



QMSOFT

Software for gauge inspection

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Notes for CD-ROM installation:

Insert the QMSOFT CD-ROM in your CD-Drive. Check the drive letter (in most cases is it „D:“). Use the Windows-File-Manager or the WINDOWS Explorer to execute the File "SETUP.EXE" in the directory "INSTALL" on the CD-ROM. See the users dialogue. You should confirm all of the default settings.

If you want to install the QMSOFT standard package choose the installation option
„GaugeMan (standard)“.

To install special QMSOFT options (e.g. the QM-TORQ program or others) the option
“GaugeMan (custom)” has to be used.

The option **„GaugeCal“** is installing only the program for the gauges nominal value calculation.

After finishing this first installation step you get a new program group on your desktop with the QMSOFT-Icon. Now start the QMSOFT program with a double click on the "Q"-Icon inside this program group. Enter the user name and the password.

ATTENTION: For both enter the word **"system"** !!

All QMSOFT programs may be executed in the DEMO mode with a restricted functionality (see also file „INFO061.TXT“ in the root directory of the CD-ROM).

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For fax support don't forget to inform us about your licence numbers and program versions of the software and about your computer and measuring device hardware. Use the „Help|FaxSheet“-Option of QMSOFT to print out a styled fax paper.

Hardware requirements for QMSOFT (Windows version)

Your computer should fulfil the following **minimum** requirements:

- Processor Intel Pentium III, IV (or AMD K6, K7..), min. 266 MHz,
- CD-ROM-Drive
- 64 MByte RAM
- 300 MByte free space on the hard disk;
- SVGA graphic (minimum resolution 800x600)
- 1 parallel port, 1 serial port (if Online connection is desirable),
- printer (Laser printer is recommended),
- operating system MS-Windows 98, Windows ME or Windows NT, Windows 2000 or XP.

About this manual

Your manual is divided into several parts each of which explains a particular component of QMSOFT. This information will provide you with all the necessary information of our program. If for some reasons the documentation you have received is not complete contact our distributor or us (our address can be found at the end of the first section). If you are interested in an upgrade service contact us directly.

The manual consists of the following:

- Part I: Installation of QMSOFT modules
- Part II: Introduction
- Part III: The gauge data management system **QM-MANAG**
- Part IV: The inspection program **QM-DIAL**
(inspection of dial gauges, dial indicators)
- Part V: The inspection program **QM-PLAIN** (inspection of plain gauges)
- Part VI: The inspection program **QM-THREAD**
(inspection of screw thread gauges)
- Part VII: The inspection program **QM-MICRO** (inspection micrometers)
- Part VIII: The inspection program **QM-CALIP** (caliper inspection)
- Part IX: The inspection program **QM-BLOCK**
(inspection of gauges blocks and -sets)
- Part X: The inspection program **QM-PINS**
(inspection of cylindrical pins and pin sets)
(other programs are being developed)
- Appendix A: General information about selling and delivering conditions of the software
- Appendix B: The „EDITOR4W“ program - editing of calibration certificates
- Appendix C: Interface programs for different machine types
- Appendix D: Making the Online-connection of measuring machines
- Appendix E: Probe management program (TASTER4W)

It should be mentioned that, due to technical advancements some minor discrepancies may be found in your manual and which appears in the screen.

QMSOFT

Software for gauge inspection

I. Installation and Program licences

I.1. QMSOFT-Installation



The software is delivered on a CD-ROM. The installation procedure starts automatically under Windows 95/98/NT, if the auto start property of the CD-ROM drive is enabled. If the installation does not start automatically, please execute "manually" the program file "\INSTALL\SETUP.EXE". Please follow the installation messages on the screen.

Please select the installation option "**GaugeMan**" if you want to install the complete QMSOFT system including the gauge management system and inspection programs. The "**GaugeCal**" package is a small program only for calculation of gauge nominal values. This functionality is also a part of the complete "**GaugeMan**" installation.

The installation of the program can be done in a few easy steps.

Make sure that your purchase of the program is done by a known dealer and distributor of L&W for software products (for licence agreements see Appendix A) !

If there are problems while installing the "**Borland Database Engine**" (BDE) you can install this engine manually by executing the file "SETUP.EXE" from the CD-ROM subdirectory "\INSTALL\BDE061". Please restart windows after the BDE installation.

Most of the QMSOFT programs (not the programs DABAQ4W, EMP4W, MEDRA4W !) you also can install without using the installation procedure. To do this please copy the directory/directories inside of the CD-ROM subdirectory "\INSTALL\QMSOFT4W" into the directory "C:\QMSOFT4W" of your hard disk (you have to create this directory manually). Please remove the read-only-attribute of the copied files.

Please try to use the setup procedure of the CD-ROM for installation, because many settings of the programs are done automatically depending of the installation options you select.

I.2. Program licences



After the installation all programs are running in a "DEMO" mode. In this mode some menu items are disabled and not all program features are usable.

If you purchase one or more programs a "**Hardlock**" is a part of the program package you get. This "Hardlock" has to be plugged into a parallel interface of your computer. The "Hardlock" acts as the registration number of the program.

Attention: Always plug the "Hardlock" in the direction of the arrow marked on it. Never plug it into a serial interface incorrectly, this will destroy it !

To remove the restrictions from a QMSOFT program you have to activate the "Hardlock" and to type in the a "Licence number" for each program which you have purchased. Please click onto the yellow key icon inside of the QMSOFT program window to initiate the licence procedure, then follow the messages being shown.

I.3. Installation on a Windows NT / Windows 2000 system

If you use a Windows NT, Windows 2000 or Windows XP workstation with the software it is necessary to install a driver for the Hardlock being used. The automatic installation during the QMSOFT installation process does require that you are logged in your system as "system manager". If the installation fails you have to install this driver manually.

To install the driver you have to execute the program:

HLDRV32.EXE located on the QMSOFT CD-ROM in the directory
„\DRIVER\Hardlock\Hldrv32“

The HLDRV32.EXE is very easy to use. You have only to follow the messages on your screen.

Pay attention, that you need „**system manager**“ rights to do this.
 Otherwise the installation will not be successful.

For more information see the file „Readme.txt“ on the CD-ROM (directory „..\DRIVER\HARDLOCK“).

I.4. Network Installation

For the QMSOFT programs the installation in a network means at first the installation of a **network access to the gauge stock** in the database DABAQ4W.

Using the inspection programs a local installation should be done.

Pay attention the following notes:

- install all inspection and indication programs on the local workstation; use the default installation procedure on the CD-ROM to do this;
- the gauge management program can be installed either on the local workstation or on the network server (we prefer a local installation); the database itself (the directory including the database tables) has to be installed on a network directory;

ATTENTION: Do not use a so called „Peer-to-Peer“ net like „Novell light“ or the functions in Windows for Workgroups or Windows 95. To guarantee a properly work of the system the installation of a „**Client/Server**“ network operating system is necessary (Windows NT or Novell server are recommended).

Steps for the network installation:

- at first install all components you want to use on the local workstations with the default installation program SETUP.EXE; if you want to use the database, then also install the Borland Database Engine (BDE) and the ReportSmith report generator (RS_RUN)
- check the available network drive and create a directory to save the DABAQ4W database on the network; make sure that you have all rights on this network directory; if necessary consult your network system manager; (for example the used network directory is „**N:\DABAQ4W**“);
- copy the installed database directories from the local hard disk to the network directory; (use the Windows file manager or the Explorer), for example
 - copy the „**C:\QMSOFT4W\DABAQ4W\DB**“ directory to „**N:\DABAQ4W**“;
 - copy the „**C:\QMSOFT\IDABAQ4W\SYSTEM**“ directory to „**N:\DABAQ4W**“;

ATTENTION: The following steps has to be done on the first workstation !!!

- start the program „BDECFG.EXE“ for the configuration of the database engine, use the shown Icon located in the QMSOFT program shell:



- in the „BDECFG“ program window select the driver **„Paradox“** on the left side; then enter on the right side in the line **„NetDir“** the wished directory on the network (for example: „N:\DABAQ4W“); on all workstations the „NetDir“ has to be identical !
- now select the page „Aliases“; here you can find for each database alias (the internal name of a database directory) the related path;
change the path names for the aliases **DABAQ_DB** and **DABAQ_SYSTEM** from the local path to the new network path (e.g.: change the path **„C:\QMSOFT4W\DABAQ4W\DB“** to **„N:\DABAQ4W\DB“**)
- save the configuration file with the menu command **"File | Save as..."** into a file on the network drive network (for example: „N:\DABAQ4W\IDAPI.CFG"). Answer with "Yes" to the question, if this saved file should be used as the new BDE configuration file.

ATTENTION: The following steps has to be done on all other workstations !!!

- start the program „BDECFG.EXE“ for the configuration of the database engine, use the shown Icon located in the QMSOFT program shell:



- load the configuration file with the menu command **"File | Load"** from the network drive network (for example: „N:\DABAQ4W\IDAPI.CFG"). All changes you made (see above) should be appear.
- save the configuration file with the menu command **"File | Save as..."** into a file on the network drive network (for example: „N:\DABAQ4W\IDAPI.CFG"). Answer with "Yes" to the question, if this saved file should be used as the new BDE configuration file.

That's all !

II. Introduction

This section includes a short overview about the QMSOFT system philosophy.

II.1. What is QMSOFT ?

Gauge data management is a vital element in any quality assurance system. It also plays an important role in connection with product liability as well as in highly technical fields (for example, in the defense industry or nuclear technology). When applying ISO 9000 to 9004 (and EN 29000 to 29004) standards the installation of a gauge data management system is indispensable. When working with these standards a complete inspection of all measurement and test gauges is required periodically.

Despite a rapidly growing interest in gauge data management, very few manufacturers of measurement devices can offer a system solution for this task. In other words, for the majority of measurement devices on the market, a suitable software supporting both gauge inspection and gauge data management was simply not available.

For this reason a variety of hardware-independent software solutions for the field of gauge data management have been developed. The majority of the systems currently on the market are limited only to the management of gauge data. In the field of gauge inspection, however, not only must gauge data be managed but, more importantly, the gauges also need to be inspected. These functions can be adequately supported by only a few systems. The result is that with many systems the input of gauge nominal values must be done manually. The possibility of entering data directly from the measurement device to the computer is not an option in most comparable software packages.

It is precisely this burdensome problem that the L & W concept seeks to resolve. The idea to develop the software first came from our own personal experience with this problem. As a state-of-the-art gauge inspection service, we are, from daily experience, well acquainted with the software options available in this field as well as what was lacking. We soon realized that the problem we were faced with was also being faced by many others in the measurement industry. Given that this was a relatively untouched aspect of quality assurance, we then decided to develop our concept into a marketable product. Our hypothesis has proven correct. Many companies who previously, like ourselves, were forced to do this tedious and time-consuming job manually have been very satisfied with the efficiency of our product.

Since 1990, under the product name **QM-SOFT (Quality Management SOFTware)**, a series of program components for gauge inspection has been developed to cover an extensive range of geometrical gauges such as thread gauges, dial gauges, plain plug gauges, plain ring gauges etc. These programs provide the ideal computer support for all aspects of gauge inspection.

QM-SOFT's features are:

- Computer supported management (evaluation, analysis and archiving) of any gauge data in a flexible data base; the parallel management of multiple sets of data is also possible.
- Automatic generation of nominal values (evaluation of gauge tolerances) for the most commonly used types of gauges (plain gauges, thread gauges etc.) according to a multitude of national and international standards.
- A system designed to be user-friendly, time-saving and virtually mistake proof making it possible for even non-experts to ensure that their work is strictly within the standards being applied.
- Integration of management and measurement, this means the gauge data can be directly transferred gauge data base.
- High flexibility and upgradability of the system through a solid modular structure; customization to individual needs (factory standards etc.) is always possible.

While developing QMSOFT we attempted to design the user dialog and the measurement procedures according to our own daily experience with the program in the laboratory. The result is that, in our client's opinion, we have successfully created a program which fulfills all of the aforementioned requirements.

II.2. QMSOFT - different types of programs

This section gives you a short overview about the QMSOFT program system and some basic information for the system handling.

Starting the QMSOFT system you get the following screen:



You can see different groups of program symbols. Depending on its basic functions, they differ in the following types of QMSOFT program modules.

ATTENTION: The user manual for each program you can find, if you start the related program and select the menu command **"Help|User manual"** !

Inspection programs:

There are different programs designed to carry out the gauge inspection for the different types of gauges. The programs are related to the standardized procedures for each gauge type.

Data base:

Gauge management system to manage all gauge data, gauge histories; transfer of gauge data. Starting the database you get a dialogue "Open database". Here you can select between **"DB"** and **"DEMO"**. The **"DB"** database should be your **"normal"** working database. Open the **"DEMO"** database to see different samples. You can also use this database while doing the first steps with the database and to learn how to operate something.

Miscellaneous (Help programs) :

Different programs for the program environment (Installation, Indication of measures; editing of record listings ...);

Indication programs:

Indication programs are designed to realize the connection to the length measuring machines. Depending on the machine interface, you should use different indication programs.



The program **"RS232DRV"** is used to connect a length measuring machine with your computer using a serial interface. This program is supporting a wide range of different interface types. If you want to do an **"Online"** measurement set the parameters for the serial interface before.



The program **"IK102021"** is used to connect a length measuring machine with your computer using a Heidenhain PC interface card (IK 120 and IK 121). If you want to do an **"Online"** measurement set the parameters for the serial interface before.



The program "SIPDRV" is designed to support the measurement with a SIP 550M device. It is realizing the connection to the SIP LMC interface program.

The program „WinDHI“ is a special program designed by TRIMOS S.A., Renens Switzerland. This program will be used for the connection to the TRIMOS „Labconcept“ machines.

Editor program:



The EDITOR4W program is designed to get the functionality to show, edit, save and print record listings for all QMSOFT inspection programs.

Normally you do not use the EDITOR-program as a stand alone system. The EDITOR will be start up automatically by one of the inspection programs if you want to perform one of the above-mentioned actions.

The different programs are designed to get a complete tool for gauge data management and gauge inspection.

We would like to add that we would be very interested to hear your ideas, requests and criticism concerning the DABAQ system. We are constantly endeavoring to improve the program and welcome your feedback for use in future versions of the program. You can contact us by mail, by phone or by fax at:

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If you want to call or write us with questions about how to use the program, please include information about the configuration of your computer and your measuring equipment.

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IX. Inspection program QM-BLOCK



The program QM-BLOCK (EMP4W) is designed to the computer supported inspection of gauge blocks used as single gauge blocks or as gauge block sets.

The program includes a database to manage all entered gauge blocks and gauge block sets and to save all inspection results of this gauge blocks. The inspection itself may be done according different evaluation methods. For example you can evaluate only the centre length deviation or the deviation range combined with the centre length deviation.

Basically the evaluation and the used tolerances are related to the ISO 3650 standard, the ANSI/ASME B89.1.9, the British standard BS 4311 or the Australian standard AS 1457. To define customised tolerance tables with user defined accuracy classes is possible.

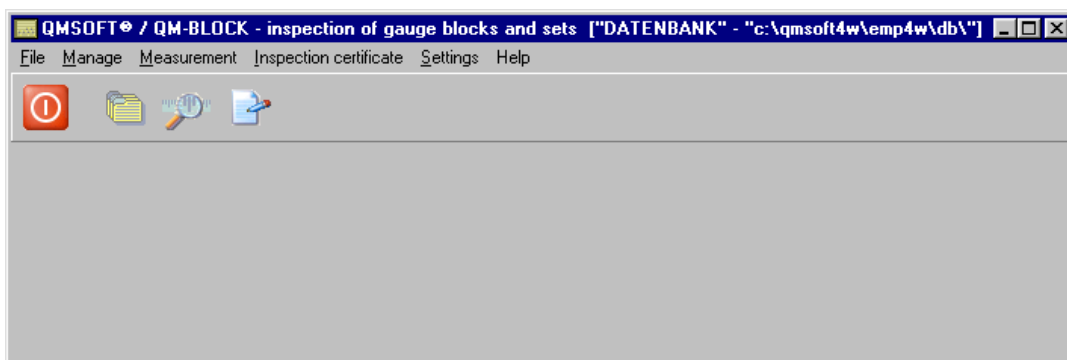
Mostly a gauge block inspection instrument does work with the method of "difference measurement". This means that you have a reference gauge block with a well known actual size which have to be compared with the size of the gauge block should be inspected. Normally, the nominal size of the used reference gauge and the inspected gauge block should be identically - a difference of only few micrometers may be possible. To compare both gauge blocks you need the nominal sizes and the centre length deviations of the used reference gauge set. You get this information from the "Calibration certificate" of the used reference gauge block set. This values have to been entered in the QM-BLOCK program. In the program you can manage the data of different reference gauge block sets.

To inspect a gauge block, normally you should touch 5 measuring points on the gauge blocks face - the order of the measuring points is related to the standard. Measurement data can be entered through an on-line measuring machine or on the keyboard. When using an On-line measurement device, the connection between the device and the computer is made on the serial interface of the PC.

Results can be produced on the screen and/or the printer and/or in a file. The nominal values of the gauge will be processed in connection with the inspection conditions and the measurement results in the results record. Tolerance excesses are marked and identified. It is possible to customise record listings using the so called "record model files" .

IX.1. Program start

You can start the program using the QMSOFT-Shell (click on the QM-BLOCK-icon) or directly with the the WINDOWS -Explorer - execute the file **EMP4W.EXE**.



Attention: If you are starting up the EMP4W program for the first time, there some entries that will have to be made that are described in section VIII.2 "Configuration"(such as; configuring the on-line interface, choosing the used record model file(s); etc.).

IX.2. Configuration

Using the program QM-BLOCK the menu "**Configuration**" give you the possibility to change different internal parameters. Such parameters are: used directories; references to used external programs (On-line connection; Editor program); tolerance tables etc.

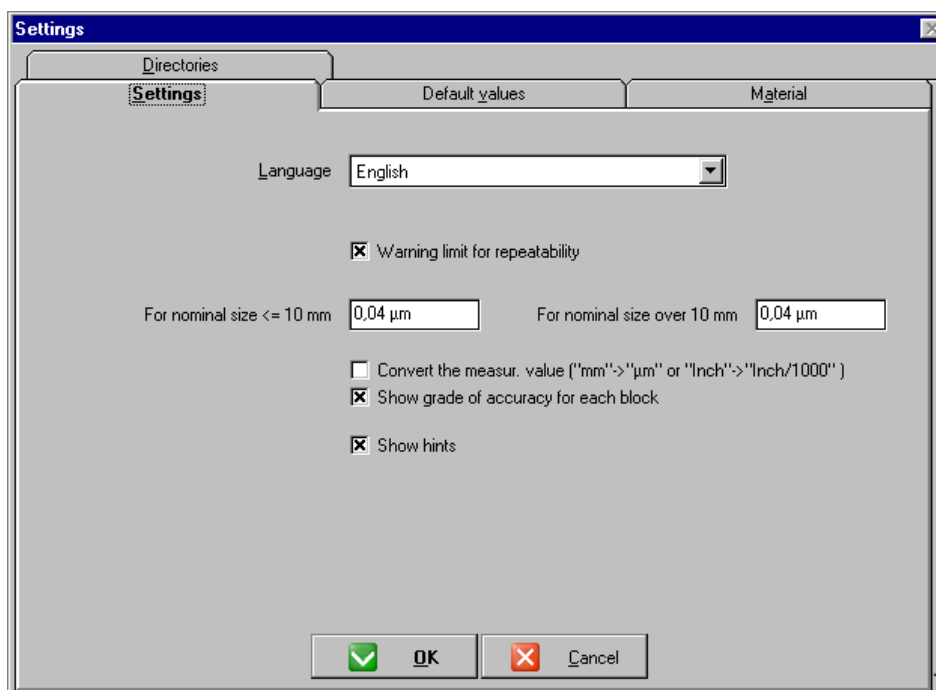
Please, pay attention that the program does only correct work if all settings are correctly - otherwise the most things will work at once with the default settings.

IX.2.1. Settings|General settings

The Menu "**Settings|General settings**" may be used to change the following groups of parameters

IX.2.1.1. Register "Settings"

Here the basic settings (language etc.) can be modified:



Remarks: Here you can also set "Warning limits" for the repeatability of the measures. If you touch a block gauge several times on the same position the software will "watch" the repeatability of your measures.

Important: Normally the gauge block inspection is executed with the help of special measuring devices (gauge block comparator). In this case the measures from the device are coming in the length unit „µm“ or „mil“ (inch/1000). The measures are the difference between the "Reference" measure and the inspected gauge block. If the measuring device will serve the measures as „mm“ or „inch“ values (as ordinary horizontal measuring machines are doing), so you have to activate the option „Convert the measur. Value...“ (see picture above).

IX.2.1.2. Register "Default values"

Here you can set or change some basic parameters like: the used unit; tolerance table; used reference gauge block set and others. Inserting a new single gauge block or gauge block set into the database this values will be used as default parameters for this gauge.

The screenshot shows a 'Settings' dialog box with a 'Default values' tab. The following parameters are configured:

- Unit:** Millimeter
- Tolerance table:** Tolerances acc. to ISO 3650
- Used reference gauge block set:** TEST
- Used measuring point pattern:** Range and centre length
- Material:** Steel
- Gauge type:** Gauge block set
- Measur. direction:** upward (selected)

Buttons at the bottom: OK (with a green checkmark icon) and Cancel (with a red X icon).

The important parameters you have to set are:

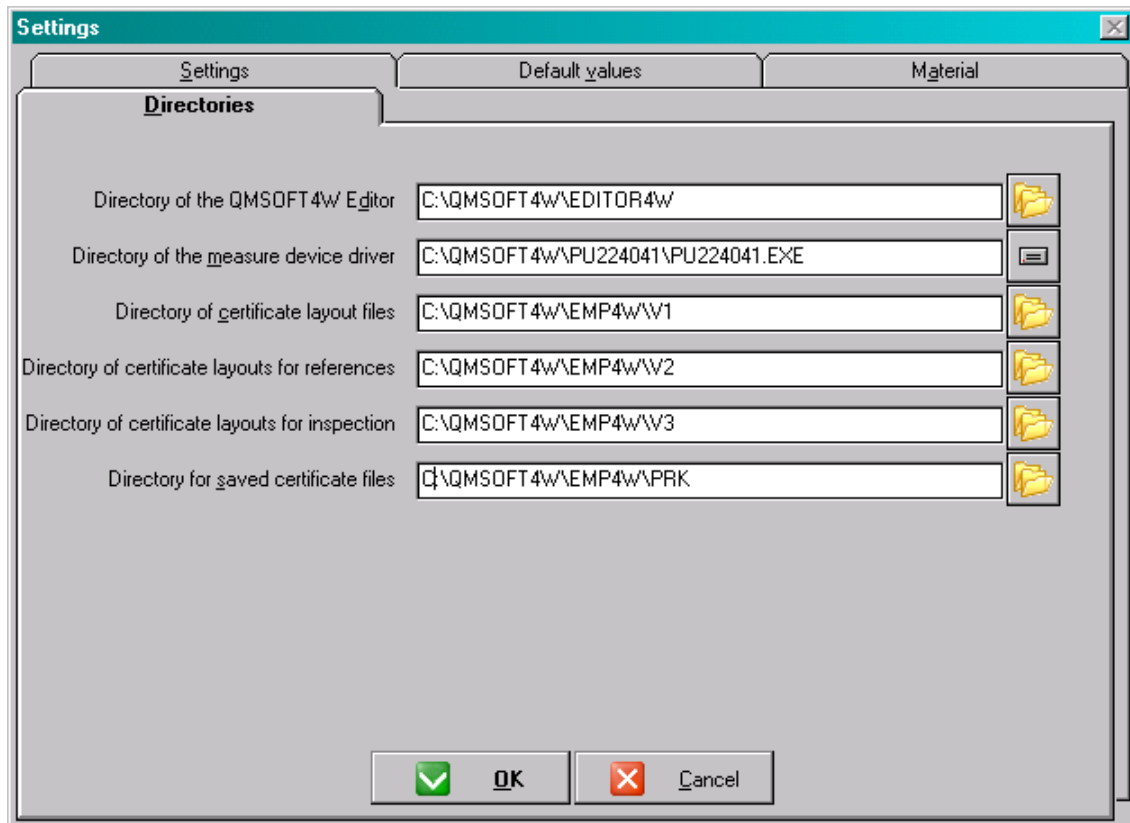
Tolerance table: Defines the default tolerance table being used for the tolerances of gauge blocks should be inspected.

Used reference gauge block set: Select the name of the gauge block set which should be used as the reference for the gauge block inspection. See section "IX.2.4. Settings|Reference gauge block sets" how to enter this reference sets.

Used measuring point pattern: A "measuring point pattern" is defining the measuring points you have to touch while calibrating a gauge block. Select here the name of a pre defined measuring point pattern. See section "IX.2.3. Settings|Patterns of measuring points" how to enter this reference sets.

IX.2.1.3. Register "Directories"

Different functions available in the program will be carry out by external programs. This programs are the "Editor-program" used to create the calibration certificates and the "Indication program" controlling all functions for the On-line connection to the measuring instrument. Here you should enter the directories where this programs are located on your hard disk. Additionally you can change the directories where the used certificate layout files are located.



Remark: Installing the program QM-BLOCK this entries will be set to default values. In the most cases it should not be necessary to change anything.

IX.2.1.4. Register "Material"

In this register you can set and/or calculate some parameters related to the material of the gauge blocks. These parameters will be used for temperature corrections or for the compensation of deformation if reference gauge and inspected gauge have different materials.

NOTE: For the compensation of deformation the reference gauges you use to determine the deformation value have to have exactly the same material parameters as the gauge blocks you want to inspect.

The screenshot shows the 'Settings' dialog box with the 'Material' tab selected. It contains two checkboxes: 'Compensation of temperature' and 'Compensation of different deformations'. Below these are two tables. The first table lists materials (Steel, Cemented carbide, Ceramics) and their expansion factors (0.0 E-6/K). The second table lists reference gauges (Steel, Cemented carbide, Ceramics) and their nominal sizes and deviations (0.0000 mm, 0.00 µm). At the bottom, there is a button labeled 'Determination of deformation factor' and 'OK' and 'Cancel' buttons.

Material	Expand.factor
Steel	0.0 E-6/K
Cemented carbide	0.0 E-6/K
Ceramics	0.0 E-6/K

Reference gauge	Nom. size	Deviation
Steel	0.0000 mm	0.00 µm
Cemented carbide	0.0000 mm	0.00 µm
Ceramics	0.0000 mm	0.00 µm

Refer. / Gauge	Steel	Cemented carbide	Ceramics
Steel	0.00 µm	0.00 µm	0.00 µm
Cemented carbide	0.00 µm	0.00 µm	0.00 µm
Ceramics	0.00 µm	0.00 µm	0.00 µm

Determination of deformation factor

OK Cancel

Compensation of temperature: Here you have to enter only the "Head expanding factor" of the used materials. If the compensation is "On" you have to enter the gauges temperature while executing the measurement.

Compensation of deformation: If you inspect a gauge block or a gauge block set consisting of a material different from the material of your reference gauge then you have to compensate the different deformations while touching the gauge. You can determine the differences of the deformation if you carry out a test measurement on reference gauges having different materials. At first you have to enter the nominal size and the known deviation of the reference gauge block being used.

IX.2.2. Settings | Tolerance tables

The program gives you the possibility to work with customised tolerance tables. This means you can define your own factory standards with different classes of accuracy.

Starting the program the tolerance tables related to the ISO 3650, ANSI/ASME B89.1.9, BS 4311 and AS 1457 are available (see the figure).

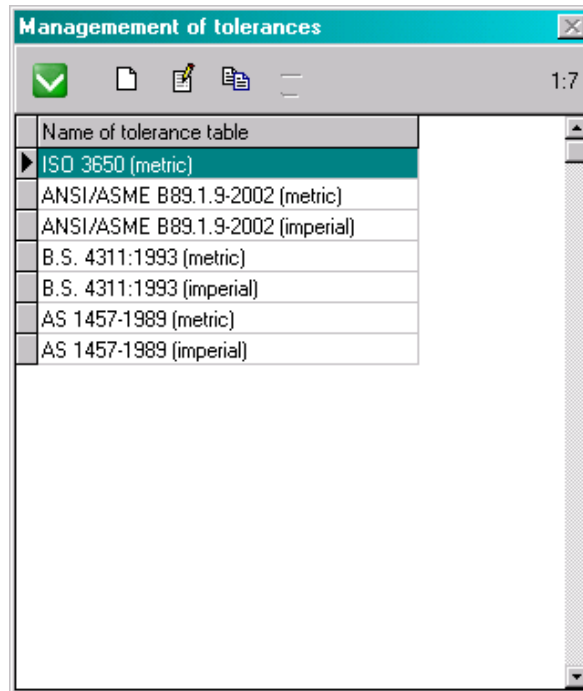


Figure: Pre-defined tolerance tables

A tolerance table consist of (at minimum one) different pages. Each page is describing the tolerances for the related “class of accuracy” - compare the functions of the “Create a new tol. class” Button while editing a tolerance table.

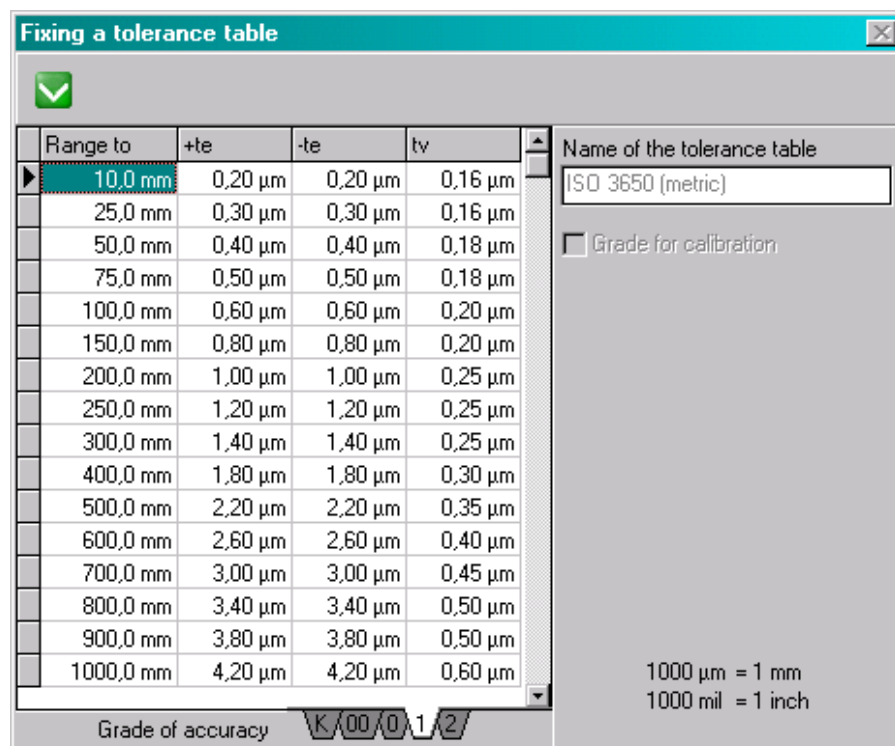


Figure: the ISO 3650 tolerance table

You can create a new tolerance table using the “Copy” Button and making the wished changes in this new table.

The tolerance values may be entered but you can also calculate this using the ISO 3650 formulas. To do this press the "Calculate tol. acc. to DIN" Button.

IX.2.3. Settings | Pattern of measuring points

Depended on the users evaluation strategy it is possible to define an optional number of "Measuring point patterns". This patterns define the order of the measuring points have to been touched while inspecting a gauge block.

Additionally, with the parameter "Repetition" you can define the number of repetitions should be done for the defined measuring points. This may be used to decrease the accuracy of your measuring result.

For each "Measuring point pattern" you should enter a significant name.

To add a new "Measuring point" to the list shown on the left side click on the related button in the fields "Position of measuring points". To delete a point use the "Delete.." Button.

IX.2.4. Settings | Reference gauge block sets

Here, you can define all reference gauge blocks and -sets you use to carry out a gauge block calibration. At first you have to define the nominal sizes of the gauge blocks existing in your set. Doing this you can use a pre-defined list with standard set compositions (sets produced from TESA, MAHR; MITUTOYO ...). In a second step you have to enter the know deviation of each reference gauge block.

The program gives you also the functionality to create a "Certificate" from this entered data.

IX.2.5. Settings | Predefined gauge block sets (nominal sizes)

Before inspecting a gauge block set, you have to enter all nominal sizes of the gauge blocks including in this set - see also section IX.4.1. To minimise the required work the program manage any pre-defined "Gauge block set compositions". This compositions are related to the offered standard sets of different producers like TESA, MAHR and MITUTOYO. Inserting a new gauge block set you can now select a pre-defined set and create all nominal sizes for your gauge block set automatically. You can also create new compositions of gauge block sets using the "Add" or "Copy" - functions.

IX.3. Certificate layout files

The program QM-BLOCK gives you the possibility to customise the layout of your record listing (Calibration certificate). The layout of the calibration certificate is based on the so called "Certificate layout file". This file contains all information about the form of the certificate and the values should appear in this. By editing this layout file you can change the layout. Saving this file with another file name give you the possibility to work with different layouts.

All certificate layout files you have created will be saved in the working directory of the EMP4W program. This files have the extension **".LW2"**.

Using the option "Inspection certificate" you can load the certificate layout file into the editor program. See "Appendix B" give you the instructions how to work with the editor program "EDITOR4W".

A certificate layout file is consisting of three different types of information:

- "normal" text: is text information just like in a known text processing application; you can change the text as you want and you can set the different text parameters;
- "Placeholders" ("Fields"): a "Field" is including a variable information about the gauge, the measuring process or the measuring environment. A "field" will be fulfilled with the actual information while executing the program. Editing a certificate layout file you can change "field" positions, delete "fields" (if you do not need the related information) and insert new "fields". To insert a new "field" in your certificate layout use the menu "Insert | Fields". Using this menu you can also see all available "Fields" and the related information.

IX.4. Manage (gauge blocks and gauge block sets)

Using the option "Manage" you get all functions for the management of gauge block and gauge block set data including the measuring history.

IX.4.1. Manage | Gauge blocks and -sets

To carry out the inspection of a gauge block or a gauge block set at first you should insert this in the program internal database. Additional to the function "Insert" a new gauge also the functions "Copy", "Edit" and "Delete" are available.

Starting the option "Manage" you get a screen window shows all gauges included in your database. Please note, that is not possible to change anything for a gauge being in inspection.

Insert a new gauge

The "Add"-Button will be used to insert a new gauge in the database. Please note, that you at first should select the wished "Gauge type" -single gauge block **or** gauge block set - before using the "Add"-Button.

Gauge block set

Details to the gauge block set

Gauge block set number: 08912

Designation: Master set 001

Customer name: Flintstone Company

Remark:

Tolerance table: Tolerances acc. to ISO 3650

Nominal grade of accuracy: 2

Parts: 87

Type of block: Gauge blocks

Gauge material: Steel

	Nominal size	Identity number	Remark	Status
▶	0.5000 mm			activ
	1.0000 mm			activ
	1.0010 mm			activ
	1.0020 mm			activ
	1.0030 mm			activ
	1.0040 mm			activ
	1.0050 mm			activ

Buttons: OK, Cancel, Gauge block set..., Add a gauge block, Delete the gauge block, Enter ID numbers, Gauge block is missing

After the selecting of the Unit you have to enter the following information (see figure):

Identity number

Enter the identity number of the gauge block set or the single block. In relation with the "Customer name" this identity number will be used for the clear identification of a gauge.

Designation	Enter a text for the further designation of the gauge.
Customer name	In connection with the identity number the customer name will be used for the identification of a gauge.
Remark	Used for any text to describe the inserted gauge.
Tolerance table	Using the "..."-Button on the right side of this field you can select the tolerance table should be used for the evaluation of the current gauge.
Class of accuracy	Related to the selected tolerance table you have to choose the nominal class of accuracy for the gauge.
Parts	The number of parts (gauge blocks) will be inserted automatically by the program. It is depended on the created list of gauge blocks.
Type of block.	In a gauge block set the single gauge blocks will be distinguished into "normal" gauge blocks and "protection gauge blocks". Using this switch you can select the wished type of the gauge blocks.
Material	Enter the gauge material each for the "normal" and the "protection" gauge blocks.
Gauge block set ...	Using this Button you get a pre-defined list of gauge block set compositions. Selecting one of this sets all nominal sizes of the included gauge blocks will be insert in your "Gauge block list" - see the lower part of the screen. Pay attention, that all gauge blocks already inserted in this list will be overwritten.
List of gauge blocks	The list with all gauge blocks included in your current set may be created manually or automatically using a pre-defined set. Additionally you can enter a identity number and/or a remark for each gauge block.
Gauge block is missing	If a gauge block, which should normally be included in the set, is missing, you can mark this gauge block using the "Gauge block is missing" button,
"Delete" and "Add" a gauge block	Using this buttons your can "Add" or "Delete" a gauge block from your list.

Please enter all values carefully. If the gauge block or the -set is already in inspection it is difficult to change faulty values.

Other management operations:

Edit a gauge

Using the "Edit" Button you can edit data of gauge blocks or gauge block sets are already in the database.

Attention: After finishing the first measurement for this gauge the most values are not be able to change!

Copy a gauge

The copy function may be used for a quick inserting of a new gauge. Pay attention that you insert a new identity number for this new gauge.

Delete a gauge

By clicking on the "**Delete**"-Button the marked gauge will be deleted out of your database. Before deleting the gauge a confirmation is necessary.

Attention: A deleted gauge can not made undeleted.

Search a gauge/Change the sort order

To search a gauge from your database use the "*Searching for..*" field and enter the wished value. Using the switch "Sort order" you can change between "Identity number" and "customer" for the entry should be searched.

IX.4.2. Manage | Inspections

The management of inspections includes only the possibility to delete one ore more inspections of a gauge - and all related data.

Attention: If a gauge is currently in inspection it is not possible to delete a inspection.

IX.5. Measurement



Doing a inspection with the program QM-BLOCK it is possible to define any gauge block or -sets should be inspected at the same time using the same reference gauge block set. To do this is very useful because you can minimise the required work - the necessary settings on your inspection instrument for a new reference gauge block size can be used for several gauge blocks with the same nominal size.

To give you the possibility to break the calibration at any time and continue it later, the menu "**Measurement**" include two different options: "**Start a new inspection**" and "**Continue an inspection**".

IX.5.1. Start a new inspection

Using this option you can start a new inspection for several gauge blocks and/or gauge block sets included in your database. Activating this option, at first the content of your database -single gauge blocks or sets - is shown on your screen. Select now the first gauge you want to inspect - mark it with a mouse click and press the "**OK**" - Button. In the following screen "Settings for measurement" you get now the list of all gauges being selected for the new measurement. Using the buttons "**Add..**" and "**Delete..**" you can now add more gauges to this list or delete a gauge out of this list.

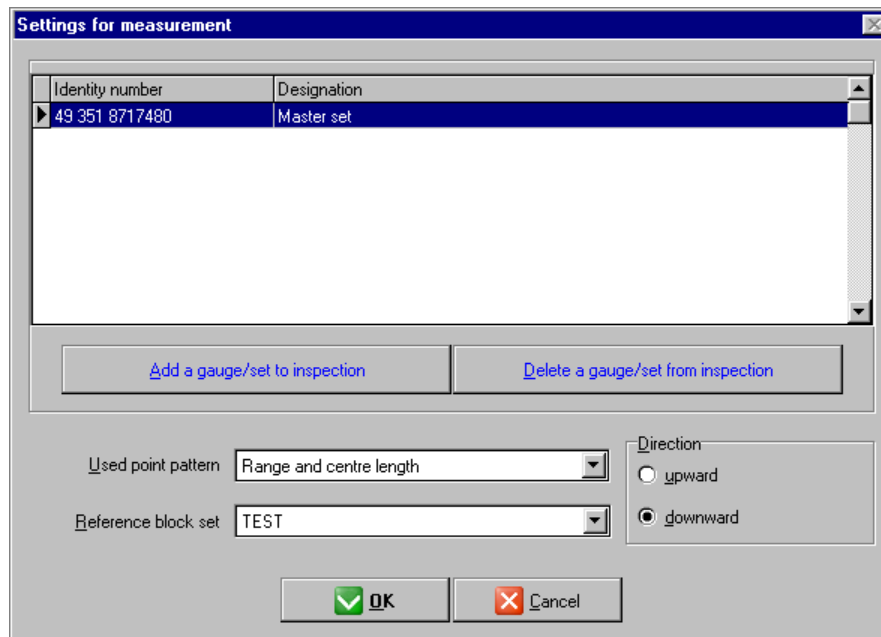


Figure: Start a new inspection

Before leaving this screen you should set the following parameters:

- **Used pattern** - select the measuring point pattern should be used for the inspection;
- **Reference set** - select the reference gauge set used for the inspection;
- **Direction** - select the wished direction (increasing or decreasing nominal sizes) for the set inspection.

Pressing "**OK**" to start the measurement.

Attention: If the used reference gauge set does not include all nominal sizes of the gauges you have selected, an error message will appear on the screen. The start of the measuring process will only be possible, if you have all required nominal sizes in your reference set.

IX.5.2. Continue an inspection

If an inspection was not finished, you can continue it using this program option. The operation steps are the same as described before, but you can only select gauges where a inspection was started.

Press the "**OK**"-Button to continue the inspection.

IX.5.3. Carry out a gauge block inspection

Doing a inspection of gauge block you have to do always the following operations:

- Select -from the shown list- the gauge block should be inspected now; this selection will be done automatically depended on the used "Direction" with decreasing or increasing nominal sizes but you can choose another gauge block at any time;
- Doing the "Inspection" of the gauge block press the "Inspection" button **or** mark the block with the "Replace" - Button (a replaced block will be inspected at once) **or** mark it as a "Missing block";
- taking over the required measuring values for the current gauge block - depended on the active program settings, enter a remark if necessary and continue the inspection with the next gauge block.

Touching on	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8
1. Repeat:	0,0010	0,0009	0,0008	0,0009	0,0010	0,0011	0,0010	0,0010
2. Repeat:	0,0011	0,0010						
Average	0,00105	0,00095						




Figure: Inspection of a gauge block

Doing the measurement always the measuring position which you should touch is shown on the screen (see figure). If the measurement of the selected block is finished the calculated parameters of this gauge block are shown. Now you can go back to the gauge block list or continue with the next gauge block.

Using the keyboard to enter the measuring values, the measures will be inserted directly in the shown table. If you use an **On-line**- connection to your inspection instrument, please refer to **Appendix C** of this manual - including the operation instructions for the different interface instruments.

The position of the next measuring point have to been touched will always shown on your screen. If you have taken over a faulty measure, click with the mouse to the related position in the table and repeat the measurement of this point.

If the measurement of your gauge block set is finished (or if you want to break the measurement) than you get the screen shown in the next figure.

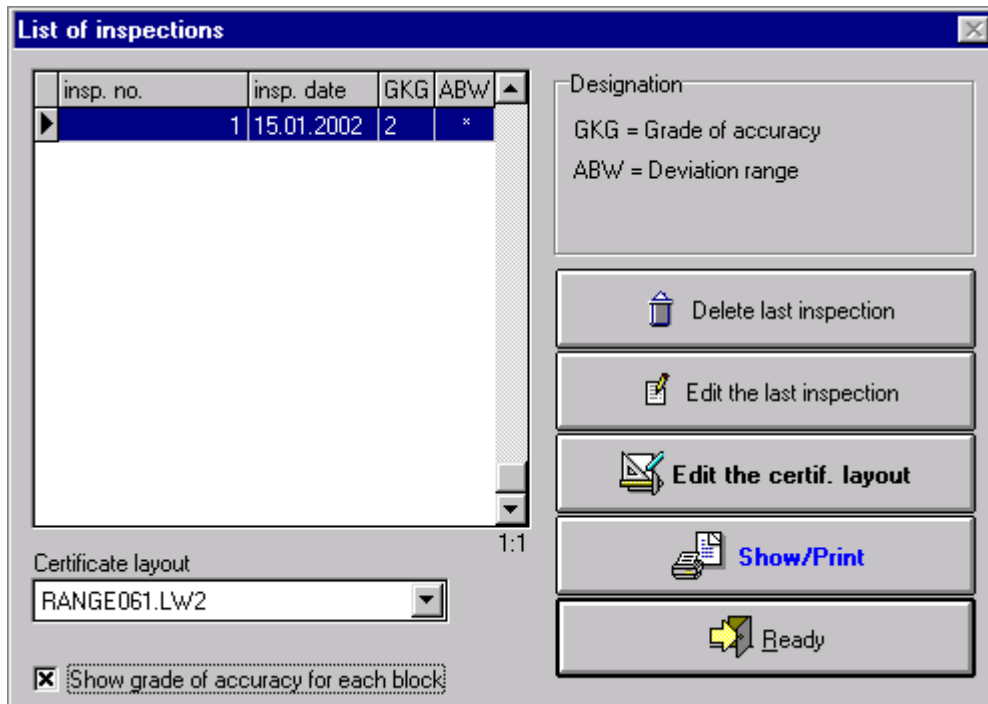
Information about the inspection	
Details about the gauge block set	Grade of accuracy
Identity number: 00	
Details about the inspection	
Number of calibration certificate	
2002-01-33	Parts: 7
Operator	missing: 0
Smith	not inspected: 7
Inspection date	inspected: 0
15.01.2002	out of tolerance: 0
	Actual grade of accuracy
	K
	Nominal grade of accuracy
	2
<div> Cancel</div> <div> Save all values</div> <div> End the inspection</div>	

Here you can enter a number for the calibration certificate. Finish the inspection procedure with the related button.

IX.6. Calibration certificate| Show/Print

The output of the results and the creation of a "Calibration certificate" will be done with the option "**Inspection certificate|Show/Print**". At first you should select the wished gauge block set out of your database.

Now the screen shown in the next figure appears:



Here you will get a list of all inspections which was done with the selected gauge block set or single gauge block. Select the wished inspection, normally the last one .

Before activating the "**Show/Print**" - Button to create the certificate and start the EDITOR-program you should check the selected certificate layout file.

All functions for the editing and the output of the record listing will be controlled by the EDITOR - program. See Appendix B - describing the handling of this program.

Attention: To continue the program QM-BLOCK in a correct way, please leave the EDITOR program exclusively with the green "**Continue**" - Button.

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Appendix A

General Terms and Conditions for Sale and Delivery of Software Products of L & W GmbH

A.1. General Information

A.1.1. These "General Terms and Conditions" are valid for any delivery of software by L & W GmbH (the vendor).

A.1.2. The vendor will deliver only on the basis of these "General Terms and Conditions". Other terms and conditions, especially those defined by the purchasing conditions of the buyer, will not become part of the contract even if such conditions are not explicitly rejected by the vendor.

A.2. Right of Use

A.2.1. The buyer is entitled to use the software for an unlimited period of time. He has no exclusive right to use the software.

A.2.2. The right to use the software is limited in the same way the use of a book is limited: The software is allowed to be passed on to another person to be used in different places and on different machines of the same type running the same operating system. Just as it is impossible for a book to be read at the same time in different places by different people, the software may not be used by different people in different places on different machines.

A.2.3. The buyer is not entitled to make copies of the software - except for backup purposes. It is not allowed to make copies of the documentation.

A.2.4. If the buyer acts as a reseller of the software, he is entitled to transfer to a third party his non-exclusive right to use the copies of the software delivered to him. At the same time he forfeits his right of use. Only the right of use, not the right to transfer the right of use, may be sold to the enduser.

A.2.5. Complete payment is the prerequisite for the right of use. The delivered software remains the property of the vendor until all open bills between buyer and vendor have been settled.

A.3. Prices and Terms of Payment

A.3.1. Without special agreement our prices are not quoted ex point of sale, packing not included.

A.3.2. Full payment is due immediately upon receipt of the goods. The vendor reserves the right to deliver only against cash on delivery or cash in advance.

A.4. Warranty and Liability

A.4.1. The vendor only accepts liability for defects which significantly affect capabilities of the software as stipulated in the contract. Excepted from any kind of warranty are defects caused by improper installation, use, and operation or by repairs and changes not explicitly authorized by the vendor.

A.4.2. The vendor will correct significant software errors (according to point 4.1.) either by installing an improved version of the software or by informing the buyer of a workaround. The correction will be provided in a timely manner and the method of correction will be chosen by the vendor.. The buyer does not have the right to request a change of the contract or a reduction of the price.

A.4.3. The vendor does not guarantee the uninterrupted or error free operation of the software. The vendor does not guarantee that every combination of functions a customer might chose will work. The suitability of the software for any particular purpose is not guaranteed by the vendor.

A.4.4. Any liability for direct and indirect damages, for consequential damage, or for damages suffered by third parties is excluded if legally permissible. Liability in the case of severe negligence,

whether accidental or intentional, remains unaffected. In any case, however, liability is limited to the purchasing price of the software.

A.4.5. The warranty is limited to 6 month from the time of shipment or pick-up of the software. This is the limitation period for all warranty claims including the ones named in point 4.4.

A.5. Place of Performance and Place of Jurisdiction

A.5.1. Place of performance is the location of the vendor's head office.

A.5.2. The exclusive place of jurisdiction for any present or future dispute stemming from any business relationship with the vendor is the location of the vendor's head office.

A.5.3. The above place of jurisdiction applies if the buyer has no general place of jurisdiction in the Federal Republic of Germany, if the buyer moves his place of residence out of Germany after signing the contract, or if the buyer's place of residence is unknown at the time of the institution of legal proceedings.

L&W GmbH, January 2003

Appendix B

EDITOR4W - editing of certificates and certificate layout files

B.1. General

The EDITOR4W program is designed to get the functionality to show, edit, save and print record listings for all QMSOFT inspection programs.

Normally you do not use the EDITOR-program as a stand alone system. The EDITOR will be start up automatically by one of the inspection programs if you want to perform one of the above-mentioned actions.

Working with the EDITOR-program there are two different modes. The first mode is the so called „**certificate layout mode**“. This mode will be used to edit „certificate layout files“ (templates) including the definition for the calibration certificate layout.

On the other hand the „**calibration certificate mode**“ will be used to edit, show or print the certificates created for a gauge inspection.

B.2. Working with the program

The operation of the program is similar to some other well known editor programs used with MS-Windows (e.g. Notepad, Write). There are different possibilities to set text parameters (font types, font sizes and parameters).

The most important editor options are:

Option "File"

Using the option „File“ you can „Open“, „Save“ and „Print“ record listings. This function will only be used if you want to start this program seperately.

Option "Edit"

Here you get all functions to edit an existing text - normally a record listing. It includes common functions like „Delete“, „Insert“, „Copy“ of text. This command works in relation to marked text sections. For this you can also see to the „MS-WINDOWS“ documentation. Also you have a function to set „Tab-stop“ positions.

Option "Search"

This functions can be used to „Search..“ and „Search and replace..“ text.

Option "Insert"

Here you can insert some things in your record listings. Available options are „FormFeed“ to insert a compulsory form feed in your record and „Graphic“ to insert a Bitmap-graphic (*.BMP) in the record listing.

Option "View"

Using this option you can show different things on your page - margins, ruler and other.

B.3. Special things using the „certificate layout mode“

This mode will be used to create and edit the so called „certificate layout file(s)“. Such a „certificate layout file“ (template) does exist for each inspection program and includes the definition for the calibration certificate layout.

Note: After the program installation you can find a lot of such files (extension *.lw2) on your hard disk. The reason is, that this files was created for the different available languages. The file names include the Windows country code to recognize the files you need (e.g. for english language a „061“ is inside the file name). If you change anything in a certificate layout file please save this with a new name. So you make sure that your changes will not overwritten if you install an update of the software.

Different to the normal mode for the editing of the certificate listings itself you have two additional things to edit. You can show this using the option „View“.

View|Place holders

The first are so called „Place holders“. This „Place holders“ will be used to insert actual values in the record listing while creating this. Each „Place holder“ consist of a special sign to describe the type (e.g. \$xxxx\$ describe a set of characters; #xxx# for a number; additional a „\$“ means a table) and the name. You can insert a place holder on each place in the record model file. To do this you can open the list of place holders and make a double click on the wished place holder. This place holder will now inserted on the current position of the cursor in your record model file.

View|Line conditions

The second thing are „line conditions“. With such a „line condition“ you can define a condition for the output of the related line. This means the line where you insert this „line condition“ on the left margin will only be shown/print if this condition will be fulfilled. For example: values for a GO side of a gauge will only be shown or print if the inspected gauge have a GO side.

Using the option „View|Line conditions“ you get a list with all currently available „Line conditions“. To insert such a line condition in your record model file make a double click on the wished entry.

B.4. Special things using the „certificate mode“ - standard mode

In the standard mode used to show, print and edit a record listing you get no line on conditions on the left margin. The text includes only lines which are in agreement wit the defined line conditions and the place holder are changed to the current values generated by the inspection program. The shown record listing may be edit in a optional way. To print it the common WINDOWS settings are used. With the option „File/Printer setup“ you may check and change the printer settings.

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Appendix C

Indication programs
(RS232DRV, IK102021, GPIBDRV, PU204041, SIPDRV, WINDHI)

C.1. General

The connection between the length measuring machine and the computer can be made by different types of interfaces. The type of the interface to be used depends on the used hardware.

To design machine independent programs we have unite all functions for the taking over off measuring data and the management of different tools (measuring pins, measuring balls, master rings and reference gauge blocks) in a QMSOFT indication program. For each type of interface one special QMSOFT does exist.

All of this programs include the following main functions:

- indication of the machines „X-axis“ and additional of an „Y-axis“;
- support for External- and Internal measurement; both as directly or differential measurement;
- change of indicated sign; set and pre-set of values; Bar-graph modus; searching of Maximum and Minimum values while measurement;
- correction of rule errors (optional);

Some functions are different depended from the used interface type. See the next pages for this. Note the relations between the QMSOFT indication programs and the supported interface types:

RS232DRV several serial interfaces (Heidenhain ND 281 and compatible; HELIOS Unitron; Mahr Millitron und Memux; STEINMEYER Feinmess Suhl; Kroepelin, SIP Karte Systeme, SYLVAC (D80, D100, Optoface), CARY; TESA Modul, MitutoyoDMX interfaces)

IK102021 and

IK220 PC interface card IK121 and IK 220 (Dr.-Johannes-Heidenhain)

PU224041 display devices PU22, PU40 and PU41 (STEINMEYER Feinmess Suhl GmbH) for use with the gauge block inspection program EMP4W

GPIBDRV GPIB (IEEE)-Interfaces
(e.g. CARYLABOR to connected to CARY gauge block inspection device)

SIPDRV SIP length measuring machine with LMC display program (Windows version) (see also the SIP user manual for the LMC program)

WINDHI TRIMOS LabConcept machines
(see the TRIMOS user manual for the WINDHI program)

WINCIM Interface for Mahr 828 CIM Machines

Please contact us to ask for other interface types can be supported from QMSOFT display programs.



C.2. Indication program IK102021 / IK121NT / IK220DRV

The indication programs IK102021 / IK121NT and IK220DRV as a part of the QMSOFT installation is realising the reading and displaying of measures from a PC counter card IK121 or IK220 of the Dr.-Johannes-Heidenhain company, to which a length measuring device is connected. The program supports the following features:

- display of measure coordinate "X" and an additional coordinate "Y" (height display)
- support of different measuring strategies (external, internal, absolute, differential measurements)
- different display and measuring settings (display value, change sign, pre-set, bar graph display, maximum, minimum value etc.)
- rule deviation correction, temperature compensation (with the ALMEMO measuring device)

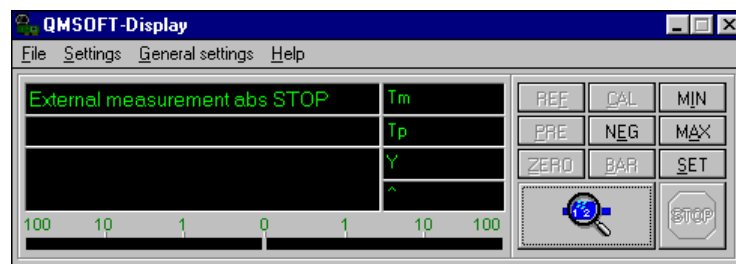
The design of the program surface is similar an indication device. This guarantees an easy and intuitive use.

C.2.1. General settings

Before working with the indication program you should set some general parameters. For this open the dialogue „General settings“ and enter the parameters to the registers „General“ and „measuring system“. See also the producer manual for the measuring device.

C.2.2. Operation field-functions

The program window contains a display area to show the measures and some Buttons to activate special functions:



NEG-Button

Here you can change the sign of the measuring value.

KAL-Button

With this button you can start a reading of the temperature and length measures of the setting normal for differential measurements (works only with enabled temperature compensation). The display value will be set to the value of the setting normal.

REF-Button

This button starts the reference mark reading. You have to move the machine to reference point position (see manual of the machine).

BAR-Button

This button resets the bar graph position to the display value.

MIN-Button

This button switches to the measure minimum search.

MAX-Button

This button switches to the measure maximum search.

NULL-Button

This button sets the display value to Zero.

SET-Button

Here you can set the used measuring method (extern, intern), select the used references, thread wires etc.

PRE-Button

Here you can switch to an additional preset value calculation: generally the preset value will be added to the display value as a constant.

START-Button

Starts the indication of measuring value or take over the indicated value if the indication is already active.

STOP-Button

Stops the indication. Now you can make different settings which are not possible whether the indication is active.

C.2.3. SET-Function

Using the „SET“ - button you get the functions to change different program settings and to select references and/or probes used for the measurement.

If „click on“ the „SET“-Button the indication will be stopped and you get the screen shown in the figure.

The following parameter fields are available:

Measuring method

Choose here the used measuring method.

Thread measuring

Making a thread measurement you should cross this field to activate the required functions.

Calling the indication program from the QM-THREAD thread measuring program this will be activated automatically.

Master for external meas.

If you make a „External measurement - differential“ you can here enter or choose the value of the used reference.

Master for internal meas.

If you make a „Internal measurement - differential“ you can here enter or choose the value of the used reference.

Probe (ball diameter, constant)

Making a „Internal measurement - directly“ you need a special probe for this. You can use either a „T-shaped“ ball probe or a „Single ball probe“. If the field „T-shaped ball probes“ is crossed such type of probe will be used. You can select from the related table the ball diameter and the probe constant. For a single ball probe the probe constant is not used. (see Appendix E probe management).

Thread wires

Making a „External measurement - Thread measurement“ select the used wires. Using the „SIP“ or „ZEISS“ button you get pre-defined tables with thread wires.

Measuring ball

Making a „Internal measurement - Thread measurement“ select the used balls.

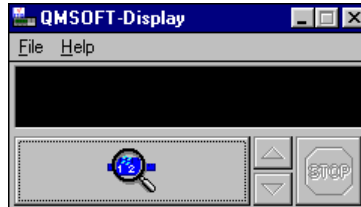
Use the „Probes/Wires“ button to call the probe management program.

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C.3. Indication program PU204041



The indication program „**PU204041**“ is realising the connection between the computer which run the QMSOFT-system and one of the following indication devices: **PU22**, **PU40** and **PU41** produced by the STEINMEYER Feinmess Suhl GmbH. This indication devices are mostly used with the **QM-BLOCK (EMP4W) program** which is designed for the gauge block inspection.



The design of the program surface is similar an indication device. This guarantees an easy and intuitive use.

C.3.1. General settings

Before working with the indication program you should set some general parameters. For this open the dialogue „*File/General settings*“ and enter the wished parameters to the registers „*General*“ and „*serial connection*“.

See also the producer manual for the indication device.

C.3.2. Operation field-functions

In the program window you get four Buttons to activate the following functions:

Cursor-Buttons (up, down)

Using this Buttons you can decrease or increase the resolution of the measuring value shown on your indication device. This function is especially useful while making the set up of the measuring instrument for a new nominal size.

START-Button

Starts the indication of a measuring value or take over the indicated value if the indication is already active. To do this, the indication device **PUxx** will be switched to the „**Remote**“-Mode (on the indication device the „REM“ display will be switched on).

STOP-Button

Stops the indication. Now you can make different settings which are not possible whether the indication is active.

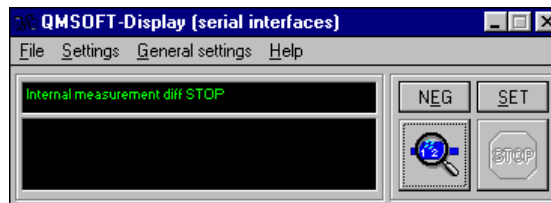
The indication device **PUxx** will be switched back to the „**Normal**“-Mode.

C.4. Indication program GPIBDRV for IEEE interfaces



Indication program for serial interfaces RS232DRV

The indication programs "GPIBDRV" and „RS232DRV“ are releasing the connection between a optional type of a measuring machine which have an GPIB- or a serial RS232-interface and the computer which run the QMSOFT-system.



The design of the program surface is similar an indication device. This guarantees an easy and intuitive use.

C.4.1. General settings

Before working with the indication program you should set some general parameters. For this open the dialogue „General settings“ and enter the wished parameters to the registers „General“ and „serial connection“. (See also „**Appendix D**“ for the required parameter or use the machines manual.

C.4.2. Operation field-functions

In the program window you get four Buttons to activate this functions:

NEG-Button

Here you can change the sign of the measuring value.

SET-Button

Here you can set the used measuring method (extern, intern), select the used references, thread wires etc.

START-Button

Starts the indication of measuring value or take over the indicated value if the indication is already active.

STOP-Button

Stops the indication. Now you can make different settings which are not possible whether the indication is active.

C.4.3. SET-Function

Using the „SET“ - button you get the functions to change different program settings and to select references and/or probes used for the measurement.

If „click on“ the „SET“-Button the indication will be stopped and you get the screen shown in the figure.

The following parameter fields are available:

Measuring method

Choose here the used measuring method.

Thread measuring

Making a thread measurement you should cross this field to activate the required functions.

Calling the indication program from the QM-THREAD thread measuring program this will be activated automatically.

Master for external meas.

If you make a „External measurement - differential“ you can here enter or choose the value of the used reference.

Master for internal meas.

If you make a „Internal measurement - differential“ you can here enter or choose the value of the used reference.

Probe (ball diameter, constant)

Making a „Internal measurement - directly“ you need a special probe for this. You can use either a „T-shaped“ ball probe or a „Single ball probe“. If the field „T-shaped ball probes“ is crossed such type of probe will be used. You can select from the related table the ball diameter and the probe constant. For a single ball probe the probe constant is not used. (see Appendix E probe management).

Thread wires

Making a „External measurement - Thread measurement“ select the used wires. Using the „SIP“ or „ZEISS“ button you get pre-defined tables with thread wires.

Measuring ball

Making a „Internal measurement - Thread measurement“ select the used balls.

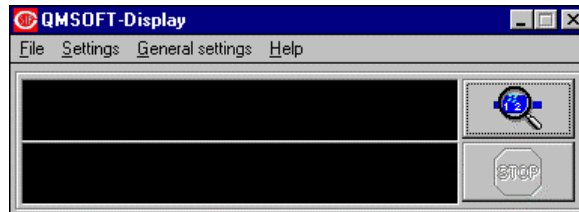
Use the „Probes/Wires“ button to call the probe management program.

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C.5. Indication program SIPDRV for SIP machines with SIP-LMC



The indication program „**SIPDRV**“ is realising the connection between the SIP-LMC program and the QMSOFT-system.



The design of the program surface is similar an indication device. This guarantees an easy and intuitive use.

C.5.1. General settings

Before working with the indication program you should set some general parameters. Important is the parameter „SIP data file“ which is set the parameter for the RAM-Drive is currently used to take over the measures from the SIP-LMC program.

C.5.2. Taking values

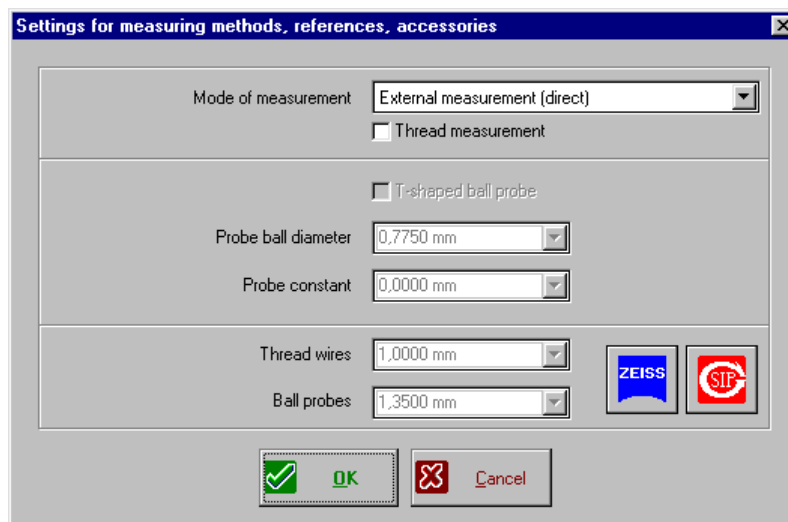
START-Button

Starts the indication of measuring value or take over the indicated value if the indication is already active.

STOP-Button

Stops the indication. Now you can make different settings which are not possible whether the indication is active.

C.5.3. Menu „Settings“



Use the menu „Settings“ you get the functions to change different program settings and to select references and/or probes used for the measurement.

NOTE: If the indication program will started up from an QMSOFT inspection program in the most cases the required parameters will be set automatically.

The following parameter fields are available:

Measuring method	Choose here the used measuring method.
Thread measuring	Making a thread measurement you should cross this field to activate the required functions. Calling the indication program from the QM-THREAD thread measuring program this will be activated automatically.
Probe (ball diameter, constant)	Making a „Internal measurement - directly“ you need a special probe for this. You can use either a „T-shaped“ ball probe or a „Single ball probe“. If the field „T-shaped ball probes“ is crossed such type of probe will be used. You can select from the related table the ball diameter and the probe constant. For a single ball probe the probe constant is not used. (see Appendix E probe management).
Thread wires	Making a „External measurement - Thread measurement“ select the used wires. Using the „SIP“ or „ZEISS“ button you get pre-defined tables with thread wires.
Ball probes	Making a „Internal measurement - Thread measurement“ select the used balls.

Use the „**Probes/Wires**“ button to call the probe management program.

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Appendix D

Connecting the Measuring machine to the Computer On-line

D.1. General Information

The connection between the measuring machine being used and the computer is always done through a serial interface of the PC and the interface of the measuring machine. Make sure you read the documentation about the machine interface before connecting the computer (for example: position of DIP switches on the Interface device).

The following devices are always supported:

- **SIP** - length measuring machine with interface card "SYSTEME" 254186 and SIP 550M
- **HELIOS** - length measuring machine with Interface HELIOS-Unitron or with Heidenhain interface card IK 120/121
- **Universal Length Measuring** machine ULM 01-600 C (**ZEISS** Jena) with Interface Heidenhain VRZ 480, Heidenhain PC counter card IK 121, Indicating Unit AE 101 with Woineck-Interface
- **MAHR** measuring machine 828a via MEMUX-interface or Mahr PC interface card
- **TRIMOS** length measuring machine with SYLVAC or Heidenhain - interface
- Universal Gage Inspection Machine UMP and length measurement machine KLM 60.01 (**Steinmeyer** Feinmess Suhl)
- Dial gauge inspection system MPG 30 - **Kroeplin** GmbH

Below you will find the inspection program with the following parameters:

Interfacetyp	Baud-Rate	Datenbits	Stopbits	Parity
AE 101 (+ Woineck Interface)	4800	8	1	NONE
STEINMEYER Feinmess Suhl	9600	7	1	ODD
Heidenhain ND 281 / VRZ 480 / TRIMOS TELMA	4800	7	2	EVEN
Kroeplin Systembus I	300	8	2	NONE
Helios Unitron 2CHA	4800	7	1	EVEN
Helios Unitron	4800	8	1	NONE
CARYLABOR	9600	8	1	NONE
SIP control box	2400	8	2	SPACE

These parameter are in the program before (!) the first on-line taking over of measuring values takes place. To do this start the indication program for the serial interface and use the program option "**General settings|Serial connection**" to set this parameter.

If a connection for you measuring machine is not listed here please contact us and L&W for further information about connections in our software. We have tried to incorporate into the software a maximum of connection possibilities in order to accommodate for just about any kind of measuring machine and would be happy to help you with any difficulties you might have in this process.

D.2. Special features of some interfaces

D.2.1. Measurement machine with Measurement value indicator VRZ 480 or ND 281(Heidenhain)

Due to the varying designs of the V.24 connection on the measurement value indicator, a modified connection cable will need to be used. This must have on the computer side a 25-pin Cannon socket and on the side of the Measurement value indicator a 25-pin Cannon plug. The following diagram shows the design of this cable.

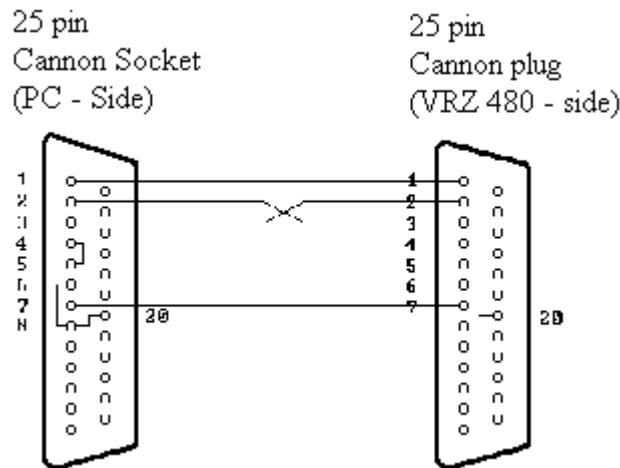


Fig. D-1: cable connection for the VRZ 480 indicator

When installing the indicator two device parameter should be entered, P0 and P6. Check the the documentation of the VRZ 480. The perimeter **P0** should be inserted into the **value 0**. The perimeter **P6** sets the Baud rate: Here the **value 2** should be entered. If required, a lower Baud rate can be chosen. Make sure that the Baud rate registert on the VRZ 480 indicator is the same as entered in the measurement program.

D.2.2. Measurement machine with AE 100 Measurement value indicator and a Woineck Interface Converter

In order to ensure a proper function of the on-line connection a minor modification of 25 pin Cannon socket is necessary. Cable bridges need to be inserted between the pins 6 and 8 as well as between 6 and 20 (see diagram B-2 below).

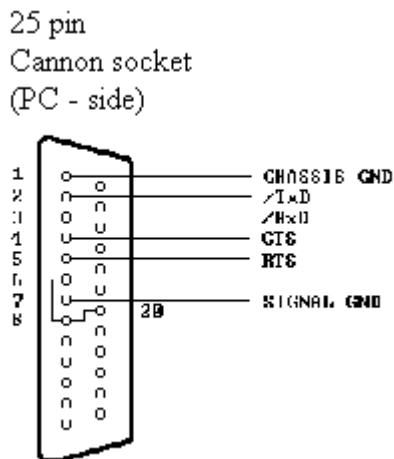


Fig. D-2: modified Cannon socket

D.2.3. MPG 30 Dial gauge inspection device with Kroeplin-Sytsebus I

The Dial gauge inspection device is to be connected using the manufacturers connection cable "KSB-PC V.24 (DB 25-socket)" (Order number 2482/75). Make sure you read the label attached to the connection cable. Those in the connection cable integrated DIP-switches are like the following to be inserted:

Terminal (KSB)	1 bis 10 OFF
Computer (PC)	1 OFF
	2 ON
	3 ON
	4 OFF
	5 OFF
	6 OFF
	7 ON
	8 OFF
	9 ON
	10 ON

D.2.4. Measurement machines with a SIP control box

In Order to connect a SIP control box to an IBM compatible PC, a SIP card "SYSTEME 254186" is necessary. The following switch positions will need to be set up this card:

SW2-1: ON	SW3-1: ON
SW2-2: OFF	SW3-2: OFF
SW2-3: OFF	SW3-3: ON
SW2-4: OFF	SW3-4: OFF
SW4-8: OFF	SW3-5: OFF
	SW3-6: ON
	SW3-7: ON
	SW3-8: OFF

Transferring the measurement values to the computer is done by pressing the "PRINT"-key on the control box.

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