

## PRODUCT DATASHEET

# ES-HG-S07-F50-R120

## Precision Transmission Component

Hat Harmonic Gearboxes | High-Torque Hat Unit Type I

### Product Overview

Precision Transmission Component with rated Torque 688 N·m, instantaneous Maximum Torque 2678 N·m and start/Stop Peak Torque 1404 N·m.

### Key Specifications

| PARAMETER                    | VALUE | UNIT    |
|------------------------------|-------|---------|
| Rated Torque                 | 688   | N·m     |
| Instantaneous Maximum Torque | 2678  | N·m     |
| Start/Stop Peak Torque       | 1404  | N·m     |
| Reduction Ratio              | 120   |         |
| Maximum Input Speed          | 3500  | r/min   |
| Allowable Average Torque     | 1057  | N·m     |
| Backlash                     | ≤20   | arc sec |
| Frame Size                   | 50    |         |
| Weight                       | 9.6   | kg      |

## Technical Specifications

| PARAMETER                     | SPECIFICATION                     | UNIT    | NOTES                                                                                           |
|-------------------------------|-----------------------------------|---------|-------------------------------------------------------------------------------------------------|
| PERFORMANCE                   |                                   |         |                                                                                                 |
| Rated Torque                  | 688                               | Nm      | Frame Size: 50; Reduction Ratio: 120; Size: 50                                                  |
| Instantaneous Maximum Torque  | 2678                              | Nm      | Frame Size: 50; Reduction Ratio: 120; Size: 50                                                  |
| Start/Stop Peak Torque        | 1404                              | Nm      | Frame Size: 50; Reduction Ratio: 120; Size: 50                                                  |
| Backlash                      | ≤20                               | arc sec | Reduction Ratio: 120; Size: 50; Frame Size: 50                                                  |
| Allowable Average Torque      | 1057                              | Nm      | Frame Size: 50; Reduction Ratio: 120; Size: 50                                                  |
| Starting Torque               | 57 / 0.57                         | Nm      | Frame Size: 50; Reduction Ratio: 120; Size: 50 / Reduction Ratio: 120; Size: 50; Frame Size: 50 |
| Angular Transmission Accuracy | 1                                 | arcmin  | Frame Size: 50; Reduction Ratio: 120; Reduction Ratio Min: 50; Size: 50                         |
| Hysteresis Loss               | 1                                 | arcmin  | Frame Size: 50; Reduction Ratio: 120; Reduction Ratio Min: 50; Size: 50                         |
| MECHANICAL                    |                                   |         |                                                                                                 |
| Frame Size                    | 50                                |         | Frame Size: 50; Reduction Ratio: 120; Size: 50                                                  |
| Weight                        | 9.6                               | kg      | Frame Size: 50; Reduction Ratio: 120; Size: 50                                                  |
| Wave Generator Dimension T    | 24.8+0.10 / 21.8+0.10 / 25.3+0.10 | mm      | Varies by published configuration.                                                              |
| Wave Generator Bore U         | φ22H7 / φ19H7                     |         | Varies by published configuration.                                                              |
| Wave Generator Keyway W       | 8JS9/P9 / 6JS9/P9                 |         | Varies by published configuration.                                                              |

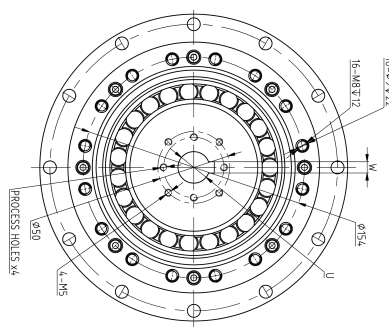
## Technical Specifications

| PARAMETER                 | SPECIFICATION                                                                                                | UNIT                       | NOTES                                                                   |
|---------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------------------------------------------------------|
| RELIABILITY               |                                                                                                              |                            |                                                                         |
| Design Life               | 15000                                                                                                        | h                          | Frame Size: 50; Reduction Ratio: 120; Size: 50                          |
| ADDITIONAL SPECIFICATIONS |                                                                                                              |                            |                                                                         |
| Reduction Ratio           | 120                                                                                                          |                            | Frame Size: 50; Reduction Ratio: 120; Size: 50                          |
| Maximum Input Speed       | 3500                                                                                                         | r/min                      | Frame Size: 50; Reduction Ratio: 120; Size: 50                          |
| Average Input Speed       | 2500                                                                                                         | r/min                      | Frame Size: 50; Reduction Ratio: 120; Size: 50                          |
| Wave Generator T          | 21.8 <sup>+</sup> 0.1 <sub>0</sub> / 24.8 <sup>+</sup> 0.1 <sub>0</sub> / 25.3 <sup>+</sup> 0.1 <sub>0</sub> | mm                         | Varies by published configuration.                                      |
| Wave Generator U          | φ19H7 / φ22H7                                                                                                |                            | Varies by published configuration.                                      |
| Wave Generator W          | 6JS9/P9 / 8JS9/P9                                                                                            |                            | Varies by published configuration.                                      |
| Torsional Rigidity K2     | 40                                                                                                           | ×10 <sup>4</sup><br>Nm/rad | Frame Size: 50; Reduction Ratio: 120; Reduction Ratio Min: 50; Size: 50 |
| Torsional Rigidity K1     | 25                                                                                                           | ×10 <sup>4</sup><br>Nm/rad | Frame Size: 50; Reduction Ratio: 120; Reduction Ratio Min: 50; Size: 50 |
| Torsional Rigidity K3     | 44                                                                                                           | ×10 <sup>4</sup><br>Nm/rad | Frame Size: 50; Reduction Ratio: 120; Reduction Ratio Min: 50; Size: 50 |
| Torsional Rigidity T2     | 382                                                                                                          | Nm                         | Frame Size: 50; Reduction Ratio: 120; Reduction Ratio Min: 50; Size: 50 |
| Torsional Rigidity T1     | 108                                                                                                          | Nm                         | Frame Size: 50; Reduction Ratio: 120; Reduction Ratio Min: 50; Size: 50 |

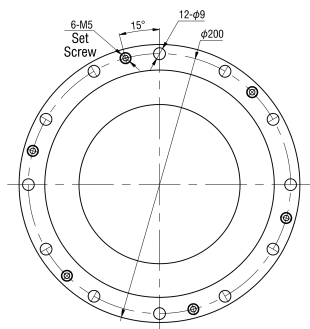
## Mechanical Overview

| PARAMETER                  | VALUE                             | UNIT |
|----------------------------|-----------------------------------|------|
| Frame Size                 | 50                                |      |
| Weight                     | 9.6                               | kg   |
| Wave Generator Dimension T | 24.8+0.10 / 21.8+0.10 / 25.3+0.10 | mm   |
| Wave Generator Bore U      | φ22H7 / φ19H7                     |      |
| Wave Generator Keyway W    | 8JS9/P9 / 6JS9/P9                 |      |

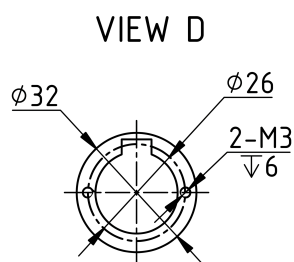
### Mechanical View 1



### Mechanical View 2



### Mechanical View 3



### Mechanical View 4

## 2D Drawing Dimensions & Callouts

| VIEW              | FIELD                          | VALUE                                                               |
|-------------------|--------------------------------|---------------------------------------------------------------------|
| Mechanical View 1 | Overall width                  | 63 mm                                                               |
|                   | Partial width                  | 39 mm                                                               |
|                   | End step width                 | 5 mm                                                                |
|                   | Maximum clearance              | MAX 2.5 mm                                                          |
|                   | Minimum clearance              | MIN 2 mm                                                            |
|                   | Outer diameter with deviations | Diameter 214 mm, upper deviation -0.02 mm, lower deviation -0.05 mm |
|                   | Bore diameter fit              | Diameter 175 H7                                                     |
|                   | Maximum diameter limit         | MAX diameter 113 mm                                                 |
|                   | Minimum diameter limit         | MIN diameter 133 mm                                                 |
|                   | Shaft diameter fit             | Diameter 170 h6                                                     |
|                   | Outer diameter fit             | Diameter 214 h7                                                     |
|                   | Datum T                        |                                                                     |
|                   | Datum D                        |                                                                     |
|                   | Component label                | Wave Generator A                                                    |
|                   | Bottom partial width           | 26.8 mm, upper deviation 0 mm, lower deviation -0.1 mm              |
|                   |                                | 29.2 ±0.2 mm                                                        |

## 2D Drawing Dimensions & Callouts

| VIEW              | FIELD                                                                           | VALUE                                                                        |
|-------------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Mechanical View 2 | Tapped holes, 16x M8, depth 12mm, evenly distributed                            | 16× M8 threaded holes, depth 12 mm, evenly distributed on bolt circle        |
|                   | Through/counterbore holes, 16x $\varnothing 9$ , depth 22mm, evenly distributed | 16× $\varnothing 9$ mm holes, depth 22 mm, evenly distributed on bolt circle |
|                   | Flange outer diameter $\varnothing 154$ mm                                      | $\varnothing 154$ mm                                                         |
|                   | Process holes × 4                                                               | 4× process holes (tooling/assembly aid holes)                                |
|                   | Tapped holes, 4x M5                                                             | 4× M5 threaded holes                                                         |
| Mechanical View 3 | Through hole quantity and diameter                                              | 12 holes, diameter 9 mm                                                      |
|                   | M5 set screw quantity                                                           | 6 M5 set screws                                                              |
|                   | Hole angular spacing                                                            | 15 degree angular spacing                                                    |
|                   | Bolt circle diameter                                                            | Diameter 200 mm bolt circle                                                  |
| Mechanical View 4 | View designation                                                                | View D                                                                       |
|                   | Diameter 32                                                                     | Diameter 32 mm                                                               |
|                   | Diameter 26                                                                     | Diameter 26 mm                                                               |
|                   | Two M3 threaded holes                                                           | 2x M3 threaded holes                                                         |
|                   | Thread hole depth                                                               | 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.