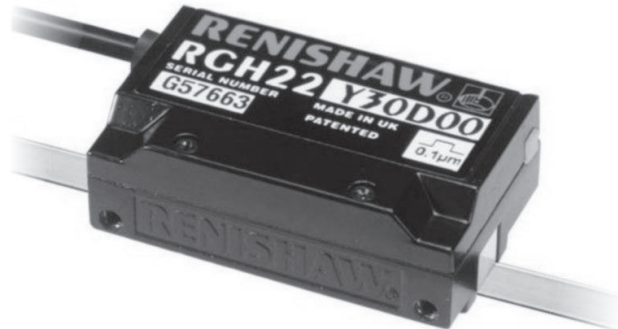


RGH22 series - digital and analogue readhead system

- Non-contact open optical system
- Integral interpolation
- Industry standard digital and analogue output options
- Resolutions from 5µm to 0.1µm
- Integral reference and limit sensors
- Dual limit sensor option
- Integral set-up LED
- Uses RGS-S self adhesive scale



Single limit range	Dual limit range
RGH22D - 5µm resolution	RGH22P - 5µm resolution
RGH22X - 1µm resolution	RGH22Q - 1µm resolution
RGH22Z - 0.5µm resolution	RGH22R - 0.5µm resolution
RGH22Y - 0.1µm resolution	RGH22S - 0.1µm resolution
RGH22B - 1Vpp differential	RGH22A - 1Vpp differential
RGH22C - 12µA differential	

Renishaw's RG2 linear encoder system is a non-contact optical encoder designed for position feedback solutions. The system uses a common reflective tape scale scanned by a readhead chosen from a range of options offering industry standard digital square wave or analogue sinusoidal output signal formats. Renishaw's unique patented optical scheme is used in the RGH22, RGH24 and RGH25 readhead series and gives proven performance benefits together with high tolerance to scale contamination.

The RGH22 range is suitable for use in a broad range of applications, offering high resolution and high speed with stability and reliability.

A dual limit sensor option is also available offering two dedicated signal outputs, for left and right end-of-axis travel indication.

RGH22 is an ideal feedback solution wherever precision controlled movement is required. The RGH22 readheads offer the full set of RG2 features and integral interpolation in a robust package with an integral set-up LED for quick and easy installation.

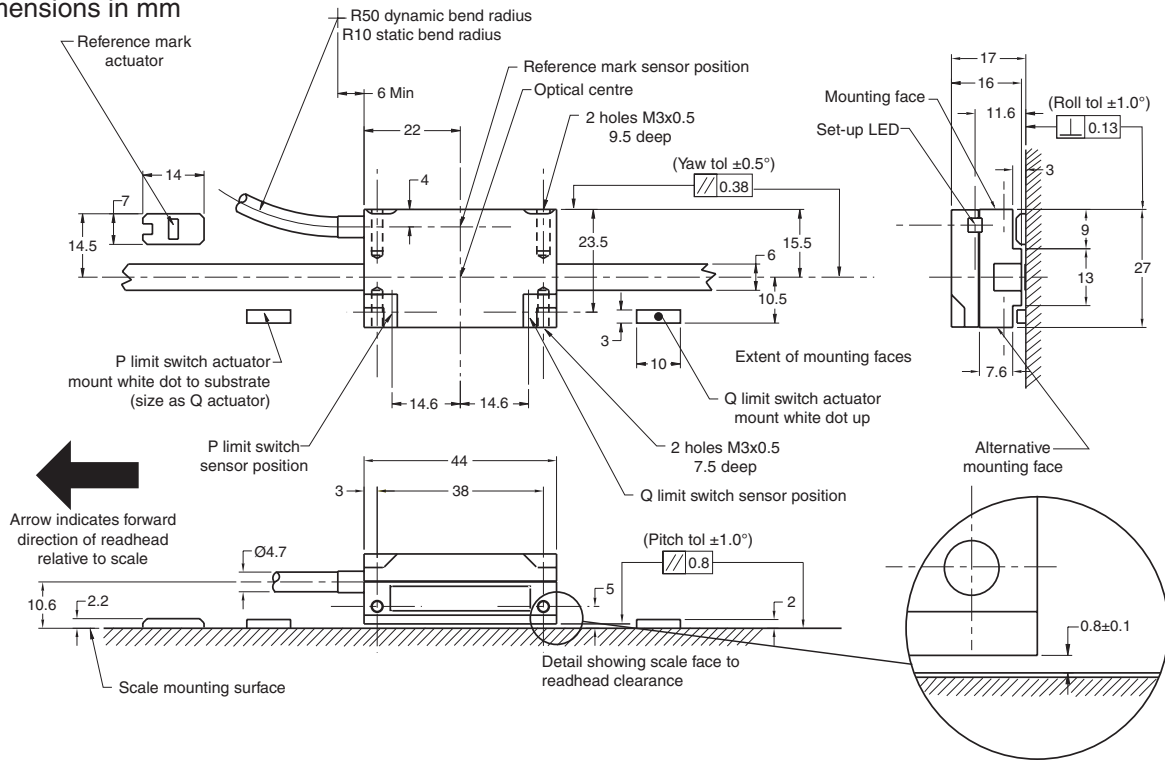
Common applications include co-ordinate measuring and layout machines, semiconductor/electronics manufacturing and inspection, height gauges, electronics assembly and test, linear motors, digital imagesetters and a variety of custom linear motion solutions.

RENISHAW

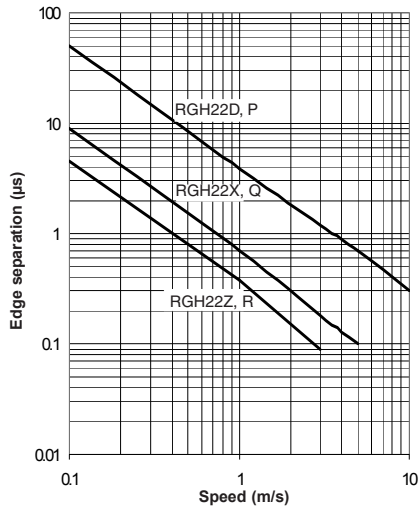
DATA SHEET

General outline and dimensions

Dimensions in mm



Edge separation - digital readheads

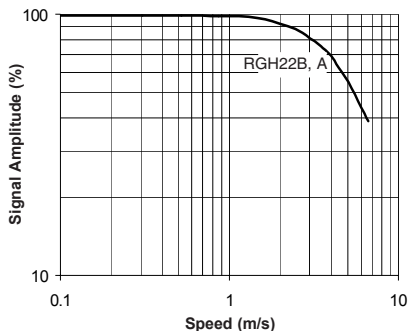


Re-timed (0.1µm) readheads

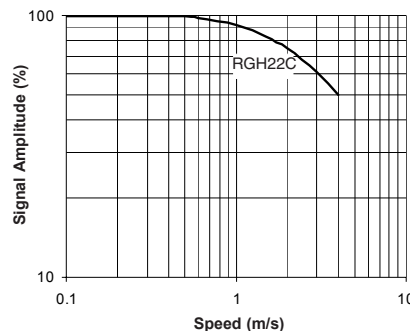
The RGH22Y,S (0.1µm) readheads are available with a variety of different clocked (re-timed) outputs to choose from. The re-timed options are designed to prevent fine edge separations being missed by receiving electronics utilising slower clock speeds. Depending on the clock frequency chosen, each option has a different maximum speed and associated minimum recommended counter clock frequency.

Head type	Maximum speed (m/s)	Minimum recommended counter clock frequency (MHz)
D, P	10.0	$\left(\frac{\text{encoder velocity (m/s)}}{\text{resolution (µm)}} \right) \times 4$ safety factor
X, Q	5.0	
Z, R	3.0	
Y, S option		
00	0.7	40
15	1.0	20
16	0.4	8

Speed - analogue type B, A readheads



Speed - analogue type C readheads



Operating and electrical specifications

Power supply	5V \pm 5%	120mA (typical) 150mA (RGH22Y, S option 00) 300mA (RGH22Y, S options 15 & 16)
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Temperature	Storage -20°C to +70°C Operating 0°C to +55°C
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Humidity	10 - 90% RH non-condensing
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Sealing	IP50
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Acceleration	operating 300m/s ²
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Shock (non-operating)	1000m/s ² , 11ms, ½ sine
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Vibration (operating)	100m/s ² 55 to 2000Hz as per IEC 68-2-6
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Weight	Readhead 45g Cable 38g/m
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EMC compliance (system)	BS EN 50081-2 BS EN 50082-2 BS EN 55011
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Cable	12 core, double shield, outside dia. 4.7mm. Flex life >10 x 10 ⁶ cycles at 50mm bend radius
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Connector options	Code - connector type	Application
	D - 15 pin D type plug	RGH22D, X, Z, Y, P, Q, R, S
	R - 12 pin circular plug	RGH22D, X, Z, Y, P, Q, R, S
	C - 9 pin circular plug	RGH22C
	L - 15 pin D type plug	RGH22B, A
	V - 12 pin circular plug	RGH22B
	W - 12 pin circular coupling	RGH22B
	F - Unterminated cable	All readheads
	X - 16 pin in line connector	All readheads

Recommended signal termination

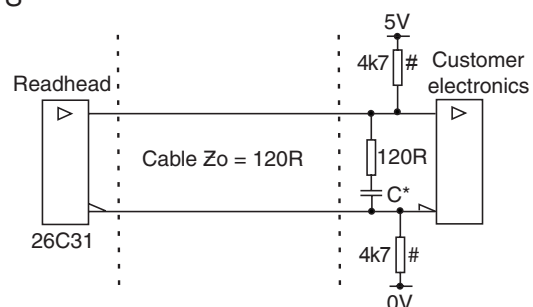
Digital readheads - type RGH22D, X, Z, Y, P, Q, R, S

* Optional power saving capacitor, for recommended values see below:

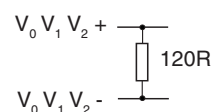
Cable length	C
<25m	4n7F
>25m	10nF

#Only required on alarm channel E for fail safe operation

Standard RS422A line receiver circuitry



Analogue readheads - type RGH22B, A

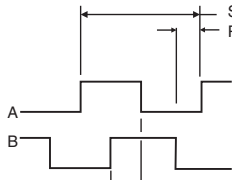


Output specifications

Digital output signals - type RGH22D, X, Z, Y, P, Q, R, S

Form Square wave differential line driver to EIA RS422 (except limit switches P, Q and external set-up signal X)

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



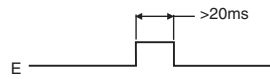
Model	P(μm)	S(μm)
RGH22D, P	20	5
RGH22X, Q	4	1
RGH22Z, R	2	0.5
RGH22Y, S	0.4	0.1

Reference



Synchronised pulse Z, duration as resolution S. Repeatability of position (uni-directional) maintained within ±10°C from installation temperature and for speed <250mm/s. Actuation device RGM22S.

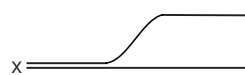
Alarm



Alarm asserted for signal amplitude <15%. For RGH22Y, S only - alarm asserted when signal amplitude <45% and line driver channels 3-stated when signal amplitude <15%.

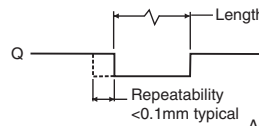
When using dual limit option, only E- signal available

Set-up



5V = good
0V = adjust
LED signal external output

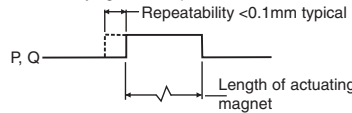
Single limit - RGH22D, X, Z, Y



Asynchronous pulse Q

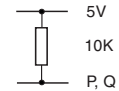
Dual limit - RGH22P, Q, R, S

(available with flying lead, 15 pin D connectors or in-line connector only)



Asynchronous pulse P, Q Actuation device RGP22S

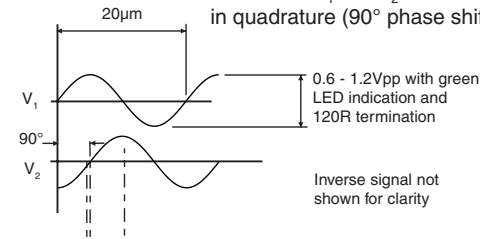
Termination



Analogue output signals

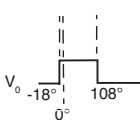
Type RGH22B, A

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



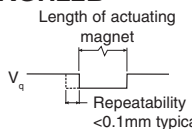
Inverse signal not shown for clarity

Reference



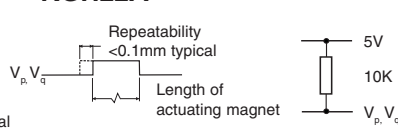
Differential pulse V₀ - 18° to 108°. Duration 126° (electrical) Repeatability of position (uni-directional) maintained within ±10°C from installation temperature and for speed <250mm/s. Actuation device RGM22S.

Single limit RGH22B

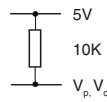


Asynchronous pulse V_p, V_q Actuation device RGP22S.

Dual limit RGH22A



Termination



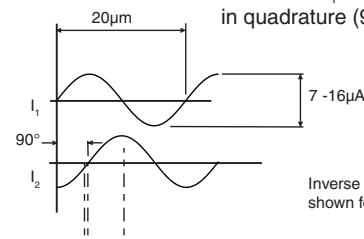
Set-up



5V = good
0V = adjust
LED signal external output

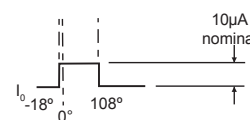
Type RGH22C

Incremental 2 channels I₁ and I₂ differential sinusoids in quadrature (90° phase shifted)



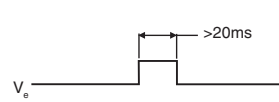
Inverse signal not shown for clarity

Reference



Differential pulse I₀ - 18° to 108°. Duration 126° (electrical) Repeatability of position (uni-directional) maintained within ±10°C from installation temperature and for speed <250mm/s. Actuation device RGM22S.

Alarm



Asynchronous pulse V_a
Trigger level <15% nominal analogue signal

Set-up



5V = good
0V = adjust
LED signal external output

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