NEOS TECHNOLOGIES
A Gooch & Housego Company

OPERATING MANUAL
POLYCHROMATIC ACOUSTO-OPTIC MODULATOR

MODEL NUMBER:

48062-XX-.55

XX = 1, 2.5, or 4.5 mm

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SECTION I

INSPECTION PROCEDURE

Examine the shipping carton for damage. If the shipping carton or packing material is damaged it should be kept for the carrier's inspection. Notify the carrier and NEOS Technologies. Check the contents of the shipment for completeness, mechanical damage, and then test the equipment electronically. Operating procedures are contained in Section V. If the contents are incomplete, or the equipment does not pass the electrical testing please notify NEOS Technologies.

If there is any problem with the use of this equipment, or if the equipment fails to function as expected contact NEOS Technologies, do not try to trouble shoot or repair this equipment. Consult with a NEOS service engineer. If the equipment needs repair or replacement, contact NEOS Technologies, Inc for a Return Authorization Number.

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SECTION II
POLYCHROMATIC ACOUSTO-OPTIC MODULATOR (PCAOM)
MODEL 48062-XX-.55

The modulator system is a tellurium diode (TeO2) substrate with a lithium niobate transducer. The 48062-XX-.55 PCAOM has been designed so that the output diffracted light will remain collinear at all visible operating wavelengths. The XX in the model number is the active optical aperture which is 1, 2.5, or 4.5 mm. The modulator assembly should be mounted on a fixture to provide sufficient adjustment to peak the modulator efficiency (Bragg angle, horizontal, and vertical position). NEOS can supply precision Bragg mount and translation stages 71001. The modulator can be driven by any driver with a crystal controlled oscillator or a synthesized oscillator having <.02% frequency stability and a nominal 50 ohm output, however, it is recommended that a NEOS driver such as the 64040-80-.4-8CH-16B system or the 64040-80-.4-8CH-16MB module be used to drive this modulator for the system to achieve optimum performance. The total RF input should not exceed 0.8 watt CW.

The modulator is labeled on the cover as to which optical aperture is input and output. The input optical polarization must be horizontal linear with respect to the mounting surface of the modulator housing. The Bragg angle should be adjusted so the +1st order diffracted light is the output (towards the connector). This diffracted light will remain collinear at all visible operating wavelengths. Operating the modulator in any other configuration than that described above will degrade its performance. The un-diffracted "0" order light can be utilized by using the 72011 Zero Order Re-combiner. Be extremely careful not to aim the laser beam on the gold bond wires. NEOS will not warranty any such damage. The modulator has been designed and verified to satisfy the specifications.

SECTION III

SPECIFICATIONS

48062-XX-.55

PARAMETER		SPECIFICATION
Interactive Material		TeO_2
Acoustic Mode		Shear
Operating Wavelength		442 to 676 nm
Operating Frequency		See Chart on next page
Window Configuration		AR Coated
Static Transmission		>95 %
Diffraction Efficiency		≥ 80 % per wavelength
Input Light Polarization		Linear, Horizontal (Parallel to acoustic propagation)
Input Beam Divergence		< 1 mrad (solid angle)
Acoustic Aperture Size		≤ 1, 2.5, or 4.5 mm
Resolution		35 Å @ 467 nm 40 Å @ 647 nm
Deflection Angle (with respect to input beam) (with respect to incident light)		1.3^{o} (wavelength insensitive)
Drive Power Per Wavelength		≤ 0.1 watts
Total Power		0.8 watts
Impedance		50 ohm
VSWR		≤2:1
Housing		53B00592
Housing with 72000 Bragg Mount		53B1827
Waterproof Housing with 72000 Bragg Mount		53C00835
Acceptance Test Procedure:		42A14986
Acceptance Test Results form:		52A7132
Recommended Drivers:		
Eight Channel:	PCAOM Driver System:	64040-75-.1-8CH-16B
	PCAOM Driver Module:	64040-75-.1-8CH-16MB
Four Channel:	PCAOM Driver System:	64040-75-.1-4CH-5
	PCAOM Driver Module:	64040-75-.1-4CH-5M

Driver Frequency @ Specified Wavelength

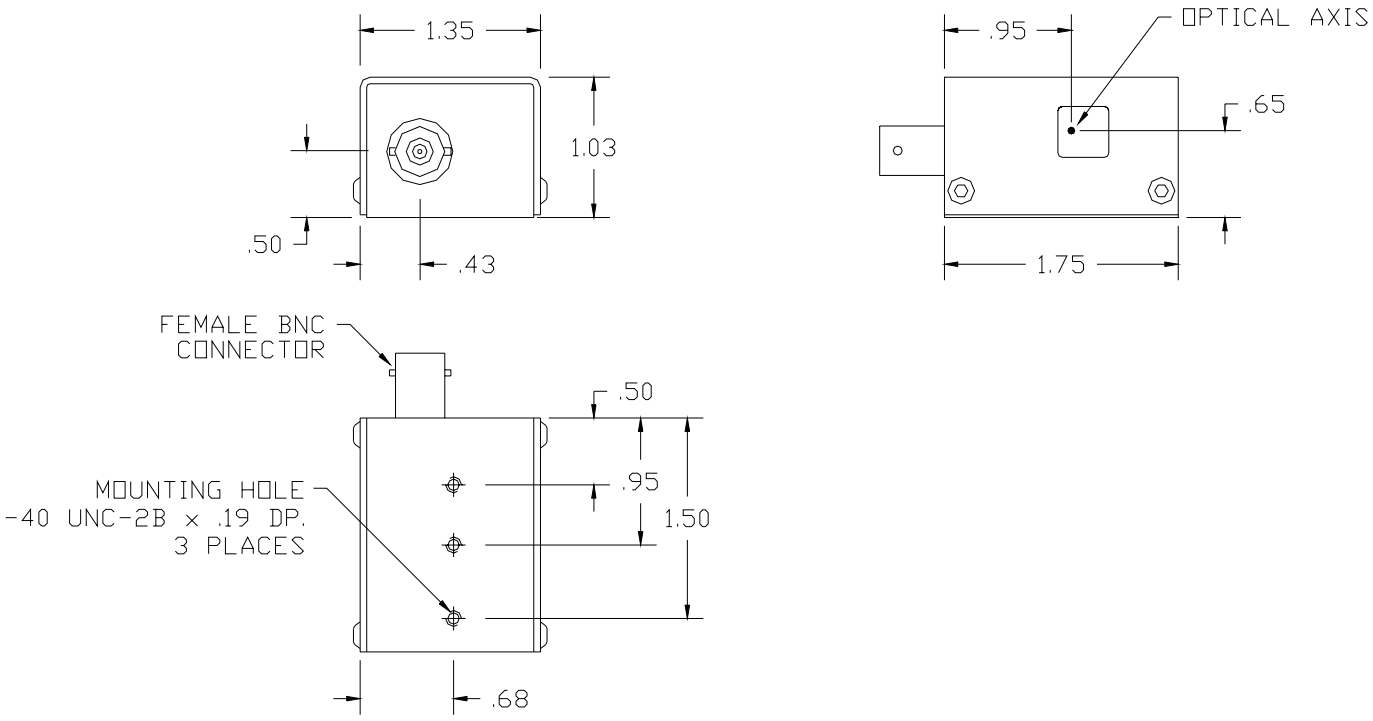
PARAMETER	SPECIFICATION
Wavelength (nm)	Frequency (MHz)
442	82.69
457*	78.19
465*	76.29
472*	74.67
476*	73.85
482	72.51
488*	71.38
496*	69.69
501*	68.70
514*	66.39
520*	65.32
525	64.50
528*	64.04
530*	63.75
532	63.51
543	61.84
561	59.23
568*	58.35
575*	57.50
632*	51.10
635	50.91
647*	49.72
650	49.46
676*	47.17

* NEOS Driver Standard Settings.

Data for other wavelengths are available.

SECTION IV

OUTLINE DRAWING



SECTION V

OPERATING PROCEDURE

The Bragg alignment can be done as follows:

Direct a horizontally polarized light beam into the center of the input aperture the PCAOM optical aperture labeled input. Be careful that any mirrors in the optical path between the laser and PCAOM do not change the original polarization direction of the laser. Make certain the RF power is applied to the PCAOM at the proper frequency for 488 nm. See acceptance test report for drive frequency information. Rotate the Bragg angle of the PCAOM. At a distance of about one meter from the output side of the PCAOM, an array of light spots will result when approaching the Bragg angle. When this array becomes evident, maximize the intensity of the diffracted positive (+) first order (away from the connector) by varying the Bragg angle, vertical and horizontal position of the PCAOM. See figure 1.

The RF power can be adjusted to achieve the required diffraction efficiency for the 488 nm wavelength, typically <0.1 watt. When the output light is maximized, adjust the fine frequency of the driver to peak the output for 488 nm wavelength.

Without changing the Bragg angle, apply the required drive frequencies for the other desired wavelengths, one at a time, and maximize the output by adjusting the drive power and fine frequency for each. See Acceptance Test Report for drive frequency data. Note: in no case should the total RF power for all frequencies exceed 0.8 watt. NEOS will not warranty any failure resulting from the application of too much RF power

All of the output wavelengths should be co-linear in the + first order beam. Use of this device in any other configuration other than described will degrade performance.

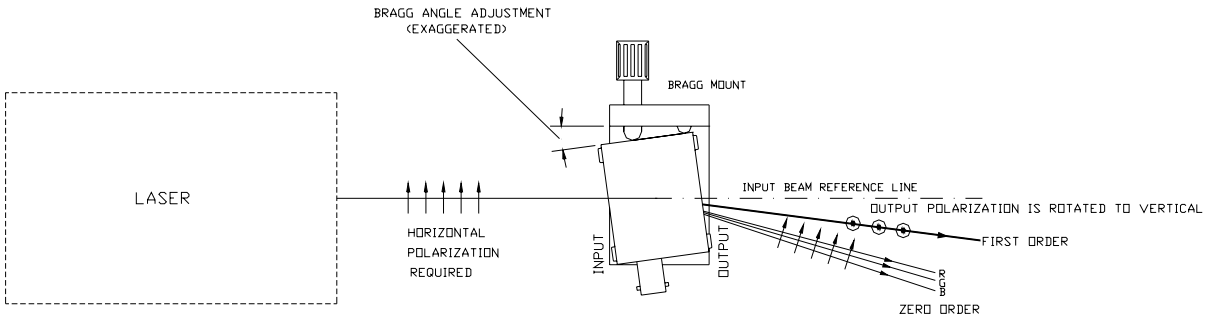


Figure 1

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SECTION VI

OPTICAL CLEANING
FOR PCAOM MODULATORS

Periodic cleaning of the PCAOM device is a normal part of maintaining an optical system. When the device is installed in an optical system, make sure that there is access to allow removal of the protective cover and room to clean the device. If removal from the system is necessary, then follow the alignment
procedure in this manual to reinstall, realign and, adjust the PCAOM device.

To clean the PCAOM device, remove the screws that hold the cover to the mount. Caution must be used when placing a screw driver near the window opening in the cover, as it is best to protect the opening with tape or cover the opening with your finger (without touching the crystal) to protect it. NEOS will not warrant any damage or scratches caused by inserting the screwdriver into the window opening.

- Remove the protective cover.
- Blow off any visible dust with canned air. Do not use an air gun unless it is filtered and water and oil free!

- Fold (4 times) a new lens tissue into a triangle to make a cleaning tool.
- Dip the tip of the lens tissue into fresh acetone or spray fresh acetone from a squeeze bottle onto the lens tissue. Then shake excess fluid out of the lens tissue. Do not handle the wet area of the tissue, as your finger oil will be absorbed and contaminate the optical surface of the crystal.

- Wipe (only once) across the crystal in an even motion, starting near the transducer and drawing the tissue across the optical surface toward the other end. Do not damage the bond wires! Do not reuse the tissue as the mounting silver epoxy may be spread onto the window of the crystal.

- Repeat with a new tissue each time and for each surface that needs cleaning.
- Replace the protective cover and screws.
- Realign the device in your system and adjust the Bragg angle for maximum diffraction efficiency as described in section V.

Notes:

- The lens tissue must be lint free and the best grade available.
- Only use each tissue once, for only one surface. Do not reuse the tissue, as it will redistribute the removed dust or mounting silver epoxy.
- The acetone must be electronic grade. The acetone must be fresh from a new bottle, as the acetone will absorb water from the air and cause streaks. Discard any acetone, which has been exposed to the air for more than 4 hours. If the bottle is half- empty, do not use.