ST-4000 LED Stroboscope

Operation Manual

Warning

Use in flammable environments is prohibited. Use in this manner may result in fire or explosive.

Do not look directly into the LED light Source. This may result in eye injury.

Do not use or store in the following environments. Direct sunshine condensation, dust or caustic.

Do not alter, or modify of improperly. Such action may cause damage and void warranty.

Operate within 0-35°C (32-95°F), 35-85% RH. Use outside of this range may alter operation of the unit.

Case may become excessively hot when used continuously for more than 2 hours.

The ST-4000 is a portable, light-weight stroboscope with gun trigger light activation that utilizes 21 super bright CREE High Powered LED lamps. The ST-4000's LED array provides a bright, stable strobe light over a wide measurement range with a lifetime far exceeding xenon-lit stroboscopes. Containing a rechargeable lithium battery, a single charge is able to last up to a full 5 hours of operation. The ST-4000 is designed for speed and frequency measurements in motion and vibration analysis applications. It is ideal for predictive and preventive maintenance applications such as: motors, shafts, roto-gravure printing, extruders, blow molding, wire lettering and striping, engraving, pulse jets, water jets, fans, cams, gear teeth, belt inspections, fuel injectors, vibration analysis, audio speaker analysis, spindle spinning, cutting blade timing and sharpness, plus many more in the printing, packaging, textile, automotive, cable, mining, steel, chemical, optical, medical and shipbuilding industries.



SPECIFICATIONS
Flash Rate Range: 30 to 120,000 FPM ; 0.5-2000 Hz
Accuracy: 0.01% ±1 digit of F.S. @ 77° F (25°C)
Lux Rating (Approx.): 6000 FPM & 85 Brightness: Distance 8″ (20 cm) 9500 lx with 7″ (178 mm) irradiation dia., Distance 20″ (50 cm) 2275 lx with 11″ (279 mm) irradiation dia. 1500 FPM & 85 Brightness: Distance 8″ (20 cm) 4250 lx with 7″ (178 mm) irradiation dia., Distance 20″ (50 cm) 1375 lx with 11″ (279 mm) irradiation dia
Lamp Lifetime: Approximately 3~5 years depending on usage.
Display: Backlit LCD
Resolution: 30 ~12,000 FPM = 0.1 FPM; 12,001~120,000 FPM = 1 FPM; 0.5~2000 HZ = 0.1 Hz
Flash Duration: 0.1°- 2.5° = 1-100 on display
Power Requirement: 100-240 VAC 50/60Hz
Battery: Lithium DC 12.6V 2600 mAh
Battery Life: Approx. 5 hours depending on settings
External Sensor Input: 12 V Pulse
Sensor Power Supply: 12 V dc up to 200 mA
Input Pulse Width: Over 50 μs
Temperature Limits: 32-95°F (0-35°C)
Humidity Limits: 35 to 85% RH
Enclosure: ABS
Product Weight: 0.62 lb (280 g)
Package Weight: 2.8 lb (1.3 kg)
Dimensions: 9 x 3.4 x 1.6" (228 x 86 x 40 mm)
Approvals: CE, RoHS
Warranty: 1 year
Included Accessories: AC power adapter, Carrying Case, Sensor Input Cable

Operation Panel

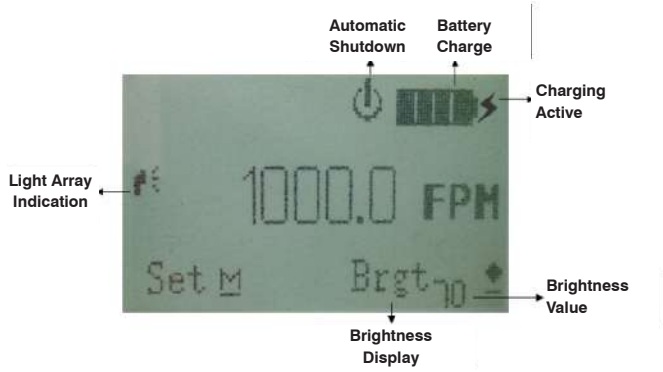
1. M: Enter the menu screen
2. X: In Internal Mode, the flash rate is multiplied by 2. Make a long press to perform faster multiplication of the flash rate. Confirms selection in menus.
3. ÷: In Internal Mode, the flash rate is multiplied by 2. Make a long press to perform faster multiplication of the flash rate. Back or return button selection in menus.
4. +: In Internal Mode, increases the flash rate value by single digits. Hold to increase speed. In menu screen, changes selection to the right.
5. - : In Internal Mode, decreases the flash rate value by single digits. Hold to increase speed. In menu screen, changes selection to the left.
6. •: In Internal Mode, press to enable adjustment of the brightness level setting. Brgt in bottom right of display will blink indicating it is active for adjustment. Press + or – to adjust up or down accordingly. Press again to exit out of brightness adjustment.
7. Power Trigger Button: In Internal Mode, press once to activate or deactivate the light array. Press for 2 seconds to turn on or off the stroboscope.



Power Trigger Button
on front of handle

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Home Display



Automatic Power Off icon appears at top if selection is set for unit to have 10 minute auto-shut off active.

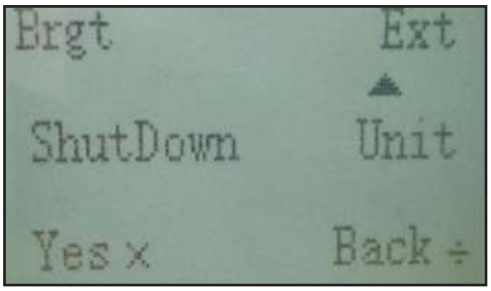
When charging cable is connected, a lightning icon appears on the upper right side of the display, indicating that charging is occurring.

Light Icon indicates light array is active when present.
Battery Indication - Indicates remaining battery charge.

	Batter capacity is full
	The Battery capacity is diminished Near zero capacity
	When battery is empty, the unit will power off

The battery can be used for more than 3.5 hours continuously when the frequency is 3000 FPM or 50Hz.

Menu Function Settings



To select any of the 4 function submenus, Press x to select, ÷ to go back to home screen.

Brgt: Allows brightness or flash duration adjustment of the light array. This can also be adjusted from the home display by pressing the • button.

Ext: Enables operation via remote sensor. Remote sensor must be connected via bottom port and included cable to operate.

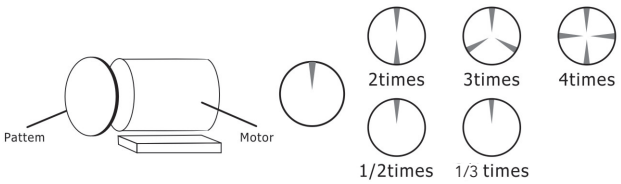
ShutDown: Activate a 10 minute auto shut off of the unit. If deactivated, unit only turns off with a 2 second hold of the handle trigger button.

Unit: Switch between Hz and FPM (flashes per minute).

Flash Rate (Frequency Setting) in Internal Mode -

One function of a stroboscope is to provide a "stopped" image of a rotating target when the flash rate of the stroboscope has matched the rotational speed of the target object. The stroboscope will show a single image when the flash rate is set to a lesser multiple of the true RPM (1/2,1/3,etc.) When the flash rate is increased to a higher multiple (2,3,etc.), multiple images will appear. To find the true RPM of the target object, begin at a higher than estimated flash rate and reduce the rate to lower values until only one stationary image appears.

Stopped Image:



Example			
True Rotational Speed of Target Object (rpm)	Flash Rate of Stroboscope (fpm)	Multiple of True Rotational Speed	Number of Stopped Images
900 rpm	3600	4 times	4
	2700	3 times	3
	1800	2 times	2
	900	1 time	1
	450	1/2 times	1
	300	1/3 times	1

Multiple/Divide by 2 Function - The flash rate can be doubled or halved by x2 and 1/2 keys on the operation panel.

1. Doubling the flash rate(x2), Press x2 key to multiply the current flash rate by a factor 2.

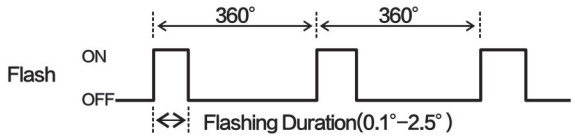
Note: The use of the x2 key will have no effect when multiplication of the current flash would result in a value that exceeds the maximum flash rate range. After the flash rate changes, it becomes the new value based on the set display resolution. Therefore, the rate may likely not return to the original frequency, even if the "1/2" key is pressed.

2. Halving the flash rate(1/2); Press "1/2" key to divide the current flash rate by a factor of 2.
Note: The use of the 1/2 key will have no effect when the division of the current flash rate would result in a value that goes below the minimum flash rate.

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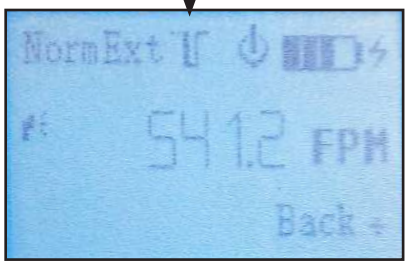
Flash Duration (Brgt) Settings
The flash duration, “Brgt”, can be set within the range of 0.1°-2.5° over a 360° period.
1 = 0.1 degree ; 100 = 2.5 degree.

When the flash duration is lengthened, the brightness of the flash will be increased, however the image of the target object may appear slightly out of focus. When the flash duration is shortened, the brightness will be decreased, yet the image of the target object will become more focused. To change the flash duration in either Internal or External modes,
From the home display, press the • key. Once pressed, the Brgt icon will blink. The flash pulse duration or brightness can now be modified from 1-100 values.



External Trigger Mode
External trigger mode will allow the flash rate of the ST-4000 stroboscope to be controlled by an external signal, such that the flash rate will automatically increase or decrease when the signal is altered, so that it may remain in unison with the speed of a changing target.

External Sensor Connection Symbol



Connector of External Input (EXT connection on bottom of handle)
External Sensor Input: 12 V Pulse
Sensor Power Supply: 12 V dc up to 200 mA
Input frequency: over 50 μs.
Note: When the external sensor is used, the AC power adapter must be connected to the unit.

Wiring:

1. Red - +12 V
2. Black - Ground
3. Yellow – Sensor Signal Pulse Input

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