Digital synthesis, high reliability, Xenon tube

STROBOSCOPE

Model : DT-2349

Your purchase of this DIGITAL STROBOSCOPE marks a step forward for you into the field of precision measurement.
Although this STROBOSCOPE is a complex and delicate instrument, its durable structure developed. Please read the following instructions carefully and always keep this manual within easy reach.

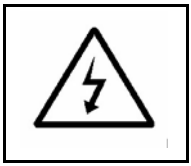
OPERATION MANUAL

Warning !

Do not look directly at strobe/reflector. Light pulses at the frequency greater than 5 Hz may cause photosensitive epilepsy in some individuals if directly viewed.

A feature of the instrument is to make moving objects appear to be stationary. Precaution should therefore be taken to ensure that there is no physical contact made with objects being viewed.

Caution Symbol



Caution :

* Risk of electric shock !

Caution :

* Do not use fingers or any tool to touch the FLASH TUBE.
* The instrument contains no user serviceable parts and should not be opened by the user.
* Repair or after service should be done by a qualified technician only.
* Power plug should apply the correct ACV power voltage
* Operating duty cycle should be adhered to.
* Cleaning - Only use the dry cloth to clean the plastic case !

Environmental Condition

* Comply with EN61010
  Transient overvoltage at Mains Supply 2500V
* Pollution Degree 2.
* Altitude up to 2000 meters.
* Indoor use.
* Relative humidity 80% max.

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1. FEATURES

* The Digital Stroboscope is used the microprocessor circuit design, high accuracy, digital readout, light duty, that is ideal for inspecting and measuring the speed of moving gears, fans, centrifuges, pumps, motors and other equipment used in general industrial maintenance, production, quality control, laboratories and as well as for schools and colleges for demonstrating strobe action.
* Digital synthesis circuit, high stability and high adjusting resolution, easy operation.
* Crystal time base to offer high accuracy measurement & fast measuring time.
* Xenon flash tube, high intensity.
* Wide range : 60 to 32,000 RPM.
* Adjustment resolution : 0.1 RPM (< 1,000 RPM), 1 RPM ($\geqq$ 1,000 RPM).
* High intensity light.
* Setting buttons : Digital adjust button, x 2 button, ÷ 2 button, + button, - button, easy operating.
* Xenon flash tube with plug and socket, easy to make the tube replacement.
* Compact and heavy duty housing case.

2. SPECIFICATIONS

2-1 General Specification

Display	5 digits (0 to 99999) LCD display.	
Flash adjust range	60 to 32,000 RPM/FPM. ** FPM : flash per minute.*	
Resolution	0.1 RPM : < 1,000 RPM.	
	1 RPM : ≧ 1,000 RPM	
Function buttons	Digital rotate knob, x 2 button, ÷ 2 button, + button, - button,	
Accuracy	± (0.05 % + 1d) ** Spec. tested under the environment RF Field Strength less than 3 V/M & frequency less than the 30 MHz only.*	
Power Supply	110 Vac ± 10%, 50/60 Hz. or 220 Vac ± 10%, 50/60 Hz. or 230 Vac ± 10%, 50/60 Hz.	
		** A " Voltage rating label " is affixed under the bottom case to show the voltage rating of power supply. When use the stroboscope, make sure to identify the power supply voltage exactly.*
Circuit	* Microcomputer LSI circuit & crystal control time base. * Digital synthesis circuit for the signal adjusting.	

Signal Stability	The signal adjusting circuit is used the digital synthesis circuit, the output signal will existing high stability and not change.
Power Supply	AC(100V to 240V) to DC 9V (3A) adapter, incuded. Build in battery compartment, power can be used the optional DC 1.2 V Ni-MH recharge battery (UM-1, D size) x 4 PCs.
Power Consumption	DC 2.4 A (3600 FPM)
Operating Temp.	0 to 50 ℃ (32 to 122 ℉).
Operating Humidity	Less than 80% R.H.
Dimension	21 x 12 x 12 cm (8.3 x 4.8 x 4.8 inch).
Weight	1Kg/2.2 LB.
Housing	Compact and impact plastic injection case with plastic mirror type reflector.
Calibration	Crystal time base and microprocessor circuit, don't necessary take any external calibration process.
Accessories Included	Operation manual.....1 PC. AC(100V to 240V) to DC 9V adapter .....1 PC.
Optional Accessory	Flash Xenon tube... Model : TBXE-2289
	DC 1.2 V Ni-MH recharge batteries, UM-1/D size (BAUM-1) x 4 PCs.
	DC 1.2 V Ni-MH batteries charger with AC adapter, complete set. Model: BACH-110 (AC 110V power) Model: BACH-220 (AC 230V power)

2-2 Flash Tube Specification

Flash tube	Xenon lamp.
Flash Duration	Approximately 5 to 12 microseconds.
Flash color Temp.	Xenon white 6,500 K degree.
Flash energy	4 Watts-seconds (joules).
Beam Angle	80 degrees.
Flash tube replacement	It is required to change the flash tube when the instrument start to flash irregularly at speeds > 3600 RPM/FPM.
Operating duty Cycle	For prolong life and safety, please adhere to the following operation duty cycle: < 2000 RPM - 2 hours 2001 to 3600 RPM - one hour 3601 to 8000 RPM - 30 minutes > 8000 RPM - 10 minutes. ** 10 min. cooling off period between cycles.*

3. FRONT PANEL & LAYOUT DESCRIPTION

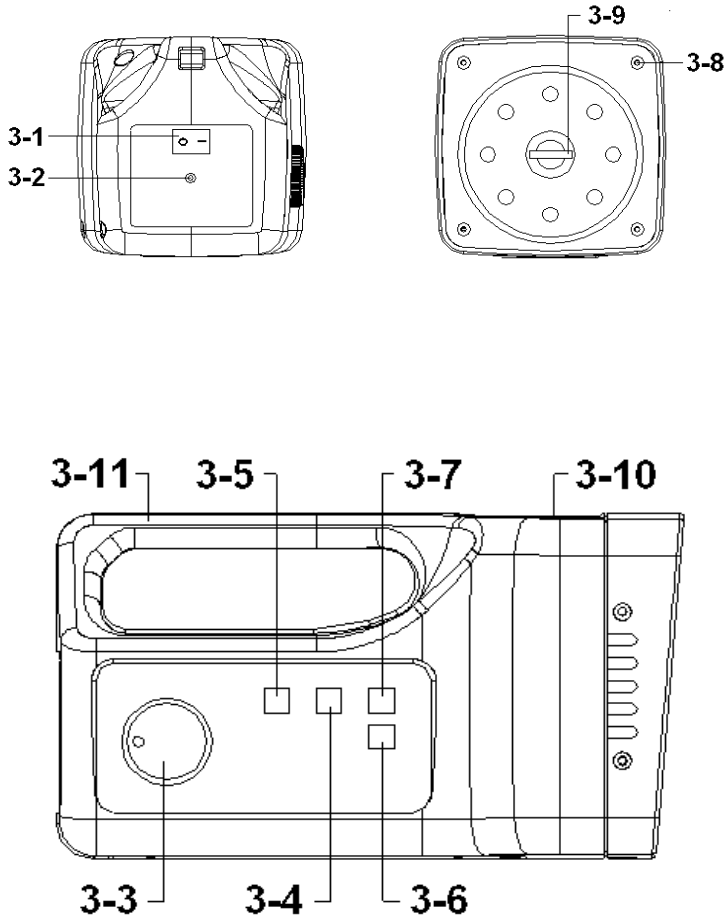


Fig. 1

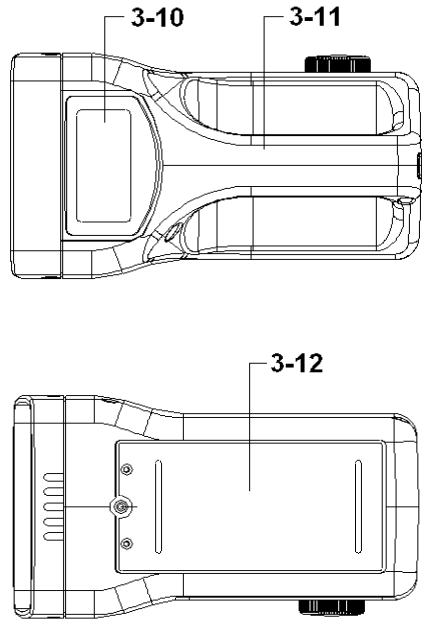


Fig. 1

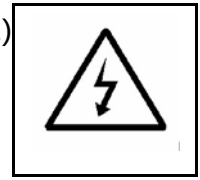
3-1 Power On/Off Switch
3-2 DC9V Power Adapter Input Socket
3-3 Digital adjusting knob
3-4 - button
3-5 + button
3-6 ÷ 2 button
3-7 x 2 button
3-8 Front Cover Screws
3-9 Xenon Tube and Tube Socket
3-10 Display
3-11 Handle
3-12 Battery Cover/Battery Compartment

4. POWER SUPPLY CONSIDERATION

1) The instrument is shipped along with an ACV (100V to 240V) to DC 9V (3A) adapter.
2) When operate the instrument, it should insert the DCV output plug of DC adapter into the " DC 9V Power Adapter Input Socket " (3-2, Fig. 1). Connect the ACV input plug of DC adapter into the a properly 110V AC, 220V AC or 240V AC outlet.

Recharge Battery operation

1) The stroboscope also build in battery compartment, power can be used the optional DC 1.2 V Ni-MH recharge battery (UM-1, D size) x 4 PCs.

2) 

Caution :

* When power use the recharge batteries, it should take away the DCV adapter away from the meter.
* Power can not use both recharge batteries and the DC 9V adapter in at the same time.

3) When the LCD Display showing " LO ", it should to replace the batteries or need to recharge the batteries again.

5. STROBOSCOPE MEASURING PROCEDURES

5-1 Preparation and operating consideration

1) Connect the Power cable into the Power input socket " 3-2, Fig. 1 ".

Caution :

* The power plug should be connected to the correct AC power supply.

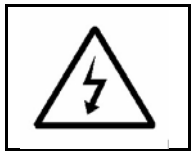
2) **A " Voltage rating label " is affixed under the bottom case to show the voltage rating of power supply.**
When use the stroboscope, make sure to identify the power supply voltage exactly.
Plug power cable's plug into a properly grounded AC outlet.

3) For prolong life and safety, please adhere to the following operation duty cycle:

< 2000 RPM - 2 hours
2001 to 3600 RPM - one hour
3601 to 8000 RPM - 30 minutes
> 8000 RPM - 10 minutes.

** 10 min. cooling off period between cycles.*

4) Do not use fingers or any tool to touch the " Xenon tube " (3-9, Fig. 1)



Caution :

* Do not use fingers or any tool to touch the " Xenon tube "
* Risk of electric shock !

5-2 Checking Speed (RPM/FPM)

1) Power off the installation to be measured, make a " mark " on the rotation area where it is intended to measure the RPM, then power on the installation to be measured.
2) Press the " Power switch " (3-1, Fig. 1) to turn on the Stroboscope.
   " 1 " position is power on.
   " 0 " position is power off.
3) The display will show " 100.0 " RPM (FPM), it is the default value.
   Use the " x 2 button " (3-7, Fig. 1) to adjust the display value near the estimate setting signal's RPM approximately..
   * *Press the " x 2 button " once will double the display value.*
     For example, the display is " 100.0 " , press the " x 2 button " , the display will change to " 200.0 ". Press once again, the display will change to " 400.0 ".....
   * *Press " ÷ 2 button " (3-6, Fig. 1) will divide the display value by two.*
     For example, the display is " 400.0 ", press the " ÷ 2 button " , the display will change to " 200.0 ". Press once again, the display will change to " 100.0 ".....

4) **Setting value by " Digital adjusting knob "**

Rotate " Digital adjusting knob " (3-3, Fig. 1)
to adjust the exact display value.

* Turn the knob to clockwise direction will increase the display value.
* Turn the knob to counter-clockwise direction will decrease the display value.
* If rotate the knob slowly, the display value will change with high resolution (change just with 1 digit).
* If rotate the knob fast, the display value will change with low resolution (change with more digits).

Setting value by " + button " , " - button "

Use the " + button " (3-5, Fig. 1) , " - button " (3-4, Fig. 1) to adjust the exact display value.

* Press the " + button " once (continuously) will increase the display value.
* Press the " - button " once (continuously) will decrease the display value.
* If press the button once, the display value will change with high resolution (change just with 1 digit).
* If press the button continuously, the display value will change with low resolution (change with more digits).

When checking the speed, care must be taken to ensure that the strobe is flashing in unison (one to one) with the object being monitored.

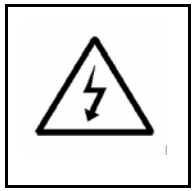
5) The Stroboscope will also stop motion at 2:1, 3:1, 4:1 et., this is normally referred to as harmonics. To ensure unison, turn the dial until two images appear - this will double the actual speed. Then lower the flashing rate until a single and stationary image appears - this is the actual true speed.

5-3 Checking Motion

For motion analysis, simply locate the actual speed as mentioned above and then turn the dial slowly up or down. This will give a slow motion effect allowing complete inspection.

6. FLASH TUBE REPLACEMENT

The flash tube requires changing when the instrument start to flash erratically at speeds of 3600 RPM/FPM or more.



Caution :

* Change of the Flash Tube should only be done by a qualified technician. As the instrument contains no user serviceable parts.
* Before replace the tube, should power off the meter, and wait at least 15 minutes until the circuit be discharged completely.

1) Loss (rotate) the " Front Cover Screws " (3-8, Fig 1, and take away the " Front end protection cover ".
2) There is a plug and the socket for connecting the the tube with the main instrument.
   Take away the tube and replace the new unit.
3) Install the front top cover and end protection cover again.

7. THE ADDRESS OF AFTER SERVICE CENTER

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