PeakTech 2860 2.7 GHz Frequency Counter User Manual

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Contents

Safety Precautions

This product complies with the requirements of the following directives of the European Union for CE conformity: 2014/30/EU (electromagnetic compatibility), 2014/35/EU (low voltage), 2011/65/EU (RoHS). Overvoltage category II; pollution degree 2.

To ensure safe operation of the equipment and eliminate the danger of serious injury due to short-circuits (arcing), the following safety precautions must be observed.

Damages resulting from failure to observe these safety precautions are exempt from any legal claims whatever.

- Do not use this instrument for high-energy industrial installation measurement.
- Do not exceed the maximum permissible input ratings (danger of serious injury and/or destruction of the equipment).
- The meter is designed to withstand the stated max voltages. If it is not possible to exclude without that impulses, transients, disturbance or for other reasons, these voltages are exceeded a suitable prescale (10:1) must be used.
- Disconnect test leads or probe from the measuring circuit before switching modes or functions.
- Check test leads and probes for faulty insulation or bare wires before connection to the equipment.
- To avoid electric shock, do not operate this product in wet or damp conditions. Conduct measuring works only in dry clothing and rubber shoes, i. e. on isolating mats.
- Never touch the tips of the test leads or probe.
- Comply with the warning labels and other info on the equipment.
- Always start with the highest measuring range when measuring unknown values.
- Do not subject the equipment to direct sunlight or extreme temperatures, humidity or dampness.
- Do not subject the equipment to shocks or strong vibrations.
- Do not operate the equipment near strong magnetic fields (motors, transformers etc.).
- Keep hot soldering irons or guns away from the equipment.
- Allow the equipment to stabilize at room temperature before taking up measurement (important for exact

measurements).

- Do not input values over the maximum range of each measurement to avoid damages of the meter.
- Replace the battery as soon as the battery indicator “BAT” appears. With a low battery, the meter might produce false reading.
- Fetch out the battery when the meter will not be used for long period.
- Periodically wipe the cabinet with a damp cloth and mid detergent. Do not use abrasives or solvents. Ensure that no water gets inside the equipment to prevent possible shorts and damage to the equipment.
- The meter is suitable for indoor use only
- Do not operate the meter before the cabinet has been closed and screwed safely as terminal can carry voltage.
- Do not store the meter in a place of explosive, inflammable substances.
- Do not modify the equipment in any way
- Opening the equipment and service and repair work must only be performed by qualified service personnel *
- **Measuring instruments don’t belong to children hands.**

Features

- TCXO (Temperature compensated crystal oscillator) time base, high stability & accuracy.
- High sensitivity for the VHF & UHF frequency measurement, useful for the CB amateur.
- Wide measuring range up to 2,7 GHz.
- Used the exclusive Microprocessor IC offered the intelligent function: Frequency, Period, Multi resolution, Data-Hold, Relative measurement, Data record (Max., Min., Average reading).
- 8 digits, 18.3 mm large LCD. * 0,1 Hz resolution for 10 MHz. * LCD display for low power consumption & clear read-out even in bright ambient light condition.
- Power supply from battery or AC to DC 9 V adapter.

Specifications

General Specifications

Display	18,3 mm (0,72″) LCD (Liquid Crystal Display), 8 digits	
Measurement	Frequency, Data Hold, Relative, Memory (max., min., average), Period	
Range	2,7 GHz	100 MHz to 2700 MHz
	100 MHz	10 MHz to 100 MHz
	10 MHz	10 Hz to 10 MHz
	Period	10 Hz to 10 MHz
Resolution, Sampling time	Ref. the following “Table for Resolution & Sampling time”.	
	10 MHz & Period	≥ 30mV_{rms} (10Hz to 10MHz)
		Typical: ≥ 15 mV_{rms} (10 Hz to 9 MHz)

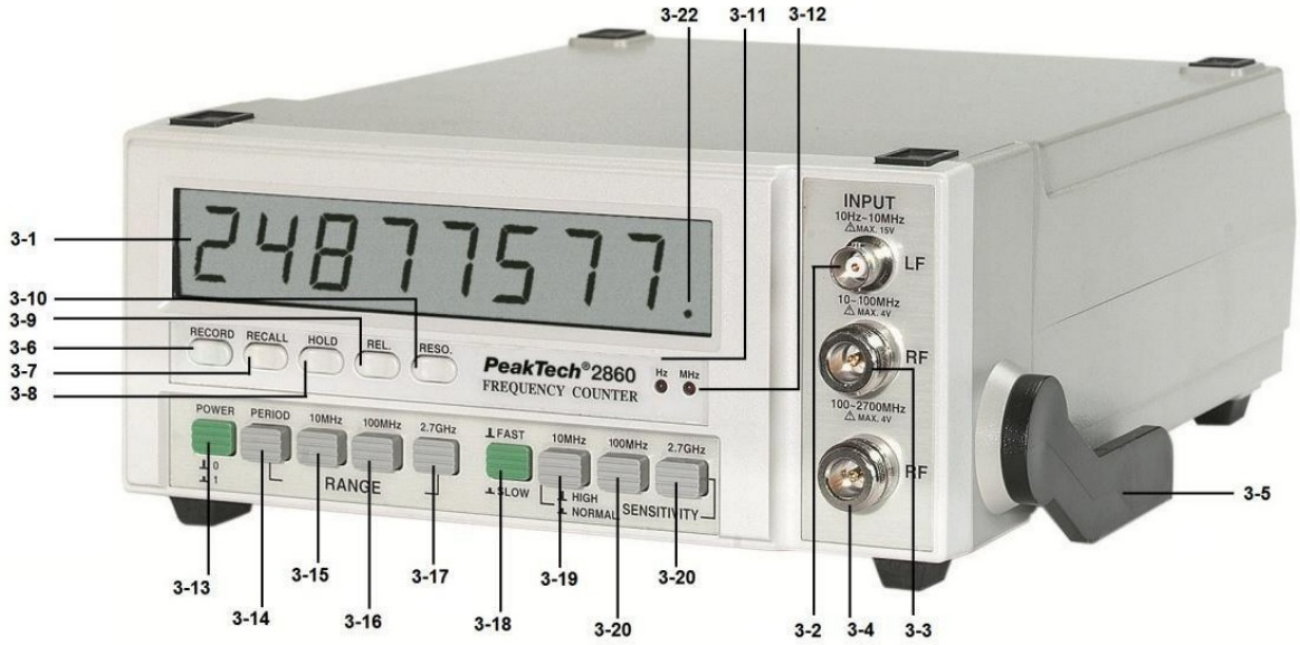
Sensitivity (Sensitivity Sw. set to high position)	100 MHz	≥ 50 mV_{rms} (10MHz to 100MHz)
		Typical: ≥ 25 mV_{rms} (30 MHz to 100 MHz)
	2,7 GHz	≥ 50 mV_{rms} (100 MHz to 2,5 GHz)
		Typical: ≥ 35 mV_{rms} 300 MHz to 2,4 GHz
Max. functional signal input (Sensitivity Sw. set to normal position)	10 MHz & Period	£ 15 V_{rms}
	100 MHz	£ 4 V_{rms}
	2,7 GHz	£ 4 V_{rms} (400 MHz to 2,7 GHz)
Over-input (Max. signal will not hurt the circuit)	10 MHz & Period range: Max. 15 V_{rms}	
	2,7 GHz & 100 MHz range: Max. 4 V_{rms}	
Time base Stability vs. Temp.	± 1,5 PPM (10° C to 30° C)	
Frequency Accuracy	± (2 PPM + 1 d) 23 ± 5° C, after calibration	
Time base circuit	16.777216 MHz, TCXO (Temperture compensated crystal oscillator)	
Input connector	10 MHz & Period range: BNC connector	
	100 MHz range: N coaxial connector	
	2700 MHz: N coaxial connector	
Case	Durable & strong ABS-plastic housing with handle	
Oper. Temp.	0° C to 50° C (32°F to 122° F)	
Oper. Humidity	Less than 80%	
Power Supply	6 x 1,5 V AA (UM-3) battery or AC to DC 9V Adapter	
Power Consumption	2700 MHz & 100 MHz range: Approx. DC 105 mA.	
	10 MHz & Period range: Approx. DC 45 mA	
AC Adapter Power Input	Optional, 9 V DC, 300 to 500 mA rating, central positive for socket	
Dimensions (WxHxD)	210 x 90 x 280 mm	
Weight	1,4 kg	
Standard Accessories	Double BNC connector, double N-coaxial connector, N- coaxial connector to BNC connector adaptor, batteries and Instruction manual	

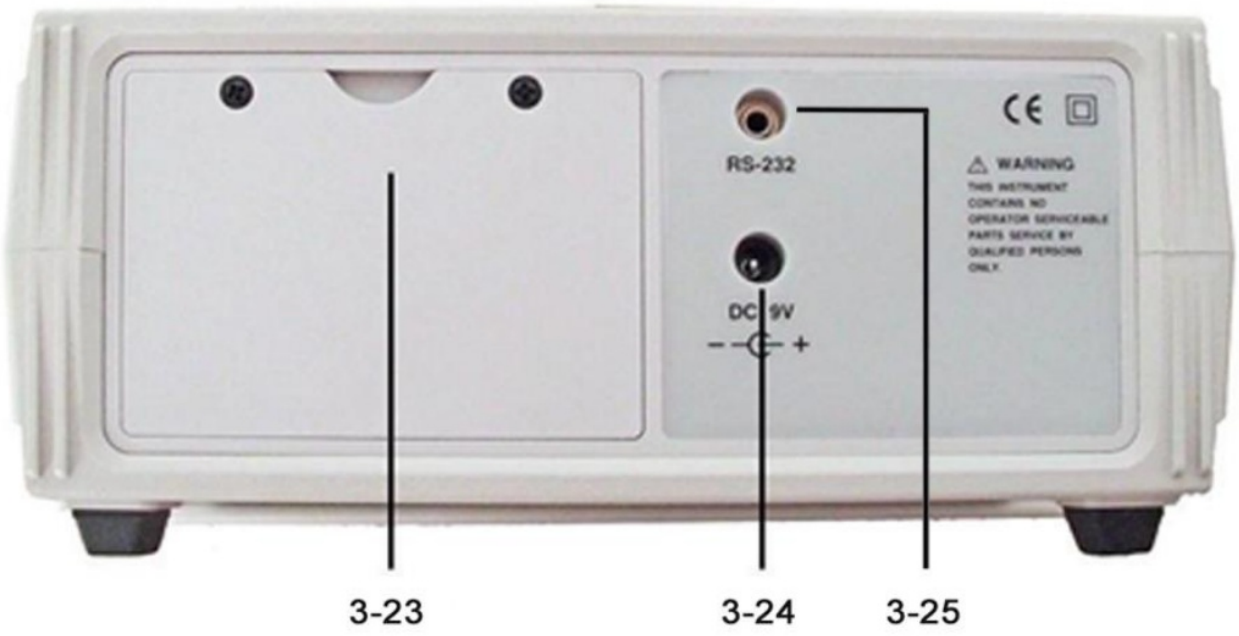
Remark: Spec. tested under the environment RF Field Strength less than 3 V/M & frequency less than the 30 MHz only.

Resolution and Sampling Time

Range	Gate Time Selection	Resolution	Sampling Time
10 MHz	FAST	10 Hz	0,5 sec
	SLOW	1 Hz	1,25 sec
	SLOW (Select 1)	0,2 Hz	6 sec
	SLOW (Select 2)	0,1 Hz	11 sec
100 MHz	FAST	100 Hz	0,75 sec
	SLOW	10 Hz	6 sec
	SLOW (Select 1)	20 Hz	5 sec
	SLOW (Select 2)	50 Hz	1,5 sec
2700 MHz (2,7 GHz)	FAST	1000 Hz	0,5 sec
	SLOW	100 Hz	2,75 sec
	SLOW (Select 1)	200 Hz	1,5 sec
	SLOW (Select 2)	500 Hz	0,75 sec

Front Panel Description




RS-232
DC 9V
WARNING
THIS INSTRUMENT CONTAINS NO OPERATOR SERVICEABLE PARTS SERVICE BY QUALIFIED PERSONS ONLY
3-23
3-24
3-25

3-1	Display
3-2	10 MHz (LF, Channel A) input, BNC Socket
3-3	100 MHz (RF, Channel B) input, N type Socket
3-4	2700 MHz (RF, Channel C) input, N type Socket
3-5	Handle
3-6	RECORD Button (Memory Record)
3-7	RECALL Button (Memory Data Call)
3-8	HOLD Button (Data Hold)
3-9	REL. Button (Relative Measurement)
3-10	RESO. Button (Resolution selecting)
3-11	Hz indicator
3-12	MHz indicator
3-13	Power Switch
3-14	Period Switch (Range Switch)
3-15	10 MHz Switch (Range Switch)
3-16	100 MHz Switch (Range Switch)
3-17	2,7 GHz Switch (Range Switch)
3-18	FAST/SLOW Switch (Gate Time Switch)
3-19	10 MHz range Sensitivity Switch
3-20	100 MHz range Sensitivity Switch
3-21	2,7 GHz range Sensitivity Switch
3-22	Gate indicator
3-23	Battery cover Screws / Battery Compartment
3-24	AC/DC 9V Adapter Socket
3-25	RS – 232 port

Measuring Procedure

Frequency Measurement

1. Push the “Power Switch” (3-13, Fig. 1), all the display segments will bright then show 0 or some random values. Now the instrument is ready for measurement.

   Considering:

   * If no signal input (or short circuit), for “Period Range” the display will show B”——oL——-”

   * If no signal input (or short circuit, for “10 MHz Range” the display will show “0”.

   * If no signal input (or short circuit, for “100 MHz and 2,7 GHz Range “the display will show certain random

value due to the environment noise for input circuit, it is normal. However after the signal input, those noise will be suppressed

2. Push the “Range Switch” (3-15, 3-16, 3-17, Fig. 1) to the “10 MHz”, “100 MHz” or “2,7 GHz” position according to the measurement required.

   Considering:

   Always to select the suitable range to get high sensitivity & good resolution.
3. Input the measured signal to Channel A/BNC socket (3-2, Fig. 1) via BNC cable (optional, PB-21 or BB-22) if the measured frequency is within 10 MHz.

   Input the measured signal to Channel B/N type socket (3-3, Fig. 1) via N type cable (optional, NN-23) if the measured frequency is within 10 MHz to 100 MHz.

   Input the measured signal to Channel C/N type socket (3-4, Fig. 1) via N type cable (optional, NN-23) if the measured frequency is within 100 MHz to 2700 MHz.
4. According the different input range, select the Sensitivity Switch (3-19, 3-20, 3-21, Fig. 1) to the “HIGH” (high sensitivity) or “NORMAL” (normal sensitivity) position.
5. Slide the Gate Time Switch (3-18, Fig. 1) to the “FAST” or “SLOW” position to determine the convenient sampling time & display resolution.
6. The display unit is Hz for 10 MHz range. The display unit is MHz for 100 & 2,7 GHz range. The Gate Indicator (3-22, Fig. 1) will be flashed one for each sampling time passed.

   Considering:

   * Select to “Gate Time Switch” to “FAST” position normally.

   * If select to “SLOW” position, then push the RESO. button (3-10, Fig. 1) at once 3 times will result 3 kinds Sampling Time & Resolution combination. For more details please see the following table:

Data Hold Measurement

During the measurement, it will hold the display values, if push the “HOLD Button” (3-8, Fig. 1) at once.

Considering:

* When push the HOLD button at once, then the display will show “- – – HOLD – – -” & holding values alternately.
* It will release the hold function if push the HOLD button at once again.

Relative Measurement

1. During the measurement, the circuit will memorize the last measured values if push the “REL. Button” (3-9, Fig. 1) at once, then LCD will show “0” & a “REL” marker appears on the right down corner.
2. The new measured frequency values will deduct above memorized “last measured values” automatically.
3. It will release the Relative Measurement function if push the REL. button at once again, at same time the “REL” marker will disappear.

Considering:

When marking the “Data Hold” & “Data Record” measurement, the Relative function is prohibited.

Data Record (Max., Min., Average reading)

1. The DATA-RECORD function displays the maximum, minimum and average readings. To start the DATA RECORD function, press the RECORD button once. An “R.C.” marker should appear on the top right corner of

the display.

2. Push the RECALL button once and “- – -HI- – -” should appear on the display followed in about a second by the maximum reading. The “R.C.” marker will be flashing.
3. Push the RECALL button again and “- – -Lo- – -” should appear on the display followed by the minimum reading.
4. Push the RECALL button again and “- – -A- – -” should appear on the display followed by the average reading. The average reading will be continually updated every ten samples.
5. Push the RECALL button again will stop the “R.C.”, marker from flashing and normal reading will be.

Period Measurement

1. Input the measured signal to Channel A/BNC socket (3-2, Fig. 1) via BNC cable (optional, PB-21 or BB-22)
2. Select the “Period Switch” Switch (3-14, Fig. 1). Select the “10 MHz range Sensitivity Switch” (3-19, Fig. 1) to the “HIGH” (high sensitivity) or “NORMAL” (normal sensitivity) position. * To select the “HIGH” sensitivity normally.’
3. Slide the Gate Time Switch (3-18, Fig. 1) to the “FAST” or “SLOW” position to determine the convenient sampling time & display resolution. * To select the “FAST” gate time normally.

Consideration:

* The input frequency range for period function is from 10 Hz to 10 MHz.
* The display will show 5 digits then following the unit: ” – s” represent milli seconds “us” represent micro – seconds
* The principal of period display is calculated from the measured frequency (Hz), the formulas are following:

$$\text{period (ms)} = \frac{1000\ \text{ms}}{\text{frequency (Hz)}}$$

$$\text{or period (us)} = \frac{1\,000\,000\ \mu\text{s}}{\text{frequency Hz}}$$

* The period range accuracy are based on the digit No. + 1 (max. 5 digits) of measured frequency. For example if measured frequency is 615 Hz (3 digits), then the period values accuracy will be on the leading four digits (1.626 mS).
* If no signal input (0 Hz), the display will show over range (- – – oL – – -).

Over Range Indicator

The Display will show the over range indicator “- – – oL – – – ” along with the “BIBI…” sound, if

- Input signal frequency over 10 MHz for 10 MHz range.
- Input signal frequency over 100 MHz for 100 MHz range.
- Input “0 Hz” for the period range.

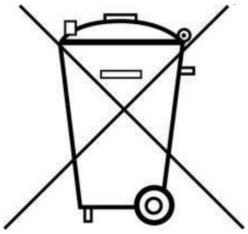
Replacement of battery

1. If the meter used the battery power source, when the display values flashed, it is necessary to replace the batteries. 3-23 Battery Cover Screws/Battery Compartment.
2. Loose the Battery Cover Screws (3-23, Fig. 1), take the battery cover away from the instrument and remove the batteries. Replace with 6 x 1,5 V AA (UM3) batteries and reinstate the cover.

3. Make sure the battery cover is secured with the screws after changing battery

Statutory Notification about the Battery Regulations

The delivery of many devices includes batteries, which for example serve to operate the remote control. There also could be batteries or accumulators built into the device itself. In connection with the sale of these batteries or accumulators, we are obliged under the Battery Regulations to notify our customers of the following:
Please dispose of old batteries at a council collection point or return them to a local shop at no cost. The disposal in domestic refuse is strictly forbidden according to the Battery Regulations. You can return used batteries obtained from us at no charge at the address on the last side in this manual or by posting with sufficient stamps.



Batteries, which contain harmful substances, are marked with the symbol of a crossed-out waste bin, similar to the illustration shown left. Under the waste bin symbol is the chemical symbol for the harmful substance, e.g. ,,Cd" for cadmium, ,,Pb" stands for lead and ,,Hg" for mercury.

You can obtain further information about the Battery Regulations from the Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (Federal Ministry of Environment, Nature Conservation and Reactor Safety).

This manual considers the latest technical knowing. Technical alterations reserved.

We herewith confirm, that the units are calibrated by the factory according to the specifications as per the technical specifications.

We recommend to calibrate the unit again, after 1 year.

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Documents / Resources

	**PeakTech 2860 2.7 GHz Frequency Counter** [pdf] User Manual 2860 2.7 GHz Frequency Counter, 2860, 2.7 GHz Frequency Counter, Frequency Counter, Counter

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