for Touch Probes

Workpiece Measurement

Quickstart
Installation instructions

English

Software	144334
Version	V3A
Control	Brother

Copyright

We always supply the latest software version. If another version is requested, please contact our Service Department / Hotline.

Prior to the start up procedure it is mandatory to check if the parameters and the software range are already used by other programmes. If so, the cycles must be adapted because overwriting of used parameters and data can have unpredictable influence on the machine and could cause damage.
After finishing the installation, the used parameters and the performed changes to programme and machine must be documented.
Blum-Novotest GmbH is not liable for damages to the machine due to programming errors or faulty application of the measuring cycles. Installing the measuring cycles, the mentioned warranty exclusions are accepted.
We reserve the right for technical modifications which improve the product. All suggestions for improvement are gladly accepted.
Decisive for the technical contents is the language version of the manufacturer (DE/EN).
Original operating instructions

Please read the manual carefully first, then start up the measuring system and the measuring cycles!

Order number Software until 03-2018: P03.8000-031.390
Order number Software as from 04-2018: 144334

Content

1. Programmes of the software package

The following table includes the programme overview of the software package.

O8700	MAIN	Main programme
O8701	TOUCH XYZ	Touching of single points and corners
O8702	XY CONTOUR	Touching of contours
O8703	PROTECTED MOVE	Protected traverse path
O8704	MEASURE	Measuring block
O8705	SET WCS	Zero point setting
O8706	SET TOOL	Tool correction
O8707	TOLERANCE	Tolerance control
O8708	PROBE ON/OFF LEVEL	Probe ON/OFF (level-controlled)
O8708	PROBE ON/OFF PULSE	Probe ON/OFF (pulse-controlled)
O8709	CALIBRATION SPHERE	Calibration on sphere
O8710	USERPARATAB	Input of user data
O8711	MESSAGES	Error messages
O8712	CALIB-PARAMETER	Conversion of calibration values
O8713	DM-3-POINTS MAIN	Calculation position diameter with 3 points
O8714	DM-3-POINTS CALCULATION	Calculation results diameter with 3 points
O8715	ANGLE-DISTANCE	Calculation of angles or distances
O8716	DPRNT	Data output via command DPRNT

1.1 Keys

NOTE

indicates measures to prevent material damage.

Information on related literature

Additional advice

WCS Workpiece coordinate system

MCS Machine coordinate system

1.2 Further applicable documents

Control-specific connection diagrams
These are available at Blum-Novotest.

2. Parameter tables

2.1 Call parameter

Call parameter		Description
A	**#1**	The positions in the programme call are interpreted in the active WCS as absolute coordinates and not as distances of the probe ball to the workpiece or traverse path in Z. With A=1. or A=#0 (PROTECTED MOVE), the positions are interpreted as absolute coordinates, with A=0. as relative coordinates.
C	**#3**	Execution of a calibration. C1.: Calibration in Z and XY on the calibration ring C2.: XY-calibration on sphere
D	**#7**	With parameter ***D***, the function "distance-angle" is activated on the second measuring point. With the transferred values >0, the distance of the measuring points will be defined. At the definition of an angle of two measuring points, the parameter ***D*** is transferred as set value of the angle with negative prefix. The value -360. corresponds to a set value of 0°. This function must be activated – see chapter 2.3.
E	**#8**	After measurement, the data of the tool, by which the measuring point was machined, are corrected. The tool number is transferred with parameter ***E***. This function can be used for all measuring points except of the measurement of a corner. Depending on the configuration of the parameters in programme "SET TOOL", either the geometry data or the wear data of the tool will be corrected in the tool memory.
H	**#11**	1st angle for 3-point-probing at bores or pins. The value of the angle must be between 0° < H < 360° – minimum distance between the angles 10°.
I	**#4**	X set position of a centre point or a surface during measurement or in the WCS to be set. If the measured point of the respective axis does not correspond to "0", the appropriate value can be defined with a suitable set value. Example: Set position in X ≠ "0" but "10." instead -> programme call "I10."
J	**#5**	Y set position of a centre point or a surface during measurement or in the WCS to be set. If the measured point of the respective axis does not correspond to "0", the appropriate value can be defined with a suitable set value. Example: Set position in Y ≠ "0" but "10." instead -> programme call "J10."
K	**#6**	Z set position of a surface during measurement or in the WCS to be set. If the measured point of the respective axis does not correspond to "0", the appropriate value can be defined with a suitable set value. Example: Set position in Z ≠ "0" but "10." instead -> programme call "K10."
M	**#13**	As standard, the probe is switched on before each measuring task and switched off afterwards. If several measuring tasks are carried out one after the other, it is expedient to switch on the probe before the initial measurement and switch it off after the last one. To this end, the parameter ***M*** with the correct value must be transferred to each programme call. Parameter ***M*** can be used for programme “MAIN“ as well as for “PROTECTED MOVE“. **M1.** switch on only **M3.** neither switch on nor off **M2.** switch off only Depending on setting of #131.9, the user data are loaded depending on call M1. For further information see chapter 3.4

Call parameter		Description
Q	**#17**	At each measuring block, the probe is traversed for a pre-defined measuring path/distance. To avoid stopping the probe if there is no trigger signal on this measuring distance, the probe is displaced over the expected surface. So to speak the edge is "searched". This distance usually corresponds to the double measuring distance defined in programme O8710(USERPARATAB), in parameter #114 (X,Y). If these values are not suited for a special measuring task the overtravel XY can be transferred with Q. Correction in Z is not possible.
R	**#18**	The safety distance while measuring inside width, inside/outside diameter is 10 mm as standard and it can be changed by parameter ***R*** if required. For inside width, inside diameter ***R*** must be negative, for outside width, outside diameter ***R*** must be positive.
S	**#19**	Size of a measuring point, i.e. width of an inside / outside width or diameter of a bore / outside diameter.
T	**#20**	Parameter ***T*** can be used to set the tolerance of a measuring point, of a contour (S) or of a position, for instance. To check a surface, corner, inside width, outside width or diameter for tolerance, the transferred value with parameter ***T*** must be positive. To check a position or centre point of a contour for tolerance, the transferred value must be negative. The set values or position settings ***I, J*** and ***K*** are taken into account. If the tolerance is exceeded, the programme stops and the error message "Tolerance exceeded" is issued. In programme O8703 (PROTECTED MOVE) parameter ***T*** activates the check of component availability.
U	**#21**	2nd angle for 3-point-probing at bores or outside diameter. The value for the angle must be between 0° < U < 360° – minimum distance between the angles 10°.
V	**#22**	3rd angle for 3-point-probing at bores or outside diameter. The value for the angle must be between 0° < U < 360° – minimum distance between the angles 10°.
W	**#23**	The number of the WCS to be set is transferred via parameter ***W***. As a standard ***W54.*** to ***W59.*** can be transferred. The external zero point offset is set with ***W53.*** If there are more WCS available by option, the number of an optional WCS with (P1... P48) with negative prefix is transferred. WCS "G54.1 P40" is set with "W-40.". The optional WCS for the clamping tool correction (G54.2 P1…P8) can be described with ***W1.*** … ***W8.***. At the simultaneous application of parameters ***A1.*** and ***W***, the set positions must be transferred with parameters ***I, J*** and ***K***. For further information see chapter 3.4.2
X	**#24**	Distance of surface which must be touched in X-direction (without ***A1.***), or X-position of the point which must be touched in the active WCS (with ***A1.***).
Y	**#25**	Distance of surface which must be touched in Y-direction (without ***A1.***), or Y-position of the point which must be touched in the active WCS (with ***A1.***).
Z	**#26**	Distance of surface which must be touched in Z-direction (without ***A1.***), or Z-position of the point which must be touched in the active WCS (with ***A1.***).

2.2 Result parameter

Parameter	Description
#111+0	X-result of the measurement in the current WCS.
#111+1	Y-result of the measurement in the current WCS.
#111+2	Z-result of the measurement in the current WCS.
#111+3	Deviation from measuring result X to set position in X. If no set position is transferred in X (parameter ***I***), this value corresponds to the X-measuring result.
#111+4	Deviation of the Y measuring result from the set position in Y. If no set position is transferred in Y (parameter ***J***), this value corresponds to the Y measuring result.
#111+5	Deviation from measuring result Z to set position in Z. If no set position is transferred in Z (parameter ***K***), this value corresponds to the Z-measuring result.
#111+6	Result of contour measurement. (Diameter bore, inside width or outside width)
#111+7	Deviation from the measuring result to the set value transferred with parameter ***S***.
#111+8	Result of check for component availability #111+8=1: Component available #111+8=-1: Component **not** available
#111+9	Result of the angle measurement to address an nth axis. If #111+9 ≠ 0, when writing the WCS the entered value is written into the axis which is entered in programme O8710(USERPARATAB) under #136.

2.3 Calculation and result parameter function D

Parameter	Description
#137+0	Storage of the type of the measuring point measured at least (diameter, single point,...)
#137+1	X-result of 1st measurement.
#137+2	Y-result of 1st measurement.
#137+3	Z-result of 1st measurement.
#137+4	X-skip position of 1st measurement.
#137+5	Y-skip position of 1st measurement.
#137+6	Z-skip position of 1st measurement.
#137+7	Result angle
#137+8	Deviation angle set to actual value
#137+9	Result distance in X
#137+10	Result distance in Y
#137+11	Result distance in Z
#137+12	Deviation from set value at distance measurement in X (distance in one axis)
#137+13	Deviation from set value at distance measurement in Y (distance in one axis)
#137+14	Deviation from set value at distance measurement in Z (distance in one axis)

2.4 Calibration parameter

Parameter	Description	
#110+0	Calibration value in X	(e.g. probe ball radius 3 mm - HSS: approx. 2.785)
#110+1	Calibration value in Y	(e.g. probe ball radius 3 mm - HSS approx. 2.788)
#110+2	Probe centre offset in X	(e.g. probe ball radius 3 mm - HSS: approx. 0.005)
#110+3	Probe centre offset in Y	(e.g. probe ball radius 3 mm - HSS approx. 0.010)
#110+4	Retraction path 2nd measuring block (see chapter 3.4.1)	
#110+5	Calibration value in Z	(e.g. probe ball radius 3 mm - HSS: approx. 0.206)

2.5 General survey of parameter requirements (example)

Description	Number # global	Number # permanent	Example
Result parameter	10		#100-#109
Setting parameter	40		#110-#149
		6	#500-#505
Function D	15		#160-#175

2.6 Internal parameters

NOTE

Malfunction

- ▶ The parameters specified herein are not allowed to be changed! They serve as information and error diagnostic only.

Parameter	Description
#117	Transfer parameter SET WCS 1 Transfer data into programme SET WCS
#118	Transfer parameter SET WCS 2 Transfer data into programme SET WCS
#119	Transfer parameter SET TOOL Transfer data into programme SET TOOL
#120	Conversion factor mm/inch Partition factor for feeds and measuring distances when switching mm -> inch.
#121	Error marker Error number storage.
#122	Tool length from memory Tool length of the active tool
#123	Result measuring block in X Skip-position
#124	Result measuring block in Y Skip-position
#125	Result measuring block in Z Skip-position
#129	Confidence interval Internal: Do not change!
#139	Not used
#141	Calibration value in X Internal calibration value in X-axis, adapted to rotation (e.g. G68)
#142	Calibration value in Y Internal calibration value in Y-axis, adapted to rotation (e.g. G68)
#143	Probe centre offset in X Internal probe centre offset in X-axis, adapted to rotation (e.g. G68)
#144	Probe centre offset in Y Internal probe centre offset in Y-axis, adapted to rotation (e.g. G68)
#145	Not used
#146	Not used
#147	Not used
#148	Not used
#149	Not used

3. Installation of the measuring system

3.1 Installation conditions

For the installation of the measuring cycles "Quickstart" the following conditions are required:

NOTE

Malfunction
The measuring software Blum Quickstart version 3 is not compatible with the measuring software Blum Quickstart version 2!

- Functioning and appropriate multi-directional BLUM measuring system (e.g. TC50)
- Brother **CNC-B00, CNC-C00**
- 16 free programme names
- 35 KB free NC-memory
- #1 - #26, #110 - #149 freely available
- 10 global, subsequent variables for the result output (standard #100-#109)
  6 permanent, subsequently following variables to store the calibration values
  Optional: 15 global, subsequently following variables on application of function D (distance angle)
- 3 call levels
- Attention: The measuring software BLUM Quickstart version 3 can not be used under G68 or G68.2.
- For the function “rotary fixtuer offset - G54.2” the required option must be set and established

Recommendation:

- 2 PLC inputs for error control (ERROR, BATTERY)

3.2 Mechanical installation

Installation and mounting of the hardware:
See installation instructions of the touch probe being used.

3.3 Execution of the software installation

The measuring cycles can be regarded as examples for carrying out the measuring tasks and must be adapted to the respective machine type by the machine manufacturer or machine user. When commissioning the measuring cycles, the programme must be tested block-by-block while adopting all safety measures (block check before execution, single block, reduced feed).

After mechanical and electrical installation of the probe and the receiver the "Quickstart" software can be installed according to the following sequence:

- Transfer of the programmes to the control

  Generally, all programmes included in the installation package, will be transferred to the control.

  144334_P03.8000-031,390-BROTHER-V3
  Package with programmes which are not adapted
  Programmes: 8700-8707, 8709, 8711-8716

  User programmes
  Programmes, which must be adapted by the user
  Programmes: 8708, 8710

- Adaptation of programme O8710 (USERPARATB) chapter 3.4
- Adaptation of the programmes O8708 (PROBE ON/OFF) chapter 3.5
- **Enter the exact probe length into the tool table of the machine!**

3.4 Adaptation of the programme USERPARATB O8710

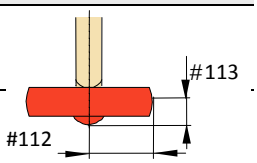
3.4.1 Parameter setting

The basic settings of the parameters are entered in programme USERPARATAB.

☞ The units of path, diameters and feeds must be entered in mm.

Parameter	Description
#1	**Start address offset WCS** First offset value of the WCS data (X-value of the external offset). See section 3.4.2.
#2	**Distance memory locations between the single axes** Difference between the memory locations in an axis. See section 3.4.2.
#3	**Distance of WCS memory locations** Difference between the memory locations in a WCS. See section 3.4.2.
#4	**Start address optional WCS** Parameter of the first offset value of the optional WCS data. See section 3.4.2.
#5	**Basic address tool length wear** Basic address of the tool memory for tool length wear. See section 3.4.4.
#6	**Basic address tool radius wear** Basic address of the tool memory for tool radius wear. See section 3.4.4.
#7	**H-number of the probe** Generally, the H-number corresponds to the magazine place of the probe.
#8	**Basic address tool memory tool length** Basic address of the tool memory for the tool length referring to the address **before** the address of the first tool. See section 3.4.4.
#9	**Additional tool length offset** If a further reference value must be considered at the actual tool length, this is possible with an additional tool length offset.
#110	**Basic address permanent parameters (calibration values)** On application of this software, values must be permanently stored on the control. For this purpose, six unused permanent subsequent parameters must be available. These must not be deleted while the control is switched off. The start value of these parameters is stored in #110. Should the values e.g. in #500 to #505 be stored, #110 must be set to 500. Parameters #100 to #199 are not allowed to be used. Default value: 500
#111	**Basic address results** The results of the measurements will be stored in 10 parameters. Default value for the results is 100. The start value of these parameters is stored in #111. Should the values e.g. in #100 to #109 be stored, #111 must be set to 100. Using the setting parameters #110 to #149 is not allowed. Using the result parameters defined in #137, is not allowed. Default value: 100

Parameter	Description
#112	**Probe ball radius XY**
#113	**Probe ball radius Z**



#114	**Overtravel / measuring distance X, Y** At single points and contours (e.g. diameter, inside width or outside width fig. 1) #114 ***(1)*** is the overtravel,if ***Q*** is not transferred.

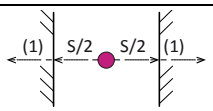


Fig. 1

Exceptionally corner (Fig. 2):

At corners in 2 or 3 axes, the measuring distance is the difference between the position (prepositioning) before the measuring block and the expected trigger point. The trigger point is "searched" on this measuring path (see fig. 2).

The default value of the measuring distance for probing in X, Y is defined with #114 ***(1)***. #114 is also defined as overtravel, if ***Q (2)*** is not transferred.

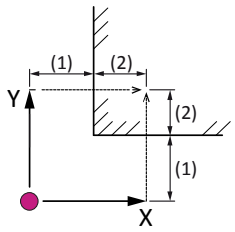


Fig. 2

#115	**Overtravel / measuring distance Z** For probing in Z, the measuring distance is stored in #115. Default (X/Y): 10 mm Default (Z): 5 mm
#116	**Axis constellation for “Rotary fixture offset – G54.2”** Selection of the axis constellation for the 4th/5th axis. See section 3.4.3. 0: No 4th/5th axis 1:A / 2:B / 3:C / 4:AB / 5:AC / 6:BC –axis (axes) Default value: 5 (AC kinematics)
#126	**Measuring feed of the 1st measuring block** For the first measuring block a measuring feed depending on the measuring input, must always be defined: HighSpeedSkip: The value can be between 1000 and 5000 (default: 2000 mm/min.). X4.7: The value can be between 30 and 60 (default: 50 mm/min.). For the usage of a 2nd measuring block, the value can be between 100 and 1000. See description #127 (default: 500 mm/min.).
#127	**Measuring feed of the 2nd measuring block in (Default X4.7)** If a value ≠ 0 is assigned to the parameter #127, a 2nd measuring block is executed with the value that has been transferred. If #127=0 is set, no 2nd measuring block will be executed. X4.7: The value should be between 30 and 60 (default: 50 mm/min.).
#128	**Feed protected traverse path** Value for the feed Default value: 5000 mm/min

Parameter	Description		
#130	**Option bit 1 (basic settings for measurement)** In #130 some data, relevant for the software, will be stored in bit form. Entering the data: #130 = Bit0: 1 + Bit1: 2 + Bit2: 4 + Bit3: 8 + Bit4: 16 + Bit5: 32 Adding values of the required functions Example: #130=2+4+32 The "readability" of the set bits is kept. or: #130= 38 If bit 1, 2 and 5 should be set.		
	Bit number	**Value**	**Function**
	BIT0	(0)	Feed-override is released When measuring, the speed of the feed can be controlled with the override.
		(1)	Feed override is disabled When measuring, the speed of the feed can not be controlled.
	BIT1	(0)	The travel movements in programme O8703 (PROTECTED MOVE) are protected (feed from #128). Note: The programme O8703 (PROTECTED MOVE) is used from programme O8700(MAIN) for prepositioning and can also be called directly by the user.
	⚠	(2)	The movements in programme O8703 (PROTECTED MOVE) are carried out with G0. **Important:** No stopping of the movement when the stylus is deflecting!
	BIT2	(0)	The IR receiver is NOT run in permanent autoflash mode, which means that at the signals TC MODE and FLASH/START of the receiver does NOT have 24 volts permanently.
		(4)	The IR receiver is run in permanent autoflash mode, which means that the signals TC MODE and FLASH/START of the receiver does have 24 volts permanently.
	BIT3	(0)	The validity of a trigger point is NOT checked. Note: If the IR transmission is interrupted during a measuring block, an invalid trigger point is generated. If free control inputs are available, each trigger point can be checked for validity (see section 3.9).
		(8)	The validity of a trigger point is checked.
	BIT4	(0)	The validity of the start condition is NOT checked. The start conditions (IR transmission, stylus not deflected) before a measuring block are NOT checked. Note: If free control inputs are available, the start conditions before each measuring block can be checked (see chapter 3.9).
		(16)	The validity of the start condition is checked.

Parameter	Description		
#130	**Option bit 1**		
	Bit number	**Value**	**Function**
	BIT5		Attention: Tool length must **always** be entered into the tool memory! Deselection of tool length compensation
		(0)	Will be set if the machine approaches the tool length at the start of the measuring cycle.
		(32)	**Default setting** Selection of active tool length compensation
	BIT6	(0)	Not used
		(64)	Not used
	BIT7	(0)	Not used
		(128)	Not used
	BIT8	(0)	Start condition tool active (H- / T-code) is checked.
		(256)	Start condition tool active (H- / T-code) is **not** checked.

Parameter	Description		
#131	**Option bit 2**		
	In #131 some data, relevant for the software, will be stored in bit form. Entering the data: #131 = Bit0: 1 + Bit1: 2 + Bit2: 4 + Bit3: 8 + Bit4: 16 + Bit5: 32 Adding values of the required functions Example: #131=2+4+32 The "readability" of the set bits is kept. or: #131= 38 If bit 1, 2 and 5 should be set.		
	Bit number	**Value**	**Function**
	BIT0	(0)	The machine has no spindle indexing.
		(1)	The machine has spindle indexing.
	BIT1	(0)	Function G68 is NOT available.
		(2)	Function G68 is available (see Programming Instructions).
	BIT2	(0)	Error texts are language-specific. (see description #132)
		(4)	Error call and error texts will be given customer-specifically. In programme O8711 (messages) the required adaptations can be carried out (see chapter 0).
	BIT3	(0)	The switch-on check of the probe is carried out via the input signal for "ERROR" (see chapter 3.5).
		(8)	The switch-on check of the probe is carried out via a "Micromove" (see chapter 3.5).

Parameter	Description		
#131	**Option bit 2**		
	Bit number	**Value**	**Function**
	BIT4	(0)	The input signal for "ERROR" is checked for "High" (security in case of a cable breakage / standard).
		(16)	The input signal for "ERROR" is checked for "Low".
	BIT5	(0)	The input signal for "STATUS INVERSE" is checked for "Low". (security in case of a cable breakage / standard).
		(32)	The input signal for "STATUS INVERSE" is checked for "High".
	BIT6	(0)	The input signal for "BATTERY" is checked for "High". (security in case of a cable breakage / standard).
		(64)	The input signal for "BATTERY" is checked for "Low".
	BIT7	(0)	Retraction probe to start position If an error occurs during measurement, the probe will be retracted to the start position.
		(128)	Retraction probe to block position If an error occurs during measurement, the probe will be retracted to the start position of the active measuring block or of the protected move.
	BIT8	(0)	The results of the angle calculation will be shown from -180<0<180°.
		(256)	The results of the angle calculation will be shown from 0° … 359°.
	BIT9	(0)	The programme O8710 USERPARATAB is carried out at each programme call O8700 MAIN /O8703 PROTECTED MOVE.

		(512)	The programme O8710 USERPARATAB is carried out at a programme call O8700 MAIN /O8703 PROTECTED MOVE if the parameter ***M1.*** (probe switch-on) is transferred.
			Warning – risk of collision: This function may only be used at sequential Quickstart-Calls. No G-Code calls may be in between the Quickstart-Calls.
			Ok
			`G65P8703 X… Y… Z… M1.`
			`G65P8703 X… Y… Z… M3.`
			`G65P8700 S…M3.`
			`G65P8703 X… Y… Z… M3.`
			`G65P8700 Z…M2.`
			NOK
			`G65P8700 Z… M1.`
			`G65P8703 X… Y… Z… M3.`
			`G0G90 X… Y… Z…`
			`G65P8700 X… M2.`

	BIT10	(0)	The probe is not oriented during measurement (default).
		(1024)	The probe is oriented in measuring direction during measurement (mono-directional). Alignment towards measuring direction is necessary!
	BIT11	(0)	The touch probe is oriented in a clockwise direction (condition: #131.10=1).
		(2048)	The touch probe is oriented in a counter-clockwise direction (condition: #131.10=1).

Parameter	Description
#132	**Country code language tags** Depending on #132 the error texts will be displayed: 0: English 1: German 2: French Default: 1
#133	**ERROR input signal** If the error signal is connected, the input can be entered in #133. Example: ERROR-signal on IN1010: #133 = 1010 No ERROR-signal available: #133 = 0 Default: 0
#134	**STATUS input signal** If the STATUS-signal is connected, the input can be entered in #134. Example: STATUS-signal on IN1011: #134 = 1011 No STATUS-signal available: #134 = 0 Default: 0
#135	**BATTERY input signal** If the battery signal is connected, the input can be entered in #135. Example: BATTERY-signal on IN1012: #135 = 1012 No BATTERY-signal available: #135 = 0 Default: 0
#136	**Number and direction of a fourth axis.** Default values: After angle measurements, no 4th axis is adjusted: 0 Rotation axis around X should be adjustable: +4 Rotation axis around Y should be adjustable: +5 Rotation axis around Z should be adjustable: +6 Usually, the prefix is positive at normal rotation direction of the axes. Default: 0
#137	**Basic address function "D" distance and angle (optional)** The results and calculation parameters of function "D" angle and distance will be stored in 15 parameters. The start value of these parameters is stored in #137. Should the values e.g. in #150 to #164 be stored, #137 must be set to 150. Using the setting parameters #110 to #149 is not allowed. Using the result parameters defined in #111, is not allowed.
#138	**G-Code for measuring block** In #138, enter the active G-Code (numer) for the function “delete remaining path” (Skip). Brother provides the following G-codes for this function: G31, G131 and G132. If requested, this G-Code can be adjusted. Default: 31
#[#110+4]	**Retraction path 2nd measuring block** Retraction path for the 2nd measuring block in mm. The probe is retracted from the 1st skip by this distance. Validity range: 0.25 < #[#110+4] < 5 mm Default: 2.5

3.4.2 Description of the parameters #1-#4 function SET WCS (O8710)

📖 Read the documentation of the control manufacturer.

Parameter	Description
#1	**Start address offset WCS** Number of the parameter in which the first offset value of the WCS data (X-value of the external offset) is stored. Fix: 5201
#2	**Distance of the WCS-memory locations (X to Y to Z...)** Difference between the storage place of a value in a WCS to the storage place of the value of the next axis in this WCS (delta value between storage places of neighboured axes). Fix: 1
#3	**Distance of memory location between the single axes (X1 to X2 ...)** Difference between the storage place of a value in a WCS to the storage place of the value of the next WCS in this axis (delta value between storage places of contiguous WCS). Fix: 20
#4	**Start address optional WCS** Number of the parameter in which the first offset value of the WCS data (X-value of the external offset) is stored. If no optional WCS are available, the value is set to zero. Fix: 7001

Example BROTHER CNC-C00 (with optional WCS P1…P48):

#1=5201
#2=1
#3=20
#4=7001(P1…P48)

BASIC WCS			
	X-axis	**Y-axis**	**Z-axis**
External offset	#5201	#5202	#5203
G54	#5221	#5222	#5223
...	...	...	...
G59	#5321	#5322	#5323

OPTIONAL WCS P1…P48			
	X-axis	**Y-axis**	**Z-axis**
G54.1 P1	#7001	#7002	#7003
…	…	…	…
G54.1 P48	#7941	#7942	#7943

3.4.3 Rotary fixture offset - G54.2

Read the documentation of the control manufacturer.

On a turn table, the deviation between the pivot of the table and the deviation of the clamped workpiece in the OFFSET-table (G54.2 P1...8). Thus, the new reference point can be determined by the control.

For determining the deviation, the zero point is absorbed and written in the corresponding table (G54.2 P1...P8) by the programme call W1...8.

This function is available for machines with an indexed table.
For the function “rotary fixture offset - G54.2”, the required Brother option must be set and established.

Parameter	Description
#116	**Axis constellation for “Rotary fixture offset – G54.2”**
	0: No 4th/5th axis
	1: A-axis
	2: B-axis
	3: C-axis
	4: AB-axes
	5: AC-axes
	6: BC-axes

3.4.4 Description of parameters #5, #6, #7 and #8 (O8710) - function SET TOOL / Monitoring O8706

The maximum tolerable correction value will be monitored in programme O8706 (SET TOOL).
If required, this limit value in programme O8706 (SET TOOL); parameter #3 (default value: 2 mm) can be adjusted.

Read the documentation of the control manufacturer.

The data for the basic address of the wear correction values are depending on the active tool offset memory.

Parameter	Description
#5	**Basic address tool length wear** Basic address of the tool memory for tool length wear Fix: 10000
#6	**Basic address tool radius wear** Basic address of the tool memory for tool radius wear Fix: 12000
#7	**H-number of the probe** Generally, the H-number corresponds to the magazine place of the probe.
#8	**Basic address tool memory tool length** Basic address of the tool memory for the tool length It refers to the address **before** the address of the first tool. Fix: 11000

At the basic addresses, the data of the first tool will be stored in the corresponding parameters. The basic addresses are the addresses before the addresses of the first tool.

Example for execution:

	Range	Basic address
Tool length (#8)	#11001...#11999	11000
Tool length wear (#5)	#10001...#10999	10000
Tool radius wear (#6)	#12001...#12999	12000

3.4.5 Spindle indexing

In programme USERPARATB in line N20, the spindle indexing must be entered on basic adjustment.
This is carried out with command M19:

```
N20 M19
```

From line N30, the command input for the spindle indexing (option bit #131.0 = 1) is stored during calibration.

```
N30IF[[#131AND1]NE1]GOTO35
M19R[180]
GOTO40
N35
M0(TURN PROBE 180 DEGREE)
N40
M[99]
```

This is where the appropriate changes for different orientation commands can be made as required.

If the spindle cannot be oriented automatically, the rotation by 180° must be done manually.
The option bit #131.0 = 0 (no spindle indexing) must be set.
The machine stops with a M0 command and the touch probe can be rotated manually by 180°.

NOTE

Measuring errors
Concentricity errors have a direct impact on the measuring result!

If this is not possible, e.g. because the local parameters will be deleted after command M0, the probe must be mechanically adjusted so that it has no run-out (<0.001 mm).
The command "`M0(TURN PROBE 180 DEGREE)`" must be deleted from programme USERPARATAB (see chapter 3.4).

Installation and mounting of the probe:

See Installation Instructions of the used probe.
Chapter mounting and installation / mounting of tool holder

3.5 Switch ON and OFF of the probe

The switch ON or switch OFF sequences for the probes will be entered in the programmes PROBE ON/OFF.
With the programme call "G65P8708 M1." the probe will be switched on, with "G65P8708 M2." it is switched off again.
Depending on the switch on mode of the probe via level (signal is permanently connected during "probe ON") or pulses, the corresponding programme must be installed and adapted.

3.5.1 Programme O8708 (PROBE ON/OFF LEVEL)

In the programme "PROBE ON/OFF LEVEL" direct outputs, M-functions or other commands for switch on or switch off can be used. The switch on of the probe (see chapter 3.4.1 - BIT 131.3) can alternatively be controlled via the ERROR-signal or a "Micromove". During "Micromove" the probe is moved by a fix value to a target position. If the target is reached, the probe will be switched on.

PROBE OFF
From line N5:

```
N5IF[#13EQ1.]GOTO10

(PROBE OFF)
#1116=0 (FLASH/START)
G04X0.05
G53
#1114=0 (MODE TC)

M[99]
…
```

PROBE ON
From line 10:

```
N10(PROBE ON)
#1114=1 (MODE TC)
#1116=1 (FLASH/START)

G53
…
```

☞ If the switch on of the probe is not controlled, after G53 an appropriate dwell time and a M[99] can be programmed.

```
N10(PROBE ON)
#1114=1 (MODE TC)
#1116=1 (FLASH/START)

G53
G04X0.5
M[99]
…
```


3.6 Programme error output O8711 (MESSAGES)

The language dependent error texts are output in programme O8711 (MESSAGES).
The output language is selected in programme O8710 (USERPARATB) in #132:

0: English
1: German
2: French

On error, the probe is switched off and the corresponding text output is in the set language.

From line N2100, the texts can be adapted individually and additional functions can be added on requirement.
For the activation of this function, the bit "customer-specific error handling" must be set in #131.2 (see chapter 3.4).
If the error messages should be displayed in any other language, the error messages can be translated and adjusted in the user area.

```
…
N100(*****************ERRORMESSAGE ENGLISH***********************)
N101#3000=101(INVALID CALL PARAMETERS)
N102#3000=102(TOLERANCE EXCEEDED)
N103#3000=103(UNEXPECTED OBSTACLE)
…
N200(*****************ERRORMESSAGE GERMAN************************)
N201#3000=101(UNGUELTIGE AUFRUFPARAMETER)
N202#3000=102(TOLERANZ UEBERSCHRITTEN)
N203#3000=103(UNERWARTETES HINDERNIS)
…
N300(*****************ERRORMESSAGE FRENCH************************)
N301#3000=101(PARAMETRES NON VALIDES)
N302#3000=102(HORS TOLERANCE)
N303#3000=103(OBSTACLE INATTENDU)
…

N2100(*****************ERRORMESSAGES USERDEFINED******************)
N2101#3000=101(UD: INVALID CALL PARAMETERS)        Invalid call parameter
N2101#3000=102(UD: TOLERANCE EXCEEDED)             Tolerance exceeded
N2101#3000=103(UD: UNEXPECTED OBSTACLE)            Unexpected obstacle
N2101#3000=104(UD: MEASURING WITHOUT TRIGGER)      Measuring block without trigger point
N2101#3000=105(UD: ERROR TOOL COMPENSATION)        Error tool length compensation
N2106#3000=106(UD: ERROR MEAS.STROKE/PRT.MOVE)     Error measuring block/protected
                                                   positioning
N2107#3000=107(UD: INVALID MEASURING POSITION)     Wrong measuring position
N2108#3006=(UD108: BATTERY WEAK)                   Battery low
#121=0
M[99]
N2107#3000=109(UD: WRONG TOOL LENGTH)              Error tool length
N2107#3000=110(UD: ERROR ON SWITCH-ON)             Error on probe ON/OFF
N2107#3000=111(UD: WRONG TOOL)                     Wrong tool selected
N2107#3000=112(UD: NO CALIBRATIONVALUE IN Z)       Not calibrated in Z
N2107#3000=113(UD: ERROR USERPARATAB)              Error tool correction in O8710
                                                   (USERPARATAB)
N2115#3006=(UD115: TURN SPINDLE)                   Rotate spindle by 180°
IF[#121NE0]GOTO2116
#3000=116(PARAMETERSETTING)                        Check parameter setting
N2116#121=0
M[99]
N9999
…
```

3.7 Adaptation of the machine data

NOTE

Malfunction

Wrongly set machine parameters can cause collisions and malfunction!

- ▶ System parameters are only allowed to be changed after consulting the machine manufacturer or the customer.

📖 Read the documentation of the control manufacturer.

The following parameter must be defined:

0301=1	Conversation/NC Language change [0: Conversation 1:NC]

3.8 Switch over of measurement unit (metric/inch)

📖 Read the documentation of the control manufacturer.

NOTE

Measuring errors

▶ After the switch over of the measurement unit from mm to inch or vice versa, the system must be recalibrated.

NOTE

Malfunction

▶ For activation of the set parameter, the machine must be switched-on and then switched-off again.

3.9 Checking the trigger point validity

If the measuring input signal level falls off, the control issues a trigger signal.
The control can not differentiate between a valid trigger point or an error, e.g. a transmission error.

In order to increase the measuring reliability, the validity of a trigger point must be checked.
To this end, the STATUS (start measuring block) and ERROR signals must be checked.
The receiver signals must be connected to the control and linked with parameters in the PLC.
The entry is carried out in the programme USERPARATAB (see chapter 3.4.1).

#133	ERROR input signal Example: ERROR-signal on IN1010:	 #133 = 1010
#134	Input signal STATUSINVERSE Example: STATUSINVERSE-signal on IN1011:	 #134 = 1011

After this optimization, the option bits #130 (bit3 and bit4) have their described function and the validity of a trigger point and the start condition before a measuring block can be checked.

3.10 Mode auto-flash (for probe with infrared transmission)

NOTE

Measuring errors

If the validity of a trigger point is not checked, the control can not detect an invalid trigger point. Error measurement is possible.

If on the control side the measuring input is available only, the IR receiver can be operated in Auto-flash mode.

Installation and mounting of the interface:

📖 See installation instructions of the used interface.
Chapter Switch-on Auto-flash/Time-out OFF

In this case the validity of a trigger point and the start condition before a measuring block can not be checked. The option bits (#130), bit3 and bit4 are irrelevant in this case.

3.11 Overview of the addresses of available inputs and outputs

📖 Read the documentation of the control manufacturer.

For switch on and switch off of the probe as well as the evaluation of the error signals ERROR, STATUS and BATTERY, the appropriate address of the connected input or output must be entered in the software.

For this functions, direct address parameter (e.g. #1000Ff /#1100ff) or M-Codes can be used.

3.12 Adapt Look-ahead

In all programmes, the comment (G53) is used as prevent buffering, followed by 3 blank lines.

Example:

Original:

```
M19S#1
N36 (G53)



G90G31X#4Y#5Z#6F#126
```


3.13 Electrical installation of infrared-/radioprobe by Interface IF59

Control-specific connection diagrams
These are available at Blum-Novotest.

3.14 Using two touch probes

When using two probes, adaptations have to be made in programme O8710 (USERPARATAB). When choosing the probe, a free global or permanent macro-variable must be used - see example below #199. This must be defined before the programme call.
The relevant command lines have to be inserted or copied and adjusted.

Example:
Selection of the second probe

#199=2.	Activating the second probe
G65 P8700 X10. W54.	Programme call
#199=#0	Delete the probe selection

```
%
O8710(USERPARATAB-QUICKSTART 3)                    Programme O8710 (USERPARATAB)
(V1AA-OPTION 01.03.2013 CB COPYRIGHT BLUM-
NOVOTEST GMBH 2012)

IF[#21EQ1.]GOTO30

N1(PROG SET WCS)
#1=      (OFFSET WCS)
#2=      (OFFSET AXIS)
…
#6=      (BASE TOOL RADIUS)

(************************)                        Call, which probe should be used and
N100                                               activated.
IF[#199EQ1.]GOTO110  (#199: NUMBER PROBE)
IF[#199EQ2.]GOTO120                                #199 not defined -> error call
#3000=101(INVALID CALL PARAMETERS - H MISSING)

N110 (1st PROBE)                                   Definition of the first probe

N3(BASE SETTING TOOL)
#7=      (H-NUMBER)
#8=      (BASEADR TOOLMEMORY)
#9=0     (ADD TOOL LENGTH OFFSET)
…
#126=    (FEEDRATE MEASURE 1. STROKE)
#127=    (FEEDRATE MEASURE 2. STROKE)
#128=    (FEEDRATE POSITIONING)

GOTO150                                            Skip to N150

N120 (2nd PROBE)                                   Definition of the second probe

N3(BASE SETTING TOOL)
#7=      (H-NUMBER)
#8=      (BASEADR TOOLMEMORY)
#9=0     (ADD TOOL LENGTH OFFSET)
…
#126=    (FEEDRATE MEASURE 1. STROKE)
#127=    (FEEDRATE MEASURE 2. STROKE)
#128=    (FEEDRATE POSITIONING)
(GOTO150)                                          Skip to N150
N150
```

4. Error messages

In case of error, the error number is set and an error message is displayed on the screen. The programme must be aborted by means of the RESET key, the cause of error must be eliminated and the programme must be restarted.
On message events (e.g. E115) the processing of the programme is interrupted by "M0". The cycle can be continued with "Cycle Start".
The extended overview enables a detailed error analysis by reading out the error marker #121.

Legend:

3 ...	**= Error message**
	= Error description
	= Check the following points
	= Remedy

3 101	**INVALID CALL PARAMETERS**
	The call parameters are invalid or faulty.
	Check the programme call.
	Enter valid values for the programme call.

#121=101.XX	Number	Programme	Meaning
	1	8700	#W and #E will be called simultaneously.
	2	8701	Neither #S nor #X, #Y, #Z are defined as call parameters.
	3	8701	#X and #C will be called simultaneously
	4	8701	#Y and #C will be called simultaneously
	5	8705	Machine setting µm: Input #W without "."
	6	8705	#W > 59
	7	8705	#W with incorrect range (53…59 / 1…+8 / -1…-48 / -1…-300)
	8	8705	#W < 53
	9	8702	Call contour "S": X and Y simultaneously
	10	8702	--
	11	8702	Call X or Y at calibration call (#C)
	12	8706	#119 in USERPARATAB not defined Values for SET TOOL
	13	8711	No value transferred in error transfer (#E) for error number -> Internal error
	14	8713	Distances for angles too small (minimum distance 10°) or transfer value is not between 0° and 360°

	15	8713	Distance measuring block/Protected Move < 0
	16	8709	No value for "Z" or "S" at calibration on the sphere transferred
	17	8708	No address entered for the ERROR-signal in programme 8710 USERPARATAB
	18	8715	The type of measuring points at the angle or distance measurement is not identical. Two different measurements have been carried out.
	19	8704	Measuring block: Assigned target position=start position / parameter A1. ?
	20	8714	Error at regression calculation - internal values?
	21	8713	Verifying call parameters for 2…12 measuring points: "H", "U", "V"

3 102	**TOLERANCE EXCEEDED**
	The tolerance transferred in the call was exceeded.
	Check of the measuring result
	

#121=102.XX	Number	Programme	Meaning
	1	8707	Tolerance dimension/position of single point exceeded
	2	8707	Tolerance on WCS setting exceeded
	3	8707	Tolerance contour dimension exceeded
	4	8707	Tolerance contour position exceeded

3 103	**UNEXPECTED OBSTACLE**
	The protected traverse path has not reached the target position.
	Was an obstacle/the workpiece encountered?
	Enter a possible / reachable target position.

#121=103.XX	Number	Programme	Meaning
	1	8703	Unexpected obstacle or probe off

3 104	**MEASURING BLOCK WITHOUT TRIGGER POINT**
	The probe did not deflect on the transferred measuring distance.
	Was a reachable position programmed in the cycle call?
	Programme a reachable target position or adapt the position of the probe before the measuring call.

#121=104.XX	Number	Programme	Meaning
	1	8704	Measuring block without trigger point (1st measuring block)
	2	8704	Measuring block without trigger point (2nd measuring block)

3 105	ERROR TOOL COMPENSATION
	No tool data could be written following measurement.
	(1) Check the programme call. (2) Check the parameter settings for the tool memory.
	(1) Programme a valid programme call. (2) Correct the parameter settings for the tool memory.

#121=105.XX	Number	Programme	Meaning
	1	8706	Error tool correction Check #5 and #6 in programme O8710 USERPARATAB
	2	8706	Maximum allowed correction value exceeded The stated limit (#3) in programme O8706 SET TOOL has been exceeded.

3 106	ERROR MEASURING BLOCK/PROT. MOVE
	No valid measuring block could be carried out.
	(1) Was the probe switched on before measurement? (2) Check the ERROR signal. (3) Check the start condition (IR transmission, probe already deflected).
	(1) Check if the probe is switched on. Check the transfer parameter ***M***. (2) Eliminate the transmission fault. (3) Position to a valid / possible start position.

#121=106.XX	Number	Programme	Meaning
	1	8703	No signal "STATUS"
	2	8703	No signal "ERROR"
	3	8704	No signal "STATUS"
	4	8704	No signal "ERROR"
	5	8704	2nd probing ended with error (ERROR)
	6	8704	Start position = Skip position in 1st measuring block
	7	8704	Start position = Skip position in 2nd measuring block

3 108	BATTERY
	The option "check battery signal" is set and the error signal "BATTERY" is active.
	(1) Check the batteries (probe flashes green - blue). (2) Check that the batteries query is correct.
	(1) Change the batteries. (2) Enter address parameter (#135) correctly.

#121=108.XX	Number	Programme	Meaning
	1	8708	Battery low Return signal IF 59 - > NC battery signal is active

3 109	WRONG PROBE LENGTH
	The entered tool length is "0".
	Check the entered parameters for the tool length (#7, #8).
	Input valid values for the probe length.

#121=109.XX	Number	Programme	Meaning
	1	8710	Probe length = 0, no correct values for the tool length entered or zero tool. For zero tool: Bit 131.8 is set?

3 110	ERROR ON SWITCH-ON
	The probe could not be switched on within the permitted time interval.
	Check function O8708 (PROBE ON/OFF). See section 3.5
	Enter valid functions in programme O8708 (PROBE ON/OFF).

#121=110.XX	Number	Programme	Meaning
	1	8708	Error when switching-on the probe Check transmission Check battery Check programming of the probe Probe already deflected

3 111	TOOL WRONG
	The H-number of the probe defined in programme USERPARATB is not active.
	Check if the correct "tool" was changed in or if the correct tool number was activated.
	Activating the correct "tool".

#121=111.XX	Number	Programme	Meaning
	1	8710	The H-number defined in #7 does not comply with the actual active H-number in #4120. Tool activated?

3 112	NO CALIBRATION VALUE IN Z
	The parameter or content for calibration value Z is undefined.
	(1) Check, if the probe is calibrated. (2) Check, if the start address for the calibration values (#110) is correct.
	(1) Calibrate the probe in Z. (2) Adapt the start address for the calibration values (#110).

#121=112.XX	Number	Programme	Meaning
	1	8700	Calibration value Z = #0 Measurement without calibration / Carry out calibration in Z
	2	8710	Calibration sphere without Z When calibrating on the sphere the probe must be calibrated in Z!

3 113	ERROR PROG. USERPARATAB
	The parameters entered in programme USERPARATAB are invalid or faulty.
	Check the parameters.
	Enter valid values for the required parameters.

#121=113.XX	Number	Programme	Meaning
	1	8710	Error on parameter check in USERPARATAB Check the following parameters: (#1, #2, #3, #110, #111, #112, #113, #126, #128)

3 116	PARAMETER SETTINGS
	The parameters #100-#149 are deleted at "M0"! During measurement/calibration, the machine can not be stopped with "M0" (see chapter 3.4.5).
	Check the parameter settings (see chapter 3.4.5).
	Adapt the parameter settings. If required: Mechanical alignment of the probe!

#121=116.XX	Number	Programme	Meaning
	1	8710	Parameter setting. At "M0" the content of the parameters is deleted. Change of the machine settings is necessary (see chapter 3.7).

Messages

3 115	TURN SPINDLE BY 180°
	**Message:** During calibration the probe must be turned by 180°. To this end, the machine stops with "M0" and the probe can be rotated manually by 180° if the machine does not have automatic spindle indexing.

5. Service

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