

Appendix C :

Measuring device driver module QMSOFT®/QM-BASIC

The Option **QMSOFT®/QM-BASIC** was designed to „computerize“ older and to support actual types of length measuring machines to extend the usability of the measuring hardware. **QMSOFT®/QM-BASIC** supports the reading and displaying of measures from a PC counter card IK220 of the Dr.-Johannes-Heidenhain company (www.heidenhain.de), to which the length measuring device is connected. It has 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 **QMSOFT®/QM-BASIC** user interface is similar to an classic indication device. This guarantees an easy and intuitive use. The **QMSOFT®/QM-BASIC** software option uses a DDE (Dynamic Data Exchange) interface to communicate with other **QMSOFT®** compatible software options and/or with other MS-Windows programs as MS-Word, MS-Excel, Notepad.exe etc. This modules itself are not included into **QMSOFT®/QM-BASIC**.

Please note: The QMSOFT®-CD-ROM contains different other QMSOFT® software modules, which you can evaluate together with QMSOFT®-QM-BASIC in a demonstration mode.

The following components are used with **QMSOFT®/QM-BASIC**:

- Counter card Heidenhain IK 220 (PCI-slot), incl. manual and driver software,
- optional: adaptor cable to connect the output of the incremental measuring system of the measuring device to one of the both input channels of the IK 220,
- optional: for inductive probe support a Millitron display unit with serial output and serial cable (not all machines) is needed, alternatively a G4.5 interface PCI-card with adapter cable
- the software **QMSOFT®/QM-BASIC** (on CD-ROM, program IK220DRV.EXE), incl. manual

This manual contains the following main chapters:

- In chapter C.1 you find a description of the steps to install and setup **QMSOFT®/QM-BASIC**. Please read this chapter to avoid typically start-up problems and errors.
- In chapter C.2 you find a description of the handling of the **QMSOFT®/QM-BASIC** software.

Please note: Because of the very high speed of the development of the computer hard- and software there may be differences between this manual and the installed software !

C.1. Installation and setup of QMSOFT®/QM-BASIC

The following steps you have to do:

- installation of the Heidenhain counter card IK 220 into the computer,
- optional: installation of the G4.5 card into the computer,
- installation of the Heidenhain device driver of the IK 220 into the operating system of the computer,
- optional: installation of the G4.5 device driver into the operating system of the computer,
- Installation of the cable(s) to connect the measuring device to the Heidenhain counter card, to the Millitron and to the G4.5 (if such devices are used),
- Installation of the **QMSOFT®/QM-BASIC** software.

Be sure to execute all steps correctly, otherwise the **QMSOFT®/QM-BASIC** program does possibly not working as expected !

C.1.1. Installation of the interface cards (IK 220 and G4.5)

At first read the manual of the Heidenhain counter card IK 220, which will be delivered together with the card. You will find there all technical parameters, the functionality, the connector's layout etc.

If you want to use the inductive probe support with the G4.5-card, please note the manual of this card, which was delivered by the manufacturer of this card.

The counter card IK 220 and also the G4.5 card is designed for PCI-compatible extension slots of the computer, and it should be installed as every extension card of MS-Windows-compatible computers:

- disconnect the computer from the power supply,
- open the computers case, look for a free PCI-slot for each card,
- plug the cards into the slots, fix them as the other cards are fixed,
- close the computer case, reconnect the computer to the power supply.
- after switching on the power supply the computer should boot normally. If the operating system is starting, it depends of the MS-Windows version, if the system can recognize the new hardware. In both cases you have to continue as described in the following chapter.

C.1.2. Installation of the Heidenhain device driver for the IK 220

Before using the Heidenhain counter card IK 220 there has to be installed the device driver, which allows applications (in this case the application „QMSOFT®-BASIC“) to access the capabilities of the card. The device driver is being delivered together with the card itself (usually at three 3.5“disc's).



You have to be logged in into the operating system as a „local administrator“! Otherwise the Windows system will not allow you to install the driver!



If the driver disks are lost, you can find the installation kit also on the website of the Heidenhain company (see link „www.heidenhain.de“) and also at the QMSOFT®-CD-ROM in the folder „\Additional\Heidenhain“ !

If your computer is using an actual MS-Windows operating system (Windows 2000, Windows XP), the „Hardware assistant“ will recognize the card.

You are invoked to select the type and the driver of the new hardware. Select as first „**Show all devices**“. Proceed with a click on „Continue >“. Insert the Heidenhain-CD-ROM into the CD-ROM-drive and click onto the button „**Browse**“.

Please select your CD-ROM-drive, continue with „**OK**“. Now the driver installation should run automatically. Close the installation assistant with „**Finish**“.

On the Heidenhain CD-ROM you can find a test program (an executable to check the correct work of the card and the driver). It also runs if there is no measuring device is connected to the card, so you can check, if the driver is installed correctly and the bothn measuring channels of the card are accessible.

C.1.3. Installation of the driver of the G4.5-card

Also this interface card need the installation of a hardware device driver into the operating system. This driver is delivered on a separate CD-ROM (together with the interface card itself and an adaptor cable for the inductive probe). The installation procedure is analog to the previous chapter, but you have to use the G4.5-CD-ROM of course. If this CD-ROM is not available, you can find the driver on the QMSOFT®-CD-ROM in the folder „Additional\ProdaSafe“.

C.1.4. Install the cable connections

To evaluate the measures in QMSOFT® you have to connect

- the incremental measuring system if your device with the help of the adapter cable to one of the both input channels (X1 or X2) of the Heidenhain counter card IK 220 and
- the serial interface of the inductive probe display unit to a free serial port of the computer (if the inductive probe support via Millitron display should be used),
- the inductive probe to the Millitron device or to the G4.5-card, if you want to use the inductive probe support,

After connecting the incremental system to the counter card the Heidenhain test program should count, and you should see measure changes, if you move the machine.

The communication between the computer and the Millitron-device can be checked with the help of the Windows-built-in terminal program „HyperTerminal“. Normally you can find it under „Start | Programs | Accessory | Communication | Hyperterminal“.

To check it please create direct connection via „COM1:“ or „COM2:“ (depending from the port, to which the Millitron is connected), set the communication parameters (baudrate, number of data bit, stop bit, parity) to the same values, which are setted up inside of the Millitron-device. After this please activate the connection and type the uppercase character „i“ into the main window, press the ENTER-key to send. Now the Millitron-device should send a response string.

If you cannot receive something, one of the following reasons may disturb the communication:

- the settings of the serial communication of the Millitron-device doesn't fit the this settings of the HyperTerminal program,
- the serial port in HyperTerminal is not the serial port, to which the Millitron-device is connected,
- the serial cable is not a nullmodem-cable,
- the cable ist damaged,
- the serial port is damaged,
- the setup of the Millitron-device does not allow to send measures to the serial output,
- the Millitron-device is damaged,
- an other software is locking the serial port.

Please note, that only a valid and ready-to-use communication between Millitron and computer (or between G4.5-card and computer) can support the Mahr length measuring machines with inductive probes by **QMSOFT®**!

C.1.5. Installation and start of QMSOFT®/QM-BASIC

To install QMSOFT®/QM-BASIC please insert the QMSOFT®-CD-ROM into the CD-ROM-drive. If the „auto start“ feature doesn't work please click onto „StartQmsoftCD.exe“ inside of the root folder of the CD-ROM. Please follow the installation instructions:

Please select the destination directory „C:\Program files\QMSOFT32“ (default) and then one of the items „QMSOFT® Desktop installation“, „QMSOFT® Client installation“ or „QMSOFT®-Option QM-BASIC“ (in all cases some additional software modules will be installed, which are needed for QMSOFT®-QM-BASIC):

- the QMSOFT®-QM-BASIC measure display program (IK220DRV),
- the probe utility program,
- a demonstration program to test the communication between QMSOFT®-QM-BASIC and other QMSOFT® programs.

Follow the rest of the installation dialog, use all default values.

After this start **QMSOFT®/QM-BASIC** by clicking onto „Start | Programs | Qmsoft32“ the program „QMSOFT®/GaugeMan“. There you can find in the group „Measuring devices“ the icon



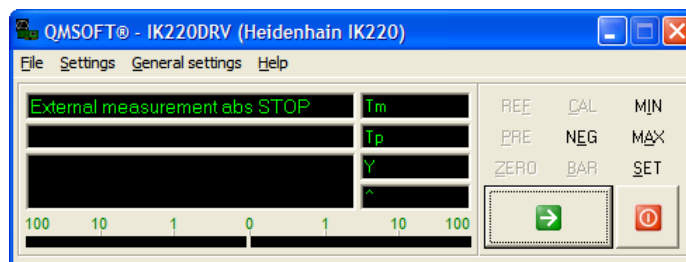
which does represent the link to the **QMSOFT®/QM-BASIC** display program. For a direct access to this program you can create a link on the desktop to the file “C:\Program files\Qmsoft32\Bin\Ik220drv.exe”

C.2. Normal use of the measure display program IK220DRV

The **QMSOFT®** measure display program IK220DRV.EXE offers the following features:

- the display of an "Y" - coordinate (for the actual position of the table of the machine) additionally to the main axis coordinate "X" (if the measuring system of the table position is compatible with Heidenhain probes and is connected to the second channel of the IK220 interface card),
- support of internal and external measurements as direct or difference measurements for different measurement tasks,
- set-features for the display values, change the signs, support to find reversal points (maximum, minimum), use of preset-values, bar graph for visualisation of the reversal point,
- scale error correction (switchable), temperature compensation (switchable, needs additional „Ahlborn“-compatible hardware to get temperature measures),
- support of special measuring equipment with inductive probes (to measure internal threads with TESA- or Mahr-probes, horizontal measuring devices with inductive probe in the opposite quill as Mahr 828 PC)

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



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

Before starting to use the software some basic settings have to be checked or changed according to the actual configuration of the length measuring device, which you want to use. Click onto the menu item „General setting“ (or press the key „F6“). The appearing configuration window will be described in the following chapters.

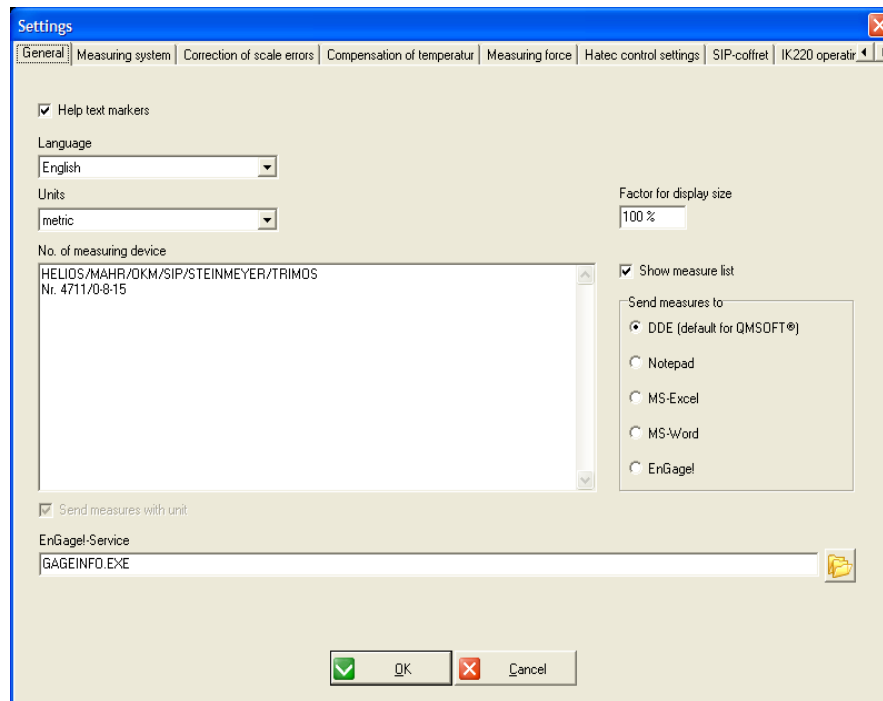
C.2.1. General settings

Before working with the indication program you should set some general parameters. For this open the dialogue „*General settings*“ and enter the parameters step by step, especially into the pages „*General*“ and „*measuring system*“. See also the manufacturer manuals for the measuring device and the interface cards.

Please note, that some special parameters (f.i. the scale correction values) are „read only“ in this dialogue, they can be changed only by using the separate configuration tool „Ik220Configurator.exe“, which can be found in folder „...Program files\QMSOFT32\BIN“. Because you need machine-related special know-how to setup this parameters, we describe here only this, parameters, which you can change inside of **QM-BASIC**.

General settings - page "General"

On this page you can set the length unit (mm/inch), the language of the user interface, the program window size, the number of the decimal digits etc. It is also possible to save information about your length measuring device such as type, identification number or manufacturer.



If the checkbox „Show measure list“ is checked, the measures will be shown inside of a separate windows „beside“ the main window of the program. This is useful, if **QM-BASIC** is running as stand-alone-program without a connection to other software systems.

Please note, that the transmission of the measures via DDE to non-QMSOFT®-programs (like MS-Word or other) is possible, if at least one **QMSOFT®**-inspection programs or the **QMSOFT®/QM-BASIC** program itself is licensed !

General settings - page "Measuring system"

At first the main axis of the measuring device has to be configured (see frame „scale measuring system“):

The counter card inputs are signed with „X1“ and „X2“. According to the port you have used to connect to the measuring device you have to select the correct „channel“, and you have also to input the „Scale graduation“ value (most Heidenhain rules are using 2 µm).

If the main axis of the machine has a „reference point“ and if there are scale correction values, please activate (otherwise deactivate) the check box „Reference point“.

The input field „Reference point distance“ can be filled with a value, to which the display will be switched after acknowledgement of the reference point (although the internal counting will start with zero and not with this value).

While setting up the digits for metric or imperial measurements please keep in your mind the accuracy of the length measuring machine. Too much digits will suggest an unreal accuracy!



The scale correction with discrete correction values is possible only in the case, that the measuring system of the axis has a reference point! See also the next chapter.

If you are using the second input channel to display additional values there are the same parameters for the measuring system of the machines table, see the frame "Measuring system - table".

If you are using a MAHR Millitron display unit (respectively a G4.5 interface card) for inductive probe systems which can be used for internal (thread) measurements you can also setup the parameters of the serial connection to the Millitron (respectively the parameters of the G4.5 card) and activate / deactivate the inductive probe system for the different types of measurement.

For internal direct measurements a „finger probe“ or a „T-shaped probe“ can be used, which is mounted onto a bracket. There are two different types of the integration of this inductive probes into the measuring system:

a) External solution with a separate Millitron/Millimar-device

If the probe is connected to an external Mahr-Millitron 1240 (or to the newer replace product Millimar), which is connected itself to the computer by a serial port, the parameters of the serial connection have to be set up. Please note again, that a communication only works correctly, if the cable configuration, the internal settings of the Millitron-device and the settings in **QM-BASIC**-have to be

correctly. If the communication between computer and Millitron-device doesn't work, a red-coloured error message appears periodically in a separate window.



Check the communication with „HyperTerminal“, if there are problems!

If possible please read also the manual of the Millitron-device.



If you don't want to connect the inductive probe to the computer (or if this connection produces trouble), you have to use the inductive probe display as „Zero-indicator“ only. You have to keep in your mind, that every deviation from the value „Zero“ while adjusting a measure is reflected as a deviation of the measure result!

The use of the inductive probe as „Zero-indicator“ is accepted and produces a high accuracy, if you reproduce the zero-value of the probe with a good repeatability.

b) Internal solution with G4.5 interface card (PCI-bus, 4 probe channels)

If you connect the inductive probe to a G4.5 interface card, you have to setup some special parameters. You can do this by clicking onto the button



which will show a special G4.5 configuration dialogue. This dialogue can also be called up later while the activated measuring window (the display window with the visualisation of the probe deviation contains the same button to call this dialogue).

The G4.5 configuration dialogue offers three separate probe configurations:

- a linear probe, which is used for the opposite quill (for all types of external measurements and for the internal difference measurement)
- two „Internal measurement equipments“ (configuration 1 and 2, are used for absolute internal measurements)

There are two separate configurations for the internal probes intended for a good support of the machines of the Mahr-828-series, which have two different brackets with two different probe types.



The selection of the actual internal probe configuration the user has to do manually, there is no automated procedure to acknowledge the active probe!

While setting up the digits for the display of the probe deviation also the accuracy of the probe should be observed. In the most cases 1 or 2 digits are enough.

After changing the equipment for the internal measurement you have to select the internal probe configuration too!

Parameter „Probe channel“

Depending from the adaptor cable, which was delivered together with the G4.5-card, the probes can be connected to four different input channels (nb. 0 to 3) of the card. If the adaptor cable has only one connector, the probe channel is channel number 0.

Parameter „TF offset“

is used to „move“ the electrical zero point. You have to setup values greater/lower than „0“ only, if the measuring range of the probe is not symmetrically enough (in the most cases at probes for internal measurements).

Parameter „TF gain“

is used to define the optimal „operating point“ of the probe. It should be setup to a value, which produces maximal deviation values (+2048 to – 2048 increments) while moving the probe in the maximum/minum positions. See also the hints of the „setup tool“!

Parameter „Factor“

is used to adapt the value of the probe deviation (internal probes)/probe movement (linear probe) to the effective length of the deflection/movement. This value can be calculated after (!) the correct setup of offset and gain with the help of the main axis of the machine (set it to 1 at first, move the machine to have contact between probe and machines quill, adjust the probe deviation to zero, set the display of the main axis to zero, move a defined distance (f.i. 0,1 mm). Now you can calculate the factor from the distance (in μm) and the display of the probe deviation.

Parameter „Destination value of probe deflection“

In most cases the probe deflection (the displayed probe) should be zero. This is warranting to have identical probe contact conditions (measuring force, deformations etc.).

Parameter „Tolerance for valid probe deflection values“

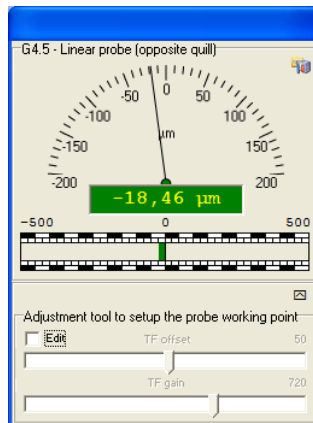
The tolerance for adjusting the destination value of the probe deflection defines a range „around“ the destination value, where a measure can be triggered to evaluate a measurement.

Parameter „Change the orientation of the probe deflection“

Here you can change the direction of the probe deflection display.

The built-in „setup tool“ for the parameters **„TF offset“** and **„TF gain“**:

If the measure display is activated a „setup tool“ for the actual inductive probe can be called up by clicking onto the little circle icon in the lower right corner of the G4.5 display window. This window grows and shows two sliders (one for „TF offset“, the other for „TF gain“):



Activate „Edit“ to adjust the values with a little bit more comfort.

General settings - page "Correction of scale errors"

QMSOFT®-QM-BASIC has two independent methods for measure correction implemented, which can be switched on or off.

The „correction of scale errors“ is used to include the systematic errors of the measuring machine into the measure calculation (only for the X-axis). In most cases the manufacturer of the machine is delivering or a calibration laboratory is calibrating such a correction table, which has to type in directly into the file „IK220Settings.INI“ in the folder „C:\Program files\QMSOFT32\BIN“ (the Windows editor program or the configuration program „Ik220Configurator.exe“ can be used to do this).

Settings

General | Measuring system | **Correction of scale errors** | Compensation of temperatur | Measuring force | Hitec control settings | SIP-coffret | IK220 operator

Scale measuring system

☒ Correction of scale errors

A: 0.00000000

B: 0.9999993000

$X' = A + B * X + \delta$

Position	Deviation
-50.00000 mm	0.00022 mm
-25.00000 mm	0.00009 mm
0.00000 mm	0.00000 mm
25.00000 mm	-0.00013 mm
50.00000 mm	-0.00019 mm

Measuring system - table

☐ Correction of scale errors

A: 0.00000000

B: 1.0000000000

$X' = A + B * X + \delta$

Position	Deviation
0.00000 mm	0.00000 mm

OK Cancel

Please note: The „correction of scale errors“ is based on availability of a „reference point“ of the rule (see page „Measuring system“) !

In **QM-BASIC** you can switch on or off only the scale error correction. This is helpful while calibrating the machine itself with the use of **QM-BASIC**.



If the manufacturer of the machine has predefined correction values, which are delivered together with the machine itself, please be careful while changing it, because the accuracy of the machine could be lost!

The scale correction consists of two components per axis:

- for a set of discrete scale positions the actual scale deviations are saved into a table, which are used to interpolate corrected positions. At least two positions in the table are needed.
- A declination of the rule to the axis of the quill, which produces a linear increase of the scale deviations, can be compensated by the parameter „B“ (slope).



Before any change of the scale correction parameters please backup the file „IK220Settings.INI“ from the folder „C:\Program files\Qmsoft32\Bin“, so you can restore the origin correction values!

General settings - page "Compensation of temperature"

The temperature compensation is used to minimize the temperature influence onto the final measure. It needs to use a temperature measurement equipment to get the actual temperature values of the inspected work piece, of the reference normal and of the rule of the machine and to send it directly to the computer.



To get good and correct results it is very important to know the exactly values of the heat expansion factors of all three components! The temperature compensation does not substitute good ambient conditions in the laboratory!

On this page you can find the setup parameters for the temperature measuring device. Until now we support only devices of the „Almemo“ family of the manufacturer „Ahlborn“.

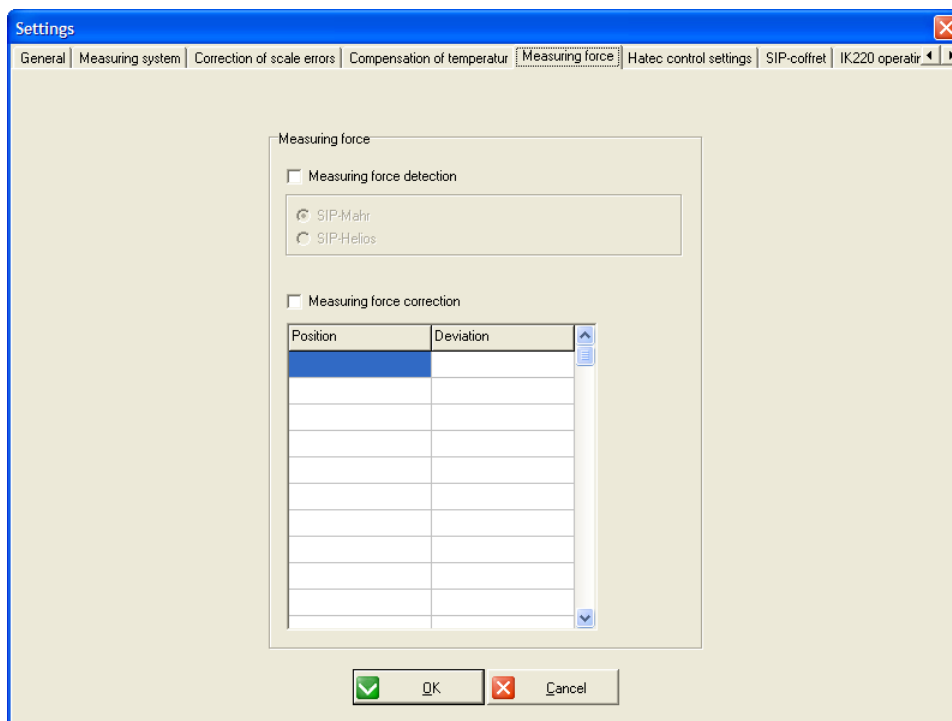
The communication with the temperature measuring device will be activated, if the temperature compensation is used. If the communication between the Almemo-device doesn't work, a separate error message inside of a red coloured window appears on the screen.



Check the communication with the Almemo-device with the help of the Windows-built-in terminalprogram „HyperTerminal“!

General settings - page „Measuring force“

The feature „Measuring force detection“ can be used to acknowledge the actual measuring force from the data stream, which special types of measuring machines of the manufacturer „SIP“ are sending to the computer. A table of correction values for the measuring force can increase the accuracy of controlling the measuring force by the software for such machines, which have the feature of a computer-controlled setting of the measuring force.



As a "default" setting the measuring force features for detection and correction are disabled. The correction table values will be delivered from the manufacturer of the machine.

General settings - page "Hatec control settings"

If QMSOFT®-QM-BASIC is used to control the HATEC probe of the manufacturer „Feinmess Jena“, you have the setup option also for the HATEC parameters. Because the manufacturer has pre-configured this parameters please change it only if you have instructions from the manufacturer !

Settings

General | Method for correction | Measuring system | Temperature indicator | **Hatec control settings**

☐ Activate Hatec control (UniMotor-card)

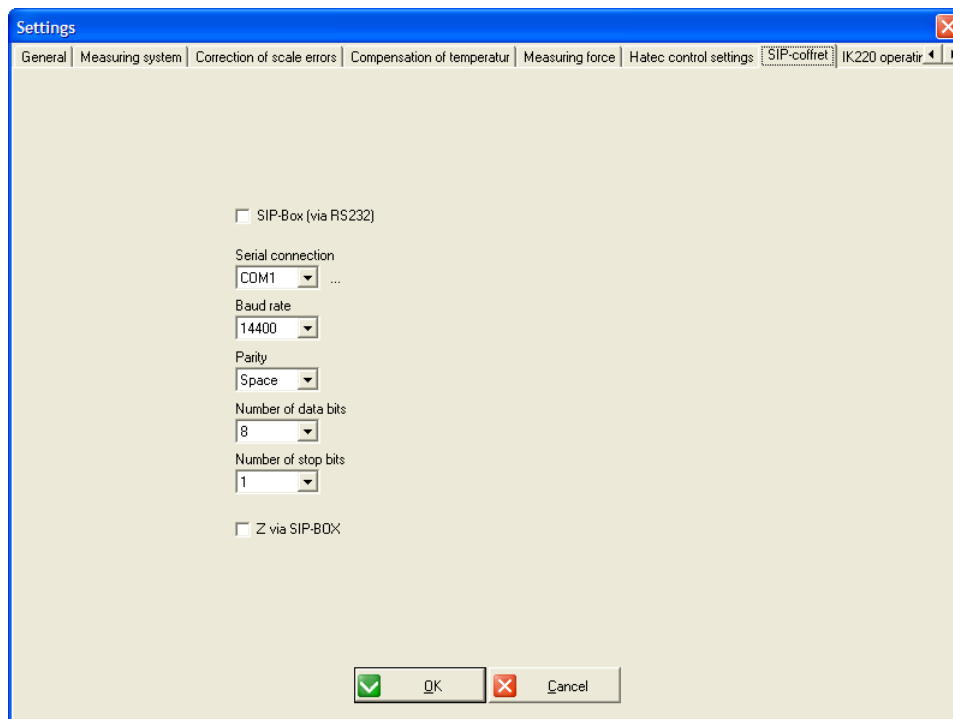
Card No.	0	Time 1 (up)	200 ms
Offset	0	Time 2 (up)	200 ms
Speed V1	128	Loops (up)	8
Speed V2	148		
Speed V3	168	Time 1 (down)	200 ms
Speed V4	188	Time 2 (down)	200 ms
Speed V5	110	Loops (down)	8
Speed V6	104		
Speed V7	88	Safety distance up	47,5 mm
Speed V8	68	Safety distance down	-47,5 mm

OK Cancel

The Hatec control option is switched off as a default.

General settings - page „SP-coffret“

The settings at this page are need for machines of the manufacturer SIP, if the machine in addition to the IK220 is connected via a serial port to a micro-controller (SIP coffret).



In the most cases the manufacturer of the SIP machine defines the settings here. For the most devices the settings should be deactivated, which is also the default setting.

General settings - page "IK220 operating parameters"

The setup of the operating parameters are pre-defined by the manufacturer of the machine or of the measuring system inside of the machine. After changing values please note, that you execute the item „File | Initialize IK220“ in the main menu of **QM-BASIC**, because the operating parameters are sent to the card only after a reset of the computer or after booting the operating systematic, otherwise the card is remembering the already setted values.

Scale measuring system	Measuring system - table
1 - encoder type 0=incremental encoder*	1 - encoder type 0=incremental encoder*
2 - signal type 0 = 11 µApp	2 - signal type 1*= 1 Vpp
3 - axis type 0*= linear axis	3 - axis type 0*= linear axis
4 - counting direction 0*= positive counting direction	4 - counting direction 0*= positive counting direction
5 - signal periods/revolution 0	5 - signal periods/revolution 0
6 - REF marks 0*= single REF mark	6 - REF marks 0*= single REF mark
7 - interpolation bits (0..12*) 12	7 - interpolation bits (0..12*) 12
8 - compensation for position value 0*= compensation for position value off	8 - compensation for position value 0*= compensation for position value off
9 - acquisition of compensation value 0*= Acquisition of compensation value off	9 - acquisition of compensation value 0*= Acquisition of compensation value off
10 - measuring points per octant (8*) 1	10 - measuring points per octant (8*) 1

The most parameters can be setup to their default values, which are marked with an „*“-character. But Please note the following exclusions:

Parameter „2 – signal type“

Heidenhain-compatible incremental measuring systems can evaluate either voltage or current signals. For older systems select the item „0 = 11 µApp“ (current), for newer systems mostly the item „1 = 1 Vpp“ is applicable. May be, you have to try both items to find out the correct one. If the parameter value is invalid, the reference point cannot be acknowledged or the counting of the axis is not consistent.

Parameter „4 – counting direction“

If the default counting direction should be invalid, you can change her the direction to negative. An invalid counting direction you have, if a larger distance between both axis quills is producing smaller display values of the axis, and if the „NEG“-button in the main window is not (!) snapped.

Parameter „14 – Latches“

If you want to use a footswitch to trigger measures of the main axis (you need additional equipment from Heidenhain to do this, see also the manual of the IK220), you have to activate the external and internal latches of the IK220 card. The external Latch L1 can be used for the footswitch (the footswitch has to be connected to the corresponding pin of the input connector!).

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

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

SET button / menu item „Settings“

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:

Preset value

Here you can type in a preset value. If you pressing the „PRE“-button in the main window the display is set to this preset value.

Indication

Here you can type in a display value directly. If the dialog is finished by „OK“ this value is the new displayed value.

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 measurements

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.

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.

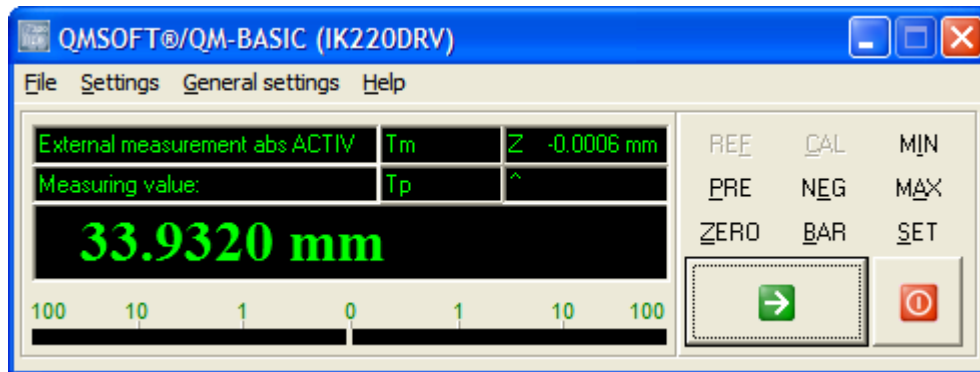
Measuring ball

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

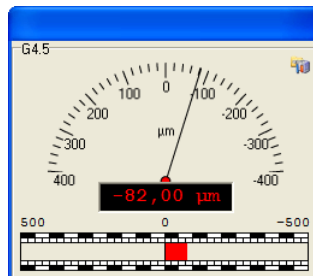
Please note: The little buttons beside some input fields are used to „transfer“ the field value from the field to the display or to the preset, the buttons with the label „0“ are used to set the field value to „Zero“

C.2.3. Execute a measurement

The transfer of a measure from **QMSOFT®/QM-BASIC** to other software modules (for example to QMSOFT® inspection modules) can be triggered by the Enter-key or by clicking onto the green button (the button with the green arrow) inside of the **QMSOFT®/QM-BASIC** window.



If the inductive probe support via G4.5 interface card was activated for the actual type of measurement, an additional window beside the main window of the program appears, which shows the actual probe value numerical and as a graphic:



Near of the „zero“-value of the probe the color of the deviation bar and of the numerical display changes from red to green, and the measures from the probe abnd from the incremental measuring system can be triggered. The result value will be shown in the area „Measuring value“ of the main window.

The separate steps, which are to do while a measurement, depend from the selected type of the measurement. It will be assumed, that you know the measurement basics of the respective type of measurement.

C.2.3.1. External measurement (direct)

If you execute an external measurement as a direct measurement you have to set the machine to zero (measure without a work piece, if both sleeves of the measuring machine are in contact, use the „NUL“-button to set the display to zero). If you now measure the work piece you directly see the result value.

C.2.3.2. Difference measurement (internal, external)

With the help of the „SET“-button at first you have to type in the size of the reference normal. After this measure this reference normal and use the „KAL“-button to indicate this calibration step and to set the display value to the size of the reference normal. If the temperature compensation is activated the temperature value of the normal is transferred into the software. Now bring the work piece onto the machine and probe it.

C.2.3.3. Internal measurement (direct)

This measurement type is based on using T-Shape-probes, and a measure is calculated from two (plain faces) or three (threads) single measure values. You will be called upon to touch the work piece (left, right). The calculated result is displayed in a separate area of the display program window.



To minimize the movements you can ignore the „right“ and „left“ direction of probing the work piece, but be sure to have different directions inside of a measurement cycle !

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