

示波表 OS710

1. SPECIFICATION

1.1. Specification for the oscilloscope OS-710

The type OS-710 oscilloscope is a precise general purpose measurement instrument built on the reliable silicon semiconductors. The replaceable plug-in units in the vertical and horizontal deflection circuits make the oscilloscope convenient in servicing and extend the range of its application. Two plug-in units can be used in the oscilloscope: Y-series unit introduced into the instrument L.H. recess and taking part in deflecting the spot vertically and X-series unit introduced into the R.H. recess and taking part in deflecting of the spot horizontally or one single double-width unit of the XY-series. All oscilloscope circuits are supplied through the stabilized power supply units, owing to which the effect of the mains voltage changes on the instrument parameters is negligible. The built-in voltage and time calibrator ensures the great measurement precision when replacing the plug-in units by their other types or specimens.

In the OS-710 a modern CRT is used with a rectangular shape screen, internal /parallax free/ graticule, employing the small size spot, which, jointly with an efficient lumiphore of GH/P91 type and an accelerating voltage of 15 kV ensures sharp tracing of display and enables taking photographs of the single-shots.

Small weight and overall dimensions, quick operation /lack of fan/, aesthetic appearance and small power consumption - all contribute to the operator's convenience.

The below given specification is binding for the oscilloscope that should be calibrated every 1000 operating hours or every 6 months in case if it is not used too frequently.

Reference documents

Oscilloscope OS-710 with X-701 and Y-701 plug-in units is manufactured in accordance with the following Polish Standards:

- a/ Electronic measurement instruments. General requirements and tests. PN-71/T-06500, sheets 1-10.
- b/ Electronic oscilloscopes. General requirements and tests. 1N-71/T-06502.

Electrical data

DESCRIPTION	REQUIREMENTS						
CRT							
Type	D13-451 GH/45 PHILIPS						
Type of screen	Rectangular. Measurement field 6cm x 10 cm provided with 1 cm divisions. Internal, parallax free graticule. Aluminized screen.						
Luminophore	Type GH/P31/. Fluorescence colour: green. Screen persistence: medium short; drop of relative intensity to the table below:						
	<table border="1"> <tr> <td>10%</td> <td>1%</td> <td>0.1%</td> </tr> <tr> <td>600 us</td> <td>8 ms</td> <td>90 ms</td> </tr> </table>	10%	1%	0.1%	600 us	8 ms	90 ms
10%	1%	0.1%					
600 us	8 ms	90 ms					
Full accelerating voltage	15 kV						
Scale illumination	By means of electric bulbs located on the CRT edge. Step-adjustable intensity.						
Geometrical distortion	Perpendicularity error: $\pm 1^\circ / \pm 0.02$ rad/. The image contour of the rectangular raster should get between two coaxial rectangles of 100x60 mm and 98x58 mm size.						
Vertical deflection system	Electrostatic with divided plates, single-beam.						
Beam finding	After depressing the pushbutton the display is lighted up and brought within the measurement field range, independently on the position of the X and Y shift control knobs.						
VERTICAL DEFLECTION							
Linearity error of the deflection factor at shifting the 1cm high signal	$\pm 10\%$						
Symmetry	Spot deflection in vertical direction max. - 2mm with respect to the screen centre at both input terminals open.						

DESCRIPTION	REQUIREMENTS
Remaining parameters	Are defined by the parameters of the used plug-in unit and given in the technical requirements of the given plug-in unit.

HORIZONTAL DEFLECTION /EXTERNAL INPUT/

Deflection factor without probe	0.1 V/cm, 0.2 V/cm, 0.5V/cm, 1V/cm
with P701 probe	1V/cm, 2V/cm, 5V/cm, 10V/cm
Basic error of the deflection factor	$\pm 3\%$ after adjusting the gain in one of the positions of the deflection factor, before making measurements.
Gain adjustment	Noncalibrated, continuous, accessible for a screwdriver.
Symmetry	At the full turn of the gain adjustment knob the spot on the screen should not move horizontally by more than 10 mm in pos. 0.1 V/cm.
Maximum permissible input voltage in positions "AC" and "DC"	400V /d.c. or d.c. + peak-to-peak a.c./
Input impedance	1 Mohm $\pm 2\%$, 13 pF ± 1 pF
Frequency of datum signal	Any within the 20 kHz - 100 kHz range
Bandwidth in position "DC" /-3 dB/	DC to 3 MHz or more.
Lower cut-off frequency in position "AC" /-3dB/ with P701 probe	3 Hz or less 0.3 Hz or less
Distortion of the pulse top	Below $\pm 2\%$
Shift in coarse pos. 1V/cm	150 - 200 mm
fine	8 - 12 mm
Additional errors caused by the change of the mains voltage and ambient temperature	to be neglected

DESCRIPTION

REQUIREMENTS

CALIBRATOR

Signal shape	Square wave signal
Polarity	Positive with base line on the ground potential
Output voltage	250 mV, 10 V /peak value/
Amplitude accuracy within range of temperatures: from +15 to +35°C	$\pm 1\%$
from +5 to +40°C	$\pm 2\%$
Frequency within ranges of temperatures: from +15 to +35°C	1 kHz $\pm 0.3\%$
from +5 to +40°C	1 kHz $\pm 0.5\%$
Filling factor	50% $\pm 2\%$
Risetime at the 10V output	below 100 ns

HORIZONTAL DEFLECTION /INTERNAL INPUT/

Shift in position xl coarse fine	Min. 15 cm, max. 20 cm Min. 8 mm, max. 12 mm
Remaining parameters	Are determined by the parameters of the plug-in unit used and are given in the technical requirements for the given plug-in unit.

EXTERNAL INTENSITY MODULATION

Modulation sensitivity	Sinusoidal signal of the 2V peak value causes noticeable intensity modulation
Bandwidth	DC to 8 MHz
DC input resistance	5.1 kohm $\pm 10\%$
Maximum input voltage	30V /d.c. + peak a.c./
Operational polarity	Positive signal /with respect to ground/ blanks trace on the screen, negative signal brightens trace on the screen

DESCRIPTION

REQUIREMENTS

OUTPUT SIGNALS

Output signals on jacks
1 and 2 on the rear
panel

Determined by the parameters of the
plug-in unit used and given in the
technical requirements of the
given plug-in unit

Different data

Weight

14.3 kg

Maximum dimensions

Height 335 x width 220 x length
600 mm

Cooling

Natural, convective

Recommended accessory
/against separate order/

RC probe type P701