

AHR Athermal Spectrometers

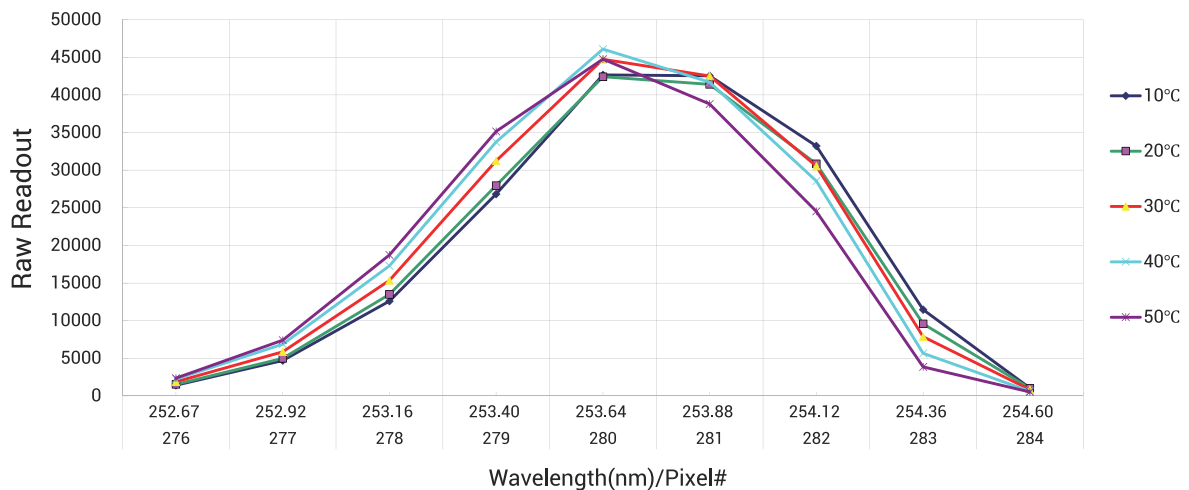


Best in Class

SNR, Thermal and Mechanical Stability, Stray Light, Optical Throughput

- Patented passive athermal opto-mechanical design, **0.003nm/C** in 910nm range.
- Optimized asymmetrical Czerny-Turner configuration
- Linear variable sorting filter on cylindrical lens
- 2/3 μ s minimum integration time, low CCD readout noise
- Back thinned Hamamatsu S11155/6, S10420 or Toshiba TCD1304DG

Thermal Wavelength Shift of Hg Line



Product	Range (nm)	FWHM-25 μ m Slit	FWHM-50 μ m Slit
AHR-01	190-950	0.8 nm	1.6 nm
AHR-02	190-1100	1.2 nm	2.0 nm
AHR-03	190-570	0.45 nm	0.72 nm
AHR-04	380-1100	0.90 nm	1.50 nm
AHR-05	380-780	0.60 nm	0.91 nm
AHR-06	190-440	0.30 nm	0.46 nm

Optical		
Optical Design	Non-Symmetrical Czerny-Turner Configuration	
Grating Selection	Support Customization	
Entrance Slit	5, 10, 25, 50, 100 μm	
Optical Fiber	SMA905	
CCD		
Detector	Toshiba TCD1304	Hamamatsu S11155/6
Pixels	3648 pixels; 8x200 μm	2048, 14x500/1000 μm
Full Well Depth	$\sim 86\text{K photon}^{(1)(2)}$	200 Ke^-
Characteristic		
SNR	420(no avg); 2073(avg 10) ⁽⁴⁾	730(no avg); 3400(avg 10)
Readout Noise	<30 rms(no avg); <6.5 rms(avg 10) ⁽⁴⁾	<4 rms(no avg); <1.5 rms(avg 10)
Dynamic Range	>2000(no avg); >10000(avg 10) ⁽⁴⁾	>16000(no avg); >43000(avg 10)
Integration Time	10 μs -65 s	2 μs -65 s
Linearity	Before Correction 99.97%; After Correction 99.98% ⁽⁴⁾	Before Correction 99.97%; After Correction 99.99%
Spectrum Range	185-1100 nm	
Resolution	0.3-1.6 nm(FWHM)	
System Stray Light	0.15% with Tungsten ⁽⁴⁾	
Thermal Spectrum Drift	Wavelength Drift<0.5 pixel(10-50°C) ⁽⁵⁾	
Electronics		
Current Consumption	140 mA@5 VDC	250 mA@5 VDC
Single Spectrum Conversion Time	3.7 ms	2.1 ms
Max Spectrum Rate	250 /s	
AD Converter	16 bit 1 MS/s Low Noise Design	
USB	USB2.0HS@480 Mbps	
GPIO	6 GPIOs	
LAMP Control	PWM, pulse, or custom output	
Trigger	Software & External	
Averaging	On-Board Averaging	
Software		
Supported Platform	Windows XP-7-8	
Interface	USB2.0HS@480 Mbps; RS232@115.2 Kbaud ⁽³⁾	
Physical		
Dimension	113.4x110.6x44.6 mm	
Weight	540 g	

1. <http://www.gratingworks.com/products/tcd1304dg.pdf>

2. From Nakamura p.317(ISBN-13:978-0849335457) daylight of around 5000 K color temperature produces about 13366 photons per $\mu\text{m}^2\text{-lx-s}$. $13366*0.004(\text{sat lx-s})*200*8(\text{pixel area})=85542$

3. RS232 only supported in special OEM version

4. <http://www.gratingworks.com/products/noise.pdf>

5. <http://www.gratingworks.com/products/temp.pdf>