ENGINEERING DOCUMENTATION

# Standard-Profile Hollow Magnetic Encoder

Dimensional & Integration Guide

| DOCUMENT | REVISION / ISSUE | STATUS |
| --- | --- | --- |
| DIG-ES-EN-C13-S020-B45 | DRAFT-08 / 25 Aug 2026 | Engineering Integration Reference |

## Integration Overview

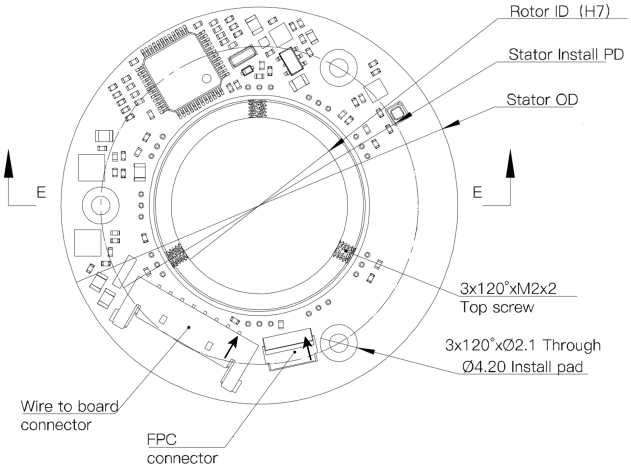
Standard-Profile Hollow Magnetic Encoder for rotary position feedback. This guide supports rotor and stator interface planning, concentricity and axial-gap control, power and signal integration, protocol selection, environmental evaluation and commissioning for ES-EN-C13-S020-B45.

## Key Integration Facts

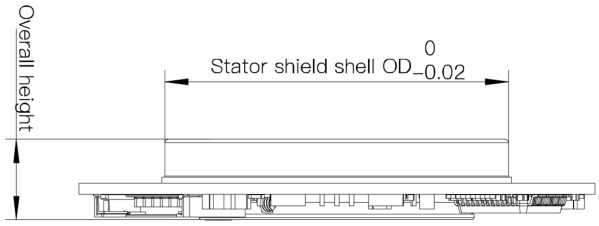
| INTEGRATION ITEM | PUBLISHED VALUE |
| --- | --- |
| Maximum Rotation Speed | 20000 rpm |
| Update Frequency | 27 kHz |
| Angle Resolution Options | 16 or 17 bit |
| Repeatable Accuracy | 0 to ±1 bit |
| Power Supply | 4.5 to 5.5 V |
| Overall Thickness | 7 mm |
| Rotor Inner Diameter | 45 mm |
| Stator Outer Diameter | 70 mm |
| Operating Temperature Options | -40 to 85; -40 to 105; -40 to 125 °C |

# Product Structure & Views

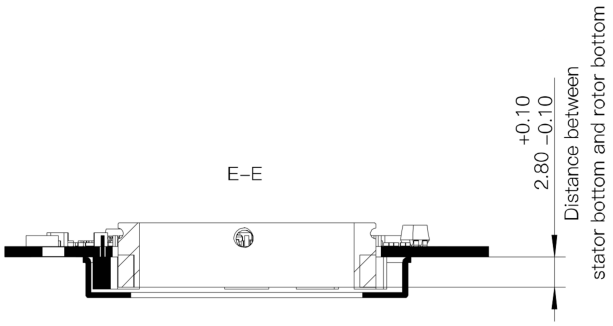
These views present the selected product structure, mounting interfaces and relevant integration geometry for this configuration.




Mechanical View 1




Mechanical View 2




Mechanical View 3

# Overall Dimensions and Mounting Interface

| PARAMETER | PUBLISHED VALUE | UNIT |
|---|---|---|
| Overall Thickness | 7 | mm |
| Series Size | 45 | mm class |
| Rotor Inner Diameter | 45 | mm |
| Stator Mounting Pitch Diameter | 60 | mm |
| Stator Shield Outer Diameter | 55 | mm |
| Stator Outer Diameter | 70 | mm |
| Mechanical Configuration | Standard | |
| Installation Method | Axial hollow | |

- Confirm the selected configuration and applicable product documentation before using interface geometry.
- Locate the stator and rotor from their specified cylindrical datums; do not use fasteners to correct runout or misalignment.
- Control concentricity, axial position, rotor insertion direction and operating air gap throughout assembly.

## Rotor, Stator and Magnetic Alignment

| PARAMETER | PUBLISHED VALUE | UNIT |
|---|---|---|
| Rotor Inner Diameter | 45 | mm |
| Stator Shield Outer Diameter | 55 | mm |
| Repeatable Accuracy | 0 to ±1 | bit |

- Keep the rotor within the approved stator shield envelope and prevent contact over the full runout and thermal range.
- Protect the calibrated rotor-stator pairing from substitution, strong external magnetic fields, impact and metallic debris.
- After assembly, rotate at low speed and verify direction, runout, signal continuity, error status and repeatability.

## Speed, Resolution and Accuracy Boundaries

| PARAMETER | PUBLISHED VALUE | UNIT |
|---|---|---|
| Maximum Rotation Speed | 20000 | rpm |
| Update Frequency | 27 | kHz |
| Angle Resolution Options | 16 or 17 | bit |
| Repeatable Accuracy | 0 to ±1 | bit |
| Temperature Drift | 0.01 | ° per 3 °C |

- Treat maximum rotation speed as a component boundary; validate shaft dynamics, balance, retention and temperature in the installed system.
- Select angle resolution and update frequency with the controller timing, latency and protocol configuration.
- Installed accuracy also depends on runout, concentricity, axial gap, temperature and calibration integrity.

# Power, Signal and Protocol Integration

| PARAMETER | PUBLISHED VALUE | UNIT |
|---|---|---|
| Power Supply | 4.5 to 5.5 | V |
| Current Consumption | 60 | mA |
| Startup Time | 15 | ms |
| Supported Output Interfaces | SSI; BiSS-C; RS485; RS422; T485; BUS; PERIOD | |
| Battery Supply | 2.7 to 3.6 | V |
| Battery Mode Current | 35 | µA |

- Select one selected output interface and use its current pin assignment, termination, timing and CRC rules.
- Provide regulated power, return, shielding and grounding compatible with the controller and cable length.
- Battery supply applies only to a compatible battery multi-turn configuration; verify polarity, service life, isolation and fault handling.

# Cable, EMC and Status Handling

- Route differential signals as differential pairs and keep them separated from motor phase and switching-power conductors.
- Terminate the cable shield according to the system grounding architecture and prevent cable force from loading the encoder.
- Map warning, error, battery, magnetic-field, temperature and overspeed status into commissioning and machine fault handling.

# Environmental and Service Conditions

| PARAMETER | PUBLISHED VALUE | UNIT |
|---|---|---|
| Operating Temperature Options | -40 to 85; -40 to 105; -40 to 125 | °C |

- Confirm the ordered temperature option and validate temperature at the installed stator and nearby drive components.
- Prevent oil, dust, metallic particles, condensation and cleaning residue from entering the rotor-stator gap and connector.
- Stop and inspect after impact, rotor contact, abnormal runout, magnetic contamination, overspeed or repeated status faults.

# Integration Checklist

| | |
|---|---|
| 01 | Confirm the exact SKU, interface drawing and selected encoder configuration. |
| 02 | Verify rotor and stator diameters, mounting pitch, axial position, concentricity and operating gap. |
| 03 | Confirm shaft shoulder, rotor retention, fasteners and full-speed mechanical integrity. |
| 04 | Select one selected protocol and verify pin assignment, termination, timing, CRC and status mapping. |
| 05 | Verify regulated power, current, battery configuration, grounding, shielding and cable strain relief. |
| 06 | At low speed verify direction, absolute position, repeatability, warning and error behavior. |
| 07 | Validate speed, update rate, accuracy and temperature over the complete duty cycle. |
| 08 | Protect the magnetic gap and connector from contamination, impact and strong external fields. |
| 09 | Include specified 2D, STEP, pinout, protocol and installation data in 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-EN-C13-S020-B45 and is intended for dimensional evaluation and preliminary integration. It is not a applicable manufacturing drawing, encoder selection approval, shaft or rotor retention approval, wiring final integration, calibration certificate, machinery risk assessment, safety validation or integration planning document. Before design freeze, assembly or commissioning, verify dimensions, fits, datums, concentricity, runout, axial gap, rotor retention, speed, resolution, accuracy, power, protocol, pinout, termination, grounding, shielding, status handling, temperature, contamination and fault response against the applicable EmbodyStack engineering data for this exact SKU and ordered configuration. Where this guide and applicable product documentation differ, the applicable product documentation governs. Validate the complete encoder, shaft, motor, controller, cable, host structure and machine under intended operating, fault, environmental and regulatory conditions.