INTELLIGENCE FREQUENCY COUTER OPERATION MANUAL



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GENERAL:

1.INTRODUCTION:

It is a high-resolution multifunction intelligent frequency counter based on microprocessor. Features include: frequency, period and equal-precision measuring. Also, 3 step function selection, work state, unit and eight-digit LED display. All function depend on a single CPU. A crystal controlled temperature circuit provides constant compensation for temperature change thereby reducing measurement errors typically caused by temperature drift. The CH.B input has an attenuator (x1, x20), & AC/DC coupling for a low-pass filter.

The instrument measures signals over a wide range from 0.01 Hz to 2.4 GHz. The gate time is continuously variable from 100 ms to 10 s.

The instrument provides high performance stability, & function at a low cost.

Note: Read this chapter carefully before using your instrument retain these instructions.

2.ELECTRICAL SPECIFICATIONS:

Input characteristics:

1) CH.A(0.01Hz~50MHz)

frequency range :DC couple 0.01Hz to 100Hz

AC couple 100Hz to 50MHz

Sensitivity : "AC" 100Hz-50MHz≤80mVrms

"DC" 0.01Hz-1Hz≤500mVp-p,

1Hz-100Hz≤80mVrms.

 $\begin{array}{ll} \text{Input impedance} & :1M\Omega \\ \text{Attenuator} & :X1,X20 \end{array}$

Max. safety voltage : 30V (DC/AC peak)

2) CH.B (50MHz~2.4GHz)

Frequency range : from 50MHz to 2.4GHz

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Sensitivity : $50 \text{MHz} \sim 1.2 \text{GHz} \leq 80 \text{mVrms}$ 1.2GHz $\sim 2.4 \text{GHz} \sim 80 \text{mVrms}$

 $\begin{tabular}{ll} Coupling & : AC only \\ Input impedance & : 50 Ω \\ Max. safety voltage & : 3 V \\ \end{tabular}$

3) Resolution : Resolution depends on gate time control setting.

Step	Coupling	Freq. Range	Resolution		
			Gate time min.	Gate time max.	
1	AC	1GHz-2.4GHz	1kHz	100Hz	
1	AC	50MHz-1GHz (no including 1GHz)	1kHz	10 Hz	
2	AC	2MHz-50MHz	1kHz	10Hz	
3	AC	100Hz-2MHz	10Hz	0.1Hz	
3	DC	0.01Hz-100Hz (no including 100Hz)		0.001Hz	

4) Time base

short time stability $:\pm 3\times 10^{-9}/\text{sec}$ ond Long time stability $:\pm 2\times 10^{-8}/\text{month}$ Temperature drift coefficient $:\pm 1\times 10^{-7}, 10^{\circ}\text{C} \sim 40^{\circ}\text{C}$

Line voltage variation : $\pm 1 \times 10^{-7}$ for line voltage $\pm 10\%$

5) Gate time : Continuously variable, from 100ms to 10s.

6) Display : 8 digit, 19X12.5mm LED with steps, frequency, period, kHz/s and MHz/ms, indicator.

7) Precision : standard time error (t) x frequency (f) ± 1 d 8) Power supply : 220 V/110 V $\pm 10\%$, (50Hz /60Hz) $\pm 5\%$.

9) Preheat time : 20 minutes

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10) Operation environment : $0^{\circ}\text{C} \sim 50^{\circ}\text{C}$, $10 \sim 90^{\circ}\text{R}$.H. Storage .environment : $-40^{\circ}\text{C} \sim 60^{\circ}\text{C}$, $5 \sim 90^{\circ}\text{R}$.H.

11) Weight : Approx. 1.6kg

12) Dimension : 270 mm × 215 mm × 100 mm 13) Accessories : Manual, power cord, test probe.

OPERATION:

1.REQUIREMENTS:

- 1) Power: AC 220 V/110 V \pm 10%, max. consumption 5W.
- 2) Before measuring, turn the unit on for 20 minutes. This preheats the unit & the crystal oscillator to ensure accurate readings & stability.

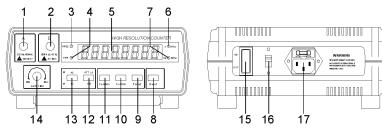
2. PANEL DESCRIPTION:

1) CH.A port2) CH.B port3) Frequency indication LED4) Period indication LED5) LED display6) kHz/s indication LED7) MHz/ms indication LED8) RESET key9) PERIOD key

10) CONFIRM key 11) FUNCTION key 12) ATT key

13)AC/DC COUPLING key 14)GATE TIME knob 15)POWER SWITCH

16) 220 V/110 V Transform SWITCH 17) POWER JACK and FUSE BOX



Note:

1)FUNCTION KEY: (including 3 steps)

- $1\ Step: 50 MHz --- 2.4 GHz\ range,\ from\ CH.B\ input,\ measurement\ unit\ indication\ "MHz/ms"\ ;$
- 2 Step: 2MHz---50MHz range, input from CH.A, measurement unit indication "MHz/ms";
- 3 Step: 0.01Hz--2MHz range, input from CH.A, measurement unit indication "KHz/s".

These are frequency measurement steps and "FREQ." indication LED flicker.

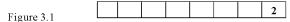
- 2) **PERIOD KEY:** Press the key down, the instrument will enter into period measure mode.
- 3) CONFIRM KEY: Press the key down, the instrument will start working according to preset state.
- 4) AC/DC COUPLING KEY: Press the key down for DC measurement, push the key up for AC measurement.
- 5) **RESET KEY**: when instrument is abnormal, press it once to reset.
- 6) ATT KEY: Press the key down for attenuated 20dB measurement, push it up for no attenuator.

3. OPERATION STEPS:

First, connect power cord (AC220V/110, 50Hz / 60Hz) and set power switch to ON position. Allow unit to warm up for 20 minutes to ensure accurate readings.

Frequency measurement:

- 1) Select CH.A or CH.B (depends on the range being measured) and connect to signal source by cable.
- 2) For signal to be measured, if frequency is less than 100Hz, press "AC/DC" coupling key down.
- 3) If input signal amplitude is high, then press "ATT" key down to ensure the instrument measures an attenuated signal.
- 4) When the "FUNCTION" key is pressed, the last digit display value is the current selection step, (for figure 3.1 2 step)



frequency measurement has only three steps (1--3) and its circle displaying;

Figure 3.2



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- 5) Complete steps 1-3, press "CONFIRM" key, the instrument will start working and display result, unit, etc.
- 6) Gate time may adjust variably.
- 7) When measuring 100Hz signal, the instrument will auto enter into equal-precision measurement state.

Period measurement:

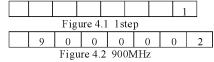
On frequency measurement state, press "PERIOD" key, instrument will start measuring period and display test result, working state and unit simultaneously.

4. FOR EXAMPLE:

- $1)\,Connect\,power\,cable\,to\,A\,C220\,V/110\,V\,power\,socket.$
- 2) Setting power switch to ON position and preheat for 20 minutes.
- 3) Connect attachtest cable to input port on front panel, according frequency range to select CH.A or CH.B.
- 4) Select proper function (step) and gate time. Gate time is shorter, measuring frequency speed is faster, but resolution is lower; however, gate time is longer, measuring frequency speed is slower, but resolution is higher.
- 5) If measure period, press down "PERIOD" key.
- 6) Press down "CONFIRM" key, then instrument start working.

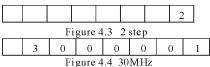
EXAMPLE 1:

Analog handset measurement: user may connect test cable to input CH.B and set the FUNCTION key to 1step position, gate time may be selected by need (manual adjust: from 100ms to 10s). Figure 4.1 and figure 4.2 are LED display reads.



EXAMPLE 2:

30MHz interphone emit frequency measurement: user may set the function key to 2 step position and gate time may by selected by need (manual adjust: from 100ms to 10s). Figure 4.3 and figure 4.4 are LED display reads.



EXAMPLE 3:

Self-oscillation frequency measurement (of BP, controlling and controlled telephone, interphone): user may set the function key to 2 step position. Connect one of feet of a 5pF capacitance to red clamp of test cable, the other as probe to directly contact frequency point, then frequency value will be measured.

5. WARNING:

- 1) When measuring high voltage or strong RF signal by cable input, cables should be in series with large resistance to prevent damage. Wireless input of very strong signals should be measured in coarse mode to avoid damage.
- 2) When instrument is working abnormally or goes "dead", only press the "RESET" key once or turn off power once to reset the system.
- 3) When there is no input signal, instrument display may not be zero. This is normal, it doesn't effect measurements or
- 4) Avoid exposing this instrument to extreme temperatures, damp conditions, dirt, dust, chemical contamination etc. Do not remove the cover for electrical shock could occur.
- 5) When instrument working on strong interference source, sensitivity will reduce.

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