

# MACHINE VISION STROBOSCOPE

## MV SERIES



## Operating Manual



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## SECTION 1 - Introduction

### 1.1 DESCRIPTION

The Check•Line Machine vision strobes are sources of short duration, high intensity light pulses for industrial machine vision applications.

The units come with an input power cable and a connector for a strobe control input cable. The light source uses a high power xenon flash tube. The light output is focused on a port configured to accept a fiber-optic cable so that light can be transmitted to a remote area from the power supply.

The MV stroboscope can be used for a wide variety of industrial robotics production applications. These can consist of sorting, package integrity, verification, counting, label reading, component orientation, motion sensing, edge detection, contaminant detection, part recognition, color differentiation and other quality assurance applications.

Please read and follow all safety precautions, such as:

|   |
|---|
| <p><b>Warning!</b><br/><b>Strobe Lights have been known to trigger seizures in people with photosensitive epilepsy.</b></p> |
|---|

|   |
|---|
| <p><b>Warning!</b><br/><b>Avoid looking directly at the high intensity light flash, whether at the unit itself or at the end of a fiber-optic cable, as this can result in damage to the eyes. A fiber-optic nosepiece is hot after continuous use. Handle with care and caution.</b></p> |
|---|

### 1.2 UNPACKING

If the condition of the outer package indicates mishandling has occurred during transit, examine stroboscope for any signs of breakage during shipment. The Xenon Flash Tube is vulnerable to rough treatment during shipment. Although special care is taken to prevent breakage if the container is mishandled in transit. If there are any indications of obvious damage to crate, contact the carrier immediately and do not proceed with the installation. It is recommended that the package material be retained and stored in the event that the unit has to be reshipped.

## SECTION 2 – Specifications

| <b>1. OPTICAL</b>             | <b>MV-6010</b>                         | <b>MV-6020</b>       | <b>MV-6060</b>       |
|-------------------------------|--|----------------------|----------------------|
| Spectral bandwidth            | 300-1100 + nm                          | 300-1100 + nm        | 300-1100 +nm         |
| Radiometric light Output      | 75mJ/cm <sup>2</sup>                   | 46mJ/cm <sup>2</sup> | 20mJ/cm <sup>2</sup> |
| Flash rate in Hz @ 600V       | 10 max                                 | 20 max               | 60 max               |
| Pulse duration @ 1/3 Peak     | 15µsec                                 | 15µsec               | 8µsec                |
| Fiber bundle outside diameter | 0.28 to 1.0 inch (7 to 25 millimeters) |                      |                      |

| <b>2. ELECTRICAL</b>                         | <b>MV-6010</b>   | <b>MV-6020</b> | <b>MV-6060</b> |
|--|--|----------------|----------------|
| Input Power                                  | 90-230VAC ± 10%, 50/60Hz   |                |                |
| Input Current                                | 0.8-0.4A rms maximum @ 90/230VAC   |                |                |
| Trigger Input                                | (+5V), 10 -100µsec pulse into 4N36 opto-isolator with internal 150'E nominal series resistor |                |                |
| FlashLamp voltage (factory Set)              | 600VDC   | 600VDC         | 600VDC         |
| Discharge capacitor                          | 24µF   | 12µF           | 4µF            |
| Input energy per flash @ 600V                | 4.32 joules  | 2.16 joules    | 0.72 joules    |
| Delay between flash command and light output | 10 µsec (typ)  | 10 µsec (typ)  | 10 µsec (typ)  |
| ext. ref. voltage                            | 5 to 10 volts DC (Vo = Vref x 75)  |                |                |

| <b>3. Environmental</b> |                                   |
|-------------------------|-----------------------------------|
| Operating temperature   | (-10° to + 110°F) (-20° to +43°C) |
| Storage temperature     | (-40° to + 194°F) (-40° to +90°C) |

## Section 3 – INSTALLATION

### 3.1 MOUNTING

Four holes in the base of the MV enclosure are available for mounting the unit. Mounting hardware is user-supplied. Position the unit so that the AC receptacle is accessible as a means of disconnect.

## 3.2 SAFETY REQUIREMENTS

The MV has features related to safety, such as:

To prevent the possibility of injury from flashlamp breakage, leave either the plastic lamp cap or a fiber-optic in place at all times. Do not operate the unit with the lamp cap in place. See flashlamp replacement warning on page 8.

Use the AC Receptacle as a disconnect device to remove any possibility of electrical input, particularly, when accessing the units interior.

## Section 4 – OPERATION

### 4.1 OUTPUT CONNECTIONS

Use a nosepiece (Table 4) or a nosepiece with adapter to connect a fiber-optic cable (Table 5) to the unit's light output port. Position the cable to distribute light to the desired area.

**Table 4. Nosepieces**

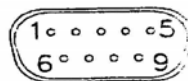
| <b>Type</b> | <b>Description</b>  |
|-------------|---|
| MVS-22      | Fostec Special 1" diameter Nosepiece  |
| MVS-23      | Fostec Standard 0.72" diameter Nosepiece                                    |
| MVS-24      | Volpi Standard 0.59" diameter Nosepiece                                     |
| MVS-25      | Dolan Jenner Standard 1.0" diameter Nosepiece (used with 1.0" O.D. Adapter) |

**Table 5. Fiber Optic Bundles**

## 4.2 INPUT CONNECTIONS

Two input connections are provided at one end of the enclosure. The larger connector is used to attach the input power cable (supplied).

The smaller, 9-pin connector (see Figure 2) is used to attach a cable for trigger and reference voltage inputs. A mating connector is supplied. Use a shielded cable, 90% coverage or better, 360° terminated to the back of the shell.



**Figure 2.**  
**Signal Input**  
**Connector**

**Table 6. Signal Input Connector – J2**

|       | INTERNAL Vref SETTING (SI-INT)   | EXTERNAL Vref CONTROL (S1-EXT)  |
|-------|--|---|
| pin 1 | No connection  | No connection   |
| pin 2 | No connection  | No connection   |
| pin 3 | No connection  | Vref: reference signal input voltage, 5-10VDC ( $V_o + V_{ref} \times 75$ )       |
| pin 4 | (- Trigger: opto-isolator Trigger return)  | (- Trigger: opto-isolator Trigger return)   |
| pin 5 | (+ Trigger: opto-isolator trigger input)<br>(+ 5v, 20mA; triggers on rising edge.) | (+ Trigger: opto-isolator trigger input;)<br>(+5v, 20mA; triggers on rising edge) |
| pin 6 | No connection  | No connection   |
| pin 7 | No connection  | No connection   |
| pin 8 | Chassis ground   | Chassis ground  |
| pin 9 | No connection  | Vref return, supply ground  |

If External Vref is not used, set toggle switch to INT and leave internal ref, at factory setting (600VDC)

## 4.3 INTERNAL VOLTAGE ADJUST

A Slide switch (S1), provided on the power supply PC board, allows the user to switch from internal to external reference voltage for adjusting intensity. (Units are shipped with this switch in the internal voltage adjust position.)

With S1 in the INT position (Factory set), the operator can adjust the output voltage from a pot mounted just above J2. The 10-turn pot can vary the voltage from 375V to a

maximum of 750V. The output voltage has been factory set at 600V. If the output is increased above 600V, the flash rate must be limited so that the system does not exceed 43 watts of average power. Power = Energy x frequency ( $P=Ef$ ) and Energy =  $\frac{1}{2}$  capacitance x voltage<sup>2</sup> ( $E=1/2CV^2$ )

The maximum voltage for the desired operating frequency is shown in Figure 3. The internal Vref Voltage can be measured by disengaging the 9-pin connector from the unit and, with a voltmeter, measuring the DC voltage between pins 2 and 9 of the unit's signal input connector. ( $V_{out} = V_{ref} \times 75$ )

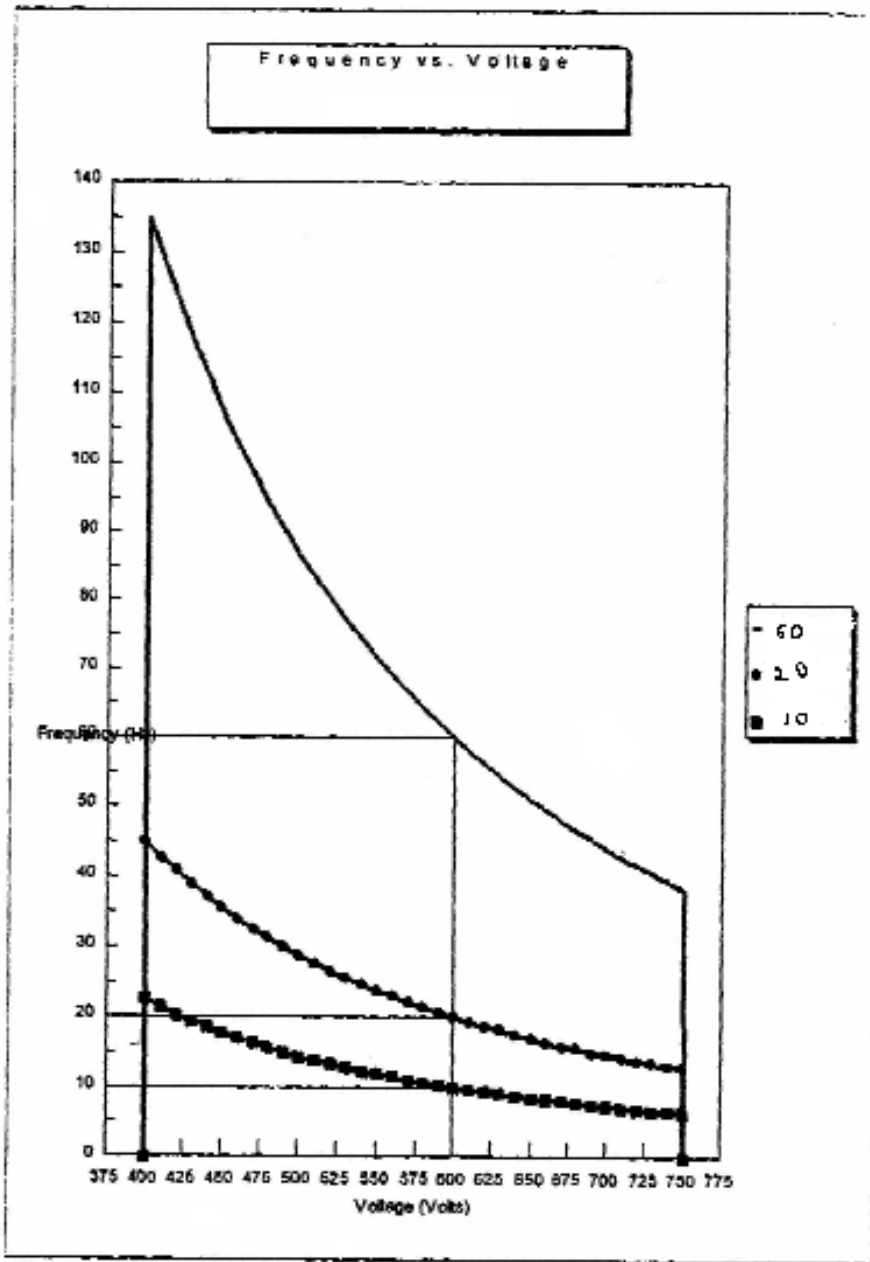


Figure 3. Frequency vs. Voltage

#### 4.4 EXTERNAL VOLTAGE ADJUST

To change the voltage adjust setting from the factory-set internal mode to external reference voltage adjust, the user must slide switch S1 from INT to the EXT position. This requires accessing the interior of the unit. PLEASE READ AND FOLLOW ALL SAFETY PRECAUTIONS!!!!!!!!!!

1. Switch the unit off and let cool for some time.
2. Disconnect the AC cord from the unit.
3. Wait at least 10 seconds to allow the energy storage capacitors to bleed down.
4. Using a screwdriver, loosen the screws on the clamps holding the cover down.
5. Slide switch S1 (at lower left corner of unit and top edge of PC board) to the EXT position.
6. Close the cover and secure the clamps before reconnecting the AC cord.

You can use an external reference signal to control the intensity of the strobe. A 5-10 VDC reference signal should be connected to pin 3 (Vref) and pin 9 (Vref return). The lamp voltage may be varied from 375 VDC to a maximum of 750 VDC ( $V_o = V_{ref} \times 75$ ). If the signal is higher than 8 VDC (or 600V lamp voltage), the flash rate must be limited so that the system does not exceed 43 watts. Power = energy x frequency ( $P=Ef$ ) and energy =  $\frac{1}{2}$  capacitance x voltage<sup>2</sup> ( $E=1/2CV^2$ ). The maximum voltage for the desired operating frequency is shown in figure 3.

## **4.5 VOLTAGE SETTING VERSUS LAMP LIFE**

Lamp life is dependent on the energy per flash. For maximum lamp life lower the lamp voltage to a minimum, that will allow sufficient light output for your application.

## **5.1 REPAIRS**

The MV strobe is, generally speaking a trouble free unit. No routine maintenance or repair is suggested, except for replacement of the flashtube module..

The unit is protected by two 3.15A fuses, one in each leg of the AC Input. If either or both fuses open, do not replace them. Return the unit to the factory for repair.

In the event that the unit fails or does not function properly (other than the flashtube failure), it is strongly recommended that no attempt be made to trouble shoot. Field repairs and customer modifications are not authorized, and if attempted, will void the warranty. Repairs must be made by factory-trained personnel, only.

## **5.2 FLASHLAMP MODULE REPLACEMENT**

Over a period of time (depending on usage), the xenon flashtube may deteriorate and have to be replaced. To replace the module:

1. Remove the line voltage from the unit.
2. Wait 60 seconds to allow energy storage capacitors to discharge.
3. Ground discharged capacitors with an insulating shorting bar to insure stored energy is discharged.
4. Disconnect faston connectors from the lamp module terminals
5. Remove all four mounting screws and lift.



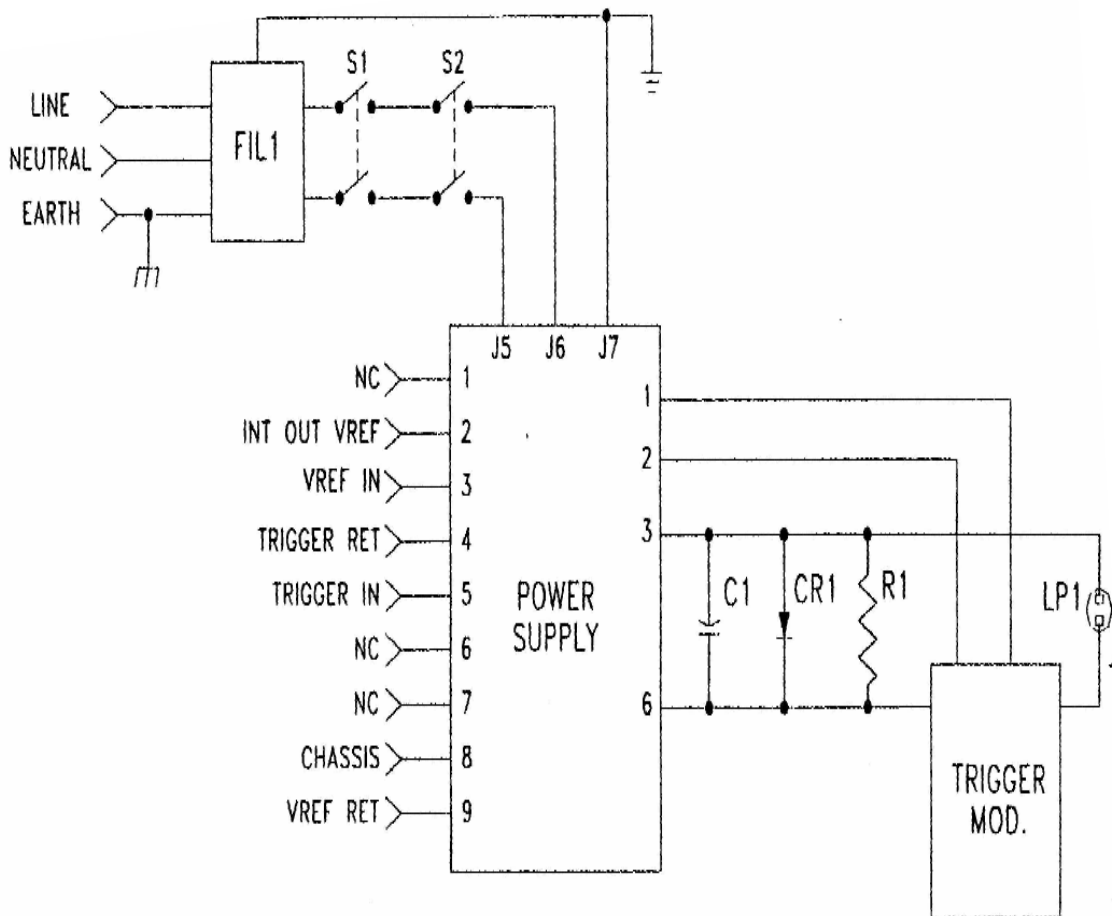
6. Install a new lamp module by reversing above procedure.

### 5.3 CLEANING

After disconnecting power from the unit, clean it with a mild, non-abrasive cleaner. Never immerse the unit in water or liquid.

### 5.4 REPACKING AND STORAGE

If the MV stroboscope is to be stored for a prolonged period, shipped to another location, or returned to factory for repair, it should be repacked in the original packaging crate.



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