

Optical Chopper – Dual Frequency

Model 320C/CD



Features

- 8Hz - 6kHz standard chopping frequency range (0.015Hz option is available)
- 102mm diameter dual frequency discs
- Choice of control units
- Compact chopper head
- Low noise and vibration
- Photochemically etched, non-magnetic discs
- Variable aperture
- Range of accessories
- **Scitec Instruments Model 320 is a high stability variable dual frequency optical chopper. The basic system consists of a control unit, a dual frequency chopping head and a set of four chemically blacked photo etched dual frequency discs. This system provides operation over the frequency range 8Hz to 6kHz. A wide selection of additional discs and accessories is available to extend the frequency range and to satisfy individual requirements.**
- Two versions of the control unit are available. The basic control unit is the 320CU, which has a 10 turn dial for setting the operating frequency. Alternatively, the 320CDU control unit has an additional 5-digit display of the chopping frequency.
- Other features are common to both control units: Chopping frequency can be controlled externally by applying an analogue voltage to a "Control" BNC. Two "Reference" BNCs provide TTL level outputs for both the inner and outer set of slots, generated directly from the opto-switches on the chopping head. These signals have constant phase relative to the chopping action and can be used as the reference for other instruments such as lock-in amplifiers.
- The 320H chopping head supplied with the standard system may be bench bolted or optical stalk (bench rod) mounted. Mountings are provided to enable parts, such as a high frequency accessory or blade protector, to be attached. For lower frequency operation, the chopper head can be fitted with a reduction gearbox motor.
- The set of four chopping discs included with the system (part number 320D) provides a choice of 4/7, 3/30, 8/60 and 53/60 slots, each having a 1:1 mark to space ratio.
- Variable apertures can be achieved by mounting two identical discs simultaneously.

- Additional discs, with up to 60 slots, are available though these are single frequency. Although the standard discs are chemically blacked other finishes, such as gold plating, are available.
- Scitec Instruments does not recommend use of discs with greater than 60 slots with the 320 range of optical choppers as the opto-switch will not support these items.

Specifications

320CU Control Unit

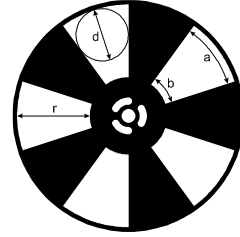
- **Stability:** +/-0.01%/°C.
- **Output Voltage:** 15 V DC Maximum.
- **Frequency Control:** Internal - Manual Control via 10 turn potentiometer fitted with a turns counting dial. External - BNC connector for 0 to 15 V.
- **Frequency stability:** Short term - see phase jitter. Long term - $\pm 0.1\%$ of maximum frequency.
- **Reference output:** 5V HCT TTL signal via BNC socket. Outer reference is available on the front panel and the inner reference is available from the back panel.
- **Power requirement:** 1100-130 V or 200-260 V AC, 50 or 60 Hz, 12 VA.
- **Dimensions:** 254(W) x 76(H) x 178(D) mm.
- **Weight:** 2.6 kg (approx).

320CDU Control Unit

- **Stability:** +/-0.01%/°C.
- **Output Voltage:** 15 V DC Maximum.
- **Frequency Control:** Internal - Manual Control via 10 turn potentiometer fitted with a turns counting dial. External - BNC connector for 0 to 15 V.
- **Frequency Read Out:** 5 digit 14 mm LED display with 0.01 Hz resolution, 0.1 Hz or 1 Hz resolution depending on frequency. A switch on the back panel selects between inner and outer reference frequencies.
- **Frequency stability:** Short term - see phase jitter. Long term - $\pm 0.1\%$ of maximum frequency.
- **Reference output:** 5V HCT TTL signal via BNC socket. Outer reference is available on the front panel and the inner reference is available from the back panel.
- **Power requirement:** 1100-130 V or 200-260 V AC, 50 or 60 Hz, 12 VA.
- **Dimensions:** 254(W) x 76(H) x 178(D) mm.
- **Weight:** 2.6 kg (approx).

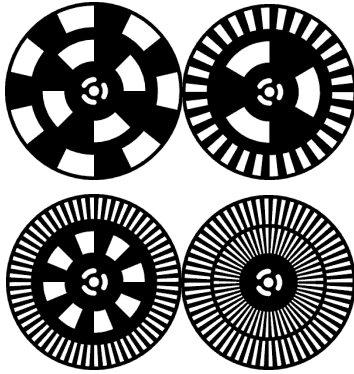
320H Chopping Head

- **Motor:** 11 pole DC motor, sleeve bearings with more than 6000 hours lifetime, 0-6000 rpm reversible.
- **Reference pick-up:** Dual IR led and phototransistor pair.
- **Dimensions:** 73(H) x 75(L) x 32(W)mm, without disc.
- **Mounting:** Optical stalk - adjustable between 6.5 and 14.0 mm diameter. Mounting holes - 2 x 3 mm.



320D Chopping Discs

- **Disc types:** 4/7, 3/30, 8/60 and 53/60 slot.
- **Material:** Half hard brass, 0.5mm thick.
- **Diameter:** 102 mm.
- **Surface Finish:** Chemically blacked.
- **Mark-Space Ratio:** 1:1 with one blade.



Frequency Range

Disc		Frequency (Hz)	Aperture (mm)				Phase Jitter Max
			r	a	b	d	
300 D4/7	Outside 7 slots	17.5 - 700	12.5	22.0	16.4	12.5	±0.7°
	Inside 4 slots	10 - 400	12.5	23.2	13.4	12.5	±0.6°
300 D3/30	Outside 30 slots	75 - 3000	12.5	5.1	3.8	4.9	±3.0°
	Inside 3 slots	7.5 - 300	12.5	30.9	17.8	12.5	±0.5°
300 D8/60	Outside 60 slots	150 - 6000	12.5	2.6	1.9	2.5	±6.0°
	Inside 8 slots	20 - 800	12.5	11.6	6.7	9.6	±1.2°
300 D53/60	Outside 60 slots	150 - 6000	15	2.6	1.8	2.5	±6.0°
	Inside 53 slots	130 - 5300	15	1.9	1.0	1.8	±8.0°

Ordering Information

Model 320C Optical Chopper System: A complete optical chopper system includes: 320CU Control Unit, 320H Chopping Head, 320I Interconnecting Cable, 320D Set of Chopping Discs and IEC mains lead.

Model 320CD Optical Chopper System: A complete optical chopper system with frequency display includes: 320CDU Control Unit, 320H Chopping Head, 320I Interconnecting Cable, 320D Set of Chopping Discs and IEC mains lead.

See separate data sheet for details of the complete range of chopper discs and accessories that can be used with the Models 320C and 320CD Optical Chopper systems.

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