PED10 – Ultra Precision Electromechanical Pan-Tilt

Zero Backlash, 0.02° Precision, 180°/s Speed, 30M Revolutions without Maintenance Pan-Tilt Unit for,

Mission Critical Applications such as Thermal Imaging and Target Tracking

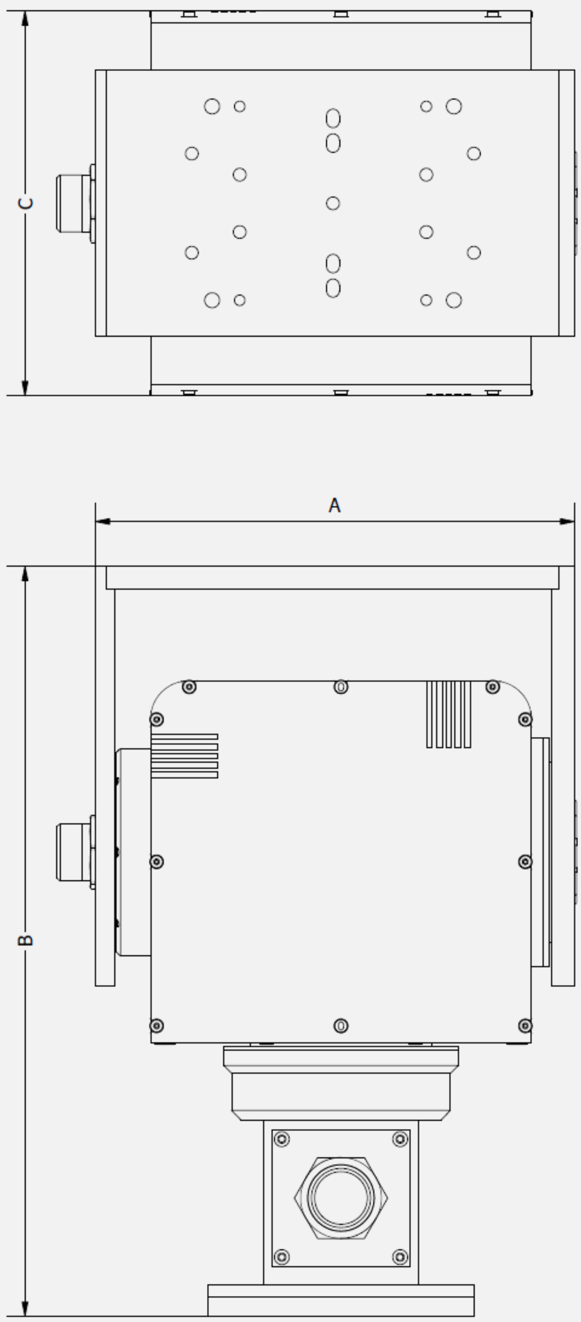
Distinctive Features

- Brushless Servo Precision: Zero-backlash for seamless tracking.
- High Torque Capacity: Up to 250Nm payload handling for heavy-duty use.
- HD-SDI and Ethernet Ready: Video and data transmission via slip ring.
- MIL-STD-461F Compliant: EMI/EMC approved for demanding applications.
- Long Lifecycle: 30 million cycles without maintenance needs.
- Dual-Loop Control System: Enhances precision up to 0.001° accuracy.

Main Features

- Engineered for high-speed, zero-backlash precision, the PED10 ensures 0.02° accuracy and heavy payload handling, ideal for thermal and radar tracking.
- PED10 features brushless servo motors, a 76-line slip ring with HD-SDI, and operates continuously with smart power-saving modes.

Configuration Breakdown	Positioner – Electromechanical – Dual Axis – 10 (Product Class) – Pan Speed/Torque – Tilt Speed/Torque
Part Number	PED10-AX-ABX (Check Available Options Below)
Available Customizations	Communication Protocol, Output Speed, Output Torque, Number of Slipring Lines, Mechanical Interfaces
Combinable Platforms	SEB20 – Multi Channel Thermal Imager MES10 – Locked Electromechanical Mast Platform MEM10 – Ultra-Stable Electromechanical Mast Platform TMH10 – Heavy Duty Tripod



PED10 – PX – ABX

Speed/Torque Configuration Breakdown

PED10	PX – Pan Axis Speed/Torque Conf.	ABX – Tilt Axis Speed/Torque Conf.
Positioner – Electromechanical – Dual Axis	Any **"A type"** configuration is applicable	Any **"A type"** or "**B type**" configuration is applicable

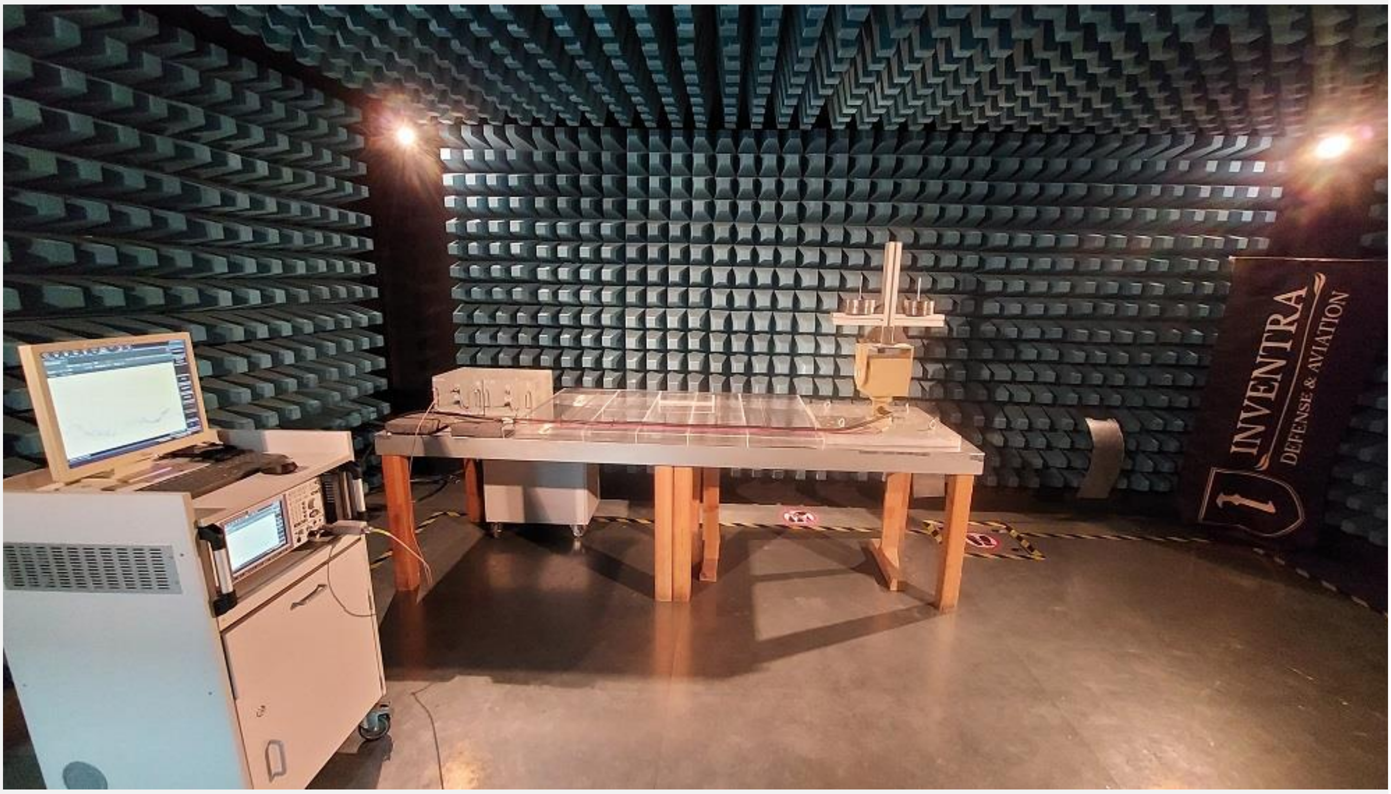
	Speed/Torque Configuration		A1	A2	A3	A4	B1	B2
PARAMETERS	Nominal Speed	°/s	28	48	96	180	28	48
	Nominal Torque	Nm	185	150	80	60	275	175
	Peak Torque	Nm	225	215	120	100	475	450
	Momentary Peak Torque	Nm	400	400	360	250	875	875

- Nominal Speed / Nominal Torque represents operation range with %100 duty cycle.
- Peak Torque represent limits for acceleration and deceleration limits.
- Momentary Peak Torque represent limits impulsive shock limits device can absorb.

- **Most common configurations are given below. Any configuration is possible according to table.**

	Parameters / Configurations		PED10-A2-A1	PED10-A4-A1	PED10-A1-B1
PERFORMANCE PARAMETERS	**Pan – Peak Torque**	**Nm**	215	100	225
	Pan –Torque (Nominal)	**Nm**	150	60	185
	Pan – Speed (Nominal)	**°/s**	48	180	28
	Tilt – Peak Torque	**Nm**	225	225	475
	Tilt – Torque (Nominal)	**Nm**	185	185	275
	Tilt – Speed (Nominal)	**°/s**	28	28	28
	Pan – Axis Range	°		N x 360°	
	Tilt – Axis Range	°		Up to ±90°	
	Resolution	°		0.002	
	Accuracy	°	0.038	0.032	0.028
	Operating Voltage	**VDC**		18-48	
	Weight	**kg**	16.1	16.1	17.5
	Communication to the Unit	-		Ethernet, RS-485, RS422 (Full Duplex), USB	
	Connector Type	-		MIL-DTL-38999	

OPTIONS	Slipring	-	Up to 76 lines including (1 Gbit Ethernet, RS422, RS232, HD-SDI)
	Stabilization	-	Available
	Dual-Loop Control	-	Position Control at the Order of 0.001° with Secondary Encoder
	Hand Controller	-	Available
	Multiple Payload Interface	-	Available
DIMENSION	Width (A)	mm	250
	Height (B)	mm	Between 350 – 395 (Depend on slipring configuration)
	Depth (C)	mm	202
ENVIRONMENTAL QUALIFICATIONS	Wind Load	km/h	120
	IP Rating	-	IP65
	Temperature	°C	MIL-STD-810G, Method 502.5 Procedure II – Operational, -32°C MIL-STD-810G, Method 501.5 Procedure II – Operational, +60°C MIL-STD-810G, Method 501.5 Procedure I – Storage; +70°C MIL-STD-810G, Method 502.5 Procedure I – Storage; -40°C
	Low Pressure	-	MIL-STD-810G, Method 500.5 Procedure I – Storage 37,000ft MIL-STD-810G, Method 500.5 Procedure I – Operational 10500ft
	Vibration	-	MIL-STD-810G, Method 514.6 Procedure I Category 20, Figure 514.6C-3
	Shock	-	MIL-STD-810G, Method 516.6 Functional Shock, 20G 11ms, XYZ Axis, 3 Positive and 3 Negative Each Axis
	Humidity	-	MIL-STD-810G, Method 507.5 Procedure I – %90 Noncondensing @60°C, 11 Days
	Rain	-	MIL-STD-810G, Method 506.5 Procedure II
	Salt Fog	-	MIL-STD-810G, Method 509.5, 2 Cycles of 24 Hours
	Dust and Sand	-	MIL-STD-810G, Method 510.5, Procedure I and Procedure II
EMI/EMC	EMI/EMC Compliancy	-	CE102 – Conducted Emissions, Power Leads CS101 – Conducted Susceptibility, Power Leads CS114 – Conducted Susceptibility, Bulk Cable Injection CS115 – Conducted Susceptibility, Bulk Cable Injection CS116 – Conducted Susceptibility, Damped Sinusoidal Transients CS118 – Conducted Susceptibility, Personnel Borne ESD RE102 – Radiated Emissions, Electric Field RS103 – Radiated Susceptibility, Electric Field



RE102 and CE102 Test Setups

Ultra Precision Electromechanical Pan-Tilt Units are EMI/EMC complaint according to MIL-STD-461G

The PED10 Positioner and MMS10 Mast Systems carry payloads with a significantly offset center of gravity on a vehicle platform at the IDEF International Defense Industry Fair.

Investing in Precision: Long-Term Value of Brushless Motors and Zero Backlash Gear Drives

A straightforward guide to help you understand the differences between two types of positioning systems. We've broken down the technical aspects into easy-to-digest information, focusing on precision, smoothness of motion, dynamic performance, power consumption, complexity, maintenance, and cost.

	Inventra Pan-Tilt Units	Alternative Systems
	Brushless Motors + Zero Backlash Drive Gear	**Stepper Motors + Worm Gears**
Precision and Accuracy	Unmatched precision due to the inherently low hysteresis in brushless motors and the precise nature of zero backlash drive gear systems. These features result in minimal positioning errors and excellent repeatability.	The alternative system strives for precision, but the presence of worm gears may introduce unavoidable backlash, potentially impacting the overall accuracy, particularly in applications requiring ultra-precision alignment.
Smoothness of Motion	The continuous rotation of brushless motors, coupled with advanced Field Oriented Control (FOC) control algorithms, ensures exceptionally smooth motion profiles. This level of smoothness is crucial in applications demanding seamless and jitter-free movements.	Stepper motors in the alternative system may exhibit stepping behavior, especially during micro-movements or at low speeds, leading to less fluid motion. Resonance effects in stepper motors and worm gears could further contribute to motion irregularities.
Dynamic Performance	The high torque-to-inertia ratio of brushless motors enhances dynamic performance, enabling rapid acceleration and deceleration. This is advantageous in scenarios requiring quick repositioning and tracking of moving targets.	The alternative system, employing stepper motors, may face limitations in dynamic performance, with potential issues related to speed and responsiveness, especially in fast-paced environments.
Power Consumption	Brushless motors are known for their efficiency, drawing power only when necessary. The system's ability to maintain holding positions with minimal energy consumption contributes to overall energy efficiency.	Stepper motors in the alternative system may continuously draw current, leading to higher power consumption, particularly during static holding positions. This can result in increased energy costs over time.
Complexity and Maintenance	The simplicity of the zero backlash drive gear system contributes to the overall reliability of the system, requiring minimal maintenance. Fewer components and points of failure reduce the likelihood of unexpected downtime.	The alternative system, incorporating worm gears, may introduce additional complexity and points of potential failure. This complexity could result in higher maintenance requirements and increased susceptibility to wear and tear over time.
Cost	The higher initial cost of your system is justified by the long-term value it provides. The reduction in maintenance needs and time consumption translates into cost savings over the system's lifecycle.	While the alternative system offers a lower upfront cost, the potential for higher maintenance expenses and increased value consumption over time should be considered for a comprehensive cost analysis.