

35 MHz Dual Channel Oscilloscope PM3218

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PHILIPS

INTRODUCTION

The 35 MHz dual-channel oscilloscope PM 3218 is a compact, portable instrument, ergonomically designed to facilitate its extensive measuring capabilities.

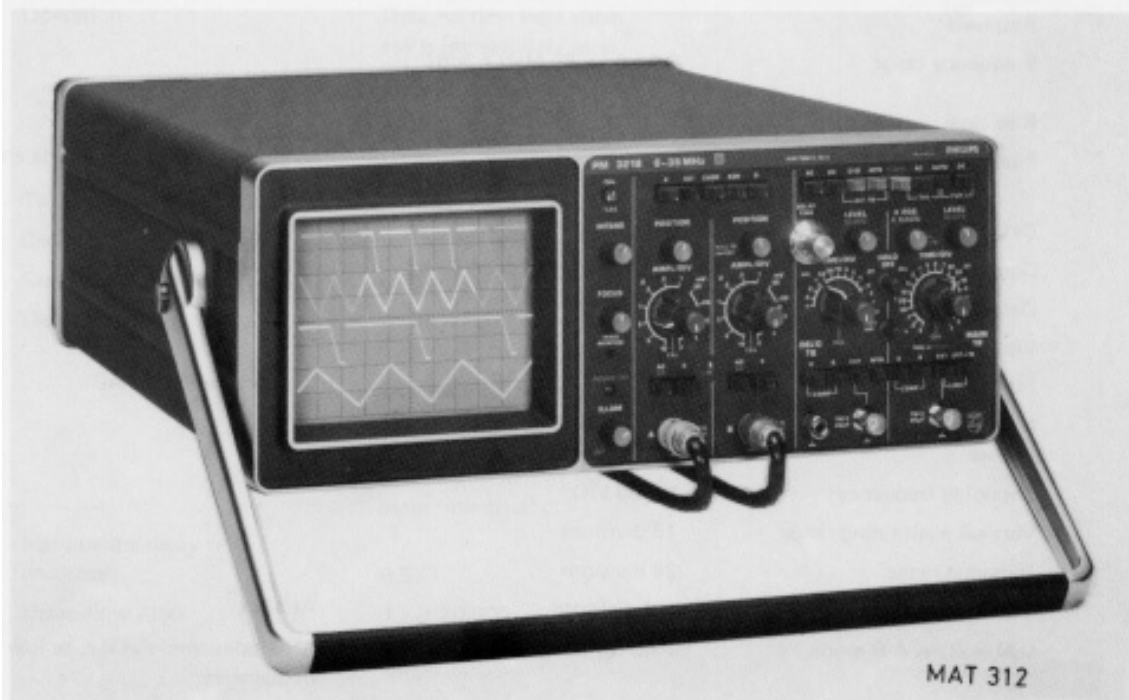
The instrument provides both a main and a delayed timebase with provision for alternate timebase displays, comprehensive triggering facilities including peak-to-peak Auto, DC coupling and automatic TV waveform display.

A large 8 x 10 cm screen with illuminated internal graticule lines makes for easier viewing, and a 10 kV accelerating potential gives a high intensity trace with a well-defined spot.

A double-insulated power supply allows the frame ground to be directly connected to floating ground circuits provided that this ground does not carry live potentials. By this means, interference by ground currents, as is frequently experienced with grounded oscilloscopes, is also substantially reduced.

The wide range of applications enabled by the above features is further extended by a versatile power supply that enables the instrument to be operated from different line voltages as well as from d.c. For field operation an optional battery version is also available.

Warning: The frame ground (and the ground lead of the probe) must not be connected to live potentials.



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1.2. CHARACTERISTICS

This instrument has been designed and tested according to IEC Publication 348 for Class II instruments and has been supplied in a safe condition. The present Instruction Manual contains information and warnings which shall be followed by the purchaser to ensure safe operation and to retain the instrument in a safe condition. Properties expressed in numerical values with stated tolerances are guaranteed for ambient temperatures of +5 °C ... +40 °C unless stated otherwise. Numerical values without tolerances are typical and represent the characteristics of an average instrument. The data apply after a warming-up period of 30 minutes.

| <i>Designation</i> | <i>Specification</i> | <i>Additional Information</i> |
|-----------------------------------|---|--|
| 1.2.1 C.R.T. | | |
| Type | D14-125 GH/08 | Rectangular tube face, mesh type, post accelerator, metal backed phosphor. |
| Measuring area | 8 x 10 divisions | 1 div. equals 1 cm |
| Screen type | P31 (GH) | P7 (GM) optional |
| Total acceleration | 10 kV | |
| Graticule | Internal | Cont. variable illumination |
| Engravings | Centimetre divisions with subdivisions of 2 mm along the central axes. Dotted lines indicate 10% and 90% of measuring lattice for measurement of rise time. | |
| 1.2.2 Vertical or Y-axis | | |
| Display modes | Channel A only Channel B only A and B chopped A and B alternating A and B added | |
| Channel B polarity | Normal or inverted | |
| Response: | | |
| Frequency range | DC : 0 ... 35 MHz (-3dB) AC : 2 Hz ... 35 MHz (-3dB) | |
| Rise time | ≤ 10ns | |
| Pulse aberrations | ≤ ± 3% (≤ 4% pp) | Measured at 6 div. amplitude and applied rise time of ≥ 1 ns. |
| Deflection coefficients | 2 mV/DIV ... 10 V/DIV | 1-2-5 sequence |
| Continuous control range | 1 : ≥ 2,5 | |
| Deflection accuracy | ± 3% | |
| Input impedance | 1 MΩ/20 pF | |
| Input RC time | 0,1 s | Coupling switch to AC |
| Maximum permissible input voltage | 400 V, d.c. + a.c. peak | |
| Chopping frequency | ≈ 500 kHz | |
| Vertical positioning range | 16 divisions | |
| Dynamic range | 24 divisions | |
| Visible signal delay | ≥ 2 divisions | At 10ns |
| C.M.R.R. in A-B mode | ≥ 40 dB at 1 MHz | After adjustment at d.c. or low frequencies |
| Cross talk between channels | -40 dB or better at 10 MHz | Both attenuators in the same setting |
| Instability of the spot position: | | |
| Temperature drift | ≤ 0,3 div/hour | |

1.2.3 Horizontal or X-axis

Horizontal deflection can be obtained from either the Main time base or the Delayed time base or a combination of the two, or from the signal source selected for X-deflection. In this case X-Y diagrams can be displayed using A, B, the Ext input connector, or Line as a signal source for horizontal deflection.

| | | |
|----------------------|--|---|
| <i>Display modes</i> | <ul style="list-style-type: none"> – Main time base – Main time base intensified by delayed time base – Main time base and delayed time base alternately displayed – Delayed time base – XY or XY/Y operation | <p>X deflection by:</p> <ul style="list-style-type: none"> – Channel A signal – Channel B signal – Signal applied to EXT connector of main time base – Line frequency |
|----------------------|--|---|

1.2.4 Main time base

| | | |
|---------------------------------|---------------------------------|--|
| Operation | Automatic | Possibility of automatic free-running in the absence of triggering signals |
| | Triggered | |
| Time coefficients | 0,5 s/DIV 0,1 μ s/DIV | 1-2-5 sequence |
| Continuous control range | 1 : \geq 2,5 | |
| Coefficient error | \pm 3% | \pm 5% including x10 magnifier |
| Magnification | 10x | |
| Max. effective time coefficient | 10 ns/DIV | |

1.2.5 Delayed time base

| | | |
|---------------------------------|--|----------------|
| Operation | Delayed time base either starts immediately after delay time or is triggerable after the delay time, by the selected delayed time base trigger source | |
| Time coefficients | 1 ms/DIV – 0,1 μ s/DIV | 1-2-5 sequence |
| Continuous control range | 1 : \geq 2,5 | |
| Coefficient error | \pm 3% | |
| Delay time | In steps variable with main time base. Continuously variable with 10-turn potentiometer between 0 x and 10 x the time coefficient of the main time base | |
| Incremental delay time accuracy | 0,5% | |
| Delay time jitter | 1 : \geq 20.000 | |

| <i>Designation</i> | <i>Specification</i> | <i>Additional information</i> |
|--|--|---|
| 1.2.6 X Deflection | | |
| Source | A, B, EXT, EXT ÷ 10 or LINE | As selected by trigger source switch, if push-button X DEFL. is depressed |
| Deflection coefficients | A or B: As selected by AMPL/DIV EXTERNAL : 0,2 DIV EXT ÷ 10 : 2V/DIV LINE 8 divisions at nominal line voltage. | |
| Deflection accuracy | ± 10% | |
| Frequency range | DC: 0 1 MHz (-3 dB) over 6 divisions | |
| Phase shift | ≤ 3° at 100 kHz | |
| Dynamic range | 24 divisions | For frequencies ≤ 100 kHz |
| 1.2.7 Triggering of the main time base | | |
| Source | Ch. A, Ch. B, Composite, External ÷ 10 and line | |
| Trigger mode | Automatic, normal AC normal DC, TV-line and TV frame | |
| Trigger sensitivity | Internal: 0,5 div (DC 5 MHz) 1 div (DC 50 MHz) External : 150 mV (DC 5MHz) 200 mV (DC 50MHz) Ext. ÷ 10 : 1,5V (DC 5MHz) 2V (DC 50MHz) | |
| Triggering frequency range | AUTO: 20 Hz..... ≥ 50 MHz AC: 5 Hz..... ≥ 50 MHz DC: 0 Hz..... ≥ 50 MHz | |
| Level range | AUTO: Proportional to peak-to-peak value of trigger signal. AC, DC: 16 div. at Internal trigg., 3,2 V at external trigg., and 32V at ext. ÷ 10 | + or -8 div and +or -1,6V referenced to centre of screen + or -16V referenced to centre of screen |
| Triggering slope | Positive or negative going | |
| Input impedance | 1 MΩ//20 pF | |
| Maximum permissible input voltage | 400 V, d.c. + a.c. peak | |
| Hold-off time | variable | |
| 1.2.8 Triggering of the delayed time base | | |
| Source | chA, chB, Composite, External, MTB. | |
| Other trigger specifications are identical to "triggering of the main time base" with the exception of the trigger modes EXT. ÷ 10, TV and AUTO. | | |
| 1.2.9 Calibration generator | | |
| Output voltage | 1,2 Vpp | Square wave |
| Accuracy | ± 1% | |
| Frequency | ≈ 2 kHz | |

| <i>Designation</i> | <i>Specification</i> | <i>Additional Information</i> |
|---|---|--|
| 1.2.10 Power supply | | |
| AC supply: | Double insulated | Safety class II, IEC 348 |
| Nominal voltage range (on line-mains voltage adaptor) | 110, 127, 220 or 240 Vac ± 10% | |
| Nominal frequency range | 50 400 Hz ± 10% | |
| Power consumption | 30 W max. | At nominal mains voltage |
| DC supply: | | |
| Voltage range | 22-27 V dc 20-28 V | Floating input with relaxed specifications |
| Current consumption | 1,1 A max. | |
| Capacity to earth | 185 pF 27 pF | Measured with rubber feet on grounded metal plate of 1 m ² Measured 30 cm above grounded plate of 1 m ² |
| 1.2.11. Environmental characteristics | | |
| The environmental data are valid only if the instrument is checked in accordance with the official checking procedure. Details on these procedures and failure criteria are supplied on request by the PHILIPS organisation in your country, or by N.V. PHILIPS' GLOEILAMPENFABRIEKEN, TEST AND MEASURING DEPARTMENT, EINDHOVEN, THE NETHERLANDS. | | |
| Ambient temperatures : | | |
| Rated range of use | + 5 ⁰ C ... +40 ⁰ C | |
| Operating | -10 ⁰ C ... +55 ⁰ C | |
| Storage and transport | -40 ⁰ C ... +70 ⁰ C | |
| Altitude: | | |
| Operating to | 5000 m (15000 ft) | |
| Non-operating to | 15000 m (45000 ft) | |
| Humidity | 21 days cyclic damp heat 25 ⁰ C -40 ⁰ C, R.H. 95% | |
| Shock | 30 g: half sinewave shock of 11ms duration: 3 shocks per direction for a total of 18 shocks | |
| Vibration | Vibrations in three directions with a maximum of 15 min. per direction, 5 – 55 Hz and amplitude of 0.7mm _{pp} and 49 max. acceleration. Unit mounted on vibration table without shock absorbing material. | |
| Electromagnetic interference | Meets VDE 0871 and VDE 0875 Grenzwertklasse B. | |
| Safety | The isolation between the oscilloscopes and line fulfills the safety requirements of IEC 348 for metal encased class II instruments. | |
| 1.2.12 Mechanical data | | |
| Dimensions: | | |
| Length | 445 mm | Handle and controls excluded |
| Width | 335 mm | Handle excluded |
| Height | 137 mm | Feet excluded |
| Weight | 8,4 kg (18,5 lb) approx. | |