

EVOLUTE™ absolute optical encoder with BiSS serial communications



Incorporating industry-proven technology from the RESOLUTE™ encoder series, EVOLUTE™ is a true-absolute 50 µm scale period optical encoder with wide installation tolerances and high immunity to dirt.

Using a scale period of 50 µm gives the EVOLUTE encoder system a generous 500 µm rideheight tolerance and its single-track optics are optimised for contamination resistance. Data redundancy encoded into the robust scale minimises the risk of positional error while sophisticated error checking mechanisms ensure an error flag is always asserted when the position cannot be determined.

The EVOLUTE system provides absolute position with resolution options down to 50 nm. Advanced optical design and high-speed signal processing mean sub-divisional error (SDE) is as low as ±150 nm with noise (jitter) below 10 nm RMS.

EVOLUTE encoders are mechanically identical to RESOLUTE encoders and are supplied with the RTLA50 scale that can be used, either in its self-adhesive form, RTLA50-S, or in the *FASTRACK*™ scale carrier system.

- True absolute non-contact optical encoder system: no batteries required
- Wide set-up tolerances for quick and easy installation
- Integral set-up LED enables easy installation and provides diagnostics at a glance
- Enhanced immunity to dirt, scratches and light oils
- Resolution options of 50 nm, 100 nm and 500 nm
- 100 m/s maximum speed for all resolutions
- ±150 nm sub-divisional error for smooth velocity control
- Less than 10 nm RMS jitter for improved positional stability
- Built-in separate position-checking algorithm provides inherent safety
- Readhead is reversible for flexible mounting. Scale orientation defines count direction only
- Scale lengths up to 10.02 m
- Operates up to 80 °C
- Integral over-temperature alarm

Compatible with:

- RTLA50-S self-adhesive tape scale
- RTLA50 with *FASTRACK* carrier
- Optional Advanced Diagnostic Tool ADTa-100

BiSS
INTERFACE

Resolutions and scale lengths

The maximum scale length is determined by the readhead resolution and the number of position bits in the serial word. For EVOLUTE BiSS readheads with fine resolution and short word length, the maximum scale length will be limited accordingly. Conversely, coarser resolutions or longer word lengths enable the use of longer scale lengths.

Contact your local Renishaw representative for details of other serial protocols.


Resolution	50 nm	100 nm	500 nm
Maximum scale length (L) with 36 bit position word	10.02 m	10.02 m	10.02 m
Maximum scale length (L) with 32 bit position word	10.02 m	10.02 m	10.02 m
Maximum scale length (L) with 26 bit position word	3.35 m	6.7 m	10.02 m
Maximum reading speed	100 m/s	100 m/s	100 m/s

Scale specifications

For more detailed scale information refer to the relevant scale data sheet.

Description	RTLA50-S	Self-adhesive hardened stainless steel tape scale for high performance motion control systems requiring easiest installation. Lengths up to 10.02 m
	RTLA50/FASTRACK	Carrier-mounted hardened stainless steel tape scale for high performance motion control systems requiring easier and faster scale installation and field replacement. RTLA50 lengths up to 10.02 m FASTRACK lengths up to 25 m
Accuracy (at 20 °C)	±10 µm/m	
Coefficient of thermal expansion (at 20 °C)	10.1 ±0.2 µm/m/°C	

General specifications

Power supply	5 V ±10%	1.25 W maximum (250 mA @ 5V)
	Ripple	200 mVpp maximum @ frequency up to 500 kHz
Temperature	Storage	-20 °C to +80 °C
	Operating	0 °C to +80 °C
Humidity	95% relative humidity (non-condensing) to IEC 60068-2-78	
Sealing	IP64	
Acceleration (readhead)	Operating	500 m/s ² , 3 axes
Shock (readhead)	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 Renishaw representative.	
Vibration	Operating	300 m/s ² , 55 Hz to 2000 Hz, 3 axes
Mass	Readhead	18 g
	Cable	32 g/m
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 	

Optional Advanced Diagnostic Tool ADTa-100



The EVOLUTE encoder system is compatible with the Advanced Diagnostic Tool ADTa-100* and ADT View software, which acquire detailed real-time data from the readhead to allow easy set-up, optimisation and in-field fault finding.

The intuitive software interface provides:

- ▶ Digital readout of encoder position and signal strength
- ▶ Graph of signal strength over the entire axis travel
- ▶ Ability to set a new zero position for the encoder system
- ▶ System configuration information

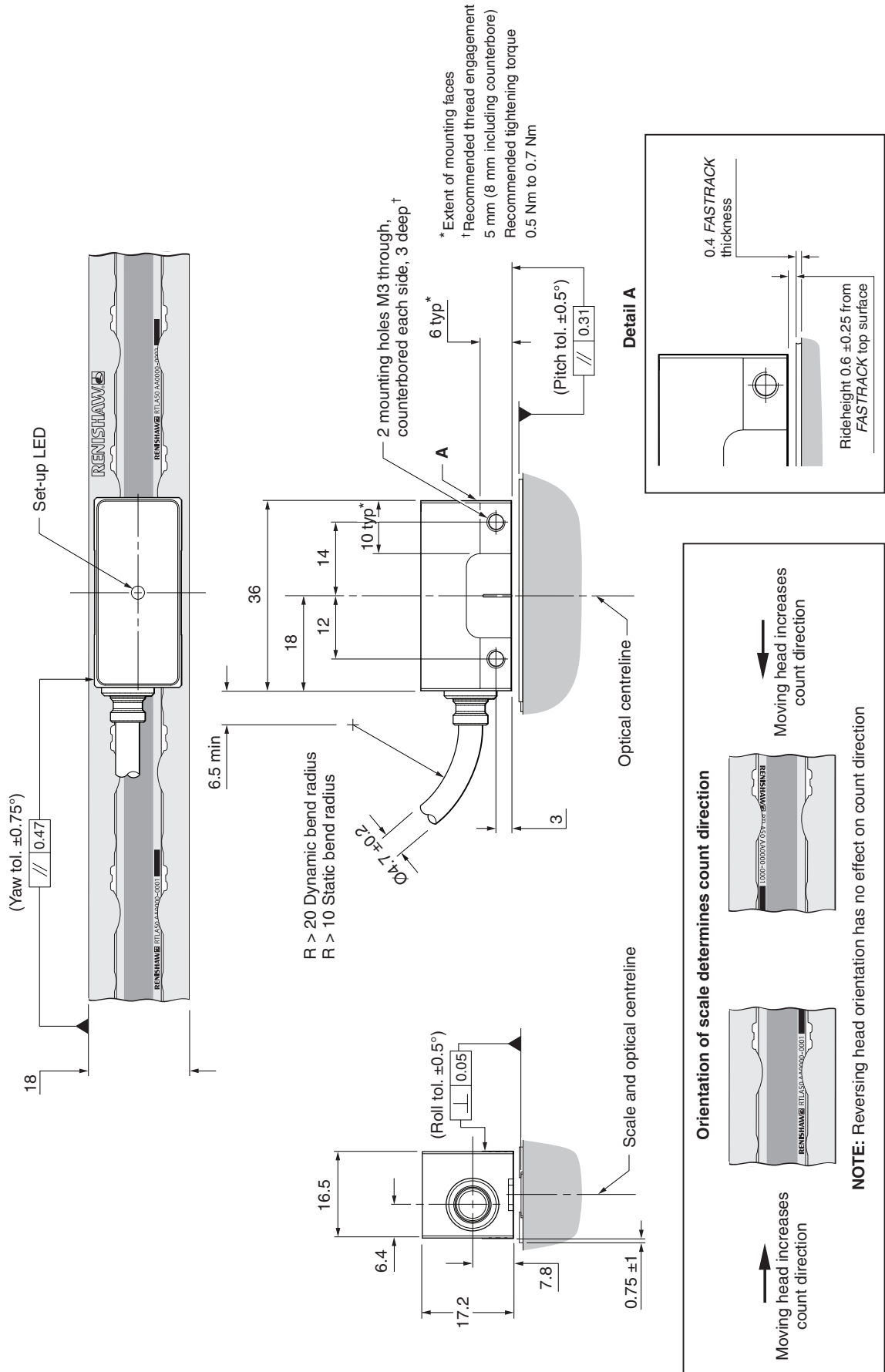
*ADTa-100 compatible readheads are marked with the symbol **ADT**

EVOLUTE installation drawing (RTLA50 and FASTRACK)

For further details, including side-exit version, refer to EVOLUTE RTLA50/FASTRACK installation guide (M-96183-9040)



Dimensions and tolerances in mm

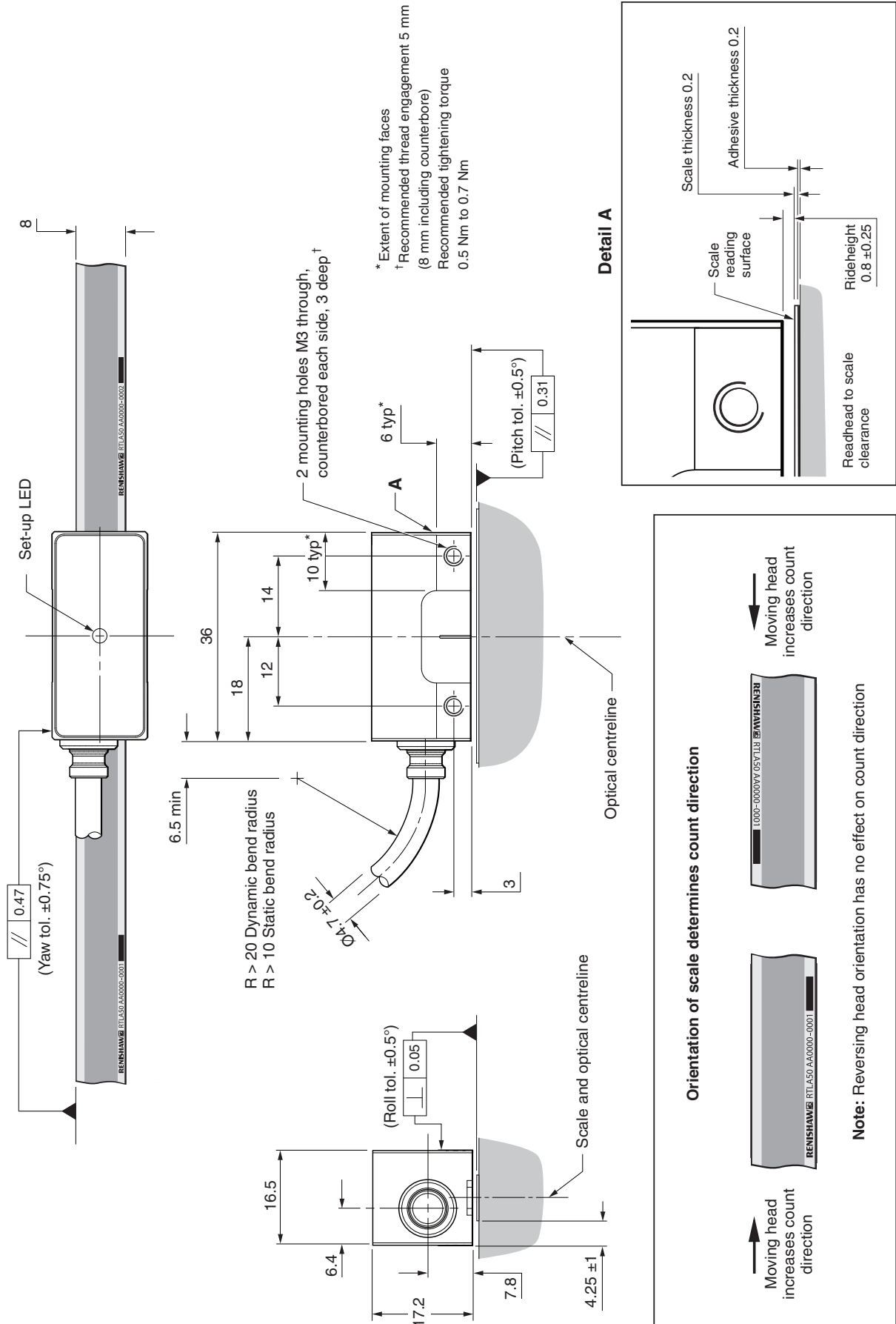


EVOLUTE installation drawing (RTL50-S)

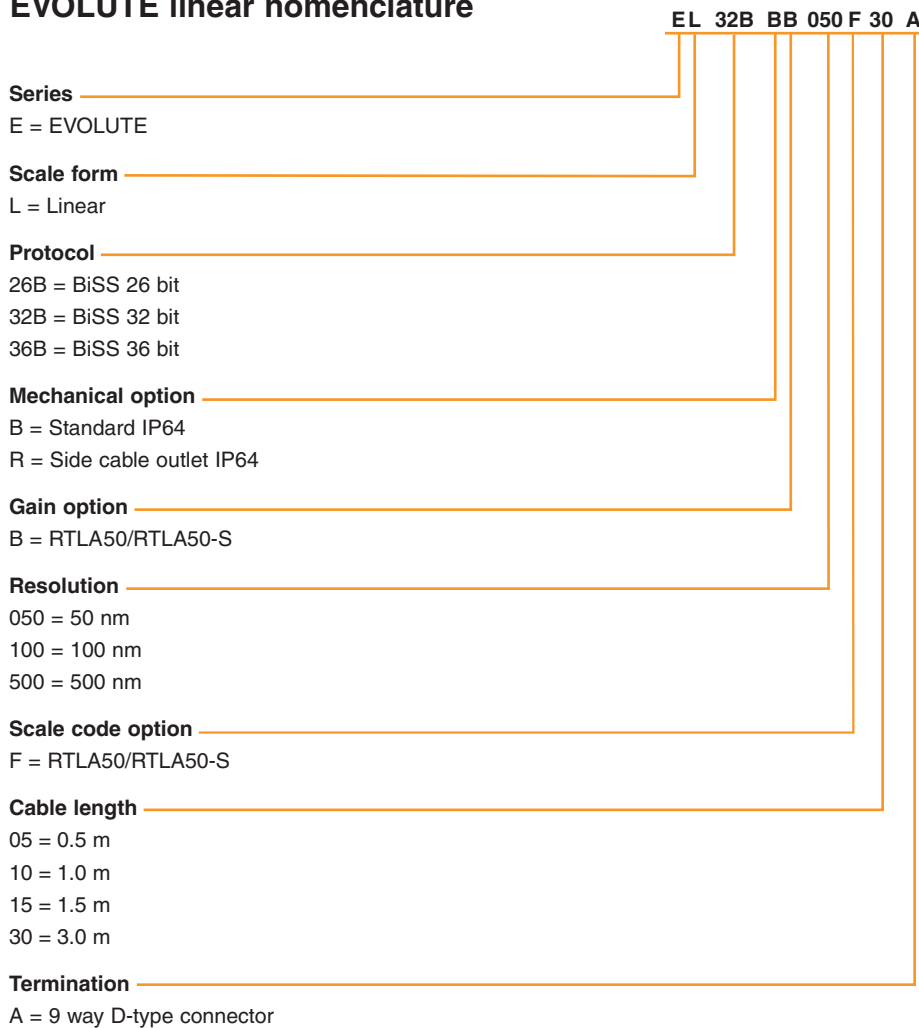
For further details, including side-exit version, refer to EVOLUTE RTL50-S installation guide (M-6183-9046)



Dimensions and tolerances in mm



EVOLUTE linear nomenclature



For scale nomenclature see *RTLA50 absolute linear encoder scale system for EVOLUTE™* data sheet (Renishaw part no. L-9517-9628).

EVOLUTE compatible products



BiSS
FANUC
Mitsubishi
Panasonic
Siemens DRIVE-CLiQ
Yaskawa



RTLA50-S self-adhesive
tape scale



RTLA50 tape scale
and FASTRACK carrier



Advanced Diagnostic Tool
ADTa-100 (A-6525-0100)

For more information about ADTa-100 and the scale refer to the relevant data sheets and installation guides which can be downloaded from www.renishaw.com/evolutedownloads

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

