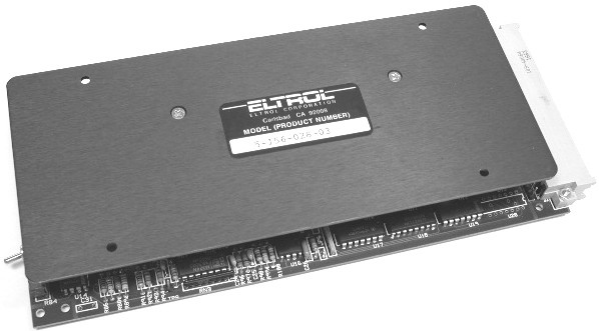
ELTROL CORPORATION

Rev 08/08

EUROCARD SERIES 40 PWM SERVO AMPLIFIER



FEATURES

- **High performance Servo Amplifier controls brush type linear or rotary motors**
- **Differential amplifier for input command and velocity feedback provides high noise and common-mode rejection**
- **Accepts tachometer, or encoder for velocity feedback**
- **High efficiency PWM drive scheme minimizes EMI in noise sensitive applications**
- **Operates with low inductance motors**
- **Current loop bandwidth and the transconductance, amps/volt scale factor, are adjustable**
- **Fault protection for over temperature, over speed, over voltage, current overloads, and motor stall**
- **Digital inputs for Enable/Reset, Brake, and ± Travel Limits**
- **Operates from one low cost unregulated DC power supply**

APPLICATIONS

- **X-Y stages, air bearings, and robotic systems**
- **Integrated circuit manufacturing and inspection**
- **Electronic assembly**
- **Factory automation**
- **Precision grinding machines**

PRODUCT DESCRIPTION

This size 3U EUROCARD provides closed loop four quadrant PWM control of velocity or force or torque of brush type linear or rotary motors.

It offers maximum flexibility. Plug able jumpers can set many of the operating features. Trim potentiometers allow user adjustment of input command gain, feedback gain, velocity loop gain, peak current, and a derived velocity feedback scale factor. Servo loop gain and compensation can be set by the selection of passive components mounted on a plug-in component carrier. Customers can request that the servo amplifier be factory configured for their specific application.

The high efficiency switch mode power output stage employs a PWM drive scheme, which minimizes EMI in noise sensitive applications. It improves motor efficiency by reducing copper and iron losses in the motor.

A switching frequency of 24 to 80KHz excludes audible noise, and allows a wide control bandwidth in the current feedback loop.

Fault protection circuits will detect and shutdown the power output stage for over temperature, over speed over voltage, current over load, and motor stall. Logic output signals, and LED indicators provide fault indication.

It will operate from a single low cost unregulated DC power supply. Internal voltage regulators provide 24VDC for the analog circuits, and 5VDC for the logic circuits.

5661 PALMER WAY #E, CARLSBAD, CA 92010
TEL: (760)438-4986 FAX: (760)438-4987 Email: sales@eltrol.com

EUROCARD SERIES 40 PWM SERVO AMPLIFIER

GENERAL SPECIFICATIONS

MODEL	6-156-028-00	6-600-055-00
Input Power Bus (Vbus) [3]	26 to 35 VDC	40 to 55 VDC
Continuous Output Power (Max.)	156 Watts [1]	500 Watts [1]
Continuous Output Current	5 Amps [1]	10 Amps [1]
Peak Output Current	10 Amps[1] (3 sec typ.)	18 Amps[1] (1 sec typ.)
Output Voltage @ Continuous Output Current	Vbus - 3 volts	Vbus - 3 volts
Minimum load inductance	100 uH	200 uh
Power Amplifier	Switch Mode Drive	
Switching Frequency	Adjustable from 24KHz to 80KHz	
Current Loop Bandwidth	Adjustable 0.5 to 4 KHZ typical	
Operating Temperature	0 TO 50 Degrees C [1]	
Maximum Heat Sink Temperature	Drive Disables if >70◦ C	
Logic Supply	5 VDC developed internally	
Weight	.482 kg (17 oz)	

OPERATING CONTROL SIGNALS and INDICATORS

Input analog control signal	± 10 Volts differential
Peak current limit	Adjustable
Drive Enable/Reset	5V logic
(+) Travel Limit	5V logic
(-) Travel Limit	5V logic
Brake [2]	5V logic
Over voltage	5V logic
Fault and/or Brake status	5V logic
Brake indicator	LED
Fault indicator	LED
Over voltage indicator	LED

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GENERAL SPECIFICATIONS

AUXILIARY OUTPUTS

Motor current monitor:	Analog Signal, Amps/volt
Motor Velocity:	5V square wave, frequency proportional to motor speed
Motor Velocity:	Analog signal proportional to motor speed
Logic supply:	5VDC with 30 ma available for external use

FAULT PROTECTION CIRCUITS

Controller over temperature
Over current
Under Voltage
Over voltage
Over speed
Motor stall

Notes:
1. Depends on ambient operating temperature, and heat sink airflow. For the rated maximum controller power dissipation, forced convection cooling with a minimum airflow of 100 CFM is required. Consult factory for assistance.

2. Actuating brake at high motor speeds may damage the controller or motor. Consult factory for details.

3. The user should protect the Amplifier and any external circuits from a catastrophic failure by fusing the input power connections to the amplifier. See Application Note Supplementary Fuse Protection.

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EXTERNAL SIGNALS AND INTERCONNECTIONS

EDGE CONNECTOR J1 IS A 48 POLE DIN 41612 SERIES F
(REF EPT P/N 109-40064) or (FCI P/N 5159009486394111)

TERMINAL	SIGNAL NAME	DESCRIPTION
J1-2D, B, Z	MTR (+)	OUTPUT TO MOTOR (+) WINDING
J1-4D, B, Z	VDC POWER BUS RETURN	POWER SUPPLY RETURN
J1-6D, B, Z	MTR (-)	OUTPUT TO MOTOR (-) WINDING
J1-8D, B, Z	VDC POWER BUS IN	POWER SUPPLY INPUT, <10>
J1-10D, B, Z	NC	NO CONNECTION
J1-12D	V+	24VDC, INTERNAL ANALOG SUPPLY
J1-12B	NC	NO CONNECTION
J1-12Z	MTR SHIELD	MOTOR SHIELD GND
J1-14D	(+) LIMIT	LOGIC 1= (+) LIMIT, <1>, <3>
J1-14B	MTR CUR	MOTOR CURRENT MONITOR, SF=SEE FUNC DIAG
J1-14Z	OVER VOLTAGE	LOGIC 0= OVER VOLTAGE
J1-16D	BRAKE CMD	LOGIC 1= BRAKE, <1>, <5>,
J1-16B	ENABLE/RESET	LOGIC 0=ENABLE, <1>, <2>
J1-16Z	"R" REFERENCE	12VDC, INTERNAL ANALOG REFERENCE
J1-18D	(-) LIMIT	LOGIC 1= (-) LIMIT, <1>, <4>
J1-18B	FEEDBACK (+)	DIFFERENTIAL ANALOG ± 10V FEEDBACK SIGNAL, <6>
J1-18Z	FEEDBACK (-)	DIFFERENTIAL ANALOG ± 10V FEEDBACK SIGNAL, <6>
J1-20D	ENCODER A IN	5VDC LOGIC
J1-20B	VELOCITY COUNT OUT	5V SQ WAVE <8>
J1-20Z	FAULT &/OR BRAKE OUT	LOGIC 1= FAULT AND, OR BRAKE ON <9>
J1-22D	NC	NO CONNECTION
J1-22B	ENCODER B IN	5VDC LOGIC
J1-22Z	NC	NO CONNECTION
J1-24D	ENCODER SHIELD	ENCODER SHIELD GROUND
J1-24B	NC	NO CONNECTION
J1-24Z	DC RTN	BOARD GND
J1-26D	COMMAND (+)	DIFFERENTIAL ANALOG ± 10V A INPUT COMMAND, <6>
J1-26B	COMMAND (-)	DIFFERENTIAL ANALOG ± 10V A INPUT COMMAND, <6>
J1-26Z	CURRENT STATUS	LOGIC 1= CURRENT FAULT
J1-28D	ENCODER POWER RTN	DC RETURN
J1-28B	ENCODER POWER	5 VDC OUT
J1-28Z	NC	NO CONNECTION
J1-30D, B	Vcc RTN OUT	5VDC RTN OUT
J1-30Z	NC	NO CONNECTION
J1-32D	CONT CUR FAULT	CONTINUOUS CURRENT FAULT, LOGIC 1=CC FAULT <9>
J1-32B	TEMPERATURE FAULT	LOGIC 1=TEMPERATURE FAULT <9>
J1-32Z	ANALOG VELOCITY SIGNAL	ANALOG VELOCITY SIGNAL OUT, V/RPM

NOTES:

<1> INTERNAL 4.7K PULL-UP RESISTOR TO 5VDC.

<2> SWITCH S1 ON PCB IS IN SERIES WITH THIS LOGIC INPUT CMD. INSTALLATION OF JUMPER JP4 WILL DISABLE THE EXTERNAL CMD.

<3> (+) LIMIT IS THE TRAVEL LIMIT THE MOTOR WILL DRIVE TOWARD WHEN THE SIGNAL AT CMD (+) IS POSITIVE WITH RESPECT TO CMD (-). INSTALLATION OF JUMPER JP1 WILL DISABLE THIS FEATURE.

<4> (-) LIMIT IS THE TRAVEL LIMIT THE MOTOR WILL DRIVE TOWARD WHEN THE SIGNAL AT CMD (+) IS NEGATIVE WITH RESPECT TO CMD (-). INSTALLATION OF JUMPER JP2 WILL DISABLE THIS FEATURE.

<5> WHEN ACTIVE, THE MOTOR WINDINGS ARE SHORTED TOGETHER. IF THE BRAKE FEATURE IS NOT REQUIRED, INSTALL JUMPER JP3. CAUTION: BRAKE CMD AT HIGH SPEED MAY DAMAGE MOTOR AND/OR CONTROLLER. CONSULT FACTORY FOR ASSISTANCE.

<6> COMMAND POLARITY DETERMINES DIRECTION OF ROTATION, SIGNAL AND SIGNAL RETURN CAN BE EXCHANGED. SEE <3>, <4> <7>.

<7> IF COMMAND CONNECTION IS REVERSED, THEN FEEDBACK CONNECTION MUST BE REVERSED TO MAINTAIN CORRECT VELOCITY LOOP PHASING. OTHERWISE MOTOR WILL RUN AWAY.

<8> SIGNALS AVAILABLE WITH OPTIONAL ENCODER AND PROCESS CIRCUITS.

<9> OUTPUT FROM CMOS TYPE LOGIC DEVICE.

<10> SEE APPLICATION NOTE SUPPLEMENTARY FUSE PROTECTION.

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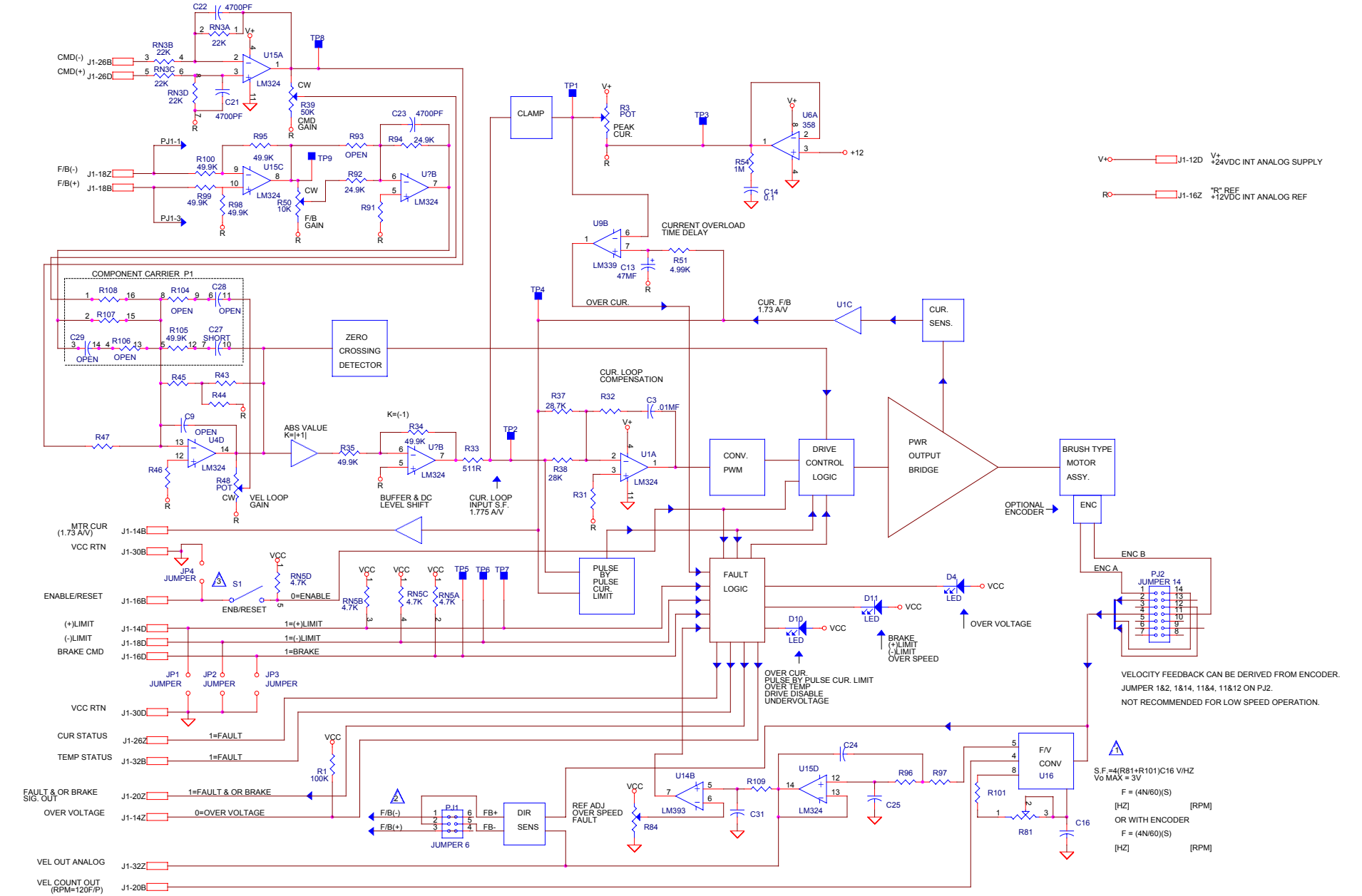

FIGURE 1

NOTES:

3. ENABLE WHEN SWITCH S1 BAT IS TOWARDS BOARD CENTER
2. PJ1 JUMPER SELECTS PHASING FOR INTERNALLY DERIVED VELOCITY FEEDBACK SIGNAL.
1. DEPENDING ON PJ2 JUMPER CONNECTIONS.

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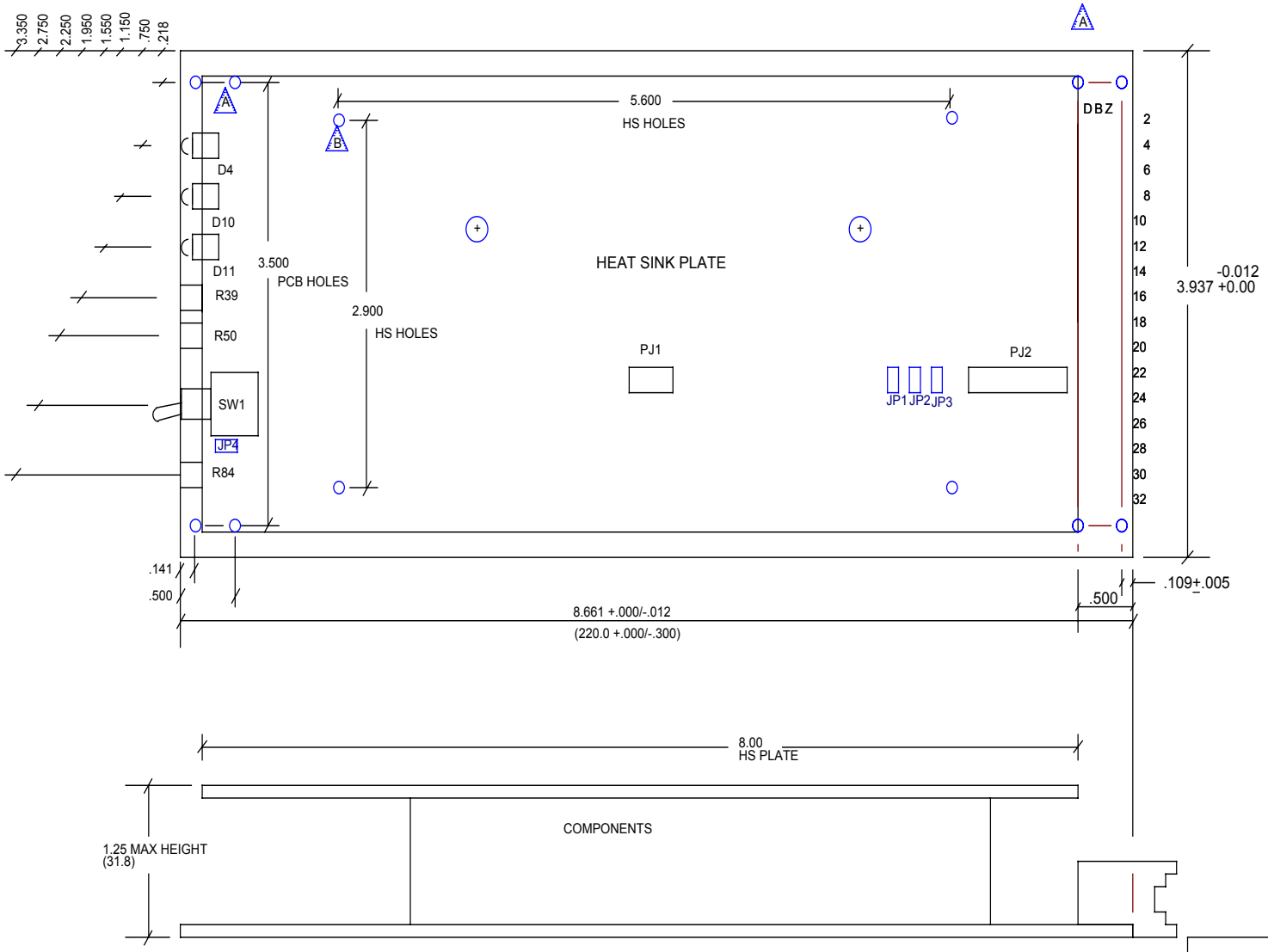
Date: Saturday, October 12, 2002	Sheet 1 of 1	

EUROCARD SERIES 4O PWM SERVO AMPLIFIER

MOUNTING DIMENSIONS



4. B 4 HOLES ON HEAT SINK PLATE .136 DIA.

3. A 6 HOLES ON PCB .120 DIA.

2.TOLARANCES FOR 3 DECIMALS ARE +/- .005 AND +/- .02 FOR 2 DECIMALS.

NOTES:1. DIMENSIONS IN INCHES (MM), DO NOT SCALE.

ELTROL CORPORATION CARLSBAD, CA	
Title: SERIES 40 & 42 DATA SHEET OUTLINE DWG	
Size: B	Document Number: 3900042 OUTLINE.SCH — Rev: A
Date: Saturday, October 12, 2002	Sheet 1 of 1