

ENGINEERING DOCUMENTATION

# Six Axis Force Sensor

## Dimensional & Integration Guide

| DOCUMENT                | REVISION / ISSUE       | STATUS                            |
|-------------------------|------------------------|-----------------------------------|
| DIG-ES-SN-C30-S001-V006 | DRAFT-08 / 25 Aug 2026 | Engineering Integration Reference |

### Integration Overview

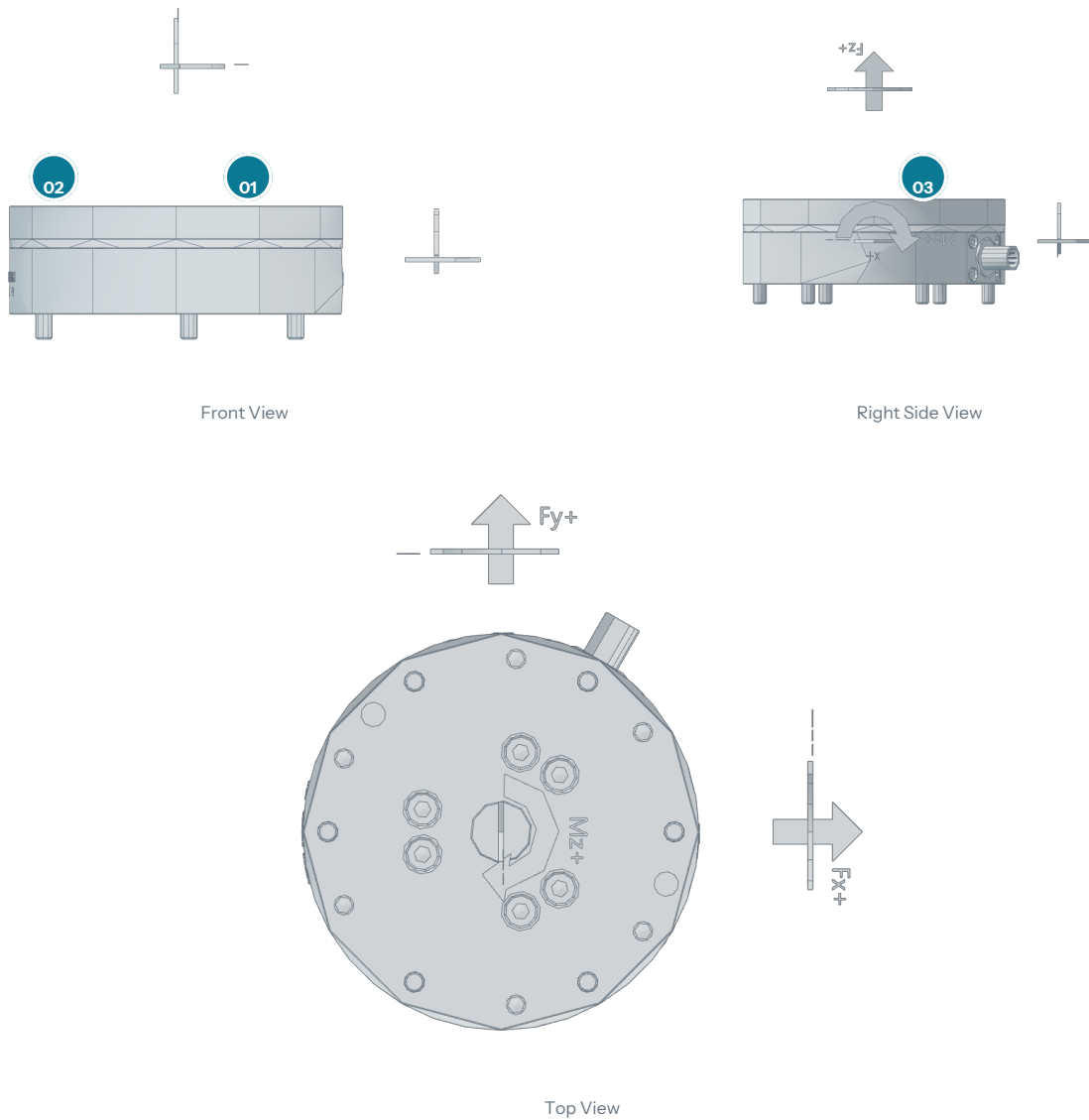
Six-axis force/torque sensing component for measuring three orthogonal force components and three orthogonal moment components. This guide supports mechanical layout, wiring planning and signal commissioning for ES-SN-C30-S001-V006.

### Key Integration Facts

| INTEGRATION ITEM        | PUBLISHED VALUE                           |
|-------------------------|-------------------------------------------|
| Dimensions              | 26 × 80 (diameter) mm                     |
| Mass                    | 259 g                                     |
| Measurement Axes        | 6 axes                                    |
| Force Range (Fxy)       | 150 N                                     |
| Force Range (Fz)        | 200 N                                     |
| Torque Range (Mxy)      | 5 Nm                                      |
| Torque Range (Mz)       | 5 Nm                                      |
| Communication Interface | Ethernet; EtherCAT; RS-485; analog output |
| Operating Temperature   | -10 to +55 °C                             |
| Ingress Protection      | IP64; IP67 customization available        |

## Annotated 3D Orientation and Interface Views

Orthographic 3D views identify the product body, primary interface and mounting relationships for ES-SN-C30-S001-V006.



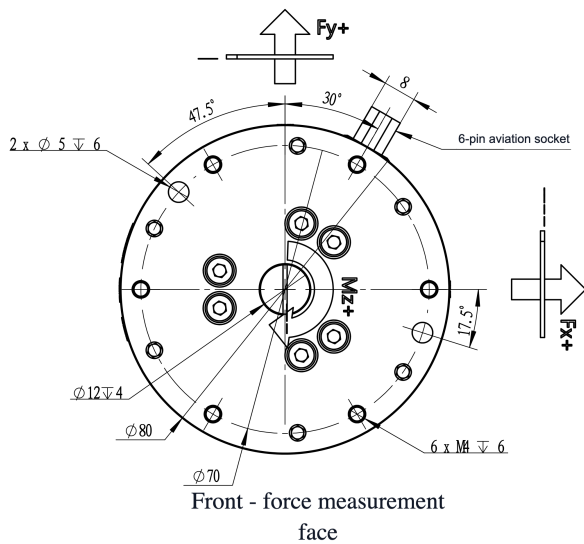
Numbered references identify the principal interfaces used by the integration sections.

### Functional Callout Schedule

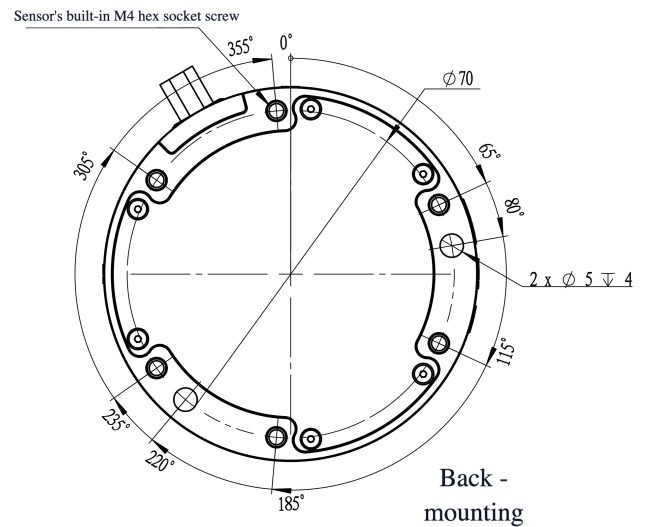
| REF. | VIEW            | INTEGRATION REFERENCE           |
|------|-----------------|---------------------------------|
| 01   | Front View      | Primary product envelope        |
| 02   |                 | Primary interface               |
| 03   | Right Side View | Mounting and locating interface |

## Product Structure & Views

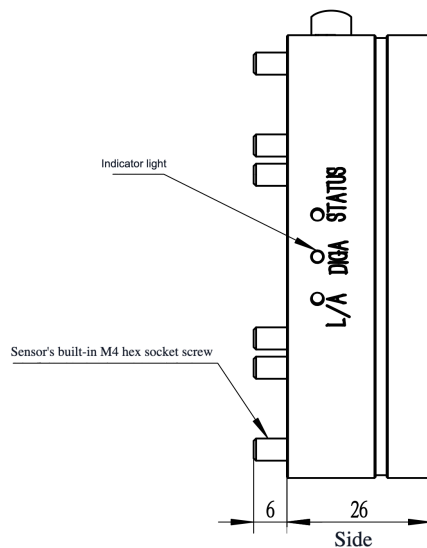
These views present product structure, mounting interfaces and relevant integration geometry for this SKU.



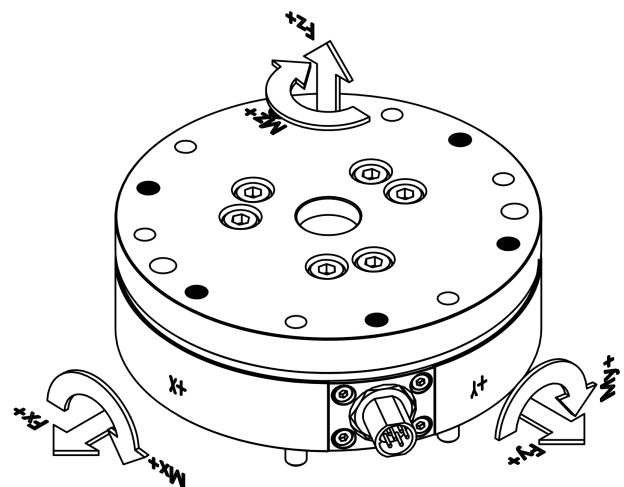
Mechanical View 1



Mechanical View 2



Mechanical View 3



Mechanical View 4

| VIEW              | FIELD                                           | VALUE                                 |
|-------------------|-------------------------------------------------|---------------------------------------|
| Mechanical View 1 | Positive Y force direction                      | Fy+ direction indicator               |
|                   | Angular position                                | 30 degrees                            |
|                   | Angular position                                | 47.5 degrees                          |
|                   | Counterbore holes quantity diameter and depth   | 2 holes, diameter 5, depth 6          |
|                   | Positive Z moment direction                     | Mz+ moment direction indicator        |
|                   | Angular position                                | 17.5 degrees                          |
|                   | Positive X force direction                      | Fx+ direction indicator               |
|                   | Hole diameter and depth                         | Diameter 12, depth 4                  |
|                   | Outer diameter                                  | Diameter 80                           |
|                   | Threaded mounting holes quantity size and depth | 6 x M4 threaded holes, depth 6        |
|                   | Pitch circle diameter                           | Diameter 70 pitch circle              |
|                   | View title                                      | Front force measurement face view     |
| Mechanical View 2 | Sensor built-in screw note                      | Sensor's built-in M4 hex socket screw |
|                   | Mounting angular position                       | 0 degrees angular position            |
|                   | Mounting angular position                       | 355 degrees angular position          |
|                   | Outer diameter                                  | Diameter 70 mm                        |
|                   | Mounting angular position                       | 305 degrees angular position          |
|                   | Mounting angular position                       | 80 degrees angular position           |
|                   | Hole specification                              | 2 holes, diameter 5 mm, depth 4 mm    |
|                   | Mounting angular position                       | 115 degrees angular position          |
|                   | Mounting angular position                       | 220 degrees angular position          |
|                   | View or mounting face label                     | Back mounting surface view            |
|                   | Mounting angular position                       | 185 degrees angular position          |
| Mechanical View 3 | Indicator light callout                         | Indicator light                       |
|                   | Sensor built-in M4 hex socket screw             | Sensor's built-in M4 hex socket screw |
|                   | Side view right length dimension                | 26 mm                                 |
|                   | Side view left offset dimension                 | 6 mm                                  |
|                   | View label                                      | Side view                             |

## Overall Dimensions and Mounting Interface

| PARAMETER  | PUBLISHED VALUE    | UNIT |
|------------|--------------------|------|
| Dimensions | 26 × 80 (diameter) | mm   |
| Mass       | 259                | g    |

- Mounting holes, locating features and face geometry are governed by the 2D views. Do not infer thread engagement, mounting torque or manufacturing tolerances from the overall envelope.

## Load and Measurement Coordinate Frame

| PARAMETER        | PUBLISHED VALUE | UNIT |
|------------------|-----------------|------|
| Measurement Axes | 6               | axes |

- The measurement data set comprises  $F_x$ ,  $F_y$ ,  $F_z$ ,  $M_x$ ,  $M_y$  and  $M_z$ . Establish the host transform from the exact coordinate origin and axis directions in the applicable product documentation and calibration data.

## Force/Torque Measurement Envelope

| PARAMETER          | PUBLISHED VALUE | UNIT |
|--------------------|-----------------|------|
| Force Range (Fxy)  | 150             | N    |
| Force Range (Fz)   | 200             | N    |
| Torque Range (Mxy) | 5               | N·m  |
| Torque Range (Mz)  | 5               | N·m  |
| Resolution (Fxy)   | 0.01            | %FS  |
| Resolution (Fz)    | 0.01            | %FS  |
| Resolution (Mxy)   | 0.01            | %FS  |
| Resolution (Mz)    | 0.01            | %FS  |
| Nonlinearity       | 0.5             | %FS  |
| Axis Crosstalk     | 2               | %FS  |
| Overload Capacity  | 350             | %    |

- Loads within the published overload capacity may still change sensor parameters. After an overload event, verify zero and measurement behavior before returning the assembly to service.

## Connector, Cable and Data Interface

| PARAMETER                       | PUBLISHED VALUE                           | UNIT                    |
|---------------------------------|-------------------------------------------|-------------------------|
| System Architecture             | Digital output with adapter               |                         |
| Communication Interface         | Ethernet; EtherCAT; RS-485; analog output |                         |
| INTERFACE                       | CONNECTOR / PHYSICAL LAYER                | AVAILABILITY / FUNCTION |
| Ethernet                        |                                           |                         |
| EtherCAT                        |                                           |                         |
| RS-485                          |                                           |                         |
| Analog output                   |                                           |                         |
| External Connector Type         | Cold-pressed terminal                     |                         |
| Power Consumption               | 1.5                                       | W                       |
| Maximum Output Data Rate        | 2700                                      | Hz                      |
| Maximum RS-485 Output Data Rate | 2200                                      | Hz                      |

- Select and qualify one output path for the ordered configuration. The published interface list represents available architecture choices and must not be interpreted as simultaneous native interfaces.
- Before energizing the assembly, verify power polarity, data-line assignment and shield termination against the applicable wiring documentation for the selected interface path.
- Provide strain relief and route the cable so that cable loads are not transferred into the sensing body or mounting interface.
- Qualify the required output rate with the selected interface and host acquisition path; use the published exact-SKU interface-specific limit where one is provided.

## Operating and Ingress Conditions

| PARAMETER             | PUBLISHED VALUE                    | UNIT |
|-----------------------|------------------------------------|------|
| Operating Temperature | -10 to +55                         | °C   |
| Ingress Protection    | IP64; IP67 customization available |      |

- The product ingress rating does not establish the protection rating of the complete host enclosure. Validate cable entry, mating interfaces and enclosure sealing in the final assembly.

### Ingress Configuration Conditions

| CONFIGURATION                | PUBLISHED CONDITION                   | INTEGRATION REQUIREMENT                                                                                                     |
|------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Standard configuration       | IP64                                  | Use this rating only for the exact standard SKU configuration and validate sealing in the final host assembly.              |
| Custom ingress configuration | IP67 option available by confirmation | Do not assign IP67 to this SKU unless the ordered configuration and applicable product documentation explicitly confirm it. |

## Mounting & Signal Commissioning

- Align the mating faces and avoid installation preload, bending or forced fit that could bias the unloaded output.
- After power-up, allow 10-20 minutes for thermal stabilization before final zeroing or baseline recording.
- After mechanical installation and thermal stabilization, perform the supported zeroing procedure and confirm unloaded outputs before commissioning.

## Integration Checklist

- 01 Confirm EmbodyStack SKU ES-SN-C30-S001-V006 and the exact 2D package before laying out the host interface.
- 02 Confirm the mounting face, hole pattern, locating features and required installation clearance.
- 03 Confirm that the host does not introduce preload, misalignment, bending or cable force into the sensing body.
- 04 Confirm the selected output architecture, power path, wiring assignment, grounding and shield strategy.
- 05 Confirm the required output rate against the published exact-SKU and interface-specific limits.
- 06 Confirm the operating temperature and the standard ingress condition for the ordered configuration.
- 07 Allow thermal stabilization, perform zeroing and record the unloaded baseline after installation.
- 08 Define an inspection and re-verification action after any overload event.
- 09 Request current 2D, STEP and wiring documentation before final design or integration planning.

[View SKU Product Datasheet](#) [Request controlled 2D drawing](#) [Request controlled STEP review](#) [Request a Quote](#)

### Engineering Use and Verification Notice

01. This Dimensional & Integration Guide applies only to EmbodyStack SKU ES-SN-C30-S001-V006 and is intended for dimensional evaluation and preliminary integration. It is not a applicable manufacturing drawing and must not be used as the sole basis for machining, tooling, tolerance allocation, wiring final integration, safety validation, enclosure certification or integration planning. during integration planning, verify all dimensions, mounting interfaces, coordinate definitions, load limits, cable and adapter configuration, power delivery, grounding, ingress conditions and environmental limits against the applicable EmbodyStack engineering data for this exact SKU. Where this guide and applicable product documentation differ, the applicable product documentation governs. Validate the complete host assembly under its intended loads, environment, duty cycle and applicable regulatory requirements.

## specified Resources