

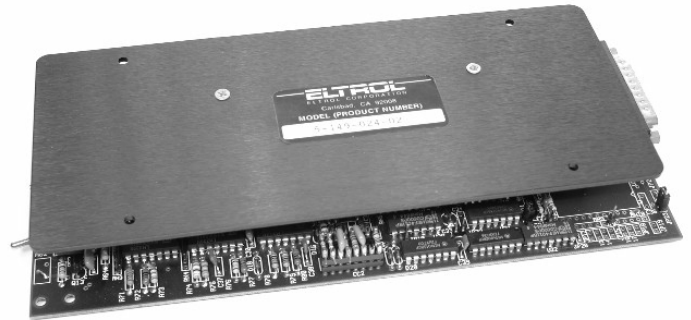
EUROCARD SERIES 49 PHASE LOCK SERVO CONTROLLER

FEATURES

- Speed regulation of $< \pm 0.001\%$ can be achieved with precision spindles and feedback devices
- Controls brushless motors over a wide speed range - 100 to over 50,000 RPM
- Switching frequency of 24 to 80KHz allows operation with low inductance motors
- Accepts external or internal frequency (speed) command
- Frequency synthesizer circuits provide a programmable frequency (speed) command from a precise crystal reference
- Velocity feedback can be derived from the motor commutation sensors, incremental encoder, or a laser scanner
- Digital inputs for Enable/Reset, Brake, Internal/External frequency command, and Direction of rotation
- Output current is adjustable to 10 amperes peak
- Drives three phase delta or wye connection stators
- Operates from one low cost unregulated DC power supply

APPLICATIONS

- Laser scanners
- High-speed air bearing spindles
- High accuracy machining and grinding
- Memory disk and head testers
- Wafer spinners
- Centrifuge



PRODUCT DESCRIPTION

This size 3U EUROCARD provides precise phase lock loop control of the speed of permanent magnet brushless DC motors.

The controller was designed to provide easy setup. The servo loop gain and compensation are pre-configured at the factory for the most demanding applications. Plug able jumpers can set many of the operating features.

The high efficiency switch mode power output stage employs a four-quadrant PWM drive scheme, which minimizes EMI in noise sensitive applications. It also 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.

The controller employs time dependent peak current limiting. A trim potentiometer allows adjustment of the peak current up to the maximum value.

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

EUROCARD SERIES 49 PHASE LOCK SERVO CONTROLLER

GENERAL SPECIFICATIONS

MODEL	5-559-048-00	5-149-024-00
Input Power Bus (Vbus) ²	40 to 55 VDC	21 to 35 VDC
Continuous Output Power (Max.)	260 Watts ¹	160 Watts ¹
Continuous Output Current	5 Amps ¹	5 Amps ¹
Peak Output Current	10 Amps (3 Sec) ¹	10 Amps (3 Sec) ¹
Out Voltage @ Continuous Output Current	Vbus - 3 volts	Vbus - 3 volts
Minimum load inductance	200 uH	100Uh
Maximum Heat Sink Temperature	Drive Disables if >70 ° C	
Power Amplifier	Switch Mode Drive	
Switching Frequency	Adjustable from 24KHz to 80KHz	
Current Loop Bandwidth	2 KHz Typical	
Operating Temperature	0 to 50 ° C	
Logic Supply	5 VDC developed internally	
Weight	.45 Kg (1 Lb)	

OPERATING CONTROL SIGNALS and INDICATORS

Speed command is proportional to input internal or external frequency	5V Square wave - Scale Factor in RPM/Hz
Plug able jumpers programs internal frequency Command	5V logic
Select internal or external frequency command	5V logic or PCB jumper
Select velocity feedback source	PCB jumper
Select direction of rotation	PCB jumper
Peak current limit	Adjustable
Drive Enable/Reset	5V logic or PCB switch
Speed @ Lock	5V logic signal and LED
Fault Status	5V logic signal and LED
Current Fault	5V logic
Temperature Fault	5V logic signal and LED
Over Voltage	5V logic signal and LED

EUROCARD SERIES 49 PHASE LOCK SERVO CONTROLLER

FAULT PROTECTION CIRCUITS

Controller over temperature
Current overload
Illegal Hall sensor input
Under voltage
Over speed
Motor Stall

Notes:

1. Depends on ambient operating temperature and heat sink. For the rated continuous power output, forced convection cooling with a minimum airflow of 100 CFM is required. Consult factory for assistance.
2. 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.

EXTERNAL SIGNALS AND INTERCONNECTIONS

EDGE CONNECTOR J1 IS A 25 CONTACT MALE D-SUB

TERMINAL	SIGNAL NAME	DESCRIPTION
J1-1	ENCODER FEEDBACK	5VDC LOGIC
J1-2	ENCODER SHIELD	ENCODER SHIELD GND
J1-3	SELECT INT/EXT FREQ CMD	LOGIC 0=EXTERNAL FREQUENCY COMMAND, <5>
J1-4	EXT FREQ (SPEED) CMD	5V SQ WAVE, FREQUENCY COMMAND SF=RPM/HZ<1>
J1-5	MTR PHASE B	OUTPUT TO MOTOR PHASE B WINDING
J1-6	MTR PHASE B	OUTPUT TO MOTOR PHASE B WINDING
J1-7	MTR PHASE A	OUTPUT TO MOTOR PHASE A WINDING
J1-8	MTR PHASE A	OUTPUT TO MOTOR PHASE A WINDING
J1-9	MTR PHASE C	OUTPUT TO MOTOR PHASE C WINDING
J1-10	MTR PHASE C	OUTPUT TO MOTOR PHASE C WINDING
J1-11	MTR SHIELD	MOTOR SHIELD GND
J1-12	VDC POWER BUS IN	POWER SUPPLY INPUT <2>, <6>
J1-13	VDC POWER BUS IN	POWER SUPPLY INPUT <2>, <6>
J1-14	ENABLE/RESET	LOGIC 0=ENABLE, <3>
J1-15	SPEED LOCK	LOGIC 0=SPEED LOCK, <4>
J1-16	GROUND	DC RTN
J1-17	HALL SENSOR POWER	5VDC OUT, 20 MILLAMPS MAX LOAD
J1-18	HALL SENSOR POWER RTN	DC RTN
J1-19	FAULT OUT	LOGIC 0 =FAULT <4>
J1-20	S1 HALL SENSOR IN	5V LOGIC
J1-21	S2 HALL SENSOR IN	5V LOGIC
J1-22	S3 HALL SENSOR IN	5V LOGIC
J1-23	HALL SENSOR SHIELD	HALL CABLE SHIELD GND
J1-24	VDC POWER BUS RETURN	POWER SUPPLY RETURN
J1-25	VDC POWER BUS RETURN	POWER SUPPLY RETURN

NOTES:

- <1> INTERNAL 100K PULL-UP RESISTOR TO 5VDC.
- <2> CONSULT FACTORY IF USING A REGULATED SUPPLY
- <3> SWITCH S1 ON PCB IS IN SERIES WITH THIS LOGIC INPUT CMD. INSTALLATION OF JUMPER JP2 WILL DISABLE THE EXTERNAL CMD.
- <4> OUTPUT FROM OPEN COLLECTOR, WITH 10K PULL-UP.
- <5> LOGIC INPUT TO SELECT INTERNAL OR EXTERNAL FREQUENCY (SPEED) COMMANDS. LOGIC "1" IS THE DEFAULT STATE. GROUND THIS INPUT OR INSTALL JUMPER JP20 TO PROGRAM THE LOGIC TO ACCEPT AN EXTERNAL INPUT FREQUENCY (SPEED) COMMAND.
- <6> SEE APPLICATION NOTE SUPPLEMENTARY FUSE PROTECTION.

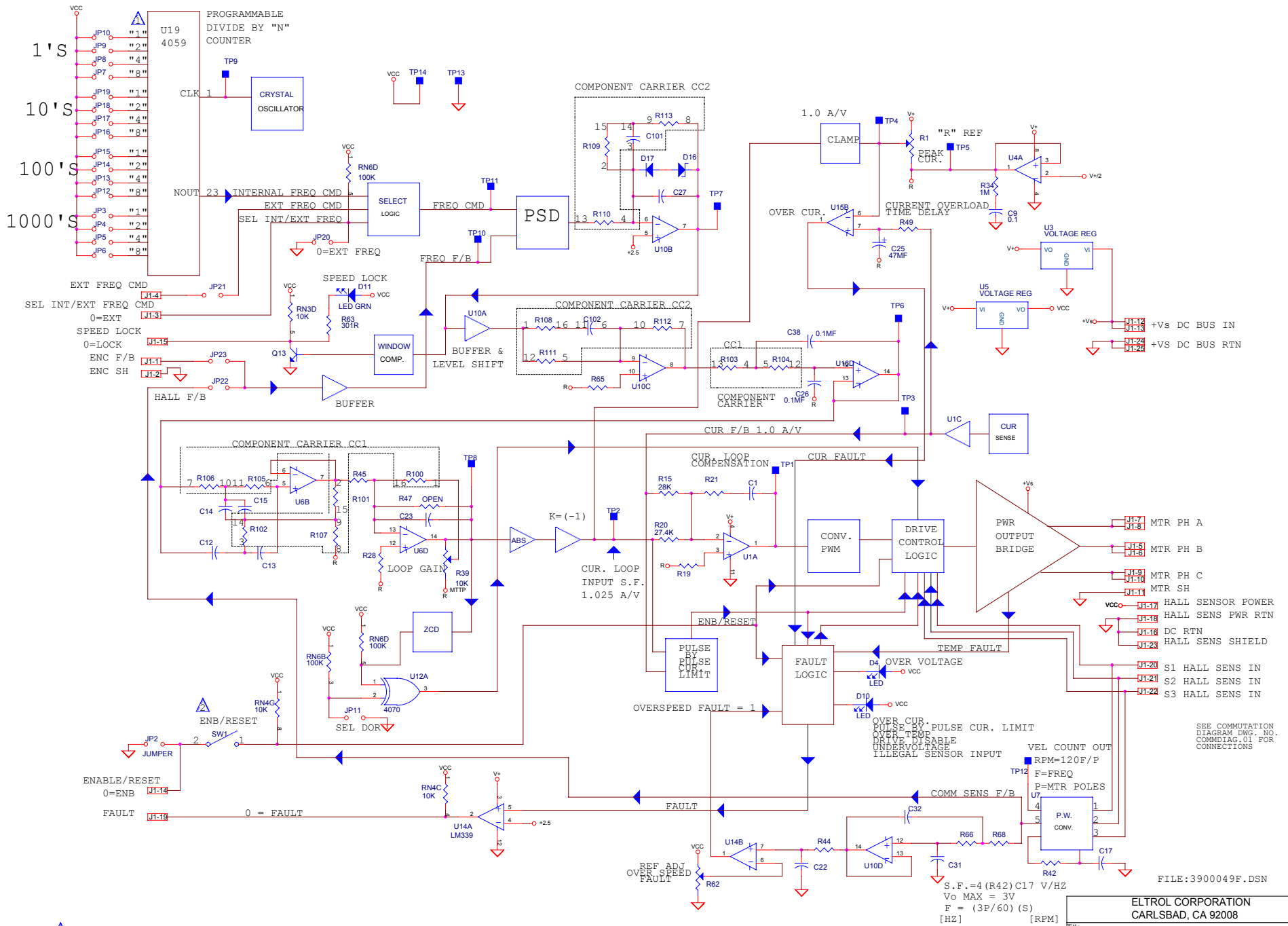


FIGURE 1

▲ ENABLE WHEN SW1 BAT IS TOWARDS BOARD CENTER
 ▲ INTERNAL 100K RESISTOR TO GND ON EACH INPUT
 NOTES:

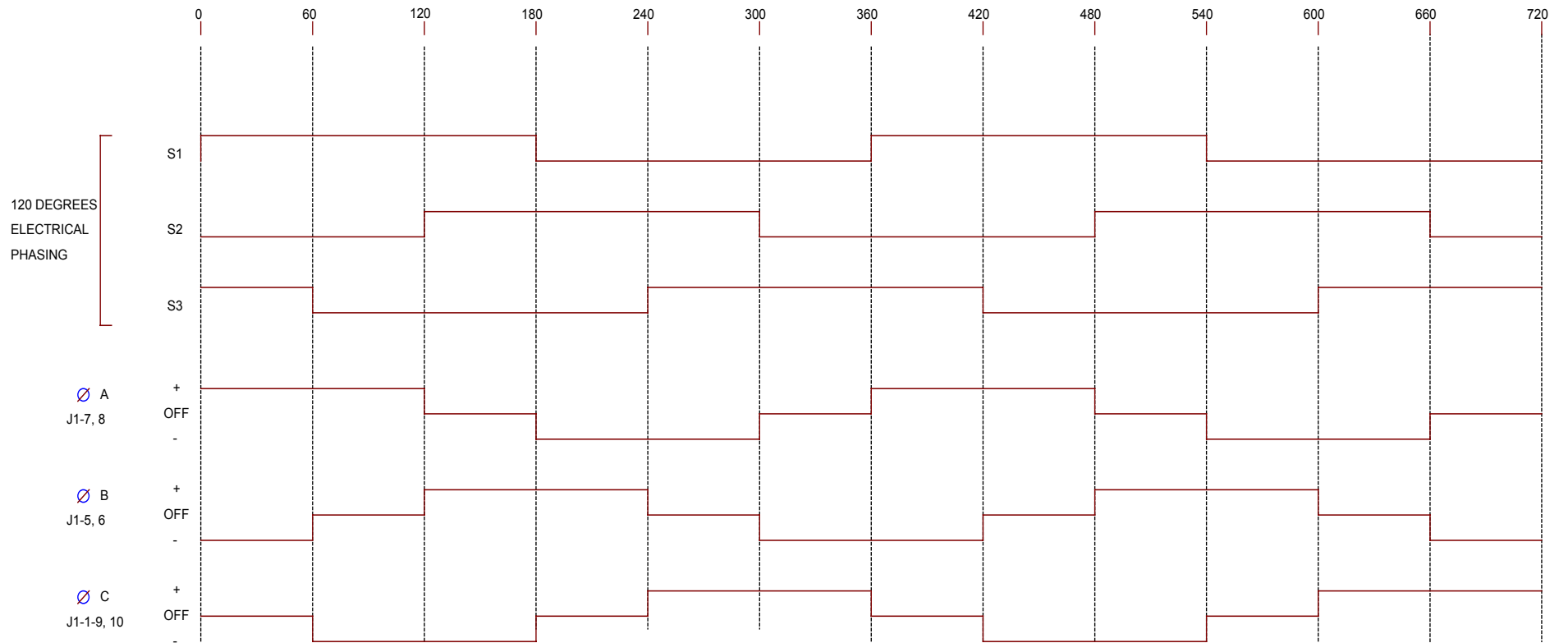
S.F. = 4 (R42) C17 V/HZ
 Vo MAX = 3V
 F = (3P/60) (S)
 [HZ] [RPM]

FILE:3900049F.DSN

ELTROL CORPORATION CARLSBAD, CA 92008		
Title	BRUSHLESS DC PHASE LOCK SERVO	
Size	Document Number	Rev
C	3900049F.03	A
Date:	Friday, September 27, 2002	Sheet 1 of 1

COMMUTATION DIAGRAM

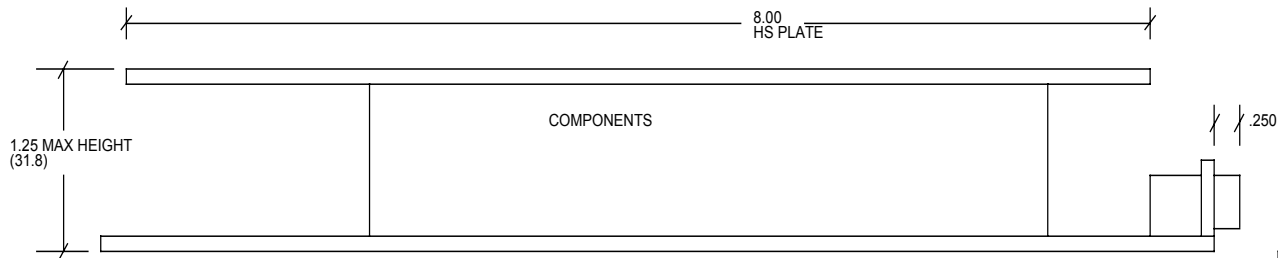
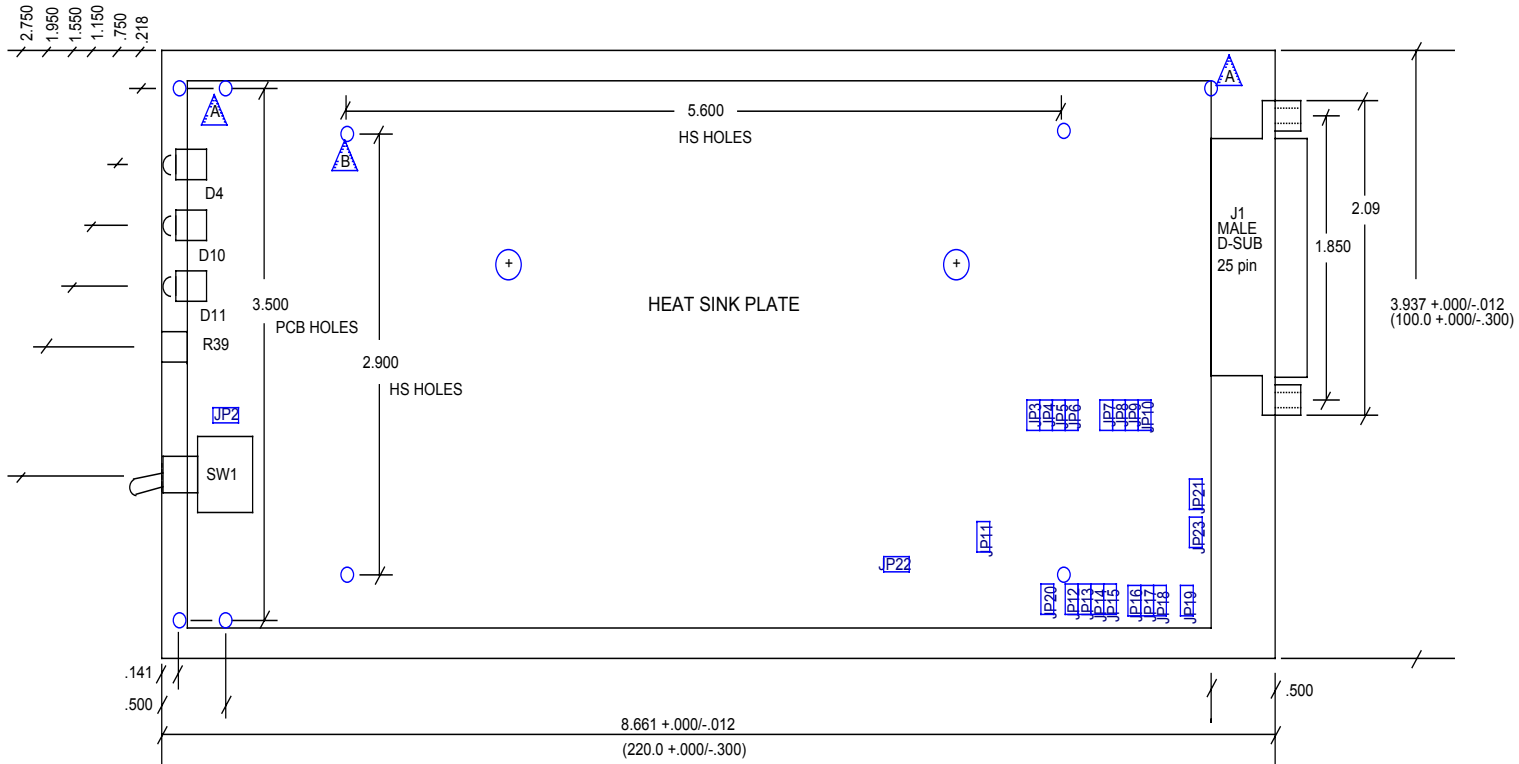
ROTOR POSITION ELECTRICAL DEGREES



ELTROL CORPORATION CARLSBAD, CA		
Title COMMUTATION DIAGRAM		
Size B	Document Number 49 SERIES COMMDIAG.02	Rev A
Date: Wednesday, October 02, 2002 Sheet 1 of 1		

EUROCARD SERIES 49 PHASE LOCK SERVO CONTROLLER

MOUNTING DIMENSIONS



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

3. 5 HOLES ON PCB .120 DIA.

2. TOLERANCES 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 49 DATA SHEET OUTLINE DWG	
Size	Document Number	Rev
B	3900049 OUTLINE.SCH	A
Date: Wednesday, October 02, 2002 Sheet 1 of 1		