

# SHIMPO

NIDEC-SHIMPO AMERICA CORPORATION

*A Nidec Group Company*

## Model DT-315P

# DIGITAL STROBOSCOPE

# INSTRUCTION MANUAL



# SHIMPO

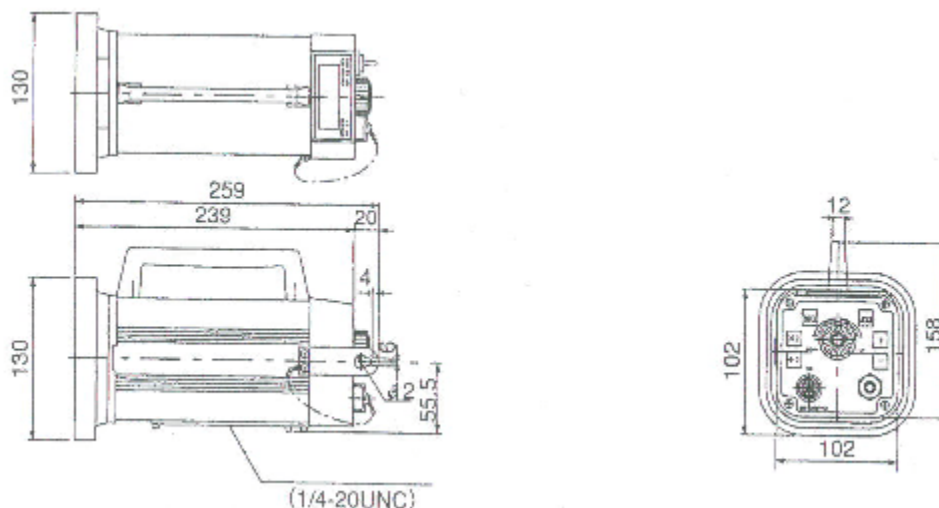
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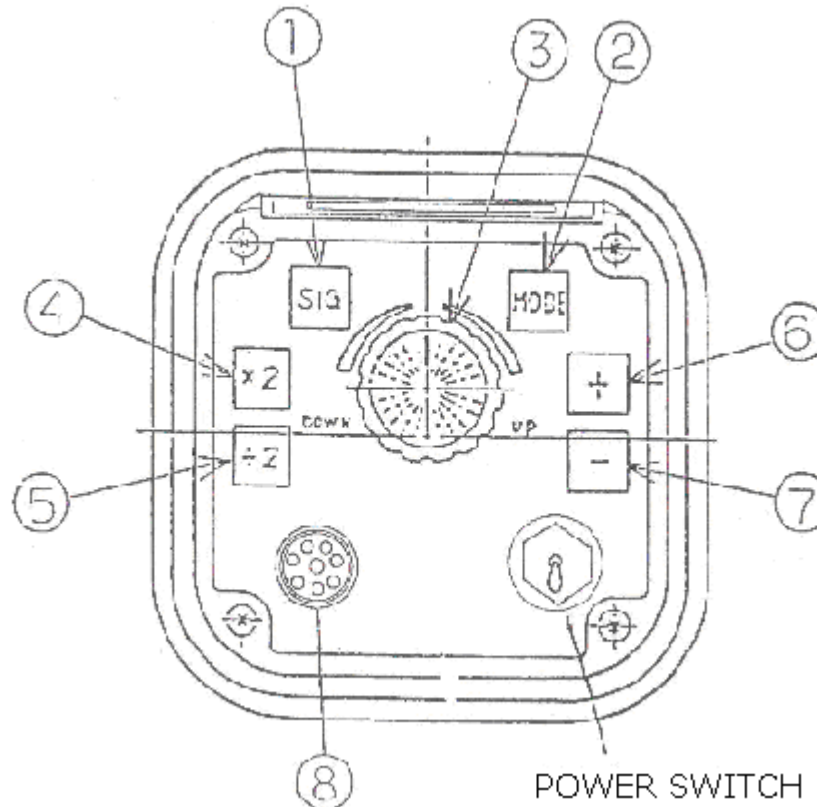
## **1. CAUTION**

- \* Do not operate or store in the following places:
  1. Explosive areas
  2. Places where water, oil, chemicals, or dust, etc. exists
  3. Places where the temperature is over 104°F (40°C)
- \* Avoid looking at the emitted light for long periods of time. It may hurt your eyes.
- \* Do not attempt to dismantle or repair this unit.
- \* Use tripod screws 1/4-20unc, length 8mm or shorter for the tripod screw holes on the bottom.
- \* Charge the battery before using the unit for the first time.
- \* After the power has been on for 10 minutes, the flashes will stop and the display will flicker to protect the life of the xenon lamp. To continue measuring, re-power on.

## **2. DIMENSIONS**



## 3. DESIGNATIONS



### 1. SIGNAL SWITCH

When the SIG button is depressed, the unit switches from the external mode to the internal mode and vice-versa and the appropriate LED lights.

### 2. MODE SWITCH

When the unit is switched to external mode, every time the mode button is depressed, the strobe will move; rpm(fpm)-deg-m.sec.

rpm(fpm) ---- displays flashes per minute  
External input: 100~3,000 FPM

deg ---- displays flash delay in degrees

m.sec ---- displays the flash delay in m.sec.



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### 3. SETTER DIAL

The setter dial changes the flashing rate.

External dial ---- used for coarse adjustment:  
clockwise for increasing rate.  
counter-clockwise for decreasing rate.  
The setter returns to mid-position.

Internal dial ---- used for fine tuning:

One turn of the dial will change 10 digits in the display.

### 4. x2 SWITCH

In the internal mode, every time the x2 button is depressed, the flashing rate is doubled.

### 5. ÷2 SWITCH

In the internal mode, every time the /2 button is depressed, the flashing rate is decrease by half.

### 6. PLUS SHIFT SWITCH

When the object appears to be standing still, pressing this button will give the illusion that the object is moving toward the rotating direction at a speed of 1 rotation in 6 seconds.

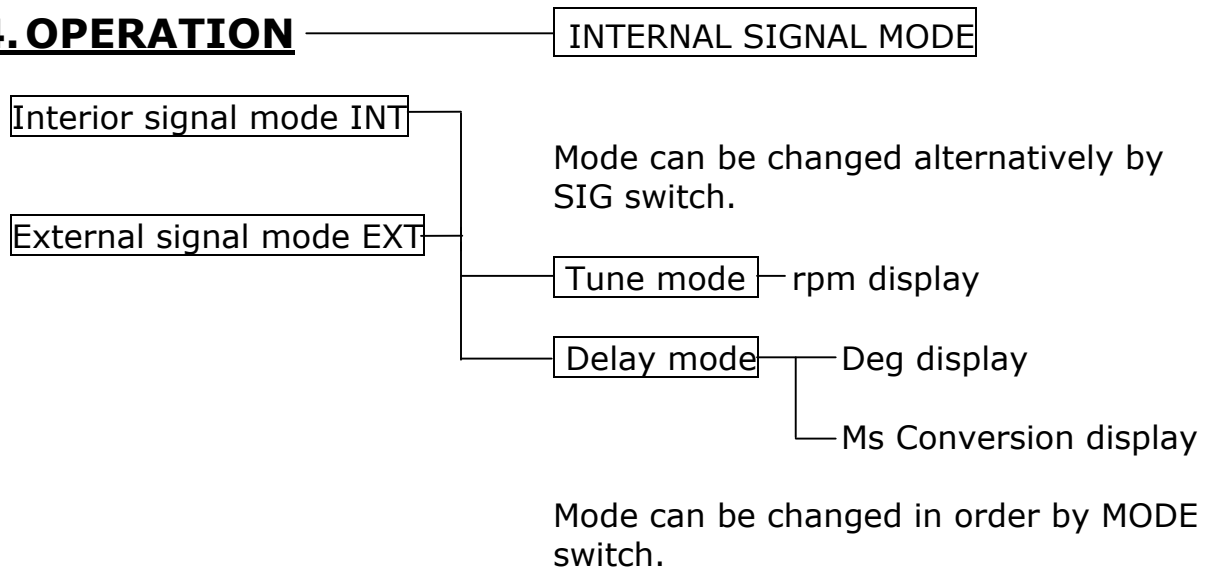
### 7. MINUS SHIFT SWITCH

When the object appears to be standing still, pressing this button will give the illusion that the object is moving in reverse of the rotating direction at a speed of 1 rotation in 6 seconds.

## 8. INPUT & OUTPUT CONNECTOR

PIN#1	+12V
PIN#2	Synchronized Output
PIN#3	Input Signal
PIN#4	0V
PIN#5	---
PIN#6	+15V
PIN#7	0V
PIN#8	Earth Ground

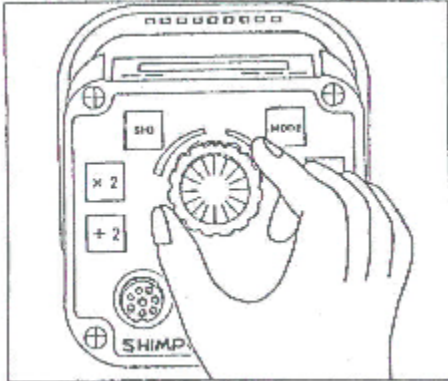
## **4. OPERATION**



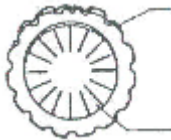
1. Firmly plug power cord into a 120VAC (USA) or 230VAC (Europe) single phase outlet.
2. Turn power switch on.
3. Press the SIG button if the INT lamp does not light up.
4. Aim the light beam at the object under observation.

The best distance between the strobe and the moving object is approximately 2 ft. (50 cm),

5. Measuring rpm is done by turning the setter dial.



Turn the EXTERNAL KNOB to adjust the flashing rate to the rotating speed of the object. The greater the turning angle, the faster the flashing rate.



Turn the INTERNAL KNOB to adjust the flashing rate to the rotating speed of the object precisely until the object appears to be standing still.

When the frozen motion is obtained, press the x2 or  $\div 2$  button:

When the x2 button is pressed, 2 frozen figures can be seen overlapped by 180 degree phase shift.

When the  $\div 2$  button is pressed, a freed figure can be seen.

At this moment, the actual rpm of the rotating shaft can be displayed.

The phase shifted frozen motion can also be seen when the displayed rpm is  $1/2$ ,  $1/3$ ,  $1/4$ , etc., of the rotating shaft. When the x2 or  $\div 2$  buttons are used effectively, the correct rpm can be attained.

When the + button is pressed, the frozen figure will shift towards the rotating direction.

## 4. OPERATION

### EXTERNAL SIGNAL MODE

Interior signal mode INT

External signal mode EXT

Mode can be changed alternatively by SIG switch.

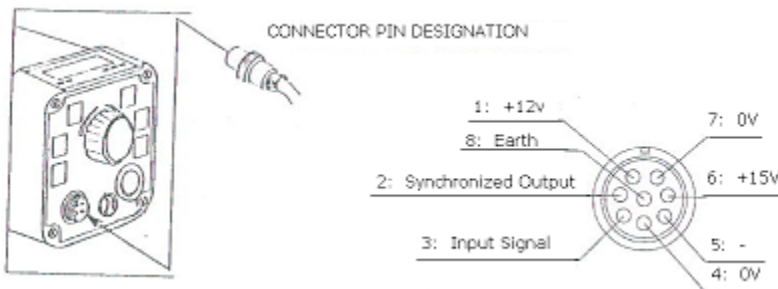
Tune mode rpm display

Delay mode Deg display

Ms Conversion display

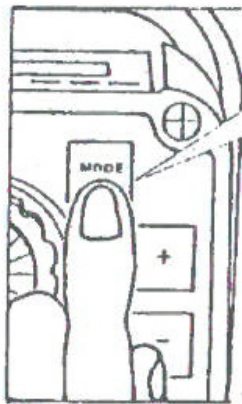
Mode can be changed in order by MODE switch.

1. Connect signal wires with main body of the instrument after soldering the wires with connectors.



2. Firmly plug power cord into a 120VAC (USA) or 230VAC (Europe) single phase outlet.

4. Turn power switch on.



Tune mode and Delay mode are available as external signal mode, can be selected by MODE button.

\* **Tune Mode** RPM flashing

When receiving the input signal, the flashing will start and the input signal will be converted and displayed in rpm. At this moment the setter dial does not interfere.



\* **Delay Mode**

When the input signal cycle is 360°, the flashing can be delayed by 1~359°. The delayed angle is adjusted by the setter dial. The display unit can be selected in deg. or ms.

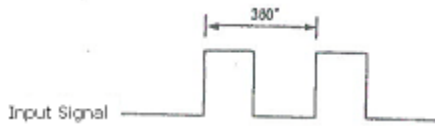
deg flashing --- shows angle display  
ms flashing --- shows time, converted from angle



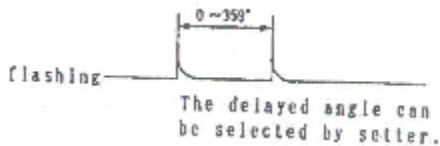
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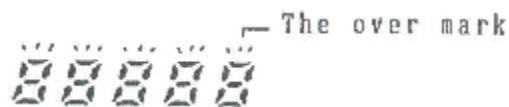
\* In delay mode, the correct delayed angle can only be obtained with a stable input signal.



If the input signal frequency exceeds the upper and lower limits, the alarm mark will be displayed and the strobe will stop flashing.

## IN RPM DISPLAY MODE

When the input signal exceeds 500Hz, the over mark will light.

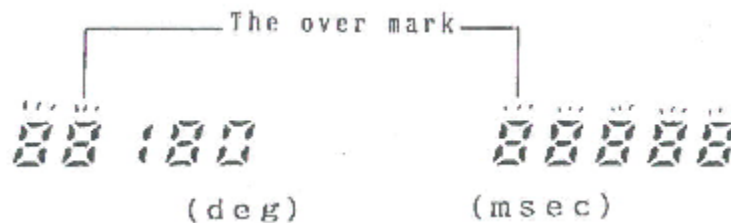


When the input signal is lower than 1.6Hz, the under mark will light.



## IN DEG, MSEC DISPLAY MODE

When the input signal exceeds 60Hz, the over mark will light.

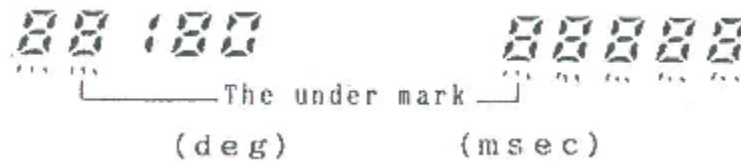


When the input signal is lower than 3.3Hz, the under mark will light.

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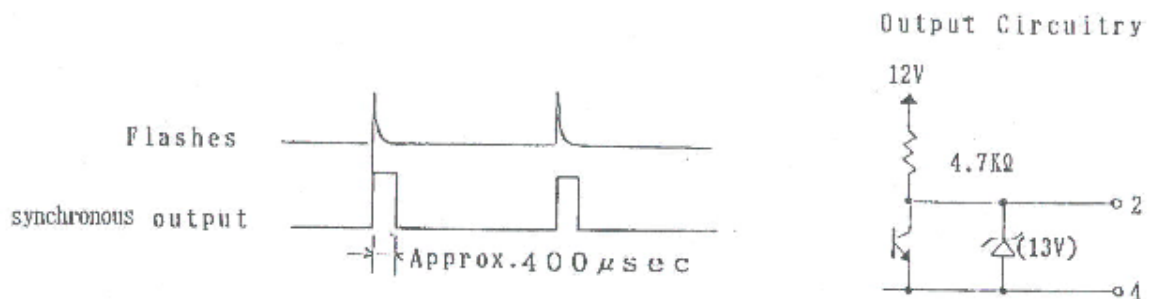
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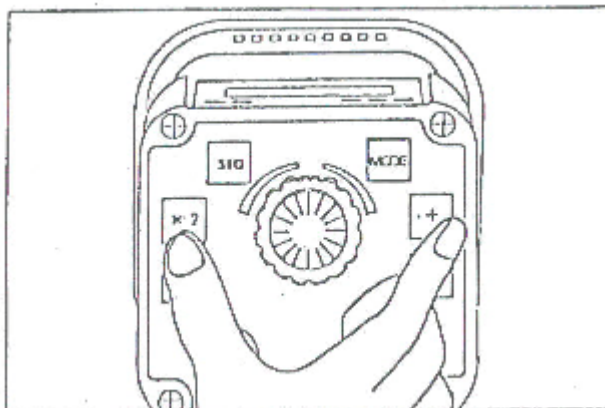
## SYNCHRONOUS SIGNAL OUTPUT

The synchronous signal is output from #2 pin connector.



## MEMORY

All previous settings are stored in the memory. When the power is turned on again, the strobe will revert back to the previous settings. If the memory data is lost by over limit noise, press x2 and + buttons at the same time, then switch on the power. This returns the strobe back to the factory settings.



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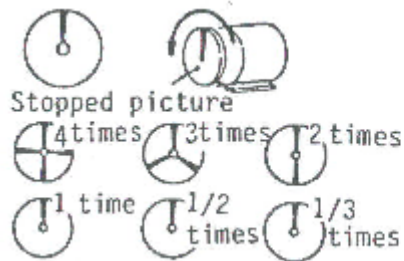
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NOTE:

TRUE RPM

All strobos give the illusion of stopped motion when flashing submultiple of the true speed.

\* To obtain the correct rpm; Turn the dial from high rpm down to low rpm. When the first single image appears, read the true rpm. To verify the rpm, press the  $\div 2$  button. A single image will appear again.



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

## FLASH TUBE REPLACEMENT

Indications:

- Lamp life is about 100 million flashes.
- Rotation speed is displayed, no flash is emitted.
- When the flash is intermittently emitted, this indicates the lamp must be replaced.
- Only replace flash tube with the specified lamp: (FLASHTUBE311-2).

Directions:

- (1) After unplugging the line cable from the power line, let the stroboscope sit for about 30 minutes or longer. Be sure stroboscope is cool to the touch before replacing the lamp.
- (2) Remove the lamp protection window by loosening the 4 screws on the window. Insert a fine screw driver into a hole of the protection window and pull out.



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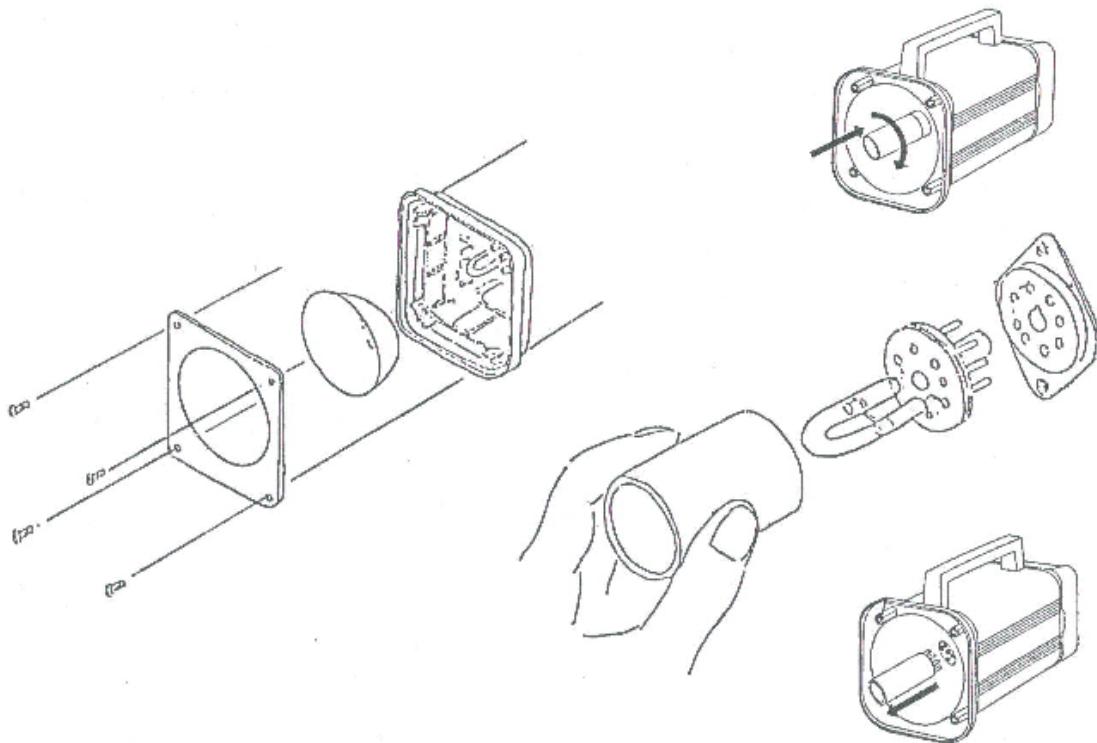
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- (3) Remove the reflector and pull out the lamp base. Caution, do not pull out the lamp glass directly.
- (4) Do not touch the flash tube with fingers. Use a clean cloth. Press the lamp base to the socket in the proper direction to install the new lamp.
- (5) Important: In order to maintain protection against water, be sure to mount the reflector in the center. Fix the reflector on the former position and fix the protective window with fingers. Use a clean cloth. Press the lamp base to the socket in the proper direction to install the new lamp.

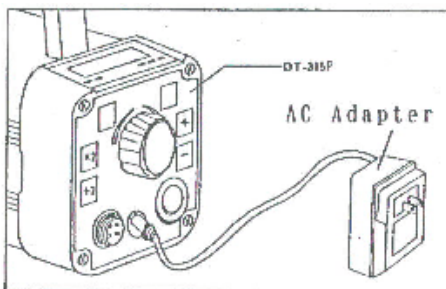
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## \* BATTERY CHARGER



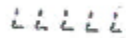
At dispatching, this instrument is in electric discharging condition. Please charge battery of this instrument at initial operation.

1. Turn off the power. Plug the strobe into the SHIMPO provided AC adapter/charger and charge the battery for approximately 10 hours. The AC adapter/charger can be used to power the strobe for up to 10 hours, then it must be disconnected in order to preserve battery life. The same is true when charging the battery without the strobe flashing.
2. During operation, if the battery is fully discharged, the following message will be displayed and the flashing will stop.

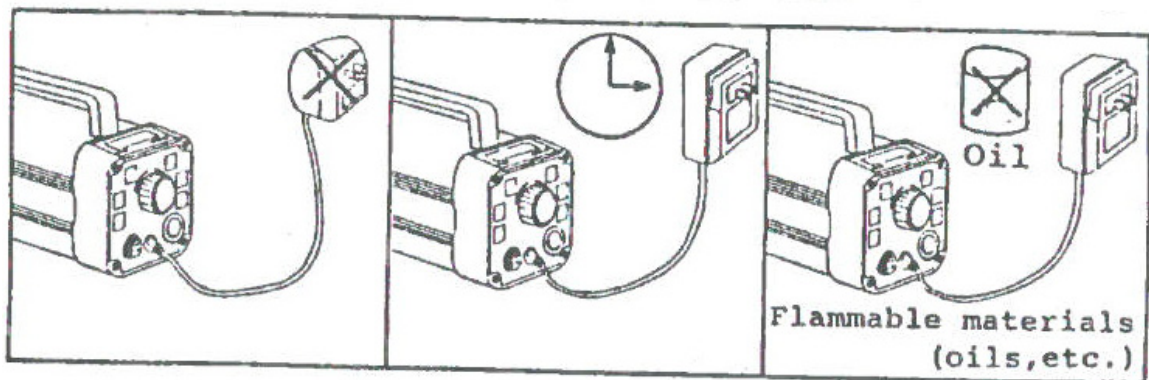
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Do not charge the battery in the following manner.



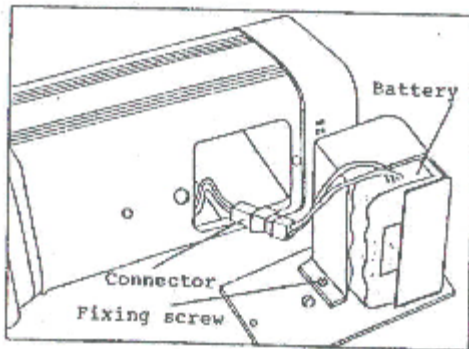
Do not use another brand of AC adapter.

Do not charge for over ten hours.

Do not charge the battery in a flammable material area.

## BATTERY REPLACEMENT

The life of the built-in battery is 300 charges. If the recharging time shortens, the battery is almost worn out. The battery must be replaced with a new one.



## CONTINUOUS OPERATION BY EXTERNAL POWER

\* The strobe can be operated by using the provided AC adapter. Do not operate the strobe over 10 hours to avoid overcharging the built-in battery. If you operate the strobe with the AC adapter provided, remove the plug connector from the built-in battery. Refer to the BATTERY REPLACEMENT process.

\* Operate by other power

If you operate the strobe by other power, remove the plug connector from the built-in battery.

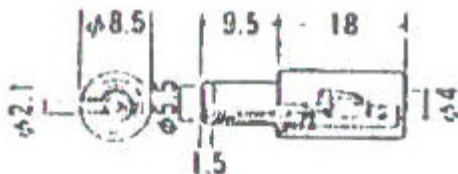
External power specifications

9~14.5VDC MAX 40mA

If the power is too high, the following message will be displayed.

XXXXXX

Plug



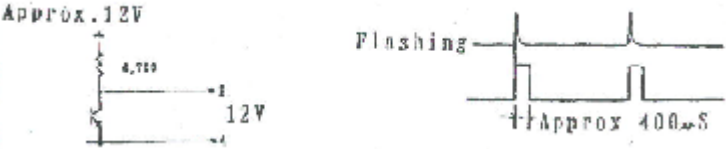
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### SPECIFICATIONS

DT-315P

INTERNAL SIGNAL MODE	
FLASHING RANGE	60.0~3,300FPM
DISPLAY ACCURACY	± 0.01%
DRIFT	± 0.01% (at 0 ~ 40°C)
UPDATE TIME	(Approx.) 0.2 seconds
TONE OUTPUT SIGNAL	
OTHER FUNCTIONS	x1/2. x2 Flashings, Phase shift adjustment
EXTERNAL SIGNAL MODE	
FLASHINGS	In synchronous mode: 60~3,000FPM In delay mode: 200~3,000FPM
DELAY ANGLE SETTING RANGE (In delay mode)	0~359° Set by 1°
DISPLAY	RPM in synchronous: e, 60~3,000FPM DELAY ANGLE in delay mode 0~359° or 0~300mS conversion display
DISPLAY ACCURACY	± 0.01% plus ±1 digit in synchronous mode +0 -0.2mS plus ±1 digit in delay mode
UPDATE TIME	1 second
INPUT SIGNAL	H level 2.5~12V *50µS or over for H.L level L level 0~0.4V *Trigger at rising edge *Approx. 10KΩ impedance
SENSOR POWER	Operate by built-in battery: 6.8~11.0V Operate by adapter: 10.2~12.2V Operate by DC: 9~14.5V: 7.8~14.1V





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SPECIFICATIONS

DISPLAY	5 digit, 7 segment red LED (Character height 0.39 in. (10mm))
SETTER	FLASHING DELAY AGLE: JOG SHUTTLE MODE, DISPLAY UNIT: TACT SWITCH
FLASHTUBE	Xenon lamp: FLASHTUBE311-2
FLASHTUBE POWER	MAX. 10W
FLASHTUBE TIME	Approx. 0.30 $\mu$ Sec
POWER	<p>* <u>Operation by built-in battery</u> Nicc battery, 8KR-2000sce SANYO Operating time: approx. 1 hour (Full charge at 3,000 FPM)</p> <p>Battery charge time: approx. 10 hours Charge with the provided adapter. Do not charge battery over 24 hours.</p> <p>Operation during charging is possible. When you are charging during use, do not use over 10 hours continuously</p> <p>* <u>Operate by external power</u> Unplug the connector of the built-in battery before operating the strobe by external power to avoid overcharging of the battery.</p> <p>DC: 9~14.5V, Max 24W (current consumption is 24W/input voltage) or operate by provided adapter AC: 100V <math>\pm</math>10%, 50Hz, Max. 40VA</p>
OPERATING TEMPERATURE	0-104°F (0-40°C)
WEIGHT	Approx. 4.63 lbs (2.1kg)
POWER PLUG	PJ-2 (Sato parts) or the equivalent
ACCESSORIES	INPUT/OUTPUT SIGNAL PLUG, AC adapter