SQM-LU-DL filter adaptor

This adaptor is used to attach a filter to the SQM-LU-DL for purposes of reducing the amount of light into meter through a Neutral density (ND) filter. Experimentally, other colour filters may be used in this adaptor. The adaptor was created for an Edmund Optics 30.5 (32mm OD) filter. Adaptors for other filter sizes may be made on request.



Illustration 1: SQM-LU-DL with ND filter attached



Illustration 2: Adaptor parts

Installation

- 1) Remove two existing #4x 3/4" screws in the meter near the front (lens).
- 2) Use longer #4 x 1" screws into the meter. Do not over-tighten.



Illustration 3: Adaptor mounted

3) Place the filter into the cap and screw that cap into the adaptor holder. Do not over-tighten the cap, in fact back-screw (unscrew) it a bit to ensure that the threads are engaging before screwing it in.



Illustration 6: Filter & cap



Illustration 4: Filter in cap



Illustration 5: Filter cap installed in adaptor holder

4) The "Light Calibration Offset" will require changing to obtain absolute calibrated values. The dark calibration number will not need changing as it refers to the sensor time parameter in total

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🖉 🕑 Unihedron Device Manager					
File View Tools Help			ISB Ethor	net DC222	
Eth : 00204AC7863B : 192.168.1.101			Ether		
Eth : 00204AAF20A2 : 192.168.1.125			Serial #:	FTDBHXFZ	
			Port:	/dev/ttyUSB2	
Information Calibration Report Interval Fi	rmware Data Loggir	ng Configuratio	n Simulat	ion	
• Get Calibration Info					
Log Calibration Info		35 - FS			
Des	ired Values	Actual Values	5		
Light Calibration Offset:	17.37 Set	19.88	mpsas		
Light Calibration Temperature:	Set	18.0	°C		
Dark Calibration Period:	Set	196.068	s		
Dark Calibration Temperature:	Set	17.0	°C		
Notes:					
- See calibration sneet for origi - Add/subtract Light Cal offset f	nai settings. or extra glass coverir	ng.			
- Temperature values get recon	verted,				
so the actual may be slightly o	interent than the de	sireu.			

darkness, and that is not affected by additional filtering:

Illustration 7: Changing the Light Calibration Offset

Filter calibration

The ofset determined by a simple light experiment should be subtracted from the reading. Take the meter to a place where there is a uniform constant light source.

Apply this offset as a negative value, i.e. if you measured 16.60 without the filter in place, then 16.75 with the filter in place, then an oset of -0.15 should be applied to all readings.

An example using the UDM software; if your oset is -0.12 and your factory calibrated light calibration oset is 19.92, then you should change the light-calibration-oset on the calibration-tab to 19.80. European users will see and use a comma instead of a decimal point.

Reading limit range

When adding any filter that limits the amount of light, the meter's bright limit will be reduced. The meter sensor is only limited by receiving more than 400kHz. The reading limit can be deduced after calibration by using the simulation mode:

- 1) From UDM (Unihedron Device Manager), select View, then check Simulation.
- 2) Select the unit under test from the Found devices table.
- 3) Select the Simulation tab.
- 4) Enter 300 into the period field and 400000 into the frequency field and press start. The following illustration shows a reading of 3.37mpsas at the maximum frequency of 400kHz:

🥌 🕺 Unihedron Device Manager	
File View Tools Help	
Q Find USB : FTDBHXFZ : /dev/ttyUSB2	USB Ethernet RS232
Eth : 00204AC7863B : 192.168.1.101	
Eth : 00204AAF20A2 : 192.168.1.125	Serial #: [FIDBHXFZ
	Port: /dev/ttyUSB2
Information Coliberation Deposit Interval Firmwork Data Lagging Configure	Simulation
Sensor timing	
Period Max (s Freq Max (Hz) Stens Temp Min Temp Max St	ens Start Stop
	Verbose
S,000000001c,0000400000f,000000230t,r, 03.37m,0000400000Hz,00000	00001c,0000000.000s, 024.1C
S,0138240000c,000000000f,000000230t,1, 23.90m,000000000Hz,01382	40000c,0000300.000s, 024.1C
Sent: S0138240000,0000000000,00230x To: /dev/ttyUSB2 Received: S,01382	2400000,00000000001,0000000230t,r, 23.90m,000000 🖉

Illustration 8: Simulation to determine absolute minimum and maximum reading values

Sample readings of ND filters on SQM

Name	Reference without filter	Reading with filter	Difference
Meade Series 4000 Filter ND96(0.9 density, 13% transmission)	8.74 mpsas	10.82 mpsas	2.08 mpsas darker
Edmund Filter ND MTD 0.9CD ND090- 30.5 12.5% transmission	8.74 mpsas	11.36 mpsas	2.62 mpsas darker