Brimrose Corporation of America
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Acousto Optic Q-switch

Features/Applications	
	• High Damage Threshold • Up to 80 MHz RF Frequency • Analog Light Intensity Modulation • Digital Switching On/Off • Water or Thermoelectrically cooled • Low Cost

Acousto-optic devices have long been used in a variety of laser intracavity applications. These applications can be divided into two categories: zero-beam order applications and diffracted beam applications. One of the zero-order beam applications is A-O Q-switching. A Q-switched laser is actually a variable cavity loss laser. Most of the time, the laser is placed in a state where the cavity loss is larger than the gain. As a result, there is no lasing and the pumping source produces a very large population inversion. After the cavity loss is suddenly decreased, a very intense pulse of stimulated radiation is obtained. *Brimrose* offers the most complete line of Acousto-Optic Q-switching systems for industrial and laboratory applications. *Brimrose* Q-switches are designed for the highest conversion efficiency of RF energy into acoustic energy by attaching the transducer to the crystal with an advanced vacuum metallized process. Careful attention is given to the optimum transfer of heat from the Q-switch. Q-switches are fabricated from high optical quality Tellurium Dioxide, Fused Quartz, or other acousto-optic materials with Brewster cut optical faces or durable hard oxide AR coatings for high optical power applications. All of these features result in the production of highly reliable Q-switches at very competitive prices.

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UV-VIS-IR Q-switches (.2 - 2.1 mm)

	FSQ-24-2-BC	FSQ-27-5-BC	FSQ-80-5-BC
Laser Wavelength:	1064 nm, Brewster Cut	1064 nm , Brewster Cut	1060 nm, Brewster Cut
Substrate:	SiO_2	SiO_2	SiO_2
Optical Power Density:	100 W/mm^2	100 W/mm^2	100 W/mm^2
Center Frequency:	24 MHz	27 MHz	80 MHz
Active Aperture:	2 mm	2 mm	1 mm
Beam Diameter Inside Crystal:	0.7 mm	0.7 mm	0.6 mm
Rise Time:	100 nsec	100 nsec	85 nsec
Digital Modulation Bandwidth:	2 MHz	5 MHz	6.5 MHz
Optical Transmission:	99.8%	99.8%	>99.5%
Diffraction Efficiency:	30%	30%	25%
Extinction Ratio:	1000:1	1000:1	1000:1
Wave Front Distortion:	λ/10	λ/10	λ/10
Bragg Angle @1064 nm:	2.5 mrad	2.5 mrad	7 mrad
Separation Angle @1064 nm:	5 mrad	5 mrad	14 mrad
Acoustic Velocity:	5.96E+3 m/sec	5.96E+3 m/sec	5.96E+3 m/sec
Maximum RF Power:	15 Watts	15 Watts	10 Watts
Input Impedance:	50 ohms	50 ohms	50 ohms
V.S.W.R.:	2:1	2:1	2.1:1
Optical Polarization:	Linear (Perpendicular to acoustic wave)		
Case Type:	#90	#90	#140
Applicable Driver:	FFH-24-B3-F15	FFH-27-B3-F15	FFH-80-B3-F10

* *Window parallelism on all Q-switches is 15 sec. +/-5 sec.*

Fixed Frequency Drivers

(For Models: FSQ-24-2, FSQ-27-5, & FSQ-80-5-BC)

	FFH-24-B3-F15	FFH-27-B3-F15	FFH-80-B3-F10
Frequency:	24 MHz	27 MHz	80 MHz
Frequency Control:	Quartz crystal referenced phased locked loop		
Frequency Accuracy:	0.015%	0.015%	0.015%
Harmonic Content:	≤ -10 dBc	≤ -10 dBc	≤ -10 dBc
Stability:	0.0015% minimum after 15 minute warm-up		
Output Power:	15 Watts	15 Watts	10 Watts
Internal Pulse Generator:	Pulse width: 200 to 500 nsec ±10% adjustable, pulse generator with 5000 Hz to 100 KHz rep rate adjustable. Front panel switch for pulse/standby operation. Front panel switch for internal/external trigger.		
Modulation:	Pulse Modulation, pulse monitor output via front panel BNC connector.		
Output Protection:	Power amplifiers used will tolerate a short term infinite V.S.W.R. without damage. Rated power is available only when a proper RF load is connected.		

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Operating Power:	117 VAC ±10%, 50-60 Hz, 50 Watts max.
Enclosure:	The unit will be packaged in forced air cooled 7.5 inch wide by 3.5 inch high by 8.75 inch deep instrument case. The internal components are fan forced air cooled. Size is exclusive of connectors. A detachable AC line cord is provided.
Environmental:	Nominal Laboratory Conditions: Temperature range 0°C - 35°C ambient; the unit is not sealed against moisture or condensing humidity.

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VIS-IR Q-switches (.4 - 4.5 mm)

	TEQ-27-4-BC	TEQ-80-20-BC
Laser Wavelength, Optimized for:	2940 nm , Brewster Cut	800 nm , Brewster Cut
Substrate:	Tellurium Dioxide (TeO_2)	Tellurium Dioxide (TeO_2)
Active Aperture:	1.5 mm	3 mm
Center Frequency	27 MHz	80 MHz
Modulation Bandwidth (3dB):	4 MHz	20 MHz
Optical Transmission:	> 95%	> 95%
Maximum Diffraction Efficiency:	> 50%	> 65%
Rise Time/Optical Beam Diameter:	150/630 nsec/µm	80/400 nsec/µm
Extinction Ratio:	>1000:1	>1000:1
Wave Front Distortion:	λ/10	λ/10
Separation Angle:	1° @ 2940 nm	0.9° @ 800 nm
Acoustic Velocity:	4.2E+3 m/sec	4.2E+3 m/sec
Maximum Electric Input Power:	15 Watts	1 Watt
Input Impedance:	50 ohms	50 ohms
V.S.W.R.:	2.1:1	2.1:1
Optical Polarization:	Linear	Perpendicular to Acoustic Wave
Case Type:	#90	#60
Applicable Driver:	**FFH-27-B3-F15**	**FFH-80-B3-F10**

Fixed Frequency Drivers

(For Models: TEQ-27-4-BC, TEQ-80-20-BC)

	FFH-27-B3-F15	FFH-80-B3-F10
Frequency:	27 MHz	80 MHz
Frequency Control:	Quartz crystal referenced phased locked loop	
Frequency Accuracy:	0.015%	0.015%
Harmonic Content:	≤ -10 dBc	≤ -10 dBc
Stability:	0.0015% minimum after 15 minute warm-up	
Output Power:	15 Watts	1 Watt
Internal Pulse Generator	Pulse width: 200 to 500 nsec ±10% adjustable, pulse generator with 5000 Hz to 100 KHz rep rate adjustable. Front panel switch for pulse/standby operation. Front panel switch for internal/external trigger.	
Modulation:	Pulse Modulation, pulse monitor output via front panel BNC connector.	
Output Protection:	Power amplifiers used will tolerate a short term infinite V.S.W.R. without damage. Rated power is available only when a proper RF load is connected.	
Operating Power:	117 VAC ±10%, 50-60 Hz, 50 Watts max.	
Enclosure:	The unit will be packaged in forced air cooled 7.5 inch wide by 3.5 inch high by 8.75 inch deep instrument case. The internal components are fan forced air cooled. Size is exclusive of connectors. A detachable AC line cord is provided.	
Environmental:	Nominal Laboratory Conditions: Temperature range 0°C - 35°C ambient; the unit is not sealed against moisture or condensing humidity.	

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