

## Gear motors RD50/70/85-HD

**Compact actuators for high precision and backlash-free drives in industry and robotics**

The geared motors of the RD-HD series are high-torque and high-precision servo solutions with hollow-shaft for low-voltage applications. The technology from Harmonic Drive uniquely combines highest precision and zero backlash in a compact lightweight design. RoboDrive technology allows Harmonic Drive gears to be operated at their peak performance.

Due to the outstanding dynamics of the RoboDrive motors and the very low gear elasticity and inertia it is possible to precisely control the powertrain. This allows the geared motors RD-HD to be used successfully in robotics, handling and automation, medical and optical applications.

On request other sizes and types of Harmonic Drive gears are delivered with matching motors.



### Key features:

- Hollow-shaft with protective tube
- Industry-leading power density
- Excellent torque density and positioning accuracy
- Absolute encoder with high resolution
- Very compact and lightweight design

### Basic data

|   | RD50x08-HD | RD70x10-HD | RD85x13-HD |
|---|------------|------------|------------|
| Power P [W]                             | 155        | 270        | 430        |
| Rated output torque $T_r$ [Nm]          | 7.8        | 40.0       | 67.0       |
| Peak output torque $T_{max}$ [Nm]       | 28         | 92         | 176        |
| Collision torque $T_{col}$ [Nm]         | 54         | 147        | 304        |
| Output speed $n_{max}^*$ at $U_r$ [rpm] | 55         | 22         | 18         |
| Gear ratio **                           | 1:100      | 1:160      | 1:160      |
| Diameter D [mm]                         | 61         | 80         | 96         |
| Length L [mm]                           | 54.3       | 63.5       | 70.3       |
| Weight m [g]                            | 890        | 2600       | 3650       |

\* Theoretical no-load rotation speeds at  $U_r = 48$  V. Variations can arise from operation with different inverters.

Higher rotation speeds or change of the voltage level can be achieved by adapting the interconnection scheme.

\*\* Other gear ratios are available on request.

## Electrical data

|                                   | RD50x08-HD   | RD70x10-HD      | RD85x13-HD      |
|-----------------------------------|--|-----------------|-----------------|
| Rated voltage $U_r$ [V]           | 48   | 48              | 48              |
| Rated current $I_r$ [A]           | 3.26   | 3.37            | 4.60            |
| Torque constant $k_T$ [Nm/A]      | 0.057  | 0.106           | 0.13            |
| Terminal resistance $R_{TT}$ [mΩ] | 552  | 470             | 210             |
| Terminal inductance $L_{TT}$ [μH] | 720  | 800             | 470             |
| Number of pole pairs              | 10   | 10              | 10              |
| Sensor type*                      | Magnetic encoder, BiSS-C differential, accuracy $\pm 0.1^\circ$ , supply voltage $U_{dd} = 5\text{ V}$ |                 |                 |
| Position resolution (drive side)  | 100,000 inc/rev  | 160,000 inc/rev | 200,000 inc/rev |

All data relate to star-serial interconnection at  $U_r = 48\text{ V}$ . The voltage can be adapted on request.

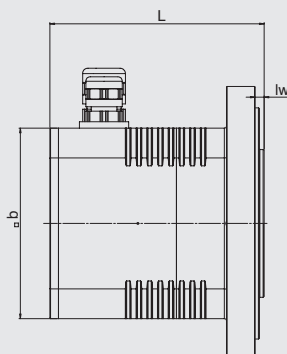
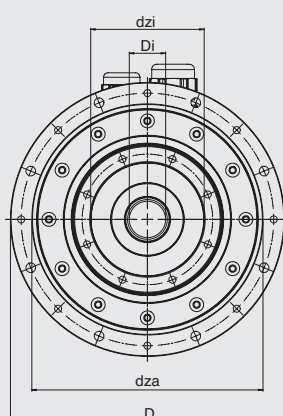
\* SSI, SPI, PWM, I2C, asynchronous serial communication interfaces can be realized on request.

## Gear data

|                                 | RD50x08-HD     | RD70x10-HD     | RD85x13-HD     |
|---------------------------------|----------------|----------------|----------------|
| Type                            | CPL-14A-100-2A | CPL-20A-160-2A | CPL-25A-160-2A |
| Torsional stiffness [Nm/arcmin] | 1.0            | 8.4            | 16.6           |
| Lost motion [arcmin]            | < 1            | < 1            | < 1            |
| Max. tilting torque [Nm]        | 205            | 230            | 277            |

## Dimensions

|                                   | RD50x08-HD | RD70x10-HD | RD85x13-HD |
|-----------------------------------|------------|------------|------------|
| Diameter D [mm]                   | 97         | 128        | 141        |
| Motor length L [mm]               | 77.6       | 99.8       | 111.3      |
| Edge length b [mm]                | 66         | 89         | 103.5      |
| Centering shaft diameter dzi [mm] | 35 H6      | 53 H6      | 58 H7      |
| Hollow-shaft diameter Di [mm]     | 10.5       | 17         | 21         |
| Shaft length lw [mm]              | 4.2        | 4.2        | 5          |
| Centering diameter dza [mm]       | 83 h6      | 108 h6     | 118 h6     |



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