

**Section 8. HARDWARE REFERENCE**

**8.1. PERFORMANCE SPECIFICATIONS**

**8.1.1. System-Dependent Specifications**

<u>DESCRIPTION</u>	<u>VALUE</u>	<u>UNITS</u>
Repeatability	+/- 0.028	Degrees, Unloaded
Accuracy	+/- 0.15	Degrees, Unloaded
Relative Accuracy	+/- 0.15	Degrees, Any Load

**8.1.2. Motor-Dependent<sup>2</sup> Specifications**

<u>DESCRIPTION</u>	<u>CPL57-120</u>	<u>CPL83-150</u>	<u>CPH83-150</u>	<u>CPH106-210</u>
Torque (cont)	130	370	370	1,100 oz-in
Torque (peak)	160	420	420	1,400 oz-in
Max continuous speed	3,600	3,600	3,600	3,600 rpm
Rotor Inertia	0.0042	0.0239	0.2390	0.1393 oz-in-sec <sup>2</sup>

**8.1.3. Units for Specifications**

Torques in ounce/inches  
 Speeds in revolutions per minute  
 Inertia in ounce/inches/sec  
 Weight in pounds

**8.2. PHYSICAL SPECIFICATIONS**

<u>DESCRIPTION</u>	<u>CPL57-120</u>	<u>CPL83-150</u>	<u>CPH83-150</u>	<u>CPH106-210</u>
Motor Weight	3.2	7.7	7.7	21.7 lbs.
Total Shipping Weight	20.0	25.0	25.0	45.0 lbs.

	<u>LOW-POWER</u>	<u>HIGH-POWER</u>
Drive Height:	11.9 (302.3)	11.9 (302.3) inch (mm)
Drive Width:	3.92 (99.6)	4.787 (121.6) inch (mm)
Drive Depth:	8.13 (206.5)	8.13 (206.5) inch (mm)

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<sup>2</sup>See torque speed curves also.

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### 8.2.1. Environmental Specifications

Driver Operating Temperature	0 to +50	Degrees Celsius
Motor Operating Temperature	100	Degrees Celsius, Max
Storage Temperature	-40 to +85	Degrees Celsius
Humidity	0 to 95	Percent, Non-Condensing

### 8.3. ELECTRICAL SPECIFICATIONS

Input power:

	<u>LOW-POWER</u>	<u>HIGH-POWER</u>
Voltage:	100-130 <sup>3</sup>	100-130VAC, single phase
Frequency:	47-66	47-66 Hz
Current:	4.0	6.0 amps max continuous (rms)

Output power: (to motor)

	<u>LOW-POWER</u>	<u>HIGH-POWER</u>
Voltage:	50	170VDC peak
Current :	6	8 amps

### 8.4. MOTOR RESOLUTION

Motor resolution: programmable 200 to 25,600 steps per revolution user units. System uses 12,800 steps per revolution internally.

### 8.5. INPUT/OUTPUT SIGNAL DESCRIPTIONS

**NOTE**

For specifications, refer to the figures that follow in this section.

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<sup>3</sup>100-130 VAC input to Transformer (supplied), 35 VAC to the Drive itself.

**Position sensor:** Accepts position information from the motor's built in resolver. The cable between the motor and drive is prewired at the factory.

**Input power:** Provides input power for the drive. 115VAC for the high-power and 36VAC for the low-power drive; however, the low-power drive is provided with a prewired 115/36VAC transformer.

High-Power

LINE	One phase of the input power (120VAC)
NEUT	Second phase of the input power (120VAC)
GND	Earth ground

Low-Power

T1	One phase of the input power (36VAC)
T2	Second phase of the input power (36VAC)
GND	Earth ground

**Motor connections:** Output power to the motor. Up to 150VDC for the high-power drive and 50VDC (pulsed) for the low-power drive.

A+	Plus side of motor phase A (Red)
A-	Minus side of motor phase A (Black)
GND	Shield ground
B+	Plus side of motor phase B (White)
B-	Minus side of motor phase B (Green)

**RS-232C connections:** RS-232C transmit and receive connections. Accepts standard EIA RS-232C signals from +15V to -15V. The baud rate is fixed at 300 - 19,200, 8 data bits, no parity, 1 stop bit. Optically isolated.

**Rx** Receive line of RS-232C. Connect to pin 2 (or 3) of terminal's 25 pin.

**Tx** Transmit line of RS-232C. Connect to pin 3 (or 2) of terminal's 25 pin.

**GND** Isolated ground. Pin 7 of terminal's 25 pin D.

**Discrete control connections:** These input and output signals control various dedicated functions of the Compumotor Plus as explained below. Optically isolated.

**ENABLE** Enable input. Enables drive. Must be connected to isolated ground for drive operation.

**CW LIMIT** Clockwise end of travel limit input. Must be connected to isolated ground for motor to move in clockwise direction.

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CCW LIMIT	Counterclockwise end of travel limit input. Must be connected to isolated ground for motor to move in counterclockwise direction.
RESET	Reset input. When connected to isolated ground, causes drive to be reset.
GND	Isolated ground.
COMMAND 1+	Positive going pulse on Step/Direction units. Causes Compumotor Plus drive to move motor one step. 600nS pulse width minimum, 640 KHz maximum frequency.  +/- 10VAC analog input on CPA (+ 10V = 50 RPS)
COMMAND 1-	Return for COMMAND 1+.
COMMAND 2+	Produces positive direction when a positive voltage (relative to COMMAND 2-) is pressed. Causes clockwise rotation when open or grounded.
COMMAND 2-	Command input minus.
MONITOR +	Analog velocity output plus. 0V = -50 rps, +5V = 0 rps, +10V = +50 revs per second.
MONITOR -	Analog velocity output return.
FAULT +	Fault indication output plus. Turns off (no current) to indicate fault condition. (Collector of optically isolated transistor.)
FAULT -	Fault indication output minus. (Emitter of optically isolated transistor.)

Discrete Input/Output connections: Inputs and outputs that affect program control. Optically isolated.

Slip Fault (Out 2) + Active during normal operation (current flowing)  
Slip Fault (Out 2) - Inactive if a slip fault occurs (no current flowing)

8.6. INPUT/OUTPUT SPECIFICATIONS: QUICK REFERENCE

**NOTE**

The other connections on the discrete I/O connector are not functional.

8.6.1. Position Sensor Connector, Low- & High-Power Drives

Not normally accessed by user. Non-isolated hazardous voltages present in high power unit. Various length cables available--consult factory.

8.6.2. Motor & Power Connector, Low-Power Drive

	Signal Name	In/Out	Type	Current	Voltage	Timing	Wire Color
1	T1 <sup>4</sup>	INPUT	PWR	4A	36VAC	50/60 Hz	BROWN
2	T2	INPUT	PWR	4A	36VAC	50/60 Hz	BLUE
3	GND	INPUT	PWR	4A	Earth	N/A	GREEN/YELLOW
4	A+	OUTPUT	MOTOR	8A	50VAC	N/A	RED
5	A-	OUTPUT	MOTOR	8A	50VAC	N/A	BLACK
6	GND	OUTPUT	MOTOR	8A	Earth	N/A	SHIELD
7	B+	OUTPUT	MOTOR	8A	50VAC	N/A	WHITE
8	B-	OUTPUT	MOTOR	8A	50VAC	N/A	GREEN

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<sup>4</sup>A 115/36 VAC external transformer is provided by Compumotor.

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8.6.3. Motor & Power Connector, High-Power Drive

	Signal Name	In/Out	Type	Current	Voltage	Timing	Wire Color
1	LINE	INPUT	PWR	6A	115VAC	50/60 Hz	BLACK
2	NEUT	INPUT	PWR	6A	115VAC	50/60 Hz	WHITE
3	GND	INPUT	PWR	6A	Earth	N/A	GREEN
4	A+	OUTPUT	MOTOR	8A	150VDC	N/A	RED
5	A-	OUTPUT	MOTOR	8A	150VDC	N/A	BLACK
6	GND	OUTPUT	MOTOR	8A	Earth	N/A	SHIELD
7	B+	OUTPUT	MOTOR	8A	150VDC	N/A	WHITE
8	B-	OUTPUT	MOTOR	8A	150VDC	N/A	GREEN

8.6.4. Control Connector, Low Power & High Power Drives

	Signal Name	In/Out	Type	Current	Voltage	Timing
1	Rx	INPUT	RS-232C	-	+/-15V	9,600 Baud
2	Tx	OUTPUT	RS-232C	-	+/-15V	9,600 Baud
3	GND	-	GROUND	-	Earth	-
4	ENABLE	INPUT	SRC	12 mA	12VDC	
5	CW LIMIT	INPUT	SRC	12 mA	12VDC	
6	CCW LIMIT	INPUT	SRC	12 mA	12VDC	
7	RESET	INPUT	SRC	12 mA	12VDC	
8	GND	INPUT	GROUND	-	-	-
9	COMMAND 1+	INPUT	BLNCD	20 mA	3.5V	600nS <sup>5</sup>
10	COMMAND 1-	Same as above				
11	COMMAND 2+	INPUT	BLNCD	20 mA	3.5V	600nS
12	COMMAND 2-	Same as above				
13	MONITOR +	OUTPUT	ANALOG	10mA	+/-10VAC	
14	MONITOR -	Same as above.				
15	FAULT +	OUTPUT	OC	50mA	30VDC	
16	FAULT -	OUTPUT	OE			

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<sup>5</sup>500nS for step/direction version (CP), +/-10 V for analog version.

8.6.5. Discrete I/O Connector, Low Power & High Power Drives

	<u>Signal Name</u>	<u>In/Out</u>	<u>Type</u>	<u>Current</u>	<u>Voltage</u>
1	OUT 2+	OUTPUT	Open Collector	50 mA	30V
2	OUT 2-	OUTPUT	Open Emitter		

8.6.6. Types of Inputs & Outputs

BLNCD	Balanced input, requires both a plus and minus to activate
GROUND	Isolated ground for logic signals
RS-232C	Standard RS-232C input and output, optically isolated inside the drive
SRC	Sourcing input, optically isolated, requires a ground to activate
OC	Open collector output, optically isolated
OE	Open emitter output, optically isolated, used with open collector output

HARDWARE REFERENCE

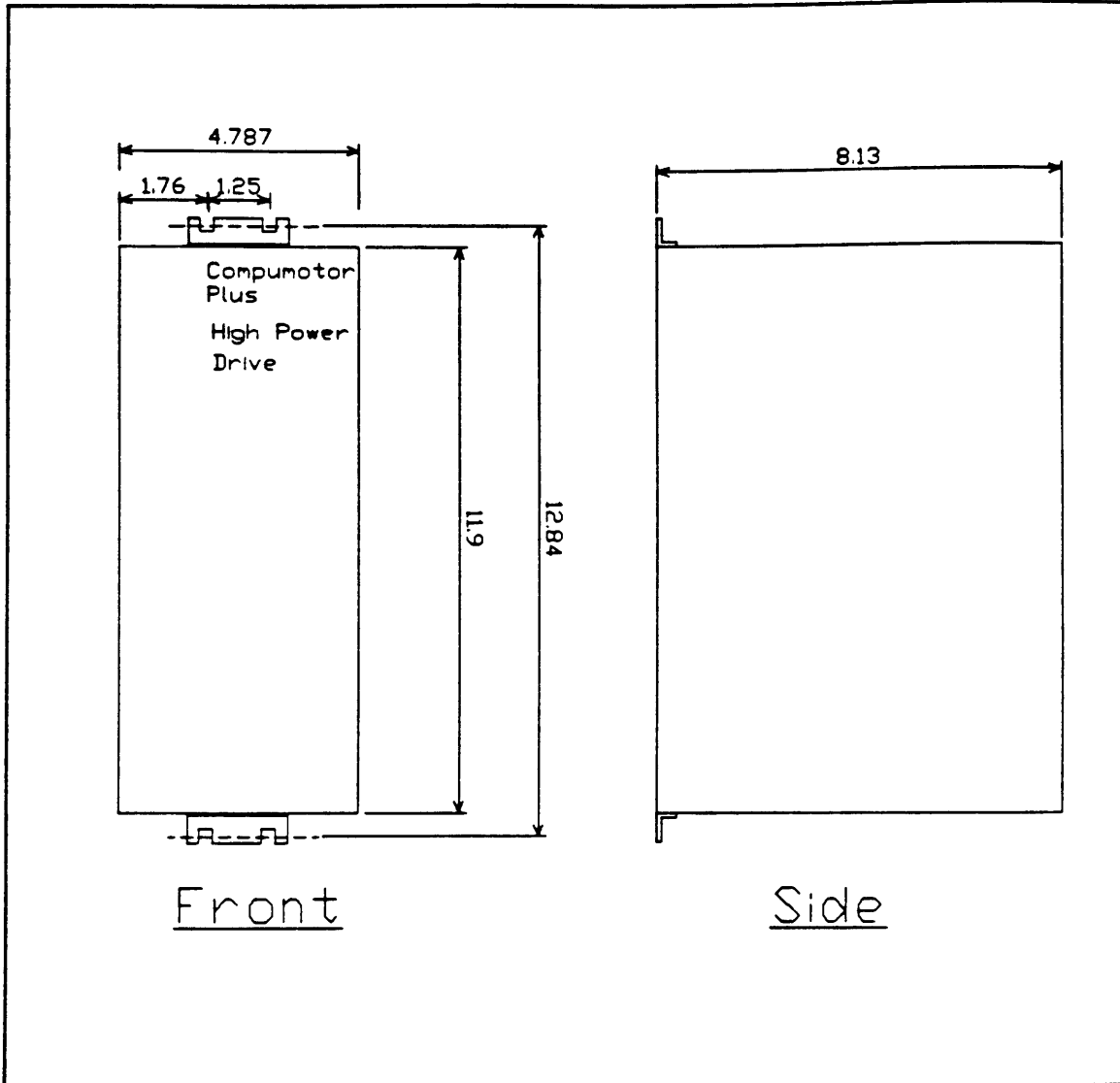


Figure 17. Low-Power Drive Dimensions

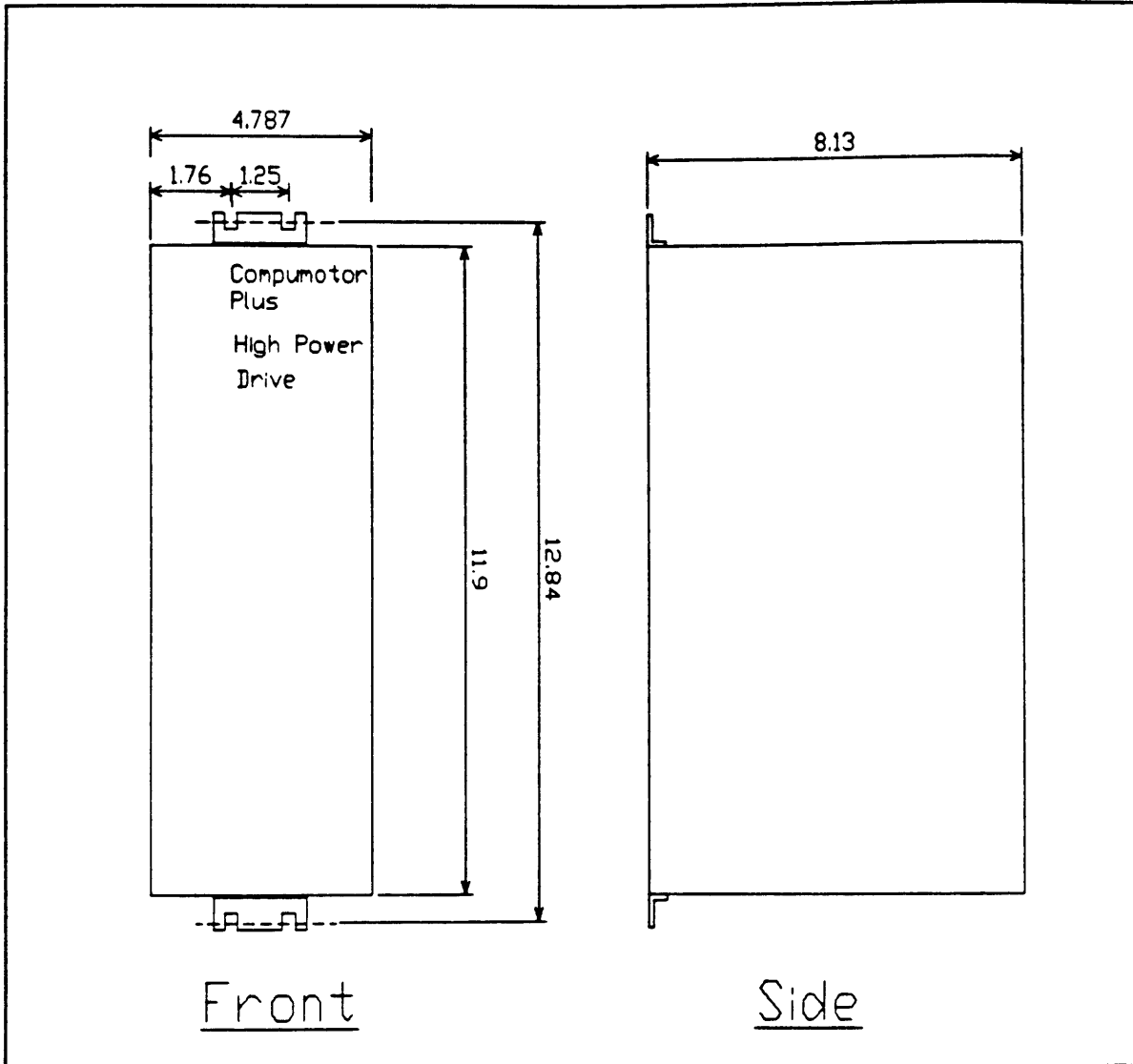


Figure 18. High-Power Drive Dimensions

HARDWARE REFERENCE

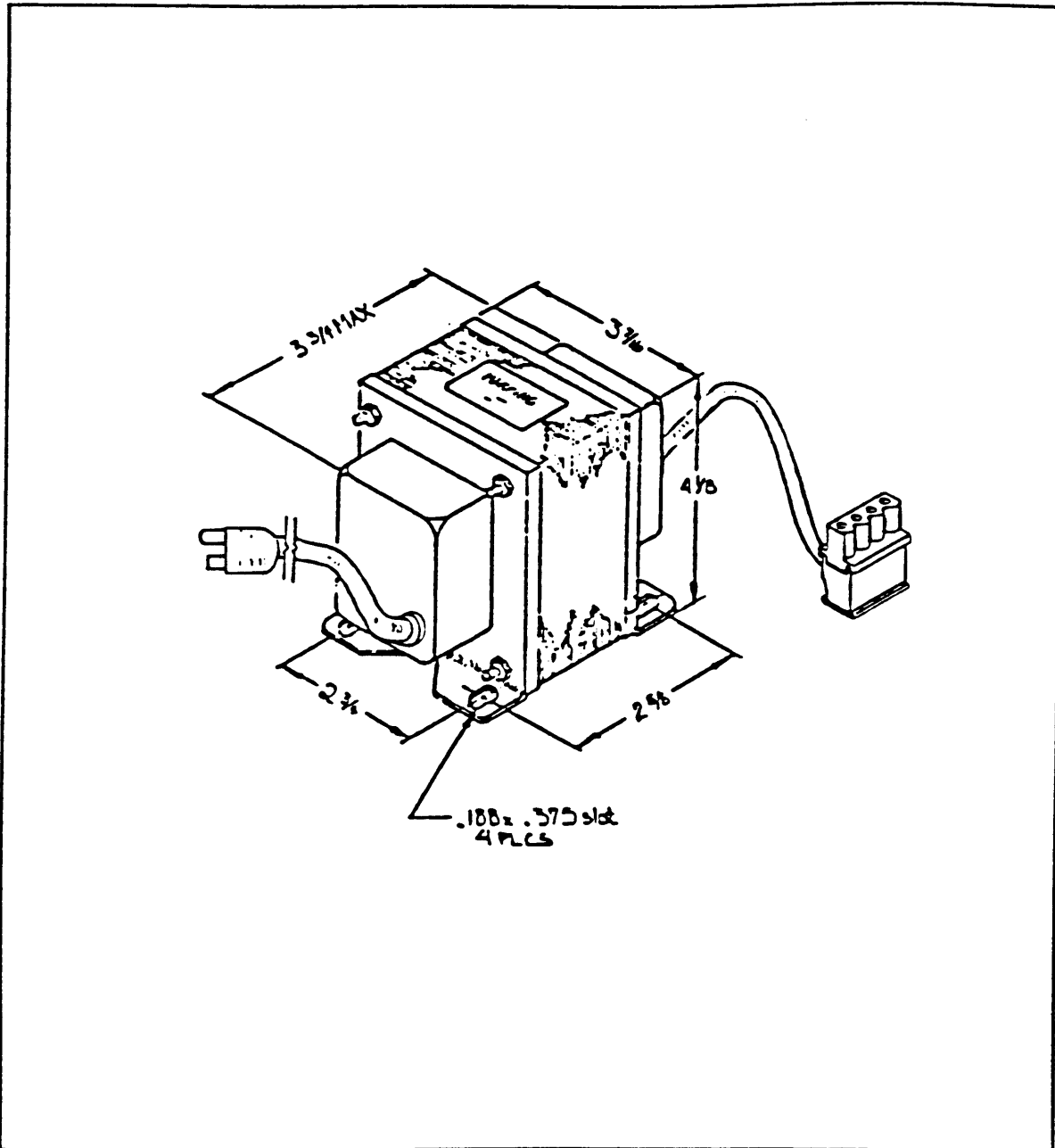


Figure 19. 110/36VAC Transformer

HARDWARE REFERENCE

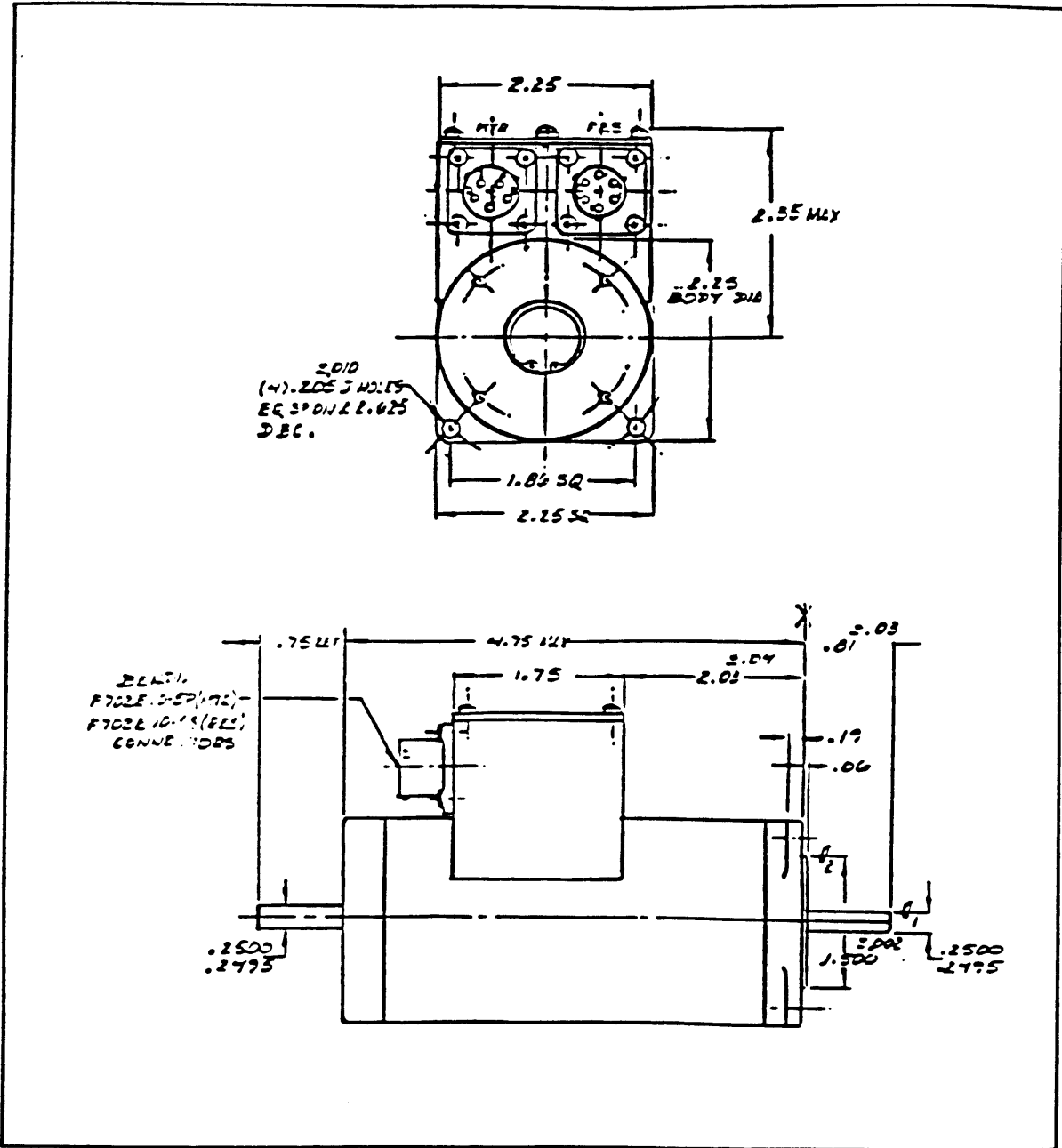


Figure 20. CPL57-120 Motors

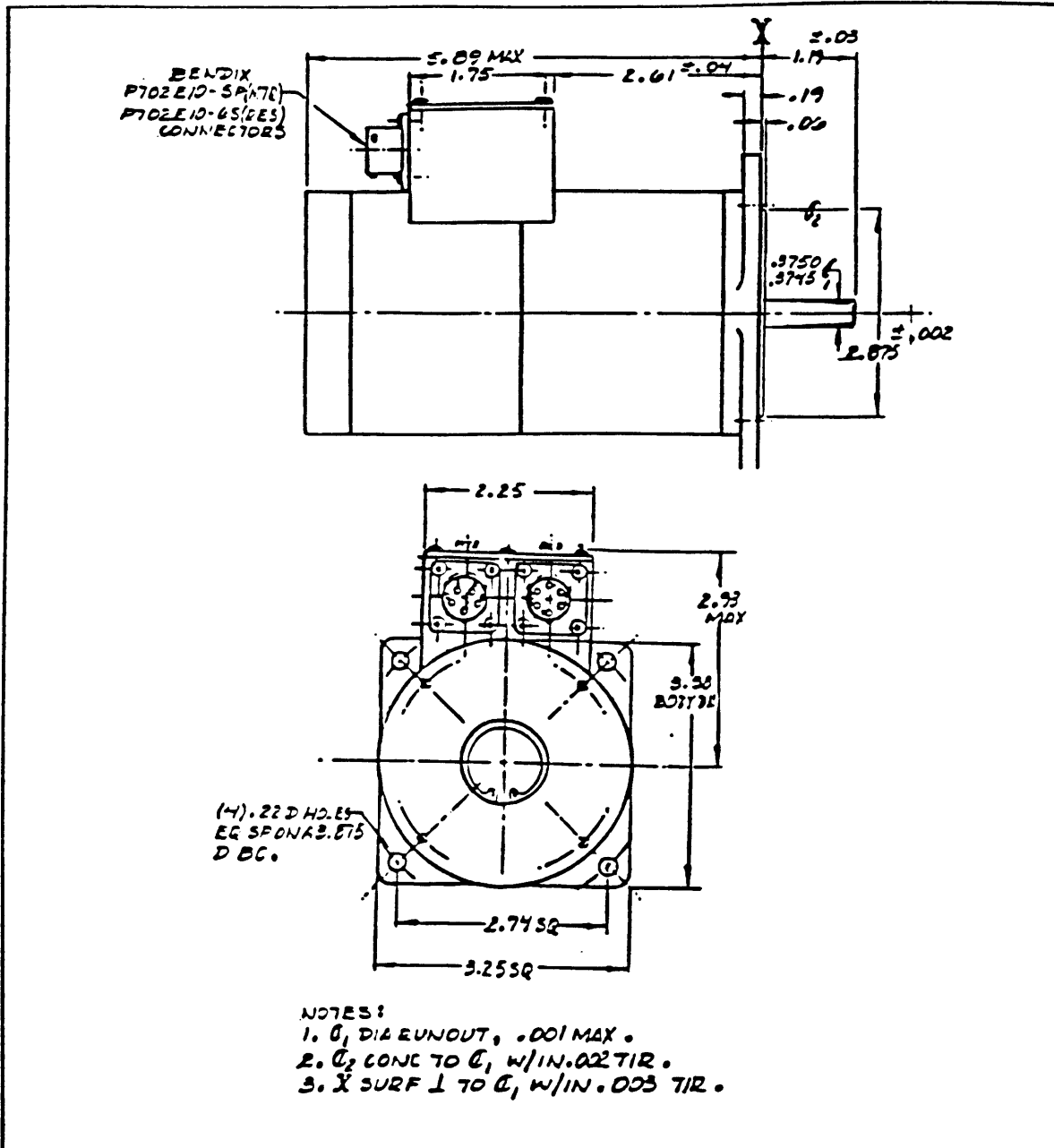


Figure 21. CPL83-150 Motors



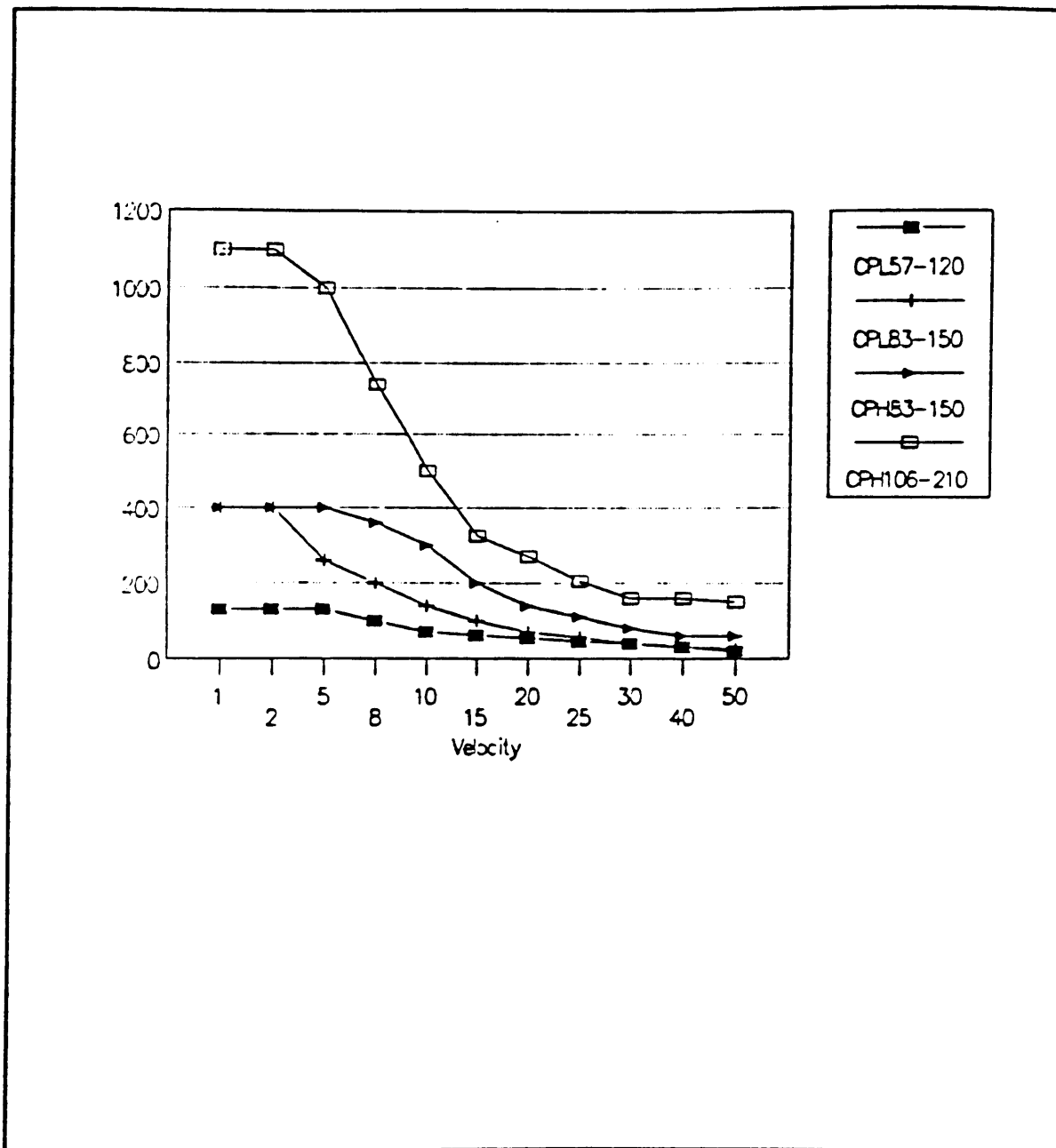




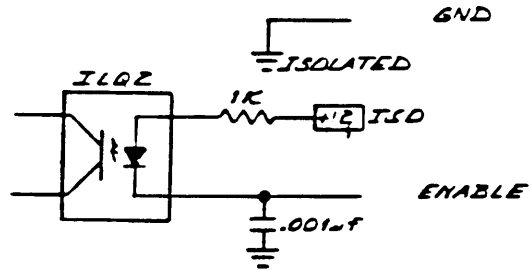
Figure 23. Torque Speed Curves

Figure 24. I/O Schematics

COMPUMOTOR INTERFACE

PIN NAME

To Opto Isolation	Motorola 	RX
To Opto Isolation	145406 	TX



Same as Enable Input  
 Same as Enable Input  
 Same as Enable Input

CW Limit  
 CCW Limit  
 Reset

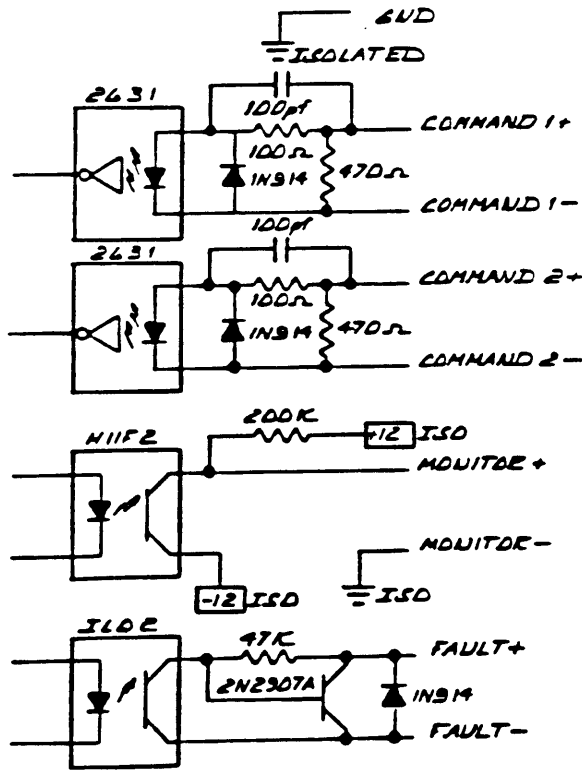
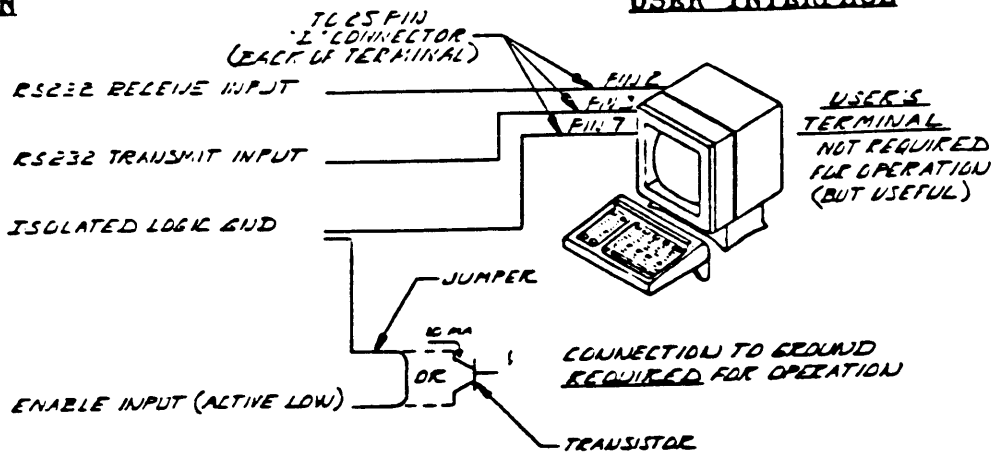


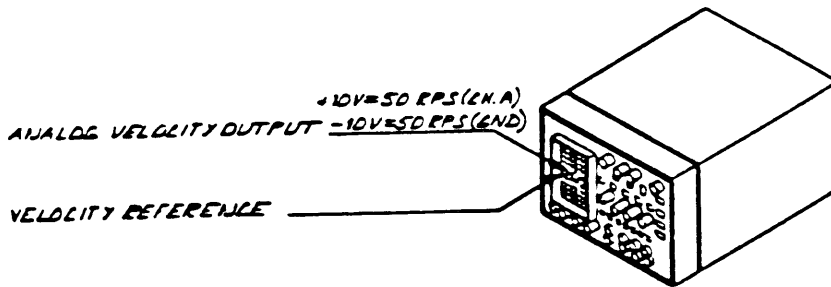
Figure 25. I/O Schematics

**FUNCTION**

**DSRR INTERFACE**



Clockwise Limit	Normally Connected to Gnd
Counter Clockwise Limit	Normally Connected to Gnd
Reset Input (Active Low)	Connection to "Gnd" causes hardware reset
Isolated Logic Gnd	
Step Input/Analog In	From indexer step output not used on Plus X
Step Return/Analog in Return	
Direction Input/Analog Ref	From Indexer Direction Output Not used on Plus X
Direction Output/Analog Ref Ret	



Fault Output (30V @ 50 ma)  
 ON (Current Flowing) indicates no fault  
 OFF Indicates Fault

Fault Return

Figure 26. I/O Schematics

POWER PLUS MOTOR CONNECTORS

High Power Plus


Line  
Neutral                      Standard 115 VAC input  
Gnd                              (Earth Gnd)

A+  
A-                              Motor Connection  
Gnd                              Cable will be prewired by Compumotor  
B+                              (Colors not yet defined)  
B-

ISOLATED 36 VAC TRANSFORMERS

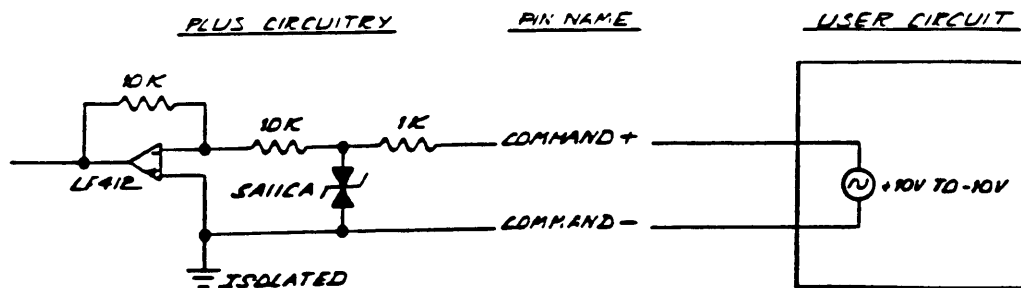
(Supplied by Compumotor)

Low Power Plus

T1                              36 VAC Power                      36 VAC  
T2                              (Earth Gnd)                      @ 4 amps   
Gnd

A+  
A-                              Motor Connection  
Gnd                              Cable will be prewired by Compumotor  
B+                              (Colors not yet defined)  
B-

1. "Reset" input must be active (10ms minimum) to initiate a hardware reset
2. Analog input versions reconfigure the Command 1 inputs thus:



When Command 2 inputs are **NOT** energized  
+10 V = 50 RPS CW  
-10 V = 50 RPS CCW

When Command 2 inputs are energized  
+10 V = 50 RPS CCW  
-10 V = 50 RPS CW

Figure 27. I/O Schematics

3. Step/Direction Version - Standard Compumotor Step/Direction input circuitry.

Maximum input step rate = 640 Khz    Minimum Step Pulse width = 500 ns  
(Direction input must be stable 400 ns prior to, during and after any step pulse).

Active on all Versions :

Slip Fault Output Bit

