

## 1. Introduction

The ComGage special measurement mode “Diameter centre position calculation with 3 probes” ( wgl009 ) allows to determine several parameters of a diameter from one or more combinations of 3 probes.

If there is more than one combination of 3 probes, the measurement mode first calculates each combination separately, then determines the measuring result by searching the Min / Max / Average / ... of the calculated combinations ( depending on the configuration ).



## 2. Configuration

The special measurement mode can be configured in the following dialogue :

Diameter center position calculation with 3 probes

Output value

X-Coordinate of Diameter Center

Average

Distance of probes from Center

20

Debug-Register for Probe Combinations

Combination 1 ... Combination 20

R1
R21

OK

Cancel

Probe T1  
Probe T2  
Probe T3  
Probe T4  
Probe T5  
Probe T6  
Probe T7  
Probe T8  
Probe T9  
Probe T10  
Probe T11  
Probe T12  
Probe T13  
Probe T14

Source	Probe-Angle [deg]
C1 ( Characteristic 1 )	0
C2 ( Characteristic 2 )	45
C3 ( Characteristic 3 )	90
C4 ( Characteristic 4 )	135
C5 ( Characteristic 5 )	180
C6 ( Characteristic 6 )	225
C7 ( Characteristic 7 )	270
C8 ( Characteristic 8 )	315
C1 ( Characteristic 1 )	0
C1 ( Characteristic 1 )	0
C1 ( Characteristic 1 )	0
C1 ( Characteristic 1 )	0
C1 ( Characteristic 1 )	0
C1 ( Characteristic 1 )	0

Probe Combinations

☒ Combination 1

T1
T4
T6

☒ Combination 3

T3
T6
T8

☒ Combination 5

T5
T8
T2

☒ Combination 7

T7
T2
T4

☐ Combination 9

☐ Combination 11

☐ Combination 13

☐ Combination 15

☐ Combination 17

☐ Combination 19

☒ Combination 2

T2
T5
T7

☒ Combination 4

T4
T7
T1

☒ Combination 6

T6
T1
T3

☒ Combination 8

T8
T3
T5

☐ Combination 10

☐ Combination 12

☐ Combination 14


☐ Combination 16

☐ Combination 18

☐ Combination 20

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The following settings can be configured :

### **Output value**

Here can be selected which parameter shall be calculated by the special measurement mode.

The following parameters are available :

- X-coordinate of Diameter Centre
- Y-coordinate of Diameter Centre
- Distance of Diameter Centre Shift :  $\text{Square root}(X\text{-coordinate}^2 + Y\text{-coordinate}^2)$
- Radius of the circle
- Diameter of the circle
- Angle of Diameter Centre Shift ( = direction of the shift ) :  $\text{ARCTAN}(Y\text{-coordinate} / X\text{-coordinate})$

Here can also be selected, if Average / Min / Max / Max-Min of the values, calculated for the separate probe combinations, shall be output as measuring result ( see “Probe Combinations” ).

### **Distance of probes from Centre**

The distance to the centre of the circle ( in the unit of the used characteristic ) has to be entered here.

### **Debug-Register for Probe Combinations**

A register range can be selected where the calculated values of the separate probe combinations are stored for debug purposes.

### **Probe T1 ... T14**

The characteristics which were created for the used probes can be selected here. The related angle can be entered next to the characteristic.

0° has to be entered for one probe, for all other characteristics the angular distance to this probe.

### **Probe Combinations**

Up to 20 combinations of the selected characteristics ( probes ) can be created. The selected parameter is calculated out of these combinations.

The available probes can be used several times and combined to different combinations.

Each combination has to consist of exactly 3 probes.

## **3. Calibration**

- A characteristic has to be created for each probe. This characteristic can contain e.g. correction factors in the formula for the measurement input.
  - A master value near 0 has to be entered for each probe ( see below ).
  - The master is inserted into the fixture and all characteristics are simultaneously calibrated with the function “Adjustment / Calibration”.
- If Diameter or Radius is selected, the function adds up the “Distance of probes from Centre” automatically.
- The characteristics which use this special measurement mode are NOT calibrated.
- Errors in the fixture / in the master ( e.g. roundness errors ) can be taken into account in the entered master values of the characteristics.