

femtoControl

Compact Motorized Dispersion Control for Optimizing Femtosecond Laser Pulse Duration

Dispersion Compensation

APE's femtoControl is a motorized dispersion compensation unit for the optimization of femtosecond laser pulse durations. Several femtoControl versions are available for the Ti:Sapphire lasers as well as for OPA/OPO systems in the near-infrared and infrared range. For applications that require extreme GDD (Group Delay Dispersion) compensation or other wavelength ranges, customized solutions are available.

Furthermore, the femtoControl AOM combines the motorized dispersion compensation capabilities with an integrated AOM (acousto-optic modulator), enabling flexible power control of the laser – faster than any mechanical attenuator setup. Unlike common electro-optic systems (e.g. pockels cells), it can handle the full power of typical femtosecond lasers for multi-photon application. The combination of AOM and pulse compressor in one device provides the perfect tool for applications with highly dispersive microscopes while preserving precious space on the optical table at the same time.



- Ideal for multi-photon microscopy
- Large range of dispersion compensation
- Different versions covering VIS, NIR and IR range
- Combination with fast modulation of optical power
- Compact footprint, enabling easy integration in existing setups

femtoControl Specifications

	femtoControl NIR	femtoControl IR	femtoControl AOM
Wavelength range (others on request)	680 nm ... 1300 nm	1150 nm ... 2500 nm	680 nm ... 1300 nm
GDD range - single pass	810 nm: -16000 fs ² ... -27500 fs ² 920 nm: -9500 fs ² ... -19000 fs ² 1040 nm: -7000 fs ² ... -14500 fs ² 1200 nm: -7000 fs ² ... -13000 fs ²	1300 nm: -5500 fs ² ... +10000 fs ² 1700 nm: -1000 fs ² ... +9000 fs ²	810 nm: -5000 fs ² ... -16000 fs ² 920 nm: -250 fs ² ... -9500 fs ² 1040 nm: 0 fs ² ... -6700 fs ² 1200 nm: -700 fs ² ... -6500 fs ²
GDD range - double pass	810 nm: -32500 fs ² ... -55000 fs ² 920 nm: -19500 fs ² ... -38000 fs ² 1040 nm: -14500 fs ² ... -29000 fs ² 1200 nm: -14500 fs ² ... -26500 fs ²	without double pass	810 nm: -21500 fs ² ... -44000 fs ² 920 nm: -10000 fs ² ... -28500 fs ² 1040 nm: -6300 fs ² ... -21500 fs ² 1200 nm: -8000 fs ² ... -19500 fs ²
Transmission	single pass: >80% at 800 nm double pass: >70%, typical 75% at 800 nm	>70% at 1300 nm >70% at 1700 nm	single pass: >65% at 800 nm double pass: >55%, typical 60% at 800 nm
Min. transform-limited pulse duration	>70 fs	>50 fs	>70 fs
Input polarization	Linear, horizontal		
Input beam diameter (1/e ²)	<4 mm		0.9 mm ... 1.1 mm
Input power	<5 W	<2.5 W	<5 W
Input laser repetition rate	>2 MHz	>1 MHz	>2 MHz

AOM Specifications

AOM contrast ratio	without AOM	without AOM	>5000 : 1
Rise/Fall time 10%/90%			<0.3 μ s
Insertion delay			<1 μ s
Modulation voltage			0 - 2 V (0 - 1 V on request)
Input impedance			1 k Ω (BNC connector)

General Specifications

Input beam height	104 mm ... 135 mm		
Dimensions (L x W x H)	580 mm x 380 mm x 190 mm ... 221 mm		
Software	software control of compressor settings; remote control via TCP/IP interface		software control: compressor settings and AOM RF frequency; analog control: AOM power
Connection, Software requirements	USB, Windows 11		

Customization

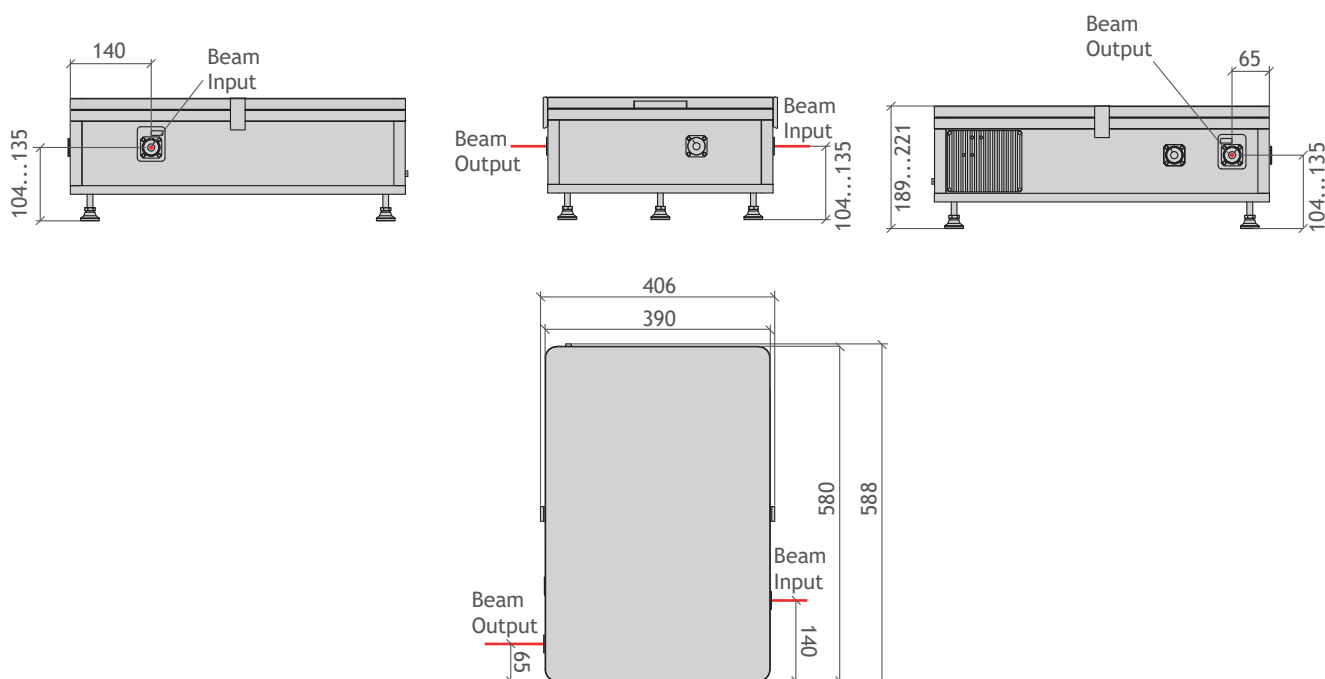
Customized femtoControl devices are available on request. Customization is possible for wavelength range as well as for GDD ranges.

Appendix Technical Drawings

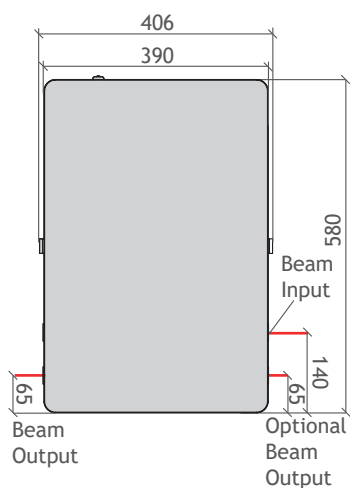
All dimensions in mm

femtoControl

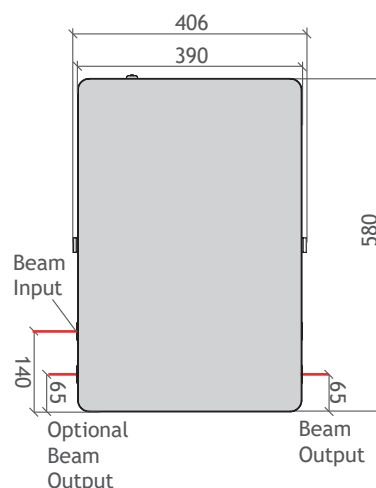
■ femtoControl AOM



■ femtoControl NIR*



■ femtoControl IR*



*Input and output beam height of femtoControl NIR/IR are similar to femtoControl AOM (104 mm ...135 mm).