ENGINEERING DOCUMENTATION

Standard Planetary Roller Screw

Dimensional & Integration Guide

DOCUMENT	REVISION / ISSUE	STATUS
DIG-ES-PS-C32-S001-V018	DRAFT-08 / 28 Aug 2026	Engineering Integration Reference

Integration Overview

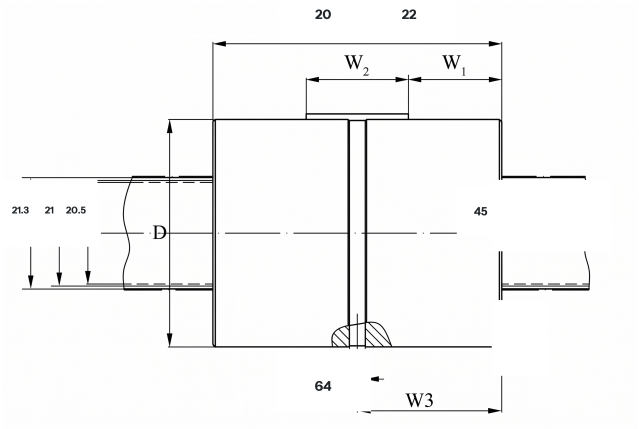
Standard Planetary Roller Screw for high-load linear motion and compact actuator integration. This guide supports host-interface design, screw and nut support, axial load-path , lead and preload integration, thermal and life validation, lubrication and commissioning for ES-PS-C32-S001-V018.

Key Integration Facts

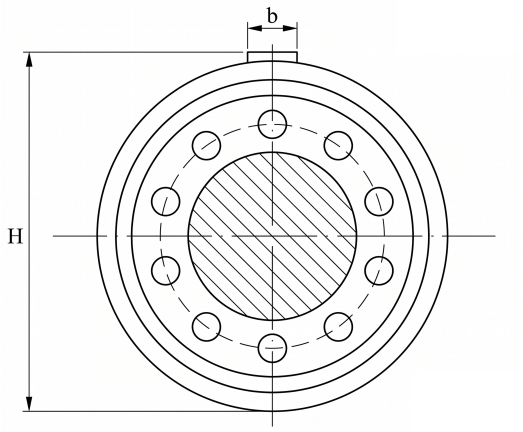
INTEGRATION ITEM	VALUE
Rated dynamic load Ca	54 kN
Rated static load Coa	93 kN
Maximum dynamic load Ca	58 kN
Maximum static load Coa	102 kN
Nominal diameter	21 mm
Ball Screw Lead	5 mm
Forward theoretical efficiency η	0.88 ratio
Reverse theoretical efficiency η′	0.86 ratio
Body diameter D	45 mm
Overall length W	64 mm

Product Structure & Views

The drawing labels show selected-configuration values. Dimensions are in millimeters unless otherwise stated; dimensions without a current standard parameter are omitted.



Mechanical View 1



Mechanical View 2

Overall Dimensions and Mounting Interface

PARAMETER	VALUE	UNIT
Nominal diameter	21	mm
Body diameter D	45	
Overall length W	64	
Segment length W1	22	
Segment length W2	20	
Diameter d1	21.3	
Diameter d0	21	
Diameter d2	20.5	

- Confirm the selected series, structure configuration and exact SKU before using dimensions or interface geometry.
- Keep mounting faces flat, clean and free of burrs, raised holes, debris and coating buildup.
- Reserve assembly, lubrication, inspection and removal access around the screw, nut and support interfaces.

Screw, Nut and Support Load Path

LOAD RATING	CONFIGURATION	LOAD	UNIT
Rated dynamic load Ca	Selected configuration	**54**	kN
Rated static load Coa	Selected configuration	**93**	kN
Maximum dynamic load Ca	Maximum roller count (on request)	**58**	kN
Maximum static load Coa	Maximum roller count (on request)	**102**	kN

- Route axial force through the specified screw, nut, support bearing and host structure; include offset, gravity, acceleration, shock and emergency-stop cases.
- Validate axial, radial and moment loads with the host guide, support stiffness and actual duty cycle; do not infer system capacity from diameter alone.
- Use a specified support and guide arrangement to limit bending, tilt and parasitic side load throughout the stroke.

Lead, Precision, Preload and Alignment

PARAMETER	VALUE	UNIT
Ball Screw Lead	5	mm
Thread count N	5	
Diameter d0	21	mm
Diameter d1	21.3	
Diameter d2	20.5	

- Use the lead and applicable precision data when validating speed, resolution, positioning and reversal behavior.
- Confirm preload state, nut orientation, concentricity, parallelism and datum position for the exact configuration; do not substitute another structure.
- After assembly, run at low speed and low load to check friction, noise, temperature and smooth travel before normal duty.

Speed, Thermal and Life Boundaries

PARAMETER	VALUE	UNIT
Forward theoretical efficiency η	0.88	ratio
Reverse theoretical efficiency η'	0.86	

- Calculate average and peak speed and axial load from the complete acceleration, constant-speed, deceleration, dwell and reversal cycle.
- Validate speed, heat generation and temperature using the installed support, lubricant, enclosure, ambient condition and complete duty cycle.
- Validate design life against axial load, speed, shock, lubrication, support, alignment, temperature and contamination.

Lubrication, Contamination and Service

- Use only the current lubricant, fill method and maintenance interval for the exact configuration. Do not mix incompatible lubricants.
- Prevent chips, fibers, cleaning residue and moisture from entering the roller tracks and nut assembly.
- Reserve assembly, lubrication, inspection and removal access around the screw, nut and support interfaces.

Commissioning and Motion Validation

- Commission in stages with supports, guides, limits and guards installed; verify each boundary before increasing speed or load.
- At low energy, verify lead direction, command polarity, travel limits and position feedback before full-power operation.
- Stop and inspect after binding, impact, abnormal noise, rising temperature, unexpected friction or loss of positioning behavior.

Integration Checklist

01	Confirm the drawing, parameters and applicable assembly data identify this SKU.
02	Verify nominal diameter, lead, overall length, body diameter, thread and mounting-hole pattern.
03	Check mounting faces, supports, guides, concentricity, parallelism, cleanliness and structural stiffness.
04	Establish the complete axial load path through screw, nut, bearings and host structure.
05	Confirm preload state, nut orientation, lead direction and current precision data.
06	Calculate average and peak speed, axial load, shock and thermal duty over the complete cycle.
07	Use the exact specified lubricant, fill method, contamination controls and service interval.
08	Run at low speed and low load to verify friction, noise, temperature, direction and smooth travel.
09	Validate limits, guarding, emergency stop, binding response and abnormal-temperature handling.
10	Include specified 2D, STEP, assembly, lubrication, support and life 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-PS-C32-S001-V018 and is intended for dimensional evaluation and preliminary integration. It is not a applicable manufacturing drawing, screw selection approval, load or life approval, lubrication specification, machinery risk assessment, safety validation or integration planning document and must not be used as the sole basis for machining, screw or nut support design, fastener selection, preload setting, lubricant filling or final integration. Before design freeze, assembly or commissioning, verify dimensions, datum geometry, fits, thread and hole interfaces, lead, load boundaries, efficiency, precision, preload state, alignment, support, critical speed, lubrication, contamination, temperature and maintenance 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 screw pair, supports, drive, host structure, motion cycle, guarding, fault cases and applicable regulatory requirements under intended operating conditions.