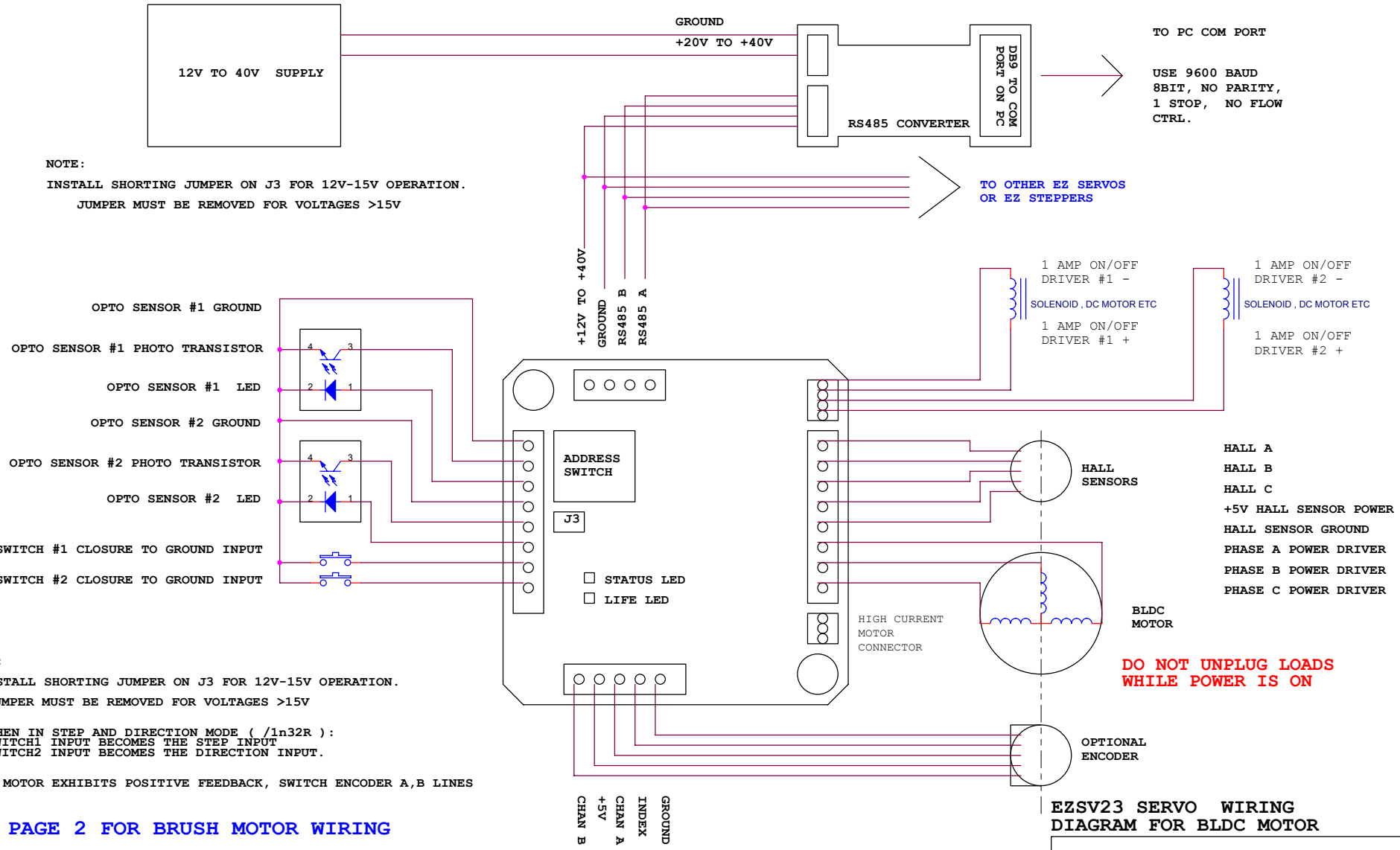



NOTES:

1) INSTALL SHORTING JUMPER ON J3 FOR 12V-15V OPERATION.
JUMPER MUST BE REMOVED FOR VOLTAGES >15V

2) WHEN IN STEP AND DIRECTION MODE ( /1n32R ):
SWITCH1 INPUT BECOMES THE STEP INPUT
SWITCH2 INPUT BECOMES THE DIRECTION INPUT.

3) IF MOTOR EXHIBITS POSITIVE FEEDBACK, SWITCH ENCODER A,B LINES

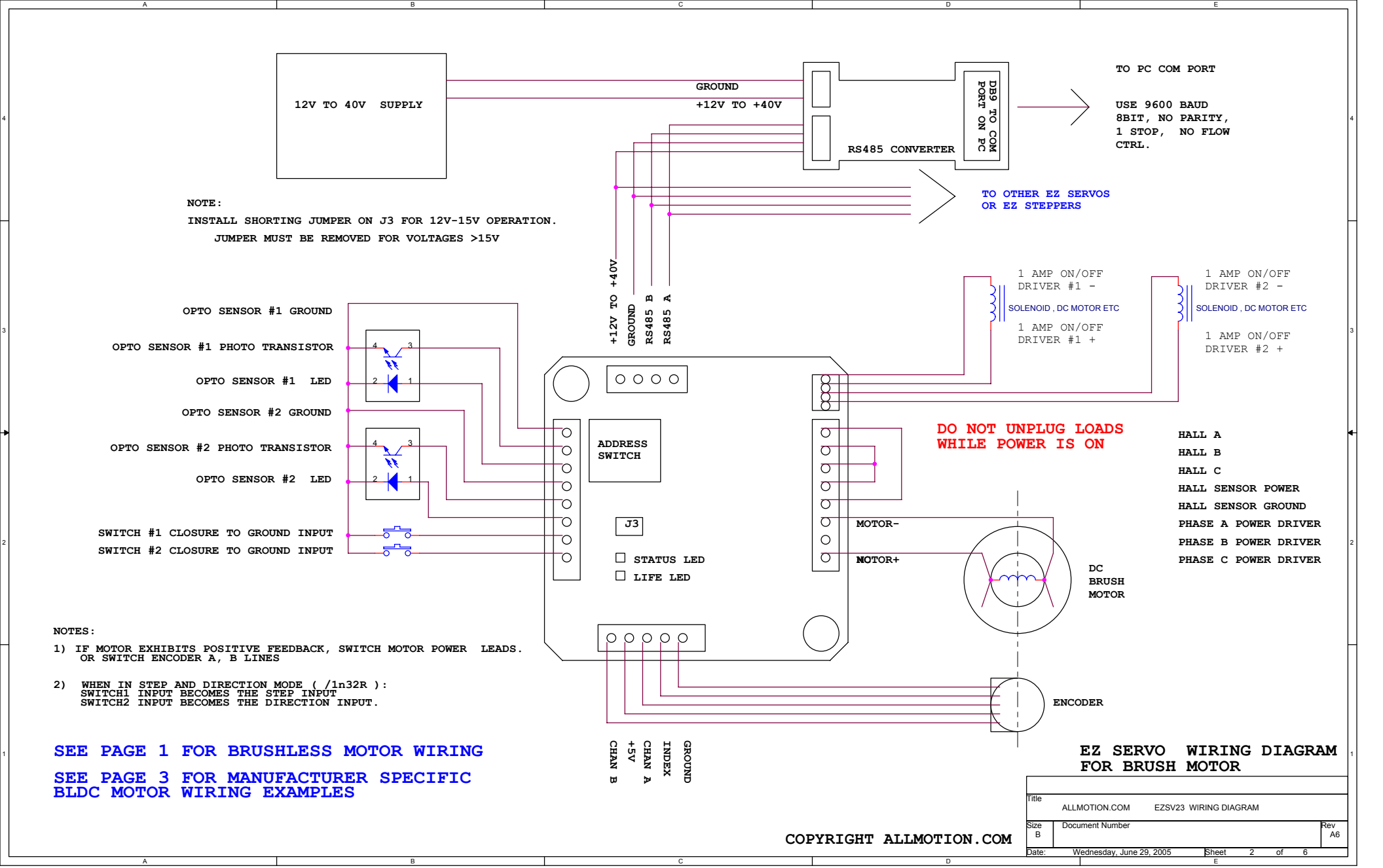
SEE PAGE 2 FOR BRUSH MOTOR WIRING

SEE PAGE 3 FOR MANUFACTURER SPECIFIC BLDC MOTOR WIRING EXAMPLES

# EZSV23 SERVO WIRING DIAGRAM FOR BLDC MOTOR



| | | |
|---|---|---|
| Title | ALLMOTION.COM EZSV23 WIRING DIAGRAM | |
| Size B | Document Number | Rev A6 |
| Date: Wednesday, June 29, 2005 | Sheet 1 of 6 | |




NOTES:

1) IF MOTOR EXHIBITS POSITIVE FEEDBACK, SWITCH MOTOR POWER LEADS. OR SWITCH ENCODER A, B LINES

2) WHEN IN STEP AND DIRECTION MODE ( /1n32R ):
SWITCH1 INPUT BECOMES THE STEP INPUT
SWITCH2 INPUT BECOMES THE DIRECTION INPUT.

SEE PAGE 1 FOR BRUSHLESS MOTOR WIRING

SEE PAGE 3 FOR MANUFACTURER SPECIFIC BLDC MOTOR WIRING EXAMPLES

# EZ SERVO WIRING DIAGRAM FOR BRUSH MOTOR



| | | |
|---|---|---|
| Title | ALLMOTION.COM EZSV23 WIRING DIAGRAM | |
| Size B | Document Number | Rev A6 |
| Date: Wednesday, June 29, 2005 | Sheet 2 of 6 | |

POWER INPUT AND COMMUNICATION

SIZE: 2.25" X 2.25" x 1.00" THICK

+12V TO +40V POWER SUPPLY
GROUND
RS485 B
RS485 A

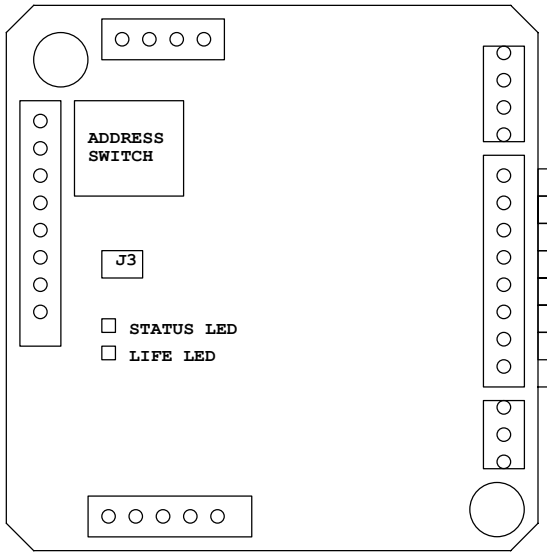
NOTE: MOTORS WITHOUT ENCODERS CAN BE RUN IN THE "N0" VELOCITY MODE, OR FOR FINER CONTROL THEY CAN BE RUN IN "N1" MODE WITH TWO OF THE HALL SENSOR LINES WIRED TO THE ENCODER CHANNELS A AND B TO ACT AS A ROUGH POSITION ENCODER. THIS WILL ALLOW FINE ACCELERATION CONTROL, OR ROUGH POSITION CONTROL. THE VELOCITY WILL NEED TO BE SET LOW. TRY /1L1V10000R, ENSURE THAT THE ENCODER IS HOOKED UP TO COUNT UP WHEN THE MOTOR MOVES IN THE POSITIVE DIRECTION.

On/Off Drivers deliver same voltage as input voltage.

DIGITAL I/O CONNECTOR

OPTO SENSOR #1 GROUND / SW CLOSURE GND
OPTO SENSOR #1 PHOTO TRANSISTOR
OPTO SENSOR #1 LED
OPTO SENSOR #2 GROUND / SW CLOSURE GND
OPTO SENSOR #2 PHOTO TRANSISTOR
OPTO SENSOR #2 LED
SWITCH CLOSURE TO GROUND INPUT
SWITCH CLOSURE TO GROUND INPUT

4 SWITCH CLOSURE, OR 2 OPTO AND 2 SWITCH CLOSURE INPUTS




ENCODER CONNECTION

1AMP ON/OFF DRIVER 1 -
1AMP ON/OFF DRIVER 1 +
1AMP ON/OFF DRIVER 2 -
1AMP ON/OFF DRIVER 2 +

PHASE A POWER DRIVER HIGH CURRENT SCREW TERMINAL
PHASE B POWER DRIVER HIGH CURRENT SCREW TERMINAL
PHASE C POWER DRIVER HIGH CURRENT SCREW TERMINAL

Use screw terminal if > 3 Amp Current

## POPULAR MANUFACTURER WIRE COLORS

| | PITTMAN | MAXON | MAXON | EAD OPTICAL HALL | EAD MAGNETIC HALL | FAULHARBER |
|---|---|---|---|---|---|---|
| HALL A | WHITE | BLUE | RED/GREY | BROWN | YELLOW | GREEN |
| HALL B | GREY | GREY | WHITE/GREY | WHITE | GREEN | BLUE |
| HALL C | BLUE | VIOLET | BLACK/GREY | GREEN | GREY | GREY |
| +5V HALL SENSOR POWER | PURPLE | YELLOW | GREEN | NC | ORANGE | RED |
| HALL SENSOR GROUND | BLACK | GREEN | BLUE | NC | BLACK | BLACK |
| PHASE A POWER DRIVER | BROWN | ORANGE | WHITE | BROWN | BROWN | BROWN |
| PHASE B POWER DRIVER | RED | RED | BLACK | WHITE | WHITE | ORANGE |
| PHASE C POWER DRIVER | ORANGE | BROWN | RED | BLUE | BLUE | YELLOW |

FROM OPTICAL ENCODER + HALL

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

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



# EZSV23 SERVO WIRING DIAGRAM

| | | |
|---|---|---|
| Title | ALLMOTION.COM EZSV23 WIRING DIAGRAM | |
| Size B | Document Number | Rev A6 |
| Date: Wednesday, June 29, 2005 | Sheet 3 of 6 | |

# EZSV23 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)

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. (0.1mH 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 Ic > 1mA @ IF = 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 ACESS 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

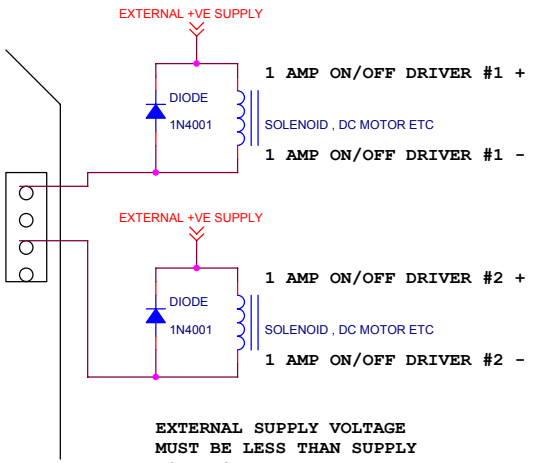
## ON/OFF DRIVERS ALTERNATE WIRING DIAGRAM

1) ON/OFF DRIVERS RATED AT 2 AMPS PEAK, 1 AMP CONTINUOUS.

2) THE NEGATIVE PIN OF THESE DRIVERS IS ACTUALLY AN OPEN COLLECTOR TYPE OUTPUT THAT PULLS DOWN TO GROUND. IT IS POSSIBLE TO DRIVE LOADS THAT ARE OF A DIFFERENT VOLTAGE THAN THE SUPPLY VOLTAGE, BY CONNECTING THE POSITIVE SIDE OF THE LOAD TO AN EXTERNAL SUPPLY, AND THE NEGATIVE SIDE TO THE -VE OUTPUT PIN. HOWEVER, IN CASE THIS IS DONE IT IS NECESSARY TO PLACE AN EXTERNAL "FREE WHEELING" DIODE ACROSS ANY INDUCTIVE LOADS. EXTERNAL SUPPLY VOLTAGE MUST BE LESS THAN SUPPLY VOLTAGE TO EZ STEPPER

3) EXTERNAL DIODE IS NOT NECESSARY IF BOTH SIDES OF LOAD ARE WIRED BACK TO THE EZ STEPPER.

ON/OFF DRIVERS ALTERNATE WIRING DIAGRAM

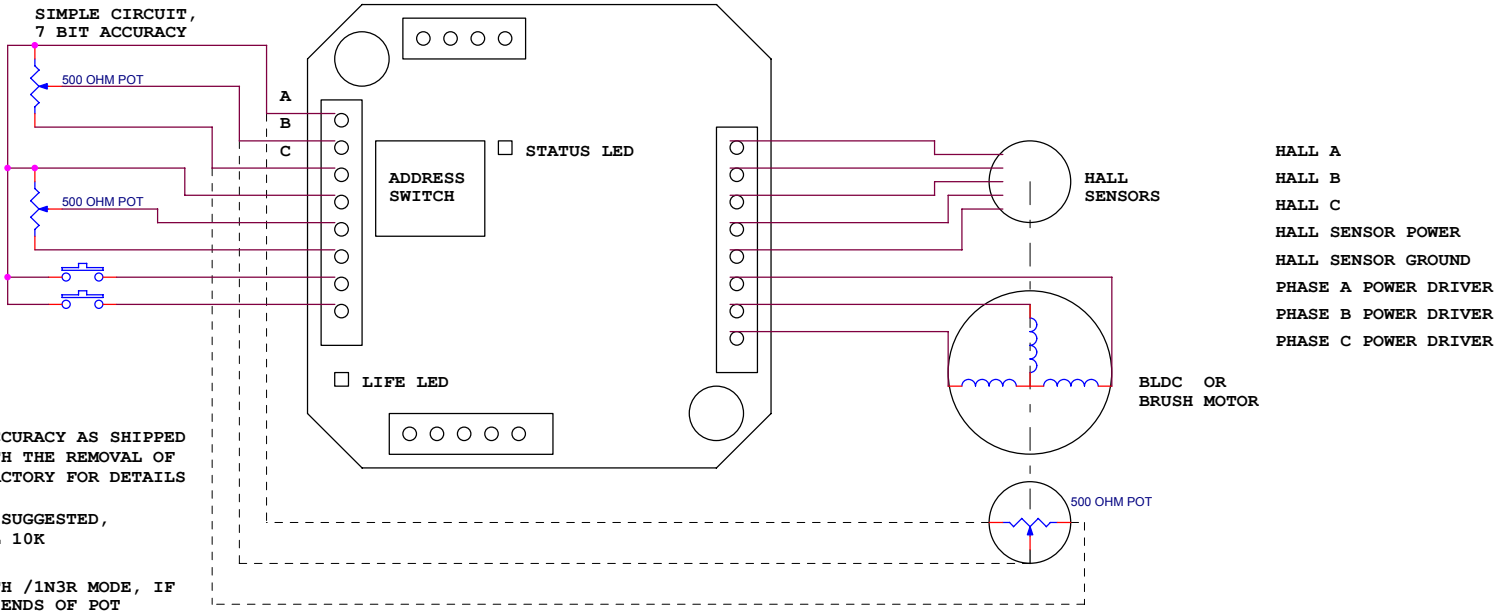



EXTERNAL SUPPLY VOLTAGE MUST BE LESS THAN SUPPLY TO EZ STEPPER

SEE NEXT PAGE FOR DIMENSIONAL INFO



| | | |
|---|---|---|
| Title | ALLMOTION.COM EZSV23 WIRING DIAGRAM | |
| Size B | Document Number | Rev A6 |
| Date: Wednesday, June 29, 2005 | Sheet 4 of 6 | |




NOTES:

1) ALL 4 INPUTS ARE ANALOG INPUTS

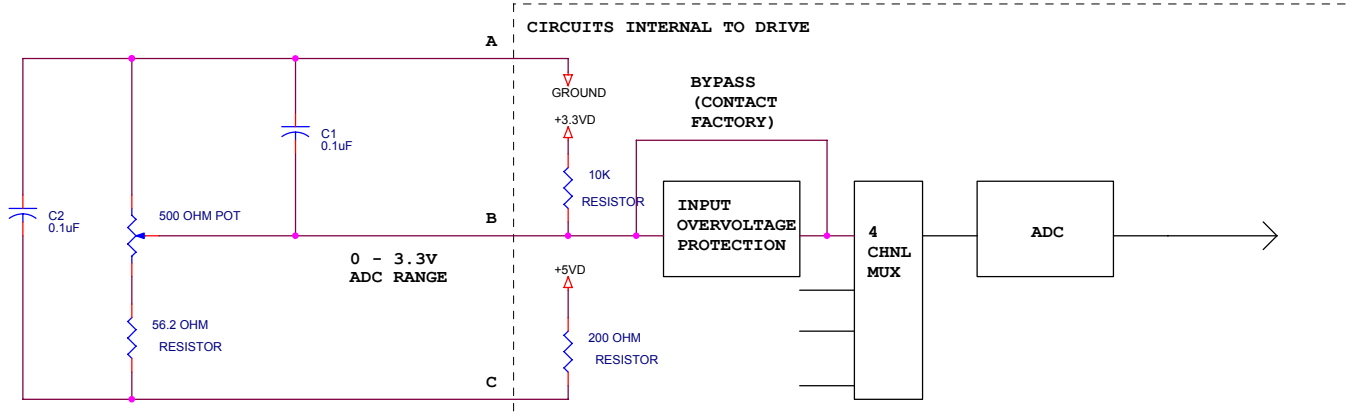
2) ADC's VALUES RANGE FROM 0-16368. THE ACCURACY AS SHIPPED IS 7 BIT BUT CAN BE IMPROVED TO >10BIT WITH THE REMOVAL OF THE INPUT PROTECTION CIRCUITRY, CONTACT FACTORY FOR DETAILS

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.

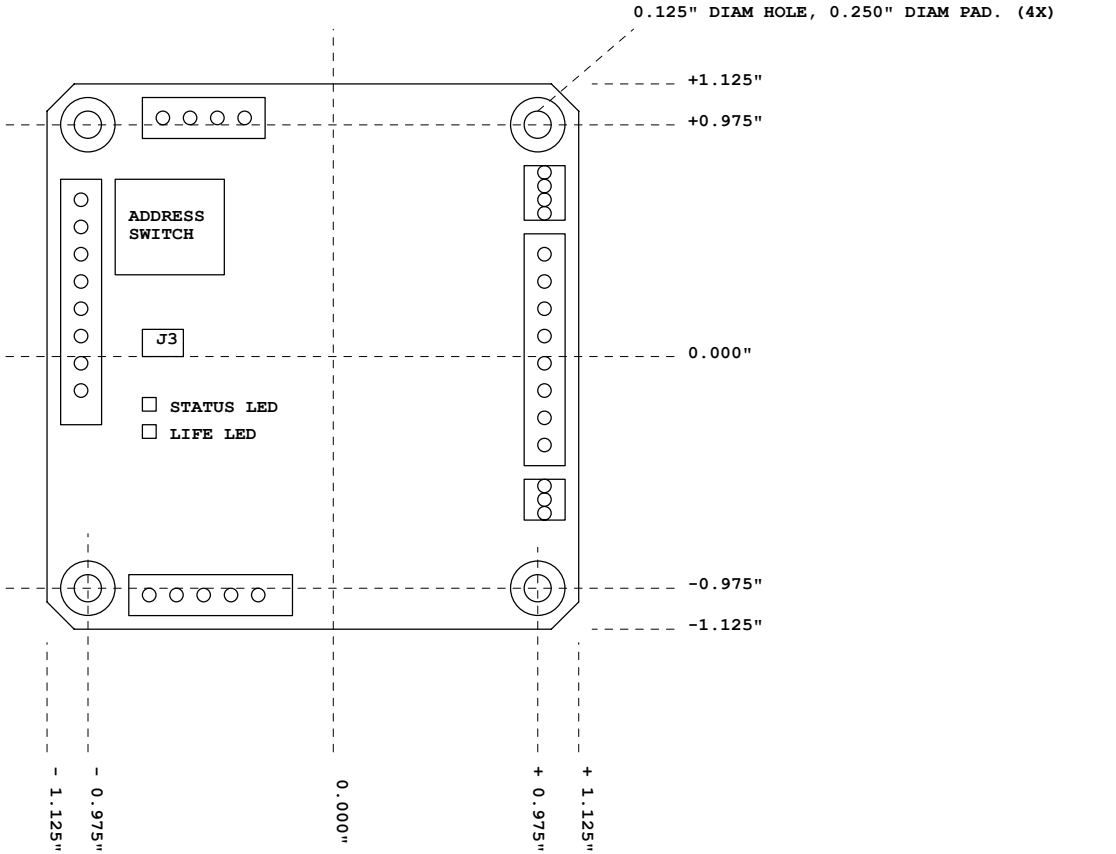


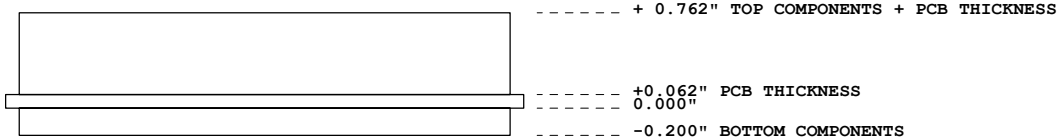

ENHANCED EXTERNAL CIRCUIT FOR > 10BIT ACCURACY



# WIRING DIAGRAM ANALOG INPUT OR POTENTIOMETER FEEDBACK

| | | |
|---|---|---|
| Title | ALLMOTION.COM EZ SERVO WIRING DIAGRAM | |
| Size B | Document Number | Rev A6 |
| Date: Wednesday, June 29, 2005 | Sheet 5 of 6 | |




## EZSV23 DIMENSIONAL INFORMATION



| | | |
|---|---|---|
| Title | ALLMOTION.COM EZ SV23 DIMENSIONAL INFO | |
| Size B | Document Number | Rev A6 |
| Date: Wednesday, June 29, 2005 | Sheet 6 of 6 | |