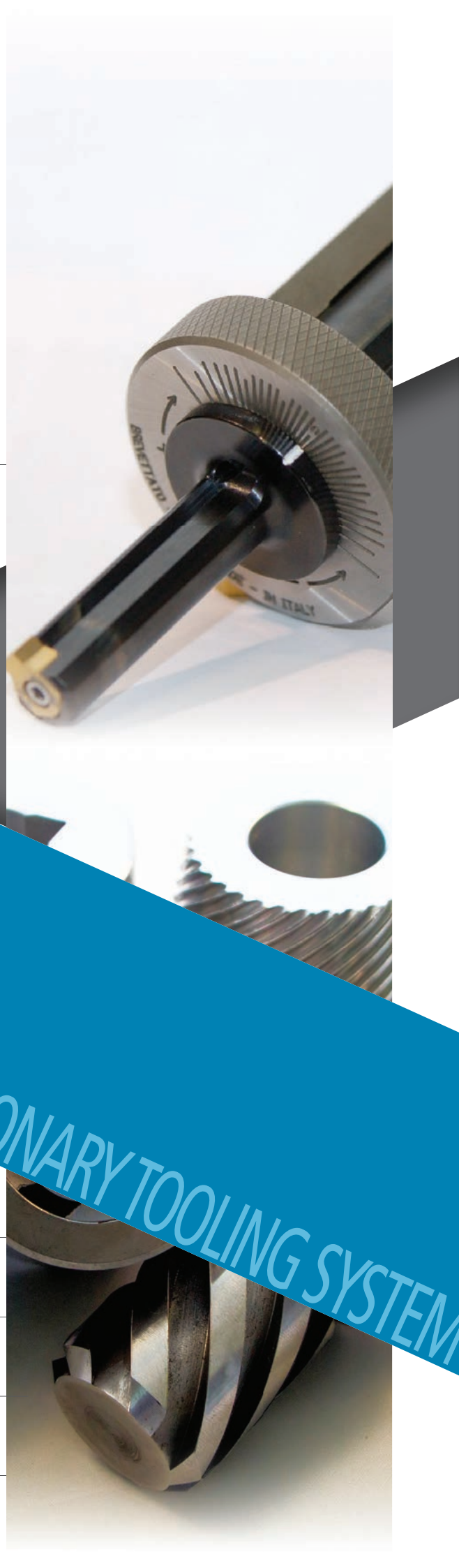# REV®
Broaching Tool

CATALOGUE

THE REVOLUTIONARY TOOLING SYSTEM

- MOTORISED SLOTTER
- FOR CNC LATHES
- FOR CNC MILLING CENTERS
- FOR SLOTTERS

Our Company, F.P. Officina Meccanica (now REV s.r.l.) , was founded in 1998 based on Mr. Paolo Franchini's 18 years of experience in the mechanics industry. For many years, the Company carried out slotting and broaching activities for third-parties, working in the hydraulic, automotive, biomedical, speed reducers, gear construction and earth moving machinery industries, etc., … Over time, in addition to slotting and broaching, the Company began CNC lathing and milling mechanical parts, which also often involved producing internal keyways, and six-spline PTOs. Not only did it require a large amount of time to set up the various tools, it was also very complicated to perform these processes on traditional broaching and slotting machines due to frequent problems in relation to clamping the workpieces and difficulties in obtaining the required level of precision. The idea of producing, in-house, a tool to perform broaching directly on CNC lathes or machining centres developed from the need to solve these issues and difficulties, and was made possible by extensive experience with CAD CAM design. This is how the "REV Broaching Tool" system for CNC machines was developed, which, after years of designing and a long period of in-house testing, was placed on the market for Companies in need of resolving the same issues that we had in relation to broaching and slotting. The REV Broaching Tool undoubtedly represents an effective solution to these issues, as it allows broaching and slotting to be carried out directly on CNC machine tools (lathes, machining centres, milling machines,

etc.), without having to set up other machines and without having to seek the assistance of subcontractors, plus, it guarantees an excellent finish and is always perfectly within tolerance. Subsequently we enhanced our internal production with several additional lines to enable our product to achieve the largest number of possible applications (tools and inserts for squares, tools and inserts for hexagons, tools for motorised slotters, tools for splined profiles, etc, ...). All the customers that have used the REV Broaching Tool system thus far have expressed great satisfaction with the machining quality and the considerable savings in time and money. Customer satisfaction is our greatest achievement and the best motivation to keep improving.
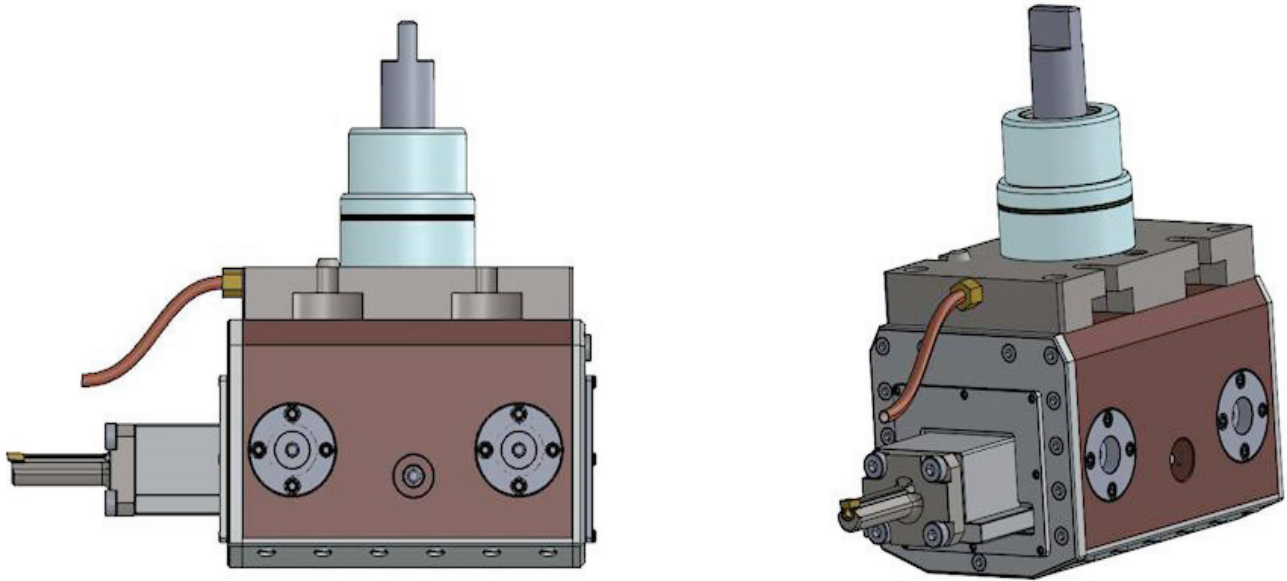
INTRODUCTION
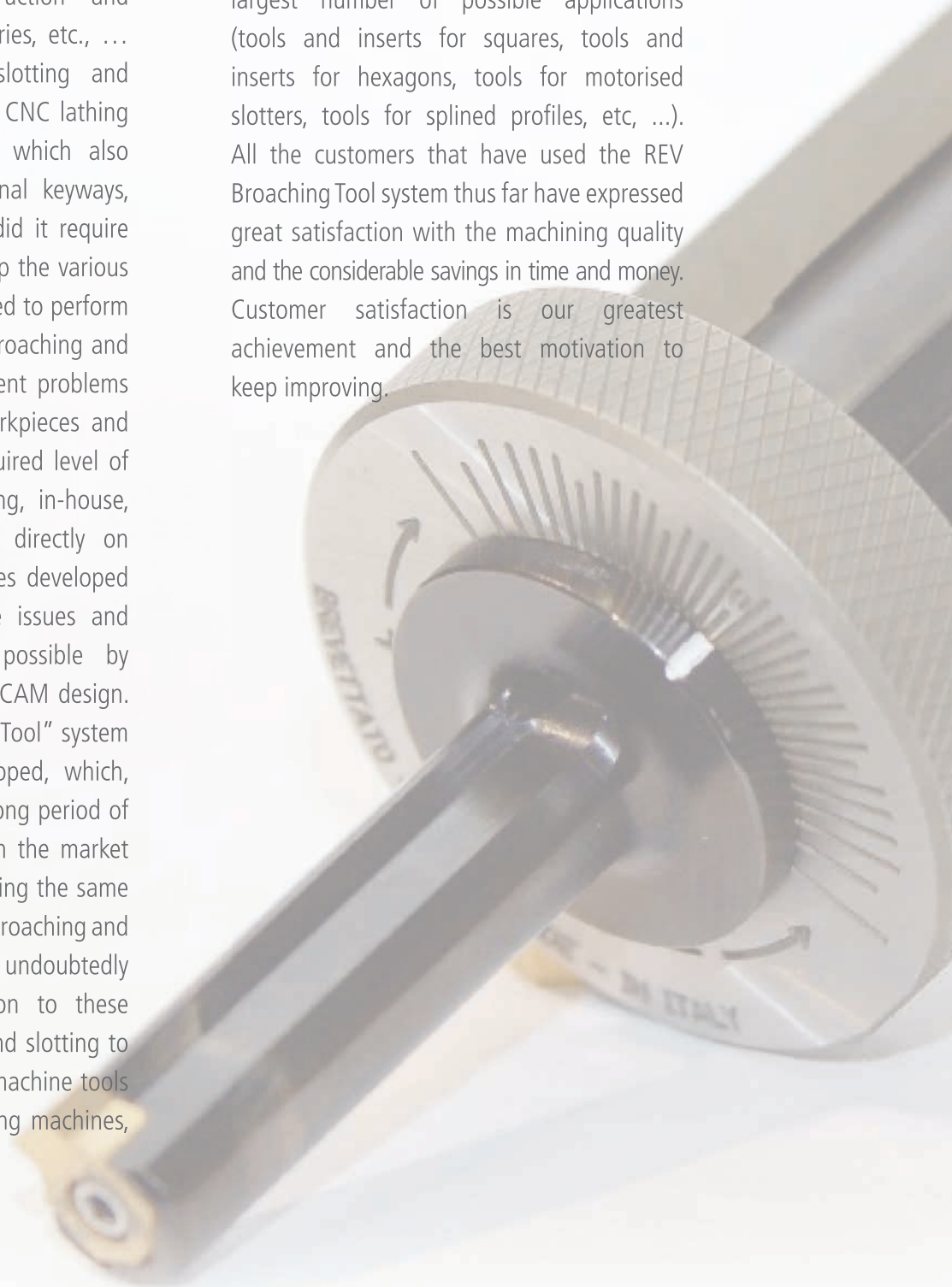
The REV Broaching Tool can be used for processes requiring straight cuts, such as broaching tab or key housings, PTOs and internal gears, directly on CNC lathes, machining centres or milling machines, considerably faster and with remarkable precision. In addition to offering the significant advantage of not having to pick up the workpiece for broaching or slotting and set it up on another dedicated machine, the tool also makes sure the broaching process is carried out correctly, at the same time as the other processes. Used on slotting or shaping machines, the REV tool represents an excellent substitute for traditional tools, as it offers greater versatility thanks to the re-usable tool body and the replaceable insert. The high rigidity of the REV Broaching Tool ensures that the sharp edge of the insert has an exceptionally long service life and that broaching or slotting is carried out perfectly in line with the axis of the workpiece. The surface finish standard achieved through processing with this tool is very high. All of these characteristics together make the REV system among the most efficient and convenient mechanical precision processing systems currently available on the market. The REV Broaching Tool is available in various sizes, covering the entire range of the most common processing sizes, and each insert size can have various tolerance classes. Special insert measurements or tool shapes can be produced very rapidly, on customer demand.

INDEX

REV MOTORISED SLOTTER

■ **T**he REV motorised slotter is designed to solve, in the most efficient way, the problem of having to perform certain processing operations on a CNC lathe, from a simple keyway to internal or external toothed profiles.

■ **T**he REV motorised slotter is designed to obtain maximum rigidity. This feature allows the insert to be used for a very long time and the processed surface to have an excellent degree of finish.

■ **T**here are remarkable advantages in using this slotter: in addition to its extremely fast processing speed, the piece does not need to be moved on other machines, thus avoiding further tool set-ups.

■ **T**he REV motorised slotter has several adjustments, which are useful for achieving correct processing, and can perform internal or external processing.

■ **T**he REV motorised slotter is protected by patent.

USE AND MAINTENANCE

1) vite di fissaggio utensile
6) foro 3/8" gas adduzione interna
3) perno registro asse - Y -
2) viti registro lardoni
5) ingrassatori
7) zona allineamento
4) vite registro angolo taglio
8) Bulloni di fissaggio dello stozzatore alla torretta
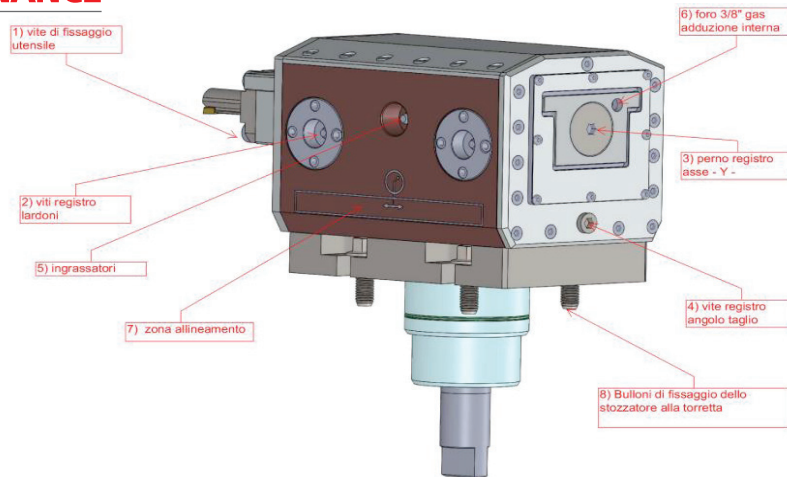
■ **Tool clamping screws**
The tool clamping screws must be slightly unscrewed before correcting any symmetry errors. Before resuming the work, make sure you have tightened the tool clamping screws again.

■ **Adjustable gib screws**
After using the slotter for a long time, it will be necessary to eliminate the potential play created in the tool. Do this by unscrewing the hexagonal nut, tightening the centre screw and then screwing the hexagonal nut back on. Repeat this operation on all four gibs of the slotter.

■ **Y-axis adjustment pin**
This is used to correct any symmetry errors between the hole and the piece currently being processed. After unscrewing the tool clamping screws 1, turn the Y-axis adjustment pin either clockwise or anticlockwise. This will allow you to move the tool along the Y-axis. The adjustment range is +/- 0.5, which is extensive enough to correct all of the symmetry errors on lathes without a Y-axis.

■ **Cutting angle adjustment screw**
This screw is used to correct any conical errors due to mechanical bending. By turning it clockwise or anticlockwise the cutting angle can be changed by about +/- 3°. This range is sufficient enough to correct any conical errors.

■ **Grease nipples**
These two grease nipples are built into the external structure of the motorised slotter and are used to grease after about 10 hours of use, meaning the effective operating time of the tool (see example of calculation for greasing).

■ **Threaded hole for internal 3/8" gas supply**
All of the tools feature holes for the supply of coolant. The internal supply is recommended more than the external supply and allows the lubricant to be directed to the cutting area.

■ **Alignment area**
This is the area to be used for the comparator control.

■ **Bolts clamping the slotter to the tool turret on the lathe**
These are bolts that fasten the slotter to the tool turret on the lathe.

FIRST USE

■ **Mount** the slotter onto the lathe. Slightly loosen the 8 clamping bolts and align the slotter using a comparator. The latter is to be placed on alignment area 7. When the slotter is perfectly aligned, tighten the 8 clamping bolts and operate the slotter at 150 movements per minute for about 10 minutes. Grease the moving slide with common oil for guides. This will soften the gaskets and break in the slotter before use.

GREASING

■ **To** preserve the mechanics, we recommend greasing the slotter every 10 hours of use, meaning actual use (see example of calculation for greasing). Preferably use Persian Poligrease EP 1. Suspend greasing when you notice grease coming out of the perimeter area of the moving slide.
Example of calculation for greasing If 2 minutes are required to produce one piece and 10 seconds are needed to make just the keyway for a feather key, grease after about 3600 pieces.

MAINTENANCE

■ **After** a long period of use (about 1,000 hours), maintenance will need to be performed on the slotter, replacing the parts subject to wear such as bearings, gaskets, etc.

INTERNAL/EXTERNAL PROCESSING

■ **This** motorised slotter can perform internal or external processing. Simply reverse the motorised rotation direction as follows:
control M04 = external processing
control M03 = internal processing.
Depending on whether internal or external processing is to be done, the tool must be fixed with the insert following the cutting direction.

DETACHMENT DURING THE RETURN PHASE

■ **During** the return phase, the tool detaches from the processed surface by 0.25 mm. This movement is essential to preserve the integrity of the insert.

UTM SERIES INSERT HOLDER
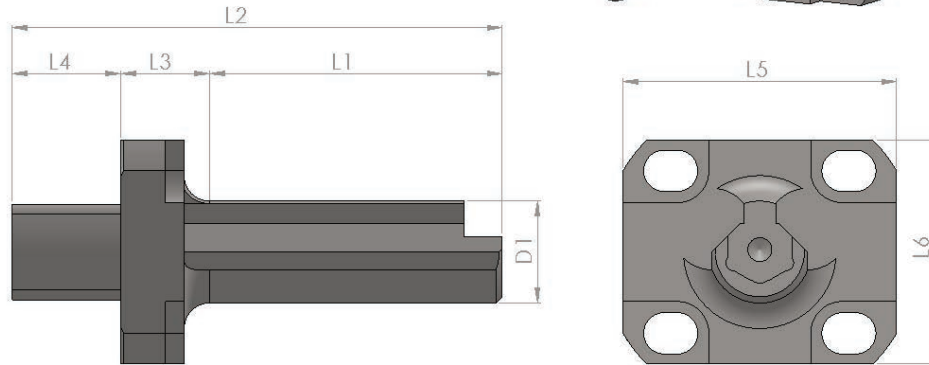
UTM 35 SERIES

CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-02-35	25	58	13	20	43	35	6	PN-0	T08	VN-1	7	0,150
UTM-03-35	30	63	13	20	43	35	8	PN-1	T08	VN-1	8,7	0,160
UTM-04-35	40	73	13	20	43	35	10	PN-1	T-08	VN-1	11	0,170
UTM-05-35	46	79	13	20	43	35	12	PN-1	T-08	VN-1	13	0,180
UTM-06-35	46	79	13	20	43	35	16	PN-2	T-15	VN-2	17	0,210
UTM-08-35	46	79	13	20	43	35	20	PN-2	T-15	VN-2	21,5	0,225
UTM-10/12-35	46	79	13	20	43	35	22	PN-3	T-20	VN-3	24	0,235
UTM-14/16-35	46	79	13	20	43	35	25	PN-4	T-20	VN-3	27	0,245

UTM 50 SERIES

CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-02-50	25	58	13	20	43	35	6	PN-0	T08	VN-1	7	0,150
UTM-03-50	30	63	13	20	43	35	8	PN-1	T08	VN-1	8,7	0,160
UTM-04-50	40	73	13	20	43	35	10	PN-1	T-08	VN-1	11	0,170
UTM-05-50	46	79	13	20	43	35	12	PN-1	T-08	VN-1	13	0,180
UTM-06-50	56	89	13	20	43	35	16	PN-2	T-15	VN-2	17	0,210
UTM-08-50	56	89	13	20	43	35	20	PN-2	T-15	VN-2	21,5	0,225
UTM-10/12-50	56	89	13	20	43	35	22	PN-3	T-20	VN-3	24	0,235
UTM-14/16-50	56	89	13	20	43	35	25	PN-4	T-20	VN-3	27	0,245

UTM 65 SERIES

CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-02-65	25	58	13	20	43	35	6	PN-0	T08	VN-1	7	0,150
UTM-03-65	30	63	13	20	43	35	8	PN-1	T08	VN-1	8,7	0,160
UTM-04-65	40	73	13	20	43	35	10	PN-1	T-08	VN-1	11	0,170
UTM-05-65	46	79	13	20	43	35	12	PN-1	T-08	VN-1	13	0,210
UTM-06-65	56	89	13	20	43	35	16	PN-2	T-15	VN-2	17	0,180
UTM-08-65	68	102	13	20	43	35	20	PN-2	T-15	VN-2	21,5	0,240
UTM-10/12-65	70	103	13	20	43	35	22	PN-3	T-20	VN-3	24	0,265
UTM-14/16-65	70	103	13	20	43	35	25	PN-4	T-20	VN-3	27	0,285

UTM-SQ SERIES INSERT HOLDER
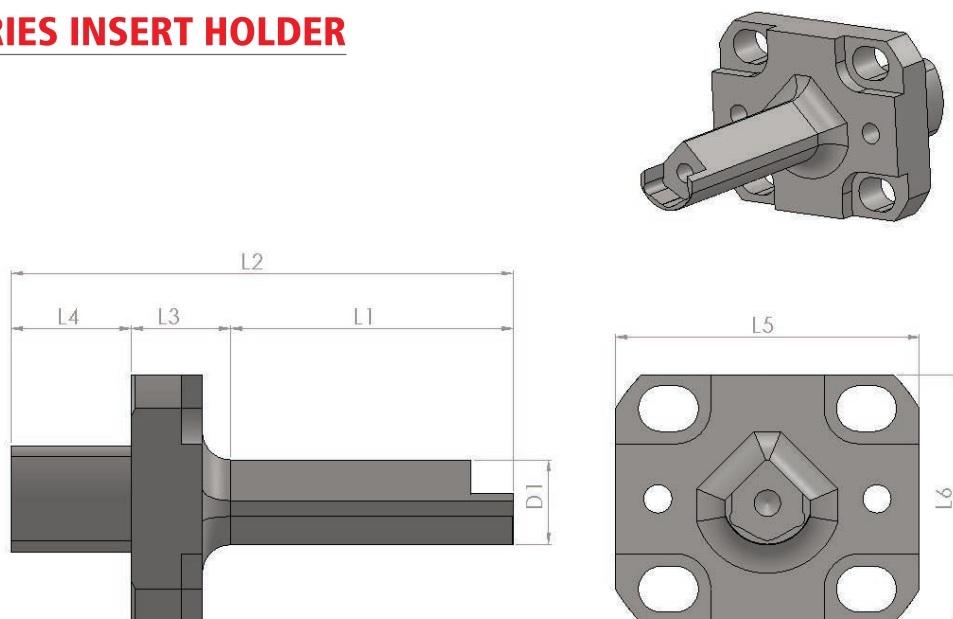
UTM-SQ 35 SERIES

CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-SQ-8/10-35	30	58	13	20	43	35	7,25	PN-1	T08	VN-1	8	0,150
UTM-SQ-10/13-35	40	63	13	20	43	35	8,6	PN-1	T08	VN-1	10	0,160
UTM-SQ-13/16-35	46	73	13	20	43	35	12	PN-2	T-15	VN-2	13	0,170
UTM-SQ-16/19-35	46	79	13	20	43	35	15	PN-3	T-20	VN-3	16	0,180
UTM-SQ-19/27-35	46	79	13	20	43	35	18,5	PN-3	T-20	VN-3	19	0,210
UTM-SQ-27/37-35	46	79	13	20	43	35	25	PN-4	T-20	VN-3	27	0,225

UTM-SQ 50 SERIES

CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-SQ-8/10-50	30	58	13	20	43	35	7,25	PN-1	T08	VN-1	8	0,150
UTM-SQ-10/13-50	40	63	13	20	43	35	8,6	PN-1	T08	VN-1	10	0,160
UTM-SQ-13/16-50	50	77	13	20	43	35	12	PN-2	T-15	VN-2	13	0,170
UTM-SQ-16/19-50	52	87	13	20	43	35	15	PN-3	T-20	VN-3	16	0,210
UTM-SQ-19/27-50	60	93	13	20	43	35	18,5	PN-3	T-20	VN-3	19	0,225
UTM-SQ-27/37-50	60	93	13	20	43	35	25	PN-4	T-20	VN-3	27	0,285

UTM-SQ 65 SERIES

CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-SQ-8/10-65	30	58	13	20	43	35	7,25	PN-1	T08	VN-1	8	0,150
UTM-SQ-10/13-65	40	63	13	20	43	35	8,6	PN-1	T08	VN-1	10	0,160
UTM-SQ-13/16-65	50	77	13	20	43	35	12	PN-2	T-15	VN-2	13	0,170
UTM-SQ-16/19-65	52	87	13	20	43	35	15	PN-3	T-20	VN-3	16	0,210
UTM-SQ-19/27-65	75	108	13	20	43	35	18,5	PN-3	T-20	VN-3	19	0,290
UTM-SQ-27/37-65	75	108	13	20	43	35	25	PN-4	T-20	VN-3	27	0,315

UTM-HEX SERIES INSERT HOLDER
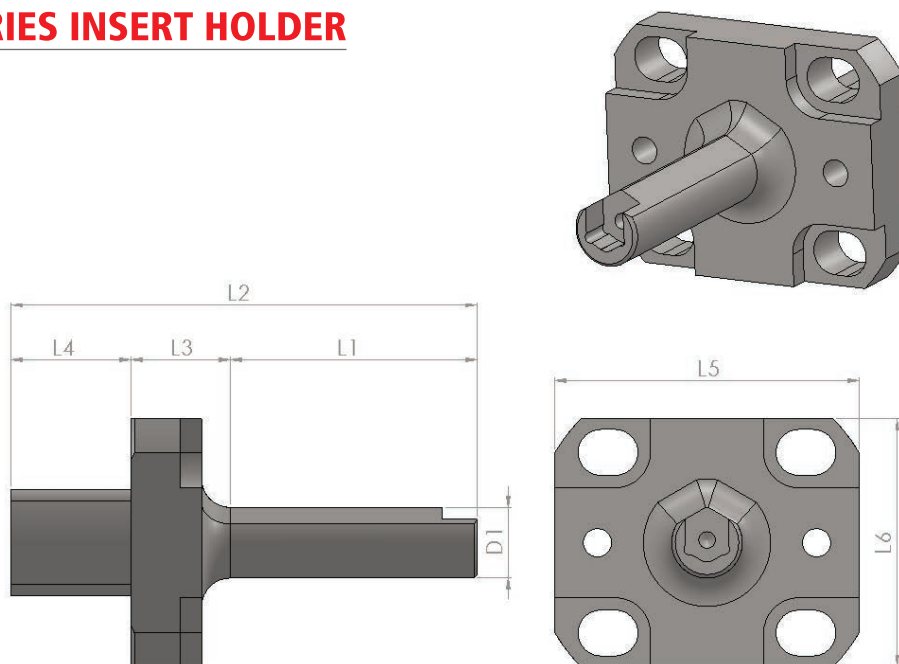
UTM-HEX 35 SERIES

CODE	Modello Stozzatore	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-HEX-9/11-35	ST-35	30	58	13	20	43	35	8	PN-1	t08	VN-1	8,7	0,150
UTM-HEX-11/17-35	ST-35	40	63	13	20	43	35	10	PN-1	T08	VN-1	10	0,160
UTM-HEX-17/28-35	ST-35	46	77	13	20	43	35	15	PN-2	T-15	VN-2	16	0,170
UTM-HEX-28/37-35	ST-35	46	79	13	20	43	35	25	PN-3	T-20	VN-3	27	0,180
UTM-HEX-37/45-35	ST-35	46	79	13	20	43	35	28	PN-4	T-20	VN-3	30	0,270

UTM-HEX 50 SERIES

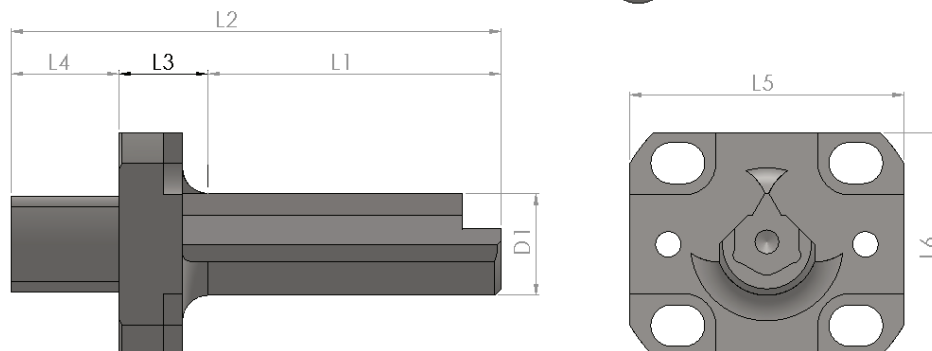| CODE	Modello Stozzatore	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-HEX-9/11-50	ST-50	30	58	13	20	43	35	8	PN-1	T08	VN-1	8,7	0,150
UTM-HEX-11/17-50	ST-50	40	63	13	20	43	35	10	PN-1	T08	VN-1	10	0,160
UTM-HEX-17/28-50	ST-50	60	93	13	20	43	35	15	PN-2	T-15	VN-2	16	0,210
UTM-HEX-28/37-50	ST-50	60	79	13	20	43	35	25	PN-3	T-20	VN-3	27	0,225
UTM-HEX-37/45-50	ST-50	60	79	13	20	43	35	28	PN-4	T-20	VN-3	30	0,245

UTM-HEX 65 SERIES

CODE	Modello Stozzatore	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-HEX-9/11-65	ST-65	30	58	13	20	43	35	8	PN-1	T08	VN-1	8,7	0,150
UTM-HEX-11/17-65	ST-65	40	73	13	20	43	35	10	PN-1	T08	VN-1	10	0,160
UTM-HEX-17/28-65	ST-65	60	93	13	20	43	35	15	PN-2	T-15	VN-2	16	0,210
UTM-HEX-28/37-65	ST-65	75	108	13	20	43	35	25	PN-3	T-20	VN-3	27	0,225
UTM-HEX-37/45-65	ST-65	75	108	13	20	43	35	28	PN-4	T-20	VN-3	30	0,275

UTM-S SERIES INSERT HOLDER

UTM-S 35 SERIES

CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-S-02-35	25	58	13	20	43	35	6,5	PN-0	T08	VN-1	7	0,150
UTM-S-03-35	30	63	13	20	43	35	8	PN-1	T08	VN-1	8,7	0,160
UTM-S-04-35	40	73	13	20	43	35	10	PN-1	T-08	VN-1	11	0,170
UTM-S-05-35	46	79	13	20	43	35	12	PN-1	T-08	VN-1	13	0,180
UTM-S-06-35	46	79	13	20	43	35	16	PN-2	T-15	VN-2	17	0,210
UTM-S-08-35	46	79	13	20	43	35	20	PN-2	T-15	VN-2	21,5	0,225
UTM-S-10-35	46	79	13	20	43	35	22	PN-3	T-20	VN-3	24	0,235
UTM-S-12-35	46	79	13	20	43	35	25	PN-3	T-20	VN-3	27	0,245
UTM-S-14/16-35	46	79	13	20	43	35	28	PN-4	T-20	VN-3	30	0,245

UTM-S 50 SERIES

CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-S-02-50	25	58	13	20	43	35	6,5	PN-0	T08	VN-1	7	0,150
UTM-S-03-50	30	63	13	20	43	35	8	PN-1	T08	VN-1	8,7	0,160
UTM-S-04-50	40	73	13	20	43	35	10	PN-1	T-08	VN-1	11	0,170
UTM-S-05-50	46	79	13	20	43	35	12	PN-1	T-08	VN-1	13	0,180
UTM-S-06-50	56	89	13	20	43	35	16	PN-2	T-15	VN-2	17	0,210
UTM-S-08-50	60	93	13	20	43	35	20	PN-2	T-15	VN-2	21,5	0,245
UTM-S-10-50	60	93	13	20	43	35	22	PN-3	T-20	VN-3	24	0,265
UTM-S-12-50	60	93	13	20	43	35	25	PN-3	T-20	VN-3	27	0,285
UTM-S-14/16-50	60	93	13	20	43	35	28	PN-4	T-20	VN-3	30	0,310

UTM-S 65 SERIES

CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-S-02-65	25	58	13	20	43	35	6,5	PN-0	T08	VN-1	7	0,150
UTM-S-03-65	30	63	13	20	43	35	8	PN-1	T08	VN-1	8,7	0,160
UTM-S-04-65	40	73	13	20	43	35	10	PN-1	T-08	VN-1	11	0,170
UTM-S-05-65	46	79	13	20	43	35	12	PN-1	T-08	VN-1	13	0,180
UTM-S-06-65	60	79	13	20	43	35	16	PN-2	T-15	VN-2	17	0,210
UTM-S-08-65	70	100	13	20	43	35	20	PN-2	T-15	VN-2	21,5	0,245
UTM-S-10-65	75	108	13	20	43	35	22	PN-3	T-20	VN-3	24	0,265
UTM-S-12-65	75	108	13	20	43	35	25	PN-3	T-20	VN-3	27	0,310
UTM-S-14/16-65	75	108	13	20	43	35	28	PN-4	T-20	VN-3	30	0,310

UTM-M SERIES INSERT HOLDER
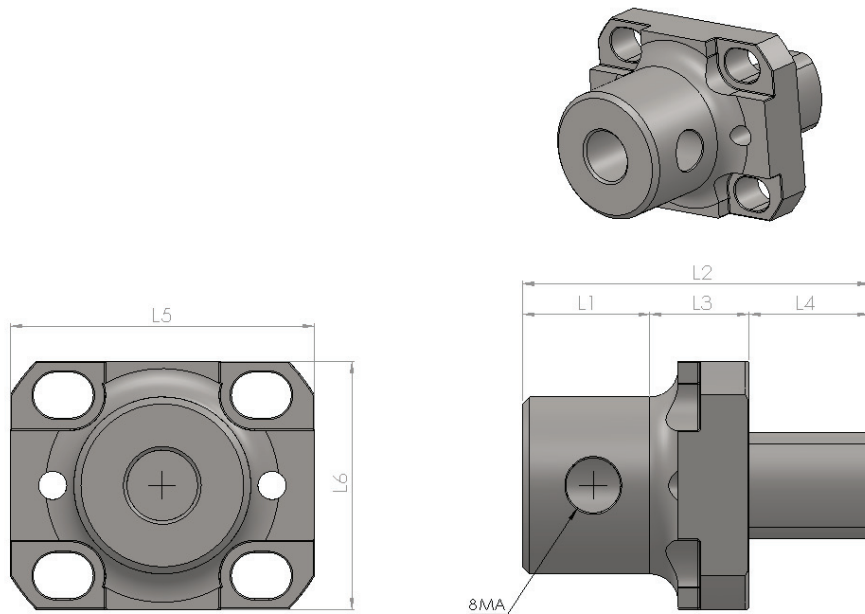
UTM-M 35 SERIES

CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-M-35	50	15	20	43	35	x	x	x	x	x	x	0,150

UTM-M 50 SERIES

CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-M-50	20	50	15	20	43	35	x	x	x	x	x	x

UTM-M 65 SERIES

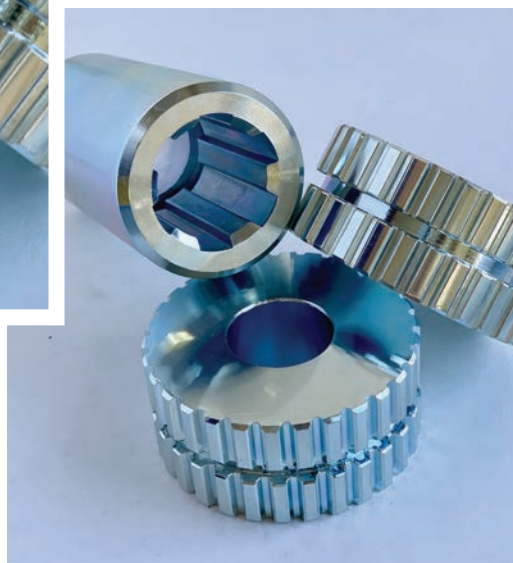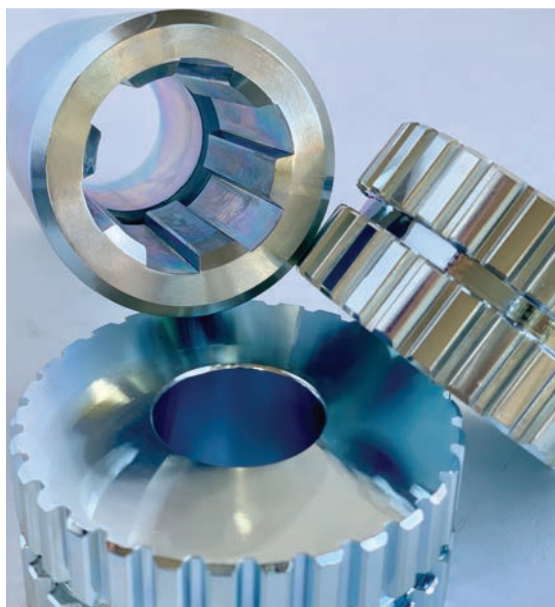| CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	D1 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTM-M-65	20	50	15	20	43	35	x	x	x	x	x	x

CUTTING PARAMETERS

■ **T**o ensure a long service life of the insert and an excellent processing finish, it is advisable to follow the suggested parameters (see parameters table).

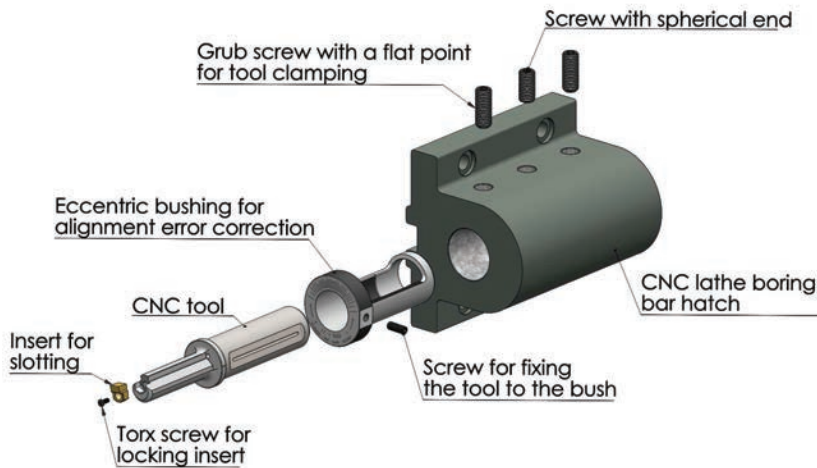## MAXIMUM THICKNESS ACHIEVABLE ON VARIOUS MATERIALS AND CUTTING

	35 mm stroke	50 mm stroke	65 mm stroke	Cutting speed	Increment
ALUMINIUM	16mm	16mm	16mm	38 m/min.	0,06 / 0,15 mm
SOFT STEEL	14mm	14mm	14mm	33 m/min.	0,04 / 0,07 mm
CAST IRON	14mm	14mm	12mm	28 m/min.	0,04 / 0,07 mm
COMMON STEEL	14mm	14mm	12mm	30 m/min.	0,03 / 0,05 mm
HARDENED STEEL	12mm	12mm	10mm	25 m/min.	0,02 / 0,04 mm
STAINLESS STEEL	12mm	12mm	10mm	25 m/min.	0,02 / 0,04 mm
PLASTIC	18mm	18mm	18mm	40 m/min.	0,07 / 0,15 mm
BRONZE-BRASS	14mm	12mm	12mm	30 m/min.	0,03 / 0,06 mm

■ **F**or any additional information contact our technical office at tecnico@revtool.eu

THE REV SYSTEM

THE REV SYSTEM FOR CNC LATHES

Grub screw with a flat point for tool clamping

Screw with spherical end

Eccentric bushing for alignment error correction

CNC tool

Insert for slotting

Torx screw for locking insert

CNC lathe boring bar hatch

Screw for fixing the tool to the bush

■ The main feature of the REV system for CNC lathes is the eccentric bushing patented by REV S.R.L. (Patent no. 1.394.481) allowing any lathe without a Y-axis to perform broaching or slotting in perfect alignment with the workpiece. It is made with tool steel which is then hardened and ground. Broaching is a process that is almost always perfectly centred on the workpiece, with an error margin of very few hundredths of a millimetre, however, symmetry errors often occur in relation to mechanical coupling between the mounted tool and the centre of the workpiece. The REV eccentric bushing makes it possible to perform a centesimal tool shift by rotating it by a max of 0.5 in Y+ and 0.5 in Y-. This range of adjustment is extensive enough to eliminate any alignment error. A graduated scale is engraved on the front of the bushing, where each notch marks a shift of 0.03 mm. When the first workpiece has been broached, and an error is detected, the bushing will be adjusted in one direction or the other, to eliminate it. The eccentric bushing is only required if the CNC lathe does not have a Y axis. If, on the other hand, the lathe is equipped with said axis, the eccentric bushing must not be installed and the CNC functions are used to set up the exact position.

ASSEMBLY ON CNC LATHES

■ Place the insert in the tool housing and clamp in on by tightening the Torx screw with the screwdriver;

■ Place the tool inside the eccentric bushing and align the white notch engraved on the tool collar with 0 on the front of the bushing; then, tighten the clamping screw positioned radially on the bushing collar, to lock the tool to the bushing;

■ Insert the unit composed of bushing and tool inside the lathe's boring bar hatch, tighten the screw with the spherical end inside the centering groove on the tool's socket rod, being careful not to completely block the tool, and finally tighten the two flat point grub screws.

CHECKS AND ADJUSTMENTS

■ When the first key has been processed, one of the ways to check the alignment is to fit a Johansson block, without any room for movement, in the processed housing and, use a gauge to take the measurement between the end of the diameter and the wall of the Johansson block.

Johansson ■ FIG.1

Johansson ■ FIG.2
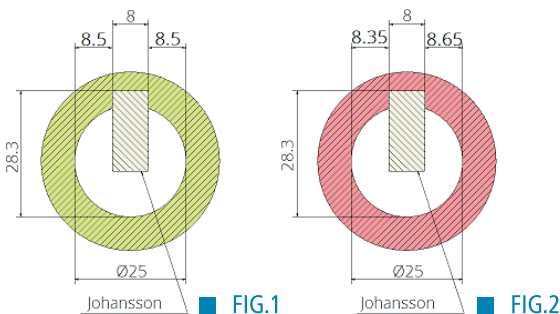
I n the example provided in Fig. 1 the measured value 8.50 mm is correct, while in Fig.2 the measured value is 8.35 mm on one side and 8.65 on the other, resulting in an alignment error of 0.15 mm that needs to be corrected.

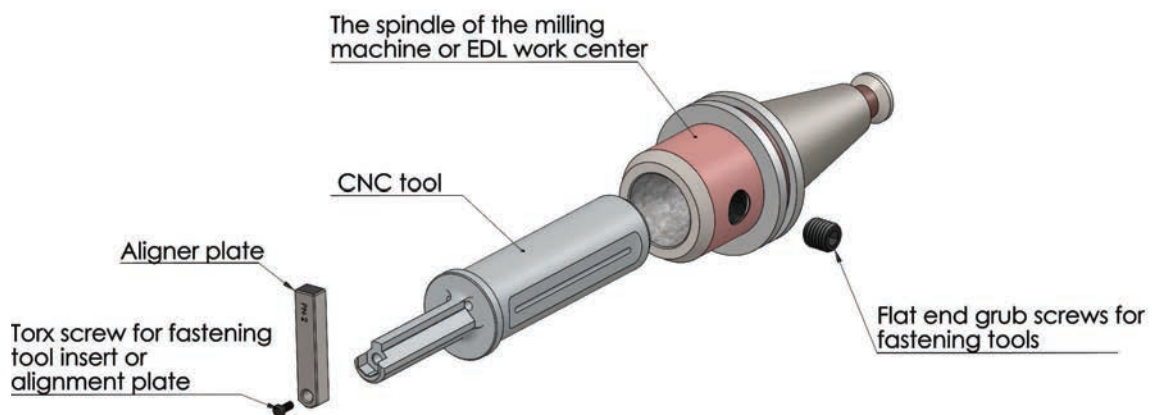## CORRECTING ALIGNMENT ERRORS WITH THE REV BUSHING

If there is an alignment error that needs to be corrected, perform the following operations:

■ Start by loosening the flat point grub screws that hold the tool in the boring bar hatch and the grub screw positioned radially in the collar of the eccentric bushing, turn the eccentric bushing in the opposite direction of the error; it basically acts as a y axis, moving the tool in Y+ and Y-. Each notch engraved on the bushing is equal to 0.03 mm;

■ Tighten the clamping grub screw positioned radially on the bushing collar back up, followed by all of the other screws on the boring bar hatch.
We advise you to always observe the recommended parameters and suggestions. In the example provided above it would have been necessary to rotate the eccentric bushing by five notches to correct the alignment.

THE REV SYSTEM FOR CNC MILLING MACHINES

The spindle of the milling
machine or EDL work center

CNC tool

Aligner plate

Torx screw for fastening
tool insert or
alignment plate

Flat end grub screws for
fastening tools

■ **F**or machines that do not feature a spindle alignment function, REV technicians have developed an alignment plate to achieve correct assembly of the REV Broaching Tool on machining centres and milling machines. It is a calibrated bar that needs to be assembled in place of the insert, with a centesimal dial gauge sliding along it (or millesimal, if greater precision is required). When the tool has been centred in relation to the reference axes of the workpiece, the cutting tool can be re-assembled and processing can begin.
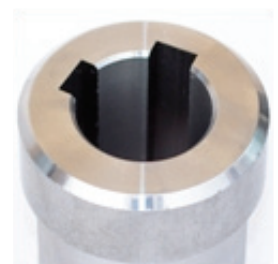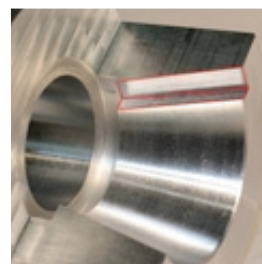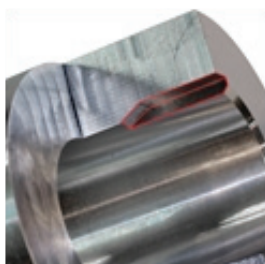
ASSEMBLY ON CNC MILLING MACHINES

■ Assemble the tool directly on a Weldon fitting (we recommend one with an internal supply);

■ Position the selector on MDI and place the machine in spindle configuration (for example Fanuc M19);

■ Place the aligner plate in the insert housing and, using a gauge or comparator, slide the axis along the flat surface of the plate until you achieve perfect alignment, parallel to the direction of operation;

■ Tighten the bolts on the Weldon fitting so as to clamp the tool on, then remove the aligner plate and put the insert in place.
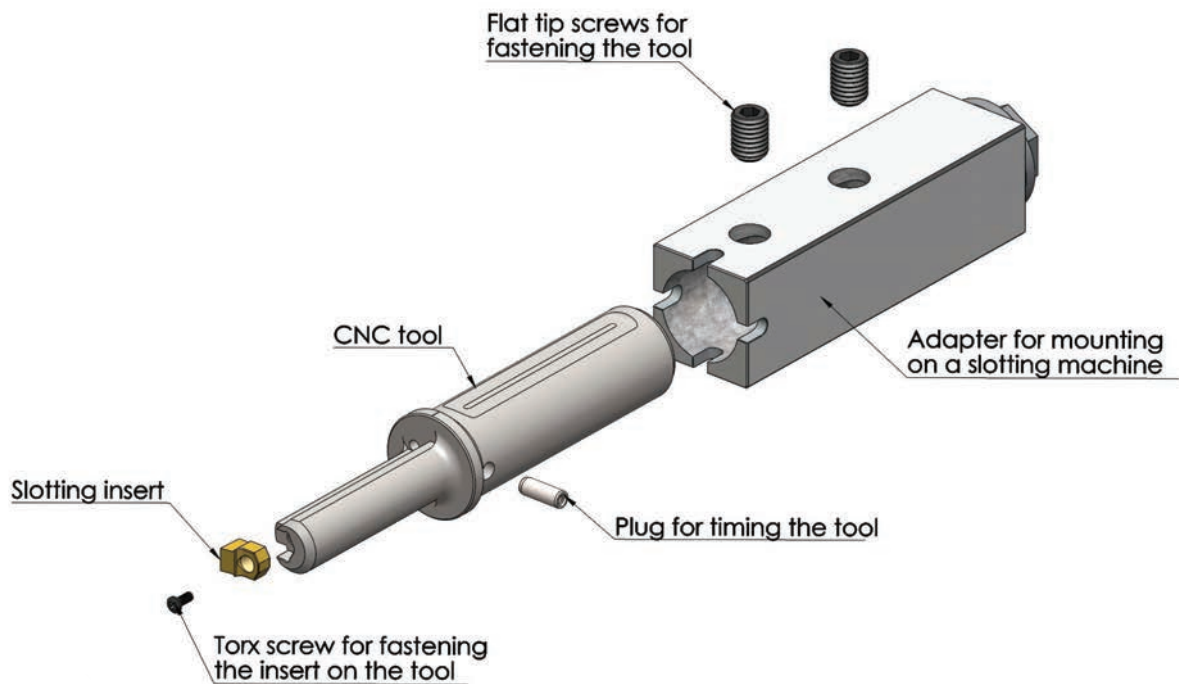
CNC PROGRAMMINGS

■ **T**he REV Broaching Tool technicians have developed CNC programmes for tool operation. These are provided free of charge on customer demand through access to the reserved area of our website. They are developed for the most common types of CNC control currently available on the market.

Using these programmes it is very easy for the operator to process simple key housings and conical internal gears, quickly and efficiently.

THE REV SYSTEM FOR SLOTTERS

Flat tip screws for fastening the tool

CNC tool

Adapter for mounting on a slotting machine

Slotting insert

Plug for timing the tool

Torx screw for fastening the insert on the tool

The REV Broaching Tool can be used, in addition to CNC machining centres and lathes, also on traditional machines such as slotting and shaping machines, offering great sturdiness and versatile use, unlike tools commonly used on these machines. To clamp the tool to slotting and shaping machines, the REV system offers an adapter (square or prismatic) that makes it possible to process the hole in four positions at 90° angles to each other. It is made with 39NiCrMO3 which, through tempering, reaches a hardness of 58/60 HRC and is then ground. The toughness and rigidity of this material make it possible to achieve processing with an excellent surface finish. The adapter (square or prismatic) is equipped with two threaded holes where the two M12x8 flat point grub screws are inserted and used to clamp the tool to the inside of the adapter. The timing pin guarantees a perfect position of the tool in relation to the work axis. REV offers the solution of clamping the tool on by a square or prismatic adapter, however, this is only one of the many ways it is possible to set up the REV Broaching Tool on slotting and shaping machines. REV technicians are in fact able to adapt the tool to all slotting and shaping machines on the market by modifying the part designed for clamping to the machine.

ASSEMBLY ON SLOTTERS

■ Place the insert in the tool housing and clamp in on by tightening the Torx screw with the screwdriver;

■ Insert the tool inside the square or prismatic adapter and lock it in place using the flat point grub screws;

■ Attach the square or prismatic adapter to the slotting or shaping machine.
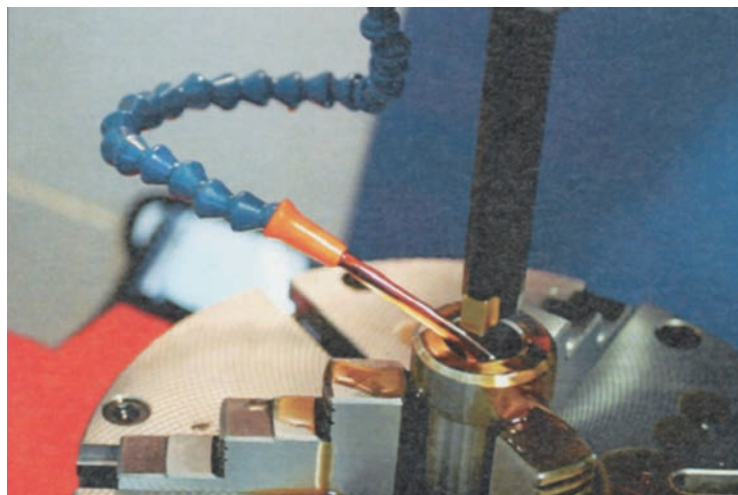
PROCESSINGS

■ **T**he processes that can be carried out with the REV Broaching Tool are, in terms of standard machining, all of those relative to broaching tab or key housings with single or multiple timing, on cylindrical or conical holes, with or without a relief groove, with or without chamfering on the base. With special tools it is also possible to execute PTOs, square, pentagonal and hexagonal holes and involute teeth.

When it is necessary to execute considerably large key housings, it is good practice to perform the operation in two steps: a roughing phase and a finishing phase. Accordingly, you avoid excessive stress to the tool, and you improve precision and surface finish at the same time.

SPECIAL TOOLS AND INSERTS

■ **T**he REV Broaching Tool production facility is able to manufacture special tools and inserts based on specific customer demands, and is able to satisfy these various requests in very short amounts of time and at advantageous costs.

WORKING PARAMETERS AND PERFORMANCES

■ **T**he cutting speed, the increase for each stroke and the service life of the cutting tool essentially depend on the material being processed.
In order to determine the approximate piece processing times with REV tools, we invite our customers to use the PROCESSING TIME CALCULATION PROGRAMME on our website http://www.revtool.eu/

TOOLS FOR INTERNAL

■ The REV tools are made with quenched and tempered tool steel. The section that houses the insert is hardened to 58/60 HRC, making it very resistant to compression and guaranteeing the tool a long service life. The REV Broaching Tool feature 4 mm holes for the forced supply of coolant liquid which, in addition to lubricating and cooling the insert, are used to extract the chips, produced through broaching or slotting, out of the blind hole.
The tool is available in two socket diameters (25 and 32). Two tool lines are available for each socket diameter: standard and long (identified by the suffix "L" in the code).
The REV Broaching Tool guarantees low impact on the machine tool bearings.
To date, none of the thousands of REV system users has reported issues of breakage or unusual wear caused by broaching on the CNC. Based on tests carried out by REV, the cutting force for executing key housings with a 20 mm width, for example, is comparable to the cutting force required for a common hole with a 14 mm diameter.
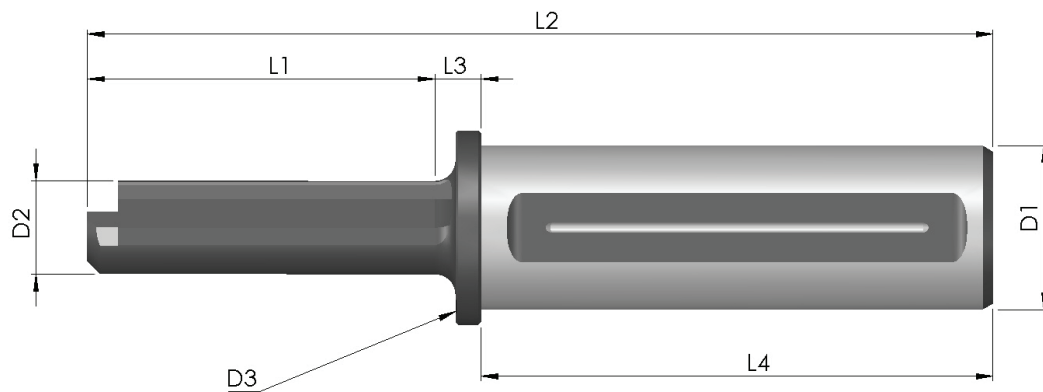
CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	D1 (mm)	D2 (mm)	D3 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UT-02-25*	25	124	9	90	25	6	30	PN-0	T08	VN-1	7	382
UT-02-25-L*	34,5	133,5	9	90	25	6	30	PN-0	T08	VN-1	7	354
UT-02-32*	25	134	9	100	32	6	37	PN-0	T08	VN-1	7	600
UT-02-32-L*	34,5	143,5	9	100	32	6	37	PN-0	T08	VN-1	7	654
UT-03-25*	30	129	9	90	25	8	30	PN-1	T08	VN-1	8,7	368
UT-03-25-L*	40	139	9	90	25	8	30	PN-1	T08	VN-1	8,7	362
UT-03-32*	30	139	9	100	32	8	37	PN-1	T08	VN-1	8,7	673
UT-03-32-L*	40	149	9	100	32	8	37	PN-1	T08	VN-1	8,7	678
UT-04-25*	40	139	9	90	25	10	30	PN-1	T08	VN-1	11	368
UT-04-25-L*	56	155	9	90	25	10	30	PN-1	T08	VN-1	11	377
UT-04-32*	40	149	9	100	32	10	37	PN-1	T08	VN-1	11	672
UT-04-32-L*	56	165	9	100	32	10	37	PN-1	T08	VN-1	11	684
UT-05-25*	46	145	9	90	25	12	30	PN-1	T08	VN-1	13	382
UT-05-25-L*	66	165	9	90	25	12	30	PN-1	T08	VN-1	13	408
UT-05-32*	46	155	9	100	32	12	37	PN-1	T08	VN-1	13	698
UT-05-32-L*	66	175	9	100	32	12	37	PN-1	T08	VN-1	13	711
UT-06-25*	56	155	9	90	25	16	30	PN-2	T15	VN-2	17,5	428
UT-06-25-L*	81	180	9	90	25	16	30	PN-2	T15	VN-2	17,5	453
UT-06-32*	56	165	9	100	32	16	37	PN-2	T15	VN-2	17,5	725
UT-06-32-L*	81	190	9	100	32	16	37	PN-2	T15	VN-2	17,5	765
UT-08-25*	68	167	9	90	25	20	30	PN-2	T15	VN-2	21,5	488
UT-08-25-L*	100	199	9	90	25	20	30	PN-2	T15	VN-2	21,5	574

|												
UT-08-32*	68	177	9	100	32	20	37	PN-2	T15	VN-2	21,5	820
UT-08-32-L*	100	209	9	100	32	20	37	PN-2	T15	VN-2	21,5	868
UT-10-25	86	185	9	90	25	25	32	PN-3	T20	VN-3	28	647
UT-10-25-L	126	225	9	90	25	25	32	PN-3	T20	VN-3	28	797
UT-10-32*	86	195	9	100	32	25	37	PN-3	T20	VN-3	28	935
UT-10-32-L*	126	235	9	100	32	25	37	PN-3	T20	VN-3	28	1097
UT-12-25	104	203	9	90	25	30	35	PN-3	T20	VN-3	32	824
UT-12-25-L	161	260	9	90	25	30	35	PN-3	T20	VN-3	32	1131
UT-12-32*	104	213	9	100	32	30	37	PN-3	T20	VN-3	32	1157
UT-12-32-L*	161	270	9	100	32	30	37	PN-3	T20	VN-3	32	1407
UT-14/16-25	126	225	9	90	25	35	37	PN-4	T20	VN-3	37	1211
UT-14/16-25-L	180	279	9	90	25	35	37	PN-4	T20	VN-3	37	1548
UT-14/16-32	126	235	9	100	32	35	37	PN-4	T20	VN-3	37	1490
UT-14/16-32-L	180	289	9	100	32	35	37	PN-4	T20	VN-3	37	1748
UT-18/25-32	140	249	9	100	32	40	45	PN-5	BRUG.5	VN-4	45	1903
UT-18/25-32-L	200	309	9	100	32	40	45	PN-5	BRUG.5	VN-4	45	2189

*On these tools there is a 4mm hole for forced coolant adduction.

INSERTS (MM)

■ The broaching and slotting inserts are made with a sintered alloy which, following heat treatment, reaches a hardness of 70-71 HRC. This material gives the REV broaching inserts high toughness, and can accordingly withstand strong pressures. The inserts are also subject to a surface treatment, TiN coating, with anti wear and seize properties.

The inserts are re-sharpened by tapering their sides. This process eliminates any gouges that would prevent the insert from cutting perpendicular to the reference axis of the workpiece during the broaching phase. The protruding shape of the inserts makes it possible to re-sharpen them numerous times. All of these characteristics make REV inserts extraordinarily long-lasting.

The inserts identified by their code ending with "SM" execute a 0.2x45° chamfering on the intersection point between the hole and the walls of the broached slot, leaving the hole burr-free. This type of chamfering can only be carried out on UNI keys. We also manufacture special inserts on customer demand.

Refer to the SM series

Chamfer 0,2x45°
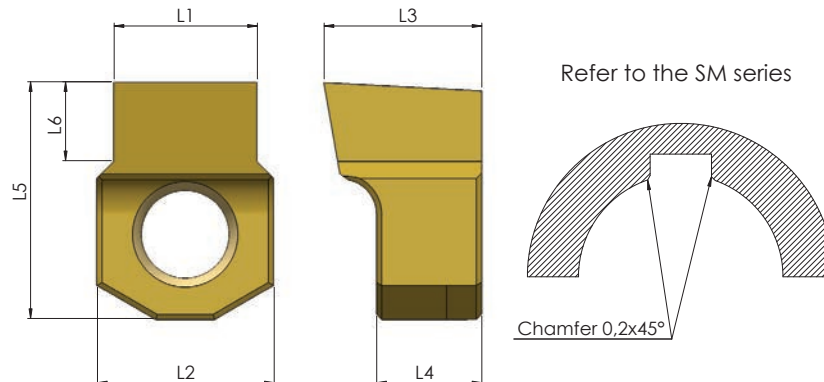
CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	Tool	Resharpener
IN-02 P9	1,994	5	6,5	5	6	1,3	UT-02	RF-0
IN-02 P9-SM	1,994	5	6,5	5	6	1,09	UT-02	RF-0
IN-02 H7	2,010	5	6,5	5	6	1,3	UT-02	RF-0
IN-02 H7-SM	2,010	5	6,5	5	6	1,09	UT-02	RF-0
IN-02 D10	2,060	5	6,5	5	6	1,3	UT-02	RF-0
IN-02 C11	2,120	5	6,5	5	6	1,3	UT-02	RF-0
IN-03 P9	2,994	6,08	6,5	5	7,5	2	UT-03	RF-1
IN-03 P9-SM	2,994	6,08	6,5	5	7,5	1,42	UT-03	RF-1
IN-03 H7	3,010	6,08	6,5	5	7,5	2	UT-03	RF-1
IN-03 H7-SM	3,010	6,08	6,5	5	7,5	1,42	UT-03	RF-1
IN-03 D10	3,06	6,08	6,5	5	7,5	2	UT-03	RF-1
IN-03 C11	3,120	6,08	6,5	5	7,5	2	UT-03	RF-1
IN-04 P9	3,988	6,08	7	5	8	2,6	UT-04	RF-1
IN-04 P9-SM	3,988	6,08	7	5	8	2,07	UT-04	RF-1
IN-04 H7	4,012	6,08	7	5	8	2,6	UT-04	RF-1
IN-04 H7-SM	4,012	6,08	7	5	8	2,07	UT-04	RF-1
IN-04 D10	4,078	6,08	7	5	8	2,6	UT-04	RF-1
IN-04 C11	4,145	6,08	7	5	8	2,6	UT-04	RF-1
IN-05 P9	4,988	6,08	7	5	8	3	UT-05	RF-1
IN-05 P9-SM	4,988	6,08	7	5	8	2,74	UT-05	RF-1
IN-05 H7	5,012	6,08	7	5	8	3	UT-05	RF-1
IN-05 H7-SM	5,012	6,08	7	5	8	2,74	UT-05	RF-1
IN-05 D10	5,078	6,08	7	5	8	3	UT-05	RF-1
IN-05 C11	5,145	6,08	7	5	8	3	UT-05	RF-1
IN-06 P9	5,988	10,08	9	6	13,5	4	UT-06	RF-2
IN-06 P9-SM	5,988	10,08	9	6	13,5	3	UT-06	RF-2
IN-06 H7	6,012	10,08	9	6	13,5	4	UT-06	RF-2
IN-06 H7-SM	6,012	10,08	9	6	13,5	3	UT-06	RF-2
IN-06 D10	6,078	10,08	9	6	13,5	4	UT-06	RF-2
IN-06 C11	6,145	10,08	9	6	13,5	4	UT-06	RF-2

IN-08 P9	7,985	10,08	9	6	13,5	4,5	UT-08	RF-2
IN-08 P9-SM	7,985	10,08	9	6	13,5	3,78	UT-08	RF-2
IN-08 H7	8,015	10,08	9	6	13,5	4,5	UT-08	RF-2
IN-08 H7-SM	8,015	10,08	9	6	13,5	3,78	UT-08	RF-2
IN-08 D10	8,098	10,08	9	6	13,5	4,5	UT-08	RF-2
IN-08 C11	8,170	10,08	9	6	13,5	4,5	UT-08	RF-2
IN-10 P9	9,985	13,1	14	10	18,5	6	UT-10	RF-3
IN-10 P9-SM	9,985	13,1	14	10	18,5	3,88	UT-10	RF-3
IN-10 H7	10,015	13,1	14	10	18,5	6	UT-10	RF-3
IN-10 H7-SM	10,015	13,1	14	10	18,5	3,88	UT-10	RF-3
IN-10 D10	10,098	13,1	14	10	18,5	6	UT-10	RF-3
IN-10 C11	10,170	13,1	14	10	18,5	6	UT-10	RF-3
IN-12 P9	11,982	13,1	14	10	18,5	6,5	UT-12	RF-3
IN-12 P9-SM	11,982	13,1	14	10	18,5	3,89	UT-12	RF-3
IN-12 H7	12,018	13,1	14	10	18,5	6,5	UT-12	RF-3
IN-12 H7-SM	12,018	13,1	14	10	18,5	3,89	UT-12	RF-3
IN-12 D10	12,12	13,1	14	10	18,5	6,5	UT-12	RF-3
IN-12 C11	12,205	13,1	14	10	18,5	6,5	UT-12	RF-3
IN-14 P9	13,982	18	14	10	22	7	UT-14/16	RF-4
IN-14 P9-SM	13,982	18	14	10	22	4,71	UT-14/16	RF-4
IN-14 H7	14,018	18	14	10	22	7	UT-14/16	RF-4
IN-14 H7-SM	14,018	18	14	10	22	4,71	UT-14/16	RF-4
IN-14 D10	14,120	18	14	10	22	7	UT-14/16	RF-4
IN-14 C11	14,205	18	14	10	22	7	UT-14/16	RF-4
IN-16 P9	15,982	18	14	10	22	8	UT-14/16	RF-4
IN-16 P9-SM	15,982	18	14	10	22	5,53	UT-14/16	RF-4
IN-16 H7	16,018	18	14	10	22	8	UT-14/16	RF-4
IN-16 H7-SM	16,018	18	14	10	22	5,53	UT-14/16	RF-4
IN-16 D10	16,120	18	14	10	22	8	UT-14/16	RF-4
IN-16 C11	16,205	18	14	10	22	8	UT-14/16	RF-4
IN-18 P9**	17,982	26	18	10	30	9	UT-18/25	RF-5
IN-18 P9-SM**	17,982	26	18	10	30	5,67	UT-18/25	RF-5
IN-18 H7**	18,018	26	18	10	30	9	UT-18/25	RF-5
IN-18 H7-SM**	18,018	26	18	10	30	5,67	UT-18/25	RF-5
IN-18 D10**	18,120	26	18	10	30	9	UT-18/25	RF-5
IN-18 C11**	18,205	26	18	10	30	9	UT-18/25	RF-5
IN-20 P9**	19,978	26	18	10	30	10	UT-18/25	RF-5
IN-20 P9-SM**	19,978	26	18	10	30	6,29	UT-18/25	RF-5
IN-20 H7**	20,021	26	18	10	30	10	UT-18/25	RF-5
IN-20 H7-SM**	20,021	26	18	10	30	6,29	UT-18/25	RF-5
IN-20 D10**	20,149	26	18	10	30	10	UT-18/25	RF-5
IN-20 C11**	20,240	26	18	10	30	10	UT-18/25	RF-5
IN-22 P9**	21,978	26	18	10	30	11	UT-18/25	RF-5
IN-22 P9-SM**	21,978	26	18	10	30	6,79	UT-18/25	RF-5
IN-22 H7**	22,021	26	18	10	30	11	UT-18/25	RF-5
IN-22 H7-SM**	22,021	26	18	10	30	6,79	UT-18/25	RF-5
IN-22 D10**	22,149	26	18	10	30	11	UT-18/25	RF-5
IN-22 C11**	22,240	26	18	10	30	11	UT-18/25	RF-5
IN-25 P9**	24,978	26	18	10	30	12	UT-18/25	RF-5
IN-25 P9-SM**	24,978	26	18	10	30	7,02	UT-18/25	RF-5
IN-25 H7**	25,021	26	18	10	30	12	UT-18/25	RF-5
IN-25 H7-SM**	25,021	26	18	10	30	7,02	UT-18/25	RF-5
IN-25 D10**	25,149	26	18	10	30	12	UT-18/25	RF-5
IN-25 C11**	25,240	26	18	10	30	12	UT-18/25	RF-5

**For these insert sizes we recommend machining in two steps: roughing and finishing.

INSERTS (INCHES)

■ The broaching and slotting inserts are made with a sintered alloy which, following heat treatment, reaches a hardness of 70-71 HRC. This material gives the REV broaching inserts high toughness, and can accordingly withstand strong pressures. The inserts are also subject to a surface treatment, TiN coating, with anti wear and seize properties.

The inserts are re-sharpened by tapering their sides. This process eliminates any gouges that would prevent the insert from cutting perpendicular to the reference axis of the workpiece during the broaching phase. The protruding shape of the inserts makes it possible to re-sharpen them numerous times. All of these characteristics make REV inserts extraordinarily long-lasting. We also manufacture special inserts on customer demand.
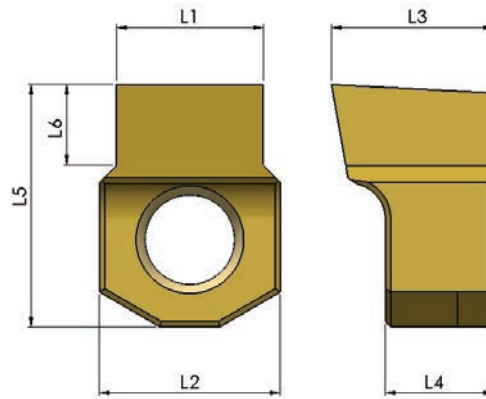
CODE	L1 (mm)	L1 (inches)	L2 (inches)	L3 (inches)	L4 (inches)	L5 (inches)	L6 (inches)	Tool	Resharpener
IN-3/32"-P9	2,375	0,0932	0,1968	0,2362	0,1968	0,2559	0,0551	UT-02	RF-0
IN-3/32"-H7	2,391	0,0941	0,1968	0,2362	0,1968	0,2559	0,0551	UT-02	RF-0
IN-3/32"-D10	2,441	0,0961	0,1968	0,2362	0,1968	0,2559	0,0551	UT-02	RF-0
IN-3/32"-C11	2,501	0,0984	0,1968	0,2362	0,1968	0,2559	0,0551	UT-02	RF-0
IN-1/8"-P9	3,1630	0,1243	0,2393	0,2559	0,1968	0,2952	0,0905	UT-03	RF-1
IN-1/8"-H7	3,1870	0,1254	0,2393	0,2559	0,1968	0,2952	0,0905	UT-03	RF-1
IN-1/8"-D10	3,2530	0,128	0,2393	0,2559	0,1968	0,2952	0,0905	UT-03	RF-1
IN-1/8"-C11	3,3200	0,1307	0,2393	0,2559	0,1968	0,2952	0,0905	UT-03	RF-1
IN-5/32"-P9	3,969	0,1555	0,2393	0,2755	0,1968	0,3149	0,1141	UT-04	RF-1
IN-5/32"-H7	3,981	0,1567	0,2393	0,2755	0,1968	0,3149	0,1141	UT-04	RF-1
IN-5/32"-D10	4,047	0,1593	0,2393	0,2755	0,1968	0,3149	0,1141	UT-04	RF-1
IN-5/32"-C11	4,114	0,1619	0,2393	0,2755	0,1968	0,3149	0,1141	UT-04	RF-1
IN-3/16"-P9	4,7510	0,1868	0,2393	0,2755	0,1968	0,3149	0,1299	UT-05	RF-1
IN-3/16"-H7	4,774	0,1879	0,2393	0,2755	0,1968	0,3149	0,1299	UT-05	RF-1
IN-3/16"-D10	4,84	0,1905	0,2393	0,2755	0,1968	0,3149	0,1299	UT-05	RF-1
IN-3/16"-C11	4,908	0,1932	0,2393	0,2755	0,1968	0,3149	0,1299	UT-05	RF-1
IN-1/4"-P9	6,335	0,2491	0,3968	0,3543	0,2362	0,5314	0,1587	UT-06	RF-2
IN-1/4"-H7	6,365	0,2505	0,3968	0,3543	0,2362	0,5314	0,1587	UT-06	RF-2
IN-1/4"-D10	6,448	0,2538	0,3968	0,3543	0,2362	0,5314	0,1587	UT-06	RF-2
IN-1/4"-C11	6,520	0,2566	0,3968	0,3543	0,2362	0,5314	0,1587	UT-06	RF-2
IN-9/32"-P9	7,129	0,2804	0,3968	0,3543	0,2362	0,5314	0,1692	UT-08	RF-2
IN-9/32"-H7	7,159	0,2818	0,3968	0,3543	0,2362	0,5314	0,1692	UT-08	RF-2
IN-9/32"-D10	7,242	0,2851	0,3968	0,3543	0,2362	0,5314	0,1692	UT-08	RF-2
IN-9/32"-C11	7,314	0,2879	0,3968	0,3543	0,2362	0,5314	0,1692	UT-08	RF-2
IN-5/16"-P9	7,922	0,3116	0,3968	0,3543	0,2362	0,5314	0,1875	UT-08	RF-2
IN-5/16"-H7	7,952	0,313	0,3968	0,3543	0,2362	0,5314	0,1875	UT-08	RF-2
IN-5/16"-D10	8,036	0,3163	0,3968	0,3543	0,2362	0,5314	0,1875	UT-08	RF-2
IN-5/16"-C11	8,108	0,3191	0,3968	0,3543	0,2362	0,5314	0,1875	UT-08	RF-2
IN-3/8"-P9	9,511	0,3741	0,5157	0,5511	0,3937	0,7283	0,2500	UT-10	RF-3
IN-3/8"-H7	9,540	0,3755	0,5157	0,5511	0,3937	0,7283	0,250	UT-10	RF-3

IN-3/8"-D10	9,623	0,3788	0,5157	0,5511	0,3937	0,7283	0,250	UT-10	RF-3
IN-3/8"-C11	9,695	0,3816	0,5157	0,5511	0,3937	0,7283	0,250	UT-10	RF-3
IN-7/16"-P9	11,094	0,4364	0,5157	0,5511	0,3937	0,7283	0,250	UT-12	RF-3
IN-7/16"-H7	11,13	0,4382	0,5157	0,5511	0,3937	0,7283	0,250	UT-12	RF-3
IN-7/16"-D10	11,232	0,4422	0,5157	0,5511	0,3937	0,7283	0,250	UT-12	RF-3
IN-7/16"-C11	11,318	0,4455	0,5157	0,5511	0,3937	0,7283	0,250	UT-12	RF-3
IN-1/2"-P9	12,682	0,4989	0,5157	0,5511	0,3937	0,7283	0,300	UT-12	RF-3
IN-1/2"-H7	12,718	0,5007	0,5157	0,5511	0,3937	0,7283	0,300	UT-12	RF-3
IN-1/2"-D10	12,8200	0,5047	0,5157	0,5511	0,3937	0,7283	0,300	UT-12	RF-3
IN-1/2"-C11	12,9050	0,508	0,5157	0,5511	0,3937	0,7283	0,300	UT-12	RF-3
IN-9/16"-P9	14,27	0,5614	0,7086	0,5511	0,3937	0,8661	0,275	UT-14/16	RF-4
IN-9/16"-H7	14,306	0,5632	0,7086	0,5511	0,3937	0,8661	0,275	UT-14/16	RF-4
IN-9/16"-D10	14,408	0,5672	0,7086	0,5511	0,3937	0,8661	0,275	UT-14/16	RF-4
IN-9/16"-C11	14,492	0,5705	0,7086	0,5511	0,3937	0,8661	0,275	UT-14/16	RF-4
IN-5/8"-P9	15,8570	0,6239	0,7086	0,5511	0,3937	0,8661	0,312	UT-14/16	RF-4
IN-5/8"-H7	15,8930	0,6257	0,7086	0,5511	0,3937	0,8661	0,312	UT-14/16	RF-4
IN-5/8"-D10	15,9950	0,6297	0,7086	0,5511	0,3937	0,8661	0,312	UT-14/16	RF-4
IN-5/8"-C11	16,080	0,633	0,7086	0,5511	0,3937	0,8661	0,312	UT-14/16	RF-4
IN-3/4"-P9**	19,028	0,7487	1,024	0,7086	0,3937	1,181	0,393	UT-18/25	RF-5
IN-3/4"-H7**	19,071	0,7508	1,024	0,7086	0,3937	1,181	0,393	UT-18/25	RF-5
IN-3/4"-D10**	19,199	0,7558	1,024	0,7086	0.3937	1,181	0,393	UT-18/25	RF-5
IN-3/4"-C11**	19,290	0,7594	1,024	0,7086	0,3937	1,181	0,393	UT-18/25	RF-5

**For these insert sizes we recommend machining in two steps: roughing and finishing.

TOOLS FOR EXTERNAL

■ The series of tools for external machining was developed to machine external surfaces (to execute toothing, keyway seatings or other).
These tools are made with tool steel.
In addition to the two types of tools for external machining available in the catalogue, the REV production facility is able to build special tools for external machining based on specific customer demands.
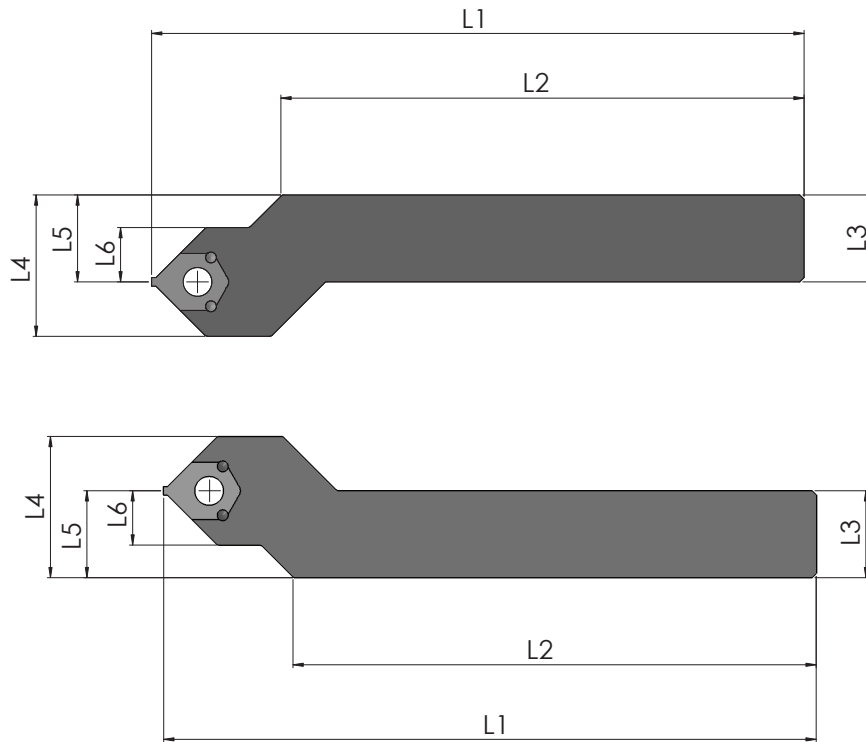
CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)
UTE-20-DX	150	110	20x20	32,5	20	12,5
UTE-20-SX	150	110	20x20	32,5	20	12,5
UTE-25-DX	150	110	25x25	37,5	25	12,5
UTE-25-SX	150	110	25x25	37,5	25	12,5

MINITOOL

■ **T**he MINITOOL series was developed based on the need to satisfy demands linked to machining small workpieces.

Integral inserts were used to satisfy these demands, as these types of inserts make it possible to achieve extremely small cutting profiles, with very diverse geometries. In order to ensure high tool rigidity and achieve tools that are absolutely perfect for the operation that needs to be performed, the integral inserts are always designed ad hoc based on specific customer demands.

To ensure the prompt supply of tools, the REV production facility always has a stock of semi-finished MINITOOL inserts and has developed specific programmes for its CNC sharpening machines, aimed at profiling inserts based on customer demands, in extremely short amounts of time.

MINITOOL series inserts can fit UT-1/8 insert-carrier (available in different socket diameters). The aforementioned insert-carrier can, in turn, be internally fitted with eccentric bushing, the same way as classic line REV tool and, therefore, can correct any alignment errors on CNC lathes that are not equipped with a Y axis.

Alternatively, MINITOOL inserts can be locked into the machine tool-carrier with a simple clamping gripper (for ex. an ER gripper). In this case it is preferable for the machine tool to be equipped with a Y axis.
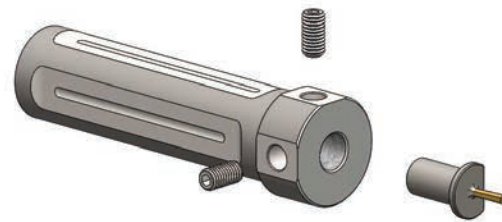
Keyway Square profile Hexagonal profile
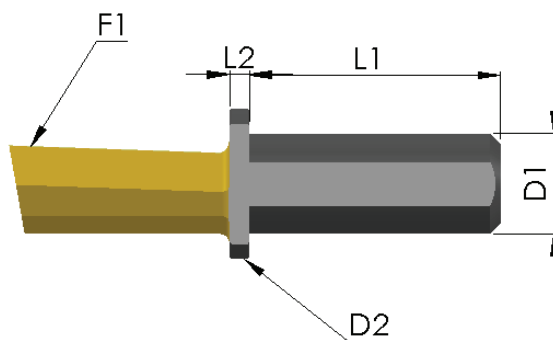
Double square profile Circle profile Circle evolvent profile

TOOL UT-1/8

Internal hole ⌀10 H7
L= 22
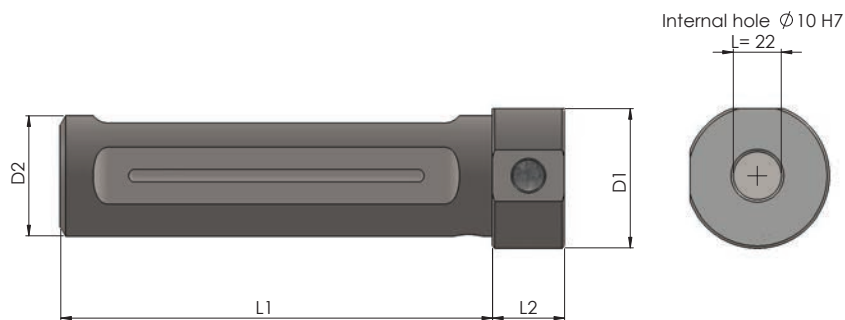
CODE	L1 (mm)	L2 (mm)	D1 (mm)	D2 (mm)
UT-1/8-19,05	90	15	30	19,05
UT-1/8-20	90	15	30	20
UT-1/8-25	90	15	30	25
UT-1/8-32	100	15	38	32

INTEGRAL INSERT

■ **I**ntegral inserts in the MINITOOL line feature a flat side on the collar, with a diameter of 15 mm, allowing the operator to check the correct position of the insert in very restricted amounts of time, through the use of common comparators or gauges.

They can be manufactured in two possible alloys: sintered steel or, alternatively, high toughness widia.

The service life of the inserts is very long and they can be re-sharpened many times before having to replace them.

The type of sharpening and coating are assessed based on the material that needs to be machined.

CODE	L1 (mm)	L2 (mm)	F1 (mm)	D1 (mm)	D2 (mm)
IN-1/8	18	2	upon request	10 H7	15

TOOLS AND INSERTS FOR SQUARE

■ **T**his series of REV tools was developed to execute internal squares.

It offers the following advantages: absolute concentricity, the possibility of correcting the required measurement, machining speed, extreme economising.

Every insert size in this line is able to execute various square sizes, which makes using REV tools for squares very economically convenient.

To execute internal square holes it is necessary to cut a pre-hole with a diameter based on the following formula:

PRE-HOLE DIAMETER = SQUARE THICKNESS X 1,050

For example, for a square with a thickness of 10 mm the diameter of the pre-hole will be:

10 mm x 1,050 = 10,50 mm

To execute completely square holes the customer will need to make a specific request and will be supplied with an ad hoc tool.

In addition to this, in many other cases, in order to obtain a perfectly appropriate tool for the type of square hole that needs to be executed, it will be possible to produce a special tool that meets the customer's specifications.


Pre-hole diameter
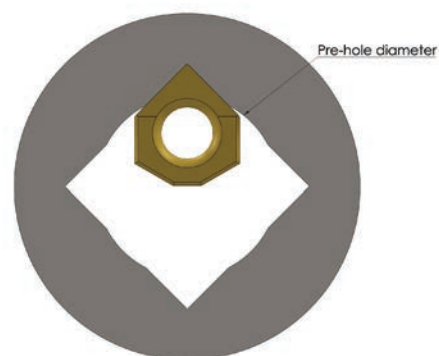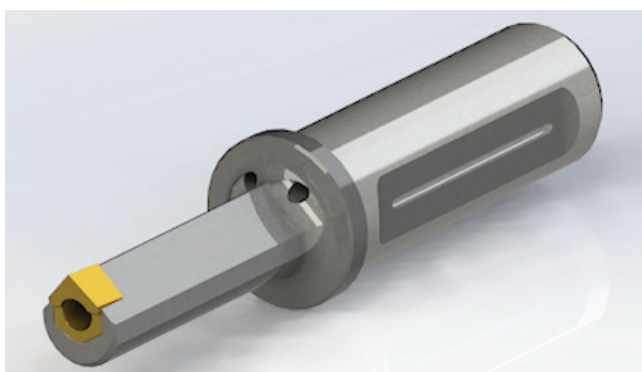
TOOLS FOR SQUARE
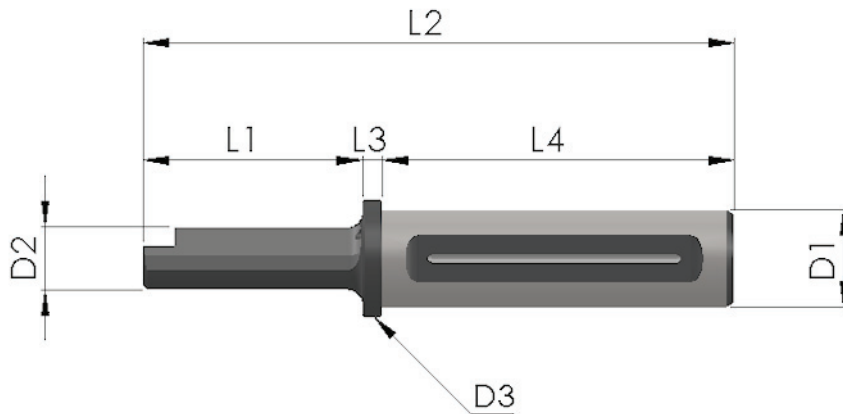
CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	D1 (mm)	D2 (mm)	D3 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UT-SQ-8/10-25	30	129	9	90	25	7,25	30	PN-1	T08	VN-1	8	368
UT-SQ-8/10-32	30	139	9	100	32	7,25	38	PN-1	T08	VN-1	8	673
UT-SQ-10/13-25	40	139	9	90	25	8,6	30	PN-1	T08	VN-1	10	368
UT-SQ-10/13-32	40	149	9	100	32	8,6	38	PN-1	T08	VN-1	10	672
UT-SQ-13/16-25	50	149	9	90	25	12	30	PN-2	T15	VN-2	13	428
UT-SQ-13/16-32	50	159	9	100	32	12	38	PN-2	T15	VN-2	13	725
UT-SQ-16/19-25	52	151	9	90	25	15	30	PN-2	T20	VN-2	16	647
UT-SQ-16/19-32	52	161	9	100	32	15	38	PN-2	T20	VN-2	16	935
UT-SQ-19/27-25	86	185	9	90	25	18,50	30	PN-3	T20	VN-3	19	824
UT-SQ-19/27-32	86	195	9	100	32	18,50	38	PN-3	T20	VN-3	19	1,157
UT-SQ-27/37-25	100	199	9	90	25	25	30	PN-4	T20	VN-3	27	1,39
UT-SQ-27/37-32	100	209	9	100	32	25	38	PN-4	T20	VN-3	27	1,49
UT-SQ-37/50-32	140	249	9	100	32	35	45	PN-5	BRUG-5	VN-4	37	1,903

INSERTS FOR SQUARE
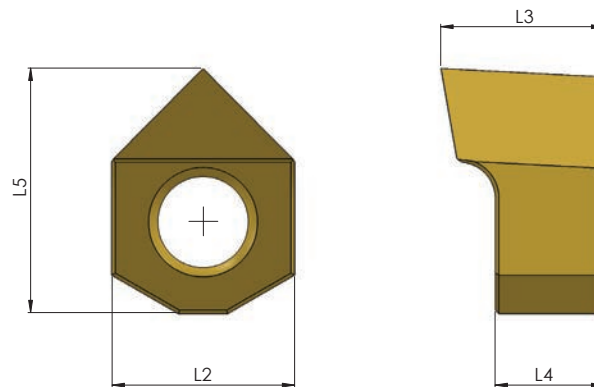
CODE	Working range (mm)	Working range (inches)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	Tool	Resharpener
IN-SQ-8/10	8mm/10mm	0,314/0,393	6	7	5	7	UT-SQ-8/10	RF-1
IN-SQ-10/13	10mm/13mm	0,393/0,511	6	7	5	7,5	UT-SQ-10/13	RF-1
IN-SQ-13/16	13mm/16mm	0,511/0,629	10	8	6	12	UT-SQ-13/16	RF-2
IN-SQ-16/19	16mm/19mm	0,629/0,748	10	8	6	12,5	UT-SQ-16/19	RF-2
IN-SQ-19/27	19mm/27mm	0,748/1,062	13	13	10	17	UT-SQ-19/27	RF-3
IN-SQ-27/37	27mm/37mm	1,062/1,456	18	14	10	22	UT-SQ-27/37	RF-4
IN-SQ-37/50	37mm/50mm	1,456/1,968	26	18	10	31	UT-SQ-37/50	RF-5

TOOLS AND INSERTS FOR HEXAGON

■ This series of REV tools was developed to execute internal hexagons.

It offers the following advantages: absolute concentricity, the possibility of correcting the required measurement, machining speed, extreme economising.

Every insert size in this line is able to execute various hexagon sizes, which makes using REV tools for hexagons very economically convenient.

To execute internal hexagonal holes it is necessary to cut a pre-hole with a diameter based on the following formula:

PRE-HOLE DIAMETER = HEXAGON THICKNESS X 1,020

For example, for a hexagon with a thickness of 10 mm the diameter of the pre-hole will be:

10 mm x 1,020 = 10,20 mm

To execute completely hexagonal holes, the customer will need to make a specific request and will be supplied with an ad hoc tool.

In addition to this, in many other cases, in order to obtain a perfectly appropriate tool for the type of hexagonal hole that needs to be executed, it will be possible to produce a special tool that meets the customer's specifications.


Pre-hole diameter
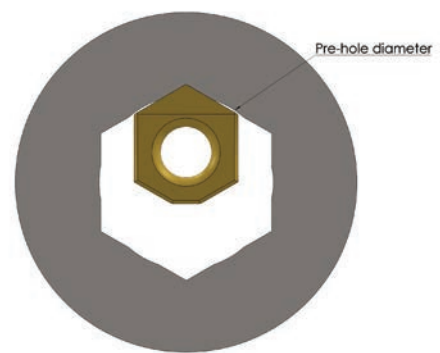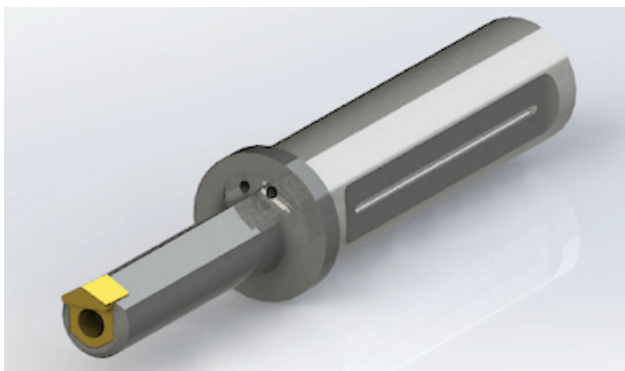
TOOLS FOR HEXAGON
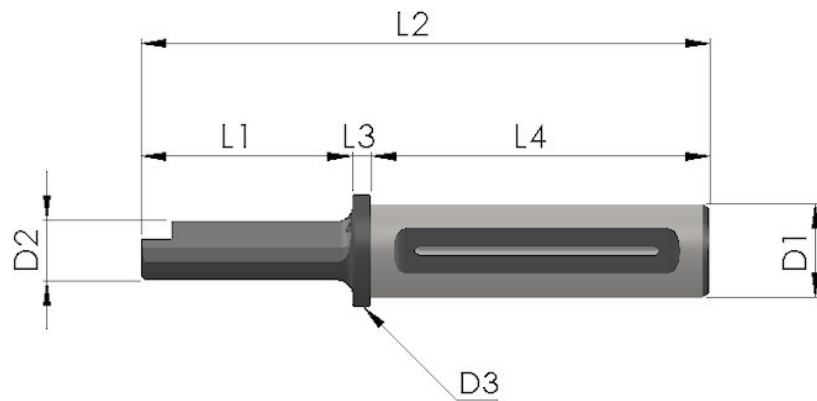
CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	D1 (mm)	D2 (mm)	D3 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UT-HEX-9/11-25	30	129	9	90	25	8	30	PN-1	T08	VN-1	9	388
UT-HEX-9/11-32	30	139	9	100	32	8	38	PN-1	T08	VN-1	9	673
UT-HEX-11/17-25	40	139	9	90	25	10	30	PN-1	T08	VN-1	11	368
UT-HEX-11/17-32	40	149	9	100	32	10	38	PN-1	T08	VN-1	11	672
UT-HEX-17/28-25	56	155	9	90	25	15	30	PN-2	T15	VN-2	17	647
UT-HEX-17/28-32	56	165	9	100	32	15	38	PN-2	T15	VN-2	17	935
UT-HEX-28/37-25	86	185	9	90	25	25	30	PN-3	T20	VN-3	28	1,39
UT-HEX-28/37-32	86	195	9	100	32	25	38	PN-3	T20	VN-3	28	1,157
UT-HEX-37/45-25	126	225	9	90	25	35	45	PN-4	T20	VN-3	37	1,49
UT-HEX-37/45-32	126	235	9	100	32	35	45	PN-4	T20	VN-3	37	1,85
UT-HEX-45/70-32	140	249	9	100	32	40	45	PN-5	BRUG 5	VN-4	45	1,95

INSERTS FOR HEXAGON
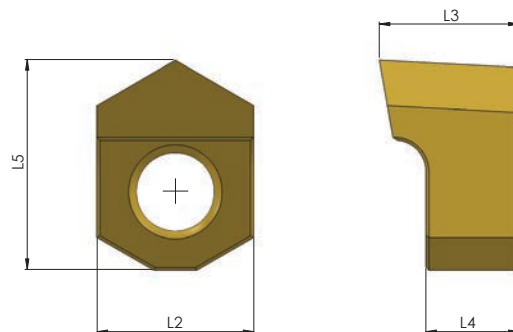
| CODE	Working range (mm)	Working range (inches)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	Tool	Resharpener
IN-HEX-9/11	9mm/11mm	0,354/0,433	6	7	5	7,5	UT-HEX-9/11	RF-1
IN-HEX-11/17	11mm/17mm	0,433/0,669	6	7	5	8	UT-HEX-11/17	RF-1
IN-HEX-17/28	17mm/28mm	0,669/1,102	10	9	6	13,5	UT-HEX-17/28	RF-2
IN-HEX-28/37	28mm/37mm	1,102/1,456	13	14	10	18,5	UT-HEX-28/37	RF-3
IN-HEX-37/45	37mm/45mm	1,456/1,771	18	14	10	22	UT-HEX-37/45	RF-4
IN-HEX-45/70	45mm/70mm	1,771/2,755	26	16	10	30	UT-HEX-45/70	RF-5

TOOLS FOR SPLINED PROFILES

■ The new UTS tool line was designed to make splined internal profiles.

The choice of tool is determined by the minimum entry hole of the workpiece to be machined. In fact, we recommend purchasing a tool with a diameter (D2) as close to the value of said hole as possible, as shown in the table.

It is also possible to make special tools in various diameters and sizes based on specific customer needs.

Inserts used on the UTS tool line for splined profiles are all considered special: they are not in stock; rather they are manufactured specifically for the customer based on the type of machining required.
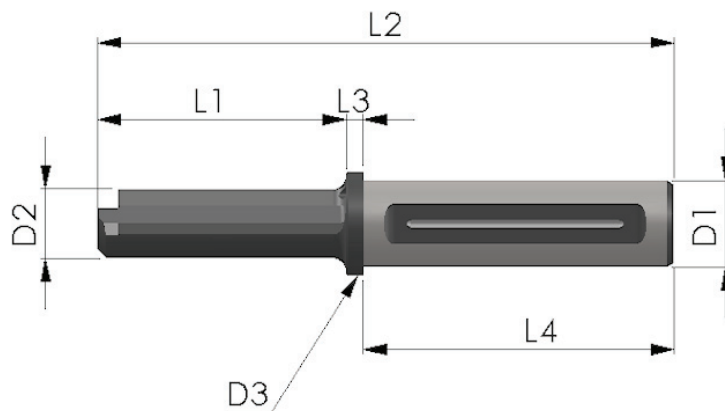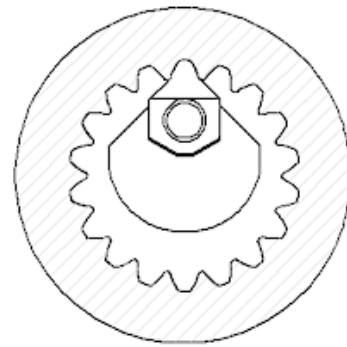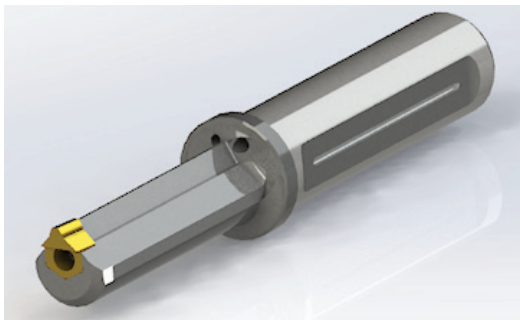
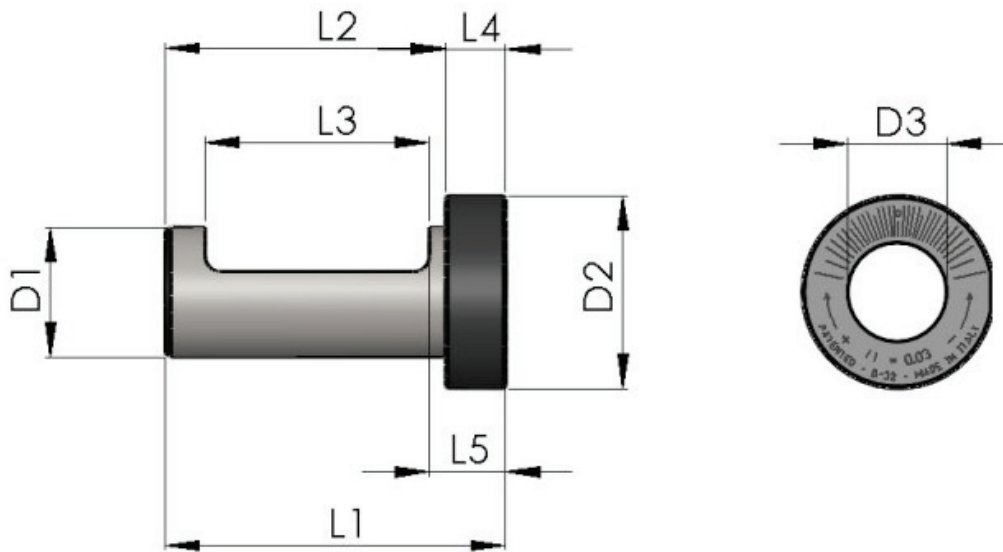| CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	D1 (mm)	D2 (mm)	D3 (mm)	Aligner	Screwdriver	Clamping screw	Minimum hole (mm)	Weight (g)
UTS-02-25	25	124	9	90	25	6,5	30	PN-0	T08	VN-1	7	382
UTS-02-32	25	134	9	100	32	6,5	37	PN-0	T08	VN-1	7	600
UTS-03-25	30	129	9	90	25	8	30	PN-1	T08	VN-1	8,5	368
UTS-03-32	30	139	9	100	32	8	37	PN-1	T08	VN-1	8,5	673
UTS-04-25	40	139	9	90	25	10	30	PN-1	T08	VN-1	10,5	368
UTS-04-32	40	149	9	100	32	10	37	PN-1	T08	VN-1	10,5	672
UTS-05-25	46	145	9	90	25	12	30	PN-1	T08	VN-1	12,5	382
UTS-05-32	46	155	9	100	32	12	37	PN-1	T08	VN-1	12,5	698
UTS-06-25	56	155	9	90	25	16	30	PN-2	T15	VN-2	16,5	428
UTS-06-32	56	165	9	100	32	16	37	PN-2	T15	VN-2	16,5	725
UTS-08-25	68	162	9	90	25	20	30	PN-2	T15	VN-2	21	488
UTS-08-32	68	172	9	100	32	20	37	PN-2	T15	VN-2	21	820
UTS-10-25	86	185	9	90	25	25	30	PN-3	T20	VN-3	28	647
UTS-10-32	86	195	9	100	32	25	37	PN-3	T20	VN-3	28	935
UTS-12-25	102	203	9	90	25	30	30	PN-3	T20	VN-3	33	824
UTS-12-32	102	213	9	100	32	30	37	PN-3	T20	VN-3	33	1157
UTS-14/16-25	126	221	9	90	25	35	37	PN-4	T20	VN-3	38	1211
UTS-14/16-32	126	231	9	100	32	35	37	PN-4	T20	VN-3	38	1490
UTS-18/25-32	140	249	9	100	32	40	45	PN-5	BRUG.5	VN-4	42	1903

ACCESSORIES

BUSHINGS FOR LATHES

The eccentric bushing for the REV BROACHING TOOL is an essential accessory for any lathe that is not equipped with a Y axis. In fact, this bushing can be used to correct any alignment error that may occur during broaching and slotting.

It is made with tool steel which is hardened and ground. Its range of operation is between 0,5 mm Y+ and 0,5 mm Y-.

The eccentric bushing is manufactured in various sizes for use on all types of machines available on the market.


BUSHINGS FOR LATHES (mm)

CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	D1 (mm)	D2 (mm)	D3 (mm)	Weight (g)
B-32	85	70	58	15	20	32 H7	48	25	300
B-40	95	80	66	15	20	40 H7	55	32	400
B-50	115	100	75	15	20	50 H7	65	32	1000
B-60	115	100	75	15	20	60 H7	80	32	1600
B-32 VDI	65	50	38	15	20	32 H7	48	25	280
B-40 VDI	80	65	51	15	20	40 H7	55	32	360
B-50 VDI	95	80	55	15	20	50 H7	65	32	850
B-60 VDI	105	80	65	15	20	60 H7	80	32	1500

BUSHINGS FOR LATHES (inches)

CODE	L1 (inches)	L2 (inches)	L3 (inches)	L4 (inches)	L5 (inches)	D1 (inches)	D2 (inches)	D3 (inches)	Weight (g)
B-1-1/4"	3,346	2,756	2,283	0,591	0,787	1,250	2,165	0,984	300
B-1-1/2"	3,740	3,150	2,598	0,591	0,787	1,500	2,165	1,260	329
B-2"	4,528	3,937	2,953	0,591	0,787	2,000	2,559	1,260	978
B-1-1/4"-VDI	2,559	1,969	1,496	0,591	0,787	1,250	2,165	0,984	267
B-1-1/2"-VDI	3,150	2,559	2,008	0,591	0,787	1,500	2,165	1,260	329
B-2"-VDI	3,740	3,150	2,165	0,591	0,787	2,000	2,559	1,260	871

ALIGNERS FOR MILLING MACHINES

■ **A**ligners for broaching or slotting are used on machining centres or milling machines to achieve correct tool assembly. They screw on in place of the insert and, thanks to their shape featuring a straight surface, using a simple gauge or comparator, they make it possible to attach the broaching tool correctly with respect to the reference axes of the workpiece.
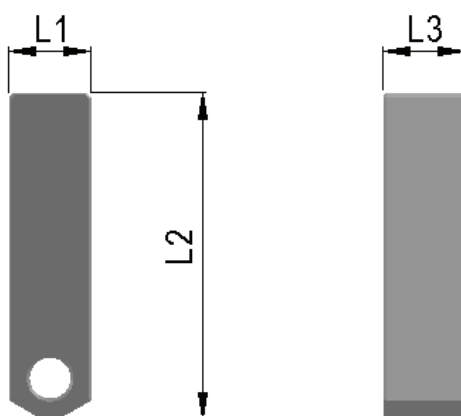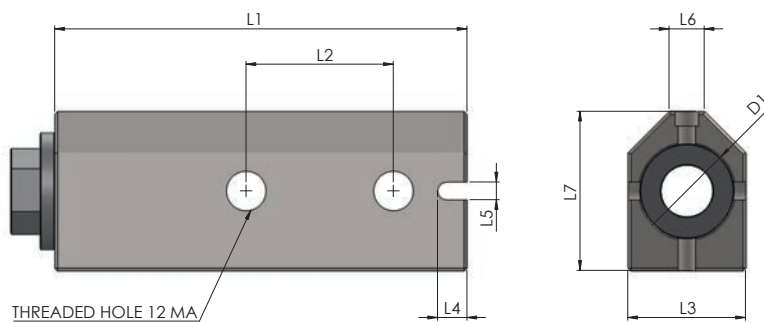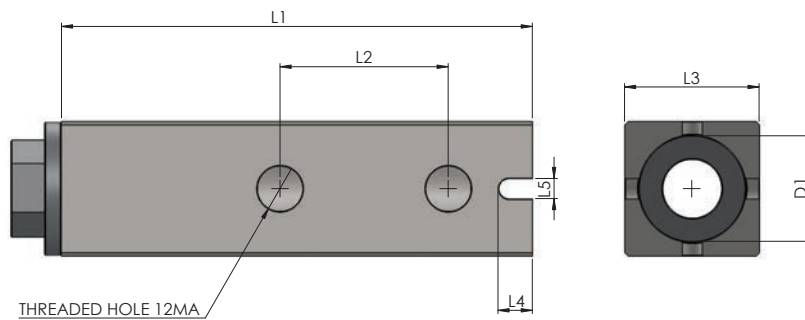
CODE	L1 (mm)	L2 (mm)	L3 (mm)	Tools
PN-0	5	50	6	UT-02
PN-1	6,08	50	8	UT-03/UT-04/UT-05
PN-2	10,08	50	8	UT-06/UT-08
PN-3	13,1	60	10	UT-10/UT-12
PN-4	18	70	10	UT-14/16
PN-5	26	70	10	UT-18/25

ADAPTERS FOR SLOTTERS

■ **T**he square and prismatic adapters are equipped with two threaded holes where the two M12x8 flat point grub screws are inserted and used to clamp the tool to the inside of the said adapters. The timing pin guarantees a perfect position of the tool in relation to the work axis.
Both the square and prismatic adapters are available in two measurements: with a hole diameter of 25 mm and another measuring 32 mm.
REV offers the solution of clamping the tool on with an adapter; however, this is only one of the many ways it is possible to set up the REV Broaching Tool on slotting and shaping machines.

| CODE	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	L7 (mm)	D1 (mm)	Weight (g)
AD-35	140	40	35	10	6	/	/	25	500
AD-40	140	50	40	10	6	/	/	32	600
AD-50	170	50	50	10	6	/	/	32	2200
ADP-35	140	40	35	10	6	10	41,5	25	600
ADP-40	140	50	40	10	6	10	50	32	700

RESHARPENERS

■ **U**sing re-sharpening rods the inserts can be re-sharpened using a standard grinding wheel. When the broached or slotted surface starts getting rough due to prolonged insert use, it will require re-sharpening.

In order to do so, unscrew the insert from the broaching machine and screw it onto the re-sharpening rod. Next, place the insert near the grinding wheel, maintaining the original inclination and, then, remove the worn material. It is important to remember that only the cutting surface must be screwed on. The re-sharpening rod has a comfortable grip and ensures that the insert protrudes from the rod making sharpening easier to perform.

This accessory is available in 6 types: RF-0 to resharpen the 2mm inserts, RF-1 to resharpen the inserts 3-4-5 mm, RF-2 to resharpen the 6-8 mm inserts, RF-3 to resharpen the 10-12 mm inserts, RF-4 to resharpen the 14-16 mm inserts, RF-5 to resharpen the 18-25 mm inserts.
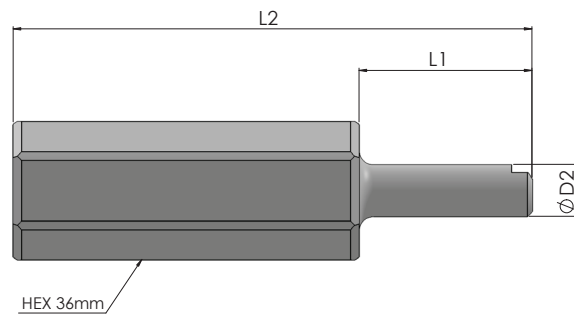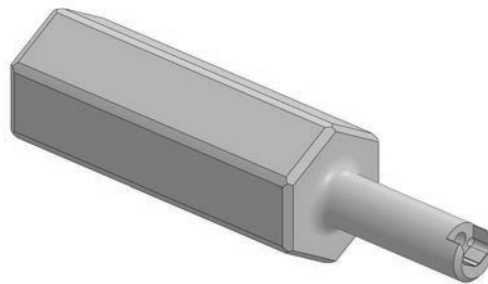
CODE	L1 (mm)	L2 (mm)	D2 (mm)
RF-0	50	150	10
RF-1	50	150	12
RF-2	50	150	15
RF-3	50	150	20
RF-4	50	150	25
RF-5	50	150	32

SCREWS WITH SPHERICAL ENDS

■ The boring bar hatch clamping screws with spherical ends are required to attach the unit comprised of REV BROACHING TOOL and eccentric bushing perfectly to the CNC lathe. Also, whenever it is necessary to correct any keyway alignment error, these screws hold the tool in the work position, making it much easier to adjust the eccentric bushing.

Six categories of them are kept in stock, from the smallest size called BU-1, which is equivalent to M6x15, to the largest one called BU-6, equivalent to M16x30. The hardness of the spring varies in relation to screw size.

Before making a purchase it is necessary to check exactly which type of screw is suitable for the boring bar hatch provided with the machine tool.

SCREWS WITH SPHERICAL ENDS (mm)

CODE	Type	Lenght (mm)
BU-1	6MA	15
BU-2	8MA	20
BU-3	10MA	20
BU-4	12MA	25
BU-5	14MA	25
BU-6	16MA	30

SCREWS WITH SPHERICAL ENDS (inches)

CODE	Type	Lenght (inches)
BU-7	UNC 5/16"-18	37/64"
BU-8	UNC 3/8"-16	5/8"
BU-9	UNC 1/2"-13	3/4"
BU-10	UNC 5/8"-11	36/64"

SCREWS FOR FIXING INSERTS

■ The clamping screws are required to clamp the inserts onto the REV BROACHING TOOL head and are all made with quenched and tempered steel, which is then tempered and burnished.

They are available in three torx sizes and one Allen size (VN-4) M8x16.

| CODE	Type	Sizes
VN-1	TORX	M2,5 X 8
VN-2	TORX	M4 X 10
VN-3	TORX	M6 X 15
VN-4	TCEI	M8 X 16

SCREWDRIVERS

■ **T**he screwdrivers are used for the fixing of the insert onto the REV BROACHING TOOL head.
They are available in three torx sizes and one Allen size 5 mm.

CODE	Type	Hex
T08	TORX	8
T15	TORX	15
T20	TORX	20
HEXAGONAL WRENCH 5	HEX WRENCH FOR TCEI SCREW	5

TOOL CARRIER BASES

■ The tool-carrier bases are metal structures with a 3 mm thickness, which represent an excellent solution for keeping REV tools in order on the machine. The tool-carrier bases come in two sub-categories: there are bases identified by the prefix ST-CNC which are used to organise tools for CNC lathes or CNC machining centres and also have a hole to fit the eccentric bushing (see image on left hand side), and other bases identified by prefix ST-SLO which are used for slotting machines tools and also have a hole to house the square or prismatic adapter (see image on right hand side).
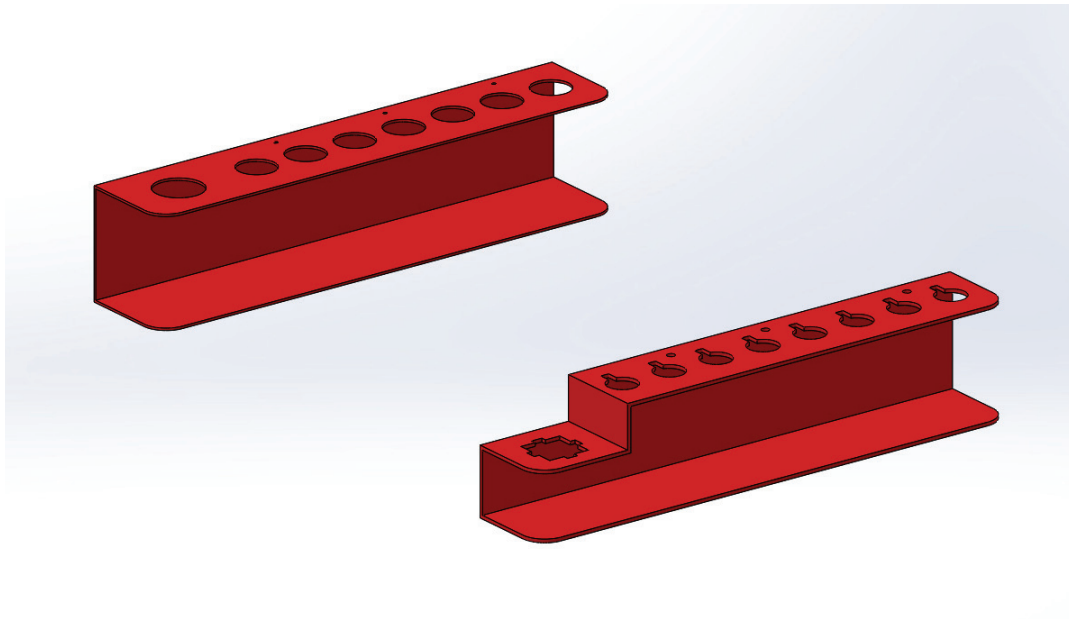
CODE	Number of housed rods	Tools housing hole diameter (mm)	Tool carrier housing hole shape
ST-CNC-1	7	25	B-32
ST-CNC-2	7	32	B-40
ST-CNC-3	7	25	B-50
ST-CNC-4	7	32	B-60
ST-CNC-5	7	25	B-1"1/4
ST-CNC-6	7	32	B-1"1/2
ST-CNC-7	7	32	B-2"
ST-SLO-1	5	25	AD-35 O ADP-35
ST-SLO-2	8	25	AD-35 O ADP-35
ST-SLO-3	5	32	AD-40 O ADP-40
ST-SLO-4	8	32	AD-40 O ADP-40
ST-SLO-5	8	32	AD-50

THE REVOLUTIONARY TOOLING SYSTEM

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