DIGITAL STROBOSCOPE PCE-DSX 100
OPERATION MANUAL

I. Introduction about the functions

Digital stroboscope tachometer is a rotation speed measuring device that makes use of persistence of vision (when the light source synchronizes with the rotation speed of an object at a pre-set flashing frequency, a relatively static phenomenon called visual persistence will occur).
In the course of observation of an object that rotates or moves at a high speed, adjust the flashing frequency of the device to synchronize it with the rotation or movement speed of the object. Although the object being measured moves at a high speed, it looks like moving slowly or static. This is an optical phenomenon of visual persistence whereby high-speed movement of an object can be easily observed with the naked eye. By using this method, the rotation speed of various rotating objects can be measured, and the movement and defects on the surface of an object can be inspected or detected. It is widely used to detect the defects on the surface and movement track of high-speed rotating objects such as various types of rotors, meshing gears, vibration diagnostic equipment as well as textiles, printing production lines, etc.

II. Performance features

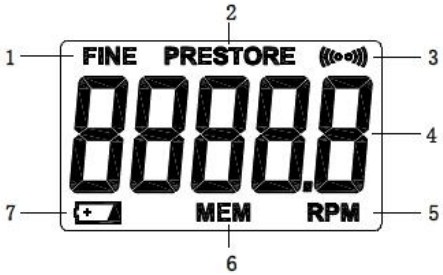
* The advanced technology such as micro-computer technology (CPU), photovoltaic technology and anti-jamming technology are applied to conduct non-contact measurement of rotation speed, as well as to inspect the status of moving objects and detect defects on the surface.
* Large LCD with backlight, which ensures a clear display of data and the avoidance of visual errors.
* Two regulation ways: single-step regulation (coarse/fine tuning) and continuous regulation (course/fine tuning).
* There are special backlight and flash control switches available, saving battery power.
* When the power supply voltage is lower than the required value, the device will automatically indicate it.
* The device has a sturdy and exquisite structure. Durable electronic components are used. Its shell is made of light solid ABS plastic with excellent shape. It is easy to carry and to operate.
* Data storage function available. Up to 10 sets of flash frequency data can be stored and can be retrieved at any time for use.

III. Technical parameters

Measurement range: 60-19999RPM
RPM: R / min
When the coarse / fine tuning range ＜1000RPM,
Coarse tuning: ±10RPM Fine tuning: ±0.1RPM
⩾1000RPM,
Coarse tuning: ±100RPM Fine tuning: ±1RPM
Accuracy: 0.05%
Resolution: ＜1000RPM: 0.1RPM ⩾1000RPM: 1RPM
Time base: quartz crystal oscillator
Display: LCD with backlight, Max.: 40000
Power supply: battery: 4 ×1.5V AA
Dimensions: 195 × 72 ×37mm
Weight: about 200g

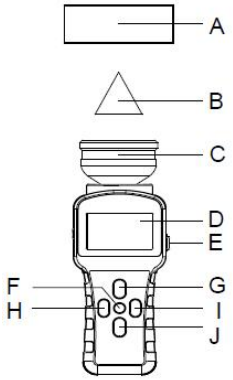
IV. Displays

1. Fine tuning symbol. When it appears, it means fine tuning.
2. Measuring data stored symbol. (Press the data store button, you can see this symbol show on the LCD, when the data already stored, the symbol disappear.)
3. Measuring symbol, the symbol appears means it is under measurement.
4. Measuring value.
5. Symbol for rotation speed unit, R / min.
6. Stored data of measurement.
7. Low-voltage prompt symbol. When it appears, it means that the battery power is low.



V. Appearance description

A. Object being measured
B. Optical path
C. Flash Light source
D. LCD
E. Light button
F. Data store button
G. Value increase button.
H. Power switch, data retrieval button
I. Coarse / fine tuning switch button; LCD backlight button
J. Value reduction button



VI. Operation

1. Select a place for observation:

As the surfaces of some objects are fissured, rough and uneven, which vary in light reflection, there are bright and dim lights, or there are asymmetric texts, images or marks at different positions. We can select one of these most obvious positions as an observation place. If the surface of the object is very smooth and gives the same light reflection, the surface can be made fissured, rough or uneven manually, or some asymmetric texts, images or marks may be created on it.

2. Power on/off:

Open the battery compartment cover on the back of the shell，fit in batteries and press the starting button " ⏻" for a while. After 3 seconds, the device will start and the initial value of 4000RPM will be displayed. If the measurement data has been stored after previous use, the latest measurement data stored will be displayed. At this time, the state of single-step coarse tuning is the default. Press " ⏻" again for a while, after 3 seconds the device will turn off and cease operation.

3. Switch on the backlight:

Power on the device, if you long press the “FINE/BL” button you can open the backlight, long press this key again to close the backlight.

4. Switch on the light source:

After you start the device, any time you press the light button, the light will flicker at the frequency value displayed on the screen. After you stop pressing the button, the light will be off.

5. Coarse / fine tuning switch:

After you start the device, every time you press the "FINE/BL" button, you switch between coarse / fine tuning. In the case of fine tuning, the characters "FINE" will appear on the left top of the display. In the case of coarse tuning, no prompt will appear.

6. Single-step regulation 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 increase or reduce by 100RPM accordingly (when the tuning range ≥ 1000RPM) or 10RPM (when the tuning range<1000RPM). in the state of fine tuning, every time you press the "UP" button or the "DOWN" button, the value of rotation speed will increase or reduce by 1RPM accordingly (when the tuning range ≥1000RPM) or 0.1RPM (when the tuning range<1000RPM).

7. Continuous regulation of rotation speed:

In order to improve the regulation efficiency and save the time of regulation, the device can also be regulated in a continuous way. In case of single-step regulation, keep pressing the "UP" or "DOWN" button, after 1 second, the device will enter the state of continuous regulation.

In the state of coarse tuning, the device will automatically increase or decrease by 100RPM (when the tuning range≥1000RPM) or 10RPM (when the tuning range <1000RPM) every 0.2s. In the state of fine tuning, the device will automatically increase or decrease by 1RPM (when the tuning range≥1000RPM) or 0.1RPM (when the tuning range<1000RPM) every 0.2s. Once you stop pressing the button, continuous regulation will be terminated, and the device will be in the state of single-step regulation.

* (Regulation limits: In case of any tuning state, when the upper limit of 40000 RPM is exceeded, the device will automatically remain at the 40000 RPM. At this time, if you press the "UP" button again, there will be no response. When the speed is lower than the lower limit of 60RPM, the device will automatically remain at 60RPM. At this time, even if you press the "DOWN" button, there will be no response.)

8. Data storage function

After adjusting speed, press the “MEM” button in the center of the device panel to store the current value. The next time the device is started, the latest measurement data stored in it will be displayed and you will not have to adjust the flash frequency. In the future, the pre-set data stored in the device can be retrieved at any time.

9. Data retrieval

Every time after the measurement, you can press the “MEM” button to store the present value. Up to 10 pieces of frequently used data can be stored in the device. Every time you start the device, the latest value stored in the device will be displayed. In case of retrieval of the data stored in the device, press the "READ" button, with every flick of the button, one piece of data will be displayed (short press). The frequently used data stored can be retrieved successively in a cycling way.

10. Measurement of rotation speed:

1) After you start the device, press the light source button, direct the light bar onto the rotating surface of the object, observe the light spot and adjust the flashing frequency of light. If the flashing frequency of light is adjusted to the same rotation speed of the object, there will be a visual persistence phenomenon that the object appears static. If the surface is obviously uneven or there are asymmetric texts, images, or marks on the surface of the object, the persistence of vision will be very obvious. When the texts, images, or marks are almost static and the light spot flickers increasingly slowly, the fine tuning function can be applied. At this time there will be N texts, images, or marks which are relatively stable or even static. (See Figure 1)

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

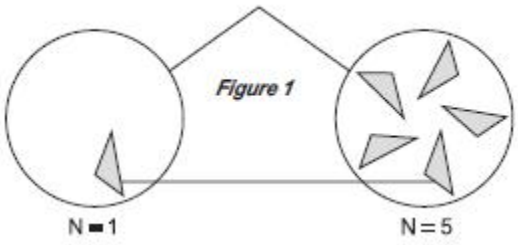


Figure 1

2) If the surface of the object is relatively smooth, adjust the flashing frequency of the light until the light spot on the rotating surface of the object no longer flickers, appears static and the brightest. At this time, the value displayed on the device is the rotation speed value of the object. (Because in this case, the optical phenomenon of visual persistence is not obvious so it is not easy for the testing personnel to make observations. In order to improve the measurement accuracy, it is suggested that the user affix a small piece of reflective slip or a label, or mark with a pen on the rotating surface.) If you select other places for observation, there will be a similar optical phenomenon on the rotating surface of the object.

11. 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, press the flash switch and direct the light bar to the moving surface of the object. If the optical phenomenon of visual persistence occurs (if the object appears static, or the texts, images or marks are static and the light spot does not flicker), it indicates that the object operates properly. If no optical phenomenon of visual, object does not operate properly and the movement speed has exceeded the limited scope, so it is necessary to carry out maintenance.

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. Attention

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 will appear at the left bottom of the display, which means the voltage of batteries is too low and replacement of battery 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 causing damages to the device.
6. If you will not use this device for a long time, please remove the batteries so as to avoid causing damages to the device as a result of battery leakage.