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## Introduction

We thank you very much for your confidence in purchasing this product.

This measuring gage is manufactured with high precision parts and carefully adjusted.

Therefore never try to disassemble or change any of the interior parts of this gage.

Do not modify the measuring arms. Do not drop or shock this gage.

Protect gage against high temperature, humidity, dust and dirt.

For a better accuracy and repeatability this gage should be used within an operating temperature of 20 +/-10°C.

This gage is used to measure external diameters, especially measuring wall thicknesses. The gage is supported by intelligent controlled measuring programs. It should only be used for this purpose. Kroeplin assumes no responsibility for damages caused by inexperienced handling



In order to achieve the best use of this measuring instrument it is most important that you first read the operating instructions and have it ready to hand.

## Safety information / EC – Declaration of Conformity



Fit only the recommended battery (→ Preparing to use the gage)!

Use no other types of batteries as they could damage health and cause personal injury. The batteries supplied are not rechargeable!



Insert batteries in accordance with the polarity symbols and use the battery type recommended in these operating instructions.



Ensure that your measuring instrument is accompanied by these instructions when you give it to others to use.



Dispose of the battery and measuring instrument in accordance with environmental regulations. Do not incinerate the batteries.



Do not use an electric marking tool on the caliper gage.



This measuring instrument conforms to the Low Voltage Directive 2006/95/EG and the Directive 2004/108/EG which concerns electromagnetic compatibility.



This measuring instrument conforms to the Directive RoHS 2002/95/EG and the amendment 2008/385/EG.

**PFOS**

This measuring instrument conforms to the Directive PFOS 2006/122/EG.

## Scope of supply

- Measuring instrument
- Operating instructions
- Certificate of quality
- Screwdriver (for changing batteries)
- Battery type: AAA (2 pcs. DURACELL Plus)

## The gage at a glance

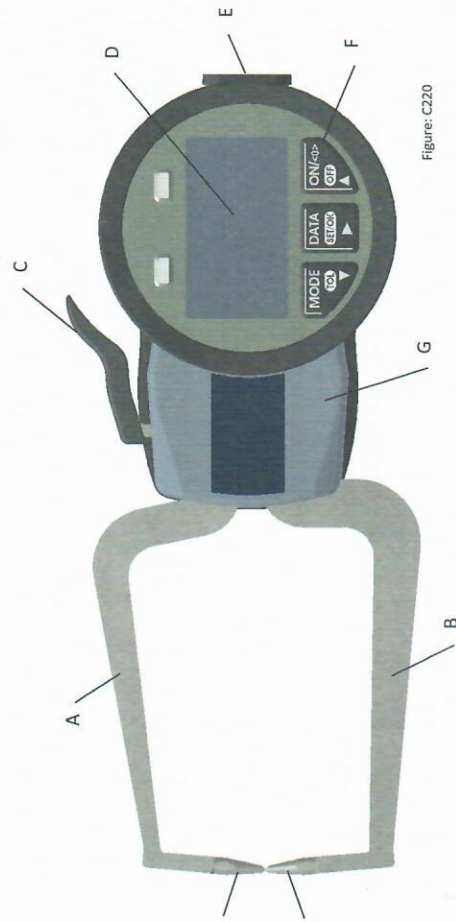


Figure: C220

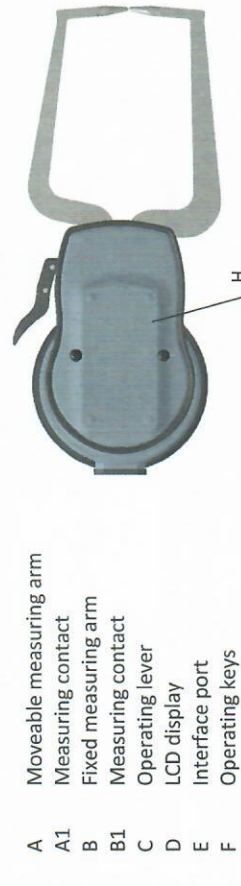
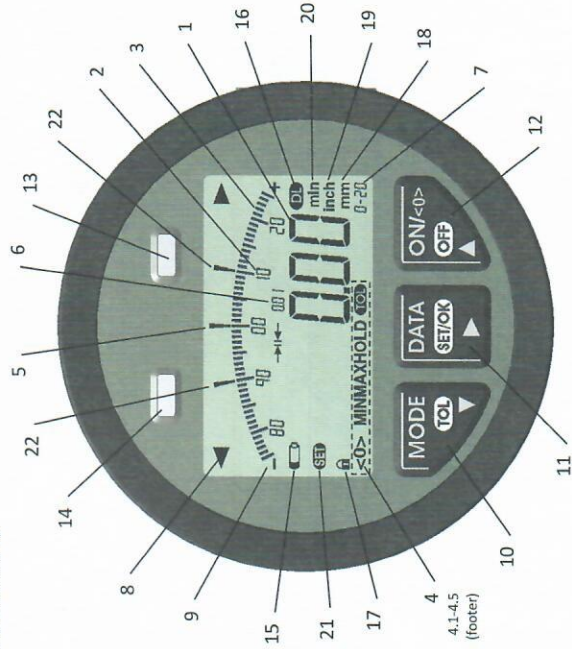


Figure: Back view C220

- A Moveable measuring arm
- A1 Measuring contact
- B Fixed measuring arm
- B1 Measuring contact
- C Operating lever
- D LCD display
- E Interface port
- F Operating keys
- G Cover
- H Battery cover

## LCD – Display

- 1 Numerical Display
- 2 Display inscription
- 3 Analog display
- 4 Measuring programs (footer):
  - 4.1 <0> – Relative mode is activated: 0-Preset with calibration gage
  - 4.2 MIN – program is activated: Determination of the minimum
  - 4.3 MAX – program is activated: Determination of the maximum
  - 4.4 HOLD – program is activated: Determination of the measuring result in measuring position
  - 4.5 TOL – program is activated: Activating the tolerance marks and LED's (red/green)
- 5 Pointer
- 6 Scale interval
- 7 Measuring range / SETUP-Menu
- 8 Tolerance direction
- 9 +/- display for comparison measurement
- 10 Key MODE – TOL
- 11 Key DATA – SET/OK
- 12 Key ON/<0> – OFF
- 13 LED red (tolerance limit)
- 14 LED green (tolerance limit)
- 15 LOW BATT activated
- 16 Data Logger activated
- 17 Key lock activated
- 18 mm – measuring value in millimeter
- 19 inch – measuring value INCH
- 20 min – AUTO-POWER-OFF in minutes
- 21 Setup – Menu active
- 22 Tolerance marks





## Preparing to use the gage / Changing the battery

To open the battery cover (H) loosen the screws (I) by using the screwdriver provided and insert the batteries.





Close the battery cover (H) after changing the batteries and tighten the screws (I).

- Insert the battery ensuring correct polarity!
- The batteries provided are not rechargeable!
- Battery type: 2x 1,5V Micro AAA / MN2400 / LR03 (particularly: DURACELL Plus)
- Always replace both batteries
- Close battery (H) cover carefully and pay attention to cleanliness!
- If the measuring instrument is not used for more than 3 months the batteries must be removed, as a leakage of the battery could cause damage to the instrument.



If LOW-BATT (15)  appears in the display a change of the battery is urgently necessary.

### Switching on:

	1x short	Press and release „ON/<0>“ key	
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### Switching off:

	1x long	Press and hold „ON/<0>“ key (>2s)	
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## Handling during measurement

Press the operating lever (C) of the caliper arm completely downwards and bring the gage in measuring position.



Please be careful with the measuring contacts (A1+B1) and the movable caliper arm (A) and try to manage the gage in measuring position without touching the workpiece.

Hold the gage loose during measurement and release the operating lever (C).

To determine the correct measuring value, please pivot or displace the gage and read from the display the minimum or maximum deflection of the pointer.

The gage software is available with different features and options which allows an easy measurement. For more information see Chapter “Measuring programs”.



Please check the instrument via comparison measurement with a gage block each time before starting a new measurement series (→ zero point adjustment).



The instrument starts the first time with “Absolute – Mode” and “standard program”.

When starting the instrument the last mode will be shown.

The gage switches back into the last used measuring mode, if no key has been pushed for more than 30s in the setup menu. Changes in the setup menu will be adopted.

## Display

Follow up constantly the measured value shown in the display.

When a reverse point is found within a range of  $\pm 20$  digits the pointer and the suitable analog bar will be shown.

If a new reversal point of more than  $\pm 20$  digits is found the analog bar will be adjusted automatically.

**(This program will be started during the initial use or after factory setting.)**

## Absolute – Mode / Relative – Mode




If the „Absolute – Mode“ is activated measurements will be made with reference to the zero point.  
(This mode will be started during the initial use or after factory setting)

If the „Relative – Mode“ is activated measurements will be made with reference to the reference value (gage block) which was selected before. This mode is used for comparison measurement.

Switching between „Absolute– / Relative – Mode“ can be made in MIN / MAX / HOLD and TOL.

### Switch-over from „Absolute – Mode“ into „Relative – Mode“:




The instrument must be switched on.

	Finding the reference value via block gage block (example: 10mm)	
1x short	Zero point adjustment according to the reference value	
	Symbol (4.1) for „Relative-Mode“ appears in the display footer, .....	<0>
	..... as well as the reference value (example: 10mm).	0-Pr-E 10.00

If „ERR 08“ appears in the display the reference point in „Relative - Mode“ is out of the indicating range.

### Switch-over from „Relative – Mode“ into „Absolute – Mode“:

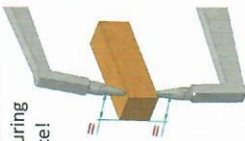
The instrument must be switched on.

	Example: Setting the zero point (10,00mm)	
1x short	The reference value is activated again	

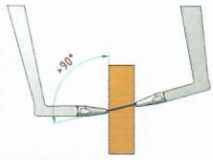
## Program: MIN / MAX / HOLD

### Important:

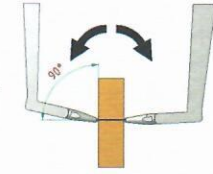
The measuring axis must be in vertical position to the measuring surface!



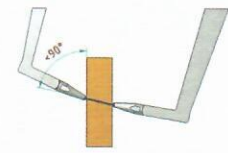
Determination of the minimum measuring value via pivoting the gage (optimal measurement)



Measured value too high



Measured value too small

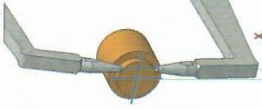


Measured value too high

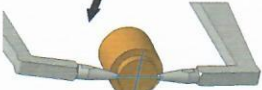
Important:  
The measuring axis must be in vertical position to the measuring surface!



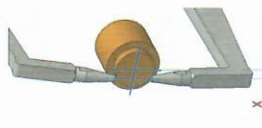
Determination of the maximum measuring value for measurement of narrow grooves via lateral displacement of the gage, where the gage cannot be pivoted vertically.



Measured value too small



Measured value too small



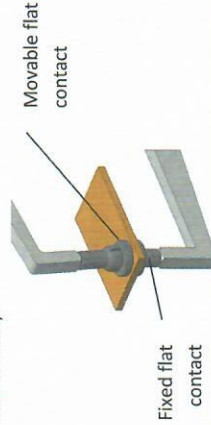
Measured value too small

For checking round parts it is advisable to use measuring gages with chisel contacts (→ Technical Data).

### Important:

The fixed flat contact must be square against the part to be measured! Hold gage steady around 2s!

Measurement of flat material (e.g. foam material) with flat measuring contacts. Take note of the measuring force!  
The movable flat contact aligns optimally so a pivoting or moving of the gage is not necessary.









Scan the QR code to get to the video tutorial



### Program: MIN / MAX / HOLD

The Programs MIN / MAX / HOLD can be used for the „Absolute – Mode“ as well as the „Relative – Mode“.

After selecting the Program is always activated without pressing the operating lever again.

 short	The instrument must be switched on. Activating the Programs will appear in the display footer (4.2 – 4.4).	
	Finding the measured value (Example: 11,37mm) In order to find the new measuring value the gauge must be brought into basic position. The display must show four bars.	
 short	Deactivating the Program and returning to the display.	

### Program: TOL

The TOL-Program is an assistance for checking tolerances during measurements.

Tolerance marks (22), red LED (13) and green LED (14) are activated in this program.  
 The red LED lights up for parts out of tolerance (rejected parts).  
 The green LED lights up for parts within the tolerance (good part).























The tolerance function can be activated in each program (MIN, MAX, HOLD).  
 Five different tolerance ranges are available in „Absolute – Mode“ as well as „REL – Mode“ and are working independently.  
 Please follow the requested requirements of each program for correct measuring results.



The measuring unit („mm“ and „inch“) and scale interval have to be selected before setting the tolerance limits otherwise incorrect measuring results may occur.

### Program: TOL

Configuration tolerance ranges: Example tolerance range 3 / Adjusting the tolerance limit –  
 Example: 10,00 ±0,1mm in the „Absolute – Mode“

 1x long	Activating the SETUP – Menu in the „Absolute – Mode“	
 2x short	„tOL“ will appear in the display	
 1x long	„1“ for tolerance range 1 will appear in the display	
The last selected status will appear in the display / Factory setting: 1		
 2x short	Switch to tolerance range “3”	
 1x long	„tOL LO“ will appear in the display for 2s	
The last saved lower tolerance value will appear.		
Adjusting lower tolerance limit (9,90mm)		
 1x short	Selecting the next digit	
 1x short	Reducing the digit	
 1x short	Selecting the next digit	
 1x short	Reducing the digit	
 1x long	For confirming and saving	
„tOL UP“ will appear in the display for 2s		
The last saved upper tolerance value will appear.		

### Program: TOL

Adjusting upper tolerance limit (10,10mm)		
2x short	Selecting the relevant digit	
1x short	Increasing the digit	
1x long	For confirming and saving	
	Afterwards you will return to the SETUP - Menu.	
2x short	Quitting the SETUP - Menu	
1x long	For confirming and saving. The instrument returns to the last program used	

„ERR 06“ in the display could be caused by the following:

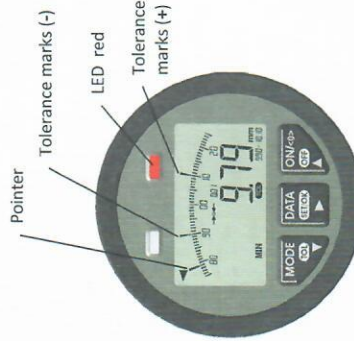
- Tolerance limit is out of the acceptable range
- The lower tolerance limit is above the upper tolerance limit.
- The upper tolerance limit is below the lower tolerance limit.

### Activating / Deactivating the tolerance marks

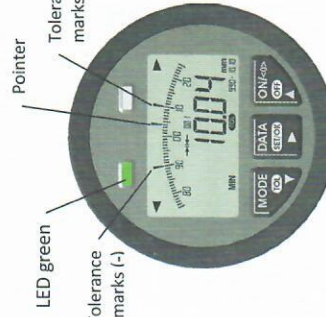
1x long	Activating TOL – Program (Example: MIN+TOL – Program)	
The last selected status will appear in the display / Factory setting: 1		
2x short	Switch to tolerance range “3” The tolerance limit appears in the display down right.	
1x long	Activating tolerance range “3”	
	The instrument returns to the last program used (ex.) The tolerance limit appears in the display down right.	
1x long	Deactivating TOL – Program (Example: MIN – Program)	

### Example: 10,00 ± 0,1mm

Measuring result *out of* tolerance:



Measuring result *within* tolerance:



The LED goes of within 5s after finding the measuring value and lights up again after finding a new measuring value.



## Zero point adjustment (OFFSET)

The gage should be verified before each series of measurements by using a gage block. If there is a deviation from the specified measurement the device should be re-adjusted via SETUP-Menu OFFSET.



**Always the total selected OFFSET value will be shown!**

The value by which the gage must be adjusted has to be added or subtracted.

In order to increase the accuracy of the measurement, the gage should be calibrated in the same position in which later the measurement will be effected.

The instrument must be switched on. The SETUP – Menu can be activated in each program.

1	1x long	Activating the SETUP – Menu	
2	1x short	„OFFSET“ will appear in the display	
3	1x long	Activating the OFFSET – Menu	
4	short	Selecting the sign <i>plus (+) / minus (-)</i> Press key several times	
5	1x short	Selecting the first digit to be settled	
6	short	Increasing the first digit of.....	
7	short	.....Reducing the first digit	
8	1x short	Selecting the next digit	
9	Repeat step 6-8 until the OFFSET value is totally entered. For scale interval 0,005 3 digits are editable!		
10	1x long	For confirming and saving	
11		Afterwards you will return to the SETUP - Menu.	

## Zero point adjustment (OFFSET)

12	1x short	Quitting the SETUP – Menu	
13	1x long	For confirming and saving. The instrument returns to the last program used	

The instrument must be adjusted until the nominal value is reached!



If „ERR 07“ appears in the display the OFFSET value is out of the acceptable range (→ Technical Data). The instrument must be returned to the manufacturer for checking.

## Changing the unit of measurement mm / inch (UNIT)

You can select between „mm“ and „inch“.

The gage must be switched on. The SETUP – Menu can be activated in each program.








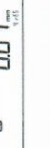







1x long	Activating SETUP – Menu	
3x short	„UNIT“ will appear in the display	
1x long	Activating UNIT – Menu	
The last used measuring unit will appear in the display / Factory setting: mm		
short	Changing the measuring unit	
1x long	For confirming and saving	
	Afterwards you will return to the SETUP - Menu.	
3x short	Quitting the SETUP – Menu	
1x long	For confirming and saving. The instrument returns to the last program used	

After changing the unit the tolerance limit must be checked again, as the tolerance limit will be rounded automatically to the new unit and could be incorrect.

## Changing the scale interval (rES)

You can select the scale interval.

The gage must be switched on. The SETUP – Menu can be activated in each program.

 1x long	Activating SETUP – Menu	
 4x short	„rES“ will appear in the display	
 1x long	Activating rES – Menu	
The last used scale interval will appear in the display		
 1x short	Changing the scale interval	
 1x long	For confirming and saving	
	Afterwards you will return to the SETUP - Menu.	
 4x short	Quitting the SETUP – Menu	
 1x long	For confirming and saving. The instrument returns to the last program used	



















After changing the scale interval the tolerance limit must be checked again, as the tolerance limit will be rounded automatically and could be incorrect.

## Auto-Power-Off (A-OFF)

The following time intervals can be selected:

- 1 minute
- 5 minutes
- 10 minutes
- OFF (deactivated the „Auto-Power-Off“)

The gage must be switched on. The SETUP – Menu can be activated in each program.

 1x long	Activating SETUP – Menu	
 5x short	„A - OFF“ will appear in the display	
 1x long	Activating the A – OFF – Menu	
The last selected time interval will appear in the display / Factory setting: 1 min		
 short	Increasing the AUTO-OFF-time Press and release the key for several times	
		
 short	Press and release the „MODE“ key for several times in order to increase or deactivate AUTO-OFF time	
 1x long	For confirming and saving	
	After 2s you will return to the SETUP - Menu	
 3x short	Quitting the SETUP – Menu	
 1x long	For confirming and saving. The instrument returns to the last program used	



## Data transfer

The measured value shown on the display can be transferred with the „DATA“-key and the connected interface (→ Interfaces).

The gage must be switched on and an interface has to be connected.













 1x short	Data will be transferred.	
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## Data Logger (d-LOG)











This instrument is provided with a datalogger (DL) which stores the measured value into the internal memory by pressing the „DATA“ key. Max. 80 measuring values can be stored with consecutive numbering.

The printing and reading of the DL-data will be carried out via interfaces (→ Interfaces). „RESET“ deletes all DL-data within the internal memory.

The gage must be switched on. The SETUP – Menu can be activated in each program.

 1x long	Activating SETUP – Menu	
 6x short	„d - LOG“ will appear in the display	
 1x long	Activating the d – LOG – Menu	
The last selected status will appear in the display / Factory setting: OFF		
 short	Switch on Data Logger (DL) to collect measured values ....or	
 short	Printing DL-data with a DP-1VR printer via DIGIMATIC interface.....or	
 short	Transmitting DL-data to a computer via USB- or U-WAVE®- interface	

## Data Logger (d-LOG)

 short	.....delete internal memory	
 1x long	For confirming and saving	
	Afterwards you will return to the SETUP - Menu.	
 2x short	Quitting the SETUP – Menu	
 1x long	For confirming and saving. The instrument returns to the last program used	
	Symbol (16) for „Datalogger“ (DL) appears in the display.	



Measuring values cannot be saved if the symbol (16) „DL“ is blinking (full memory). The measured values can be printed and read via interfaces.











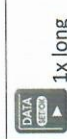




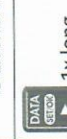

Shortcut for direct activating and deactivation the d-LOG menu.

	Activating „d-LOG“ – Menu	
 +  short	„d - LOG“ will appear in the display	
 +  short	The last selected status will appear in the display / Factory setting: OFF	
	Deactivating „d-LOG“ – Menu	
 +  short	The instrument returns to the last program used. (Example: 0,00mm)	

## Factory settings (RESET)

Resetting the instrument.

The gage must be switched on. The SETUP – Menu can be activated in each program.








 1x long	Activating SETUP – Menu	
 7x short	„RESET“ will appear in the display	
 1x long	Activating RESET – Menu	
 1x short	Changing selection	
 1x long	For confirming and saving	
	Afterwards you will return to the SETUP - Menu.	
 1x short	Quitting the SETUP – Menu	
 1x long	For confirming and saving. The instrument returns to the last program used.	

The instrument is now reset to the status as delivered.

## Activating / Deactivating keypad lock

You can „lock“ the keypad on your instrument. This protects the keypad against inadvertent activation.

**When the keypad lock is active nevertheless the measuring value can be transferred by using the „DATA“ key and by using the „ON/<0>“ the instrument can be switched on and off.** If locked keys are pressed the symbol (17) „Keypad lock active“ appears in the display. The key pad lock can be activated in each measuring program.

 +  1x simultaneous / short	For activating the keypad lock press and hold both keys simultaneously.	
	Symbol (17) for „keypad lock active“ appears in the display footer.	
 +  1x simultaneous / short	For deactivating the keypad lock press and hold both keys simultaneously.	

## Error report

ERR 01	Unknown Input (Input is not supported)
ERR 02	Unknown Input (Input is not supported)
ERR 06	Tolerance limit is out of the acceptable range
ERR 07	OFFSET is out of the acceptable range
ERR 08	<b>The instrument must be returned to the service centre for checking</b>
ERR 09	Reference point in „Relative-Mode“ is out of the indicating range
ERR 10	no communication with computer or peripheral devices interruption of communication during data transfer

## Spare parts / Accessories

### Part-No.:

0230-38 Screws M2,5x6 (I)  
0683-92 2 pcs. DURACELL Plus Typ AAA  
1070-03 Cover (G)

	A1 <sup>1)</sup>	B1 <sup>1)</sup>	Holding unit	Wooden box
C110	0251-04	0251-04	8004-50	1732-45
C110T	1533-51	0701-77		
C110S	-	-		
C1R10	0251-04	-		
C1R10S	-	-		
C220	0251-04	0251-04		
C220T	1533-50	0701-75		
C220S	-	-		
C2R20	0251-04	-		
C2R20S	-	-		

<sup>1)</sup>

A1 Measuring contact (movable measuring arm)

B1 Measuring contact (fixed measuring arm)


- Measuring contacts are not interchangeable



## Spare parts / Accessories

### Part-No.:

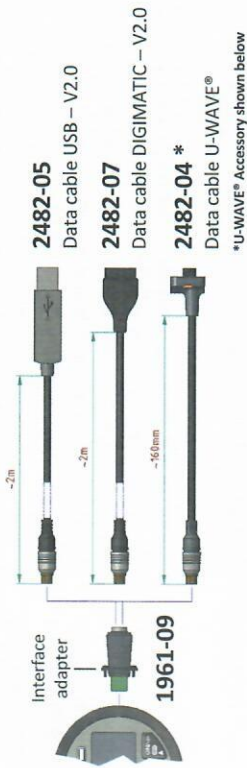
0230-38 Screws M2,5x6 (I)  
 0683-92 2 pcs. DURACELL Plus Typ AAA  
 1070-32 Cover (G)

	A1 <sup>*)</sup>	B1 <sup>*)</sup>	Wooden box
C330	0251-26	0251-26	
C330S	-	-	
C3R30	0251-26	-	
C3R20S	-	-	
C330T	1503-04	0701-73	
C450	0251-26	0251-26	
C450S	-	-	
C450B	0251-20	0251-20	
C450F	0251-20	0251-20	
C4R50	0251-26	-	
C4R50S	-	-	
C450T	1503-04	0701-73	
C4100	0251-20	0251-20	HK
C4150	0251-20	0251-20	
C8100	0251-20	0251-20	
C8R100	0251-20	0251-20	
C8100T	1503-04	0701-73	

\*)

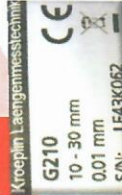
- A1 Measuring contact (movable measuring arm)
- B1 Measuring contact (fixed measuring arm)
- Measuring contacts are not interchangeable

## Interfaces



\*U-WAVE® Accessory shown below

Valid from S/N: 1.....  
 Always specify serial number  
 when ordering interfaces or  
 accessories!!!



## Compatibility:

The USB interface is compatible from USB 1.1.+2.0.  
 The Digimatic interface is compatible with all Digimatic devices  
 U-WAVE® specifications see details of Mitutoyo.

No special drivers are required for using the data cable USB 2.0. The instrument is recognised as a  
 USB keyboard interface (HID).

The measured values will be transmitted directly to Excel or other text or statistic programs.  
 After each measured value a separator is sent as an [Enter] command

## U-WAVE® - Accessory:

