

STEPS OF CALIBRATION OF TOOL SETTERS ON LATHES EQUIPPED WITH NCT 201/204/304 CONTROL



After levelling following installation of the machine and after servicing affecting the machine geometry, the tool setter arm used on lathes must be calibrated before first use so that it measure accurate values.

The positions of the stylus calibrated are stored in system parameters in the control. The parameters can be found in the **SERVICE / PARAMETERS / COORDINATES** (SZERVIZ/PARAMÉTEREK/COORDINATES) group.

- N0205 XN Contact Position S the tool moves from the outer diameter in the direction X–
- N0206 XP Contact Position S1 the tool moves from the inner diameter in the direction X+
- N0209 ZN Contact Position S1 the tool moves from the tailstock in the direction Z–
- N0210 ZP Contact Position S1 the tool moves from the chuck in the direction Z+

Paraméterek						×	⊿7
N0003 Channel Name N0004 Nr. of Interface Cards	^				Érték másolása		
N0005 NC cycle time		N0205 XN C	ontact Po	sition S1			[mm]
• N0100 Axis Config		Name	Machine	User			
NO200 Coordinates							
NO201 Reference Position1		L1-Lathe	0				
N0202 Reference Position3							
N0203 Reference Position4							
NO204 Distance of DTP							
-N0205 XN Contact Position S1	- 1						
- N0206 XP Contact Position S1							
- NO207 YN Contact Position S1							
NO208 TP Contact Position S1							
N0211 XN Contact Position S2							
NO212 XP Contact Position S2							
- NO213 YN Contact Position S2							
NO214 YP Contact Position S2							
- NO215 ZN Contact Position S2							
NU216 ZP CONTACT POSITION S2							
NO300 Feedrate	· 🗸						
< >>							
N0205 Min: -1.79769313486232E+308	Мах	: 1.79769313	486232E+	-308 [Futás időben]		

Figure 1 Contact position parameters

Before calibration the parameters must be zeroed. If they have any value, it is advisable to record it first. Modification of the parameters is possible only in the mode **EDIT** (SZERKESZT)

During calibration, a manual tool setting carried out by turning is compared with an automatic tool setting carried out on the same tool.



Steps of the manual calibration

- In **JOG** mode, turn a measurable clear diameter and measure it by the use of a micrometer or a digital calliper. After turning, move from the surface only in the direction Z!
- Enter the menu item OFFSETS[F7] / MEASUREMENT [F1] / COMPENSATION MEASUREMENT [F2] (ELTOLÁSOK [F7] / BEMÉRÉS [F1] / KORREKCIÓ BEMÉRÉS [F2]).

Eltolások - Korrekc	ió-bemérés				×	2			
G	épi pozíció:		†	Be					
øX	0.0	000mm	øΧ		0.0000mm				
Z	0.0	000mm	Z		0.0000	mm			
W	0.0	000mm	W		0.0000	mm			
G5	3	Sz korrekció: 1			Kopás korr.:	1			
Nullpont	eltolás:	Geo	ometria		Kopás				
N1 🔶 Q=	•0	R 0.0000mm			0.0000mm				
øΧ	0.0000mm	øX 0.0000mm			0.0000mm				
Z	0.0000mm	Z	0.00	000 mm	0.0000mm				
W	0.0000mm								

Figure 2 The window Offsets / compensation measurement

- Zero point offset: by double clicking on it open the zero points, and then select the G53.
- T compensation (Sz korrekció): When automatic tool setting arm is used for measurement, the control saves the tool compensation into that compensation the number of which is equal to number of the tool post in each case. So, in the case of T0202, the X and Z geometric values of the tool will be stored in the compensation cell 02. Therefore, in the case of manual measurement, it is advisable during calibration to save the tool T0202 into the compensation fields 01 or 02.
- Click twice on the field X under the Measuring position (Bemérési Pozíció), enter the value measured by micrometer, and then confirm it by ENTER.
- For measuring 'Z', use a raporter (gauge block).
- Move the tool to the plane of the chuck, and place the raporter between the tool and the surface of the chuck (see the following figure).



Figure 3 Manual measurement using a raporter

• Click twice on the field Z under the Measuring position (Bemérési Pozíció), enter the raporter dimension (e.g. 50) after the Z, and then confirm it by ENTER.

STEPS OF CALIBRATION OF TOOL SETTERS ON LATHES EQUIPPED WITH NCT 201/204/304 CONTROL



• As a consequence, a value has been stored in the cell 1 in the tool compensation memory, in the fields X and Z of the column **GEOMETRY** (GEOMETRIA) – THE MANUAL SETTING IS DONE!

Eszterga I. szerszámkorrekciós tábla											× 2
[mm]	ØX geometria	ØX	Z geometria	Z ko	R g	R kopás	Q ér	lrány	Típus	Altípus	Szélesség ^
N1	-130.4600	0.0000	-346.5700	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N3	0.0000	0.0000	0.0000	0.0000	0.4000	0.0000	3	Axiális	Nincs	0	0.0000
N4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N11	0.0000	0.0000	0.0000	0.0000	0.8000	0.0000	2	Axiális	Nincs	0	0.0000
N12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000 🗸
Harás (NI)	<										>
ogras (N).											



Steps of the calibration by the use of the tool setting arm

- Zeroize the parameters Contact Position.
- Turn out the automatic setting arm (if the workpiece is in the way, remove it from the chuck). With turning out the arm, the OFFSETS / SETTING (ELTOLÁSOK / BEMÉRÉS) window pops up automatically.
- The feed rate is automatically reduced so that it is not possible to run into the arm.
- Using the handwheel or the buttons moving the axes, approach the upper probe head approx. to 5 mm.



Figure 5 Automatic tool setting in the direction X negative

 Zero point offset: by double clicking on it open the zero points, and then select the G53; newer controls do this automatically.



STEPS OF CALIBRATION OF TOOL SETTERS ON LATHES EQUIPPED WITH NCT 201/204/304 CONTROL

• In Jog mode, carry out setting by the use of the buttons moving the axes. Since the outer

diameter is being measured, using the button $\begin{bmatrix} -X \end{bmatrix}$ keep moving until motion stops; at this moment the geometric value of X will be entered automatically.

- Using the axis moving button [+X], leave the probe head.
- Move to the probe head facing to the tailstock.



Figure 5 Automatic tool setting in the direction Z negative

Carry out setting by the use of the buttons moving the axes. Since the Z position on the side of the tailstock is being measured, using the button -Z keep moving until

motion stops; at this moment the geometric value of Z will be entered automatically.

- Using the axis moving button [+Z], leave the probe head.
- As a consequence, a value has been stored in the cell 2 in the tool compensation memory, in the fields X and Z of the column GEOMETRY (GEOMETRIA) – THE AUTOMATIC SETTING IS DONE!

Eszterga I. :	szerszámkorrekciós tá	bla									× 2
[mm]	ØX geometria	ØX	Z geometria	Z ko	R g	R kopás	Q ér	lrány	Típus	Altípus	Szélesség 🏾
N1	-130.4600	0.0000	-346.5700	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N2	-114.4600	0.0000	-296.5700	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N3	0.0000	0.0000	0.0000	0.0000	0.4000	0.0000	3	Axiális	Nincs	0	0.0000
N4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N11	0.0000	0.0000	0.0000	0.0000	0.8000	0.0000	2	Axiális	Nincs	0	0.0000
N12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
N14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	Axiális	Nincs	0	0.0000
	<										>

Figure 7 Data of the N2 line created after automatic tool setting



Calculating and entering the Contact Position parameters

In the previous steps two probe heads have been measured, thus two parameters can be filled in, namely the XN Contact Position S1 and the ZN Contact Position S1.

XN Contact Position S1= ((N2 Geometria X - N1 Geometria X) / 2)

ZN Contact Position S1= (N2 Geometria Z – N1 Geometria Z)

e.g.: N1 Geom X -130.46

Geom Z -346.57

N2 Geom X -114.46

Geom Z -296.57

XN Contact Position S1= ((-114.46 - (-130.46)) / 2) = 8

ZN Contact Position S1= (-296.57 -(-346.57))*1000 = 50

All numbers must be entered with the correct sign, it is the only way to get realistic values.

Procedure for entering the values

The parameters can only be modified in EDIT (SZERKESZT) Delta mode!

- Enter the **SERVICE [F9] / PARAMETERS [F1]** (SZERVIZ [F9] / PARAMÉTEREK [F1]) menu item.
- In the left-hand side list find the **Coordinates** group, and open it using the [+] mark
- Select the parameter to be modified. Click twice on the value under the column **User** of the right-hand side table, and then overwrite the number being there with the value calculated; confirm it by ENTER.
- After making modifications, click on the button **Save** (Ment) **[F3]** at the lower menu item in order to save the parameters.

Paraméterek				2		×	2				
- N0003 Channel Name ^ - N0004 Nr. of Interface Cards		Érték másolása									
N0005 NC cycle time	N0205 XN	Contact Po	sition S1				[mm]				
NO100 Axis Config	Name	Machine	licor								
NO200 Coordinates	Name	Placinite	U SEI								
N0200 Reference Position1	11-Lathe	8	8								
- N0201 Reference Position2											
- N0202 Reference Position3											
- N0203 Reference Position4											
N0204 Distance of DTP											
-N0205 XN Contact Position S1	•										
N0206 XP Contact Position S1											
- N0207 YN Contact Position S1											
N0208 YP Contact Position S1											
- N0209 ZN Contact Position S1											
- N0210 ZP Contact Position S1											
- NO211 XN Contact Position S2											
N0212 XP Contact Position S2											
- NO213 YN Contact Position S2											
N0214 YP Contact Position S2											
N0215 ZN Contact Position S2											





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Paraméterek						
- N0003 Channel Name - N0004 Nr. of Interface Cards	^				Érték másolása	
N0005 NC cycle time		N0209 ZN C	ontact Po	sition S1		[mm]
N0100 Axis Config		Name	Machine	User		
NU200 Coordinates						
NO200 Reference Position2		L1-Lathe	50	50		
N0202 Reference Position3						
- N0203 Reference Position4						
- N0204 Distance of DTP						
- N0205 XN Contact Position S1						
N0206 XP Contact Position S1						
NU2U/ YN Contact Position S1						
N0209 7N Contact Position S1						
- NO210 ZP Contact Position S1						
- NO211 XN Contact Position S2						
- NO212 XP Contact Position S2						
- NO213 YN Contact Position S2						
N0214 YP Contact Position S2						
NU215 ZN Contact Position S2						
NO217 Polar Into Comp Amount	.					
IN NO300 Feedrate	` _					
< >>						
						_

N0209 Min: -1.79769313486232E+308 Max: 1.79769313486232E+308 [Futás időben]

Figure 9 Modification of the parameter Z negativ Contact

The other two probe head must be calibrated on the basis of the abovementioned way. For calibration of the lower probe head and the probe head on the side of the chuck use a boring bar and a recessing tool, respectively (see the next figure). Important! Pay particular attention to the width of the insert. Since the right side of the insert is touched to the probe head, but its left side was measured at the plane of the chuck using a raporter, therefore, in the case of Manual setting, the width of the insert must be added to the length of the raporter, and this sum must be written for the Z setting position.

For example: If an 50 mm raporter is used and the width of the insert is 5 mm, it is 55 to be written for the Z value after manual setting.



Figure 10 Manual and automatic method of setting the recessing tool

Tool setting

When calibration of all the four sides of the probe is completed, the next step will be the tool setting. For this, turn down the tool setter, and then touch that point of the probe where it is intended to probe the tool. At this moment, the measured value will automatically be written in the tool compensation table. It is important, that a given tool cannot be assigned to another field, i.e. if the tool being at the post 6, the value will be saved in the compensation field 6.