NINGLU SIM990

Echo Sounder & Transducer Tester Operation Manual

NINGLU

Doc No： NLT-SIM990-SSEN
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Content

Introduction

SIM990 is a handheld portable tester for echo sounder and transducer.

Echo sounder tester

The SIM990 can measure the output of an echo sounder, and if required, reply with a user defined signal to simulate operation of the transducer.

Transducer tester

The SIM990 is a tester that measures the characteristics of the transducer, showing the resonance and electrical characteristics of the transducer. The tester works for most transducer (directly to transducer, not through circuitry).

Features

- Transducer tester
- Echo sounder tester
- Built-in rechargeable battery

Packing list

Description	Qty	Comment
Echo sounder & Transducer tester	1	
Cable for echo sounder tester	1	
Cable for transducer tester	1	
Adapter power	1	
Operation manual	1	
Travel case	1	

Button description

Indication LEDs:

Yellow flashing: There are input pulses, which is to have been connected with echo sounder/ fish finder with power on.

Red flashing: There are output single, which is to send to bottom/fish signal.

Power on/off: Turn on/off the system.

Operation Area:

To move the cursor position

To set values

To echo transmit/pause and test start/pause

To return to previous menu

To enter the selected menu.

External connector:

Five-core socket for connecting echo sounder or transducer

换能器测试前请确认换能器与测深仪分离

Disconnect transducer with echo-sounder before transducer testing

When transducer test of SIM990 is on, the transducer cannot be connected with the main unit and the cable for transducer tester must be used.

Specification

Summary

Display screen： 128×64 dot-matrix LCD

Dimension： 235mm×135mm×55mm

Weight： 750g (1.2 kg with bag and cables)

Power supply internal: Rechargeable li-ion battery (12.6 V DC)

Power supply external: 12.6 V/350 mA operation and battery charging

Built-in battery: 12.6VDC 1500mAh

Battery charger： 12.6V/350mA

Working temperature： -15~55℃

Echo sounder tester

Parameter	Alias	Range	Resolution	Accuracy
Input frequency	Ifreq	10 kHz - 999.9 kHz	0.1 kHz	±0.1 kHz
Input width	Iwidth	20 us - 60 000 us	1 us	±1 us
Input period	Iperiod	1 ms - 6 553.5 ms	0.1 ms	±0.1 ms
Input amplitude	Vipp	50 V - 2 500 V	10V	±20%
Output frequency	Ofreq	10 kHz - 999.9 kHz	0.01 kHz	±0.1 kHz
Output bottom width	Obwidth	20 us - 60 000 us	1 us	±1 us
Output bottom depth	Obdepth	0.3 m - 999.9 m	0.3 m	±0.1 m
Output fish width	Ofwidth	20 us - 60 000 us	1 us	±1 us
Output fish depth	Ofdepth	1 m - 999.9 m	1 m	±0.1 m
Output amplitude	Vopp	1 mV - 590 mV	1 mV	±1 mV
Output fish ratio	Ofr	00:00 - 99:99	1	0

Note: Specified for input width greater than 9 ms

Transducer tester

Parameter	Alias	Range	Resolution	Accuracy
Scan frequency	Fs	10 kHz - 999.9 kHz	0.01 kHz	±0.1 kHz
Resonant frequency	Fr	10 kHz - 999.9 kHz	0.01 kHz	±0.1 kHz
Resonant impedance of the transducer	Zr	1 ohm - 65 535 ohm	1 ohm	±1 ohm
Resonant phase of the transducer	Qr	0~3.14	0.01	±0.01
Transducer impedance at the specified frequency	Zt	1 ohm - 65 535 ohm	1 ohm	±1 ohm
Transducer phase at the specified frequency	Qt	0~3.14	0.01	±0.01

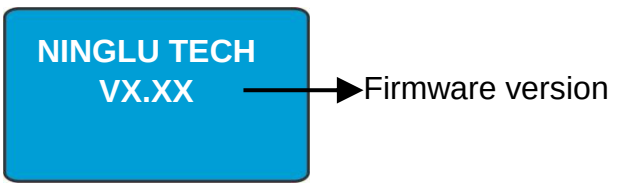
Operation

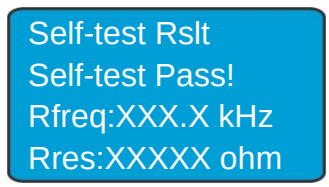
Warning

Disconnect transducer
from echo sounder before testing!

Auto self-test

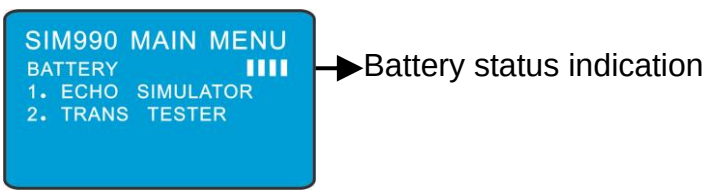
On startup, the screen will show the system firmware version.





Main menu

After the auto self-test procedure, the SIM990 MAIN MENU appears.

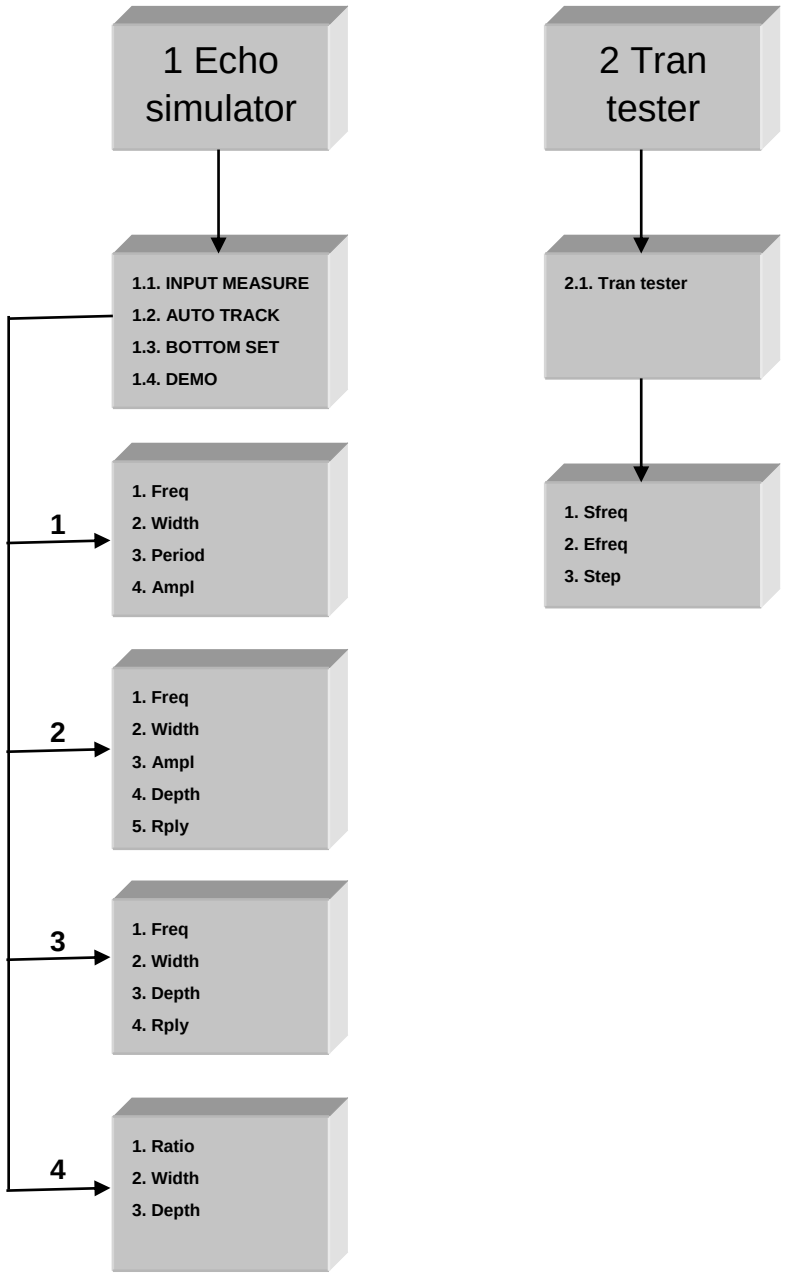


The SIM990 also shows the battery status. The battery should last about 4 hours for transducer tester and shorter for simulator. In echo sounder simulator mode, the signal will become noisy if the voltage gets lower. It is therefore recommended to use the power supply in this mode. If the battery level gets less than 50 %, a low-battery warning will show.

To prolong the battery life, please charge timely when battery gets low.

On the tester, press ▼ or ▲ to change the location of the flashing cursor, and press ENT to enter the function accordingly.

SIM990 Menu Structure

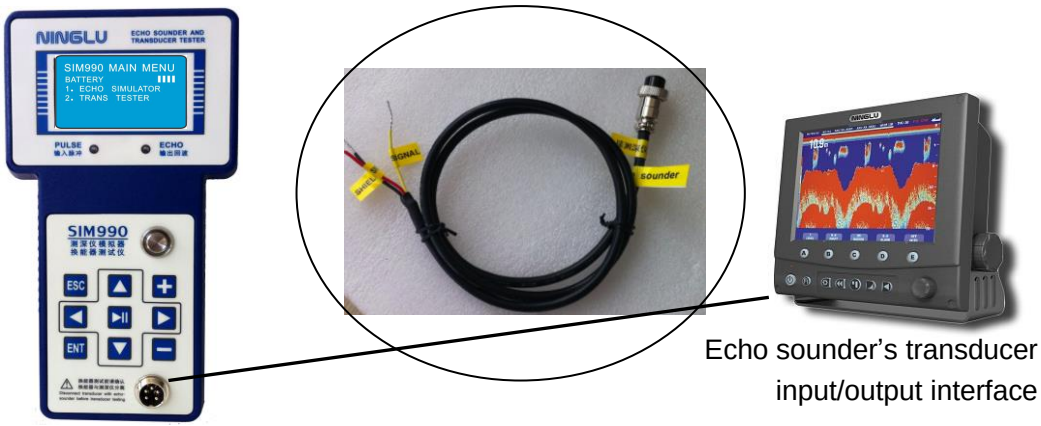


1 Echo simulator

Connect SIM990 to the echo sounder's transducer input/output interface. The echo simulator is used to verify that the transceiver electronics is working satisfactory. This should be used if the system seems to have shorter range than normal, if there is too much noise on the screen, or if the system looses the bottom.

Important, warning:

Use the cable for echo sounder tester, the one **without cable clips**. The wires are different and damage can be caused by using the other wire.



Echo sounder's transducer input/output interface

Use ▼ or ▲ and select 1. ECHO SIMULATOR and press ENT.

The following screen picture will appear:

Screen picture	Description
1. INPUT MEASURE 2. AUTO TRACK 3. BOTTOM SET 4. DEMO	**1. INPUT MEASURE** is used for showing the transmitter signal values from the echo sounder.
	2. AUTO TRACK is used to measure in the incoming pulse and return the same pulse width and frequency with a user determined amplitude and depth.
	3. BOTTOM SET is used to set all the returned parameters including frequency and bottom width.
	4. DEMO is used to show a moving bottom, with fish if required.

1.1 INPUT MEASURE

Use ▼ or ▲ and select 1. ECHO SIMULATOR and press ENT.

The following screen picture will appear:

Screen picture	Description
INPUT MEASURE Freq: 49.8 kHz Width: 322 us Period: 350 ms Ampl: 1050 V	**Freq:** The frequency of connected echo sounder output.
	Width: The width of received pulse from echo sounder.
	Period: The time between the received pulses.
	Ampl: The signal level (Vpp) on the received pulse from the echo sounder.

Note: In this mode the simulator will not return a signal. The echo sounder may search for the bottom and adjust its pulse characteristics. If this happens, use AUTO TRACK mode instead.

Press ESC to return to previous menu. Use ▼ or ▲ and select 2. AUTO TRACK and press ENT.

1.2 AUTO TRACK

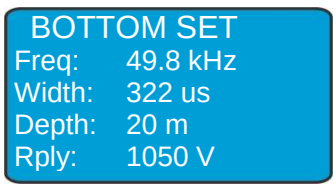
Screen picture	Description
AUTO TRACK Freq: 50.0 kHz Width: 322 us Ampl: 1000 V Depth: 30 m Rply 1.00 mV	**Freq**: The measured frequency of the transmitted pulse to the echo sounder.
	Width: The measured width of the transmitted pulse to the echo sounder.
	Ampl: The signal level on the received pulse from the echo sounder.
	Depth: User defined simulated depth.
	Rply: The user defined value of the signal level on the transmitted pulse to the echo sounder.

This mode both receives the pulse, and then sends back the identical pulse in frequency and pulse width. It also allows the user to set the return pulse amplitude and depth. This mode allows the user to inspect normal operation conditions.

Press ▲ ▼ ◀ or ▶ to change the place of the flashing cursor, and press + or − to change the value of the number where the cursor flashed. If the settings are finished, press ▶II to send the bottom echo that you set.

Press ESC to return to previous menu. Use ▼ or ▲ and select 3. BOTTOM SET and press ENT.

1.3 BOTTOM SET

Screen picture	Description
	**Freq:** The user defined frequency of the transmitted pulse to the echo sounder.
	Width: The user defined width of the transmitted pulse to the echo sounder.
	Period: The user defined selected depth.
	Rply: The user defined value of the signal level on the transmitted pulse to the echo sounder.

This mode allows the user to set all the return pulse parameters and simulate extreme conditions. Press ▲ ▼ ◀ or ▶ to change the place of the flashing cursor, and press + or − to change the value of the number where the cursor flashed. If the settings are finished, press ▶II to send the bottom echo that you set.

Press ESC to return to previous menu. Use ▼ or ▲ and select 4. DEMO and press ENT.

1.4 DEMO

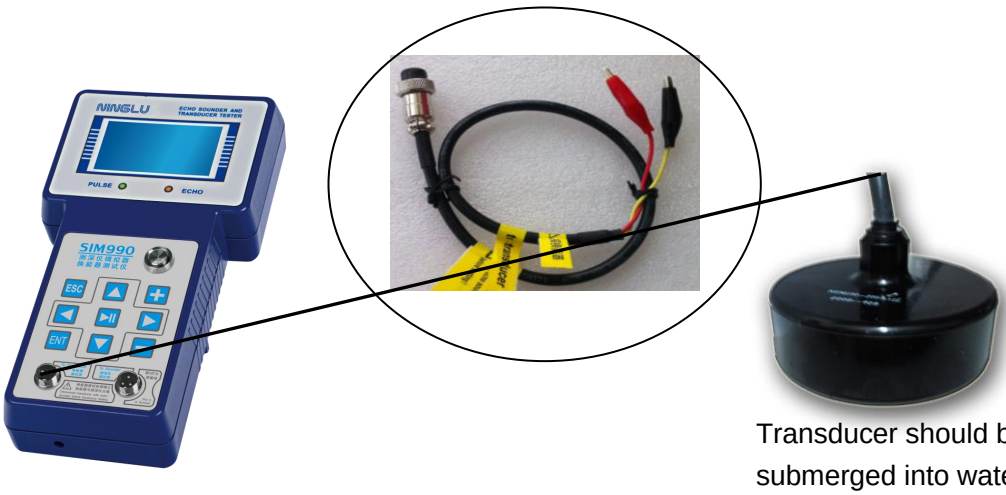
DEMO mode will slowly vary the depth around the depth and bottom parameters set in the BOTTOM SET screen. If fish are required, the parameters on this screen can be used to select how strong and how often fish returns show. These will also vary between the set depth and the bottom.

Screen picture	Description
	**Ratio:** How often fish show.
	Width: The width of the fish echo.
	Depth: The minimum depth of the fish echo.

2 TRANS(DUCER) TESTER

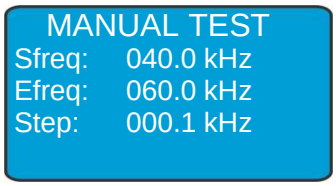
If you suspect the transducer has a problem, firstly disconnect it from the echo sounder. Connect the transducer to the SIM990 with transducer tester cable. Then run a sweep across the expected resonance frequency. Look at the resonant frequency, the impedance and check it against the manufacturers' specification. Generally, if the resonance frequency is within 5% of the designed frequency or the impedance is between 20 and 350 ohms, the transducer is ok.

The transducer should be submerged into water when testing. Both resonance frequency and impedance may change in air.



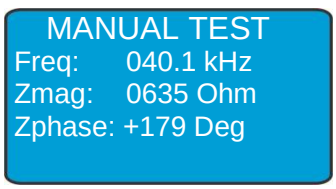
Transducer should be submerged into water!

The tester is designed to sweep through a series of frequencies and measure the characteristics of the transducer. Like a bell that rings at a particular (resonant) frequency, most transducers have a frequency where they perform best. For optimal use of the transducer, this frequency should be the same, or close to the frequency that the echo sounder is sending. The tester will measure the impedance as a factor of magnitude and phase through the defined frequency range and find the point where these are lowest, defining this as the resonant point.

Screen picture	Description
	**Sfreq:** The start frequency of the test sweep. **Efreq:** The end frequency of the test sweep. **Step:** The frequency step interval.

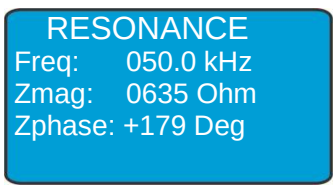
Press ▲ ▼ ◀ or ▶ to change the place of the flashing cursor, and press + or − to change the value of the number where the cursor flashed. If the settings are finished, press ⏯ to begin the test.

When the test starts, the TEST menu appears on the display:

Screen picture	Description
	**Freq:** The frequency at which the impedance is currently being measured. **Zmag:** The impedance magnitude at this frequency. **Zphase:** The phase angle at this frequency.

You can press ⏯ to stop the change of the frequency. The impedance and phase angle at the frequency now is shown on the screen. Press ⏯ to continue the sweep.

When the sweep is finished, the RESONANCE menu will appear:

Screen picture	Description
	**Freq:** The resonant frequency of the tested transducer. **Zmag:** The impedance of the tested transducer at resonance. **Zphase:** The resonant phase angle.

This data shows the resonant point of the transducer. This is the point where the transducer is most effective. Generally this should be within about 5 % of the echo sounder frequency. Zmag is the impedance measured at the resonant frequency. This is usually within the range of 20 to 300 ohms, however the exact ranges are available from the manufacturer. If this value is very high or very low, then the transducer may be at fault.