

**Operating Instructions  
for the  
Intelligent Calibration Module  
IKM**



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### Check list before every calibration:

✓	Correct piston/cylinder system selected?	Section 3.3.4 - page 13	Selection by serial No.
✓	Correct weight set selected?	Section 3.3.4 - page 13	Selection by serial No.
✓	Correct pressure medium selected?	Section 3.3.5 - page 10	Oil or gas (air)?
✓	Ambient parameters measured and entered?	Section 3.3.5 - page 10	Type in values *)

\*) If you have the IKM with metrology addition, values do not need to be typed in. They are recorded automatically.

### For IKM with optional transmitter addition:

✓	Test specimen specified	Section 3.3.2 - page 11
✓	Test specimen correctly connected (electrically)	Section 2.3.4 - page 7

To make things easier for you, enter YOUR assignments of serial number for pressure scale/measuring set and piston/cylinder systems in the following table:

Oil / gas	Measurement range	S/No. piston/cylinder system	S/No. weight set / pressure scale

## 1. General Instructions

These Operating Instructions contain important information on operating the IKM. If you need additional information or if you encounter problems that are not treated in detail in these operating instructions, please contact your supplier:

The warranty period for the IKM is 24 months starting from the date of delivery as described in our General Terms and Conditions. All claims under the warranty will be considered null and void if the system was not handled professionally or if these Operating Instructions were not followed. In addition, we draw your attention to the fact that the content of these Operating Instructions does not constitute a portion of any previous or existing agreement, promise or legal relationship, nor shall it modify any of the aforesaid.

All obligations of DRUCK & TEMPERATUR Leitenberger are derived from specific sales contracts and are based on the General Business Conditions of DRUCK & TEMPERATUR Leitenberger GmbH.

The devices described in this manual represent the latest state of the art in terms of their design, dimension and materials. We reserve the right to make changes to or replace materials without any obligation to give immediate notification.

## 2. Product Description

The IKM was specially developed for combined use with a piston pressure gauge. The IKM makes it easier to use pressure scales. It is especially easier to make more precise measurements since factors causing consistent errors can be corrected. In addition, it is possible to convert to different pressure units.

### 2.1 Basic principles of the pressure scale

Pressure scales are the most precise instruments available on the market for pressure measurements. Their operating principle is based on the physical definition of pressure, the quotient of force and surface.

$$Pressure = \frac{Force}{Area}$$

The key element of a pressure scale is a precision-manufactured piston/cylinder system with a precisely measured cross-sectional surface. To apply a pressure charge to the system, the piston is placed under a load with calibrated weight pieces.

The weights are chosen according to the desired pressure value (weight pieces). After that, the integrated spindle pump increases the pressure until the weights are in a hovering state.

### 2.2 Factors at Work

The pressure scale is calibrated to standard reference conditions when it leaves the factory (depending on customer specifications). If there are significant deviations between the application conditions and the defined reference conditions, appropriate corrections must be made. Following are the main factors that enter into play and must be considered.

#### 2.2.1 Local Fluctuations in the Force of Gravitation

The local force of gravitation (gravitational acceleration) is subject to major fluctuations caused by geographical variation. The value may differ from one place on earth to another by as much as 0.5%. Since this value has a direct effect on the measurement, it is essential that it be taken into consideration. If the gravitational force is indicated at the time when the order is made, an adjustment can be made in the factory if desired for later use of the pressure scale at the specified location. Another option, especially if the device will be used at different locations, is to perform a calibration to the standard force of gravitation, "Standard-g = 9.80665 m/s<sup>2</sup>". Then a correction must be performed for each measurement according to the formula below:

$$True\ pressure = Nominal\ value \cdot \frac{g - Application\ site}{Standard - g}$$

Example:           Local force of gravitation set during manufacturing:     9.806650 m/s<sup>2</sup>  
                       Locale force of gravitation at application site:       9.811053 m/s<sup>2</sup>

Nominal pressure: 100 bar

$$\text{True pressure: } p = p_{\text{Nominal}} \frac{g_{\text{Local}}}{g_{\text{Standard}}} = 100 \text{ bar} \frac{9.81105}{9.80665} = 100.0449 \text{ bar}$$

Without the correction, measurements would all be "off" by 0.05%.

***This correction calculation is automated with the IKM.***

### 2.2.2 Temperature on the piston/cylinder system

The effective cross-sectional surface of the piston/cylinder system depends on the temperature. The effect depends on the material used and is described by the temperature coefficient (TC). In the event of deviations from standard reference conditions (typically 20°C), the following formula must be used to make a correction:

$$\text{True pressure} = \text{Nominal value} \cdot \frac{1}{\left(1 + (t_{\text{Appl}} - t_{\text{Reference}}) \cdot TK\right)}$$

Example:           Reference temperature:           20°C  
                       Temperature during use:           23°C  
                       Temperature coefficient TC:     0.0022%

$$\text{True pressure} = 100 \text{ bar} \cdot \frac{1}{\left(1 + (23 - 20) \cdot 2.2 \cdot 10^{-5}\right)} = 99.99340 \text{ bar}$$

Without the correction, measurements would all be "off" by 0.007%.

***This correction calculation is automated with the IKM.***

### 2.2.3 Ambient Conditions

Ambient conditions such as the air pressure, room temperature (and relative humidity) do not need to be taken into consideration unless measurements are highly precise (accurate to within <0.01%). Fluctuations in ambient conditions change air density. The air density affects the pressure through the buoyancy of the weights:

$$\text{Weight} = \text{Nominal weight} \cdot \left(1 - \frac{\text{Air density}}{\text{Weight density}}\right)$$

The air density is typically 1.2 kg/m<sup>3</sup>.

The density of the weights (non-magnetic steel) for type CPB 5000 is documented on the certificate (typically 7900 kg/m<sup>3</sup> for weights made of steel or 2700 kg/m<sup>3</sup> for weights made of aluminium).

A fluctuation of 5% in the relative humidity causes an additional uncertainty in the measurement of about 0.001%.

***This correction calculation is automated with the IKM.***

#### 2.2.4 How the Cross-Sectional Surface Responds to Pressure

Especially at higher pressures, the effective cross-sectional surface changes due to the pressure load. The ratio of the cross-section and increasing pressure is linear within an initial approximation. It is represented by the coefficient of expansion caused by pressure ( $\lambda$ ). You can find the coefficient of expansion caused by pressure ( $\lambda$ ) on the enclosed certificate.

$$\text{True pressure} = \frac{\text{Nominal pressure}}{1 + \lambda \cdot \text{Nominal pressure}}$$

Example:      Measuring point:      1000 bar

System with coefficient of expansion caused by pressure:  $10^{-7}$  1/bar:

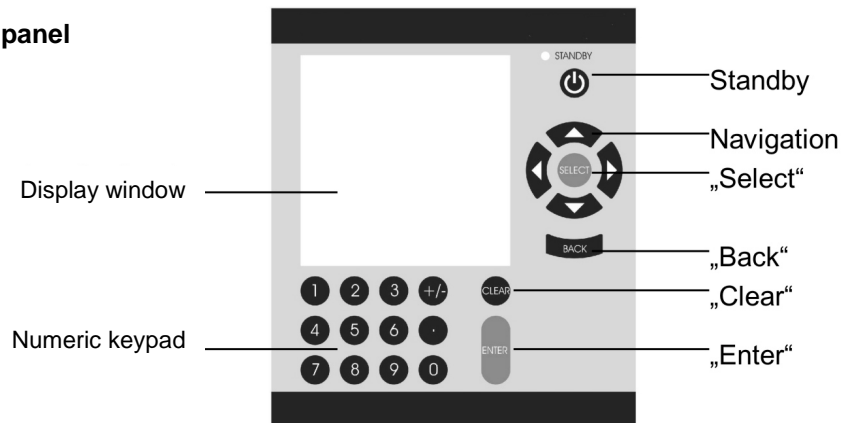
$$\text{True pressure} = \frac{1000}{1 + 1 \cdot 10^{-7} \cdot 1000} \text{ bar} = 999.90 \text{ bar}$$

Without the correction, measurements would all be "off" by 0.01%.

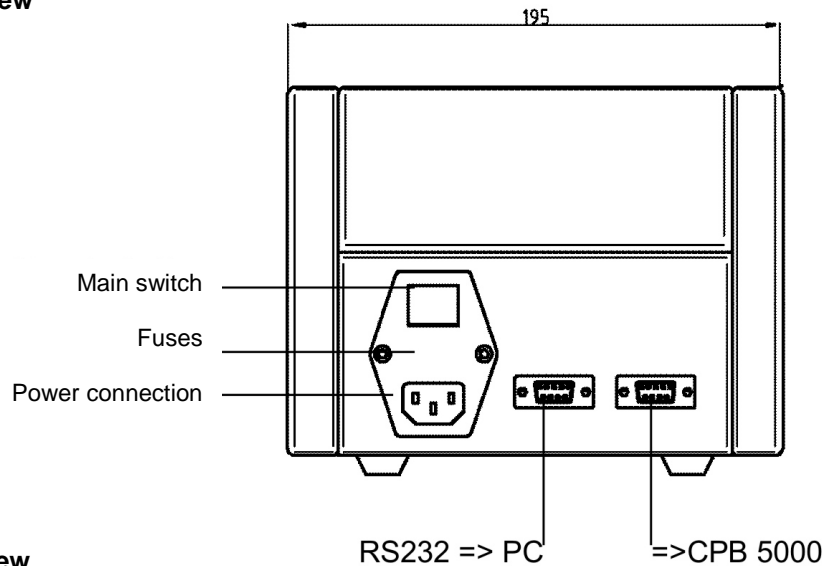
***This correction calculation is automated with the IKM.***

### 2.3 Arrangement of Control Elements

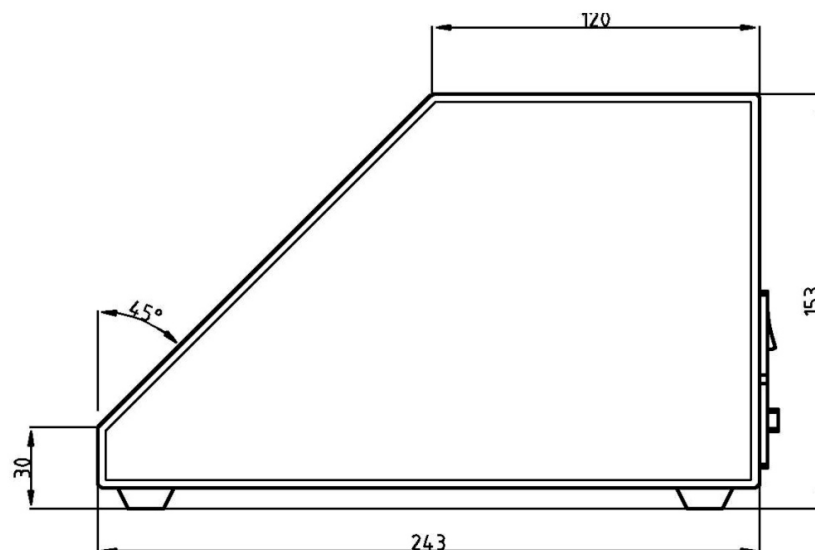
#### 2.3.1 Control panel



#### 2.3.2 Rear view

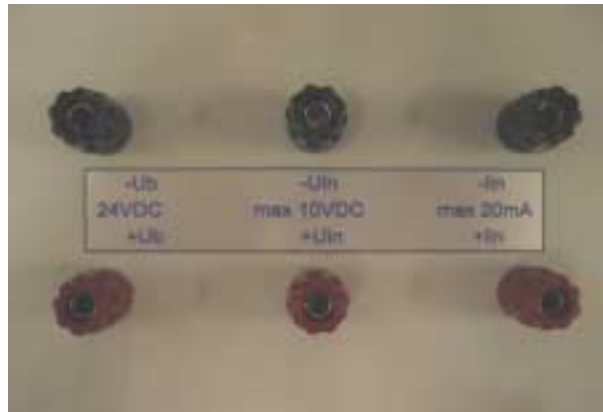


#### 2.3.3 Side view



### 2.3.4 View from above - with optional transmitter addition

In the IKM design with an optional transmitter addition, the necessary electrical connections are on the top of the housing above the display.



The electrical connection of a test specimen (pressure transmitter) is based on the following table:

Test specimen	Connection:	+I in	-I in	+U in	-U in	+UB	-UB
2-conductor transmitter Output 4...20 mA	0V / S-		Bridge to -UB			UB+ / S+	Bridge to -I in
3-conductor transmitter Output 0...20 mA	S+		S and bridge to -UB			+UB	Bridge to -I in
3-conductor transmitter Output 0...10 V				S+	S and bridge to -UB	+UB	Bridge to -U in
4-conductor transmitter Output 0...10 V				S+	S-	+UB	-UB

**Note:**

In the IKM design with optional transmitter addition, there is a **continuous** supply of auxiliary power for the test specimen (24 VDC, regulated).

## 3. Operation

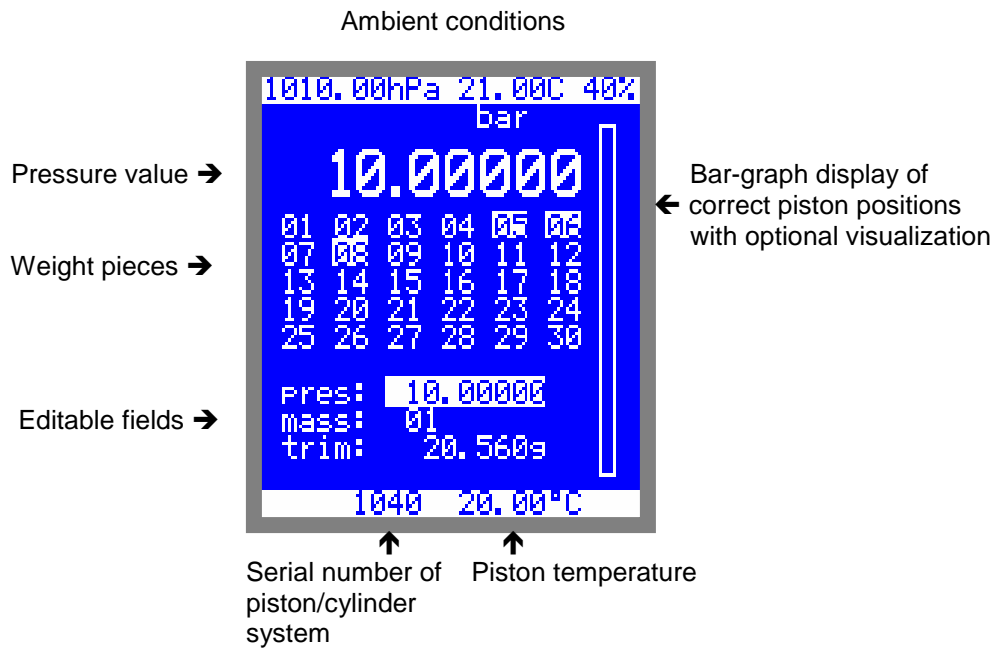
### 3.1 Commissioning

- Connect the 230 VAC / 50-60 Hz power supply using the power cord included with delivery.
- Turn on the power switch on the rear side of the device.
- Note: The IKM can be placed in Standby mode with the STANDBY key on the keyboard on the front side.

The Power-On screen first appears in the display window showing the device type and version of the system. Then after a brief time the main screen is displayed.



## 3.2 Main screen



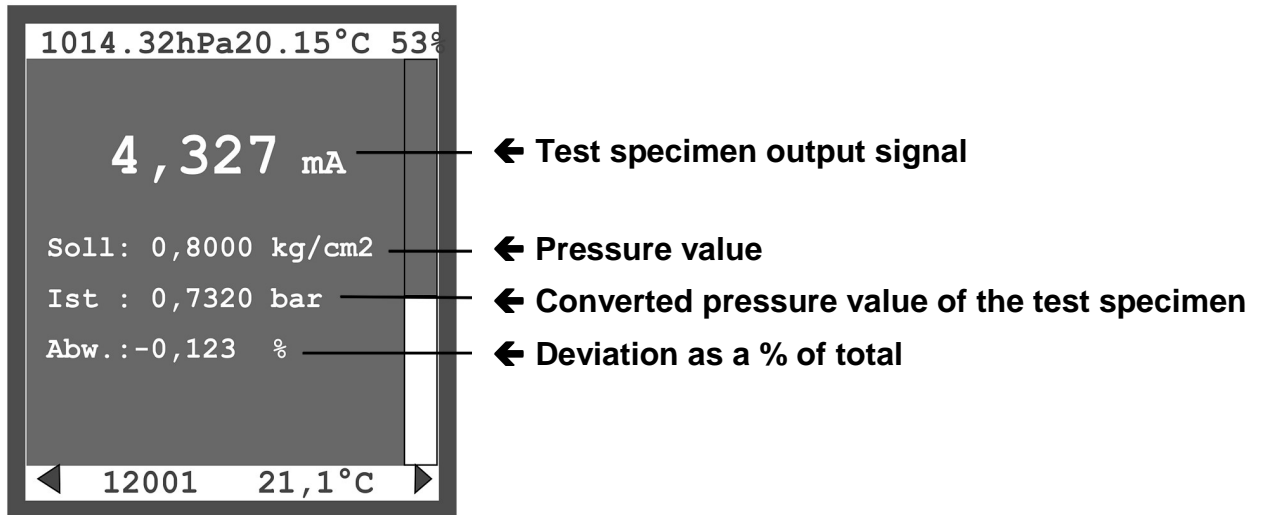
- Weight pieces (weights) are converted into pressure values in the main screen (or vice-versa).
- You can assign a pressure value in the editable "Pressure" box. Then the corresponding weight pieces (weights) that combine as closely as possible to form the desired weight value are shown highlighted in the window.
- Additional weights can be activated or deactivated in the editable "Weight" box by entering the weight piece number. The pressure value is updated accordingly after each selection.
- The respective ambient parameters are taken into consideration. These values are show in the first line (from left to right: barometric air pressure, ambient temperature and relative humidity). If your IKM includes the optional metrology addition (sensor package), these values are recorded automatically. Otherwise, the ambient parameters are entered manually in the "Measurement parameters" window (configuration menu; see next page).
- The lower status line shows the number of the "active" piston/cylinder system as well as its temperature. If your IKM includes the optional metrology addition (sensor package), the piston temperature is recorded automatically. Otherwise, the piston temperature is entered manually in the "Measurement parameters" window (configuration menu; see next page).

If your IKM is equipped with the optional transmitter addition, a second main screen is available (see next page).

You can use the "left" and/or "right" navigation keys to switch back and forth between the two main screens.

### Second Main Screen for IKM with Optional Transmitter Addition:

(Switching back and forth between the two main screens using the "left"/"right" navigation keys)



The output signal of the test specimen (pressure transmitter) is shown as a current (mA) or voltage (V).

The nominal pressure is shown underneath in the pressure unit specified in the device configuration.

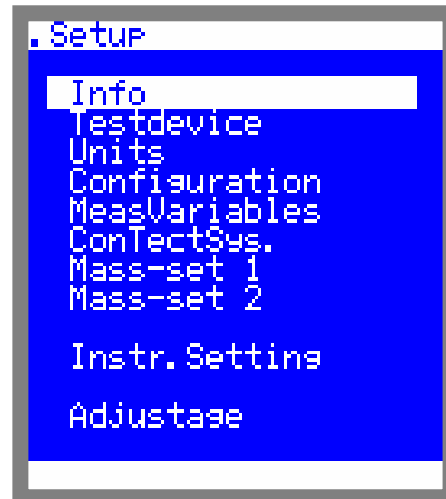
The third display line shows the output signal of the test specimen converted into pressure from the current or voltage. You can enter the information for the conversion in the Configuration menu under "Test specimen" (see Sect. 3.3.2).

The last display line contains the deviation of the output signal for the test specimen from the nominal pressure as a percentage of the final value of the test specimen's measurement value range.

**NOTE:** The test specimen data must be specified previously in the Configuration menu under "Test specimen"; see Section 3.3.2.

### 3.3 Before the Measurement

#### 3.3.1 Configuration menu



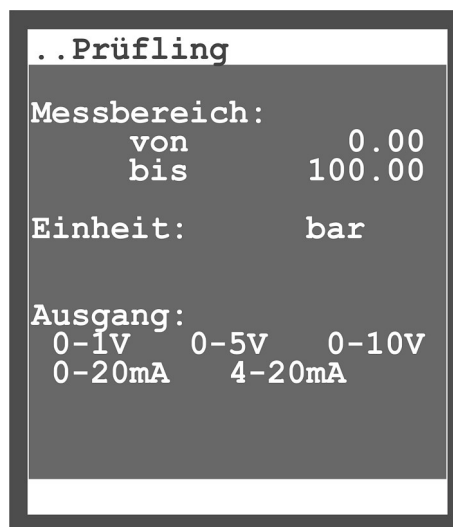
Not accessible until password  
has been entered →

- You can reach the Configuration menu starting from the main screen by pressing the SELECT key
- To make a menu selection, use the "Up"/"Down" navigation keys and then press the SELECT key.
- The "Adjustment" menu item only appears if you enter the password **1310**. To do this, simply type in those four numbers and then do **not** press the ENTER key.  
The "Adjustment" menu item now appears in the Configuration menu, but only until the next time the device is turned off.

### 3.3.2 Test specimen

**NOTE:** The test specimen must be configured for testing pressure measurement converters if your IKM is equipped with the optional transmitter addition.  
The electrical connection of the test specimen is described in Section 2.3.4.  
If your IKM is not equipped with the transmitter addition, that menu item cannot be selected.

- From the Configuration menu, select the "Test specimen" entry with the navigation keys and press the SELECT key.
- The following window for configuring the test specimen is displayed:

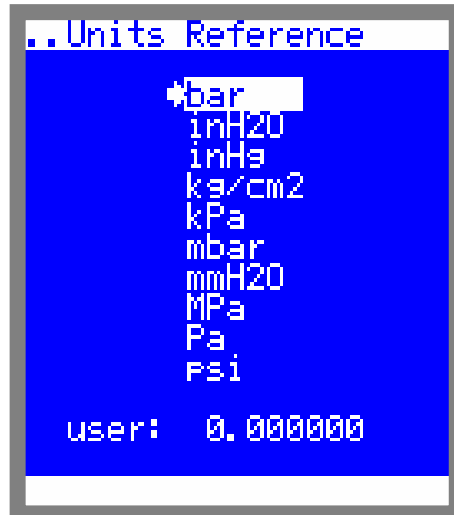


- Measurement range from:  
Enter the starting value of the test specimen's measurement range here using the numeric keypad and then press the ENTER key.
- Measurement range to:  
Enter the final value of the test specimen's measurement range here using the numeric keypad and then press the ENTER key.
- Unit:  
Move the cursor to the pressure unit that is displayed and press the SELECT key. A pull-down menu appears from which you can select the pressure unit using the navigation keys. Confirm your selection with the SELECT key. When you press the BACK key, you return to the test specimen configuration screen.
- Output:  
Using the navigation keys, select the output signal of the test specimen and confirm your selection with the SELECT key.
- Pressing the BACK key takes you back to the configuration menu. Your settings are saved.

*Incidentally:* In IKM devices with the optional transmitter addition, the auxiliary power supply (12 VDC, regulated) is continuously available.

### 3.3.3 Selecting the Pressure Unit

- From the Configuration menu, select the "Units" entry with the navigation keys and press the SELECT key.
- The following window for selecting the pressure unit specimen is displayed:

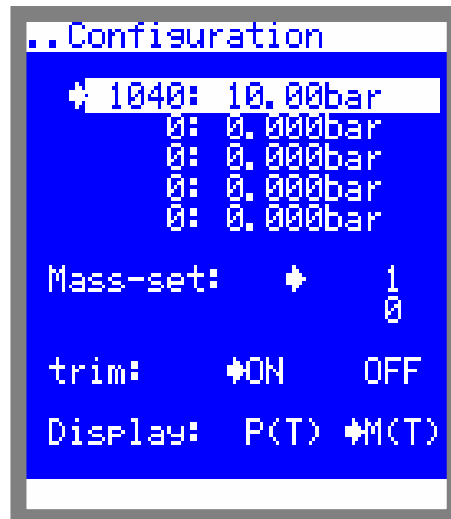


- Using the navigation keys, select the desired pressure unit. Then press the SELECT key (the pressure unit identified by the arrow before it is highlighted). After you have pressed the BACK key, your selection is saved ("Save" appears briefly in the bottom screen status line).
- A user-definable pressure unit "user" can also be selected. A conversion factor should be entered here to convert into "bar" (for the example in the illustration above: 1.123456). To do this, select "user" as the unit as described above. Then use the "Right Arrow" key to go to the field next to "user:" and enter the conversion factor. Confirm the entry with the ENTER key and then press the BACK key to return to the configuration menu. (Pressing the BACK key takes you back to the main screen.)

### 3.3.4 Configuration Section

- From the Configuration menu, select the "Configuration" entry with the navigation keys and press the SELECT key.

The following window is displayed:



The currently selected settings are each shown with an arrow → to the left in front of the entry.

- The piston/cylinder systems stored in the IKM that are available for selection are shown above (serial No. and area).  
**NOTE:** This data is created in "system data maintenance"; see Section 3.4.1  
Using the navigation keys, select the desired piston/cylinder system and press the SELECT key.
- The weight sets stored in the IKM are shown in the middle (serial numbers).  
**NOTE:** This data is created in "system data maintenance"; see Section 3.4.2  
Using the navigation keys, select the desired weight set and press the SELECT key.
- If you do not want to use any fine weights, (because you don't have any available, for example), select "OFF" (No) for the "Trim" entry, otherwise "ON" (Yes). You can also do this with the navigation keys and then pressing the SELECT key.
- The "Display update" section controls the procedure when updating the display of the main screen.
  - With the P(T) setting, the pressure value that is displayed changes depending on the ambient parameters. No weight pieces need to be adjusted.
  - With the M(T) setting, the IKM calculates the new weights each time to maintain the same pressure value with differing ambient parameters.

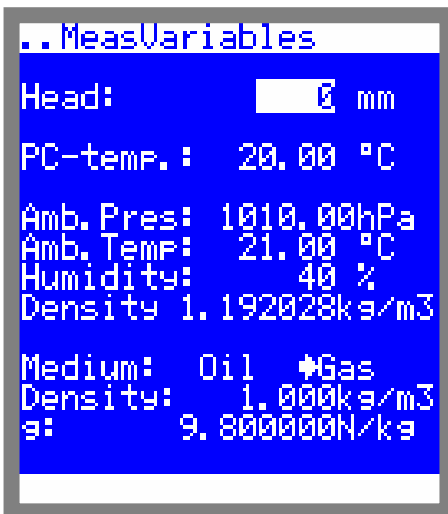
Once all necessary settings have been made and all desired values are identified by an arrow → to the left in front of them, press the BACK key. Your information is saved ("Save" appears briefly in the lowest

screen line) and you return to the configuration menu. (Pressing the BACK key takes you back to the main screen.)

### 3.3.5 Specifying the Measurement Parameters

- From the Configuration menu, select the "Measurement parameters" entry with the navigation keys and press the SELECT key.

The following window is displayed:



- Difference in height
- Piston temperature
- Ambient air pressure
- Ambient temperature
- Relative air humidity
- Resulting air density
- Test medium
- Density of the test medium
- Local the force of gravitation at application site

**NOTE:** For IKM with optional metrology addition (sensor package) the parameters

- piston temperature
- barometric air pressure (ambient pressure)
- ambient temperature
- relative air humidity

are automatically recorded and displayed (display is updated 5 times per second). If you do not have the metrology addition, you will have to enter these values manually yourself.

Using the navigation keys, move to the individual measurement parameters. The selected parameter is highlighted.

- Height diff. (difference in height):  
If the reference height of the test specimen is not identical to that of the pressure scale, the height difference can be entered here in mm: Type in the value in mm and press the ENTER key.  
*The formula is: Height difference = Height (test specimen) - Height (pressure scale)*
- Piston temp (piston temperature °C):  
Only if you do not have the metrology addition: Measure the piston temperature with a suitable digital thermometer (for example Digital Hand Measuring Device C100) and type in the value in °C. Then press the ENTER key.

- **Amb. pressure (ambient pressure in hPa=mbar):**  
Only if you do not have the metrology addition: Measure the barometric air pressure with a suitable precision barometer (for example *Digital Hand Measuring Device C300*) and type in the value hPa (mbar). Then press the ENTER key.
- **Amb.Temp (ambient temperature in °C):**  
Only if you do not have the metrology addition: Measure the ambient temperature with a suitable room thermometer or hand measuring device (for example *Digital Hand Measuring Device C100*) and type in the value in °C. Then press the ENTER key.
- **Humidity (% relative air humidity):**  
Only if you do not have the metrology addition: Measure the relative air humidity with a suitable measuring device (for example *Digital Hand Measuring Device C200*) and type in the value as a %. Then press the ENTER key.
- **Density (kg/m<sup>3</sup> of ambient air):**  
This value is derived from the entries made above of barometric air pressure and ambient temperature. It does **not** need to be entered/changed. The calculation is performed automatically.
- **Medium (pressure medium):**  
In hydraulically activated pressure scales, move the cursor to "Oil" and press the SELECT key. In pneumatically activated pressure scales, move the cursor to "Gas" and press the SELECT key. The selection you made is shown with an arrow → to the left in front of it.
- **Density (kg/m<sup>3</sup> of the pressure medium):**  
The density (kg/m<sup>3</sup>) of the pressure medium (for example oil) is especially important to correct the difference in height for the medium that is used, if a value has been entered under "Height difference". In pneumatically activated pressure scales with air as a pressure medium, the density is typically 1.2 kg/m<sup>3</sup>. In oil activated pressure scales with **CPB5000-FLUID** or comparable as a pressure medium, the density is **860 kg/cm<sup>3</sup>**.
- **g (local force of gravitation):**  
You will find explanations of this on page 4 under Section 2.2.1 Please type in the applicable value for the location where the pressure scale will be operated and then press the ENTER key.

If all the settings and entries are correct, press the BACK key. This causes your information to be saved ("Save" appears briefly in the lowest screen line) and you return to the configuration menu. (Pressing the BACK key takes you back to the main screen.)



### 3.3.6 Configuration of the distance sensor (only with the optional visualisation addition)

The optional visualisation addition consists of a distance sensor mounted on the pressure scale plus the corresponding signal evaluation in the IKM. The piston position is shown as a bar graph, as illustrated in Section 3.2 (main screen).

The measurement is made with an ultrasonic sensor and does not involve any contact. An adjustment is required to be able to do this. This adjustment has already been performed at DRUCK & TEMPERATUR Leitenberger GmbH if the IKM was purchased together with the piston pressure scale CPB 5000.

To adjust the visualisation addition (distance sensor), follow these steps:

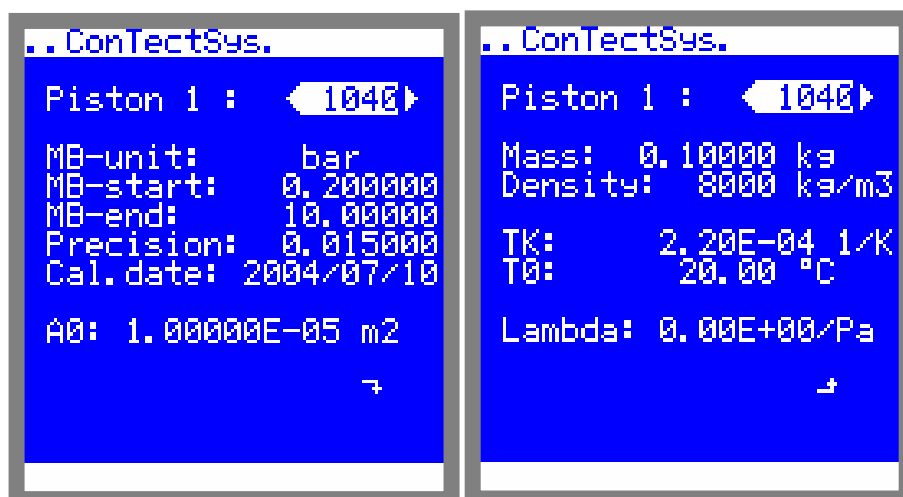
- Make certain there is no excess pressure in the system.
- Set the bell-shaped weight carrier and a large weight disk (for example No. 3) in place.
- Move the cursor on the IKM to "Piston pos: Down" and confirm with the SELECT key.
- The zero point (or reference point) is now saved.
- Now bring the piston slowly into equilibrium by turning the spindle in.
- Now slowly and carefully increase the pressure with the spindle until the piston has moved up to the upper stop.
- Move the cursor on the IKM to "Piston pos: Up" and confirm with the SELECT key.

The calibration is now complete and the visualisation addition can be used.

## 3.4 Maintaining System Data

### 3.4.1 Piston/Cylinder Systems

- From the Configuration menu, select the "Piston systems" entry with the navigation keys and press the SELECT key.



- Up to five different piston/cylinder systems can be stored together with key data for each one in the integrated database of the IKM. If you buy the IKM together with your pressure scale with a weight-loaded piston or one or more piston/cylinder systems, this key data is generally already entered as factory settings.

If you buy the IKM later or if you are using it with a third-party manufacturer's pressure scales, make the changes as follows (for the data, refer to the calibration certificate of the piston/cylinder system):

- After "Piston #" (# is a sequential number from 1 to 5) type the serial number of the piston/cylinder unit as it appears on the certificate (in the example above, "12105". Then press ENTER.
- MR unit (measurement range pressure unit):  
The measurement range of a piston/cylinder system is generally indicated in "bar". If the piston/cylinder system is certified for a different pressure unit, move the highlighted display to the word "bar" with the navigation keys and then press the SELECT key. A list of all available pressure units now appears. Select the pressure unit with the navigation keys and press the SELECT key, then the BACK key.
- MR start (starting value of the measurement range):  
Enter the starting value of the measurement range of the piston/cylinder system as it appears on the certificate and then press the ENTER key.
- MR end (ending value of the measurement range):  
Enter the ending value of the measurement range of the piston/cylinder system as it appears on the certificate and then press the ENTER key.
- Accuracy:  
Enter the accuracy as a % here as it appears on the certificate and then press the ENTER key.
- Cal. dat. (calibration date):  
Enter the date of the calibration of the piston/cylinder system as it appears on the certificate (YY/MM/DD) and then press the ENTER key.
- A0 (cross section of the piston in m<sup>2</sup>):  
Enter the cross section of the piston in m<sup>2</sup> here as it appears on the certificate and then press the ENTER key.

To reach the second screen page for additional entries, move the cursor with the navigation keys to the three dots "..." at the bottom of the first screen page and press the SELECT key.

- Weight (of the piston in kg):  
Enter the weight of the piston in kg here as it appears on the certificate and then press the ENTER key.
- Density (of the piston material in kg/m<sup>3</sup>):  
Enter the density of the piston material in kg/m<sup>3</sup> here as it appears on the certificate, generally 7960 kg/m<sup>3</sup>, then press the ENTER key.
- TC (temperature coefficient of the piston material):  
Enter the temperature coefficient of the piston material here as it appears on the certificate, for example 2.20E-05 1/K. Then press the ENTER key.

- T0 (reference temperature):  
Typical value: 20 °C generally set as default.
- Lambda (coefficient of expansion caused by pressure):  
Enter the coefficient of expansion caused by pressure for the piston here as it appears on the certificate,

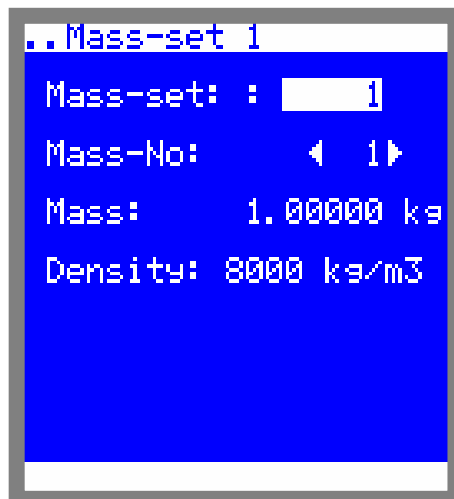
**NOTE:** This value is not indicated on many certificates. If necessary, please consult with your supplier.  
**The value can be ignored in pressure ranges below 1000 bar.**

(To go back to the first screen page, move the cursor with the navigation keys to the three dots "..." at the bottom of the second screen page and press the SELECT key.)

If all the settings and entries are correct, press the BACK key. This causes your information to be saved ("Save" appears briefly in the lowest screen line) and you return to the configuration menu. (Pressing the BACK key takes you back to the main screen.)

### 3.4.2 Weight Sets:

- The IKM is equipped with a database for two different weight sets. Up to 30 individual weights can be entered for each set. If you buy the IKM together with your pressure scale with a weight set, this data is generally already entered when you receive the product. If you buy the IKM later or if you are using it with a third-party manufacturer's pressure scales, make the changes as follows for the necessary data, refer to the calibration certificate:
- From the Configuration menu, select the "Weight set 1" or "Weight set 2" entry with the navigation keys and press the SELECT key.  
The following window is displayed:



- **Weight set:**  
Enter the serial number of the weight set here and then press the ENTER key.
- **Weight No:**  
Use the "right" and "left" navigation keys to scroll through the individual weight pieces (1 to max. 30). The weight disks should be numbered sequentially accordingly.  
Enter the data as it appears on the certificate here and then press the ENTER key for each item.

**NOTE:** The density for weight pieces made of steel is generally 7960 kg/m<sup>3</sup>. If there are aluminium plates in the weight set, their density is generally 2700 kg/m<sup>3</sup>. You will find this information on the certificate for your pressure scale ("Material density").

If all the settings and entries are correct, press the BACK key. This causes your information to be saved ("Save" appears briefly in the lowest screen line) and you return to the configuration menu. (Pressing the BACK key takes you back to the main screen.)

### 3.5 IKM Settings (Device Setting)

- From the Configuration menu, select the "Device Setting" entry with the navigation keys and press the SELECT key.



You can adjust the following here:

- **German / English (language of the IKM operator's manual)**  
Select the language you prefer with the navigation keys and confirm with the SELECT key.
- **Amb.press: (Ambient pressure / barometric air pressure)**  
Using the navigation keys, select the desired pressure unit (hPa=mbar or psi) to display the ambient barometric air pressure and confirm with the SELECT key.

- **Temperature:** (ambient temperature and piston temperature)  
Using the navigation keys, select the desired temperature unit (°C or °F) to display the ambient temperature and piston temperature. Then confirm with the SELECT key.
- **Date:**  
Using the navigation keys, move the cursor to the "Date" input box and type the date in the format YYYY/MM/DD to set the real time clock. Then press the ENTER key.
- **Time:**  
Using the navigation keys, move the cursor to the "Time" input box and type the time in the format hh/mm/ss to set the real time clock. Then press the ENTER key.
- **Brightness:**  
Using the navigation keys, move the cursor to the "Brightness" input box and type the desired display brightness as a %. Then press the ENTER key.
- **Contrast:**  
Using the navigation keys, move the cursor to the "Contrast" input box and type the desired display contrast as a %. Then press the ENTER key.
- **Baud rate:**  
Only required if the IKM is connected with a PC via a serial RS232 interface.

*Auxiliary programs for the PC may be available in the future that can be used to edit entries of weight set definitions on the PC, for example, and then transfer them to the IKM.*

*We also reserve the option of offering optional PC software in the future to support the user in creating calibration certificates.*

Select the baud rate with the navigation keys and press the SELECT key. The activated value is displayed with an arrow → to the left in front of it.

If all the settings and entries are correct, press the BACK key. This causes your information to be saved ("Save" appears briefly in the lowest screen line) and you return to the configuration menu. (Pressing the BACK key again takes you back to the main screen.)

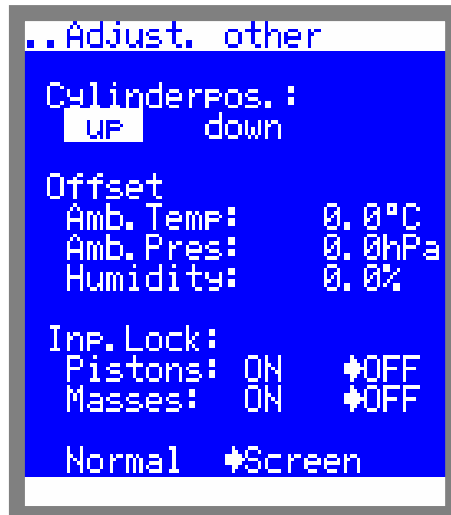
### 3.6 Adjustment

**Note:** This menu item is only shown if the password **1310** has been typed into the configuration menu since the last time the IKM was turned on (without then pressing the ENTER key).

After you have selected "Adjust" in the configuration menu a selection appears. Other than the item described below, "General adjustment", the items in this menu should only be used by specialists authorised by the manufacturer.

- Adjst. KZE temp → can only be called by specialists authorised by manufacturer!
- Adjst. Vlt. 1 → can only be called by specialists authorised by manufacturer!
- Adjst. Vlt. 2 → can only be called by specialists authorised by manufacturer!
- Adjst. current → can only be called by specialists authorised by manufacturer!
- Adjst. other You are also allowed to make changes here.

Using the navigation keys, select the "Adjust.other" menu item and press the SELECT key. The following screen is now displayed:



- Piston position:  
This entry is used to adjust the optional visualisation addition of the IKM. The visualisation addition represents the correct piston position as a bar graph on the IKM.
- Offset:  
Offset values for sensors belonging to metrology additions can be adjusted here. Generally you should enter **nothing**.
- Input lock:
 

Piston	Input lock ON:	Calibration data for the piston can be viewed but not edited.
	Input lock OFF:	Calibration data for the piston can be edited (changed).
Weights	Input lock ON:	Calibration data for the weight sets can be viewed but not edited.
	Input lock OFF:	Calibration data for the weight sets can be edited.

Mark the desired entry with the navigation keys and confirm your selection with the SELECT key.

To return to the configuration menu, press the BACK key once. Your entries/changes will be saved when you return.

To return to the main screen, press the BACK key twice in a row.

## 4. Technical Data

IKM - basic design	
Display:	Active graphic display 128 x 128 pixels
Resolution:	1E -06
Keyboard:	Foil keyboard
Digital interface:	RS232 serial
Mains power connection:	100-240 VAC, 50/60 Hz, <0.4 A
	Fuses: T 0.4 L 250 V
Ambient conditions:	Use is only permitted in inside areas
	Contamination level 2; over-voltage category II
Operating temperature:	+15...+35°C
Protection type:	IP 31
Weight:	About 3.3 kg (depending on options included)
IKM - metrology addition	
Air pressure: *)	900...1100 mbar absolute
Piston temperature: *)	+10...+40°C
Ambient temperature: *)	+10...+40°C
Relative air humidity: *)	20...80%
IKM - visualisation addition	
Position sensor: *)	20...200 mm
IKM - transmitter addition	
DMU power supply:	24 VDC stabilised, <0.4 A
Voltage input:	Max. 10 VDC
Current input:	Max. 20 mA

\*) Only sensors specified by DRUCK & TEMPERATUR Leitenberger GmbH can be used. Failure to observe this requirement voids the warranty.

### You can also have your IKM refitted later (fee required):

- Metrology addition
- Visualisation addition
- Transmitter addition

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