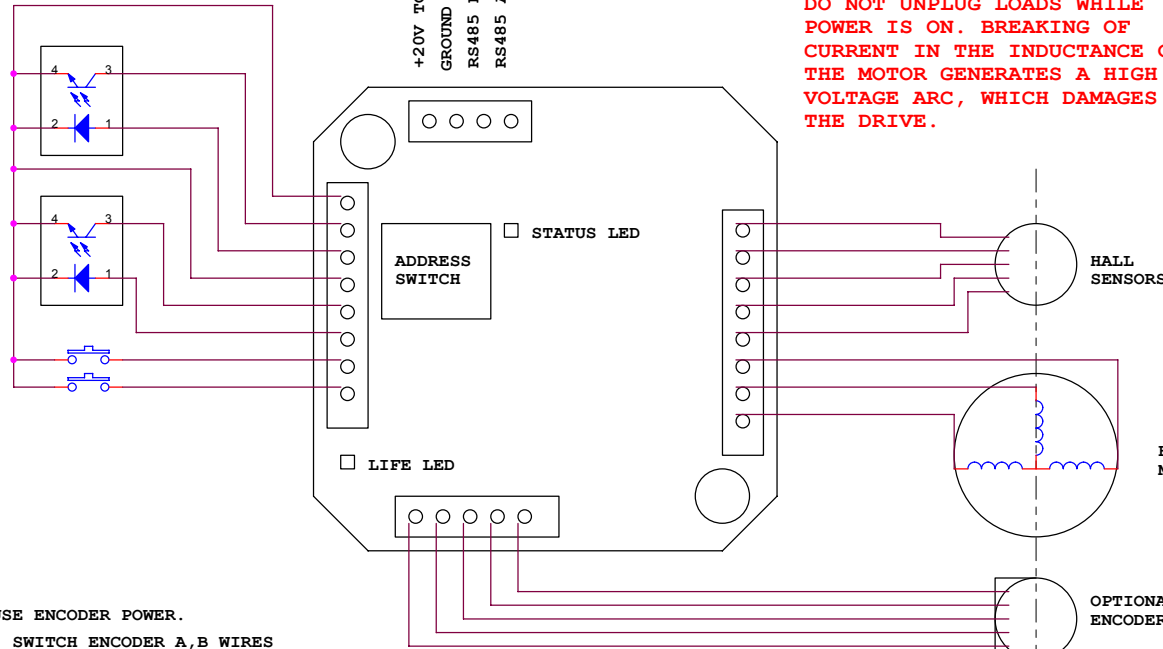


TO PC COM PORT
USE 9600 BAUD
8BIT, NO PARITY,
1 STOP, NO FLOW
CTRL.

TO OTHER EZ SERVOS
OR EZ STEPPERS

**DO NOT UNPLUG LOADS WHILE
POWER IS ON. BREAKING OF
CURRENT IN THE INDUCTANCE OF
THE MOTOR GENERATES A HIGH
VOLTAGE ARC, WHICH DAMAGES
THE DRIVE.**

- OPTO SENSOR #1 GROUND
- OPTO SENSOR #1 PHOTO TRANSISTOR
- OPTO SENSOR #1 LED
- OPTO SENSOR #2 GROUND
- OPTO SENSOR #2 PHOTO TRANSISTOR
- OPTO SENSOR #2 LED
- SWITCH #1 CLOSURE TO GROUND INPUT
- SWITCH #2 CLOSURE TO GROUND INPUT



- HALL A
- HALL B
- HALL C
- +15V HALL SENSOR POWER
- HALL SENSOR GROUND
- PHASE A POWER DRIVER
- PHASE B POWER DRIVER
- PHASE C POWER DRIVER

- NOTES:
- 1) IF HALL SENSORS REQUIRE 5V POWER , USE ENCODER POWER.
 - 2) IF MOTOR EXHIBITS POSITIVE FEEDBACK, SWITCH ENCODER A,B WIRES
 - 3) KEEP ENCODER / INPUTS AWAY FROM NOISEY MOTOR POWER WIRES.

SEE PAGE 2 FOR BRUSH MOTOR WIRING

SEE PAGE 3 FOR MANUFACTURER
SPECIFIC BLDC MOTOR WIRING
EXAMPLES

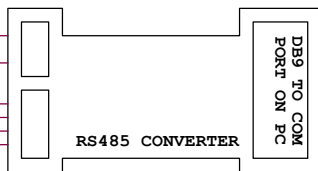
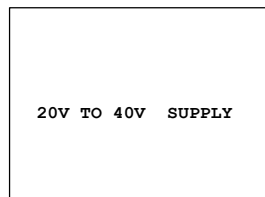
- GROUND
- INDEX
- CHAN A
- +5V
- CHAN B

NOTE: ENCODER SIGNALS MUST BE >4.5V HIGH LEVEL.
THIS MAY REQUIRE EXTERNAL PULLUPS.

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**EZ SERVO EZSV17 WIRING
DIAGRAM FOR BLDC MOTOR**

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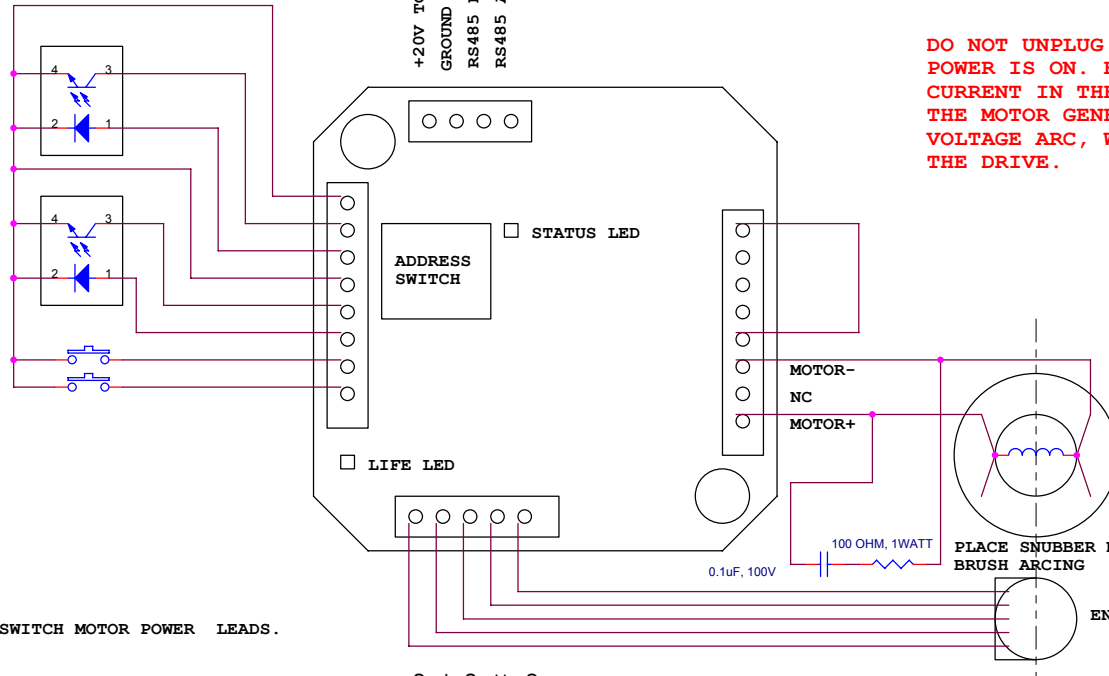


TO PC COM PORT
USE 9600 BAUD
8BIT, NO PARITY,
1 STOP, NO FLOW
CTRL.

TO OTHER EZ SERVOS
OR EZ STEPPERS

**DO NOT UNPLUG LOADS WHILE
POWER IS ON. BREAKING OF
CURRENT IN THE INDUCTANCE OF
THE MOTOR GENERATES A HIGH
VOLTAGE ARC, WHICH DAMAGES
THE DRIVE.**

- OPTO SENSOR #1 GROUND
- OPTO SENSOR #1 PHOTO TRANSISTOR
- OPTO SENSOR #1 LED
- OPTO SENSOR #2 GROUND
- OPTO SENSOR #2 PHOTO TRANSISTOR
- OPTO SENSOR #2 LED
- SWITCH #1 CLOSURE TO GROUND INPUT
- SWITCH #2 CLOSURE TO GROUND INPUT



- HALL A
- HALL B
- HALL C
- HALL SENSOR POWER
- HALL SENSOR GROUND
- PHASE A POWER DRIVER
- PHASE B POWER DRIVER
- PHASE C POWER DRIVER

**EZ SERVO WIRING DIAGRAM
FOR BRUSH MOTOR**

- NOTES:
- 1) IF MOTOR EXHIBITS POSITIVE FEEDBACK, SWITCH MOTOR POWER LEADS.
OR SWITCH ENCODER A,B WIRES
 - 2) KEEP ENCODER / INPUTS AWAY FROM NOISEY MOTOR POWER WIRES.

SEE PAGE 1 FOR BRUSHLESS MOTOR WIRING
**SEE PAGE 3 FOR MANUFACTURER SPECIFIC
BLDC MOTOR WIRING EXAMPLES**

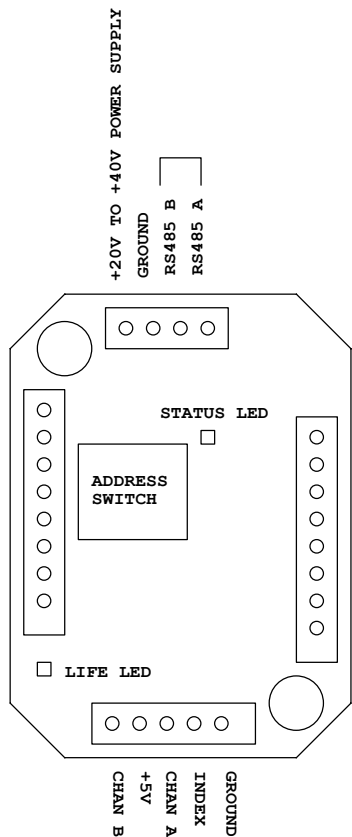
- GROUND
- INDEX
- CHAN A
- +5V
- CHAN B

NOTE: ENCODER SIGNALS MUST BE >4.5V HIGH LEVEL.
THIS MAY REQUIRE EXTERNAL PULLUPS.

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POWER INPUT AND COMMUNICATION



SIZE: 1.6" X 1.6" x 0.6" THICK

POPULAR MANUFACTURER WIRE COLORS

MOTOR CONNECTION	PITTMAN	MAXON	EAD OPTICAL HALL	EAD MAGNETIC HALL	FAULHARBER	ANAHEIM AUTOMATION	HARMONIC DRIVES RSF8B	PORTESCAP NUVODISC 32BF	MAXON EC-max	
HALL A	WHITE	BLUE		BROWN	YELLOW	GREEN	WHITE	YELLOW	SENSOR1	GREY
HALL B	GREY	GREY		WHITE	GREEN	BLUE	BLUE	BROWN	SENSOR3	BROWN
HALL C	BLUE	VIOLET		GREEN	GREY	GREY	GREEN	RED	SENSOR2	YELLOW
+15V HALL SENSOR POWER	PURPLE	YELLOW	NC	ORANGE	RED	RED	RED	WHITE (PINK)	VDD	GREEN
HALL SENSOR GROUND	BLACK	GREEN	NC	BLACK	BLACK	BLACK	BLACK	BLACK	GROUND	BLUE
PHASE A POWER DRIVER	BROWN	ORANGE	BROWN	BROWN	BROWN	BLACK (M)	BLACK (M)	BLACK (M)	PHASE 3	BLACK
PHASE B POWER DRIVER	RED	RED	WHITE	WHITE	ORANGE	YELLOW (M)	RED (M)	RED (M)	PHASE 2	RED
PHASE C POWER DRIVER	ORANGE	BROWN	BLUE	BLUE	YELLOW	RED (M)	WHITE (M)	WHITE (M)	PHASE 1	WHITE

FROM OPTICAL ENCODER + HALL

GROUND BLACK
 INDEX ORANGE
 CHAN A YELLOW
 +5V RED
 CHAN B BLUE

DO NOT CONNECT ORANGE BLUE GREEN

ENCODER CONNECTION

NOTE: ENCODER SIGNALS MUST BE >4.5V HIGH LEVEL. THIS MAY REQUIRE EXTERNAL PULLUPS.

EZ SERVO WIRING DIAGRAM

PLEASE NOTE: FOR OTHER MOTORS, ALLMOTION WILL BE PLEASED TO WORK OUT THE WIRING FOR NO CHARGE.

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EZSV17 ACESSORIES AND OTHER ELECTRICAL NOTES

MATING CONNECTORS:

AMP MTA 100 SERIES
4PIN 22 GA DIGIKEY P/N A23849 (INPUT CONNECTOR)
8PIN 22 GA DIGIKEY P/N A23841 (NEMA23 MOTOR)
8PIN 24 GA DIGIKEY P/N A23820 (NEMA17 MOTOR)
8PIN 26 GA DIGIKEY P/N A23799 (FOR OPTOS)
5PIN 26 GA DIGIKEY P/N A23796 (FOR ENCODER)
T HANDLE CRIMP TOOL DIGIKEY P/N A9982

MOTORS:

1) THE EZ SERVO WILL DRIVE MOST SERVO MOTORS
2) FOR BEST PERFORMANCE SELECT A MOTOR THAT HAS A BACK EMF OF ABOUT 1/2 OF THE SUPPLY VOLTAGE, AT THE MAX SPEED DESIRED TO RUN AT. (Eg USE A 12V MOTOR WITH A 24V SUPPLY).
3) TYPICALLY A MOTOR THAT HAS AN INDUCTANCE OF AROUND 1mH AND A RESISTANCE OF AROUND 1 OHM WORKS WELL. BUT OTHER VALUES ARE ALSO OK. (0.5mH MINIMUM)

ENCODERLESS OPERATION:

1) THE EZSERVO CAN PERFORM VELOCITY MODE CONTROL OF A MOTOR THAT DOES NOT HAVE AN ENCODER BY USING THE HALL SENSORS AS A GAGE OF SPEED. (N=0 MODE)
2) IT IS POSSIBLE TO USE THE N=1 POSITION CONTROL MODE BY WIRING TWO OF THE HALL SENSOR LINES TO THE ENCODER A AND B INPUTS IN ADDITION. THIS ALLOWS A CRUDE POSITION CONTROL MODE. IN THIS MODE THE VELOCITY CONTROL IS SUPERIOR TO THE N=0 MODE. USE SMALL ACCELEARTIONS AND VELOCITIES IN THIS MODE. Eg TRY /1L1V10000P0R
3) IF WIRING HALL SENSORS AS ENCODERS , USE THE ENCODER 5 V TO POWER THE HALL SENSORS.

OPTO HOME SWITCH:

1) "Z" OR HOME COMMAND RUNS MOTOR UNTIL OPTO #1 IS ON FLAG EDGE.
2) AN OPTO SWITCH PROVIDED WITH EACH STARTER KIT
3) USE TRANSISTOR OPTO THAT HAS $I_c > 1mA$ @ $I_F = 20mA$.
4) EXAMPLES OF ACCEPTABLE OPTOS ARE:
DIGIKEY P/N QVA11134
DIGIKEY P/N H21A1
HONEYWELL HOA1887-012 (IS PREWIRED)
HONEYWELL HOA1870-33 (IS PREWIRED)
OPTEK OPB830W11 (IS PREWIRED)
5) THE OPTO COUPLER LED PIN HAS 200 OHM TO 5V IN SERIES ON THE BOARD. THE 200 OHM CAN BE REMOVED IF DESIRED FOR RUNNING SENSORS THAT REQUIRE DIRECT ACCESS TO 5V. (OR USE ENCODER 5V POWER) THE COLLECTOR OF THE TRANSISTOR HAS A 10K PULLUP TO 5V.
6) ALL INPUTS WORK ON TTL LEVEL SIGNALS

SEE NEXT PAGE FOR DIMENSIONAL INFO

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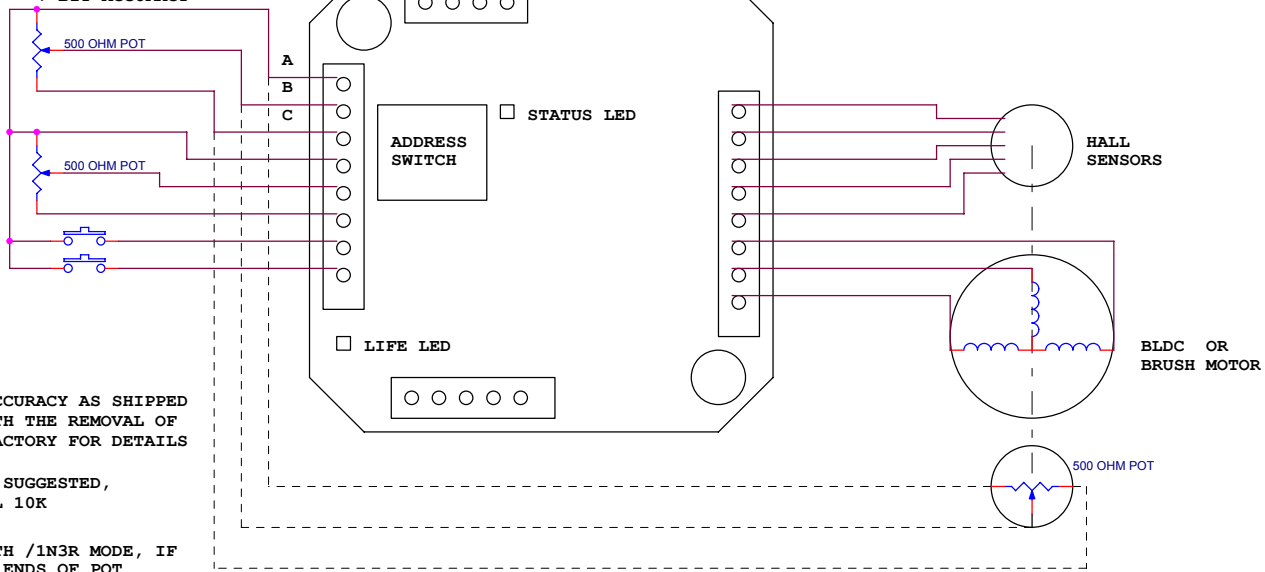
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FEEDBACK POT1 GROUND
 FEEDBACK POT1 WIPER
 FEEDBACK POT1 POWER

POSITION COMMAND POT2 GROUND
 POSITION COMMAND POT2 WIPER
 POSITION COMMAND POT2 POWER

SWITCH #1 CLOSURE TO GROUND INPUT
 SWITCH #2 CLOSURE TO GROUND INPUT

**SIMPLE CIRCUIT,
 7 BIT ACCURACY**

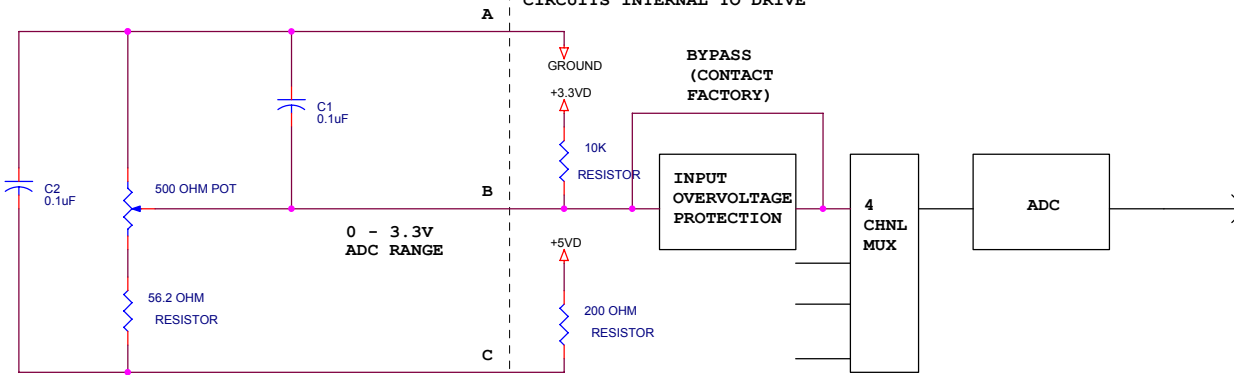


HALL A
 HALL B
 HALL C
 HALL SENSOR POWER
 HALL SENSOR GROUND
 PHASE A POWER DRIVER
 PHASE B POWER DRIVER
 PHASE C POWER DRIVER

NOTES:

- 1) ALL 4 INPUTS ARE ANALOG INPUTS
- 2) ADC's VALUES RANGE FROM 0-16368. THE ACCURACY AS SHIPPED IS 7 BIT BUT CAN BE IMPROVED TO >10BIT WITH THE REMOVAL OF THE INPUT PROTECTION CIRCUITRY, CONTACT FACTORY FOR DETAILS
- 3) POTS IN THE RANGE OF 500 OHM - 10K ARE SUGGESTED, LOWER VALUES ARE LESS AFFECTED BY INTERNAL 10K PULLUP. 500 OHM RECOMMENDED.
- 4) IF USING POT FOR POSITION FEED BACK WITH /1N3R MODE, IF MOTOR EXHIBITS POSITIVE FEEDBACK, SWITCH ENDS OF POT
- 5) 10K INTERNAL PULLUP WILL INTERFERE WITH LINEARITY OF POT VOLTAGE, AND MAY NEED TO BE REMOVED - CONTACT FACTORY.
- 6) INPUT OVERVOLTAGE PROTECTION CIRCUITRY MAY NEED TO BE REMOVED FOR >7BIT ACCURACY - CONTACT FACTORY.

CIRCUITS INTERNAL TO DRIVE



ENHANCED EXTERNAL CIRCUIT FOR > 10BIT ACCURACY

**WIRING DIAGRAM ANALOG INPUT OR
 POTENTIOMETER FEEDBACK**

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