

# Ultrasonic Flaw Detector

# SONOCON B



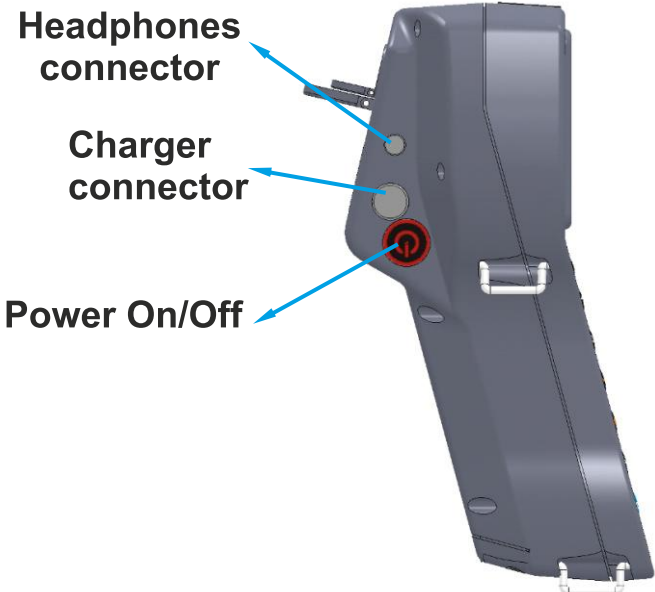
## Quick start guide

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

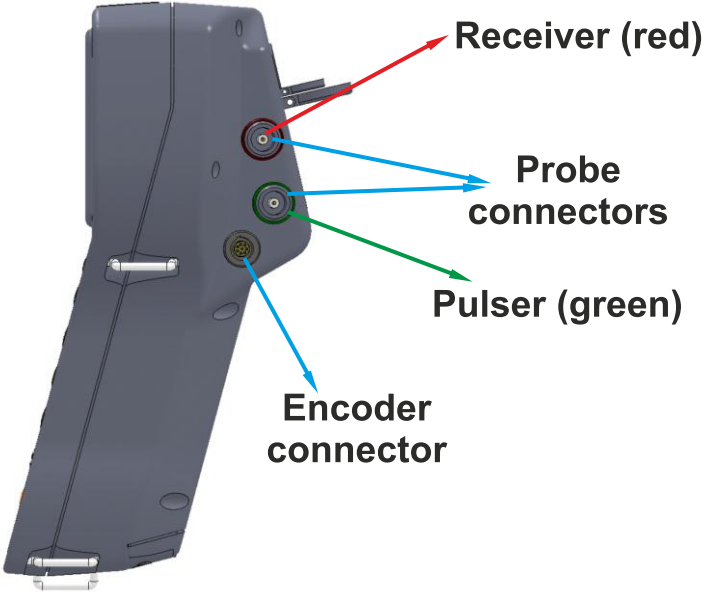
# Rear Panel of the Flaw Detector



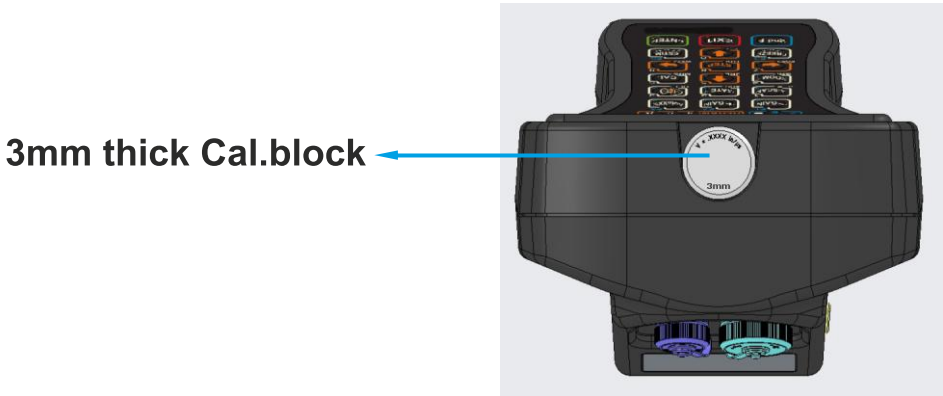
# Left Side Panel of the Flaw Detector



# Right Side Panel of the Flaw Detector

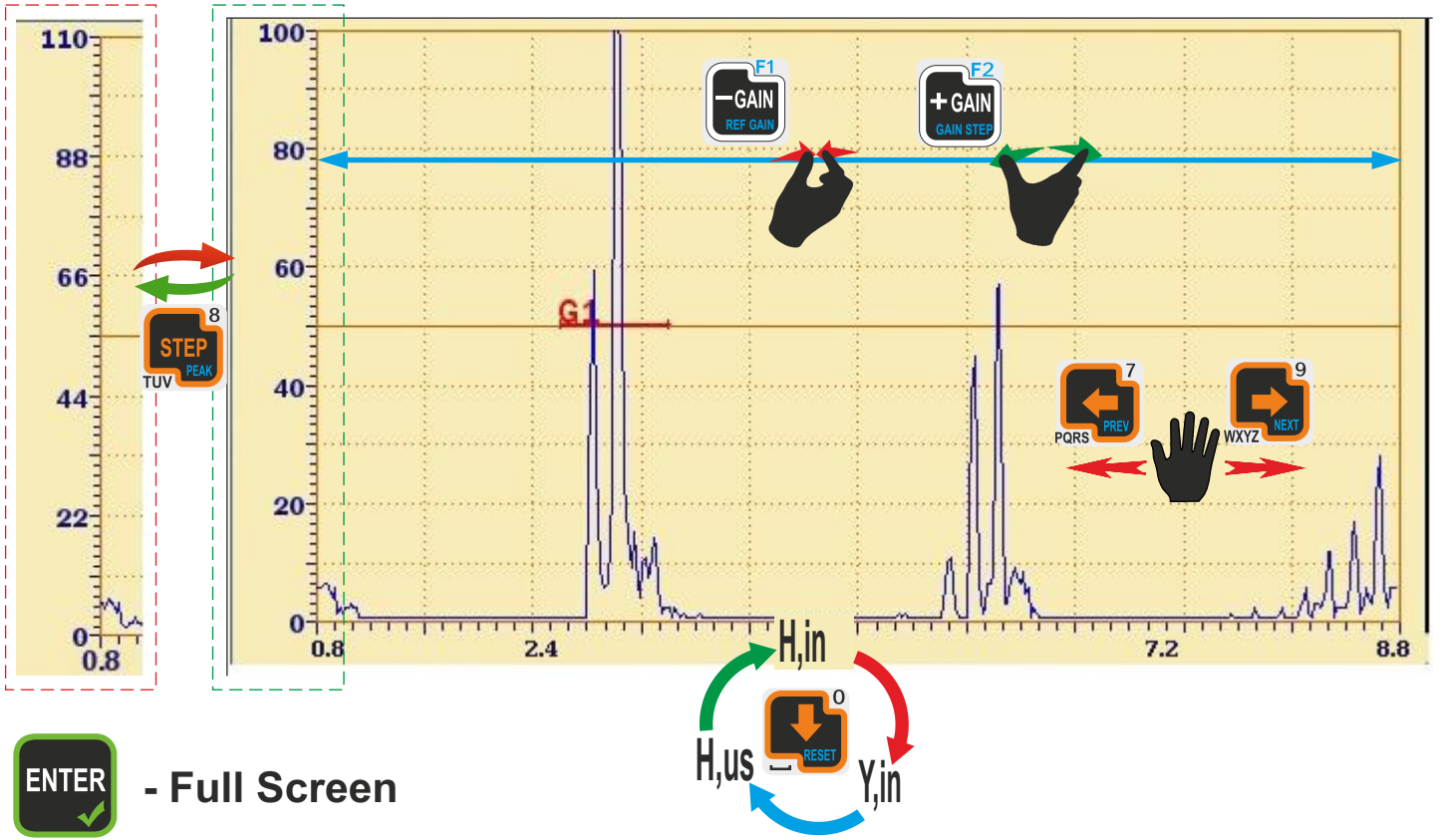


# Top Panel of the Flaw Detector

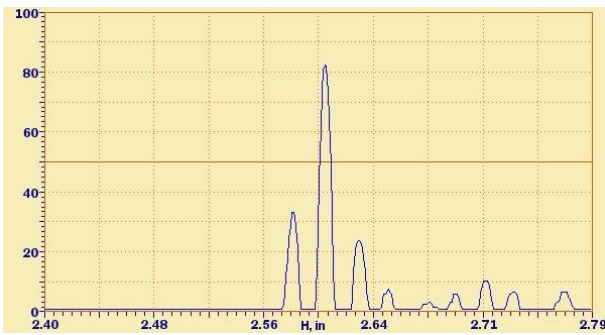




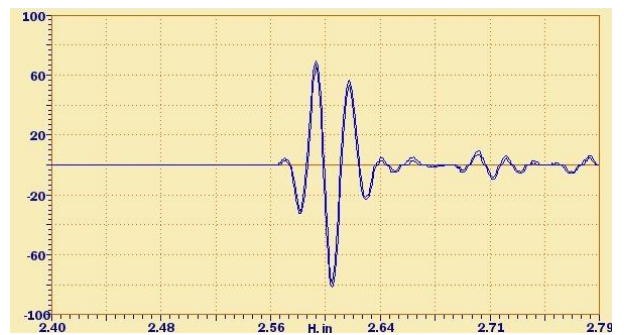
# A-SCAN MANIPULATION



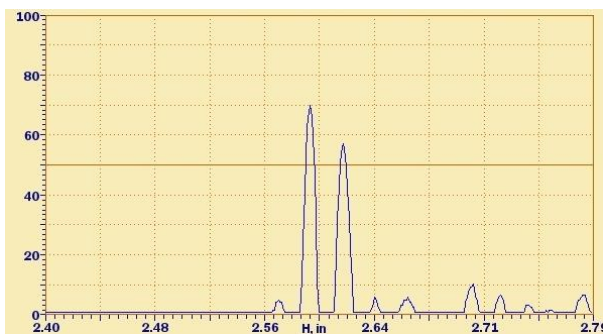
# RECTIFICATION CHOICE



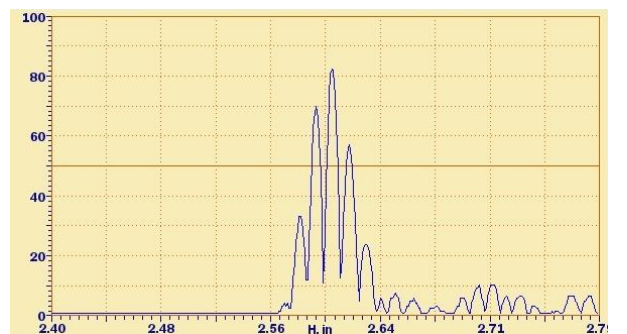
Negative halfwave



Radio Frequency



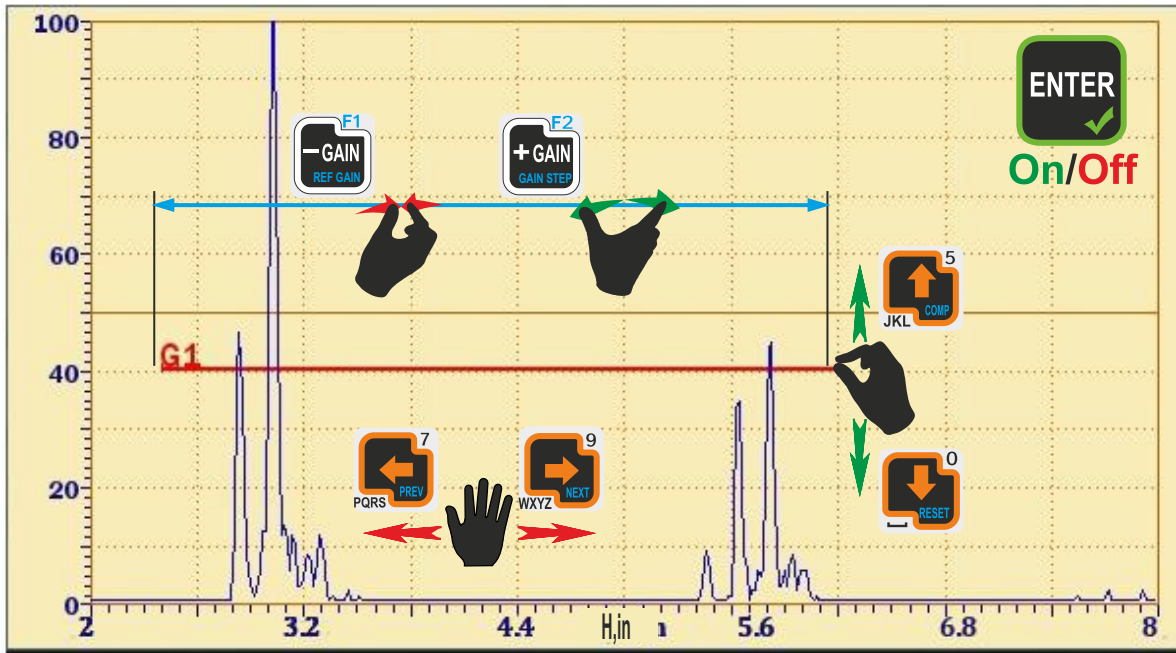
Positive halfwave



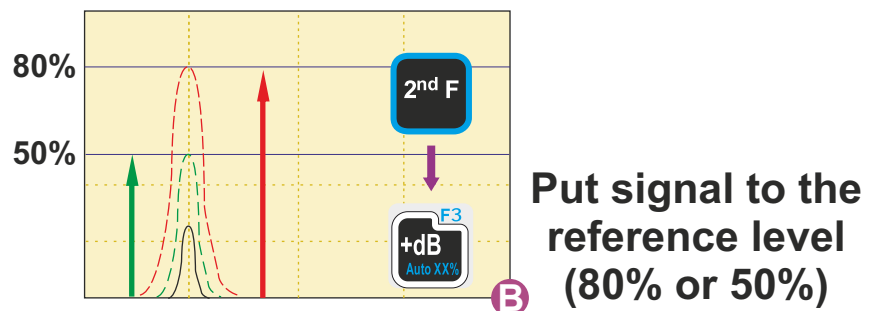
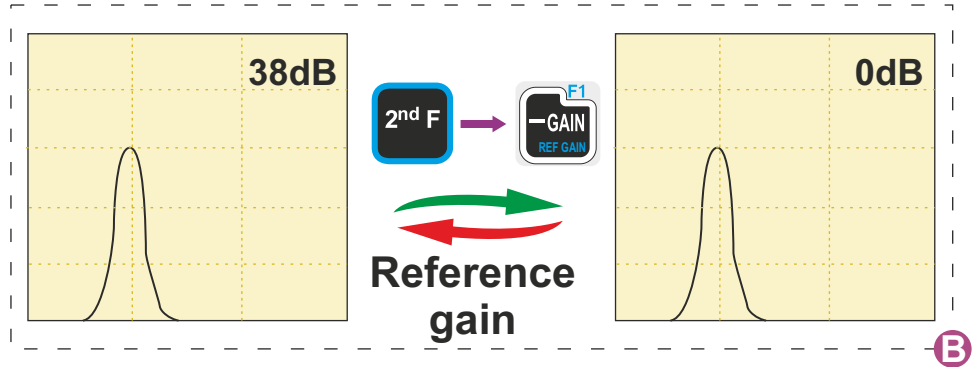
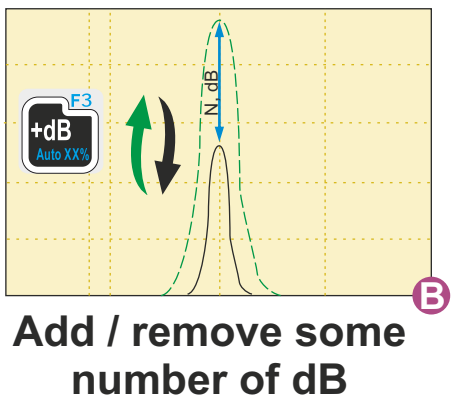
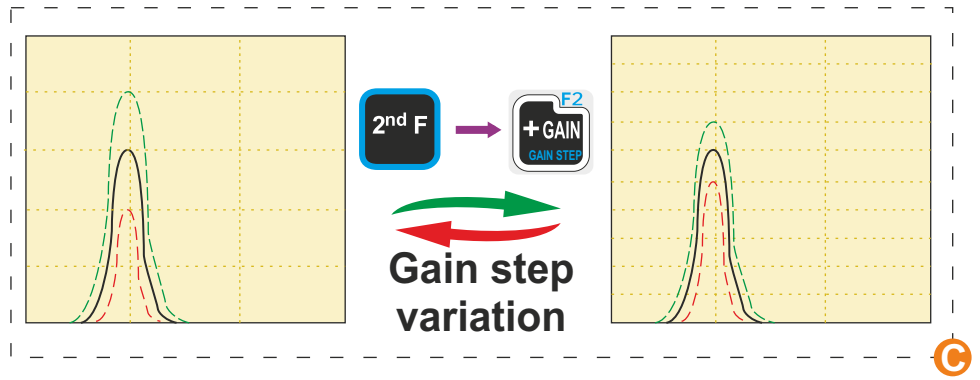
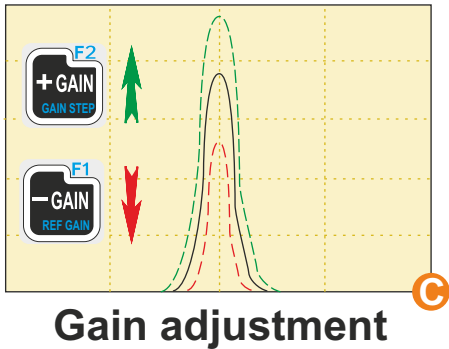
Full wave



# GATES MANIPULATION <sup>C</sup>



## GAIN MANIPULATION



# 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), Pulsar type (Square pulse), Amplitude (50 V), Energy (20 ns), Damping (Off), and Ac. ghosts control (Off). The 'Energy' parameter is circled in yellow. A hand icon points to the 'Energy' parameter. To the left of the menu, there are navigation icons: an orange 'UP' arrow with '5' and 'JKL COMP', a red 'DOWN' arrow with '0' and 'RESET', and a blue 'EXIT' button with a red 'X'. Below the menu, there are two rows of function keys. The first row includes 'PROBE', 'TEST OBJECT', 'SCAN', 'GATE 1', 'GATE 2', 'MEASURE', 'PULSER', and 'RECEIVER'. The second row includes 'TCG/DAC', 'DGS', 'AWS D1.1', 'AGC', 'COUP. GATE', 'CURSORS', 'MEMORY', and 'OPTIONS'. A hand icon points to the 'PULSER' key. In the center, a graph shows a pulse waveform with a peak labeled 'G1'. Callouts '7', '8', and '9' point to 'PREV', 'STEP PEAK', and 'NEXT' buttons respectively. At the bottom, '2nd F' buttons are shown with callouts '7' and '9' pointing to 'PREV' and 'NEXT' buttons.

# INDICATION PANEL <sup>Ⓑ</sup>

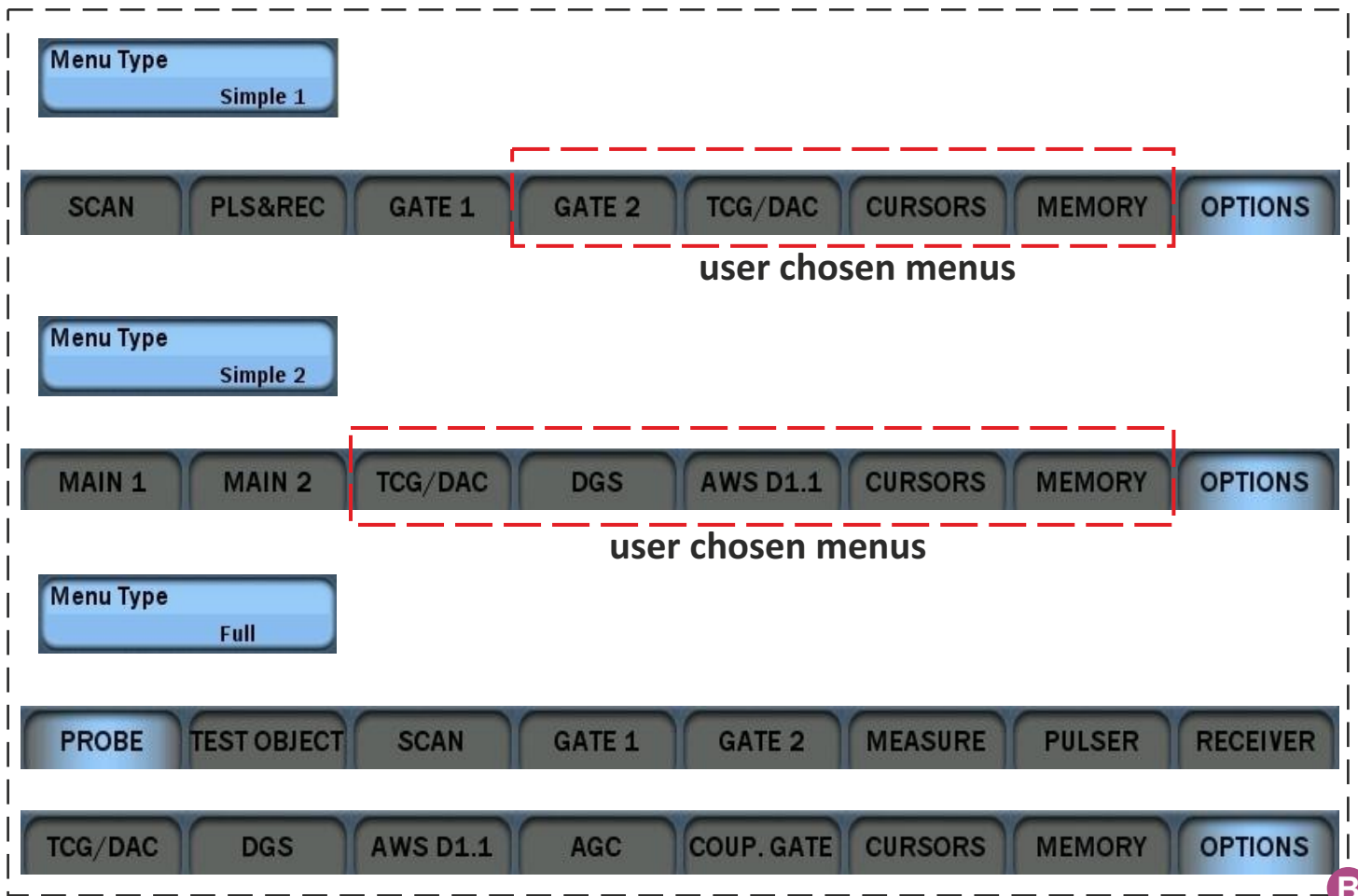
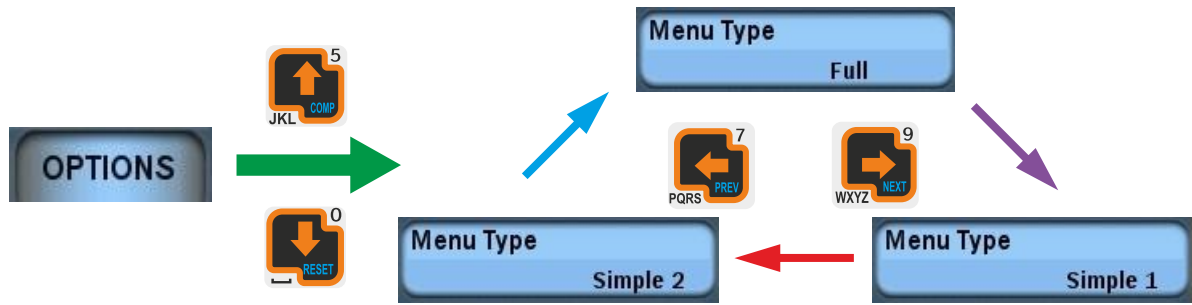
The image shows a close-up of the 'Indicators panel'. It displays several numerical values: '0.0' (Gain), 'F: 5.0' and 'V: 5800' (Probe frequency and Sound velocity), and 'Δ: -18.4' and 'H: ...' (Measurands). Below these values are several function keys: '+dB', 'dBr', 'AGC', 'TCG', 'DAC', 'DGS', 'AWS', a waveform icon, '1', '80%', a bar chart icon, a snowflake icon, a magnifying glass icon, a keypad icon, and a battery icon. Red arrows point from labels to the corresponding 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 a red arrow points to the entire panel area.

# 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-Basic software version there are 3 sets of main menu - up to your choice:



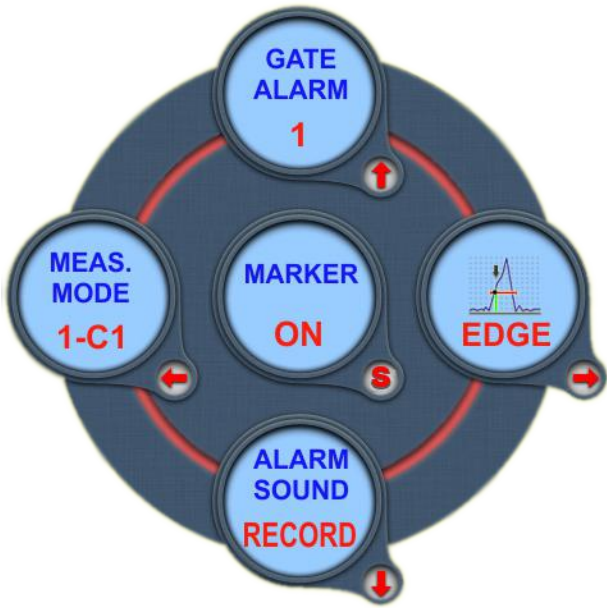
In Thickness Gauge+ software version there is only one menu type:



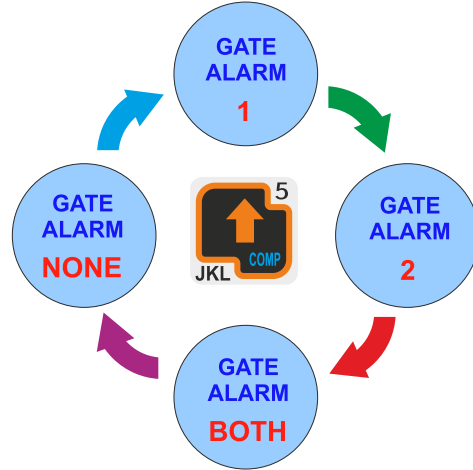


# QUICK ACCESS TO MAIN PARAMETERS<sup>B</sup>

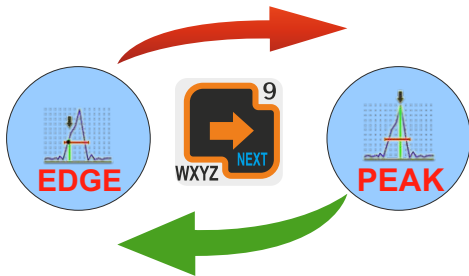
## UT-B 1. Measurement and alarm



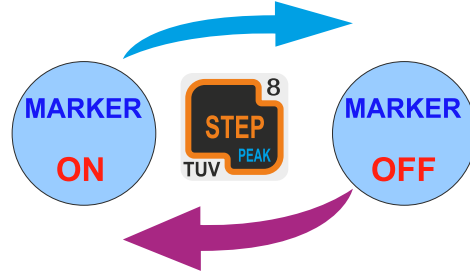
«Gates choice for Flaw Alarm System»



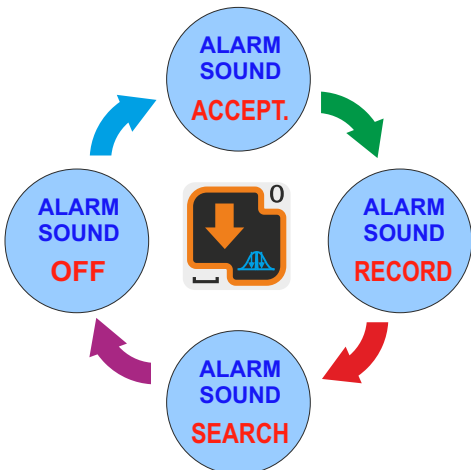
«Time/distance measurement threshold choice»



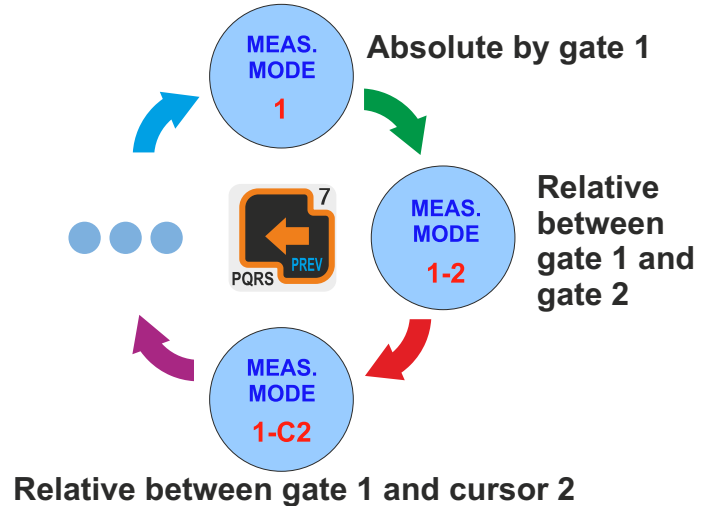
«Measurement point marker»



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



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

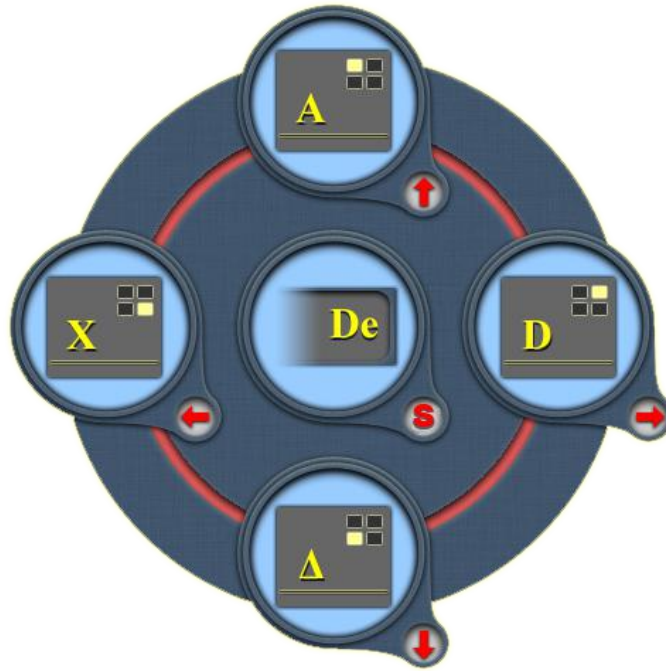




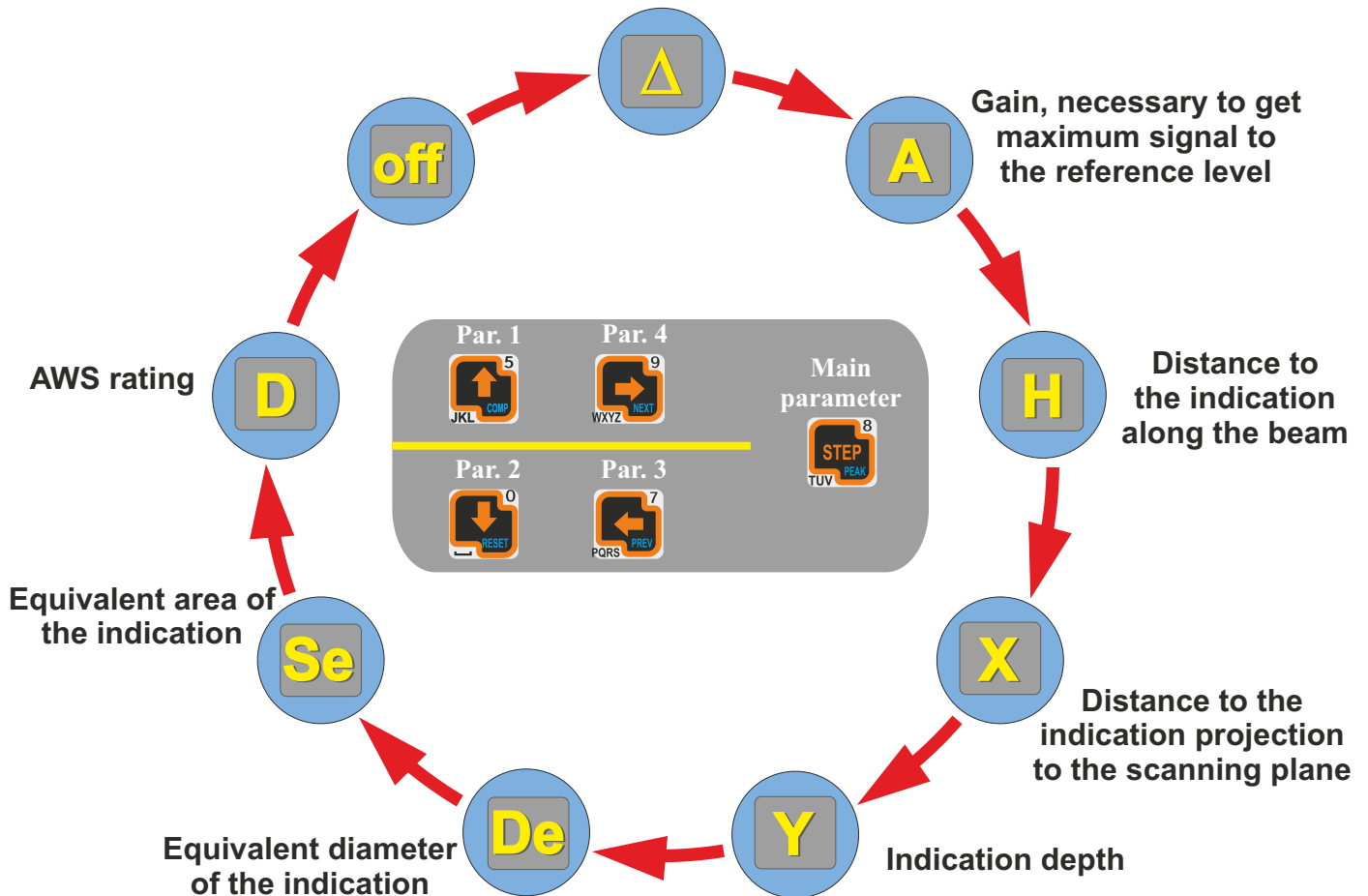


# QUICK ACCESS TO MAIN PARAMETERS<sup>B</sup>

## UT-B 2. Measurands choice



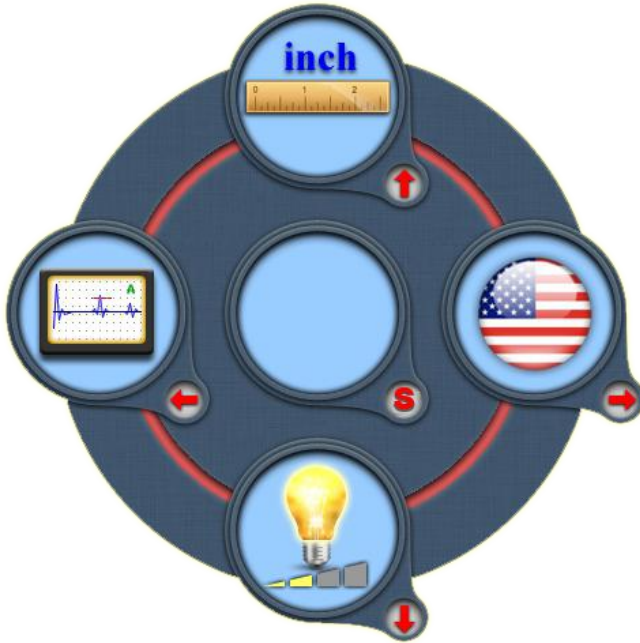
Maximum signal amplitude,  
relative to the reference level



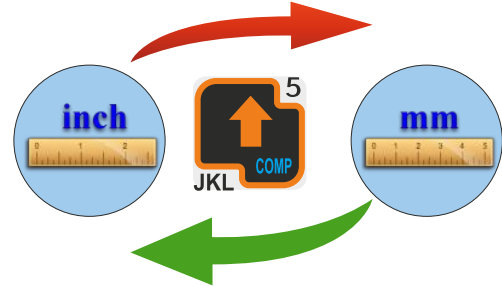


# QUICK ACCESS TO MAIN PARAMETERS<sup>B</sup>

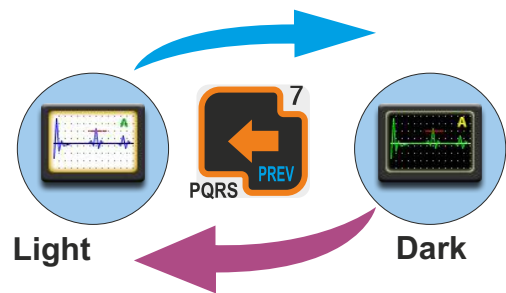
## UT-B 3. Display options



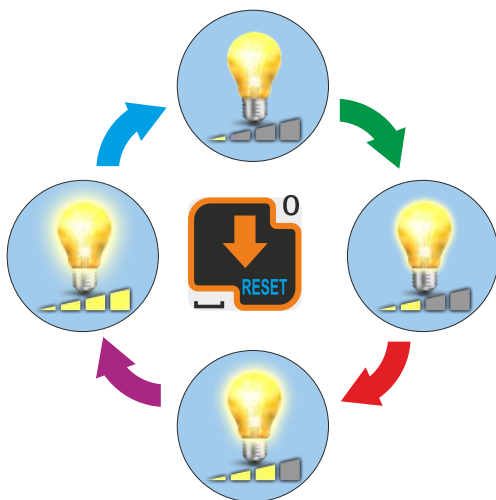
«Switching measurement units»



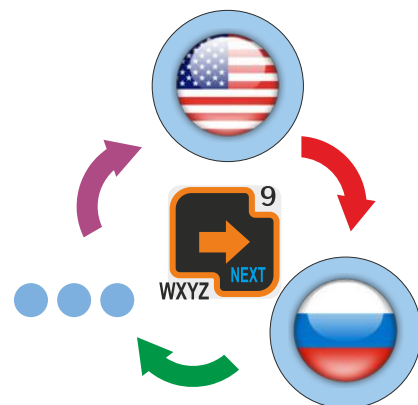
«Switching color schemes»



«Display brightness adjustment»



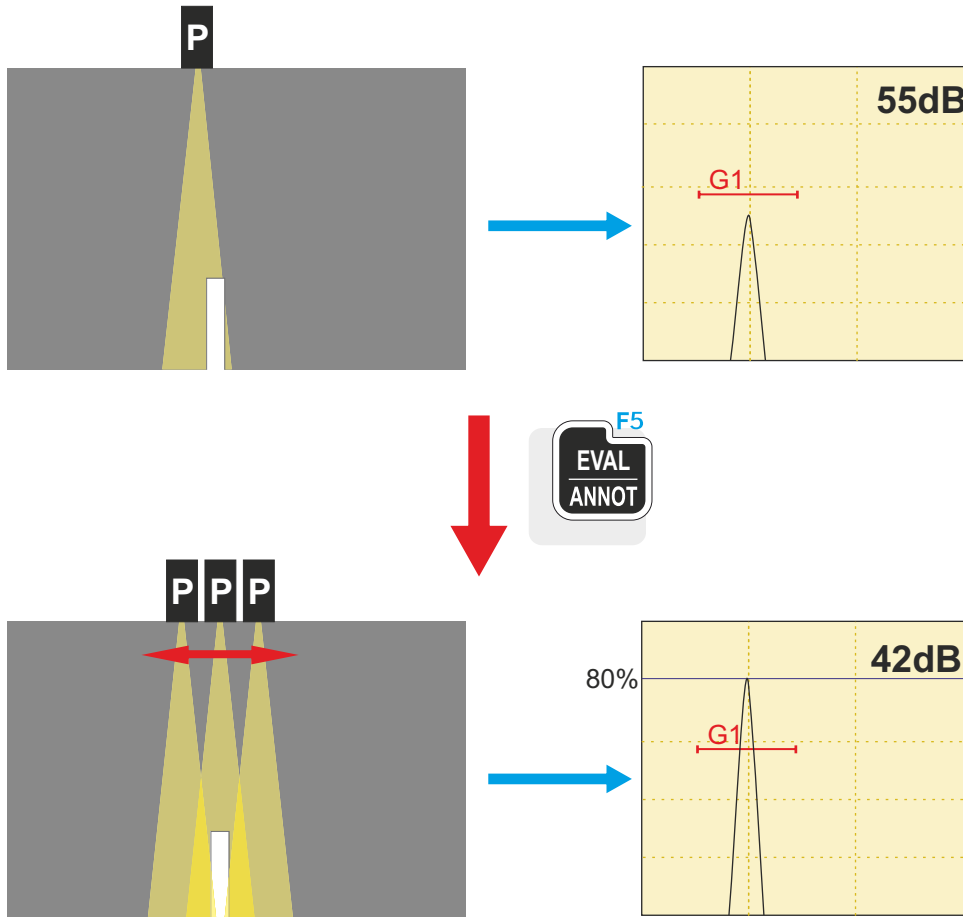
«Interface language choice»



# 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

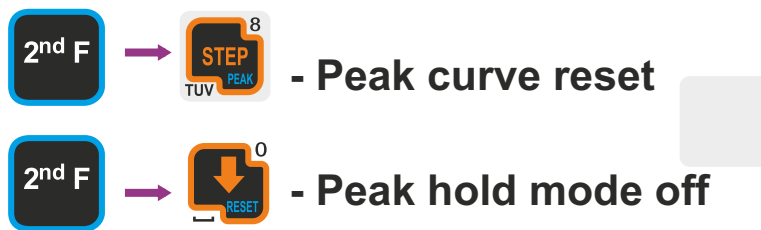
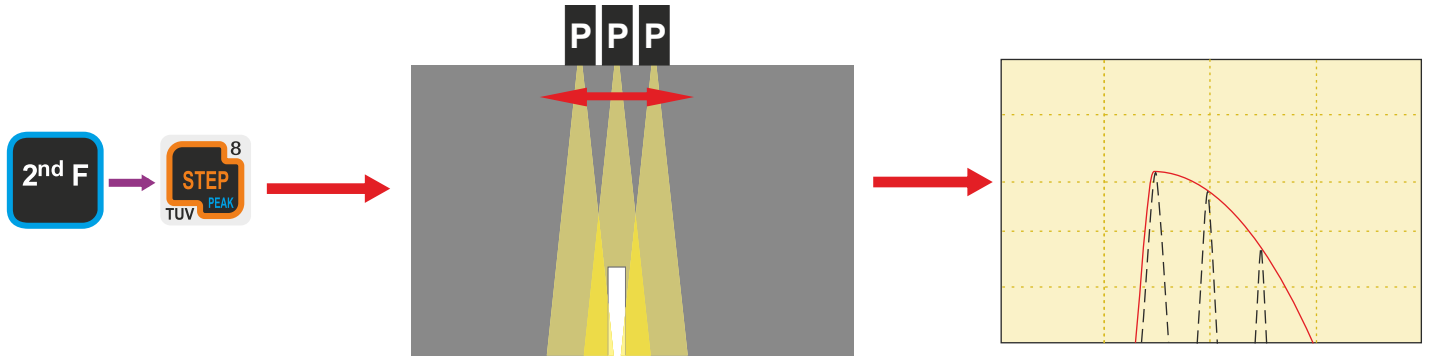


- switches evaluate mode off  
and retrieves the original gain

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

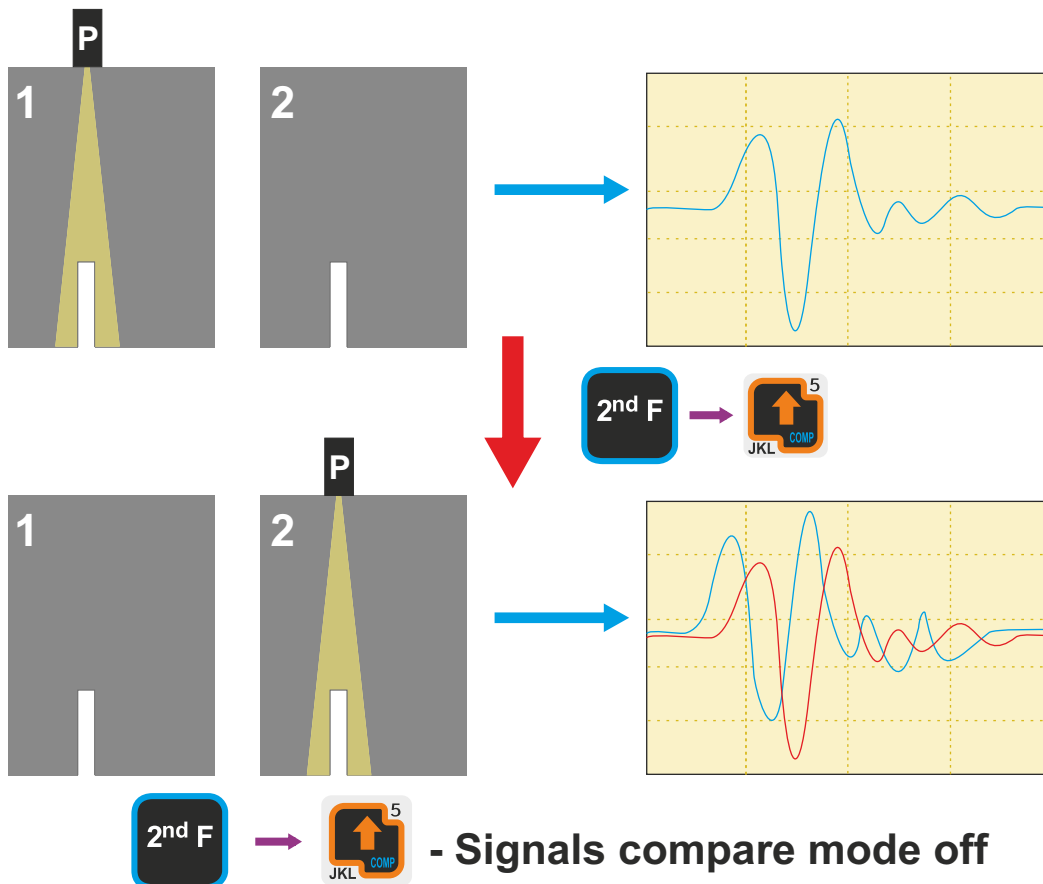
## Peak hold mode

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



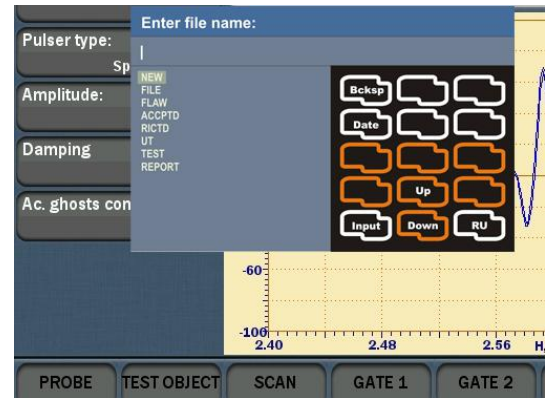
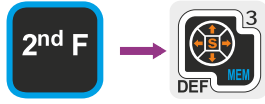
## Signals compare mode

Displays both "frozen" and current signals.

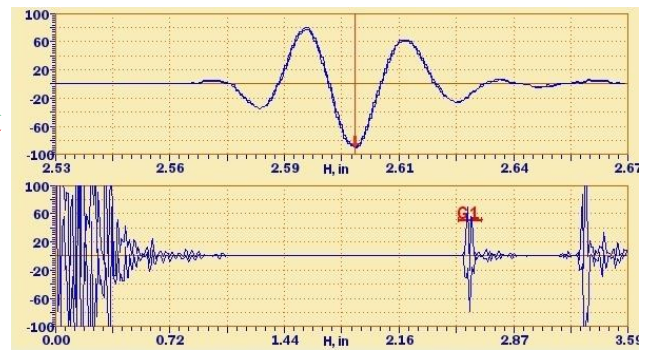
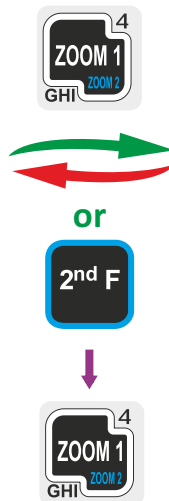


# INDICATION SEARCH, EVALUATION AND DOCUMENTATION AIDS <sup>B</sup>

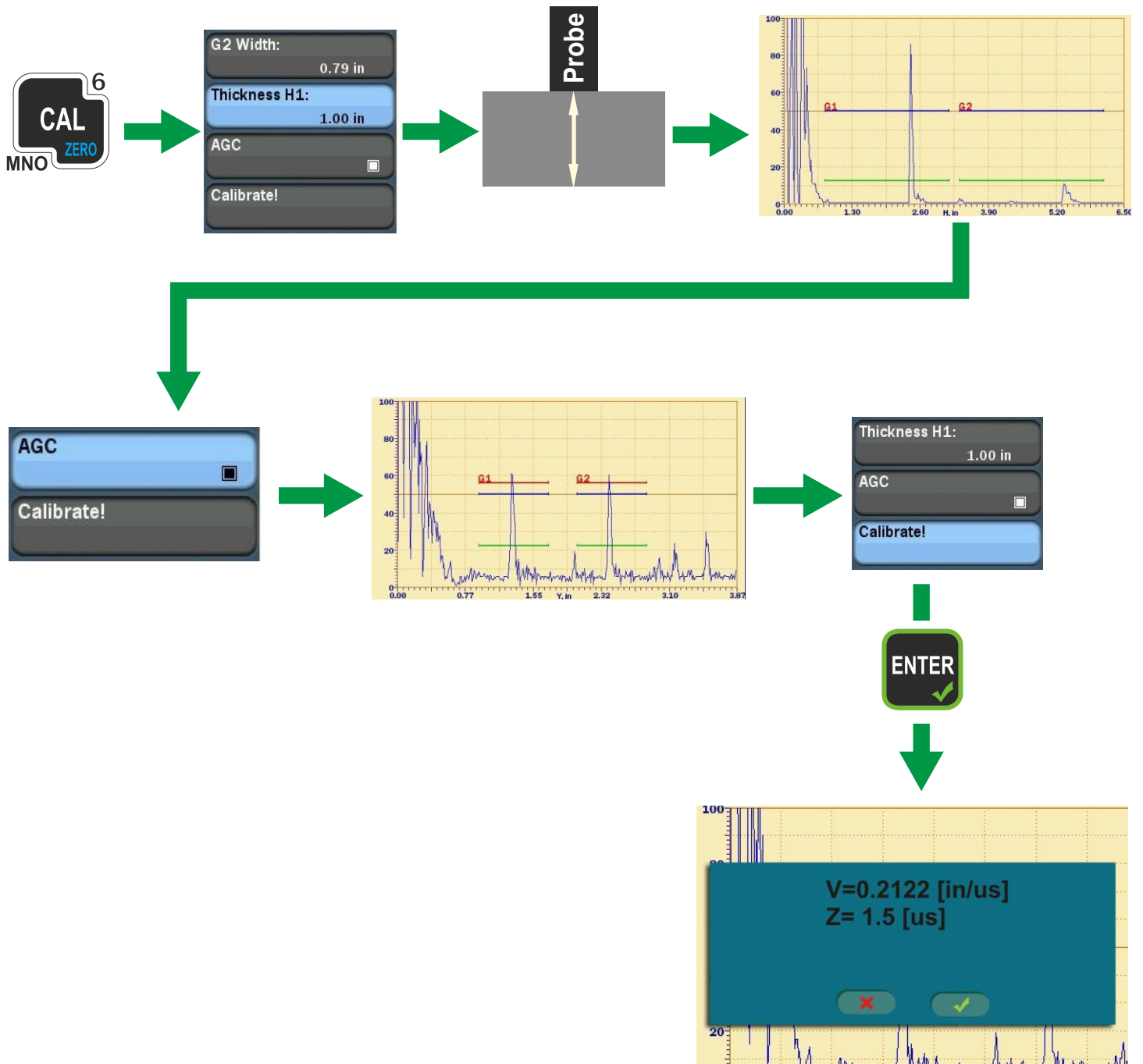
Memory shortcuts. Results saving



## Smart zoom mode

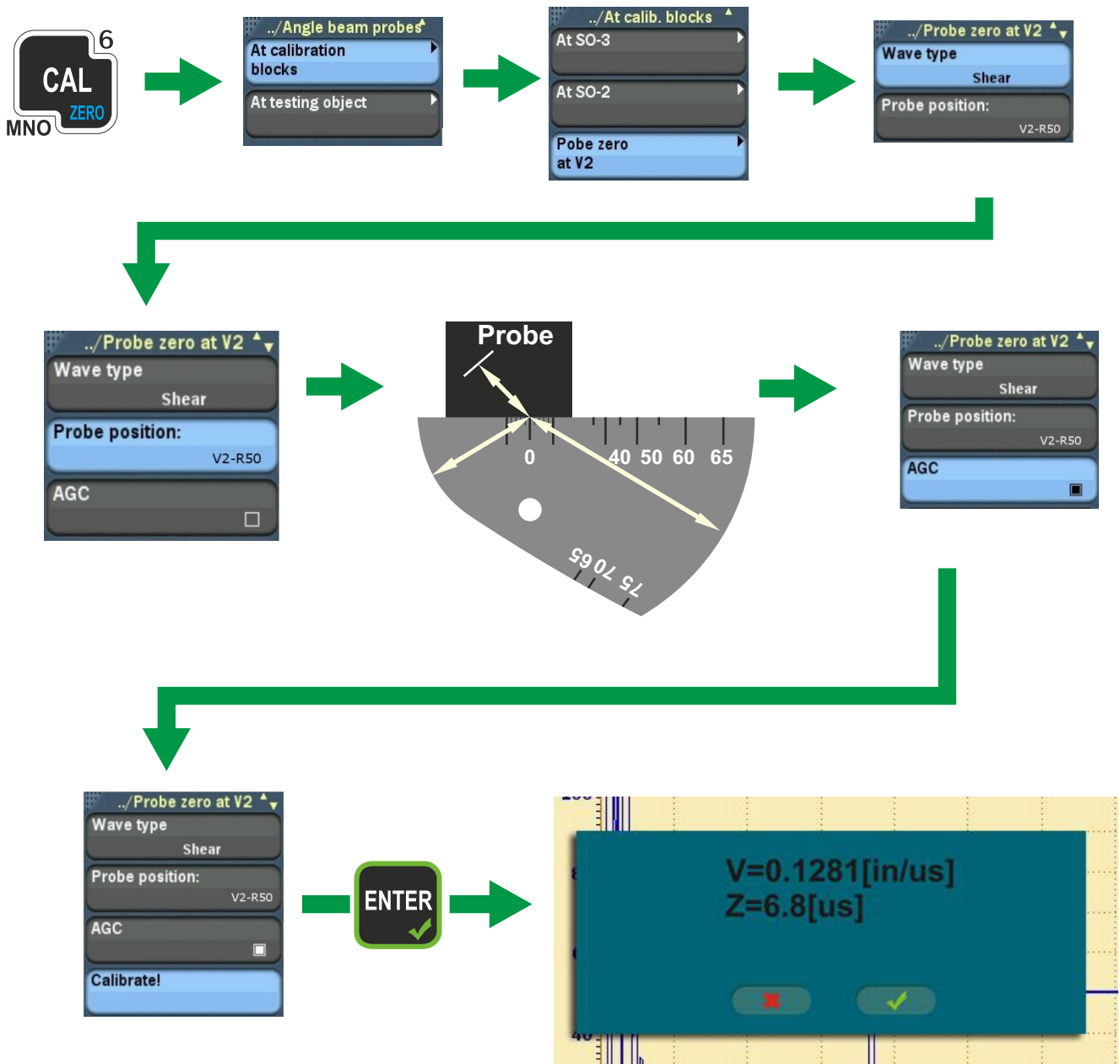


# STRAIGHT-BEAM PROBES CALIBRATION <sup>B</sup>



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

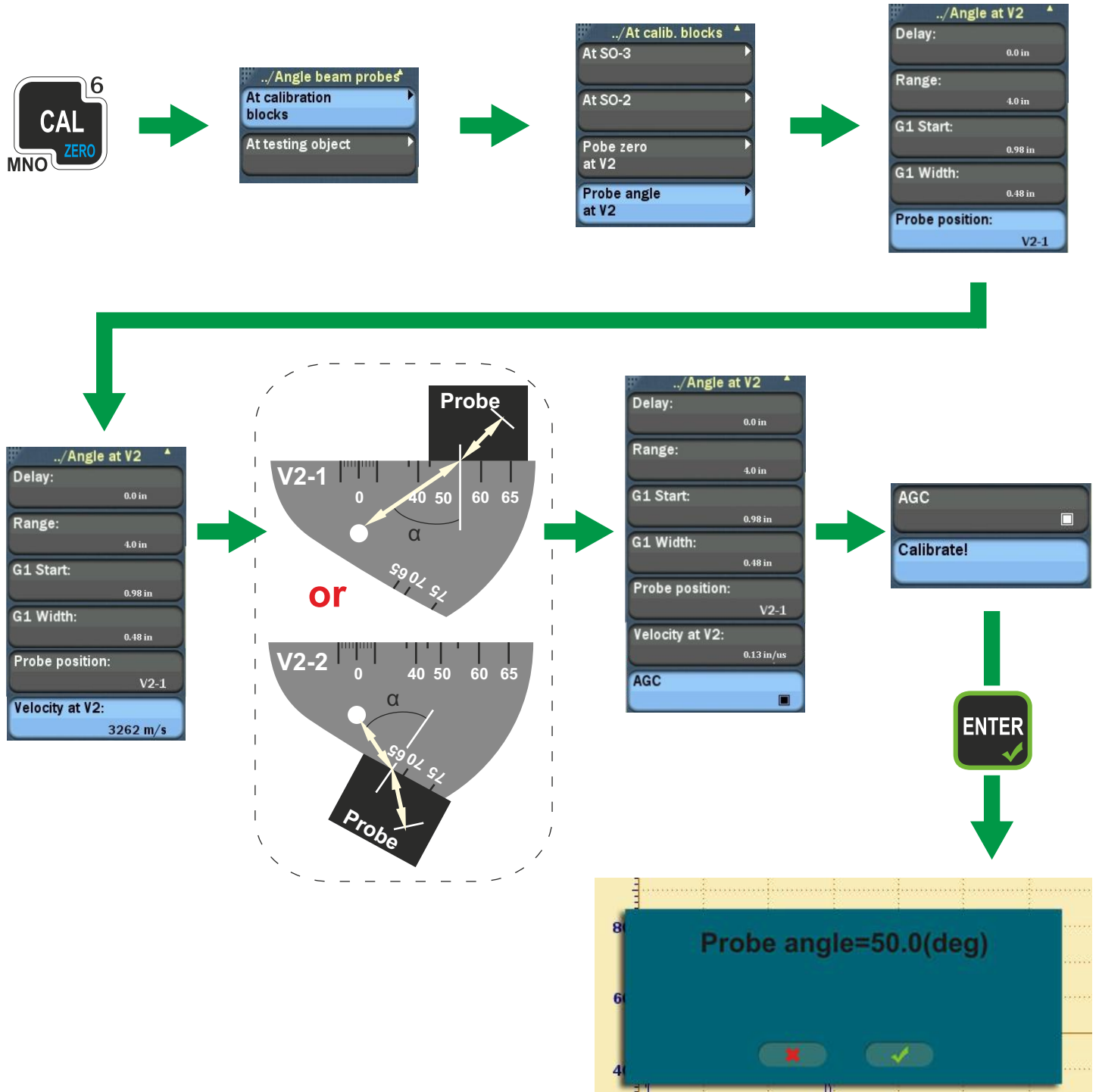
Calibration of the sound velocity and probe zero at V2 calibration block



# 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.

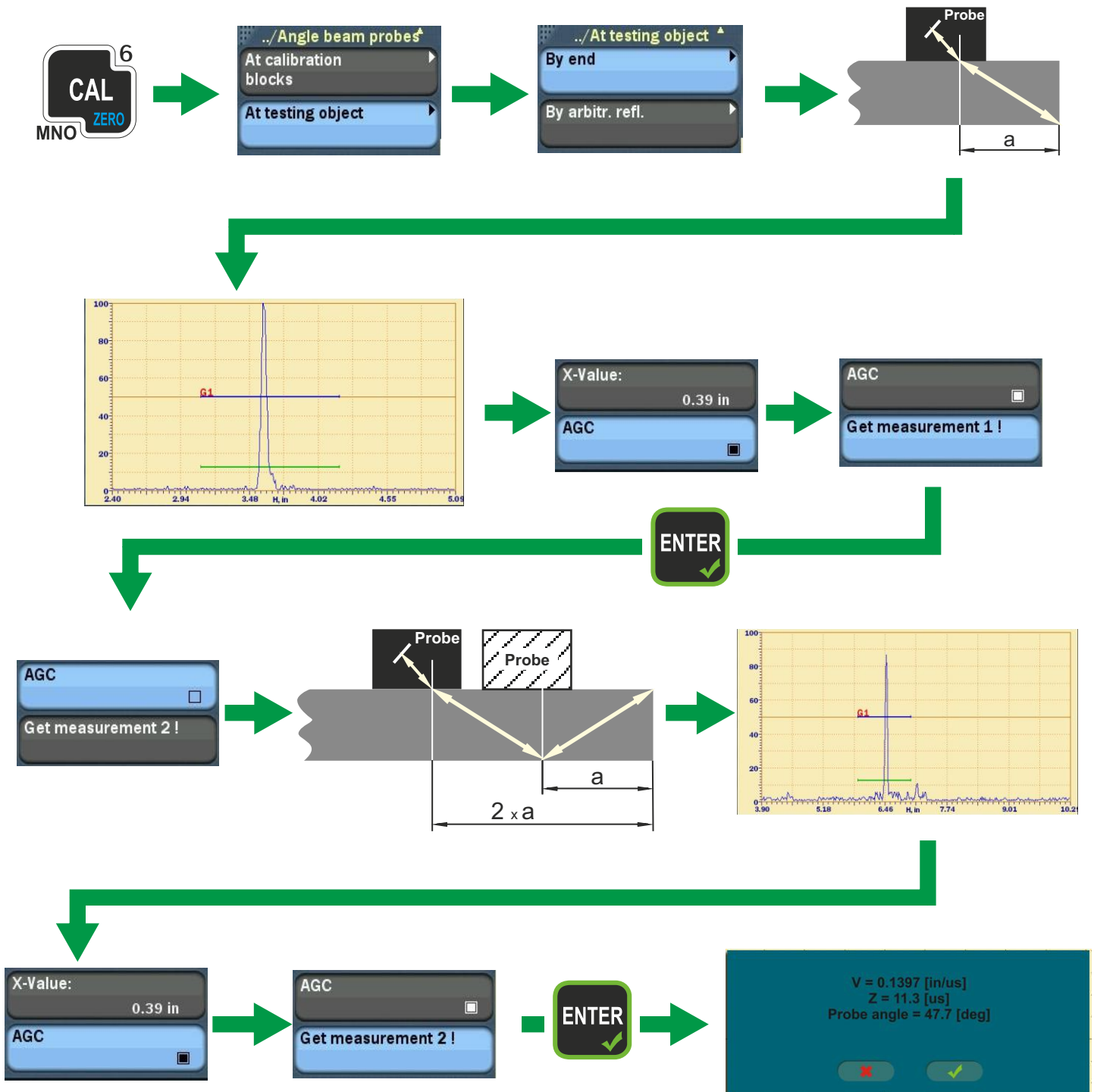




# ANGLE-BEAM PROBES CALIBRATION <sup>B</sup>

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

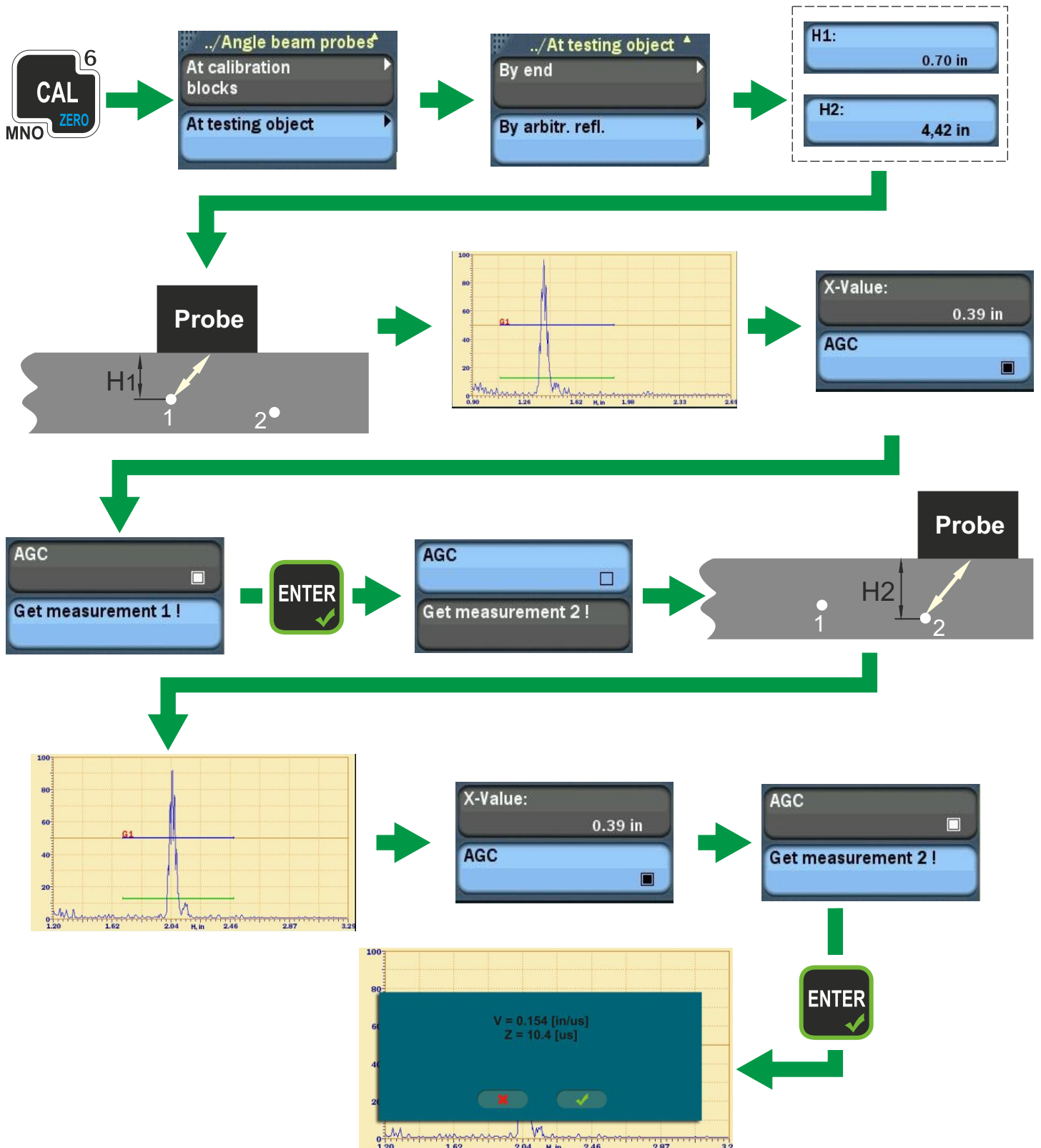
Set up probe angle and X-value before starting this calibration



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

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

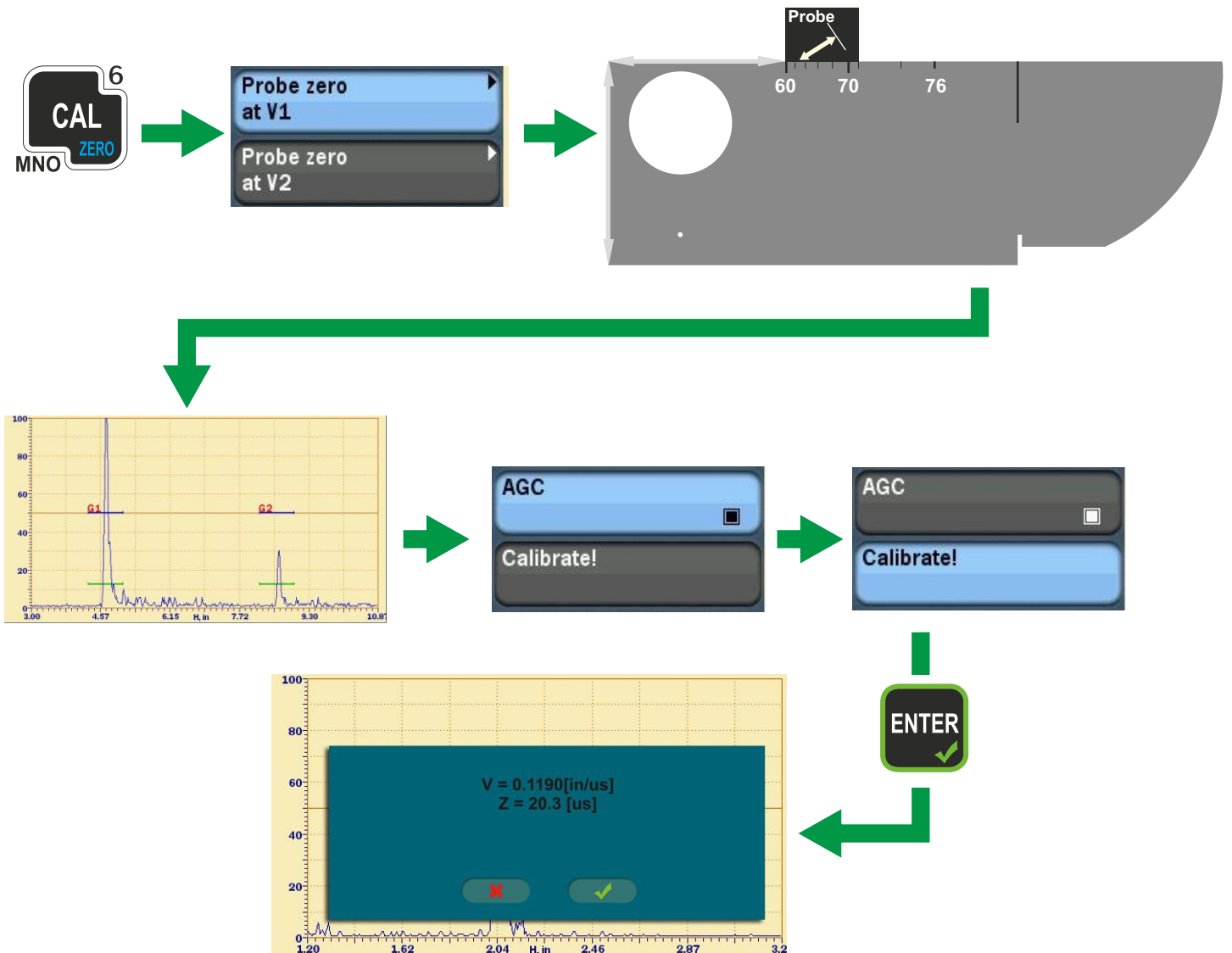
Set up probe angle before starting this calibration



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

## Calibration of probe zero at V1 block

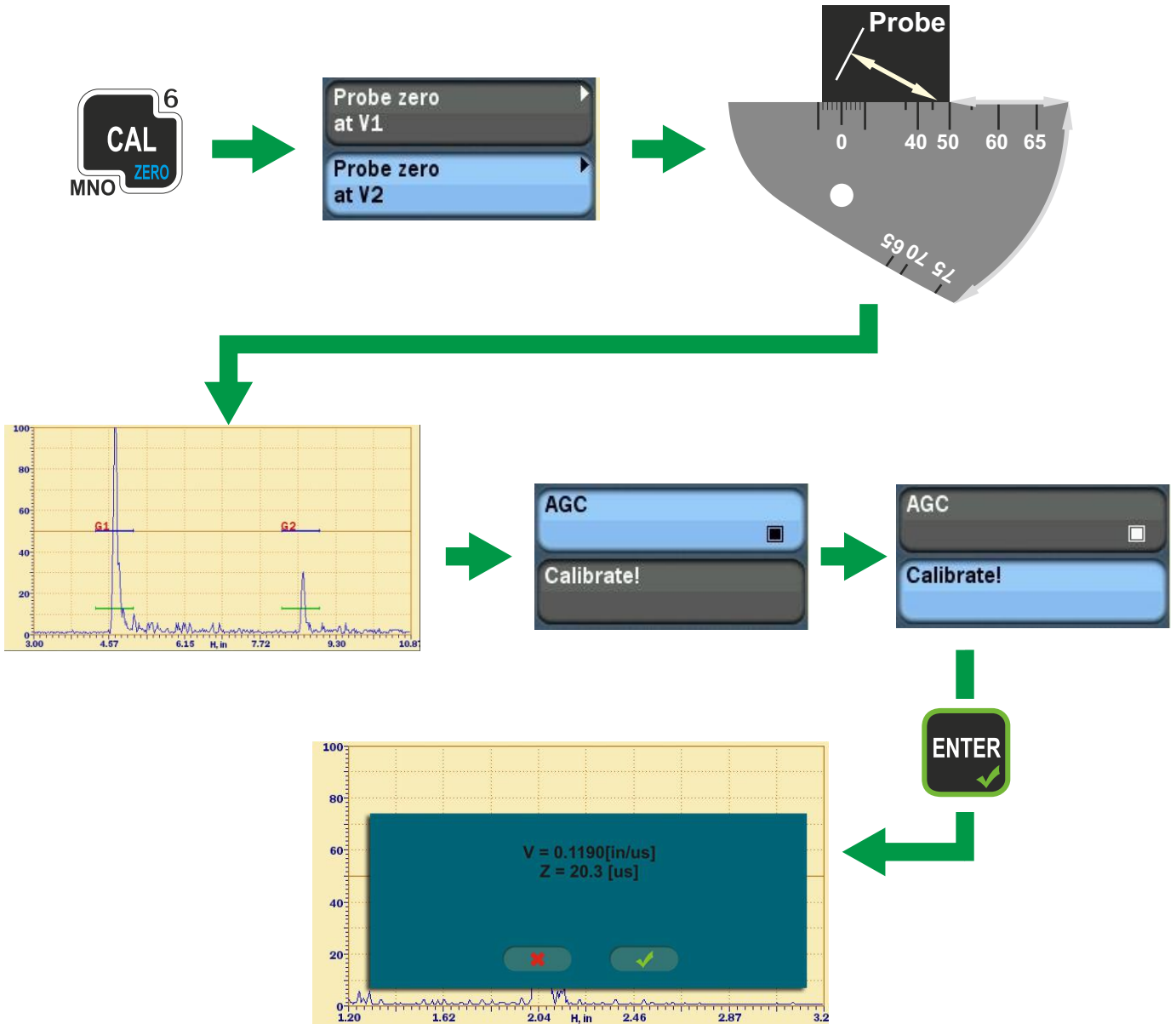
Set up probe angle = 90° before starting this calibration



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

## Calibration of probe zero at V2 block

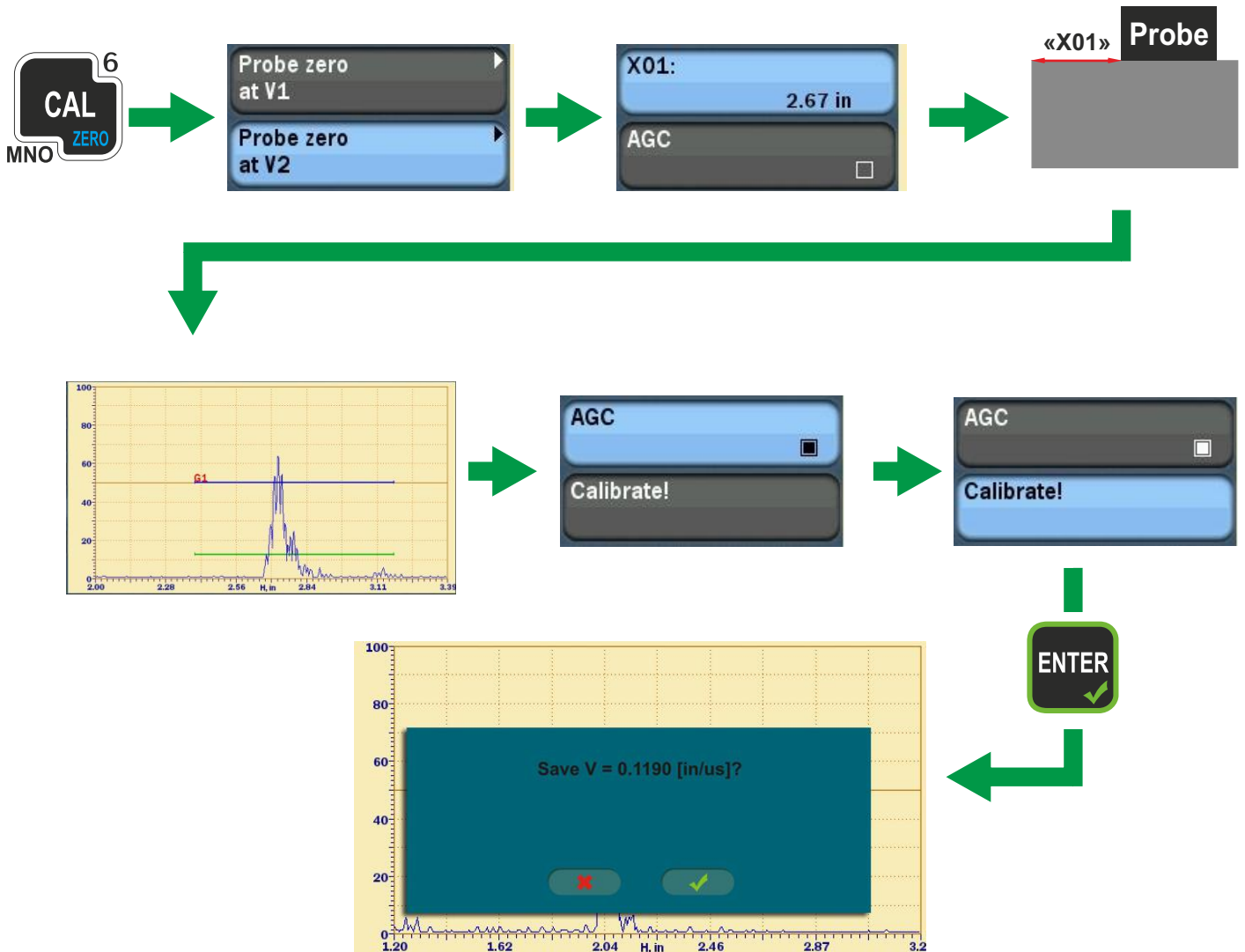
Set up probe angle = 90° before starting this calibration



# 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 <sup>T</sup>

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 <sup>T</sup>

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 T

PROBE

Probe type

Probe #:

Probe zero:  
0.000 us

ENTER

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

F1  
-GAIN  
REF GAIN

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 ADD F2 USE F3 DELETE

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

ENTER

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

ENTER

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	<input type="checkbox"/>
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

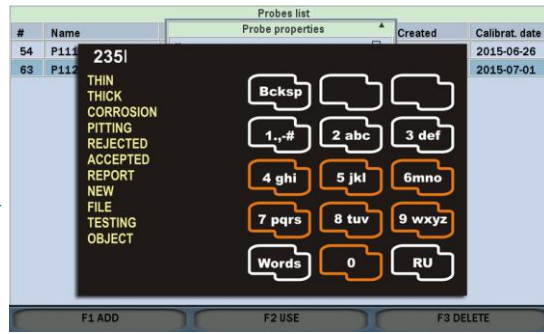
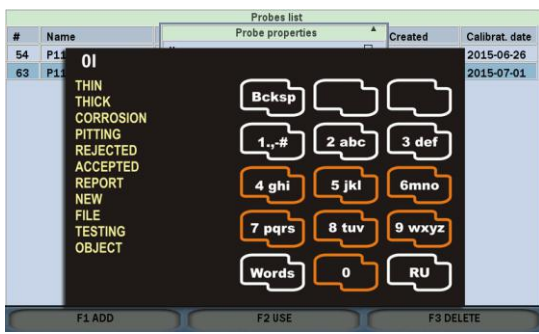
F1 ADD F2 USE F3 DELETE

Probes list							
#	Name	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
63	P112-5,0-12/2	0	Dbl.Cryst.	5 MHz	0.000 us	2015-07-01	2015-07-01

F1 ADD F2 USE F3 DELETE

9  
WXYZ NEXT

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 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 <sup>5</sup> <sub>COMP</sub>

<sub>RESET</sub> <sup>0</sup>



#	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

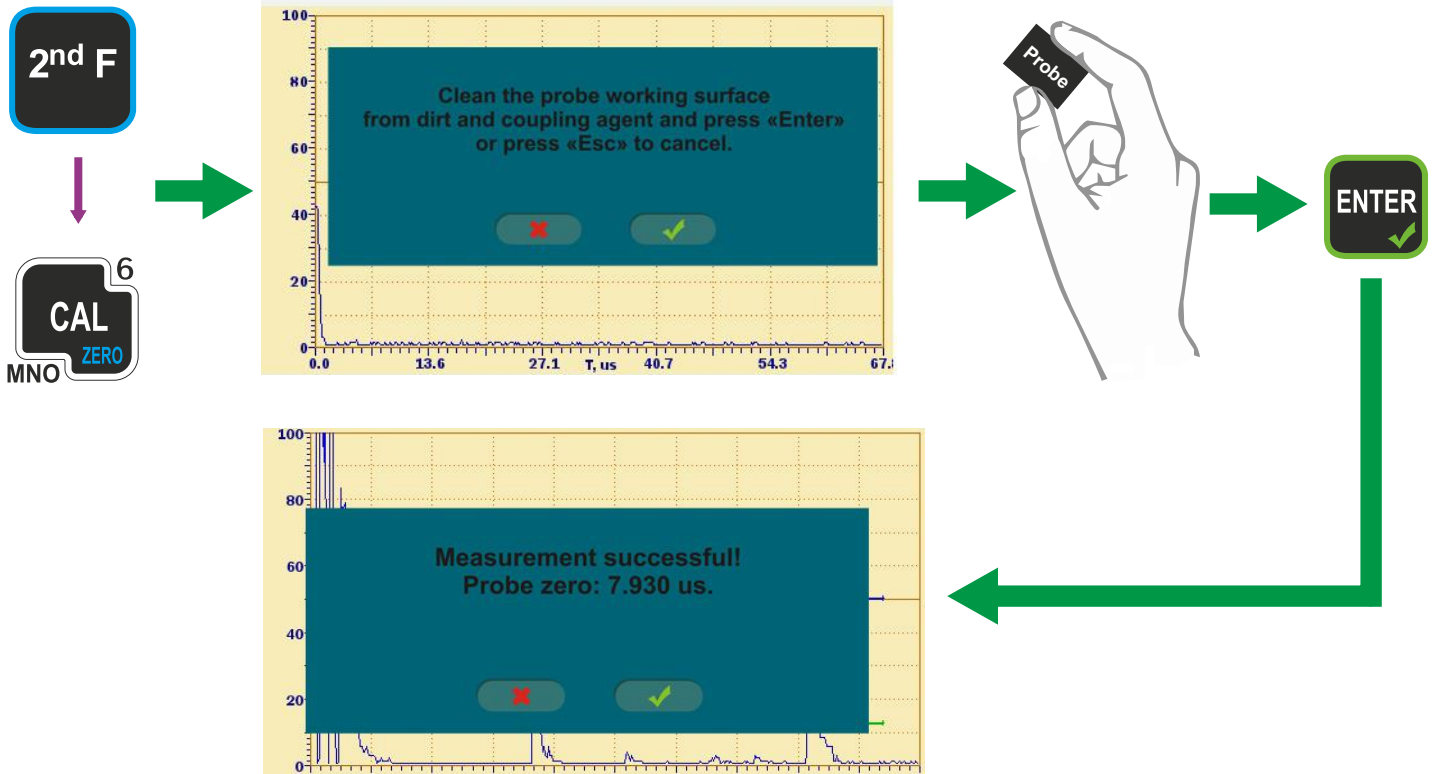




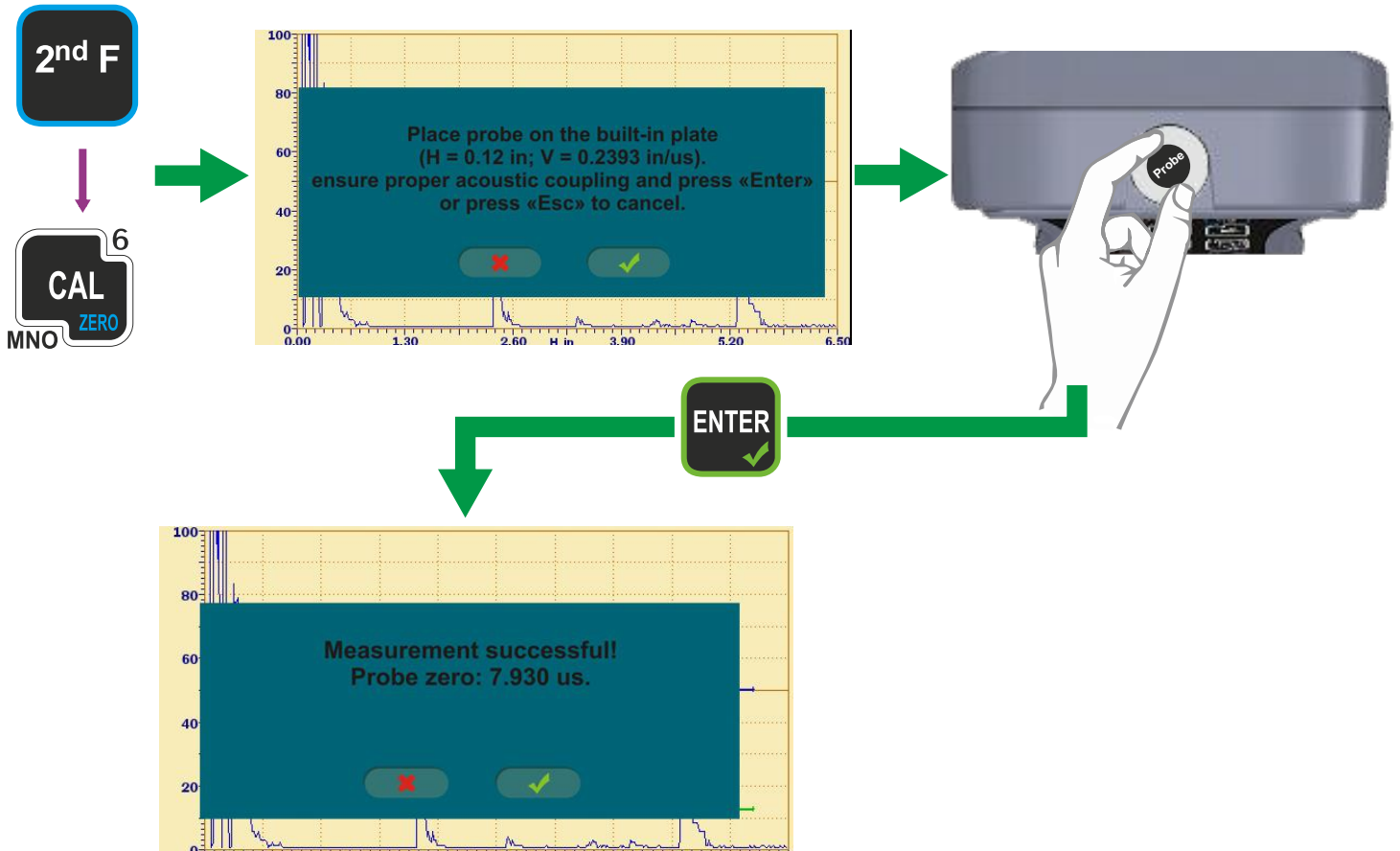
# PROBE ZEROING <sup>T</sup>

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

## Zeroing in “in air” mode



## Zeroing in “on block” mode

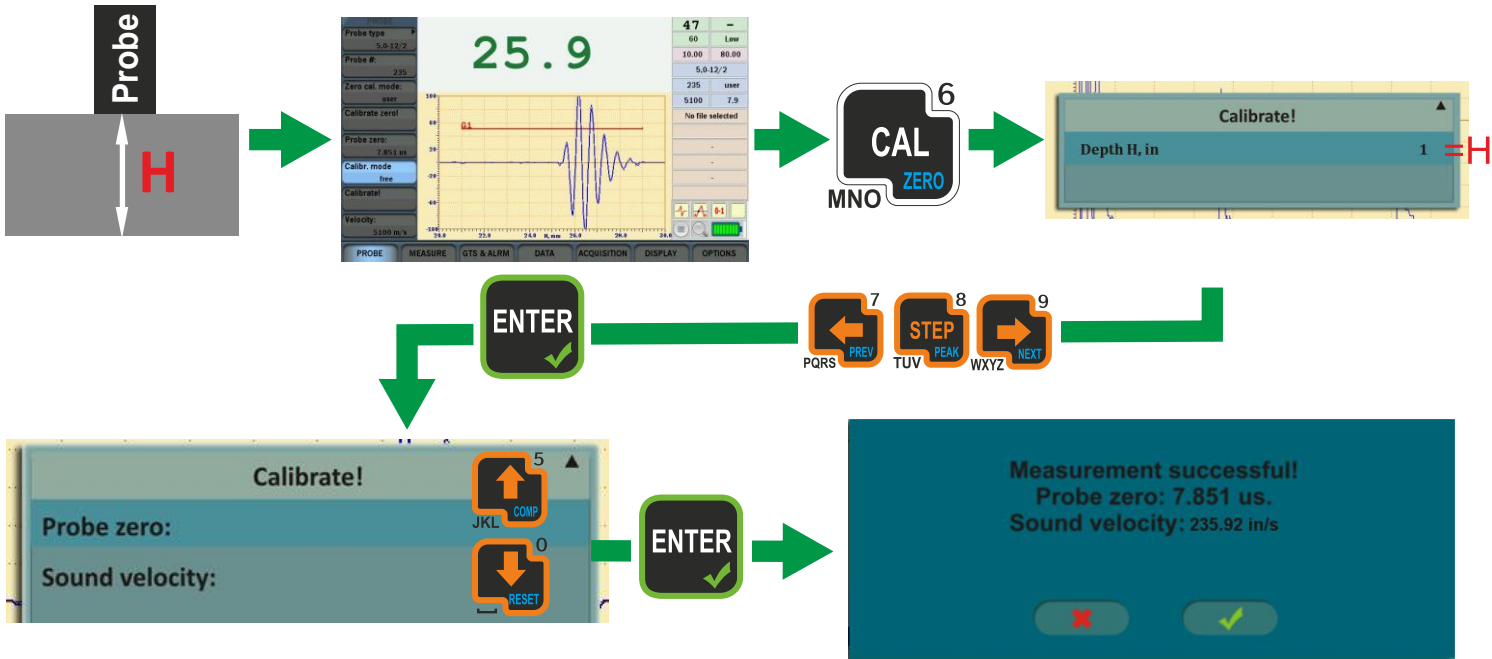


# FREE CALIBRATION <sup>T</sup>

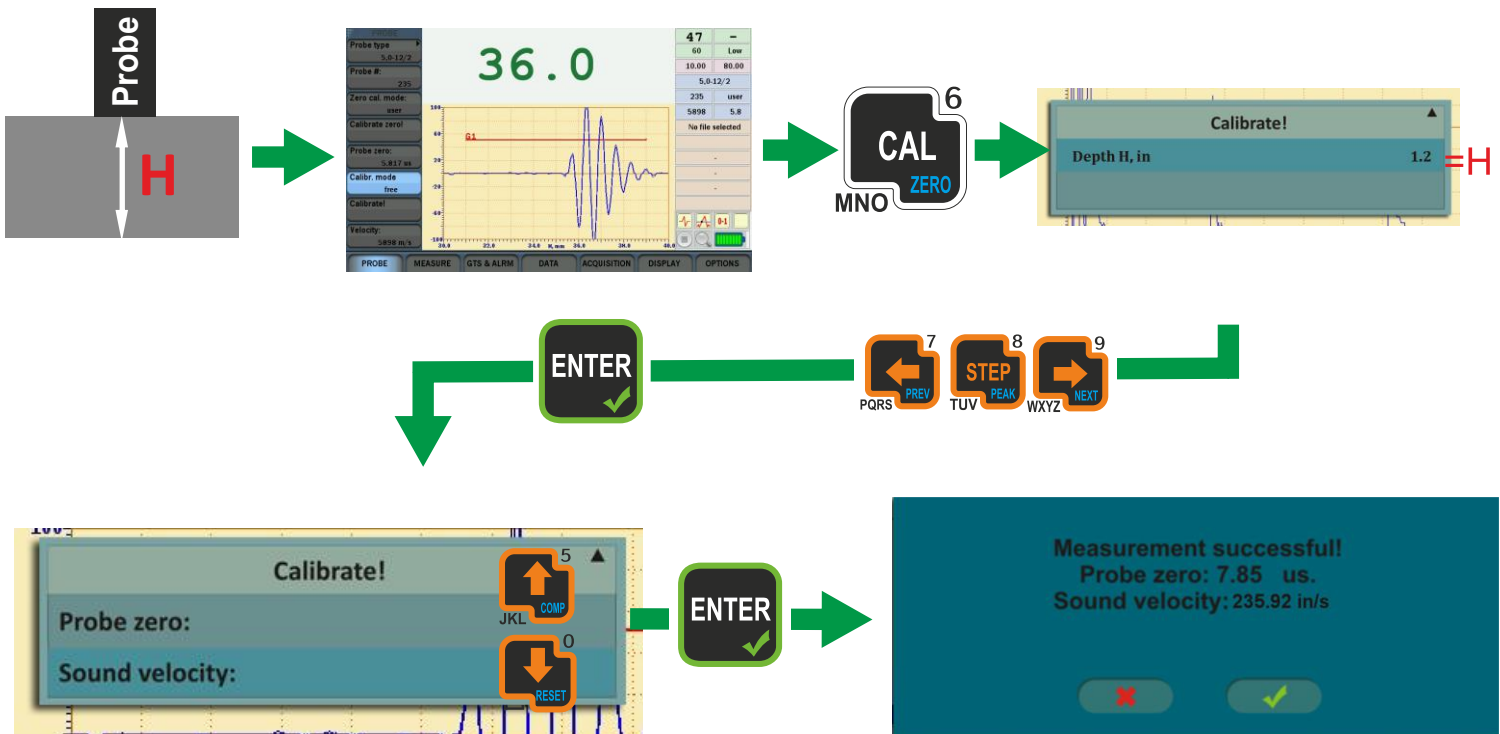
Should be chosen in PROBE → Calibr.mode

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)

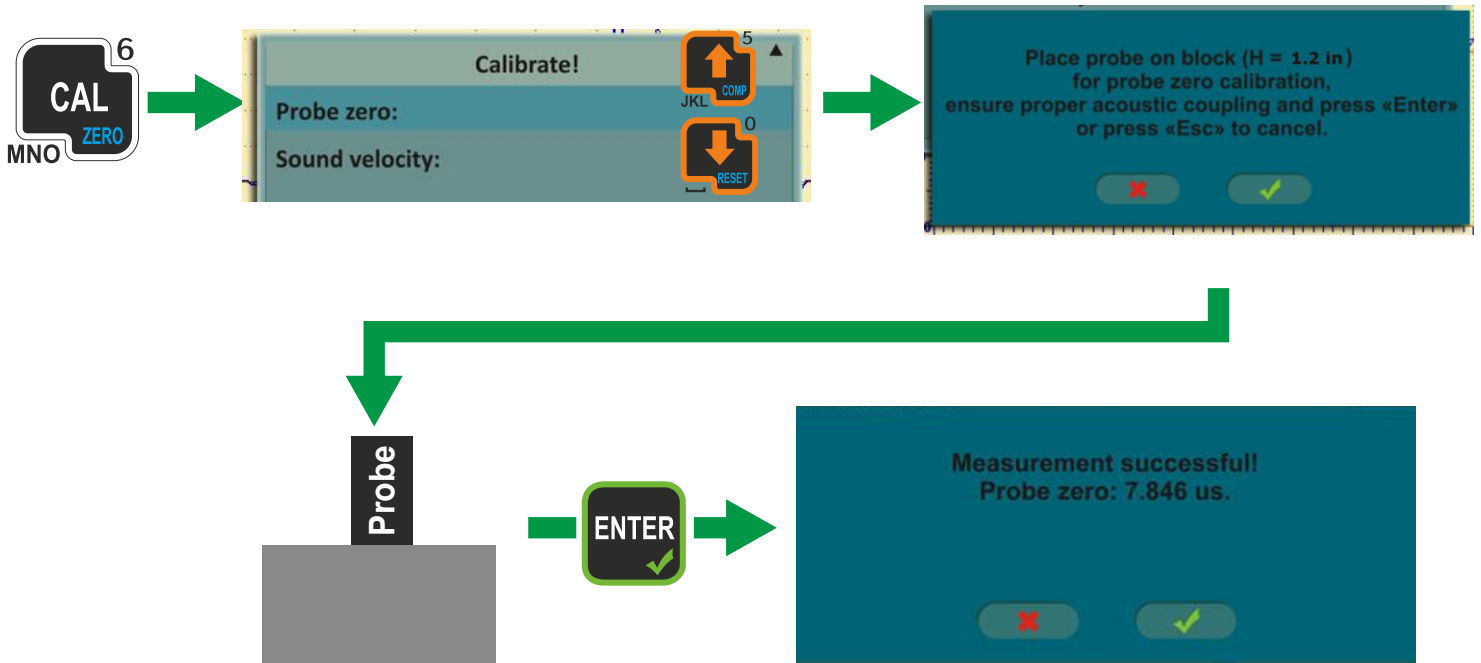


# 1-POINT CALIBRATION <sup>T</sup>

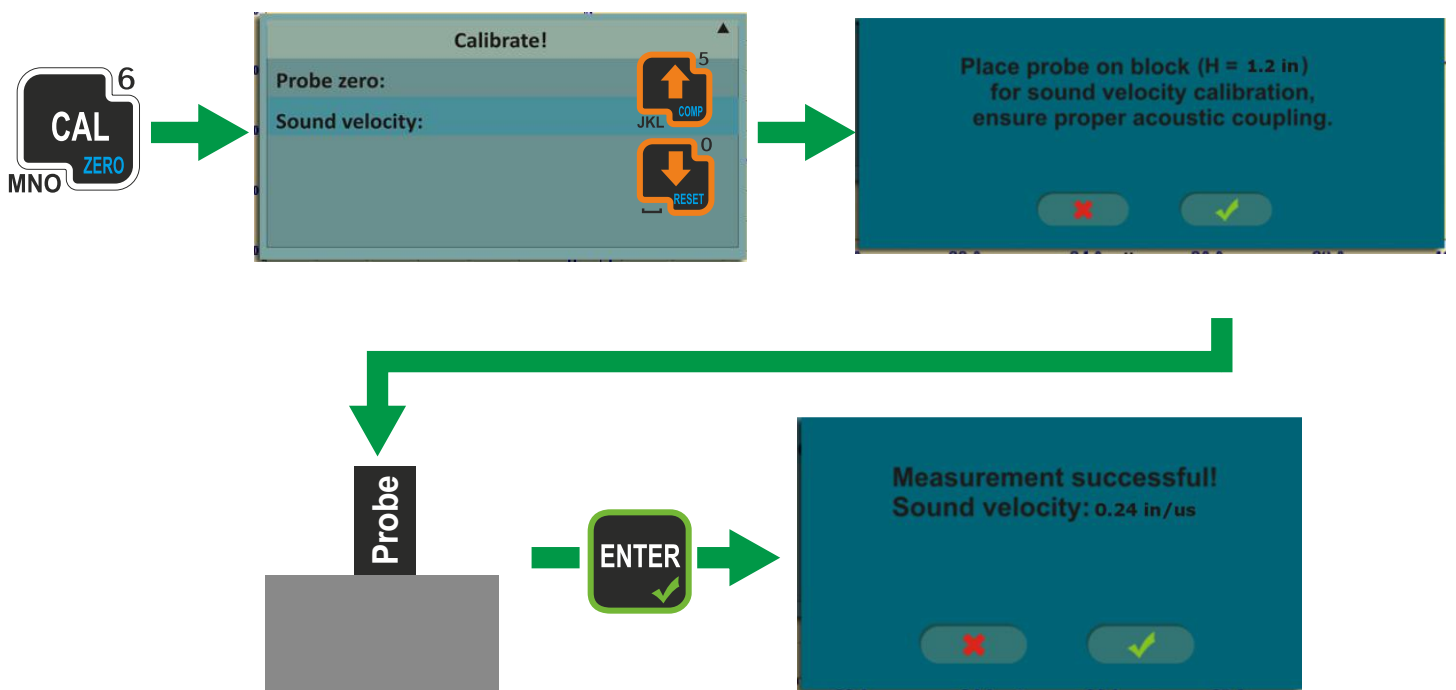
Should be chosen in PROBE → Calibr.mode

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)



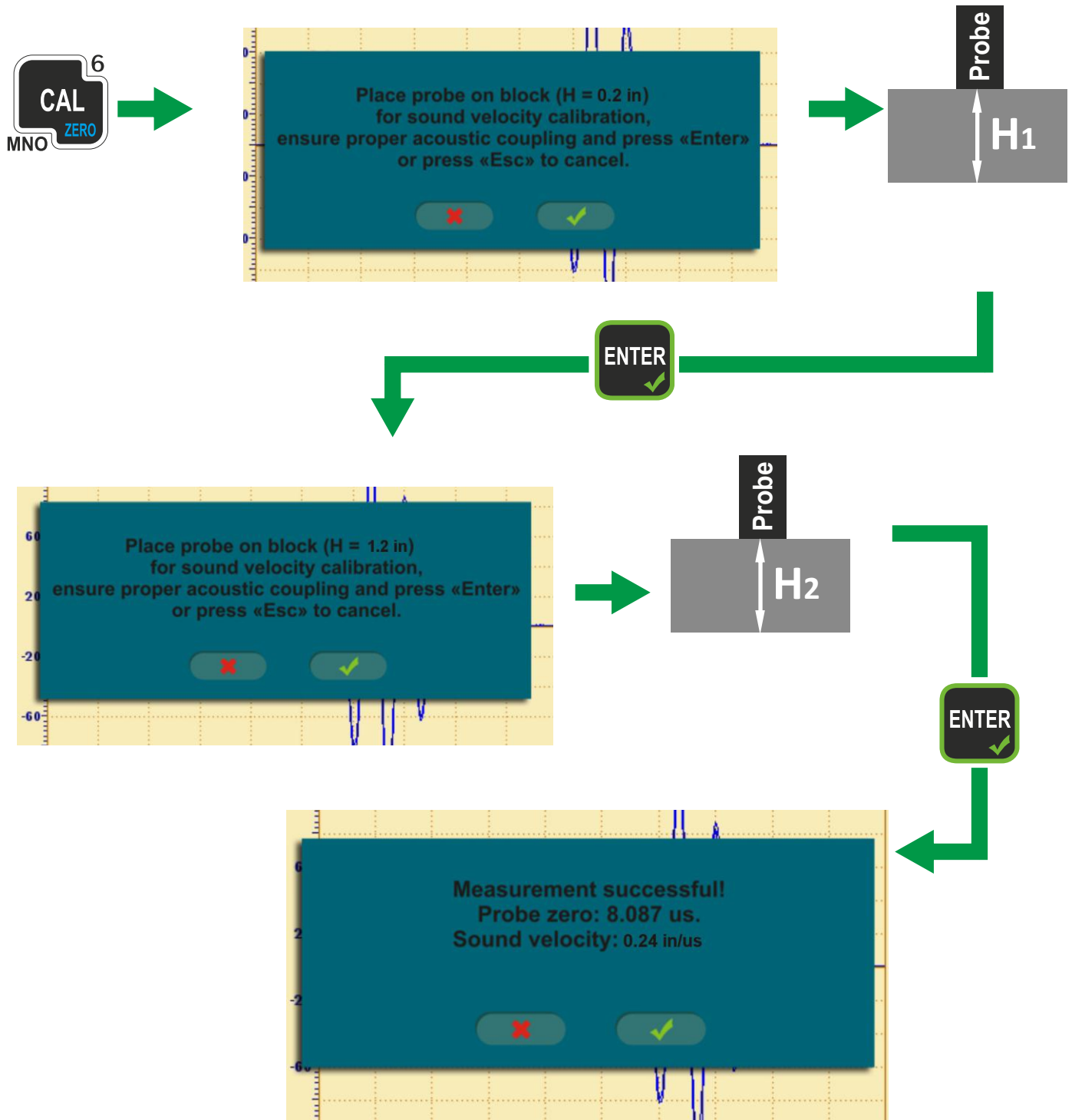
## Calibrating sound velocity (the probe is already zeroed)



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

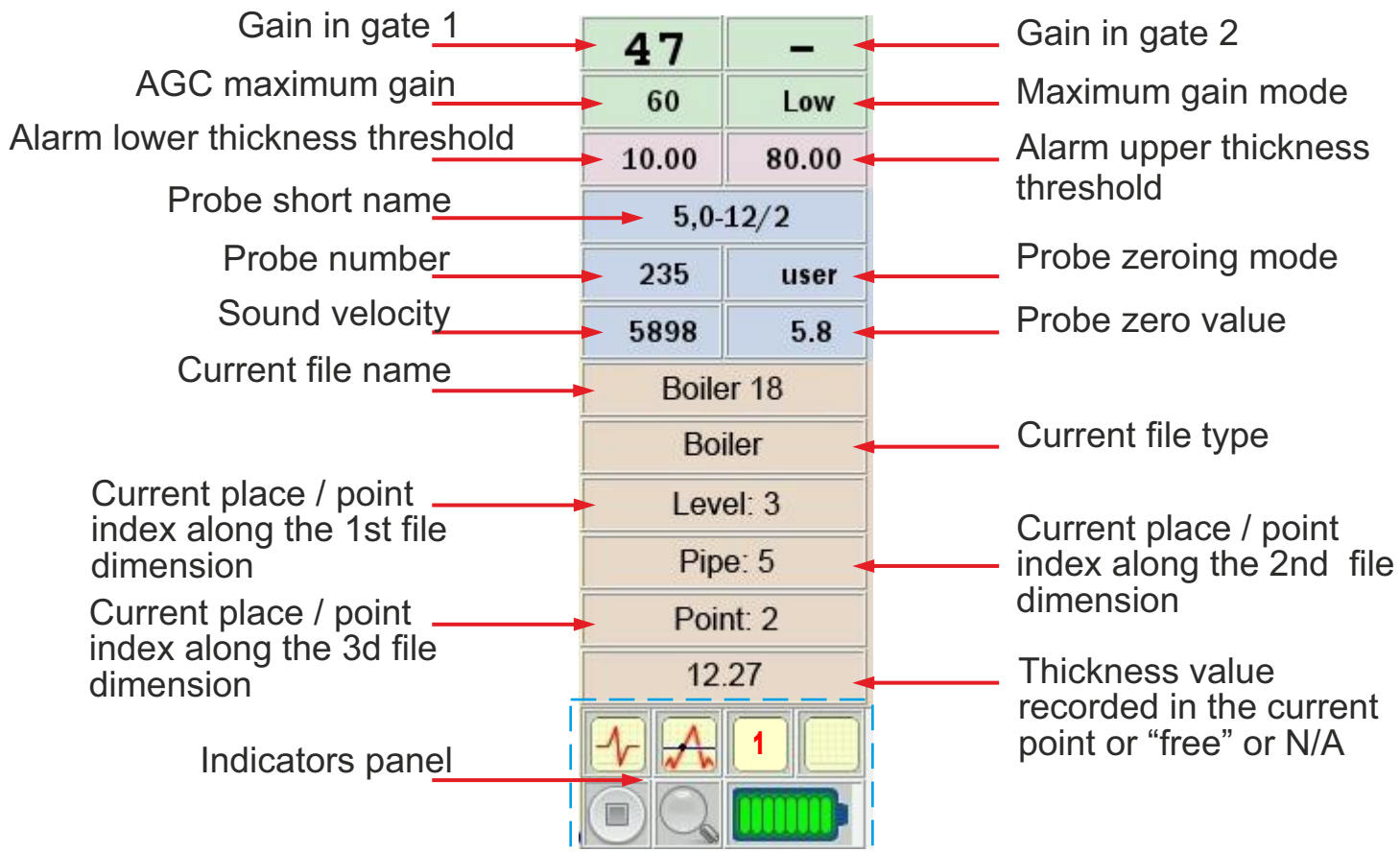
Should be chosen in PROBE → Calibr.mode

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.

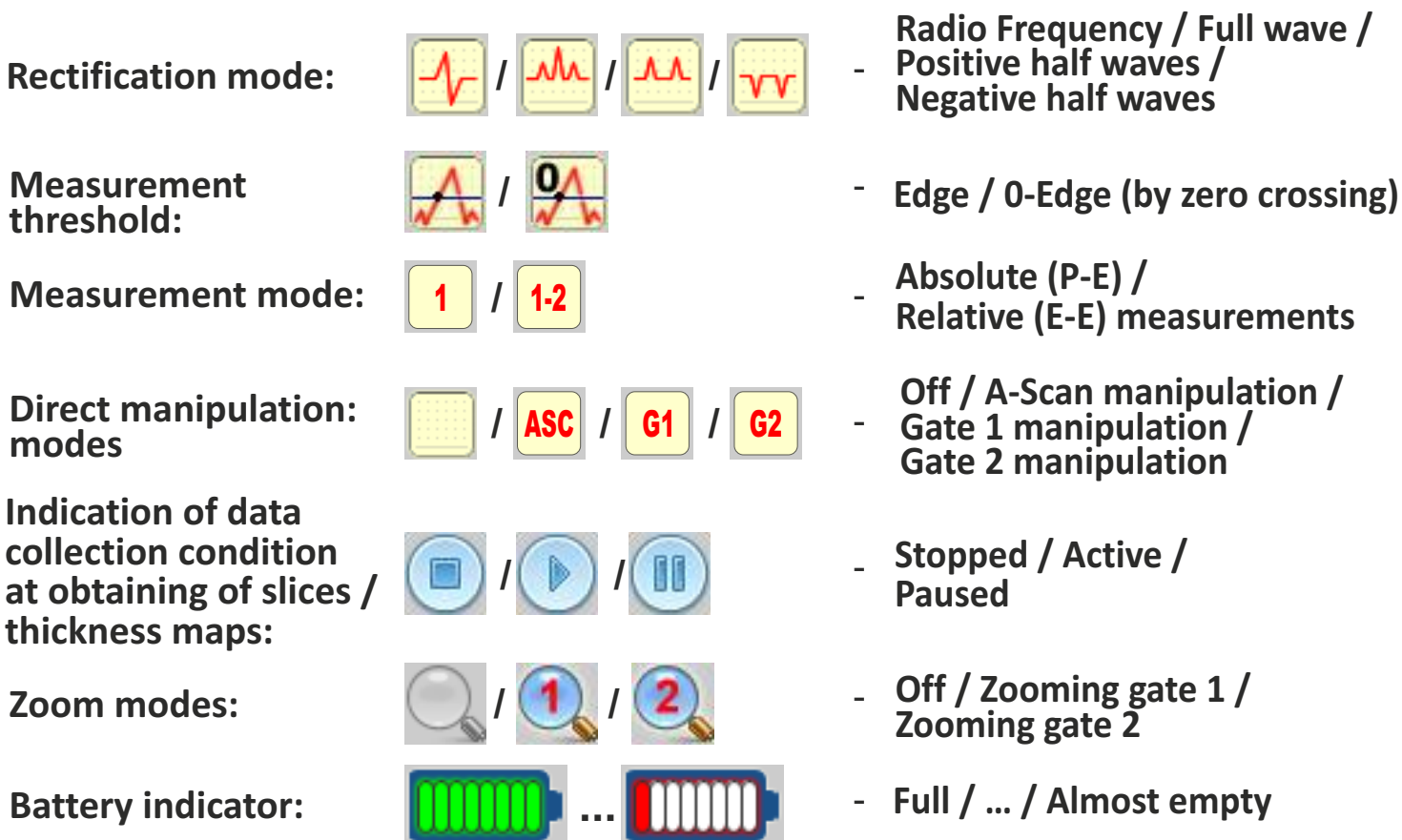


Thicknesses of calibration blocks for 2-points calibration should differ at least 2 times.

# INDICATION PANEL <sup>T</sup>



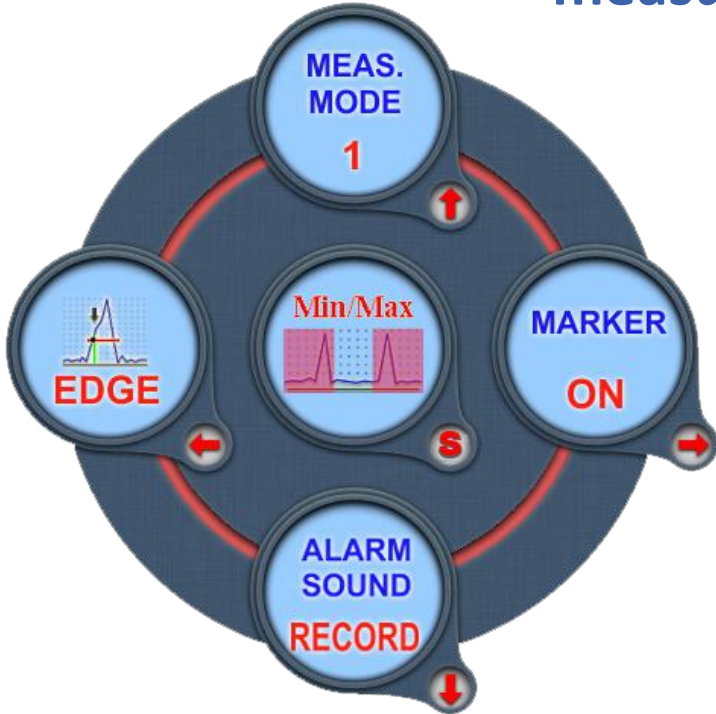
# INDICATORS <sup>T</sup>



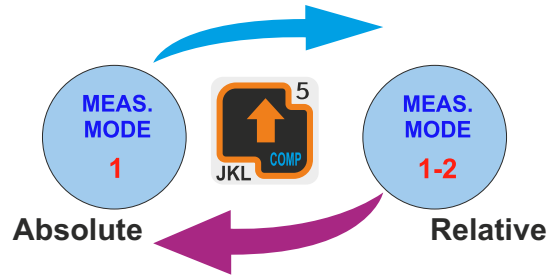


# QUICK ACCESS TO MAIN PARAMETERS<sup>T</sup>

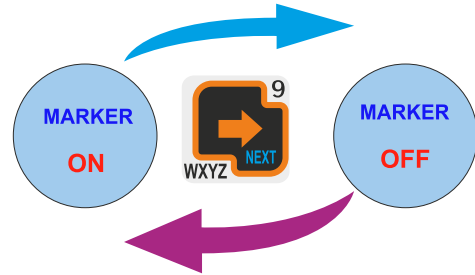
## TG+ 1. Gates choice for absolute or relative measurements



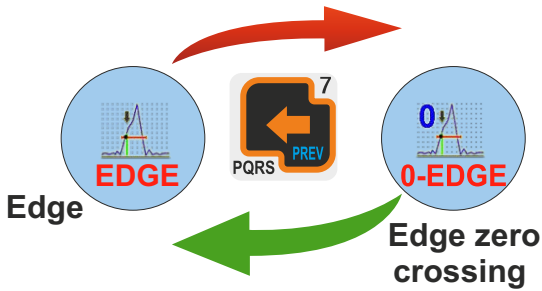
«Choice of the measurement mode: absolute or relative»



«Measurement point marker»

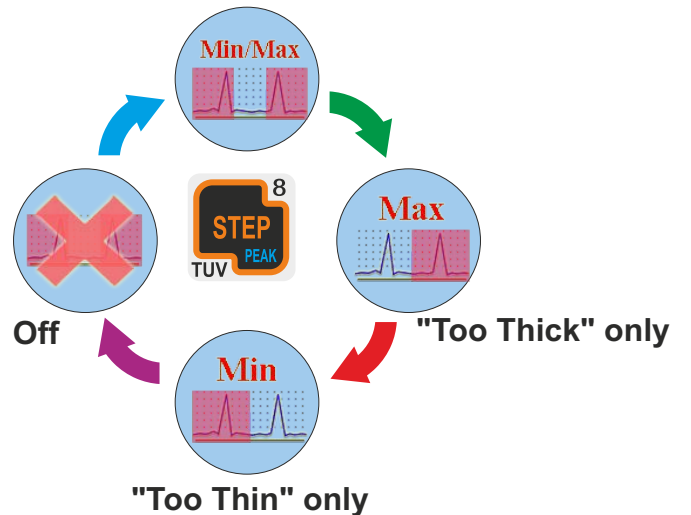


«Time/distance measurement threshold choice»

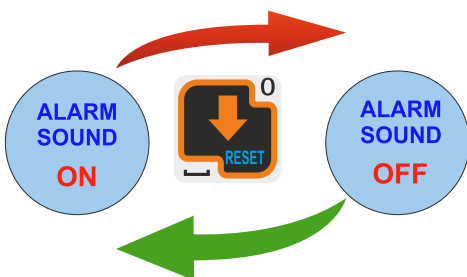


«Flaw alarm logic choice»

Both "Too thin" and " Too thick"



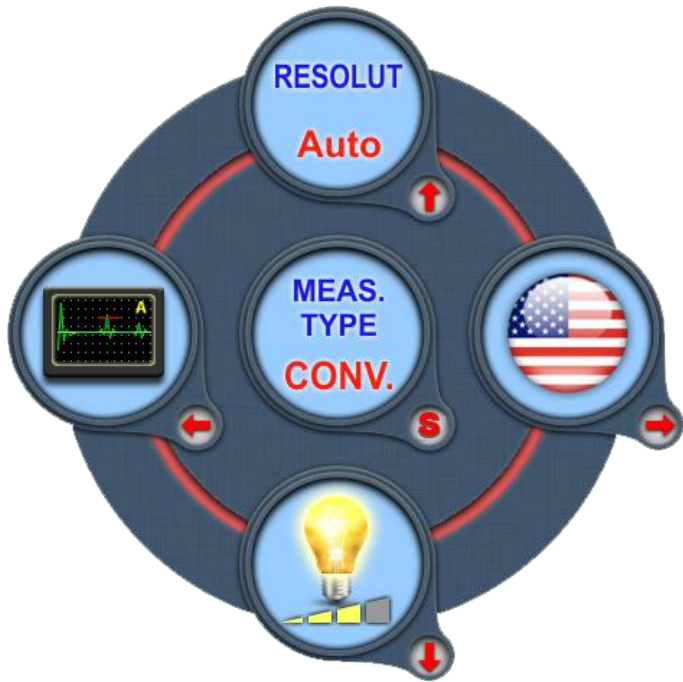
«Choice of the gate(s) level for the sound alarm»



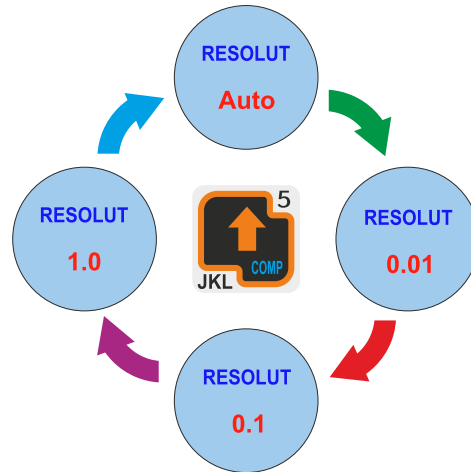


# QUICK ACCESS TO MAIN PARAMETERS<sup>T</sup>

## TG+ 2. Display options



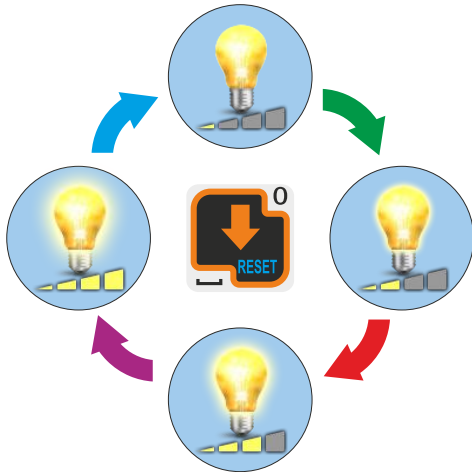
«Resolution choice»



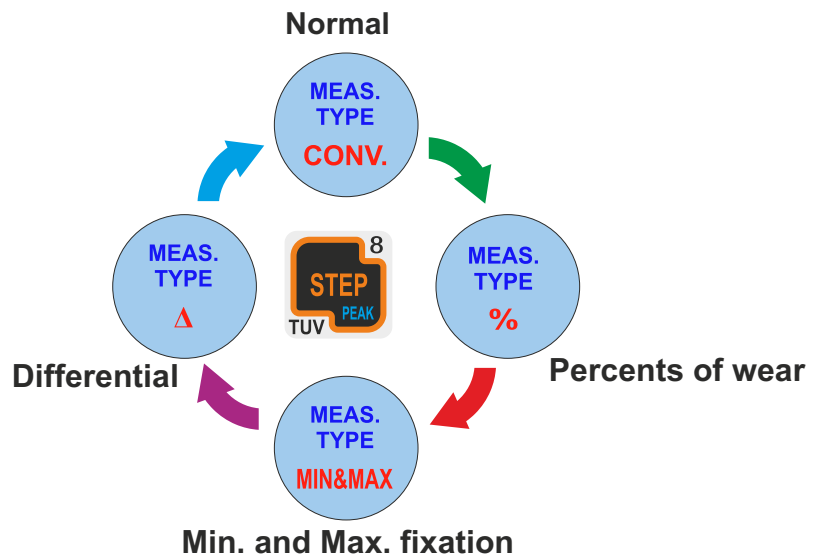
«Interface language choice»



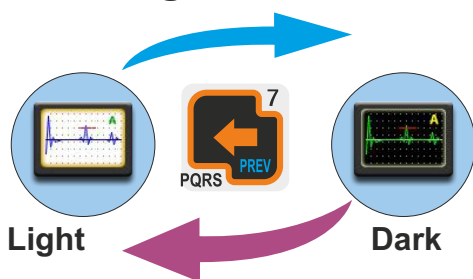
«Display brightness adjustment»



«Measurement type choice»



«Switching color schemes»



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