

Instruction Manual SC

DIGITAL LED- STROBOSCOPE



Model: SC 40K0.1



Model: SC 20K0.1



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1. Introduction

On the one hand, the stroboscope is used to measure the rotation speed of systems or machines as well as to determine vibrations and other periodical sequences contact-free. On the other hand, fast moving parts can be observed, while being in use. This would no more be possible with the naked eye. The stroboscope sends out flashes in a pre-set frequency. If the frequency of flashes adjusts the rotation or movement of the observed object, the picture seems to stand still for the human eye. This static phenomenon is called "visual persistence". By using this method, the rotation speed of various objects can be measured and the movement and defects on the surface of an object can be inspected or detected. On the LCD of the display the rotation speed or rather frequency of the movement can be read off.

The stroboscope is widely used to detect 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 textile industry, medical engineering, packing industry, printing production lines, etc.

2. Features

* The advanced technology such as micro-computer technology (CPU), photovoltaic technology and anti-jamming technology are applied to conduct contact-free measure-

ment 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 avoiding visual errors.
- * Two regulation ways:
 - single-step regulation (coarse / fine tuning)
 - continuous regulation (coarse / fine tuning)
- * Special backlight and flash control switches are available to save battery power.
- * When the power supply voltage is lower than the required value, the instrument will automatically give a message.
- * The instrument has got a sturdy and exquisite structure, durable electronic components are used. Its shell is made of light solid ABS plastic with an excellent shape. It is easy to carry and to handle.
- * Data storage function available: up to 10 pieces of flash frequency data can be stored and retrieved any time for use. It is convenient and quick.

3. Specifications

Measurement range:

SC 40K0.1:	60 to 40,000 RPM/FPM
SC 20K0.1:	60 to 19,999 RPM/FPM

RPM:	R/ min (rotations/ min.)
FPM:	F/ min (flashes/ min.)

Coarse/ fine tuning range:

< 1000 RPM	Coarse tuning: 10 RPM/FPM
	Fine tuning: 0.1 RPM/FPM
≥ 1000 RPM	Coarse tuning: 100 RPM/FPM
	Fine tuning: 1 RPM/FPM

Accuracy: 0.05%

Resolution: < 1000 RPM: 0.1 RPM/FPM
≥ 1000 RPM: 1 RPM/FPM

Time base: MHz quartz crystal oscillator

Light source LED

Brightness 91 Lux (at 1 m distance)

Display: 5 digits, LCD with backlight
Model **SC 40K0.1**: max. display 40000
Model **SC 20K0.1**: 19999

Power supply:

SC 40K0.1:	4 x 1.5V AA (UM-3) battery
SC 20K0.1:	4 x 1.5V AA R6P (UM-3) battery

Power consumption: about 6mA

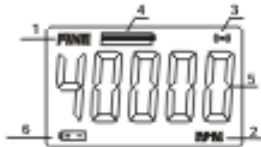
Dimensions: 195 x 73 x 38mm

Weight: about 200g

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As the values of RPM and FPM are the same, only RPM is used in the following text.

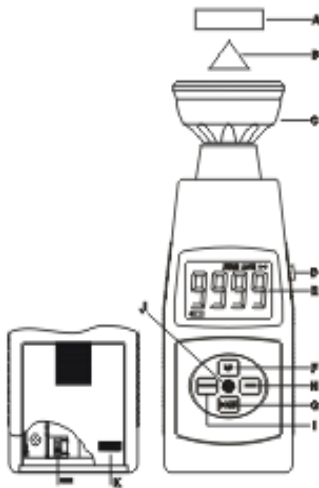
4. Display



1. Fine tuning symbol: when it appears, it means fine tuning was selected.
2. Symbol for rotation speed unit, R/ min.
3. Prompt symbol for “under measurement”.
When it appears, it means, that measurements can be performed.
4. Prompt symbol for measurement data storage (by a flick of the data storage button, “PRESTORE” will be on and data will be stored. After data storage is complete, the light will turn off).
5. Measurement data.
6. Low voltage prompt symbol. When it appears, it means that the battery power is low.

5. Front panel description

Model SC 40K0.1 and SC 20K0.1



- A Object being measured
- B Optical path
- C Flash
- D Flash switch
- E LCD
- F Value increase button
- G Value reduction button
- H Coarse / fine tuning button
- I Power switch, data retrieval button
- J Data storage button
- K Battery compartment cover
- L Backlight control switch

At **Model 20K0.1** there is no data storage button (J) and therefore no data retrieval button (I) findable, because this function is not available. The following buttons are different beginning with button I:



- I Power button (on/ off)
- J Battery cover (backside of housing, as above)
- K Backlight switch (backside of housing, as above)

6. Operation

1. Select a place for observation

As the surfaces of some objects are fissured, rough or uneven, which vary in light reflection, there are bright and dim lights, or there are asymmetric texts, images or marks on different positions. One of these most obvious positions can be selected as an observation place. If the surface of an 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/ Power off

The battery compartment on the back of the housing has to be opened, the batteries have to be inserted and the start button  has to be pressed for a short time. After 3 seconds the instrument will be „on“ and the initial value of 4000 RPM will be displayed (at Model SC 20K0.1: 1200RPM). If the measurement data have 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. The button  has to be pressed again for a while and after 3 seconds the instrument will turn off and cease operation.

3. Switch on the backlight

The battery compartment on the back of the housing has to be removed, the batteries have to be taken out at the lowest end. Then the backlight control switch has to be set at “ON” (it means “the backlight is turned on” or “off” (it means “the backlight is turned off”), according to one’s needs.

4. Switch on the flash

After the instrument is powered on, any time the flash switch is pressed, the flash will flicker at the frequency value displayed on the screen. When the button is released, the flash will be off.

5. Coarse / fine tuning

After the instrument is powered on, every time the “FINE” button is pressed, it is possible to switch between coarse / fine tuning. In case of fine tuning, the characters “FINE”

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will appear on the left top of the display. In case of coarse tuning, no prompt will appear.

6. Single-step regulation of rotation speed

In the state of coarse tuning, every time when the "UP" button or the "DOWN" button is pressed, the value of the rotation speed will be increased or reduced by 100RPM steadily (when the tuning range is > 1000RPM) or 10 RPM (when the tuning range is < 1000RPM).

In the state of fine tuning, every time when the "UP" button or the "DOWN" button is pressed, the value of the rotation speed will be increased or reduced by 1RPM steadily (when the tuning range is > 1000RPM) or 0.1 RPM (when the tuning range is < 1000RPM).

7. Continuous regulation of rotation speed

In order to improve the regulation efficiency and save the time of regulation, the stroboscope can also be regulated in a continuous way. In case of single-step regulation, the "UP" or "DOWN" button has to be pressed and not released. After one second, the state of continuous regulation will be entered. In the state of coarse tuning, the instrument will automatically increase or decrease by 100 RPM (when the tuning range is > 1000RPM) or 10 RPM (when the tuning range is < 1000RPM) every 0.2 seconds. In the state of fine tuning, the instrument will automatically increase or decrease by 1 RPM (when the tuning range is > 1000RPM) or 0.1 RPM (when the tuning range is < 1000RPM) every 0.2 seconds. If the button is released, continuous regulation will be terminated and the instrument is in the state of single-step regulation.

***Regulation limits:** In case of any tuning state, when the upper limit of 40000 RPM (at Model: **SC 40K0.1**) is exceeded, the instrument will automatically remain at the 40000 RPM. At Model **SC 20K0.1** the upper limit is already 19999 RPM. In this case, if the "UP" button is pressed again, there will be no response. If the speed is lower than the lower limit of 60 RPM, the instrument will automatically remain at 60 RPM. In this case, if the "DOWN" button is pressed, there will be no response. The lower limit is defined the same, for both models, **SC 40K0.1** and **SC 20K0.1**.

8. Data storage function at Model SC 40K0.1

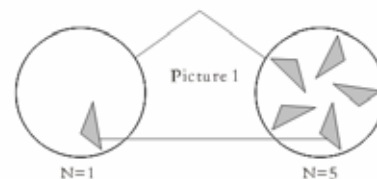
After the speed has been adjusted, the data storage button (J) in the centre of the front panel has to be pressed to store the current value. The next time the instrument is started, the latest measurement data stored in it will be displayed and the flash frequency doesn't have to be adjusted. So, it's very easy to handle. In further operation, the pre-set data stored in the instrument can be retrieved any time (up to 10 pieces of data can be stored). This function does not exist at Model **SC 20K0.1**.

9. Data retrieval

Every time after the measurement, the data store button (J) has to be used to store the measurement value. Up to 10 pieces of frequently used data can be stored in the instrument. Every time it is powered on, the last value stored in the device will be displayed. In case of retrieval of the data stored in the instrument, the "READ" button has to be flicked. With every flick of the button, one piece of data will be displayed (it has to be pressed for a little while). The frequently used data stored can be retrieved successively in a cycling way (10 default values stored in the instrument at the initialization phase are as follows in numerical order: 4000, 8000, 12000, 16000, 20000, 24000, 28000, 32000, 36000 and 40000, which is easy for the user to find the data quickly, is close to the actual value and shortens the time of regulation).

10. Measurement of rotation speed

After the instrument is powered on, the flash source switch has to be pressed and the light bar is directed onto the rotating surface of the object. The light spot has to be observed and the flashing frequency of the flash has to be adjusted. If the flashing frequency 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 if there are asymmetric texts, images or marks on the surface of the object, the persistence of vision will be very obvious. If these 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 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 doesn't rotate. At this time the value displayed 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; now, the value displayed is N times the speed value of the object. The value displayed has to be divided by N to calculate the actual speed value of the object.

** If the surface of the object is relatively smooth the flash frequency of the flash has to be adjusted 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 is the rotation speed value of the object. In this case, the optical phenomenon of visual persistence is not obvious and it isn't easy for the testing person to observe. In order to improve the measurement accuracy, it is suggested to affix a small piece of reflective slip or label or

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to make a mark with a pen on the rotating surface. If there are selected 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 the movement rate of the object is already known, the instrument has to be adjusted to the corresponding flashing rate (F/ minute), the flash switch has to be pressed. Then the light bar has to be directed to the moving surface of the object. If the optical phenomenon of visual persistence occurs, the user can be assured that the object operates properly. If not, the object doesn't operate properly and the movement speed has exceeded the limited scope. So it is necessary to carry out maintenance. It has to be checked if there are any defects on the surface of the high-speed rotating object:

The optical phenomenon of visual persistence occurs when the rotation speed is measured. It occurs because the flashing frequency of the flash synchronizes with the rotation speed of the object. In this case, the object appears static and, even with the naked eye, defects on the surface of the object can be detected easily.

7. Annotations

- If the approximate rotation speed of the object is known, better results can be achieved by using this stroboscope to measure and monitor the rotation speed.
- The surface of the object may not be fissured, rough or uneven and there may not be obvious parts of reflection on the surface, such as electric drill bit, fan blades, etc.
- If the voltage of the power supply is lower than the required value, the low voltage prompt will appear on the left bottom of the display, which means that the voltage of batteries is too low and a replacement of batteries is required.
- The flash may not be directed towards humans' or animals' eyes, it may cause harm.
- To avoid damages, the instrument may not be left close to water or any other corrosive liquid.
- If the instrument is not used for a longer period, batteries have to be removed. Otherwise it might cause damages as a result of battery leakage.

8. Declaration of conformity



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Konformitätserklärung

Declaration of conformity for apparatus with CE mark
Konformitätsklärung für Geräte mit CE-Zeichen
Declaración de conformidad para aparatos con marca CE
Dichiarazione di conformità per apparecchi contrassegnati con la marcatura CE

English: We hereby declare that the product to which this declaration refers conforms with the following standards.

Deutsch: Wir erklären hiermit, dass das Produkt, auf das sich diese Erklärung bezieht, mit den nachstehenden Normen übereinstimmt.

Français: Nous déclarons avec cette responsabilité que le produit, auquel se rapporte la présente déclaration, est conforme aux normes citées ci-dessous.

Español: Manifiestamos en la presente que el producto al que se refiere esta declaración está de acuerdo con las normas siguientes.

Italiano: Dichiariamo con ciò che il prodotto al quale la presente dichiarazione si riferisce è conforme alle norme di seguito citate.

Stroboscope: SAUTER SC

Mark number	EU Directives	Standards
100410640		EN60741-1:1996+A1:2001+A2:2003 EN 61010-2:2006

Date: 07.01.2009

Signature: 
SAUTER GmbH
Management

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