

# Ultrasonic Flaw Detector

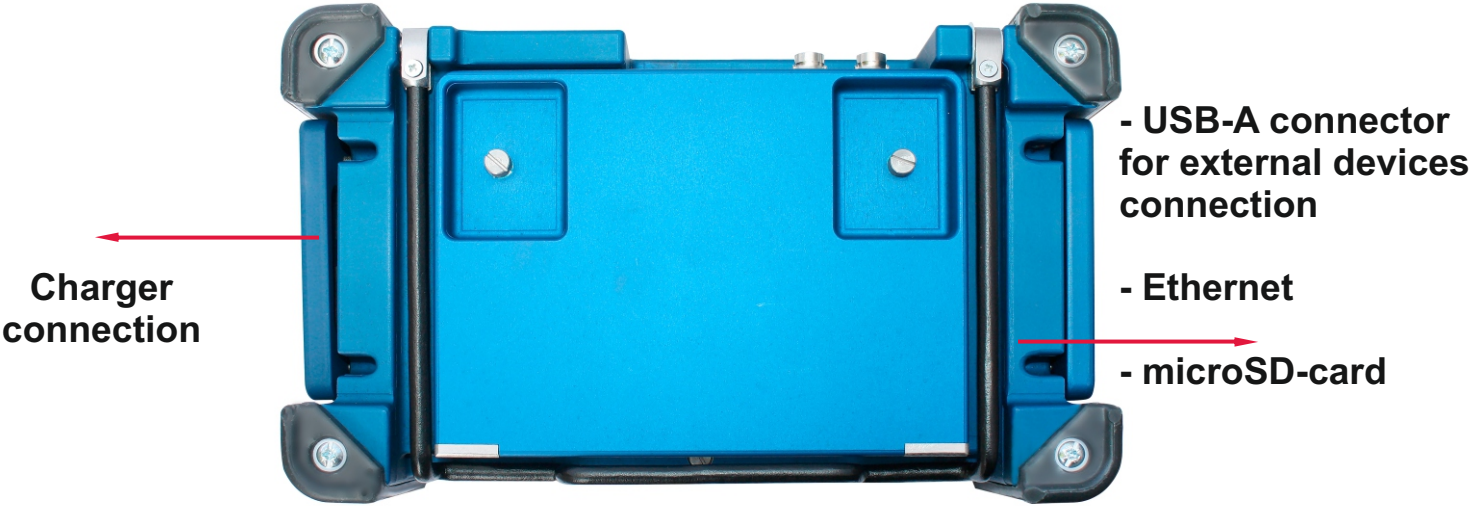
# SONOCON BL



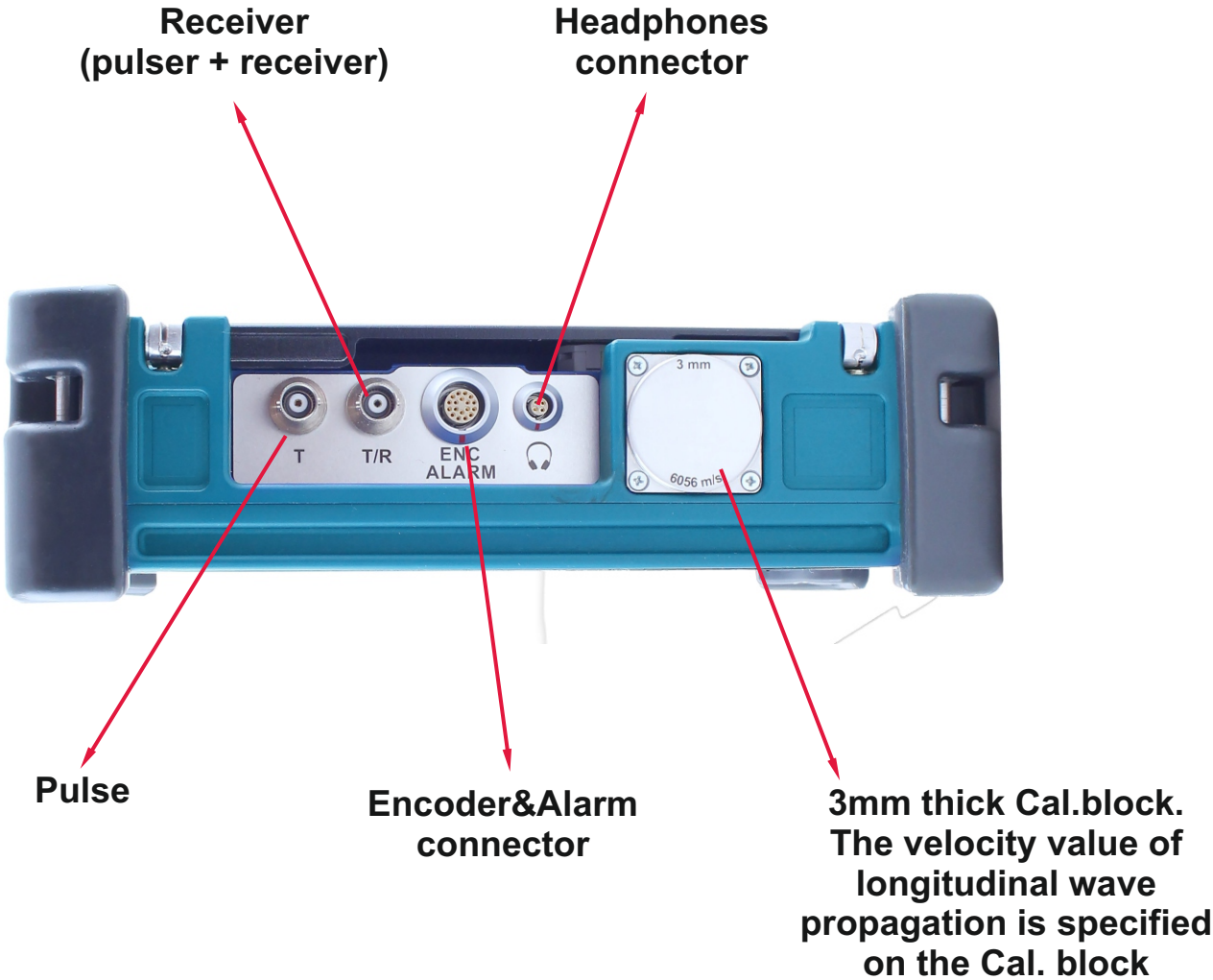
## Quick start guide

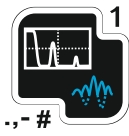
- Common features **C**
- UT version features **B**
- Thickness Gauge + version features **T**

# Rear Panel of the Flaw Detector

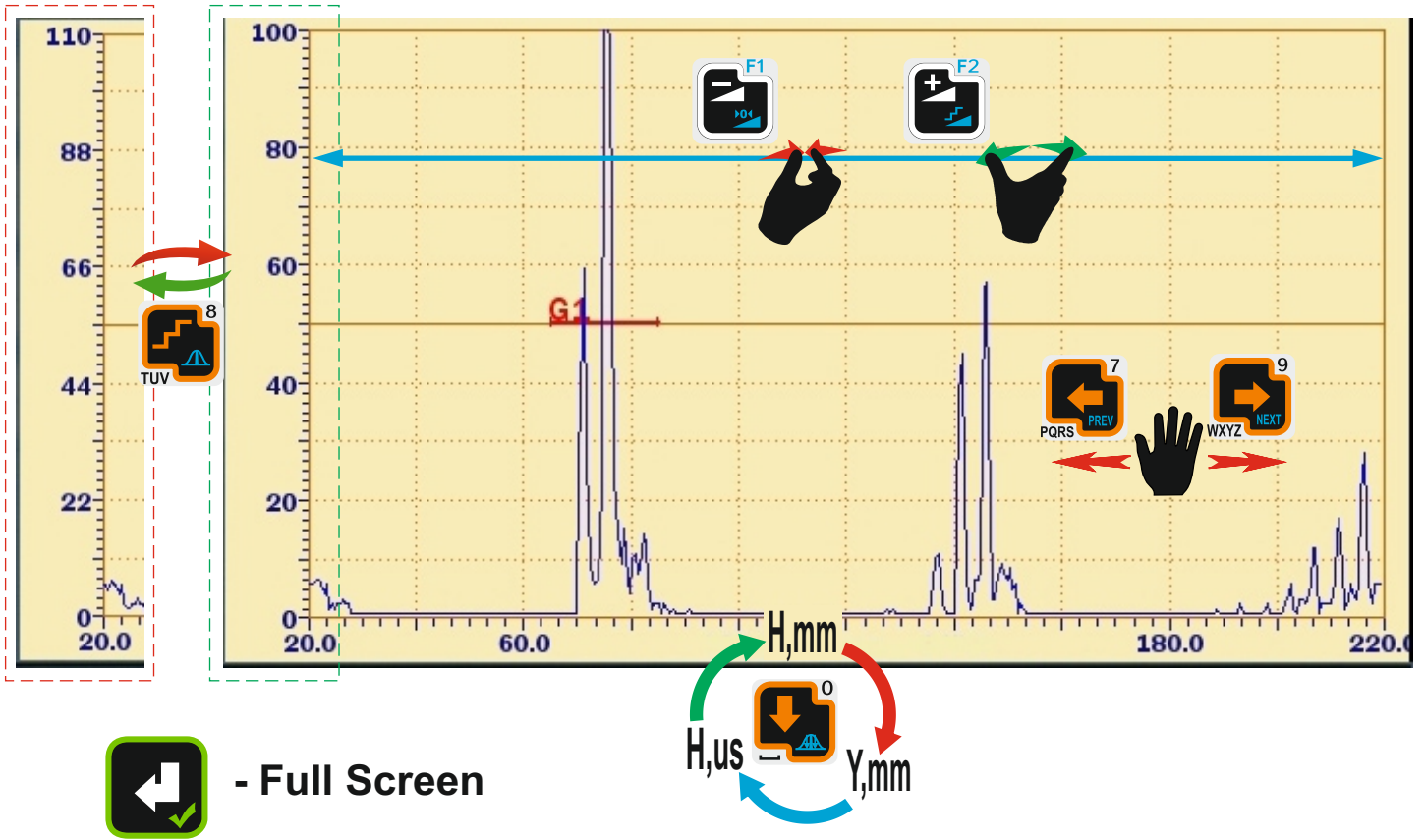


# Side Panel of the Flaw Detector



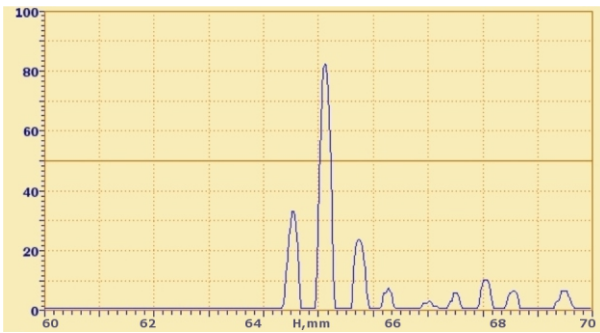


# A-SCAN MANIPULATION <sup>©</sup>

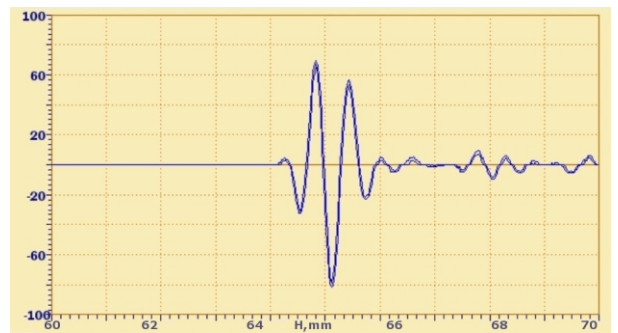


- Full Screen

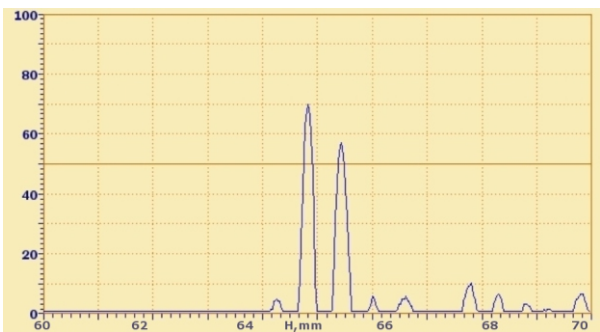
# RECTIFICATION CHOICE <sup>©</sup>



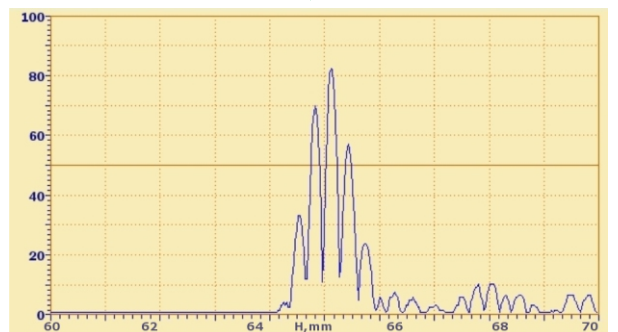
Negative halfwave



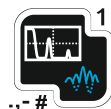
Radio Frequency

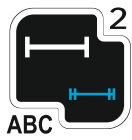


Positive halfwave



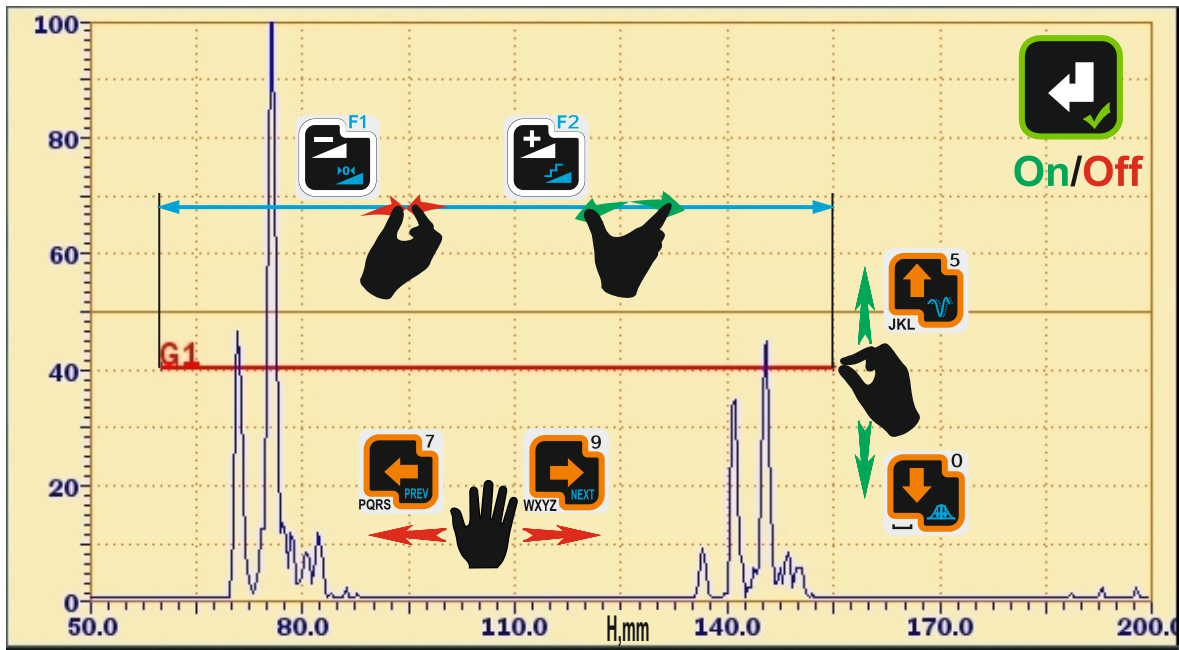
Full wave



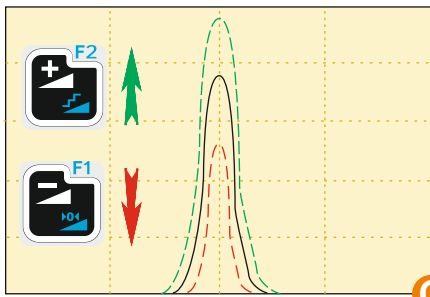


# GATES MANIPULATION <sup>C</sup>

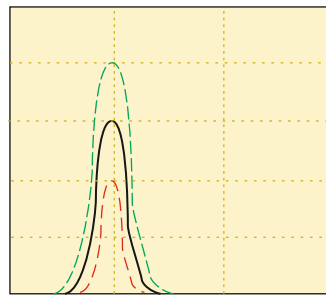
or



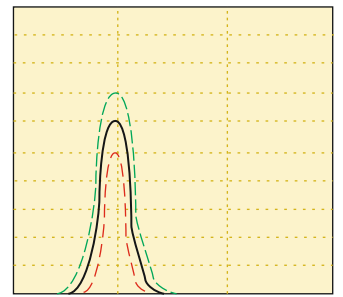
## GAIN MANIPULATION



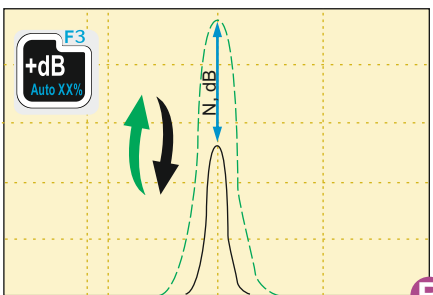
Gain adjustment <sup>C</sup>



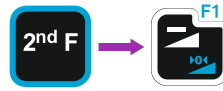
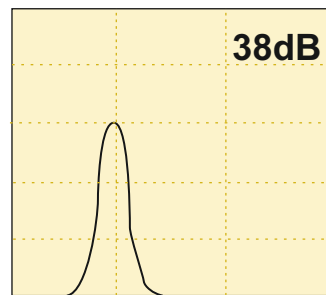
Gain step variation



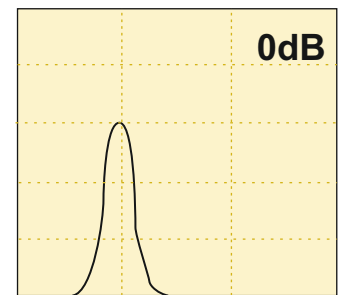
<sup>C</sup>



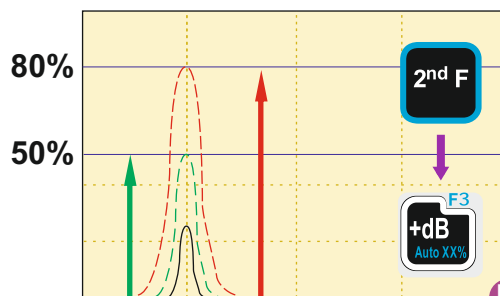
Add / remove some number of dB <sup>B</sup>



Reference gain



<sup>B</sup>



Put signal to the reference level (80% or 50%) <sup>B</sup>

# MENU NAVIGATION AND PARAMETERS ADJUSTMENT <sup>Ⓒ</sup>

The image shows the 'PULSER' menu interface. On the left, a vertical list of parameters is shown: PRF mode (960 Hz), Comfort, PRF: 960 Hz, Pulsar type: Square pulse, Amplitude: 50 V, Energy: 20 ns, Damping: Off, and Ac. ghosts control: Off. A hand icon points to the 'Energy' parameter, which is circled in yellow. To the right is a graph showing a pulse waveform with a horizontal line at approximately 60 units. Below the graph is a row of function buttons: +dB, dBr, AGC, TCG, DAC, DGS, AWS, a waveform icon, '1', '50%', a vertical bar icon, a waveform icon, a snowflake icon, a magnifying glass icon, a keypad icon, and a battery icon. At the bottom, there are two rows of menu buttons: PROBE, TEST OBJECT, SCAN, GATE 1, GATE 2, MEASURE, PULSER, RECEIVER; and TCG/DAC, DGS, AWS D1.1, AGC, COUP. GATE, CURSORS, MEMORY, OPTIONS. Navigation arrows and icons (numbered 5, 0, 7, 8, 9) indicate how to move between these elements.

# INDICATION PANEL <sup>Ⓑ</sup>

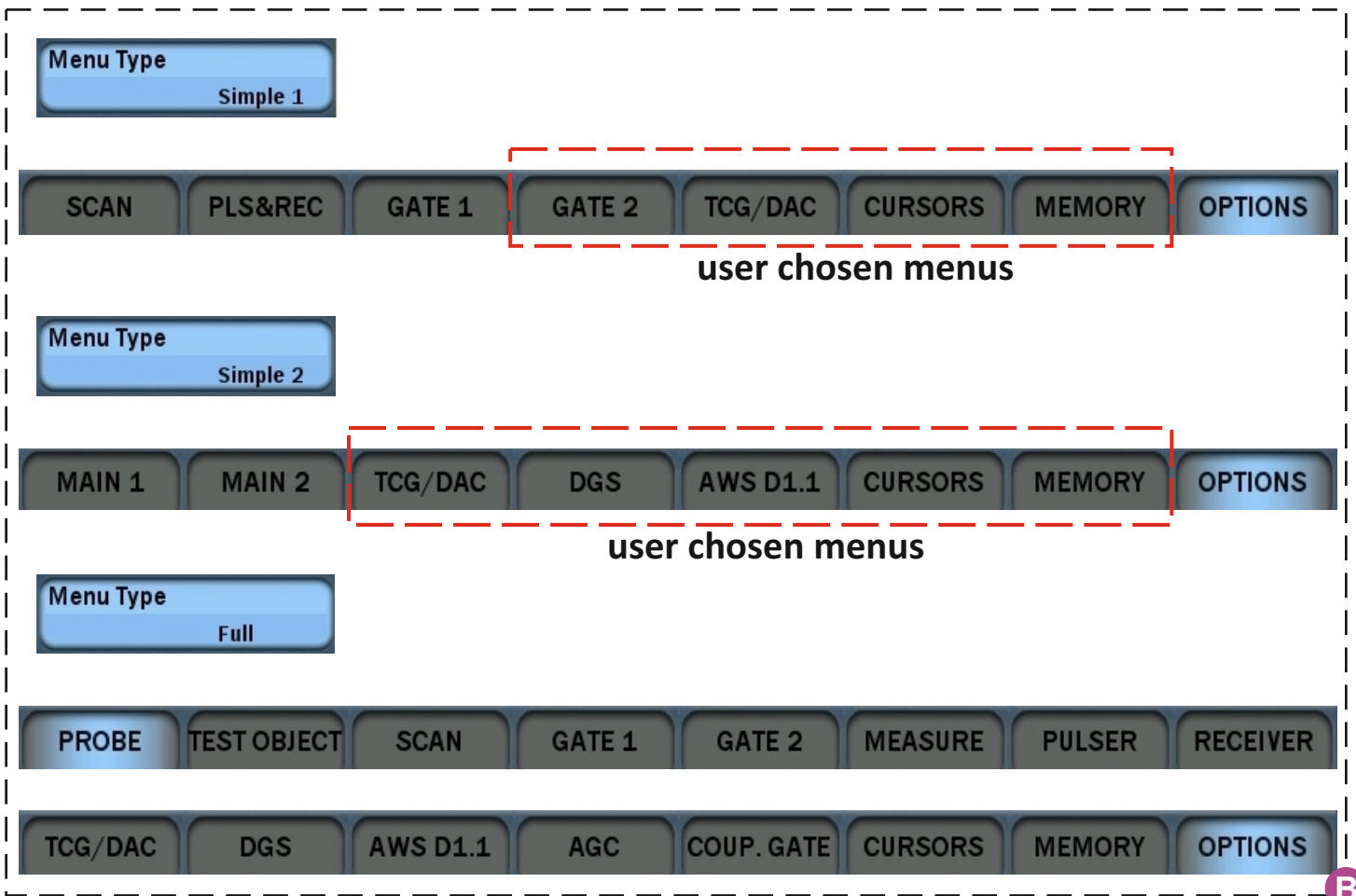
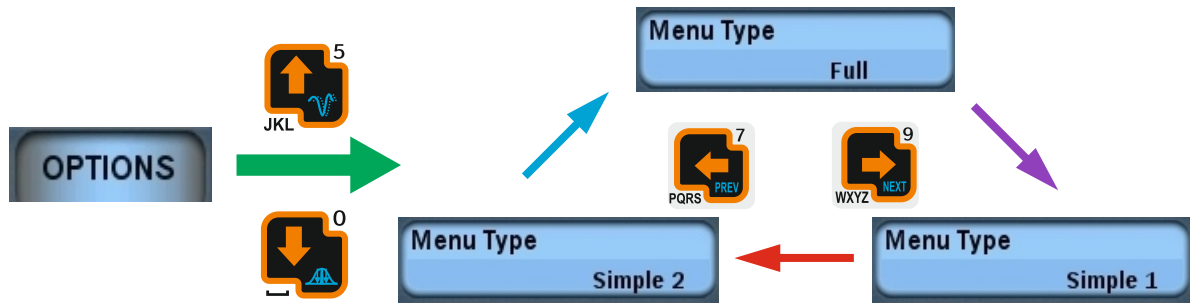
The image shows a close-up of the 'Indicators panel' at the top of the device. It displays several numerical values: '0.0' on the left, 'F: 5.0 V: 5800' and 'α: 0.0 Z: 0.00' in the middle, and 'Δ: -18.4 H: ...' and '-18.4' on the right. Below these values is a row of function buttons: +dB, dBr, AGC, TCG, DAC, DGS, AWS, a waveform icon, '1', '80%', a vertical bar icon, a waveform icon, a snowflake icon, a magnifying glass icon, a keypad icon, and a battery icon. Red arrows point from text labels to specific values: 'Gain' points to '0.0', 'Probe frequency' points to 'F: 5.0', 'Sound velocity' points to 'V: 5800', 'Measurands' points to 'Δ: -18.4', 'Probe angle' points to 'α: 0.0', and 'Probe zero' points to 'Z: 0.00'. A label 'Indicators panel' with an arrow points to the entire top section.

# INDICATORS <sup>B</sup>

N dB addition to the current gain:	 / 	- Not added / Added
Reference gain mode:	 / 	- Off / On
AGC:	 / 	- Inactive / Active
TCG:	 / 	- Inactive / Active
DAC system:	 / 	- Inactive / Active
DGS system:	 / 	- Inactive / Active
AWS rating:	 / 	- Inactive / Active
Measurement threshold:	 / 	- Edge / Peak
Measurement mode:	 /  /  / ...	- 1, 2 – gates 1 and 2; C1, C2 – cursors 1 and 2.
Reference level:	 / 	- Reference level for amplitude measurement in % of vertical scale
Probe type:	 / 	- Single element / Dual element
Rectification mode:	 /  /  / 	- Radio Frequency / Full wave / Positive half waves / Negative half waves
Signal freeze modes:	 /  /  / 	- Off / Frozen / Frozen + Live signals / Estimate mode
Zoom modes:	 /  / 	- Off / Zooming gate 1 / Zooming gate 2
Direct manipulation modes:	 /  /  / 	- Off / A-Scan manipulation / Gate 1 manipulation / Gate 2 manipulation
Battery indicator:	 ... 	- Full / ... / Almost empty

# MENU STRUCTURE

In UT software version there are 3 sets of main menu - up to your choice:



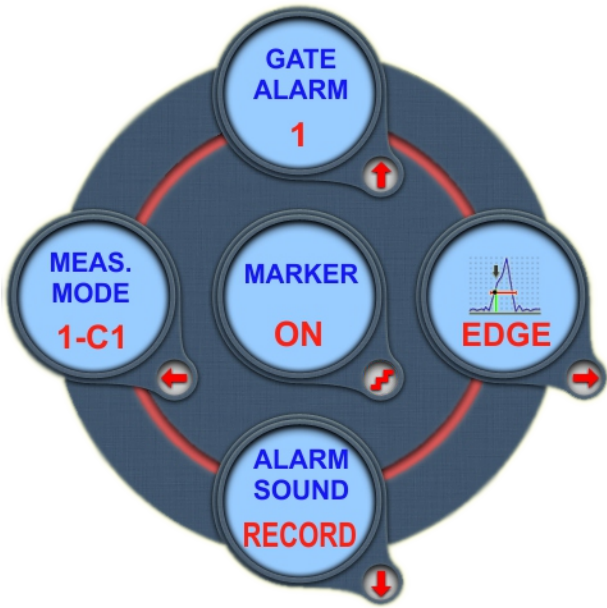
In Thickness Gauge+ software version there is only one menu type:



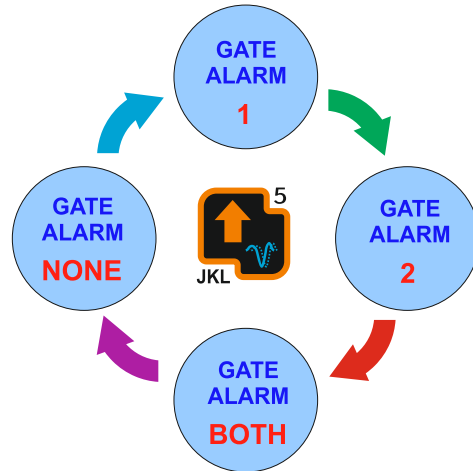


# QUICK ACCESS TO MAIN PARAMETERS<sup>B</sup>

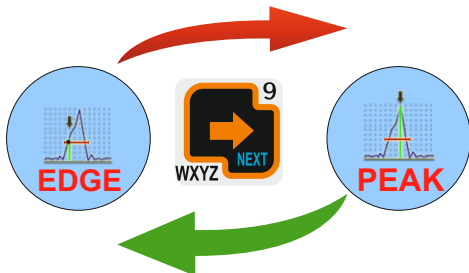
## UT-B 1. Measurement and alarm



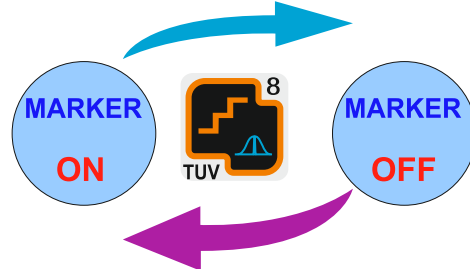
«Gates choice for Flaw Alarm System»



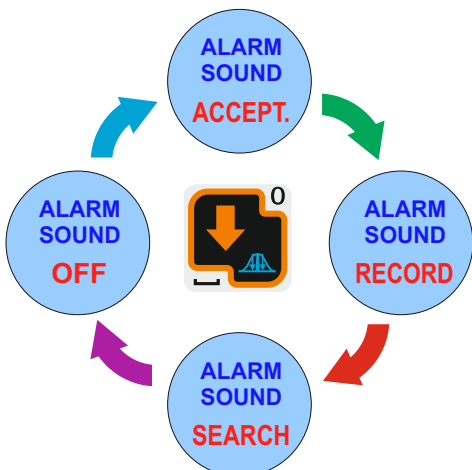
«Time/distance measurement threshold choice»



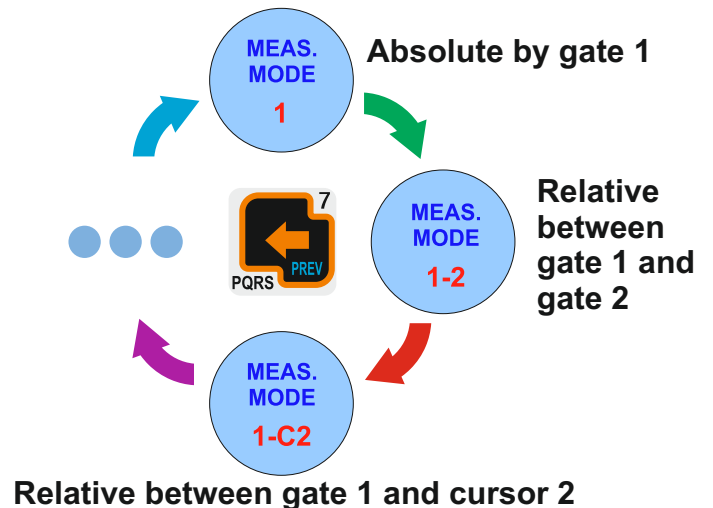
«Measurement point marker»



«Choice of the gate(s) level for the sound alarm»



«Choice of gate(s) and cursor(s) for absolute or relative measurements»

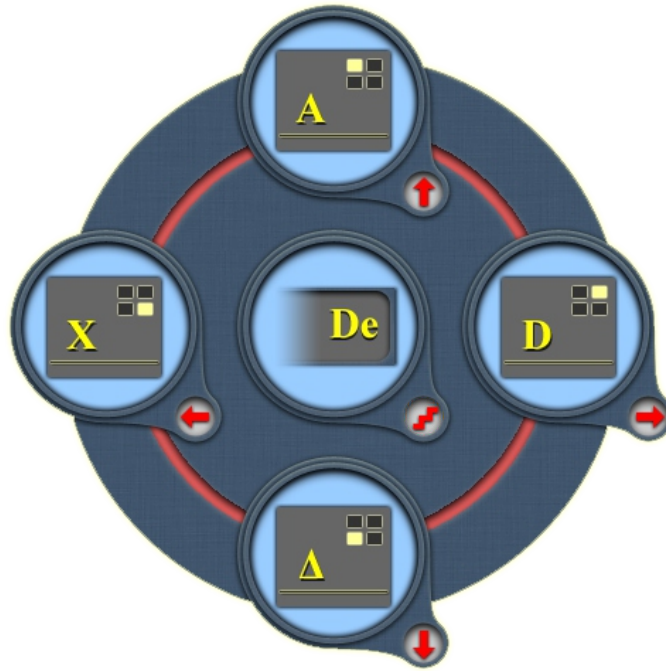




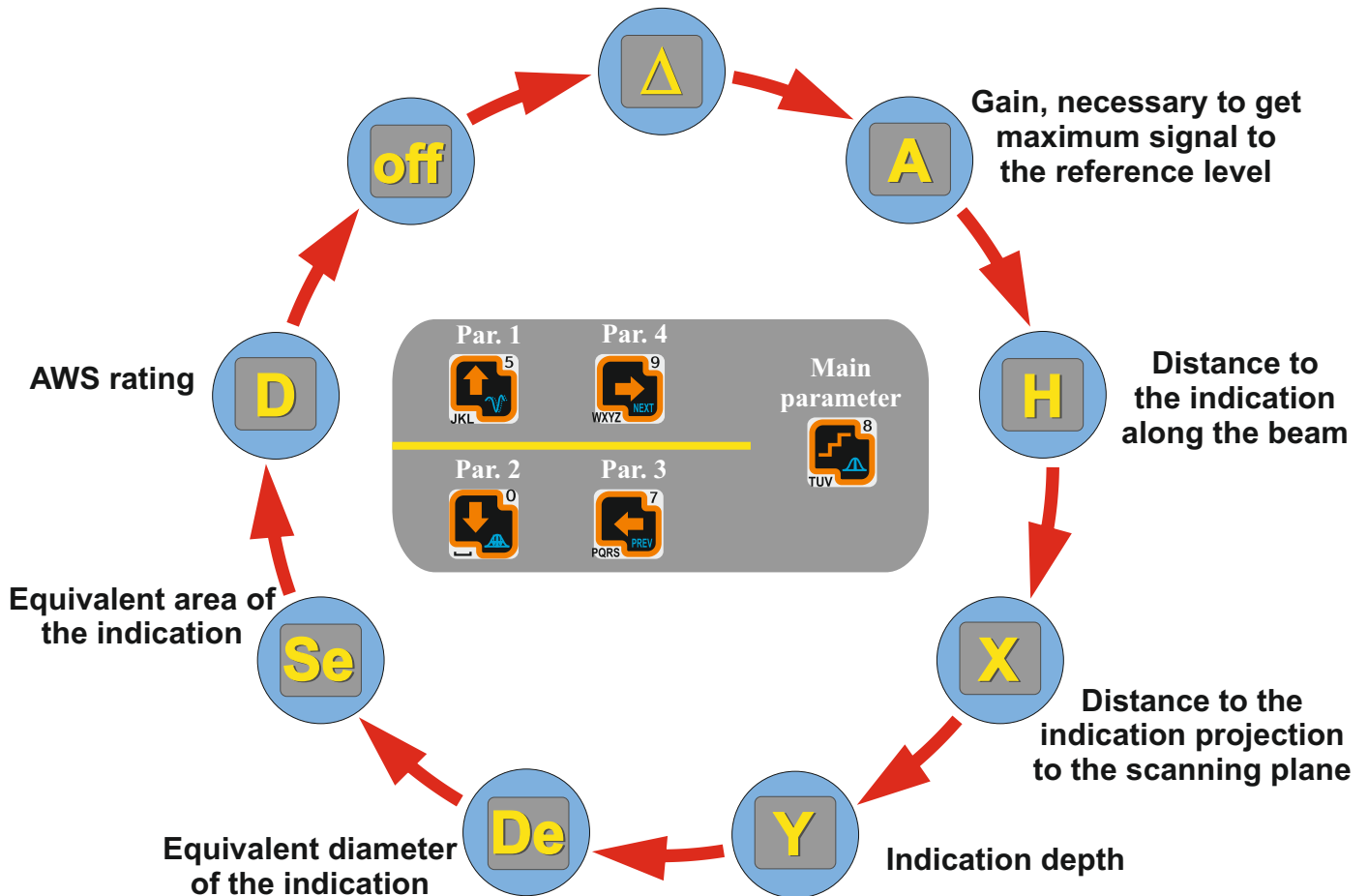


# QUICK ACCESS TO MAIN PARAMETERS<sup>B</sup>

## UT-B 2. Measurands choice



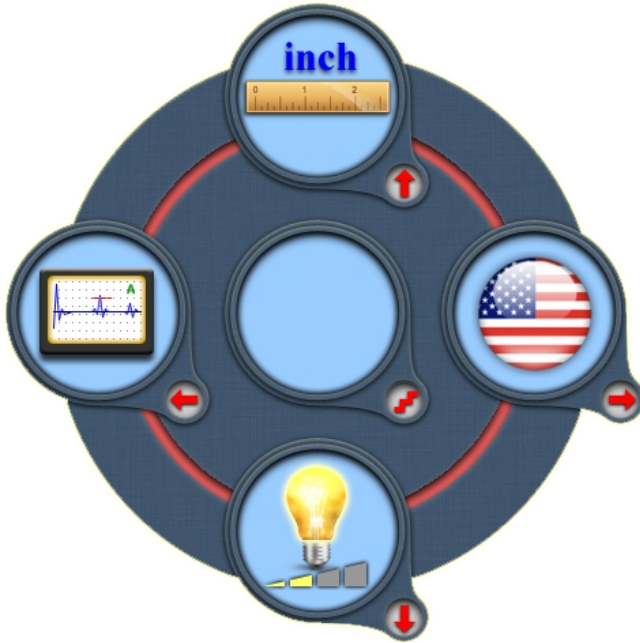
Maximum signal amplitude,  
relative to the reference level



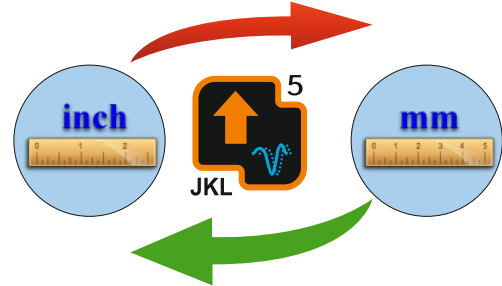


# QUICK ACCESS TO MAIN PARAMETERS<sup>B</sup>

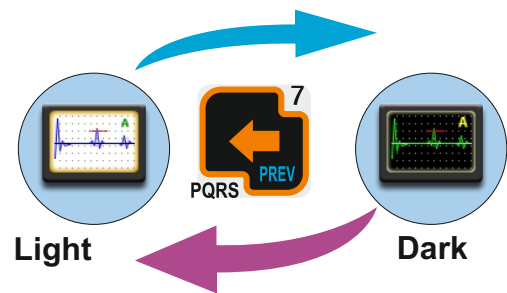
## UT-B 3. Display options



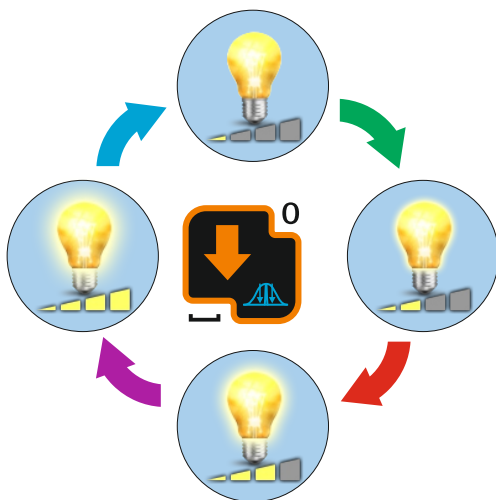
«Switching measurement units»



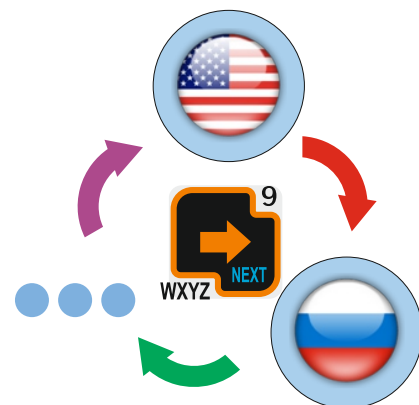
«Switching color schemes»



«Display brightness adjustment»



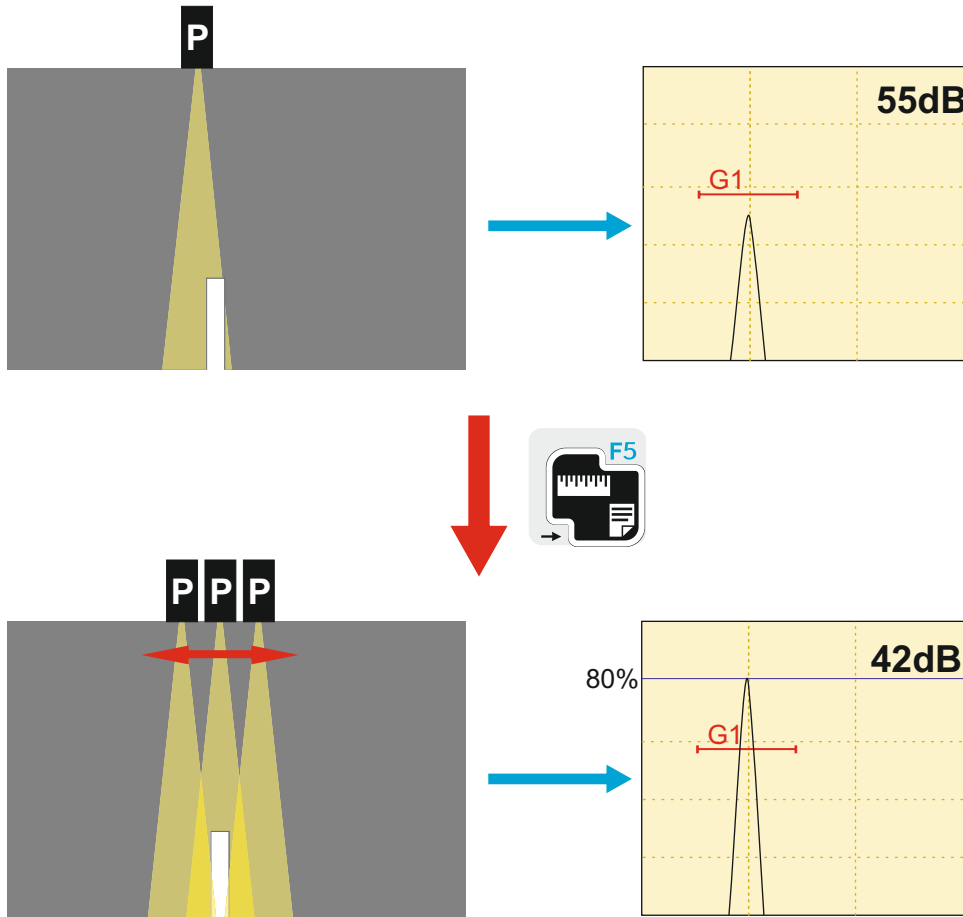
«Interface language choice»



# INDICATION SEARCH, EVALUATION AND DOCUMENTATION AIDS<sup>B</sup>

## Evaluate mode

Helps finding the “best” signal. Just turn it on and scan.



Review all readings and save the indication if necessary

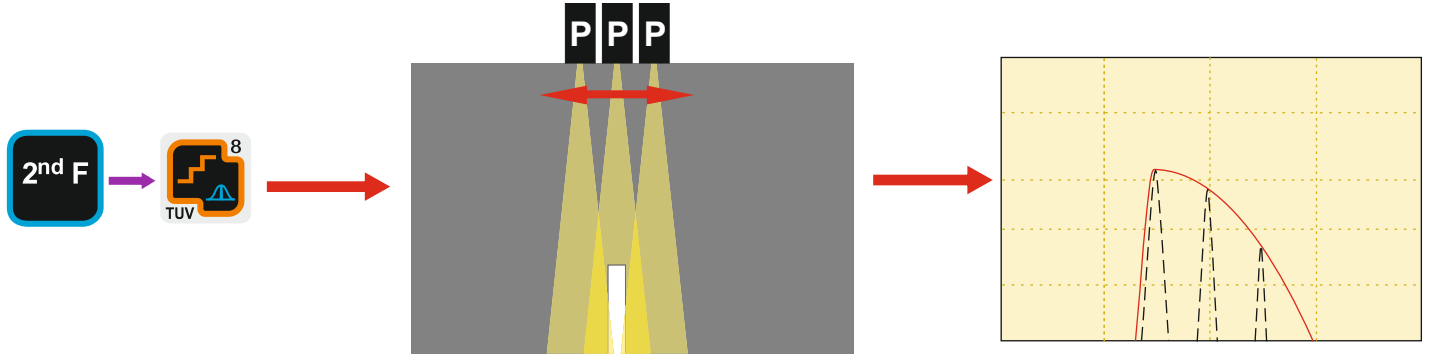


- switches evaluate mode off  
and retrieves the original gain

# INDICATION SEARCH, EVALUATION AND DOCUMENTATION AIDS <sup>B</sup>

## Peak hold mode

Saves the peak values of all signals along the A-Scan.

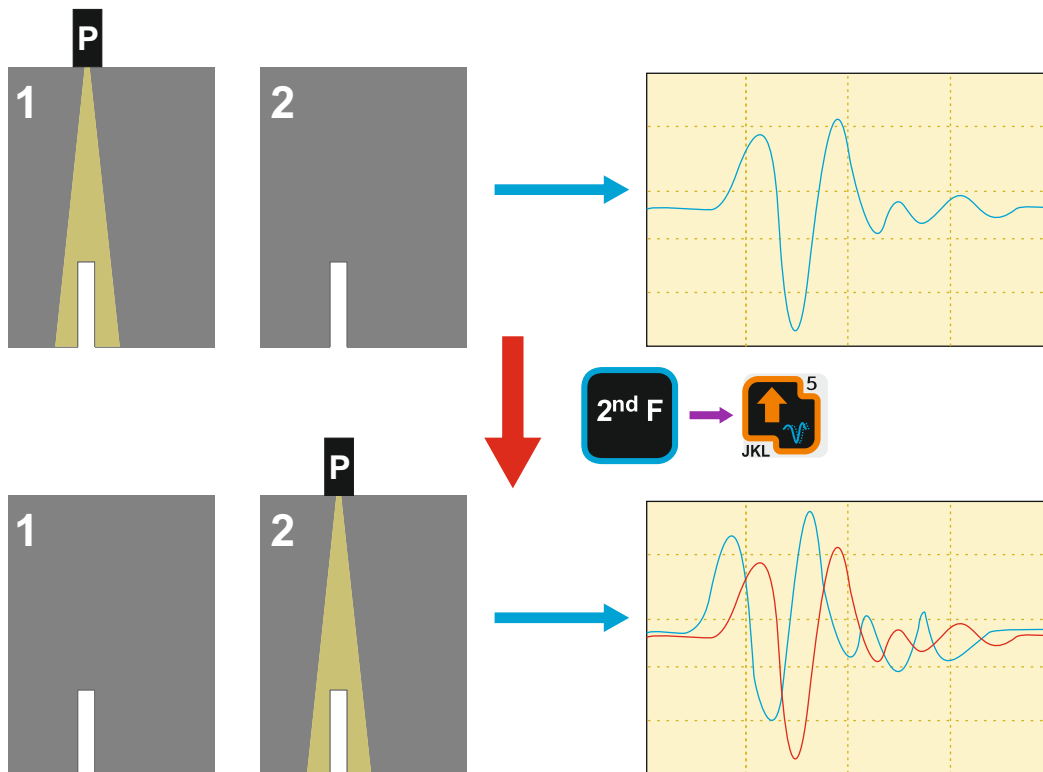


**2nd F** →  - Peak curve reset

**2nd F** →  - Peak hold mode off

## Signals compare mode

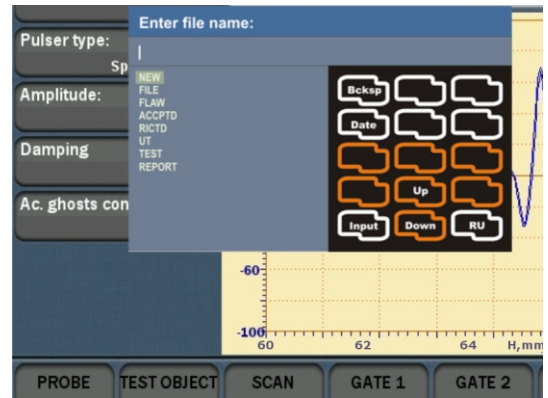
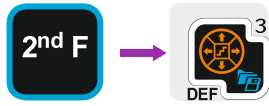
Displays both “frozen” and current signals.



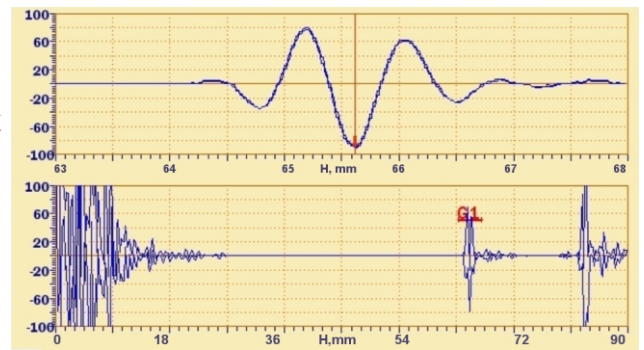
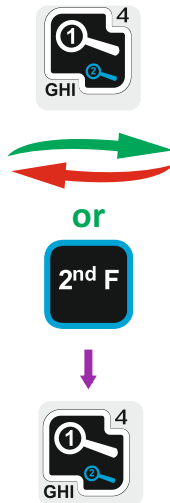
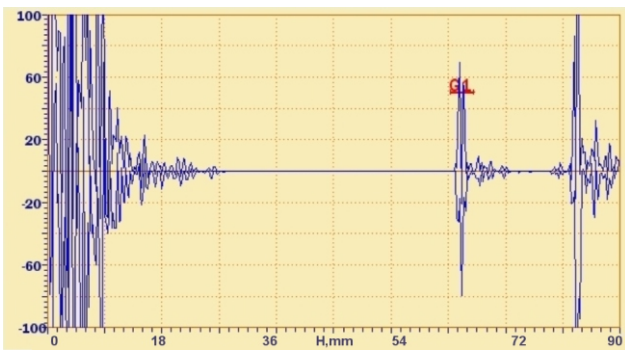
**2nd F** →  - Signals compare mode off

# INDICATION SEARCH, EVALUATION AND DOCUMENTATION AIDS <sup>B</sup>

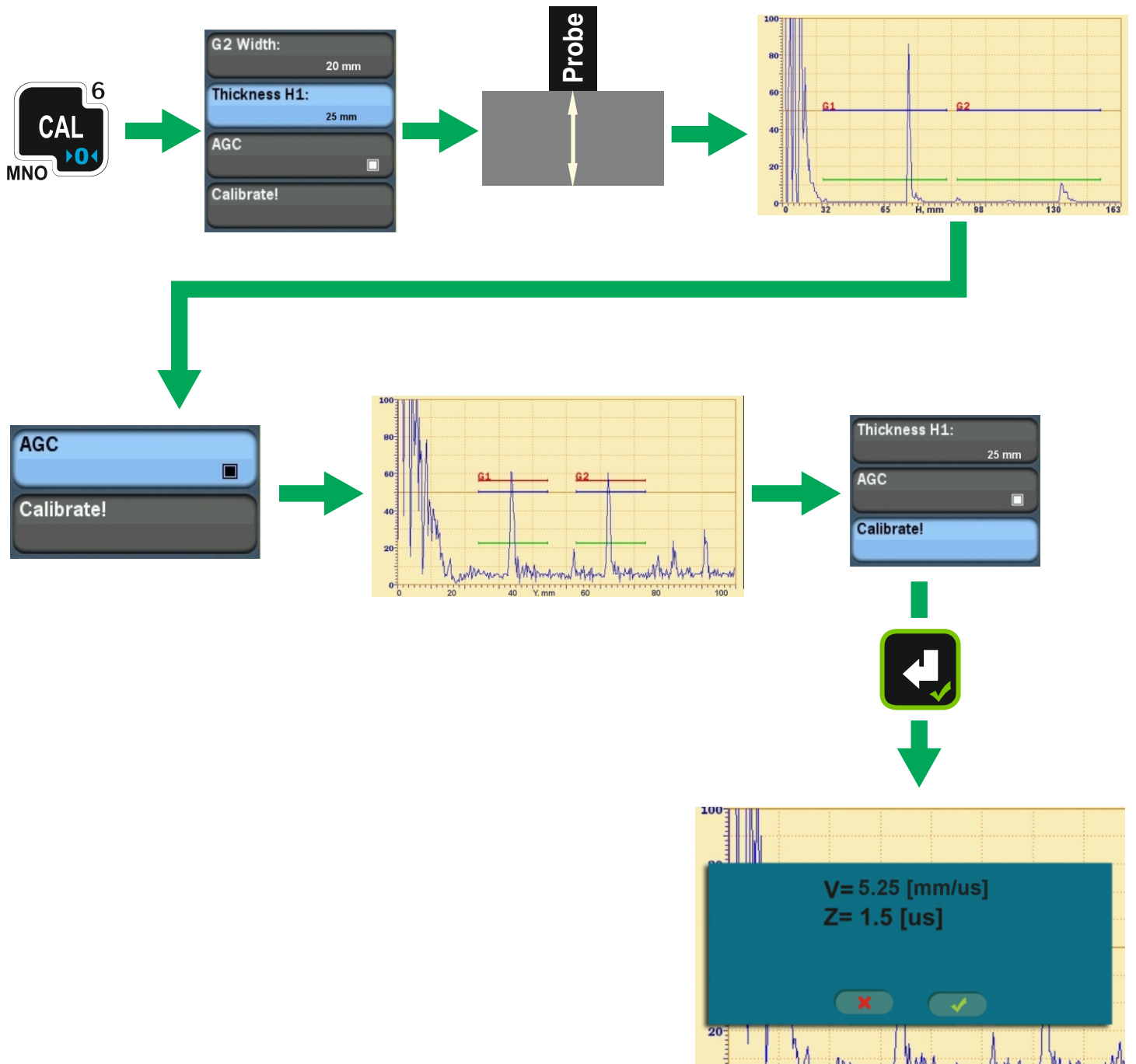
Memory shortcuts. Results saving



## Smart zoom mode

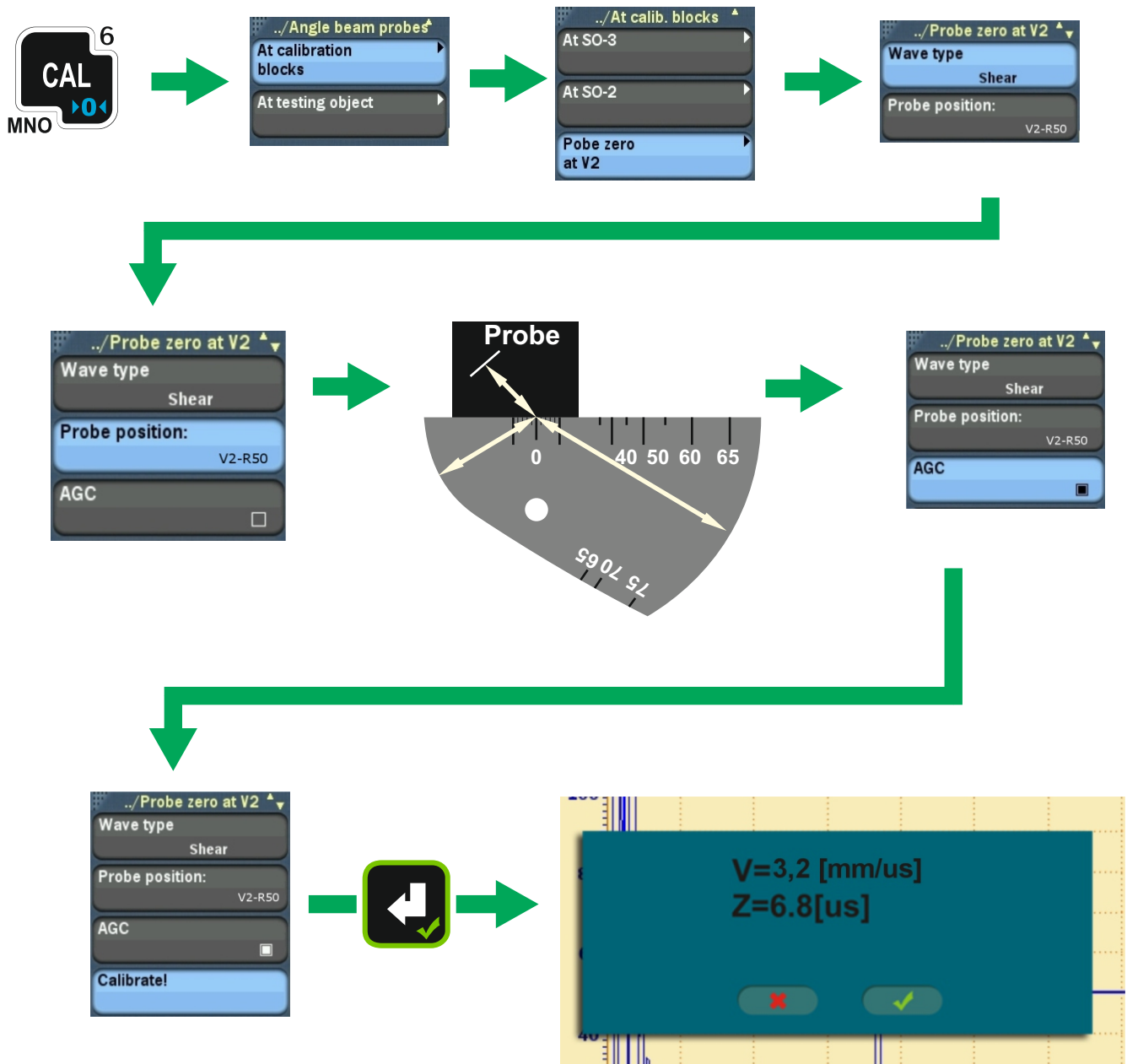


# STRAIGHT-BEAM PROBES CALIBRATION <sup>B</sup>



# ANGLE-BEAM PROBES CALIBRATION <sup>B</sup>

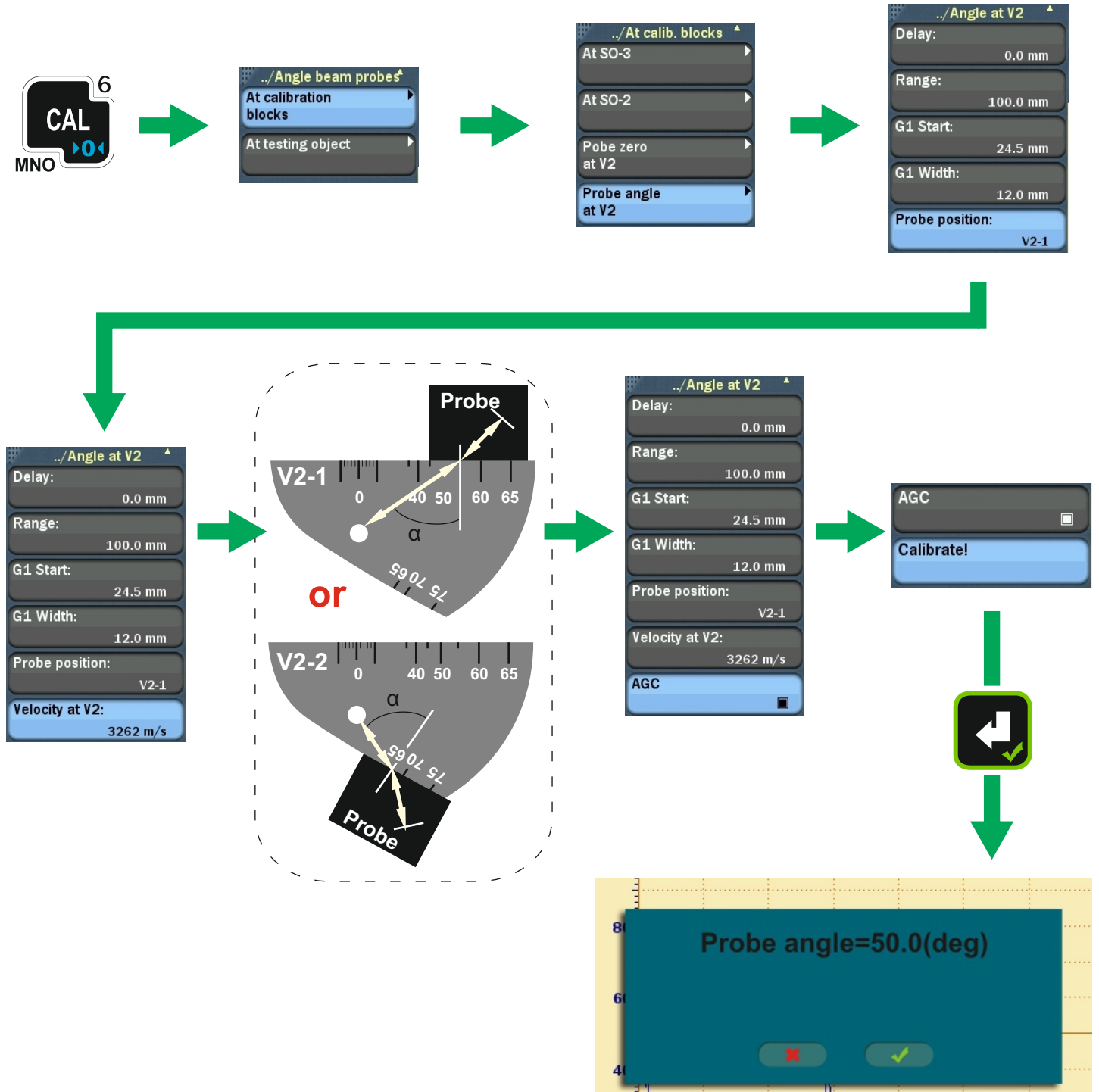
Calibration of the sound velocity and probe zero at V2 calibration block



# ANGLE-BEAM PROBES CALIBRATION <sup>B</sup>

## Probe angle calibration at V2

Set up probe zero and sound velocity in V2 before starting this calibration.

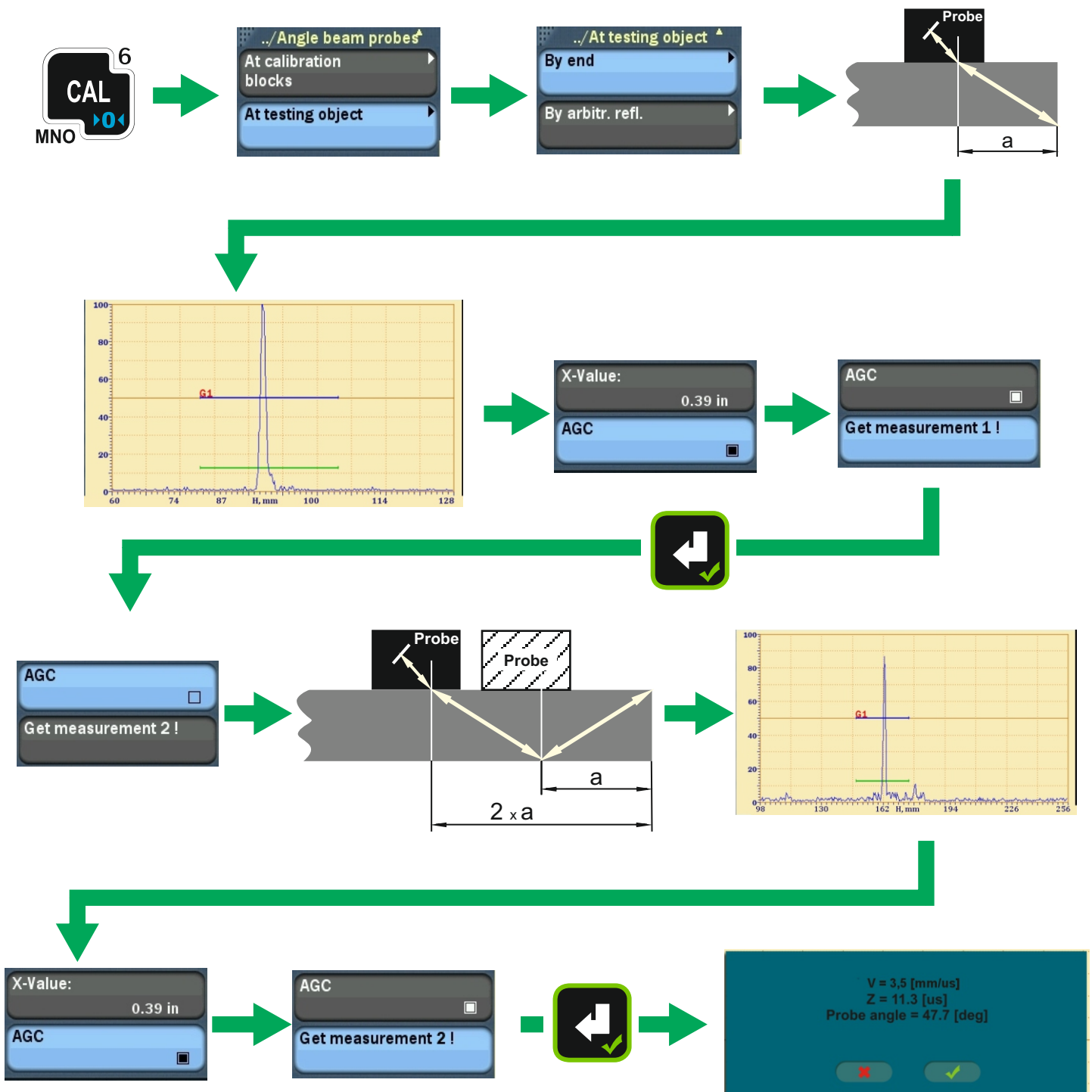




# ANGLE-BEAM PROBES CALIBRATION<sup>B</sup>

Calibration of sound velocity and probe zero by block or testing object end

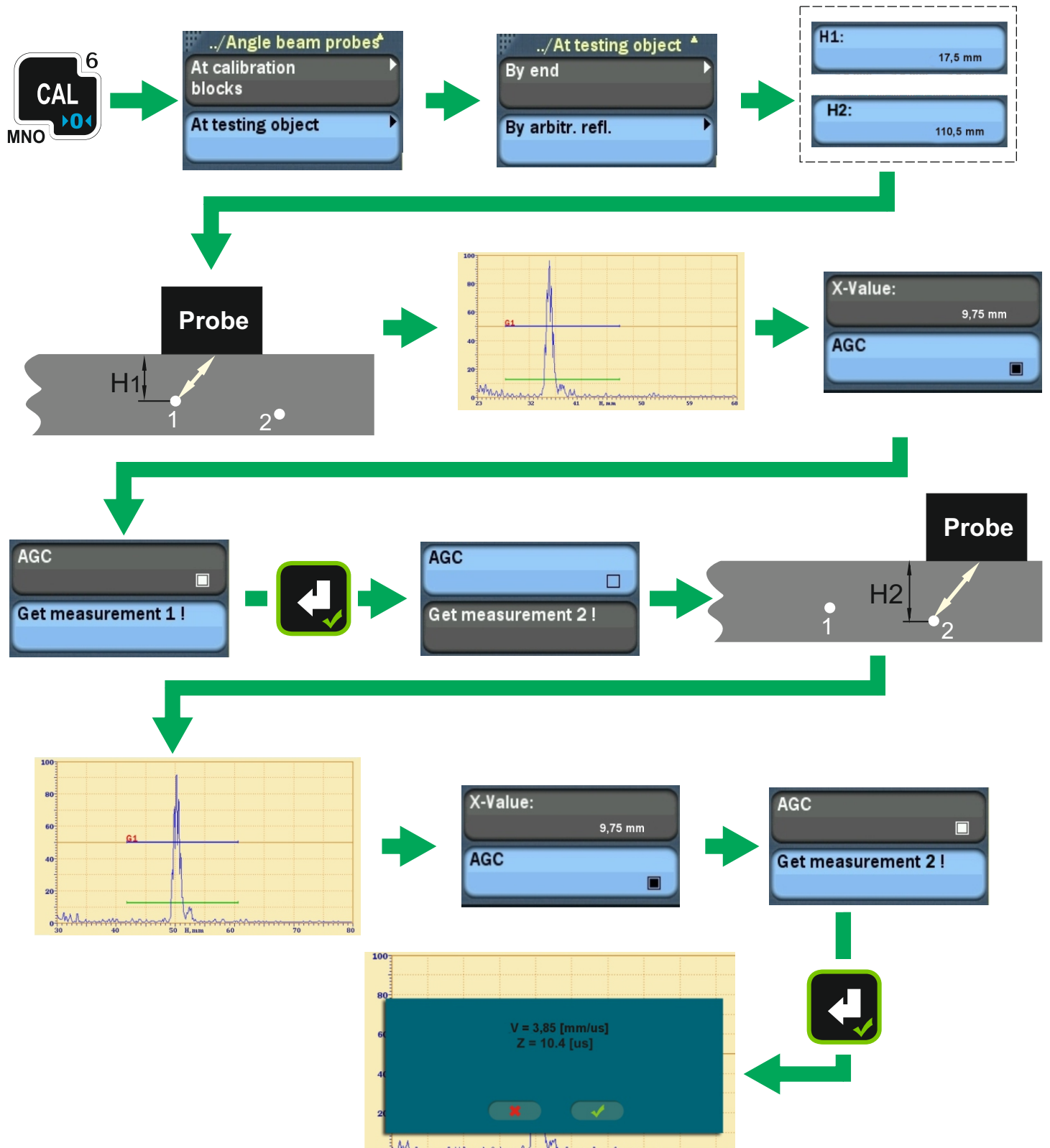
Set up probe angle and X-value before starting this calibration



# ANGLE-BEAM PROBES CALIBRATION <sup>B</sup>

Calibration of sound velocity and probe zero by any reflectors with known location depth

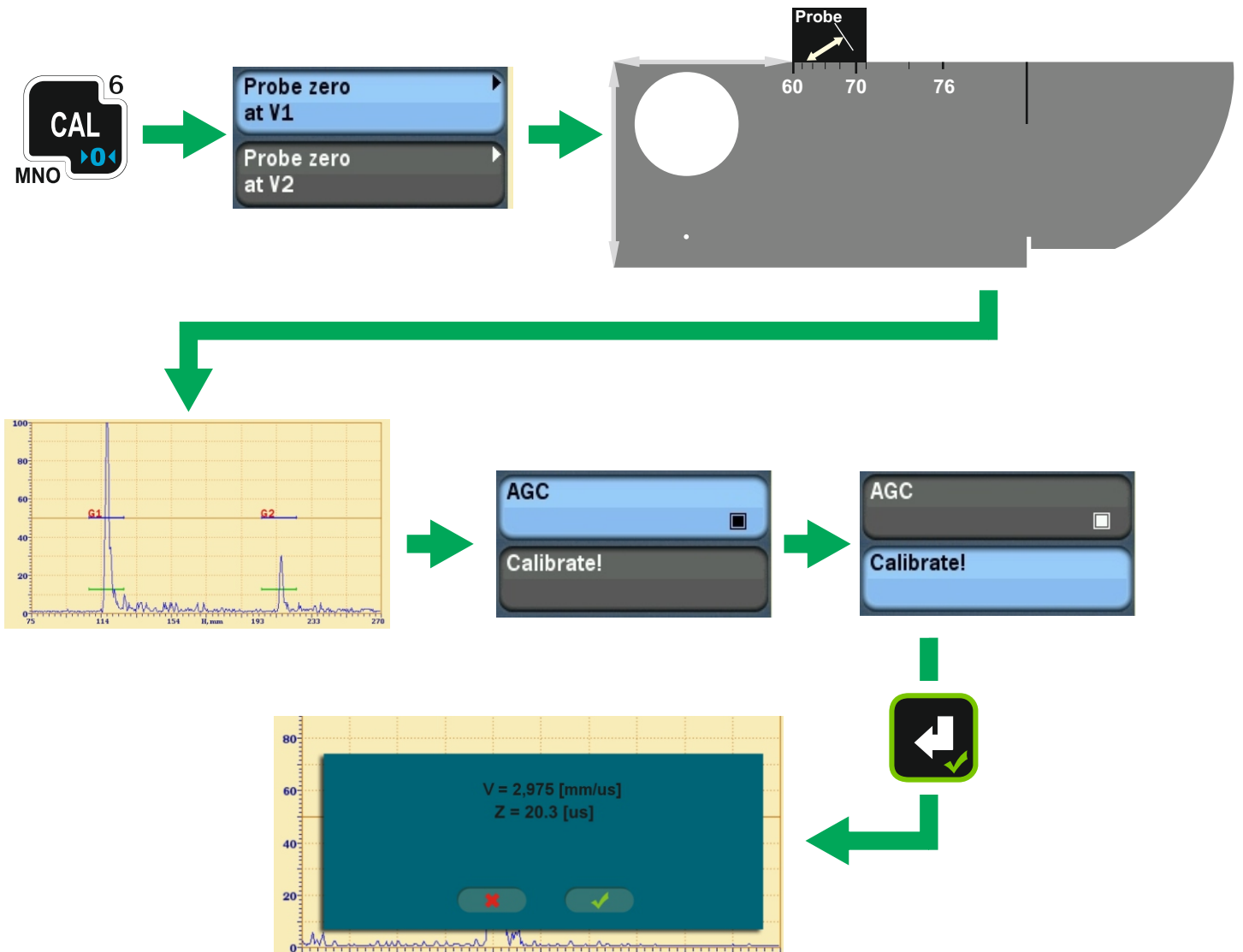
Set up probe angle before starting this calibration



# RAYLEIGH WAVE PROBES CALIBRATION<sup>B</sup>

## Calibration of probe zero at V1 block

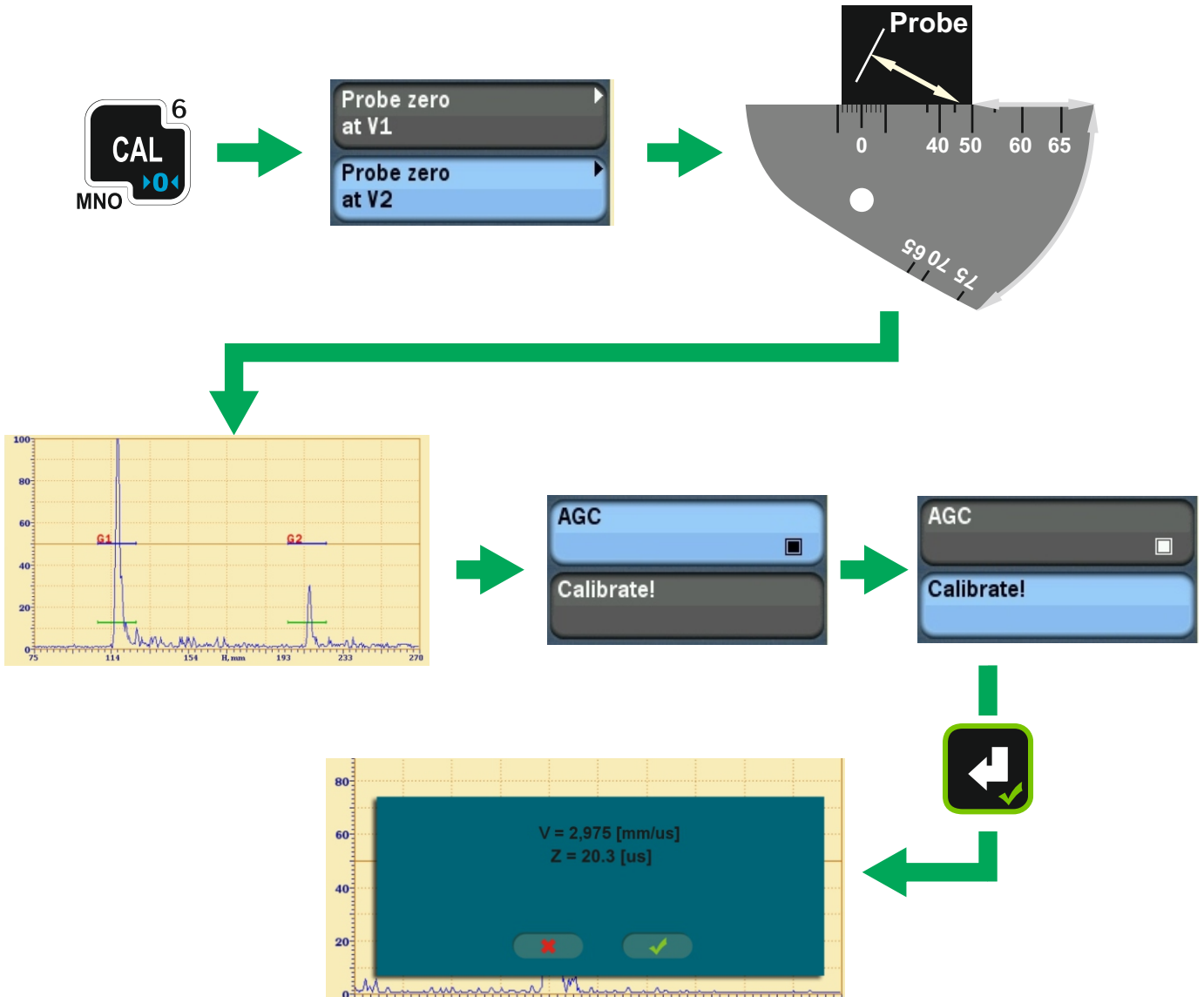
Set up probe angle = 90° before starting this calibration



# RAYLEIGH WAVE PROBES CALIBRATION<sup>B</sup>

## Calibration of probe zero at V2 block

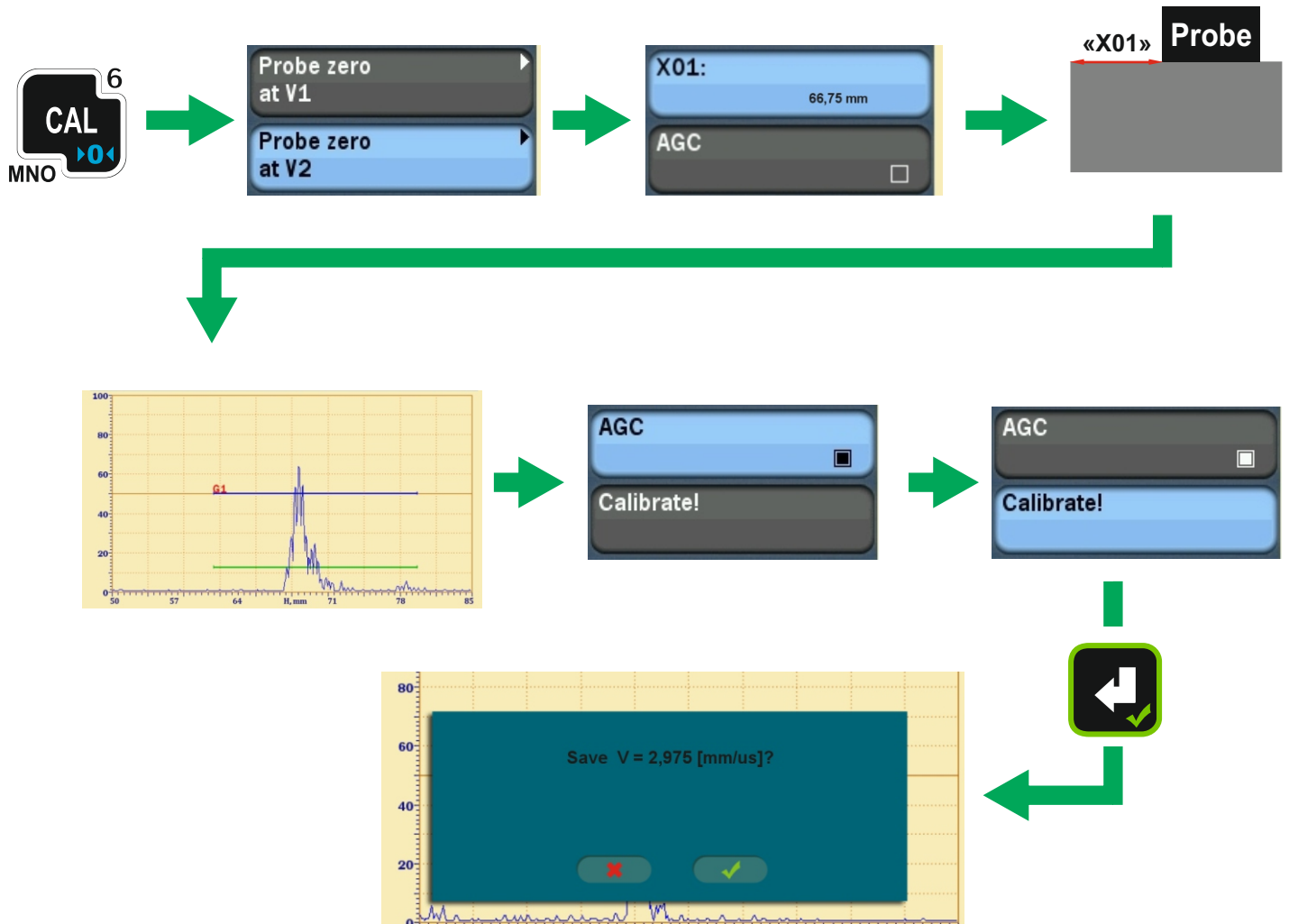
Set up probe angle = 90° before starting this calibration



# RAYLEIGH WAVE PROBES CALIBRATION<sup>B</sup>

## Calibration of sound velocity at testing object

Set up probe angle = 90° before starting this calibration



# **BASIC PREPARATION FOR THICKNESS MEASUREMENT**

- 1.** Connect probe and select it in the probes list – *PROBE* → *Probe type* (add it to the list if necessary);
- 2.** Calibrate probe zero (for details refer to next pages);
- 3.** Set or calibrate sound velocity (for details refer to next pages);
- 4.** Choose measurement type – *MEASURE* → *Meas. type* (0-1 by default);
- 5.** Choose AGC mode *MEASURE* → *AGC mode* (*Peak* by default);
- 6.** Specify such Maximum Gain Mode (*MEASURE* → *MaxGain mode*) and value of Maximum Gain (*MEASURE* → *MaxGain*) for manual mode, that Maximum Gain is high enough to raise back wall echoes at all thicknesses to be measured at necessary level and low enough that no noises come in the gate when probe is in the air;
- 7.** Adjust scan and gate (for details please refer to the beginning of this guide) so that back wall echoes at all thicknesses to be measured are in the gate limits;
- 8.** Choose PRF mode (*MEASURE* → *PRF mode*)– *High* by default or other in case if acoustic ghost signals are detected.

# **ADDITIONAL PREPARATION FOR THICKNESS MEASUREMENT**

- 1.** Choose measurement threshold (*MEASURE* → *Threshold: Edge / 0-Edge*);
- 2.** Choose measurement mode (*MEASURE* → *Mode: Conventional / Min & Max / Differential / % of wear*) and specify rated thickness for “Differential” and “% of wear” modes;
- 3.** Specify measurement frequency;
- 4.** Switch on measurement point marker (*GTS & ALRM* → *Marker*)(visible in zoom mode);
- 5.** Set alarm bounds (*GTS & ALRM* → *Tmin* and *Tmax*), alarm mode (*GTS & ALRM* → *Alarms*), visualization (*GTS & ALRM* → *Show alarm zones*) and sound (*GTS & ALRM* → *Sound*).

# ADDING NEW PROBE TO THE LIST <sup>T</sup>

PROBE

Probe type

Probe #:

Probe zero:  
0.000 us

Probes list

#	Name	Probe #	Probe type	Probe freq.:	Pr. zero	Created	Calibrat. date
54	P111-5-K12	0	Sing.Cryst.	5.0	0.000	2015-06-26	2015-06-26

F1 ADD    F2 USE    F3 DELETE



Probes list

#	Name	Probe type	Created	Calibrat. date
54	P111-5-K12		5-06-26	2015-06-26
1	P112-5,0-12/2			
2	P111-5-K6			
3	P111-5-K12			
4	P111-2,5-K20			
5	P111-2,5-K12			
6	P112-10-6/2-T			
7	P112-5,0-20x6-P			
8	P112-5,0-20/2			
9	P112-5,0-12/2-T			
10	P112-5,0-9/2-T			
11	P112-4,0-20/2			
12	P112-2,5-20x6-P			

F1 New    F2 Edit    F3 Delete    F4 Calibr.    F5 V-Corr.



Probes list

#	Name	Probe #	Probe type	Probe freq.:	Pr. zero	Created	Calibrat. date
54	P111-5-K12	0	Sing.Cryst.	5.0	0.000	2015-06-26	2015-06-26
61	P112-5,0-12/2	0	Dbl.Cryst.	5.0	0.000	2015-07-01	2015-07-01

F1 ADD    F2 USE    F3 DELETE



Probes list

#	Name	Created	Calibrat. date
54	P111-5-K12	2015-06-26	2015-06-26
61	P112-5,0-12/2	2015-07-01	2015-07-01

Probe properties

Use

Name: P112-5,0-12/2

Short name: 5,0-12/2

Probe #: 0

Probe type: Dbl.Cryst.

Probe frequency: 5 MHz

Probe zero: 0.000 us

F1 ADD    F2 USE    F3 DELETE

Probes list

#	Name	Created	Calibrat. date
54	P111-5-K12	2015-06-26	2015-06-26
63	P112-5,0-12/2	2015-07-01	2015-07-01

Probe properties

Use

Name: P112-5,0-12/2

Short name: 5,0-12/2

Probe #: 0

Probe type: Dbl.Cryst.

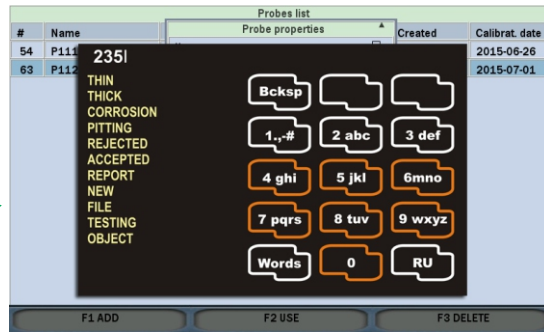
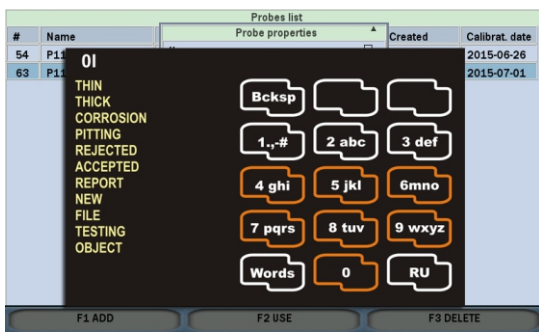
Probe frequency: 5 MHz

Probe zero: 0.000 us

F1 ADD    F2 USE    F3 DELETE



Continued at the next page



#	Name	Probe #	Probe type	Probe freq.:	Pr. zero	Created	Calibrat. date
54	P111-5-K12	0	Sing.Cryst.	5.0	0.000	2015-06-26	2015-06-26
*61	P112-5,0-12/2	235	Dbl.Cryst.	5.0	0.000	2015-07-01	2015-07-01



# CHOOSING CONNECTED PROBE FROM THE LIST <sup>T</sup>

PROBE

PROBE

Probe type

Probe #:

Probe zero:  
0.000 us



#	Name	Probe #	Probe type	Probe freq.:	Pr. zero	Created	Calibrat. date
54	P111-5-K12	0	Sing.Cryst.	5.0	0.000	2015-06-26	2015-06-26
61	P112-5,0-12/2	0	Dbl.Cryst.	5.0	0.000	2015-07-01	2015-07-01

JKL 5

0



#	Name	Probe #	Probe type	Probe freq.:	Pr. zero	Created	Calibrat. date
54	P111-5-K12	0	Sing.Cryst.	5.0	0.000	2015-06-26	2015-06-26
*61	P112-5,0-12/2	235	Dbl.Cryst.	5.0	0.000	2015-07-01	2015-07-01

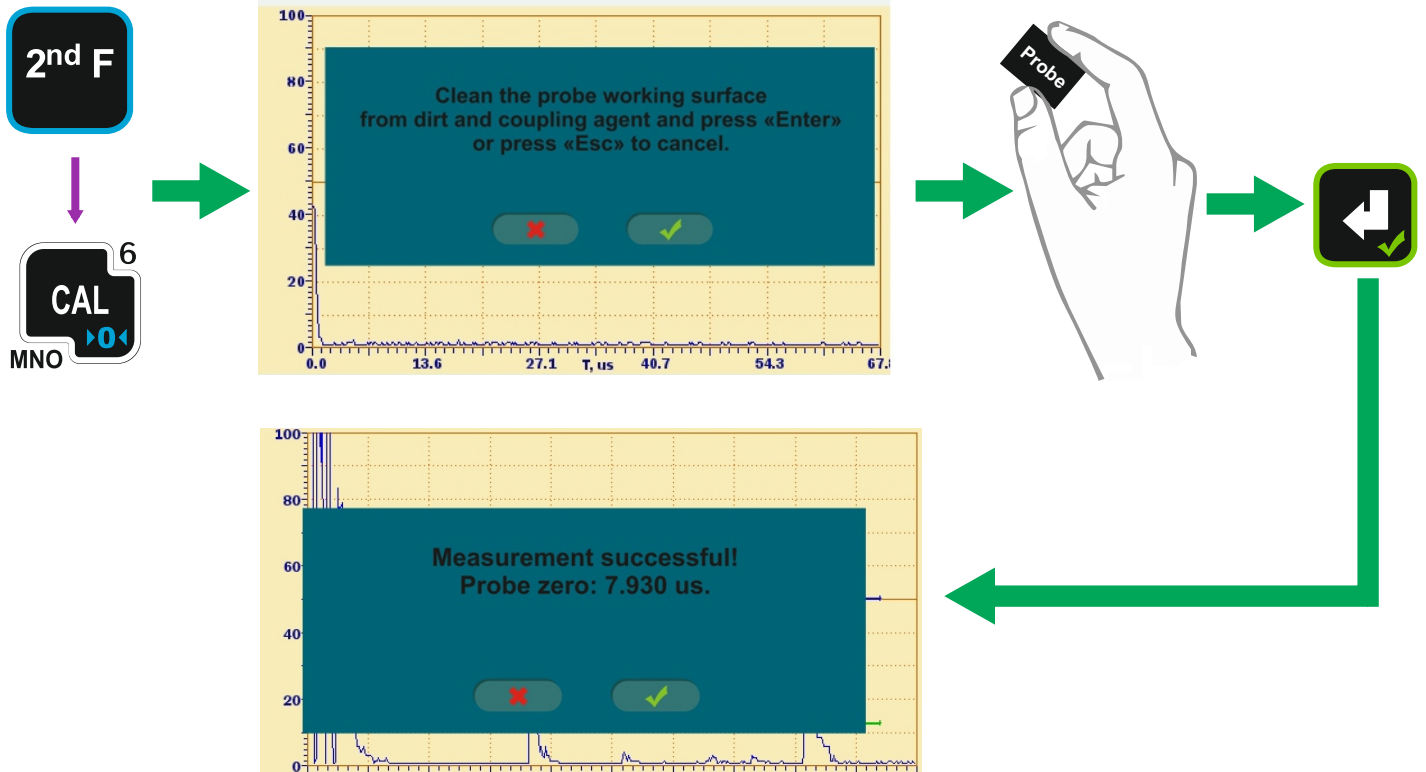




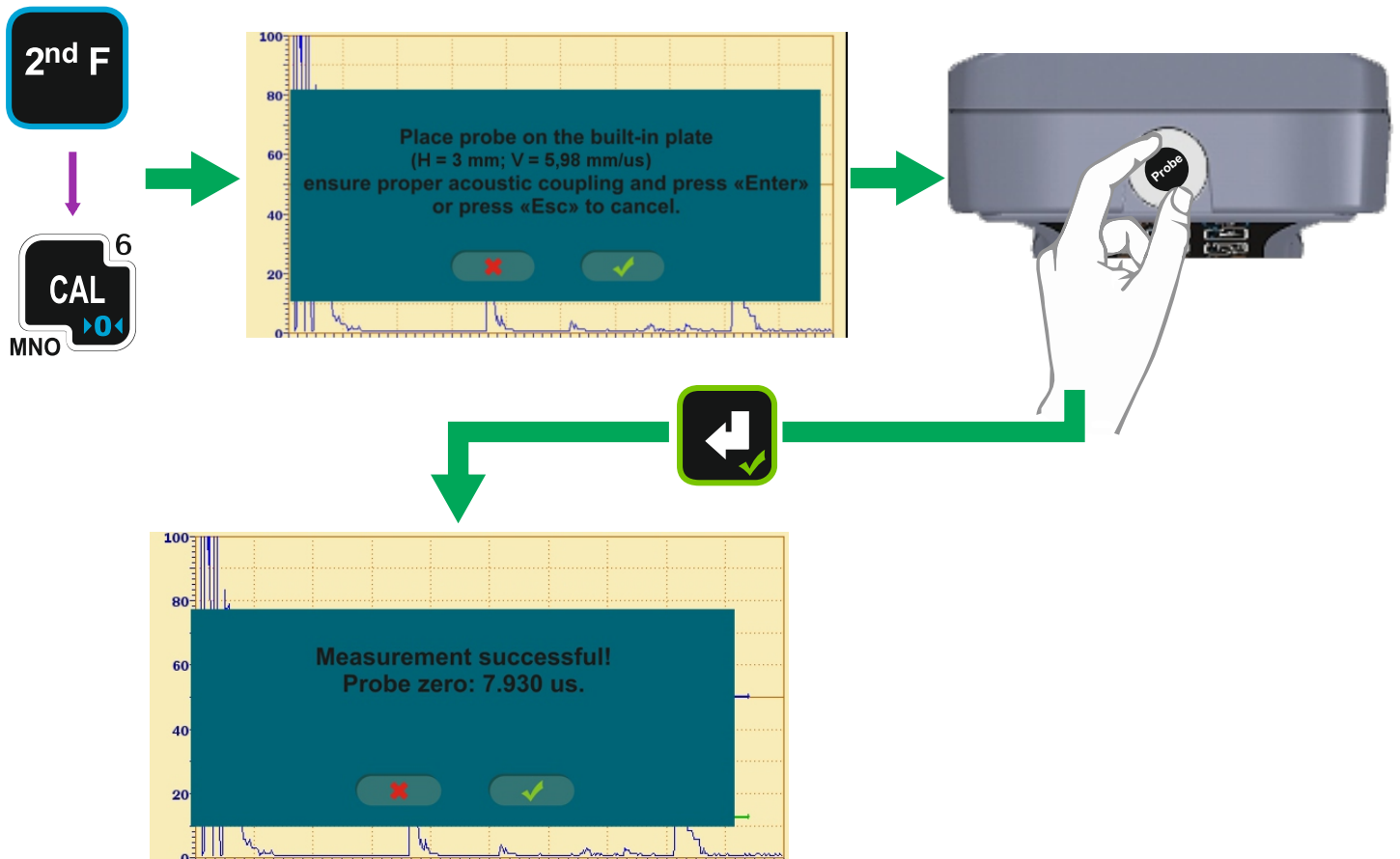
# PROBE ZEROING <sup>T</sup>

Choose zero calibration mode (PROBE → Zero cal. mode: in air / on block)

## Zeroing in “in air” mode



## Zeroing in “on block” mode

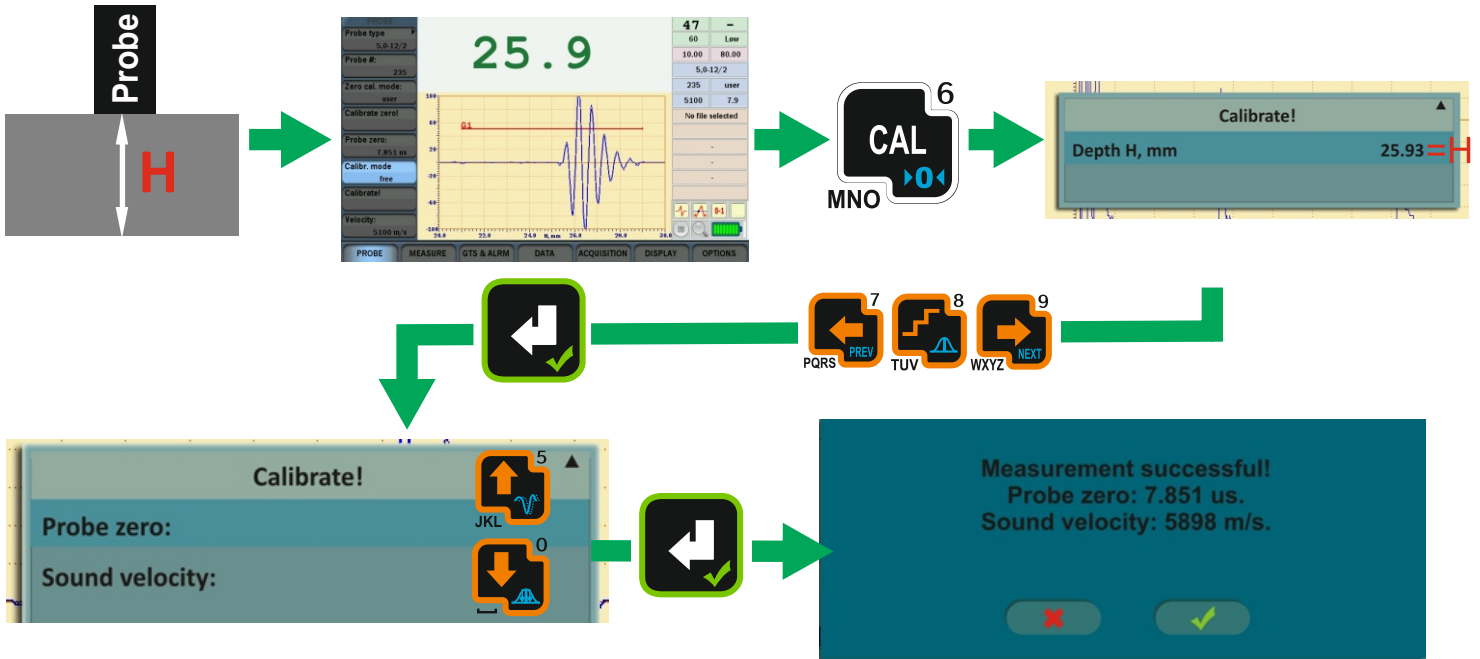


# FREE CALIBRATION <sup>T</sup>

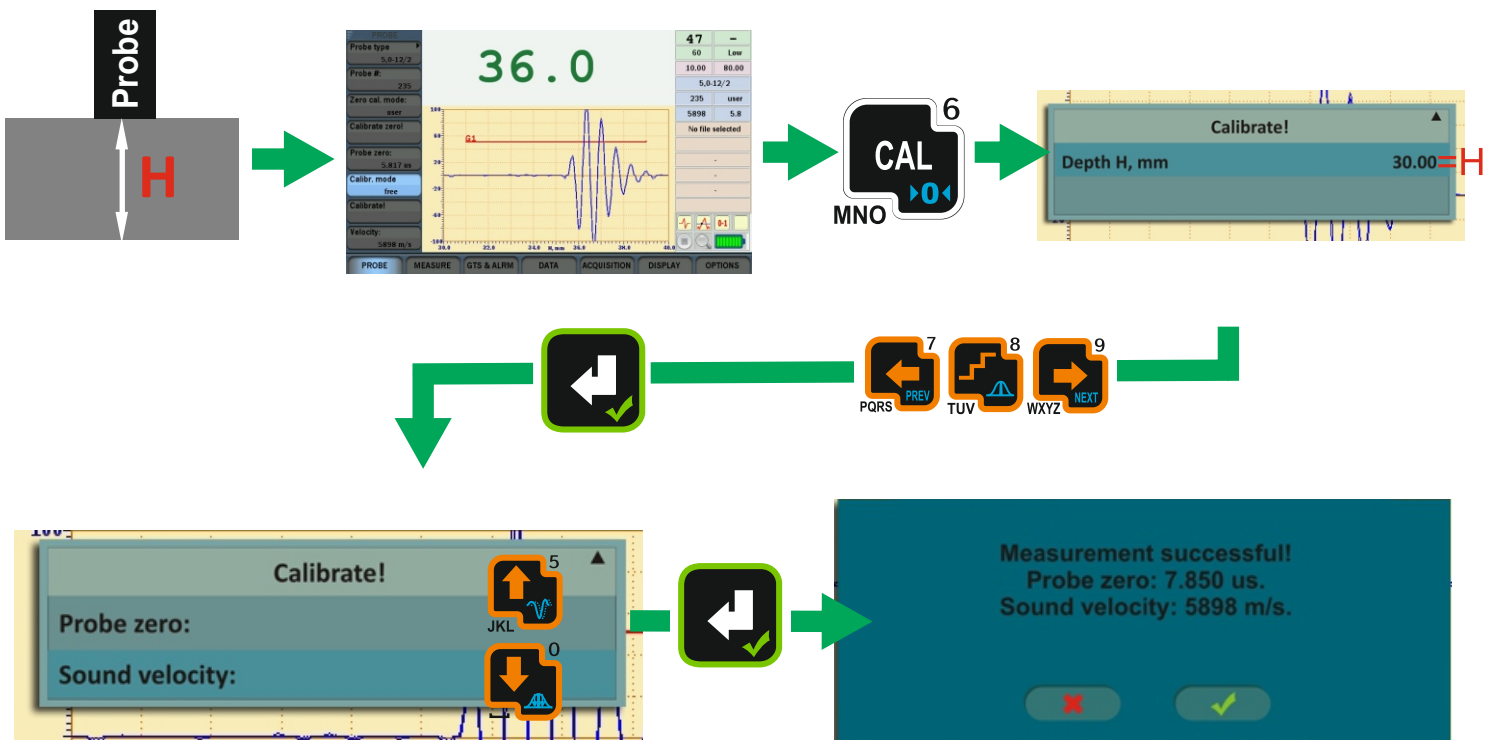
Should be chosen in PROBE → Calibr.mode

Prior to use free calibration all necessary preparations should be made and a thickness reading (can be incorrect) at the calibration block (or other object with known thickness) should be acquired.

## Calibrating probe zero (sound velocity is already set)



## Calibrating sound velocity (the probe is already zeroed)

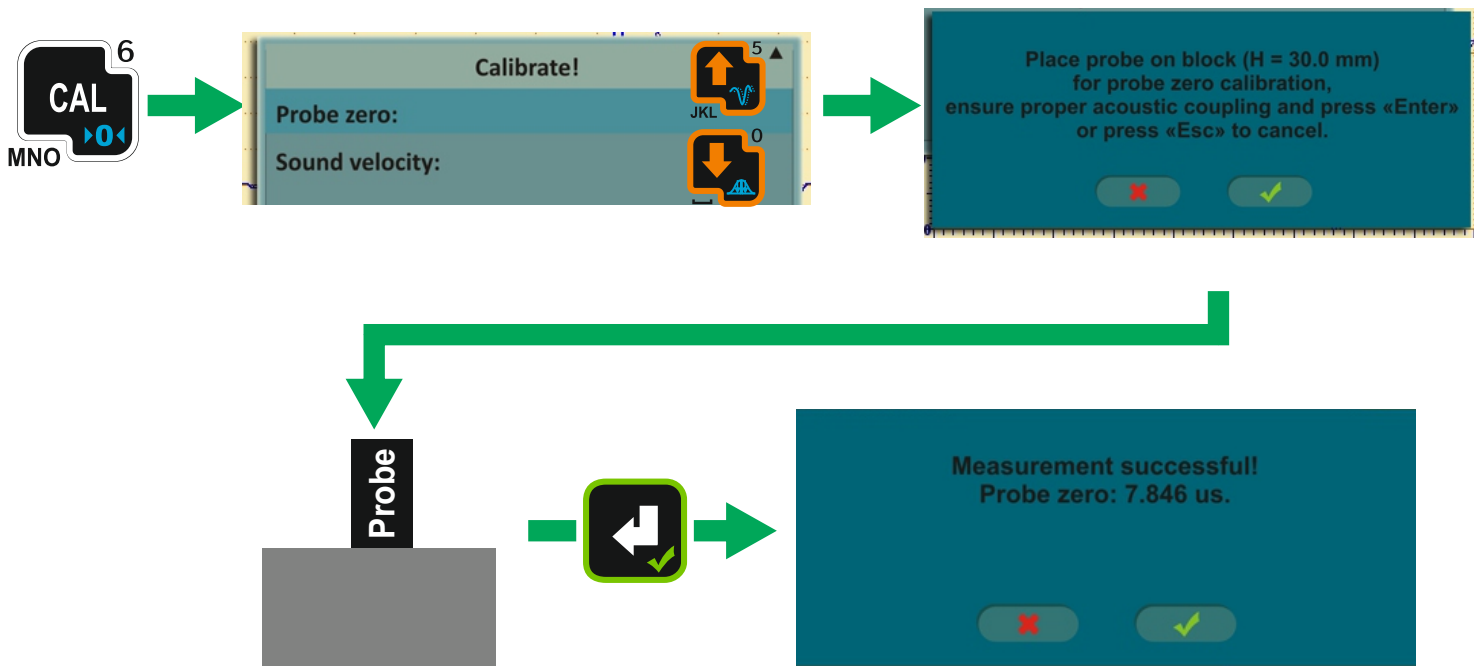


# 1-POINT CALIBRATION <sup>T</sup>

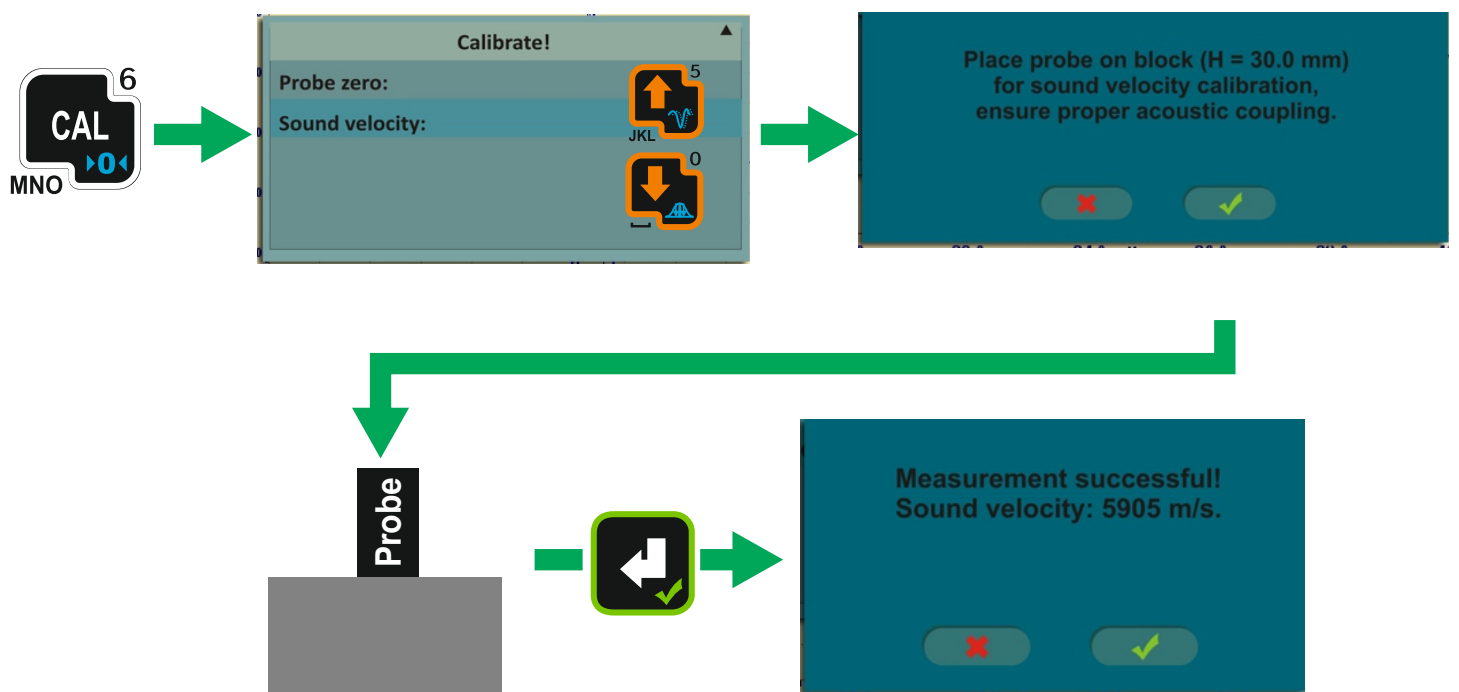
Should be chosen in PROBE → Calibr.mode

Prior to use 1-point calibration it is necessary to specify the calibration block parameters in OPTIONS → Block 1pt menu.

## Calibrating probe zero (sound velocity is already set)



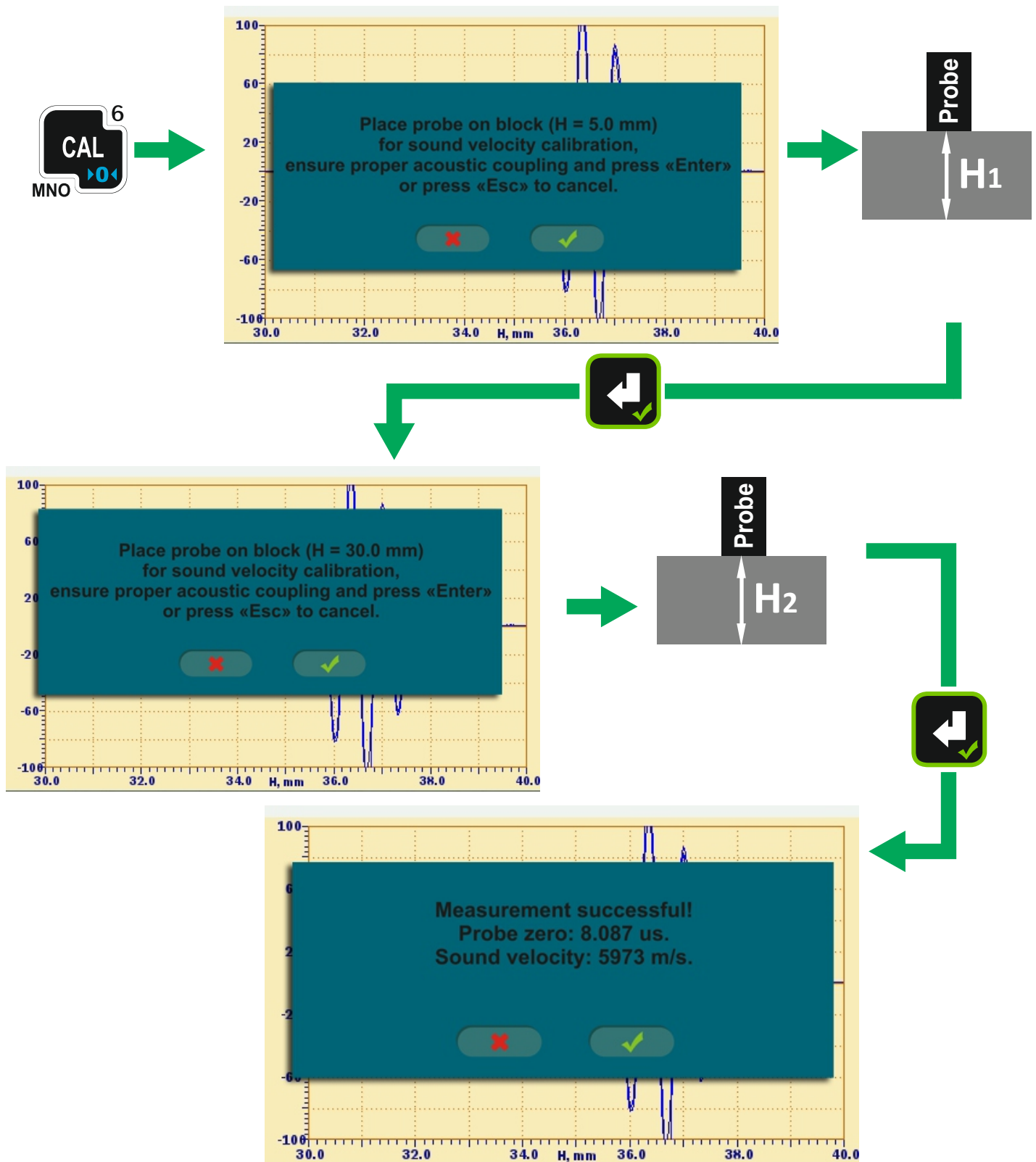
## Calibrating sound velocity (the probe is already zeroed)



# 2-POINTS CALIBRATION<sup>T</sup>

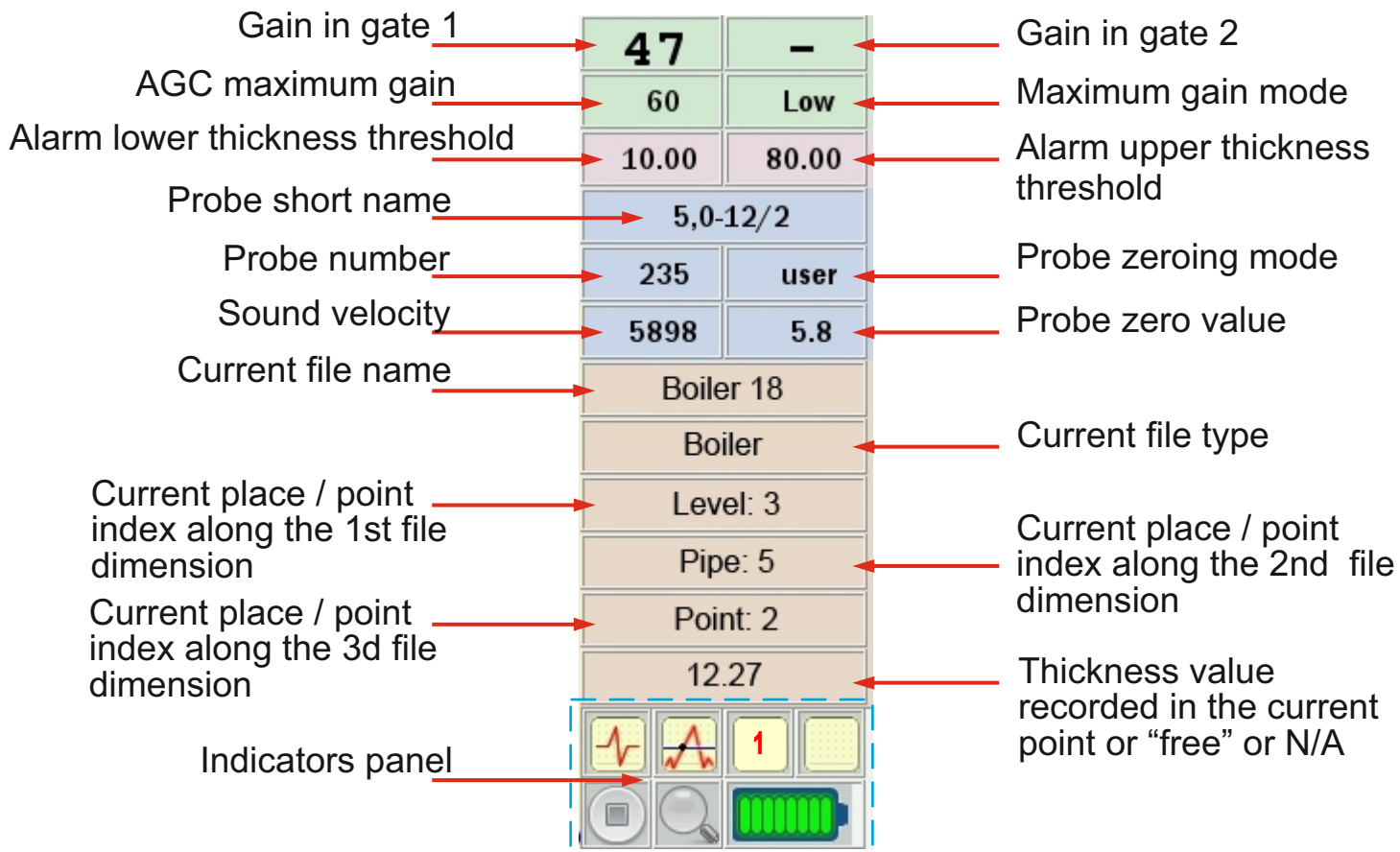
Should be chosen in PROBE → Calibr.mode

Prior to use 2-point calibration it is necessary to specify the calibration blocks parameters in OPTIONS → Block 2pts-1 and Block 2pts-2 menus.

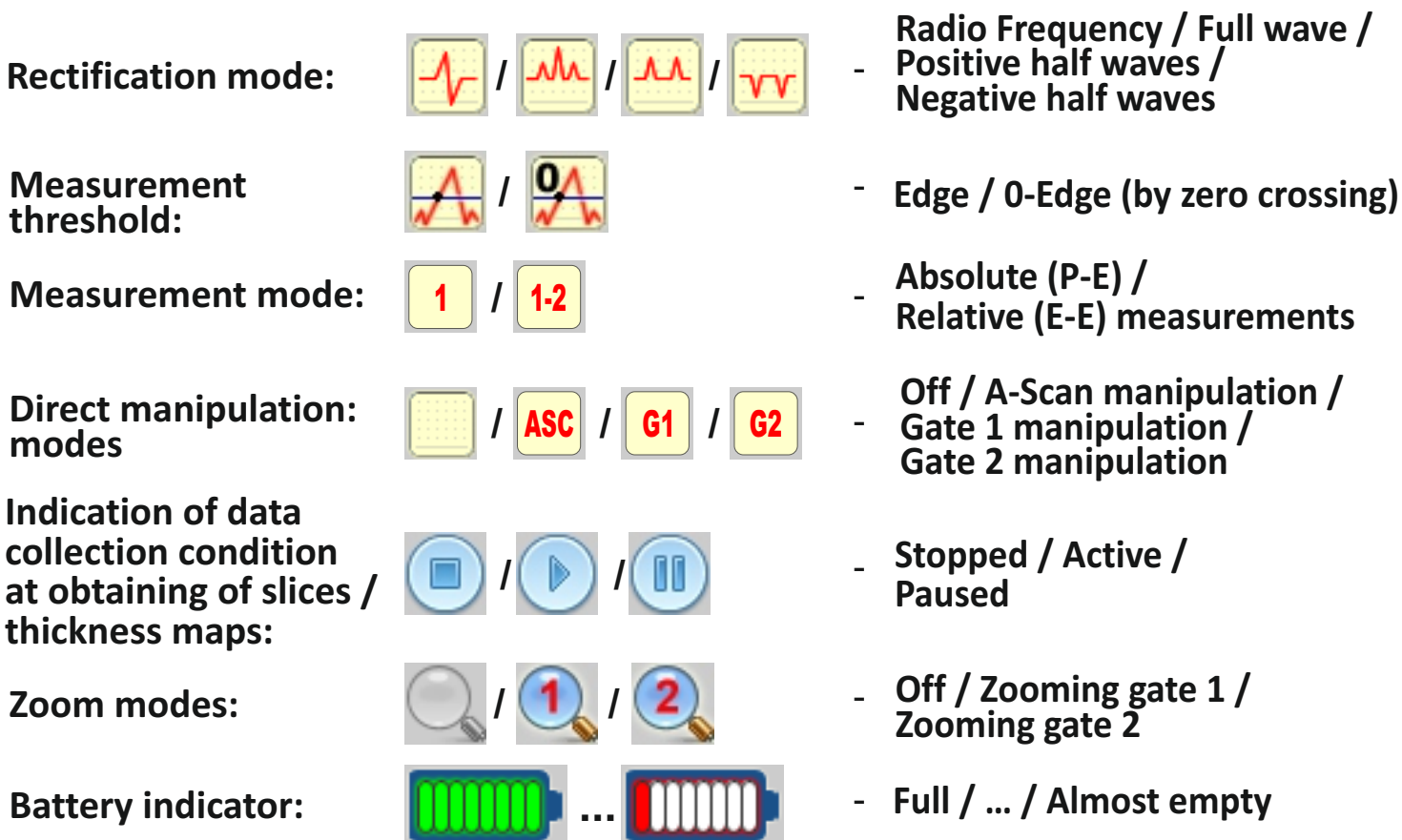


Thicknesses of calibration blocks for 2-points calibration should differ at least 2 times.

# INDICATION PANEL <sup>T</sup>



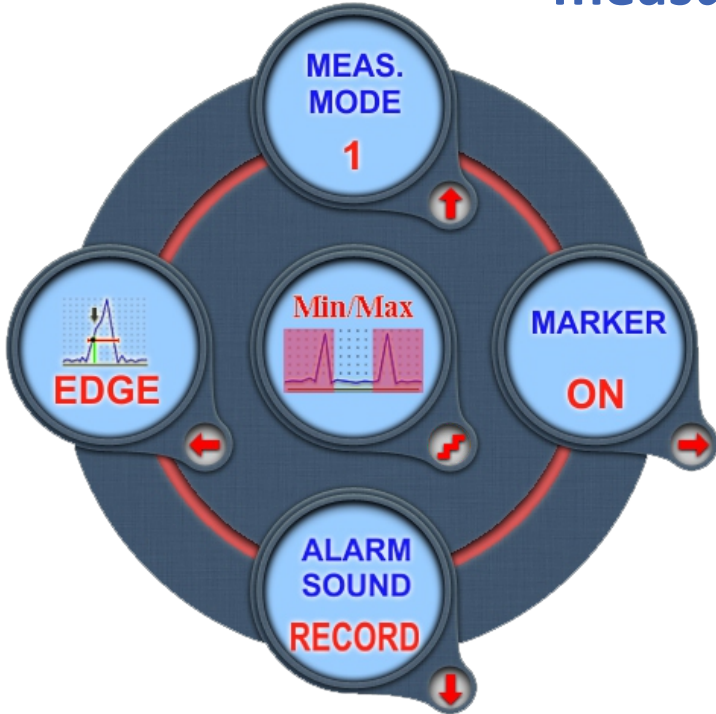
# INDICATORS <sup>T</sup>



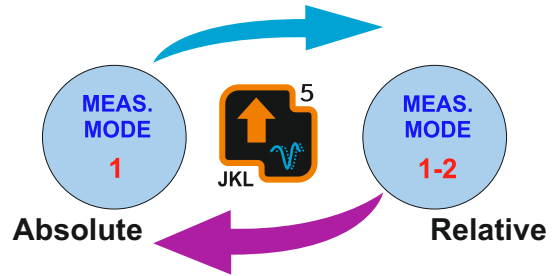


# QUICK ACCESS TO MAIN PARAMETERS <sup>T</sup>

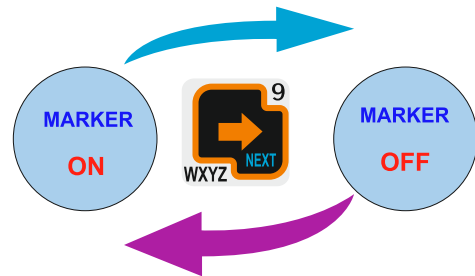
## TG+ 1. Gates choice for absolute or relative measurements



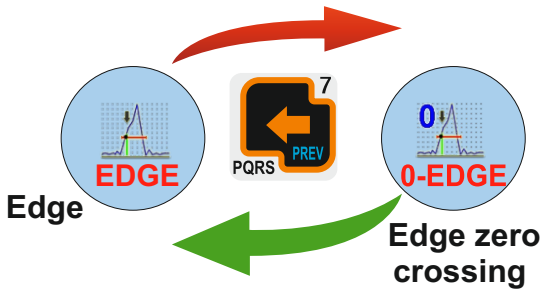
«Choice of the measurement mode: absolute or relative»



«Measurement point marker»

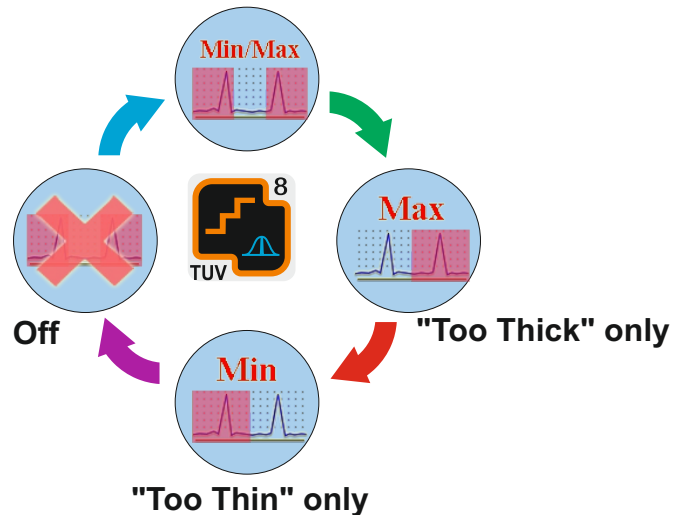


«Time/distance measurement threshold choice»

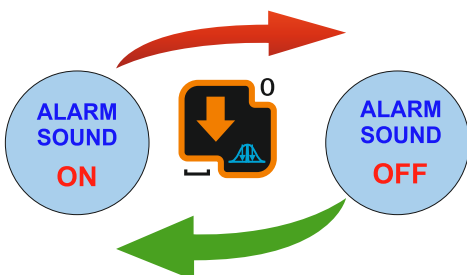


«Flaw alarm logic choice»

Both "Too thin" and " Too thick"



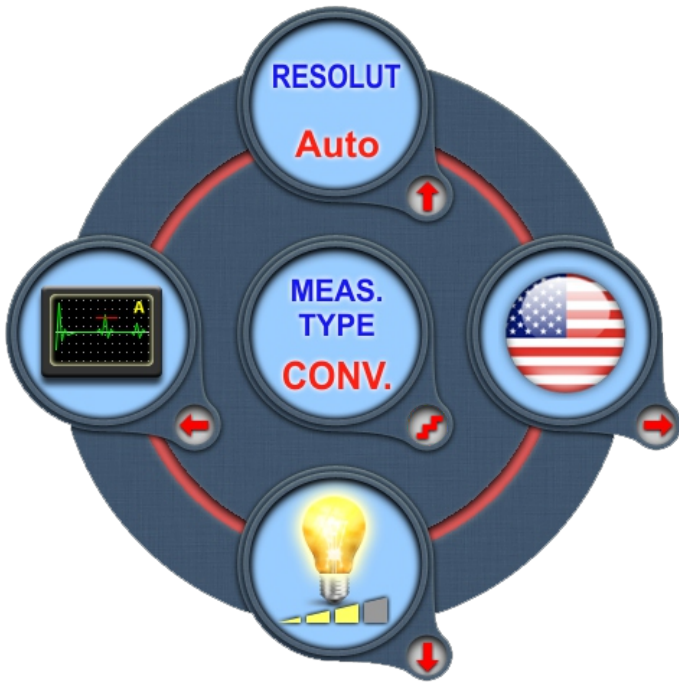
«Choice of the gate(s) level for the sound alarm»



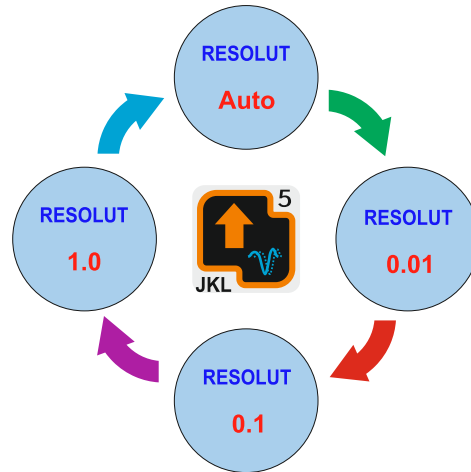


# QUICK ACCESS TO MAIN PARAMETERS <sup>T</sup>

## TG+ 2. Display options



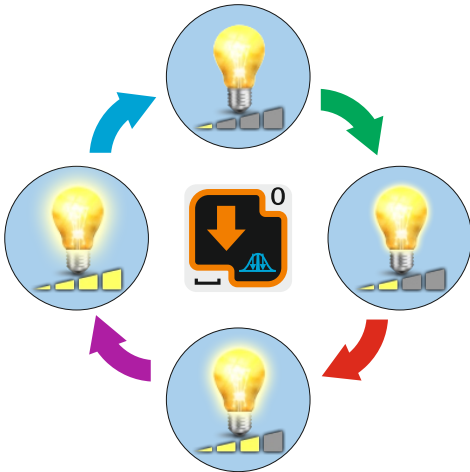
### «Resolution choice»



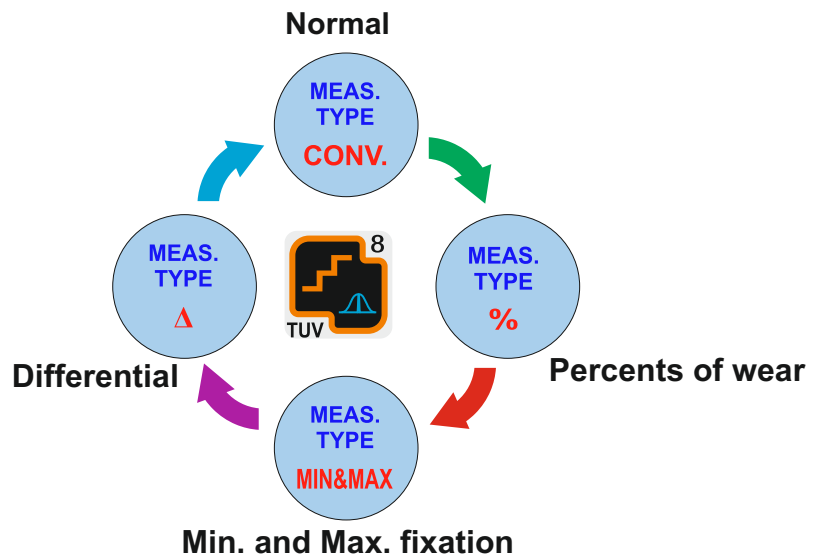
### «Interface language choice»



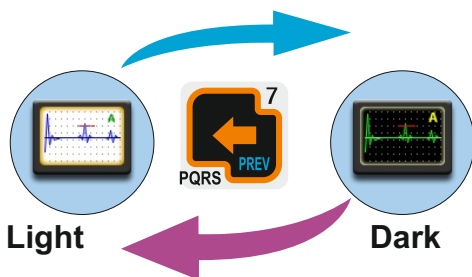
### «Display brightness adjustment»



### «Measurement type choice»



### «Switching color schemes»



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