Pluto
Digital Servo Drive

Open frame, compact miniature DC Servo Drive

pluto* Servo Drive

* High precision and performances for your motion control applications

ingenia motion control

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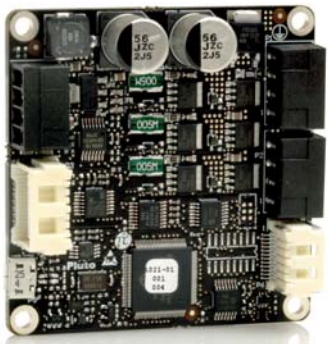
High power Servo Drive

Pluto is an ultra-high power density slave or standalone Servo Drive capable of driving most motor types up to 800 W power peak without the need of any additional heat-sink on its whole operating temperature range.

Supply voltage	12 VDC - 48 VDC
Power	50 W continuous / 100 W peak (1s) (-HS version) 250 W continuous / 500 W peak (1s) (-STD version) 400 W continuous / 800 W peak (1s) (-EXT version)
Motor phase continuous current	1 ARMS / 2 ARMS peak (-HS version) 5 ARMS / 10 ARMS peak (-STD version) 8 ARMS / 16 ARMS peak (-EXT version)
Supported motor types	DC brush, brushless trapezoidal, brushless sinusoidal, voice coil, 2 phases bipolar stepper, 3 phases stepper
Shunt regulator	Configurable level and duty cycle for regen. braking
Ambient temperature	• -10 °C to 50 °C full current (operating) • 50 °C to 80 °C derrating (operating) • -20 °C to 100 °C (non-operating)
Humidity	5% - 85% (non-condensing)



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Advanced control

Pluto uses PID algorithms with advanced control capabilites to regulate position, velocity and current/torque. The instantaneous demand of the main variables is internally computed by a trajectory generator which generates an optimal profile allowing for smooth movements. The instantaneous demand could also be received from a host at a regular interval time allowing for sync between different axes.

Current / Torque Servo Loop	• PI with output bias • Sampling rate of 10 kHz
Velocity Servo Loop	• PID with integration limit, anti-windup and acceleration feed-forward • Sampling rate of 1 kHz
Position Servo Loop	• PID with integration limit, anti-windup, velocity and acceleration feed-forward • Sampling rate of 1 kHz
Operating Modes	Open Loop, V/F, Profiled Torque, Profiled Velocity, Profiled Position, Interpolated Position, Cyclic Sync Position and Homing

Communications

Pluto includes USB 2.0 interface for configuration and for driving single-axis applications.
For systems with high communications traffic or sync multi-axis, Pluto includes a CAN interface with CANopen protocol.

USB 2.0	Configuration
CANopen	Up to 1 Mbps. Using CiA-301, CiA-303, CiA-305, CiA-306 and CiA-402

Command sources

Pluto accepts a wide set of command sources. It also can work in stand-alone mode executing a pre-stored program from its non-volatile memory.

Network	Using communication interfaces
+/-10V and 0-5V Analog input	User configurable input, offset and dead-band
Pulse Width Modulation (PWM)	• PWM and direction mode (0 - 100 % PWM range) • PWM mode (0 - 50 % PWM range)
Step & Direction	Step size configurable. Max. frequency 10 MHz
Electronic Gearing	Gear ratio configurable. Max. frequency 10 MHz
Standalone	Up to 128 macros of 128 commands (1024 Kb of program memory)

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Feedbacks

Many of the most known feedbacks work together with Pluto independently of the controlled motor. Pluto also incorporates different start-up commutation methods to work with non-absolute feedbacks together with brushless motors.

Quadrature incremental encoder	Single ended or differential (RS-422) configuration. Max. encoder frequency 10 MHz
Analog SinCos incremental encoder	1 Vpp differential (configurable independent gain & offset)
Digital hall sensor	Alignment correction by software
Analog hall sensor (linear hall)	Configurable independent gain and offset
Analog input	Input used configurable
PWM sensor	16 bits resolution – Frequencies from 1 kHz to 10 kHz
DC-Tachometer (analog tacho)	Input used, offset and V/rpm ratio are user configurable

Inputs & Outputs

Input and output signals, both digital and analog, are available for easy interfacing with Pluto. Digital inputs and outputs could accept TTL or PLC levels giving to Pluto the possibility to be part of a low-level system or to directly fit in an industrial environment.

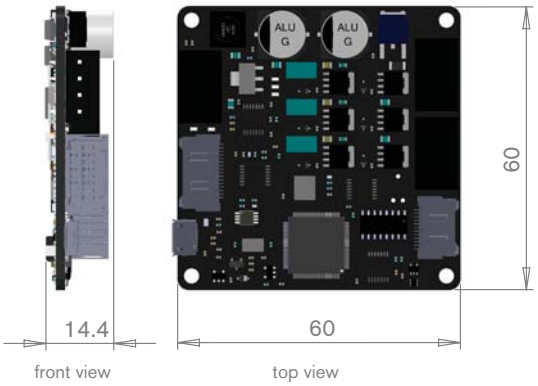
4x digital inputs	• 2x Low speed single ended configuration • 2x High speed differential configuration
2x analog inputs	• 1x +/-10 V differential (12 bits) • 1x 0 to 5 V (12 bits)
2x digital outputs	• Maximum current 500 mA, 48 V • Open drain outputs with weak pullup at 5 V • Thermal, overload, short-circuit protected

Protections & Compliance

Pluto is a RoHS marked product with a wide set of self-protection mechanisms to assure top reliability.

User configurable over/under temp. and voltage disconnection
Line-to-line, line-to-power, line-to-gnd short-circuit detection
Overcurrent, supply inverse polarity and i^2t protection
IOs and feedback lines protected against ESD and EMI
High power on board TVS for small regenerative braking
Shunt output for external braking resistor

RoHS	2002/95/EC



Mechanical

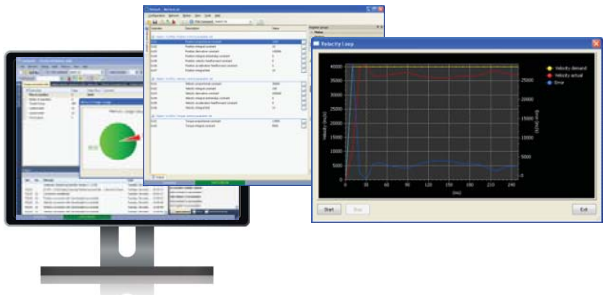
Pluto design is compact and offers several mounting options.

Dimensions	60 mm x 60 mm x 15 mm
Weight	35 g

Software

Pluto comes with a complete suite of user-friendly and intuitive software tools that helps user to configure, operate and program the controller.

MotionLab	Graphical user interface for configuring and tuning
Composer	Integrated development environment for developing and debugging
MCLAPI	Motion Control Library API (C/C++ and .NET)



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