Servo Drives

Wide range of connectivity options	Programmable PMP motion controller via MATLAB Simulink integration	Integrated filtering	Ultra-low output noise & High output linearity	EtherCAT, CANopen and IO bus device busses

Prodrive Technologies offers a number of drive options which are readily available. These drives can be operated in stand-alone mode, used in combination with one of our motion controllers, or can be integrated within an existing motion control system.

Powerful series of motion controllers for controlling demanding multi-axis motion systems. Supporting EtherCAT, CANopen and IObus communication networks, including multiple synchronized EtherCAT busses using the Prodrive Motion Platform (PMP).

Servo Drives

Cygnus series
The Cygnus series are drives for three-phase actuators. The drives use the programmable PMP platform and can be commanded via both EtherCAT and Ethernet.

✓ Programmable PMP motion controller
✓ Wide range of connectivity options
✓ Integrated filtering
✓ Flexible mounting options

Detailed data sheet

Apogee series
The Apogee series consist of an S3-120/07, which is a single-axis intelligent PWM drive for three-phase actuators, and a D1-120/07, which is a dual-axis intelligent PWM drive for single-phase actuators.

✓ Programmable PMP motion controller
✓ Ultra-low output noise
✓ High output linearity
✓ Wide range of connectivity options

Detailed data sheet

Kepler series
The Kepler series consist of a D3-220/04, which is a dual-axis intelligent PWM drive for three-phase actuators, and a D1-220/04, which is a dual-axis intelligent PWM drive for single-phase actuators.

✓ Programmable PMP motion controller
✓ Ultra-low output noise
✓ High output linearity
✓ Wide range of connectivity options

Detailed data sheet

Servo Drives

Drives (1/2)

Series	Cygnus	Cygnus	Cygnus	Apogee	Apogee	Kepler	Kepler
Model	Q3-48/10	S3-400/8	D3-400/4	S3-120/07	D1-120/07	D1-200/04	D3-200/04
Power input							
Input voltage range	10 - 54V_{DC}	390 - 410V_{DC}	390 - 410V_{DC}	60-120V_{DC}	60-120V_{DC}	60-200V_{DC}	60-200V_{DC}
Input voltage, abs max	60V_{DC}	450V_{DC}	450V_{DC}	140VDC	140VDC	220V_{DC}	220V_{DC}
Input current	30A_{RMS}	10A_{RMS}	10A_{RMS}	7A_{RMS}	7A_{RMS}	9A_{RMS}	9A_{RMS}
Input current, peak	50A_{PK}	20A_{PK}	20A_{PK}	12A_{PK}	12A_{PK}	21A_{PK}	21A_{PK}
Auxiliary input voltage	21-26 V_{DC}			22-26V_{DC} (optional)			
Auxiliary input current	max 3A			max 2A_{RMS} (4A_{PK})			
Actuator outputs							
Number of motor outputs	4	1	2	1	2	2	2
Supported motor types (linear and rotary)	stepper, 1-phase (voice coil) 3-phase (PMSM/Reluctance/Induction/BLDC)						
Maximum phase current	10A_{RMS}	8A_{RMS}	4A_{RMS}	6.5A_{RMS} (60s)	6.5A_{RMS} (60s)	4A_{RMS} (60s)	4A_{RMS} (60s)
Peak phase current (1s)	20A_{RMS}	16A_{RMS}	8A_{RMS}	16A_{PK}	16A_{PK}	20A_{PK} (200ms)	20A_{PK} (200ms)
Maximum output voltage (line-line, typical)	0-30V_{RMS}	0-250V_{RMS}	0-250V_{RMS}	0...70V_{RMS}	0...70V_{RMS}	0...115V_{RMS}	0...115V_{RMS}
Rated switching frequency	16-20kHz			200kHz	200kHz	200kHz	200kHz
Output frequency	0-700Hz			0-6000Hz		0-4000Hz	
Internal brake resistor	N			Y	N	N	Y
External brake resistor	Y			N			
Encoder inputs							
Number of encoder inputs	4	1	2	2	2	2	2
Supported types	Digital quadrature (A/B/I) Analog sin/cos 1Vpp (12bit) Digital hall (5V) EnDAT 2.1/2.2 Hiperface DSL 2- / 4-wire BiSS C SSI			Digital quadrature (A/B/I) Analog sin/cos 1Vpp (14bit) Digital hall (5V) EnDAT 2.1/2.2 Hiperface DSL 4-wire BiSS C SSI			
Maximum signal fequency with no missing pulses	4MHz			4MHz			
Maximum baudrate (digital encoders)	32MHz			32MHz			
Encoder supply (each input)	5V 500mA / 10V 500mA			5V 500mA / 10V 500mA (with remote voltage sense)			
General purpose inputs/outputs							
Isolated digital inputs	4 x 24V input (V_{IH}≥11V, V_{IL}≤5V, I_{IN}<15mA)			4 x 24V input (VIH≥11V, VIL≤5V, IIN<15mA)			
Isolated digital outputs	2 x 30V / 500mA			4 x 30V / 500mA			
Non-isolated digital inputs	3 x TTL (shared with digital hall)			4 x TTL			
Non-isolated digital outputs	4 x 24V - 2A			2 x 24V - 1A + 2x 24V - 200mA + 4x TTL output			
Analog inputs	1 x ±10V differential input, 10bit			2 x ±10V differential input, 16bit			
Analog outputs	-			2 x ±10V differential output, 16bit			
Brake outputs	2 x 24V - 2A			-			

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Servo Drives

Drives (2/2)

Series	Cygnus	Cygnus	Cygnus	Apogee	Apogee	Kepler	Kepler
Model	Q3-48/10	S3-400/8	D3-400/4	S3-120/07	D1-120/07	D1-200/04	D3-200/04

Control							
Interface	Ethernet / EtherCAT / RS485 (50MBps max) / CAN			Ethernet / EtherCAT / RS485 (50MBps max)			
Update rate	100Hz - 20kHz						

Performance							
Offset error [%of Ipk]				0.40%	0.40%	0.25%	0.25%
Offset drift [%of Ipk]				0.04%	0.04%	0.07%	0.07%
Gain error [%of Ipk]				0.70%	0.70%	0.82%	0.82%
Gain drift				max 150ppm	max 150ppm	max 0.15%	max 0.15%
Linearity error [ppm of Ipk]				max 50ppm	max 50ppm	max 550ppm	max 550ppm
Current loop, small signal bandwidth (-3dB)	Typical 600Hz – 1kHz			Typical 6-7kHz		Typical 2-4kHz	
Output current noise spectral density @100Hz				max 1 µA/√Hz	max 1 µA/√Hz	max 20 µA/√Hz	max 20 µA/√Hz
Output current noise, rms 1Hz-10kHz				max 110uArms	max 110uArms	max 600uArms	max 600uArms
Output current noise, rms 1Hz-20MHz				max 150uArms	max 150uArms	max 800uArms	max 800uArms

Functional safety							
Applicable standard	IEC62061:2010			-			
STO	SIL3 (certification pending)			-			
SBC	SIL3 (certification pending)			-			

Electrical safety							
Applicable standard	IEC/UL61800-5-1						
Pollution degree	2						
Overvoltage category	III						
IP-protection class / enclosure type	IP20 / open type						
Maximum altitude during operation	2000m above mean sea level						

EMC							
Applicable standard	IEC61800-3						
Input filtering	CM+DM, cat C2, 2nd env. when used with cat C3, 2nd env. listed power supply						
Output filtering	Clamped LC filter (dV/dt limiting) + HF output filter			Low-pass filter			

Mechanical & Climatic							
Dimensions (width x depth x height)	265mm x 195mm x 73mm	265mm x 195mm x 90mm	265mm x 195mm x 90mm	271 mm x 447 mm x 70mm			
Mass (typical)	3	3.3	3.3	7	7	6	
Operating temperature range	-5°C - 45°C			10°C - 40°C			
Operating humidity range	0-90% non-condensing			20-80% non-condensing			
Shock&Vibration	IEC61800-5-1, IEC60068-2-6 (Fc)						
Lifetime	>10 years						

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