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 50 nm resolution. 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 RTLA50 scale that can be used, either in its self-adhesive form, RTLA50-S, or in the FASTRACK™ scale carrier system.
EVOLVE absolute optical encoder (Siemens DRIVE-CLiQ)

Resolutions and scale lengths
EVOLVE with Siemens DRIVE-CLiQ serial comms is available with 50 nm resolution option.
The maximum reading speed is 100 m/s.
The maximum scale length is as described in the scale specifications below; i.e., it is not limited by absolute word length.
Contact your local Renishaw representative for details of other serial protocols.

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

<table>
<thead>
<tr>
<th>Description</th>
<th>RTLA50-S</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self-adhesive hardened stainless steel tape scale for high-performance motion control systems requiring easiest installation.</td>
</tr>
<tr>
<td></td>
<td>Lengths up to 10.02 m</td>
</tr>
<tr>
<td>RTLA50/FASTRACK</td>
<td>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</td>
</tr>
<tr>
<td>Accuracy (at 20 °C)</td>
<td>±10 µm/m</td>
</tr>
<tr>
<td>Coefficient of thermal expansion (at 20 °C)</td>
<td>10.1 ±0.2 µm/m°C</td>
</tr>
</tbody>
</table>

General specifications

<table>
<thead>
<tr>
<th>Power supply</th>
<th>24 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.05 W maximum (encoder: 1.25 W + interface: 1.8 W)</td>
<td></td>
</tr>
<tr>
<td>24 Vdc power is provided by the DRIVE-CLiQ network</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>Ripple</td>
<td>200 mVpp maximum @ frequency up to 500 kHz maximum</td>
</tr>
<tr>
<td>Temperature (system)</td>
<td>Storage: -20 °C to +70 °C</td>
</tr>
<tr>
<td>(readhead)</td>
<td>Operating: 0 °C to +80 °C</td>
</tr>
<tr>
<td>(interface)</td>
<td>Operating: 0 °C to +55 °C</td>
</tr>
<tr>
<td>Humidity (system)</td>
<td>95% relative humidity (non-condensing) to IEC 60068-2-78</td>
</tr>
<tr>
<td>Sealing (readhead)</td>
<td>IP64</td>
</tr>
<tr>
<td>(interface)</td>
<td>IP67</td>
</tr>
<tr>
<td>Acceleration (readhead)</td>
<td>Operating: 500 m/s², 3 axes</td>
</tr>
<tr>
<td>(interface)</td>
<td>IP67</td>
</tr>
<tr>
<td>Shock (readhead/interface)</td>
<td>Non-operating: 500 m/s², 11 ms, ½ sine, 3 axes</td>
</tr>
<tr>
<td>Maximum acceleration of scale with respect to readhead</td>
<td>2000 m/s²</td>
</tr>
<tr>
<td>NOTE: This is the worst case figure that is correct for the slowest communications request rates. For faster request rates, the maximum acceleration of scale with respect to the readhead can be higher. For more details, contact your local Renishaw representative.</td>
<td></td>
</tr>
<tr>
<td>Vibration (readhead)</td>
<td>Operating: 300 m/s², 55 Hz to 2000 Hz, 3 axes</td>
</tr>
<tr>
<td>(interface)</td>
<td>Operating: 100 m/s², 55 Hz to 2000 Hz, 3 axes</td>
</tr>
<tr>
<td>Mass</td>
<td>Readhead: 18 g</td>
</tr>
<tr>
<td>Interface</td>
<td>218 g</td>
</tr>
<tr>
<td>Readhead cable</td>
<td>32 g/m</td>
</tr>
<tr>
<td>Cable (readhead to interface)</td>
<td>7 core, tinned and annealed copper, 28 AWG</td>
</tr>
<tr>
<td>Single-shielded, outside diameter 4.7 ±0.2 mm</td>
<td></td>
</tr>
<tr>
<td>Flex life &gt; 40 x 10⁶ cycles at 20 mm bend radius</td>
<td></td>
</tr>
<tr>
<td>10 m maximum length (refer to Siemens DRIVE-CLiQ specifications for maximum cable length from interface to controller)</td>
<td></td>
</tr>
<tr>
<td>UL recognised component</td>
<td></td>
</tr>
</tbody>
</table>
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

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

**DRIVE-CLiQ interface installation drawing**

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Dimensions and tolerances in mm

M12 8-way female for readhead connection

M12 8-way male for DRIVE-CLiQ connection (including power supply)
EVOLUTE installation drawing (RTLA50 and FASTRACK)

For further details, including side-exit version, refer to EVOLUTE RTLA50/FASTRACK installation guide (M-6183-9040)

Dimensions and tolerances in mm

NOTE:

- Reversing head orientation has no effect on count direction
- Orientation of scale determines count direction

Moving head increases count direction

R> 20 Dynamic bend radius
R> 10 Static bend radius

(Phrase tol. ±0.5)

6.5 min

2 mounting holes M3 through, counterbored each side, 3 deep

6 typ

(Pitch tol. ±0.5)

A

Optical centreline

Set-up LED

0.47

18

0.05

7.8

6.4

0.75 ±1

17.2

0.75 ±1

0.4

Renishaw thickness

6 typ

*Extent of mounting faces

*Recommended tightening torque

0.5 Nm to 0.7 Nm

†Recommended thread engagement

8 mm including counterbore

0.5 Nm to 0.7 Nm

Reversing head orientation has no effect on count direction

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†Recommended thread engagement

8 mm including counterbore

0.5 Nm to 0.7 Nm

Reversing head orientation has no effect on count direction

Orientation of scale determines count direction

Moving head increases count direction

NOTE: Reversing head orientation has no effect on count direction

Moving head increases count direction
EVOLUTE installation drawing (RTLA50-S)

For further details, including side-exit version, refer to EVOLUTE RTLA50-S installation guide (M-6183-9046)

Dimensions and tolerances in mm

- Orientation of scale determines count direction
- Moving head increases count direction
- Note: Reversing head orientation has no effect on count direction

Detail A

- Set-up LED
- Dimensions:
  - Ø4.7 ±0.2
  - Scale and optical centreline:
    - 7.8
    - 16.5
  - Details:
    - 0.47
    - (Yaw tol. ±0.75°)
    - 0.05
    - 6.4
    - 4.25 ±1

- Orientation:
  - (Pitch tol. ±0.5°)
  - R > 20 Dynamic bend radius
  - R > 10 Static bend radius

- Recommended thread engagement 5 mm
- Recommended tightening torque 0.5 Nm to 0.7 Nm
- Extent of mounting faces
- Moving head increases count direction

- Count direction:
  - Moving head
  - Reversing head

- Note:
  - Extent of mounting faces
  - Moving head increases count direction
  - Reversing head orientation has no effect on count direction

- Dimensions:
  - 17.2
  - 7.8
  - 4.25 ±1

- Orientation:
  - (Roll tol. ±0.5°)

- Scale thickness 0.2
- Adhesive thickness 0.2
EVOLUTE linear nomenclature

**Series**
- E - EVOLUTE

**Scale form**
- L - Linear

**Protocol**
- 28D - Siemens DRIVE-CLiQ 28 bit

**Mechanical option**
- B - Standard IP64
- R - Side cable outlet IP64

**Gain option**
- B - RTLA50/RTLA50-S

**Resolution**
- 050 - 50 nm

**Scale code option**
- F - RTLA50/RTLA50-S

**Cable length**
- 05 - 0.5 m
- 10 - 1.0 m
- 15 - 1.5 m
- 30 - 3.0 m

**Termination**
- S - M12 (sealed) connector

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

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

- RTLA50-S self-adhesive tape scale

- RTLA50 tape scale and FASTRACK carrier

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

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