses
 - B** - The tools must have obvious construction and quality defects, that have to be mentioned on the transport document with the return. It's also essential to mention the reference of the supply (N. invoice, date, ecc.)
 - C** - The tools will not be substituted, neither repaired free of charge, if they would result damaged by lack of skill, tampering, adaptation to improper use or performance over maximum allowed.
- 12)** The illustrations, the characteristics and all others indications on the catalogue and price list are intended approximate; we reserve the right to bring any modify that, in our opinion, constitute an improvement, without justify for this reason any complaint from the buyer.
- 13)** Qualified court: for every controversy on recognize the competence of the court of Milano - Italy

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