

# Model AR2 Wiring Harness

WIRING HARNESS ASSEMBLY

# BILL OF MATERIALS

All Stepper motors, drivers and power supplies are available at:  
[www.omc-stepperonline.com](http://www.omc-stepperonline.com)



TronicsPros High Quality 4 Pin 4 Color 10m 20m RGB Extension Cable Wire LED Strip Connector  
RGB 5050 3528 LED Strip  
by TronicsPros

\$10<sup>96</sup> ✓prime  
Some colors are Prime eligible

★★★★★ ▾ 28

**Product Features**  
... 4 pin LED extension cable for SMD 5050  
strip lights. ...



Hilitchi 240pcs(30set) 2.5mm Pitch 3-Pin JST SM Male & Female Plug Housing  
and Male/female Pin Header Crimp Terminals Connector Kit  
by Hilitchi

\$10<sup>63</sup> ✓prime  
Only 18 left in stock - order soon.

More Buying Choices  
\$10.63 (2 new offers)

★★★★★ ▾ 1

10% off item with purchase of 1 items and 1  
more promotion ▾

**Product Features**  
Pin Pitch: 2.5mm



Hilitchi 274pcs(25set) 2.5mm Pitch 4-Pin JST SM Male & Female Plug Housing  
Male/female Pin Header Crimp Terminals Connector Kit  
by Hilitchi

\$11<sup>58</sup> ✓prime  
Only 5 left in stock - order soon.

More Buying Choices  
\$10.99 (2 new offers)

★★★★★ ▾ 4

10% off item with purchase of 1 items and 1  
more promotion ▾

**Product Features**  
Pin Pitch: 2.5mm



### 34Meter Long PE Polyethylene 4mm Spiral Cable Wire Wrap Tube Black

by Amico

\$8<sup>39</sup> ✓prime

Only 1 left in stock - order soon.

★★★★★ 7

#### Product Features

... Diameter : 4mm / 0. ... 03" Package

Content : 1 x Spiral Wrap ...



### uxcell 33ft Length 10mm Dia Tube Computer Manage Cable Wire Spiral Wrap Black

by uxcell

\$7<sup>35</sup>

✓prime

#### Product Features

... Package Content: 1 x Wire Spiral Wrap

Thickness: 0. ... 10mm/0. ...

More options available:

\$7.07 Other Sellers



### uxcell® 10mm Black Polyolefin Insulation Heat Shrink Tubing 3 Meters 9.8ft

by uxcell

\$5<sup>94</sup> ✓prime

Get it by **Tuesday, Aug 8**

★★★★★ 18

More Buying Choices

\$5.03 (2 new offers)



### Vktech 150pcs 2:1 Heat Shrink Tubing Tube Sleeving Wire Cable 8 Sizes 2-13mm Black

by Vktech

\$5<sup>99</sup> ✓prime

Get it by **Sunday, Sep 17**

More Buying Choices

\$5.99 (3 used & new offers)

★★★★★ 365

5% off purchase of \$50.00 and 1 more promotion ▼

#### Product Features

Big collection of *heat shrink* tubing, 8 Specifications



Switchcraft

### Switchcraft EHRJ45P5ES RJ45 CAT5e Feedthru Panel Mount Jack, Shielded, Plastic Black Housing

★★★★☆ • 7 customer reviews

Was: \$11.70

Price: **\$9.99** ✓prime

You Save: \$1.71 (15%)

Get \$70 off instantly: Pay \$0.00 upon approval for the Amazon Prime Rewards Visa Card.

**Only 6 left in stock (more on the way).**

**Want it tomorrow, Feb. 20?** Order within **3 hrs 2 mins** and choose **One-Day Shipping** at checkout. [Details](#)

Ships from and sold by Amazon.com. Gift-wrap available.

- The EH Series Connectors by Switchcraft is a complete line of Audio, Video and Data Connectors built into standard panel mount XLR housings.
- Custom Combinations can be loaded into any Switchcraft Q-G Panel or any panel or plate punched for standard XLR's.

### Uxcell a16022200ux0139 Polyurethane PU Air Tube Pipe Hose, 4 mm OD, 2 mm Inner Diameter, 19 m Long Black, Metal, 0.08"

by uxcell

**\$7.87**

FREE Shipping on eligible orders

More Buying Choices

**\$7.87** (2 new offers)

★★★★☆ ▾ 2

**Product Features**

Outside diameter: 4Mm/0.16"; inside



### Permatex 81158 Black RTV Silicone Sealant. 3 oz.

by Permatex

**\$6.94**

FREE Shipping on eligible orders

More Buying Choices

**\$4.40** (8 new offers)

★★★★★ ▾ 14



### Hammond 1591BSBK ABS Project Box Black

★★★★☆ ▾

57 customer reviews | 8 answered questions

**Amazon's Choice** for "abs project box"

Price: **\$6.51** ✓prime

FREE One-Day Pickup. [Details](#)

Get \$70 off instantly: Pay \$0.00 upon approval for the Amazon Prime Rewards Visa Card.

**In Stock.**

**Want it tomorrow, Feb. 20?** Order within **5 hrs 56 mins** and choose **One-Day Shipping** at checkout. [Details](#)

Sold by Gerber Electronics and Fulfilled by Amazon. Gift-wrap available.





YXQ

### PG16 Waterproof Cable Gland Joints Adjustable Lock Nut Connector For 10-13mm Cable Black Plastic 12Pcs

[Be the first to review this item](#)

Price: **\$8.29** ✓prime

Get \$70 off instantly: Pay \$0.00 upon approval for the Amazon Prime Rewards Visa Card.

**Only 12 left in stock - order soon.**

Sold by [WLG Electrical](#) and [Fulfilled by Amazon](#). Gift-wrap available.

Size: **PG16**

PG7

PG9

PG11

PG13.5

**PG16**

PG19

PG21

PG24

(you will need 2 packs of 10 aviation plugs)



### 4 Pin Metal Male Female Panel Connector 16mm GX16-4 Silver Aviation Plug of 10 pcs

★★★★★ 1 customer review

**Note:** This item is only available from third-party sellers ([see all offers](#)).

**Available from these sellers.**

- Product Name : Aviation Connector Plug;Model : 16-4;Type : Male Female Plug;
  - Contacts Pin Number : 4
  - Rated : 125V/5A;WorkingVoltage : AC 200V;Withstand Voltage : AC 1500V
  - Total Size : 4.7 x 1.9cm/ 1.8" x 0.7" (Lx Max.W);
  - Material&Package: Metal;10 Pairs Aviation Connector Plug
- [See more product details](#)

[Compare with similar items](#)

**New (1)** from \$12.99 + \$5.27 shipping




### Monoprice 100-Foot 18AWG CL2 Rated 4-Conductor High-Purity Oxygen-Free Copper Speaker Wire

★★★★★ 85 customer reviews | 15 answered questions

**Amazon's Choice**

for "speaker wire 4 conductor"

Price: **\$34.55** ✓prime

 **FREE One-Day Pickup.** [Details](#)



## SV-166-1C25 Limit Switch Long Hinge Roller Arm SPDT Action 3-16A 250VAC (10 pieces)

Be the first to review this item

Price: **\$7.56** (\$0.76 / item) + \$4.49 shipping

Note: Not eligible for Amazon Prime.

Only 2 left in stock - order soon.

Get it as soon as Feb. 14 - 17 when you choose Expedited Shipping at checkout.

Ships from and sold by Standard Supply Co.

New (1) from \$7.56 + \$4.49 shipping

### Specifications for this item

Brand Name	Yueqing Saigo Electronics
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Odiyurveil

## Odiyurveil (TM) XV-152-1C25 Hinge Lever Type Miniature Micro Switch(Pack of 5)

★★★★★ 15 customer reviews | 4 answered questions

Price: **\$8.29** ✓Prime

In Stock.

Want it Friday, April 21? Order within 3 hrs 24 mins and choose Two-Day Shipping at checkout.

Details

Sold by Overseasymall and Fulfilled by Amazon. Gift-wrap available.

- Product Name : Micro Switch;Model No. : XV-152-1C25;
- Actuator Type : Straight Hinge Lever;

(Make sure you buy high quality non roller switch for J6 – note the rivet hinge pin)



Red 16pc 22 AWG Wire with .187 Quick Disconnect



Grey 16pc 22 AWG Wire with .187 Quick Disconnect



Black 16pc 22 AWG Wire with .187 Quick Disconnect

<https://www.focusattack.com/electrical/wiring/by-gauge/22-awg/>



## Sharpie Oil-Based Paint Markers, Fine Point, Assorted Colors, 5-Count

by Sharpie

**\$10<sup>68</sup>** ~~\$15.99~~ ✓prime

Get it by **Sunday, Sep 17**

More Buying Choices

**\$4.69** (17 new offers)

★★★★★ 239



**Gardner Bender 48-308UVB Mounting Cable Tie, 8 Inch.,50 lbs. Tensile Strength, Wire / Cord Management Industrial and Household Use, Nylon Zip Tie, 100 Pk., UV Resistant Black**

by Gardner Bender

**\$8<sup>39</sup>** ~~\$9.51~~ ✓prime

Get it by **Tomorrow, Aug 6**

[More Buying Choices](#)

★★★★★ ▼ 52

**Product Features**

*Mounting cable ties*



**IWISS Crimping Tools for Dupont Professional Pin Compression Ratcheting Modular Insulated Terminal Crimper Pin 2.54mm 3.96mm 28-18AWG 0.5-1.0mm2 with Wire-electrode Cutting Die**

by Iwiss

**\$23<sup>00</sup>** ✓prime

Get it by **Tuesday, Aug 8**

[More Buying Choices](#)  
**\$21<sup>39</sup>** (1 used offer)

★★★★★ ▼ 277

**Product Features**

*... pins Wire-electrode cutting die sets promise a high-precision crimping ...*



**Neiko 01924A Ultimate Self-Adjusting Wire and Cable Stripper**

by Neiko

**\$13<sup>99</sup>** ~~\$19.99~~ ✓prime

Get it by **Tomorrow, Sep 11**

[More Buying Choices](#)  
**\$11.95** (13 used & new offers)

★★★★★ ▼ 538

**Product Features**

*... Innovative wire stripper with self-adjusting mechanism is ideal for ...*



You will need 1 limit switch tip  
For J6, this part must be 3D printed.  
The print file can be found on  
The project page with all the other  
3D print files.

# SECTION 1

FEMALE 4 PIN JST CONNECTOR FOR  
MOTOR END OF WIRING HARNESS





BEND AND BREAK OFF FEMALE PIN  
FROM STRIP.

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NOTE THAT THE GAP ON THE PIN  
INSULATION WINGS IS TYPICALLY TOO  
WIDE OR TOO OPEN.

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USE NEEDLE NOSE PLIERS TO CLOSE THE GAP AS SHOWN

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THE GAP SHOULD NOW LOOK LIKE THIS.

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PLACE END OF RIBBON WIRE IN SELF  
ADJUSTING WIRE STRIPPERS AS SHOWN.

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STRIP END LEAVING APPROX 3mm OF  
WIRE EXPOSED ON ALL 4 WIRES.

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USE CUTTERS OR RAZOR KNIFE TO  
SEPARATE WIRES.

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NOTE THE LIP OR STEP IN THE UPPER  
JAW OF THE CRIMPING TOOL.

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WITH CRIMPING TOOL UPSIDE DOWN IN YOUR LEFT HAND PLACE THE FEMALE PIN INTO THE JAW WITH YOUR RIGHT HAND AS SHOWN. THE WINGS SHOULD BE UP AGAINST THE STEP SHOWN IN THE PREVIOUS STEP..



CLOSE THE CRIMPER SLOWLY UNTIL THE RATCHET MECHANISM CLICKS 3 TIMES BUT DO NOT FULLY CLAMP. IT SHOULD LOOK LIKE THIS.





FLIP THE CRIMPER BACK RIGHT SIDE UP AND HOLD WITH YOUR RIGHT HAND, THEN STARTING WITH THE BLUE WIRE AS SHOWN – INSERT THE WIRE INTO THE CRIMPER AND PIN.

---



THIS PICTURE SHOWS WHERE THE WIRE SHOULD BE SITTING INSIDE THE PIN.

NOTE THE JACKET IS JUST PAST THE LARGE WINGS AND THE WIRE ITSELF IS INSIDE THE SMALLER SET OF WINGS.

IT WILL TAKE PRACTICE TO GET A FEEL FOR HOW TO INSERT THE WIRE INTO THE CRIMPER TO GET THIS ALIGNMENT.

---



WITH THE WIRE AT THE CORRECT  
DEPTH COMPLETELY CLAMP THE CRIMPER.

---



THIS PICTURE SHOWS HOW IT SHOULD  
LOOK AFTER BEING CRIMPED.

NOTE THE JACKET IS FULLY CLAMPED  
BY THE LARGE WINGS BUT THE JACKET  
STOPS RIGHT AT THE SMALLER WINGS  
AND THE SMALLER WINGS HAVE  
CLAMPED ONLY THE METAL WIRE.

I SUGGEST PRACTICING THIS SEVERAL  
TIMES TO GET THE HANG OF IT BEFORE  
TRYING TO MAKE YOUR WIRING  
HARNESS.

---





**THIS PICTURE SHOWS AN INCORRECTLY CRIMPED CONNECTOR.**

**NOTE THE JACKET IS NOT FULLY INSIDE OR CLAMPED BY THE WINGS.**

---

**THIS IS NOT ACCEPTABLE – IF IT LOOKS LIKE THIS YOU NEED TO RE-DO IT.**



**THIS PICTURE ALSO SHOWS AN INCORRECTLY CRIMPED CONNECTOR.**

**NOTE THE WIRE WAS INSERTED TOO FAR AND THE JACKET IS CLAMPED BY BOTH THE LARGE AND SMALL WINGS.**

**THIS IS NOT ACCEPTABLE – IF IT LOOKS LIKE THIS YOU NEED TO RE-DO IT..**





ONCE YOU HAVE MASTERED CRIMPING  
CONTINUE CRIMPING A PIN ON ALL 4  
WIRES AS SHOWN.

PINCH EACH CONNECTOR IN YOUR  
FINGERS AND TUG ON IT TO MAKE  
SURE IT DOESN'T COME OFF EASILY. IF  
IT COMES OFF IT OBVIOUSLY NEEDS TO  
BE REDONE AND WASN'T FULLY  
CRIMPED.



CUT A LENGTH OF HEAT SHRINK  
TUBING APPROX 25mm LONG AND RUN  
WIRES THROUGH IT AS SHOWN.



USE A RAZOR BLADE TO MAKE SURE  
THE TANGS ON EACH PIN ARE POINTED  
OUT.

SOMETIMES THEY GET FLATTENED AND  
WILL NOT LATCH INTO THE PLASTIC  
HOUSING.

---



START TO FEED WIRES INTO FEMALE  
HOUSING AS SHOWN.

---





CONTINUE TO FULLY INSERT WIRES INTO HOUSING.

NOTE THE TANGS ARE FULLY INSERTED INTO THE SLOTS AND DO NOT PULL BACK OUT

NOTE WITH THE SLOTS FACING YOU THE BLUE WIRE IS ON TOP, THEN RED, GREEN AND BLACK ON THE BOTTOM. IT IS IMPORTANT THEY ARE INSERTED IN THIS ORDER.



APPLY BLACK SILICONE AROUND THE BASE OF THE CONNECTOR ON BOTH SIDES AS SHOWN.



USE A TOOTHPICK TO WORK SILICONE INTO EACH JACKET ON BOTH SIDES.

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AFTER WORKING SILICONE INTO CONNECTOR SPREAD IT A SHORT WAY DOWN THE WIRES – IT SHOULD LOOK LIKE THE PICTURE.

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SLIDE THE LENGTH OF HEAT SHRINK TUBING OVER THE CONNECTOR AS SHOWN.

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USE A HEAT GUN TO SHRINK THE TUBING AS SHOWN.

THIS CONNECTOR IS NOW COMPLETE

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## SECTION 2

FEMALE 3 PIN JST CONNECTOR FOR LIMIT  
SWITCH END OF WIRING HARNESS



REMOVE THE BLUE STRAND FROM THE RIBBON WIRE AS THIS CONNECTOR ONLY REQUIRES 3 WIRES.

CRIMP FEMALE PINS TO THE ENDS OF EACH OF THE WIRES STARTING WITH THE RED WIRE AS SHOWN – REFER TO INSTRUCTIONS IN SECTION I FOR CRIMPING DETAILS.



INSERT WIRES WITH FEMALE PINS INTO THE 3 PIN FEMALE JST HOUSING AS SHOWN.

NOTE WITH THE SLOTS FACING YOU THE RED WIRE IS ON TOP, THEN GREEN AND BLACK ON THE BOTTOM. IT IS IMPORTANT THEY ARE INSERTED IN THIS ORDER.

APPLY SILICONE AND HEAT SHRINK  
TUBING AS OUTLINED IN SECTION I.

THIS CONNECTOR IS NOW COMPLETE.

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## SECTION 3

### MALE 3 PIN JST CONNECTOR LIMIT SWITCH PIGTAILS



CONNECT BLACK, RED AND GREY 22 AWG QUICK DISCONNECT WIRES TO EACH LIMIT SWITCHES FOR ALL 6 AXIS.

NOTE: J1 THROUGH J5 WILL USE THE ROLLER LIMIT SWITCH SHOWN. J6 WILL USE A STRAIGH ARM WITH TIP EXTENSION SHOWN IN THE NEXT STEP.



NOTE THE LIMIT SWITCH FOR AXIS 6 USES A STRAIGH ARM LIMIT SWITCH WITH THE J6 LIMIT SWITCH TIP ATTACHED.

LIGHTLY SAND END OF LIMIT SWITCH ARM ON BOTH SIDES AND THEN USE EPOXY TO SECURE J6 LIMIT SWITCH TIP TO ARM OF SWITCH.

.STL PRINT FILE FOR THIS TIP CAN BE FOUND ON PROJECT PAGE INCLUDED WITH THE OTHER PRINT FILES FOR THE COMPLETE PRINTED ROBOT.

Cut quick disconnect wires to length for each switch as shown below

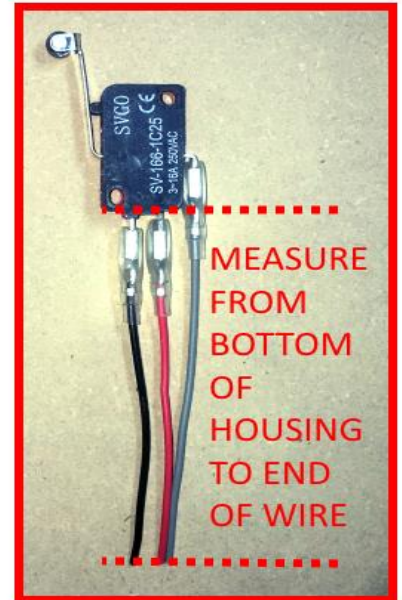
J1 - CUT WIRES TO 8.25cm (3.25")



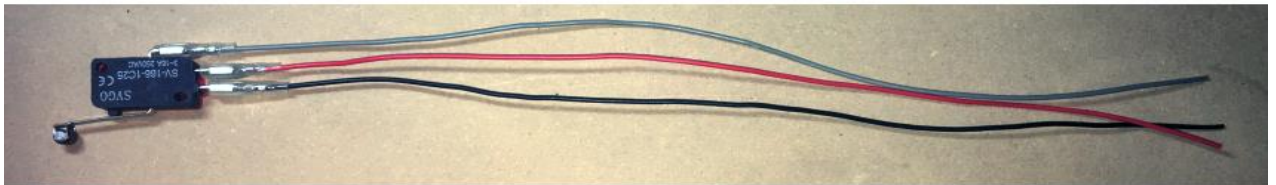
J2 - CUT WIRES TO 8.25cm (3.25")



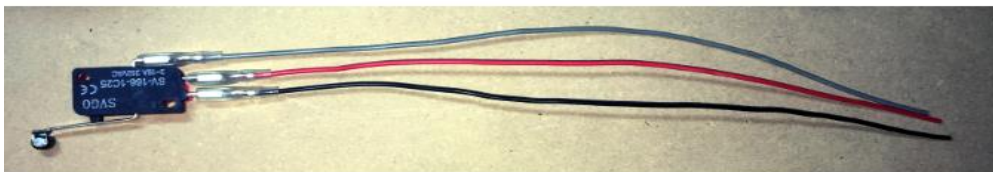
J3 - CUT WIRES TO 8.25cm (3.25")



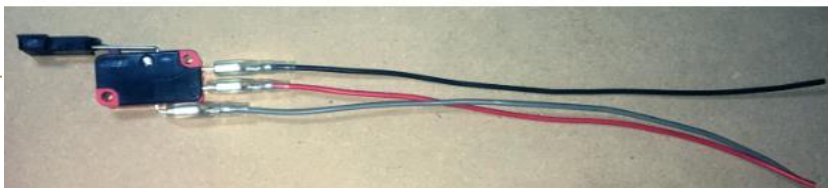
J4 - CUT WIRES TO 30.5cm (12")



J5 - CUT WIRES TO 21.5cm (8.5")



J6 - CUT WIRES TO 17.2cm (6.75")





CRIMP JST MALE PINS TO RED, GREY AND BLACK WIRES IN THE EXACT SAME PROCEEDURE OUTLINED IN SECTION I FOR ALL 6 LIMIT SWITCHES.

---



INSERT WIRES INTO MALE JST HOUSING AS SHOWN – WITH CLIP FACING FORWARD INSERT RED WIRE ON TOP, GREY IN THE MIDDLE AND BLACK ON THE BOTTOM.

---





INSERT PINS UNTIL THEY ARE FULLY SEATED AND CLICK INTO THE HOUSING.

---



PLACE SILICONE AROUND WIRES AT BASE OF JST HOUSING AND WORK SILICONE INTO REAR OF CONNECTOR IN THE SAME WAY SHOWN IN SECTION I.

---







WRAP WIRES WITH 4mm SPIRAL WRAP –  
MAKE SURE SPIRAL WRAP EMBEDS INTO  
SILICONE BEFORE IT CURES.

---



PLACE SHORT LENGTH OF HEAT  
SHRINK TUBE OVER WIRES AND ONTO  
JST CONNECTOR AS SHOWN.

---





USE HEAT GUN TO SHRINK TUBING  
AROUND CONNECTOR AND WIRES.

---



AFTER ALL 6 LIMIT SWITCH PIGTAILS ARE  
COMPLETE USE PAINT PENS TO MARK  
THE CONNECTORS AS SHOWN ON THE  
NEXT PAGE

---



# MARK CONNECTORS AS SHOWN



J1 - DO NOT MARK WITH PAINT



J2 - MARK WITH BLUE PAINT PEN



J3 - MARK WITH RED PAINT PEN



J4 - MARK WITH YELLOW PAINT PEN



J5 - MARK WITH WHITE PAINT PEN

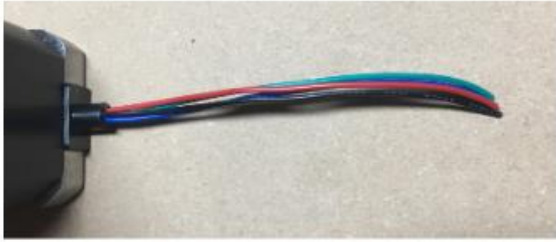


J6 - DO NOT MARK WITH PAINT

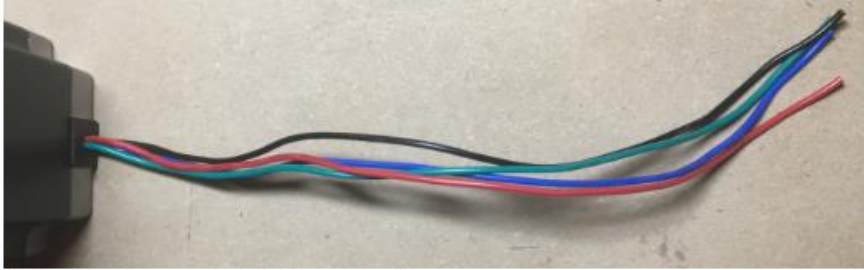
## SECTION 4

MALE 4 PIN JST CONNECTOR ON  
MOTOR PIGTAILS

# CUT MOTOR WIRES TO THE FOLLOWING LENGTHS



J1 - CUT TO 7.5cm (3")



J2 - CUT TO 17.75cm (7")



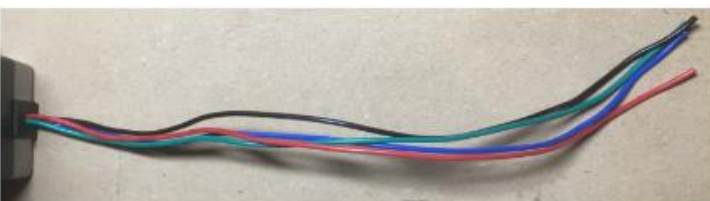
J3 - CUT TO 17.75cm (7")



J4 - CUT TO 20.25cm (8")

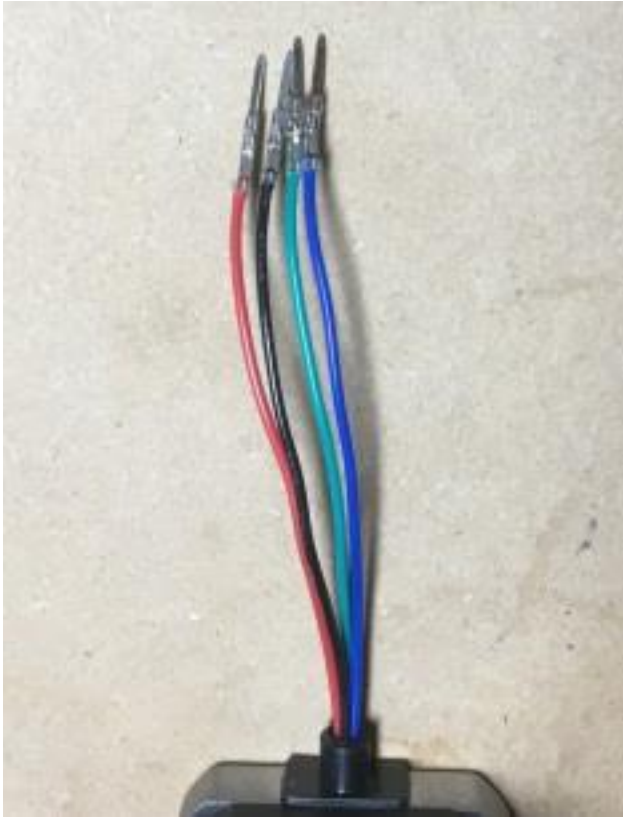


J5 - CUT TO 28cm (11")



J6 - CUT TO 15.25cm (6")





CRIP MALE JST PINS AS OUTLINED IN SECTION 1 TO EACH WIRE ON ALL 6 MOTORS.

---



SLIDE SHORT LENGTH OF HEAT SHRINK TUBE OVER WIRES.

---





WRAP 4mm SPIRAL WRAP AROUND WIRES AND SLIDE UNDER HEAT SHRINK WRAP AS ITS WRAPPED.



INSERT WIRES INTO MALE JST HOUSING AS SHOWN. – MAKE SURE THEY FULLY CLICK INTO PLACE.

MAKE SURE WITH THE CLIP FACING YOU THAT THE BLUE WIRE IS ON THE LEFT, THEN THE RED, GREEN, AND BLACK ON THE RIGHT.

NOTE: THE MOTORS FOR J5 AND J6 HAVE DIFFERENT WIRE COLORS, SEE ELECTRICAL SCHEMATIC FOR CORRECT COLOR ORDER.

*J5 motor*



*J6 motor*





APPLY BLACK SILICONE TO WIRES AND CONNECTOR – WORK SILICONE INTO BACK OF CONNECTOR WITH TOOTH PICK.

---



FINSIH WRAPPING SPRIRAL WRAP INTIL WRAP IS EMBEDDED INTO SILICONE..

---





SLIDE HEAT SHRINK TUBE OVER  
CONNECTOR AS SHOWN.

---



USE HEAT GUN TO SHRINK TUBING AS  
SHOWN.

---





APPLY BLACK SILICONE TO THE BASE OF EACH PIGTAIL.





# MARK EACH CONNECTOR WITH PAINT PENS AS SHOWN



J1 - DO NOT MARK WITH PAINT



J2 - MARK WITH BLUE PAINT



J3 - MARK WITH RED PAINT



J4 - MARK WITH YELLOW PAINT



J5 - MARK WITH WHITE PAINT



J6 - DO NOT MARK WITH PAINT

# SECTION 5

## WIRING HARNESS ASSEMBLY



CUT 6 LENGTHS OF 4-STRAND  
RIBBON WIRE TO THE  
FOLLOWING LENGTHS:

J1- WIRE = 40.6cm (16") LONG

J2- WIRE = 71cm (28") LONG

J3- WIRE = 71cm (28") LONG

J4- WIRE = 86.3cm (34") LONG

J5- WIRE = 86.3cm (34") LONG

J6- WIRE = 132cm (52") LONG

---



CONNECT 4 PIN FEMALE JST  
CONNECTOR TO ONE END OF EACH  
WIRE AS OUTLINED IN SECTION I.



Use paint pens to mark each end  
of the motor wires as shown:

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J1 - NO PAINT



J2 - BLUE BOTH ENDS



J3 - RED BOTH ENDS



J4 - YELLOW BOTH ENDS



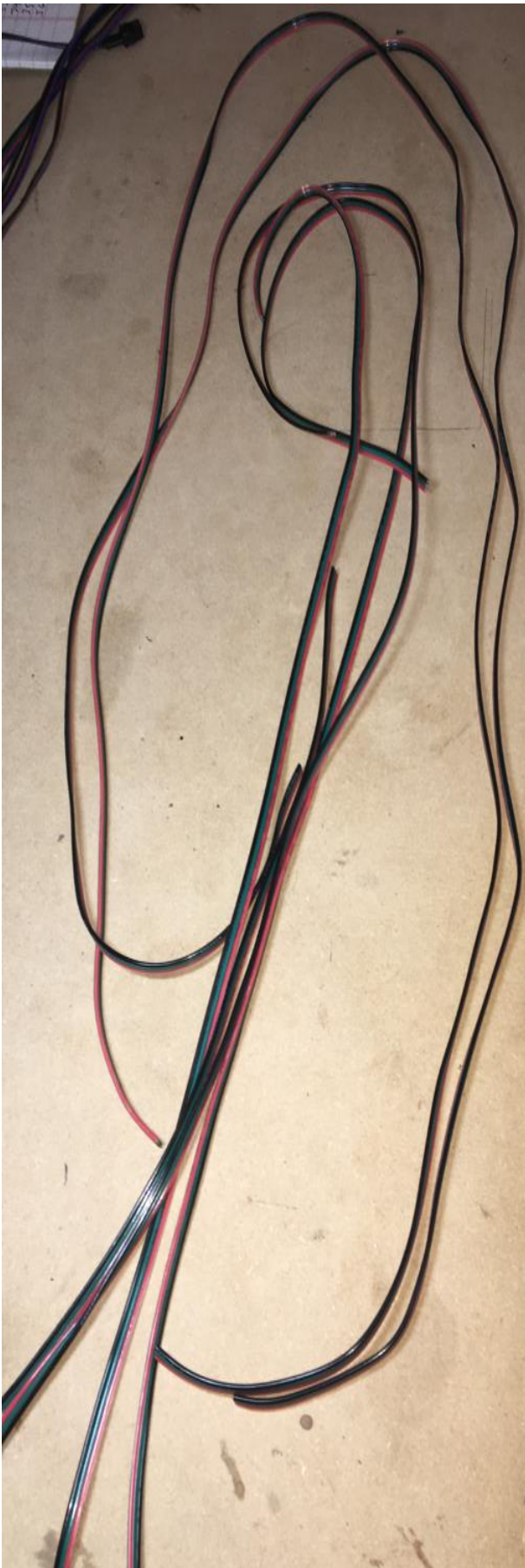
J5 - WHITE BOTH ENDS



J6 - NO PAINT







CUT 6 LENGTHS OF  
STRANDED RIBBON WIRE TO  
THE FOLLOWING LENGTHS –  
STRIP OFF THE BLUE WIRE  
FROM EACH SO THAT YOU  
HAVE 3 STRAND WIRES (RED,  
GREEN, BLACK):

J1- WIRE = 71cm (16") LONG

J2- WIRE = 58.4cm (23") LONG

J3- WIRE = 86.4cm (34") LONG

J4- WIRE = 86.4cm (34") LONG

J5- WIRE = 132cm (52") LONG

J6- WIRE = 132cm (52") LONG

THESE 6 WIRES WILL BE FOR THE  
LIMIT SWITCHES.

---



INSTALL 3 PIN FEMALE JST CONNECTOR  
AS OUTLINED IN SECTION 2 ON THE  
END OF EACH OF THE 6 LIMIT SWITCH  
WIRES.

---



STRIP 6mm TO 8mm FROM THE OTHER  
END OF THE LIMIT SWITCH WIRES

---





USE BLUE PAINT PEN TO MARK THE J2  
LIMIT SWITCH WIRE AT BOTH ENDS AS  
SHOWN.

-----  
*NOTE: AS BEFORE THE J1 WIRE DOES NOT  
NEED TO BE MARKED.*



USE RED PAINT PEN TO MARK THE J3  
LIMIT SWITCH WIRE AT BOTH ENDS AS  
SHOWN.



USE YELLOW PAINT PEN TO MARK THE J4 LIMIT SWITCH WIRE AT BOTH ENDS AS SHOWN.

---



USE WHITE PAINT PEN TO MARK THE J5 LIMIT SWITCH WIRE AT BOTH ENDS AS SHOWN.

*NOTE: AS BEFORE THE J6 WIRE DOES NOT NEED TO BE MARKED.*





USE STEPPED BIT TO DRILL 7/8" HOLE IN  
END OF PROJECT BOX.

---



PULL ALL MOTOR AND LIMIT SWITCH  
WIRE ENDS THROUGH PG16 GLAND  
NUT AS SHOWN

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INSTALL WIRE LOOM AND GLAND NUT INTO PROJECT BOX AS SHOWN.

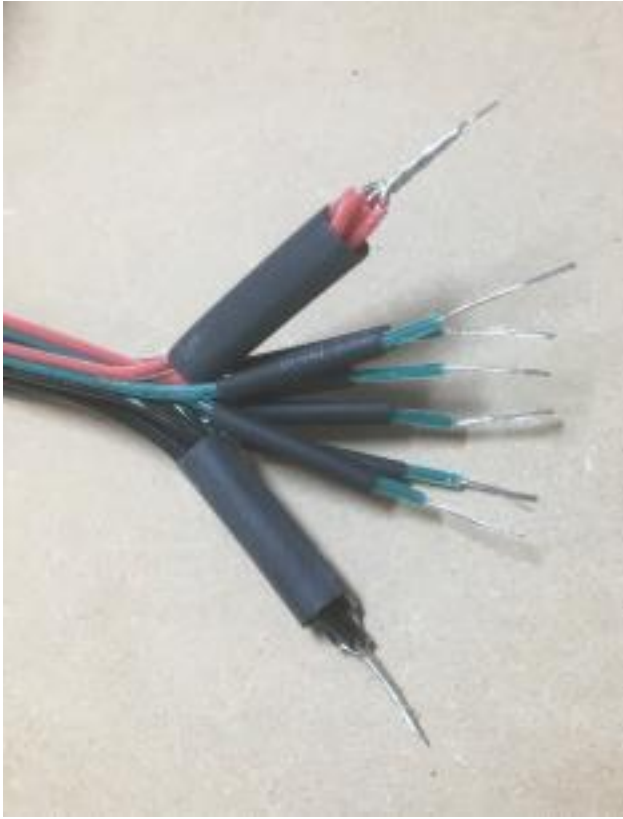
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PULL LIMIT SWITCH WIRES FAR ENOUGH OUT OF BOX TO GIVE YOURSELF SOME ROOM TO WORK. ON THE STRIPPED END OF LIMIT SWITCH WIRES – SEPARATE THE WIRE STRANDS THEN TWIST ALL THE RED WIRES TOGETHER AND THEN TWIST ALL THE BLACK WIRES TOGETHER.

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SLIP 2.5cm (1") LENGTH OF 6mm HEAT SHRINK TUBING OVER RED AND BLACK WIRE BUNDLES.

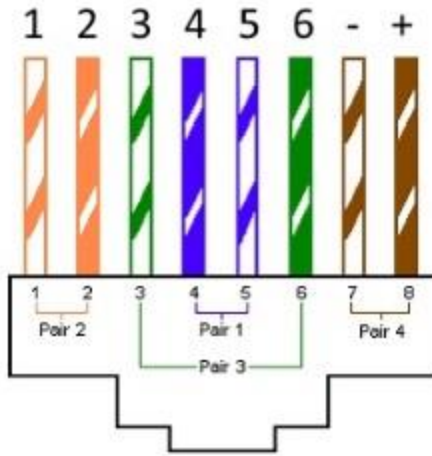
SLIP 2.5cm (1") LENGTH OF 2mm HEAT SHRINK TUBING OVER EACH OF THE GREEN WIRES.



CUT OFF MALE END OF RJ45 EXTENSION WIRE AND STRIP OFF OUTER SHEATHING AS SHOWN.

THE FOLLOWING STEPS WILL  
CONNECT THE GREEN LIMIT SWITCH  
WIRES TO THE CORRECT RJ45 WIRES.

THE IMAGE TO THE LEFT SHOWS THE  
COLOR CODE FOR WHICH RJ45 WIRE  
GOES TO WHICH LIMIT SWITCH



J1 = WHITE / ORANGE STRIPE

J2 = ORANGE / WHITE STRIPE

J3 = WHITE / GREEN STRIPE

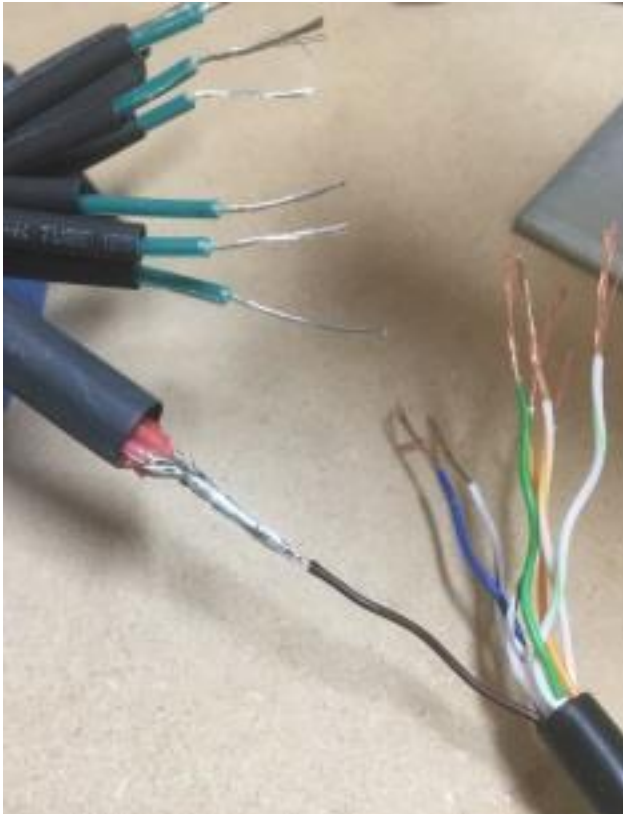
J4 = BLUE / WHITE STRIPE

J5 = WHITE / BLUE STRIPE

J6 = GREEN / WHITE STRIPE

COMMON NEGATIVE = WHITE / BROWN  
STRIPE.

COMMON POSITIVE = BROWN / WHITE  
STRIPE.





SLIDE HEAT SHRINK TUBE OVER SOLDER JOINT AND USE HEAT GUN TO SHRINK TUBE.

---



SOLDER WHITE / BROWN STRIPE WIRE TO THE GROUP OF BLACK WIRES.

---





SLIDE HEAT SHRINK TUBE OVER SOLDER JOINT AND USE HEAT GUN TO SHRINK TUBE.

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TRACE UNPAINTED GREEN WIRE FROM SHORT JI LIMIT SWITCH WIRE AND SOLDER TO THE WHITE / ORANGE STRIPE WIRE.

THEN SLIDE HEAT SHRINK TUBE OVER SOLDER JOINT AND SHRINK WITH HEAT GUN.

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FIND THE J2 LIMIT SWITCH WIRE WHICH WAS MARKED WITH BLUE PAINT PEN AND SOLDER TO THE ORANGE / WHITE STRIPE WIRE.

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THEN SLIDE HEAT SHRINK TUBE OVER SOLDER JOINT AND SHRINK WITH HEAT GUN.



FIND THE J3 LIMIT SWITCH WIRE WHICH WAS MARKED WITH RED PAINT PEN AND SOLDER TO THE WHITE / GREEN STRIPE WIRE.

THEN SLIDE HEAT SHRINK TUBE OVER SOLDER JOINT AND SHRINK WITH HEAT GUN.

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FIND THE J4 LIMIT SWITCH WIRE WHICH WAS MARKED WITH YELLOW PAINT PEN AND SOLDER TO THE BLUE / WHITE STRIPE WIRE.

---

THEN SLIDE HEAT SHRINK TUBE OVER SOLDER JOINT AND SHRINK WITH HEAT GUN.



FIND THE J5 LIMIT SWITCH WIRE WHICH WAS MARKED WITH WHITE PAINT PEN AND SOLDER TO THE WHITE / BLUE STRIPE WIRE.

THEN SLIDE HEAT SHRINK TUBE OVER SOLDER JOINT AND SHRINK WITH HEAT GUN.

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FIND THE REMAINING J6 LIMIT SWITCH WIRE WHICH WAS NOT MARKED AND SOLDER TO THE GREEN / WHITE STRIPE WIRE.

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THEN SLIDE HEAT SHRINK TUBE OVER SOLDER JOINT AND SHRINK WITH HEAT GUN.



SLIDE THE LARGE 10mm HEAT SHRINK TUBE OVER THE ENTIRE BUNDLE OF JOINTS AND USE HEAT SHRINK GUN TO SHRINK TUBING.





USE STEPPED BIT TO DRILL (x6) 5/8" diameter holes evenly spaced as shown. Holes are 7/8" from edges and 1" apart.

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Use drill bit and rotary tool bit to create a square hole at end opposite the 6 holes as shown. Hole should be 7/8" x 3/4" to accept the RJ45 panel mount plug.

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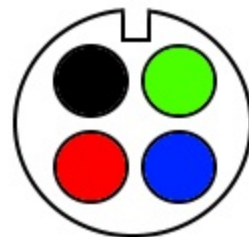
Install (x6) male side 4pin aviation plugs and (x1) RJ45 panel mount jack as shown in project box cover.

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Solder the J1 motor wires to the back side of aviation plug as shown.

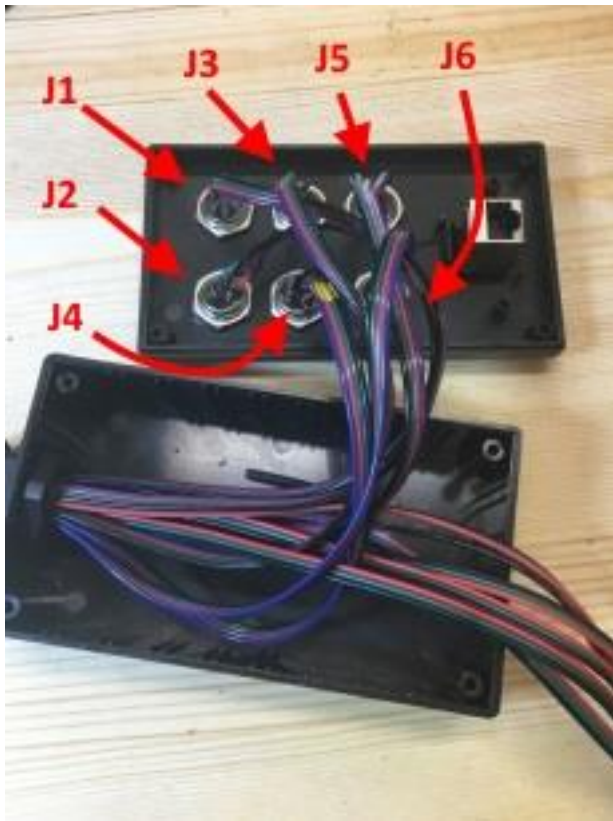
Looking at the back of the connector solder the black wire to upper left, green wire upper right, red wire to lower left and the blue wire to lower right.



VIEW FROM BACKSIDE  
OF CONNECTOR

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Solder the remaining motor wires to aviation plugs as shown.

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Install RJ45 plug into panel socket.

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Carefully pull wire slack out and install cover on project box.

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Work 10mm wire wrap under gland nut and into gland.

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Tighten gland nut.

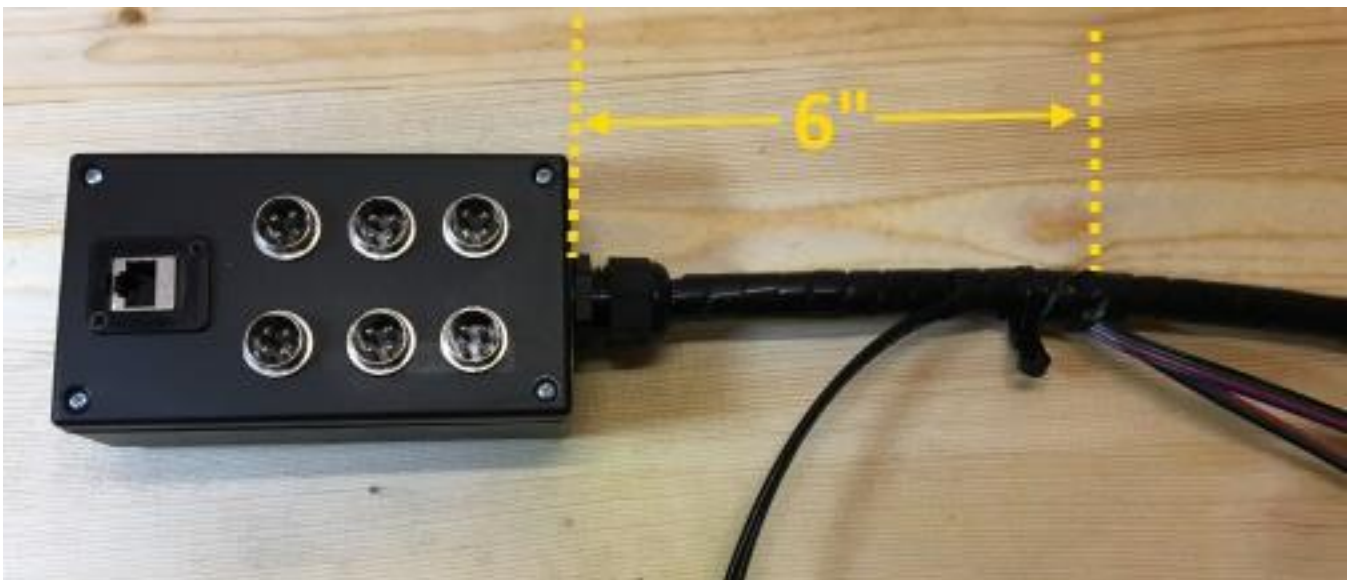


Use digital multi meter to test continuity on every pin of every motor wire and every limit switch wire.





IF YOU WILL BE USING A PNEUMATIC GRIPPER LAY PNEUMATIC LINES ALONG WITH WIRE BUNDLES. THE PNEUMATIC LINES CAN BE AS LONG AS YOU WANT BUT MAKE SURE THE PNEUMATIC LINES EXTEND APPROX 8" PAST THE J6 CONNECTORS AT THE VERY END OF THE HARNESS.

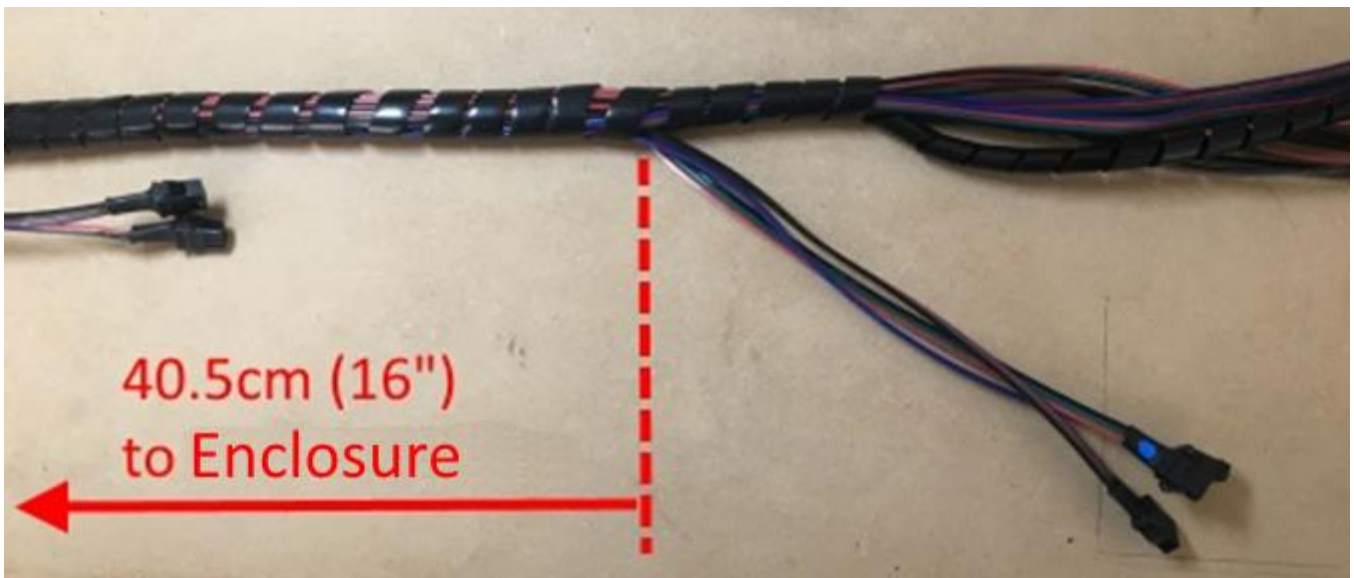


WRAP BUNDLE WITH 10mm SPIRAL WRAP AS SHOWN – WHEN YOU ARE 15.25cm (6") FROM END OF ENCLOSURE PULL THE J1 MOTOR AND LIMIT WIRES OUT OF THE BUNDLE.





CONTINUE WRAPPING SPIRAL WRAP PAST THE SPOT WHERE THE J1 WIRES EXIT THE WRAP – THEN ATTACH A MOUNTING CABLE TIE AS SHOWN.

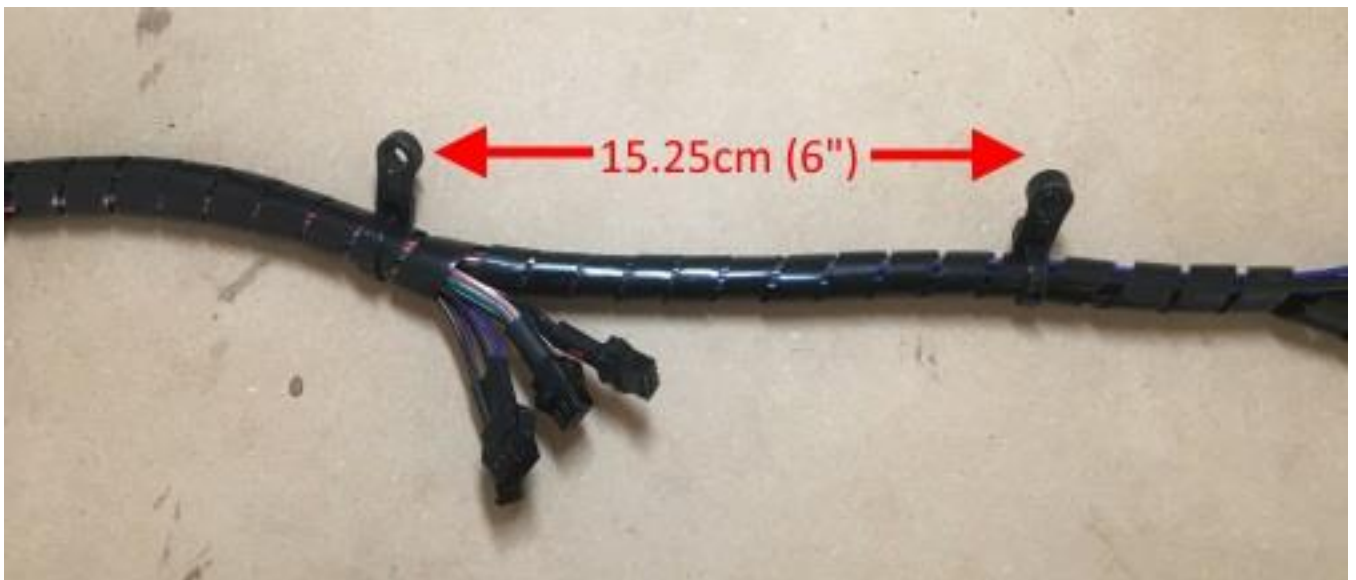


CONTINUE WRAPING BUNDLE WITH SPIRAL WRAP – WHEN YOU ARE 40.5cm (16") FROM ATX CONNECTOR PULL THE J2 MOTOR AND LIMIT WIRES AS WELL AS THE J2 MOTOR OUT OF THE WRAP AS SHOWN.





CONTINUE WRAPPING BUNDLE WITH SPIRAL WRAP – WHEN YOU GET JUST PAST 69cm FROM ATX CONNECTOR BREAK THE J4 AND J5 MOTOR CONNECTORS AND J2 AND J4 LIMIT CONNECTORS OUT OF THE WRAP. THEN PLACE A MOUNTING CABLE TIE 68.5cm FROM ATX CONNECTOR.



CONTINUE WRAPPING BUNDLE AND PLACE ANOTHER MOUNTING CABLE TIE 15.25cm (6\") FROM PREVIOUS CABLE TIE.





CONTINUE WRAPPING SPIRAL WRAP ALL THE WAY TO THE J6 CONNECTORS AS SHOWN. INSTALL MOUNTING CABLE TIE AT END OF SPIRAL WRAP AS SHOWN.



GO BACK TO THE J2 & 3 MOTOR AND LIMIT WIRES THAT EXIT THE LOOM AND WRAP THEM IN SPIRAL WRAP AND THEN WRAP THE JOINT WITH ELECTRICAL TAPE AS SHOWN.

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WIRING HARNESS IS NOW COMPLETE



# SECTION 6

## WIRING HARNESS INSTALLATION



SECURE HARNESS TO BASEPLATE USING M4 SCREW AND THEN CONNECT THE J1 MOTOR AND LIMIT SWITCH CONNECTORS.

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SECURE THE HARNESS TO THE J2 ARM USING M4 SCREWS THROUGH THE CABLE TIE MOUNTS AS SHOWN.

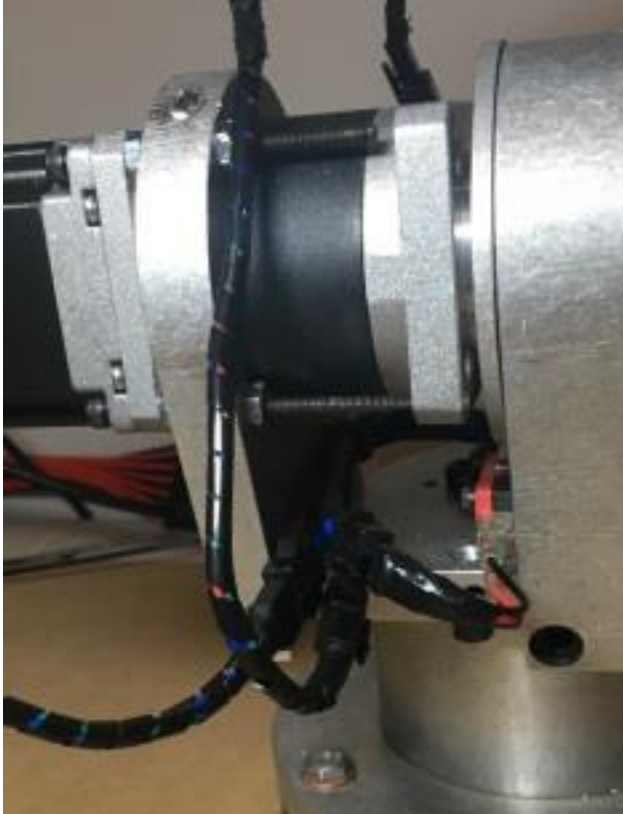
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ROUTE THE J2 & J3 MOTOR AND LIMIT SWITCH WIRES THROUGH THE CENTER OF ROBOT AND THEN SECURE TO THE J2 MOTOR SUPPORT PLATE USING A STANDARD CABLE TIE THROUGH THE SIDE HOLE AS SHOWN.

THE CABLE TIE SHOULD REMAIN LOOSE AROUND THE WIRES – JUST TIGHT ENOUGH SO THE CONNECTORS CANT SLIP THROUGH THE TIE AND THE WIRES CANT SWING INTO THE J2 LIMIT SWITCH.



CONNECT THE J2 & J3 MOTOR CONNECTORS AND THE J2 LIMIT SWITCH CONNECTOR AS SHOWN.



CONNECT THE J4 & J5 MOTOR AND  
LIMIT SWITCH CONNECTORS AS  
SHOWN.

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SECURE THE END OF THE HARNESS TO  
THE J5 SUPPORT ARM AS SHOWN USING  
A M4 SCREW AND THEN CONNECT THE  
J5 & J6 CONNECTORS AS WELL AS THE  
PNEUMATIC GRIPPER TUBES.

**THIS CONCLUDES THE WIRING  
HARNESS MANUAL – PLEASE VISIT  
THE PROJECT PAGE AND REVIEW  
THE VIDEO ON STARTUP AND  
CALIBRATION.**

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# SECTION 7

## MOTOR CABLES



You will need to make 6 cables for the robot and a 7<sup>th</sup> if you are building a travel track.

Cut each cable to whatever length you need – in this example I have cut each cable to 6' long.

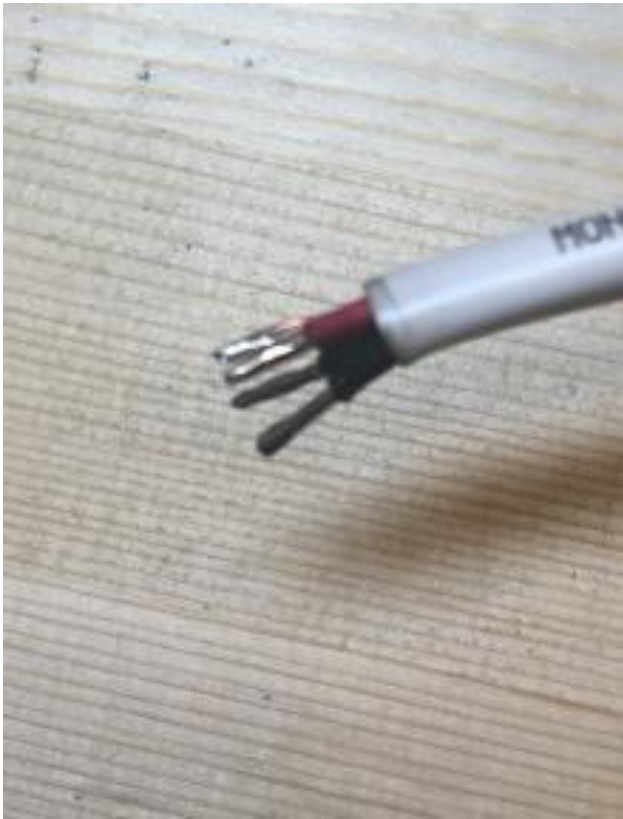
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Strip 10mm of outer sheathing off each end of cable.

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Strip 5mm sheathing off each wire and then tin each wire with solder as shown.

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Pre apply solder to each contact on connector.

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Solder wires to each contact on connector – see following steps for wire position.

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END 1



END 2

Cables are “straight through” - solder wires on each end of cable mirror image to the other as shown in the sketch and photo shown.

VIEW FROM BACK SIDE OF CONNECTORS





Wrap electrical tape around solder joints to prevent any potential short on connector housing.

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Slide connector housing over connector and install screw.

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Tighten screws on wire clamp.

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Repeat this process for each cable needed.

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