EVOLUTE™ absolute optical encoder with FANUC serial communications

- 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

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.
Resolutions and scale lengths

EVOLUTE with FANUC serial comms is available with 50 nm, 100 nm, and 500 nm resolution options.

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 relevant scale data sheet.

<table>
<thead>
<tr>
<th>Description</th>
<th>RTLA50-S</th>
<th>Self-adhesive hardened stainless steel tape scale for high-performance motion control systems requiring easiest installation. Lengths up to 10.02 m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<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>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accuracy (at 20 °C)</th>
<th>±10 µm/m</th>
</tr>
</thead>
<tbody>
<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>5 V ±10%</th>
<th>1.25 W maximum (250 mA @ 5V)</th>
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</thead>
<tbody>
<tr>
<td>Ripple</td>
<td>200 mVpp maximum @ frequency up to 500 kHz</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Storage: -20 °C to +80 °C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operating: 0 °C to +80 °C</td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>95% relative humidity (non-condensing) to IEC 60068-2-78</td>
<td></td>
</tr>
<tr>
<td>Sealing</td>
<td>IP64</td>
<td></td>
</tr>
<tr>
<td>Acceleration (readhead)</td>
<td>Operating: 500 m/s², 3 axes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-operating: 1000 m/s², 6 ms, ½ sine, 3 axes</td>
<td></td>
</tr>
<tr>
<td>Maximum acceleration of scale with respect to readhead</td>
<td>2000 m/s²</td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>Operating: 300 m/s², 55 Hz to 2000 Hz, 3 axes</td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>Readhead: 18 g</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cable: 32 g/m</td>
<td></td>
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<tr>
<td>Readhead cable</td>
<td>7 core, tinned and annealed copper, 28 AWG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single-shielded, outside diameter 4.7 ±0.2 mm</td>
<td></td>
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<tr>
<td></td>
<td>Flex life &gt; 40 x 10⁶ cycles at 20 mm bend radius</td>
<td></td>
</tr>
<tr>
<td></td>
<td>UL recognised component</td>
<td></td>
</tr>
</tbody>
</table>

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.
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-6183-9040)

Dimensions and tolerances in mm

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NOTE:
- Reversing head orientation has no effect on count direction.
- Orientation of scale determines count direction.
- Moving head increases count direction.
- Rideheight 0.6 ±0.25 from FASTRACK top surface.
- 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)
EVOLUTE linear nomenclature

Series
E - EVOLUTE

Scale form
L - Linear

Protocol
37F - FANUC 37 bit

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

Gain option
B - RTLA50/RTLA50-S

Resolution
050 - 50 nm
100 - 100 nm
500 - 500 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
A - 9-way D-type connector

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

EVOLUTE compatible products

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