

Digital Stroboscope Tachometer Operation Manual

I . Introduction:

The stroboscope is a rotational speed measuring instrument that makes use of the persistence of vision (when the light source flashing at the set frequency is synchronized with the rotational speed of the object, a relatively static visual persistence phenomenon occurs). When observing an object rotating at a high speed or moving, by adjusting its flickering frequency to be close to and synchronizing with the rotation or moving speed of the measuring object, the measured object looks be moving slowly or static although moving at a high speed, this optical phenomenon of persistence of vision makes it easy to observe the motion of high-speed moving objects with the naked eyes. In this way, it is possible to measure the rotational speed of various types of rotating objects without contact, as well as to detect the motion state and surface defects of the object. Its application is very wide, such as various types of rotors, gear meshing, vibration equipment diagnostics, textile, printing, production lines and other high-speed rotating object surface defects and motion trajectories.

II. Performance features:

- * The advanced technologies such as micro-computer technology (CPU), software frequency generator and anti-jamming technology are applied to conduct non-contact measurement of rotation speed, as well as to inspect the status of moving objects and detect defects on the surface.
- * Large LCD with backlight ensures clear readings and no parallax.
- * Two adjustment ways: single-step adjustment (coarse/fine adjustment) and continuous adjustment (coarse/fine adjustment) for easy measurement.
- * With data storage function, it can store 10 commonly used stroboscopic data, which can be called up at any time, very convenient and quick.
- * There are special backlight and flash control switches, saving battery power.
- * The power supply uses four AA 3.7V lithium-ion rechargeable batteries (14500) to ensure long-lasting power. When the voltage is lower than the specified voltage, it will automatically prompt.
- * 60 high-brightness LED flash heads, double the brightness and more convenient to use (observe).
- * The structure is sturdy and exquisite. The whole machine adopts durable and high quality electronic components. The outer casing is made of light weight and hard ABS+PC engineering plastic. It has beautiful appearance, convenient carrying and simple operation.

III. Technical parameters:

Measuring range:	60 ~ 40000RPM/FPM
RPM:	R / min
FPM:	F / min
Coarse / fine tuning range	<400RPM, Coarse tuning: 1RPM/FPM Fine tuning: 0.01RPM/FPM

< 4000RPM,
Coarse tuning: 10RPM/FPM
Fine tuning: 0.1RPM/FPM
< 40000RPM,
Coarse tuning: 100RPM/FPM
Fine tuning: 1RPM/FPM

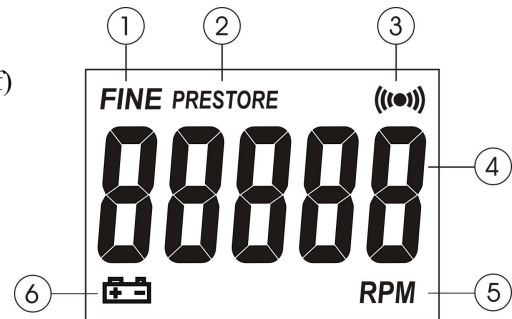
Accuracy: 0.05%
Resolution: <400RPM: 0.01RPM/FPM
<4000RPM: 0.1RPM/FPM
<40000RPM: 1RPM/FPM

Time base: 10MHz industrial grade quartz crystal
Display 5 digits LCD with backlight, Max. indication: 40000
Power supply: 4 × 3.7V(14500) AA Lithium ion rechargeable batteries
Power loss: Approx. 60mA
Dimensions: 195 × 73 × 38mm
Weight: Approx. 220g

* The value of FPM is the same as that of RPM. The following are all based on the speed RPM.

IV. Description of the display (Fig. 1)

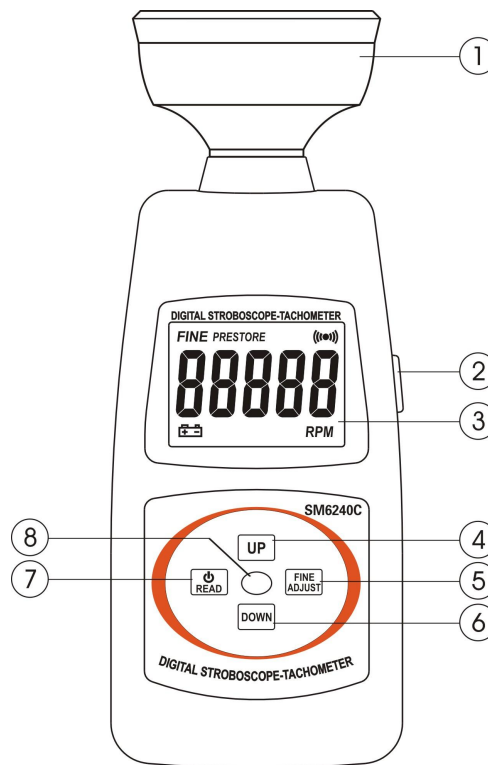
1. Fine tuning symbol. When it appears, it means fine tuning.
2. Prompt symbol for measurement data storage (by triggering the data storage button, "PRESTORE" will be on, and data will be stored. After data storage is completed, the light will turn off)
3. Prompt symbol for "under measurement". When it appears, it means "under measurement".
4. Measurement data .
5. Symbol for rotation speed unit, R/ min.
6. Low-voltage prompt symbol. When it appears, it means that the battery power is low.



(Fig. 1)

V. Description of the Panel: (Fig. 2)

1. Flash light source
2. Flash light source switch
3. LCD display screen
4. Value increase button
5. Coarse / fine tuning switch button
6. Value reduction button
7. Power switch, data retrieval button
8. Data storage button



(Fig.2)


VI. Operation:


1. Select an observation point:

Some objects have uneven surfaces and different reflection degrees on light, so different positions are either bright or dark, or there are asymmetrical texts, patterns, marks, etc., we can select these most obvious positions as observation points; if the surface of object is very smooth and has the same degree of reflection. It can artificially make the surface uneven, or do some asymmetrical text, patterns, marks, etc. (reflective strips are prepared in the accessories).

2. Power on / off:

Open the battery compartment cover of the rear case, install batteries, press and hold the the power button

"  ". After pressing for 3 seconds, turn on the meter and it displays the initial value of 4000RPM. If measurement is completed and the measured value is stored, the latest measurement data stored will be displayed.

At this time, the state is single-step coarse tuning by default. Press and hold the power button"  " for 3 seconds again to turn off the meter and end operation.

3. Switch on the backlight:

Open the battery compartment cover of the rear case and take out the lowermost battery. You can turn the backlight control switch to "ON" (indicating that the backlight is on) or "OFF" (indicating that the backlight is off), depending on your needs. After the instrument is turned on, if the backlight switch has been turned to "ON", the backlight will be bright; otherwise the backlight will not light.

4. Switch on the flash:



After the instrument is turned on, the flash light source switch is pressed and held at any time, the flash light source will flash with the frequency value displayed on the screen. When release the button, the flash light source will be off.

5. Coarse / fine tuning switch:

After the instrument is turned on, each time the “FINE” button is pressed, the coarse/fine adjustment can be switched. If it is fine-tuned, there will be a “FINE” prompt symbol on the upper left side of the display; there is no prompt symbol in the coarse adjustment state.

6. Single-step tuning of rotation speed:

In the state of coarse tuning, every time when you press the "UP" button or the "DOWN" button, the value of rotation speed will accordingly increase or reduce by 1RPM (<400RPM), 10RPM (<4000RPM) or 100RPM (<40000RPM). In the state of fine tuning, every time you press the "UP" button or the "DOWN" button, the value of rotation speed will accordingly increase or reduce by 0.01RPM (<400RPM) 0.1RPM (<4000RPM) or 1RPM (<40000RPM).

7. Continuous tuning of rotation speed:

In order to improve the adjustment efficiency and save the adjustment time, the meter can also be continuously adjusted. When the speed is adjusted step by step, if you press and hold the “UP” or “DOWN” button, the meter will enter continuous adjustment state after 1 second. In the coarse tuning state, the meter automatically increases or decreases 1RPM (<400RPM), 10RPM (<4000RPM) or 100RPM (<40000RPM) every 0.2S. In the fine-tuning state, meter will automatically increase or decrease 0.01RPM (<400RPM), 0.1RPM (<4000RPM) or 1RPM (<40000RPM) every 0.2S. Once release the button, the continuous adjustment is terminated and the meter will be reverted to single-step adjustment state.

* (Adjustment limit: In any tuning state, when the upper limit value is above 40000RPM, the meter will automatically stay at 40,000 RPM/FPM. At this time, pressing the “UP” button, the meter will have no reaction; when it is below the lower limit of 60 RPM, the meter will automatically stay at 60RPM/FPM, and then press the “DOWN” button, the meter will not respond.)

8. Data storage function (set this function for faster adjustment and avoiding repeated adjustments)

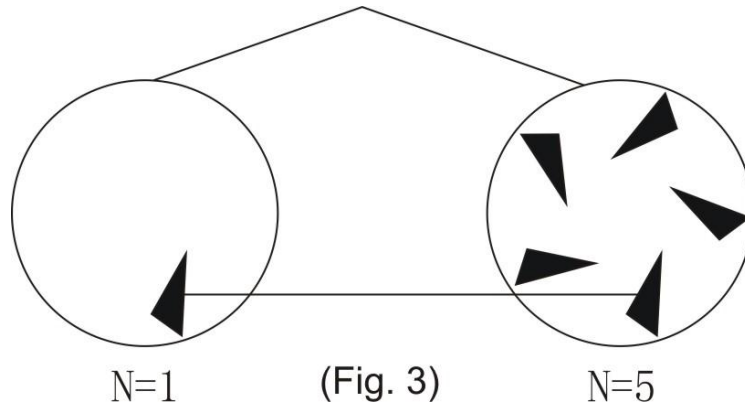
The instrument pre-stored 10 speed values, which are: 200RPM, 400RPM, 1000RPM, 2000RPM, 3000RPM, 40000RPM, 10000RPM, 20000RPM, 30000RPM, 40000RPM. The user can firstly select the pre-stored value that is closest to the desired speed value, and then use the coarse or fine tuning key to adjust the speed. If you use a certain speed value frequently, you can save it after adjusting the speed. Press the storage button in the middle of the meter to save it. The next time you use it, the last stored value will be displayed for easy use. These set and stored speed values can be recalled at any time in subsequent measurements (users can store up to 10 speed values instead of factory pre-stored values).

9. Data retrieval

After measurement, the memory key (Middle key) can be triggered to save the measurement value. The meter can store up to 10 frequently used data. When turn on the meter again, it displays the last stored value. If need to recall the previously stored data, please trigger the "READ" button. And it displays one data per trigger (short press) to cycle through the stored common measured speed values.

10. Measurement of rotation speed:

(1) After the instrument is turned on, press the flash source switch to illuminate the light bar on the rotating surface of the measured object, observe the flashing of the spot and adjust the flashing frequency of the flash. If the flashing frequency of the flash adjusted is same with the speed of the measured object, there will be a visual persistence phenomenon in which the object looks like still. If the surface of measured object has obvious uneven or asymmetrical text, patterns, marks, etc., the visual persistence phenomenon will be more obvious. Fine adjustment can be used when the text, pattern or mark is close to motion and the spot flickers slowly. There will be N relatively stable or even stationary words, patterns or marks. (Fig. 3)



When $N = 1$, the texts, images or marks will be static and the light spot does not rotate; at this time the value displayed on the device is the rotation speed value of the object. When $N \neq 1$, the texts, images or marks will be static and the light spot does not flicker; at this time the value displayed is N times of the speed value of the object. Divide the value displayed on the instrument by N to calculate the actual speed value of the object.

2) When the surface of the measured object is relatively smooth, adjust the flashing frequency of the flash source until the spot on the rotating surface of the measured object no longer flickers, and it looks like it is stationary and the brightness is also the brightest. At this time, the value displayed on the instrument is the rotation speed value of the object. (Because the optical phenomenon of visual persistence in this case is not very obvious, it is not conducive to personnel observation. In order to improve the accuracy of the measurement, it is recommended that the user marks on the surface of measured object with a pen.) Select other types of observation point, an optical phenomenon similar to this will occur on the rotating surface of the measured object.

Monitor the movement of the object:

If you have already known the movement rate of the object, adjust the device to the corresponding flashing rate (F/minute), press the flash switch and illuminate the light bar to the moving surface of the object. If the optical phenomenon of visual persistence occurs (the object looks like it is still or the text, pattern or mark is still, the spot is not flashing), it indicates that the object operates properly. If optical phenomenon of visual persistence does not occur, it indicates that the object does not operate properly and the movement speed has exceeded the limited scope.

Check if there are any defects on the surface of high-speed rotating object:

The optical phenomenon of visual persistence occurs when you measure the rotation speed. It is because the flashing frequency of flash synchronizes with the rotation speed of the object. At this time the object appears static, and even with the naked eye, it is easy to detect if there is any defect on the surface of the object.



VII. Precautions:

1. If you know the approximate rotation speed of the object, better results can be achieved by using this device to measure and monitor the rotation speed.
2. The surface of the object shall need to be fissured, rough and uneven, or there are obvious parts for reflection on the surface, such as an electric drill bit, fan blades, etc.
3. When the voltage of power supply is lower than the required value, the low voltage prompt symbol will appear at the left bottom of the display, which means the voltage of batteries is too low and replacement of batteries is required.
4. Do not direct the flash toward humans' or animals' eyes, as it may cause harm.
5. Do not leave the device close to water or any other corrosive liquid so as to avoid damaging the device.
6. In case the device is not used for a long time, please take out the batteries so as to avoid damaging due to liquid leakage.