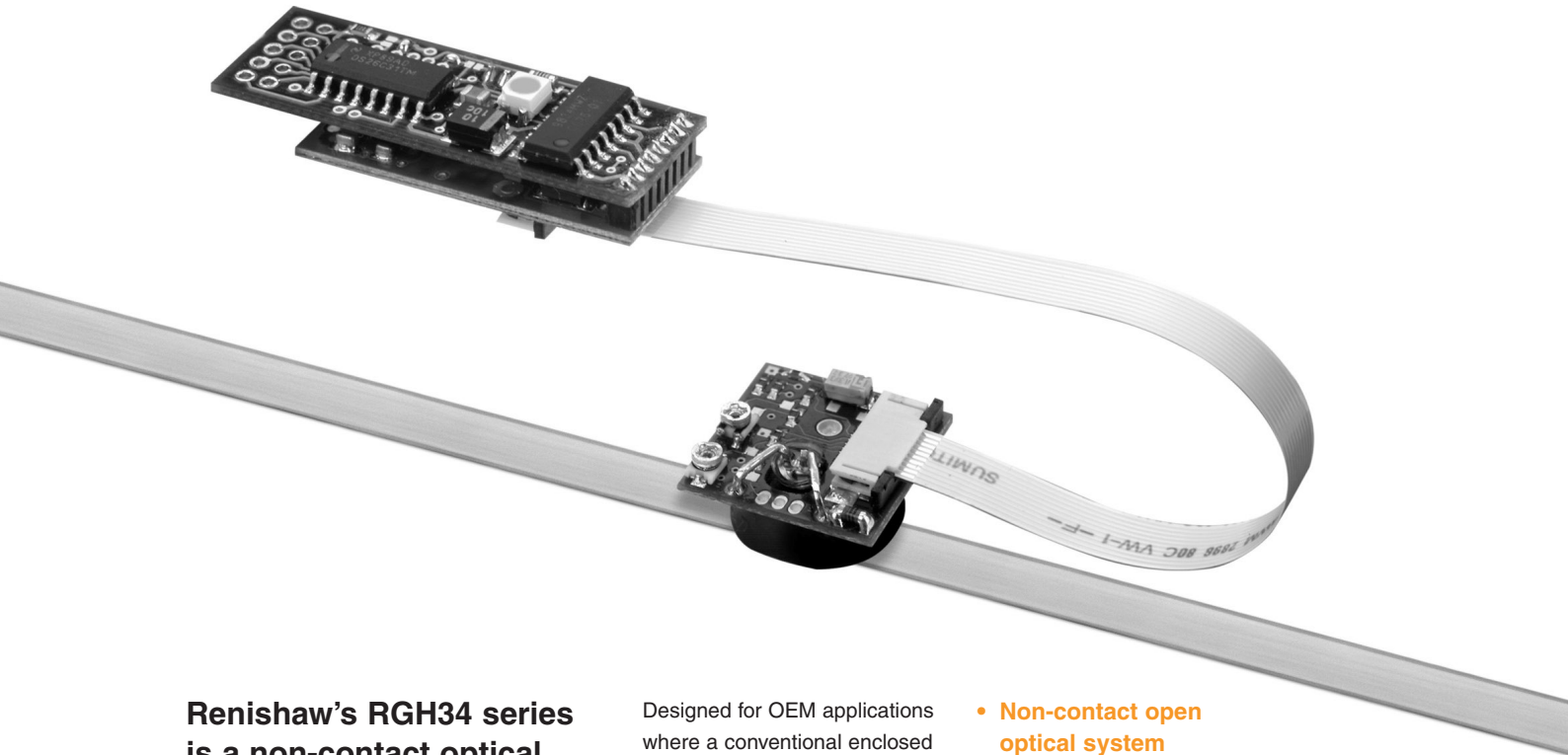


RGH34 series encoder system



Renishaw's RGH34 series is a non-contact optical encoder system that offers the performance and reliability of the established RG2 linear encoder system with the versatility of a miniaturised component system.

Renishaw's unique patented filtering optical technology eliminates friction, hysteresis and wear while giving high contamination tolerance and exceptional reliability. The versatile system can read Renishaw's RGS40-S self-adhesive scale, RGS40-G glass scale and RESR rings as well as industry standard 40 µm chrome/glass etched scale, making it suitable for a wide range of applications.

The component style construction allows integration flexibility for even the smallest motion systems, while the generous set-up tolerances, easy to install adhesive scale and patented set-up LED make installation quick and easy.

Designed for OEM applications where a conventional enclosed readhead cannot be fitted, the RGH34 brings reliable state-of-the-art performance to size sensitive precision linear and rotary motion applications such as ultra small linear actuators, microscopes and microstages.

Common readhead

RGH34U

Digital range

RGI34T - 10 µm resolution

RGI34D - 5 µm resolution

RGI34G - 2 µm resolution

RGI34X - 1 µm resolution

RGI34N - 0.4 µm resolution

RGI34W - 0.2 µm resolution

RGI34Y - 0.1 µm resolution

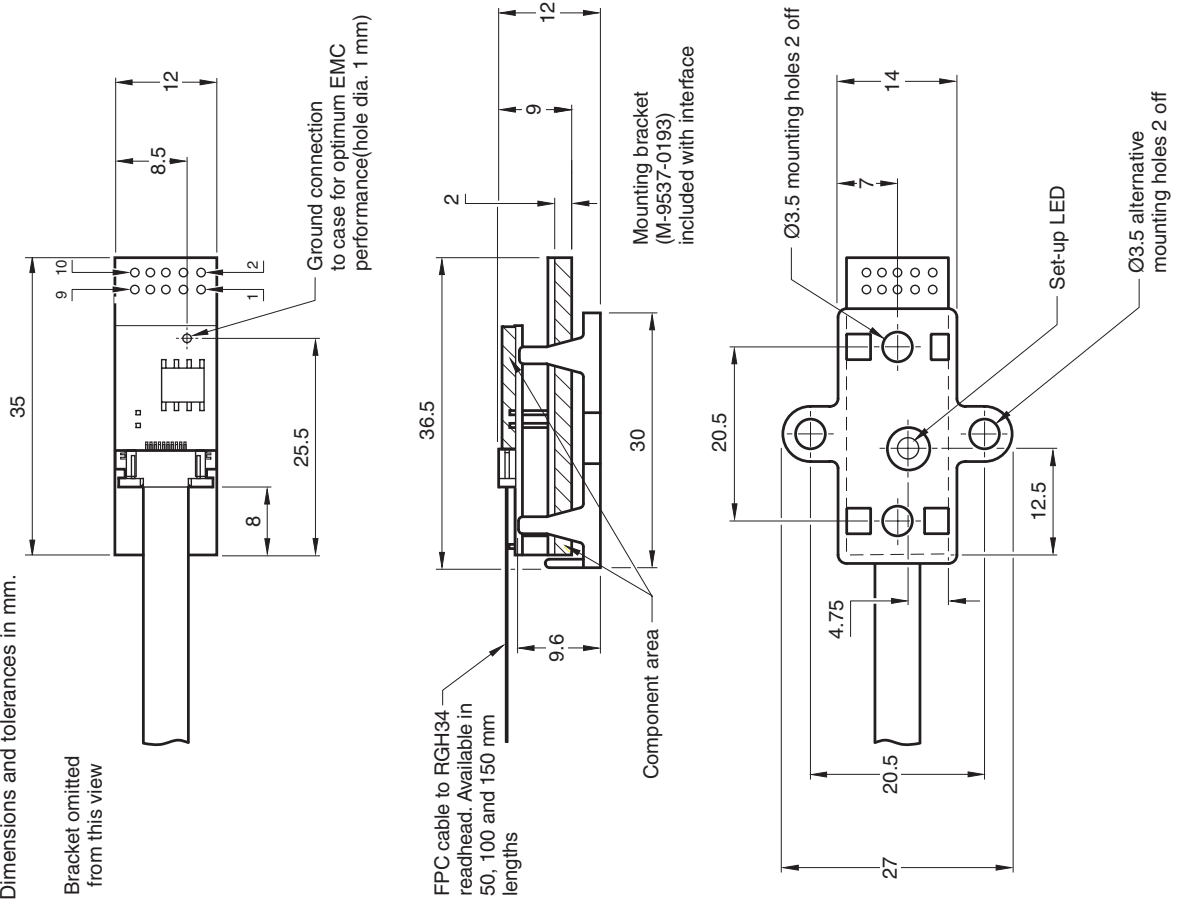
Analogue range

RGI34B - 1 Vpp differential

- **Non-contact open optical system**
- **Compact component style readhead**
- **Large installation tolerances**
- **High speed operation**
- **Industry standard digital and analogue output options**
- **Resolutions from 10 µm to 0.1 µm**
- **Optional reference or limit sensor**
- **Integral set-up LED**
- **Uses low profile RGS40-S self-adhesive scale, RGS40-G glass scale, RESR rings and other reflective scale types**

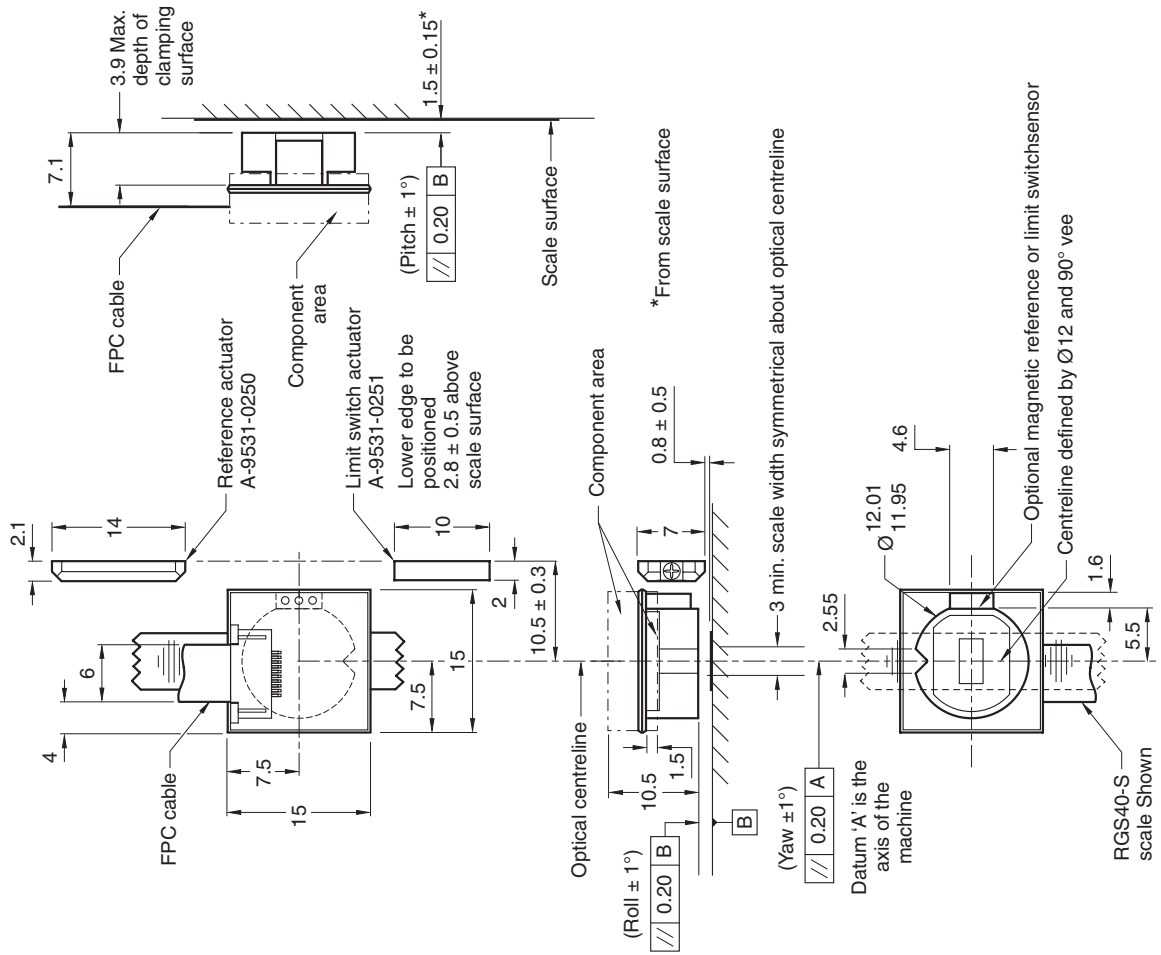
RG134 Installation drawing

Dimensions and tolerances in mm.



RGH34 Installation drawing

Dimensions and tolerances in mm.



Operating and electrical specifications

Power supply	5 V ± 5%	120 mA
	<p>NOTE: Current consumption figures refer to unterminated interfaces.</p> <p>For digital outputs a further 25 mA per channel pair (eg A+, A-) will be drawn when terminated with 120 Ω.</p> <p>For analogue outputs, a further 20 mA will be drawn when terminated with 120 Ω.</p> <p>Renishaw encoder systems must be powered from a 5 V dc supply complying with the requirements for SELV of standard EN (IEC) 60950.</p>	
	Ripple	200 mVpp @ frequency up to 500 kHz maximum.
Temperature	Storage -20 °C to +70 °C	Operating 0 °C to +55 °C
Humidity	Storage 95% maximum relative humidity (non-condensing) Operating 80% maximum relative humidity (non-condensing)	
Acceleration	Operating 500 m/s ² BS EN 60068-2-7:1993 (IEC 68-2-7:1983)	
Shock (non-operating)	1000 m/s ² , 6 ms, ½ sine BS EN 60068-2-27:1993 (IEC 68-2-27:1987)	
Vibration (operating)	100 m/s ² max @ 55 Hz to 2000 Hz BS EN 60068-2-6:1996 (IEC 68-2-6:1995)	
Mass	Readhead 2 g	Interface 3 g
Electrical integration	The RGH34 and RGI34 have been designed as system components and to be compliant with EMC regulations for products of their type. Care must be taken with shielding and grounding arrangements to ensure EMC performance once installed (refer to RGH34 installation guide for full recommendations). It is the system integrator's responsibility to implement, test and prove EMC compatibility for the whole machine.	
Readhead to Interface connections	Very low profile zero insertion force micro-connector for 10 way Flexible Printed Circuit (FPC) cable. Cable flex life minimum 10 x 10 ³ cycles at 5 mm bend radius.	
FPC cables	FPC (flexible printed circuit) cables should be ordered separately from your local Renishaw representative. The part numbers for the standard lengths are listed below.-	

Part	Part number
50 mm FPC	A-9537-0182
100 mm FPC	A-9537-0183
150 mm FPC	A-9537-0184

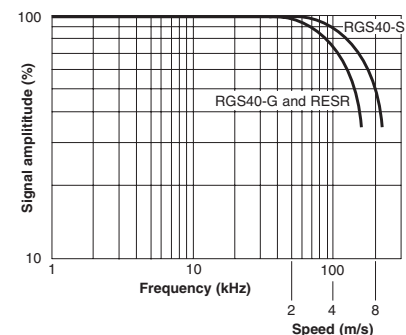
Speed

The table below shows the maximum speed and associated minimum recommended counter clock frequency for all digital output interfaces. The RGI34N, W and Y options have clocked outputs. These are designed to prevent fine edge separations being missed by receiving electronics utilising slower clock speeds.

RGI34 digital interfaces

Head type			Maximum speed (m/s)			Minimum recommended counter clock frequency (MHz)		
			RGS40-S	RGS40-G+RESR				
Analogue	B (1Vpp)	-3dB	6	4.5		—		
		-6dB	8	5.5				
Digital	T (10 µm)		8	5.5		$\left(\frac{\text{Encoder velocity (m/s)}}{\text{Resolution (µm)}} \right) \times 4 \text{ safety factor}$		
	D (5 µm)		8	5				
	G (2 µm)		7.5	4				
	X (1 µm)		6	3				
			Maximum speed (m/s)-all scale types					
			N	W	Y	N	W	Y
			(0.4 µm)	(0.2 µm)	(0.1 µm)	(0.4 µm)	(0.2 µm)	(0.1 µm)
		Option code						
		30	—	1.3	0.6	—	12	12
		31	—	0.9	0.45	—	8	8
		32	1.3	—	—	6	—	—
		33	0.9	0.45	0.2	4	4	4

RGI34 analogue type B interfaces



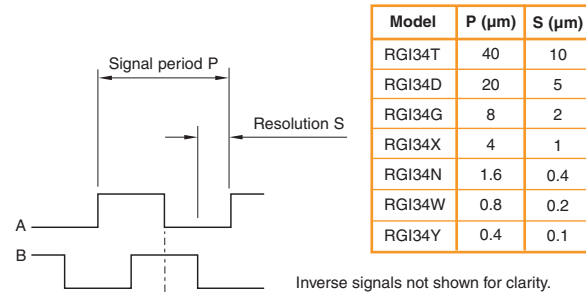
Output specifications

Digital output signals

RGI34T, D, G, X, N, W, Y

Square wave differential line driver to EIA RS422A

Incremental - 2 channels A and B in quadrature (90° phase shifted)



Reference

Synchronised pulse Z, duration as resolution S. Repeatability of position (uni-directional) maintained within ± 20 °C from temperature at time of phasing and for speeds < 0.5 m/s. Inverse signal not shown for clarity. Actuation device A-9531-0250.

Limit

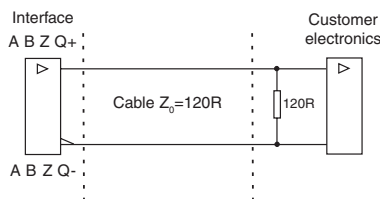
Repeatability < 0.1 mm typical
 Length of actuating magnet
 Asynchronous pulse Q
 Inverse signal not shown for clarity.

NOTE: RGH34 readheads and RGI34 digital interfaces are available with reference mark or limit switch detection. Select output option at order. Actuation device A-9531-0251, A-9531-2052, A-9531-2054

Alarm

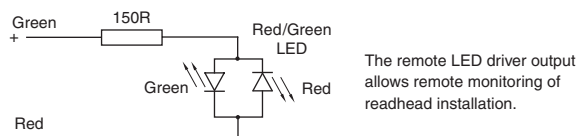
3-state alarm
 Incremental channels forced open circuit for > 20 ms when signal is too low for reliable operation. For RGI34N, W and Y only, incremental channels forced open circuit for > 10 ms when signal is too low or speed too high for reliable operation.

Recommended signal termination



Remote LED driver

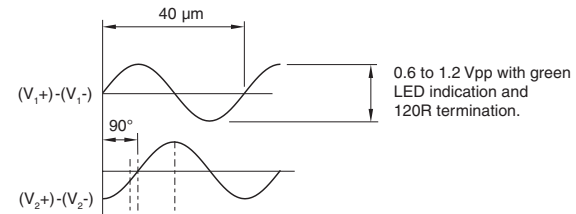
Recommended termination



Analogue output signals

RGI34B (1 Vpp)

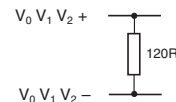
Incremental - 2 channels V₁ and V₂ differential sinusoids in quadrature (90° phase shifted)



Reference

Differential pulse V₀ -18° to 108°. Duration 126° (electrical). Repeatability of position (uni-directional) maintained within ± 20 °C from installation temperature. Actuation device A-9531-0250.

Analogue termination network



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