

## PRODUCT DATASHEET

# ES-HG-S09-F25-R120

## Precision Transmission Component

Hollow Shaft Harmonic Gearboxes | High-Torque Hollow Shaft Gear Unit

### Product Overview

Precision Transmission Component with rated Torque 87 N·m, instantaneous Maximum Torque 395 N·m and start/Stop Peak Torque 217 N·m.

### Key Specifications

| PARAMETER                    | VALUE | UNIT    |
|------------------------------|-------|---------|
| Rated Torque                 | 87    | N·m     |
| Instantaneous Maximum Torque | 395   | N·m     |
| Start/Stop Peak Torque       | 217   | N·m     |
| Reduction Ratio              | 120   |         |
| Maximum Input Speed          | 5600  | r/min   |
| Allowable Average Torque     | 140   | N·m     |
| Backlash                     | ≤20   | arc sec |
| Frame Size                   | 25    |         |
| Weight                       | 2.02  | kg      |

## Technical Specifications

| PARAMETER                     | SPECIFICATION | UNIT    | NOTES                                                                   |
|-------------------------------|---------------|---------|-------------------------------------------------------------------------|
| PERFORMANCE                   |               |         |                                                                         |
| Rated Torque                  | 87            | Nm      | Frame Size: 25; Reduction Ratio: 120; Size: 25                          |
| Instantaneous Maximum Torque  | 395           | Nm      | Frame Size: 25; Reduction Ratio: 120; Size: 25                          |
| Start/Stop Peak Torque        | 217           | Nm      | Frame Size: 25; Reduction Ratio: 120; Size: 25                          |
| Backlash                      | ≤20           | arc sec | Reduction Ratio: 120; Size: 25; Frame Size: 25                          |
| Allowable Average Torque      | 140           | Nm      | Frame Size: 25; Reduction Ratio: 120; Size: 25                          |
| Angular Transmission Accuracy | 1             | arcmin  | Frame Size: 25; Reduction Ratio: 120; Reduction Ratio Min: 50; Size: 25 |
| Hysteresis Loss               | 1             | arcmin  | Frame Size: 25; Reduction Ratio: 120; Reduction Ratio Min: 50; Size: 25 |
| MECHANICAL                    |               |         |                                                                         |
| Frame Size                    | 25            |         | Frame Size: 25; Reduction Ratio: 120; Size: 25                          |
| Weight                        | 2.02          | kg      | Frame Size: 25; Reduction Ratio: 120; Size: 25                          |

## Technical Specifications

| PARAMETER                        | SPECIFICATION | UNIT                    | NOTES                                                                   |
|----------------------------------|---------------|-------------------------|-------------------------------------------------------------------------|
| <b>RELIABILITY</b>               |               |                         |                                                                         |
| Design Life                      | 15000         | h                       | Frame Size: 25; Reduction Ratio: 120; Size: 25                          |
| <b>ADDITIONAL SPECIFICATIONS</b> |               |                         |                                                                         |
| Reduction Ratio                  | 120           |                         | Frame Size: 25; Reduction Ratio: 120; Size: 25                          |
| Maximum Input Speed              | 5600          | r/min                   | Frame Size: 25; Reduction Ratio: 120; Size: 25                          |
| Average Input Speed              | 3500          | r/min                   | Frame Size: 25; Reduction Ratio: 120; Size: 25                          |
| Torsional Rigidity K2            | 5             | $\times 10^4$<br>Nm/rad | Frame Size: 25; Reduction Ratio: 120; Reduction Ratio Min: 50; Size: 25 |
| Torsional Rigidity K1            | 3.1           | $\times 10^4$<br>Nm/rad | Frame Size: 25; Reduction Ratio: 120; Reduction Ratio Min: 50; Size: 25 |
| Torsional Rigidity K3            | 5.7           | $\times 10^4$<br>Nm/rad | Frame Size: 25; Reduction Ratio: 120; Reduction Ratio Min: 50; Size: 25 |
| Torsional Rigidity T2            | 48            | Nm                      | Frame Size: 25; Reduction Ratio: 120; Reduction Ratio Min: 50; Size: 25 |
| Torsional Rigidity T1            | 14            | Nm                      | Frame Size: 25; Reduction Ratio: 120; Reduction Ratio Min: 50; Size: 25 |



## 2D Drawing Dimensions & Callouts

| VIEW              | FIELD                                            | VALUE   |
|-------------------|--------------------------------------------------|---------|
| Mechanical View 1 | Overall length                                   | 55.5 mm |
|                   | Middle section length                            | 43.5 mm |
|                   | Right section length                             | 6 mm    |
|                   | Left section length                              | 26 mm   |
|                   | Lower left section length                        | 10.5 mm |
|                   | Right section length                             | 8.5 mm  |
|                   | Outer mounting hole diameter with tolerance      | Φ110 H7 |
|                   |                                                  | Φ115 h7 |
|                   | Inner hole diameter with tolerance (upper right) | Φ29 H7  |
|                   | Inner hole diameter with tolerance (lower left)  |         |
|                   | Middle hole diameter with tolerance              | Φ60 h7  |
|                   |                                                  | Φ38 h7  |
|                   | Middle ring diameter                             | Φ90     |
|                   | Center section length                            | 23 mm   |
|                   | Lower left end length                            | 10 mm   |

## 2D Drawing Dimensions & Callouts

| VIEW              | FIELD                                   | VALUE                                      |
|-------------------|-----------------------------------------|--------------------------------------------|
| Mechanical View 2 | Flange mounting threaded holes          | 6 × M3 threaded holes                      |
|                   | Pitch circle diameter of mounting holes | DP6 (likely designation or reference code) |
|                   | Center bore diameter                    | φ33.5 mm                                   |
|                   | Outer mounting holes                    | 12 × φ4.5 mm holes                         |
|                   | Flange outer diameter                   | φ102 mm                                    |
| Mechanical View 3 | Outer circle threaded holes (M4)        | 16 holes, M4 thread, tap depth 8 mm        |
|                   | Outer circle through holes (φ4.5)       | 16 holes, φ4.5 mm, through depth 15.5 mm   |
|                   | Outer circle diameter                   | φ77 mm                                     |
|                   | Inner circle diameter                   | φ33.5 mm                                   |
|                   | Inner circle threaded holes (M3)        | 6 holes, M3 thread, tap depth 6 mm         |

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**01** Specifications are subject to change without notice. Verify the current product configuration before final design release.

**02** 2D drawings, CAD files and integration documentation are controlled documents and are supplied separately on request.