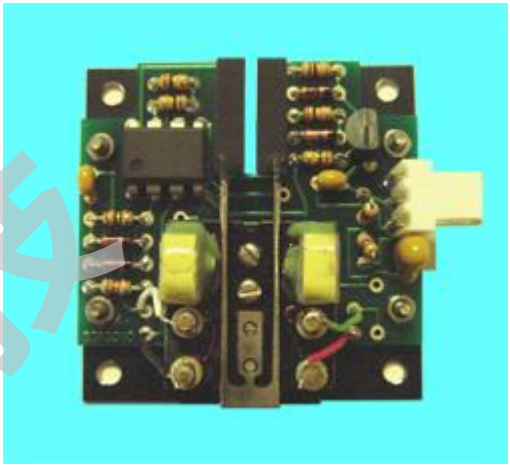
ELECTRO-OPTICAL PRODUCTS CORP.

P.O. BOX 650441 . FRESH MEADOWS, NY 11365 . TEL: (718) 456-6000 . FAX: (718) 456-6050 . www.EOPC.com

RESONANT OPTICAL MODULATOR
CH-25
TUNING FORK CHOPPER WITH INTEGRATED DRIVE ELECTRONICS

FEATURES AND ADVANTAGES:

***ONE FIXED FREQUENCY from the range of 200 Hz to 1000Hz**
***Integrated driver**
***Simple to use, no wiring and no adjustments required**
***TTL monitor output (reference signal)**
***Low power drive electronics**
***Aperture up to 5mm**
***Small size/lightweight**
***Withstands shock and vibration**
***Rugged, no wearing parts**
***Maintenance free**
***High reliability**
***High frequency stability (to 0.005%)**
***High amplitude stability <.01%**
***Jitter free operation**
***No radiated electromagnetic interference (EMI)**



DESCRIPTION:

The FIXED FREQUENCY resonant optical modulator is an electromagnetically driven tuning fork device, which uses vanes, of different shapes and surface characteristics, attached to moving tines, to chop a light beam with a sinusoidal motion. A range of factory set fixed frequency modulation waveforms (sine, half sine and pulse) is available. The modulating frequency range of the CH-25 chopper is from 200 Hz to 1000Hz, **fixed at any one value** within the range. The aperture is inversely proportional to the frequency, and is a function of the size of the vanes and the type (duty cycle). Operation at the natural resonant frequency is sustained by a feedback amplifier. The driver controls the aperture and provides a TTL output as a reference signal.

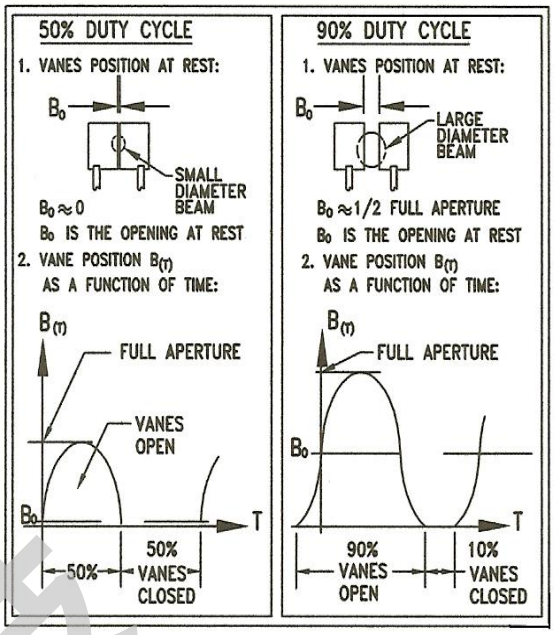
The most common type of aperture is the half open in the rest position, 90% duty cycle. It is used for a large beam diameter. When the modulator is operating in this configuration the maximum aperture is produced. The vanes are factory adjusted so that when fully illuminated the maximum excursion condition (controlled by the drive electronics) generates an almost complete sine wave as shown in table. Typically, the light is transmitted for 90% of each cycle. The 50% duty cycle modulation is used for a small beam diameter. The vanes are factory adjusted to be just closed in the rest position. Full aperture for 50% duty cycle is one half of the 90% duty cycle. Balanced operation and high "Q" insure frequency stability, low electrical drive power and low reaction forces. High flexural stiffness provides good resistance to shock and vibration. The standard operating temperature is 0^{o}C to $+65^{o}$C.

Tuning fork choppers are especially suitable for long life, dedicated applications, OEM, built into an instrument/system, and for portable systems. When working in tight spaces choppers are the best solution. An important use of the chopper is in the communication and data acquisition environments, where optical signals are obscured by noise. A fixed frequency modulated signal can be filtered from background noise much more readily than an un-modulated signal. This is best achieved using a lock-in amplifier. In this arrangement, the detected signal and the reference signal, mixed with the frequency of the tuning fork chopper, cause the frequency of interest to appear as a pure dc output level. All other signals are filtered with the low pass filter. Once noise is removed, proper signal measurements can be obtained.

Applications include: test equipment, noise detection (with a lock-in amplifier), pollution and gas detection, radiometry, radiation pyrometry, military systems, scientific and medical research, small size and hand held instruments.

FREQUENCY VERSUS APERTURE:

FREQUENCY	50% DUTY CYCLE FULL APERTURE		90% DUTY CYCLE FULL APERTURE	
(Hz)	(mm)	(Inches)	(mm)	(Inches)
200	2.5	0.10	5.0	0.20
400	1.5	0.06	3.0	0.12
800	1.0	0.04	2.0	0.08
1000	0.85	0.03	1.7	0.07



DRIVER SPECIFICATIONS:

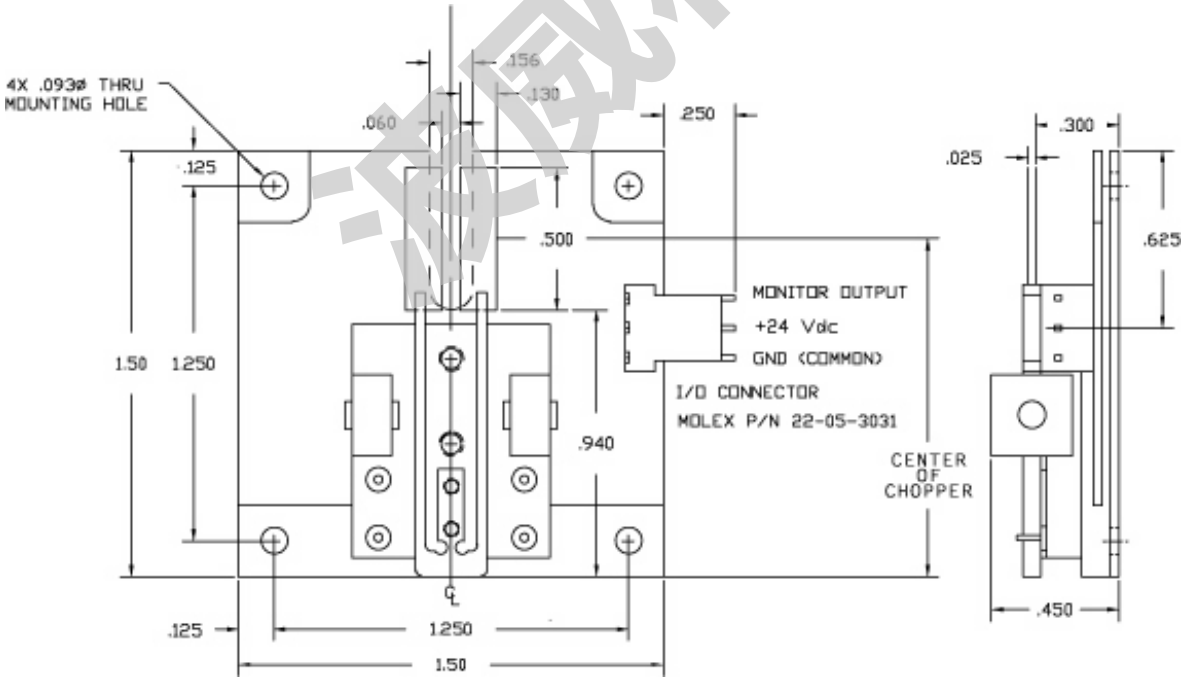
Input power: 24 V dc, +/-4V, 50 mA

Frequency range: 2Hz to 1000Hz

Monitor output: A square wave TTL reference output

Connector: 3 pin Molex connector P/N 22-05-2021

NOTES: 1) FOR 50% DUTY CYCLE: THE OPENING AT REST IS ZERO
2) THE STANDARD BASE HOLDS A SINGLE COIL.
A BASE WITH TWO COILS IS RECOMMENDED FOR LOW FREQUENCIES AND HIGH AMPL STABILITY (WITH THE AGC DRIVER) AND FOR A WIDE TEMPERATURE RANGE
A BASE WITH THREE COILS IS RECOMMENDED FOR HIGH FREQUENCIES AND HIGH AM STABILITY (WITH THE AGC DRIVER) AND FOR A WIDE TEMPERATURE RANGE
3) THE VANE MOTION IS SINUSOIDAL



OUTLINE DRAWING: CH-25, 400Hz, 90% Duty cycle

ORDERING INFORMATION:

TYPE [CH-25]; DUTY CYCLE [%]; VANE [B=bright or D=dark]; FREQUENCY [Hz]
Example: PART NO. CH25-50D800. *This part number specifies the model CH-25 chopper, with 50% duty cycle, dark vanes and 800Hz operating frequency.*

Special vane configurations, modulating waveforms and shapes are available on special order. Consult factory. Drive electronics with different packages, regulation, and reference signal and power supply options are available. Special pricing for OEM applications.

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