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HTDR-1001

Device for reproducing of deformations at high temperatures



Pic. 1 – Overview photo of UVDT tool (without graduation beam installed)

1. General information

The HTDR-1001 device for reproducing of deformations at high temperatures (hereinafter – Device) is dedicated for determination of parameters of strain gages such as: gage factor, creep and mechanical hysteresis in the temperature range from 20 to 1000°C.

2. Structure and parameters of the Device

The principle of operation is based on the deformation of a beam of constant cross-section (graduation beam) by the scheme of pure bending. Depending on the deflection of the beam, the relative deformation of the lower and upper surfaces of the beam is being determined.

The Device consists of a loading device, graduation beam, beam heating system, strain measuring device and deflection meter. The loading device consists of a frame, a fixed traverse fastened to the frame, and a movable traverse. Each traverse is equipped with rollers, between which a calibration beam is installed. As the movable traverse moves

upwards, the upper fibers of the calibration beam are compressed, while the lower ones are stretched. Deformation of the beam is set using the deflection meter indicator installed on the beam surface.

The graduation beam is made of a material that has a high limit of proportionality both at room and at elevated temperatures. When the beam is heated by electric current, its temperature is controlled by a thermoelectric transducer. Loading of the graduation beam is done manually by rotating the wheel on the front side of the device.

Signal from the strain gages installed on the graduation beam is collected in automatic mode using special software, installed on a standalone PC. The software allows to input data and perform control from the keyboard, collecting signals by a predefined algorithm, mathematical processing of the data, display of obtained results and communication with other external devices.

3. Metrological and technical parameters

Table 1. Metrological parameters

Parameter	Value
Relative deformation measuring range, ppm	From -3000 to -100 and from +100 to +3000
Limit of maximum deviation of relative deformation measurement, by subranges, ppm:	
-3000 to -500 and +500 to +3000 ppm	$\pm[8+0.004\varepsilon+0.05\cdot T]^*$
-499 to -100 and +100 to +499 ppm	$\pm[8+0.004\varepsilon+0.007\cdot T]$
Temporal instability of deformation maintenance, ppm	< 1

* ε – result of measurement of the relative deformation, unsigned, ppm

T – deviation of the beam temperature from the normal temperature (20°C)

Table 2. Technical parameters

Parameter	Value
Nominal dimensions of graduation beam, LxWxH, mm	600x12x6
Deflection meter base length, mm	200
Nominal deflection of the beam at 200 mm base length, mm	6.0
Operating temperature range of the beam, °C	+15 to +1000
Overall dimensions of the device, LxWxH, mm	330x600x560
Net weight, max., kg	12.0
Power supply parameters:	
Nominal voltage, VAC	220
Frequency, Hz	50
Power consumption, max., kVA	8.0
Operating conditions:	
Environment temperature, °C	+15 to +35
Relative humidity, %	50 to 80

4. Standard equipment set

Table 3. Standard equipment set

Name	Qty, pcs.
1. Loading device	1
2. Graduation beam	1
3. NORGAU 042 measuring head	1
4. Beam heating control system	1
5. DTP series thermoelectric transducer	1
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