

Power Range	
Peak Current	10 A
Continuous Current	5 A
Supply Voltage	10 - 36 VDC



Description

The CUBE10A36 PWM servo drive is designed to drive brushless and brushed DC motors at a high switching frequency. The CUBE10A36 is fully protected against over-voltage, under-voltage, over-current, over-heating, and short-circuits. A single digital output indicates operating status. The drive interfaces with digital controllers that have analog $\pm 10V$ output. The CUBE10A36 can utilize incremental encoder feedback for velocity control, and Hall Sensors for commutation.

See Part Numbering Information on last page of datasheet for additional ordering options.

Features

- Four Quadrant Regenerative Operation
- Direct Board-to-Board Integration
- Lightweight
- High Switching Frequency
- Wide Temperature Range
- Differential Input Command
- Digital Fault Output Monitor
- Current Monitor Output
- Encoder Velocity Mode
- Compact Size
- High Power Density
- 12VDC Operation

HARDWARE PROTECTION

- Over-Voltage
- Under-Voltage
- Over-Current
- Over-Temperature
- Short-circuit (phase-phase)
- Short-circuit (phase-ground)

INPUTS/OUTPUTS

- Digital Fault Output
- Digital Inhibit Input
- Analog Current Monitor
- Analog Command Input

FEEDBACK SUPPORTED

- Incremental Encoder
- Hall Sensors

MODES OF OPERATION

- Encoder Velocity

COMMUTATION

- Trapezoidal

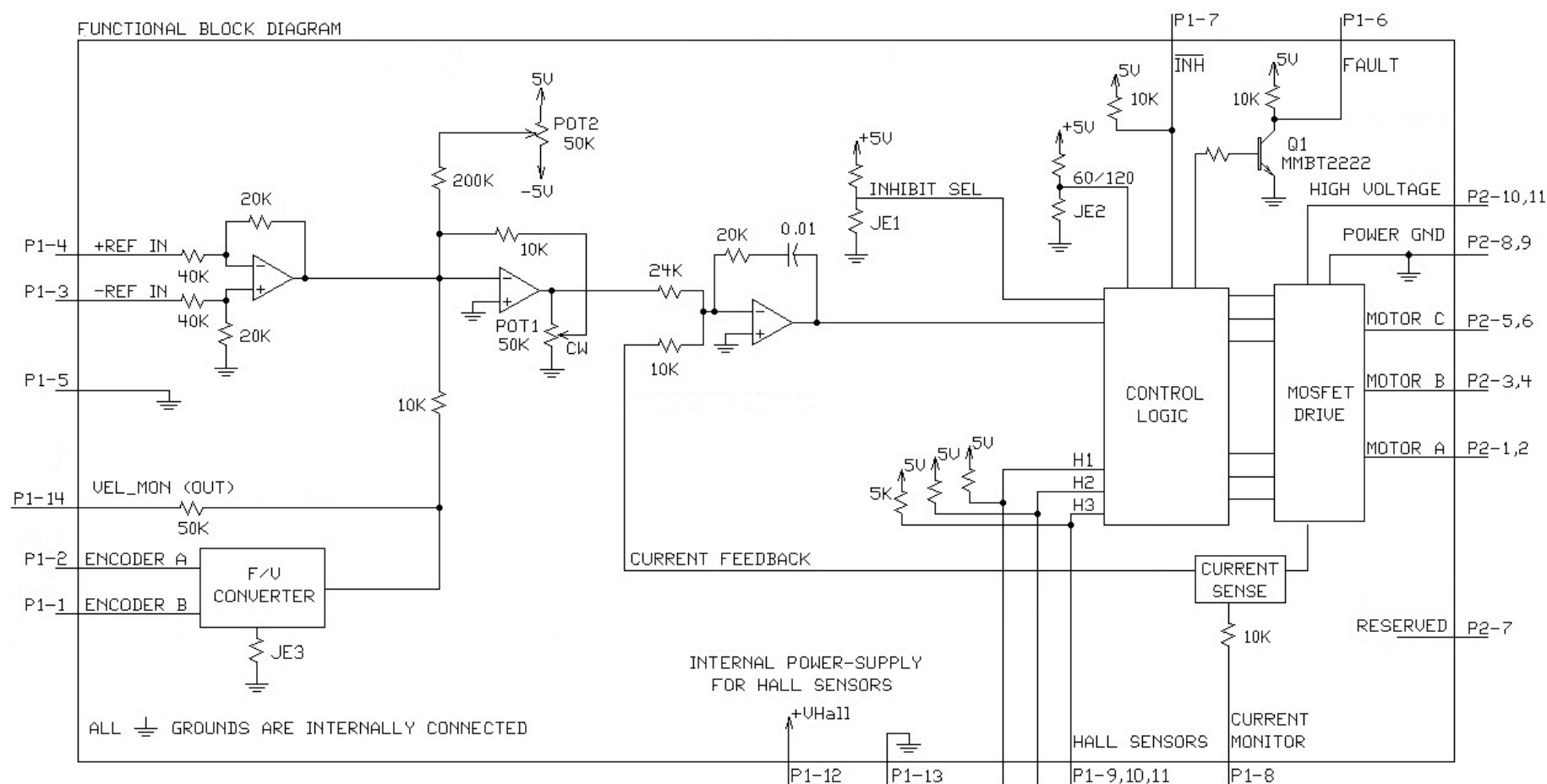
MOTORS SUPPORTED

- Three Phase (Brushless)
- Single Phase (Brushed, Voice Coil, Inductive Load)

COMMAND SOURCE

- $\pm 10 V$ Analog

BLOCK DIAGRAM



SPECIFICATIONS

Power Specifications		
Description	Units	Value
DC Supply Voltage Range	VDC	10 - 36
DC Bus Under Voltage Limit	VDC	8
DC Bus Over Voltage Limit	VDC	40
Maximum Peak Output Current ¹	A	10
Maximum Continuous Output Current	A	5
Maximum Continuous Output Power	W	171
Maximum Power Dissipation at Continuous Current	W	9
Minimum Load Inductance (Line-To-Line) ²	μH	100
Internal Bus Capacitance ³	μF	23.5
Low Voltage Supply Outputs	-	+5 VDC (30 mA)
Maximum Output PWM Duty Cycle	%	92 (±3%)
Switching Frequency	kHz	40
Control Specifications		
Description	Units	Value
Command Sources	-	±10 V Analog
Feedback Supported	-	Halls, Incremental Encoder
Commutation Methods	-	Trapezoidal
Modes of Operation	-	Encoder Velocity
Motors Supported	-	Three Phase (Brushless), Single Phase (Brushed, Voice Coil, Inductive Load)
Hardware Protection	-	Invalid Commutation Feedback, Over Current, Over Temperature, Over Voltage, Short Circuit (Phase-Phase & Phase-Ground)
Mechanical Specifications		
Description	Units	Value
Size (H x W x D)	mm	71 x 56 x 33.33
Operating Temperature Range	°C (°F)	0 - 85 (32 - 185)
Storage Temperature	°C (°F)	-40 - 85 (32 - 185)
Relative Humidity	-	0 - 90% Non-Condensing
P1 Connector		14 Pin dual row, pitch 2 mm connector, vertical installation
P2 Connector		KF250NH-3.81-5P Spring Clamp System Terminal Block

Notes

1. Maximum duration of peak current is ~2 seconds. Peak RMS value must not exceed continuous current rating of the drive.
2. Lower inductance is acceptable for bus voltages well below maximum. Use external inductance to meet requirements.
3. Requires a minimum of 47 μF external bus capacitance between the DC Supply and Power Ground.

Jumper Settings

Jumpers are SMT, 0 ohm resistors located on the underside of the drive PCB. By default, the drive is configured with the jumpers installed. Typical drive operation will not require the jumpers to be removed. Please contact the factory before jumper removal.

Jumper		Description	Configuration	
		SMT Jumper (0Ω Resistor)	Not Installed	Installed (default)
JE1	Inhibit logic. Sets the logic level of inhibit pins. Labeled JE1 on the PCB of the drive.		Low Enable	Low Inhibit
JE2	Hall sensor phasing. Selects 120 or 60 degree commutation phasing. Labeled JE2 on the PCB of the drive.		60 degree	120 degree
JE3	Velocity feedback polarity. Changes the polarity of the internal feedback signal and the velocity monitor output signal. Inversion of the feedback polarity may be required to prevent a motor run-away condition.		Inverted	Standard

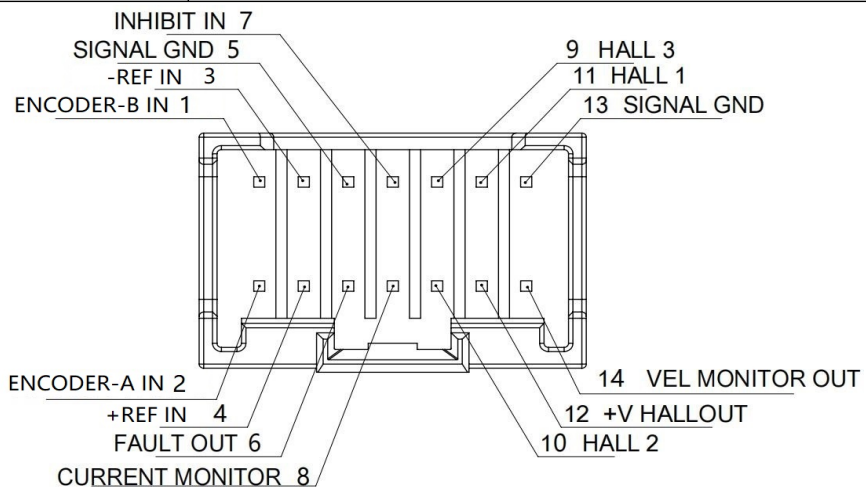
Potentiometer Functions

Potentiometers are approximately linear and have 12 active turns with 1 inactive turn on each end.

Potentiometer	Description	Turning CW
1	Loop gain adjustment for encoder velocity mode. Located closest to the corner of the PCB.	Increases gain
2	Offset. Used to adjust any imbalance in the input signal or in the amplifier. Located furthest from the corner of the PCB.	Adjusts offset in negative direction

PIN FUNCTIONS

P1 Signal Interface Definitions		
Connector information		14 Pin dual row, pitch 2 mm connector, vertical installation
Matching Connector	Part No.	MoleX: 051353-1400 (Housings); 056134-910(Socket)
	Remark	Connectors need to be ordered separately
Pin	Signal	Description
1	ENCODER-B IN	Single-ended encoder channel inputs. +5 V logic level.
2	ENCODER-A IN	
3	-REF IN	Differential Reference Input (± 10 V Operating Range, ± 15 V Maximum Input)
4	+REF IN	Differential Reference Input (± 10 V Operating Range, ± 15 V Maximum Input)
5	SIGNAL GND	Signal Ground (Common With Power Ground).
6	FAULT OUT	TTL level (+5 V) output becomes high when power devices are disabled due to at least one of the following conditions: invalid Hall state, output short circuit, over voltage, over temperature, power-up reset.
7	INHIBIT IN	TTL level (+5 V) inhibit/enable input. Leave open to enable drive. Pull to ground to inhibit drive. Inhibit turns off all power devices.
8	CURRENT MONITOR	Current Monitor. Analog output signal proportional to the actual current output. Polarity is reversed from command voltage. Scaling is 2 A/V. Measure relative to signal ground.
9	HALL 3	Single-ended Hall/Commutation Sensor Inputs (+5 V logic level)
10	HALL 2 ¹	
11	HALL 1	
12	+V HALL OUT	Hall Sensors Power(+5 V@30mA). Referenced to signal ground. Short circuit protected.
13	SIGNAL GND	Signal Ground (Common With Power Ground).
14	VEL MONITOR OUT	Velocity Monitor (± 2.5 V range). Analog output proportional to motor speed. In Encoder Velocity mode, output is proportional to the electrical cycle frequency. Encoder Velocity scaling is 90 kHz/V.



The diagram shows a 14-pin dual row connector. The pins are numbered 1 through 14. The signal assignments are as follows:

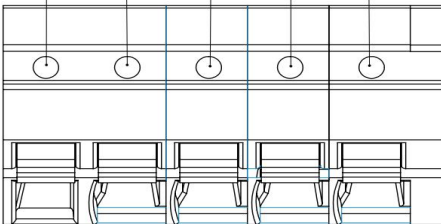
- Pin 1: ENCODER-B IN
- Pin 2: ENCODER-A IN
- Pin 3: -REF IN
- Pin 4: +REF IN
- Pin 5: SIGNAL GND
- Pin 6: FAULT OUT
- Pin 7: INHIBIT IN
- Pin 8: CURRENT MONITOR
- Pin 9: HALL 3
- Pin 10: HALL 2
- Pin 11: HALL 1
- Pin 12: +V HALL OUT
- Pin 13: SIGNAL GND
- Pin 14: VEL MONITOR OUT

1. For use with Single Phase (Brushed) motors, ground Hall 2 and only connect motor leads to Motor A and Motor B.

P2 Power Interface Definitions

Connector information		KF250NH-3.81-5P Spring Clamp System Terminal Block
Matching Connector	Part No.	N/A
	Remark	
Pin	Signal	Description
1	GND	Power Ground (Common With Signal Ground).
2	HV	DC+ Power Input
3	MC	Motor Phase W
4	MB	Motor Phase V
5	MA	Motor Phase U

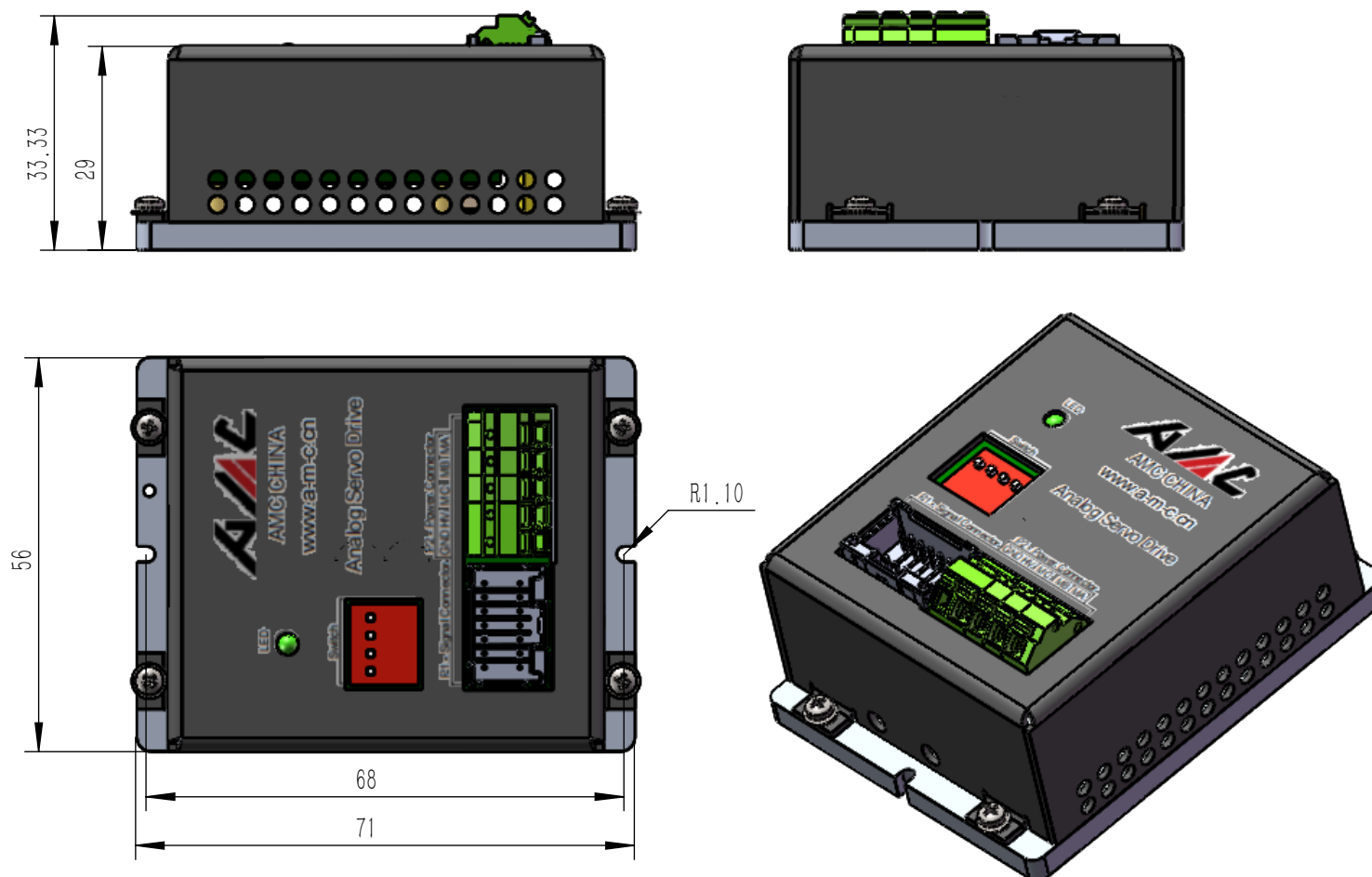
1GND 2HV 3MC 4MB 5MA



Golden Ding Series Analog Servo Drives



DIMENSIONS (mm)



PART NUMBERING INFORMATION

