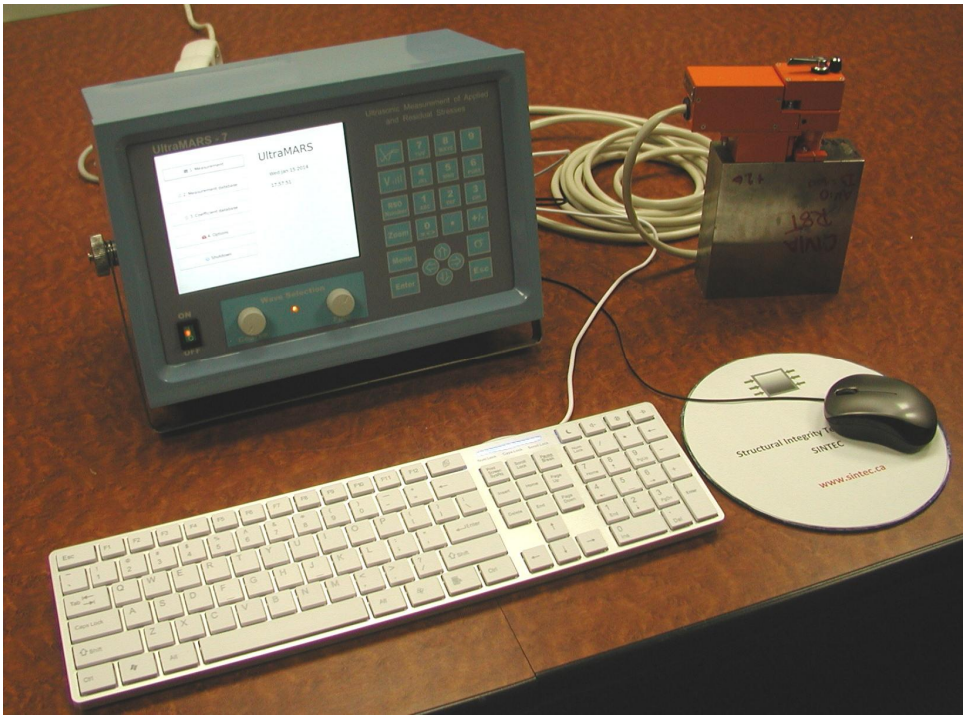
SINTEC

UltraMARS®-7

OPERATION MANUAL



UltraMARS® - 7

DEVICE FOR ULTRASONIC MEASUREMENT OF APPLIED AND RESIDUAL STRESSES

QUICK GUIDE

TABLE OF CONTENTS

1. INTRODUCTION

1. INTRODUCTION

Read this manual thoroughly and follow all directions to assure maximum protection of the equipment during operation. This Manual describes preparation of UltraMARS™-7 device for operation, and operations sequence in the process of Stress Measurement in samples and real structural elements.

1.1. MAJOR APPLICATIONS OF THE ULTRAMARS® -7 DEVICE

A portable, semi-automatic device for **Ultra**sonic **M**easurements of **A**pplied and **R**esidual **S**tress is designed for measurement of Residual and Applied stresses in samples, parts, welded elements and structures non-destructively.

The UltraMARS®- 7 device is used to provide the following measurements:

- Magnitude and sign of Uni- and Biaxial applied and residual stresses in samples and real structural elements.
- Uniaxial stresses and forces in pins and bolts.
- Parameters of the acoustic-elastic characteristics of materials.
- Residual stress change as a result of post-welding treatment and service loading.
- The thickness of parts and structural elements.

The ultrasonic transducer/receiver are using quartz plates measuring from 3×3 mm to 10×10 mm attached to the object of investigation by special clamping straps and/or electromagnets.

Main technical characteristics of UltraMARS®- 7 device:

- Stress can be measured in materials with thickness 2 - 200 mm.
- Error of stress determination (from external load): 5 - 10 MPa.
- Error of residual stress determination: 0.1 σy (yield strength), MPa.
- Stress and force measurement in fasteners (pins): 25-1000 mm long.
- Option of using an independent power supply (accumulator battery 12 V).
- Overall dimensions of measurement device: 330x215x165 mm.
- Weight of the measurement unit with transducers: 7.7 kg.

The supporting software allows controlling the measurement process, storing the measured and other data and calculating and plotting the distribution of residual stresses. The software also allows an easy connection with standard PC. UltraMARS®-

10.6. YOUR ULTRAMARS® 7 SYSTEM TOUR

10.6.2. The side view of the ULTRAMARS®-7 device.

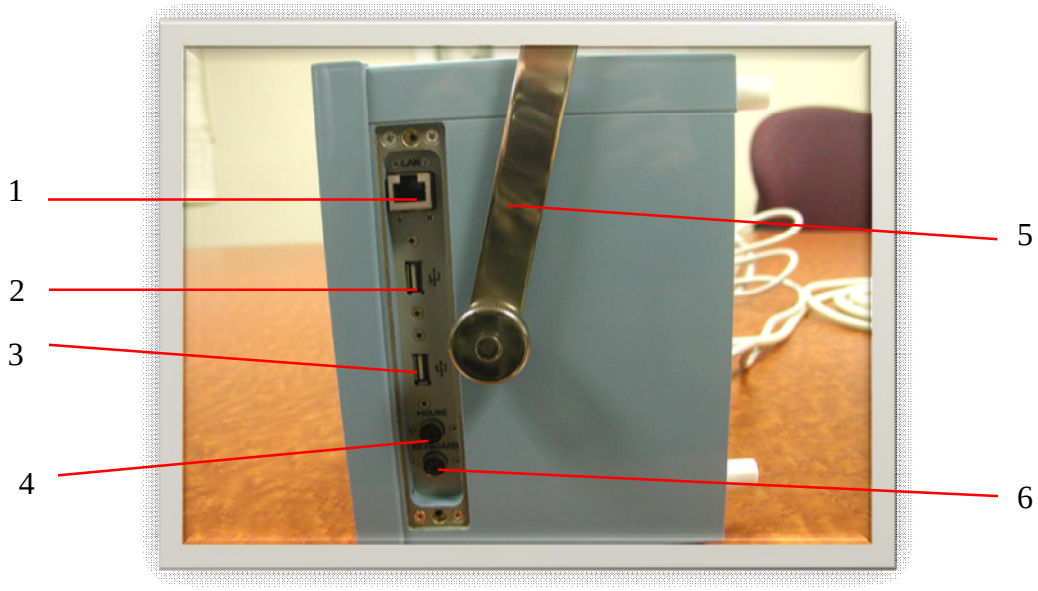


Figure 85 The right side view of the UltraMARS® -7 device

1 – LAN connector; **2, 3** – USB ports (may be used for mouse and keyboard connection); **4** – Mouse connector; **5** – UltraMARS® -7 device handle; **6** – Keyboard connector

10. APPENDIXES (continued)

10.6.3. The Mechanical holder vs. Magnet vs. Electromagnet holder for transducers.

Figure 86 The Mechanical Holder with Transducer Installed

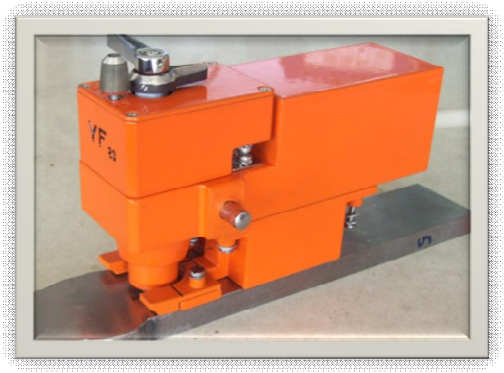


Figure 87 The Magnet Holder with Transducer Installed

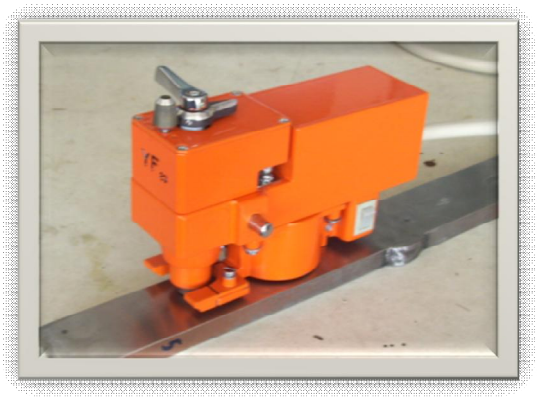


Figure 88 The Electromagnet holder with Transducer Installed

10. APPENDIXES (continued)

10.7. CONTENTS OF THE PACKAGE

Table 6 Contents of the package

#	Description	Visual image
1	Device UltraMARS®-7	
2	REW magnet transducer holder with cord for connection of the REW unit to the measurement device	
3	Power Cable for connection of Device UltraMARS™-7 to a 220 /110 V, 50 Hz Net	
4	Four Transducers and the electromagnet clamp	
5	Sample holder for determining the Acoustic-elastic coefficients of the material	
6	Extensions to the sample holder (2)	
7	Base for the REW transducer holder for mechanical clamping of transducers	
- 8	Keyboad and mouse	