1. GENERAL

1.1. INTRODUCTION

The PM 5131 function generator is an instrument designed for applications extending from the educational to the general purpose area.

It produces sinewave, triangular and squarewave output signals, the frequencies of which are adjustable in three logarithmical sub-ranges from 0.1 Hz to 2 MHz. The frequency vernier allows the frequency setting to be varied from −20 % to +20 %.

The output voltage is continuously adjustable up to 30 V_{pp} and can be attenuated in steps of 10 dB down to 60 dB.
A continuously adjustable output voltage can be selected separately or whenever used as d.c. offset voltage added to the selected output signal.

The generator provides a more than 3 decade sweep facility with adjustable sweep range and a variable sweep time from 10 to 150 secondes. For instance it is possible to cover the audio frequency range of 20 Hz to 20 kHz in one continuous sweep. Moreover external sweep and frequency modulation can be performed.

For TTL applications a separate output is available.

The ergonomic design of the controls and sockets serves for convenient operating the instrument.

1.2. TECHNICAL DATA

General information:

On delivery from the factory, the instrument complies with the safety regulations of measuring and control equipment. The information and warnings contained in this instruction manual must be followed by the user to ensure safe operation and to maintain the instrument in a safe condition.

- Only data with indicated tolerances or limits are guaranteed; data without tolerances are given only for guidance.
- All specifications will be met after a warm-up time of 30 min. when keeping the instrument in a constant mounting position.
- Inaccuracies (absolute or in %) relate to the indicated reference value.

1.2.1. Frequency

Frequency range	0.1 Hz - 2 MHz
Selected ranges I	0.1 Hz – 200 Hz
II	10 Hz – 20 kHz
III	1 kHz – 2 MHz
Characteristic	logarithmic
Adjustments	– three range pushbuttons – dial with logarithmic scale – fine control knob
Frequency indication	logarithmic scale on the dial
Setting error	$< \pm$ 10 %
Vernier frequency adjustment	−20 % ... +20 % of the dial setting
Temperature coefficient	< 0,5 %/K
Short-term drift	< 0,5 % within 15 min.
Long-term drift	< 0,7 % within 7 h.

1.2.2. Output

Connection	BNC socket
Impedance	50 Ω
Load capability	short-circuit proof
Wave forms	Sinewave, triangular-, squarewave; all time-symmetrical; with or without d.c. offset. d.c. voltage without a.c.
Open circuit voltage	
– setting range	3 V_{pp} ... 30 V_{pp}, continuously adjustable
– maximum value	± 15 V
DC (offset) voltage	
– button PUSH FOR ZERO pulled, open circuit voltage	–10 V ... +10 V, continuously adjustable
– button PUSH FOR ZERO or WAVE FORM button DC pressed	< 50 mV
Attenuation	
– continuous	0 ... 20 dB (see open circuit voltage 3 V_{pp} – 30 V_{pp})
– fixed	0 to 60 dB in steps of 10 dB
Distortion (sinewave)	< 0,5 % in ranges I,II < 3 % in range III
Linearity (triangular wave)	better than 99,5 % in ranges I, II
Rise time, fall time (squarewave)	< 75 ns
Overshoot and ringing (squarewave)	< 2 %
Amplitude response (sinewave; reference value 1 kHz)	< 0,1 dB in ranges I, II < 0,3 dB in range III < 1 MHz < 1 dB in range III ⩽ 2 MHz (output voltage 3 ... 30 V_{pp}, load 50 Ω, attenuation 0 dB).

1.2.3. TTL output

Connection	BNC socket
Duty cycle	50 %
Fan out	⩾ 20 TTL inputs

1.2.4. Frequency control

1.2.4.1. Internal sweep

Sweep mode	single sweep
Sweep characteristic	logarithmic
Sweep range (ratio f STOP/f START)	1 ... 2000 (1 ... $2 \cdot 10^3$), continuously adjustable
Sweep period (sweep time)	⩽ 10 ... 150 s, continuously adjustable.
SWEEP VOLTAGE output (frequency analogue voltage)	
– connection	BNC socket
– scale factor	1 V/frequency decade

1.2.4.2. External sweep or frequency modulation

Connection	BNC socket SWEEP VOLTAGE IN/OUT
Voltage vs. frequency characteristic	logarithmic
Max. sweep range	total sub-range I, II or III
Sensitivity	1 V/frequency decade

Input impedance	1 kΩ
Max. modulation frequency	ca. 5 kHz

1.2.5. Power supply — **AC mains**

Reference value	230 V
Nominal values	115 V/230 V selectable by solder links
Nominal operating range	±15% of selected nominal value
Operating limits	±15% of selected nominal value
Nominal frequency range	50 - 100 Hz
Limit range of operation	47.5 - 105 Hz
Power consumption	21 W

1.2.6. Environmental conditions

Ambient temperature

Reference value	+23 °C ± 1 °C
Nominal working range	+5 °C ... +40 °C
Limits for storage and transport	−40 °C ... +70 °C

Relative humidity

Reference range	45 ... 75 %
Nominal working range	20 ... 80 %

Air pressure

Reference value	1013 mbar (≙ 760 mm Hg)
Nominal working range	800 ... 1066 mbar (up to 2200 m height)

Air speed

Reference value	0 ... 0.2 m/s
Nominal working range	0 ... 0.5 m/s

Operating position	normally upright on feet or with handle fold down
Warm-up time	30 min.

1.2.7. Cabinet

Protection type (see DIN 40 050)	IP 20
Protection class (see IEC 348)	class I, protective conductor
Overall dimensions	
– height	140 mm
– width	310 mm
– depth	330 mm
Weight	approx. 4.5 kg

1.3. ACCESSORIES

1.3.1. Standard

Instruction manual
Fuse 500 mA delayed

1.3.2. Optional

PM 9585: 50 Ω termination 1 W

PM 9581: 50 Ω termination 3 W

PM 9075: Coaxial connection cable BNC–BNC