

RGH22 series readhead





EMC compliance

The RG2 encoder system conforms to the relevant harmonised European standards for electromagnetic compatibility as detailed below.

BS EN 61326

Patents

Features of Renishaw's encoder systems and similar products are the subjects of the following patents and patent applications:

EP 0207121	JP 1549396	US 4959542	EP 0274491
JP 501381/88	US 4,974,962	EP 0274492	US 4926566
EP 0383901	JP 2,963,926	US 5,088,209	EP 0388453
JP 2837483	US 5,063,685	EP 0514081	JP 3,202,316
US 5,241,173	EP 0543513	EP 0843159	JP 248,895/1993
US 5,302,820	EP 0748436	US 5,861,953	EP 826138 B
JP 506,211/1999	US 6,051,971	WO 01/29516	EP 1147377

Further information

For further information relating to the installation of RGH22 readheads, see also the RGH22 Data sheet (Part number L-9517-0182), and the Scale installation guide (part number M-9517-2855). These can be downloaded from our website www.renishaw.com/encoder and are also available from your local representative.

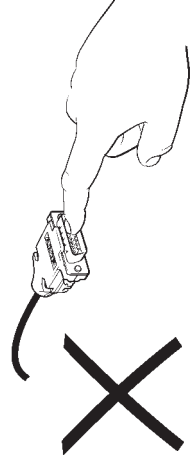
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Storage and handling



GB - WARNINGS

It is the responsibility of the machine manufacturer and/or encoder installer to ensure that, in safety critical applications of Renishaw encoder systems, any form of readhead signal deviation from the limits of the receiving electronics, howsoever caused, shall not cause the machine to become unsafe. It is the machine supplier's responsibility to ensure that the user is made aware of any hazards involved in operation of their machine, including those mentioned in Renishaw product documentation, and to ensure that adequate guards and safety interlocks are provided. Remove power before performing any maintenance or cleaning operations.

F - AVERTISSEMENTS

Il incombe au fabricant de la machine et/ou à l'installateur du codeur de veiller à ce que, dans le cadre d'applications des systèmes de codeurs Renishaw où les considérations de sécurité doivent être impérativement prises en compte, toute forme de déviation du signal de tête de lecture par rapport aux limites des dispositifs électroniques récepteurs, quelle qu'en soit la cause, ne risque pas de rendre la machine dangereuse. La responsabilité de veiller à ce que l'utilisateur du système soit informé de tous risques associés à l'utilisation des machines, y compris les risques figurant dans la documentation afférente aux produits Renishaw et de vérifier que les dispositifs de protection et de verrouillage de sécurité appropriés ont bien été prévus, incombe au fournisseur de la machine. Veiller à bien isoler les systèmes de la source d'alimentation avant de procéder à un travail d'entretien quelconque.

D - ACHTUNG

Es liegt in der Verantwortung des Maschinenherstellers und/oder dem Nachrüster von Renishaw Wegmess-Systemen, dass bei einer sicherheitskritischen Anwendung der Systeme die Empfangs elektronik keine Signalabweichung von den Spezifikationen verursacht, die zu einem unsicheren Betrieb der Maschine führen könnten. Es liegt weiterhin in der Verantwortung des Maschinen-Herstellers sicherzustellen, dass der Benutzer auf alle (einschließlich die in der Renishaw Produktdokumentation aufgeführten) Gefahrenwirkungen beim Betrieb der Maschine hingewiesen wird. Ferner ist dafür zu sorgen, dass entsprechende Sicherheitsvorrichtungen vorhanden sind. Schalten Sie vor Durchführung von Wartungs- oder Reinigungsarbeiten den Strom ab.

I - AVVERTENZE

Il fabbricante della macchina e/o l'installatore del sistema dotato di encoder hanno la responsabilità di assicurarsi che, nel caso di applicazioni critiche dei sistemi dotati di encoder Renishaw, qualsiasi forma di deviazione, dovuta a qualsiasi causa, del segnale della testina di lettura dai limiti richiesti dal sistema elettronico a cui è diretto non renda la macchina insicura. Il fornitore della macchina è responsabile di assicurarsi che l'utente sia messo al corrente di qualsiasi pericolo connesso con il funzionamento della macchina, inclusi quelli menzionati nella documentazione Renishaw del prodotto, e di assicurarsi che siano fornite adeguate cuffie di protezione ed asservimenti di sicurezza. Staccare la rete elettrica d'alimentazione prima di eseguire qualsiasi operazione di manutenzione o di pulizia.

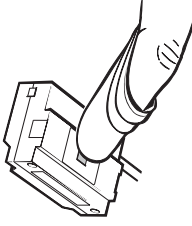
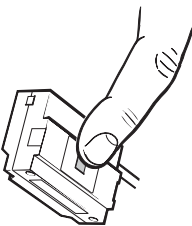
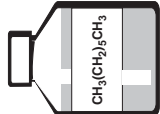
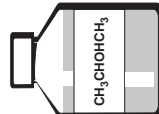
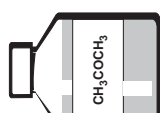
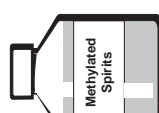
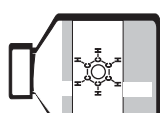
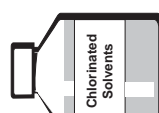
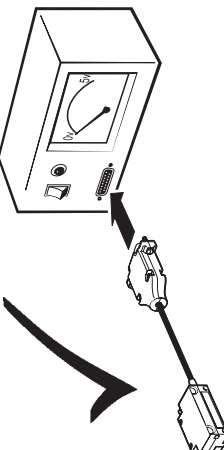
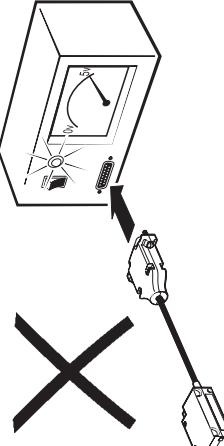
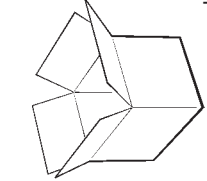
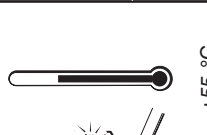
E - ADVERTENCIAS

Es responsabilidad del fabricante de la máquina y/o el instalador del encóder asegurarse de que, en las aplicaciones de los sistemas de encóder Renishaw en las que resulta crítica la seguridad, ninguna forma de desviación de la señal de la cabeza lectora de los límites de la electrónica receptora, sea cual sea la causa, hará que la máquina se vuelva peligrosa. Es responsabilidad del proveedor de la máquina asegurarse de que el usuario tenga conocimientos de cualquier peligro que implica la operación de su máquina, incluyendo los que se mencionan en la documentación sobre los productos Renishaw, y asegurarse de haber suministrado las defensas y dispositivos de interbloqueo adecuados. Se debe cortar la corriente antes de realizar cualquier trabajo de mantenimiento o limpieza.

P - AVISOS

É de responsabilidade do fabricante da máquina e/ou instalador do sistema de leitores certificar-se que, em aplicações críticas de segurança dos sistemas Renishaw, qualquer forma de desvio do sinal do leitor fora dos limites da eletrônica receptora, independente do motivo, não afetará a segurança da máquina. É a responsabilidade do fornecedor da máquina de garantir que o utilizador esteja ciente dos perigos envolvidos na operação da máquina, a incluir os mencionados na documentação do produto da Renishaw e de certificar-se de que existem protectores e travas de segurança adequados. Desligar a máquina antes de efectuar operações de manutenção ou limpeza.

Storage and handling (continued)

	
<p>N-heptane</p>  <p>Propan-2-ol</p> 	<p>Acetone</p>   <p>Benzene</p>  
	
 <p>+70 °C -20 °C System</p>	 <p>+55 °C 0 °C System</p>
<p>Storage <95% RH Operating <80% RH (BS EN 61010-1) System</p>	

DK - ADVARSLER

Maskinfabrikanten og/eller indkodingsoperatoren har ansvaret for at sørge for at sikkerheden opretholdes for Renishaw encoder systemer's kritiske applikationssystemer, samt at alle former for afvigelse i læsesignalerne fra modtagerelektronikkens begrænsninger ikke gør maskinen usikker, uanset hvordan dette er opstået.

Maskinleverandøren er ansvarlig for at brugeren gøres bekendt med de risici der er involveret i betjening af maskinen, inklusive dem der angivet i Renishaw's produktokumentering, samt sikre tilstedeværelsen af forsvarelige sikkerhedsskærme og sikkerhedslåse.

Inden der udføres nogen for vedligeholdelse eller rengøring, skal strømforsyningen frakobles.

NL - WAARSCHUWINGEN

De machinefabrikant en/of de installateur van het codeersysteem is ervoor verantwoordelijk dat bij de toepassing van Renishaw encoder systemen waar de veiligheid kritisch is, elk deviatie van het lees-signaal buiten de grenzen van de ontvangerselektronische apparatuur, ongeacht de oorzaak, de machine niet onveilig maakt. De machineleverancier is ervoor verantwoordelijk dat de gebruikers van de mogelijke gevaren bij het gebruik van hun machine bewust worden gemaakt, inclusief de gevaren die in de productdocumentatie van Renishaw vermeld staan, en tevens dat er voldoende afschermingskapen en beveiligingsschakelingen worden aangebracht. Schakel eerst de stroom uit voordat u schoonmaak- of onderhoudswerkzaamheden uitvoert.

SW - VARNING

Det är maskintillverkarens och/eller givarsysteminstallatörens ansvar att se till att säkerheten inte äventyras i säkerhetskritiska tillämpningar av Renishaws pulsgivarsystem, om signalen från läshuvudet skulle avvika från vad den mottagande elektroniken klarar, hur denna avvikelse än har uppstått.

Det är maskinleverantörens ansvar att se till att användaren är medveten om eventuella faror förbundna med användningen av maskinen, inklusive de som anges i Renishaws produktokumentation, och att se till att lämpliga skydd och förreglingar finns.

Maskinen måste göras strömlös innan några skötsel- eller rengöringsarbeten görs.

FIN - VAROITUKSIA

Koneen valmistajan ja/tai kooderin asentajan vastuulla on varmistaa, että turvallisuuskriittisissä sovelluksissa Renishaw-enkooderijärjestelmät tai mitkäään vastaantotelektronikan rajoista poikkeavat lukupään signaalipoikkeamat, riippumatta siitä kuinka ne on aiheutettu, eivät saa konetta toimimaan vaarallisesti.

Koneen toimittajan vastuulla on varmistaa, että käyttäjä on tietoinen kaikista koneensa käyttöön liittyvistä vaaroista mukaan lukien Renishaw-yhtiön tuoteasiakirjojen mainitsemat vaarat ja varmistaa, että on toimitettu asianmukaiset suojukset ja turvalukitukset.

Katkaise virta ennen minkäänlaisten huolto- tai puhdistustoimien suorittamista.

GR - ΠΡΟΕΙΔΟΠΟΙΗΣΕΙΣ

Ο κατασκευαστής του μηχανήματος και/ή ο υπεύθυνος εγκατάστασης του συστήματος κωδικοποίησης οφείλουν να διασφαλίσουν ότι, κατά τις επισφαλείς εφαρμογές των συστημάτων της Renishaw, οποιαδήποτε μορφή απόκλισης του σήματος κεντρικής ζώνης από τα όρια του ηλεκτρικού δέκτη, που δημιουργήθηκε κατόπιν οποιασδήποτε αιτίας δεν θα θέσει σε κίνδυνο την ασφάλεια του μηχανήματος.

Ο προμηθευτής του μηχανήματος οφείλει να διασφαλίσει ότι ο χρήστης είναι ενήμερος για τους κινδύνους που συνδέονται με τη χρήση του μηχανήματος του, συμπεριλαμβανομένων και όλων συγκαταλέγονται στα έγγραφα προλόγων του Renishaw. Επίσης οφείλει να διασφαλίσει ότι υπάρχουν οι κατάλληλες ασφαλείες και δικλείδες ασφαλείας.

Κλείστε το διακόπτη του ρεύματος προτού ξεκινήσετε οποιαδήποτε λειτουργίες συντήρησης ή καθαρισμού.

JP - 警告

レニショー製エンコーダシステムの安全限界性能以内で、受信電回路が受け取れる信号の限界から逸脱した信号が、リードヘッドから如何なる形式で、出力されたとしても、装置を安全な状態に保つ事は、装置製造メーカーの責任です。

レニショーの製品関連書類に記載されている事項を含め、装置の操作中に起こり得る如何なる危険性を作業者に知らせる事、及び、十分な安全性、及び、安全確保機能を設ける事は、装置供給業者の責任です。メンテナンス及び、クリーニング作業の際は、必ず電源を切ってから行なって下さい。

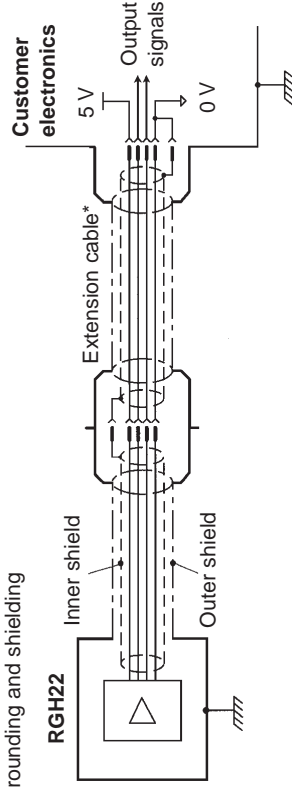
General specifications

Power supply	5 V ± 5%, 120 mA typical 250 mA RGH22Y retained only
NOTE:	For digital outputs, current consumption figures refer to unterminated readheads/interfaces. A further 25 mA per channel will be drawn when terminated with 120 Ω.
Sealing	IP50
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, 1/2 sine BS EN 60068-2-27:1993 (IEC 68-2-27:1987)
Vibration	operating 100 m/s ² , 55 Hz to 2000 Hz BS EN 60068-2-6:1996 (IEC 68-2-6:1995)
Mass	Readhead 45 g Cable 38 g/m
Cable	12 core, double shielded, outside diameter 4.7 mm Flex life >20 x 10 ⁶ cycles at 50 mm bend radius

IMPORTANT: Power to Renishaw readhead units must be supplied from a 5V DC SELV supply complying with the essential requirements of BS EN 61010 or similar specification. The RGH22 series readheads have been designed to the relevant EMC standards, but must be correctly integrated to achieve EMC compliance. In particular, attention to shielding and earthing arrangements is essential.

Electrical connections

RGH22 grounding and shielding



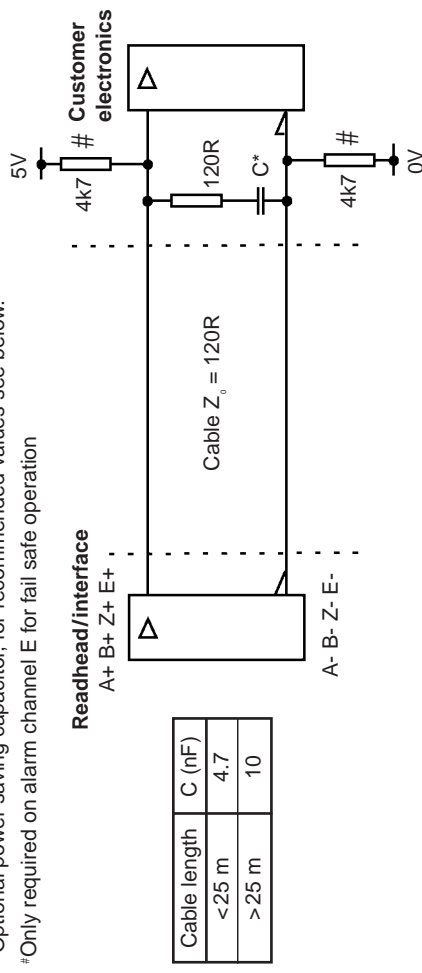
*RGH22B -100 m, RGH22D, X, Z, P, Q, R, -50 m, RGH22C-30 m, RGH22Y, S-20 m

Recommended signal termination

Digital outputs - type RGH22, D, X, Z, Y, P, Q, R, S, RS422A

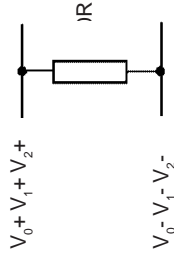
* Optional power saving capacitor, for recommended values see below.

* Only required on alarm channel E for fail safe operation

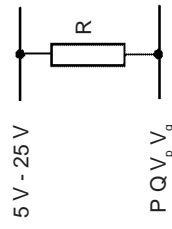


Cable length	C (nF)
< 25 m	4.7
> 25 m	10

Analogue termination - type RGH22 A, B



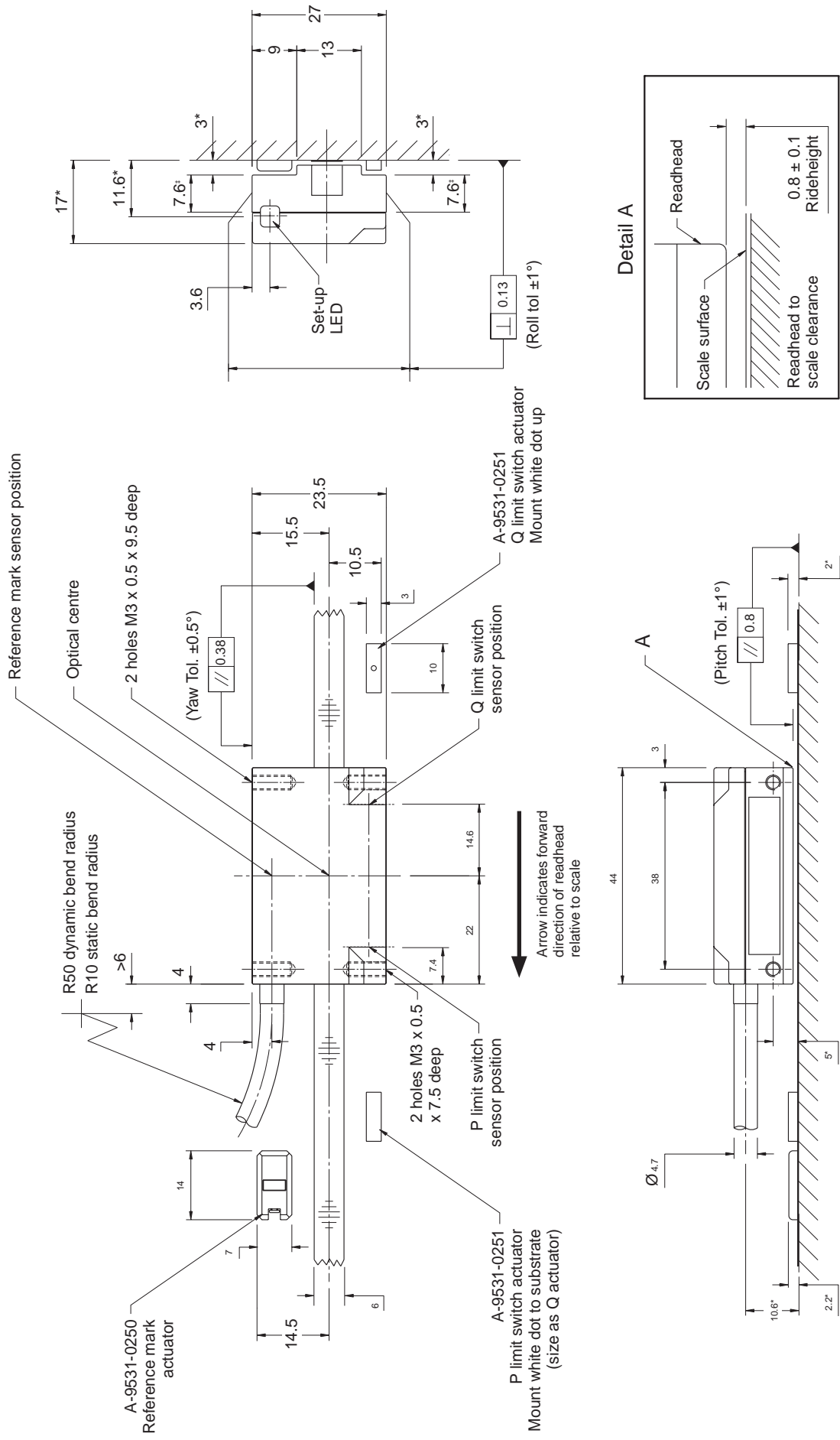
Limit termination



Select R so that maximum current does not exceed 20 mA.
Alternatively, use a relay or opto-isolator.

RGH22 Installation drawing

Dimensions and tolerances in mm.



* Dimensions measured from substrate allowing for a 0.2 mm nominal scale thickness
 † Alternative mounting faces

Readhead mounting/installation

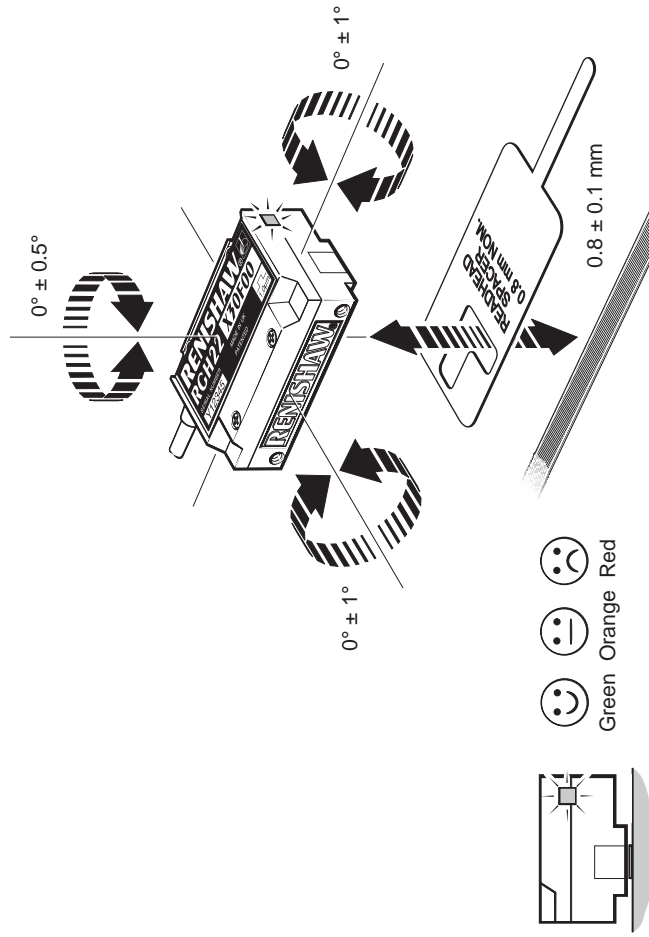
Mounting brackets

The bracket must have a flat mounting surface, ensure conformance to the installation tolerances, allow adjustment to the rideheight of the readhead, and be sufficiently stiff to prevent deflection of the readhead during operation. For easier installation, initial adjustment of the roll and yaw of the bracket with respect to the axis of readhead travel should be made before the RGH22 is attached. This can be done with a clock gauge and a precision square.

Readhead set-up

To set nominal rideheight, position readhead spacer with the "J" shaped aperture under the optical centre to allow normal LED function during set-up procedure. Ensure that the scale, readhead optical window and mounting face are clean and free from obstructions.

NOTE: Ensure readhead fixing screws are tightened to 0.5 Nm-0.7 Nm.



For reliable operation, the set-up LED should be GREEN (RGH22 external set-up signal at 5V) when readhead is moved slowly along the full axis travel. An external set-up signal (X or V_x) is also available on RGH22 interfaces for use where the LED is not visible. In this case, 5V indicates optimum set-up, while a 0V signal indicates that the set-up should be adjusted.

Limit switch

A limit switch signal is output when the readhead sensor passes over the magnetic actuator. For full output specification refer to RGH22 Data sheet (Part number L-9517-0182).

Reference mark set-up

To ensure unidirectional repeatability, the reference mark requires phasing with the scale in the direction of normal datuming operation.

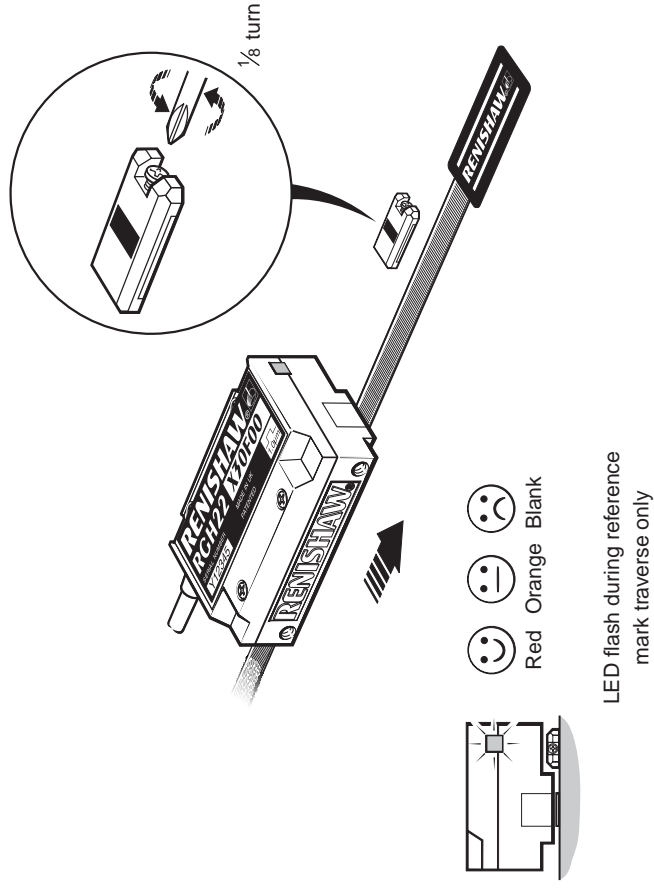
A reference pulse is output in both directions, but repeatability is guaranteed only in the phased direction.

The readhead should be set up correctly ensuring a green LED indication over the full length of travel. The reference mark actuator should be installed as shown on the installation drawing.

NOTE: Reference mark output is synchronised with the incremental channels, giving unit of resolution pulse width. For further details see RGH22 Data sheet (Part number L-9517-0182).

Phasing procedure

The readhead must be moved over the reference mark in the direction to be used for the datuming operation. The reference mark is phased correctly when the set-up LED flashes red for 0.25 seconds. If it flashes orange or goes blank, the reference mark adjuster screw should be turned anti-clockwise by 1/8 turn and the procedure repeated until a red flash is obtained.



Connections

RGH22 D, X, Z, Y, P, Q, R, S, RS422A digital

Function	Signal	Colour	15 pin 'D' type (D)	12 pin circular (R)	15 pin reversed count 'D' type (E)	In-line connector (X)
Power	5 V	Brown	7	2	7	A
		Brown (link)	8	12	8	M
	0 V	White	2	10	2	B
Incremental signals	+	Green	14	5	13	G
		Yellow	6	6	5	D
	-	Blue	13	8	14	R
		Red	5	1	6	F
Reference mark	+	Violet	12	3	12	K
	-	Grey	4	4	4	O
	Q	Pink	10	-	10	H
*Limit switch						
Alarm	+	Black	11	9	11	I
	-	Orange	3	7	3	P
External set-up	X	Clear	1	-	1	E
	Inner	Green/Yellow	15	11 (link)	15	L
Shield	Outer	-	Case	Case	Case	Case

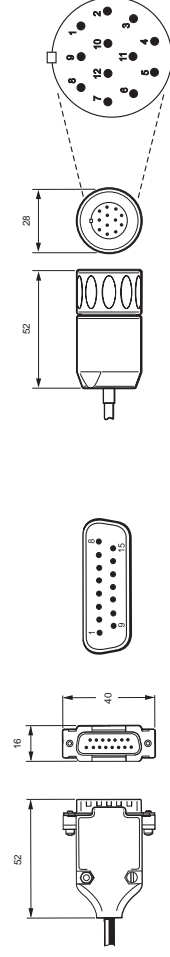
* NOTE: Dual limit versions (P, Q, R, and S) utilise the black wire (pin 11) as the 'P' limit output.

The 'E' alarm signal on these versions is only available at the orange wire as a single-ended E - output.

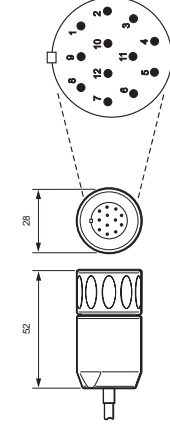
Dual limit readheads are only available with 'F', 'D', 'E' or 'X' terminations.

E signal missing from option 20 readheads – 3-state only.

15 pin 'D' type plug (termination code D, E, L)



12 pin circular plug (termination code R, V)



RGH22 A, B 1 Vpp analogue

Function	Signal	Colour	15 pin 'D' type (L)	12 pin circular (V)	12 pin circular coupling (W)	In-line connector (X)
Power	5 V	Brown	4	2	2	A
		Brown (link)	5	12	12	M
	0 V	White	12	10	10	B
Incremental signals	+	Red	9	5	5	F
		Blue	1	6	6	R
	-	Yellow	10	8	8	D
		Green	2	1	1	G
Reference mark	+	Violet	3	3	3	K
	-	Grey	11	4	4	O
	V _a	Pink	8	N/C	N/C	H
**Limit switch						
External set-up	V _x	Clear	7	N/C	N/C	I
	BID	Black	6	9'	9"	P
Reference mark uni-directional operation	DIR	Orange	14	7'	7"	E
	Inner	Green/Yellow	15	11 (link)	11 (link)	L
Shield	Outer	-	Case	Case	Case	Case

** NOTE: Dual limit versions (A) utilise the clear wire (pin 7)

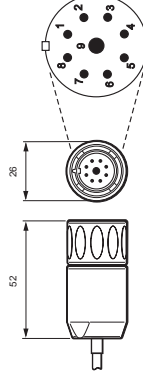
as the 'V_p' limit output. The 'V_x' external set-up signal on these versions is not available. Dual limit readheads are only available

with 'F', 'L' or 'X' terminations.

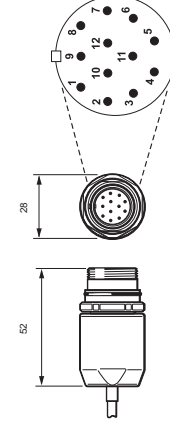
'Only connected with option 17

"Only connected with option 18

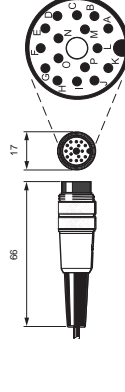
9 pin circular plug (termination code C)



12 pin circular coupling plug (termination code W)



In-line connector (termination code X)



RGH22C 12 µA analogue

Function	Signal	Colour	9 pin circular (C)	In-line connector (X)
Power	5 V	Brown	6	A
		Orange	-	E
	0 V	White	5	B
		Pink	-	H
Incremental signals	I ₁	Green	8	G
		Yellow	7	D
	I ₂	Blue	4	R
		Red	3	F
Reference mark	+	Violet	2	K
		Grey	1	O
	-	Black	-	P
Alarm	V ₀	Black	-	P
External set-up	V ₁	Clear	-	I
	Inner	Green/Yellow	9	L
Shield	Outer	-	Case	Case

BID/DIR connections (A, B 1 Vpp analogue)

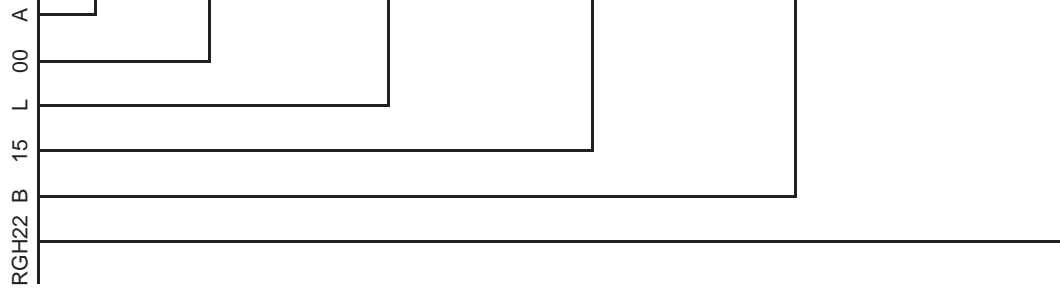
BID/DIR connections for normal operation

BID/DIR connection	To:-	Reference mark output direction
BID	+5 V or not connected	Forward and reverse
DIR	Do not connect	

To ignore unphased reference pulse

BID	0 V	
DIR	+5 V or not connected	Forward
DIR	0 V	Reverse

Readhead part numbers



Type of mounting bracket

- A - no mounting bracket (standard)
- B - 4.5 mm thick aluminium mounting bracket

Options

- 00 - standard
- 15 - 20 MHz retimed 'Y' type
- 16 - 8 MHz retimed 'Y' type
- 17 - as termination V but with BID and DIR lines

Termination

- Z - no cable (Ribbon cable connector)
- F - flying lead
- C - 9W circular plug, 12 µA output
- D - 15D plug for digitals
- E - 15D reversed count for digitals
- R - 12W circular for digitals

Cable length

- 00 - Ribbon cable connector
- 05 - 0.5 m
- 10 - 1 m
- 15 - 1.5 m
- 30 - 3 m
- 50 - 5 m

Type

- Analogue**
 - A - 1 Vpp dual limit
 - B - 1 Vpp
 - C - 12 µA
 - E - 1 Vpp ribbon cable
- Digital**
 - D - 5 µm
 - X - 1 µm
 - Z - 0.5 µm
 - Y - 0.1 µm

Digital

- P - 5 µm dual limit
- Q - 1 µm dual limit
- R - 0.5 µm dual limit
- S - 0.1 µm dual limit

Digital

- J - 5 µm ribbon cable connector
- K - 1 µm ribbon cable connector
- L - 0.5 µm ribbon cable connector
- M - 0.1 µm ribbon cable connector

Readhead series

NOTE: Not all combinations are valid.

Check valid combinations and all available options online at www.renishaw.com/epc

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*** M - 9 5 3 1 - 2 0 5 0 - 0 2 - A ***