

## Operation Manual



### Warning

Don't look directly into the light source. This may result in eye injury.

Don't use or store in the following environments: Direct sunlight, condensation, dust or caustic.

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

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



The DT-311D is a portable, highly stable, industrial-quality stroboscope for non-contact inspection and observation of moving parts by providing the user the illusion of stopped or slowed down equipment movement. Constructed with a rugged, metal enclosure, the DT-311D's withstand harsh industrial usage. The universal power range (85-240 VAC) allows one model to be utilized on various power voltages in a multitude of countries. The included top and bottom handles aid in portability and usage flexibility. The control adjustment settings allow the flash rate to be readily altered by the user to visually inspect rotating or reciprocating machinery such as gear teeth, rotors, shafts, rewinders, printing presses, etc. all without stopping production. These features make the DT-311D ideal for quality inspection and preventive maintenance of automated motion equipment.

### SPECIFICATIONS

**Flashing Range:** 60-12,000 fpm (flashes per minute)

**Accuracy:**  $\pm 0.01\%$  F.S.

**Resolution:** 0.1 from 60-6,000; 1 from 6,001-12,000

**Display:** 5 digits 0.4" (10 mm) height

**Flashtube Power/Life:** Xenon  $\leq 45W$  / 50,000,000

**Flash Duration:** 10-30  $\mu s$  automatically adjusts with flash rate

**External Trigger Input:** 5 V dc ~ 12 V dc pulse signal input (high level trigger) from sensor

**Sensor Power Supply:** 12 V dc up to 50 mA

**Lux Rating:** 8" (20 cm) Distance = 1550 lx @ 1500 fpm, 2350 lx @ 6000 fpm with 15.5" (400 mm) irradiation diameter.

20" (50 cm) Distance = 650 lx @ 1500 fpm, 580 lx @ 6000 fpm with 23.5" (600 mm) irradiation diameter

**Sensor Power Supply:** 5-12 VDC up to 50 mA

**Battery Life:** 1.5 to 2 hours depending on settings

**Time to Charge Battery:** 5 hours to full charge

**Power Requirement:** 85-240 VAC 50/60 Hz

**Operating temperature:** 32° – 104°F (0 – 40°C)

**Dimensions:** 8.3 x 4.7 x 4.7" (210 x 120 x 120 mm)

**Product Weight:** 2.2 lb (1.0 kg)

**Package Weight:** 2.6 lb (1.2 kg)

**Warranty:** 1 Year

**Certification:** CE, RoHS

**Included Accessories:** Top & bottom handles, 9.8' (3 m) power cable, 3 pin female M16 threaded connector

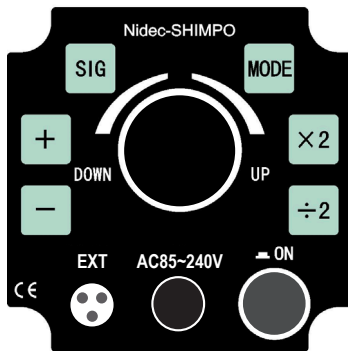
## FEATURES & FUNCTIONS

### Display



- FPM Flash speed indication in flashes per minute
- HZ Flash speed indication in Hz
- INT Operation in internal user settings mode
- EXT Operation in external sensor input settings mode

### Function Keys



- SIG** Signal selection. Press this key to switch between internal and external signal operation
- MODE** Switches between Hz and FPM
- +** Increases the frequency (internal trigger mode only)
- Decreases the frequency (internal trigger mode only)
- ×2** Multiplies the flash rate/frequency by a factor of 2 (internal trigger mode only)
- ÷2** Divides the flash rate/frequency by a factor of 2 (internal trigger mode only)
- EXT** External trigger Input
- ON** Switch on button

## OPERATION

### The Use of Internal Trigger

Turn the power on. The system enters the internal trigger mode. Turn the encoder knob, or press the “+” “-” keys to adjust the strobe frequency or flash speed so that detected the object appears stationary. Use “× 2” “÷ 2” keys to make large changes to the flash frequency.

To measure true revolutions per minute (RPM) by Marking:

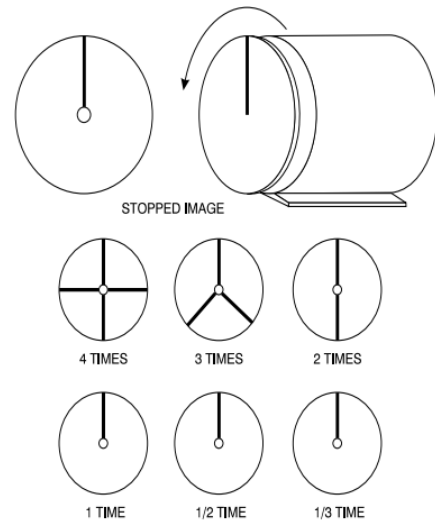
1. “Mark” the object to be measured by either visually noting an inherent distinguishing characteristic (such as a label, scratch, etc.) or physically marking the object with a small piece of tape, pencil mark, etc. If the object has a uniform shape, such as multi blade fan or the shaft of a motor, you should give it an identifying mark with reflective tape or paint to distinguish its direction.

2. Turn power switch on.

3. Set flash rate to the highest value and adjust downward.

4. The true RPM can be noted once the action appears frozen and the first single image of the “mark” appears (see chart below and accompanying diagram for further explanation).

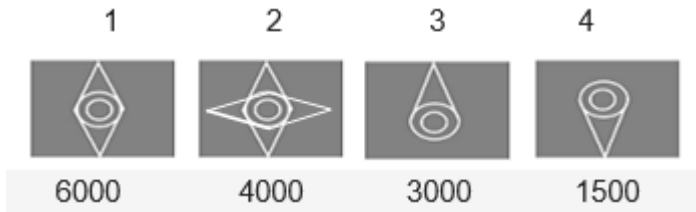
5. To verify RPM reading, press “÷2”; a single image should appear again.



Rotation of shaft (rpm)	Number of flashes (rpm)	Flashes/ rpm shaft	Number of stopped images
at 1,500 rpm	6,000	4 times	4
	4,500	3 times	3
	3,000	2 times	2
	1,500	1 times	1
	750	1/2 times	1
	500	1/3 times	1

To measure true revolutions per minute (RPM) without Marking:  
This example explains that if the object has a suitable, unique shape, then the actual speed of the object may not need to be determined by marking the object.

In this example, the rotation is below 7000 rpm, the following harmonic image appears:



Harmonic images at 6000 and 4000 rpm are not a single still image, but double and quadruple. Single image appears at 3000 and 1500 rpm. 1500 is half of 3000 and the same single image appears, therefore, the actual speed of the object is 3000 rpm.

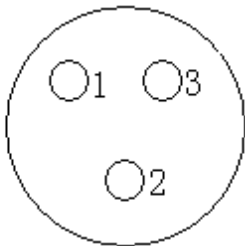
Actual Speed RPM	Strobe Frequency FPM	Multiple	Number of Still Images
3000	12,000	4	4
3000	9,000	3	3
3000	6,000	2	2
3000	3,000	1	1
3000	1,500	1/2	1
3000	1,000	1/3	1

### The Use of External Trigger

When in EXT mode: In this mode, the flash trigger signal frequency or flash rate speed is automatically adjusted according to an external sensor's input signal.

Wiring of the external sensor is as follows:

- 1: +12 V dc up to 50 mA
- 2: Ground
- 3: Trigger signal 5 - 12 V dc



### TROUBLESHOOTING

Issue	Troubleshooting Methods
Unit does not work and no display	Check the power supply is proper
	Power Switch is functioning
	Whether internal fuse is burn out, check and replace
Unit does not work but displays properly	Silicon controlled rectifier / optical coupler (IRF840/521-1) need replacement
	Strobe flashtube needs to be replaced
	Check if unit is in external trigger mode
Does not flash under external trigger mode	Check if the trigger sensors are working properly
Flashes intermittently	Flashtube needs to be replaced
Flash but the flash is darker or dimmer than typical	

**DIMENSIONS (mm)**

