M

CT 12000 – Drill measurement
The measuring station for long drills

The larger CT-12000 version is available as a supplement for the CT-6000. One of the reasons for a second model is the 250 mm Y-axis measuring system. This model is ideal for step drills with lengths over 50 mm or similar geometries.

The holding V-block can be rotated 240° on the base plate. Fitted with a stop on the rear, drills or parts with similar geometry can be mounted in a reproducible manner. The V-block is open at the rear and can be easily positioned and locked using a knurled thumb screw. The system is also available equipped with an optional precision chuck from Röhm. Simple change-over by simply replacing the V-block with the chuck with angle mount allows quick positioning.

As with the preceding CT-9000 system the incremental zoom system in the 12000 series is mounted on an XY measurement table and fitted with 50 mm Mitutujo Digimatic dial gauge for the Z-axis. Both measuring systems can be read out to the Metric MT measuring software via an interface.

A trapezoidal threaded spindle with hand wheel allows the entire optical unit to be moved vertical on the precision guide. The length measuring system is integrated into the guide unit.

A 50 Watt Xenon light source with 10° slit ring light and diffuser guarantee excellent image quality. A parallel illumination unit, which is required as a "bottom light" for measuring thread taps, can be retrofitted on the side of the positioning V-block.

In order to ensure a safe measuring process, the CT-12000 is also available with a motorised zoom system. The zoom levels are not manually selected, but rather using the measuring software.

Optional accessories for CT–12000

Measurement of small cutters and drills in the V-block can be somewhat arduous when the objects to be measures are turned into the cross-hairs in combination with cross-hair measurements. For such applications, two mounts are offered as optional accessories for drill bit measuring stations.

CT–ADP–Röhm

The V-block is replaced by a mounting device for a Röhm chuck (ZG dia. 80 – ID 146 195 – for up to 19.5 mm) on the motion carriage and arrested at the bottom with a knurled screw. The Röhm chuck is also available with the holding device, if required.

CT–ADP–Concentricity

As an alternative we offer an adapter plate for the Concentricity Pro from Rollomatic. Here it is also only necessary to fasten the adapter plate to the motion carriage using two Allen screws. The Concentricity Pro allows the specimen to be positioned very precisely, however, is only practical for smaller objects. The Concentricity Pro is also available with the holding device, if required.
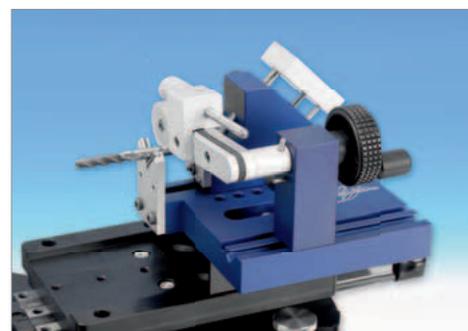
CT–ADP–PPL–B

Measuring the edges of the diameter or the thread pitch with top light or diffuse bottom light presents problems. On rotationally symmetrical objects no distinct edges are obtained, or, expressed differently: The light "creeps" around the edges reducing the diameter of the specimen in the image. For such measuring tasks we use a parallel bottom light to prevent such problems. A blue LED is used, because blue has the lower deflection.

The CV-LPW-B parallel bottom light is available in a special housing which can attached simply on the motion carriage and arrested with a knurled screw. The set includes a special power pack which allows very precise adjustment of the brightness.

| Order no.	Decription	Price excl. VAT
CT–12000	**System price with Metric MT** (Free updates via Internet download)	
Delivery	Incl. packaging, freight charges see **www.m–service.de**	
Payment:	30 days, net	

Prices for option accessory CT-12000

Order no.	Decription	Price excl. VAT
CT–ADP Röhm	Holder for Röhm chuck # 146 195	1,320.00 €
CT Röhm 146 195	Röhm three jaw chuck	550.00 €
CT–ADP Concentricity	Holder for Rollomatic Concentricity Pro	290.00 €
CT–Concentricity Pro	Rollomatic Concentricity Pro	1,150.00 €
CT–ADP–PPL–8	Parallel illumination with housing for CT	1,960.00 €
CT–NAV–MOT	Additional cost for motorised zoom system	2,315.00 €
CT–Service	1 day service assignment incl. travel costs (FRG)	750.00 €
Delivery	Incl. packaging, freight charges see **www.m–service.de**	
Payment:	30 days, net	

Metric MT measuring software

In addition to the various standard functions such as distance, radii and angles, surfaces and diameter and DFX overlay, a range of special measuring functions has been programmed for the Metric software for the CT-6000 and CT-12000.

Lip angle
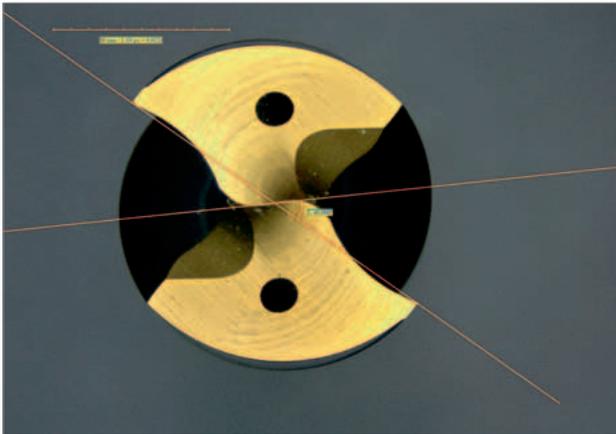
By setting two points on the outer edge of the drill point, a continuous line is automatically created, as well as a revolving line which is fixed in the centre. Depending on which side of the rotating line the cursor is used, the angle changes from $0°$ to $180°$ or $180°$ to $0°$.

Lip angle

By setting two points on one of the cutting edges, a parallel line is automatically created, from which a line is drawn to the second cutting edge with the help of the cursor. Using the option 'Object Properties', a centre line can be superimposed to mark the centre. The result is displayed immediately.

Angle in circle
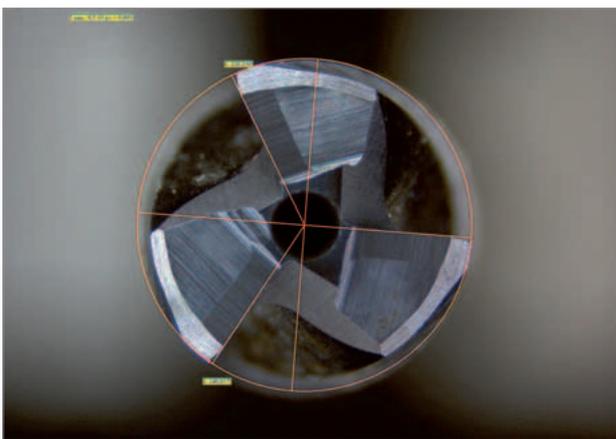
In order to avoid the time-consuming screwing of the cutter or drill in a zero position of a crosshair, this function has been programmed. Four points on the outer edge of the cutter are set (for an object with three cutters, points are set on the last of the third and fourth cutters). A circle is then automatically generated. By right-clicking on a selected edge, the zero position is marked. The other cutting edges are then marked with the cursor (left-click) and the angles are automatically calculated in relation to the zero position selected.
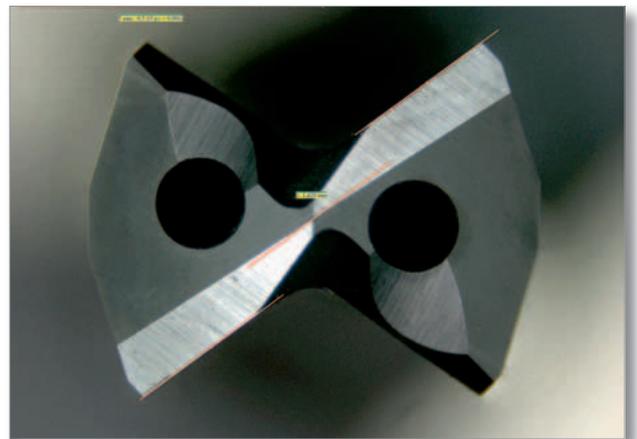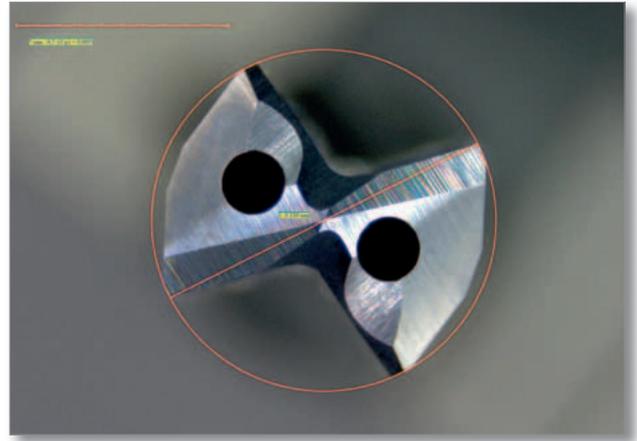
Point to point distance with auxiliary circle

Normally the diameters are measured with three or more points. However, given that with spiral drills, for instance, it is not possible to set three outer points, the diameter is automatically calculated using two outer points in this function, as in a distance measurement.
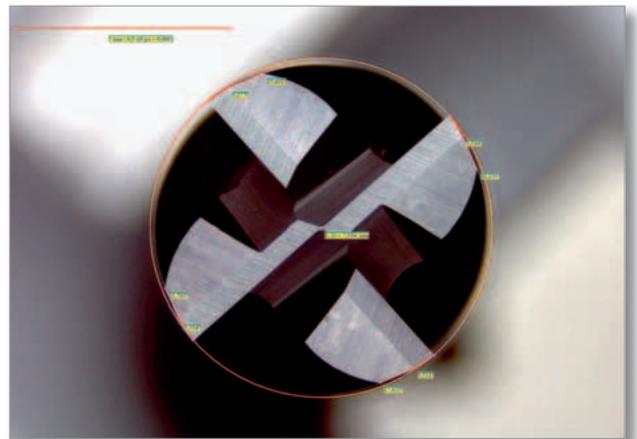
Radial clearance angle I

Using the cursor, a point is set at the outer tip of each cutting edge. By right-clicking with the mouse, a circle is automatically created. In order to mark the corresponding clearance angle or measuring point (left-click), the user must start with the first point set. The results are automatically displayed after the last point has been marked on the screen. The software saves the number of set points on the cutting edge tips before creating the circle. Reference lines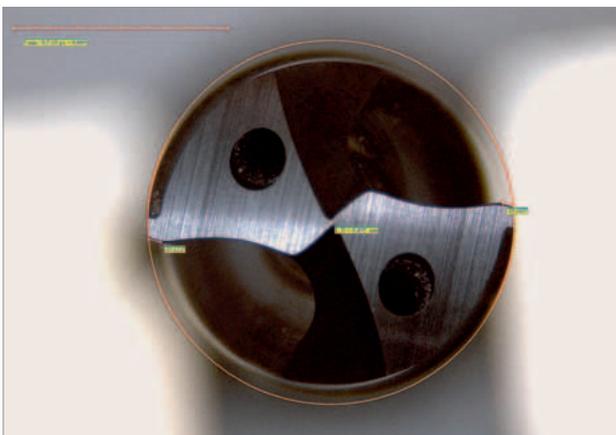 required to calculate the clearance angle are created automatically by Metric in the background. However, these are not displayed in order to avoid unnecessary graphical representations in the image documentation.

Radial clearance angle I and II

The measurement is identical to radial clearance angle I measuring function. Nevertheless, after marking the clearance angle I, clearance angle II must be clicked upon before the next cutter can be measured. After completing all measuring points, the results are displayed automatically.

Chip angle

Using the cursor, a point is set at the outer tip of each cutting edge. By right-clicking with the mouse, a circle is automatically created. In order to mark the corresponding chip angle or measuring point (left-click), the user must start with the first point set. The results are automatically displayed after the last point has been marked on the screen. The software saves the number of set points on the cutting edge tips before creating the circle. Reference lines required for calculating the chip angle are created automatically by Metric in the background, although these are not displayed in order to avoid unnecessary graphical representations in the image or Excel documentation.

Chip angle and radial clearance angle I

This measurement is identical to the measuring function for the chip angle. Nevertheless, after marking the chip angle, clearance angle I must be clicked upon before measuring the next cutter. After completing all measuring points, the results are displayed automatically.
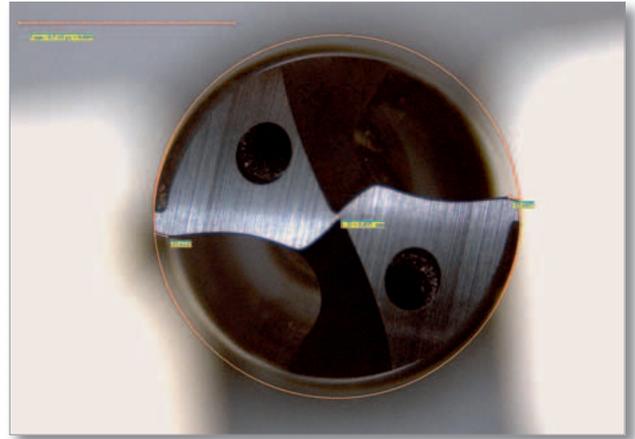

Chip angle and radial clearance angle I and II
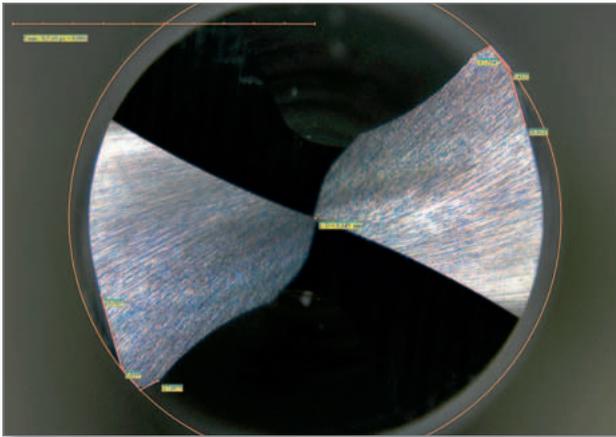
This measurement is identical to the measuring function for the chip angle. Nevertheless, after marking the chip angle, clearance angles me and II must be clicked upon before measuring the next cutter. After completing all measuring points, the results are displayed automatically.

IMPORTANT NOTE ON MEASURING ACCURACY

Clearance angles I and II, as well as the chip angle, can only be measured with high precision if the measuring points are greatly enlarged. Given that the field of vision is naturally very small, the dial gauges and XY coordinate read-out are used. Measurements should be carried out at least with click stop five to six. By using the measuring tables and position value read-outs, accurate measuring is enabled.
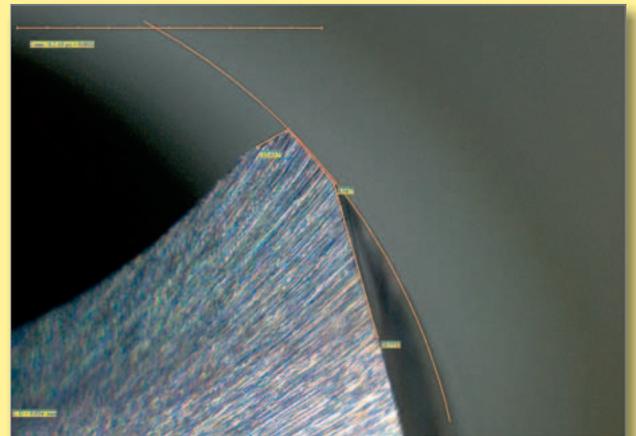

RC (radius centre) measurement
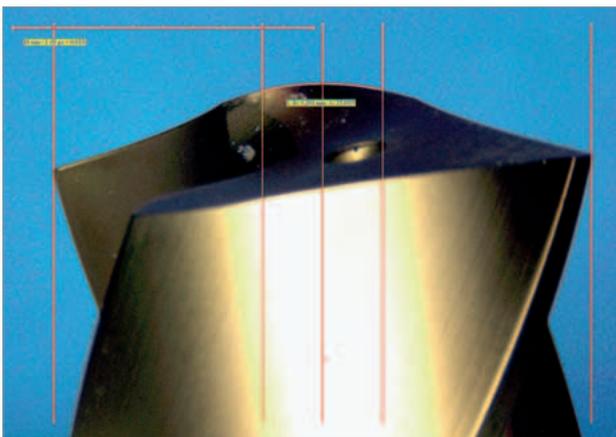
This special function has been programmed to determine a radius in a defined area on the drill tip, providing that a nominal size has been specified. A point is marked at each of the outer edges of the drill. A command window opens automatically, in which the measuring area of the radius is entered. Three vertical lines are created immediately. Now the intersection points are clicked upon on the left line, then the right line and finally, the middle line and the result is entered immediately on the screen. The radius and angle are displayed as a result.

The point angle can be measured using the four-point angle standard function. Four measuring points are marked along the two lines and the result is automatically entered by right clicking on the mouse. Measuring the point angle on three-sided cutters is carried out with the help of the function 'Crosshairs, simple and rotatable'.
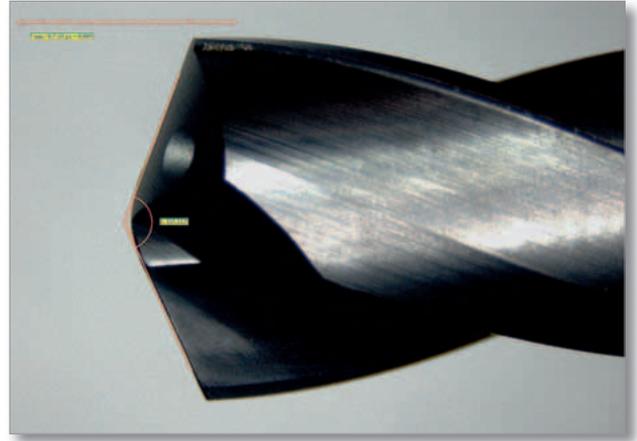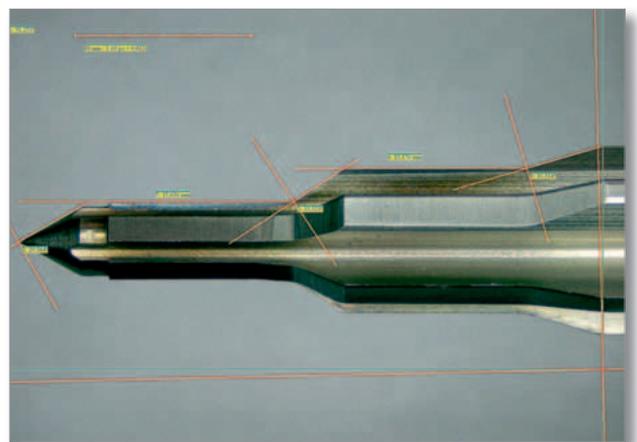
Crosshairs, simple and rotatable
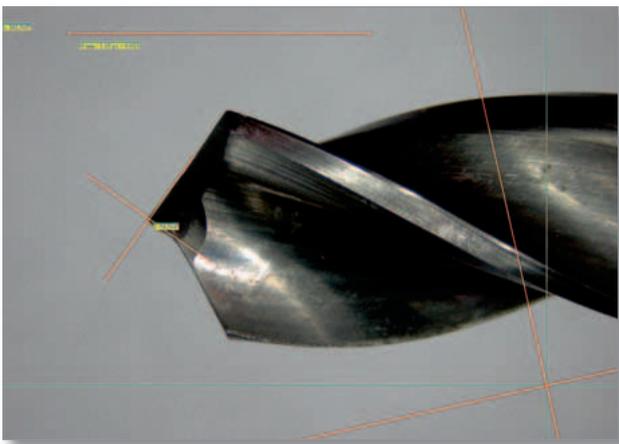
Generally, this function has been programmed for quick measuring or comparison of angles on tools. As shown here, the point angle on a drill with three cutters should be measured. The blue crosshair can be moved in the x and y axis. The red crosshair can be rotated in the axis of rotation. After screwing in the drill, the centre of the crosshair is positioned precisely on the tip. The rotatable crosshair is not positioned on the cutting edge. By right-clicking with the mouse and clicking on 'Add object', the angle value with the corresponding crosshair is represented on the screen.

Crosshairs, simple and rotatable

In order to combine the distance measurements of a step drill with the evaluation of an angle, the function is used with the XY display in the Metric program. The first intersection is initiated with the blue crosshair, the XY display is set to zero. The angle is then set and entered via 'Add object'. The measuring table is moved on to the second intersection. In the 'Table position' window, the length value is transferred to the Excel table by pressing the button 'Add object'. Then set the angle again, position to zero and proceed to the next measuring point. This simple and rapid measuring process makes the evaluation of step drills significantly easier. For the drill measuring station CT-6000, evaluation is limited to 50 mm. The CT-12000 can evaluate up to 300 mm in length.
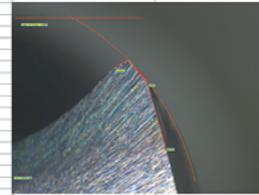
Tolerance rings
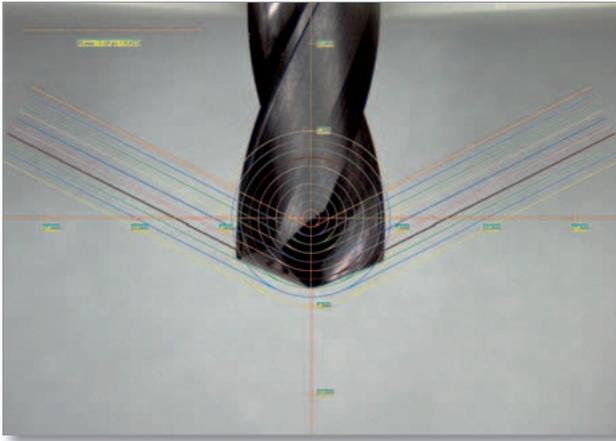
Another standard Metric software function involves the tolerance rings. Up to twelve rings can be constructed in a range of colours and sizes. These can in turn be combined with the adjustable subsidiary lines in the angle. Crosshairs and dimensioning aids can be shown or hidden. The adjustable tolerance rings can also be saved as tables (masks) in any amount.

Documentation of measured values

Once the measurements have been completed, press the Excel button to transmit all measured values and a scaled image to an Excel log file. During the first transmission, a window opens automatically to give the Excel table a name. By default, every time the Excel button is pressed, Metric transmits an image and all corresponding measurement values. However the program options also allow line for line transfer to an Excel sheet. However in this case only the first image created is entered. Using the keywords in table 1, the user can create an Excel log file as desired (graph. representation). Aids such as file path pre-setting are also integrated in Metric.

CT–9000 – for measuring cooling channels

CT–6000 – The version for small drills