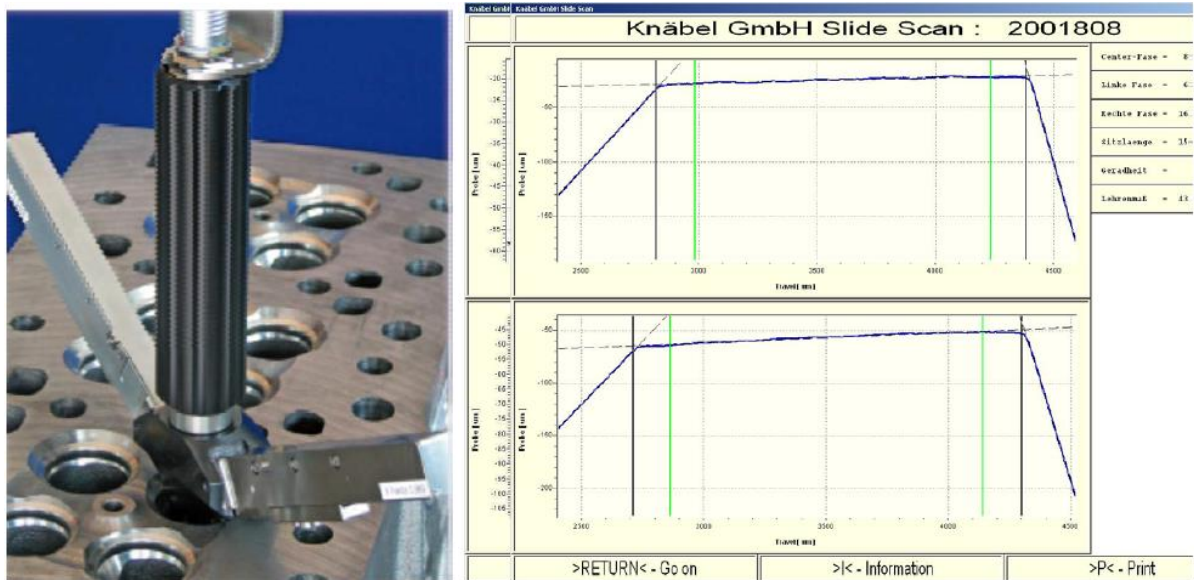


## 1. Introduction

The test step function Knäbel GmbH Slide Scan provides all functions to calibrate, measure and visualize measuring results of Knäbel Slide Scan gauges for valve seats :

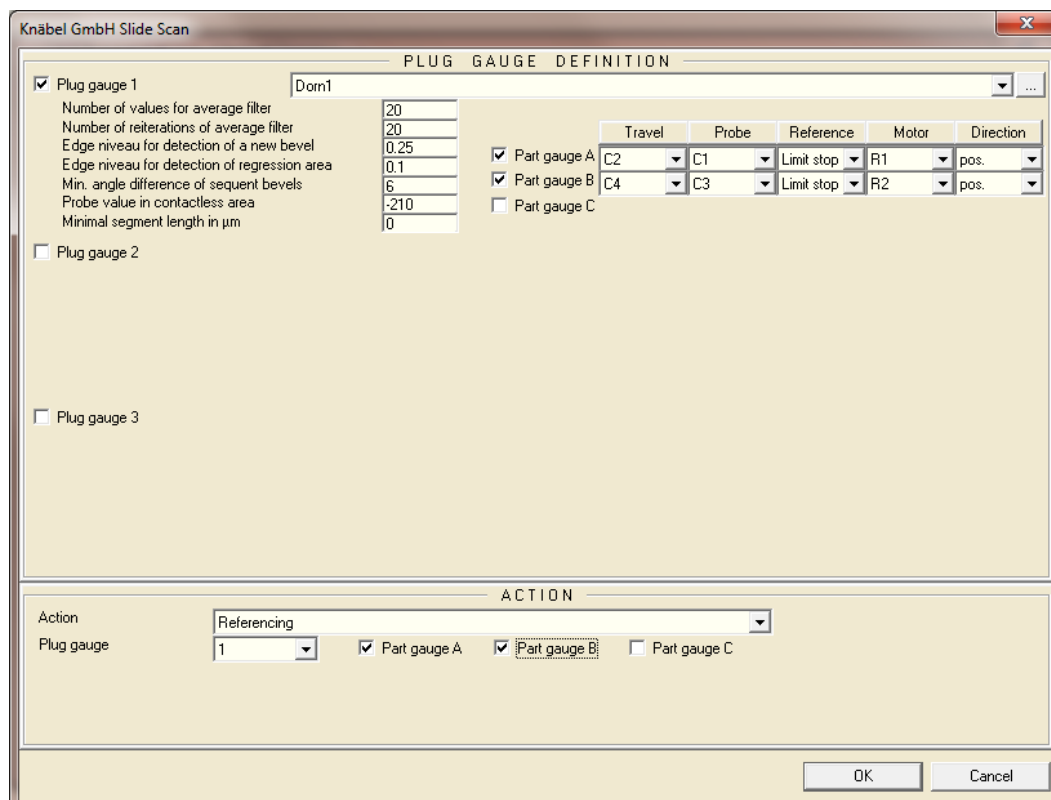


### Important notes :

- This test step function can only be executed in a ComGage test order.
- The software license 71 is required for this test step function.

## 2. Configuration

The function is created in in a test step. By pressing the *Setup* button the following dialogue can be opened :



The figure shows the "Knäbel GmbH Slide Scan" configuration dialog box. The title bar is "Knäbel GmbH Slide Scan". The main window is divided into two sections: "PLUG GAUGE DEFINITION" and "ACTION".

**PLUG GAUGE DEFINITION:**

- ☒ Plug gauge 1: Dorn1
  - Number of values for average filter: 20
  - Number of iterations of average filter: 20
  - Edge niveau for detection of a new bevel: 0.25
  - Edge niveau for detection of regression area: 0.1
  - Min. angle difference of sequent bevels: 6
  - Probe value in contactless area: -210
  - Minimal segment length in µm: 0
- ☐ Plug gauge 2
- ☐ Plug gauge 3

**Table:**

	Travel	Probe	Reference	Motor	Direction
<input checked="" type="checkbox"/> Part gauge A	C2	C1	Limit stop	R1	pos.
<input checked="" type="checkbox"/> Part gauge B	C4	C3	Limit stop	R2	pos.
<input type="checkbox"/> Part gauge C					

**ACTION:**

- Action: Referencing
- Plug gauge: 1
- ☒ Part gauge A
- ☒ Part gauge B
- ☐ Part gauge C

Buttons: OK, Cancel

The dialogue offers the following configuration options :

In the upper part “PLUG GAUGE DEFINITION” three different plug gauges can be defined :

**Note :** *These settings are valid for all test steps inside one test scheme.*

- In the first line of each plug gauge the INI-file can be selected & programmed ( see chapter 5 ).
- With the settings “Number of values for average filter”, ..., “Minimal segment length in  $\mu\text{m}$ ” the analysis algorithms for Component Measurement can be programmed.
- Each plug gauge can consist of 1...3 part gauges.

For the encoder and the probe each time a characteristic must be created for reading the raw values. The characteristics are assigned as value source to the part gauges.

The motor is controlled over “digital outputs” inside the test scheme. The assigned Register is used to set / reset these digital outputs ( see page 8 ).

In the lower part “ACTION” it is defined which function shall be executed :

- Available actions :
  - Referencing ( all motors are moved to the reference )
  - Scan with graphical output of the results
  - Angle Calibration ( with Min & Max Master ) → also available without graphics
  - Gauge Dimension-Calibration ( with one Master ) → also available without graphics
  - Component Measurement ( Measurement & Analysis of a part )
  - Graphic output of the component measurement ( graphical visualisation of the measurement results )
  - Graphic output of filtered values, 2<sup>nd</sup> derivation, result ( only for setting up the algorithms )
  - Loading of a \*.dat file / Writing of a \*.dat file ( read / write raw values into a \*.dat file for analysis )
  - Positioning ( drive motors to a fix position )
  - Execution of started action ( Checks whether the currently running action, e.g. Component Measurement is finished or not / Answer over Register R100 )
  - Check Angle-Master ( Measures one master and outputs its calibrated angle for checking the calibration ) → also available without graphics
  - Stop of started action ( stops the currently running action )
  - Writing of a \*.dat file (<test order>\_<plug gauge>\_<timestamp>.dat)  
( writes raw values into a \*.dat file with the name format as stated )
- For all functions the Plug Gauge and Part gauges must be selected.
- On most functions the start / stop positions for the motors must be input in  $\mu\text{m}$ , as well as the gauge diameter in mm.

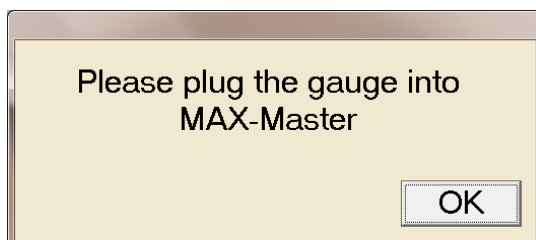
### Additional information for actions

“Scan with graphical output of the results”

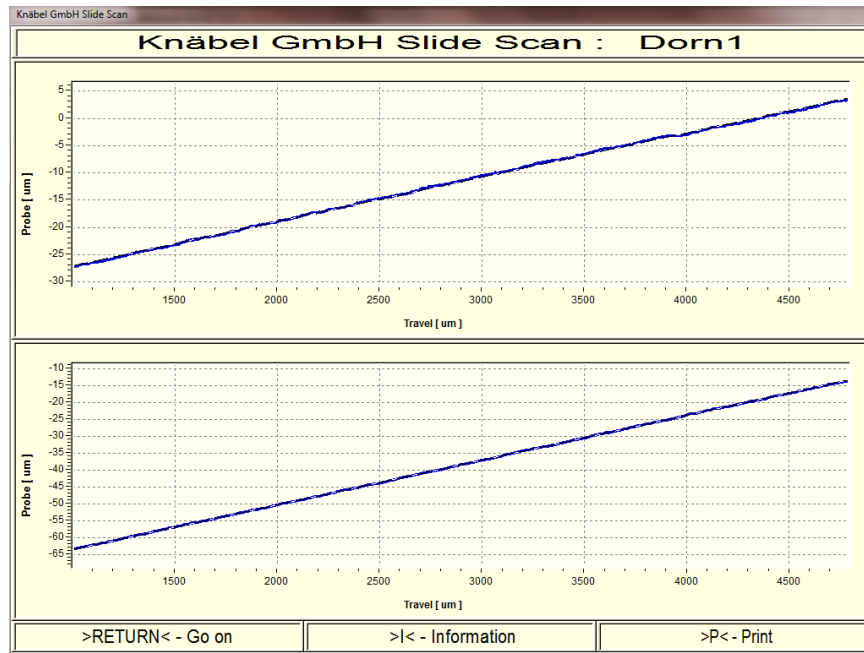
- For the selected part gauges the measuring values are collected over the defined range ( = start / stop ).
- The collected curves are shown in a graphic and can be later stored as \*.dat file.

“Angle calibration”

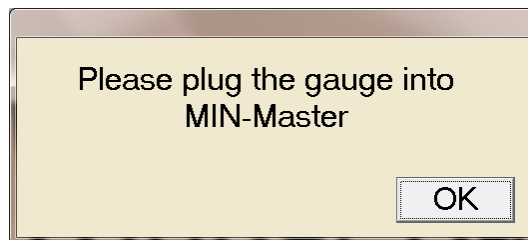
- The software requests the operator to put the plug gauge into the MAX-master :



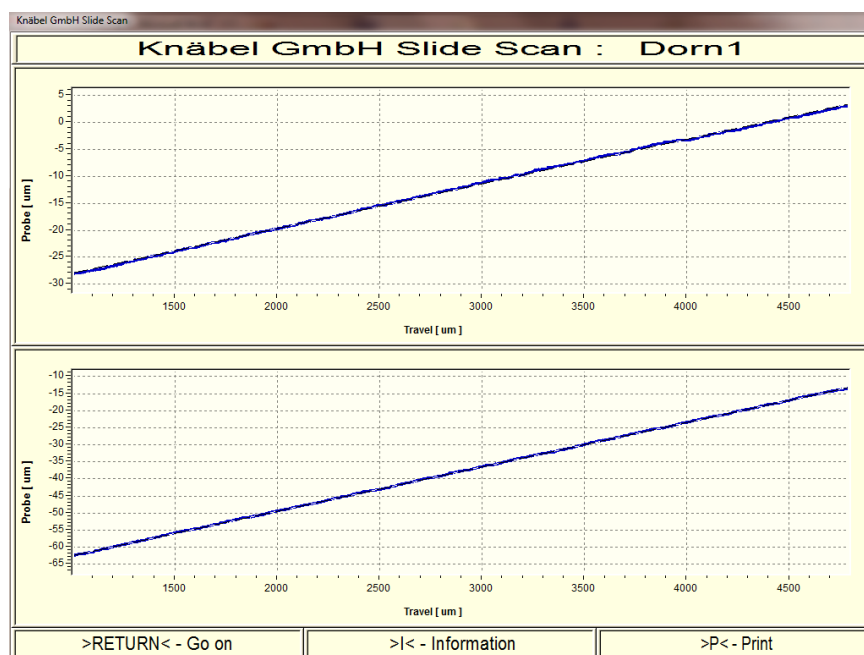
- For the selected part gauges the measuring values are collected over the defined range ( = start / stop ) and shown after measurement in the graphic :



- The software requests the operator to put the plug gauge into the MIN-master :



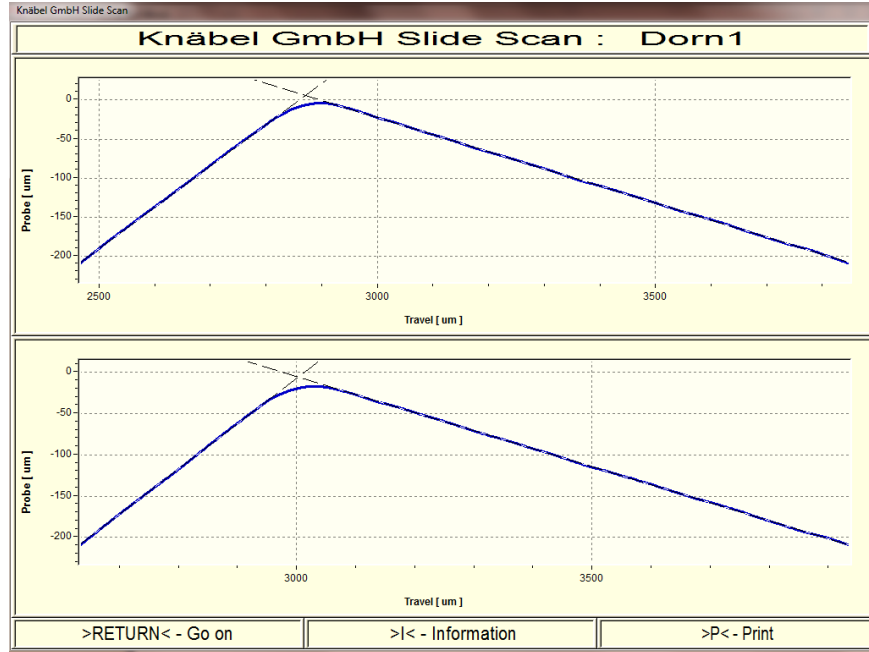
- For the selected part gauges the measuring values are collected over the defined range ( = start / stop ) and shown after measurement in the graphic :



- The calibration factor ( **CorrAngle** ) and offset ( **Skal** ) are calculated and stored in INI file.

### “Gauge Dimension-Calibration”

- The software requests the operator to put the plug gauge into the master.
- For the selected part gauges the measuring values are collected over the defined range ( = start / stop ) and shown after measurement in the graphic :



- The two offsets ( **MasterGageLinePos & PositionOffset\_180** ) are calculated and stored in INI file.

### “Component measurement”

- For the selected part gauges the measuring values are collected over the defined range ( = start / stop ).
- The software calculates the valve seat parameters and stores them in Registers :
  - R101 = Angle of center bevel [ in ° ]
  - R102 = Angle of left bevel [ in ° ]
  - R103 = ...

( see chapter 4 )

These Registers are used to assign the results to the characteristics.

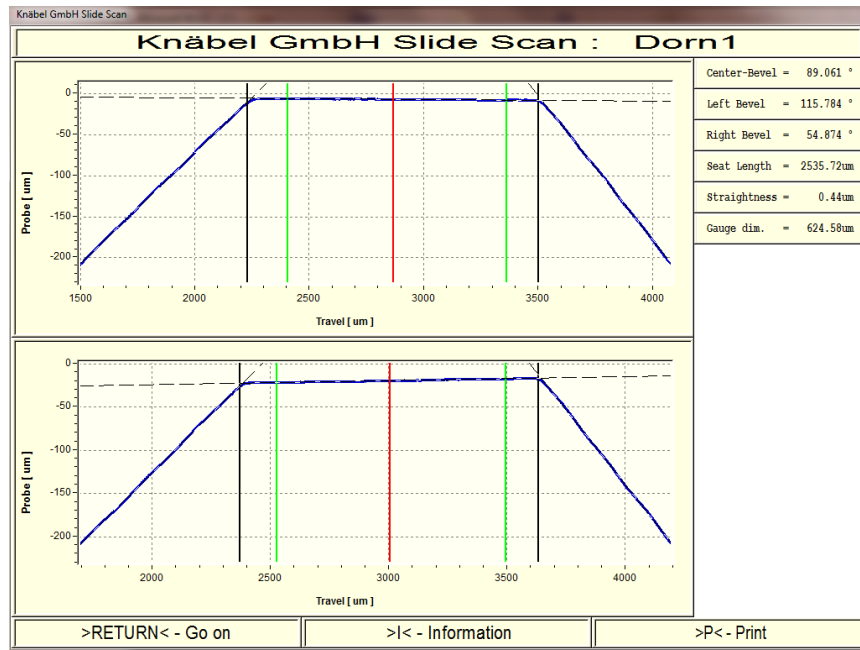
# ComGage – Test step function SFct040

## “Knäbel GmbH Slide Scan”



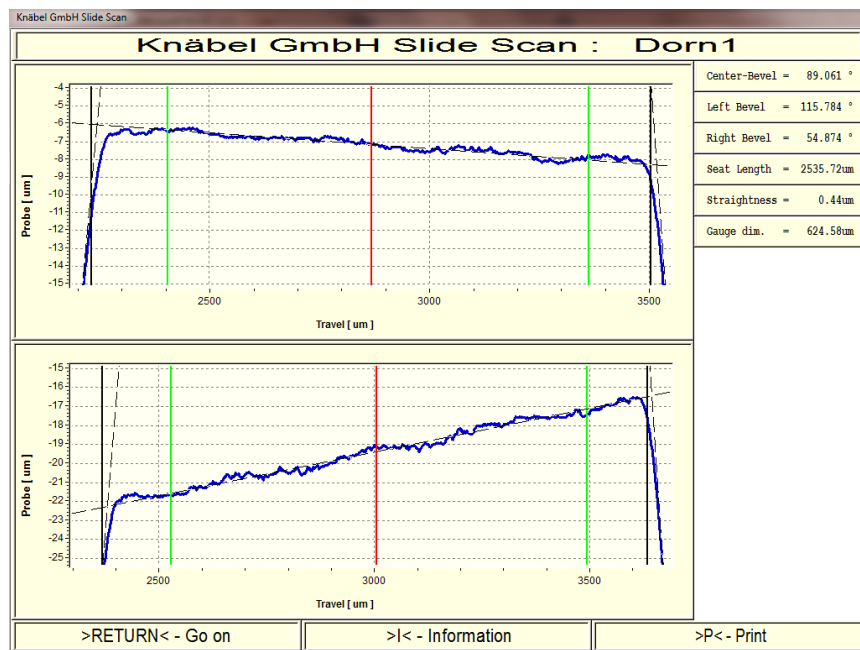
“Graphic output of the component measurement”

- Register R100 ... R179 are reset to 0 on start of measurement.
- The results of last component measurement are shown in a graphic :

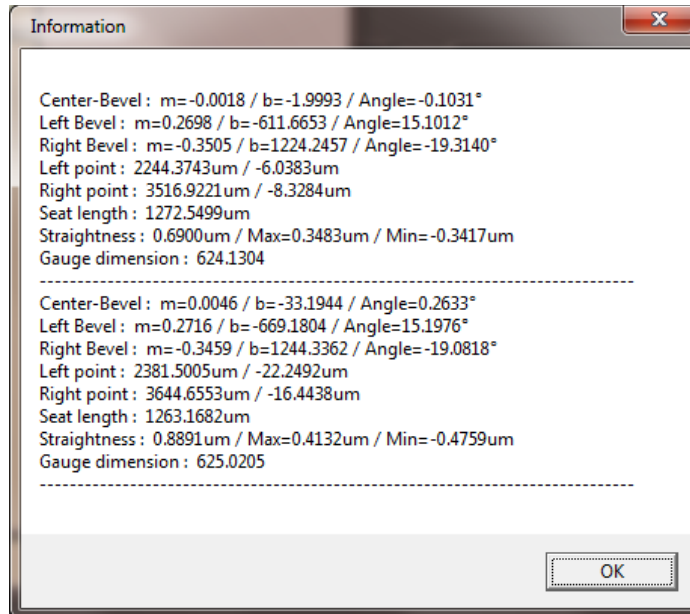


- Blue line = Raw values of measurement
- Black lines ( dashed ) = Regression lines
- Black lines ( thick ) = Bevel limits
- Green lines ( thick ) = Area used for calculating the regression line of center bevel and used for calculating the straightness.
- Red line ( thick ) = Gauge dimension

- It can be zoomed by mouse into the graphic to see more details :



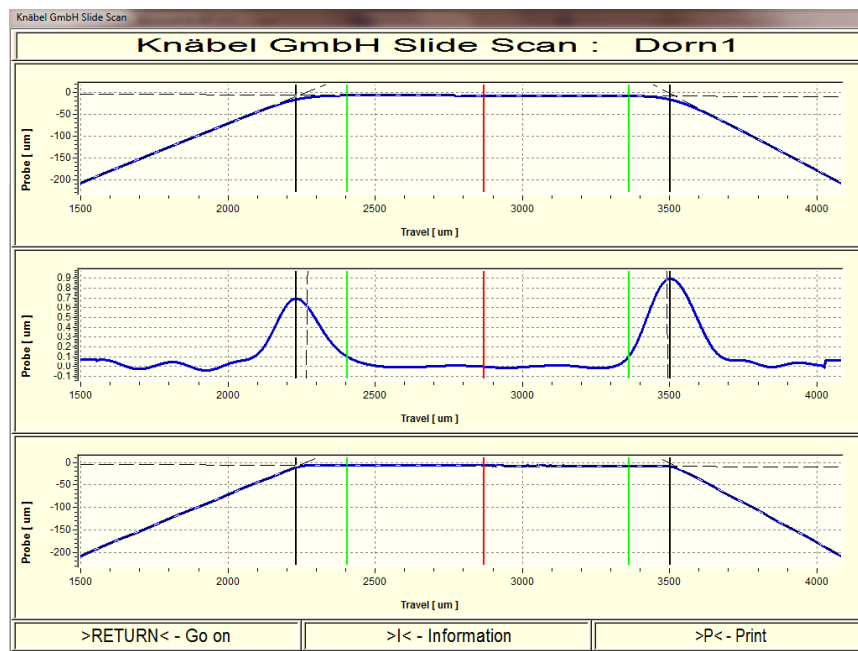
- By button “I” all calculated results are shown ( separated for the part gauges ) :



- By button “P” the screen contents with the graphics can be printed.

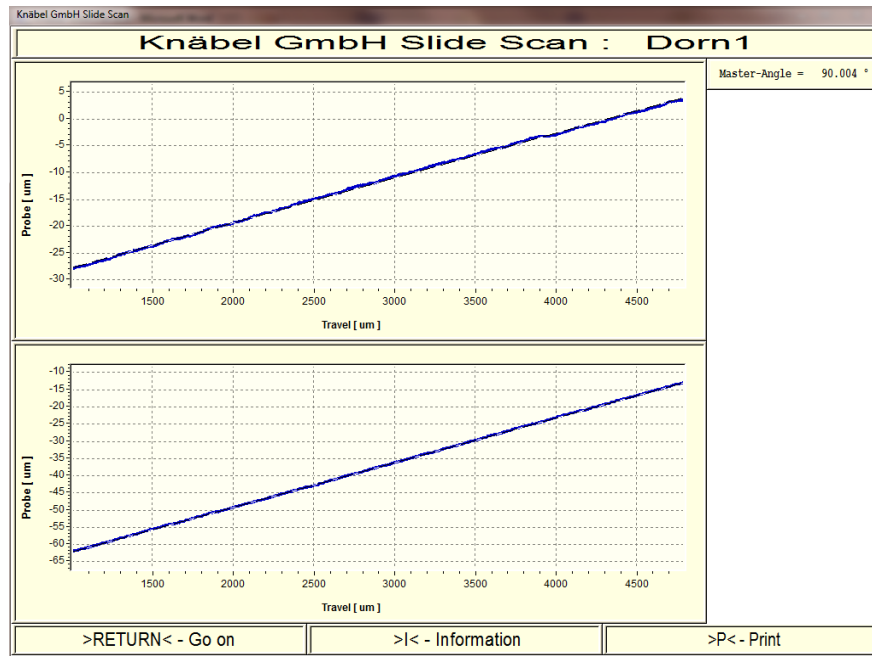
“Graphic output of filtered values, 2<sup>nd</sup> derivation, result”

- The main steps of algorithms are shown in 3 graphics ( filtered values, 2<sup>nd</sup> derivation, result ) to define the “PLUG GAUGE DEFINITION” parameters in setup window :



### “Check Angle-Master”

- The software requests the operator to put the plug gauge into the MAX / MIN master.
- For the selected part gauges the measuring values are collected over the defined range ( = start / stop ) and shown after measurement in the graphic together with the calculated angle :



## 3. Implementation in the test scheme

### Characteristics

- For each part gauge one characteristic for the encoder ( = travel ) and one characteristic for the probe must be created :  
( Both characteristics are assigned to the part gauges in setup window )

C1	Probe - Part Gauge 1	0	---	---	---	---	μm	M1	Static ...	---	---
C2	Travel - Part Gauge 1	0	---	---	---	---	μm	M3	Static ...	---	---
C3	Probe - Part Gauge 2	0	---	---	---	---	μm	M2	Static ...	---	---
C4	Travel - Part Gauge 2	0	---	---	---	---	μm	M4	Static ...	---	---

- The valve seat parameters of last measured part are stored in Register R101 ... R179 ( see chapter 4 ). So these Registers must be assigned to characteristics containing the valve seat parameters :

C5	Center Bevel	0	---	---	---	---	*	R101	Static ...	---	---
C6	Left Bevel	0	---	---	---	---	*	R102	Static ...	---	---
C7	Right Bevel	0	---	---	---	---	*	R103	Static ...	---	---
C8	Seat Length	0	---	---	---	---	μm	R104	Static ...	---	---
C9	Straightness	0	---	---	---	---	μm	R105	Static ...	---	---
C10	Gauge Dimension	0	---	---	---	---	μm	R106	Static ...	---	---

Inside the formulas of these characteristics addition factors or offsets can be used.  
( e.g.  $0.5 \cdot R102 + 12.8$  )

To these characteristics the tolerances of the part must be assigned.

These characteristics must be stored and exported to Q-DAS, SESAME, ... .



### Test steps

- It is recommended to create for each Action ( Calibration, Component measurement, ... ) an own test step.
- **In the display window of these test steps the characteristics with probe / encoder values of the used part gauges must be integrated – otherwise no values are read from IMBus modules.**
- Needed functions in one test step ( e.g. Component-Measurement ) :

LIST OF CREATED FUNCTIONS					
Function	Function key	Hand/Footsw...	Dig. Input	Event	
Knäbel GmbH Slide Scan	---	---	---	Test Step Start	Edit
Knäbel GmbH Slide Scan	---	---	---	Formula : R100>0.	Delete
Change to next test step	---	---	---	Formula : R100=0.	

“Knäbel GmbH Slide Scan” ( with Action = “Component Measurement” ) is called on start of the test step to start the Component-Measurement.

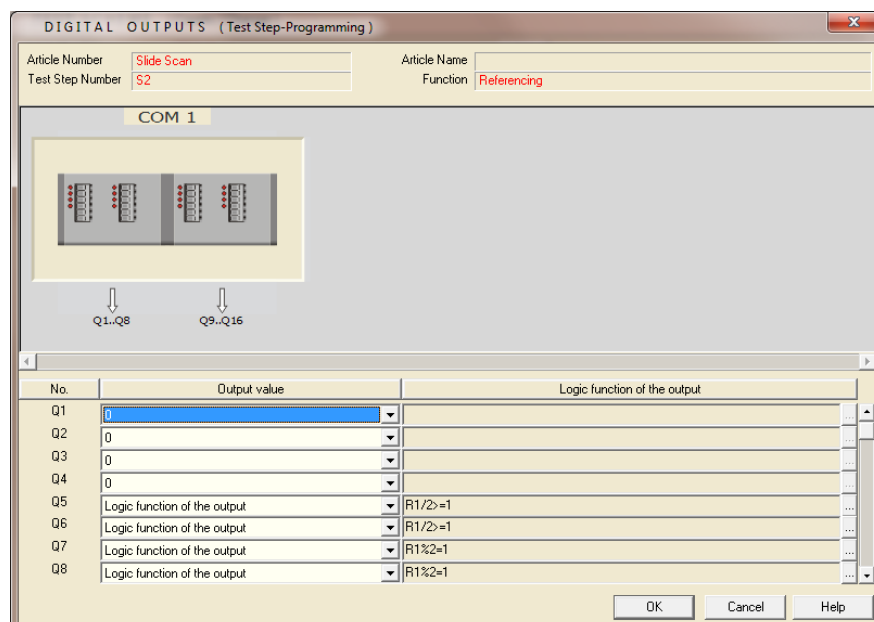
“Knäbel GmbH Slide Scan” ( with Action = “Execution of started action” ) is called as long as Register R100>0 ( = “Component Measurement is still running” ) to check whether the Action has finished.

“Change to next test step” is called when R100=0 ( = “Measurement is finished” ).

**!!! Register R100 contains the state whether an Action is (1) running or (0) finished !!!**

### Digital outputs

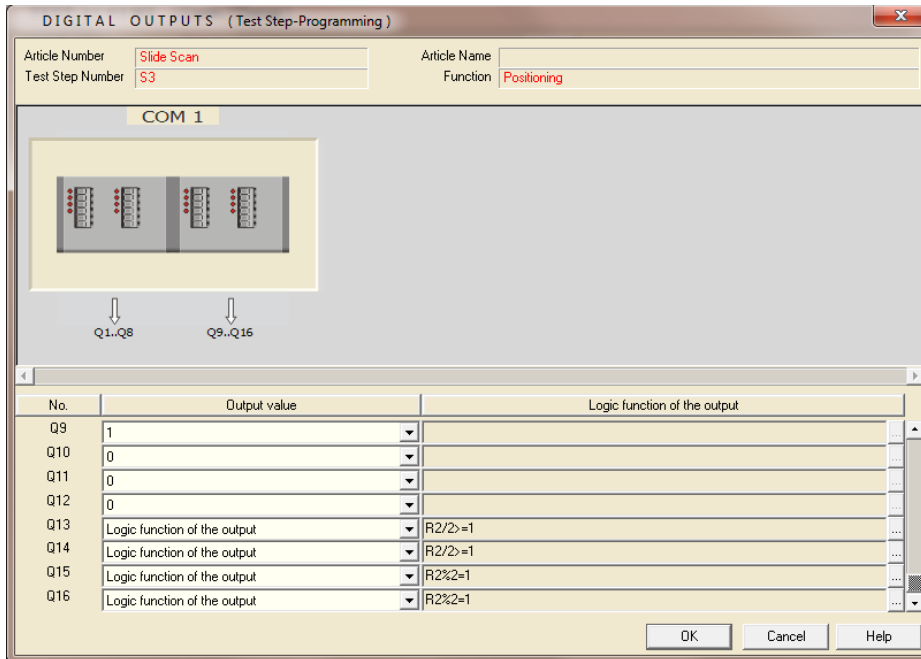
- To control the motor of each part gauge an IMB-pm channel and a special adapter cable is needed.
- The IMB-pm channel for each part gauge is programmed with a special IMB-co8 software, so inside ComGage for each part gauge 8 digital outputs are available, which are controlled by the assigned registers R1 & R2 ( see part gauge definition in setup window ).
- On two part gauges the digital outputs Q1..Q8 control motor of part gauge 1 and the digital outputs Q9...Q16 control motor of part gauge 2.
- Output 1 of one part gauge defines the speed ( 0=slow / 1=fast ).
- Outputs 5 & 6 of one part gauge control moving direction 1.
- Outputs 7 & 8 of one part gauge control moving direction 2.
- Example for controlling part gauge 1 over Register R1 ( slow movement because Q1=0 ) :



No.	Output value	Logic function of the output
Q1	0	
Q2	0	
Q3	0	
Q4	0	
Q5	Logic function of the output	R1/2=1
Q6	Logic function of the output	R1/2=1
Q7	Logic function of the output	R1&2=1
Q8	Logic function of the output	R1&2=1



- Example for controlling part gauge 2 over Register R2 ( fast movement because Q9=1 ) :



DIGITAL OUTPUTS (Test Step-Programming)

Article Number: Slide Scan  
Test Step Number: S3  
Article Name:  
Function: Positioning

COM 1

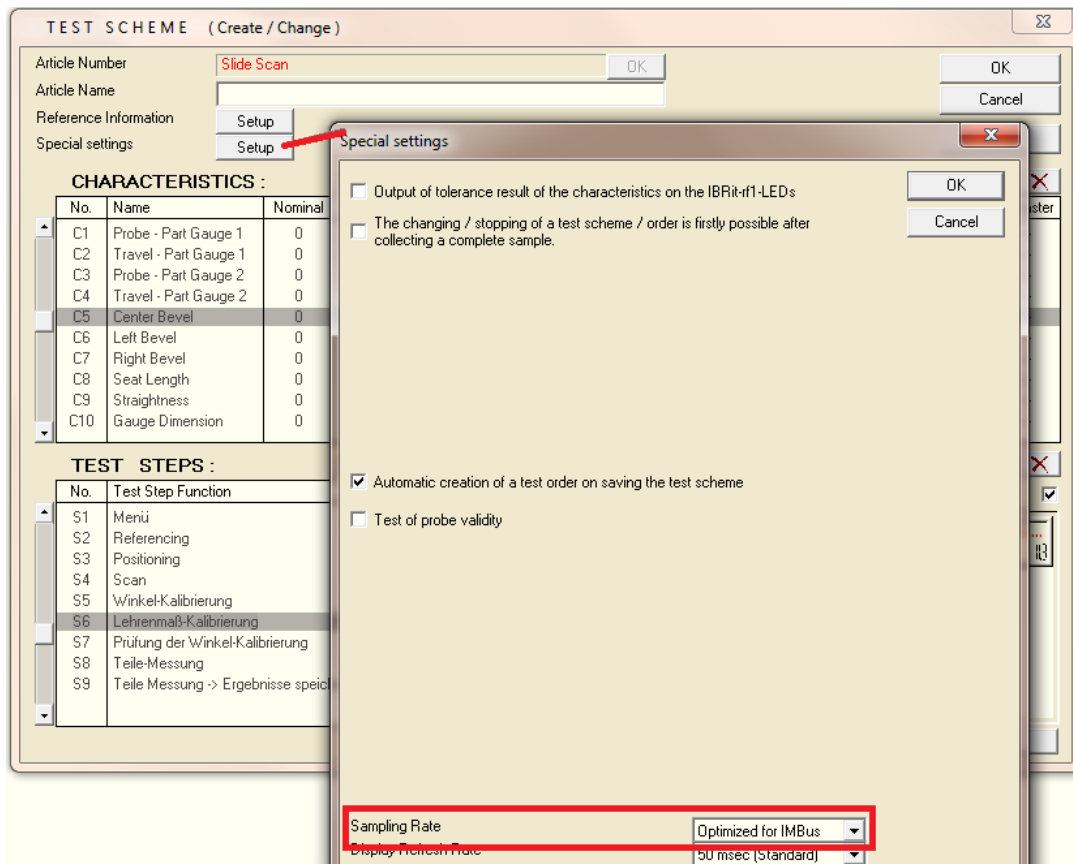
Q1..Q8      Q9..Q16

No.	Output value	Logic function of the output
Q9	1	
Q10	0	
Q11	0	
Q12	0	
Q13	Logic function of the output	R2/2>=1
Q14	Logic function of the output	R2/2>=1
Q15	Logic function of the output	R2%2=1
Q16	Logic function of the output	R2%2=1

OK Cancel Help

### Sampling rate

- Inside the “Special settings” of the test scheme, the “Sampling Rate” must be set to “Optimized for IMBus” :



TEST SCHEME (Create / Change)

Article Number: Slide Scan  
Article Name:  
Reference Information: Setup  
Special settings: Setup

CHARACTERISTICS :

No.	Name	Nominal
C1	Probe - Part Gauge 1	0
C2	Travel - Part Gauge 1	0
C3	Probe - Part Gauge 2	0
C4	Travel - Part Gauge 2	0
C5	Center Bevel	0
C6	Left Bevel	0
C7	Right Bevel	0
C8	Seat Length	0
C9	Straightness	0
C10	Gauge Dimension	0

TEST STEPS :

No.	Test Step Function
S1	Menü
S2	Referencing
S3	Positioning
S4	Scan
S5	Winkel-Kalibrierung
S6	Lehrenmaß-Kalibrierung
S7	Prüfung der Winkel-Kalibrierung
S8	Teile-Messung
S9	Teile Messung -> Ergebnisse speich

Special settings

☐ Output of tolerance result of the characteristics on the IBRiit-f1-LEDs

☐ The changing / stopping of a test scheme / order is firstly possible after collecting a complete sample.

☒ Automatic creation of a test order on saving the test scheme

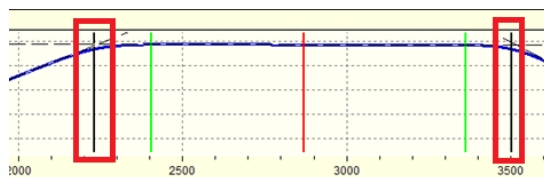
☐ Test of probe validity

Sampling Rate: Optimized for IMBus

Display Refresh Rate: 50 msec (Standard)

### 4. Overview of used registers

- R100 = contains the state whether an Action is (1) running or (0) finished
- R101 = Angle of center bevel [ in ° ]
- R102 = Angle of left bevel [ in ° ]
- R103 = Angle of right bevel [ in ° ]
- R104 = Seat length [ in μm ]
- R105 = Straightness [ in μm ]
- R106 = Gauge dimension [ in μm ]
- R110 = Max. Angle on „Check Master-Angle“ [ in ° ]
- R116 = Number of detected bevels
- R197 = Deactivation of special bevel detection algorithm : (0) no / (1) yes ( see chapter 5 )
- R120 = Angle of part gauge A of center bevel [ in ° ]  
( raw value is multiplied with calibration factor of Min/Max calibration  
but only ½ of the calibration offset of the Min/Max calibration will be added )
- R121 = Angle of part gauge B of center bevel [ in ° ]
- R122 = Angle of part gauge C of center bevel [ in ° ]
- R123 = Angle of part gauge A of left bevel [ in ° ]
- R124 = Angle of part gauge B of left bevel [ in ° ]
- R125 = Angle of part gauge C of left bevel [ in ° ]
- R126 = Angle of part gauge A of right bevel [ in ° ]
- R127 = Angle of part gauge B of right bevel [ in ° ]
- R128 = Angle of part gauge C of right bevel [ in ° ]
- R130 = Seat length of part gauge A [ in μm ]
- R131 = Seat length of part gauge B [ in μm ]
- R132 = Seat length of part gauge C [ in μm ]
- R135 = Straightness of part gauge A [ in μm ]
- R136 = Straightness of part gauge B [ in μm ]
- R137 = Straightness of part gauge C [ in μm ]
- R140 = Gauge Dimension of part gauge A [ in μm ]
- R141 = Gauge Dimension of part gauge B [ in μm ]
- R142 = Gauge Dimension of part gauge C [ in μm ]
- R150 = Distance of 2 black lines of center distance of part gauge A [ in μm ]
- R151 = Distance of 2 black lines of center distance of part gauge B [ in μm ]
- R152 = Distance of 2 black lines of center distance of part gauge C [ in μm ]

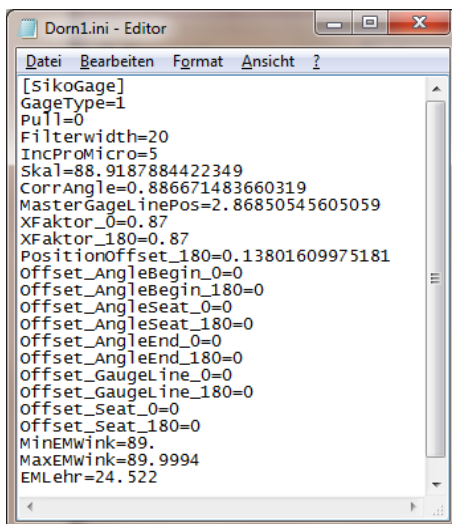


- R153 = Biggest Distance between measuring values and regression line on full length of center distance of part gauge A above regression line [ in μm ]
- R154 = Biggest Distance between measuring values and regression line on full length of center distance of part gauge B above regression line [ in μm ]
- R155 = Biggest Distance between measuring values and regression line on full length of center distance of part gauge C above regression line [ in μm ]
- R156 = Biggest Distance between measuring values and regression line on full length of center distance of part gauge A below regression line [ in μm ]
- R157 = Biggest Distance between measuring values and regression line on full length of center distance of part gauge B below regression line [ in μm ]
- R158 = Biggest Distance between measuring values and regression line on full length of center distance of part gauge C below regression line [ in μm ]

- R180 = Plug gauge 1 : (0) not referenced / (1) already referenced  
R181 = Plug gauge 1 : Angle calibration (0) not done / (1) already done  
R182 = Plug gauge 1 : Gauge Dim. calibration (0) not done / (1) already done  
  
R185 = Plug gauge 2 : (0) not referenced / (1) already referenced  
R186 = Plug gauge 2 : Angle calibration (0) not done / (1) already done  
R187 = Plug gauge 2 : Gauge Dim. calibration (0) not done / (1) already done  
  
R190 = Plug gauge 3 : (0) not referenced / (1) already referenced  
R191 = Plug gauge 3 : Angle calibration (0) not done / (1) already done  
R192 = Plug gauge 3 : Gauge Dim. calibration (0) not done / (1) already done  
  
R199 = Result of last called action :  
    (0) no error  
    (1) Wrong average filter settings inside Setup menu  
    (2) Not enough measuring values available for calculations / data output  
    (3) Not enough bevels are detected  
    (4) Too many bevels are detected  
    (10) Two different masters required on Angle calibration  
    (20) Error on loading \*.dat file  
    (21) Error on writing \*.dat file  
    (30) Error on writing \*.dat file with graphical data  
  
R198 = Control of Angle Calibration : ( only required on “MsgOutputOff=1” )  
    (0) Measurement of MAX/MIN-Master is running  
    (-1) The curve of MAX-master was measured.  
        Operator now needs to insert MIN-master  
        ➔ After inserting MAX-master the application must set R198 = 0 to trigger  
           measuring of MIN-master

## 5. INI file

- Over the “...” button of the Setup window ( see chapter 2 ) the selected INI file can be changed in an editor :



- ComGage loads the following parameters out of the INI-file :
  - XFaktor\_0** - Correction factor for 0° part gauge
  - XFaktor\_180** - Correction factor for 180° part gauge
  - MinEMWink** - Master value 1 for angle calibration
  - MaxEMWink** - Master value 2 for angle calibration
  - EMLehr** - Master value for gauge dimension

- ComGage stores the following parameters in the INI-file :
  - Skal** - Offset of Angle-Calibration
  - CorrAngle** - Calibration factor of Angle-Calibration
  - MasterGageLinePos** - Position of gauge dimension on 0° part gauge
  - PositionOffset\_180** - Offset between 0° & 180° part gauges

- All other parameters inside INI file are not changed by ComGage.

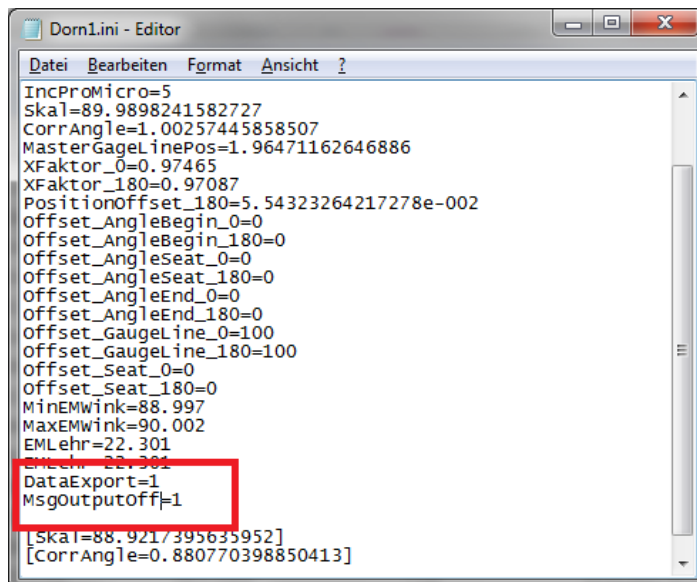
**Note :** For parameters *XFaktor\_0*, *XFaktor\_180*, *MinEMWink*, *MaxEMWink*, *EMLehr* wild cards for ComGage registers ( R1 ... R2000 ) or characteristic master values ( C1M1 ... C128M2 ) can be used instead. The parameters will be updated from configured ComGage register on calling the actions “Referencing” and “Loading of a \*.dat file”.

E.g. *XFaktor\_0=R101* loads *XFaktor\_0* from [Register 101](#) on action “Referencing” or “Loading of a \*.dat file”.

E.g. *XFaktor\_0=C1M1* loads *XFaktor\_0* from [master value 1](#) of [characteristic 1](#) on action “Referencing” or “Loading of a \*.dat file”.

E.g. *XFaktor\_0=C128M2* loads *XFaktor\_0* from [master value 2](#) of [characteristic 128](#) on action “Referencing” or “Loading of a \*.dat file”.

### Settings inside INI-File which control behaviour of SFct040.DLL



#### DataExport=1 :

- Switches the output of the graphics ( e.g. seat profile curves, etc. ) = off
- Stores graphical data inside TEMP-files

#### MsgOutputOff=1 :

- Switches all error messages ( = PopUp-Windows ) = off, except of the error messages coming from not correctly installed measuring station :
  - a) Dongle error messages
  - b) IBR\_DDK.DLL is missing
  - c) SFct040.DLL is missing
  - d) File access errors on \*.INI file itself  
( If the measuring station is correctly installed, no error message shall pop-up. )
- Switches message to insert Max / Min / Gauge-dimension master on calibrations = off

### Settings inside INI-File for special algorithms

```
*OP120.ini - Editor
Datei Bearbeiten Format Ansicht Hilfe
[SikoGage]
GageType=1
Pull=0
Filterwidth=20
IncProMicro=5
Skal=89.8434967155901
CorrAngle=1.01424364384441
MasterGageLinePos=3.51751335890159
XFaktor_0=0.984
XFaktor_180=0.982
PositionOffset_180=-2.96108367784544e-002
Offset_AngleBegin_0=0
Offset_AngleBegin_180=0
Offset_AngleSeat_0=0
Offset_AngleSeat_180=0
Offset_AngleEnd_0=0
Offset_AngleEnd_180=0
Offset_GaugeLine_0=0
Offset_GaugeLine_180=0
Offset_Seat_0=0
Offset_Seat_180=0
MinEMWink=89.029
MaxEMWink=89.989
EMLehr=25.742
EMLehr=25.742
SpecBevelDetect_Mode=1
SpecBevelDetect_Beg=500
SpecBevelDetect_End=2700
```

#### **SpecBevelDetect\_Mode = 0 :**

- Only the standard algorithm is used for bevel detection.
- An error message is output, when < 3 bevels are detected.

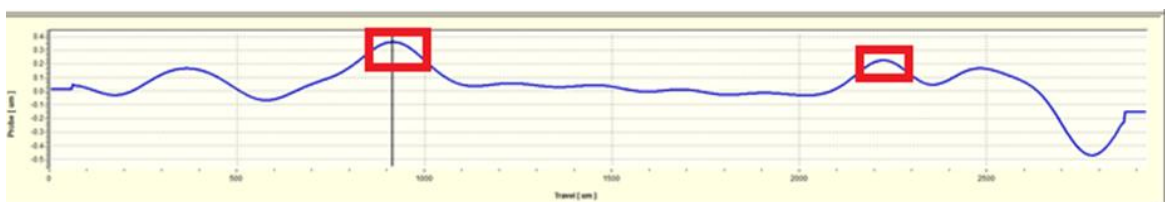
#### **SpecBevelDetect\_Mode = 1 : ( R197 must be = 0 / on R197 = 1 special algorithm is off )**

- Activates a special algorithm to find the left / center / right bevels, if only 0...2 bevels are detected by standard algorithm. If  $\geq 3$  bevels are detected then the standard algorithm is always used.
- No error message is output because of too less detected bevels.

#### **SpecBevelDetect\_Mode = 2 : ( R197 must be = 0 / on R197 = 1 special algorithm is off )**

- Activates a special algorithm to find the left / center / right bevels, if only 2 bevels are detected by standard algorithm. If  $\geq 3$  bevels are detected then the standard algorithm is always used.
- No error message is output because of too less detected bevels.

The special algorithm uses the 2 maximum values of the 2<sup>nd</sup> deviation as the limits of the center bevel. All calculations of the other parameters are done as usual, like angles, straightness, ... ( see also page 6 ).



#### **SpecBevelDetect\_Beg ... SpecBevelDetect\_End :**

- Defines the range on the “Travel” axis of the 2<sup>nd</sup> deviation within the software searches for the 2 maximum values of the second deviation.
- Outside this range no maximum values are search.
- If not specified then SpecBevelDetect\_Beg=-10000 and SpecBevelDetect\_End = +10000.

### Settings inside INI-File for bitmap output of Component Measurement

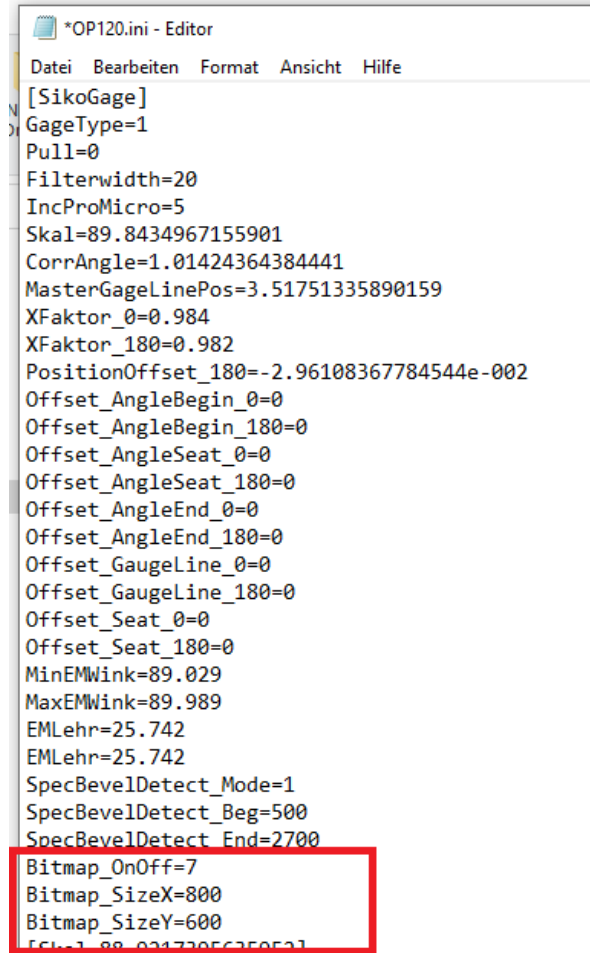
If the bitmap output is activated, then on calling the actions :

“Graphic output of the component measurement”

“Graphic output of filtered values, 2<sup>nd</sup> derivation, result”

the graphics are also stored inside a bitmap besides to the display output on the monitor.

The bitmap output is activated inside the INI-file :



```
*OP120.ini - Editor
Datei Bearbeiten Format Ansicht Hilfe
[SikoGage]
GageType=1
Pull=0
Filterwidth=20
IncProMicro=5
Skal=89.8434967155901
CorrAngle=1.01424364384441
MasterGageLinePos=3.51751335890159
XFaktor_0=0.984
XFaktor_180=0.982
PositionOffset_180=-2.96108367784544e-002
Offset_AngleBegin_0=0
Offset_AngleBegin_180=0
Offset_AngleSeat_0=0
Offset_AngleSeat_180=0
Offset_AngleEnd_0=0
Offset_AngleEnd_180=0
Offset_GaugeLine_0=0
Offset_GaugeLine_180=0
Offset_Seat_0=0
Offset_Seat_180=0
MinEMWink=89.029
MaxEMWink=89.989
EMLehr=25.742
EMLehr=25.742
SpecBevelDetect_Mode=1
SpecBevelDetect_Beg=500
SpecBevelDetect_End=2700
Bitmap_OnOff=7
Bitmap_SizeX=800
Bitmap_SizeY=600
[Clock_89.0317305635053]
```

#### Bitmap\_OnOff = 0 :

- No additional bitmap output.

#### Bitmap\_OnOff > 0 : ( max. value = 32767 )

- Bitmap output = activated.
- The BMP-file is stored inside the folder for Pictures ( see menu “Options / Data directories” ).
- The filename is : SFct040\_<index>.bmp.  
The index is the number assigned to Bitmap\_OnOff.  
In the example : Sfct040\_7.bmp

#### Bitmap\_SizeX / Bitmap\_SizeY :

- Size of the bitmap in X- / Y-direction in Pixel.
- In the example the bitmap has a size of 800x600 Pixel.



### 6. Required hardware

1. Required IMBus modules for a Slide Scan with 2 part gauges :
  - 1x IMB-pm2 ( for motor control )
  - 1x IMB-im2 ( with adjustment for Knäbel probes )
  - 1x IMB-tc2 ( for encoders )
  - 2x Adapter cable for connection of one part gauge to IMB-pm / IMB-tc modules

**!!! The IMBus modules must be connected to the computer in the order above !!!**
2. IMB-pm2 :
  - contains the special software “T: \ Software \ IMB-pm \ Execute \ sl\_scan.bin”
  - behaves in the software like 2x IMB-co8, so it has 16 digital outputs.
  - digital outputs 1...8 control motor of part gauge 1
  - digital outputs 9...16 control motor of part gauge 2
  - for more information see chapter 3
3. IMB-im2 :
  - measuring direction = when measuring tip is pressed in, the value must become bigger
  - digital filter = level 1
  - measuring step = 0.0001
  - double MTA-values stored in modules for higher resolution  
( e.g. in first delivered system : 40580 / 40710 )
4. IMB-tc2 :
  - measuring direction = inverse
  - measuring step = 0.0002
  - error output mode = off
5. Required current for one system with 2 part gauges : 700 mA



6. Setting up the COM port of the computer :
- the required speed can be only reached over a COM port
  - in Windows the following settings must be made for the COM port :
    - Call **”Start / Settings / Control Panel / System”**
    - Select register card **”Hardware”** and press button **”Device Manager”**
    - Select the COM port under **Ports (COM and LPT )**
    - Press Button **Properties**
    - Select Register card **”Port settings”** and press Button **”Advanced”**
    - Set receiver buffer to 1

