

Ultrasonic Flaw Detector

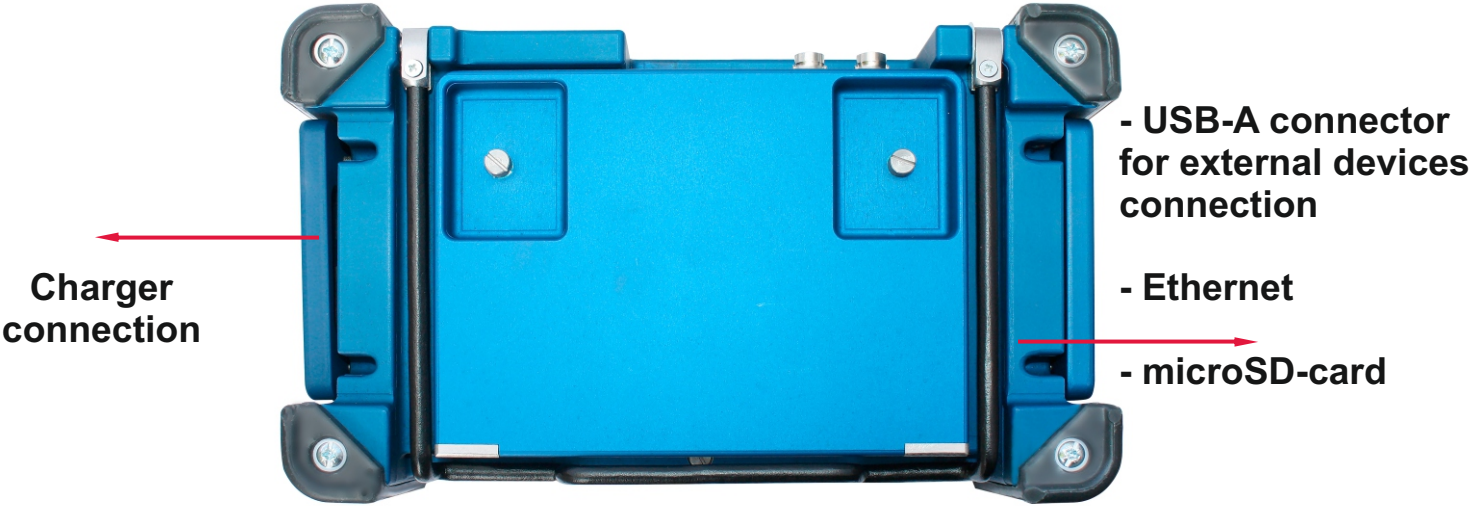
SONOCON BL



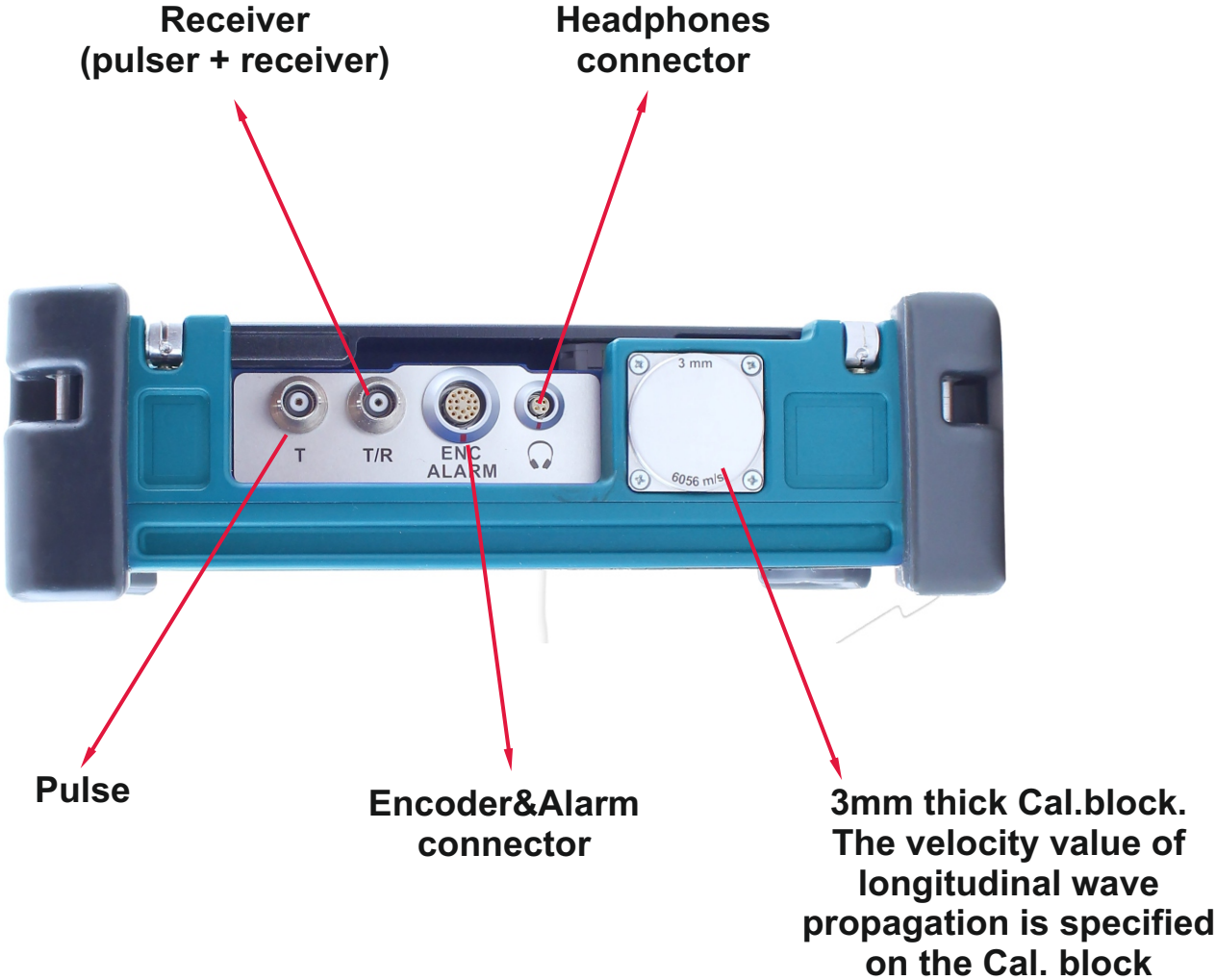
Quick start guide

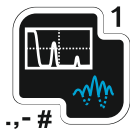
- Common features **C**
- UT version features **B**
- Thickness Gauge + version features **T**

Rear Panel of the Flaw Detector

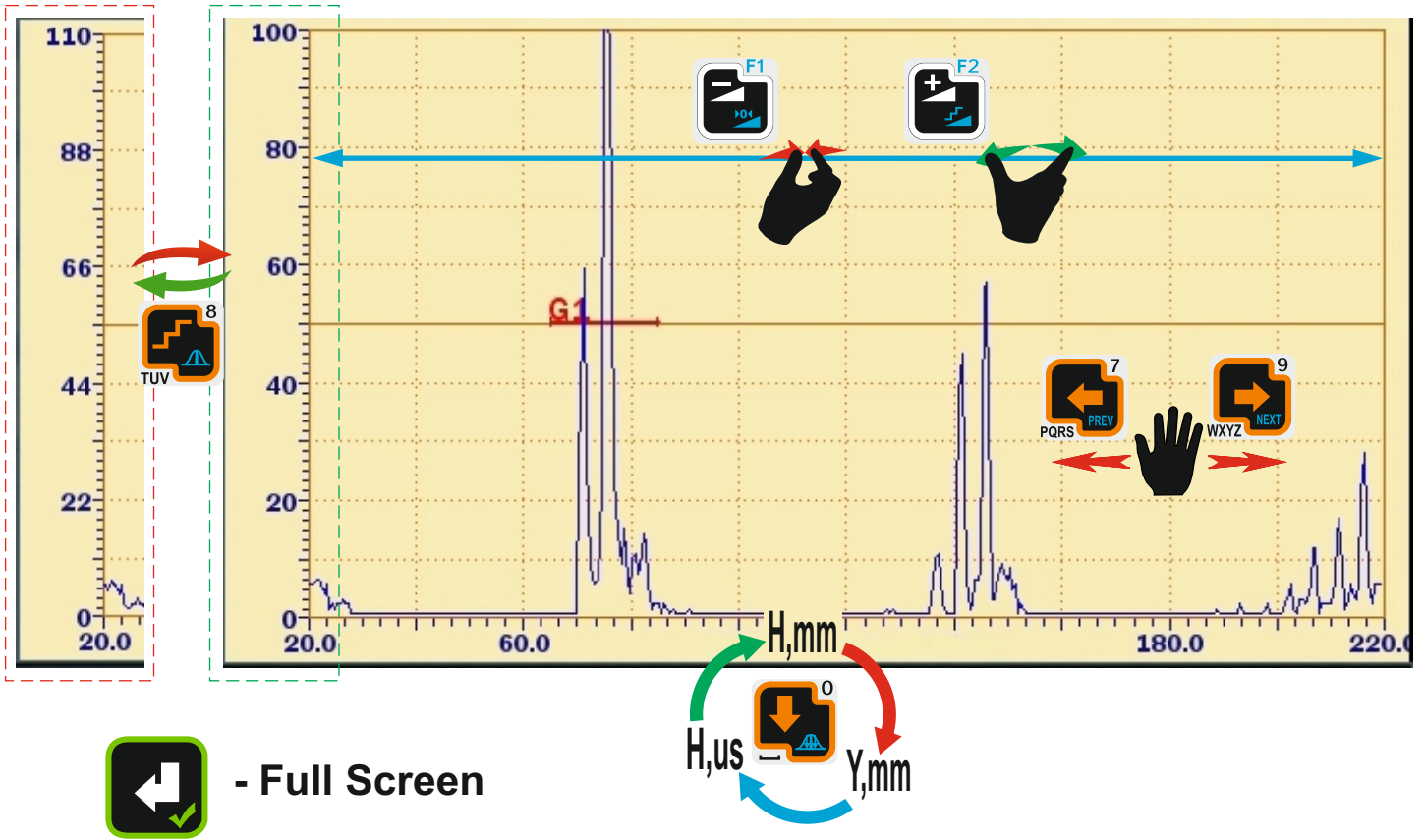


Side Panel of the Flaw Detector

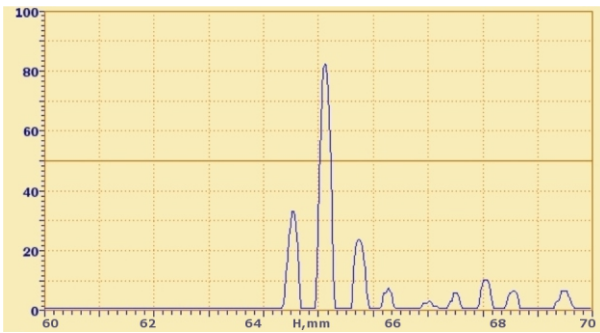




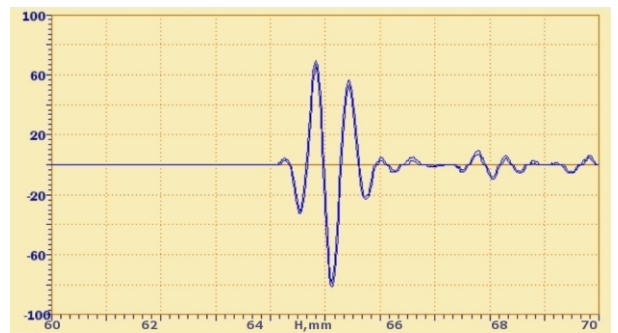
A-SCAN MANIPULATION [©]



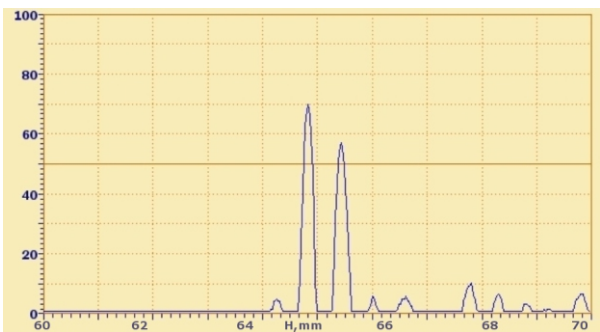
RECTIFICATION CHOICE [©]



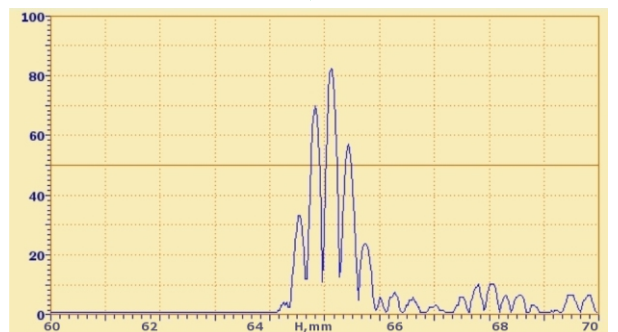
Negative halfwave



Radio Frequency

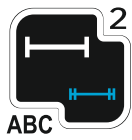


Positive halfwave

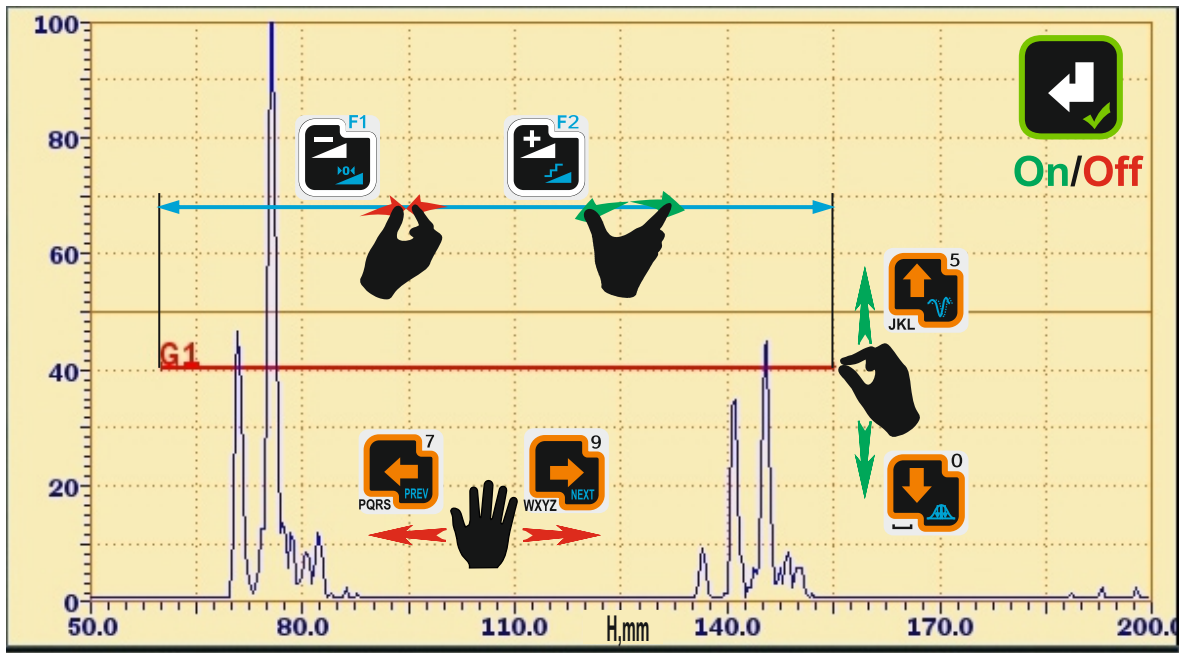


Full wave

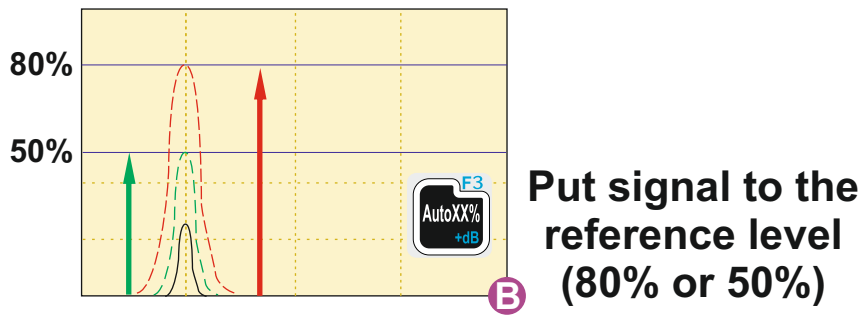
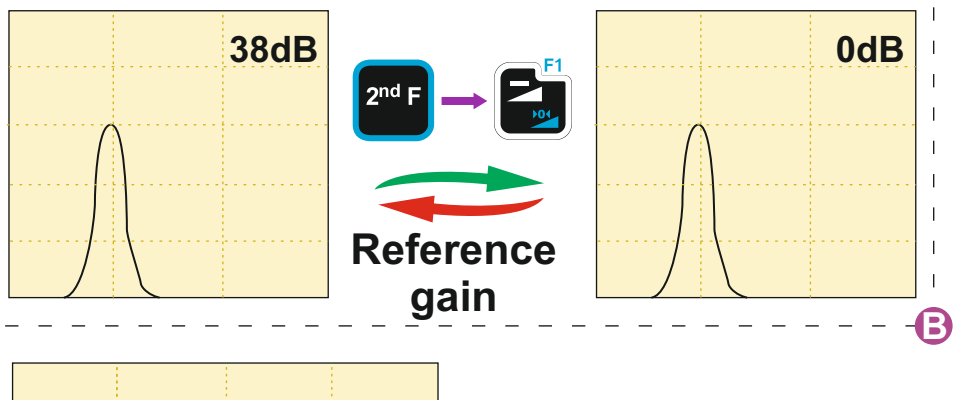
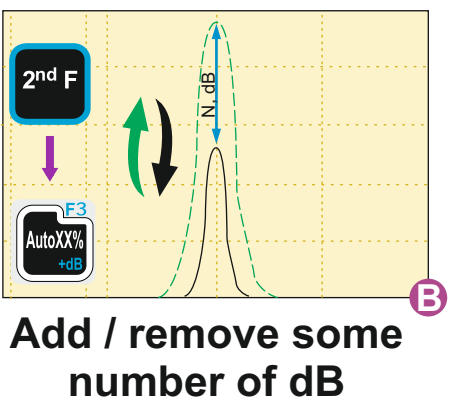
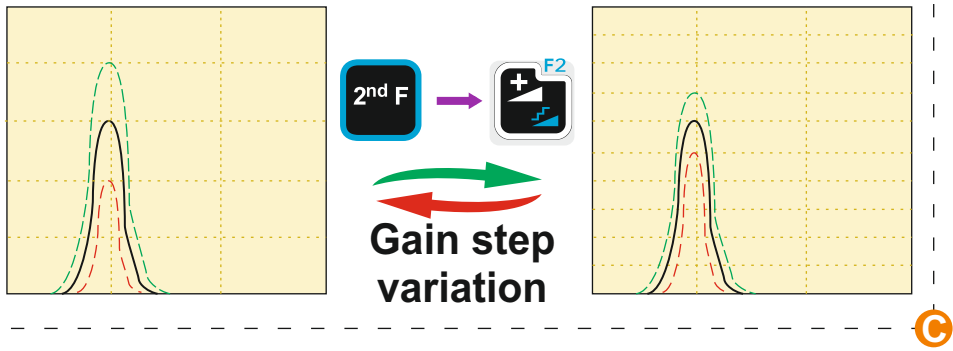
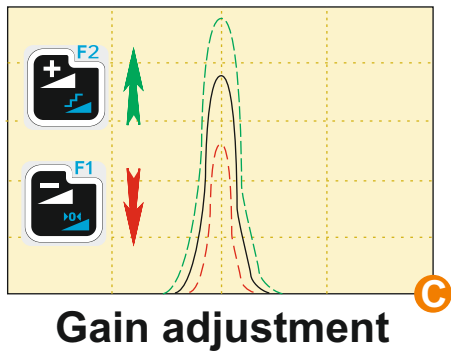




GATES MANIPULATION ^C



GAIN MANIPULATION



MENU NAVIGATION AND PARAMETERS ADJUSTMENT [Ⓒ]

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). A hand icon indicates navigation between these items. At the top left, a callout '5' with an up arrow and 'JKL' is shown. At the top right, a callout '0' with a down arrow is shown. A red circle highlights the '20 ns' value in the Energy parameter. Below the menu is a graph showing a pulse waveform with a callout '9' pointing to the 'NEXT' button and '8' pointing to the 'TUV' button. At the bottom, a row of buttons includes 'PROBE', 'TEST OBJECT', 'SCAN', 'GATE 1', 'GATE 2', 'MEASURE', 'PULSER', and 'RECEIVER'. A hand icon points to the 'PULSER' button. Below this row are buttons for '2nd F', 'PQRS PREV', 'WXYZ NEXT', 'PQRS PREV', and 'WXYZ NEXT'. At the very bottom, a row of buttons includes 'TCG/DAC', 'DGS', 'AWS D1.1', 'AGC', 'COUP. GATE', 'CURSORS', 'MEMORY', and 'OPTIONS'.

INDICATION PANEL [Ⓑ]

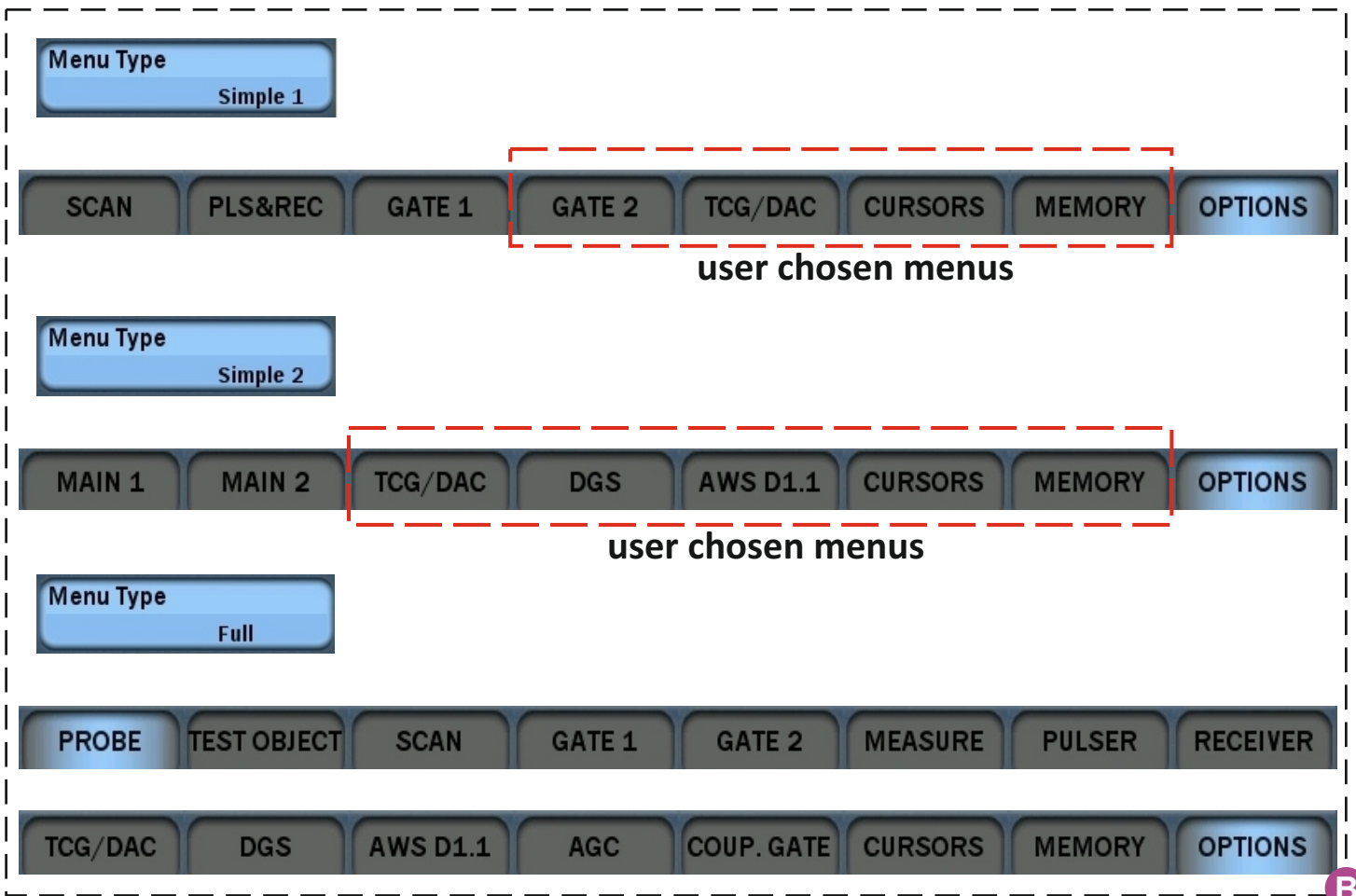
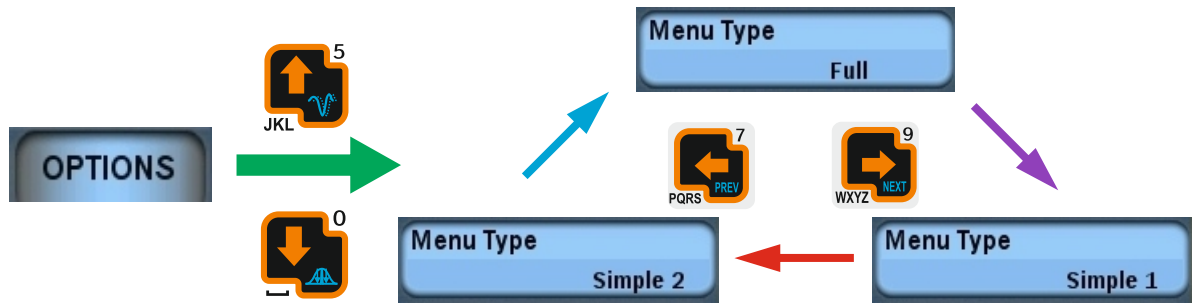
The image shows a close-up of the 'Indicators panel'. It features several numerical displays and buttons. Labels with red arrows point to specific elements: 'Gain' points to the '0.0' display; 'Probe frequency' points to 'F: 5.0'; 'Sound velocity' points to 'V: 5800'; 'Measurands' points to 'Δ: -18.4'; 'Probe angle' points to 'α: 0.0'; and 'Probe zero' points to 'Z: 0.00'. The panel also shows 'H: ...' and 'y: ...' displays, and a large '-18.4' display on the right. Below the displays is a row of 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.

INDICATORS ^B

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:



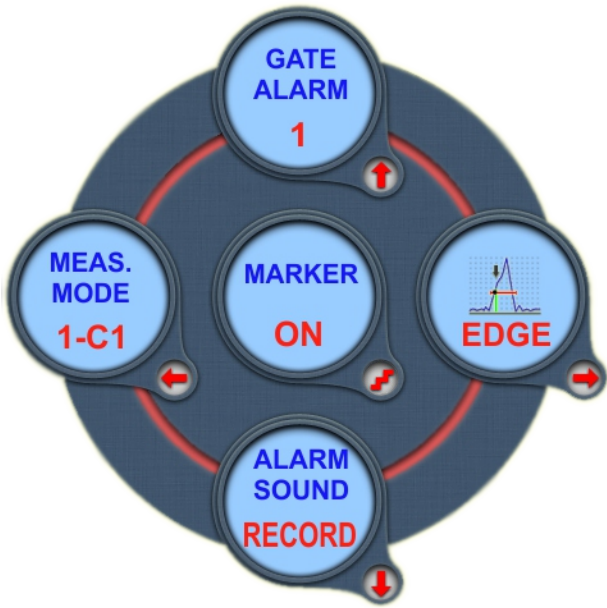
In Thickness Gauge+ software version there is only one menu type:



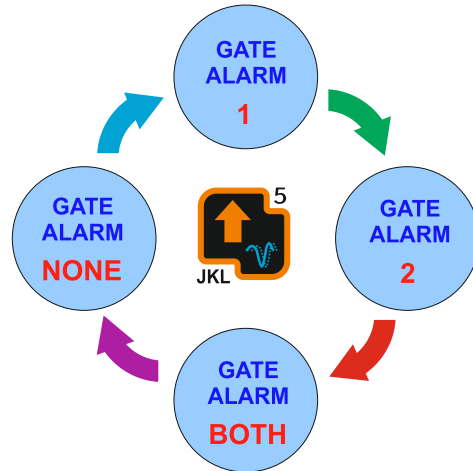


QUICK ACCESS TO MAIN PARAMETERS^B

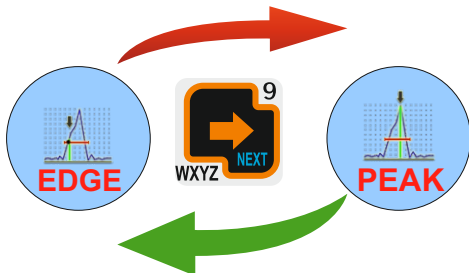
UT-B 1. Measurement and alarm



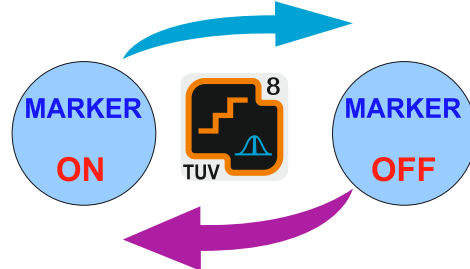
«Gates choice for Flaw Alarm System»



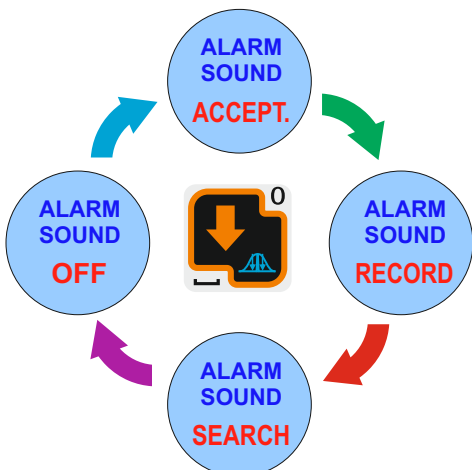
«Time/distance measurement threshold choice»



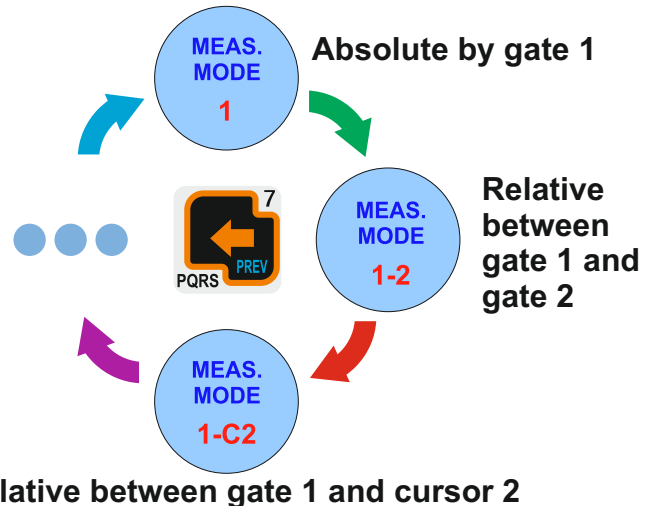
«Measurement point marker»



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



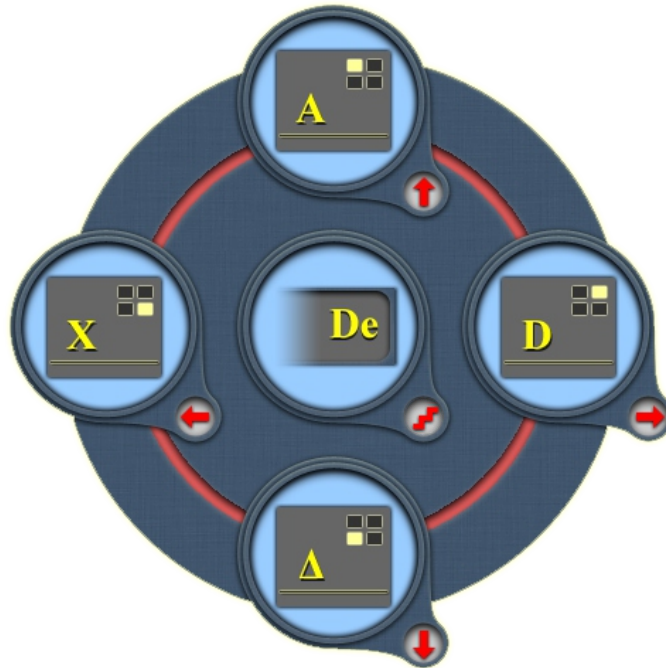
«Choice of gate(s) and cursor(s) for absolute or relative measurements»



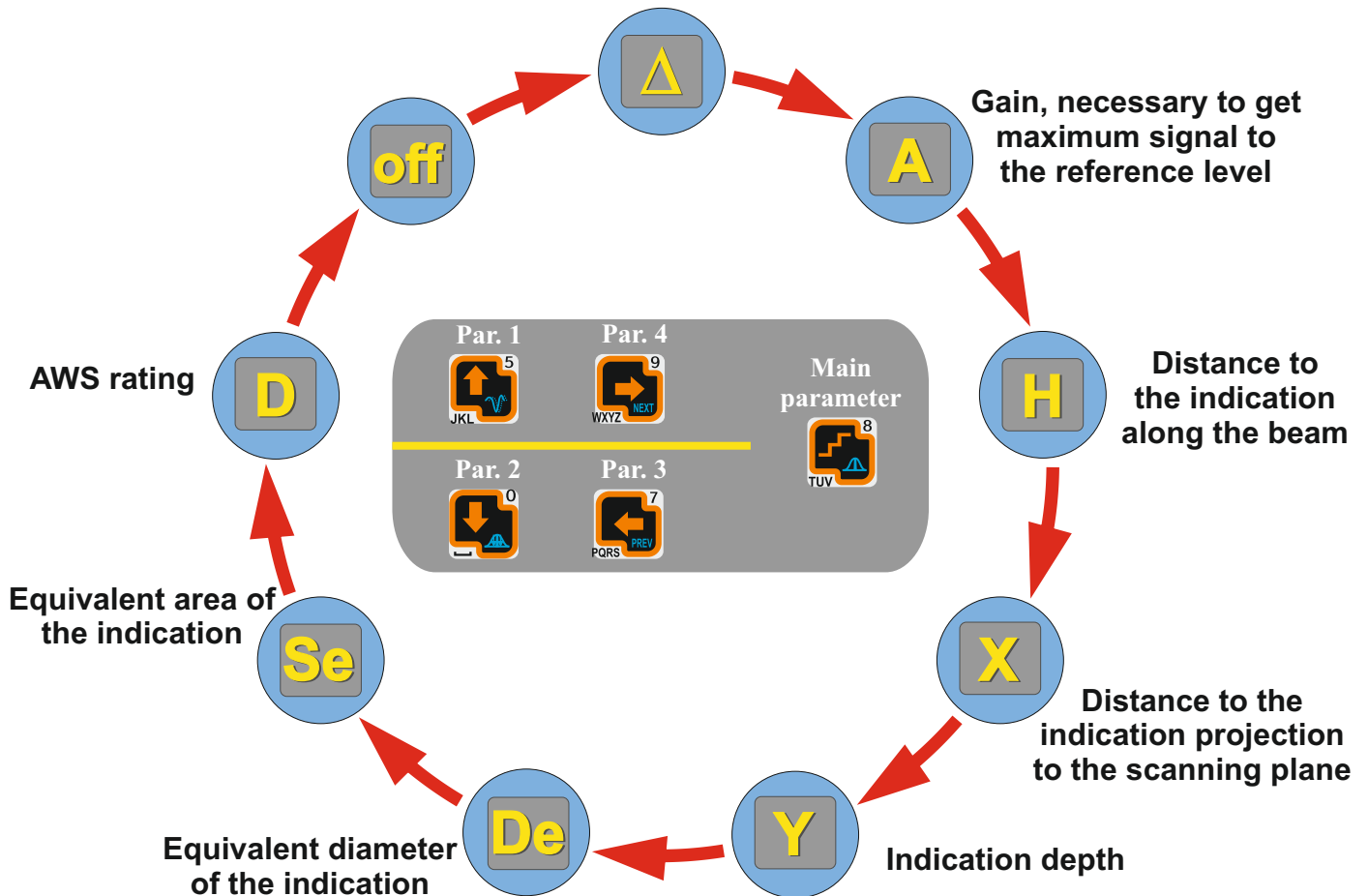


QUICK ACCESS TO MAIN PARAMETERS^B

UT-B 2. Measurands choice



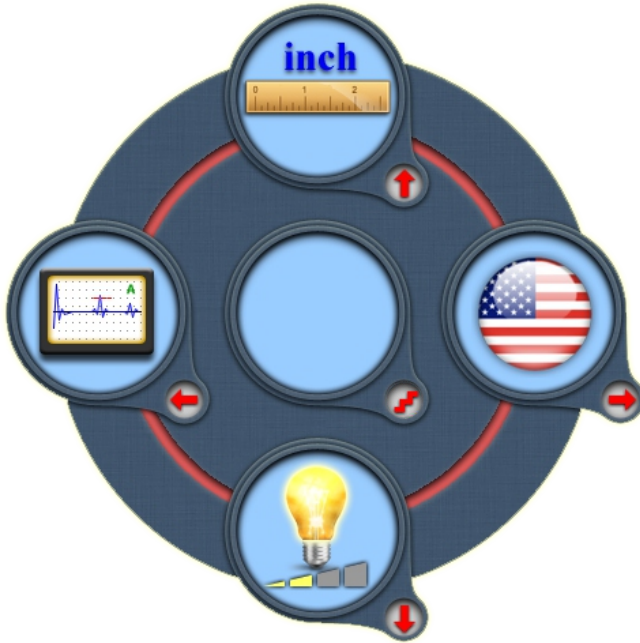
Maximum signal amplitude,
relative to the reference level



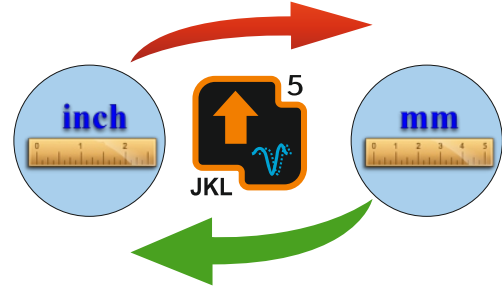


QUICK ACCESS TO MAIN PARAMETERS^B

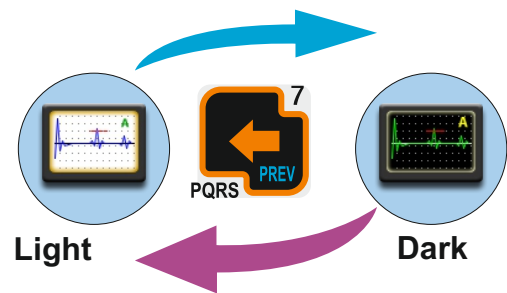
UT-B 3. Display options



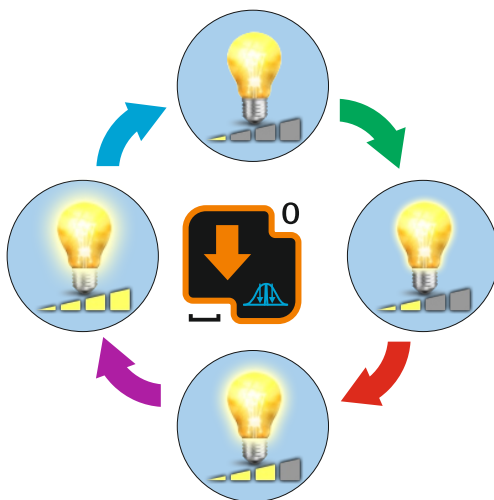
«Switching measurement units»



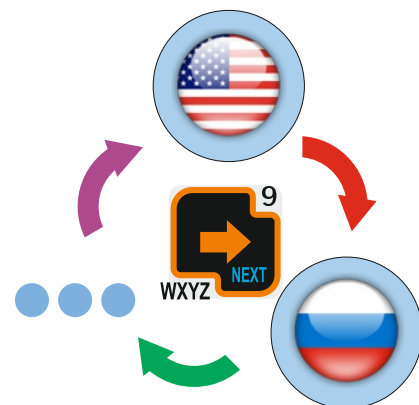
«Switching color schemes»



«Display brightness adjustment»



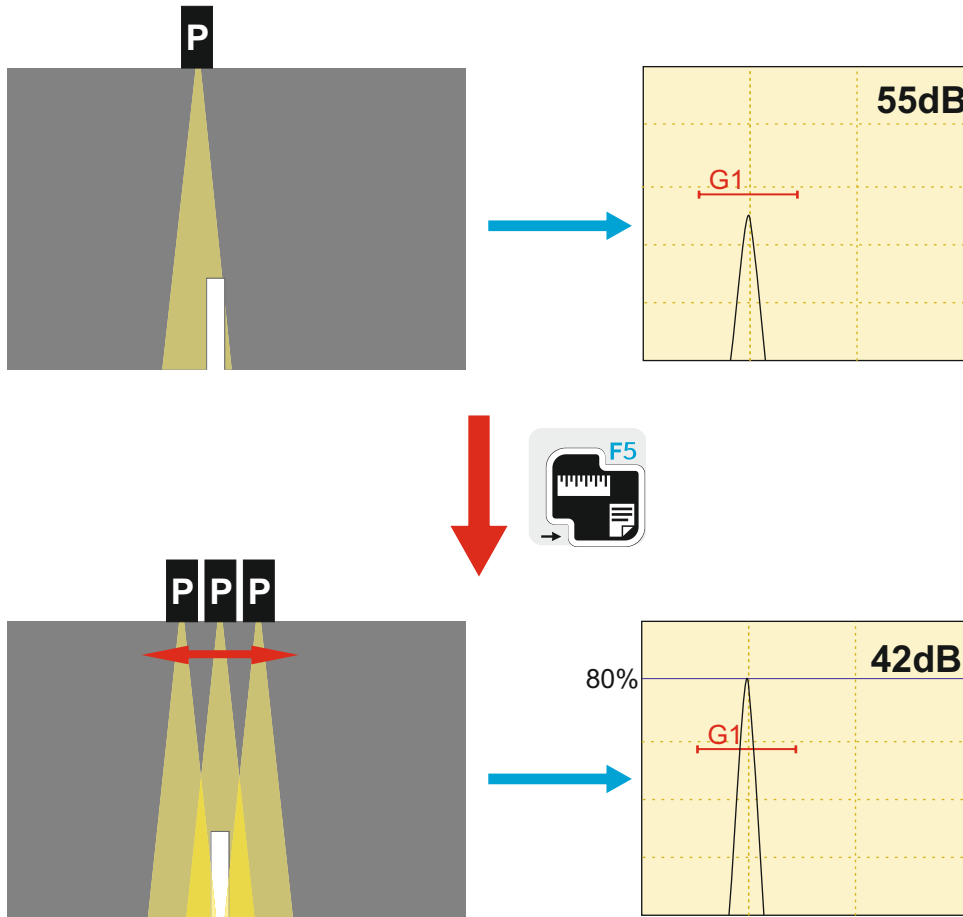
«Interface language choice»



INDICATION SEARCH, EVALUATION AND DOCUMENTATION AIDS^B

Evaluate mode

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



Review all readings and save the indication if necessary

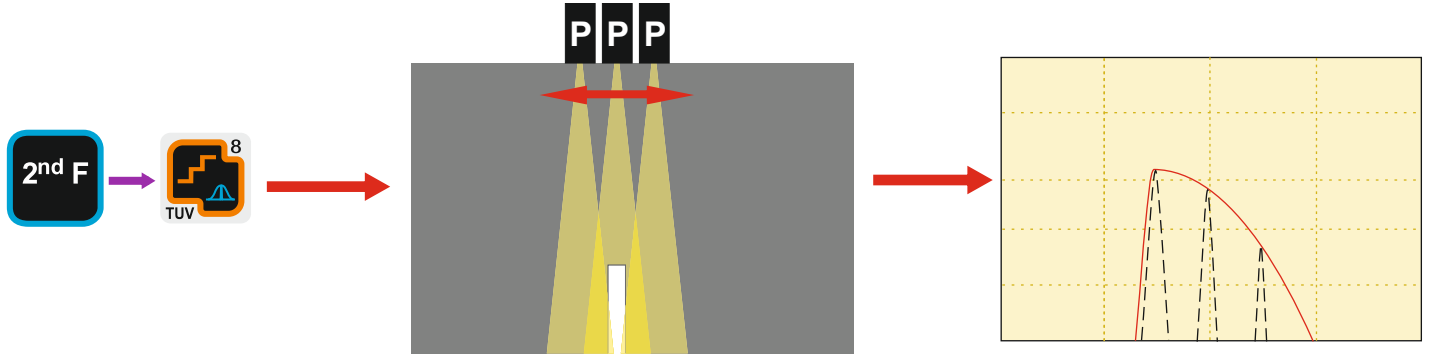


- switches evaluate mode off
and retrieves the original gain

INDICATION SEARCH, EVALUATION AND DOCUMENTATION AIDS ^B

Peak hold mode

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

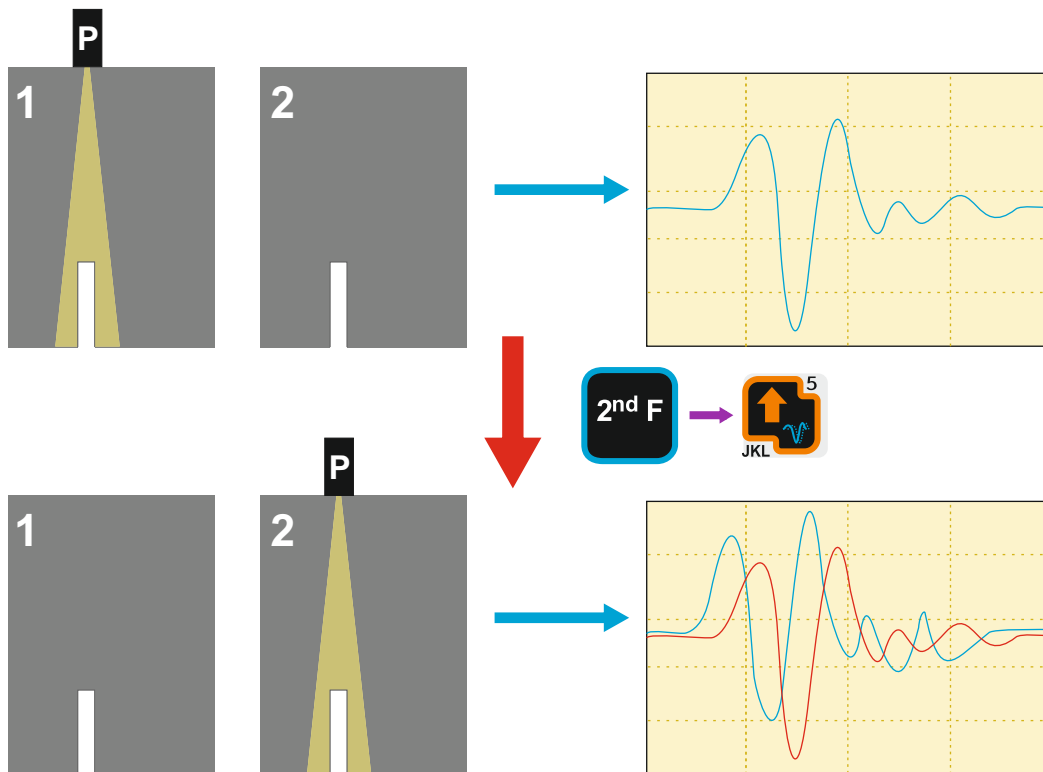


2nd F →  - Peak curve reset

2nd F →  - Peak hold mode off

Signals compare mode

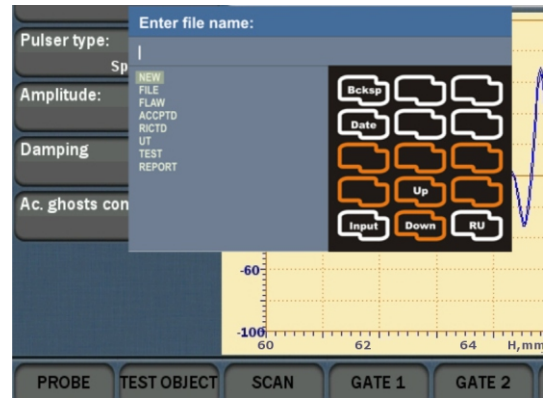
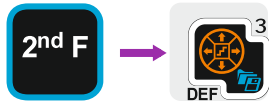
Displays both “frozen” and current signals.



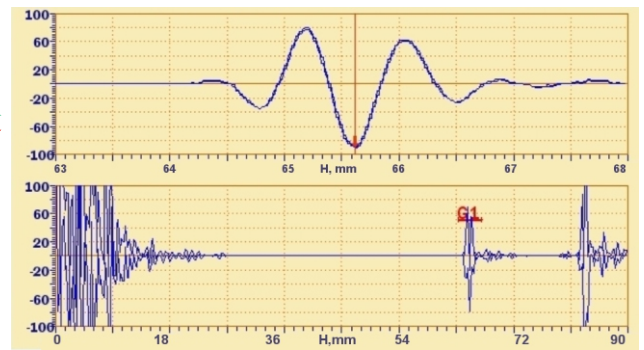
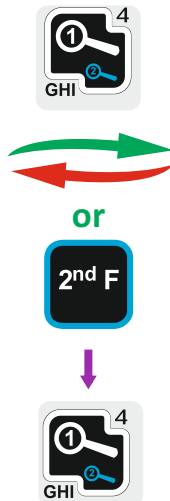
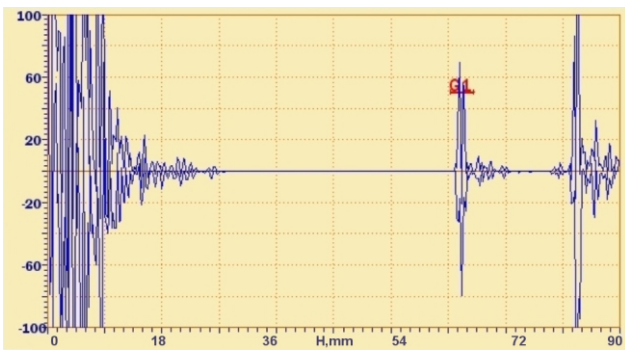
2nd F →  - Signals compare mode off

INDICATION SEARCH, EVALUATION AND DOCUMENTATION AIDS ^B

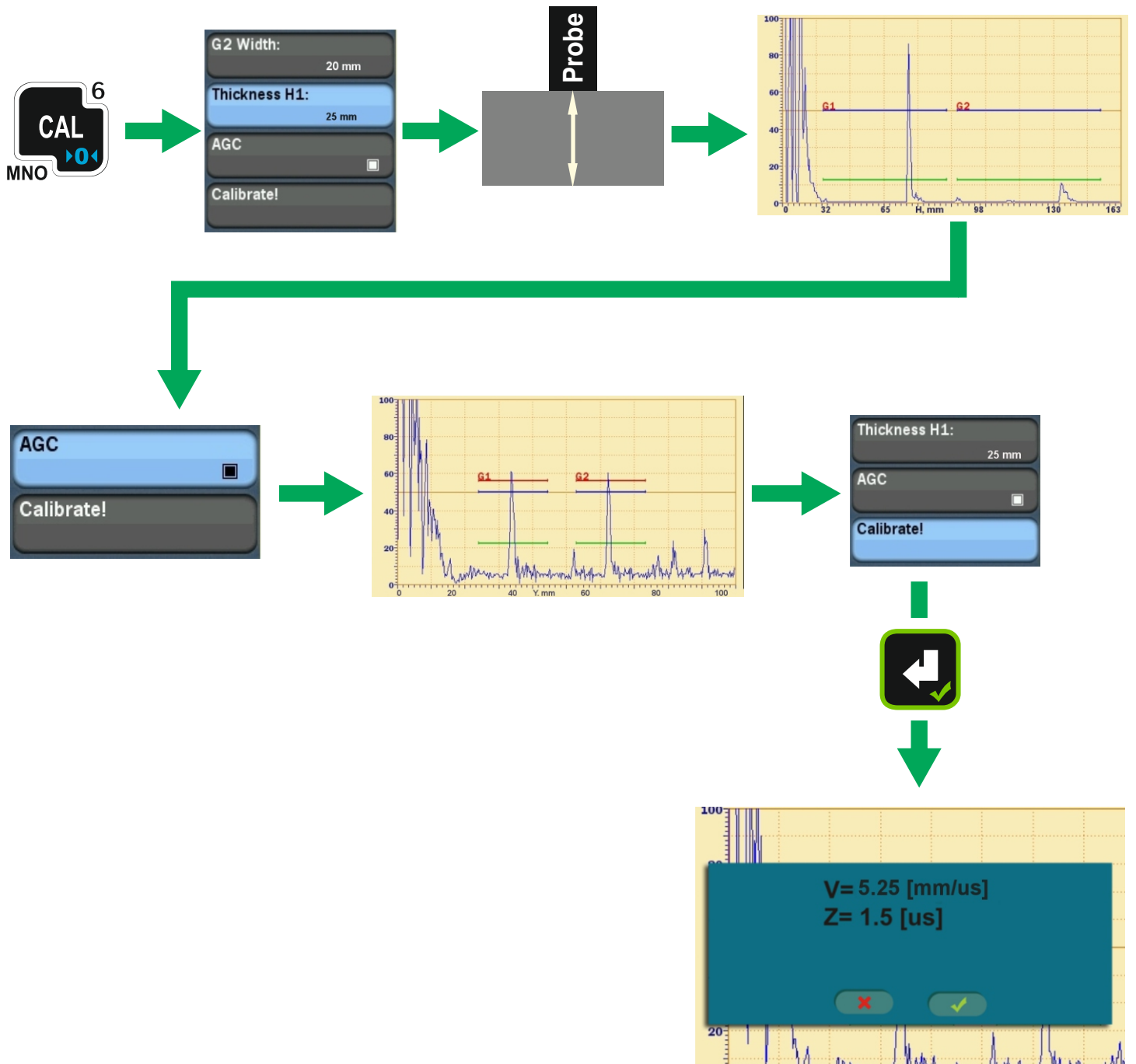
Memory shortcuts. Results saving



Smart zoom mode

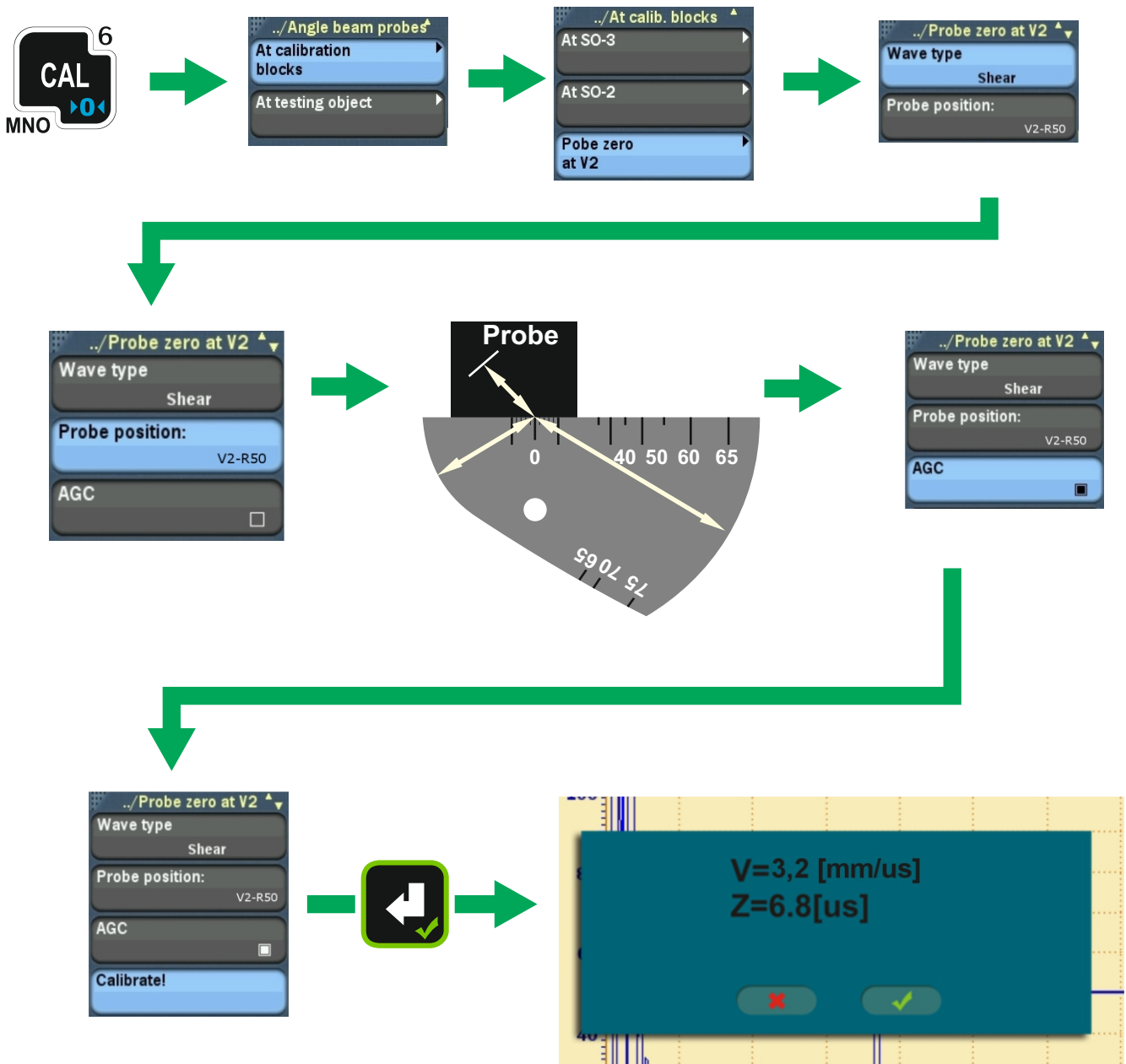


STRAIGHT-BEAM PROBES CALIBRATION ^B



ANGLE-BEAM PROBES CALIBRATION ^B

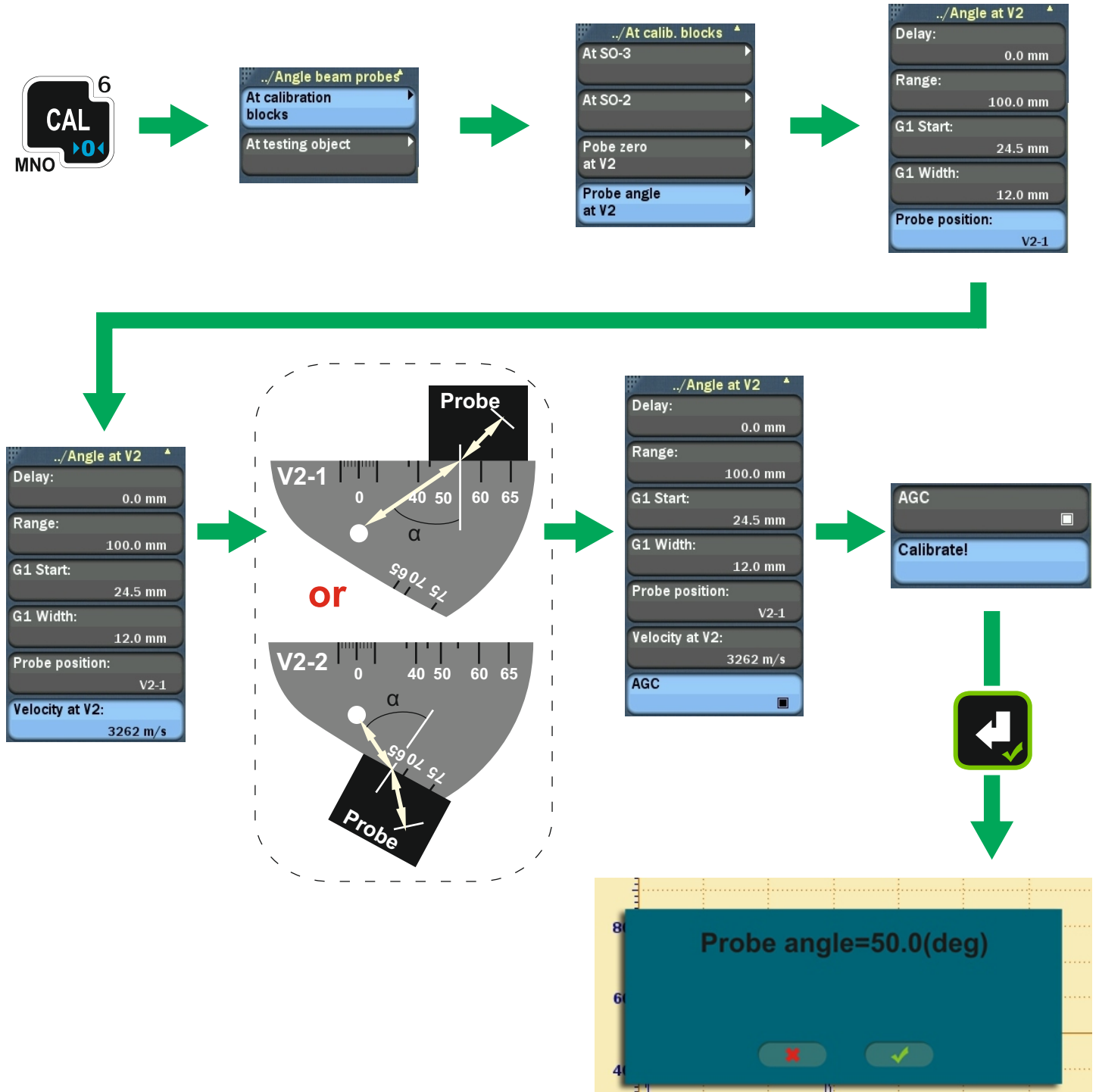
Calibration of the sound velocity and probe zero at V2 calibration block



ANGLE-BEAM PROBES CALIBRATION ^B

Probe angle calibration at V2

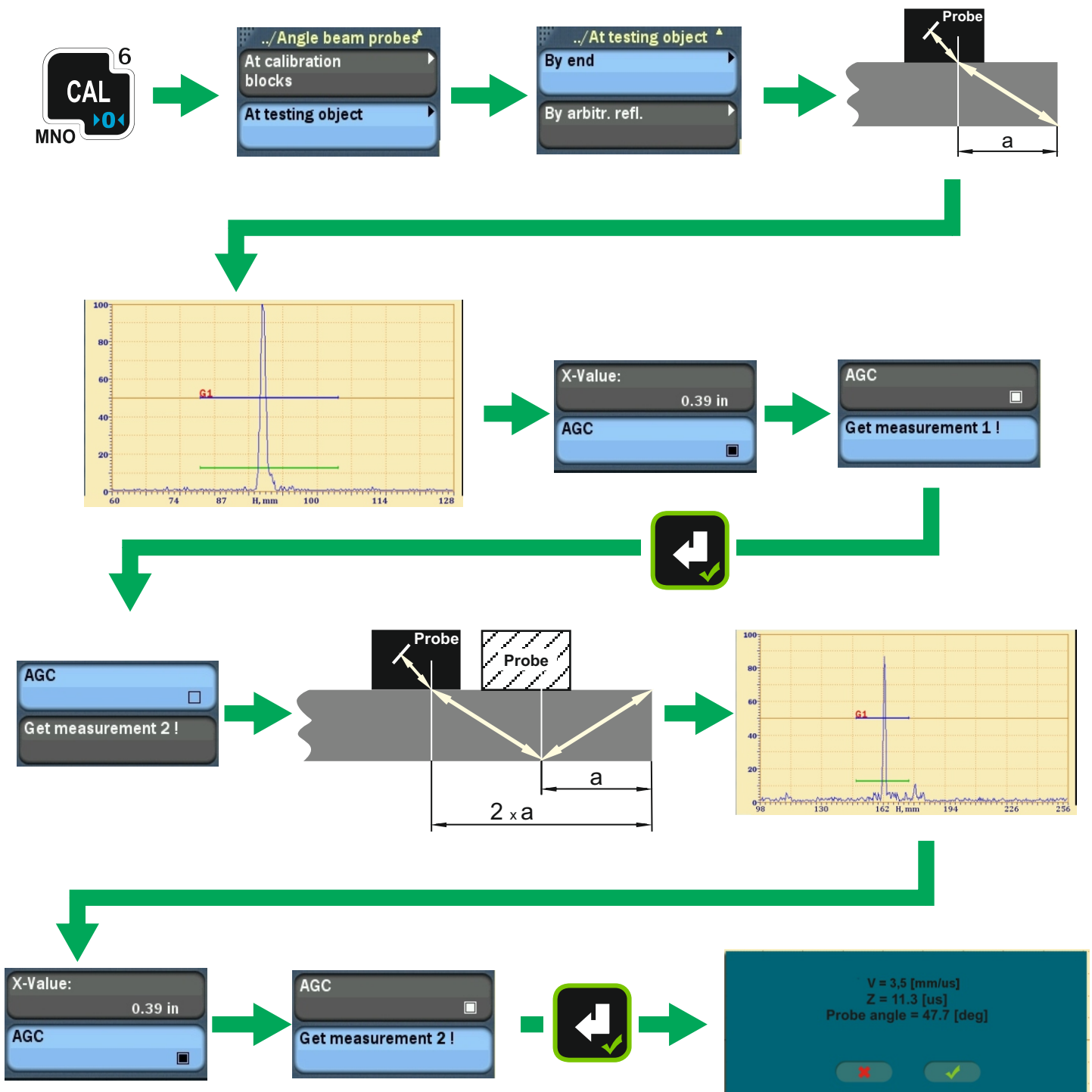
Set up probe zero and sound velocity in V2 before starting this calibration.



ANGLE-BEAM PROBES CALIBRATION ^B

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

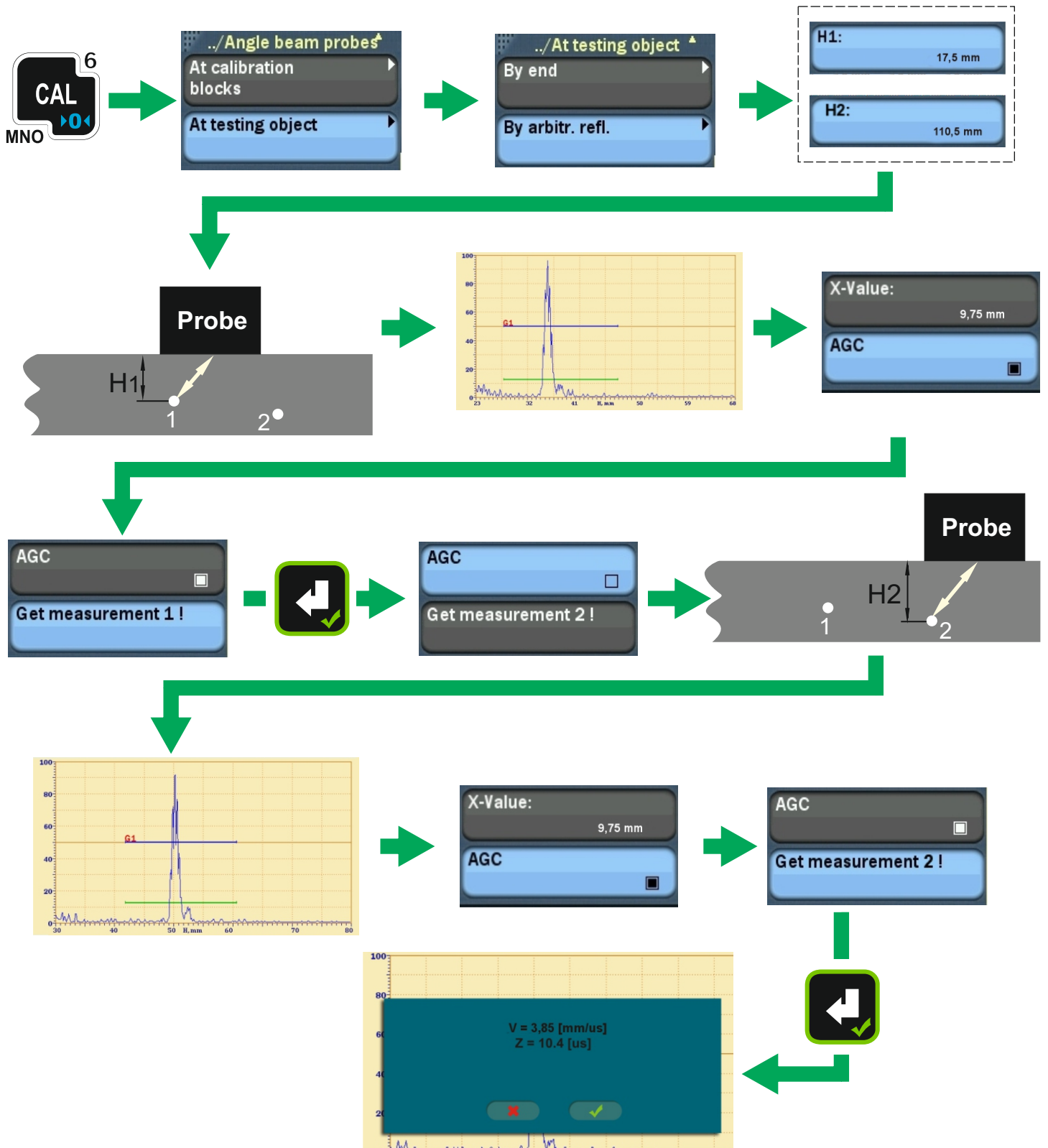
Set up probe angle and X-value before starting this calibration



ANGLE-BEAM PROBES CALIBRATION ^B

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

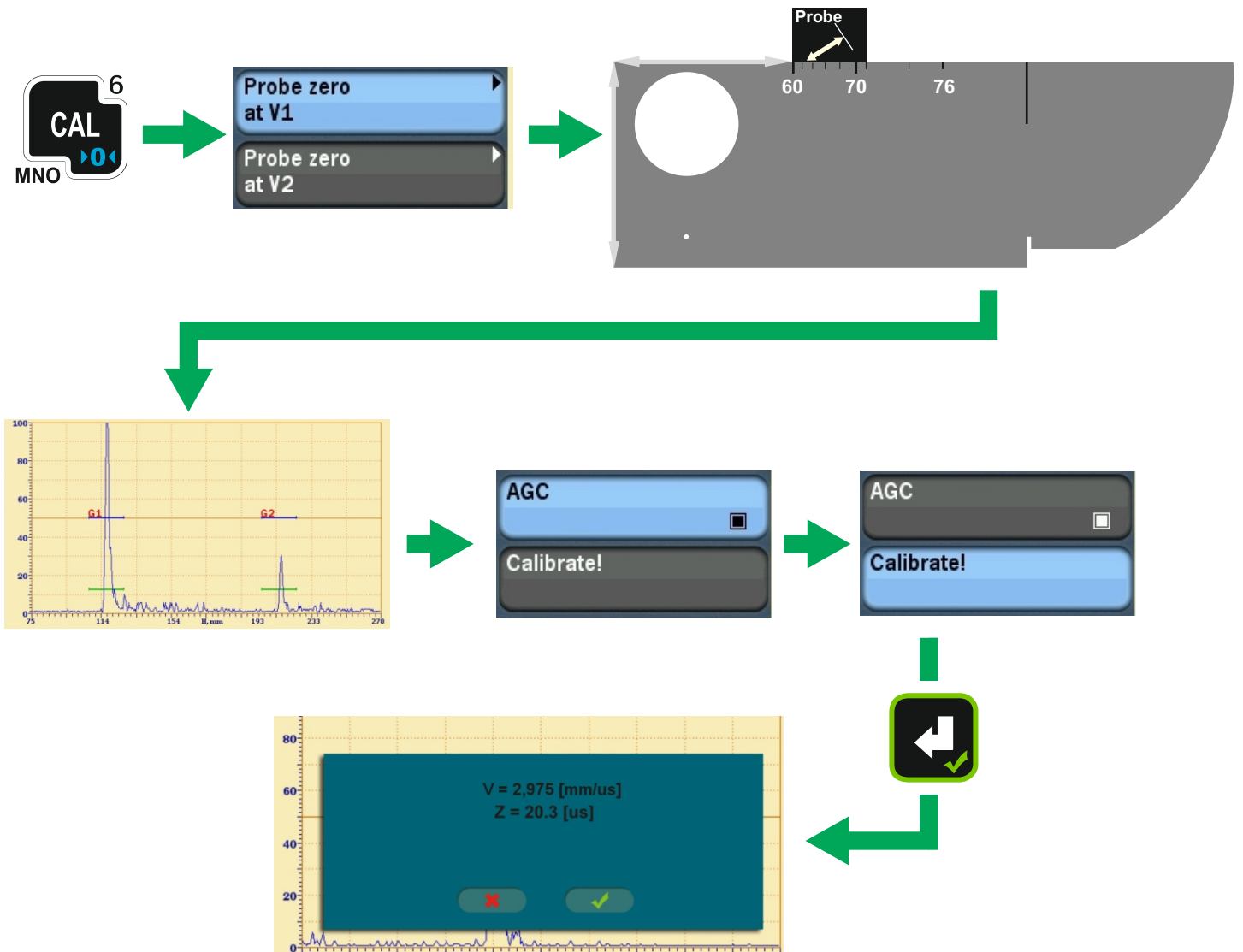
Set up probe angle before starting this calibration



RAYLEIGH WAVE PROBES CALIBRATION^B

Calibration of probe zero at V1 block

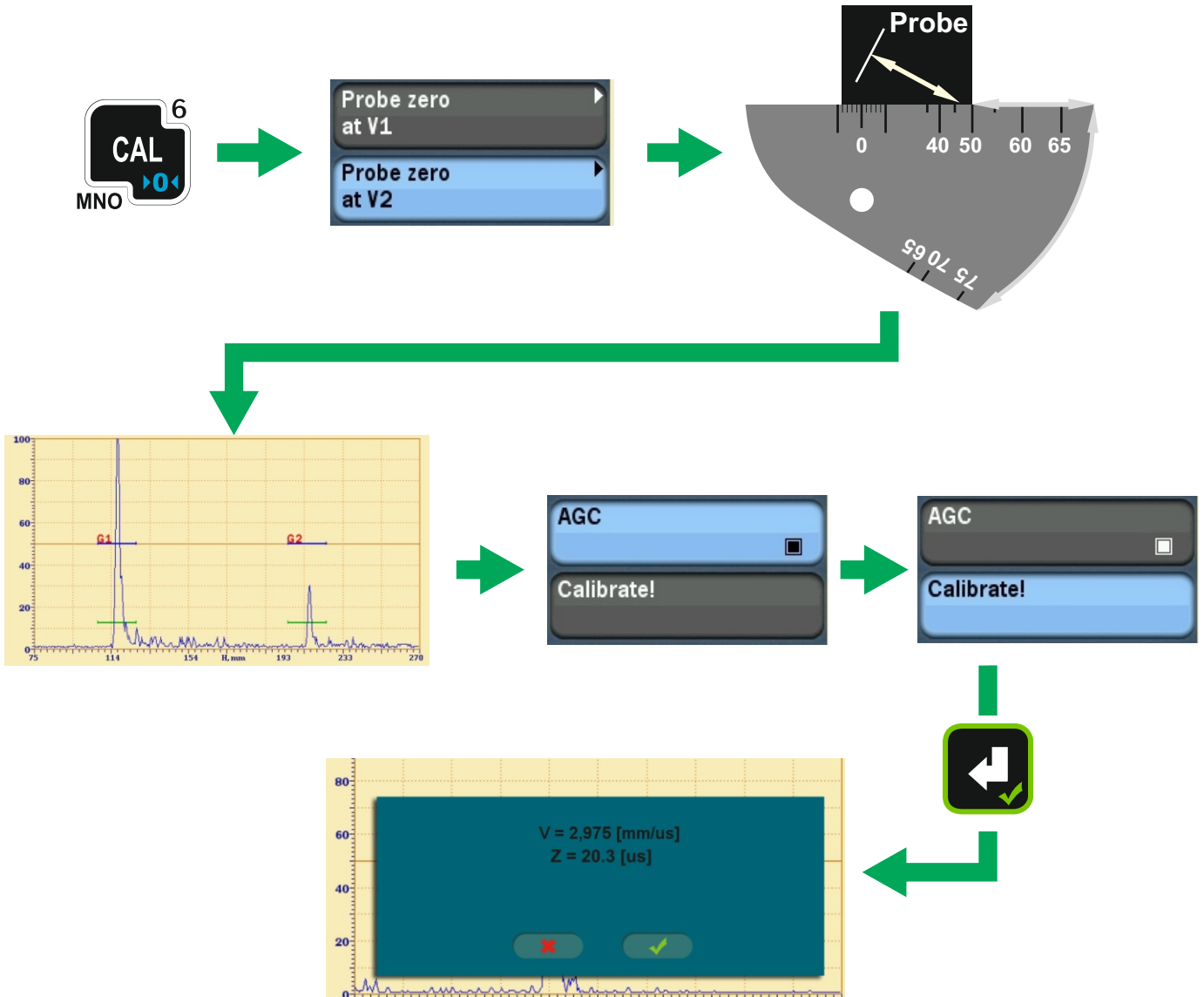
Set up probe angle = 90° before starting this calibration



RAYLEIGH WAVE PROBES CALIBRATION^B

Calibration of probe zero at V2 block

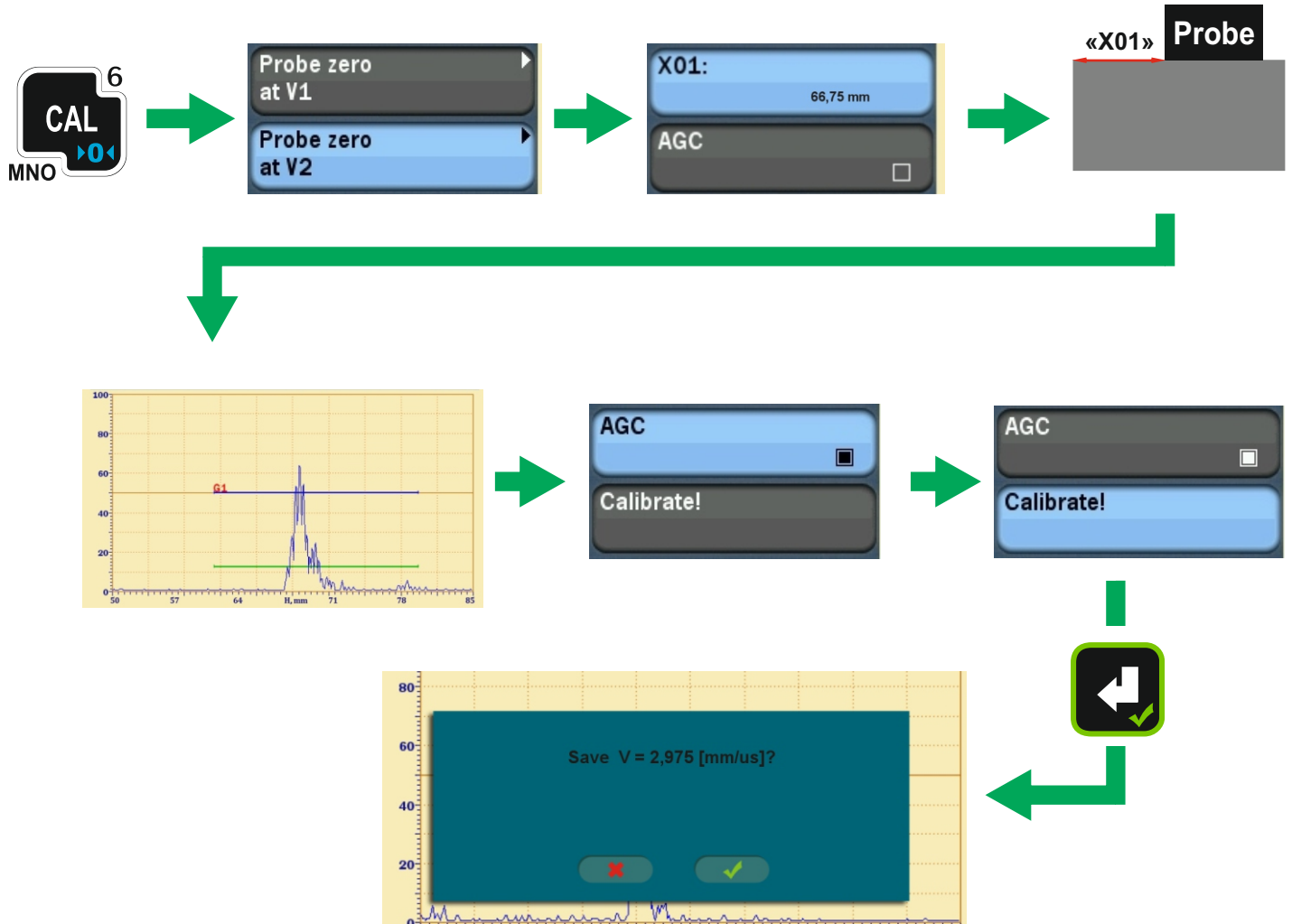
Set up probe angle = 90° before starting this calibration



RAYLEIGH WAVE PROBES CALIBRATION^B

Calibration of sound velocity at testing object

Set up probe angle = 90° before starting this calibration



BASIC PREPARATION FOR THICKNESS MEASUREMENT ^T

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 ^T

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

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. 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
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	
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

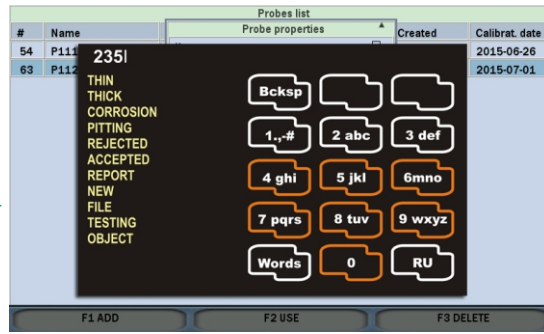
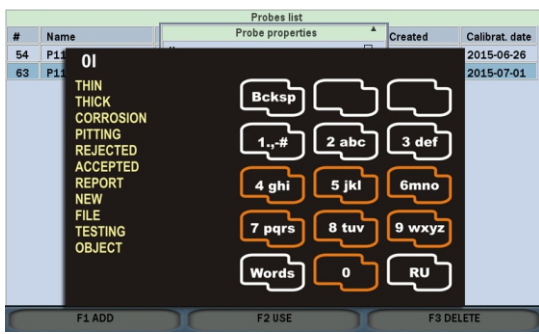
Probes list			
#	Name	Created	Calibrat. date
54	P111-5-K12	2015-06-26	2015-06-26
63	P112-5,0-12/2	2015-07-01	2015-07-01

Probe properties	
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 ^T

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



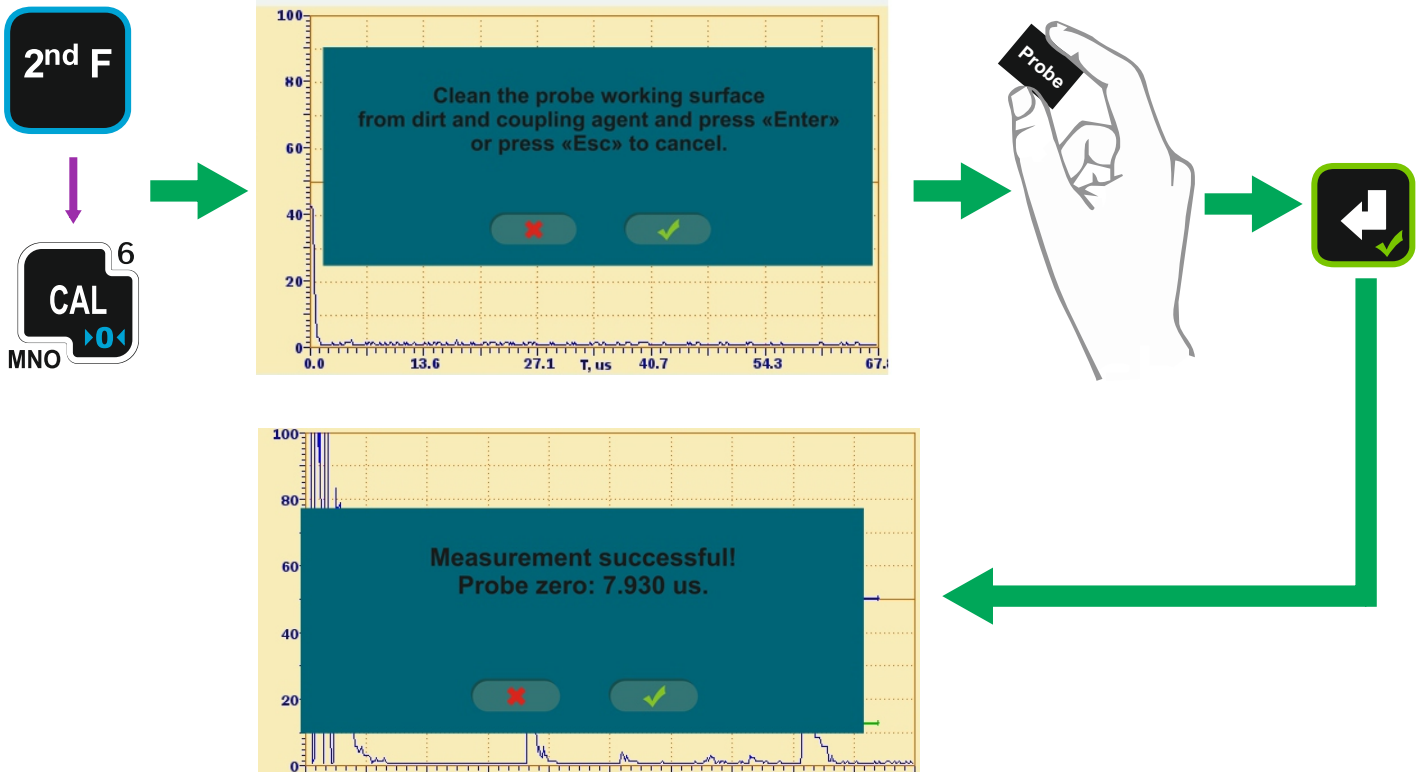
#	Name	Probe #	Probe type	Probe freq.:	Pr. zero	Created	Calibrat. date
54	P111-5-K12	0	Sing.Cryst.	5.0	0.000	2015-06-26	2015-06-26
*61	P112-5,0-12/2	235	Dbl.Cryst.	5.0	0.000	2015-07-01	2015-07-01



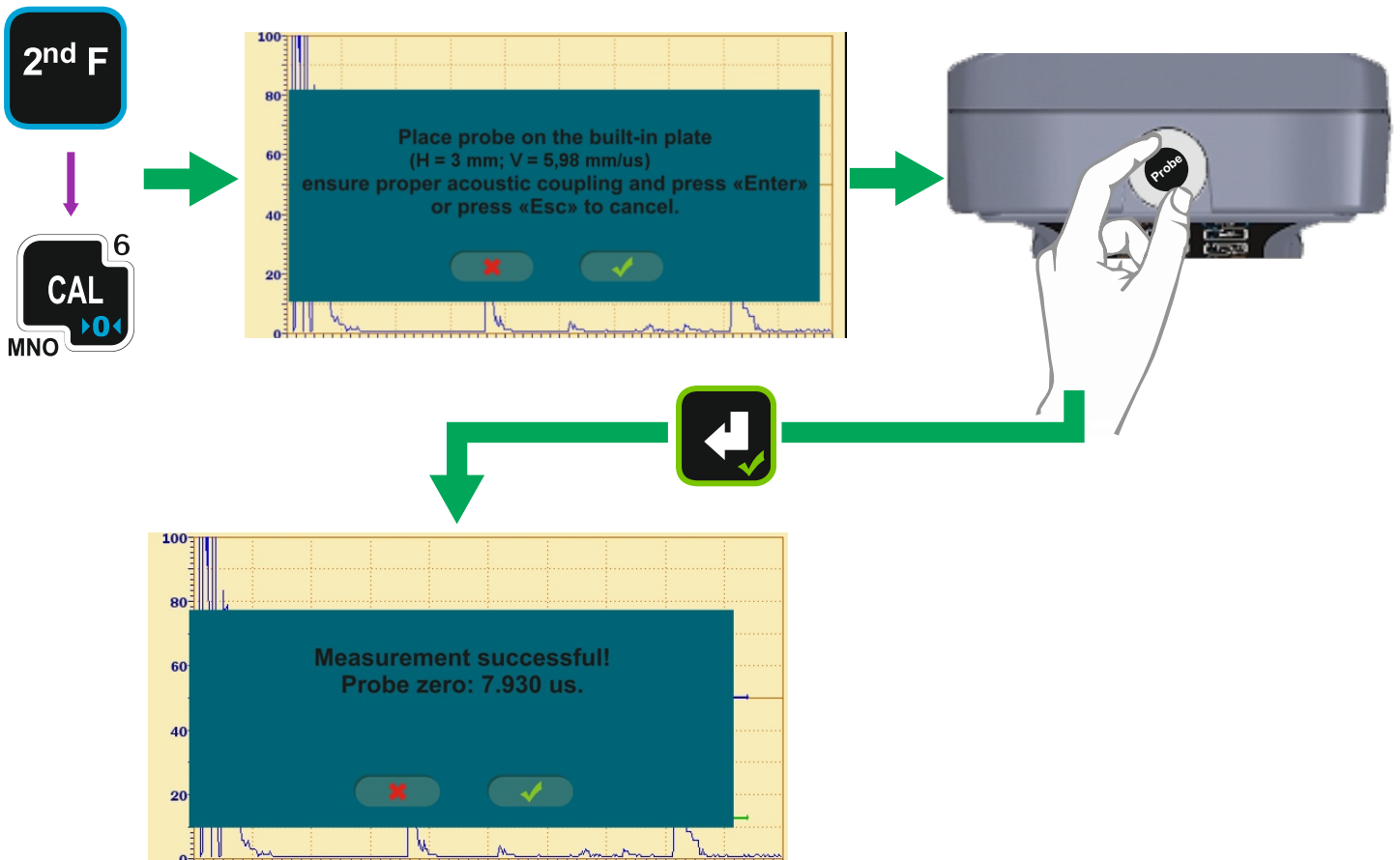
PROBE ZEROING ^T

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

Zeroing in “in air” mode



Zeroing in “on block” mode

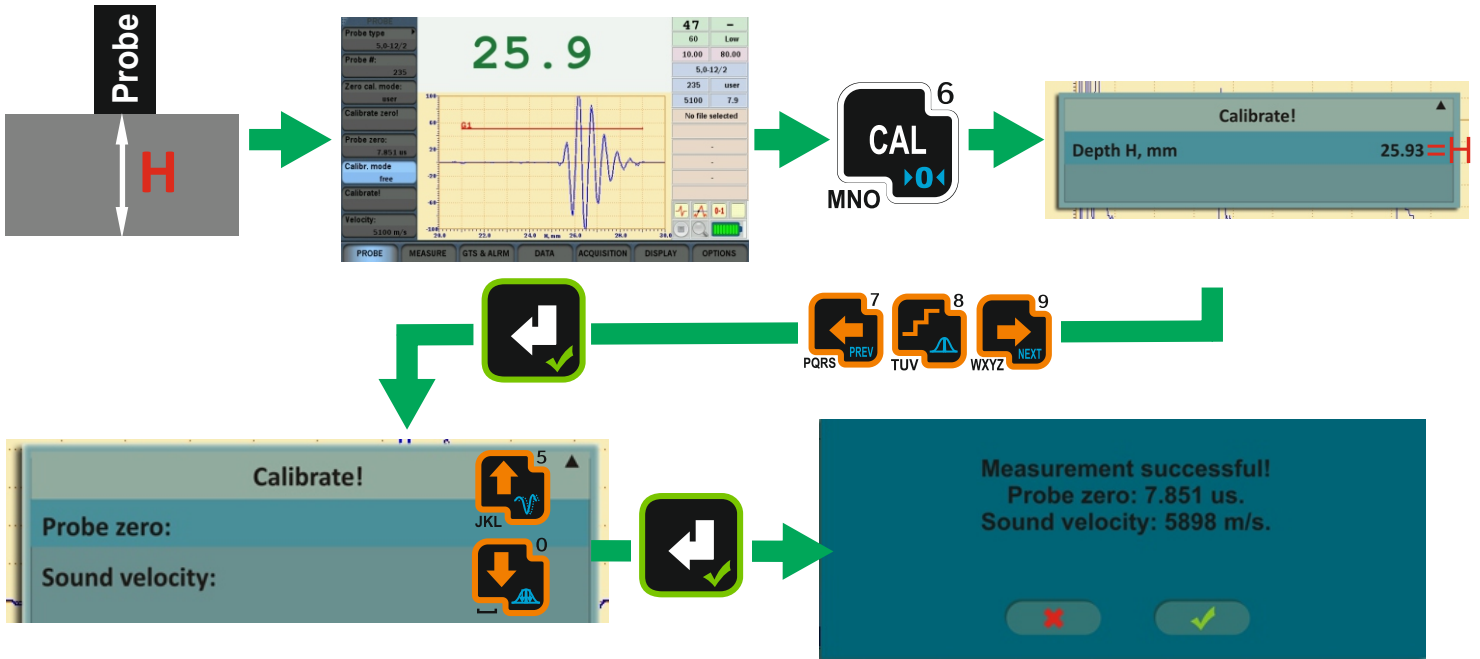


FREE CALIBRATION ^T

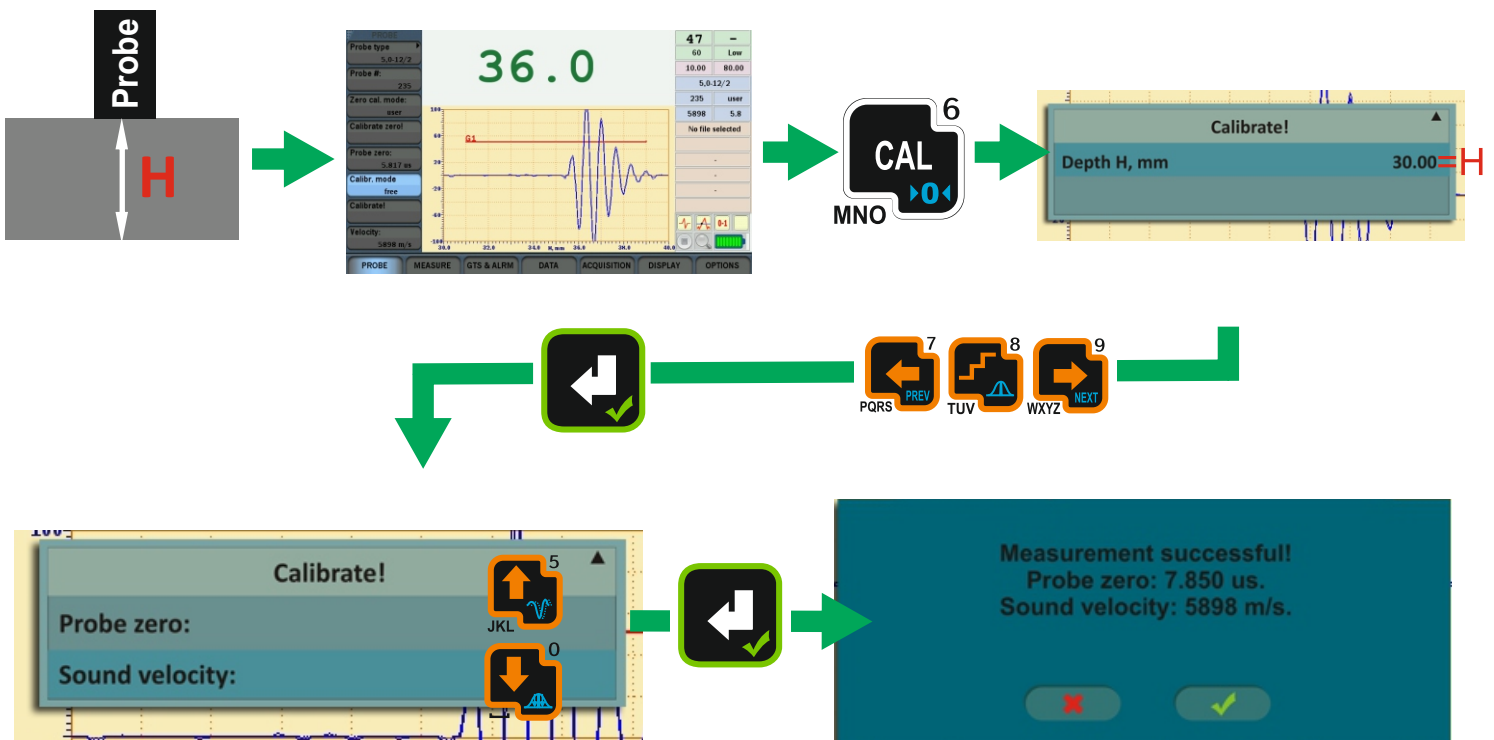
Should be chosen in PROBE → Calibr.mode

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)

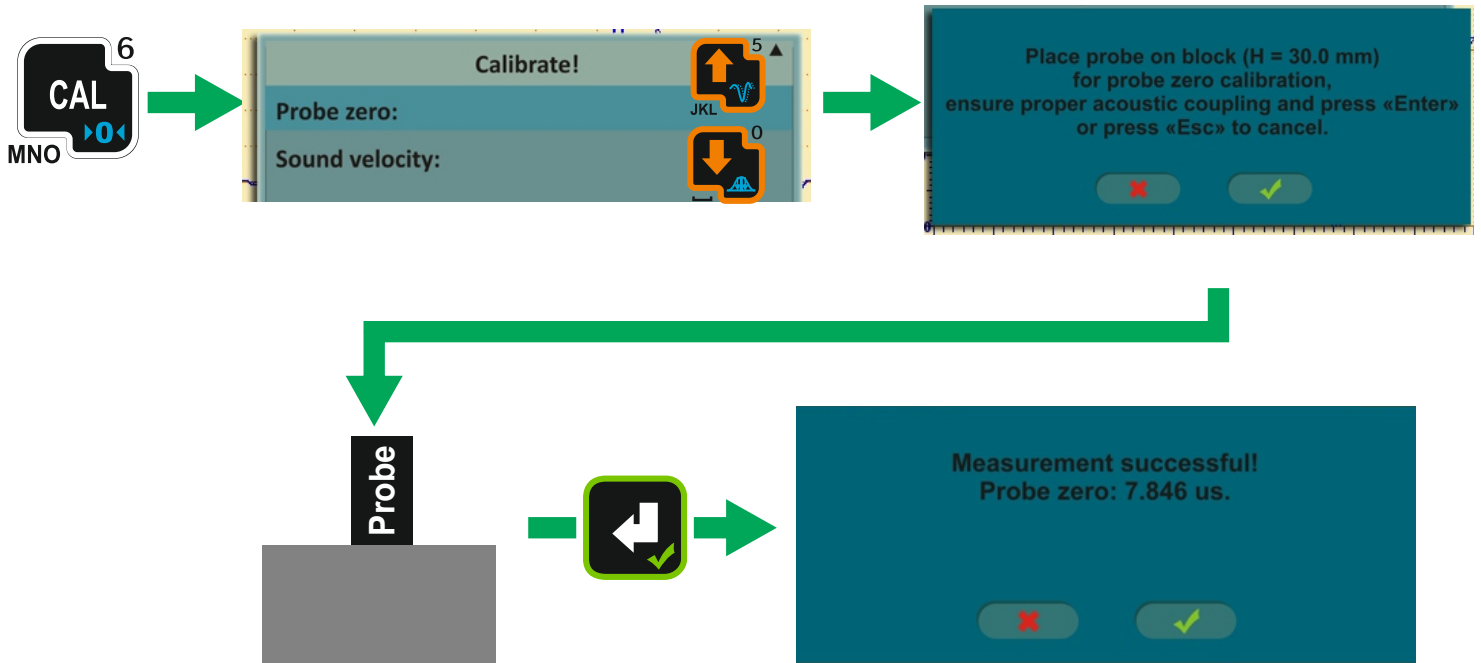


1-POINT CALIBRATION ^T

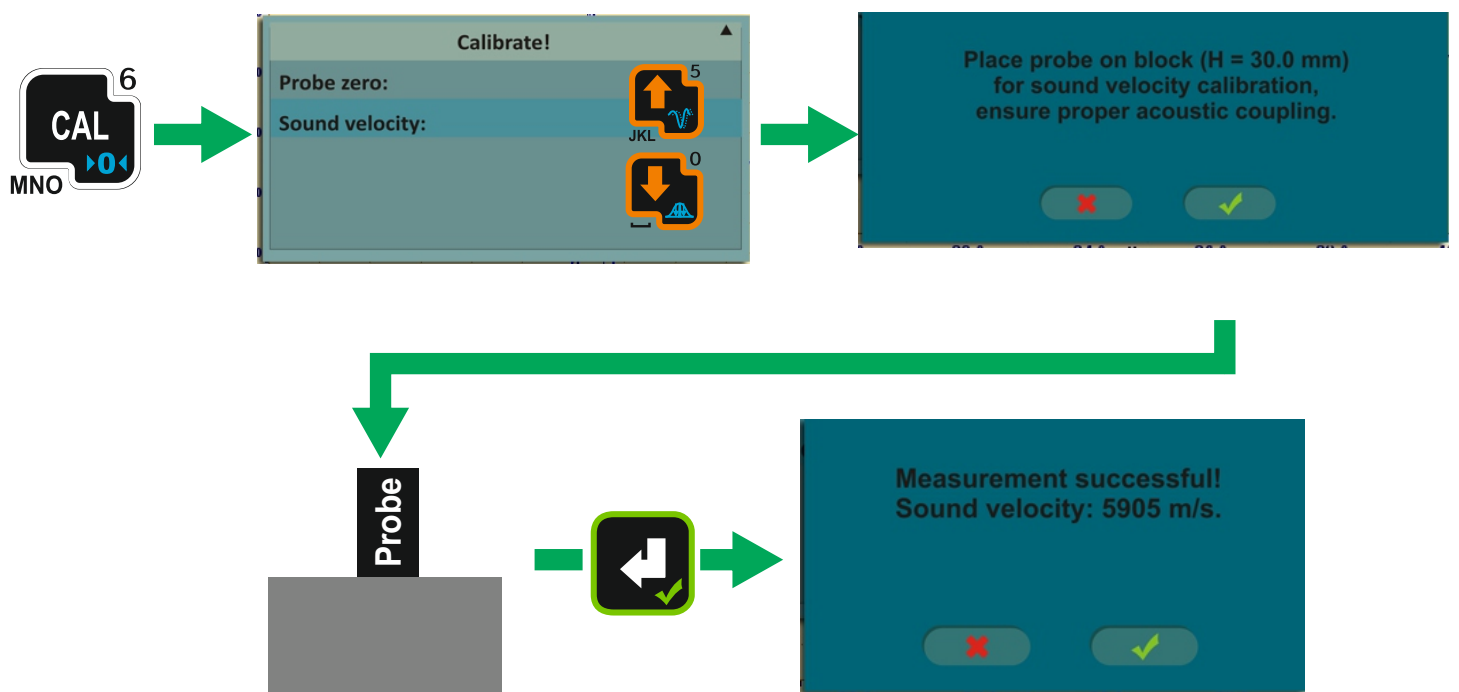
Should be chosen in PROBE → Calibr.mode

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)



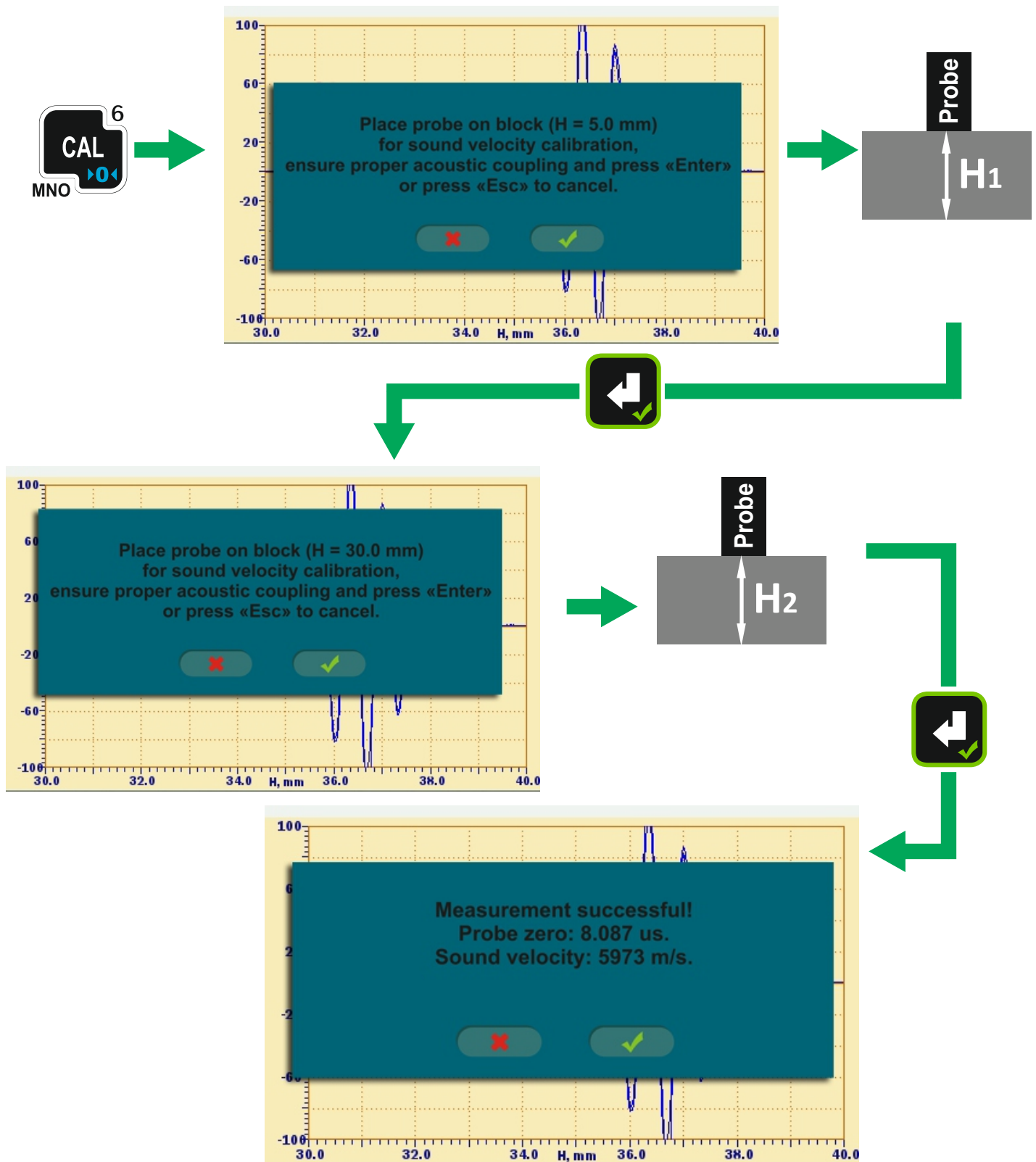
Calibrating sound velocity (the probe is already zeroed)



2-POINTS CALIBRATION^T

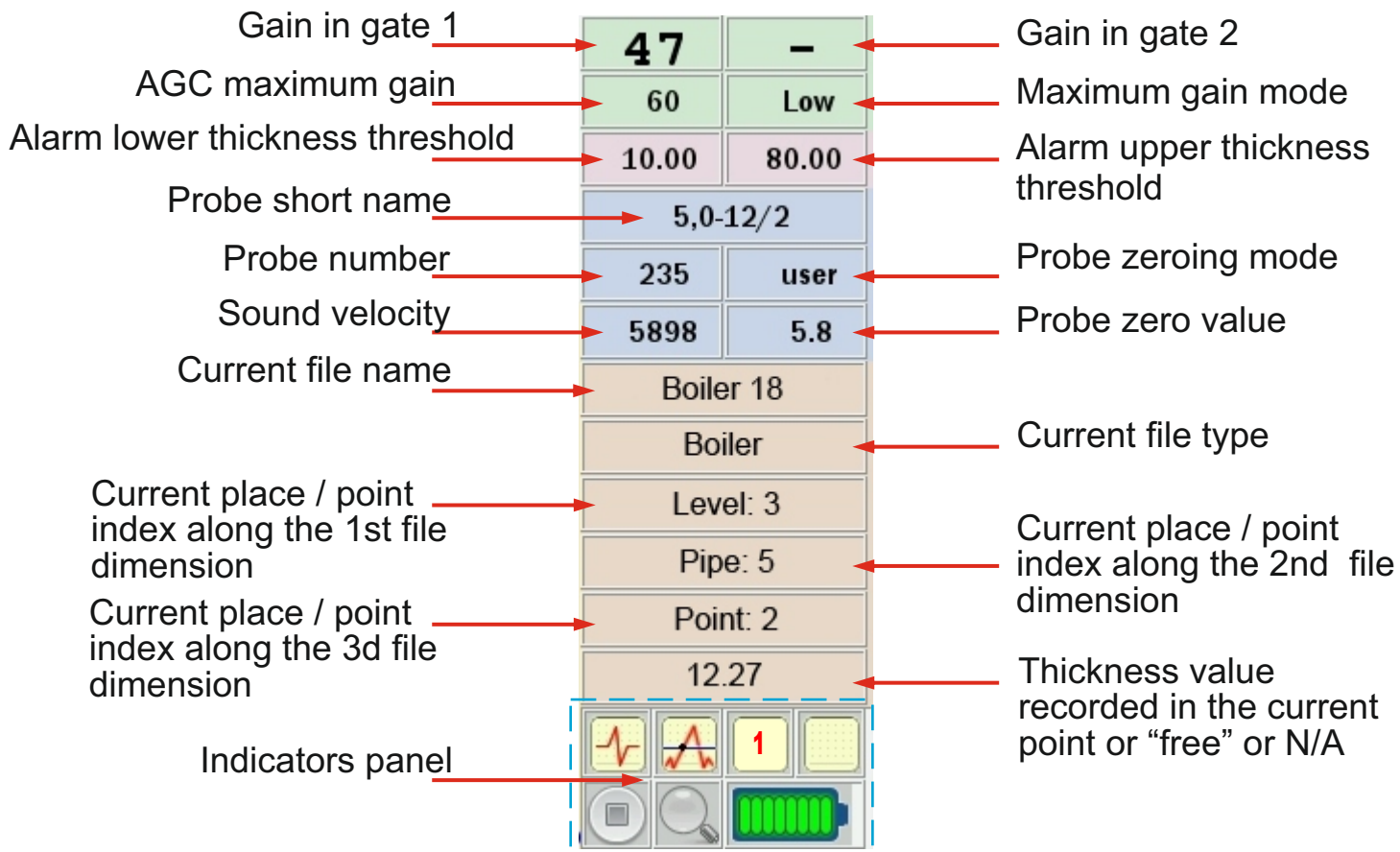
Should be chosen in PROBE → Calibr.mode

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.

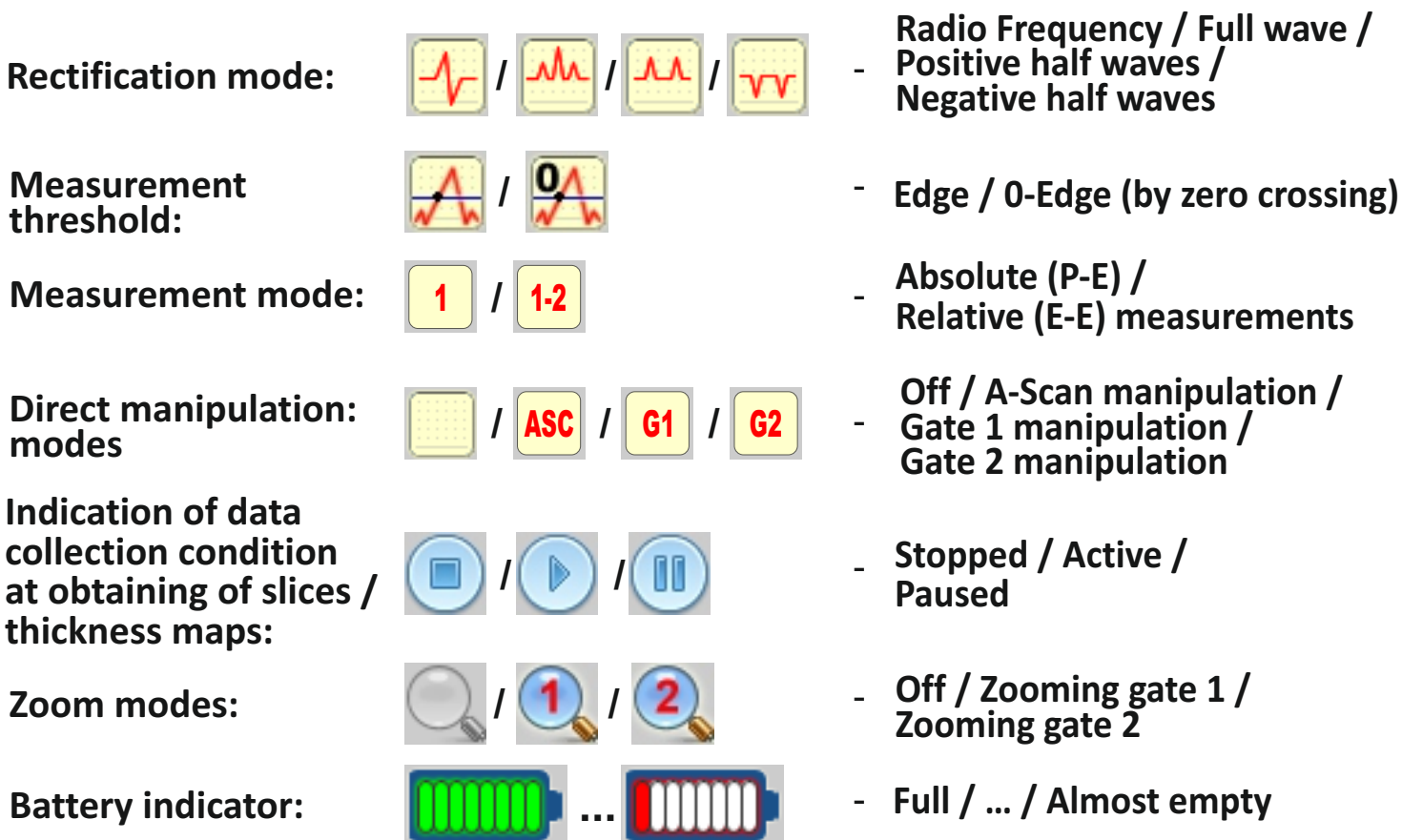


Thicknesses of calibration blocks for 2-points calibration should differ at least 2 times.

INDICATION PANEL ^T



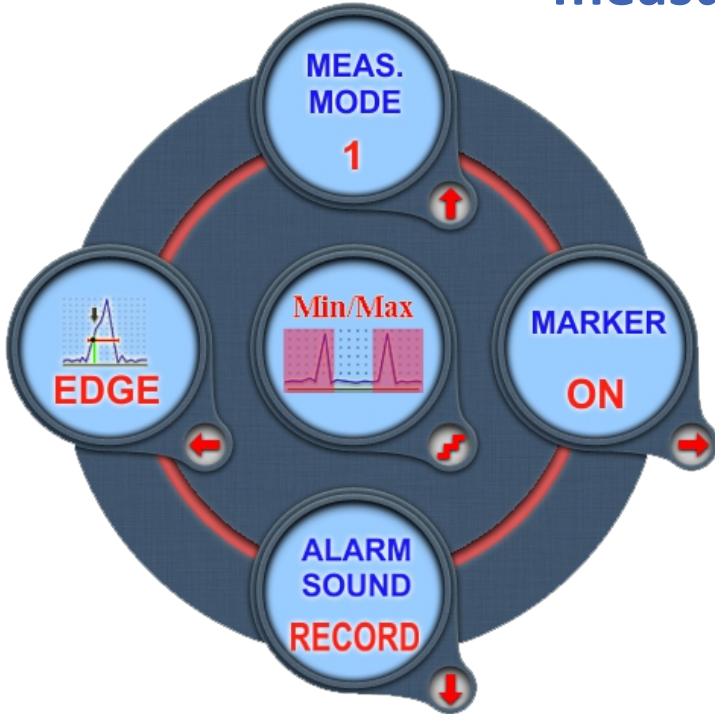
INDICATORS ^T



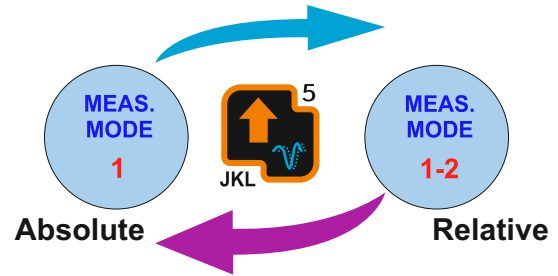


QUICK ACCESS TO MAIN PARAMETERS ^T

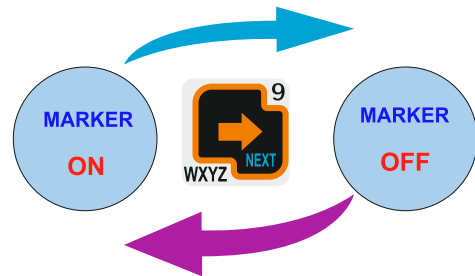
TG+ 1. Gates choice for absolute or relative measurements



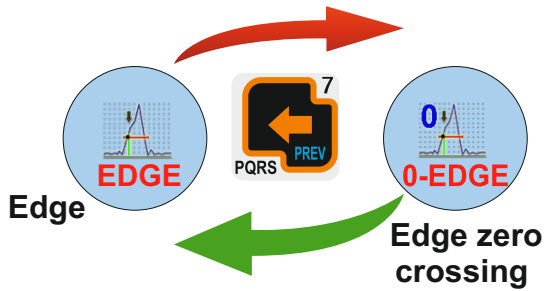
«Choice of the measurement mode: absolute or relative»



«Measurement point marker»

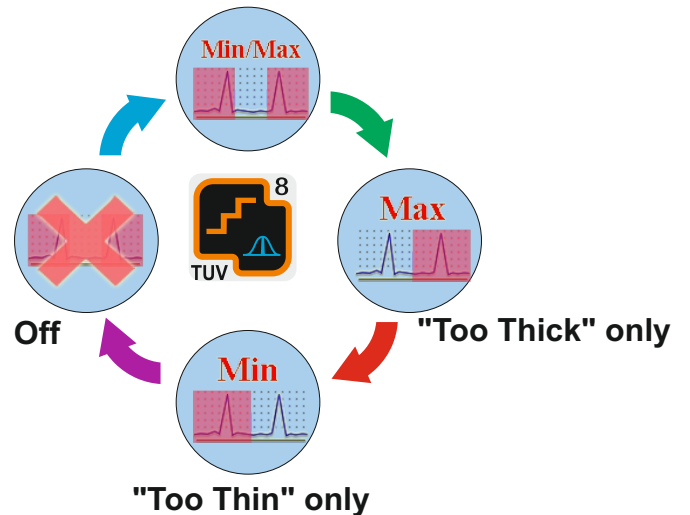


«Time/distance measurement threshold choice»

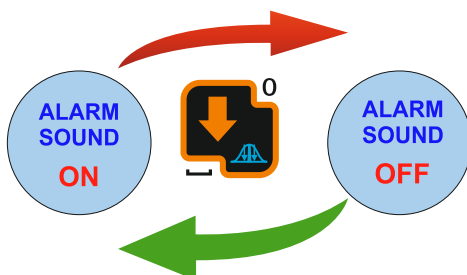


«Flaw alarm logic choice»

Both "Too thin" and "Too thick"



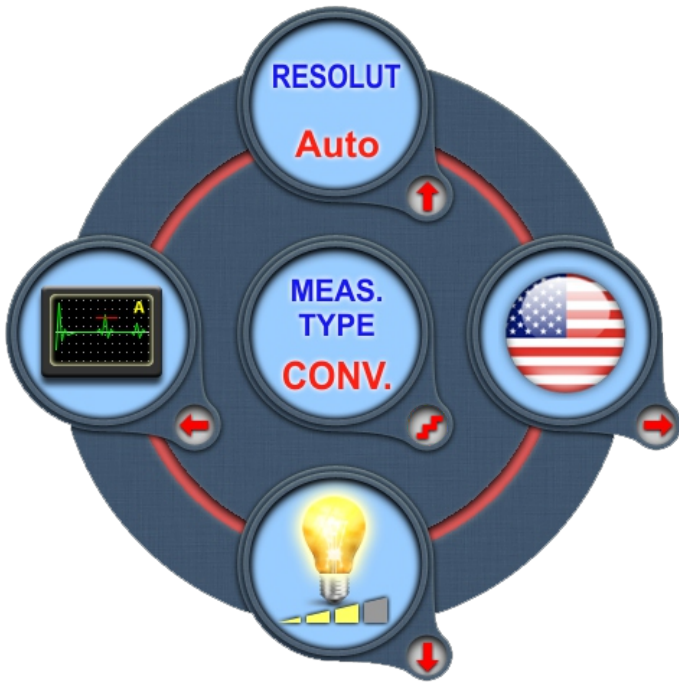
«Choice of the gate(s) level for the sound alarm»



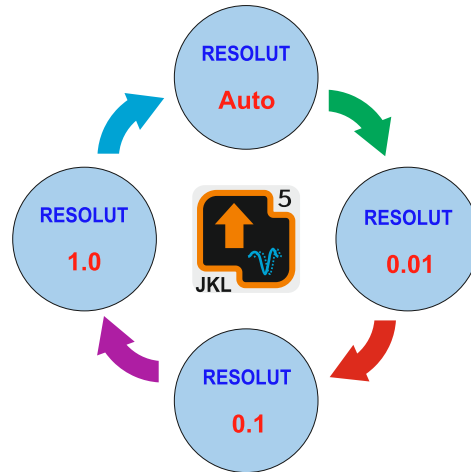


QUICK ACCESS TO MAIN PARAMETERS ^T

TG+ 2. Display options



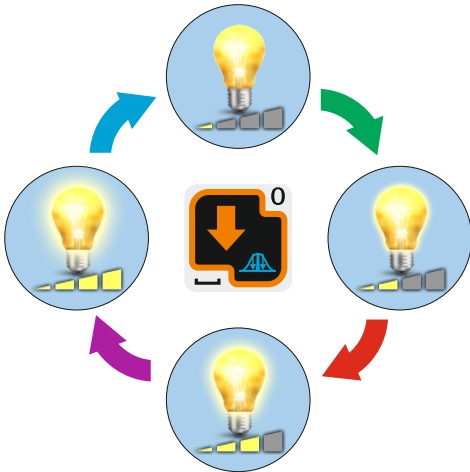
«Resolution choice»



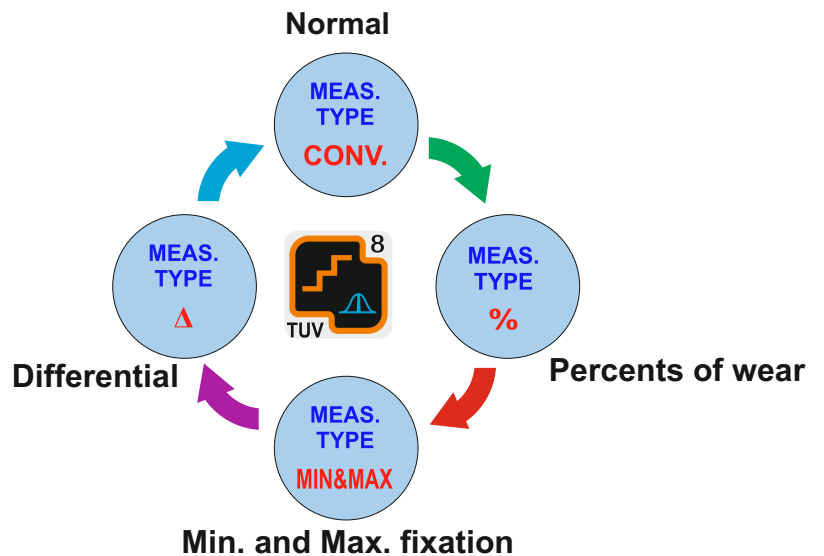
«Interface language choice»



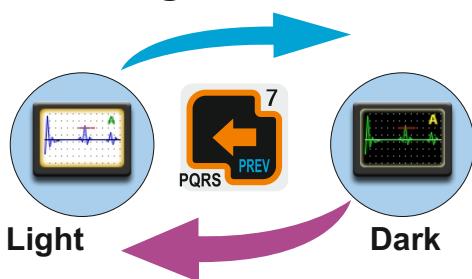
«Display brightness adjustment»



«Measurement type choice»



«Switching color schemes»



CONTENTS

C	A-Scan manipulation	3
C	Rectification Choice	3
C	Gates manipulation	4
C B	Gain manipulation	4
C	Menu navigation and parameters adjustment	5
B	Indication panel	5
B	Indicators	6
B T	Menu structure	7
B	Quick access to main parameters:	
	UT-B 1. Measurement and alarm	8
	UT-B 2. Measurands choice	9
	UT-B 3. Display options	10
B	Indication search, evaluation and documentation AIDS:	
	Evaluate mode	11
	Peak hold mode	12
	Signals compare	12
	Memory shortcuts. Results saving	13
	Zoom mode	13
B	Straight-beam probes calibration	14
B	Angle-beam probes calibration:	
	Calibration of the sound velocity and probe zero at V2 calibration block	15
	Probe angle calibration at V2	16
	Calibration of sound velocity and probe zero by block or testing object end	17
	Calibration of sound velocity and probe zero by any reflectors with known location depth	18
B	Rayleigh wave probes calibration:	
	Calibration of probe zero at V1 block	19
	Calibration of probe zero at V2 block	20
	Calibration of sound velocity at testing object	21
T	Basic preparation for thickness measurement	22
T	Additional preparation for thickness measurement	22
T	Adding new probe to the list	23
T	Choosing connected probe from the list	24
T	Probe zeroing	25
T	Free calibration	26
T	1-point calibration	27
T	2-points calibration	28
T	Indication panel	29
T	Indicators	29
T	Quick access to main parameters:	
	TG+ 1. Gates choice for absolute or relative measurements	30
	TG+ 2. Display options	31