New linear motors with optimised efficiency
Iron-core motors for high speed and high duty cycle operations and Ironless motors for cogging-free and high dynamic applications. Both motor and families deliver unparalleled accuracy and performance benefits.
- Ironless and iron-core types available
- High dynamic and precise positioning
- Compact and flat design iron-core motors
- Excellent force-to-weight ratio ironless motors
- Weight-optimised magnet track
- Optional digital hall-sensor and connectors
- Temperature sensors included

Ratings
- Iron-core motors – 48 to 760 N (2,000 N peak force)
- Ironless motors – 29 to 423 N (2,100 N peak force)

System configuration
(Refer to servo drive chapter)
### Linear motor/servo drive combination

#### Linear motor coil

<table>
<thead>
<tr>
<th>Type</th>
<th>Rated force</th>
<th>Peak force</th>
<th>Model</th>
<th>Code</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>R88L-EC-FW-</td>
<td>48 N</td>
<td>105 N</td>
<td>R88L-EC-FW-0303-ANPC</td>
<td>FW-0303-ANPC</td>
<td>iron-core motors</td>
</tr>
<tr>
<td></td>
<td>96 N</td>
<td>210 N</td>
<td>R88L-EC-FW-0306-ANPC</td>
<td>FW-0306-ANPC</td>
<td>iron-core motors</td>
</tr>
<tr>
<td></td>
<td>160 N</td>
<td>400 N</td>
<td>R88L-EC-FW-0612-ANPC</td>
<td>FW-0612-ANPC</td>
<td>iron-core motors</td>
</tr>
<tr>
<td></td>
<td>608 N</td>
<td>1600 N</td>
<td>R88L-EC-FW-1115-ANPC</td>
<td>FW-1115-ANPC</td>
<td>iron-core motors</td>
</tr>
<tr>
<td></td>
<td>760 N</td>
<td>2000 N</td>
<td>R88L-EC-FW-1115-ANPC</td>
<td>FW-1115-ANPC</td>
<td>iron-core motors</td>
</tr>
</tbody>
</table>

#### Linear servo drive

<table>
<thead>
<tr>
<th>Linear servo drive</th>
<th>Accurax G5 EtherCAT model</th>
<th>Accurax G5 analogue/pulse model</th>
</tr>
</thead>
<tbody>
<tr>
<td>230V</td>
<td>230V</td>
<td>230V</td>
</tr>
<tr>
<td>400V</td>
<td>400V</td>
<td>400V</td>
</tr>
</tbody>
</table>

#### Accurax G5 EtherCAT model

- R88D-KN02H-ECT-L
- R88D-KN06H-ECT-L
- R88D-KN09H-ECT-L
- R88D-KN10H-ECT-L
- R88D-KN15H-ECT-L
- R88D-KN20H-ECT-L
- R88D-KN30F-ECT-L
- R88D-KT02H-L
- R88D-KT06F-L
- R88D-KT09F-L
- R88D-KT10H-L
- R88D-KT15F-L
- R88D-KT20F-L
- R88D-KT30F-L

#### Accurax G5 analogue/pulse model

- R88D-KT02H-L
- R88D-KT06F-L
- R88D-KT09F-L
- R88D-KT10H-L
- R88D-KT15F-L
- R88D-KT20F-L
- R88D-KT30F-L

### Type designation

#### Linear motor coil

**Motor type**

- Code: FW
  - Iron-core motor coil
- Code: GW
  - Ironless motor coil

**Motor series**

- Code: C
  - Compact (iron-core models)
- Code: S
  - Standard (ironless models)

**Connector option**

- Code: NP
  - No connectors
- Code: PL
  - With connectors

**Design Revision No.**

#### Magnet width

- Code: 03
  - 30 mm active magnet width
- Code: 05
  - 50 mm active magnet width
- Code: 06
  - 60 mm active magnet width
- Code: 07
  - 70 mm active magnet width
- Code: 11
  - 110 mm active magnet width

#### Coil model

- Code: 03
  - 3-coil model
- Code: 06
  - 6-coil model
- Code: 09
  - 9-coil model
- Code: 12
  - 12-coil model
- Code: 15
  - 15-coil model

---

**R88L-EC-FW-0303-ANPC**

- Motor type: FW
- Iron-core motor coil
- Magnet width: 03
  - 30 mm active magnet width
- Coil model: 03
  - 3-coil model

---

**R88L-EC-GW-0303-ANPS**

- Motor type: GW
- Ironless motor coil
- Magnet width: 03
  - 30 mm active magnet width
- Coil model: 03
  - 3-coil model
### Magnet track

<table>
<thead>
<tr>
<th>Code</th>
<th>Specifications</th>
<th>Length of magnet track in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>30 mm active magnet width</td>
<td>15</td>
</tr>
<tr>
<td>05</td>
<td>50 mm active magnet width</td>
<td>20</td>
</tr>
<tr>
<td>07</td>
<td>70 mm active magnet width</td>
<td>25</td>
</tr>
<tr>
<td>11</td>
<td>110 mm active magnet width</td>
<td></td>
</tr>
</tbody>
</table>

### Hall sensor

<table>
<thead>
<tr>
<th>Code</th>
<th>Specifications</th>
<th>Placeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>30 mm active magnet width</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>50 mm active magnet width</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>70 mm active magnet width</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>110 mm active magnet width</td>
<td></td>
</tr>
</tbody>
</table>

### Linear servomotor specifications

#### Iron-core motors R88L-EC-FW-□ (230/400 VAC)

<table>
<thead>
<tr>
<th>Voltage</th>
<th>230/400V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear motor model</td>
<td>R88L-EC-FW-□</td>
</tr>
<tr>
<td>Voltage</td>
<td>230/400V</td>
</tr>
<tr>
<td>Linear motor model</td>
<td>R88L-EC-FW-□</td>
</tr>
<tr>
<td>Maximum speed (100 V) m/s</td>
<td>2.5</td>
</tr>
<tr>
<td>Maximum speed (200 V) m/s</td>
<td>5</td>
</tr>
<tr>
<td>Maximum speed (400 V) m/s</td>
<td>10</td>
</tr>
<tr>
<td>Peak force</td>
<td>N</td>
</tr>
<tr>
<td>Peak current</td>
<td>Arms</td>
</tr>
<tr>
<td>Continuous force</td>
<td>N</td>
</tr>
<tr>
<td>Continuous current</td>
<td>Arms</td>
</tr>
<tr>
<td>Motor force constant</td>
<td>N / Am</td>
</tr>
<tr>
<td>BEMF</td>
<td>V / m/s</td>
</tr>
<tr>
<td>Motor constant</td>
<td>N / W</td>
</tr>
<tr>
<td>Phase resistance</td>
<td>Ω</td>
</tr>
<tr>
<td>Phase inductance</td>
<td>mH</td>
</tr>
<tr>
<td>Electrical time constant</td>
<td>ms</td>
</tr>
<tr>
<td>Max. cont. power dissipation (all coils) W</td>
<td>32</td>
</tr>
<tr>
<td>Thermal resistance</td>
<td>K/W</td>
</tr>
<tr>
<td>Thermal time constant</td>
<td>s</td>
</tr>
<tr>
<td>Magnetic attraction force</td>
<td>N</td>
</tr>
<tr>
<td>Magnet pole pitch</td>
<td>mm</td>
</tr>
<tr>
<td>Weight coil unit</td>
<td>Kg</td>
</tr>
<tr>
<td>Weight magnet track</td>
<td>Kg/m</td>
</tr>
<tr>
<td>Dimension cooling plate (l x w x h) mm</td>
<td>238 x 220 x 10</td>
</tr>
<tr>
<td>Protection methods</td>
<td>Temperature sensors (KTY-83/121 &amp; PTC 110C), self cooling</td>
</tr>
<tr>
<td>Hall sensor</td>
<td>Digital (optional)</td>
</tr>
<tr>
<td>Insulation class</td>
<td>Class B</td>
</tr>
<tr>
<td>Max. bus voltage</td>
<td>560 VDC</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>500 VDC, min. 10 MΩ</td>
</tr>
<tr>
<td>Di-electric strength</td>
<td>2,750 V for 1 sec</td>
</tr>
<tr>
<td>Max. allowable coil temperature</td>
<td>130°C</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>20% to 80% (non-condensing)</td>
</tr>
<tr>
<td>Max. allowable magnet temperature</td>
<td>70°C</td>
</tr>
</tbody>
</table>

1. Coil temperature rising by 6K/s.
2. Values at 100°C coil temperature and magnets at 25°C. Coil unit must be attached to the given cooling plate sizes in the table and an airstream of 2.5 m/s (25°C) has to be applied.
3. Weight without connector and cable.
4. P² has to be set properly for high current applications.

All other values at 25°C (±10%).
AC servo systems

Force-speed characteristics

*1 The DCBus voltage corresponds to an AC voltage input \( V_{ACIN} \) of 235 V or more.

*2 The DCBus voltage corresponds to an AC voltage input \( V_{ACIN} \) of 400 V or more.

*3 The DCBus voltage corresponds to an AC voltage input \( V_{ACIN} \) of 115 V or more.

Note: The DCBus value is calculated from the below formula (where is the AV voltage drop in the DC Bus):

\[
DCBus = V_{ACIN} \times \sqrt{2} - AV
\]
Ironless motors R88L-EC-GW-□ (230 VAC)

<table>
<thead>
<tr>
<th>Voltage</th>
<th>230V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear motor model</td>
<td>R88L-EC-GW-□</td>
</tr>
<tr>
<td>Voltage (100V)</td>
<td>600V</td>
</tr>
<tr>
<td>Maximum speed (100V)</td>
<td>100</td>
</tr>
<tr>
<td>Peak force</td>
<td>N</td>
</tr>
<tr>
<td>Peak current</td>
<td>Arms</td>
</tr>
<tr>
<td>Continuous force</td>
<td>N</td>
</tr>
<tr>
<td>Continuous current</td>
<td>Arms</td>
</tr>
<tr>
<td>Motor force constant</td>
<td>N/Ams</td>
</tr>
<tr>
<td>BEMF</td>
<td>V/m/s</td>
</tr>
<tr>
<td>Motor constant</td>
<td>N/m/s</td>
</tr>
<tr>
<td>Phase resistance</td>
<td>Ohm</td>
</tr>
<tr>
<td>Phase inductance</td>
<td>mH</td>
</tr>
<tr>
<td>Electrical time constant</td>
<td>s</td>
</tr>
<tr>
<td>Max. cont. power dissipation (all coils)</td>
<td>W</td>
</tr>
<tr>
<td>Thermal resistance</td>
<td>°C/W</td>
</tr>
<tr>
<td>Thermal time constant</td>
<td>s</td>
</tr>
<tr>
<td>Magnetic attraction force</td>
<td>N</td>
</tr>
<tr>
<td>Magnet pole pitch</td>
<td>mm</td>
</tr>
<tr>
<td>Weight coil unit</td>
<td>Kg</td>
</tr>
<tr>
<td>Weight magnet track</td>
<td>Kg/m</td>
</tr>
<tr>
<td>Protection methods</td>
<td>*1 Temperature sensors NTC10k, PTC110C, self cooling</td>
</tr>
<tr>
<td>Hall sensor</td>
<td>Digital (optional)</td>
</tr>
<tr>
<td>Insulation class</td>
<td>Class B</td>
</tr>
<tr>
<td>Max. bus voltage</td>
<td>325 VDC</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>500 VDC, min. 10 MΩ</td>
</tr>
<tr>
<td>Di-electric strength</td>
<td>2250 V for 1 sec</td>
</tr>
<tr>
<td>Max. allowable coil temperature</td>
<td>110°C</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>20 to 80% non-condensing</td>
</tr>
<tr>
<td>Max. allowable magnet temperature</td>
<td>70°C</td>
</tr>
</tbody>
</table>

*1 Coil temperature rising 03-series by 40K/s, 05-series by 20K/s and 07-series by 20K/s.

*2 Values at 110°C coil temperature and magnets at 25°C. Coil unit installed on a water-cooled aluminium surface. Attention: All other values at 25°C. Values can have a tolerance of 10%.

*3 Weight without connector and cable.

*4 Table values at 25°C (±10%).

All other values at 25°C (±10%).

---

**Force-speed characteristics**

![F-V-curve at 90% Ubus and coils at 100°C](image1)

![F-V-curve at 90% Ubus and coils at 100°C](image2)

![F-V-curve at 90% Ubus and coils at 100°C](image3)

![F-V-curve at 90% Ubus and coils at 100°C](image4)
*1 The DCBus voltage corresponds to an AC voltage input (V_{ACIN}) of 235 V or more.

*2 The DCBus voltage corresponds to an AC voltage input (V_{ACIN}) of 115 V or more.

Note: The DCBus value is calculated from the below formula:

\[ DCBuS = V_{ACIN} \times \sqrt{2} - \Delta V \]
Iron-core R88L-EC-FW-03

Motor coil

<table>
<thead>
<tr>
<th>Model</th>
<th>L1 (mm)</th>
<th>L2 (mm)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>R88L-EC-FW-0303-1</td>
<td>105±0.5</td>
<td>79+0.15/–0.35</td>
<td>1</td>
</tr>
<tr>
<td>R88L-EC-FW-0306-1</td>
<td>153±0.5</td>
<td>127+0.15/–0.35</td>
<td>2</td>
</tr>
</tbody>
</table>

Motor coil dimensions with magnet track and hall sensor (optional)

Wiring specifications for motor with connectors

Cable length 500×30
Connector optional
Made by Hypertec
LRRA05MRP1003 (MALE)
Pin article code: 021.279.1020

Magnet track

<table>
<thead>
<tr>
<th>Model</th>
<th>L1 (mm)</th>
<th>n</th>
<th>Approx. weight (Kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R88L-EC-FM-03096-A</td>
<td>96</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>R88L-EC-FM-03144-A</td>
<td>144</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>R88L-EC-FM-03384-A</td>
<td>384</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>
Iron-core R88L-EC-FW-06

Motor coil

<table>
<thead>
<tr>
<th>Model</th>
<th>L1 (mm)</th>
<th>L2 (mm)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>R88L-EC-FW-0606-@</td>
<td>153±0.5</td>
<td>127±0.15~0.35</td>
<td>2</td>
</tr>
<tr>
<td>R88L-EC-FW-0609-@</td>
<td>201±0.5</td>
<td>175±0.15~0.35</td>
<td>3</td>
</tr>
<tr>
<td>R88L-EC-FW-0612-@</td>
<td>249±0.5</td>
<td>223±0.15~0.35</td>
<td>4</td>
</tr>
</tbody>
</table>

Motor coil dimensions with magnet track and hall sensor (optional)

Wiring specifications for motor with connectors

<table>
<thead>
<tr>
<th>Power connector</th>
<th>Pin No.</th>
<th>Wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Black-1</td>
<td>Phase U</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Black-2</td>
<td>Phase V</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Green/Yellow</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Black-3</td>
<td>Phase W</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Not used</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Not used</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Temperature sensor connector</th>
<th>Pin No.</th>
<th>Wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not used</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Not used</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Not used</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Not used</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Not used</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>White</td>
<td>PTC</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Brown</td>
<td>PTC</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Green</td>
<td>KTY</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Yellow</td>
<td>KTY</td>
<td></td>
</tr>
<tr>
<td>Case</td>
<td>Shield</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hall sensor connector (optional)</th>
<th>Pin No.</th>
<th>Wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2</td>
<td>Red</td>
<td>Hall U</td>
<td>–</td>
</tr>
<tr>
<td>3</td>
<td>Grey</td>
<td>Hall V</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Yellow</td>
<td>Hall W</td>
<td>–</td>
</tr>
<tr>
<td>5</td>
<td>White</td>
<td>GND</td>
<td>–</td>
</tr>
<tr>
<td>6</td>
<td>Not used</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>7</td>
<td>Not used</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>8</td>
<td>Not used</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>9</td>
<td>Not used</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Case</td>
<td>Shield</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Magnet track

<table>
<thead>
<tr>
<th>Model</th>
<th>L1 (mm)</th>
<th>n</th>
<th>Approx. weight (Kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R88L-EC-FM-06192-A</td>
<td>192</td>
<td>3</td>
<td>3.8</td>
</tr>
<tr>
<td>R88L-EC-FM-06288-A</td>
<td>288</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
Iron-core R88L-EC-FW-11

Motor coil dimensions with magnet track and hall sensor (optional)

Motor coil

<table>
<thead>
<tr>
<th>Model</th>
<th>L1 (mm)</th>
<th>L2 (mm)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>R88L-EC-FW-1112-4</td>
<td>249±0.5</td>
<td>223±0.15/–0.35</td>
<td>4</td>
</tr>
<tr>
<td>R88L-EC-FW-1115-4</td>
<td>297±0.5</td>
<td>271±0.15/–0.35</td>
<td>5</td>
</tr>
</tbody>
</table>

Motor coil specifications for motor with connectors

Cable length 500±30
Connector optional
Made by Hirose:
LRRA5M4PFN183 (MALE)
Pin code: 021.279.1020

Power connector

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Black-1</td>
<td>Phase U</td>
</tr>
<tr>
<td>2</td>
<td>Black-2</td>
<td>Phase V</td>
</tr>
<tr>
<td>3</td>
<td>Green/Yellow</td>
<td>Ground</td>
</tr>
<tr>
<td>4</td>
<td>Black-3</td>
<td>Phase W</td>
</tr>
<tr>
<td>5</td>
<td>Not used</td>
<td>–</td>
</tr>
<tr>
<td>6</td>
<td>Not used</td>
<td>–</td>
</tr>
</tbody>
</table>

Magnetic connector:
Plug type: LRRA58RFRR110

Temperature sensor connector

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not used</td>
<td>–</td>
</tr>
<tr>
<td>2</td>
<td>Not used</td>
<td>–</td>
</tr>
<tr>
<td>3</td>
<td>Not used</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Not used</td>
<td>–</td>
</tr>
<tr>
<td>5</td>
<td>Not used</td>
<td>–</td>
</tr>
<tr>
<td>6</td>
<td>White</td>
<td>PTC</td>
</tr>
<tr>
<td>7</td>
<td>Brown</td>
<td>PTC</td>
</tr>
<tr>
<td>8</td>
<td>Green</td>
<td>KTY</td>
</tr>
<tr>
<td>9</td>
<td>Yellow</td>
<td>KTY</td>
</tr>
<tr>
<td>Case</td>
<td>Shield</td>
<td>–</td>
</tr>
</tbody>
</table>

Wiring specifications for motor with connectors

Cable length 500±30
Connector optional
D-Sub-9-pin (MALE)

Hall sensor connector (optional)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>SV</td>
</tr>
<tr>
<td>2</td>
<td>Red</td>
<td>Hall U</td>
</tr>
<tr>
<td>3</td>
<td>Grey</td>
<td>Hall V</td>
</tr>
<tr>
<td>4</td>
<td>Yellow</td>
<td>Hall W</td>
</tr>
<tr>
<td>5</td>
<td>White</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>Not used</td>
<td>Not used</td>
</tr>
<tr>
<td>7</td>
<td>Not used</td>
<td>Not used</td>
</tr>
<tr>
<td>8</td>
<td>Not used</td>
<td>Not used</td>
</tr>
<tr>
<td>9</td>
<td>Not used</td>
<td>Not used</td>
</tr>
<tr>
<td>Case</td>
<td>Shield</td>
<td>–</td>
</tr>
</tbody>
</table>

Magnet track

<table>
<thead>
<tr>
<th>Model</th>
<th>L1 (mm)</th>
<th>n</th>
<th>Approx. weight (Kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R88L-EC-FM-11192-A</td>
<td>192</td>
<td>3</td>
<td>10.5</td>
</tr>
<tr>
<td>R88L-EC-FM-11288-A</td>
<td>288</td>
<td>5</td>
<td>10.5</td>
</tr>
</tbody>
</table>
Ironless R88L-EC-GW-03

Motor coil

<table>
<thead>
<tr>
<th>Model</th>
<th>L1 (mm)</th>
<th>L2 (mm)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>R88L-EC-GW-0303-</td>
<td>95.4</td>
<td>78</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>R88L-EC-GW-0306-</td>
<td>155.4</td>
<td>138</td>
</tr>
<tr>
<td></td>
<td>R88L-EC-GW-0309-</td>
<td>215.4</td>
<td>198</td>
</tr>
</tbody>
</table>

Motor with magnet track (separate order no.)

Motor with hall sensor (optional)

Wiring specifications for motor with connectors

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Black</td>
<td>Phase U</td>
</tr>
<tr>
<td>2</td>
<td>Red</td>
<td>Phase V</td>
</tr>
<tr>
<td>3</td>
<td>White</td>
<td>Phase W</td>
</tr>
<tr>
<td>4</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Green</td>
<td>Ground</td>
</tr>
</tbody>
</table>

Making connector: Plug type: SPOC06KFSDN169

Temperature sensor connector

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>White</td>
<td>PTC</td>
</tr>
<tr>
<td>7</td>
<td>Brown</td>
<td>PTC</td>
</tr>
<tr>
<td>8</td>
<td>Green</td>
<td>NTC</td>
</tr>
<tr>
<td>9</td>
<td>Yellow</td>
<td>NTC</td>
</tr>
<tr>
<td>Case</td>
<td></td>
<td>Shield</td>
</tr>
</tbody>
</table>

Cable length 500x30
Connector optional
D-Sub 9-pin (MALE)

Magnet track

<table>
<thead>
<tr>
<th>Model</th>
<th>L1 (mm)</th>
<th>n</th>
<th>Approx. weight (Kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R88L-EC-UM-03090-A</td>
<td>90</td>
<td>2</td>
<td>4.8</td>
</tr>
<tr>
<td>R88L-EC-UM-03120-A</td>
<td>120</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>R88L-EC-UM-03390-A</td>
<td>390</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>
### Motor coil

<table>
<thead>
<tr>
<th>Model</th>
<th>L1 (mm)</th>
<th>L2 (mm)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>R88L-EC-GW-0503-1</td>
<td>123.4</td>
<td>106</td>
<td>3</td>
</tr>
<tr>
<td>R88L-EC-GW-0506-1</td>
<td>207.4</td>
<td>190</td>
<td>6</td>
</tr>
<tr>
<td>R88L-EC-GW-0509-1</td>
<td>291.4</td>
<td>274</td>
<td>9</td>
</tr>
</tbody>
</table>

### Magnet track

<table>
<thead>
<tr>
<th>Model</th>
<th>L1 (mm)</th>
<th>n</th>
<th>Approx. weight (Kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R88L-EC-GM-05126-A</td>
<td>126</td>
<td>2</td>
<td>11.2</td>
</tr>
<tr>
<td>R88L-EC-GM-05168-A</td>
<td>168</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>R88L-EC-GM-05210-A</td>
<td>210</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>R88L-EC-GM-05546-A</td>
<td>546</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>
Ironless R88L-EC-GW-07

Motor coil

<table>
<thead>
<tr>
<th>Model</th>
<th>L1 (mm)</th>
<th>L2 (mm)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>R88L-EC-GW-0703-A</td>
<td>151.4</td>
<td>134</td>
<td>3</td>
</tr>
<tr>
<td>R88L-EC-GW-0706-A</td>
<td>265.4</td>
<td>248</td>
<td>6</td>
</tr>
<tr>
<td>R88L-EC-GW-0709-A</td>
<td>379.4</td>
<td>362</td>
<td>9</td>
</tr>
</tbody>
</table>

Motor with magnet track (separate order no.)

Motor with hall sensor (optional)

Wiring specifications for motor with connectors

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>White, PTC</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Brown, PTC</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Green, PTC</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Yellow, PTC</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Cable, Ground</td>
<td></td>
</tr>
</tbody>
</table>

Motor coil mounting surface

Magnet track

<table>
<thead>
<tr>
<th>Model</th>
<th>L1 (mm)</th>
<th>n</th>
<th>Approx. weight (Kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R88L-EC-GM-07114-A</td>
<td>114</td>
<td>1</td>
<td>25.5</td>
</tr>
<tr>
<td>R88L-EC-GM-07171-A</td>
<td>171</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>R88L-EC-GM-07456-A</td>
<td>456</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>
Optional serial converter unit

Specifications

<table>
<thead>
<tr>
<th>Serial converter model R88A-</th>
<th>SC01K-E</th>
<th>SC02K-E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Serial converter from 1 Vpp to 15 V serial data transmission and with hall sensor input</td>
<td>KTY sensor detection of iron-core motor coil, NTC sensor detection of ironless motor coil</td>
</tr>
<tr>
<td>Temperature sensor</td>
<td>NTC sensor detection of ironless motor coil</td>
<td></td>
</tr>
<tr>
<td>Electrical characteristics</td>
<td>Power supply voltage</td>
<td>5 VDC, max. 250 mA supplied by the drive</td>
</tr>
<tr>
<td>Standard resolution</td>
<td>Interpolation factor 100 plus quadrature count</td>
<td></td>
</tr>
<tr>
<td>Max. input frequency</td>
<td>400 kHz 1 Vpp</td>
<td></td>
</tr>
<tr>
<td>Analog input signals (cos, sin, Ref)</td>
<td>Differential input amplitude: 0.4 V to 1.2 V input signal level: 1.5 V to 3.5 V</td>
<td></td>
</tr>
<tr>
<td>Output signals</td>
<td>Position data, hall and temperature sensor information, and alarms</td>
<td></td>
</tr>
<tr>
<td>Output method</td>
<td>Serial data transmission</td>
<td></td>
</tr>
<tr>
<td>Transmission cycle</td>
<td>&lt; 42 µs</td>
<td></td>
</tr>
<tr>
<td>Mechanical characteristics</td>
<td>Vibration resistance</td>
<td>98 m/s² max. (1 to 2500 Hz) in three directions</td>
</tr>
<tr>
<td>Shock resistance</td>
<td>980 m/s², (11 ms) two times in three directions</td>
<td></td>
</tr>
<tr>
<td>Environmental conditions</td>
<td>Operating temperature</td>
<td>0 to 55°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>–20 to 80°C</td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>20% to 90% relative humidity (without condensation)</td>
<td></td>
</tr>
</tbody>
</table>

Note: As the 6, 7, 8, 9 pins in the CN2 and CN3 connectors are internally wired, the temperature sensor can be connected to both connectors. When the hall sensor is also required, use the same cable for hall and temperature signals and the CN2 connector.
Ordering information

(Refer to servo drive chapter)

Note: The symbols ABC ... show the recommended sequence to select the linear motor, cables and serial converter for a linear motor system.

Linear motors

R88L-EC-FW-□ Iron-core type

230 VAC single phase/three phase, 400 VAC three phase

<table>
<thead>
<tr>
<th>Linear motor parts</th>
<th>Linear drive</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symbol</strong></td>
<td><strong>Rated force</strong></td>
</tr>
</tbody>
</table>

Coil without connectors

Coil with connectors

<ref to page>
R88L-EC-GW-□ Ironless type

230VAC single phase/three phase

<table>
<thead>
<tr>
<th>Linear motor parts</th>
<th>Linear Servo drive</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td><strong>Rated force</strong></td>
</tr>
<tr>
<td>1 2 3 4</td>
<td>25 N</td>
</tr>
<tr>
<td>1 2 3 4</td>
<td>58 N</td>
</tr>
<tr>
<td>1 2 3 4</td>
<td>87 N</td>
</tr>
<tr>
<td>1 2 3 4</td>
<td>140 N</td>
</tr>
</tbody>
</table>

Note: If no temperature sensor is needed, then it does not matter which converter you use.

Servo drive

4 Refer to Accurax G5 servo drive chapter for detailed drive specifications and selection of drive accessories.

Serial converter unit

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Specifications</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Serial converter unit from 1 Vpp to G5 serial data transmission (with KTY sensor detection of iron-core motor coil)</td>
<td>R88A-SC01K-E</td>
</tr>
<tr>
<td>7</td>
<td>Serial converter unit from 1 Vpp to G5 serial data transmission (with NTC sensor detection of ironless motor coil)</td>
<td>R88A-SC02K-E</td>
</tr>
</tbody>
</table>

Note: If no temperature sensor is needed, then it does not matter which converter you use.

Serial converter cable to servo drive

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Specifications</th>
<th>Model</th>
<th>Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Accurax G5-Linear drive to serial converter cable. (Connectors R88A-CN41L and DB-15)</td>
<td>R88A-CRKN001-5CR-E</td>
<td><img src="image" alt="Serial Converter Cable" /></td>
</tr>
</tbody>
</table>

Note: This cable can be used also for A/B pulse encoder Numerik Jena standard pinout.

Power cable

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Specifications</th>
<th>Model</th>
<th>Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>For iron-core linear motors</td>
<td>R88A-CAWK001-SS-DE</td>
<td><img src="image" alt="Power Cable" /></td>
</tr>
<tr>
<td>9</td>
<td>For iron-core linear motors</td>
<td>R88A-CAWK003-SS-DE</td>
<td><img src="image" alt="Power Cable" /></td>
</tr>
<tr>
<td>9</td>
<td>For iron-core linear motors</td>
<td>R88A-CAWK005-SS-DE</td>
<td><img src="image" alt="Power Cable" /></td>
</tr>
<tr>
<td>9</td>
<td>For iron-core linear motors</td>
<td>R88A-CAWL001-SS-DE</td>
<td><img src="image" alt="Power Cable" /></td>
</tr>
<tr>
<td>9</td>
<td>For iron-core linear motors</td>
<td>R88A-CAWL003-SS-DE</td>
<td><img src="image" alt="Power Cable" /></td>
</tr>
<tr>
<td>9</td>
<td>For iron-core linear motors</td>
<td>R88A-CAWL005-SS-DE</td>
<td><img src="image" alt="Power Cable" /></td>
</tr>
<tr>
<td>9</td>
<td>For iron-core linear motors</td>
<td>R88A-CAWL010-SS-DE</td>
<td><img src="image" alt="Power Cable" /></td>
</tr>
<tr>
<td>9</td>
<td>For iron-core linear motors</td>
<td>R88A-CAWL015-SS-DE</td>
<td><img src="image" alt="Power Cable" /></td>
</tr>
<tr>
<td>9</td>
<td>For iron-core linear motors</td>
<td>R88A-CAWL020-SS-DE</td>
<td><img src="image" alt="Power Cable" /></td>
</tr>
</tbody>
</table>

Accurax linear motor
### Linear Encoder cable to Serial Converter

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Specifications</th>
<th>Model</th>
<th>Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Diagram" /></td>
<td>Extension cable for Numerik Jena linear encoder to R88A-S0:C-K-E serial converter (Connector DB-15) (This extension cable is optional)</td>
<td>1.5 m: R88A-CFKA001-5CR-E, 3 m: R88A-CFKA003CR-E, 5 m: R88A-CFKA005CR-E, 10 m: R88A-CFKA010CR-E, 15 m: R88A-CFKA015CR-E</td>
<td><img src="image2.png" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image3.png" alt="Diagram" /></td>
<td>Extension cable for Renishaw linear encoder to R88A-S0:C-K-E serial converter (Connector DB-15) (This extension cable is optional)</td>
<td>1.5 m: R88A-CFKD001-5CR-E, 3 m: R88A-CFKD003CR-E, 5 m: R88A-CFKD005CR-E, 10 m: R88A-CFKD010CR-E, 15 m: R88A-CFKD015CR-E</td>
<td><img src="image4.png" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image5.png" alt="Diagram" /></td>
<td>Extension cable for Heidenhain linear encoder to R88A-S0:C-K-E serial converter (Connector DB-15) (This extension cable is optional)</td>
<td>1.5 m: R88A-CFKD001-5CR-E, 3 m: R88A-CFKD003CR-E, 5 m: R88A-CFKD005CR-E, 10 m: R88A-CFKD010CR-E, 15 m: R88A-CFKD015CR-E</td>
<td><img src="image6.png" alt="Diagram" /></td>
</tr>
</tbody>
</table>

### Hall and Temperature sensors cable to Serial Converter

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Specifications</th>
<th>Model</th>
<th>Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image7.png" alt="Diagram" /></td>
<td>Extension cable from hall and temperature sensors to R88A-S0:C-K-E serial converter (Connector DB-9) (This extension cable is optional)</td>
<td>1.5 m: R88A-CFKB001-5CR-E, 3 m: R88A-CFKB003CR-E, 5 m: R88A-CFKB005CR-E, 10 m: R88A-CFKB010CR-E, 15 m: R88A-CFKB015CR-E</td>
<td><img src="image8.png" alt="Diagram" /></td>
</tr>
</tbody>
</table>

### Connectors

<table>
<thead>
<tr>
<th>Specification</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accurax G5 servo drive encoder connector (for CN4)</td>
<td>R88A-CNK41L</td>
</tr>
<tr>
<td>Hypertac power cable connector IP67 for iron-core linear motors</td>
<td>LPRA-06B-FRB9170</td>
</tr>
<tr>
<td>Hypertac power cable connector IP67 for ironless linear motors</td>
<td>SPOC06KFSN169</td>
</tr>
</tbody>
</table>

---

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. I160E-EN-02A

In the interest of product improvement, specifications are subject to change without notice.