SINGLE-CHANNEL
DOUBLE INSULATED OSCILLOSCOPE

"DIDASCOPE"
OX 71

USER MANUAL

IM 0908G01

CONTENTS

1. GENERAL INSTRUCTIONS

This instrument conforms to the IEC 1010 double insulation safety standard (Overvoltage category II, Degree of pollution 2) concerning electronic measuring instruments. To ensure your own safety and that of the instrument, you should comply with all the instructions set out in this manual.

1.1. Precautions

1.1.1. Before use

- Your OX 71 oscilloscope runs on a 230 V AC ± 10% mains supply (optionally : 240 V ± 10%), with a frequency**Erreur! Signet non défini.** of 50 Hz (compatible with a 40-60 Hz source).
- To ensure the double-insulation protection, it is essential that all accessories (connecting and interface cables) and other measuring instruments connected to the oscilloscope should also conform to double insulation safety standard IEC 1010. The common mode voltage must not exceed 400 Vrms.
- If all the accessories do not conform, the signal reference must be earthed. In this configuration, the oscilloscope and its environment are no longer double-insulated and floating measurements can no longer be taken.

1.1.2. During use

- Only use measuring leads in good condition.
- Choose the appropriate vertical sensitivity and timebase ranges for the measurement.
- Never exceed the protection limit values set out in the specifications.
- Never touch an unused socket when the instrument is connected to measuring circuits.
- Disconnect the instrument from both mains supply and measuring circuits in the event of any fault or abnormal stress.
- The X, Y and Z amplifier inputs with insulated safety sockets support a maximum voltage of 400 Vrms, with f less than 1 kHz. Before undertaking any measurement, check that the voltage level at the point concerned is not greater than 400 Vrms.

1.2. **Safety**Erreur! Signet non défini. **instructions**

Never open up the instrument without first disconnecting it from the mains supply and the measuring circuits.

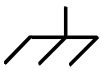
Caution*: some internal capacitors may retain a hazardous potential for some time after the instrument has been switched off.*

Any adjustment, maintenance or repair of the oscilloscope when powered up should be carried out only by qualified personnel.

1.3. Symbols

Refer to the operating manual

Risk of electric shock

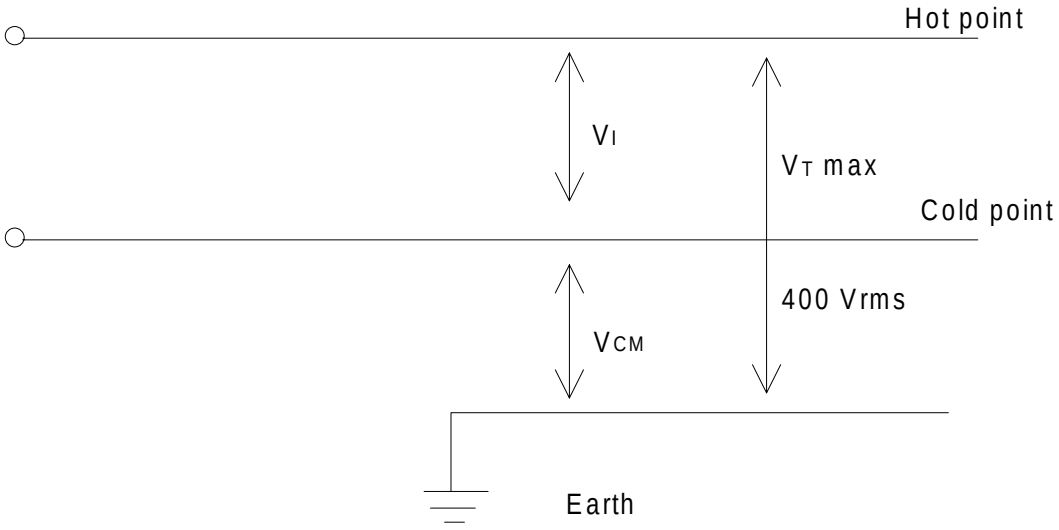


Measurement circuit ground (cold point)

Double Insulation

1.4. Safety class

You should be careful to observe certain input conditions where there is a total voltage V_T made up of the observed input voltage V_I (between cold point and hot point) and the common mode voltage V_{CM} (between cold point and earth).



V_T rms voltage between hot point and earth
V_I rms voltage applied between the cold point and the hot point of a measurement input of the oscilloscope
V_{CM} Common mode rms voltage

1.5. **Warranty**Erreur! Signet non défini.

METRIX equipment is warranted against any defects of manufacture or materials for a period of one year from the date of delivery. During this period (2 years), defective parts will be replaced, the manufacturer reserving the right to repair or replace the product. In the event of the equipment being returned to the METRIX after sales department or to a METRIX local agency, carriage shall be payable by the customer.

The METRIX warranty does not cover :

1. Repairs necessitated by misuse of the equipment or its use in conjunction with incompatible equipment.

2. Modification of the equipment or any related software without the explicit involvement of the technical departments of METRIX.

3. Repairs necessitated by attempts to repair or maintain the product made by a person not approved by the company.

4. Adaptation to a specific application not provided for in the specifications of the equipment or the user manual.

The contents of this manual must not be reproduced in any form whatsoever without the consent of METRIX.

1.6. Maintenance

For problems concerning maintenance, spare parts, warranty or others, please contact your METRIX local agency.

This organisation will quickly process orders for spare parts and will help you towards a quick repair and calibration service.

1.7. Unpacking - Repacking

The equipment is fully inspected mechanically and electrically before despatch. All possible precautions are taken to ensure that the instrument reaches you without damage.

☝ ***Caution :*** ***Should the instrument need to be returned, preferably use the original packaging, accompanied by a note indicating the reason for return as clearly as possible.***

☞ ***Note :*** ***METRIX products are patented in FRANCE and OTHER COUNTRIES and the METRIX and DIDASCOPE logotypes are registered.***
METRIX reserves the right to modify the specifications and prices as required by technological improvements.

2. DESCRIPTION OF THE INSTRUMENT

- All the circuits used feature very low dissipation. The amplifiers offer very high stability through the use of integrated circuit technology.

- The input is protected against voltages up to 400 Vrms with a high impedance**Erreur! Signet non défini.**
  (1MΩ/35 pF).
  Input is via insulated sockets (the metal parts cannot be touched by the user).

- The 14 cm rectangular CRT has a usable area of 80 mm x 100 mm with an internal graticule.
  The total acceleration voltage of 1.8 kV gives a very bright trace facilitating signal display, even at very high sweep speeds.

- The 0 to 5 MHz bandwidth**Erreur! Signet non défini.** means that most normal signals can be observed with a sensitivity of 50 mV/div and an attenuation of up to 5 V/div.

- The timebase**Erreur! Signet non défini.** ranges from 0.5 s to 0.5 µs per division with just one DC input coupling position.

- The trigger system features a very high bandwidth and is effective even on very fast signal edges with a good sensitivity.

- The X input, when used in XY mode**Erreur! Signet non défini.**, has a fixed sensitivity of 0.5 V/div.

- The unit stands on non-skid feet.
  In use, the carrying handle folds back and doubles as a tilt stand without impeding access to the front panel controls. The power supply cable is permanently connected to the oscilloscope.

- The instrument features an intensity modulation input (Z input) via safety socket.

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3. CONTROLSErreur! Signet non défini.

3.1. Front panelErreur! Signet non défini.

FUNCTION	ITEM	INDICATION
Starting up Erreur! Signet non défini. Power on/off Intensity**Erreur! Signet non défini.** Focus**Erreur! Signet non défini.**	1 13 14	Associated LED : POWER (15) INTENSITY FOCUS
SignalsErreur! Signet non défini.		
Reference	4	⏚
VERTICAL { Y signal input	3	Y
HORIZONTAL { X signal input	5	X
{ Z modulation**Erreur! Signet non défini.** input	7	Z
	2	AC DC 0
Y input coupling**Erreur! Signet non défini.**	10	V/DIV
Vertical sensitivity**Erreur! Signet non défini.**	9	POSITION
Horizontal alignment	11	POSITION
Vertical alignment		
TimebaseErreur! Signet non défini. Sweep speed**Erreur! Signet non défini.**	6	T/DIV
TriggerErreur! Signet non défini. Level	8	LEVEL FIXED AUTO
TraceErreur! Signet non défini. Rotation setting *	12	TRACE ROTATE

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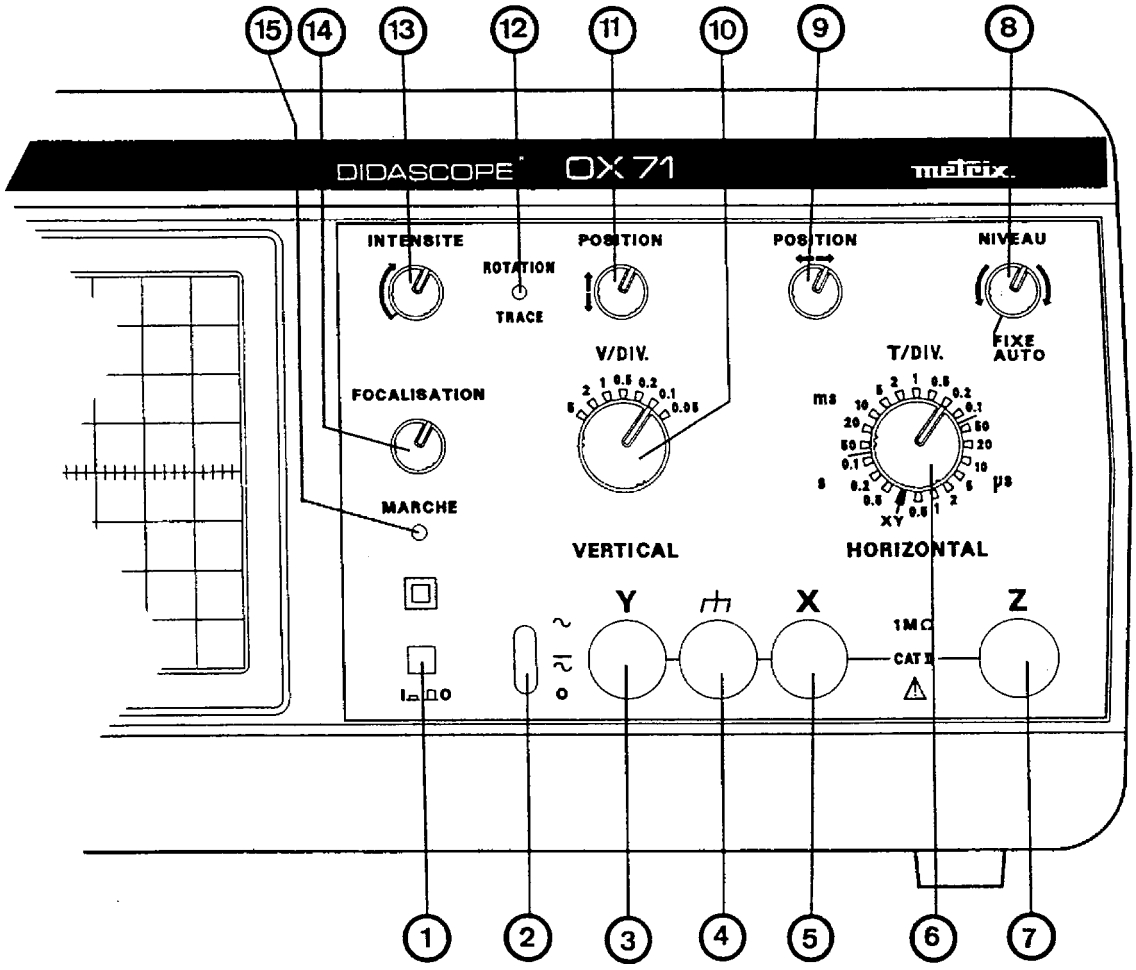
Erreur! Signet non défini.

* Trace rotate**Erreur! Signet non défini.** : front panel setting (potentiometer accessed through 2.9 mm diameter hole).

4. GETTING STARTED

- Set the controls as follows:

(9, 11. 13 and 14)	to mid-travel
(8)	latched
(6)	to 1 ms/div
(2)	to 0



- Switch on (1) (POWER LED (15) on).

- A horizontal trace will appear on the screen after a few seconds. Centre this horizontally and vertically (9 and 11).

- Adjust:
  . trace intensity (13)
  . trace focus (14)

- If there is no trace, check the fuse**Erreur! Signet non défini.** inside the oscilloscope (0.125 A, slow blow).

The instrument is now ready to display signals.

5. FUNCTIONAL DESCRIPTION

5.1. Vertical channelErreur! Signet non défini.

(11) Vertical trace alignment

(10) Vertical sensitivity: 7 positions (0.05 to 5 V/div)
Vertical deflection coefficient (input attenuator setting the amplitude of the observed signal on the channel concerned).

(3, 5 and 7) Y, X and Z inputs via safety sockets

(2) Input coupling**Erreur! Signet non défini.**

AC Display AC component (suppressing DC component)

DC Display complete signal

0 Display channel 0 V reference (without short-circuiting the input signal). Can be used to position the trace accurately on screen (control 11).

(9) Horizontal trace alignment**Erreur! Signet non défini.**

5.2. Timebase

(6) Sweep speed**Erreur! Signet non défini.**: 19 positions (0.5 µs to 0.5 s/div).

5.3. **Trigger**Erreur! Signet non défini.

LEVEL (8) Trigger level**Erreur! Signet non défini.** adjustment

Control unlatched: no trace before trigger signal

Control latched in the left end-stop position (FIXED AUTO) :
Automatic timebase trigger. The timebase returns to triggered mode on the first trigger signal.**Erreur! Signet non défini.**

6. APPLICATIONSErreur! Signet non défini.

6.1. Single traceErreur! Signet non défini. mode

- Determine the input coupling mode : DC or AC (2)
- Select the appropriate vertical sensitivity (10) for the signal
- Apply the signal to be observed to the Y input via :
  . two leads terminated with banana plugs
  . a coaxial lead terminated with a banana plug
- Align the trace (9 and 11)
- Select the appropriate sweep speed for the signal (6).

6.2. XY mode

This mode is used to observe Lissajous curves and orthogonal coordinate graphs.

- Select the XY mode (control 6): the timebase is now disabled
- Determine the input coupling mode (2)
- Apply the signal for the X axis to the X input (5) and the signal for the Y axis to the Y input (3)
- Adjust vertical sensitivity (10)
- Align horizontally and vertically by adjusting (9 and 11). In XY mode, the bandwidth of channel X is at least 100 kHz.

7. TECHNICAL SPECIFICATIONS

Only values assigned tolerances or limits are guaranteed values. Values without tolerances are given for information only.

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7.1. Vertical deflection

Y	SPECIFICATION	REMARKS
Input impedance**Erreur! Signet non défini.**	1 MΩ ± 1% // 35 pF approx.	
Vertical deflection**Erreur! Signet non défini.** factor (sensitivity**Erreur! Signet non défini.**)	Ranges: 0.05 V/div to 5 V/div ± 5%	7 positions 1-2-5 sequence
Bandwidth**Erreur! Signet non défini.** at -3 dB	> 5 MHz	On all ranges
Rise time	70 ns	
Input coupling**Erreur! Signet non défini.**	~ 5 Hz to 5 MHz ~ 0 Hz to 5 MHz 0 0 V reference	
Max input voltage	Constant: 400 Vrms	
Display	Y Y channel only	
Alignment	± 4 div	

7.2. **Timebase**Erreur! Signet non défini.

Y	SPECIFICATION	REMARKS
Sweep speed**Erreur! Signet non défini.**	Ranges: 0.5 µs to 0.5 s ± 5%	19 positions, 1-2-5 sequence
Trigger mode	Triggered or Automatic	
XY mode**Erreur! Signet non défini.**	X-axis bandwidth (-3 dB) DC coupling 0 Hz to 100 kHz min	

7.3. **Trigger**Erreur! Signet non défini. **system**

Y	SPECIFICATION	REMARKS
Channel Y	Normal trigger sensitivity 0.5 div 5 Hz to 2.5 MHz 1 div 2.5 MHz to 5 MHz	 AC links
Mode	Auto trigger, fixed threshold Normal trigger, variable threshold	Relaxed mode Triggered mode
Level	Trigger range covers screen amplitude	Alignment does not affect trigger level

7.4. X and Z inputs

	X input	Z input
Impedance	1 MΩ ± 1% // 35 pF approx.	1 MΩ ± 1% // 35 pF approx.

Maximum voltage	400 Vrms	400 Vrms
Command signal level		TTL

7.5. General specificationsErreur! Signet non défini.

CRT**Erreur! Signet non défini.**

Type	rectangular, 140 mm diagonal
Graticule	80 x 100 mm
Acceleration voltage	1.8 kV
Screen	average persistence GY phosphor
Trace	focus adjustment intensity adjustment trace rotate

Power supply**Erreur! Signet non défini.**

Frequency	50 to 60 Hz
Mains voltage	230 V ± 10% (optionally 240 V)
Consumption	< 20 W
Protection	0.125 A slow-blow ceramic fuse**Erreur! Signet non défini.** on internal fuseholder

Environment**Erreur! Signet non défini.**

Reference domain	+18°C to +28°C
Rated range of use	+10°C to +40°C
Operating limits	0°C to +40°C
Storage temperature range	-20°C to +70°C
Relative humidity	< 80% RH at 40°C
Electromagnetic compatibility	
. Interference	VDE 871 class**Erreur! Signet non défini.** B
. Susceptibility	IEC 801-3 level 3

Mechanical

Dimensions	180 x 330 x 430 mm
Weight	5.2 kg

Packaging

Dimensions	300 x 480 x 710 mm
Weight	8 kg

Safety**Erreur! Signet non défini.**

IEC 1010-1	Double insulated
Installation category II	Pollution rating 2
Common mode	≤ 400 Vrms

7.6. Accessories

Supplied with the OX 71
. one user manual
. two 0.125 A slow-blow ceramic fuses

8. INDEX

OX 71 FRONT PANEL

KEY

1. On/off switch
2. Input coupling
3. Channel Y (Yellow)
4. Reference (Black)
5. Channel X (Red)
6. Sweep speed
7. Z modulation input (Blue)
8. Trigger level (Red)
9. Horizontal alignment (Red)
10. Vertical sensitivity (Yellow)
11. Vertical alignment (Yellow)
12. Trace rotate
13. Intensity
14. Focus
15. On/off LED