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SERIES 5046D E-O SYSTEMS

FOR LASER PULSE PICKING, GATING & CHOPPING

5046D Systems feature digitally controlled Input/Output Delay time and Pulse Width front panel controls. 5046D Systems are highly reliable, completely solid state instruments that combine electro-optic light modulators with high speed, high voltage switching drivers capable of producing quarter and halfwave retardation voltages over an optical spectrum of 300 nm to more than 2000 nm by selecting the most appropriate Pockels cell crystal material and antireflection coatings.

With rise and fall times as fast as 3 nanoseconds, 5046D Systems are exceptionally useful for regenerative amplifier switch in-out, laser pulse slicing, mode locked pulse gating, cavity dumping and Q-switching. The systems are valuable for both intracavity and extracavity applications and offer the latest technology in reliable, lowest radiated noise, solid state, high voltage switching design.

5046D Systems can be configured for a variety of applications. An extensive selection of components and operating parameters is available. The Power Supply/Timing Generator (PS/TG) is a standard 19"wide x 4.75" high (3U size) rack mountable configuration. The Optical Head Assembly (OHA) options are shown on the next page.

Optical switching is accomplished by Series 1040, 1145, 1148 and Q1059P KD*P (DKDP); Series 1147 (RTP) and Series 1150 BBO Pockels cells. The cells are designed to match the optical wavelength and electrical characteristics of the High Voltage MOSFET Switching Driver Modules located within the OHA.

Series 1040 KD*P Pockels cells are available with apertures of 10, 16 and 20 mm and with single or double crystal configurations.

Series Q1059P KD*P Pockels cells are available with 10 and 12 mm clear apertures.

Series 1145 KD*P cells are miniature devices (19 mm Diameter x 25 mm Long) with 8 mm clear apertures.

Series 1148 cells are similar to the Q1059 Series but with reduced outer diameter and length (25 x 40 mm)

Series 1147 Pockels cells utilize RTP (Rubidium Titanyl Phosphate), noted for its ability to produce optical switching without superimposing photoelastic ringing on the transmitted beam. RTP modulators use two crystals, a configuration that provides excellent thermal compensation and stability with low operating voltages.



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Series 1150 BBO Pockels cells utilizing Beta Barium Borate ($\beta\text{BaB}_2\text{O}_4$) are currently available in aperture sizes of 3, 4 and 6 mm diameters. BBO is noted for its very low piezoelectric response, ability to tolerate high average power and operate in the UV through near IR spectrum.

5046D Systems incorporate a shielded "OHA" (Optical Head Assembly) enclosure for EMI/RFI suppression and a separate Power Supply-Timing Generator cabinet.

High average and peak power operation with the standard KD*P devices in the range of 500 to 1100 nm is enhanced by the use of Sol Gel antireflection coatings on the crystal surfaces. Damage thresholds in the range of 10 to 20 GW/cm^2 with laser pulse widths of less than 100 fs and up to 10 GW/cm^2 with pulse widths < 1 ns are feasible.

The 5046D System's High Voltage MOSFET Switch Modules are configured for operation at voltages suitable for half wave operation of KD*P longitudinal field modulators in the 1000 nm range (~7 kV). By simply adjusting the front panel HV control, the driver can operate at the quarter wave voltage (or less) without loss of efficiency or increased rise or fall times. Operation in the half wave mode may obviate the usual requirement for a quarter or half wave plate in the optical train in many regenerative amplifier configurations.

Maximum system repetition rate is determined by the Pockels cell capacitance and high voltage setting. For a Model Q1059P Pockels cell (5 pf) and nominal 7 kV operating voltage, the repetition rate is limited to 5 kHz. At 4 kV maximum voltage, the repetition rate increases to about 7.5 kHz maximum. For RTP Pockels cells, (C~5 pf) maximum repetition rate is approximately 7.5 kHz, a benefit of RTP's lower operating voltages. BBO Model 1150-6 mm devices can operate at 1/2 wave retardation at 800 nm.

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5046D Systems are self-contained. The Optical Head Assembly (OHA) and HV Power Supply/Timing Generator are packaged in EMI shielded enclosures. Unshielded, open configurations for OEM and end user packaging are also available. A typical shielded system consists of the following elements:

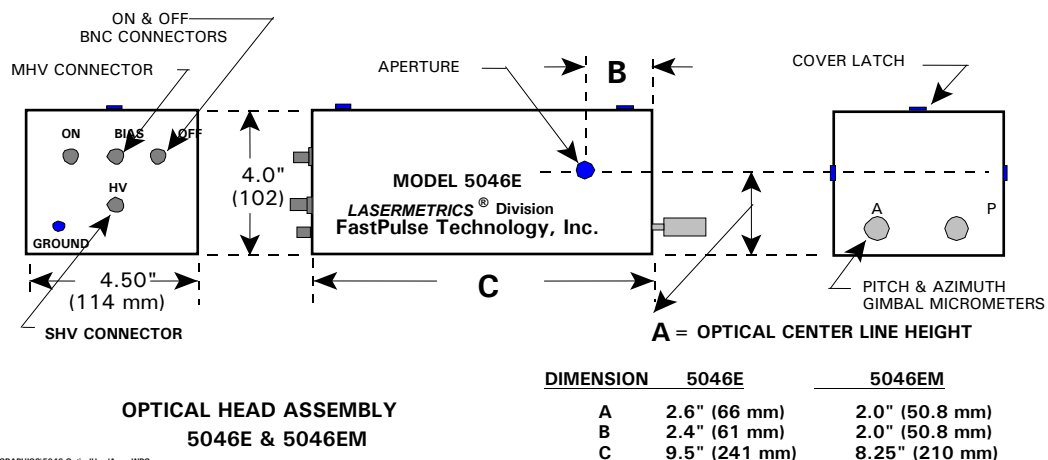
- 5046DR - Rack Mountable HV Power Supply/Timing Generator (PS/TG) & Cable Set
- 5046E - OR 5046EM Optical Head Assembly (OHA) containing: Baseplate, Cover and Gimbal and 5046 High Voltage Switching Modules (located in the OHA)
- Q1059PSG Series KD*P Pockels cell, with AR coatings. RTP & BBO devices are available
- Optional Mounted Glan-Air polarizers and thin film polarizers are available

Contact our Engineering Sales Group for alternatives and options to match your application

NOMINAL SPECIFICATIONS

Useful Optical Wavelength Range*:	300 to 2200 nm (depends on Pockels cell crystal)
Optical Rise and Fall Times (10 to 90%):	~4 ns (with Q1059P or 1147) Pockels cells)
Repetition Rate, single shot to:	5 kHz
Optical Pulse Width Range, FWHM	<5 ns to ~1 μ s
Jitter, System Input to Output:	<1 ns
Input-Output Delay Time, adjustable:	50 ns to ~1 μ s
Input-Output Delay Time: directly into HV Output Module:	~50 ns
Trigger Input Impedance:	50 ohms
Trigger Input Pulse:	
CW Trigger Input: (for extraction of CW/ML pulses)	+2 to 10 volts, 1 ns to 1 μ s width
Trigger/Photo Input: (for extraction of Q-SW/ML pulses)	+/- 100 mV to 3 volts, \leq 1 ns to 1 μ s width
Dimensions:	
Optical Head Assembly, Standard Size:	5046E: 4H x 4.5W x 9.5L, inches
Miniature Size:	5046EM: 4H x 4.5W x 8.25L inches
Power Supply/Timing Generator Cabinet	5046DR - Rack Mount: 4.75H x 19W x 17.1L, (3U)
Power Requirements:	100/115/230 VAC, 50/60 Hz, 35 Watts

* Wavelength range is dependent on choice of electro-optic modulator, antireflection coatings and crystal material. For instance, for operation at 1064 nm with <10 watts average power and peak power densities of more than 500 MW/cm², the Series 1147 RTP modulators with AR coatings for 1064 nm would be likely candidates.



Specifications may change to incorporate latest modifications or improvements

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