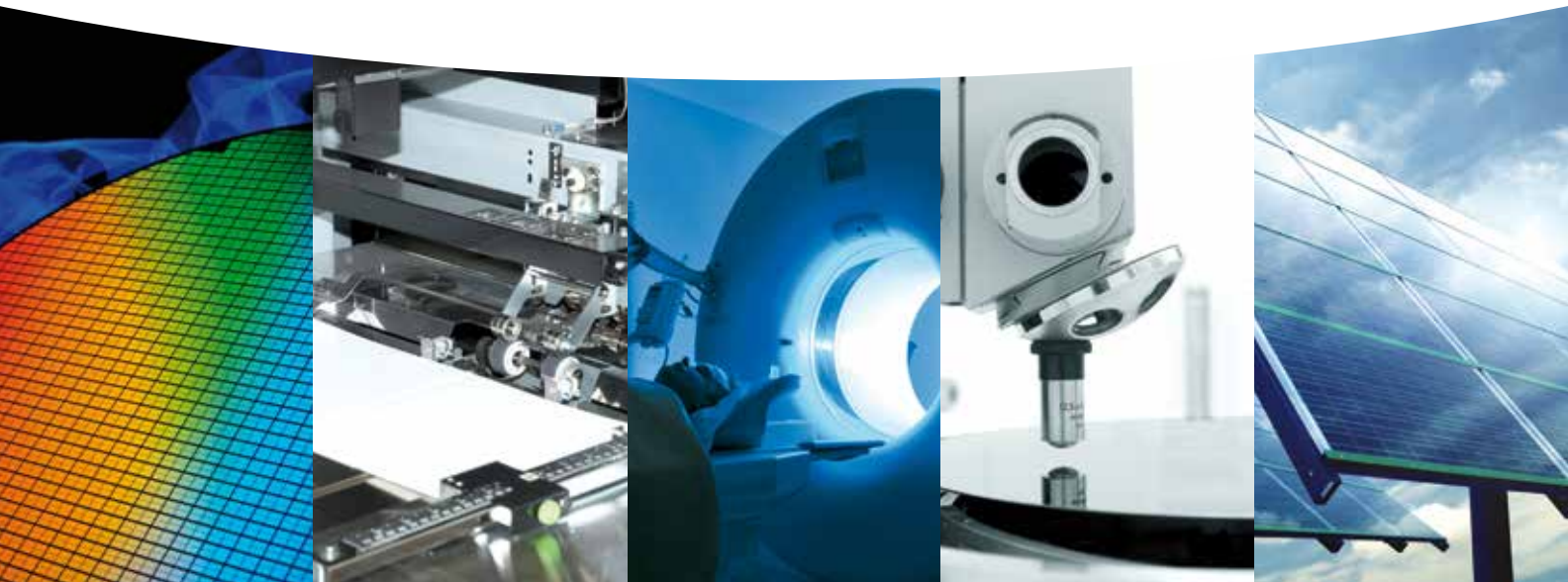
ElectroCraft®
powering innovation™

ELECTROCRAFT
PRO SERIES

PRO Series Programmable Servo Drive

Product Datasheet for

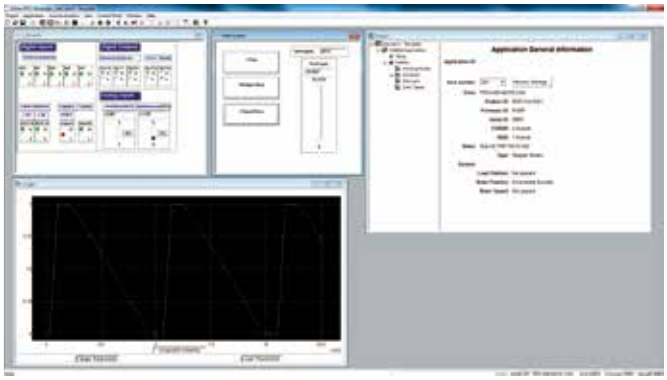
PRO-A04V36

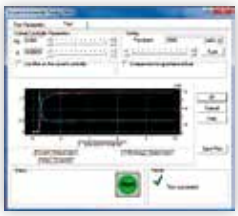


Compact drive solution for rotary or linear brushless, stepper or PMDC brush motors.

The ElectroCraft PRO Series Programmable Servo Drives are based on a new design concept offering a cost effective, compact and modular solution for the control of rotary or linear brushless, stepper or PMDC brush motors of powers up to 144W, with 36V nominal voltage.

Designed to support both low and high-volume applications, the ElectroCraft PRO Series drive integrates advanced motor control and motion control functionality in a single plug-in module or stand-alone drive. The PRO-A04V36 offers a flexible and modular solution in two form factors: PCB Mount (PE models) or built into a stand-alone package with pluggable connectors (SA models). With the comprehensive and flexible motion instruction set, the PRO-A04V36 is an intelligent drive that is programmable for many applications and levels of experience.





MotionPRO Suite User Interface

The drive can operate:

- As a single-axis motion controller, autonomously running the program residing in its non-volatile memory.
- As an intelligent slave executing motion sequences triggered by input lines.
- As a part of a multi-axis, distributed motion control solution in either stand-alone or slave configurations.
- As an intelligent slave executing motion sequences triggered by commands received via RS-232 or CAN bus communication.

The configuration, tuning and programming of the PRO-A04V36 drive is easy with ElectroCraft's powerful MotionPRO Suite user interface.

Features

- **Fully digital servo drive suitable for the control of rotary or linear brushless, stepper or PMDC brush motors**
- **Very compact design**
- **Standard PCIe 4x mating connectors (PE Versions)**
- **Sinusoidal or trapezoidal (Hall-based) control of brushless motors**
- **Open or closed-loop control of 2-phase stepper motors**
- **Various modes of operation, including: torque, speed or position control; position or speed profiles, external analogue reference or sent via communication bus**
- **Comprehensive motion instruction set for the definition and execution of motion sequences**
- **CAN-Bus 2.0B up to 1 Mbit/s (CANopen (CiA 301v4.2 and 402v3.0) protocols**
- **Single power supply: 9-36V; optional logic supply: 7-36V**
- **Digital and analogue I/Os:**
  - **5 Digital inputs: 5-36V, NPN [Enable, 2 Limit switches, plus 2 general purpose]**
  - **4 Digital outputs: 5-36V, 0.5A, 5 NPN open-collector [Ready, Error, plus 2 general purpose]**
  - **2 Analogue inputs: 12-bit, 0-5V [Reference, Feedback or general-purpose]**
- **Standalone operation with stored motion sequences**
- **RS-232 serial communication**
- **Switching Frequency up to 100kHz**
- **Operating ambient temperature: 0-40°C**
- **Feedback devices supported:**
  - **Incremental quad encoder (single-ended, open collector and differential)**
  - **Analogue sine/cosine incremental encoder (differential 1Vpp)**
  - **Digital and linear Hall sensors**
  - **Support for absolute feedback (SSI, BiSS, EnDAT and resolver via additional extension module)**
- **Hardware protections: short-circuit (between motor phases and from motor phases to GND), over-voltage, under-voltage and I^2t**

Specifications

Flexibility – Control schemes supported by the PRO-A04V36x Drive

Motor Types (rotary or linear)	Torque Control	Speed Control	Position Control
Brushless	✓	✓	✓
Stepper	✓	✓	✓
PMDC Brush	✓	✓	✓

Ordering Information

PRO-A04V36A-PE-CAN	PCB Mount Programmable Drive (36V, 4A, 144W, Enc., CAN)
PRO-A04V36A-SA-CAN	Stand-alone Programmable Drive (36V, 4A, 144W, Enc., CAN)
2000695	PRO-A04V36x-PE-CAN Evaluation Kit (PCB Mount, 36V, 4A, 144W, Enc., CAN)
2000696	PRO-A04V36x-SA-CAN Evaluation Kit (Stand-alone, 36V, 4A, 144W, Enc., CAN)
500500	MotionPRO Suite User Interface Software

Motor – sensor configurations

Motor Types	Brushless	Stepper (2-phase)	PMDC Brush
Incr. Encoder	✓	✓	✓
Incr. Encoder + Hall	✓		
Analog Sin/Cos encoder	✓		
Linear Halls	✓		
Tacho			✓
Open-loop (no sensor)		✓	

NOTE: SSI, EnDAT, BiSS encoders and Resolver feedback is possible with an additional feedback extension module

Conditions

Operating		Min.	Typ.	Max.	Units
Ambient Temperature[1]		0		+40	°C
Ambient Humidity	Non-condensing	0		90	%Rh
Altitude / Pressure[2]	Altitude (vs. sea level)	-0.1	0-2.5	[2]	Km
	Ambient Pressure	0[2]	0.75-1	10.0	atm
Storage		**Min.**	**Typ.**	**Max.**	**Units**
Ambient Temperature		-40		+85	°C
Ambient Humidity	Non-condensing	0		100	%Rh
Ambient Pressure		0		10.0	atm

[1] Operating temperature can be extended up to +65°C with reduced current and power ratings.
[2] PRO-A04V36 can be operated in vacuum (no altitude restriction), but at altitudes over 2,500m, current and power rating are reduced due to thermal dissipation efficiency.

Evaluation Kit:

The quickest way to get started with the PRO Series Drive.

Electrical Specifications

Maximum DC Supply Voltage: motor & logic		36	volt
Maximum continuous current	Peak of sine	4	amp
	RMS	2.8	amp
Peak current (2.4 sec. max.)	Peak of sine	10	amp
	RMS	7.1	amp
Nominal switching frequency		20 – 60	kHz

Input

Logic Supply Input ($+V_{LOG}$)		Min.	Typ.	Max.	Units
Supply Voltage	Nominal values	7		36	V_{DC}
	Absolute maximum values, drive operating but outside guaranteed parameters	4.9		40	V_{DC}
	Absolute maximim values, continuous	-0.7		42	V_{DC}
	Absolute maximum values, surge (duration ≤ 10ms)†	-1		+45	V
Supply Current	$+V_{LOG}$ = 7V		125	300	mA
	$+V_{LOG}$ = 12V		80	200	
	$+V_{LOG}$ = 24V		50	125	
	$+V_{LOG}$ = 40V		40	100	
Motor Supply Input ($+V_{MOT}$)		**Min.**	**Typ.**	**Max.**	**Units**
Supply Voltage	Nominal values	9		36	V_{DC}
	Absolute maximum values, drive operating but outside guaranteed parameters	8.5		40	V_{DC}
	Absolute maximim values, continuous	-0.7		42	V_{DC}
	Absolut maximum values, surge (duration ≤ 10ms)†	-1		+45	V
Supply Current	Idle		1	5	mA
	Operating	-10	±4	+10	A
	Absolute maximum value, short-circuit condition (duration ≤ 10ms)†			15	A

Output

Motor Outputs (A/A+, B/A-, C/B+, BR/B-)			Min.	Typ.	Max.	Units
Nominal output current, continuous	DC brushed, steppers and BLDC motors with Hall-based trapezoidal control				4	A
	Brushless motors with sinusoidal control (sinusoidal amplitude RMS value)				4	
	Brushless motors with sinusoidal control (sinusoidal effective RMS value)				2.82	
Motor output current, peak	maximum 2.5s		-10		+10	A
Short-circuit protection threshold	measurement range			±13	±15	A
Short-circuit protection delay			5	10		µS
On-state voltage drop	Nominal output current; including typical mating connector contact resistance			±0.3	±0.5	V
Off-state leakage current				±0.5	±1	mA
Motor inductance (phase to phase)	Recommended value, for current ripple max. ±5% of full range; $+V_{MOT}$ = 36 V	F_{PWM}				µH
		20 kHz	250			
		40 kHz	120			
		60 kHz	90			

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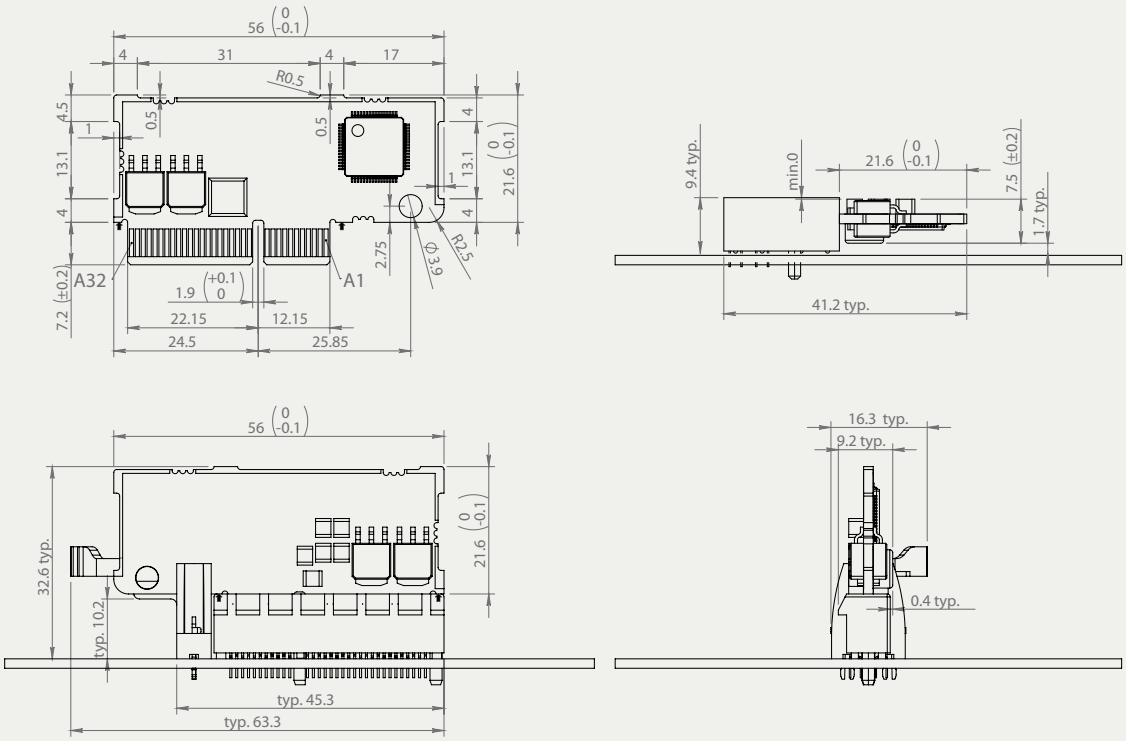
Dimensions

PCB Mount

PRO-A04V36x-PE-CAN

Height: 32.6 mm
Width: 16.3 mm
Length: 56 mm



Stand-alone

PRO-A04V36x-SA-CAN

Height: 16.3 mm
Width: 55 mm
Length: 80 mm