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DOUBLE FLANK INSPECTION MACHINE FOR SPUR & HELICAL GEARS

GTS100DF

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BRIEF INTRODUCTION

Double flank measurement is the most widely used method to evaluate the quality on both piece production and mass production.

GTS100DF, based on our first inspection machine GMS32, is our best-seller double flank tester having the record of universal usage on a wide range of gears and sizes.
It can measure spur & helical gears, internal, external, clamped fleetingly or on shaft, worm gears (in terms of double-flank measures) just changing the mechanical clamping system and position of the masters.

Very fast measurements, user-friendly software and transparent results give to GTS100DF the record for a reliable QC-lab instrument.

Perfect for plastic components as well as finely grinded gears used on e-mobility.

From very small gears with module of 0,05 mm up to max. diameter of measured part 100mm
the usable range makes our GTS100DF the most versatile Double Flank measurement instrument.

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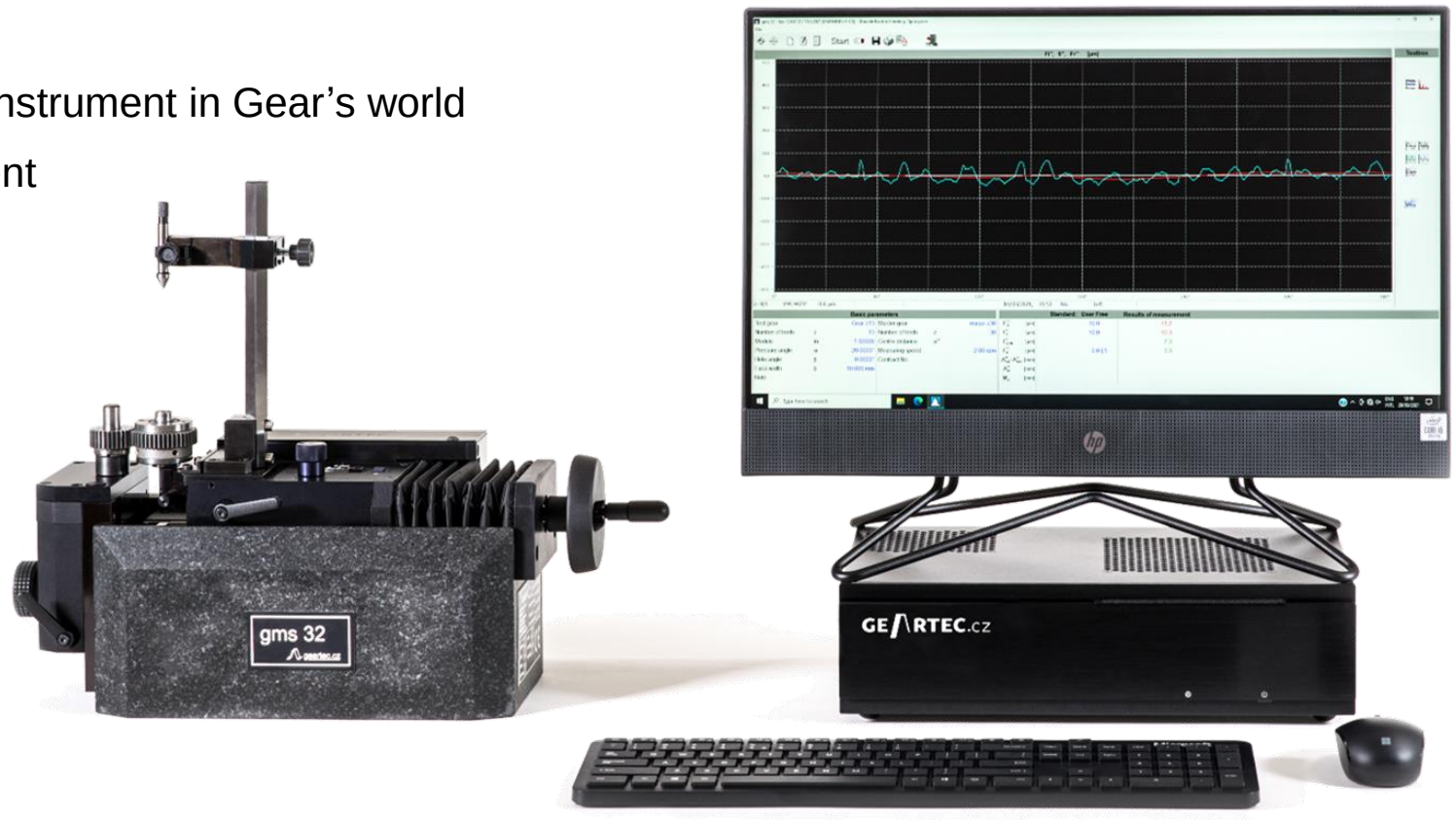
GEARTEC'S BEST SELLER formerly known as GMS32

Our smallest and well-accepted instrument in Gear's world

Double-flank measuring instrument

- ACCURATE
- EASY
- ROBUST
- UNIVERSAL
- BENCH-TOP
- RELIABLE
- STABILE
- MULTI-PURPOSE



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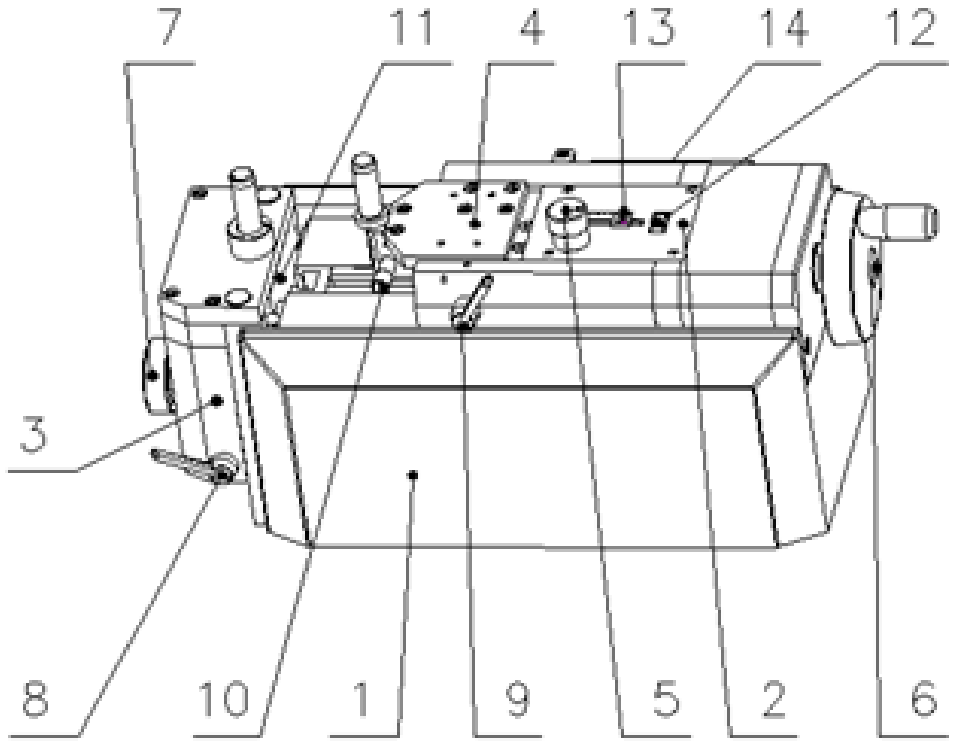
MACHINE DESCRIPTION

- A solid granite desk (**1**) with a horizontal slide (**2**) constructed and fixed on it with a handwheel (**6**) for a smooth horizontal motion of the slide.
- A vertical slide with driving axes (**3**) to be moved by a handwheel (**7**) on the left side of the machine.
- The horizontal motion can be fixed by an arresting lever (**9**) and the vertical motion by an arresting lever (**8**).
- There is a measuring carriage (**4**) with a handwheel (5) for its horizontal motion.
- On the top of the machine there is a clamping eccentric for overhung clamping (**10**) and a lock screw for arbor of driving axis (**11**).
- A handwheel for setup of preloading (**12**) is next to setup of preloading (**13**) on the top surface of the machine.
- An encoder (**14**) is placed on the rear part of the machine.



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MACHINE PARAMETERS

Range of the measured Modules	**From 0,055 – 2 mm**
Center distance	
Distance between centres of basic tester (clamped fleetingly or between centres)	**16,5 – 90 mm**
Distance between centres using a special fixture (clamped fleetingly)	**0 – 80 mm**
Vertical slide	
Vertical stroke	**50 mm**
Max. diameter of master gear (clamped between centers)	**78 mm**
Max. weight of master gear	**app. 1 kg**
Measuring slide	
Max. diameter of measured gear (clamped fleetingly)	**100 mm**
Max. diameter of measured gear (clamped between centers, basic version) Other diameter upon request.	**80 mm**
Max. length of measured gear (clamped between centers), basic version	**110 mm**
Max. length of measured gear (clamped between centers), increased version	**270 mm**
Max. weight of measured gear	**app. 1 kg**
Adjustable measuring force	**0 – 8 N**
Max. uncertainty of measuring	**up to 1 µm**
Repeatability of measuring	**up to 1 µm**

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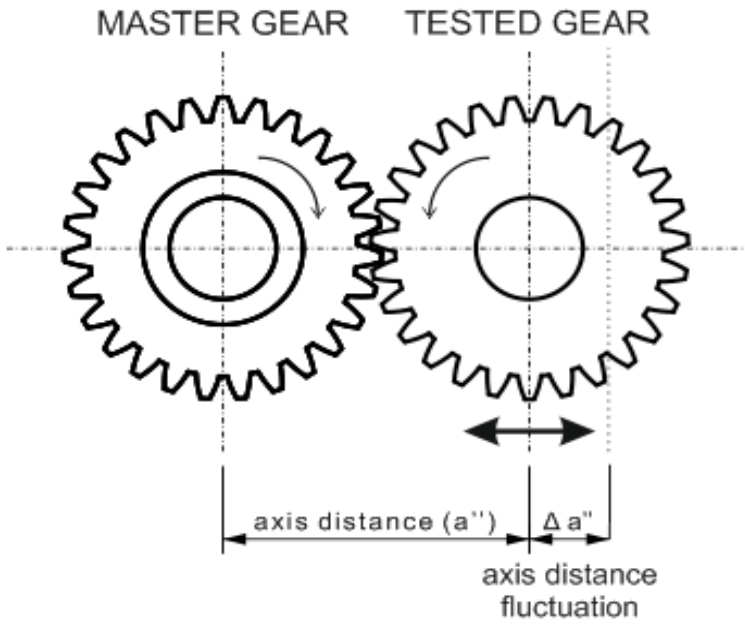
MEASURING PRINCIPLE

- Measured gear is pressed by a defined force into the contact with a master gear.
- Master gear rotates and the measured part is driven accordingly, the rolling movement creates a linear fluctuation that is analysed and processed.
- Fluctuation of axis distance is observed during rolling.



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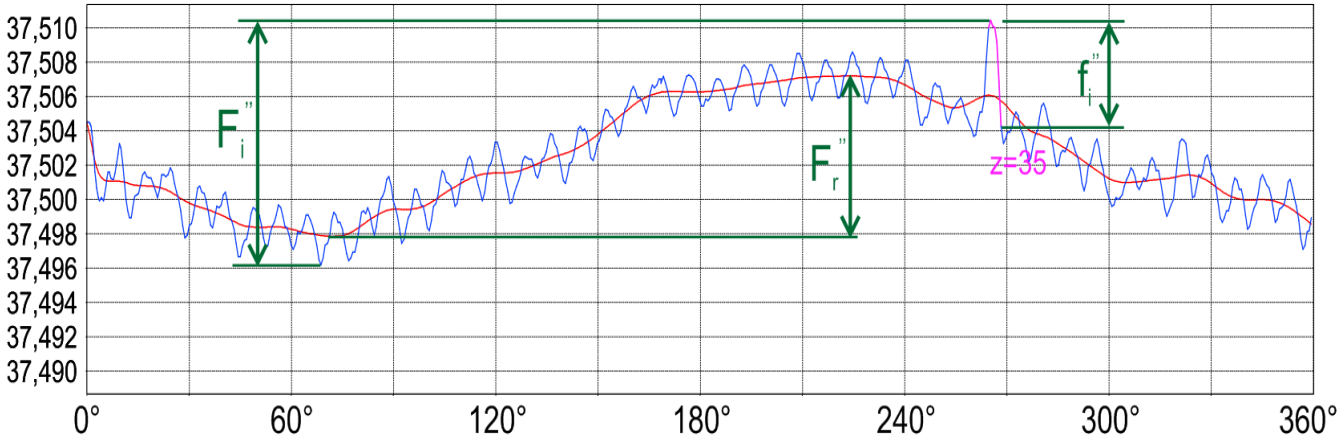
EVALUATED DEVIATIONS



F_i''	Total composite error
f_i''	Tooth to tooth error
F_r''	Radial runout (average value of double flank deviation)
j	Backlash
A_a''	Fluctuation of axis distance
M''_z	Measure over teeth
M''_{dk}	Measure over pins

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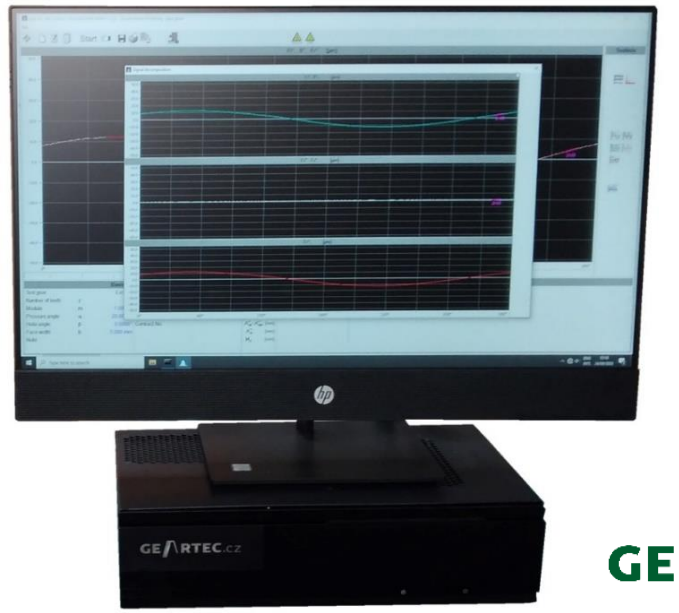
ELECTRONIC AND CONTROL

GEARTEC concept of controller, that is the brain of our GTS100DF, consists of the most up-to-date electronics for the sake of evaluation precision and speed of data transfer.

Along with the „black box“ an All-in-one computer is delivered based on Windows 11 (64bit) architecture with full-HD resolution of the large screen.

Includes a LAN switch, all power-driver cards, power supply and communication firmware.

- Electronic has been completely upgraded.
- From analogue controller to completely DIGITAL controller, entirely made in-house.
- PC based on industrial computer has been changed to the newest All-in-one Pc and communications with the controller has been increased manifolds by LAN communication.



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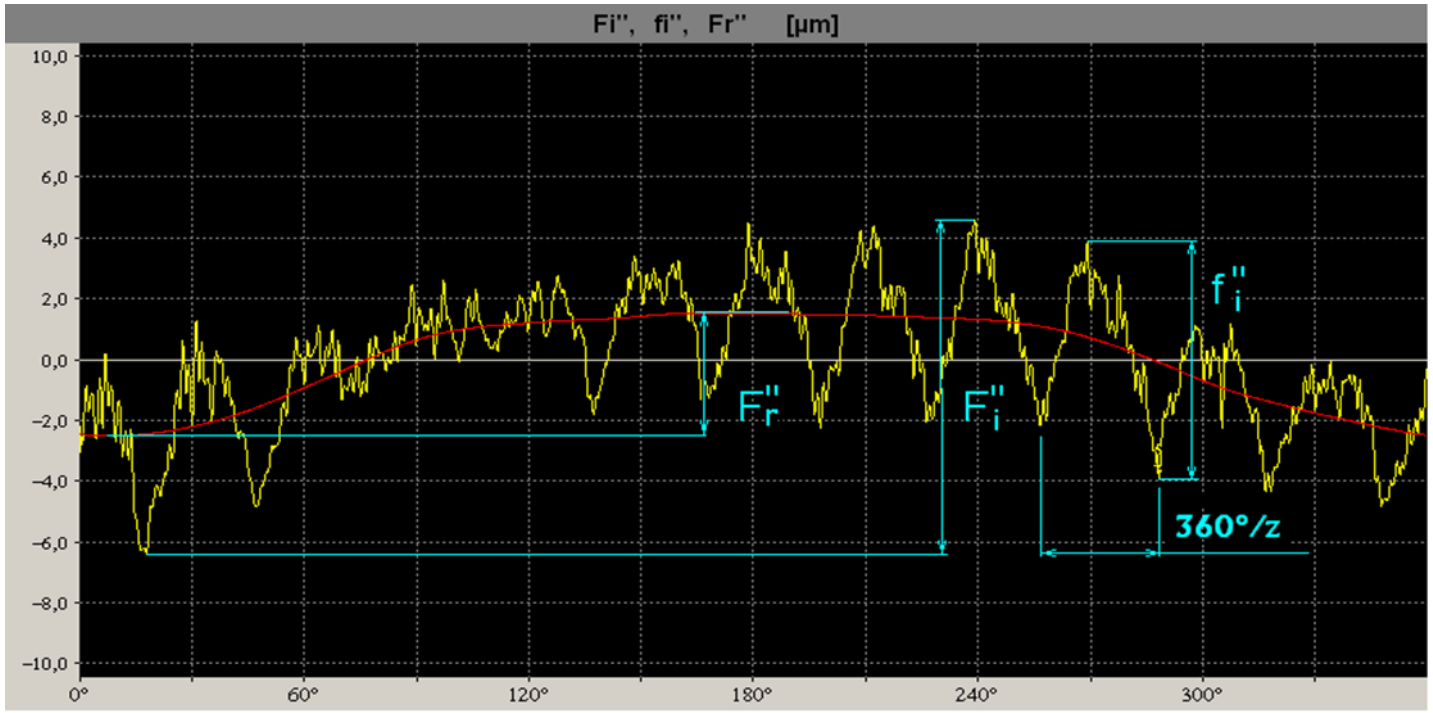
MEASURING APPLICATION

- MULTILINGUAL
- INTUITIVE
- EASY TO UNDERSTAND
- DATABASE OF RESULTS
- PERMANENT SW LICENSE
- WORKS UNDER WINDOWS
- REMOTE SERVICE POSSIBLE



This is a standard chart, showing the double flank deviations F_i'' , f_i'' , F_r''

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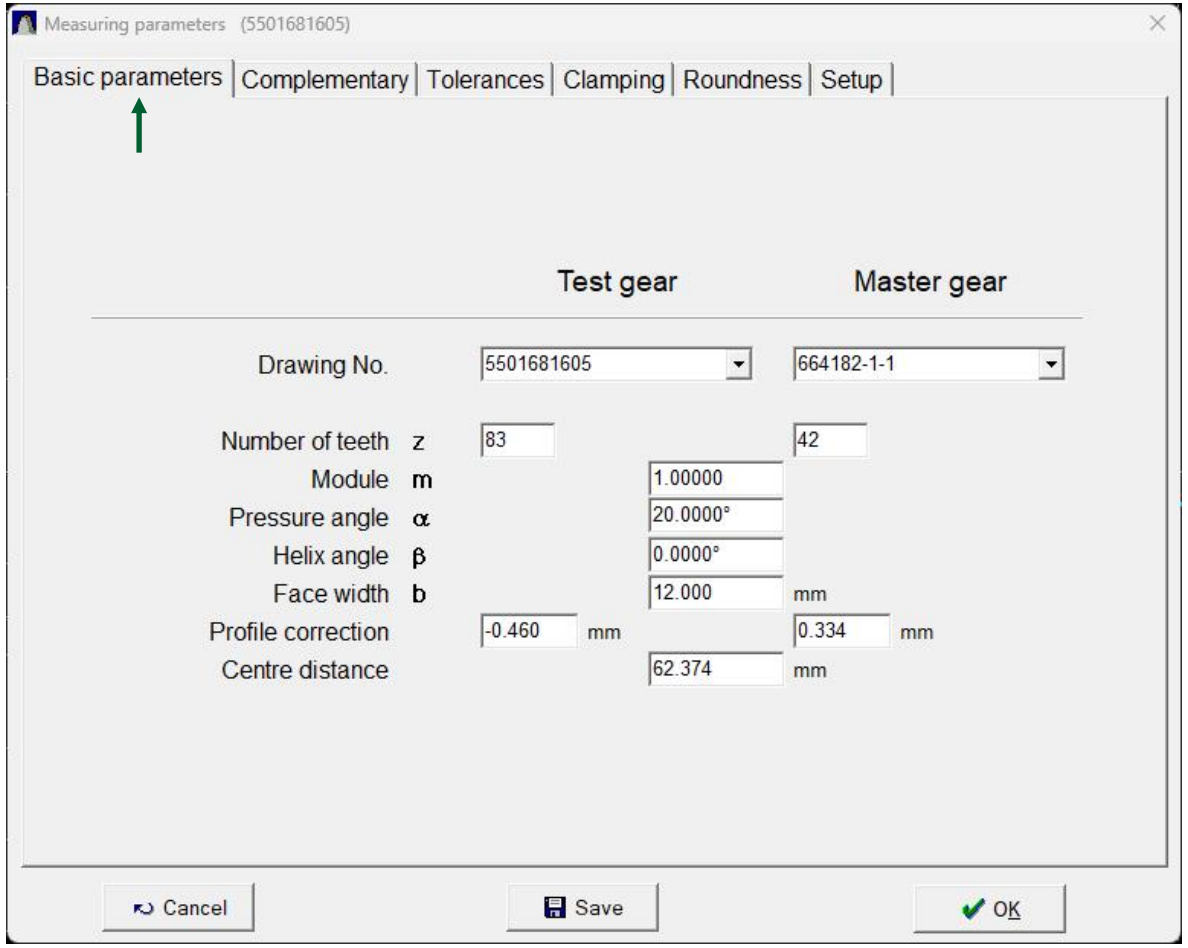
BASIC PARAMETERS



In this window the basic parameters are to be entered

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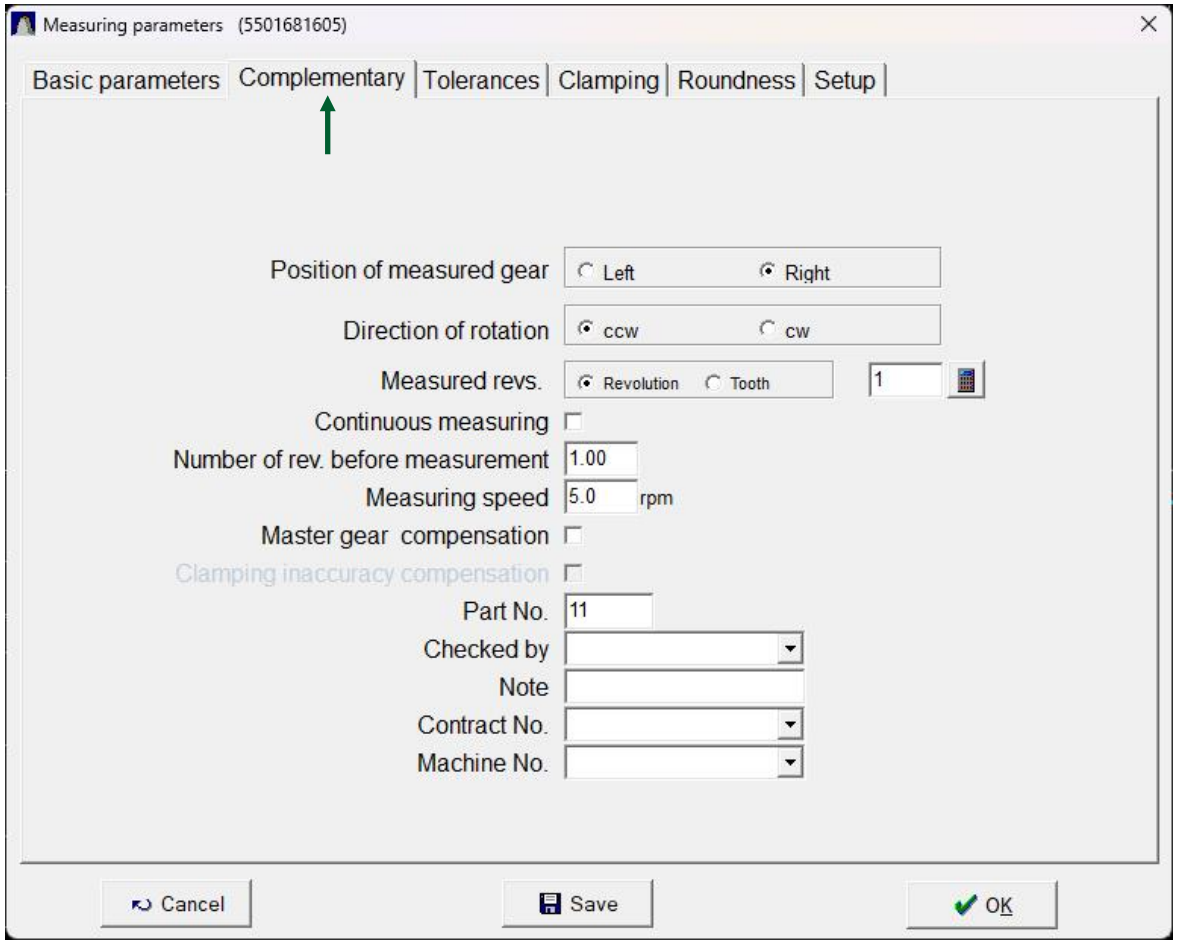
COMPLEMENTARY PARAMETERS



Entering of complementary parameters follows here

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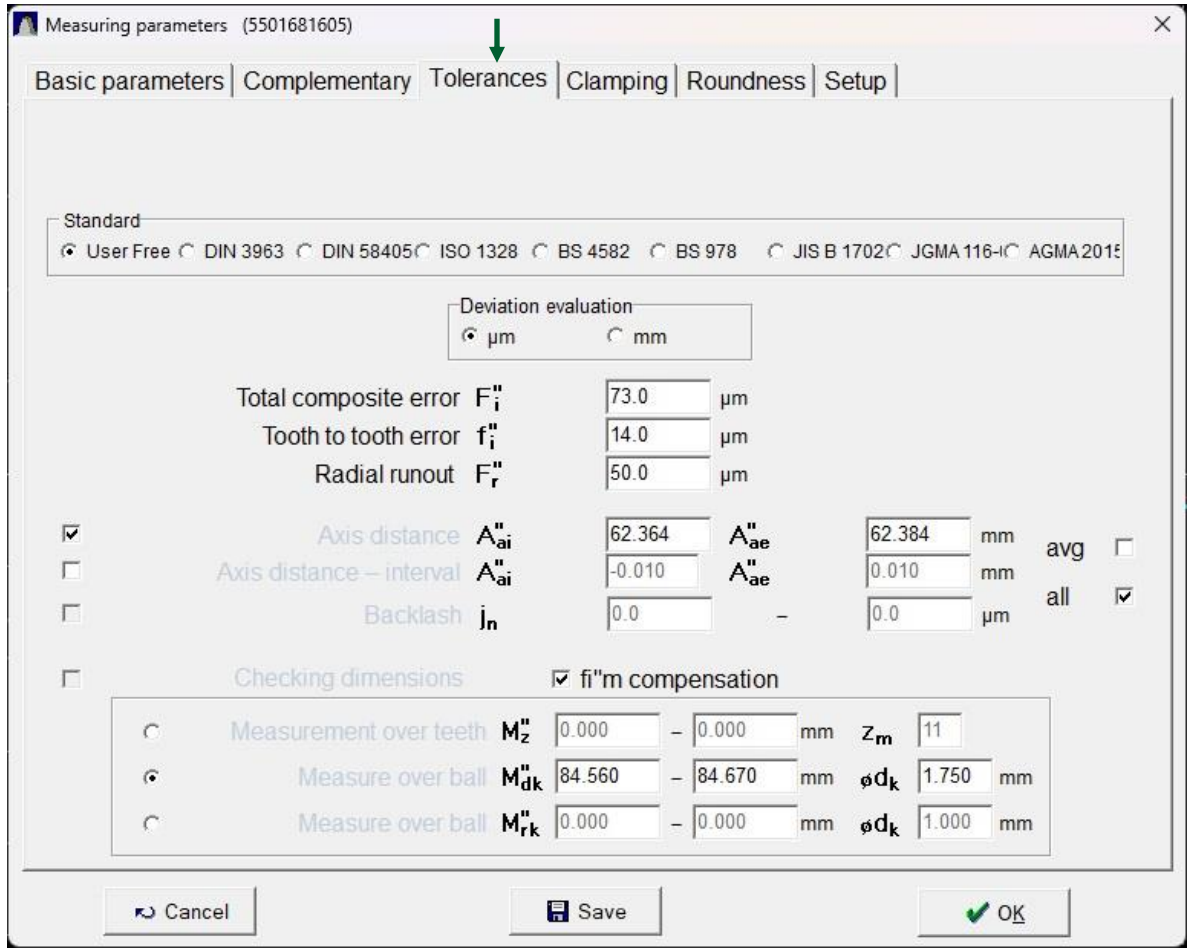
TOLERANCES



Window for selection from applicable standards and deviations

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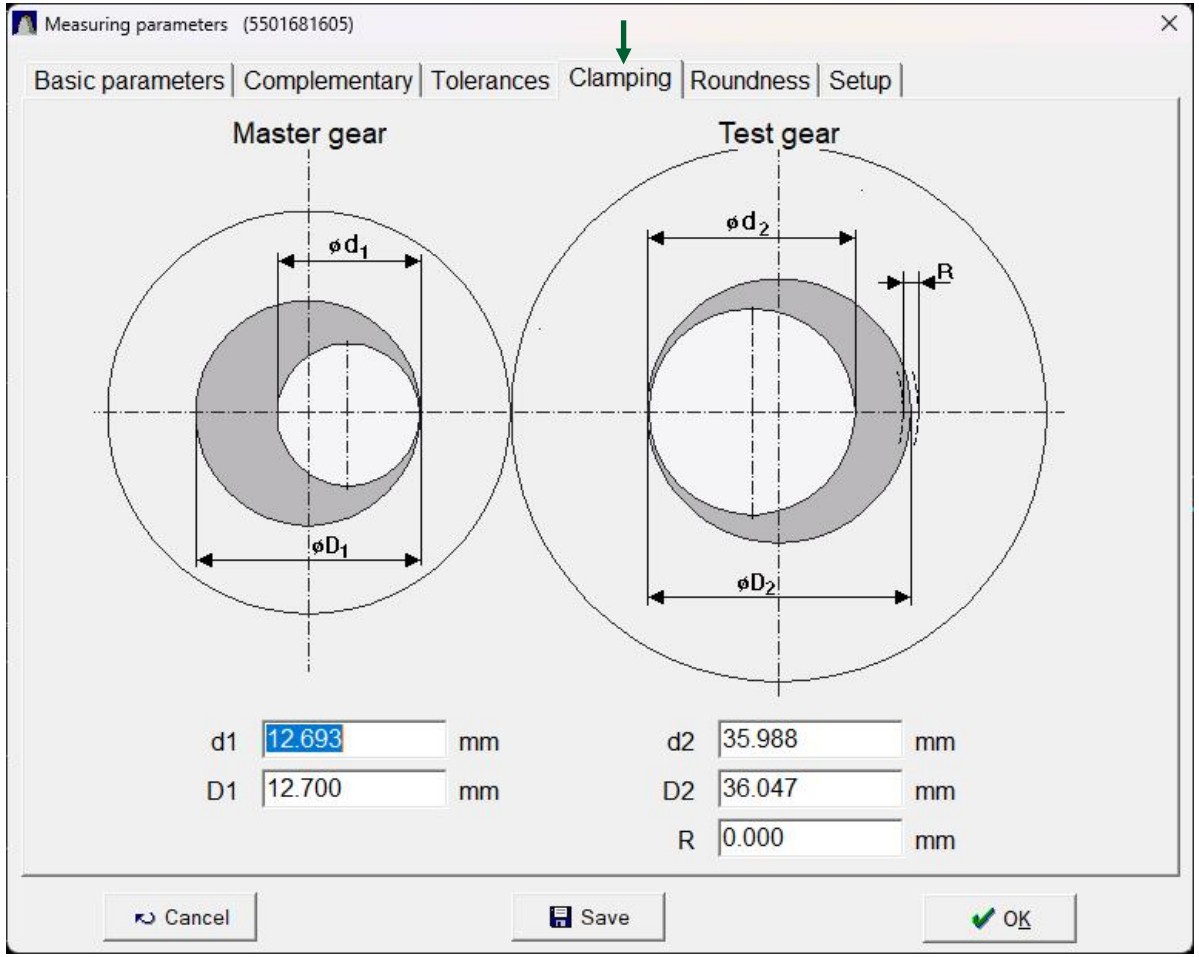
CLAMPING



This module enables to set up the axis distance precisely.
Needed for exact evaluation of measure over teeth or
measure over pins

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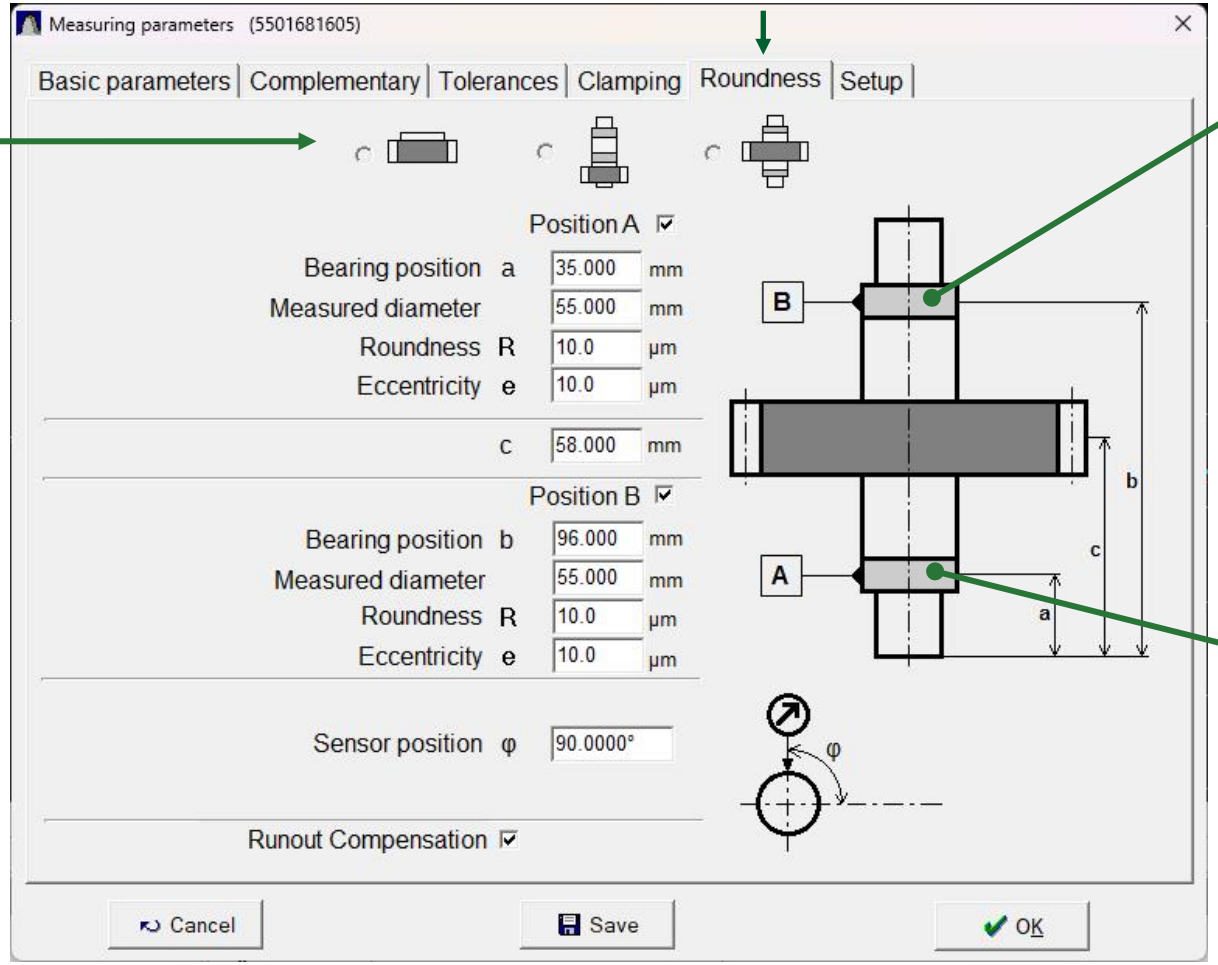
ROUNDNESS

Type of measured part



Scanned surface B

Scanned surface A

This module enables to eliminate the clamping inaccuracy

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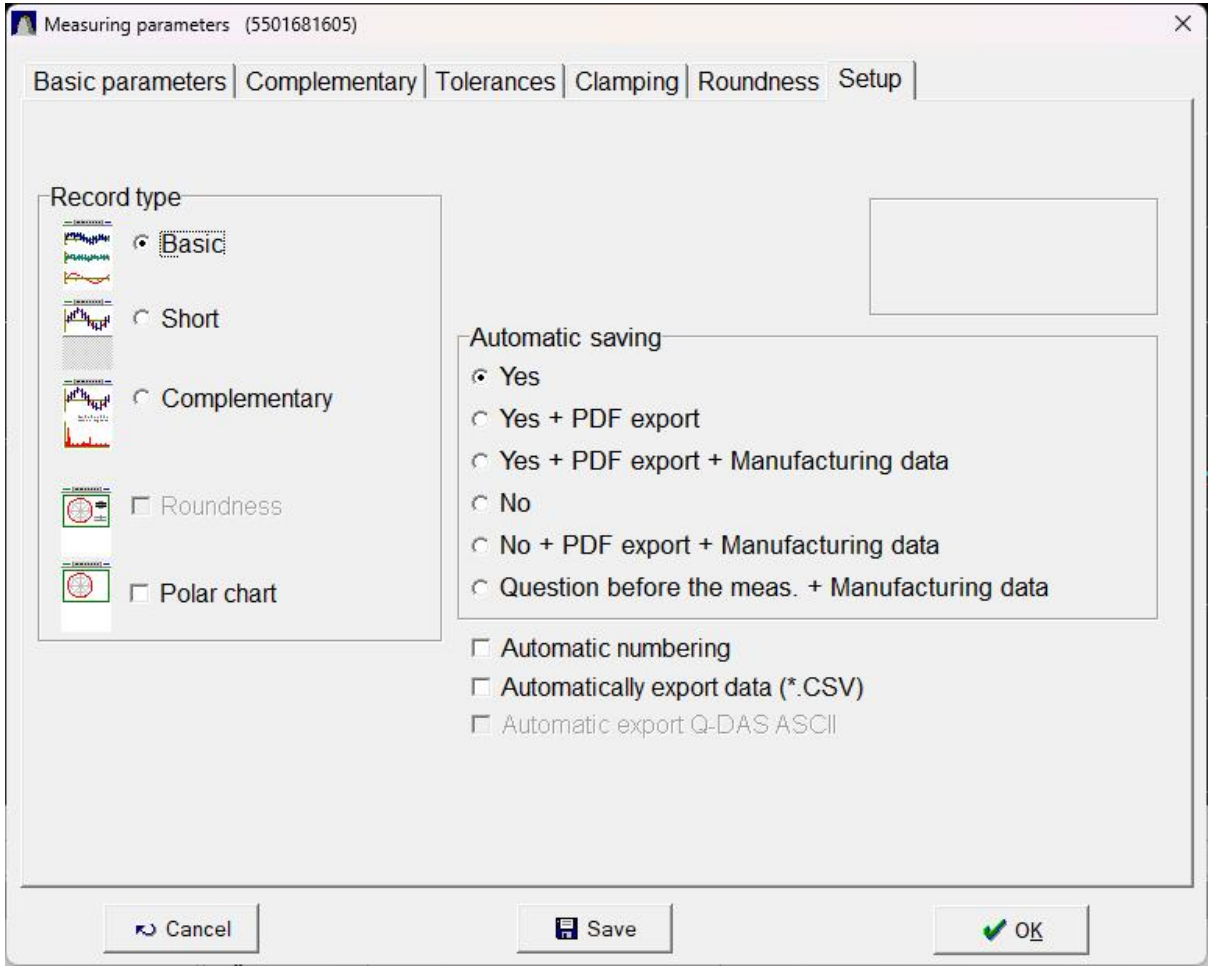
SETUP



In this window, the different types of diagram and the way of saving can be chosen

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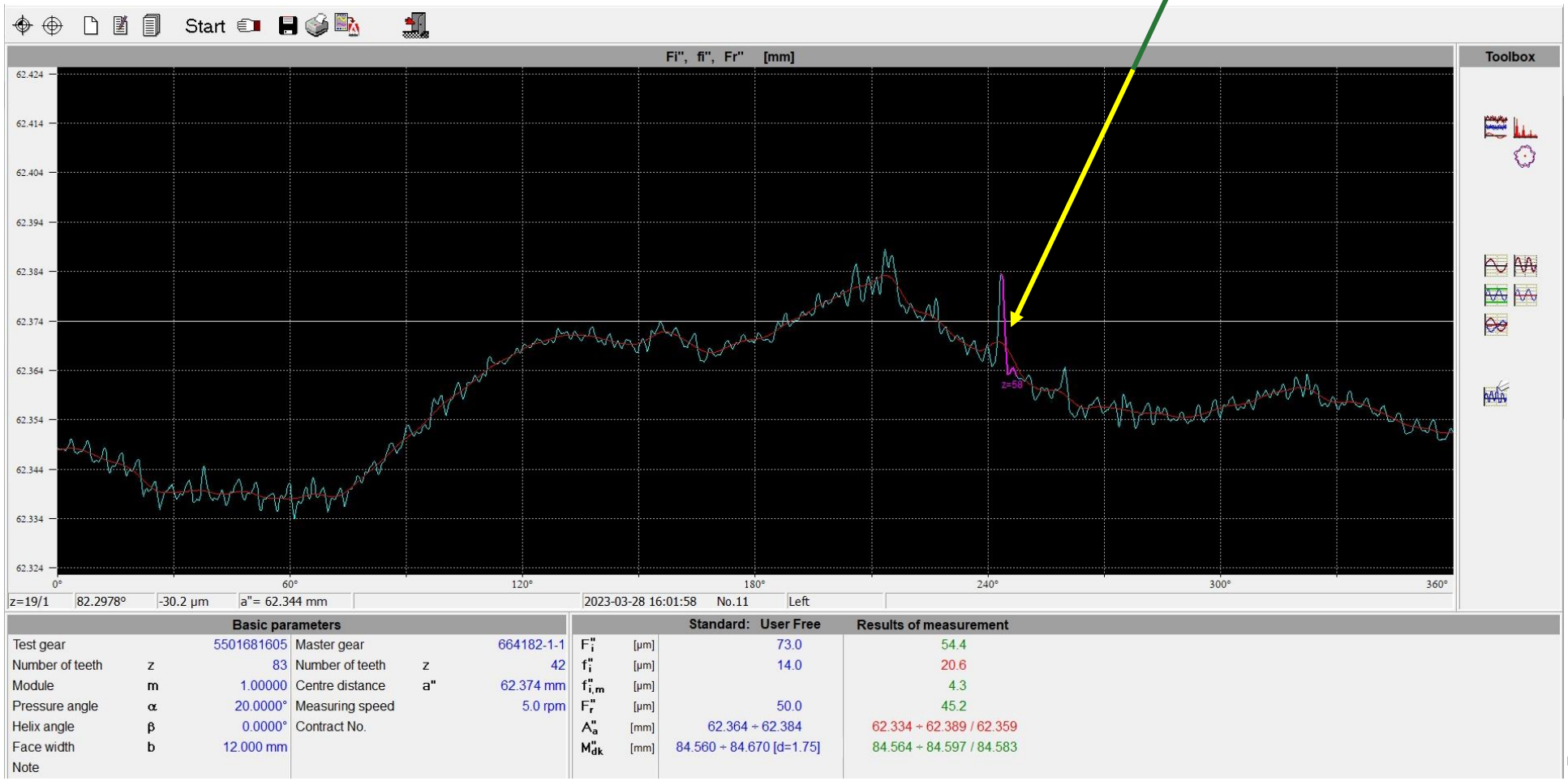
EXAMPLE OF MEASURED RESULTS

By a mouse click in the chart, the selected area rotates automatically in front of operator.



Basic parameters					
Test gear		5501681605	Master gear		664182-1-1
Number of teeth	z	83	Number of teeth	z	42
Module	m	1.00000	Centre distance	a"	62.374 mm
Pressure angle	α	20.0000°	Measuring speed		5.0 rpm
Helix angle	β	0.0000°	Contract No.		
Face width	b	12.000 mm			
Note					

		Standard: User Free	Results of measurement
F''_i	[µm]	73.0	54.4
f''_i	[µm]	14.0	20.6
$f''_{i,m}$	[µm]		4.3
F''_r	[µm]	50.0	45.2
A''_a	[mm]	62.364 ÷ 62.384	62.334 ÷ 62.389 / 62.359
M''_{dk}	[mm]	84.560 ÷ 84.670 [d=1.75]	84.564 ÷ 84.597 / 84.583

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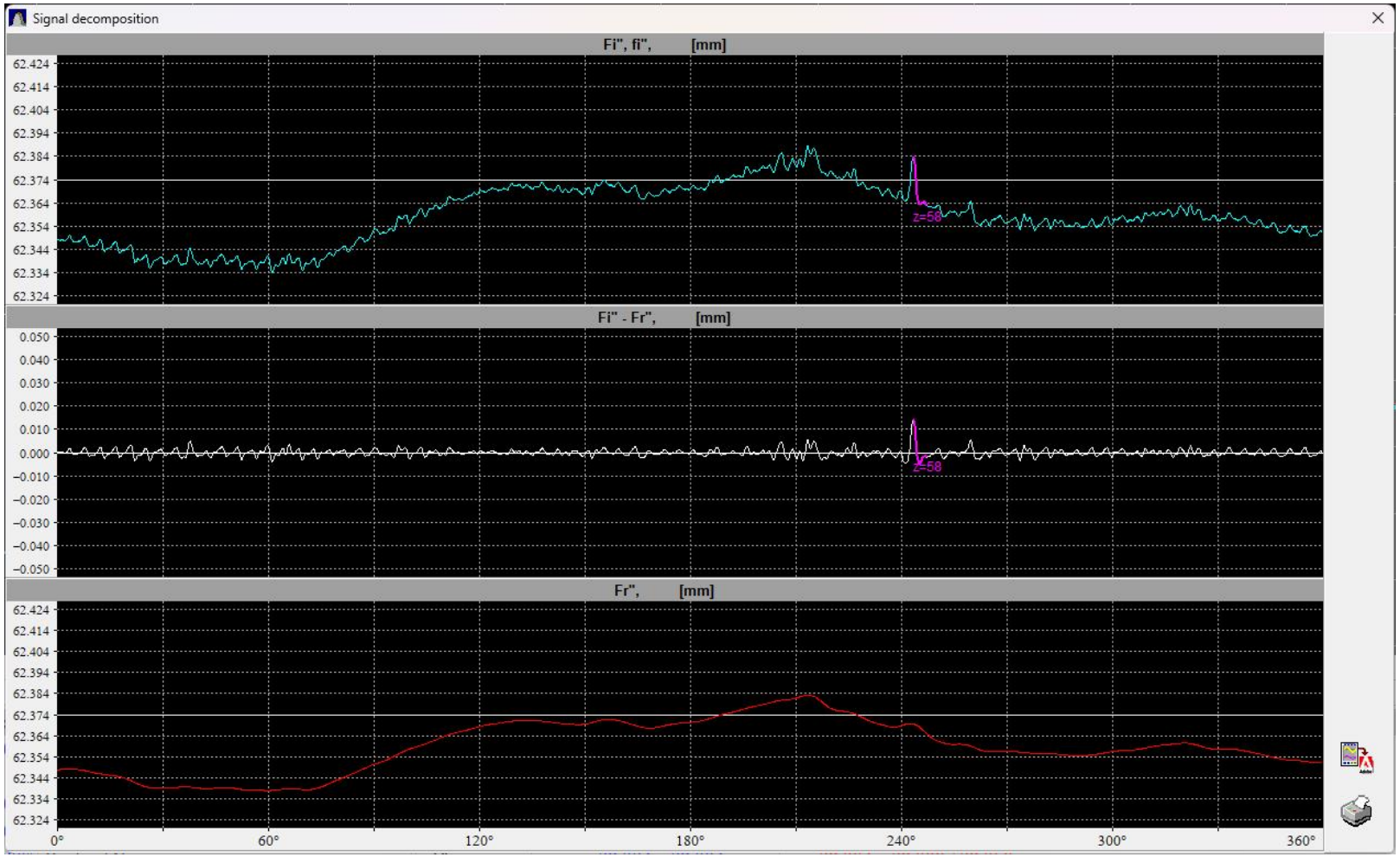
SIGNAL DECOMPOSITION



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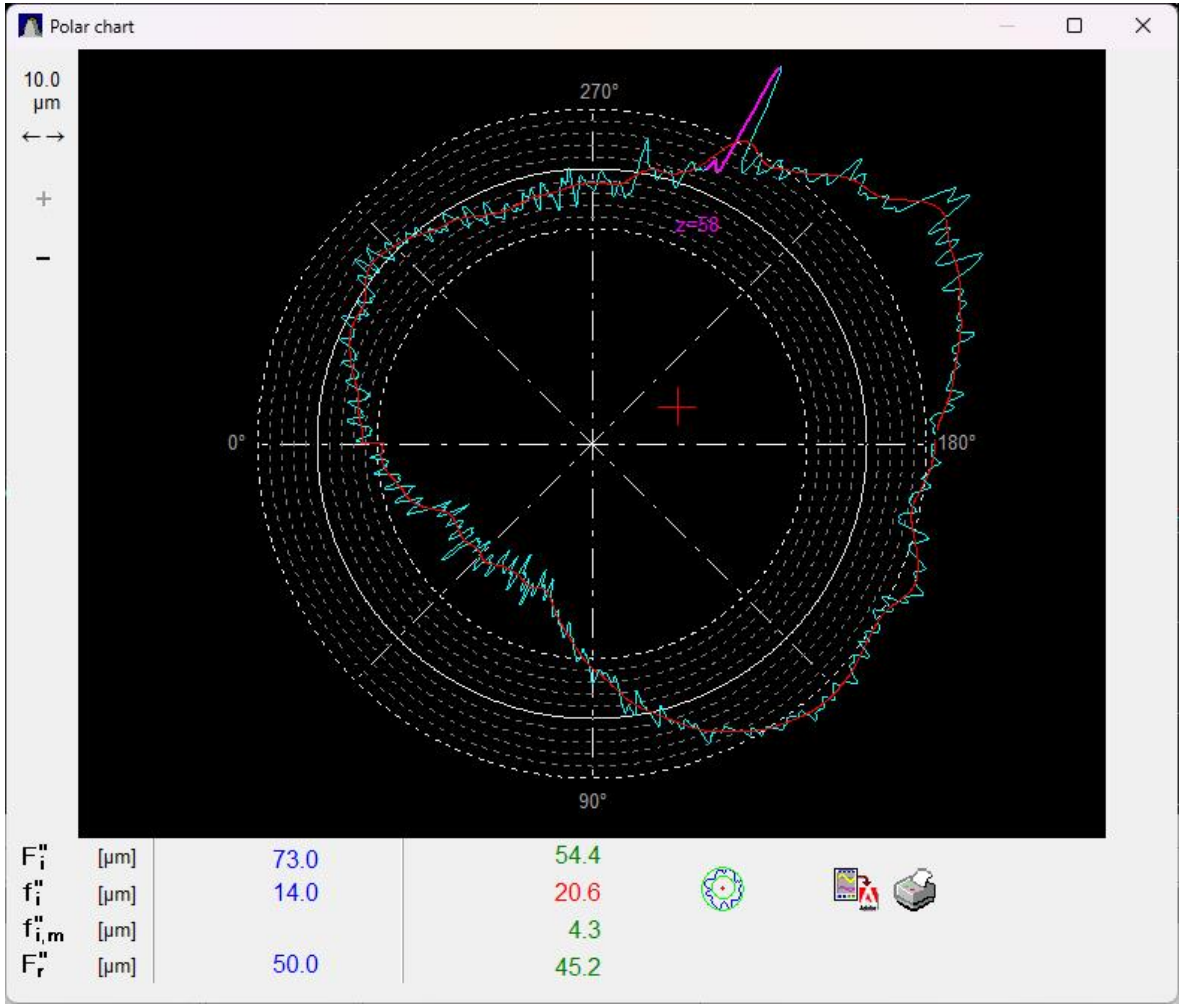
POLAR CHART



Optional software module for quick depiction of tested part shape.
Useful tool in case of asymmetric, thin walled or plastic gears.

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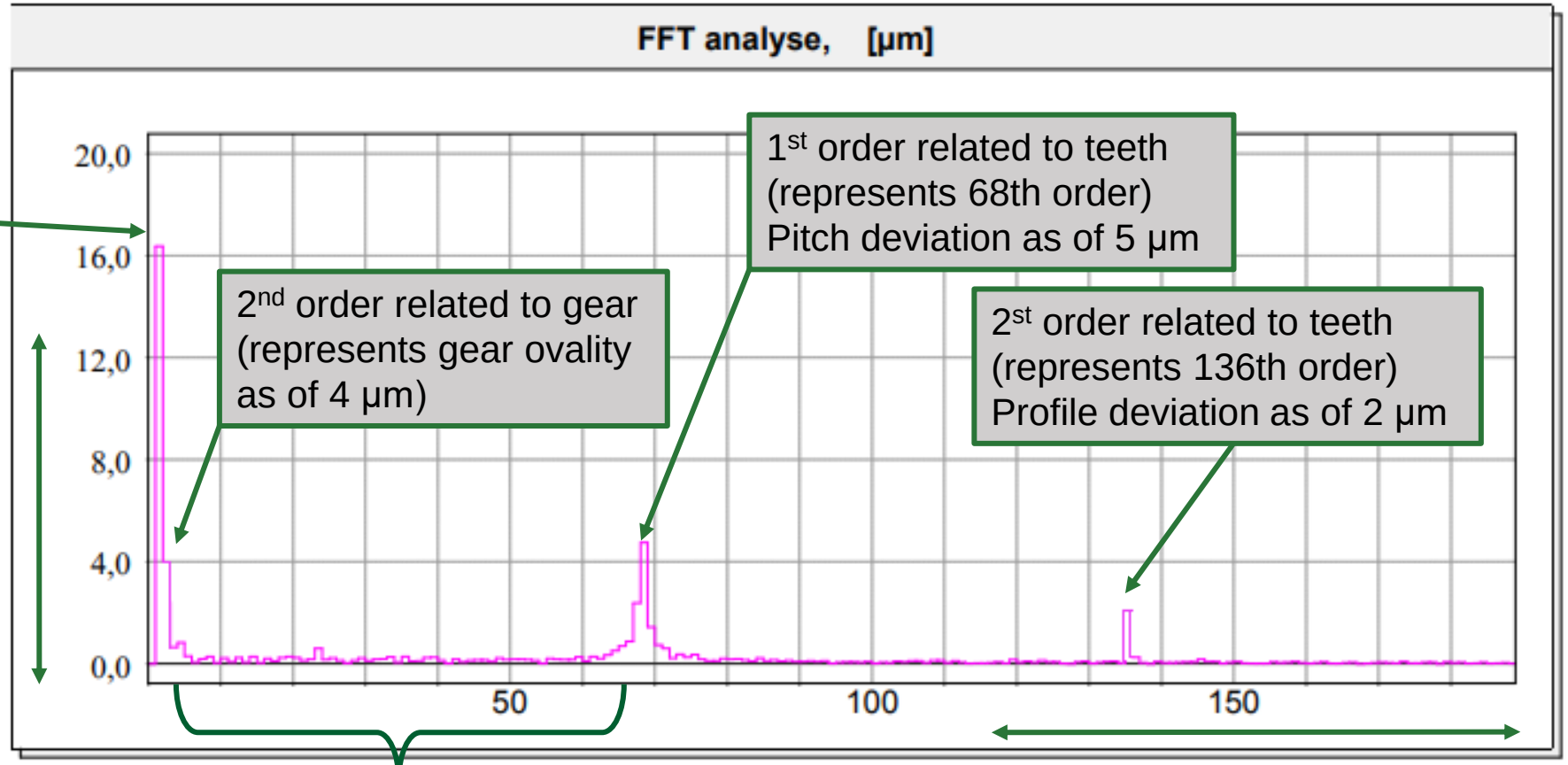
FFT ANALYSIS

Gear with 68 teeth



1st order related to gear (gear runout as of 17 µm)

1st order related to teeth (represents 68th order) Pitch deviation as of 5 µm

2nd order related to gear (represents gear ovality as of 4 µm)

2st order related to teeth (represents 136th order) Profile deviation as of 2 µm

Vertical scale = amplitude of each harmonic order in µm

Harmonic orders of unknown source(s) (ghost frequencies) in µm coming from production process!

Individual harmonic orders

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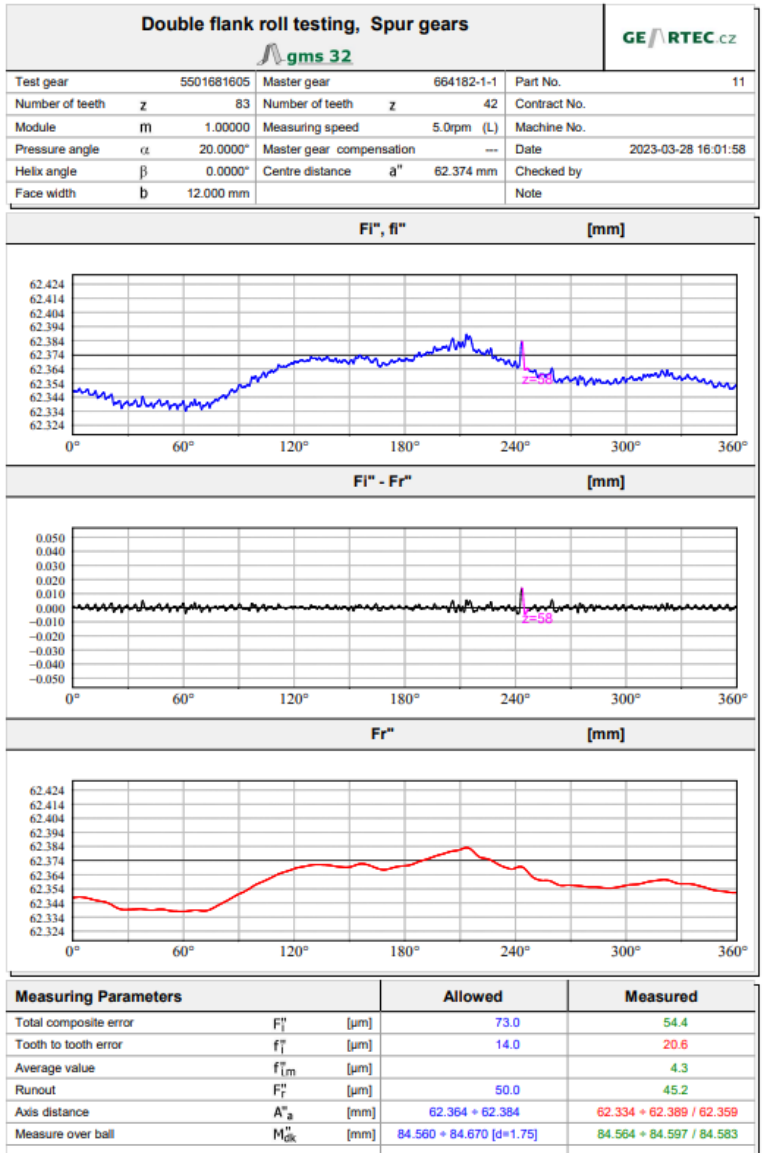
INSPECTION REPORT

- Our inspection report is fully configurable.
- Decomposition of the results is an optimum method to understand the charts and data.
- The decomposition is displayed in the scale that was set in the working window.
- Scale is changeable on screen adjusting itself to the displayed results
- All these details are also displayed in the individual component charts.



Double flank roll testing, Spur gears

gms 32

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Test gear		5501681605	Master gear		664182-1-1	Part No.	11
Number of teeth	z	83	Number of teeth	z	42	Contract No.	
Module	m	1.00000	Measuring speed		5.0rpm (L)	Machine No.	
Pressure angle	α	20.0000°	Master gear compensation		---	Date	2023-03-28 16:01:58
Helix angle	β	0.0000°	Centre distance	a"	62.374 mm	Checked by	
Face width	b	12.000 mm				Note	

Fi", fi" [mm]

62.424 62.414 62.404 62.394 62.384 62.374 62.364 62.354 62.344 62.334 62.324

0° 60° 120° 180° 240° 300° 360°

Fi" - Fr" [mm]

0.050 0.040 0.030 0.020 0.010 0.000 −0.010 −0.020 −0.030 −0.040 −0.050

0° 60° 120° 180° 240° 300° 360°

Fr" [mm]

62.424 62.414 62.404 62.394 62.384 62.374 62.364 62.354 62.344 62.334 62.324

0° 60° 120° 180° 240° 300° 360°

Measuring Parameters			Allowed	Measured
Total composite error	F_i''	[µm]	73.0	54.4
Tooth to tooth error	f_i''	[µm]	14.0	20.6
Average value	f_{im}''	[µm]		4.3
Runout	F_r''	[µm]	50.0	45.2
Axis distance	A_a''	[mm]	62.364 ÷ 62.384	62.334 ÷ 62.389 / 62.359
Measure over ball	M_{dk}''	[mm]	84.560 ÷ 84.670 [d=1.75]	84.564 ÷ 84.597 / 84.583

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HEADER OF INSPECTION REPORT

Your logo appears here

Double flank roll testing, Spur gears

gms 32

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Test gear		5501681605	Master gear		664182-1-1	Part No.	11
Number of teeth	z	83	Number of teeth	z	42	Contract No.	
Module	m	1.00000	Measuring speed		5.0rpm (L)	Machine No.	
Pressure angle	α	20.0000°	Master gear compensation		---	Date	2023-03-28 16:01:58
Helix angle	β	0.0000°	Centre distance	a"	62.374 mm	Checked by	
Face width	b	12.000 mm				Note	

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FOOTER OF INSPECTION REPORT

Measuring Parameters			Allowed	Measured
Total composite error	F''_i	[µm]	73.0	54.4
Tooth to tooth error	f''_i	[µm]	14.0	20.6
Average value	$f''_{i,m}$	[µm]		4.3
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Axis distance	A''_a	[mm]	62.364 ÷ 62.384	62.334 ÷ 62.389 / 62.359
Measure over ball	M''_{dk}	[mm]	84.560 ÷ 84.670 [d=1.75]	84.564 ÷ 84.597 / 84.583

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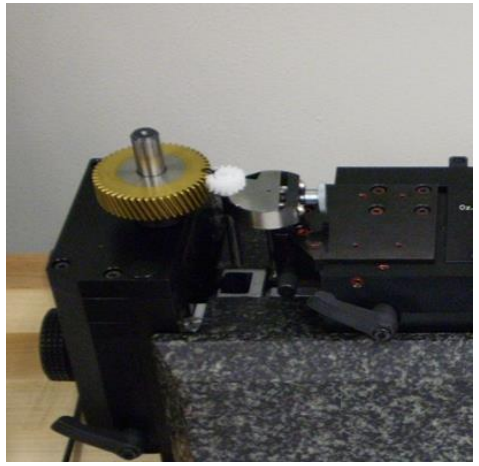
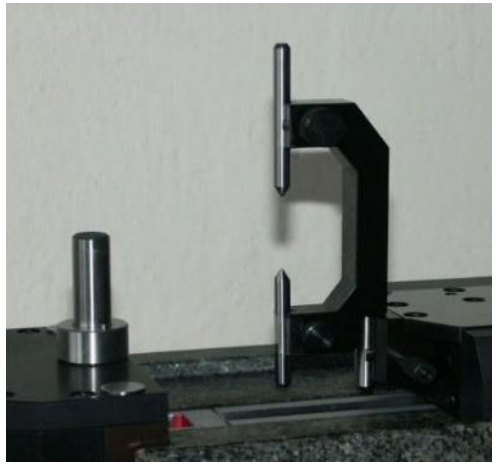
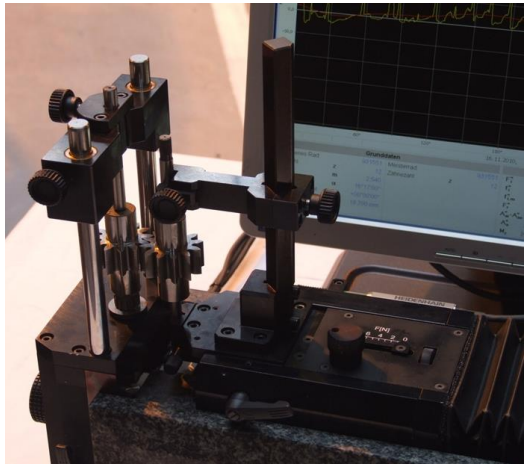
WIDE RANGE OF OPTIONAL ACCESSORIES



Clamping fixture
for smallest gears



Mini centre bracket



Clamping between centres

Attachment for measuring
of internal gears

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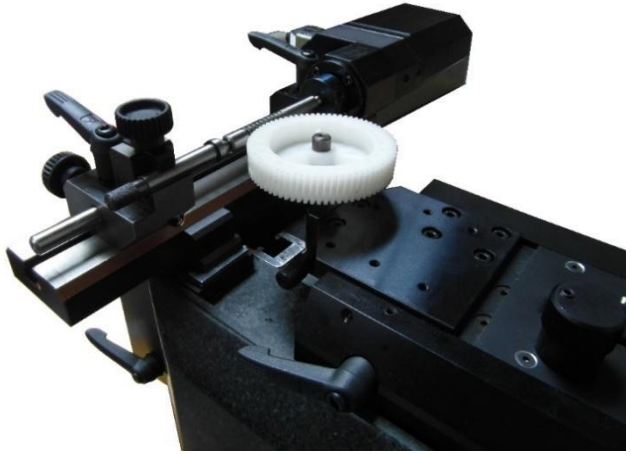
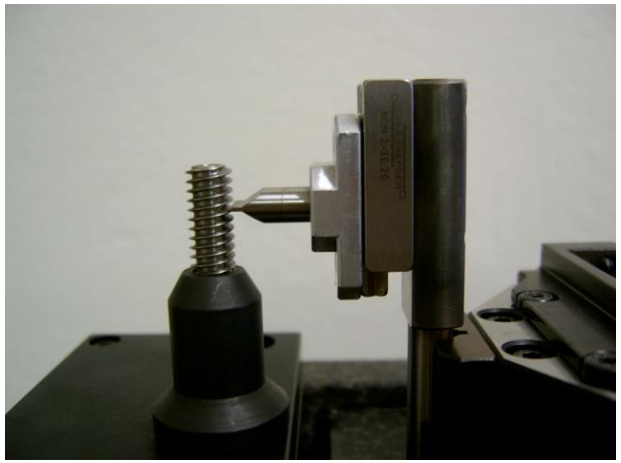
WIDE RANGE OF OPTIONAL ACCESSORIES



Attachment for measuring of worms & worm gears



Attachment for testing of runout, shape and measure over pins of small worms

Master gears

AND MANY OTHER …

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REFERENCE LIST

NEARLY 100 PIECES OF GTS100DF OPERATE IN 16 COUNTRIES AROUND THE WORLD.

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CONTACT US AT ANY TIME

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