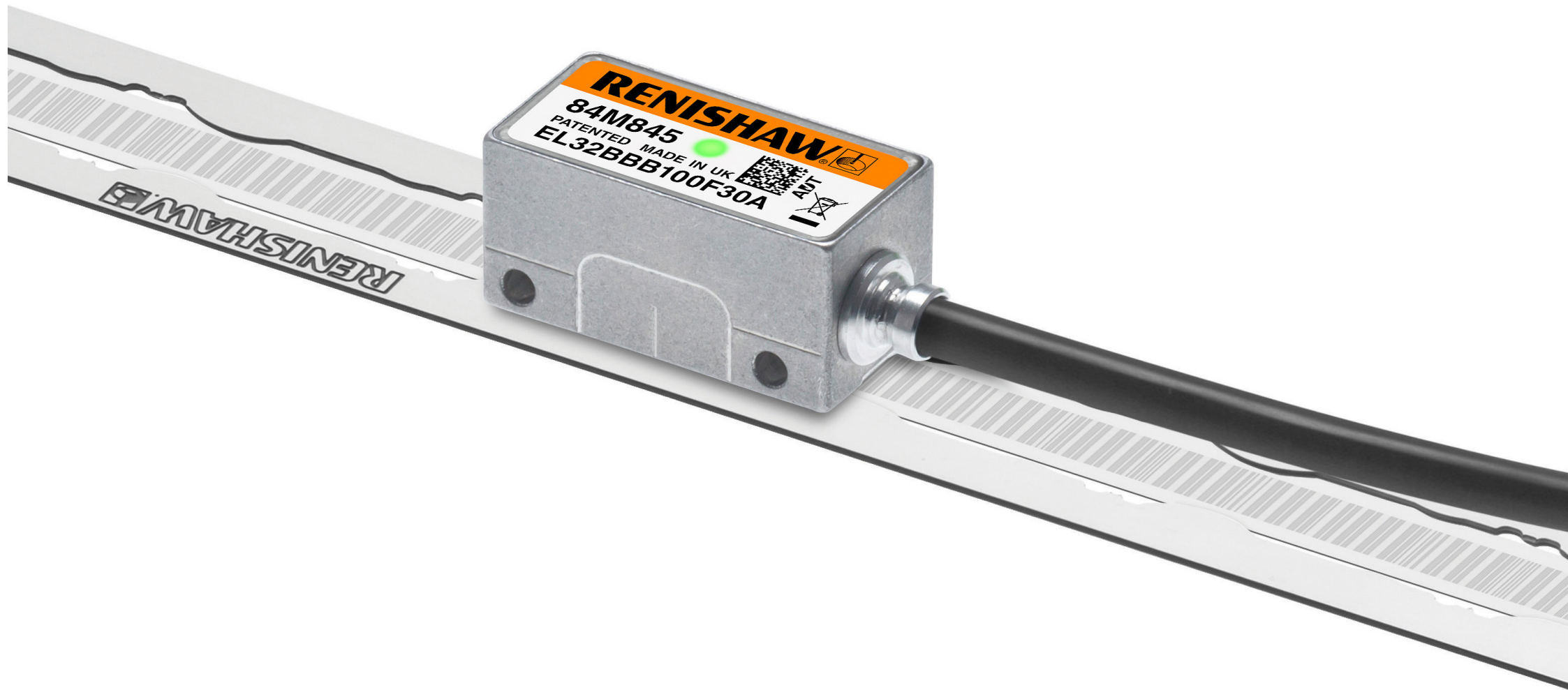


EVOLUTE™ RTLA50/FASTRACK™ absolute linear encoder system



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Product compliance



Renishaw plc declares that the EVOLUTE™ encoder system complies with the applicable standards and regulations. A copy of the EU declaration of conformity is available on request from our website at:

www.renishaw.com/productcompliance

FCC compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The user is cautioned that any changes or modifications not expressly approved by Renishaw plc or authorised representative could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NOTE: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance.

Patents

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

CN1260551	US7499827	JP4008356	GB2395005	CN1314511
EP1469969	JP5002559	CN102197282	EP2350570	JP2012507028
US20110173832	KR20110088506	CN102388295	EP2417423	KR20120014902
US2012007980	CN102460077	EP2438402	US20120072169	KR20120026579
US8141265	EP2294363	CN102057256	JP2011524534	KR20110033204

Further information

Further information relating to the EVOLUTE encoder range can be found in the EVOLUTE encoder system data sheets available from your local Renishaw representative. This document may not be copied or reproduced in whole or in part, or transferred to any other media or language, by any means without the written prior permission of Renishaw. The publication of material within this document does not imply freedom from the patent rights of Renishaw plc.

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The packaging of our products contains the following materials and can be recycled.

Packaging Component	Material	ISO 11469	Recycling Guidance
Outer box	Cardboard	Not applicable	Recyclable
	Polypropylene	PP	Recyclable
Inserts	Low Density Polyethylene Foam	LDPE	Recyclable
	Cardboard	Not applicable	Recyclable
Bags	High Density Polyethylene Bag	HDPE	Recyclable
	Metallised Polyethylene	PE	Recyclable

REACH regulation

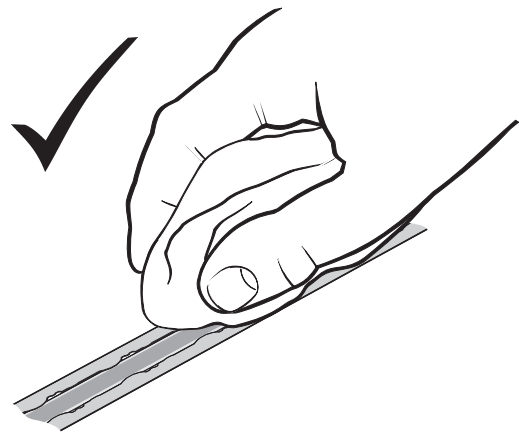
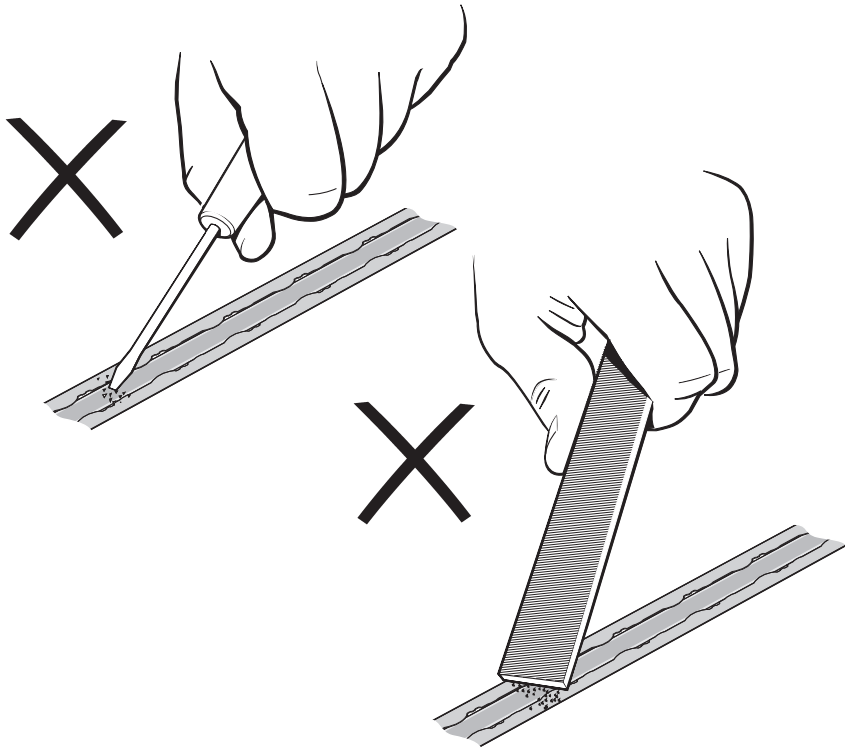
Information required by Article 33(1) of Regulation (EC) No. 1907/2006 ("REACH") relating to products containing substances of very high concern (SVHCs) is available at:

www.renishaw.com/REACH

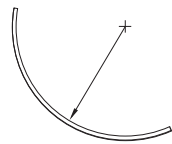


The use of this symbol on Renishaw products and/or accompanying documentation indicates that the product should not be mixed with general household waste upon disposal. It is the responsibility of the end user to dispose of this product at a designated collection point for waste electrical and electronic equipment (WEEE) to enable reuse or recycling. Correct disposal of this product will help to save valuable resources and prevent potential negative effects on the environment. For more information, please contact your local waste disposal service or Renishaw distributor.

Storage and handling



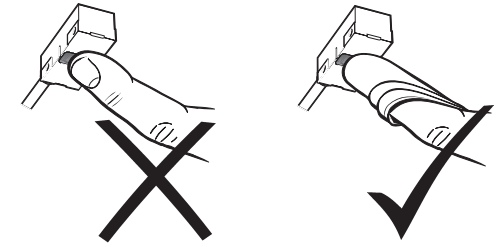
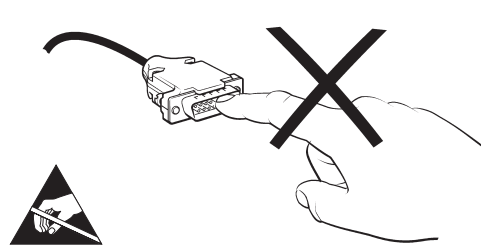
Minimum bend radius



RTLA50 – 50 mm
FASTRACK – 200 mm

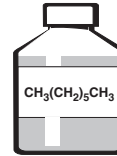
NOTE: Ensure self-adhesive tape is on the outside of the bend.

Readhead

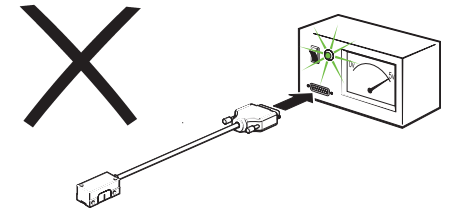
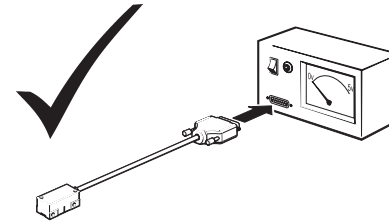
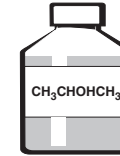


Scale and readhead

N-heptane

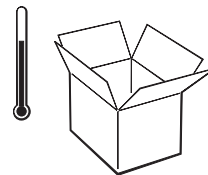


Propan-2-ol



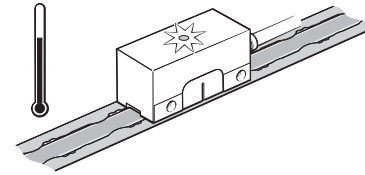
Storage

+80 °C
-20 °C



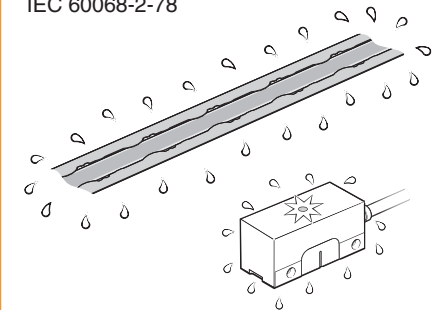
Operating

+80 °C
0 °C



Humidity

95% relative humidity
(non-condensing) to
IEC 60068-2-78



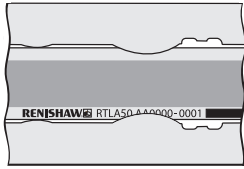
Installation drawing: EVOLUTE readhead

Dimensions and tolerances in mm

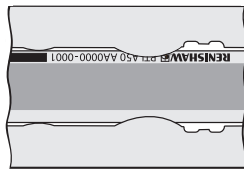


Orientation of scale determines count direction

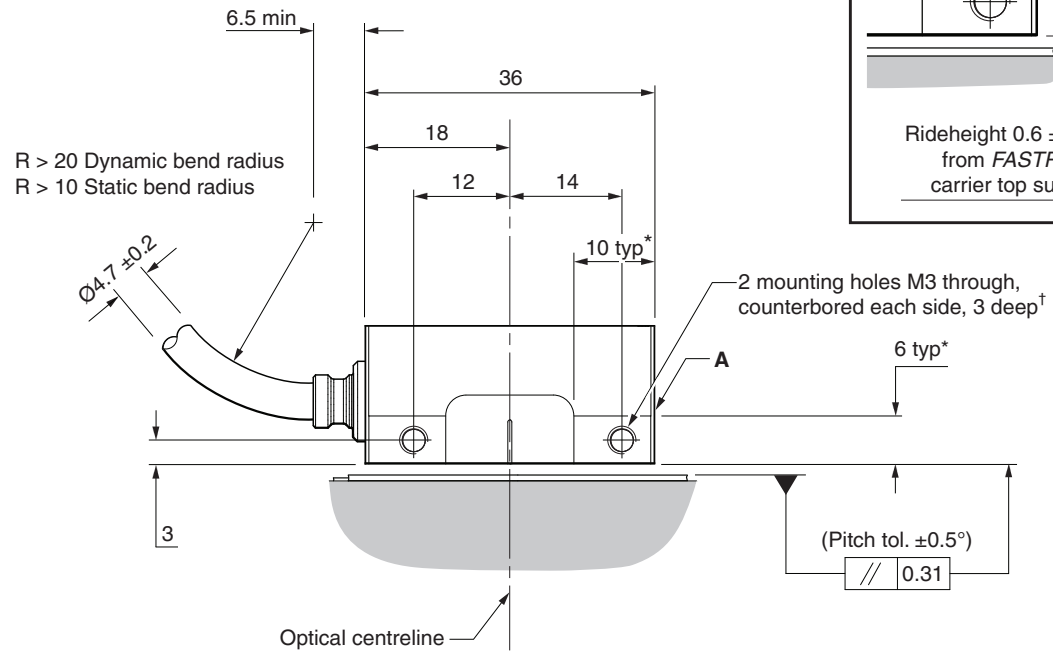
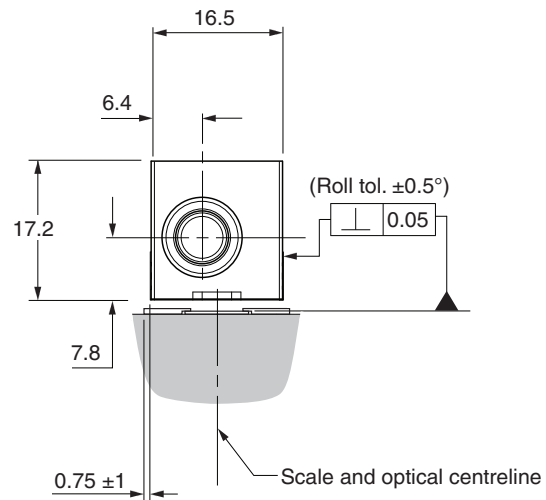
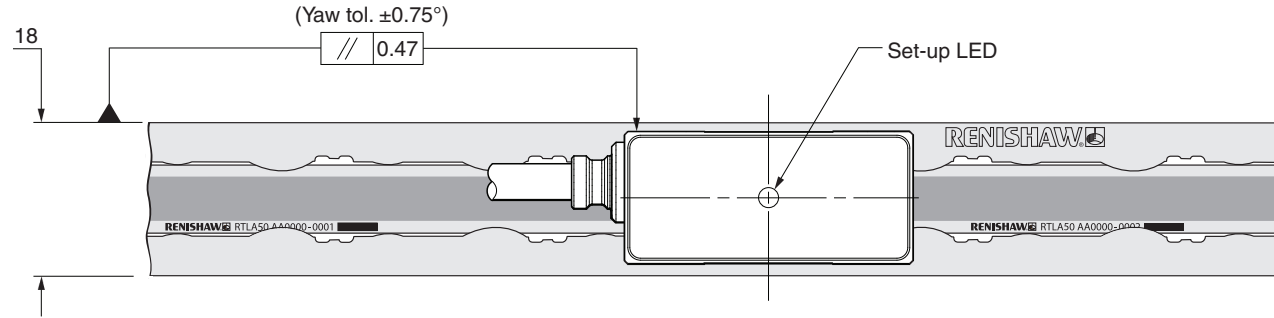
Moving head increases count direction



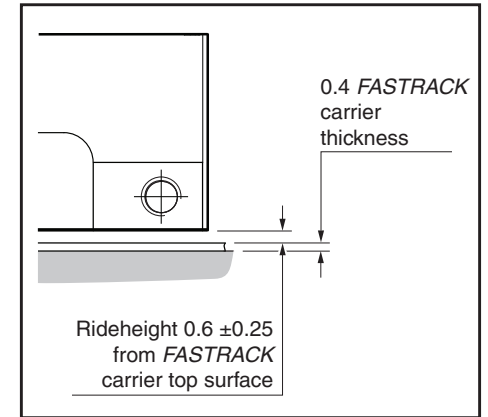
Moving head increases count direction



Note: Reversing head orientation has no effect on count direction.



Detail A



*Extent of mounting faces.

†Recommended thread engagement 5 mm (8 mm including counterbore). Recommended tightening torque 0.5 to 0.7 Nm.

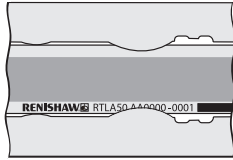
Installation drawing: EVOLUTE readhead (side cable outlet)

Dimensions and tolerances in mm

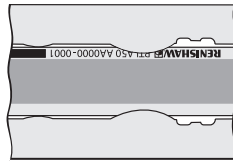


Orientation of scale determines count direction

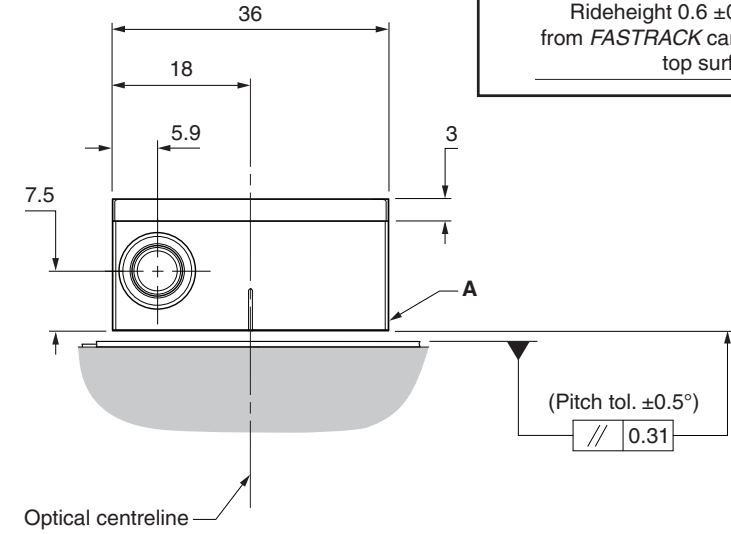
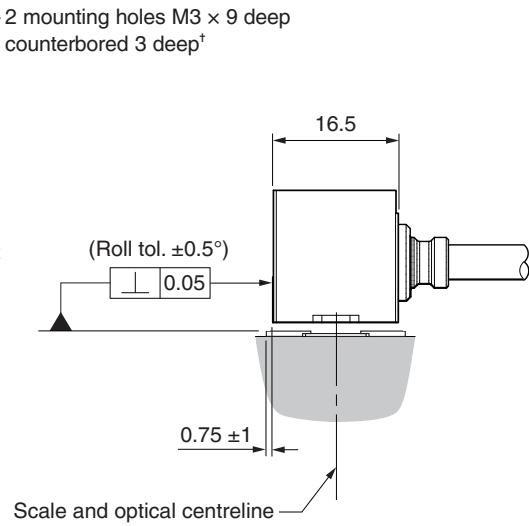
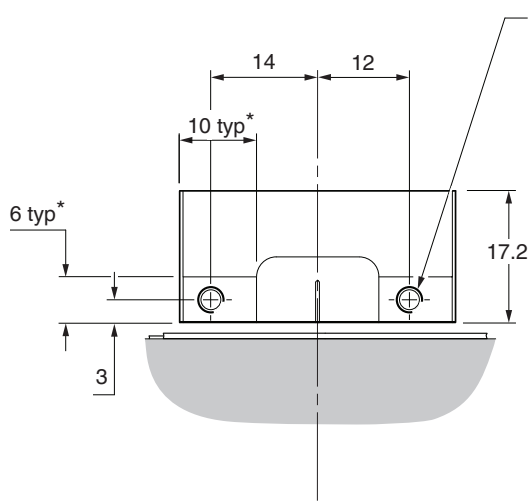
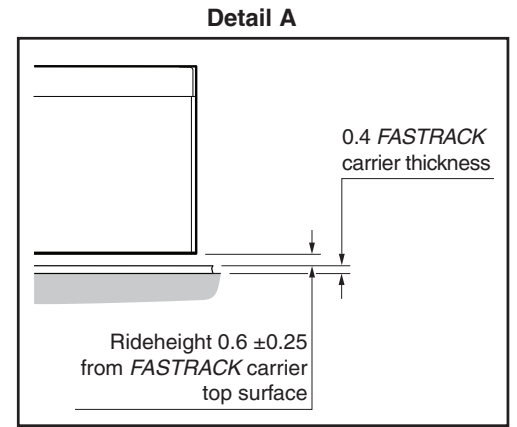
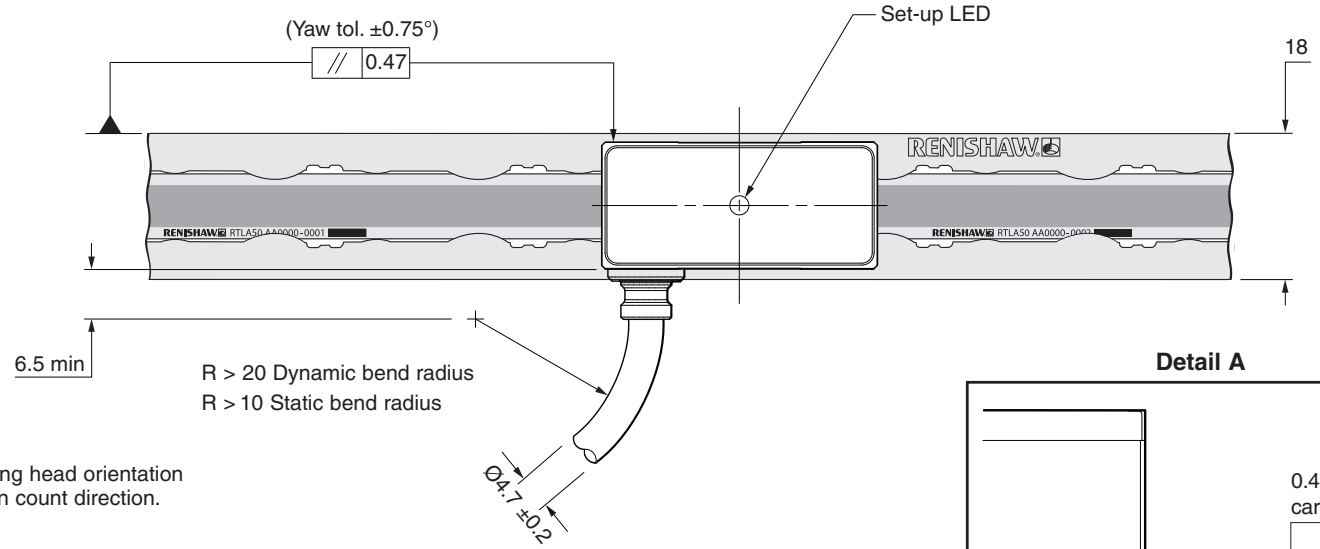
→
Moving head increases count direction



←
Moving head increases count direction



NOTE: Reversing head orientation has no effect on count direction.

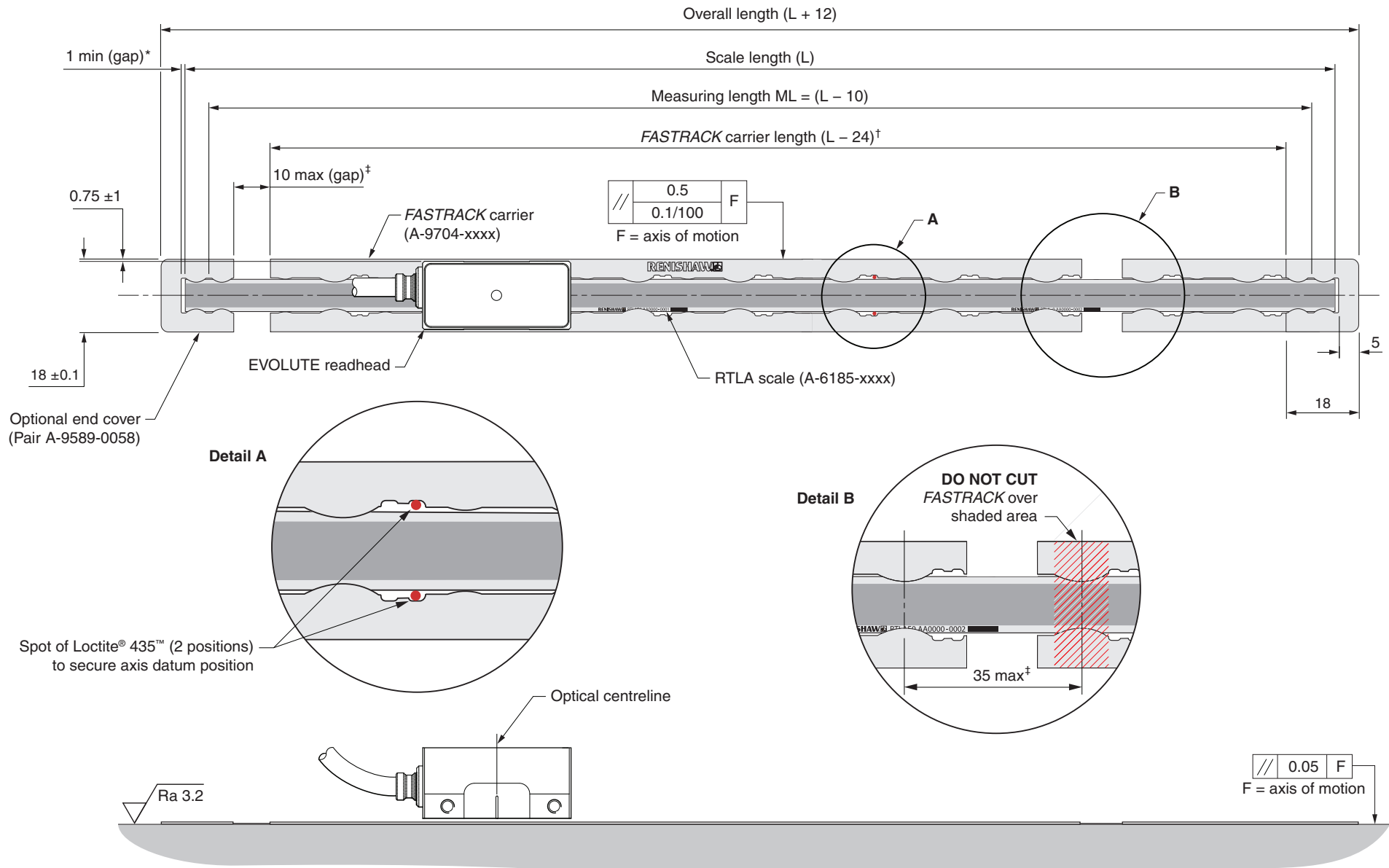


*Extent of mounting faces.

†Recommended thread engagement 5 mm (8 mm including counterbore). Recommended tightening torque 0.5 to 0.7 Nm.

Installation drawing: RTLA50/FASTRACK carrier

Dimensions and tolerances in mm



NOTE: Minimum recommended *FASTRACK* carrier length = 100 mm. All dimensions applicable when using EVOLUTE side cable outlet version.

[†]Assumes 1 mm gap between scale and end covers and zero gap between *FASTRACK* carrier and end covers. [‡]Only required for sectional installations. *For thermal expansion.

RTLA50/FASTRACK carrier installation

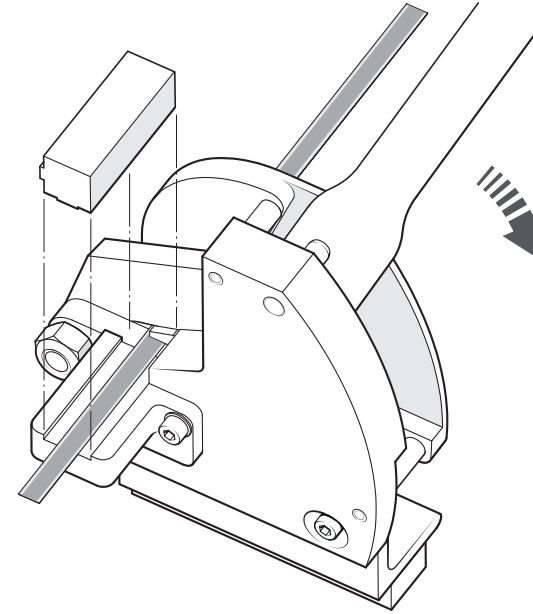
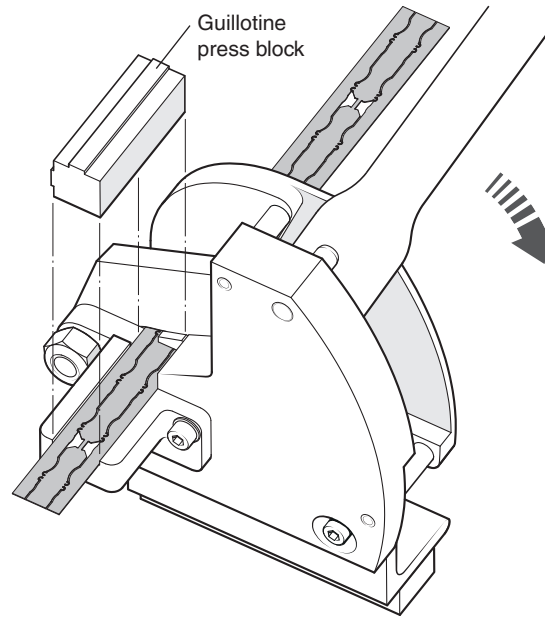
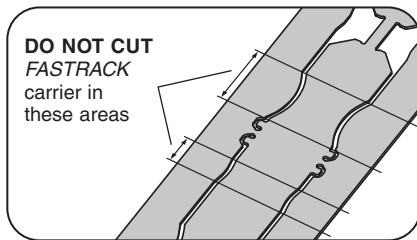
During handling or installation of the *FASTRACK* carrier suitable gloves should be worn to protect against injury from sharp edges.

- ① If required cut the *FASTRACK* carrier and scale to length (separately) using guillotine (A-9589-0071) after referring to the installation drawing.

The guillotine should be held securely in place, using a suitable vice or clamping method.

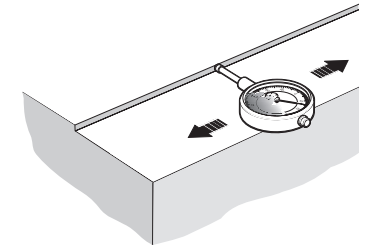
Feed the *FASTRACK* carrier or scale through the guillotine as shown, and place the guillotine press block down onto the *FASTRACK* carrier or scale.

Ensure the block is in the correct orientation (as shown). Whilst holding the block in place, in a smooth motion, pull down the lever to cut through the *FASTRACK* carrier or scale.

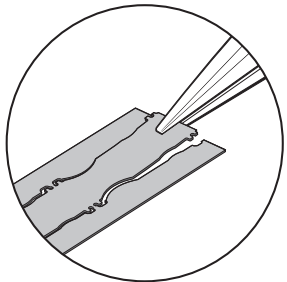


- ② Thoroughly clean and degrease the substrate and allow to dry. For the *FASTRACK* carrier location a ledge, separate straight edge(s) or dowels can be used.

Check alignment of ledge/separate straight edge(s) with respect to axis of motion (see 'Installation drawing: RTLA50/FASTRACK carrier' on page 5).



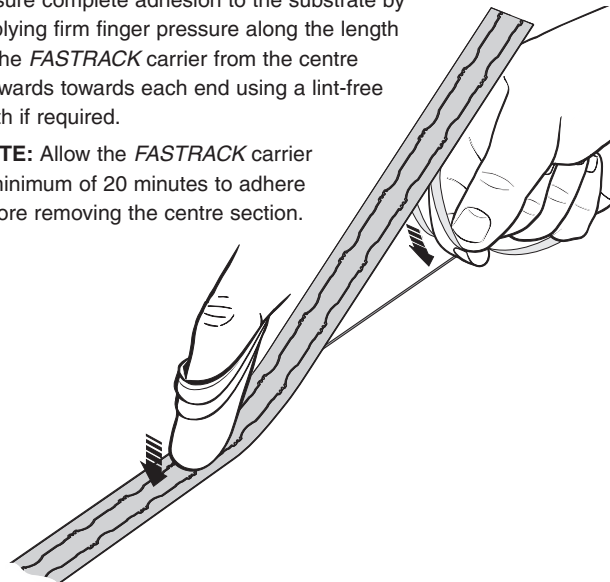
- ③ Before sticking the *FASTRACK* carrier to the substrate bend the centre section upwards slightly using a small pair of pliers.



- ④ Remove backing liner and stick to substrate, locating against ledge/separate straight edge(s) or dowels.

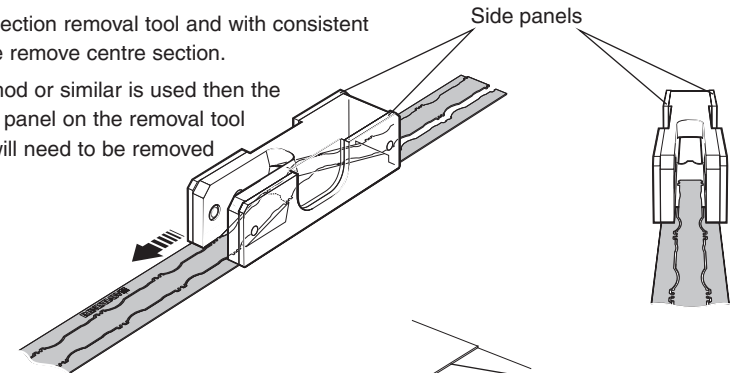
Ensure complete adhesion to the substrate by applying firm finger pressure along the length of the *FASTRACK* carrier from the centre outwards towards each end using a lint-free cloth if required.

NOTE: Allow the *FASTRACK* carrier a minimum of 20 minutes to adhere before removing the centre section.

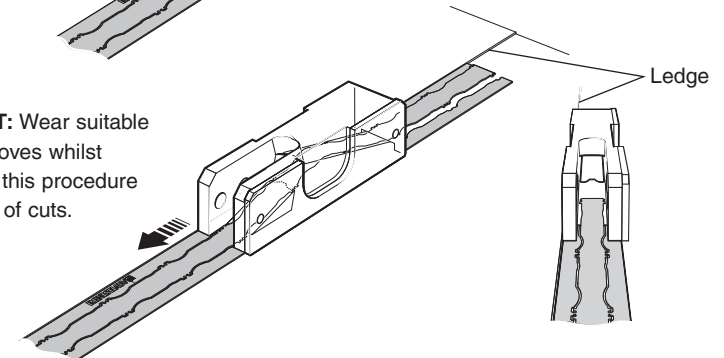


- ⑤ Engage centre section removal tool and with consistent forward pressure remove centre section.

If the ledge method or similar is used then the appropriate side panel on the removal tool (A-9589-0122) will need to be removed as shown.



IMPORTANT: Wear suitable protective gloves whilst carrying out this procedure to avoid risk of cuts.



RTLA50/FASTRACK installation (Continued)

- 6 Slide RTLA50 scale into the *FASTRACK* carrier ensuring the scale is fed under the projections as shown.

Scale can be installed manually by either pulling or pushing it through the *FASTRACK* carrier.

Alternatively use the optional scale installation tool (A-9589-0420) as shown, for easy installation.

NOTE: For instructions on how to use the scale installation tool, download the *RTL scale installation tool (A-9589-0420)* user guide (Renishaw part no. M-9589-9101) from the website at www.renishaw.com/encoderinstallationguides

IMPORTANT: If manually installing the scale using fingers, suitable gloves should be worn to protect against injury from sharp edges.



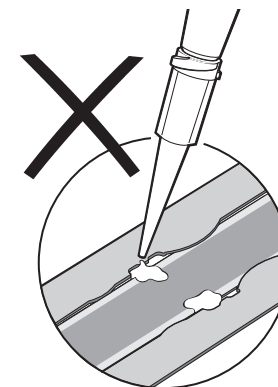
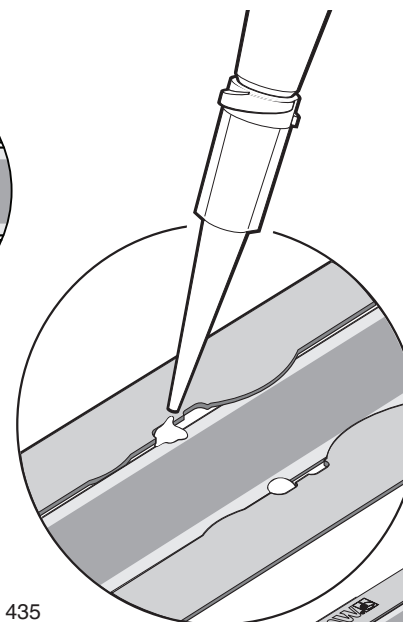
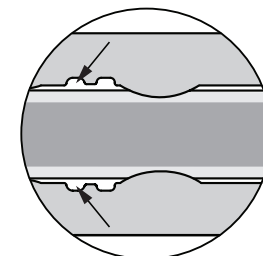
Projections

- 8 Optional: fix self-adhesive end covers ensuring a gap of at least 1 mm between the end of the scale and the end cover.

Ensure a gap > 1 mm

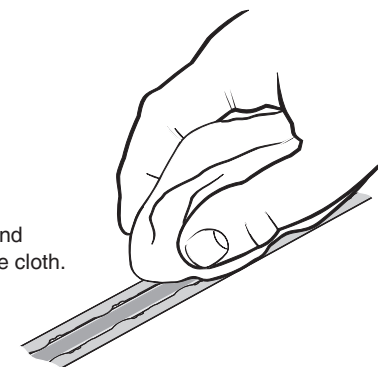
- 7 Create scale datum. Using dispensing tip P-TL50-0209 apply Loctite 435 between scale and *FASTRACK* so it wicks underneath adjacent to user selected datum location as shown.

NOTE: Mechanical datum clamp (A-9589-0096) is also available. Please contact your local Renishaw representative for more details.



NOTE: Only apply Loctite 435 in the locations shown. Loctite 435 has been carefully selected as it will wick under the scale to lock it to the substrate.

- 9 Clean *FASTRACK* and scale using a lint-free cloth.



Readhead mounting/installation

Mounting brackets

The bracket must have a flat mounting surface, enable conformance to the installation tolerances, allow adjustment of the rideheight of the readhead, and be sufficiently stiff to prevent deflection or vibration of the readhead during operation.

Readhead set-up

Ensure that the scale, readhead optical window and mounting face are clean and free from obstructions.

NOTE: When cleaning readhead and scale apply cleaning fluid sparingly; do not soak.

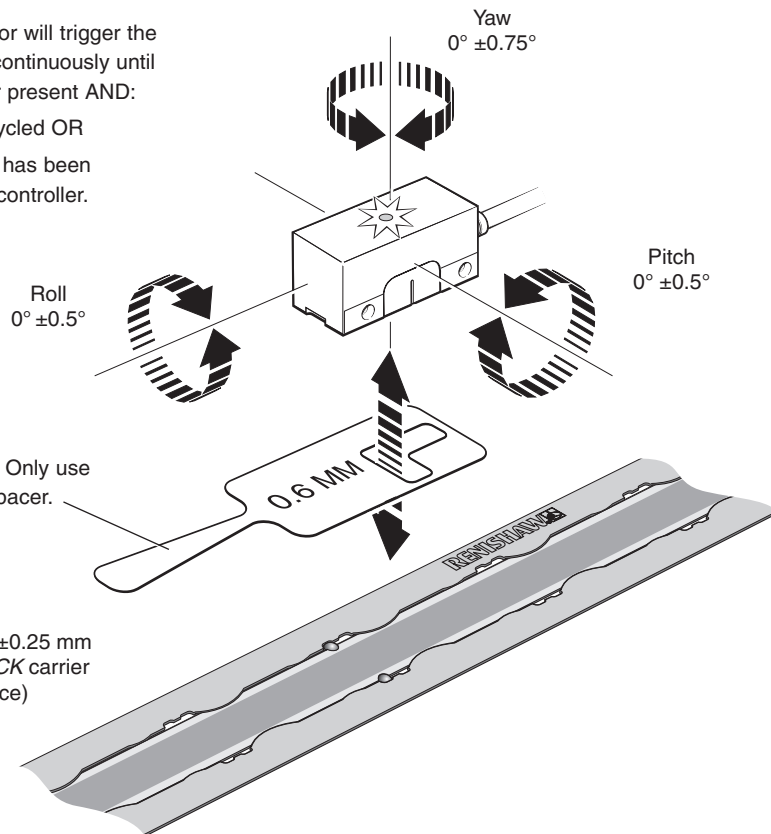
To set nominal rideheight for RTLA50/FASTRACK installations, use the red 0.6 mm readhead spacer on FASTRACK surface to set rideheight. Adjust the readhead to maximize the signal strength along the full axis of travel to achieve a Green LED.

Readhead set-up LED status



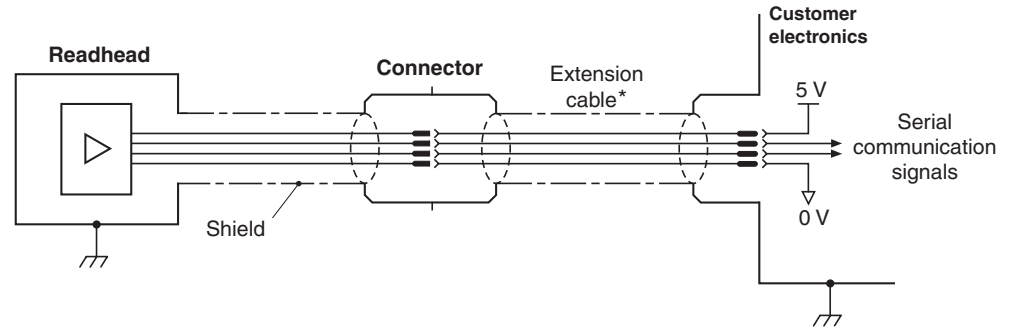
NOTE: A position error will trigger the set-up LED to flash continuously until the error is no longer present AND:

1. Power has been cycled OR
2. A position request has been received from the controller.



Electrical connections

EVOLUTE grounding and shielding

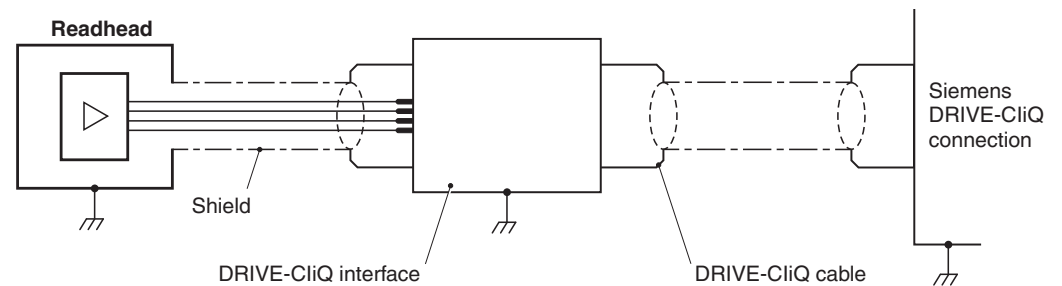


IMPORTANT: The shield should be connected to the machine earth (Field ground).


IMPORTANT: If the connector is modified or replaced, the customer must ensure both 0 V cores (White and Green) are connected to 0 V.

*For maximum extension cable length please consult your local Renishaw representative.

EVOLUTE grounding and shielding – Siemens DRIVE-CLiQ protocol only



General specifications

Power supply	5 V ±10%	1.25 W maximum (250 mA @ 5V) NOTE: Current consumption figures refer to terminated EVOLUTE systems. Renishaw encoder systems must be powered from a 5 Vdc supply complying with the requirements for SELV of standard IEC 60950-1.
Power supply (DRIVE-CLiQ system)	24 V	1.8 W maximum (75 mA @ 24 V), 24 V as per DRIVE-CLiQ specification. 24 V power is provided by the DRIVE-CLiQ network. NOTE: The Renishaw DRIVE-CLiQ interface must be powered from a 24 Vdc supply complying with the requirements for SELV of standard IEC 60950-1
	Ripple	200 mVpp maximum @ frequency up to 500 kHz
Sealing (readhead)		IP64
(DRIVE-CLiQ interface)		IP67
Acceleration (readhead)	Operating	500 m/s ² , 3 axes
Shock (readhead and interface)	Non-operating	1000 m/s ² , 6 ms, ½ sine, 3 axes
Maximum acceleration of scale with respect to readhead		2000 m/s ² NOTE: This is the worst case figure that is correct for the slowest communications clock rates. For faster clock rates, the maximum acceleration of scale with respect to the readhead can be higher. For more details, contact your local representative.
Vibration (readhead)	Operating	300 m/s ² , 55 Hz to 2000 Hz, 3 axes
(DRIVE-CLiQ interface)	Operating	100 m/s ² , 55 Hz to 2000 Hz, 3 axes
Mass	Readhead	18 g
	Cable	32 g/m
	Interface	218 g
Readhead cable		7 core, tinned and annealed copper, 28 AWG Single-shielded, outside diameter 4.7 ±0.2 mm Flex life > 40 × 10 ⁶ cycles at 20 mm bend radius UL recognised component 
Maximum readhead cable length *		3 m

*Extension cables available. Contact your local Renishaw representative for further details. Refer to Siemens DRIVE-CLiQ specifications for maximum cable length from interface to controller.

CAUTION: The EVOLUTE encoder system has been designed to the relevant EMC standards, but must be correctly integrated to achieve EMC compliance. In particular, attention to shielding arrangements is essential.

Scale technical specifications

RTLA50

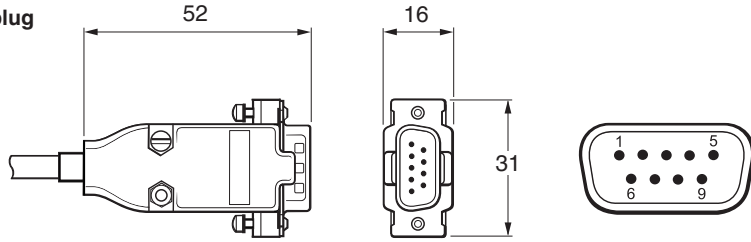
Form (H × W)	0.2 mm × 8 mm
Datum fixing	Loctite 435
Material	Hardened and tempered martensitic stainless steel
Accuracy (at 20 °C)	±10 µm/m, calibration traceable to International Standards
Coefficient of thermal expansion (at 20 °C)	10.1 ±0.2 µm/m/°C
Maximum length	10.02 m

FASTRACK

Form (H × W)	0.4 mm × 18 mm (includes adhesive)
Mounting	Self-adhesive backing tape
Material	Hardened and tempered martensitic stainless steel
Coefficient of thermal expansion (at 20 °C)	10.1 ±0.2 µm/m/°C
Minimum recommended length	100 mm

Output signals

9-way D-type plug



BiSS C-mode serial comms – output signals

Function	Signal *	Wire colour	Pin
			9-way D-type
Power	5 V	Brown	4, 5
	0 V	White Green	8, 9
Serial communications	MA+	Violet	2
	MA-	Yellow	3
	SLO+	Grey	6
	SLO-	Pink	7
Shield	Shield	Shield	Case

* For details, refer to BiSS Data sheet L-9709-9005.

FANUC serial comms – output signals

Function	Signal	Wire colour	Pin
			9-way D-type
Power	5 V	Brown	4, 5
	0 V	White Green	8, 9
Serial communications	REQ	Violet	2
	*REQ	Yellow	3
	SD	Grey	6
	*SD	Pink	7
Shield	Shield	Shield	Case

Mitsubishi serial comms – output signals

Function	Signal	Wire colour	Pin
			9-way D-type
Power	5 V	Brown	4, 5
	0 V	White Green	8, 9
Serial communications	MR	Violet	2
	MRR	Yellow	3
Shield	Shield	Shield	Case
Reserved	Do not connect	Grey	6
		Pink	7

Panasonic serial comms – output signals

Function	Signal	Wire colour	Pin
			9-way D-type
Power	5 V	Brown	4, 5
	0 V	White Green	8, 9
Serial communications	PS	Violet	2
	\overline{PS}	Yellow	3
Shield	Shield	Shield	Case
Reserved	Do not connect	Grey	6
		Pink	7

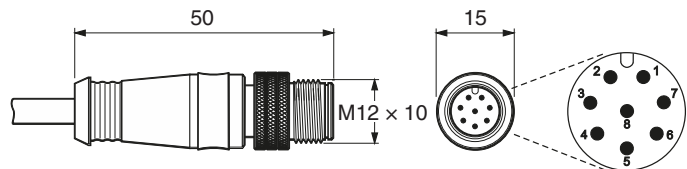
Yaskawa serial comms – output signals

Function	Signal	Wire colour	Pin
			9-way D-type
Power	5 V	Brown	4, 5
	0 V	White Green	8, 9
Serial communications	S	Violet	2
	\overline{S}	Yellow	3
Shield	Shield	Shield	Case
Reserved	Do not connect	Grey	6
		Pink	7

Output signals (Continued)

Siemens DRIVE-CLiQ – output signals

M12 plug (Siemens DRIVE-CLiQ protocol only)



Signals between readhead and interface

Function	Signal	Wire colour	Pin
			M12
Power	5 V	Brown	2
	0 V	White	5, 8
		Green	
Serial communications	A+	Violet	3
	A-	Yellow	4
Shield	Shield	Shield	Case
Reserved	Do not connect	Grey	7
		Pink	6

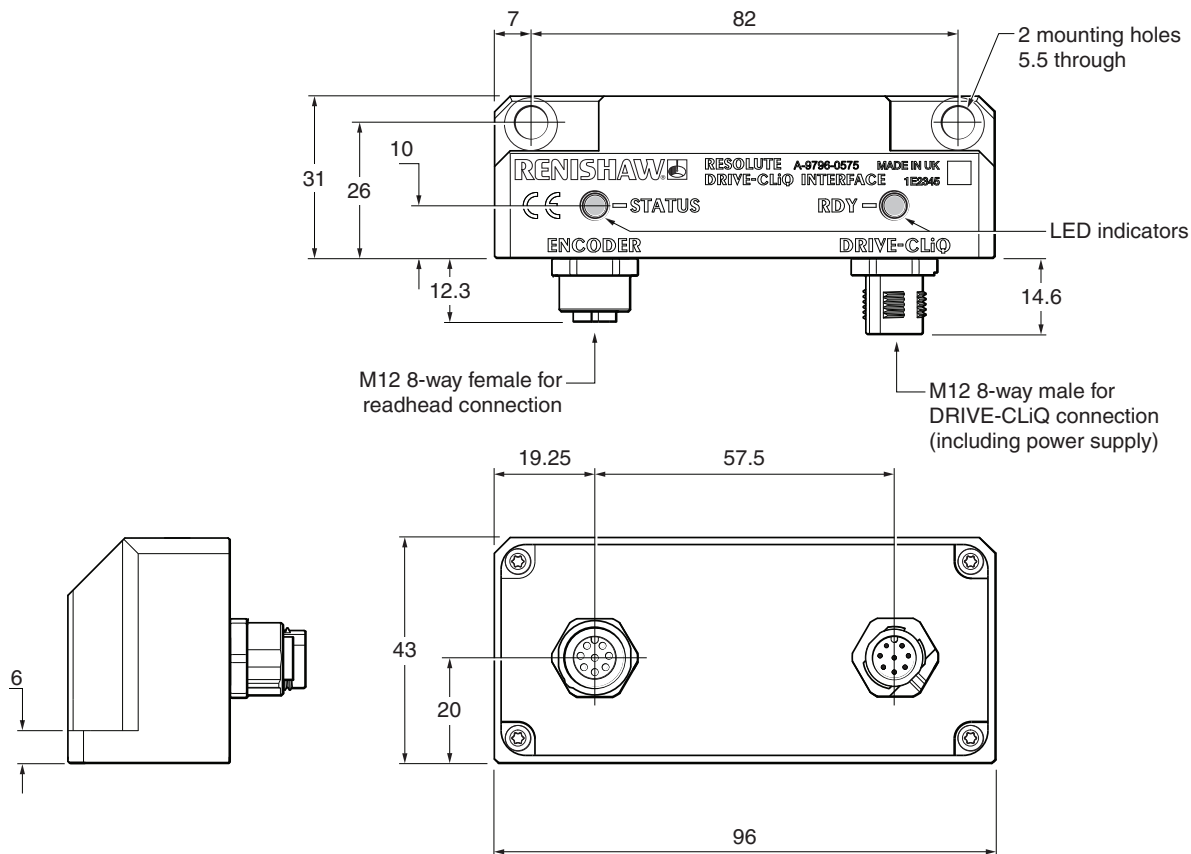
Interface output

Function	Signal	Pin
		M12 ('A' code)
Power	24 V	1
	0 V	5
DRIVE-CLiQ communications	RX+	3
	RX-	4
	TX+	7
	TX-	6
Shield		Case

Siemens DRIVE-CLiQ interface (A-9796-0575)

Dimensions and tolerances in mm

DRIVE-CLiQ interface installation drawing



RDY LED functions

Colour	Status	Description
–	Off	Power supply is missing or outside of permissible tolerance range
Green	Continuous light	The component is ready for operation and cyclic DRIVE-CLiQ communication is taking place
Orange	Continuous light	DRIVE-CLiQ communication is being established
Red	Continuous light	At least one fault is present in this component. NOTE: The LED is activated regardless of whether the corresponding messages have been reconfigured.
Green/Orange or Red/Orange	Flashing light	Component recognition via LED is activated (p0144). NOTE: Both options depend on the LED status when component recognition is activated via p0144=1.

STATUS LED function

STATUS displays the readhead set-up status as shown on the readhead set-up LED



Renishaw plc
New Mills, Wotton-under-Edge,
Gloucestershire GL12 8JR
United Kingdom

T +44 (0)1453 524524
F +44 (0)1453 524901
E uk@renishaw.com
www.renishaw.com

RENISHAW 
apply innovation™

For worldwide contact details, visit www.renishaw.com/contact

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