

Digital Ultrasonic Flaw Detector CMSUFD100 series



CMSUFD100 series are portable and digital Ultrasonic Flaw Detector, the detector can rapidly, non-destructively and accurately test, locate and evaluate multi-defects, such as welding bead, crack, slag and blowhole etc.. The detector can be used in the laboratory, also can be used at the project site. The detector is widely used in the manufacturing, steel metallurgy, metal processing industry, chemistry etc. that the fields need testing defect and control ling quality, it is also widely used in in-service inspection and life span evaluation for the fields of aircraft, railway traffic, boiler, pressure vessels etc.

Safety tips

- The detector is the device for industry ultrasonic non-destructive testing, can not use to medical testing;
- To ensure safety operation, the operator must have special knowledge of non-destructive testing;
- The detector must be used under allowed environment condition, especially, the detector can not be used under the strong magnetic field and strong corrosion environment
- To avoid unnecessary loss and ensure safety, please operate the detector according to the manual.
- Contact us when the detector appear fault, please don't disassemble and repair it by yourself.

Declaration

- Our company has no responsibilities for any consequences caused by misuse, please operate the detector in proper according to the manual.

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Technical Parameters

CMSUFD100 series Ultrasonic Flaw Detector are all digital, and have features of high speed, high accuracy, high efficiency, high reliability, good over-all properties, and real-time operation. The detectors designed using advance technology, so they have outstanding site properties.

Multi-channel inspection, you can choose save as, it is useful for inspection.

Large capacity storage for waveform, the waveform can be loaded.

High speed and long time video for inspection process.

Multi- shortcuts key, menu operation, digital shuttle roller, convenient to operate, advanced technology.

- TFT color screen with 5.7 inches, the color and bright can be set according to environment.
- Disassemble battery, online charging, offline charging and charge while working, convenient to change battery. Long time working outside and no worries. Small volume, light weight and portable.
- Damping match meets working requirement with different sensitivity and resolution .
- Four working modes, normal probe, angle probe, dual-crystal probe, through probe.
- Amplify receive
Real-time sample : high speed ADC, fully display the wave detail.
Rectify : Full, positive, negative, reflective
Gate : dual-gate , support time gate and sound path gate.
Gain : Multi-grade adjustable, has basic gain, scan gain, compensation gain, Support gain locked and auto gain.
- Alarm type
Beep alarm and led alarm.
- Alarm condition
It can be chosen among wave in gate, wave out gate, wave in curve and wave out curve
- Data save
The detector designs save shortcut key, very convenient to operate. The save as, load, play and delete can be carried out quickly.
- Inspection function
Peak memory: Search the highest wave in real-time, recording the maximum value of the defect.
Echo envelope: Peak trace depiction for defect echo, it provides detail info for judging defect.
Crack height measurement: Automatically measure and calculate crack height.
B-SCAN: Real-time scan, cross-section display, B-SCAN can display the workpiece shape which make the result displayed directly.

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Aperture: Auto calculating flaw equivalent i.e. Φ value.

DAC, AVG: normal/angle probe inspect forged piece and the detector can find the highest wave of the defect and automatically calculate equivalent Φ , the DAC and AVG can be done in section.

Record: Record waveform in real-time, save and play.

Defect location: Horizontal value L, depth H, sound path S.

Defect quantitative: Flexible displays according to setting reference.

Defect qualitative: Manual experience judgment by envelope waveform.

Curved surface correction: Inspection for curved surface workpiece, revise the curvity conversion.

- Real-time clock record
Date, time tracking record and save.
- Communication
High speed USB provides transportation data.

Functions

The functions of CMSUFD100 series are shown in the Table 1.

Table 1 Functions of CMSUFD100 series

MODEL	CMSUFD100 Series				
	CMSUFD 100	CMSUFD 110	CMSUFD 120	CMSUFD 130	CMSUFD 140
SCREEN	TFT	TFT	TFT	TFT	TFT
DAC	√	√	√	√	√
AVG	×	√	√	√	√
STANDARD INSIDE	×	√	√	√	√
GATE ALARM	√	√	√	√	√
CURVE ALARM	√	√	√	√	√
WAVE FREEZE	√	√	√	√	√
CHANNEL	10	10	100	100	100
WAVE	100	100	1000	1000	1000
Video	×	5min×10	5min×20	5min×20 60min×1	5min×20 60min×1
AUTO CALIBRATION	√	√	√	√	√
REJECT	√	√	√	√	√
PEAK MEMORY	√	√	√	√	√
ECHO ENVELOPE	×	√	√	√	√
THICKNESS B-SCAN	×	√	√	√	√
COLOR B-SCAN	×	×	×	√	√
AUTO GAIN	√	√	√	√	√
ECHO CODE	×	×	√	√	√
APERTURE CALCULATION	×	×	√	√	√
WELDING GRAPH	×	×	×	×	√
CRACK HEIGHT MEASUREMENT	×	×	×	×	√
CURVED SURFACE CORRECTION	×	×	√	√	√

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PC SOFTWARE	√	√	√	√	√
BATTERY	1	1	2	2	2

√ : HAVE THE FUNCTION × : HAVE NO THE FUNCTION

Specifications

The specifications of CMSUFD100 series are shown in the Table 2.

Table 2 Specifications of CMSUFD100 series

	CMSUFD 100	CMSUFD 110	CMSUFD 120	CMSUFD 130	CMSUFD 140
TESTING RANGE	0~6000mm	0~9999mm			0~25000mm
VELOCITY	1000~9999m/s			400~20000m/s	
GAIN	0dB~110dB				
DISPLAY DELAY	-20μs~+3400μs				
PROBE DELAY	0μs~99.99μs				
FREQUENCY	0.2~10MHz	0.2~15MHz		0.2~20MHz	
NOISE LEVEL	≤10%				
PROBE DAMPING	100Ω, 150Ω, 200Ω, 500Ω				
PROBE REPEATING FREQUENCY	10~1000Hz			10~2000Hz	
SENSITIVITY	>62dB (DEPTH: 200mm, FLAT-BOTTOM HOLE Φ2)				
RESOLUTION	>40dB (5P14)				
LINEARITY REJECT	0~80% (DIGITAL REJECT)				
VERTICAL LINEARITY ERROR	≤3%				
HORIZONTAL LINEARITY ERROR	≤0.1%				
DYNAMIC RANGE	≥32dB				
PULSE	SQUARE WAVE				
PULSE ENERGY	FIXED		MULTI-GRADES ADJUSTABLE		
PULSE WIDTH	50~300ns		AUTO MATCH/ 50~1000ns		
ENVIROMENT TEMPERATURE	-10□~50□				
ENVIROMENT HUMIDITY	20%~95% RH				
POWER VOLTAGE	DC:7.2V; AC:220V				
WORKING HOURS	≥ 20 hours				
SIZE	220×175×59 (mm)				
WEIGHT	1.3 kg including battery				

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Unit

The face of CMSUFD 100 series Ultrasonic Flaw Detector is shown in the Fig. 1.

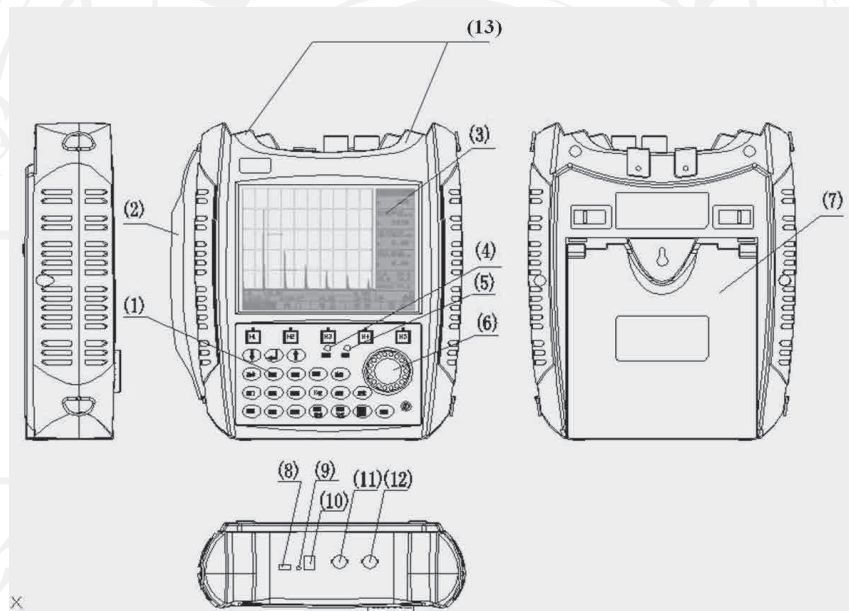


Fig. 1

- (1) Keypad (2) Hand-belt (3)TFT screen (4) Power indicator (5)Alarm indicator
(6) Digital shuttle roller (7)supporter (8)USB port (9)Reset and off port
(10) Charging port (11) Receiving port (12) Receiving/transmitting port (13) Protecting shell

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Keypad introduction

The detector keypad is as shown in the Fig.2.



Fig.2

-  function selecting keys
-  Down arrow, use to use to select KUB menu downward.
-  ENTER key, to confirm each operation.
-  Up arrow, use to select KUB menu upward.
-  POWER Power indicator
-  ALARM Alarm indicator
-  BASE Base function keys, it includes RANGE, GATES, GAIN, MODE and ECHO, the detail info. refer to Table3.
-  CAL Calibration function keys, it includes PROBE, CAL, ANGLE, PULSER and SETUP, the detail info. refer to Table3.
-  SAVE Save function keys, it includes CHNL, WAVE, VIDEO, RESET and RESV, the detail info. refer to Table3.

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SYSTEM

System function keys about the detector, it includes DISP, SCALE, ALARMS, SETUP and INFO, the detail info. refer to Table3.

FUNC

Function keys about the special function of the detector, it includes SCAN, WELD, DIAM, CRACK and CSC, the detail info. refer to Table3.

GATE

Gate shortcuts key, the detail info about gate can be set directly by pressing **GATE** key.

GAIN

Gain shortcuts key, the detail info about gain can be set directly by pressing **GAIN** key.

CHAN

Channel shortcuts key, the detail info about channel can be checked directly by pressing **GAIN** key.

ANGLE

Angle shortcuts key, the detail info about angle can be set and calibrated directly by pressing **ANGLE** key

CURVE

Curve function key, DAC and AVG can be switched by pressing CURVE key.

EXPAND

Expand shortcuts key, the wave in the gate will expand automatically by pressing **EXPAND** key.

COLOR

Color shortcuts key, you can directly set the color of the screen according to your requirement by pressing **COLOR** key.

PARAMETER

Parameter shortcuts key, you can enter into the parameter setting GUI to set each parameter, it includes almost all parameters.

STANDARD

Standard shortcuts key, you can enter into the standard setting GUI to select the standard according to your requirement.

AUTO GAIN

Auto gain shortcuts key, the wave in the gate will arrive the reserved height (default

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value)



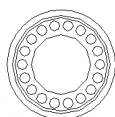
Peak memory shortcuts key, the peak memory and echo envelope will be opened or switched by pressing **PEK MEM** key.



Record shortcuts key, the detector will directly enter into the video operation GUI, or stop recording by pressing **RECORD** key.



The wave will be frozen by pressing **FREEZE** key.



Digital shuttle roller, mainly used to increase or decrease, step selection.

The keypad area is divided into three parts as shown in the Fig.2. The first part is the first row, that is function selection key composed of F1,F2,F3,F4 and F5. You can select the function option in accordance with the main menu below the screen by pressing these five keys.

Second part is the second row includes three basic operation buttons which are **UP**, **ENTER**, **DOWN** key, different parameters at the right screen in the KUB menu can be switched by pressing **UP** and **DOWN** key, press **ENTER** key to confirm operation and enter into the next step.

The third part is the area of function group and shortcuts.

Menu structure

The menu structure of the CMSUFD100 series is shown in the Table3.

BASE		CAL		SAVE		SYSTEM		CURVE				FUNC	
RANGE	RANGEmm	PROBE	P-TYPE	CHAN	SELECT	DISP	LIGHT	DAC	DRAW	AVG	DRAW	SCAN	B-SCAN
	MTLVELm/s		P-FREQ		SAVE		COLOR		DB-BAS dB		DB-BAS dB		B-DIR
	D-DLY us		X-VAL		DELETE		ECHO-H		ECHO-H		PERIOD		
	P-DLY us		P-SIZE		SAVE AS		GSTART mm		GSTART mm		A-SCAN		
GATES	SELECT	CAL	AUTO	WAVE	SELECT	SCALE	GRID	EDIT	ADJUST	EDIT	ADJUST	WELD	PARAM
	GSTART mm		MANUAL		SAVE		UINITS mm		INDEX		INDEX		
	WIDTH mm		FRONT		LOAD		H-AXIX		ECHO-H		ECHO-H		
	THRESH		P-DLY		DELETE		GSTART mm		GSTART				
	DB-BAS dB		AUTO		SELECT		KEY SND		DAC-RL		AVG-HL		EOU DIAM

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Table 3 Menu structure

GAIN	DB-BAS dB	ANGLE	AUTO	VIDEO	SELECT	ALARMS	KEY SND	OFFSET	DAC-RL	OFFSET	AVG-HL	DIAM	EOU DIAM
	DB-STP dB		MANUAL		RECORD				DAC-SL				GSTART
	DB-SCN dB		ANGLE		PLAY				DAC-EL				P-SIZE
	DB- CMP dB		ANGLE-K		DELETE				ALM REF				P-FREQ
MODE	LOGIC	PULSER	ENERGY	RESET	ALL CHNL	SETUP	STANDARD	SETUP	FLAW TYP	SETUP	AVG REF	CRACK	HEIGHT
	AUTOSNAP		P-WIDTH		ALL WAVE				FLAW-D		REF-D		PT-A mm
	DETECT		PRF		ALL VDO				FLAW-L		P-SIZE		PT-B mm
			P-DAMP		RECALL		SHUTDOWN		DAC REF		P-FREQ		GSTART mm
ECHO	RECTIFY	SETUP	THICK	RESV		INFO	YY-MM-DD	DISP	DAC SHOW	DISP	AVG SHOW	CSC	O-DIAM
	REJECT		AUTO-80				HH:MM		TYPE		TYPE		I-DIAM
	FILL		PEAK MEM				FW VER		FITTING		FITTING		CSC
	ECHO ENC		ENVELOPE				OTHER		DELETE		DELETE		

Table 3 Menu structure

	CMSUFD 110	CMSUFD300
		
TESTING RANGE	0~9999mm	2.5 mm ~5000 mm
VELOCITY	1000~9999m/s	1000 m/s~9999m/s
GAIN	0dB~110dB	0dB~110dB
DISPLAY DELAY	-20μs~+3400μs	-20μs~+3400μs
PROBE DELAY	0μs~99.99μs	0μs~99.99μs
FREQUENCY	0.2~15MHz	0.2~15MHz
NOISE LEVEL	≤10%	
PROBE DAMPING	100Ω, 150Ω, 200Ω, 500Ω	50ohms, 150ohms and 400ohms
PROBE REPEATING FREQUENCY	10~1000Hz	10~1000Hz

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SENSITIVITY	>62dB (DEPTH: 200mm, FLAT-BOTTOM HOLE $\Phi 2$)	>60dB
RESOLUTION	>40dB (5P14)	>40dB (5P14)
LINEARITY REJECT	0~80% (DIGITAL REJECT)	0~80% (DIGITAL REJECT)
VERTICAL LINEARITY ERROR	$\leq 3\%$	$\leq 3\%$
HORIZONTAL LINEARITY ERROR	$\leq 0.1\%$	$\leq 0.2\%$
DYNAMIC RANGE	≥ 32 dB	≥ 32 dB
PULSE	SQUARE WAVE	
PULSE ENERGY	FIXED	
PULSE WIDTH	50~300ns	
ENVIROMENT TEMPERATURE	-10°C~50°C	-10°C~50°C
ENVIROMENT HUMIDITY	20%~95 RH	20%~95 RH
POWER VOLTAGE	DC:7.2V; AC:220V	Li battery 4×3.6V 4000mAh
WORKING HOURS	≥ 20 hours	≥ 10 hours
SIZE	220×175×59 (mm)	243mm×173 mm×70 mm
WEIGHT	1.3 kg including battery	1.47kg
Parameter adjustment	shuttle control and Key control	Key control

Table 3 Menu structuer

	CMSUFD 120	CMSUFD310
		
TESTING RANGE	0~9999mm	2.5 mm ~5000 mm
VELOCITY	1000~9999m/s	1000 m/s~9999m/s
GAIN	0dB~110dB	0dB~110dB
DISPLAY DELAY	-20 μ s~+3400 μ s	-20 μ s~+3400 μ s
PROBE DELAY	0 μ s~99.99 μ s	0 μ s~99.99 μ s
FREQUENCY	0.2~15MHz	0.2~15MHz
NOISE LEVEL	≤ 10	
PROBE DAMPING	100Ω, 150Ω, 200Ω, 500Ω	50ohms, 150ohms and 400ohms
PROBE RPEATING FREQUENCY	10~1000Hz	10~1000Hz
SENSITIVITY	>62dB (DEPTH: 200mm, FLAT-BOTTOM HOLE $\Phi 2$)	>60dB

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RESOLUTION	>40dB (5P14)	>40dB (5P14)
LINEARITY REJECT	0~80% (DIGITAL REJECT)	0~80% (DIGITAL REJECT)
VERTICAL LINEARITY ERROR	≤3%	≤3%
HORIZONTAL LINEARITY ERROR	≤0.1%	≤0.2%
DYNAMIC RANGE	≥32dB	≥32dB
PULSE	SQUARE WAVE	
PULSE ENERGY	MULTI-GRADES ADJUSTABLE	
PULSE WIDTH	AUTO MATCH/ 50~1000ns	
ENVIROMENT TEMPERATURE	-10℃~50℃	-10℃~50℃
ENVIROMENT HUMIDITY	20%~95% RH	20%~95% RH
POWER VOLTAGE	DC:7.2V; AC:220V	Li battery 4×3.6V 4000mAh
WORKING HOURS	≥ 20 hours	≥ 10hours
SIZE	220×175×59 (mm)	3*+00 ×45+#00 ×5/#00
WEIGHT	1.3 kg including battery	1.47kg
Parameter adjustment	shuttle control and Key control	Key control

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Probes chosen principle

Probe Type	Specification
Angle Beam Probe	6×6, 8×9, 10×10
Angle Beam Probe	13×13, 14×16, 18×18
Angle Beam Probe	20×20, 20×22
Angle Beam Probe	30×30
Straight Beam Probe (softfilm)	Φ6, Φ8, Φ10, Φ12
Straight Beam Probe (softfilm)	Φ14, Φ16, Φ20, Φ24
Straight Beam Probe (softfilm)	Φ25, Φ30
Dual Element Beam Probe (Softfilm)	Φ8, Φ10, Φ12
Dual Element Beam Probe (Softfilm)	Φ14, Φ20
Dual Element Beam Probe (Softfilm)	Φ25, Φ30
Immersion Probe	Φ10, Φ14
Immersion Probe	Φ20, Φ25
Water filled Probe	Φ20, Φ25
Small Angle Probe	Φ14, Φ20
Small Angle Probe	Φ25, 18×18
Dual Element Straight Beam Probe (Softfilm)	8×9, 10×12
Variable Angle Probe	10×10, 10×12
Plate Wave Probe	20×30
Small-diameter Probe	5×5, 5×7
Creeping Wave Probe	8×12, 6×6
Surface Wave Probe	10X12

Note: 1.The probe price mainly depends on the crystal size. And the frequency can be chose by yourself in the range of 0.2MHz~10MHz. For other parameters like angle,we can provide the general angles such as 30°, 45°, 60°, 70°, 80°and so on. You can chose by yourself.

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