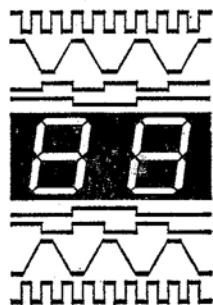


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Counter timer 80 MHz **PM 6622**

9446 066 220.1

Timer counter 520 MHz **PM 6624**

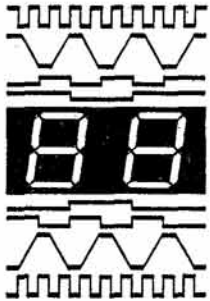
9446 066 240.1

Timer counter 1 GHz **PM 6625**

9446 066 250.1



PHILIPS



PM 6620 Series of Counters

Ordering number of this manual 9499 460 09302

780315/3



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PHILIPS



PM 6622

9446 066 220.1

Operating manual



PM 6624

9446 066 240.1



PM 6625

9446 066 250.1

IMPORTANT

In correspondence concerning this instrument, please quote the type number and the serial number as given on the type plate on the rear of the instrument.

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I. INTRODUCTION

GENERAL INFORMATION

The counters in the PM 6620-series have frequency ranges from D.C. up to 80 MHz, 520 MHz and 1 GHz respectively for the PM 6622, PM 6624 and PM 6625.

All models can measure frequency, ratio, period, time interval and have a totalizing mode.

Optional accessories such as four different oscillators, a battery unit, a BCD output unit, a D/A converter and a BUS interface system extend the range of application.

II. TECHNICAL DATA

Properties expressed in numerical values with statement of tolerances are guaranteed. Numerical values without tolerances are intended for information purposes only and indicate the properties of an average instrument. The numerical values hold good for the nominal mains voltage.

A. MEASUREMENTS

Frequency

Range	DC ... 80 MHz. Input A. All models 50 ... 520 MHz. Input C. PM 6624 50 ... 1000 MHz. Input C. PM 6625
Gate times	10 ms, 100 ms, 1 s and 10 s. Input A
Resolution	100 Hz, 10 Hz, 1 Hz and 0.1 Hz. All models
Accuracy	± 1 count $\pm$ time base error

Single Period B

Range	100 ns ... 10^5 s (DC ... 10 MHz)
Frequency counted	10 MHz or 10 kHz
Time resolution	100 ns or 100 μ s
Accuracy	± 1 count $\pm$ trigger error* $\pm$ time base error

Period average B

Range	1 Hz ... 10 MHz
Frequency counted	10 MHz
Number of averagings	$N = 10^2, 10^4$ and 10^6
Time resolution	$\frac{100 \text{ ns}}{N}$
Accuracy	± 1 count $\pm$ trigger error*/ N $\pm$ time base error

Time interval A—B

	Single	Average
Range	100 ns ... 10^5 s	1 ns ... 1 s
Frequency counted	10 MHz or 10 kHz	10 MHz
Time resolution	100 ns or 100 μ s	$\frac{100 \text{ ns}}{\sqrt{N}}$
Number of averagings		$N = 10^2, 10^4, 10^6$
Min. time stop to start		250 ns
Accuracy	± 1 count $\pm$ trigger error** $\pm$ time base error	$\pm 5 \text{ ns} \pm$ time base error $\pm 100 \text{ ns} \pm$ trigger error** $\sqrt{N}$
Time interval repetition rate	max. 5 MHz	max. 4 MHz

Count A

Range	1 to 999999999
Mode	Accumulates pulses on channel A during time interval between start and stop signal or gate signal at input B
Pulse pair resolution	12 ns

Frequency ratio A/B or C/B

Range	fA: DC ... 80 MHz. All models fB: DC ... 10 MHz. All models fC: 50 ... 520 MHz. PM 6624 fC: 50 ... 1000 MHz. PM 6625
Multiplier	$N = 10^4$ and 10^6
Accuracy	$\pm 1 \text{ count} \pm \frac{\text{trigger error}^* \text{ of B}}{N}$

Check

HOLD OFF on	10 MHz internally applied to channel A and B The hold off duration will be displayed if SINGLE PERIOD B is selected. PM 6622.
-------------	---

Auxiliary functions

Reset	Pushing RESET button resets the counter, releasing it starts new measurement.
Start/Stop and Gated by B	In function COUNT A the gate time is controlled either by start/stop or gate signal at input B. Mode of operation is selected by a slide switch at the front panel.
Display time	Continuously variable between 0.2 ... 5 s and infinite of display time knob is pulled.
Stand by	The switch is combined with display time control. Position STAND BY keeps an oven oscillator heated.
Memory	Switchable by push-button MEMORY
Trigger hold off	Active in the time-interval and the period mode. PM 6622.
Range	Approximately 10 ... 500 μ s, 500 μ s ... 100 ms if control knob is pulled. Hold off time is monitored at output gate open.

* Trigger error is $\leq \pm 3 \times 10^{-3}$ for sine wave signals with signal to noise ratio of ≥ 40 dB.

** Trigger error for any wave shape is $\leq \pm \frac{2.5 \times 10^{-3}}{\text{Signal slope (V/ns)}} \text{ ns}$

B. INPUT CHARACTERISTICS**Input A and B**

Range	DC ... 80 MHz	} Input B is functionally limited to 10 MHz
DC coupled	100 Hz ... 80 MHz	
AC coupled	Sine wave: 20 mV _{rms}	
Sensitivity	Pulses: 60 mV _{p-p} for pulse width ≥ 6 ns	
Impedance	1 M Ω /25 pF	
Coupling	DC and AC	
Attenuation	$\times 1$ and $\times 10$	
Trigger level	Preset 0 V or variable between ± 2.5 V with high resolution around 0 V.	
Safe overload		
Attenuation $\times 1$	≤ 440 Hz: 250 V DC or 230 V _{rms}	
	> 440 Hz: falling to 12 V _{rms} at 1 MHz	
Attenuation $\times 10$	Max. 250 V DC or 230 V _{rms}	

Input C

(Not present in PM 6622)

Frequency range
Dynamic voltage rangeImpedance
VSWR
Coupling
Attenuation
Prescaling factor
Safe overload
AM tolerance**PM 6624**50 ... 520 MHz
10 mV_{rms} ... 12 V_{rms}
(-27 dBm ... +35 dBm)

50 Ω

<2

AC

by automatic PIN diode attenuator, maximum 62 dB.

8

12 V_{rms}

98 % at 5 kHz modulation frequency

30 % at 1 MHz modulation frequency

PM 662550 ... 1000 MHz
10 mV_{rms} ... 12 V_{rms}
(-27 dBm ... +35 dBm)

50 Ω

<2

AC

16

12 V_{rms}

All models

D OUT/IN 10 MHzRange
Sensitivity
Coupling
Impedance
Safe overload

External oscillator input or internal oscillator output. Selectable by a switch at the rear panel.

1 kHz ... 10 MHz

500 mV_{rms}

AC

≈ 10 kΩ

50 V_{rms}**EXT. RESET/START**

0 V ± 0.4 V applied to EXT. RESET input will reset the counter.

If DISPLAY TIME is set to position ∞ one new measurement will be initiated when the EXT. RESET is returned to > +2.4 V (max. 5.5 V) or the input is left open.

Max. 0.4 mA at 0.4 V

Input current

* Above 960 MHz, the sensitivity of the PM 6625 might drop to 14 mV_{rms} (-24 dBm) at 1 GHz**C. OUTPUT CHARACTERISTICS****D OUT/IN 10 MHz**Output frequency
Signal level
Output impedance
Coupling

Internal oscillator output or external oscillator input. Selectable by a switch at the rear panel.

Internal oscillator frequency, 10 MHz.

≈ 1 V_{rms}, open circuit.

≈ 200 Ω, short circuit proof.

DC

GATE OPEN

Output level

< 0.4 V during main gate open

≈ 1.5 during hold off time. PM 6622

> 2.5 V during main gate closed.

Output impedance
Delay

≈ 400 Ω.

Internal delay between the signal inputs and the trigger monitor output is approximately 65 ns.

DISPLAY

9 digits.

In plane 7 segment gas discharge display with decimal point indication.

Gate lamp

Indicates that main gate is open and counting takes place.

In stand by position the Gate lamp indicates that mains or battery voltage is connected.

Unit annunciators

kHz, MHz, ms and ns.

D. GENERAL CHARACTERISTICS

Oscillator

See Chapter VIII.

Supply

By mains

100 ... 130 V or 200 ... 260 V, 50 ... 400 Hz max. 20 VA depending on options.

By external battery

+ 11.5 to 28 V approximately 8 W.

By internal battery option

PM 9673

Environmental characteristics

Temperature

Operating

0° C ... 50° C

0° C ... 40° C with battery option PM 9673.

Storage

—40° C ... 70° C

—40° C ... 50° C with battery option PM 9673.

Mains interference

Below CISPR (22/3, 29/2 and 40/1)

Altitude

5000 m operating

15000 m storage.

Shock

Meets the requirements of the IEC 68 Eb recommendations.

Vibration

Meets the requirements of the IEC 68 F recommendations.

Dimensions

Width

210 mm

Height

89 mm

Depth

325 mm

Weight

Approximately 2.8 kg.

III. ACCESSORIES

1. Standard accessories supplied with the instrument

1 mains cable

PM 9584 Resistive mixing piece, 50 Ω , 3 BNC sockets

1 manual

PM 9346 Active-probe power supply

1 1.6 A fuse, fast action

1 "115 V" label

2. Accessories to be ordered separately

2.1. Oscillators

PM 9677 Standard oscillator

PM 9678 TCXO

PM 9679 Oven-enclosed oscillator 1×10^{-7} /month

PM 9690 Oven-enclosed oscillator 1.5×10^{-9} /24 h.

2.2. Output interface units

PM 9674 BCD output unit

PM 9675 D/A converter

2.3. Input interface accessories

PM 9351 Passive measuring probe 10 M Ω ,/11 pF
220 MHz, attenuation 10 $\times$

PM 9353 FET probe, 1M Ω /3.5F, 220 MHz

2.4. Coaxial cables

PM 9074 50 Ω , BNC to BNC, length 1 m

PM 9588 Set of 50 Ω cables, BNC to BNC:

5 cables, length 20.7 cm

4 cables, length 40.5 cm

3 cables, length 60.3 cm

3 cables, length 198.6 cm

2.5. Mains cable

PM 9011 3-core detachable mains cable

2.6. Rack mount adapter

PM 9669 19" rack mount adapter

2.7. Battery unit

PM 9673 Internal battery unit

2.8. Carrying case

PM 9672 Carrying case for the instrument