



MANUAL

ComGage Software

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 IBR



Messtechnik GmbH & Co. KG



Contents

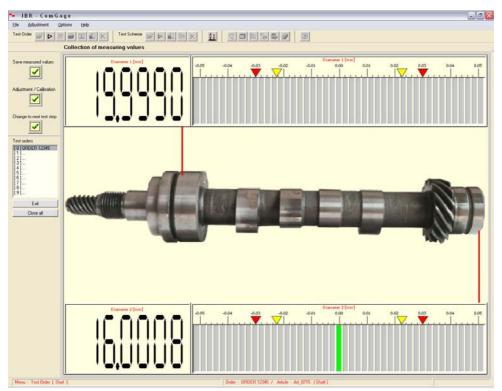
1.	Introduction	3
2.	Features	3
3.	General information about (working with) ComGage	4
4.	Installation and brief overview	
	4.1 Installation	5
	4.2 Brief overview	6
5.	User login	9
6.	Getting started / Basic settings	
	6.1 Connections	9
	6.2 Display elements	11
	6.3 Language selection	12
	6.4 Selection of data directories	12
	6.5 User management	13
	6.6 Reference information (operators, machines, batch numbers, etc.)	14
	6.7 Automatic start	16
	6.8 Convert:	17
7.	Creating a test scheme	
	7.1 Programming the test scheme head	18
	7.2 Programming the article reference information	20
	7.3 Programming the special settings	21
	7.4 Programming the characteristics (drawing data)	22
	7.5 Programming the characteristics (statistics)	25
	7.6 Programming the characteristics (reference information)	26
	7.7 Programming the test steps (sequence control)	27
	7.8 Programming the test steps (digital outputs)	33
	7.9 Programming the test steps (additional settings)	35
	7.10 Programming the test steps (programming the display windows)	36
8.	Programming examples	
	8.1 Example 1	39
	8.2 Example 2	43
	8.3 Example 3	48
9	Starting the test scheme (measuring)	51
		01
10.	Additional test scheme menus	54
	10.1 Convert	54 54
	10.2 Duplicate	54 54
	Creating a test order	55
12.	Starting the test order (measuring)	56
13.	Additional test order menus	
	13.1 Close	63
	13.2 Print	63
	13.3 Analyse	63
	13.4 Convert	63
	13.5 Delete	63
14.	Adjustment window	
	14.1 Mechanical adjustment of inductive probes	66
15.	Important conditions concerning the use of ComGage	67



1. Introduction

ComGage is a universal software for metrology and statistical process control in manufacturing facilities.

The software allows testing of components with various characteristics. Additionally the software provides information for statistical process control by means of the statistical functions included.



2. Features

- Connection of all gauges and sensors via IBR Instruments
- Test orders for saving and analysing of measurement values
- Test schemes for defining the characteristics of the component
- Inclusion of reference information (machines, operators, batch numbers, ...) in test orders and schemes
- Simultaneous opening of several test orders or test schemes for collection of measurement data on different production lines
- Up to 128 characteristics can be assigned to each component
- Free definition of gauges with mathematical functions (such as sin, cos, tan, min, max, ...)
- Static and dynamic measuring modes
- Many possibilities for the definition of the measurement displays (visual design of the display)
- Statistical displays (like Control Charts, Histograms, Statistical Data, Run Charts, ...)
- Automatic and manual saving of measurement values
- Automatic and manual switching over of test steps
- Zero adjustment and calibration of gauges (on air-gauging)
- Opening of zero adjustment and gauge calibration window by function key, foot switch, timer or number of measured components
- Reference test for performing fixture check
- Control functions by digital inputs and outputs
- Converting of measurement values to different formats (Q-DAS, Excel, ...)
- Analysis of measurement values with printout function
- User management (for assigning rights to the different users)





3. General information about (working with) ComGage

ComGage is programmed with C++ using standard API functions only. This allows optimum speed, less usage of resources and the possibility to generate a Windows CE version of ComGage.

In addition to universal measuring routines and online SPC functions for the production an easy understandable shell, multiple languages (European and Asian), operation only by a small keyboard and less usage of PC resources (for working on small Windows CE PCs – e.g. Pocket PCs) were important points for the development of ComGage.

The programming in ComGage is visual. The layout and colours can be defined without limitations – always seeing the result or information on the screen.

In ComGage you can mainly programme two groups of files :

a) Test Scheme :

A test scheme contains the definition of the component with its characteristics (nominal size, tolerances, ...). In addition it contains the definition of how to measure (measurement sequences, static / dynamic measurements, probe mixings, ...) and the design of the display. No measurement data can be saved when running a test scheme.

b) Test Order :

A test order serves to assign measurement and test data to the corresponding production lots or customer orders. A test order must contain a test scheme (which defines all parameters for the test of the component) and the number of components to be tested.

The measurement data of a test order can be saved, converted (Excel, QS-Stat, \dots), analysed and printed.

Test schemes and test orders can also contain reference information (machines, operators, batch numbers, ...). The programming of test schemes and test orders is described in detail in this manual.

The ComGage software consists of 5 modules :

- 1.) IBR_TSH (Test Scheme Handler) for creating test schemes.
- 2.) IBR_TOH (Test Order Handler) for creating, analysing, printing and converting test orders
- 3.) IBR_WGL (Window Gauge Library) for measuring
- 4.) IBR_SPC (Statistical Process Control) for online statistics and analysis of measurement data

5.) IBR_PLC (**P**rogrammable Logical Control) for controlling of digital inputs and outputs Example of a company's usage of the 5 modules :

In the company there are a PC in the supervisors office (for creating test schemes, test orders and analysis of the measurement values) and 5 measuring PCs with online SPC.

On the supervisors PC the following modules are needed : IBR_TSH, IBR_TOH and IBR_SPC. On the 5 measuring PCs the following modules are needed : IBR_WGL and IBR_SPC.

The integrated user management allows deactivating certain menus for different users. (e.g. the menus for creating test schemes and test orders can be deactivated for the operators at the manufacturing facilities)

ComGage	– files	:
---------	---------	---

*.tsf

*.tod

- \rightarrow Test scheme files
- *.rto, *.cto \rightarrow Test order files
 - → Measurement data files
- ComGage.rif
- \rightarrow Reference information files
- ComGage.usr → User setup files *.sch → Display Elemen
 - → Display Element design files





4. Installation and brief overview

The following chapter portrays a brief overview of the steps necessary for installing the software and adjusting the basic settings. It also describes how to create a small measuring programme (= test scheme).

4.1 Installation

Hardware requirements :

Pentium 500 ≥ 64 MB Ram

 \geq 100 MB free hard disk space

Software requirements : Windows 95 ... Windows 7 Windows CE

Installation from a CD :

- 1. Insert the CD IBR Software for Metrology and SPC into your CD-drive.
- Go to Start / Run and enter
 <Letter of CD-Drive>: \ ComGage \ ComGage _INST.
 Start the installation by clicking the OK button.

The installation programme then requests the installation parameters in a few windows.

- The first window allows the selection of the language desired for the installation procedure. Click the Next> - button to confirm.
- 4. The second and third windows display some general information concerning programme installation. Click the **Next>** button to confirm.
- The fourth window requests the destination directory for the ComGage software. Click the Next> - button to confirm.
- In the fifth window you can select the folder for Start / Programmes. Click the Next> - button to confirm.
- 7. The sixth window displays your choice of settings once again for control purposes and can be confirmed by clicking the **Installation** button.

Now the installation is executed !!!

 Close the programme installer by clicking the Finish - button, after the installation procedure has been completed successfully. Initial operation of the software can take place directly after completion of the installation procedure. In order to do so, leave the box "Launch Program File" checked and click the Finish - button.

Installation after downloading from website www.IBRit.com :

- Download the file COMGAGE.zip from the Homepage www.IBRit.com. Go to Downloads \ Software in order to do so. Then unzip the file.
- 2. Start the unzipped installation file ComGage_Inst.exe.
- 3. Execute the above-described steps 3. to 8. for Installation.

Note :

Before first programme start you must connect the IBR – interface or measuring instruments to the PC and the dongel to a USB- or COM-Port.



4.1 **Brief overview**



ComGage-CD zur Installation einlegen. Die Installation erfolgt automatisch und es öffnet sich das Fenster für die Einstellung der Messgeräteanschlüsse.

Mess- bzw. Interfacegeräte am PC anschließen.

Auswahl der angeschlossenen Mess- und Interfacegeräte :

-					_
1 Auswahl des PC-Anschlusses, an dem das Messgerät bzw. Interface angeschlossen ist.	Programming of the devices PC-Connection IBR-instrument USB IMB/unit 1 2	Connection Add: 1 Add: 2 Add: 3 Footkey 0 Footkey 1	DEVICE 1 Gauge / Sensor [MBI m2] 2 MMago Connection 1 [MBI m2] 2 MMago Connection 2 [MBI m1] 1 Indiative Pable Input] Connection 1 connected to IBR Instrument 1	Setup Setup	
2 Auswahl des angeschlossenen Gerätetypes.	PC-Connection IBR-Instrumen	L Connection	DEVICE 2 Gauge / Sensor	Sense Sense	F
 Optional Einstellung der Messeingänge 	- 21			Sente Sente Sente Sente Sente Sente Sente Sente	
z.B. Auflösung, Messrichtung,	D Part 1		DK.	Cancel	

OK Cancel

Insert ComGage-CD for installation. The installation occurs automatically and a window for setting up the connected instruments opens.

> Connect measuring or interface instrument to the PC.

Selection of the connected measuring and interface instruments :

(1)

Selection of the PC connection to which the gauge or interface is connected.

2

Selection of the connected gauge type.

Optional (3)

Measuring input configuration i.e. resolution, direction, ...

Prüfplan

Beim Einsatz von Software in der Messtechnik muss für jede Prüfaufgabe ein Prüfplan erstellt werden.

Print

Der Prüfplan erhält alle Informationen über die Messaufgabe und legt somit den Prüfablauf für die Software fest.

Prüfplan-Erstellung mit ComGage

Test scheme

On the use of software in the metrology for each measuring application a test scheme must be created.

The test scheme contains all information about the measuring application and stipulates hence the measuring sequence for the software.

Creation of a test scheme with ComGage

1 Button : Test Scheme / Create.

> (2) Insert article number.

> > (3) Insert article name.

Optional (4) Reference information input (operator, machine, ...).

(Flefmence Information) Unit Mea. Inputs	Mode 1. Master 2
V Attinuture \	F 2 D 9
and the second se	heview of display window :
[
	Additional setting: Adjust the characteristics p



(1)Button : Prüfplan / Anlegen.

(2) Artikelnummer eingeben.

3 Artikelbezeichnung eingeben.

4 Optional Stammdaten-Eingabe (Prüfer, Maschine, ...).



Characteristics

Merkmale

1

2

3

eintragen.

Optional

eintragen.

(5)

6

M1+M2.

gangs.

klicken.

In der Messtechnik werden die zu prüfenden Maße eines Teiles als Merkmale bezeichnet. Jedes Merkmal muss zunächst im Prüfplan beschrieben werden.

In the metrology the measured dimensions are called characteristics. Each characteristic must be described at first in the test scheme.

Merkmal - Erstellung im ComGage - Prüfplan

Auf Neu-Button zum An-

und den Toleranzen

Merkmalbezeichnung

Merkmaldaten (Einheit,

Nennmaß, Toleranzen)

messdornkalibrierung

Auswahl eines Messein-

Messeingang eintragen.

+/-0.06 mm wird über

Messeingang 1 erfasst.

legen eines Merkmals

Beispiel :

TEST SCHEME (Create/C Click on New-Button Selup 1 Help DBX Example : Das angelegte Merkmal C1 The created characteristic mit Durchmesser 40 mm C1 with diameter 40 mm and tolerances of Digital Out +/-0.06 mm is collected FJDFX TEST STEPS (Addition over measuring input 1. DRAWING DATA (ion limit (USL) (3 aus Zeichnung übernehmen. olling limit (UCL ling limit (LCL) tion limit (LSL) 0.00 MEA VALUE COLLEC 1 oder 2 Meisterwerte für ent node * Setup Induktivtaster- oder Luft-MENT OF THE C 1. Master value 17 4 2. Master value 17 10 (4) Reference test OK Cancel Help Insert measuring input. Optional können beliebige Formeln und Verknüpfungen eingegeben werden, z.B. $(\mathbf{6})$ Input of the mea. Values by keyboard OK Cancel Help

Durch wiederholte Betätigung des Neu-Buttons können weitere Merkmale von dem zu prüfenden Teil angelegt werden.

Repeat with the New-Button for additional characteristics of the component.

Creation of characteristics in ComGage test scheme

1

for creating a characteristic.

2

Insert characteristic name.

(3)

Insert characteristic data (unit, nominal size, tolerances) from the drawing.

Optional (4)

Insert 1 or 2 Master values for calibration of i.e.inductive probes or air plugs.

(5)

Selection of a measuring input.

6

Optional free formulas or mixings can be inserted, i.e. M1+M2.





Prüfablauf

Der Prüfablauf enthält die einzelnen Prüfschritte mit den Anzeigefenstern.

TEST SCHEME (

The test sequence contains the single test steps

Prüfschritt - Erstellung im ComGage - Prüfplan

1

Auf Neu-Button zum Anlegen eines Prüfschritts klicken.

Beispiel :

In dem Prüfschritt kann während der Messung Merkmal C1 über Fusstaster gespeichert werden.

(2) Optional

Kommentar für Funktion des Prüfschritts eintragen.

(3)

Ausführbare Funktion für den Prüfschritt auswählen.

(4)

Merkmale für Funktion auswählen.

(5)

Fusstaster, Funktionstaste, ... zum Ausführen der Funktion auswählen.

Beispiel :

Im Prüfschritt S1 wird der letzte Messwert von Merkmal C1 über F1-Taste gelöscht.

(6)

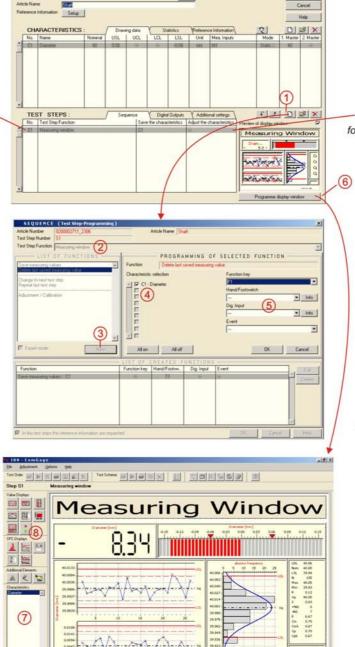
Gestaltung des Anzeigefensters aufrufen.

(7)

Anzuzeigendes Merkmal in Liste auswählen.

(8)

Anzeigeelement für angewähltes Merkmal auswählen und platzieren.



with the display windows.

DK.

Creation of test steps in ComGage test scheme

Test sequence

(1)

Click on New-Button for creating a test step.

Example :

In the test step the characteristic C1 can be saved by foot switch in measuring mode.

Optional (2)

Insert comment for function of test step.

(3)

Select executable function for test step.

4

Select characteristics for function.

(5)

Select foot switch, function key, ... for execution of function.

Example :

In step S1 the last measuring value of characteristic C1 is deleted by F1-key.

(6)

Call design of display window.

(7)

Select characteristic for display from list.

(8)

Select and place display element for selected characteristic.

Durch wiederholte Betätigung des Neu-Button können weitere Prüfschritte angelegt werden.

Der Prüfplan ist nun erstellt und die Prüfung der Teile kann beginnen.

On repeated clicking on the New-Button additional test steps can be added.

The test scheme is now created and the measurement of components can be started.

Foot switch = Save / F1=Delete

Color | See





5. User login

On activated user management (see chapter 6.5) you must log in after starting ComGage :

Log in	X
User name Password	
ОК	Cancel

On initial operation of ComGage only one user exists :

User name	=	admin
Password	=	admin

After successfully logging in, the main window of ComGage opens.

Note : Capitalization of user name and password is not checked.

6. Getting started / Basic settings

On initial operation of the ComGage software there are several important settings that have to be made within the programme. By choosing the **Options** menu, these basic settings can also be modified later on. In the following the submenus of the **Options** menu are described.

6.1 Connections

In the **Options / Connections** menu (Button :) the connected interfaces and measuring instruments are selected and configured (if necessary - by clicking the **Setup** - button). ComGage automatically opens the window of the Options / Connections menu on initial operation.

Pr	ogramming of t	the devices				
-				DEVICE 1		1
	PC-Connection	IBR-Instrument	Connection	Gauge / Sensor	Mea.	Step
	USB 💌				Setup	
		 IBRit-rf1			Setup Setup	
		IMBus			Setup	
					Setup	
					Setup Setup	
		Service			Setup	-
	PC-Connection	IBR-Instrument	Connection	DEVICE 2 Gauge/Sensor	Mea.	Shan
	VINNECTION		Connection	Gauge / Sensoi	Setup	Step
					Setup	
					Setup	
					Setup	
					Setup	
		Service			Setup	
		3011100			Setup	
	Print			OK	Cancel	Help

<u>Note :</u> On initial operation of the software the message or window shown above is displayed in the language of the Windows operating system.

At first select the PC-Connection and then the connected IBR-Instrument.





IBRit-rf1 :

In case of IBRit-rf1 radio modules you can access the menu for module configuration (e.g. setting module address) by clicking the **Service** - button. → Please refer to the IBRit-rf1 manual.

Cor	G OF THE RF-MOD mmand	Parameter	1	ОК
Set factory settings				Service
Set Module Addr	ess	Addr. 2 Addr. 3		
		- Addr. 4		IBRit-rf1-23
Permanent Mode -> Value number Permanent Mode -> Interval time				prog.
		Addr. 7		
(*) Factory setting	IS		OK (>>	
MEASUREMEN	T VALUES FROM	THE RF-MODULES		-
Number	Address	Measurem	ent Value	1
				-

IMBus :

After selecting **IMBus** as setting for the **IBR-Instrument**, the measuring bus is analysed and all connected IMBus modules are displayed.

			DEVICE 1	
PC-Connection	IBR-Instrument	Connection	Gauge / Sensor	
USB 👻	IMBus 💌	Addr.1	IMB-sm1 (1 RS232 Connection) Connection 1	Setup
		Addr.2	IMB-im2 (2 Induktive Probe Inputs) Connection 1	Setup
		Addr.3	IMB-im2 (2 Induktive Probe Inputs) Connection 2	Setup
		Addr.4	IMB-dm2 (2 Incremental Systems) Connection 1	Setup
		Addr.5	IMB-dm2 (2 Incremental Systems) Connection 2	Setup
		Footkey 0	connected to PC	Setup
		Footkey 1	connected to IBR-Instrument 1	Setup
	Service	Footkey 2	connected to IBR-Instrument 2	Setup

By means of the **Setup** - buttons for the individual measuring inputs you can select e.g. the gauges connected to IMBus interface modules (IMB-sm1...4, IMB-pm1, ...):

IMBus module programming	
Module type	ок
IMB-sm1	Cancel
Serial Number 00033906	
Hardware Version V1.0	
Software Version V1.1	
Firmware-Update	
Select gauge driver	
Gauge manufacturer	
J _	
Gauge type	
	Driver setup





In case of IMBus measuring modules (IMB-im1...8, IMB-dm1...4, IMB-tc1...4, IMB-ai1...8, IMB-ae1, ...) you can select the resolution, measuring direction and more :

IMBus module progra	mming	×
Module ty	pe	ок
IMB-im2		Cancel
Serial Number	00022008	
Hardware Version	V1.0	
Software Version	V1.6	
	Firmware-Update	
Programme measur	ing module	
Measuring direction		
Standard	•	
Measuring step		
0.0001		
Digital filter		
Level 3	•	Zeroadjust.
		Calibration
		Mech. Adjust.

In case of the devices <u>IBRit-md1 / md2 / mc4 / mc1 / di8 / de8 / da8 / ...</u> you can select the following parameters :

Setup	: By means of the Setup -button you can, in case of the IBRit-mc1, md2 (s) (c) and
	ma1/2 interfaces, select the gauge or sensor connected to the particular input of
	your interface from the IBR I/O catalogue.
Mea. Step	: In case of the IBRit-di8 / de8 / da8 measuring instruments you can programme the
	measuring steps (resolution) of the measuring inputs.

With the selection of the **PC-connections** and connected **IBR-instruments** done and the configuration of the instruments completed, you can confirm the settings and close the window by clicking the **OK** - button.

6.2 Display elements

By choosing the **Options / Display Elements** menu (Button :) the window for the definition of the measurement display colours and the individual design of all measurement- and statistical display elements is opened.

In the main window you get a preview of the display elements, when you use your mouse to point at a particular button or when a button is selected. The Programming of the display elements is self-explanatory and is supported by a preview of the display element in the programming window. (see illustration below) In addition you can define, save and delete schemes including a colour palette and the settings of the display elements.

The defined colours and settings of the display elements are copied into each test scheme when inserting the display elements in the menu *create test scheme*. The settings of the display elements can be changed afterwards in each test scheme if required.

					Programming of	the Mulleric D	вриау	<u> </u>
Programming of the Histogram	×				Display E	lement	Set Additional Information	on and Tolerances
Display Element Set Additional	Information				- Forme		A B C	. D E
Frame A B	C D E	al Column	n Display		×		1	1
Filme button out Backgound Color Value Display Filme Backgound Color Display Type Case Number Color Color Tunais of the Tolegaces Dutsis of the Tolegaces Datase of the Tolegaces	C 0 E T 0 0 E T 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	al Column v 2 3 4 v v 5	Set Add	Additional Additional Fork Type Characteristic IIII Write Measurement Mode IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Fort Color Fort C	Color kay ue in Color Display × Lec V	A Sector Sector	Constant of the second of the
Gausser-Curve Avis 1.2.3 Color	Measurement Mode Beckground Mode-State Beckground	6 7 8	-0.4	100	ttom up 💌	Color Value		Cancel Help
OK Cancel Help	- Background			K Cancel	Help			





6.3 Language selection

You can select the language by choosing the **Options / Language** menu (Button : D). On language selection a window containing a list of the available languages is displayed.

Select your language :	×
Deutsch English Français Italiano Japanese Svenska Danish Português - BR Español Chinese Polski čačtina	OK Cancel

Select your language and confirm by clicking the **OK** - button.

<u>Note :</u> On initial operation of the software the language is automatically set according to the language settings of the Windows operating system.

6.4 Selection of data directories

By choosing the **Options / Data Directories** menu (Button : 1) you can choose the directories, to which ComGage saves its data or from where ComGage loads its data :

- Directory for the test scheme files
- Directory for the test order files and collected measurement data
- Directory for the converted test orders (Excel files, QDAS files, ...)
- Directory for the pictures (*.bmp files)
- Directory for the reference information and user management data

Select Data Directories 🛛 🔀
Directory for Test Schemes
C:\ComGage\
Directory for Test Orders
C:\ComGage\
Directory for converted Measuring data
C:\ComGage\
Directory for Pictures
C:\ComGage\
Directory for Reference Information and User Setup
C:\ComGage\
OK Cancel Help

<u>Note</u>: You can type in only the names of existing directories. The ComGage software will not create any new directories.





6.5 User management

In the window of the **Options / User setup** menu (Button : 1990) you can create and change user data.

User name	
	▼ 0K
Password	Delete
Setting the	rights for the user
File	Adjustment
Test Order	🥅 Mechanical Adjustment
🔲 Create/Change	🔲 Calibration
📃 Start	
Close	
Print	Options
Analyse	Connections
Convert	Display Elements
Test Scheme	Language Data Directories
Create/Change	User setup
Start	Beference Information
Print	Freisisi de memoren
📕 Duplicate	
🔽 Delete	
🥅 Data Transfer	
User management activated	

The checkbox **User management activated** (left bottom window corner) allows you to generally activate / deactivate the user management.

In order to change user data, please select the user from the list and press the **OK** - button. In order to create a new user, please input the new user name and press the **OK** - button.

	User na	me and password	
Jser name Example			
Password	qwertzser		Delete
	Setting th	e rights for the user	
File		Adjustment	
Test Order		🔽 Mechanical Adju	istment
Create/Ch	ange	Calibration	
🔽 Start			
Close			
🗌 Print		Options	
Analyse		Connections	
Convert		Display Elements	1
Test Scheme		Data Directories	
Create/Ch	ange	User setup	
Start	ange	Reference Infor	nation
E Print		1 Hororotoc mon	nddorr
🔽 Duplicate			
🔲 Delete			
🗖 Data Transfer			
10.0	IA N W		
User management a	ctivated		

After selecting the user you can :

- input a login password for this user
- choose which menus are activated / deactivated for this user
- delete this user



By clicking the **Next >** - button the new settings of the currently programmed user are saved and you can go on programming the next user.

By choosing the Options / New login menu you can log in as an other user :

cel
an

Note :	Capitalization of user name and password
	is not checked.

The name of the user currently logged in is shown in the status bar at the right bottom corner :



6.6 Reference information (operators, machines, batch numbers, etc.)

In the **Options / Reference Information** menu (Button :) the window for programming the reference information tables is opened.

All reference information - except the batch / serial number and the last 5 user defined reference information types (no. 26 - 30) - are selected from the reference information tables (see below). Only the batch / serial number and the last 5 user defined reference information types can be input in an editable field - they are not selected from a reference information table.

1. Customer	on creation of test scheme 📃 💌	Setup	for whole part
2. Supplier	on creation of test order	Setup	for whole part
3. Manufacturer	on starting the measurement 💌	Setup	for whole part
4. Works / Department	before measuring a part 📃 💌	Setup	for each characteristic
5. Machine	off 📃 💌	Setup	for each characteristic
6. Fixture	off 📃 💌	Setup	for whole part
7. Nest	off	Setup	for whole part
8. Tool	off	Setup	for each characteristic
9. Material	off	Setup	for whole part
10. Test equipment	off	Setup	for whole part
11. Operator	off	Setup	for whole part
12. Shift	off	Setup	for whole part
21. Lubrication	on creation of test scheme	Setup	for whole part
22.	off	Setup	for whole part
23.	off	Setup	for whole part
24.	off	Setup	for whole part

1.) For each data type the data request mode can be selected :

off

- The data type is not used
- on creation of test scheme on creation of test order on starting the measurement before measuring a part
- The data type is requested when the test scheme is created
- The data type is requested when the test order is created
- The data type is requested when the measuring mode is started
 The data type is requested for every part in measuring mode
 - (e.g. for serial numbers)





2.) By clicking the **Setup** - Button you can programme the tables of the selected data type.

Reference	Information	-> Customer						
Name	002 003	02 Customer 2						
Name	Customer 1							
Number	001							
Note	First Custom	er				0		
			Next >	ОК	Cancel	Help		

First of all you must select a data set in the list or create a new one by clicking the **New -** Button. After selecting it, you can change the data set or delete it by clicking the **Delete -** button.

For each data set you can programme the following :

Name	(90 characters)
Number	(10 characters)
Note	(650 characters)

After programming one data set you can save the settings and leave the window by clicking the **OK** - button. The **Next >** - button allows you to store the settings and directly go on with programming the next data set.

Note : All settings stored by clicking the "Next >" - button do not get lost when the "Cancel" - button is clicked.

- 3.) For each data type you can choose whether the data is to be collected for the whole part (component) or for each characteristic separately (e.g. one characteristic is measured using a calliper and an other one using a dial gauge).
- 4.) "Reference information request in one window" should be activated, if the reference information is to be selected using a mouse. "Sequential reference information request" should be activated, if the reference information is to be selected using a keyboard.

Note : In ComGage you can programme the following reference information data types :

-	Customer	-	Operator
-	Supplier	-	Shift
-	Manufacturer	-	Test place
-	Works / Department	-	Storage place
-	Machine	-	Production instruction
-	Fixture	-	Test instruction
-	Nest	-	Events (why a measurement value is out of tolerance)
-	Tool	-	Batch / Serial number
-	Material	-	Action
-	Test equipment		

- 5 user defined data types (Selection by tables in measuring mode)

- 5 user defined data types (Direct input by keyboard in measuring mode)





6.7 Automatic start

In the **Options / Automatic Start** menu you can activate automatic starting of test schemes or test orders when ComGage is started or by a barcode reader. In measuring mode, the selection of a test scheme or test order can be done by keyboard (keys: 0 ... 9), foot switch, measuring input or barcode reader.

Start of test orders and test schemes							
Test Ord	ers		Test Schemes				
Start by COM 14	Start by COM 14 (i.e. PLC, Barcode Reader,)						
Automatic Start on ComGage Start		F Automatic St	art on ComGage Start				
Test Orders	Mea. Input	Foot switch	Test	Schemes	Mea. Input	Foot switch	
Order 12345 💌							
••••							
••••				*			
···· •				T			
••••				~			
				<u>-</u>			
• • • •							
• • • •	1		+++	*			
				×			
···· •				~			
OK Cancel Help							

Test Orders & Start by COM1...4

→ On ComGage Start or on choosing the Menu File / Test Order / Start you are requested to select a test order by the Barcode Reader :

Please s	elect one test	order or test	scheme with
i iease s		le Reader	
	the Daroot	e nedder,	

The barcodes used must be available in the Format : **CODE128** and contain the test order name.

Test Orders & Automatic Start on ComGage Start

- → After starting ComGage all selected test orders are started automatically for measurement data collection
- → If an assigned measurement input (Mea. Input) Mxx detects a measurement value change then the test order belonging to it is automatically executed in the foreground. The measuring input can be selected by clicking the button .
- → If an assigned foot switch Txx is activated then the test order belonging to it is automatically executed in the foreground. The foot switch can be selected by clicking the button

Test Schemes & Start by COM1...4

→ On ComGage Start or on choosing the Menu File / Test Scheme / Start you are requested to select a test scheme by the Barcode Reader. (see Test Orders & Start ...)

Test Schemes & Automatic Start on ComGage Start

- \rightarrow After starting ComGage all selected test schemes are started automatically.
- → If an assigned measurement input (Mea. Input) Mxx detects a measurement value change then the test scheme belonging to it is automatically executed in the foreground. The measuring input can be selected by clicking the button .
- → If an assigned foot switch Txx is activated then the test scheme belonging to it is automatically executed in the foreground. The foot switch can be selected by clicking the button





6.8 Convert

In the menu **Options / Convert** the automatic conversion of measurement data can be activated for the measuring mode.

Convert one T	est Order 🛛 🔀
File Format	Excel-Format
T Automatic Con	version of the measuring data after leaving the measuring mode
🔽 Automatic Con	version of the measuring data on storing a data set in measuring mode
Conversion Time P	oint on converting a data set in measuring mode
Convert only und	feletable values 🔽
C On the start of	a test order already collected measuring values are NOT converted OK Cancel Help

File format

 \rightarrow Selection of the data format, into which the conversion shall occur :

QDAS – Format (File name : *Test order name .dfq*) Excel – Format (File name : *Test order name .xls*) Special Format (File name : *Test order name .xls*) → An UDI Script for SPC Light from Lighthouse is available on request)

- Automatic conversion of the measuring data after leaving the measuring mode
 - → The conversion of the measuring data into the selected format occurs after leaving the measuring mode

Automatic conversion of the measuring data on storing a data set in measuring mode

ightarrow The conversion of the measuring data into the selected format occurs while measuring

Conversion Time Point on converting a data set in measuring mode

Convert only undeletable values

During measuring, the operator is authorised to delete only the last collected measurement value of a characteristic. All measurement values collected before cannot be deleted anymore. Hence, measurement values are automatically converted as soon as a further measurement value is collected, because they are then undeletable.

Convert all values directly

All measurement data is automatically converted when the "save measured values" function is executed

Convert the values after measuring the complete part

The measurement data is converted as soon as all characteristics of the component to be measured have been saved.

On the start of a test order already collected measuring values are NOT converted

- \rightarrow Measuring values that are already saved when the test order is started, are not converted.
- \rightarrow This function only makes sense in connection with *File Format* = Special Format.





7. Creating a test scheme

In a test scheme the part, its characteristics and the measuring sequence are defined :

- In the test scheme head the article number, the part name and the part-reference information (operator, machine, batch, ...) are entered.
 - Up to 128 characteristics can be created :
 - Characteristic name
 - Nominal size and tolerances
 - Probe mixing (with mathematical functions, such as sin, cos, tan, Min, Max, ...)
 - Measuring modes (for static, dynamic [Min, Max, TIR, Mean], ... measurements)
 - Master values for zero-adjustment or automatic gauge-calibration (for air gauging)
 - Sample size
 - Settings for the statistics (plausibility limits, distribution form, ...)
- Up to 128 test steps can be created :
 - Free design of display windows with numeric displays, column displays, analogue meters, control charts, histograms, ..., lines, texts, pictures
 - Assignment of foot switches, function keys, digital inputs and free definable conditions (with mathematical operators, logical operators, trigonometric functions, timers, ...) to the executable functions (e.g. saving of measurement values, deleting of measurement values, adjustment, ...)
 - Setting of digital outputs

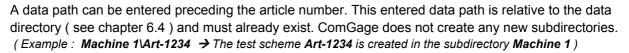
7.1 Programming the test scheme head

In the File / Test Scheme / Create & Change menu (Button : 2000)) test schemes can be programmed :

🐤 IBR - ComGago			
File Adjustment Options Help			Second Married Woman
Test Order Com P R R R R X	Test Scheme I D D D X		
Value Displays			
	EST SCHEME (Create / Chang le Number Article 1234		
SPC-Displays Articl	le Name	i oc	Cancel
dilla and a second	rence Information Setup		Heb
8 1 1 1 1	cial settings Setup		
and a second sec	CHARACTERISTICS : /	Drawing data Statistics Reference Information Q	1. Master 2. Master
A 2 m -			
Characteristics			
0			
4	TEST STEPS:	Sequence V Digital Outputs V Additional settings	
	No. Test Step Function	Save the characteristics Adjust the characteristics Preview of display w	
-			
		Poptente	dipla/window
ER I			
		Generale Window Contents automatication Copy window contents	Aspen al daday elementa
Menu : Test Scheme [Create/Change]		Anticle : Anticle 1234 ()	Uses : admin

At first you have to enter the *Article Number*. If you input an existing *Article Number* you can modify the particular test scheme, otherwise you create a new one.





8	TEST	г снем	E (Create / Cl	nange)									×
Arti	cle Num	iber	Art_0715					OK					ок
Arti	cle Nam	ame Shaft						0	ancel				
		Information	Setup										Help
Sp	ecial set	tings	Setup										нер
	CHA	RACTERIS	STICS :	Draw	ing data	\ Sta	atistics	Referen	ce Information		₹		B X
	No.	Name	Nominal	USL	UCL	LCL	LSL	Unit	Mea. Inputs		Mode	1. Master	2. Master
	C1	Diameter 1	20	0.03	0.0225	-0.0225	-0.03	mm	M1+M2		Static	19.999	
	C2	Diameter 2	16	0.03	0.0225	-0.0225	-0.03	mm	M3+M4		Static	16.001	
·													
	TES	ST STEPS	: ,	Seq	uence		Outputs	Additio	onal settings \		5 3		BX X
	No.	Test Step Func	tion		Save	e the charac	teristics	Adjust the	characteristics	Preview of	of display wir	ndow :	
_	S1	Collection of me	easuring values		C1,C	2		C1,C2		Diam			
-	S2	SPC-Window								- 8.3'-		#m 0.00	0.05
										antilla		ALC DI	
										Diam	-0.05	# 0.00	0.05
Ŧ										<u> - 8.3'4</u>			
_										F	^o rogramme d	isnlau windr	100

The following settings can be programmed in the test scheme :

- 1) Article Name (Name of the measured part, e.g. cylinder, bore, ...)
- 2) Article Reference Information (Additional data for test scheme documentation, e.g. manufacturer, distributor, customer, operator, batch, → See chapter 7.2)
- 3) **Special settings** (Special settings for the test scheme, such as output of tolerances on the IBRit-rf1-LEDs, test of probe validity, → See chapter 7.3)
- 5) Characteristics Statistics (The statistical data consists of the optional settings for the statistical analysis of characteristics, such as sample size, plausibility limits, → See chapter 7.5)
- 6) Characteristics Reference Information (Data entered as characteristics reference information can be e.g. the test equipment used. → See chapter 7.6)
- 7) Test Steps Sequence (Programming of the test sequence, e.g. : In which test step of the test sequence is characteristic 2 saved ? How is the saving of the characteristics called in the current test step ?
 → See chapter 7.7)
- 8) Test Steps Digital Outputs (Programming of the output values of the digital outputs in the particular test steps, for controlling external lamps, motors, → See chapter 7.8)
- 9) **Test Steps Additional settings** (Programmable additional settings are for example : a sample plan or automatic recognition of plug gauges. → *See chapter 7.9*)
- 10)**Test steps Programme display window** (Design of the display windows for the particular test steps. → See chapter 7.10)





7.2 Programming the article reference information

ARTICLE	E REFERENCE INFORMATION	X
Article Number Art	t_0715 Article Name Shaft	
	RENCE INFORMATION	
Customer	001 - Customer 1	
Supplier	002 - Supplier 2	•
		_
		_
		_
		_
		_
		<u> </u>
Creation Date	26.11.2009 Created by A. Sampleman	
Note		~
		~
	OK Cancel	Help

Article Reference Information

In this window a data set must be selected or input for all reference information activated for the test scheme. The programming and activating of the reference information for the test scheme is described in chapter 6.6.

Creation date

Creation date of the test scheme.

Created by

Name of the operator, who has created the test scheme.

Note

Free editable field for documentation (e.g. entry of test scheme history).



7.3 **Programming the special settings**

Special settings				
Output of tolerance result of the characteristi	ics on the IBRit-rf	-LEDs		OK
✓ The changing / stopping of a test scheme / collecting a complete sample.	order is firstly pos:	sible after		Cancel
Max. collection time for one sample Call test step for error output	off Step 1		•	
Observed characteristics : C1 - Diameter 1 C2 - Diameter 2	,			
Automatic creation of a test order on saving I	the test scheme			
Validity range 1 (Upper / Lower limit)	1	-1		
Validity range 2 (Upper / Lower limit)	2	-1		
Validity range 3 (Upper / Lower limit)	5	-5	-	
M1 = ADR1.1	Validity ra	inge 1	-	
M2 = ADR1.2	Validity ra	inge 2	-	
M3 = ADR1.3	Validity ra	inge 3	-	
M4 = ADR1.4	Validity ra	inge 1	-	
	off	the The March	-	
	off		-	
Sampling Rate	50 msec	(Standard)	•	

Output of tolerance result of the characteristics on the IBRit-rf1-LEDs

With this option activated, the tolerance status of the currently measured characteristic is output on the LEDs of the IBRit-rf1 radio module on transmission and simultaneous saving of the measurement values by a IBRit-rf1 radio module (red = not okay / yellow = corrective action / green = okay).

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

With this option activated, changing / stopping of a test scheme / order is prevented, as long as there is an incomplete sample collection. In the submenu you can define a maximum collection time for one sample (in minutes) as well as the test step to be called for error output in case the defined collection time has been exceeded (on doing so, ComGage deletes the measurement values of the incomplete sample). Additionally you can define which characteristics are to be observed by the sample supervision.

Automatic creation of a test order on saving the test scheme

With this option activated, a test order is automatically created when the test scheme is saved. The order number then corresponds to the article number of the test scheme.

Test of probe validity

With this option activated, the validity of the measurement inputs needed for measuring a particular characteristic is checked, as soon as the data of this particular characteristic is saved. For this, the raw-values of the probes are used. In the submenu you can define up to three validity ranges (values in mm). Additionally you can assign a validity range to every particular measurement input. If a measurement input is outside the validity range on data saving, then the characteristics are not saved and an error message is output.

Sampling rate

Adjustment of measurement speed. This parameter must be changed only in case of special applications. (Example : The connected gauge allows data request only every 300 msec.)

Display refresh rate

Adjustment of the display refresh rate. This parameter must be changed only in case of slow processors (e.g. Pentium 400 or less), in order to keep the measurement rate as high as possible.



7.4 Programming the characteristics (drawing data)

For programming the drawing data of a characteristic the following window is opened :

DRAWING DATA (Characteristic-Programming)							
I MEAL IA	ele Name Shaft racteristic name Diameter 1						
CHARACTERISTIC DATA FROM THE DRAWING Unit mm Setup Nominal size 20							
Upper spezification limit (USL) Upper controlling limit (UCL) Lower controlling limit (LCL) Lower spezification limit (LSL)	0.0225 75% of USL 0.0225 75% of LSL ✓						
MEA. VALUE COLLECTION Measurement inputs M1+M2 Setup Measurement mode Static Measurement Setup							
ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 19.999 2. Master value 0							
Reference test	OK Cancel Help						

1.) Characteristic name :

Name of the characteristic (e.g. diameter, length, ...)

2.) Unit :

Selection of the Unit.

In the list you find the standard units.

Special units (**Setup** \rightarrow) can be defined by clicking the **Setup** - Button. For a "special" unit you can define a *conversion offset* and a *conversion factor* (e.g. for converting °F to °C the factor is 5/9 and the offset is -160/9).

- 3.) Nominal size (of the characteristic)
- 4.) Tolerances (of the characteristic / are input relatively to the nominal size)

5.) Measurement inputs :

Connection of measurement inputs (probe mixing) for gauge definition \rightarrow see below

6.) Measurement mode :

Measurement mode for calculating the measurement result (e.g. static, dynamic) \rightarrow see below

7.) Master values :

Input of the master values for this characteristic.

The input of *one* master value is necessary to perform a *zero adjustment*, for performing a *gauge calibration* (e.g. air gauging) the input of *two* master values is necessary.

8.) Reference test :

Allows activating calibration tolerances (referring to the master value(s)). An upper and lower tolerance value is defined, using the unit of the characteristic. If the function "Adjustment / Calibration" is executed during the test sequence, then the tolerances defined here are used. If the defined tolerance values are exceeded, then an error message is displayed and the register R990 is set (R990=1). Hence, this function is used to supervise the fixture (typical defects : probe got loose / masterpiece dirty).





Measurement inputs (\rightarrow Setup)

Gauge Mixing					
Mea. Inputs Characte	eristic list Dig. Input				
USB	USB				
↓ ↓ ↓ M1 M2 M3 M4	M5 				
C Measuring Input					
C Input of the mea. Values by keyb		> M1+M2			
Selection of the attribute from list A F F	Axial run-out Radial run-out Roundness Concentricity		ОК	Cancel	Help

The following selection is possible for the calculation of the measuring value of a characteristic :

- a) Selection of a single measurement input whose measurement values are adopted as measurement values of the characteristic
- b) Selection of a probe mixing, e.g. measurement of outer diameter by the two measurement inputs M1 and M2 or input of a formula for any combination of measurement inputs, characteristics values etc. (see below)
- c) Input of a measurement value by keyboard
- d) Selection of an attribute from a list (e.g. red, green, blue) including the assignment of a numeric value as characteristics value (1. entry = 0 / 2. entry = 1 etc.).

It is possible to switch between the display of the available measurement inputs, the characteristics list or the available digital inputs (see the tabs at the upper edge of the window).

Formula :

In a formula for probe mixing the measurement inputs, results of other characteristics, footswitch inputs, digital inputs, register values, other numeric values and the time values can be combined in any way.

Address	Input
Mx	Measuring input x
Сх	Current measuring value of characteristic x
Cx_File	Last measuring value from file of characteristic x
Cx_USL	If measuring value of characteristic x is > USL, then Cx_USL = 1
Cx_UCL	If measuring value of characteristic x is > UCL and < USL, then Cx_UCL = 1
Cx_ok	If measuring value of characteristic x is inside the controlling limits, then Cx_ok = 1
Cx_LCL	If measuring value of characteristic x is > LSL and < LCL, then Cx_LCL = 1
Cx_LSL	If measuring value of characteristic x is < LSL, then Cx_LSL = 1
lx	Digital input x (State "set" = 1 / State "not set" = 0)
Тх	Hand / Foot switch x (State "pressed" = 1 / State "not pressed" = 0)
Rx	Register x
Fx	Function key F1 F12

In the formulas the following inputs can be used :





Operator	Function	Example
+	Addition of inputs, characteristics and numbers	M1+M10-34
-	Subtraction of inputs, characteristics and numbers	M1-M2+1.1e-4
*	Multiplication of inputs, characteristics and numbers	M3*0.5+M2*M1
1	Division of inputs, characteristics and numbers	M2/3
٨	'x power by y' (e.g. 2^3 = 2*2*2 = 8)	M2 ^(1/2) = Square root of M2
%	Modulo-operator = carryover of a division (e.g. 5%3 = 2)	M2%2
ABS()	Absolute value	ABS(M1)
SIGN()	Delivers the sign of the parameter	SIGN(-5.23)=-1
ROUND()	Rounds to the next integer	ROUND(5.43)=5 / ROUND(5.53)=6
INT()	Rounds down to the next integer	INT(5.43)=5 / INT(5.53)=5
CEIL()	Rounds up to the next integer	CEIL(5.43)=5 / CEIL(5.53)=5
SIN()	Sine (unit : degree)	SIN(M2)
COS()	Cosine (unit : degree)	COS(M2)
TAN()	Tangent (unit : degree)	TAN(M2*3+M1)
ASIN()	Arc – Sine (unit : degree)	ASIN(M2/50.4)
ACOS()	Arc – Cosine (unit : degree)	ACOS(M2/50.4)
ATAN()	Arc – Tangent (unit : degree)	ATAN(M2/50.4)
PI	Pi (=3,141592654)	SIN(M2*180/PI)
EXP()	Exponential function (2.7182818 ^ x)	EXP(M1)
LOG()	Natural logarithm	LOG(M1)
TIME(0)	Returns the number of milliseconds since midnight	TIME(0)
MONTH	Current month (1=January, 2=February,)	MONTH
DAY	Current day of month (1 31)	DAY
DAYOFWEEK	Current day of week (0=Sunday, 1=Monday,, 6=Saturday)	DAYOFWEEK
HOUR	Current time : Hour (0 23)	HOUR
MINUTE	Current time : Minute (0 59)	MINUTE
SECOND	Current time : Second (0 59)	SECOND
Min(;;;)	Min-value of all elements in the list	Min(M1;M2;C3;M4+C5)
Min()	Min-value of all saved measuring values of the characteristic	Min(C3)
Max(;;;) or Max()	Max-value (see Min-function)	Max(M1;M2;C3;M4+C5) or Max(C3)
Avr(;;;) or Avr()	Average (see Min-function)	Avr(M1;M2;C3;M4+C5) or Avr(C3)
Tir(;;;) or Tir()	Max-value minus Min-value (see Min-function)	Tir(M1;M2;C3;M4+C5) or Tir(C3)
SD(;;;) or SD()	Standard deviation (see Min-function)	SD(M1;M2;C3;M4+C5) or SD(C3)

In the formulas the following operators can be used :

Measurement mode

a) Static measurement

The component is measured statically, it is for example lying in a fixture during measurement. ComGage continuously measures and calculates the result of the characteristic. The display continuously outputs the current measurement value.

b) Dynamic measurement

The component is moved (e.g. rotated) during measurement. During this movement of the component, the Minimum, Maximum, TIR and Mean values are searched.

Dynamic Measurement	
Display Value Min ▼ Min TIR (Max - Min) MEAN ((Max + Min)/2) MEAN ((X1++Xin)/n)	OK Cancel

Dynamic Measurement	
Display Value Min	Cancel
✓ Use dynamic measuring result for calibration	Carlot





Min	\rightarrow	Search for the smallest measurement value
Мах	\rightarrow	Search for the biggest measurement value
TIR	\rightarrow	Search for the TIR Value (Max-Min)
MEAN((Max+Min)/2)	\rightarrow	Calculation of the Mean value ((Max+Min)/2)
MEAN((X1++Xn)/n)	\rightarrow	Calculation of the Mean value (Addition of all measurement
		values and division by the number of values)

Use dynamic measuring result for calibration

In this mode adjustment / calibration is performed using the result of the last dynamic measurement. In order to do so, you must programme a corresponding test step in your test sequence performing a dynamic measurement followed by the function "Adjustment / Calibration".

c) Gauge Triggered

Only those measurement values are shown, which are transmitted by data key on the gauge. This mode is especially for hand gauges on which the measuring values are sent by the data key of the gauge or for e.g. balances which automatically send their measuring value at the end of measurement.

7.5 Programming the characteristics (statistics)

STATI	STICS (Characteristic-Pr	rogramming)			
Article Number Char. Number	Art_0715 C1	Article Name Characteristic name	Shaft Diameter 1		
- MEA. VALUE	Upper plausibility limit (Lower plausibility limit ((LPL)			OK Cancel
- REQUEST OF		ion on 🔽 Specificatio Controlling Detection of Detection of	≿ MESSAGE n limit violation by one measuring valu imit violation by Xq, S, R f a RUN (X-Chart) f a TREND (X-Chart)	e	
Control		plimits Xq-Shewhart-(vel [%] 99.73 plimits are used in	m specification limits QCC column / analogue displays / formulas	•	
	Output control Limits shown in control Message outp	I chart Controlling limit	s + Warning limits n limit violation by one measuring valu imit violation by Xq, S, R	•	
	Cancel-Button on message o	output J			Help

1.) **Sample size** (for measurement of the characteristic)

Note : In case of 100% control it is not possible to display a control chart and Cp / Cpk

2.) Plausibility limits :

If a measuring value is outside the plausibility limits on data saving, then the operator is asked, whether the measuring value should be saved or rejected. If the measuring value is rejected, then the measurement can be directly repeated.

3.) Norm for the standard deviation :

Selection of the norm for calculating of the standard deviation (ISO9000 / QS9000).





4.) Distribution type :

Not available at this time. All statistical analysis is performed based on the normal distribution.

5.) Request of event and action :

You can choose when the event and the action are to be requested

6.) Calculation of controlling limits :

Off (inserted controlling limits are used)

The controlling limits defined in the characteristics "drawing data" are used.

Calculation from specification limits

The controlling limits are calculated from the tolerance limits, based on the Cp-formula and the control chart formulas.

Calculation by the first 125 collected samples

The controlling limits are calculated from the first 125 collected samples, based on the control chart formulas. Afterwards they are fixed.

Continuous calculation by all samples

The controlling limits are calculated from all collected samples every time a new sample was collected. Calculation is based on the control chart formulas.

7.) Control chart type for calculation of controlling limits :

Selection of the control chart type to be used (Xq = average chart, Xm = median chart, X = raw value chart, S = standard deviation and R = range), as well as calculation method for controlling limits (Shewhart or Acceptance).

8.) Confidence level :

Setting for calculation of controlling limits.

9.) Calculated controlling limits are used in column / analogue displays / formulas :

With this option deactivated, the controlling limits entered in the **drawing data** are used for tolerance interpretation by the column / analogue displays and formulas. With this option activated, the calculated controlling limits are used for tolerance interpretation by the column / analogue displays and formulas.

10.) Output control chart :

Activates fade in of the control chart for the span of time selected.

11.) Limits shown in control chart :

Selection of the following settings can be made for the control chart that is faded in : "Controlling limits + Warning limits" or "Specification limits + Controlling limits".

12.) Message output :

You can select when a warning message is to be output.

13.) Cancel-Button on message output :

The cancel - button can be enabled / disabled. If it is enabled, then the measurement values are not saved in case the cancel - button is clicked. The operator can repeat the measurement. (cf. plausibility limits)

7.6 Programming the characteristics (reference information)

Characteristic Reference Information

In this window a data set must be selected or input for all reference information activated for the characteristic. The programming and activating of the reference information for the characteristic is described in chapter 6.6.

Note

Free editable field for documentation.



7.7 Programming the test steps (sequence control)

In this window the foot switches, function keys, digital inputs and events are assigned to the particular functions (save measured values, delete measured values, adjustment / calibration, ...) that are to be executed by them.

est Step Number S1 Collection of measurement / Calibration LIST OF FUNCTION djustment / Calibration Leter Calibration Lete		Function	- PROGRA			
djustment / Calibration elete Adjustment / Calibration faster-Calibration ero adjustment with 1. Master	DNS	Function	- PROGRA			
djustment / Calibration Jelete Adjustment / Calibration faster-Calibration Jero adjustment with 1, Master		Function	- PROGRA			
relete Adjustment / Calibration faster-Calibration 'ero adjustment with 1, Master		Function		MMING OI	F SELECTED FUNCT	10 N
faster-Calibration ero adjustment with 1. Master		ranodon	Adjustment	Calibration		
		Characteristic	selection		Function key	
unamio measurament, on/off			Diameter 1		F2	
	=	and the second second	Diameter 2		Hand/Footswitch	
lynamic measurement on lynamic measurement off	1.040				T1	- Inf
-				٦	Dig. Input	
nput of values by keyboard		i i i	3		13	💌 Inf
all subsequence leturn from subsequence		Г			Event	
					Clicking Button 2	
ave measured values on disk relete all measured values	×					
Expert mode 2	New	All on	All off		OK	Cancel
			CREATED F	A 18 / 2 / 10 / 18 / 3	T	
Function			Hand/Footsw	Dig. Input	Event	Edit
ave measured values : C1, C2		F1	1442		Clicking Button 1	Delet
djustment / Calibration : C1, C2 hange to next test step		F2 F3			Clicking Button 2 Clicking Button 3	
4		27.5				

- 1. Input of test step function (e.g. Collection of characteristic C1...C5, Statistic window, ...) *Text field for documentation of the test step function !!*
- Select a function from the list and click the New Button (All functions are available in the Expert mode.)

Table of available functions :

Name of function	Description of function
Save measured values	The current measured values of the selected characteristics are saved.
Delete last saved measured value	The last saved measured value of the selected characteristics is deleted.
	But it is only possible to delete the last collected measured value. All meas- ured values collected before are undeletable.
Change to next test step	Change to next test step or in Expert mode to a specified test step. By add-
	ing the function several times within one test step it is possible to branch to
	several test steps.
Repeat last test step	The previous test step is called.
Adjustment / Calibration	Adjustment / Calibration of the selected characteristics. A possibly activated
	reference test is executed before (see chapter 7.4).
Delete Adjustment / Calibration	The stored offset values of the selected characteristics are deleted. On
	characteristics with 2 master values activated, stored calibration factors are
	also deleted. (The raw values of the measuring inputs are visible again.)
Master-Calibration	The Adjustment / Calibration of the selected characteristics is executed
	without the calibration tolerance check of the reference test (see chapter
	7.4). The function serves for the initial calibration of a fixture.





Name of function	Description of function
Zero adjustment with 1. Master	Allows the zero adjustment of the selected characteristics with one master,
	even if two master values are assigned to these characteristics.
Dynamic measurement on / off	The dynamic measurement of the selected characteristics is switched on
	and on second function call switched off again.
Dynamic measurement on	The dynamic measurement of the selected characteristics is switched on.
Dynamic measurement off	The dynamic measurement of the selected characteristics is switched off.
Input of values by keyboard	The measuring values of the selected characteristics or the attributive list of
	the characteristics are requested by keyboard. The values input by keyboard
Call subacquance	are automatically saved when the input is completed. Change to next test step or to a specified test step as subsequence (after
Call subsequence	that return to origin).
	By this function you can change from several test steps to e.g. a calibration
	test step. After completion of the subsequence ComGage automatically
	changes back to the original test step.
Return from subsequence	End of subsequence and return to original test step.
Save measured values on disk	The function "Save measured values" saves the measured values only in
	RAM. On leaving the measurement the measured values are stored on disk.
	This function also allows the saving of measured values on disk during the
	measurement.
Delete all measured values	All collected measured values of the selected characteristics are deleted.
Excel-Export and delete all values	All collected measured values of the selected characteristics are at first
	exported into an Excel-file and then deleted. The Excel-file has as filename
	the test order number with an appended counter, which is incremented on
	each call of the function.
Assign event & action	It is possible to assign an event to the collected measured data (e.g. break-
	ing of the tool) as well as a corrective action (e.g. exchange of the tool).
Print the characteristics	The last dataset of the selected characteristics is printed out in tabular form.
	On repeated call of the function all datasets are printed on one sheet, as
Print the characteristics on new page	long as enough space is available on page. After that a paging occurs. The last dataset of the selected characteristics is printed out in tabular form.
Find the characteristics on new page	On repeated call of the function each dataset is printed out in tabular form.
Simulation of a function key	The function which is assigned to the simulated function key in the test
Simulation of a function key	scheme is executed. It is possible to e.g. simulate the keys "09" to call
	another test order or to simulate the key "/" to change to full screen mode.
Change characteristic parameter	By this function the operator is given the possibility to change characteristics
	data (e.g. master values, nominal size, tolerances,) during the meas-
	urement.
Printout of the screen contents	The current display window contents are printed out as form of screen-shot.
Output optical and acoustical message	It is possible to superimpose a message using a pop-up-window for an ad-
	justable period of time (e.g. "calibration is executed"). In addition an acous-
	tical signal can be output by the sound card of the PC (if not available by
	the PC-speaker).
Set current reference info. data set	By this function it is possible to assign reference information (operator,
	machine,) to measured data.
Q-DAS Konverter	Export of measured data as Q-DAS-file. By this function it is possible to
	create an own Q-DAS-file per dataset, which has as filename the test order
	number and a counter. It is also possible to create Q-DAS-files with several
Setting a register	datasets. Additionally the exported K-Fields can be modified.A specific register is set to a definable value or the register value is incre-
	mented / decremented.
Messwerte kopieren	It is possible to copy the measured values of a characteristic into the meas-
	ure value memory of a second characteristic.
Output of values over RS232	It is possible to output the measured values of a characteristic using differ-
	ent multiplexer protocols on a RS232. The different protocols are described
	in the Setup window of the function.
Control by barcode reader	It is possible to call an other test order by a barcode-reader. The barcode
-	must contain the test order number.





Name of function	Description of function
Save calibration data in file	It is possible to save the calibration (offsets + factors) of the current test scheme into a file and to adopt the calibration to another test scheme. By this means no separated calibration is necessary in each test scheme.
Execution of a file	It is possible to execute a file (e.g. PDF, MP3, AVI, EXE,) and so it is possible to bestow the operator additional assistance during the measuring process.
Duplicate test order for parallel access from 2nd PC	During the measurement the current test order cannot be accessed for analysis by a second PC. By this function all measured data can be written into a second test order in parallel, which can be opened on second PC for analysis.

3. Assignment of characteristics to the function and assignment of foot switches, function keys, digital inputs and events for execution of the function :

	PROGRAMMING	0 F	SELECTED	FUNCTION	
Function	Adjustment / Calibration				
Characteristic sele	ection		Function key		
🖂 🔽 C1 - Diam	neter 1		F2		•
C2 - Diam	neter 2		Hand/Footswi	itch	
			T1		▼ Info
			Dig. Input		
			13		👻 Info
			Event		
			Clicking Butto	on 2	•
All on	All off		[OK	Cancel

Notes :

- a) By clicking the Info Button the available digital inputs are graphically illustrated in a picture.
- b) Available events :

Event	
Clicking Button 1	-
Test Step Start Clicking Button 1 Clicking Button 2 Clicking Button 3 Characteristic 1> dyn. measuring stopped Characteristic 2> collection by data key Formula	

2

Test Step Start

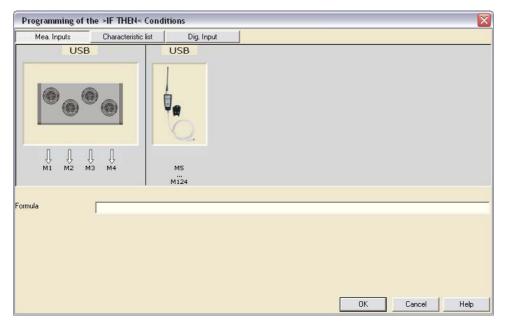
The function is executed automatically on the start of the test step, i.e. when ComGage changes to the test step. With this event it is possible e.g. to start a dynamic measurement, when ComGage changes to the test step for dynamic measurement.

Dynamic measurement on : C1	 	 Test Step Start
Dynamic measurement off : C1	 	 Formula : Timer(17000,0)=1
Save measured values : C1	 	 Characteristic 1> dyn. measuring
	•	





Clicking Button 13 :	In the measuring window three buttons are available, which can be assigned to a function in the test scheme for execution of that particular function.		
	Save measured values		
	Adjustment / Calibration		
	Change to next test step		
Characteristic x → dyn. meas :	If the dynamic measurement of character then the assigned functions are executed With this event it is possible e.g. to save acteristics when the dynamic measureme	the result of all char-	
Dynamic measurement on : C1 Dynamic measurement off : C1 Save measured values : C1	Test Step S Test Step S Formula : T Characteris	itart imer(17000,0)=1 tic 1> dyn. measuring	
Characteristic x → collection :	If a value from characteristic x is received cally sent from the gauge or transmitted l gauge, then the function is executed. With this event it is possible e.g. to direct measuring value :	d, which is automati- by the data key of the	
Save measured values : C2	F1 Characteris	stic 2> collection by dat	
Formula :	Free Input of a condition for executing the (by clicking the Setup - button).	e function	



The inputted formula always consists of logical conditions : x>y, z=1, These logical conditions can be combined by Boolean operators (AND, OR, ...). If the logical conditions of a formula are fulfilled, then the assigned function is executed.

It is possible to switch between the display of the available measurement inputs, the characteristics list or the available digital inputs (see the tabs at the upper edge of the window).





As logical operators are available :

Operator	Function
&	AND conjunction between 2 conditions
	OR conjunction between 2 conditions
=	The condition is fulfilled, if both parameters are equal
<	The condition is fulfilled, if parameter 1 is smaller than parameter 2
>	The condition is fulfilled, if parameter 1 is bigger than parameter 2
>=	The condition is fulfilled, if parameter 1 is equal or bigger than parameter 2
<=	The condition is fulfilled, if parameter 1 is equal or smaller than parameter 2

Example for a formula : (x>5 & y<=3) | z=1

In the formulas the following inputs can be used :

Address	Input
Mx	Measuring input x
Сх	Current measuring value of characteristic x
Cx_File	Last measuring value from file of characteristic x
Cx_USL	If measuring value of characteristic x is > USL, then Cx_USL = 1
Cx_UCL	If measuring value of characteristic x is > UCL and < USL, then Cx_UCL = 1
Cx_ok	If measuring value of characteristic x is inside the controlling limits, then Cx_ok = 1
Cx_LCL	If measuring value of characteristic x is > LSL and < LCL, then Cx_LCL = 1
Cx_LSL	If measuring value of characteristic x is < LSL, then Cx_LSL = 1
Cx_USL_File	If last measuring value from file of characteristic x is> USL, then Cx_USL_File = 1
Cx_UCL_File	If last measuring value from file of characteristic x is > UCL and < USL, then Cx_UCL_File = 1
Cx_ok_File	If last measuring value from file of characteristic x is inside the controlling limits, then Cx_ok_File = 1
Cx_LCL_File	If last measuring value from file of characteristic x is > LSL and < LCL, then Cx_LCL_File = 1
Cx_LSL_File	If last measuring value from file of characteristic x is < LSL, then Cx_LSL_File = 1
Тх	If an actuation of hand / foot switch x is detected, then Tx = 1 is set
Tx_State	Current state of hand / foot switch x (State "pressed" = 1 / State "not pressed" = 0)
lx	If a setting of digital input x is detected, then Ix = 1 is set
Ix_State	Current state of digital input x (State "set" = 1 / State "not set" = 0)
F1 F12	If an actuation of function key x is detected, then Fx = 1 is set
F1_State F12_State	Current state of function key x (State "pressed" = 1 / State "not pressed" = 0)
Rx	Register x

In the formulas the following mathematical operators can be used :

Operator	Function	Example
+	Addition of inputs, characteristics and numbers	M1+M10-34
-	Subtraction of inputs, characteristics and numbers	M1-M2+1.1e-4
*	Multiplication of inputs, characteristics and numbers	M3*0.5+M2*M1
1	Division of inputs, characteristics and numbers	M2/3
٨	'x power by y' (i.e. 2^3 = 2*2*2 = 8)	M2 ^(1/2) = Square root of M2
%	Modulo-operator = carryover of a division (e.g. 5%3 = 2)	M2%2
ABS()	Absolute value	ABS(M1)
SIGN()	Delivers the sign of the parameter	SIGN(-5.23)=-1
ROUND()	Rounds to the next integer	ROUND(5.43)=5 / ROUND(5.53)=6
INT()	Rounds down to the next integer	INT(5.43)=5 / INT(5.53)=5
CEIL()	Rounds up to the next integer	CEIL(5.43)=5 / CEIL(5.53)=5
SIN()	Sine (unit : degree)	SIN(M2)
COS()	Cosine (unit : degree)	COS(M2)
TAN()	Tangent (unit : degree)	TAN(M2*3+M1)
ASIN()	Arc – Sine (unit : degree)	ASIN(M2/50.4)
ACOS()	Arc – Cosine (unit : degree)	ACOS(M2/50.4)
ATAN()	Arc – Tangent (unit : degree)	ATAN(M2/50.4)
PI	Pi (=3,141592654)	SIN(M2*180/PI)
MONTH	Current month (1=January, 2=February,)	MONTH
DAY	Current day of month (1 31)	DAY
DAYOFWEEK	Current day of week (0=Sunday, 1=Monday,, 6=Saturday)	DAYOFWEEK
HOUR	Current time : Hour (0 23)	HOUR
MINUTE	Current time : Minute (0 59)	MINUTE
SECOND	Current time : Second (0 59)	SECOND
EXP()	Exponential function (2.7182818 ^ x)	EXP(M1)





Operator	Function	Example
LOG()	Natural logarithm	LOG(M1)
Min(;;;) Min()	Min-value of all elements in the list Min-value of all saved measuring values of the characteristic	Min(M1;M2;C3;M4+C5) Min(C3)
Max(;;;) or Max()	Max-value (see Min-function)	Max(M1;M2;C3;M4+C5) or Max(C3)
Avr(;;;) or Avr()	Average (see Min-function)	Avr(M1;M2;C3;M4+C5) or Avr(C3)
Tir(;;;) or Tir()	Max-value minus Min-value (see Min-function)	Tir(M1;M2;C3;M4+C5) or Tir(C3)
SD(;;;) or SD()	Standard deviation (see Min-function)	SD(M1;M2;C3;M4+C5) or SD(C3)
PartOK	 =0, if the current measuring value of at minimum one characteristic is outside the tolerances =1, if the current measuring values of all characteristics are inside the tolerances 	PartOK=1
PartOK_File	 =0, if the last measuring value from file of at minimum one characteristic is outside the tolerances =1, if the last measuring values from file of all characteristics are inside the tolerances 	PartOK_File=1

Example of a formula : 45e-5 + sin(5*M1/M2)*cos(4*M3) - (C2+M3+4.5)^(1/2) + Min(sin(C1);cos(M2)/3;M2+M3;5) > 1000

Additionally there are the following special functions for the formulas available :

Special function	Description		
Timer	Timer (time interval, num. of calls)		
	The Timer is initialised on the start of the particular test step and triggers the event on expiration of the time. On each leaving and new call of the test step the Timer is reset.		
	time interval → Time interval after which the Timer triggers the event [in msec] num. of calls → Number of calls of the Timer (e.g. 100 measuring values shall be saved all 100 msec) 0 = Special case : The Timer triggers the event unlimited times 1 = The Timer triggers the event 1-time after test step start 2 = The Timer triggers the event 2-times after test step start		
GlobalTimer	GlobalTimer (time interval, num. of calls)		
	The Timer is initialised on the FIRST start of the particular test step and triggers the event on expiration of the time, when the test step is currently active. It varies from the normal "Timer" in that way, that it is NOT reset after leaving and new call of the test step.		
	time interval → Time interval after which the Timer triggers the event [in msec] num. of calls → Number of calls of the Timer (see Timer)		
PartCounter	PartCounter (reset size)		
	The Part Counter counts the measured parts since the start of the test scheme / test order. When the counter reaches the reset size then the counter is reset. (serves for e.g. a call on a part forced calibration)		
	reset size → Number of parts after which the PartCounter is reset 0 = Special case : The counter is never reset 1 = The counter is reset after one part 2 = The counter is reset after two parts		
NumOfVal	NumOfVal (Number of the characteristic)		
	Returns the number of measuring values in file of the characteristic.		
StableValue	StableValue (Number of the characteristic, begin, end, time, max. jump)		
	Detection of a stable value.		
	Characteristic → Number 1128 of the observed characteristic begin & end → Measuring range in which the observation for a stable value takes place. After detection of a stable value the measuring range must be first left, before a new stable value can be detected. time & jump → Time period "time" in msec, in which the measuring value must not jump more than "jump" for detecting a stable value.		
	Example : StableValue (3, 19.99, 20.01, 1000, 0.005) =1 The event is triggered, if the measuring value of characteristic 3 is within the measuring range of 19.99 to 20.01 and is stable, i.e. it jumps less than 0.005 for a time of 1000 msec.		
MVChange	MVChange (Number of the characteristic, Changing, Time)		
	Detection of a changing value.		
	Characteristic → Number 1128 of the observed characteristic Changing → Minimal-required change of the measuring value for triggering the event Time → Time period in msec, within which the measuring value must change for "Changing"		
	Example : MVChange (3, 0.1, 1000) =1 The event is triggered, if characteristic 3 changes in 1000 msec at minimum for 0.1.		

Example for a formula : Timer(1000,1)<mark>=1</mark>





4. All the created functions are shown in the table. These can be modified or deleted :

LIST OF CREATED FUNCTIONS						
Function	Function key	Hand/Footsw	Dig. Input	Event		Edit
Save measured values : C1, C2	F1			Clicking Button 1		Dalaha
Adjustment / Calibration : C1, C2	F2			Clicking Button 2	<u> </u>	Delete
Change to next test step	F3			Clicking Button 3		
					-	

5. In the "Reference information – menu" (see chapter 6.6) you can select that certain types of reference information are requested at the start of a component measurement. This could be for example the serial number of the component. By checking the box "In this test step the reference information are requested" you can define the test step in which these reference information types are requested.

7.8 Programming the test steps (digital outputs)

In this window the output values of the digital outputs can be assigned to the single test steps. (e.g. for controlling a machine):

DIGI	TAL OUTPUTS (Test Step-Progr	amming)		$\overline{\mathbf{X}}$
Article Number		Article Name	Shaft in fixture	
Test Step Nur	nber S1	Function	Wait for measurement start and calibration	
	USB			
No.	Output value	1		
Q1	0	-		-
Q2	1			
Q3	0			
Q4	Good Signale of the part (Current values)			
Q5	LCL of the part (Current values) LSL of the part (Current values)	(internet)		
Q6	Outside of the Tolerances (Current values)			
Q7	Outside of the Controlling Limits (Current values) Characteristic C1			
Q8	Characteristic C2			100
20	Upper plausibility limit (UPL) Lower plausibility limit (LPL)	-		<u> </u>
	Logic function of the output	~	OK Cancel	Help

The digital outputs and their addresses are shown in the picture.

O starstandar	Ordered
Output value	Output
0	The digital output is not set.
1	The digital output is set.
USL of the part	The digital output is set, if the last saved measuring value of at minimum one
(Values from file)	characteristic is outside the upper specification limit (USL).
UCL of the part	The digital output is set, if the last saved measuring value of at minimum one
(Values from file)	characteristic is outside the upper controlling limit (UCL) and if no measuring
	value is outside the specification limits (USL & LSL).
Good Signale of the part	The digital output is set, if the last saved measuring value of all characteristics is
(Values from file)	within the controlling limits and within the specification limits.

For the digital outputs the following output values are available :





Continuation of values for the digital outputs :

Output value	Output
LCL of the part	The digital output is set, if the last saved measuring value of at minimum one
(Values from file)	characteristic is outside the lower controlling limit (LCL) and if no measuring
	value is outside the specification limits (USL & LSL).
LSL of the part	The digital output is set, if the last saved measuring value of at minimum one
(Values from file)	characteristic is outside the lower specification limit (LSL).
Outside of the Tolerances	The digital output is set, if the last saved measuring value of at minimum one
(Values from file)	characteristic is outside the specification limits (USL & LSL).
Outside of the Controlling Limits	The digital output is set, if the last saved measuring value of at minimum one
(Values from file)	characteristic is outside the controlling limits (UCL & LCL) and if no measuring
	value is outside the specification limits (USL & LSL).
USL of the part	The digital output is set, if the current measuring value of at minimum one charac-
(Current values)	teristic is outside the upper specification limit (USL).
UCL of the part	The digital output is set, if the current measuring value of at minimum one charac-
(Current values)	teristic is outside the upper controlling limit (UCL) and if no measuring value is
	outside the specification limits (USL & LSL).
Good Signale of the part	The digital output is set, if the current measuring value of all characteristics is
(Current values)	within the controlling limits and within the specification limits.
LCL of the part	The digital output is set, if the current measuring value of at minimum one charac-
(Current values)	teristic is outside the lower controlling limit (LCL) and if no measuring value is
	outside the specification limits (USL & LSL).
LSL of the part	The digital output is set, if the current measuring value of at minimum one charac-
(Current values)	teristic is outside the lower specification limit (LSL).
Outside of the tolerances	The digital output is set, if the current measuring value of at minimum one charac-
(Current values)	teristic is outside the specification limits (USL & LSL).
Outside of the Controlling Limits	The digital output is set, if the current measuring value of at minimum one charac-
(Current values)	teristic is outside the controlling limits (UCL & LCL) and if no measuring value is
	outside the specification limits (USL & LSL).
Characteristic Cx	The digital output is set, if the current measuring value of characteristic Cx is
	within the specification limits.
Upper plausibility limit	The digital output is set, if the current measuring value of at minimum one charac-
(UPL)	teristic is outside the upper plausibility limit (UPL).
Lower plausibility limit	The digital output is set, if the current measuring value of at minimum one charac-
(LPL)	teristic is outside the lower plausibility limit (LPL).
Logic function of the output	Input of a formula
	→ see formula editor in chapter 7.7



7.9 Programming the test steps (additional settings)

Additional settings of the test steps					
Article Number Art_0715	Article Name				
Test Step Number S1	Function	Collection of measuring values			
CALLING	THE TEST STEP OF	IN VALUE CHANGE			
TAutomatic calling of the test step on detection of a value change on characteristic :					
Needed value change for calling the test step		0.0120			
	SAMPLE PLA	AN			
• 100 % Control					
C Calling the test step all 5 of 20	Parts				
C Calling the test step all 30 Minutes					
	- COLLECTION T	TYPE			
C Part depending measurement					
Characteristic depending measurement					
Number of parts to collect in test step 5					
		OK Cancel Help			
		OK Cancel Help			

Automatic calling of the test step on detection of a value change on characteristic :

With this option activated and a characteristic assigned to it, the particular test step is automatically called if the measurement value of the assigned characteristic changes. Additionally you can define a minimum value change which serves as trigger level for the automatic call of the test step.

Example :

There are 3 bore gauges connected. For each one of them a test step with display window is created in ComGage. If you now assign characteristic 1 to the first test step, characteristic 2 to the second test step and so on, then ComGage always displays the measurement values of the active bore gauge.

Sample plan :

100 % Control

The test step is always called.

Calling the test step all x of y parts

The test step is only called x-times out of y-times, i.e. with this function the collection of uncritical characteristics can be skipped, so that these characteristics do not have to be collected for each part.

Calling the test step all x Minutes

The test step is only called all x minutes, i.e. with this function a time-controlled execution of the test step can be programmed. This can be useful for example to execute a forced periodical calibration.

Collection type :

Part depending measurement

All characteristics of a part are measured one after the other before the next part is measured. **Characteristic depending measurement**

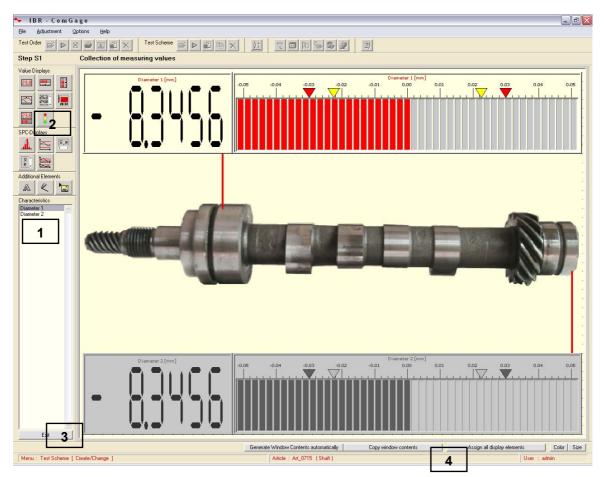
At first characteristic 1 of x parts is measured, then characteristic 2 of x parts is measured and so on. With this option activated, ComGage firstly allows leaving the test step, when x parts have been measured.





7.10 Programming the test steps (programming the display windows)

In this menu the display windows for the individual test steps can be created.



1.) Selection of the characteristic

Before creating a display element the characteristic must be selected, to which the new display elements shall belong.

2.) Creating display elements

You can create a display element by using the buttons. The new display elements belong to the currently selected characteristic. (see 1.) The new display element is placed at the centre of the display and can then be moved.

3.) Leaving the programming menu

By clicking the Exit - button you can leave the menu for programming the display window.

4.) Additional buttons

On clicking the **Generate Window Contents automatically** - button, ComGage automatically creates the display window with the display elements for a list of characteristics, which can be selected on clicking the button.

By clicking the **Copy window contents** - button the display window contents of another test step can be copied.

By clicking the **Assign all display elements** - button all display elements of a display window can be assigned to a particular characteristic.

By clicking the **Color** - button you can select the background colour of the window.

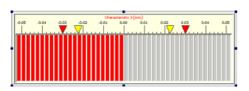
By clicking the Size - button you can adapt the display window to different screen sizes.





5.) Moving display elements

If you click on a display element then it gets activated. When it is activated you can move it or change its size using the mouse. (alternative **cursor keys** : move the element / **shift+cursor keys** : change its size)

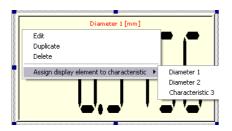


6.) Grey display elements

All display elements of the currently selected characteristic are shown in colour, the display elements of other characteristics are shown in grey.

7.) Editing, duplicating or deleting a display element

By clicking the right mouse button or pressing the ENTER key the following menu for programming the selected display element is opened :



By means of this menu the display elements can be edited (e.g. colour), duplicated, deleted or assigned to an other characteristic.

Editing of display elements :

Measurement value displays and SPC displays

Most parameters of the display elements (such as colour or font) are independent from the characteristic. There are few parameters of the single display elements which are depending on the characteristic.

Display element	Parameters depending on the characteristic
Numeric Display	- Resolution, number of digits
Column Display	 Zero point of the column (= nominal size)
	 Column range (A user defined range is possible)
Analogue Meter	- Zero point (= nominal size)
	 Display range (A user defined range is possible)
Histogram	 Histogram type (for process control or process analysis)
	- Number of classes
Run Chart	 Number of values shown in the chart
	- Scrollbar on / off
Statistical Data	 Selection of the statistical data (min, cp, cpk,) to be shown
Combination Display	- Resolution
	- Number of digits
	 Zero point of the Column (= nominal size)
	 Number of values shown in the chart
Control Chart	 Chart types (average chart [Xq], median chart [Xm], raw value chart
	[X], standard deviation chart [S], range chart [R])
	 Calculation of the controlling limits (Shewhart, Acceptance)
	 Number of values shown in the chart
	- Scrollbar on / off





Scale --> Color Text : \$n, \$t

On control or run charts you can input a text which is used as axis label for each value : Tex In this text you can use the following variables :

Variable	Contents
\$n	Number of the displayed measured value
\$t	Time on which the measured value was collected
\$d	Date on which the measured value was collected
\$r1	Customer
\$r2	Supplier
\$r3	Manufacturer
\$r4	Works / Department
\$r5	Machine
\$r6	Fixture
\$r7	Nest
\$r8	Tool
\$r9	Material
\$r10	Test equipment
\$r11	Operator
\$r12	Shift
\$r13	Test place
\$r14	Storage place
\$r15	Production instruction
\$r16	Test instruction
\$r17	Events
\$r18	Batch number
\$r19	Action
\$r21 - \$r30	User definable reference information 110

Note : All variables (except \$n) are only shown when you measure using a test order.

Text Elements

You can input freely definable text to a text element and select the font colour and the element colour. The text elements additionally allow the linking of variables. The variables always belong to the characteristic the text element was assigned to :

Variable	Contents
\$n	Number of measured components
\$s	Number of measured components from current sample
	On sample size of 5 \$s is assigned the values 04
\$o0	Order number
\$o1	Article number
\$o2	Article name
\$o3	Quantity
\$04	Creation date
\$05	Created by
\$06	Article text
\$r1 - \$r30	See table above

Note : All variables (except \$n) are only shown when working with test orders.

Line Elements

You can create line elements and define the thickness and colour of the line.

Picture Elements

A bitmap (picture) can be selected. (Only pictures in *.bmp format can be used)



8.) Keys

The programming of the display elements can be done by using the following keys :

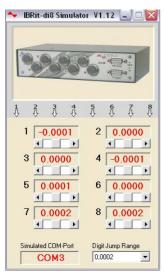
Key	Function
ТАВ	Moves the cursor from button to button and from display element to display element
SPACEBAR	Presses a button
Cursor	Moves a display element / Selection of menu points
Shift+Cursor	Changes the size of a display element
Enter	Opens the menu for editing and deleting the currently selected display element
Del	Deletes the currently selected display element
D	Duplicates the currently selected display element
L	Loads a saved display window (.dwc-file) into the current test scheme
S	Saves the current display window as .dwc-file to the chosen directory

8. Programming examples

8.1 Example 1 (Multi gauging application with DI8_Simulator.EXE)

Basic settings :

The programme "DI8_Simulator.EXE" simulates an IBRit-di8, so that each customer, who does not have an IBR instrument, can test ComGage with "DI8_Simulator" Software.



In the "DI8_Simulator" Software the measuring values of the 8 channels of the simulated IBRit-di8 can be selected by the scrollbars.

The simulated COM-Port must be selected in ComGage.



After Installation (self explaining) and Start of "DI8_Simulator"-Software "COM3" must be selected as PC-Connection and "IBRit-di8" as IBR-Instrument in the "Options / Connections" menu of ComGage.

			DEVICE 1		
PC-Connection	IBR-Instrument	Connection	Gauge / Sensor	Mea. Step	
сомз 👻	IBRit-di8 💌	1.1	Standard inductive gauge Setur	0.0001	
		1.2	Standard inductive gauge Setur	0.0001	
		1.3	Standard inductive gauge Setur	0.0001	
		1.4	Standard inductive gauge Setur	0.0001	
		1.5	Standard inductive gauge Setur	0.0001	
		1.6	Standard inductive gauge Setur	0.0001	
		1.7	Standard inductive gauge	0.0001	
	Service	1.8	Standard inductive gauge Setup	0.0001	
		1			
PC-Connection	IBR-Instrument	Connection		Mea. Step	
PC-Connection			DEVICE 2 Gauge / Sensor	Mea. Step	
			DEVICE 2 Gauge / Sensor Setur Setur	Mea. Step	
			DEVICE 2 Gauge / Sensor	Mea. Step	
			DEVICE 2 Gauge / Sensor Setur Setur	Mea. Step	
			DEVICE 2- Gauge / Sensor Setur Setur Setur Setur Setur Setur	Mea. Step	
			DEVICE 2 Gauge / Sensor Setur Setur Setur Setur Setur Setur Setur Setur	Mea. Step	
			DEVICE 2- Gauge / Sensor Setur Setur Setur Setur Setur Setur	Mea. Step	

Application :

- Measurement of two diameters of a shaft.
- On pressing the **F1** key the measuring values shall be stored in file.
- On pressing the **F2** key the characteristics shall be calibrated.
- On pressing the **F3** key the statistic window shall be opened.

Creation of the test scheme :

Creation of a test scheme with article number "Art_0715" and article name "Shaft" :

	TEST	г зснеми	E (Create/C	hange)									X
	icle Num		Art_0715					OK					OK)
1000	icle Nam		Shaft									С	ancel
		Information	Setup										Help
Sp	ecial set	tings	Setup									2 <u>1</u>	
0		RACTERIS		Drawin		1	atistics	1	ce Information		<u>V</u>		<u>a</u> X
	No.	Name	Nominal	USL	UCL	LCL	LSL	Unit	Mea. Inputs		Mode	1. Master	2. Master
÷	C1 C2	Diameter 1 Diameter 2	20	0.03	0.0225	-0.0225 -0.0225	-0.03	mm	M1+M2 M3+M4		Static	19.999 16.001	
	1.2	Diameter 2	10	0.03	0.0225	-0.0225	-0.03	mm	M 3+M 4		Static	16.001	
F													
	TES	T STEPS	:	Sequ	ence		l Outputs	Additio	nal settings		5 3		BX X
	No.	Test Step Funct	tion		Save	e the charac	oteristics	Adjust the c	characteristics	Preview	of display win	idow :	
-	S1	Collection of me	asuring values		C1,C	2		C1,C2		Diam			
-	S2	SPC-Window								- 8.3'-		*** 0.00	0.05
										antila		ACH	
										Diam		# 0.00	0.05
F										<u> - 83'-</u>	S6	<u> • • • • • • • • • • • • • • • • • • •</u>	
								-			^D rogramme d	isplay windo	w





Creation of both characteristics for measuring two diameters (see brief overview - page 7):

MEA. VALUE COLLECTION Measurement inputs M1+M2 Setup static Measurement mode Static Measurement Setup Setup static ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 13.999 Setup Setup Reference test OK Cancel Help DR A W ING D A T A (Characteristic-Programming) X Article Number Articol Name Diameter 2 Characteristic Diameter 2 Characteristic name Diameter 2 Characteristic Diameter 2 The diameter 2 The diameter 2 Upper controlling limit (UCL) 0025 75% of USL The diameter 2	DRAWING	DATA (Characteristic-	Programming)	X	
CHARACTERISTIC DATA FROM THE DRAWING Upper specification limit (USL) Upper controlling limit (UCL) Lower controlling limit (USL) Lower controlling limit (USL) Lower controlling limit (USL) Lower controlling limit (USL) Measurement inputs M1-M2 Setup ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 0 Characteristic name DR A WING D A T A (Characteristic-Programming) Atticle Number AdJUSTMENT OF THE CHARACTERISTIC 1. Master value 0 Characteristic name Disameter 2 Characteristic Data FROM THE DRAWING Lower controlling limit (USL) Lower controlling limit (USL) Lower specification limit (USL) Lower controlling limit (USL) AdJUSTMENT OF THE CHARACTERISTIC 1. Master value 0 Limit (USL) Lower controlling limit (USL) Limit (Article Number Art_0	715 Art	cle Name	Shaft		
Unix mm Nominal size 20 Upper spezification limit (USL) 1022 75% of USL Lower controlling limit (LCL) 10225 75% of USL Lower spezification limit (LSL) 003 <	Char. Number C1	Ch	aracteristic name	Diameter 1		
Unit mm Nominal size 20 Upper specification limit (USL) 0.0225 75% of LSL Lower controlling limit (UCL) 0.0225 75% of LSL Lower specification limit (LSL) 0.0225 75% of LSL Lower specification limit (LSL) 0.0225 MEA VALUE COLLECTION Measurement inputs M1+M2 Measurement mode Static Measurement ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 13.333 2. Master value 0 Reference test OK Characteristic-Programming) Article Number 4.02015 Characteristic name 13.333 2. Master value The difference test The difference test The difference test Article Number Addition Number 12. CHARACTERISTIC DATA FROM THE DRAWING Upper specification limit (USL) 13.003 14.003 15.003 15.003 16.001 2. Master value 16.001 2.	- CHARACTERISTIC	DATA FROM THE DRAWING				
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Upper controlling limit (UCL) 0.0225 75% of USL Image: Controlling limit (UCL) 0.0225 75% of USL Image: Controlling limit (UCL) 0.0225 75% of USL Image: Controlling limit (USL) 0.03 Image: Controlling limit (USL) Image: Controlling limit (USL) 0.03 Image: Controlling limit (USL) Image: Controlling limit		Nominal siz	e 20	—		
Lower controlling limit (LCL) 0.0225 75% of LSL The difference Lower spezification limit (LSL) 0.03 <-		Upper spezification limit (USL	.) 0.03	<	-	
Lower spezification limit (LSL) MEA. VALUE COLLECTION Measurement inputs MEA. VALUE COLLECTION Measurement inputs Mither Value Image: Static Measurement Measurement inputs Mither Value Image: Static Measurement Measurement inputs Mither Value Image: Static Measurement Measurement inputs Mither Value Image: Static Measurement Measurement inputs Mither Number Characteristic Programming Article Number Advorts Article Number Characteristic Programming Article Number Characteristic Programming Article Number Characteristic Data FROM THE DRAWING Upper spezification limit (USL) Dogo: Static Measurement inputs Measurement inputs Measurement inputs Measurement inputs Measurement inputs Mater value Image: Static Measurement Setup Advoustment of the CHARACTERISTIC 1. Master value 1. Master value Image: Static Measurement Setup Advoustment of the CHARACTERISTIC 1. Master value 1. Master value Image: Static Measurement Setup Measurement m		Upper controlling limit (UCL	1 0.0225	75% of USL		
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MEA. VALUE COLLECTION Measurement inputs M1+M2 Setup static MEA. VALUE COLLECTION Measurement inputs Static Measurement Static Measurement Setup ADJUSTMENT OF THE CHARACTERISTIC 1. Master value Image: Static Measurement Setup Setup Reference test OK Cancel Help Article Number Art_0715 Aticle Name Shaft CharACTERISTIC DATA FROM THE DRAWING Image: Static Measurement Setup Upper spezification limit (USL) 003 <		Lower spezification limit (LSL	.) -0.03	<		formu
Measurement inputs M1+M2 Setup Measurement inputs Static Measurement Setup ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 19.993 2. Master value 0 OK Cancel Reference test OK Cancel Help DR A W IN G D A T A (Characteristic-Programming) X X Article Number Art_0715 Article Name Shaft Characteristic Data FROM THE DRAWING Unit mm Setup Upper spezification limit (USL) 0.025 75% of USL V Lower controlling limit (UCL) 0.025 75% of USL V Lower controlling limit (USL) 0.03 <	- MEA VALUE COLLE	ECTION				
ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 19.393 2. Master value D Atricle Number Atricle Number Atricle Name Atricle Name Atricle Name Characteristic -Programming Atricle Name Characteristic name Diameter 2 CHARACTERISTIC DATA FROM THE DRAWING Unit mm Nominal size 16 Upper sopedification limit (USL) 0.03 (CHARACTERISTIC DATA FROM THE DRAWING Measurement inputs M3+M4 Setup ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 1 . Master value 1 . Master value 1 . Master value 1 . Master value 1 . Master value 1 . Master	MER. THEOR OULL		s M1+M2		Setup	Static
ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 19.393 2. Master value D Atricle Number Atricle Number Atricle Name Atricle Name Atricle Name Characteristic -Programming Atricle Name Characteristic name Diameter 2 CHARACTERISTIC DATA FROM THE DRAWING Unit mm Nominal size 16 Upper sopedification limit (USL) 0.03 (CHARACTERISTIC DATA FROM THE DRAWING Measurement inputs M3+M4 Setup ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 1 . Master value 1 . Master value 1 . Master value 1 . Master value 1 . Master value 1 . Master		Measurement mod	e Static Measure	ement	- Setup	
1. Master value 19.3939 2. Master value 0 Reference test DK Cancel Help DR A WING DATA (Characteristic-Programming) Article Name Shaft Characteristic-Programming) Article Name Article Name Characteristic name Diameter 2 Characteristic name Characteristic name Nominal size Characteristic name Upper specification limit (USL) O0225 OUS Upper specification limit (USL) OU225 MEA. VALUE COLLECTION Measurement inputs M3+M4 Setup ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 0 0 OUST						
2. Master value Reference test DK Cancel Help Article Number C1 Characteristic-Programming) Article Number C2 Characteristic name Setup Characteristic name Diameter 2 CHARACTERISTIC DATA FROM THE DRAWING Unit Nominal size Upper spezification limit (USL) 00225 Doge: controlling limit (UCL) 00225 Total Lower controlling limit (USL) 00225 Total MEA. VALUE COLLECTION Measurement mode Static Measurement Static Measurement Setup ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 0	- ADJUSTMENT UF I		e 🔽 19 999			
Reference test OK Cancel Help DR AWING DATA (Characteristic-Programming) Image: Characteristic Article Name Shaft Image: Characteristic Characteristic name Image: Characteristic Characteristic name Image: Characteristic name Image: Characteristic Characteristic name Image: Cha						
DRAWING DATA (Characteristic-Programming) Article Number Article Number Char. Number C2 CHARACTERISTIC DATA FROM THE DRAWING Unit Moninal size 16 Upper spezification limit (USL) 00325 75% of USL Lower controlling limit (UCL) 00225 75% of USL Lower controlling limit (USL) 003 Very controlling limit (USL) 003 KEA. VALUE COLLECTION Measurement mode Static Measurement Static Measurement Static Measurement Static Measurement 2. Master value 0			- <u> </u>			
Article Number Art, 0715 Article Name Char. Number C2 CHARACTERISTIC DATA FROM THE DRAW/ING Unit mm Nominal size 16 Upper spezification limit (USL) 0.03 C- Upper controlling limit (UCL) 0.025 75% of USL Uower controlling limit (USL) 0.03 C- MEA. VALUE COLLECTION Measurement inputs M3+M4 Static Measurement Static Measurement Static Measurement Carteria Content of the CHARACTERISTIC 1. Master value 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Reference test			OK Car	ocal Halp	
Article Number Art.0715 Article Name Characteristic name Diameter 2 CHARACTERISTIC DATA FROM THE DRAWING Unit mm Nominal size 16 Upper spezification limit (USL) 0.03 C Upper controlling limit (UCL) 0.0225 75% of USL Lower spezification limit (USL) 0.03 C MEA. VALUE COLLECTION Measurement inputs M3+M4 Static Measurement Static Measurement Static Measurement 16.001 2. Master value 1 0					icol noip	
Cher Number C2 Characteristic name Diameter 2 CHARACTERISTIC DATA FROM THE DRAWING Unit mm V Setup Nominal size 16 Upper controlling limit (USL) 0.03 < Lower controlling limit (USL) 0.0225 75% of USL V Lower controlling limit (USL) 0.0225 75% of USL V Lower spezification limit (USL) 0.03 < MEA. VALUE COLLECTION Measurement inputs M3+M4 Measurement mode Static Measurement ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 7 16.001 2. Master value 7 16.001						
Characteristic name Diameter 2 CHARACTERISTIC DATA FROM THE DRAWING Unit mm Nominal size 16 Upper specification limit (USL) 0.03 < Upper controlling limit (UCL) 0.0225 75% of USL Lower controlling limit (UCL) 0.025 75% of USL Lower specification limit (LSL) 0.03 < MEA. VALUE COLLECTION Measurement inputs M3+M4 Static Measurement ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 7 16.001 2. Master value 7 16.001	DRAWING	DATA (Characteristic-	Programming)		
Unit mm Setup Nominal size 16 Upper spezification limit (USL) 0.03 <						
Unit mm Setup Nominal size 16 Upper spezification limit (USL) 0.03 <	Article Number Art_0	715 Art	cle Name	Shaft		
Nominal size 16 Upper spezification limit (USL) 0.03 <-	Article Number Art_0 Char. Number C2	715 Art Ch	cle Name	Shaft		
Upper spezification limit (USL) 0.03 <-	Article Number Art_0 Char. Number C2	715 Art Ch DATA FROM THE DRAWING	cle Name aracteristic name	Shaft Diameter 2		
Upper controlling limit (UCL) 0.0225 75% of USL Image: Controlling limit (UCL) 0.0225 75% of USL Image: Controlling limit (UCL) 0.025 75% of USL Image: Controlling limit (USL) 0.03 Image: Controlling limit (USL) 0.03 Image: Controlling limit (USL) Image: Controlling limit (USL) 0.03 Image: Controlling limit (USL) Image: Controlling	Article Number Art_0 Char. Number C2	715 Art Ch DATA FROM THE DRAWING Ur	cle Name aracteristic name it mm	Shaft Diameter 2		
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Lower spezification limit (LSL) 0.03 <- Static MEA VALUE COLLECTION Measurement inputs M3+M4 Measurement mode Static Measurement ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 1 1. Master va	Article Number Art_0 Char. Number C2	715 Art Ch DATA FROM THE DRAWING Ur Nominal siz Upper spezification limit (USI	cle Name aracteristic name it mm e 16 -) 0.03	Shaft Diameter 2		The di
MEA. VALUE COLLECTION Measurement inputs M3+M4 Measurement Static Measurement ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 156.001 2. Master value 10	Article Number Art_0 Char. Number C2	715 Art Ch DATA FROM THE DRAWING Ur Nominal siz Upper spezification limit (USI Upper controlling limit (UCI	cle Name aracteristic name t mm e 16 .0.03 0.0225	Shatt Diameter 2		The di
Measurement inputs M3+M4 Setup Measurement mode Static Measurement Setup ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 16001 2. Master value 10	Article Number Art_0 Char. Number C2	715 Art DATA FROM THE DRAWING Ur Nominal siz Upper spezification limit (UCL Upper controlling limit (UCL Lower controlling limit (LCL	cle Name aracteristic name it mm e 16 -) 0.03 -) 0.0225 -) -0.0225	Shaft Diameter 2		The di formul
Measurement mode Static Measurement ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 2. Master value	Article Number Art_0 Char. Number C2 - CHARACTERISTIC I	715 Art DATA FROM THE DRAWING Ur Nominal siz Upper spezification limit (USI Upper controlling limit (UCI Lower controlling limit (LCI Lower spezification limit (LSI	cle Name aracteristic name it mm e 16 -) 0.03 -) 0.0225 -) -0.0225	Shaft Diameter 2		The di formul
ADJUSTMENT OF THE CHARACTERISTIC 1. Master value 16.001 2. Master value 0	Article Number Art_0 Char. Number C2 - CHARACTERISTIC I	715 Art Ch DATA FROM THE DRAWING Ur Nominal siz Upper spezification limit (UCI Lower controlling limit (UCI Lower controlling limit (LCI Lower spezification limit (LSI CTION	cle Name aracteristic name it mm e 16) 0.03) 0.0225) -0.0225) -0.03	Shaft Diameter 2	Setup	The di formu
1. Master value 🔽 16.001 2. Master value 🗖 🛛	Article Number Art_0 Char. Number C2 - CHARACTERISTIC I	715 Art DATA FROM THE DRAWING Un Nominal siz Upper spezification limit (USI Upper controlling limit (UCI Lower controlling limit (LCI Lower spezification limit (LSI ECTION Measurement input	cle Name aracteristic name e 16 J 0.03 J 0.0225 J -0.0225 J -0.03 s M3+M4	Shaft Diameter 2 ₹ 75% of USL 75% of LSL	Setup Setup Setup Setup	The di formul
2. Master value 🔽 🔽	Article Number Art_0 Char. Number C2 - CHARACTERISTIC I	715 Art DATA FROM THE DRAWING Un Nominal siz Upper spezification limit (USI Upper controlling limit (UCI Lower controlling limit (LCI Lower spezification limit (LSI ECTION Measurement input	cle Name aracteristic name e 16 J 0.03 J 0.0225 J -0.0225 J -0.03 s M3+M4	Shaft Diameter 2 ₹ 75% of USL 75% of LSL	Setup Setup Setup Setup	The di formu
	Article Number C2 Char. Number C2 CHARACTERISTIC I MEA. VALUE COLLE	715 Art Ch DATA FROM THE DRAWING Ur Nominal siz Upper spezification limit (USI Upper schrölling limit (ULI Lower controlling limit (LLI Lower spezification limit (LSI Lower spezification limit (LSI ECTION Measurement input Measurement mod	cle Name aracteristic name 16 16 10.03 10.0225 10.0225 10.025 10.03 10.0225 10.03 1	Shaft Diameter 2 ₹ 75% of USL 75% of LSL	Setup Setup Setup Setup	The di formul
Reference text	Article Number C2 Char. Number C2 CHARACTERISTIC I MEA. VALUE COLLE	715 Art Ch DATA FROM THE DRAWING Un Nominal siz Upper spezification limit (USI Upper controlling limit (UCI Lower controlling limit (UCI Lower spezification limit (LSI ECTION Measurement input Measurement mod THE CHARACTERISTIC 1. Master valu	cle Name aracteristic name it mm e 16 0 003 0 00225 0 00225 0 00225 0 003 s M3+M4 e Static Measure e IV 16.001	Shaft Diameter 2 ₹ 75% of USL 75% of LSL	Setup Setup Setup Setup	The di formul static
	Article Number C2 Char. Number C2 CHARACTERISTIC I MEA. VALUE COLLE	715 Art Ch DATA FROM THE DRAWING Un Nominal siz Upper spezification limit (USI Upper controlling limit (UCI Lower controlling limit (UCI Lower spezification limit (LSI ECTION Measurement input Measurement mod THE CHARACTERISTIC 1. Master valu	cle Name aracteristic name it mm e 16 0 003 0 00225 0 00225 0 00225 0 003 s M3+M4 e Static Measure e IV 16.001	Shaft Diameter 2 ₹ 75% of USL 75% of LSL	Setup Setup Setup Setup	The di formu

The diameter is calculated by the formula M1+M2 and is collected by a static measurement.

The diameter is calculated by the formula M3+M4 and is collected by a static measurement.

Creation of a test step for collecting the measuring values (see brief overview - page 8):

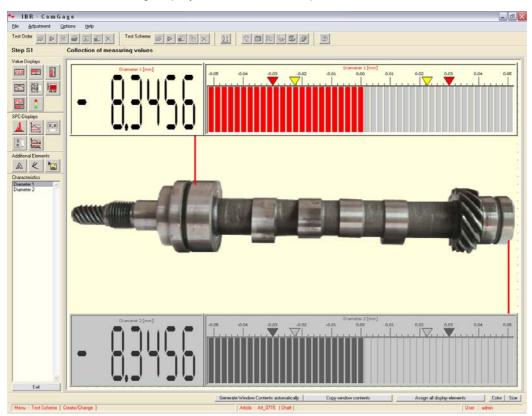
SEQUENCE (Test Step-Programm	ning)					×
Article Number Art_0715 Test Step Number S1		Article Name Sha	aft			
Test Step Function Collection of measuring values						7
LIST OF FUNCTIONS	1	- PROGRA	MMING O	F SELECTED	FUNCTION	
Save measured values	Function	Adjustment 7	Calibration			
Delete last saved measured value	Characteristic	selection		Function key		
Change to next test step Repeat last test step	 	Diameter 1		F2		-
·····		Diameter 2		Hand/Footswite	ch	
Adjustment / Calibration						▼ Info
				Dig. Input		
	i i i					▼ Info
	П			Event		
				Clicking Buttor	12	_
Expert mode New	All on	All off			ОК	Cancel
	LISTOF	CREATED F	UNCTIONS			
Function	Function key	Hand/Footsw	Dig. Input	Event		Edit
Save measured values : C1, C2	F1			Clicking Button 1		Delete
Adjustment / Calibration : C1, C2 Change to next test step	F2 F3			Clicking Button 2 Clicking Button 3		
Change to new rest step	13					×
In this test step the reference information are request	ed			OK.	Cancel	Help

- On pressing the **F1** key the measuring values are stored in file.
- On pressing the **F2** key the characteristics are calibrated.
- On pressing the **F3** key the statistic window is opened.





Creation of the following display window for test step S1 :



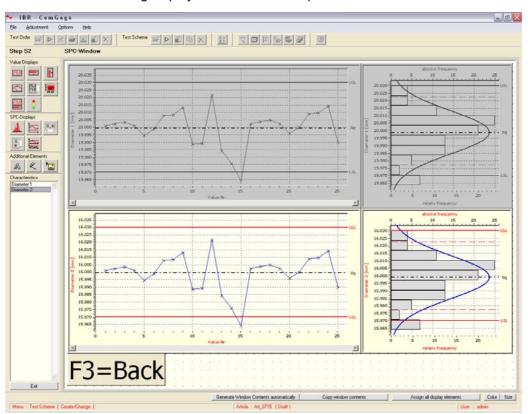
Creation of a second test step for statistic display (see brief overview - page 8):

SEQUENCE (Test Step-Programm	ning)					
Article Number Art_0715		Article Name Sh	aft			
Test Step Number S2						
Test Step Function SPC-Window						•
LIST OF FUNCTIONS	1					
Save measured values Delete last saved measured value						
Change to next test step Repeat last test step						
Adjustment / Calibration						
×						
Expert mode New						
	LIST OF (CREATED F	UNCTIONS			
Function	Function key	Hand/Footsw	Dig. Input	Event		Edit
Change to next test step	F3					Delete
In this test step the reference information are request	ed			0	K Canc	el Help

- On pressing the **F3** - key ComGage returns to measurement window (= test step S1).



Creation of the following display window for test step S2 :



8.2 Example 2 (Collection of several characteristics one after the other with IBRit-rf1)

Basic settings :

After connecting the IBRit-rf1-usb radio module to the PC you must select "USB" as PC-Connection and "IBRit-rf1" as IBR-Instrument in the "Options / Connections" menu of ComGage :

			DEVICE 1		
PC-Connectio	n BR-Instrument	Connection	Gauge / Sensor	All off	All on
USB	▼ IBRit-rf1 (*)	Addr.1	Radio module (IBRit-rf1) with Addr. 1	on	Setup
-		Addr.2	Radio module (IBRit-rf1) with Addr. 2	on	Setup
		Addr.3	Radio module (IBRit-rf1) with Addr. 3	on	Setup
		Addr.4	Radio module (IBRit-rf1) with Addr. 4	on	Setup
		Addr.5	Radio module (IBRit-rf1) with Addr. 5	on	Setup
		Addr.6	Radio module (IBRit-rf1) with Addr. 6	on	Setup
		Addr.7	Radio module (IBRit-rf1) with Addr. 7	on	Setup
	Service	0.64.6		1	C 1
		Addr.8	DEVICE 2	on	Setup
PC-Connectio					Mea. Step
-			DEVICE 2		
-	n BR-Instrument		DEVICE 2	Setup	
-	n BR-Instrument		DEVICE 2	Setup	
-	n BR-Instrument		DEVICE 2	Setup Setup	
-	n BR-Instrument		DEVICE 2	Setup Setup Setup	
-	n BR-Instrument		DEVICE 2	Setup Setup Setup Setup	
	n BR-Instrument		DEVICE 2	Setup Setup Setup Setup Setup	

Application :

- Measurement of two diameters one after the other with calliper.
- On pressing the **F10** key the last collected measuring value shall be deleted and the collection shall be repeated.





Creation of the test scheme :

Creation of a test scheme with article number "Art_0716" and article name "Shaft" :

техт хснем	E (Create/C	hange)									×
Article Number	Art_0716					OK					ок
Article Name	Shaft									C	ancel
Reference Information	Setup										
Special settings	Setup										Help
CHARACTERI	STICS :	/ Drawing o	data	\ Sta	atistics	Reference	e Information	P	21		BX X
No. Name	Nominal	USL I	UCL	LCL	LSL	Unit	Mea. Inputs		Mode	1. Master	2. Master
C1 Diameter 1	20	0.1 0).075	-0.075	-0.1	mm	M12	G	Gauge T		
C2 Diameter 2	16	0.1 0	0.075	-0.075	-0.1	mm	M12	G	Gauge T		
											_
TEST STEPS	3 :	Sequen	се	V Digita	l Outputs	Additic	nal settings		£] 7		2 ×
No. Test Step Fun	nction	,	Save	e the chara	cteristics	Adjust the a	characteristics	Preview of	display win	dow :	
S1 Collect diamet	er 1		C1			122			anopiay init		_
S2 Collect diamet	er 2		C2						w A Mar		⊊
S3 Result window	v							E	X XX	<u>~~× </u>]]==	
											-
								-6	EH-DO	LPP-	
									-	_	
								1	Tiarent meerin	g valueby gauged	tata key
W								Hth-Collet si	and description and	in .	
								Pro	ogramme di	isplay windo	w

Creation of both characteristics for measuring two diameters (see brief overview - page 7):

DRAW	ING	DATA (Characteri	stic-P	rogramming	;)				×
Article Number	Art_07	16	Articl	e Name	9	Shaft			
Char. Number	C1		Char	acteristic name		Diameter 1			
CHARACTER	RISTIC D.	ATA FROM THE DRAWING	a —						(
			Unit	mm	-				Setup
			nal size	20					
		Upper spezification lim		0.1		<		•	
		Upper controlling lim		0.075		75% of U	SL	-	
		Lower controlling lim		-0.075		75% of L9	5L	•	
		Lower spezification lim	nt (LSL)	·0.1		<		•	
MEA. VALUE	E COLLEO								
		Measuremen							Setup
		Measuremer	nt mode	Gauge Trigge	ered			•	Setup
ADJUSTME	NT OF TH	E CHARACTERISTIC							
		1. Maste		_					
		2. Maste	er value	D					
Reference I	to at			F		ок	Cancel	1	Help
nelelence	lest						Cancer		neip
DRAW	ING	DATA (Characteri	ietic -D	roorammino					
D R A W		DATA (Characteri			_	21. 0			×
Article Number	Art_07	· · · · · · · · · · · · · · · · · · ·	Articl	e Name	9	Shaft Siameter 2			
Article Number Char. Number	Art_07 C2	16	Articl Char		9	Shaft Diameter 2			X
Article Number Char. Number	Art_07 C2		Articl Char-	e Name acteristic name	9 C)iameter 2			
Article Number Char. Number	Art_07 C2	16 ATA FROM THE DRAWING	Articl Char G Unit	e Name acteristic name mm	9)iameter 2			Setup
Article Number Char. Number	Art_07 C2	16 ATA FROM THE DRAWING Nomi	Articl Char G Unit nal size	e Name acteristic name mm 16	9 C)iameter 2			
Article Number Char. Number	Art_07 C2	16 ATA FROM THE DRAWING Nomi Upper spezification lim	Articl Char G Unit nal size it (USL)	e Name acteristic name mm 16 0.1	9 C	Diameter 2			
Article Number Char. Number	Art_07 C2	16 ATA FROM THE DRAWING Nomi Upper spezification lim Upper controlling lim	Articl Char Unit nal size it (USL)	mm 16 0.1 0.075	9 C)iameter 2 < 75% of U	SL		
Article Number Char. Number	Art_07 C2	16 ATA FROM THE DRAWING Nomi Upper spezification lim	Articl Char- Unit nal size it (USL) it (UCL)	e Name acteristic name mm 16 0.1 0.075 -0.075		Diameter 2	SL		
Article Number Char. Number - CHARACTEI	Art_07	16 ATA FROM THE DRAWING Nomi Upper spezification lim Upper controlling lim Lower controlling lim Lower spezification lim	Articl Char- Unit nal size it (USL) it (UCL)	e Name acteristic name mm 16 0.1 0.075 -0.075		< 75% of US	SL	•	
Article Number Char. Number	Art_07	16 ATA FROM THE DRAWING Nomi Upper spezification lim Upper controlling lim Lower controlling lim Lower spezification lim	Articl Char- Unit nal size it (USL) it (UCL) it (LCL) nit (LSL)	e Name acteristic name mm 16 0.1 0.075 -0.075 -0.1		< 75% of US	SL		Setup
Article Number Char. Number CHARACTEI	Art_07	16 ATA FROM THE DRAWING Nomi Upper spezification lim Upper controlling lim Lower controlling lim Lower spezification lim	Articl Char- Unit nal size it (USL) it (UCL) it (LCL) nit (LSL) uit (LSL)	e Name acteristic name mm 16 0.1 0.075 -0.075 -0.075 -0.1 M12		< 75% of US	SL		
Article Number Char. Number CHARACTEI	Art_07 C2 RISTIC D.	16 ATA FROM THE DRAWINI Upper specification lim Upper controlling lim Lower controlling lim Lower specification lim Cover specification lim Measuremen Measuremen	Articl Char- Unit nal size it (USL) it (UCL) it (LCL) nit (LSL) uit (LSL)	e Name acteristic name mm 16 0.1 0.075 -0.075 -0.1		< 75% of US	SL		Setup
Article Number Char. Number CHARACTEI	Art_07 C2 RISTIC D.	16 ATA FROM THE DRAWING Nomi Upper spezification lim Upper controlling lim Lower controlling lim Lower spezification lim TTION Measuremen He CHARACTERISTIC	Articl Char. Unit nal size it (USL) it (UCL) it (UCL) it (LCL) it (LSL) t inputs nt mode	e Name acteristic name mm 16 0.1 0.075 0.075 0.1 M12 Gauge Trigge		< 75% of US	SL		Setup
Article Number Char. Number CHARACTEI	Art_07 C2 RISTIC D.	16 ATA FROM THE DRAWING Nomi Upper spezification lim Upper controlling lim Lower controlling lim Lower spezification lim Cover spezification lim Measuremen Measuremen HE CHARACTERISTIC 1. Maste	Articl Char- Unit nal size it (USL) it (UCL) nit (UCL) nit (LCL) nit (LSL) nit (LSL) et inputs nt mode	e Name acteristic name mm 16 0.1 0.075 -0.075 -0.1 M12 Gauge Trigge		< 75% of US	SL	•	Setup
Article Number Char. Number CHARACTEI	Art_07 C2 RISTIC D.	16 ATA FROM THE DRAWING Nomi Upper spezification lim Upper controlling lim Lower controlling lim Lower spezification lim TTION Measuremen He CHARACTERISTIC	Articl Char- Unit nal size it (USL) it (UCL) nit (UCL) nit (LCL) nit (LSL) nit (LSL) et inputs nt mode	e Name acteristic name mm 16 0.1 0.075 -0.075 -0.1 M12 Gauge Trigge		< 75% of US	SL		Setup

The diameter is transmitted by data key (gauge triggered mode) of radio module with addr. 12. The zero adjustment does not occur in software but directly on calliper – so no master values are input.

The diameter is transmitted by data key (gauge triggered mode) of same radio module. The zero adjustment does not occur in software but directly on calliper – so no master values are input.

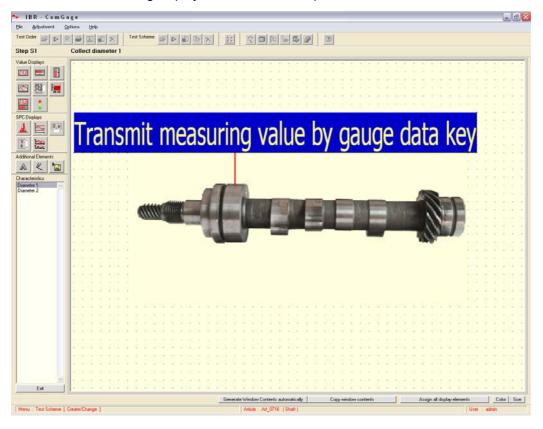


Creation of a test step for collecting diameter 1 (see brief overview - page 8):

SEQUENCE (Test Step-Programm	ning)				$\overline{\mathbf{X}}$
Article Number Art_0716		Article Name Sh	aft		
Test Step Number S1					
Test Step Function Collect diameter 1					<u></u>
LIST OF FUNCTIONS		- PROGRA	MMING OF	SELECTED FUNCTION	-
Save measured values Delete last saved measured value	Function	Save measu	ured values	Function Low	
Change to next test step	Characteristic	selection		Function key	
Repeat last test step		Diameter 1		Hand/Footswitch	-
Adjustment / Calibration	1 C2 · I	Diameter 2			1
	-				▼ Info
	i i			Dig. Input	1.6
				<u> </u>	✓ Info
				Event	
×				Characteristic 1> collection by	data key 🗾
Expert mode New	All on	All off		ОК	Cancel
	LIST OF C	CREATED F	UNCTIONS		
Function	Function key	Hand/Footsw	Dig. Input	Event	Edit
Save measured values : C1		-		Characteristic 1> collection by dat	Delete
Change to next test step				Characteristic 1> collection by dat	
In this test step the reference information are request.	ed			OK. Cancel	Help

On transmission of a measuring value by data key of the radio module or calliper the received measuring value is automatically stored for characteristic 1. Then ComGage automatically switches to the next test step for collection of characteristic 2.

Creation of the following display window for test step S1 :







Creation of a second test step for collecting diameter 2 (see brief overview - page 8):

SEQUENCE (Test Step-Programm	ning)			
Article Number Art_0716		Article Name Sh	aft	
Test Step Number S2				
Test Step Function Collect diameter 2				
LIST OF FUNCTIONS	1			F SELECTED FUNCTION
Save measured values Delete last saved measured value	Function	Save measu	ired values	Function key
Change to next test step				
Repeat last test step		Diameter 1 Diameter 2		Hand/Footswitch
Adjustment / Calibration	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	Diameter 2		Info
· · · · · · · · · · · · · · · · · · ·	i i			Dig. Input
				Info
				Event
×				Characteristic 2> collection by data key
Expert mode New	All on	All off		OK Cancel
	LISTOF	CREATED F	UNCTIONS	
Function	Function key	Hand/Footsw	Dig. Input	Event Edit
Save measured values : C2				Characteristic 2> collection by dat
Change to next test step	<u>222</u> 33		3.5266	Characteristic 2> collection by dat
Delete last saved measured value : C1	F10		1000	
Repeat last test step	F10	-		····
In this test step the reference information are request	ed			OK Cancel Help

On transmission of a measuring value by data key of the radio module or calliper the received measuring value is automatically stored for characteristic 2. Then ComGage automatically switches to the next test step. On pressing the **F10** - key the last measuring value of characteristic 1 is deleted and ComGage returns to the previous test step for new measurement of characteristic 1.

🔸 IBR - ComGage - 6 × Test Order PARKEX Test Scheme PARK 11 200500 D Step S2 Collect diame 839 **E** 20.1 🖾 🔛 210 1 ×* A K 🔚 Transmit measuring value by gauge data key F10=Collect value of characteristic 1 again le Window Contents automatically Copy window contents Assign all display elements Color Size

Creation of the following display window for test step S2 :



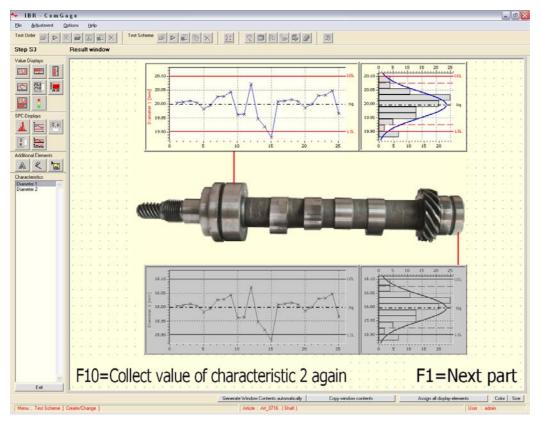


Creation of a third test step for displaying the collected measuring results of diameter 1 and diameter 2 :

SEQUENCE (Test Step-Program	ning)					×
Article Number Art_0716 Test Step Number S3		Article Name Sh	aft			
Test Step Function Result window						<u>-</u>
LIST OF FUNCTIONS		- PROGRA	MMING DI	F SELECTE	FUNCTION	l
Save measured values	Function	Delete last s	aved measured	value		
Delete last saved measured value	Characteristic	selection		Function ke	y	
Change to next test step Repeat last test step		Diameter 1		F10		-
	and the second second	Diameter 2		Hand/Foots	witch	
Adjustment / Calibration	Г					💌 Info
	<u> </u>			Dig. Input		
						▼ Info
	Ē			Event		
						•
2						
Expert mode New	All on	All off			ОК	Cancel
	LIST OF	CREATED F	UNCTIONS			
Function	Function key	Hand/Footsw	Dig. Input	Event		Edit
Delete last saved measured value : C2	F10					Delete
Repeat last test step Change to next test step	F10 F1					
Change to next test step	r i					
In this test step the reference information are request	ed.			OK.	Cancel	Help

On pressing the **F10** - key the last measuring value of characteristic 2 is deleted and ComGage returns to the previous test step for new measurement of characteristic 2. On pressing the **F1** - key the measurement of the next part is started.

Creation of the following display window for test step S3 :







8.3 Example 3 (Keyboard input, static and dynamic measurements with IMBus)

Basic settings :

After connecting the IMBus to the PC you must select "USB" as PC-Connection and "IMBus" as IBR-Instrument in the "Options / Connections" menu of ComGage :

			DEVICE 1		
PC-Connectio	n IBR-Instrument	Connection	Gauge / Sensor	All off	All on
USB	✓ IMBus (*)	Addr.1	IMB-pm1 (1 Parallel Connection) Connection 1	on	Setup
		Addr.2	IMB-sm1 (1 RS232 Connection) Connection 1	on	Setup
		Addr.3	IMB-im2 (2 Induktive Probe Inputs) Connection 1	on	Setup
		Addr.4	IMB-im2 (2 Induktive Probe Inputs) Connection 2	on	Setup
		INP 1	Digital Input 1 (IMB-io4)	on	Setup
		INP 2	Digital Input 2 (IMB-io4)	on	Setup
		INP 3	Digital Input 3 (IMB-io4)	on	Setup
	Service	INP 4	Digital Input 4 (IMB-io4)	on	Setup
č.	Sec.		DEVICE 2		e e e e e e e e e e e e e e e e e e e
PC-Connectio	n BR-Instrument	Connection	DEVICE 2 Gauge / Sensor		Mea. Step
PC-Connectio	n IBR-Instrument	Connection	1	Setup	Mea. Step
		Connection	1	Setup Setup	Mea. Step
			1		Mea. Step
			1	Setup	Mea. Step
		Connection	1	Setup Setup	Mea. Step
		Connection	1	Setup Setup Setup	Mea. Step
		Connection	1	Setup Setup Setup Setup	Mea. Step

Application :

Collection of several characteristics by different measurement modes or keyboard input.

Creation of the test scheme :

Creation of a test scheme with article number "Art_0717" and article name "Shaft" :

	TEST	т SCHEME	Create / C	hange)									×
	icle Num icle Nam	in the second	0717					OK					ок
		Julia										C	ancel
	ecial set		etup etup										Help
	CH/	RACTERISTIC	3:	Drawi	ing data	γ Sta	atistics	Referen	ce Information		₹		i≊ X
	No.	Name	Nominal	USL	UCL	LCL	LSL	Unit	Mea. Inputs		Mode	1. Master	2. Master
-	C1	Data collection by da		0.3	0.225	-0.225	-0.3	mm	M2		Gauge T		
	C2	Static measurement	30	0.03	0.0225	-0.0225	-0.03	mm	M3		Static	29.999	
	C3 C4	TIR Keyboard	0 50	0.012 0.3	0.225	-0.225	0 -0.3	mm	M4 Keyboard		TIR (Ma Keyboard		
	TES	ST STEPS :		Seq	uence		Outputs	Additio	onal settings \		5 3		BX X
	No.	Test Step Function			Sav	e the charac	teristics	Adjust the	characteristics	Preview of	of display win	dow :	~
	S1	Data Collection			C1,0	2,03,04		C2			lī		-1
										1720 1480 1820 1240 .140 .200 .680 1219)072)0)048)0)982)0)024)0)114)0)120)0)168)0	IR Key 774 1720 069 1480 056 3820 064 1240 084 .200 093 .680 044 3219	





Creation of the characteristics for the measurements planned (see brief overview - page 7):

	Programming)		×
-	icle Name	Shaft	
Char. Number C1 Ch	aracteristic name	Data collection by data key	
CHARACTERISTIC DATA FROM THE DRAWING			
	it mm 💌		Setup
Nominal siz	e 20		
Upper spezification limit (USL	J 0.3	< •	
Upper controlling limit (UCL		75% of USL 🔹	
Lower controlling limit (LCL	1	75% of LSL 🔹	
Lower spezification limit (LSL	-] -0.3	< v	
	,	· _	
MEA. VALUE COLLECTION Measurement input	s M2		Setup
	e Gauge Triggered		Setup
	Talaage miggelea		o crap
ADJUSTMENT OF THE CHARACTERISTIC			
1. Master valu 2. Master valu			
2. Mastel Valu	e i o lo		
Reference test		OK Cancel	Help
DRAWING DATA (Characteristic-	Programming)		
· · · · · · · · · · · · · · · · · · ·		26.40	
		Shaft Static measurement	
,	1.		
CHARACTERISTIC DATA FROM THE DRAWING	e		Cature 1
	it mm		Setup
Nominal siz			
Upper spezification limit (USL		< •	
Upper controlling limit (UCL		75% of USL 💌	
Lower controlling limit (LCL		75% of LSL	
Lower spezification limit (LSL	-7 [-0.03	< •	
MEA. VALUE COLLECTION			
Measurement input			Setup
Measurement mod	e Static Measureme	nt 💌	Setup
ADJUSTMENT OF THE CHARACTERISTIC			
1. Master valu	e 🗹 29.999		
2. Master valu	e 🗖 🛛		
Reference test		OK Cancel	Help
DRAWING DATA (Characteristic-	Programming)		2
_		Shaft	
Char. Number C3 Ch	aracteristic name	rir R	
CHARACTERISTIC DATA FROM THE DRAWING			
Un	it mm 💌		Setup
Nominal siz	e 0		
Upper spezification limit (USL	-) 0.012	< •	
Upper controlling limit (UCL	1	off 📃 💌	
	.)	off 👻	
Lower controlling limit (LCL			
Lower controlling limit (LCL Lower spezification limit (LSL	.) 0	< •	
Lower spezification limit (LSL)	< I	
Lower spezification limit (LSL)	< I	Setup
Lower spezification limit (LSL - MEA, VALUE COLLECTION Measurement input)		Setup Setup
Lower spezification limit (LSL MEA: VALUE COLLECTION Measurement input Measurement mod	s M4		
Lower spezification limit (LSL - MEA, VALUE COLLECTION Measurement input	s M4 Dynamic Measure		
Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement input Measurement mod	s M4 e Dynamic Measure e T 0		
Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu	s M4 e Dynamic Measure e T 0	ment 💌	
Lower spezification limit (LSL MEA, VALUE COLLECTION Measurement input Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master value	s M4 Dynamic Measure e 0 e 0		
Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu Reference test	* M4 • Dynamic Measure • • •	ment 💌	Setup
Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu	* M4 • Dynamic Measure • • •	ment 💌	Setup
Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu Reference test DRAWING DATA (Characteristic- Article Number Art_0717 Art	S M4 Dynamic Measure	ment 💌	Setup
Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu Reference test DRAWING DATA (Characteristic- Article Number Art_0717 Arti	M4 Dynamic Measure F Dynamic Measure F Programming Cde Name	ment	Setup
Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement input ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu Reference test DRAWING DATA (Characteristic- Article Number C4 Ch	M4 Dynamic Measure M4 Dynamic Measure Programming) Ccle Name	ment CK Cancel	Setup
Lower spezification limit (LSL MEA, VALUE COLLECTION ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu Reference test DRAWING DATA (Characteristic - Article Number C4 CharACTERISTIC DATA FROM THE DRAWING	M4 Dynamic Measure Toppamic Measure Top	ment CK Cancel	Setup
Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement input Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu 3. Mas	s M4 Dynamic Measure c Dynamic Measure c Dynamic Measure p Programming) Cicle Name p aracteristic name p t mm	ment CK Cancel	Setup Help
Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement input Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu 3. Mas	s M4 o Dynamic Measure o Dynam	ment DK Cancel Shatt (eyboard	Setup Help
Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement input Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu Reference test DRAWING DATA (Characteristic Article Number C4 Characteristic CHARACTERISTIC DATA FROM THE DRAWING Un Nominal siz Upper spezification limit (USL	s M4 Dynamic Measure e 0 Programming) Cick Name aracteristic name p t mm v e 50 J 0.3	ment	Setup Help
Lower spezification limit (LSL MEA, VALUE COLLECTION ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu 3. Master	s M4 Dynamic Measure e 0 Programming) cicle Name aracteristic name f t mm v e 50 J 0.3 J 0.225	ment CK Cancel	Setup Help
Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement input Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu Reference test DRAWING DATA (Characteristic Article Number Char. Number C4 CHARACTERISTIC DATA FROM THE DRAWING Upper controlling limit (USL Upper controlling limit (USL	Image: Mail of the second s	ment	Setup Help
Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement input Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu Reference test DRAWING DATA (Characteristic- Article Number Art_0717 Art Char.Number C4 CHARACTERISTIC DATA FROM THE DRAWING Upper spezification limit (USL Upper controlling limit (UCL Lower spezification limit (LSL	Image: Mail of the second s	ment CK Cancel	Setup Help
Lower spezification limit (LSL MEA, VALUE COLLECTION Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu Reference test DRAWING DATA (Characteristic - Article Number Art_0717 Art Char. Number C4 CHARACTERISTIC DATA FROM THE DRAWING Upper spezification limit (USL Upper controlling limit (USL Lower spezification limit (LSL Lower spezification limit (LSL	3 M4 e Dynamic Measure e □ e □ 0 0 Programming) □ ccle Name □ aracteristic name □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □	ment	Setup Help
Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement input Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu Reference test DRAWING DATA (Characteristic- Article Number Art_0717 Art Char.Number C4 CHARACTERISTIC DATA FROM THE DRAWING Upper spezification limit (USL Upper controlling limit (UCL Lower spezification limit (LSL	3 M4 e Dynamic Measure e □ e □ 0 0 Programming) □ ccle Name □ aracteristic name □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □	ment	Setup Help
Lower spezification limit (LSL MEA, VALUE COLLECTION Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu Reference test DRAWING DATA (Characteristic - Article Number Art_0717 Art Char. Number C4 CHARACTERISTIC DATA FROM THE DRAWING Upper spezification limit (USL Upper controlling limit (USL Lower spezification limit (LSL Lower spezification limit (LSL	3 M4 e Dynamic Measure e □ e □ 0 0 Programming) □ ccle Name □ aracteristic name □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □ ↓ □	ment	Setup Help
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Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu 2. Master valu Reference test DRAWING DATA (Characteristic - Article Number Art_0717 Arti Char. Number C4 CHARACTERISTIC DATA FROM THE DRAWING Un Nominal siz Upper spezification limit (USL Lower controlling limit (UCL Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement input ADJUSTMENT OF THE CHARACTERISTIC	Image: Mail of the source	ment	Setup Help
Lower spezification limit (LSL MEA. VALUE COLLECTION Measurement mod ADJUSTMENT OF THE CHARACTERISTIC 1. Master valu Reference test DRAWING DATA (Characteristic Article Number Art_0717 Art Characteristic CA ChARACTERISTIC DATA FROM THE DRAWING Upper spezification limit (USL Upper controlling limit (USL Lower spezification limit (LSL Lower spezification limit (LSL ADJUSTMENT OF THE CHARACTERISTIC ADJUSTMENT OF THE CHARACTERISTIC ADJUSTMENT OF THE CHARACTERISTIC	3 M4 e □ b Dynamic Measure e □ 0 0 Programming) Cole Name ccle Name □ aracteristic name □ 0 0.0 0 0.225 0 0.3 • Keyboard	ment	Setup Help

The measuring values of characteristic 1 are transmitted by data key of gauge. (Gauge triggered mode)

The measuring values of characteristic 2 are displayed continuously and shall be stored by function key (static mode).

The TIR measurement of characteristic 3 shall be started by function key and stopped by a second pressing of function key. The TIR value shall be automatically saved on stopping the dynamic measurement (dynamic mode).

On pressing a function key the window for keyboard input shall be opened.



Creation of a test step for data collection (see brief overview - page 8):

SEQUENCE (Test Step-Programm	ning)						×
Article Number Art_0717		Article Name Sha	aft				
Test Step Number S1							
Test Step Function Data Collection							
LIST OF FUNCTIONS	[
Save measured values Delete last saved measured value							
Change to next test step Repeat last test step							
Adjustment / Calibration							
Dynamic measurement on/off							
Input of values by keyboard							
Expert mode New							
	LIST OF	CREATED F	UNCTIONS	6			
Function	Function key	Hand/Footsw	Dig. Input	Event			Edit
Save measured values : C1				Chara	cteristic 1> co	llection by dat	▲ Delete
Save measured values : C2	F1						Delete
Dynamic measurement on/off: C3	F2			22273			
Save measured values : C3		1000	1000	Chara	cteristic 3> dyi	n. measuring	
Input of values by keyboard : C4	F3	100	1.222				
Adjustment / Calibration : C2	F10		1.000				
							•
In this test step the reference information are requeste	d				OK	Cancel	Help

- All measuring values of characteristic 1 transmitted by data key of gauge are saved in file.
- On pressing the **F1** key the measuring values of characteristic 2 are saved in file.
- On pressing the **F2** key the dynamic measurement of characteristic 3 is started or stopped. On stopping the dynamic measurement the found TIR value is automatically saved in file.
- On pressing the **F3** key the window for input of characteristic 4 by keyboard is opened.
- On pressing the F10 key the characteristic 2 is calibrated.

Creation of the display window :

Alto No Let Share Let Share <thlet share<="" th=""> <thlet share<="" th=""></thlet></thlet>	IBR - ComGa			
ep 51 Date Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection Image: Collection <thimage: collection<="" th=""></thimage:>	a la sector de la se		test testimetrationical test testimetration	
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Image: Control of address for a ddddd for address for address for address for address for a	ip S1	Data Collection		
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		Data collection by data key [mm]	Static measurement [mm] Off TIR [mm]	Explored (nm)
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Schwarz 6 - 20130 7 - 20130	and summing systems	64-> 20.0060	64+> 30.0006 64+> 0.0067	64-> 50.0000
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No. 134739 No. 238739 No. 0.0001 No. 134739 No. No.< No.< No.<		86 -> 19.9219	86 -> 29,9921 86 -> 0,0044	86 -> 49.9219
9% 13799 9% 20005 9% 00005 9% 47799 9% 204490 9% 200068 9% 00005 9% 40799 9% 40799 9% 204490 9% 200068 9% 00005 9% 9% 40007 9% 40799 9% 200068 9% 00007 9% 50.0700 9% 50.0700 9% 50.0700 9% 50.0700 9% 50.0700 9% 50.0700 9% 50.0700 9% 50.0700 9% 50.0700 F1=Save characterist 9% 201400 9% 201000 9% 200004 9% 50.0700 F1=Save characterist F2=Control characterist F3				
91 -> 20.460 91 -> 30.0048 91 -> 0.0009 91 -> 50.480 9		89 -> 19.7899	89 -> 29.9789 89 -> 0.0017	89 - 2 49,7999
92 -> 20.6600 92 -> 30.0050 92 -> 0.0071 93 -> 50.0060 93 -> 50.0060 93 -> 50.0060 93 -> 50.0060 93 -> 50.0060 93 -> 50.0060 93 -> 50.0060 93 -> 50.0060 93 -> 50.0060 93 -> 50.0060 93 -> 50.0060 93 -> 50.0060 93 -> 50.0060 91 -> <td></td> <td></td> <td></td> <td></td>				
93 -> 20/720 93				
95 -> 13,9820 95 -> 23,9892 95 -> 0.0054 95 -> 91,9820 H1=Save characterist 95 -> 20,0140 97 -> 30,0124 97 -> 0.0054 95 -> 90,9820 H1=Save characterist 95 -> 20,0140 97 -> 30,0124 97 -> 0.0064 97 -> 50,1140 F2=Control characterist 95 -> 20,100 97 -> 30,0120 97 -> 0.0084 97 -> 50,1140 F2=Control characterist 95 -> 20,140 97 -> 30,0120 97 -> 0.0084 97 -> 50,1400 F2=Control characterist 97 -> 20,140 97 -> 0.0084 97 -> 50,040 F2=Control characterist 97 -> 20,480 97 -> 0.0084 97 -> 50,040 F3=Input characterist 97 -> 20,480 97 -> 0.0084 97 -> 50,040 F3=Input characterist			93 -> 30.0072 93 -> 0.0074	
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■ ■ 100-5 201300 91-5 20120 91-5 000000 91-5 000000 91-5 000000 91-5 00000000 91-5 000000000000000000000000000000000000		96 ->= 20.0240	96 -> 30.0024 96 -> 0.0064	94 -> 50.0240
99.5 201660 99.5 201660 99.5 201660 99.5 201660 99.5 201600000000000000000000000000000000000				
► 100-5 194219 J 100-5 0.0044 J 100-5 49.921 J F3=Input characteris				99.1 50.1600
		100 -> 19.9219	100 ·s 29.9921 v 100 ·s 0.0044 v	F3=Input characteristic 4
LM	Exit			





9. Starting the test scheme (measuring)

This menu is created for testing the function of the test scheme before you create the test orders.

The measurement values you have collected in this menu are not saved and get lost, when you stop measurement operation.

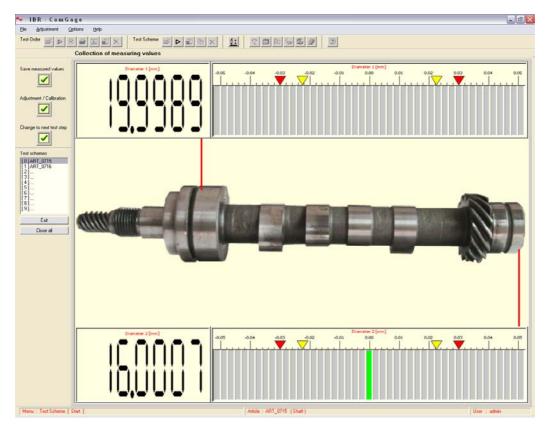
You start the test scheme by clicking the File / Test Scheme / Start menu (Button : Line).

After you have selected the menu you must select the test scheme you want to start :

				\mathbf{X}
Filename	State	Size	Date	
ART_0715 ART_0715 ART_0716 ART_0717 ART_0717 ART_0718	Test Scheme Test Scheme Test Scheme Test Scheme Test Scheme Test Scheme	45340 45940 46800 41800 43300	11/27/2009 11/26/2009 11/23/2009 11/23/2009 11/26/2009	< I
		OK Ca	incel Help	

In this menu it is possible to start up to 10 test schemes at the same time.

After the start of a test scheme ComGage automatically assigns one of the keys 0 .. 9 to the test scheme.







1.) Starting an additional test scheme

You can start an additional test scheme by clicking the File / Test Scheme / Start menu

(Button:

). One of the keys 0 ... 9 is then automatically assigned to the test scheme.

2.) List of started test schemes

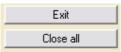
The started test schemes and their keys 0..9 are shown in following list :

Test schemes
[0]ART_0715
[1]ART_0716
[2]
[3]
[4]
[5]
[6]
[7]
[8]
[9]

The Number left of the article numbers (e.g. [0]) informs you which key you must press to start measuring with the particular test scheme. By clicking on the test scheme it is automatically started.

3.) Closing of one test scheme or all test schemes

By clicking the **Exit** - Button you can close the currently measuring test scheme. By clicking the **Close all** - Button you can close all started test schemes.



When all test schemes are closed the menu is left automatically.

4.) Buttons

The buttons are assigned to a function in the test scheme for execution of that particular function (see chapter 7.7).



5.) Adjustment Button

By clicking the following button in the menu bar you can open the window *mechanical adjustment of inductive probes*. (See chapter 14 for menu description)

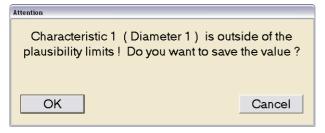






6.) Saving values

If a measurement value is outside the plausibility limits, then the following window is displayed.



By clicking the Cancel - button the measurement value is rejected, i.e. it is not saved.

!!! When this window is open, ComGage stops further measuring until the window is closed.

7.) Deleting values

If the operator has done a faulty measurement, he can delete the wrong measurement values of the last part and can repeat the measurement. But he cannot delete the measurement values of previously measured parts.

8.) Zero adjustment and gauge calibration

If you press the button, function key or foot switch assigned to the function "Adjustment / Calibration", then a zero adjustment or gauge calibration is executed.

On zero adjustment the programmed master values are adopted as measurement values of the particular characteristics.

On gauge calibration the value is stored as first master value as soon as the button, function key or foot switch assigned to the function "Adjustment / Calibration" is actuated the first time. Afterwards the numeric display alternately indicates "Cal" and the measured value. As soon as the button, function key or foot switch assigned to the function "Adjustment / Calibration" is actuated the second time, the measurement value of the second master is adopted and the corresponding parameters are calculated. The gauge calibration is completed.

So you must insert the first master into the fixture before the first actuation of the button, function key or foot switch and the second master before the second actuation.

9.) Keys

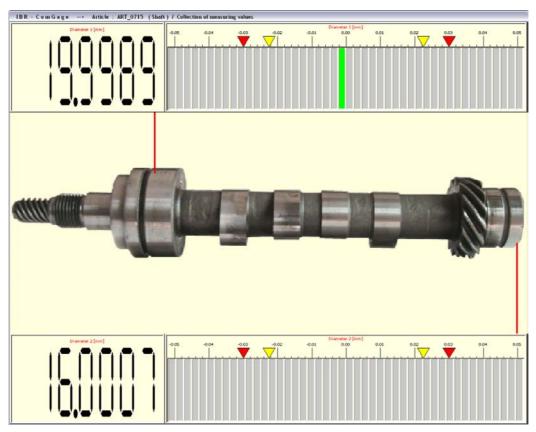
The following function keys are available for operating the measurement mode :

Key	Function
TAB, +	Moves the cursor from button to button
SPACEBAR, ENTER	Presses the selected button
F1, F2,	The functions of the function keys are defined in the test scheme
1	Switches the window to full screen mode and back to normal mode
Cursor	Scrolling within the statistical display elements (with scrollbar)
0 9	Selection of a test scheme



10.)Full screen mode

Example of full screen mode :



10. Additional test scheme menus

10.1 Convert

By clicking the **File / Test Scheme / Convert** menu (Button :) you can convert your test scheme into a Word-file for documentation purposes. At first you must select the test scheme, which you want to convert. At the beginning of the conversion process the message shown below will appear.

į	The test scheme will be saved as Word-file (*. doc). ComGage controls MS-Word in background for generating the Word-file. Because of this MS-Word 2000 / XP / 2003 / must be installed on the PC.
	(OK

10.2 Duplicate

By clicking the **File / Test Scheme / Duplicate** menu (Button :) you can duplicate a test scheme. At first you must select the test scheme, which you want to duplicate. After this you have to enter the article number of the new test scheme and at last you can modify the test scheme settings.

10.3 Delete

By clicking the File / Test Scheme / Delete menu (Button :) you can delete test schemes.





11. Creating a test order

A test order serves to assign measurement and test data to the corresponding production lots or customer orders.

At first the data of the test order head must be entered and then the test scheme of the component you want to produce and test is selected.

In the **File / Test Order / Create & Change** menu (Button :) test orders can be programmed. For that, the window shown below is opened.

	ORDER			
Order Number	Order 1234			OK.
Article Number	Art_0715			OK
Name	Shaft			
Quantity	10000	Re	ference Information	
Order Text	ORDER DOCUN Sample test order	IENTATION		~
				V
Creation Date	27.11.2009	Created by	L. Hedke	

At first you have to enter the *Order Number*. If you input an existing *Order Number* you can modify the particular test order, otherwise you create a new one.

A data path can be entered preceding the order number. This entered data path is relative to the data directory (see chapter 6.4) and must already exist. ComGage does not create any new subdirectories. (*Example : Machine 1*\Art-1234 \rightarrow The test order Art-1234 is created in the subdirectory Machine 1)

The next step is the selection of the test scheme. (Component you want to produce and measure)

- **!!! Attention :** When you have created a test order, the test scheme assigned to it can only be modified by clicking the **Update** button. It is not possible to assign an other test scheme to the test order at any later time.
 - So you should at first test the test scheme, before assigning it to a test order.

On creating a test order, you can make the following entries :

- 1.) Name (Name of the component, e.g. cylinder, bore, \dots)
- 2.) Quantity (Number of components you have to produce [depends on the customers order])
- 3.) Order Text (Free editable text field for documentation of the test order)
- 4.) Creation Date (Creation date of the test order)
- 5.) Created by (Name of the operator, who created the test order)

By clicking the **NEXT>** - Button the settings of the current test order are saved and you can go on creating the next test order.





By clicking the **Reference Information** - button the window for selecting the reference information assigned to request in the test order is opened :

Reference Inform	ation	
Order Number	Order 1234	
Urder Number by component Characteristics Diameter 1 Diameter 2	Customer	REFERENCE INFORMATION
		OK Cancel Help

In this window a data set must be selected or input for all reference information activated for the test order. They are valid for the whole test order.

The entry **by component** in the left column says that this reference information is assigned to all characteristics. After that you can select or input the reference information for each characteristic. In order to do so, please select the particular characteristic in the left column and programme its reference information.

The programming and activating of the reference information for the test order is described in chapter 6.6.

Note : Once you have started to collect measurement data with a test order, you cannot change the reference information of this test order any more. If reference information is to be requested at every beginning of measurement operation, it must have the mode 'on starting the measurement' assigned to it. (see chapter 6.6)

12. Starting the test order (measuring)

This menu contains the measurement mode of ComGage.

In this menu it is possible to start up to 10 test orders at the same time (for different production lines). After the start of a test order ComGage automatically assigns one of the keys 0 .. 9 to the test order.

If an operator has to measure a component, he can select his test order by one of the keys 0 ... 9 and can measure his sample. After this a second operator from a second production line can measure his component after by pressing the key assigned to his test order.

A test order can be started by clicking the File / Test Order / Start menu (Button :







After you have selected the menu you must select the test order you want to start :

Filename	State	Size	Date	
DRDER 12345 DRDER ABCD	open	6	11/25/2009 	
				-

In this menu it is possible to start up to 10 test orders at the same time. After the start of a test order ComGage automatically assigns one of the keys 0 .. 9 to the test order.

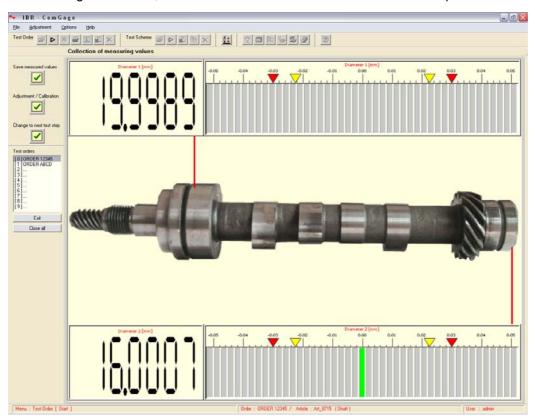
On the start of a test order, the reference information which has the mode 'on starting the measurement' assigned to it, is requested :

Reference Informati	on		
Order Number	ORDER 12345		
by component		REFERENCE INFORMATION	
Characteristics	Manufacturer	001 - Manufacturer 1	
Diameter 1 Diameter 2			
Diamoter 2			
			_
			*
)	
			- -
	Batch / Serial Number	1456987	
			-
	1		
		OK Cancel	Help

For documentation of the window : See previous page.



After starting a test order, the main window of the measurement mode is opened as shown below.



1.) Starting an additional test order

You can start an additional test order by clicking the File / Test Order / Start menu

(Button:). One of the keys 0 ... 9 is then automatically assigned to the test order.

2.) List of started test orders

The started test orders and their keys 0..9 are shown in following list :

Test orders
[0] ORDER 12345
[1] ORDER ABCD
[2]
[3]
[4]
[5]
[6]
[7]
[8]
[9]

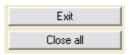
The Number left of the order numbers (e.g. [0]) informs you which key you must press to start measuring with the particular test order. By clicking on the test order it is automatically started.





3.) Closing of one test order or all test orders

By clicking the **Exit** - Button you can close the currently measuring test order. By clicking the **Close all** - Button you can close all started test orders.



When all test orders are closed the menu is left automatically.

4.) Buttons

The buttons are assigned to a function in the test scheme for execution of that particular function. (see chapter 7.7).



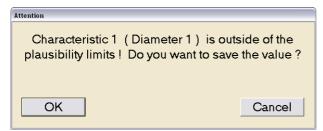
5.) Adjustment Button

By clicking the following button in the menu bar you can open the window *mechanical adjustment of inductive probes*. (See chapter 14 for menu description)



6.) Saving values

If a measurement value is outside the plausibility limits, then the following window opens.



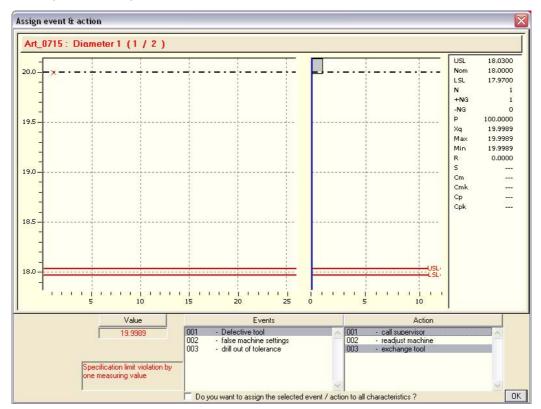
By clicking the **Cancel** - button the measurement value is rejected, i.e. it is not saved.

!!! When this window is open, ComGage stops further measuring until the window is closed.





If you have activated **Events** and **Actions** (see chapter 6.6) and the measurement value is out of range, then you must select the event causing the measurement to run out of range (e.g. defective tool, ...) and the corrective actions that have been taken (e.g. the supervisor was called, ...). A multiple choice is possible.



7.) Deleting values

If the operator has done a faulty measurement, he can delete the wrong measurement values of the last part and can repeat the measurement. But he cannot delete the measurement values of previously measured parts.

8.) Zero adjustment and gauge calibration

If you press the button, function key or foot switch assigned to the function "Adjustment / Calibration", then a zero adjustment or gauge calibration is executed.

On zero adjustment the programmed master values are adopted as measurement values of the particular characteristics.

On gauge calibration the value is stored as first master value as soon as the button, function key or foot switch assigned to the function "Adjustment / Calibration" is actuated the first time. Afterwards the numeric display alternately indicates "Cal" and the measured value. As soon as the button, function key or foot switch assigned to the function "Adjustment / Calibration" is actuated the second time, the measurement value of the second master is adopted and the corresponding parameters are calculated. The gauge calibration is completed.

So you must insert the first master into the fixture before the first actuation of the button, function key or foot switch and the second master before the second actuation.





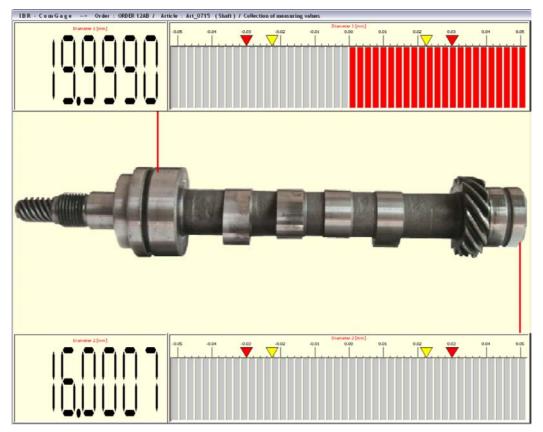
9.) Keys

The following function keys are available for operating the measurement mode :

Key	Function	
TAB, +	Moves the cursor from button to button	
SPACEBAR, ENTER	Presses the selected button	
F1, F2,	The functions of the function keys are defined in the test scheme	
1	Switches the window to full screen mode and back to normal mode	
Cursor	Scrolling within the statistical display elements (with scrollbar)	
09	Selection of a test scheme	
*	Look at, change and delete measuring values	

10.) Full Screen Mode

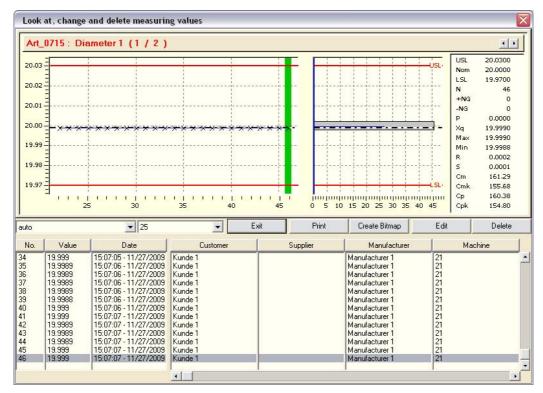
Example of full screen mode :





11.) Look at, change and delete measuring values

By pressing the * - key the Look at, change and delete measuring values menu is opened.



You can select the characteristic by clicking the arrow - buttons in the upper right window corner.

By pressing the **cursor** keys **left** and **right** you can scroll in the run chart / control chart of the current characteristic and have the reference information of the currently selected measurement value displayed. The **cursor** keys **up** and **down** can be used to scroll in the reference information table.

Additionally the most important statistical data and a histogram of the current characteristic are shown.

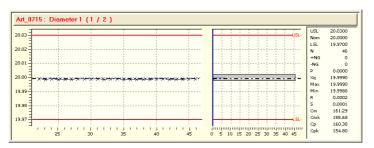
By the **left hand dropdown field** (standard entry : auto) you can select which chart type is to be used for displaying the run chart / control chart.

By the **right hand dropdown field** (standard entry : 25) you can select how many measurement values are to be displayed in the run chart / control chart.

By clicking the **Exit** - button you can exit the **Look at, change and delete measuring values** menu. The window will then be closed automatically.

By clicking the **Print** - button you can generate a print-out of the run chart / control chart and the histogram of the current characteristic.

By clicking the **Create Bitmap** - button you can generate and save a bitmap picture of the run chart / control chart and the histogram of the current characteristic. An example is shown below.







By clicking the Edit - button the current measurement value can be modified. Before, the entry of a password is requested.

Look at, change and	delete measuring val	ues				
Characteristic Diamete	r1	Value Nr.	46			
Value	19.999					
Customer Supplier	Kunde 1					
Manufacturer	Manufacturer 1			•	Note :	The Password for editing and
Machine	21			•	Note .	deleting is "sval"
Events						deleting is sval
				<u> </u>		
				<u> </u>		
	/					
Batch / Serial Number	1456987					
				_		
			ок	Cancel Help		

By clicking the **Delete** - button the current measurement value can be deleted. Before, the entry of a password is requested.

13. Additional test order menus

13.1 Close

) you can close a test order By clicking the File / Test Order / Close menu (Button : (when all components are produced).

Test orders which you have closed cannot be used for further measurements anymore, but they can be analysed or converted to different formats.

13.2 Print

By clicking the File / Test Order / Print menu (Button :

) you can print the collected measurement

values of a test order in tabular form.

After selection of the test order, you select which characteristics shall be printed. At last you have to select the printer.

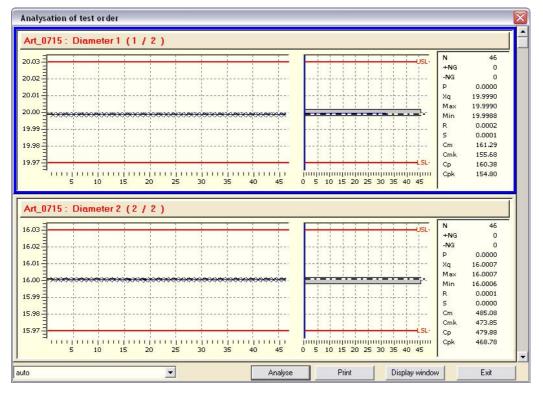


13.3 Analyse

In the **File / Test Order / Analyse** menu (Button :) you can analyse the measured values of a test order. First of all you can select filters for the data you want to analyse. See the window below.

Input of measur	ement value filters			×
Order Number	ORDER 12345	Article Number	Art_0715	
Name	Shaft			
Time space		💽 until		•
Customer				-
Supplier				
Manufacturer				-
Machine				•
Events				•
Batch / Serial Numbe	·			•
Action				-
			OK Cancel	Hilfe
				Hilfe

After clicking the **OK** - button the analysis window is opened, as shown below.



You can scroll through the individual characteristics by using the scrollbar at the right window side.

By the **left hand dropdown field** (standard entry : auto) you can select which chart type is to be used for displaying the run chart / control chart.

By clicking the **Analyse** - button you can open the **Look at, change and delete measuring values** menu (see description in chapter 12.11).

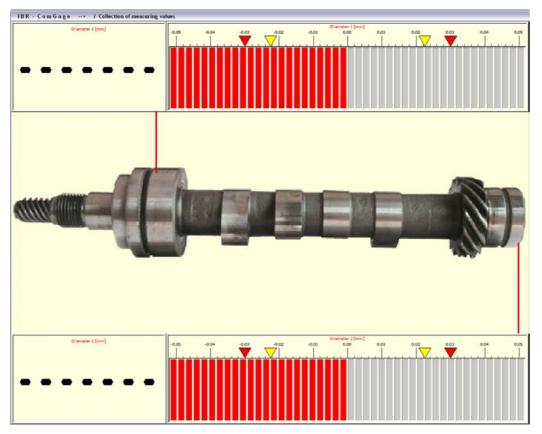
By clicking the **Print** - button you can generate a print-out of the run charts / control charts and the histograms of the current test order.





By clicking the **Display window** - button the measurement windows (without measuring) are opened in full screen mode.

By pressing the **PgUp** and **PgDn** keys you can switch to the SPC windows that have been defined in the test scheme :



By pressing the **P** key you can print the window contents. You can exit the full screen mode and return to the previous window by pressing the **ESC** key.

By clicking the **Exit** - button you can exit the **Analysation of test order** menu. The window will then be closed automatically.

13.4 Convert

By clicking the **File / Test Order / Convert** menu (Button :) you can convert the measurement values of a test order into a different format. After selecting the test order you want to convert in the selection window, the window shown below is opened :

Convert one	e Test Order 🛛 🔀
File Format	QDAS-Format
Output File	C:\ComGage\ORDER 12345.dfq
	OK Cancel Help

Now you can select the desired file format. Then output file is displayed. This automatically suggested path and file name can be edited by the user. By clicking the **OK** - button the conversion is triggered.





13.5 Delete

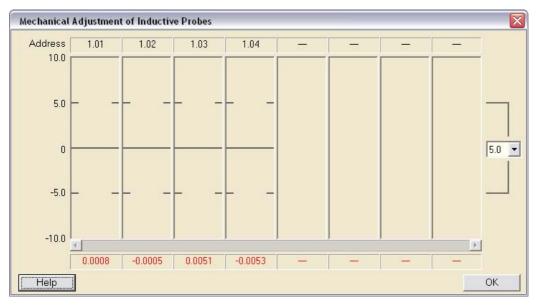
By clicking the **File / Test Order / Delete** menu (Button :) you can delete one or more test orders. After selecting the test orders you want to delete in the selection window, these will be deleted by clicking the **OK** - button. Before, you have to confirm a warning message in order to avoid deleting by mistake.

14. Adjustment window

14.1 Mechanical adjustment of inductive probes

By clicking on the **Adjustment / Mechanical Adjustment** menu (Button :) the window for the mechanical adjustment of inductive probes in the fixture is opened.

(This is necessary because inductive probes only work optimal near their electrical zero-point.)



Adjustment process :

- 1. Selection of the probe which shall be adjusted (Address). If there are more than eight probes present, then you can scroll through the connected probes by using the scrollbar.
- 2. Insert the masterpiece or a working piece into the fixture.
- 3. Mechanical adjustment of the probes until all bars are within the green area. The green area of the bars is selectable (from +/- 0,01 mm to +/- 5 mm, default +/- 0.05 mm) by using the selection field at the right side of the window.
- 4. By clicking the **OK** button you can exit the window.



15. Important conditions concerning the use of ComGage

- 1. IBR Software products are not developed and tested for the high demands in the medical field, in combination with applications in the medical field or in critical components in life-saving systems whose malfunctions or failure can lead to personal injury.
- 2. On absolutely all applications the stability of the software can be influenced by different factors, i.e. fluctuations in the power supply, computer hardware errors, operating system errors, compiler errors, installation errors, software and hardware compatibility problems, not defined use or misuse or errors by the operator. (All kinds of these errors are called in the following document : SYSTEMERRORS)
- 3. All applications which contain the risk that SYSTEMERRORS can lead to damages or personal injuries should not only depend on electronic systems. To prevent damages or injuries the operator or system developer should create reasonable precautions against SYSTEMERRORS or their consequents (including backup or shutoff mechanisms).
- 4. Because all computer systems are adapted for the operator the systems are different in compare to the IBR test systems. Because the IBR products can also be integrated in applications not tested or not intended in this way by IBR the operator or system developer is completely responsible for the test and release of the applications in which IBR products are embedded. This contains the structure, the procedure and the security level of the application.
- 5. In no event IBR will be liable for any damages including lost profits for any special, indirect, incidental or consequential damages arising out of the use or inability to use the product, whether claimed under the safety instructions or otherwise.
- 6. Corporate guidelines and safety regulations enforced by the industrial trade associations for the prevention of industrial accidents must be strictly observed. Make sure to consult the safety officer at your company.
- 7. All rights depend on German law.
- 8. All rights for the ComGage belong to IBR Messtechnik GmbH & Co. KG

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