

# Model AR2 Robot

BILL OF MATERIALS

# Printed Components

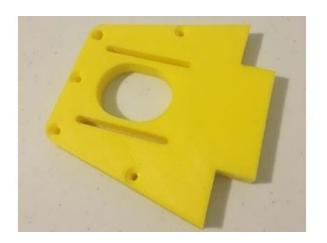
- Components printed out of ABS
- Printed with thick shells
- Printed 2mm thick layers
- Unless otherwise noted most parts printed 50% solid
  - (spindles and stress bearing components printed 100% solid)



J1 base plate part 1



Base support part I

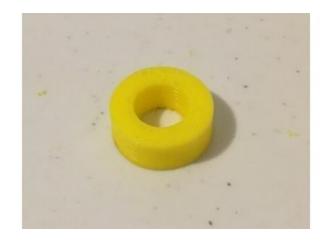


J1 base plate part 2



Base support part 2





J1 alignment plug



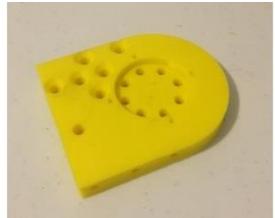
J1 turret housing



J1 spindle



J2 turret housing

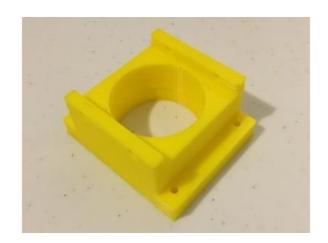


J1 platform

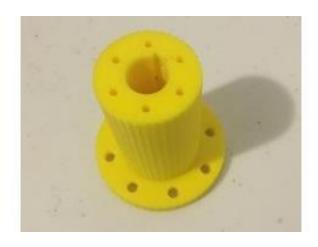




J2 arm parts 1 and 2

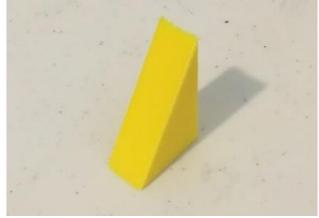


J1 motor mount



J2 spindle (PRINT SOLID)









J2 motor support



J2 retainer (PRINT SOLID)



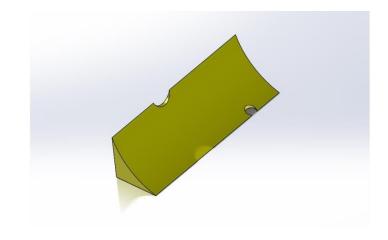
J2 spring housing (PRINT SOLID)



J2 spring housing auxiliary support



J3 motor mount



J1 platform auxiliary support



J3 bearing cup



J3 spindle (PRINT SOLID)



J4 turret housing



J3 spindle retainer (PRINT SOLID)



J5 motor mount



J4 driven pulley



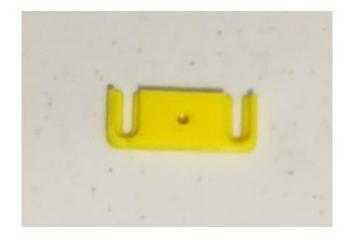
J5 housing



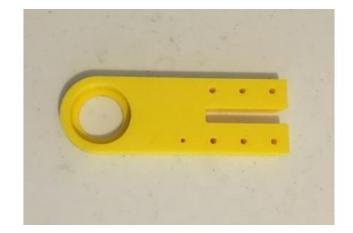
J4 motor mount



J5 carrier (PRINT SOLID)



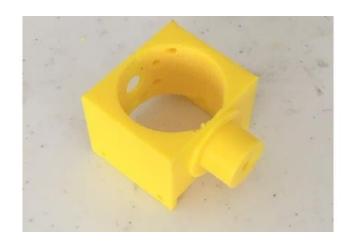
J5 idler tension block



J5 bearing support arm



J5 idler post



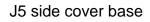
J6 turret housing





J6 spindle J6 bearing cap

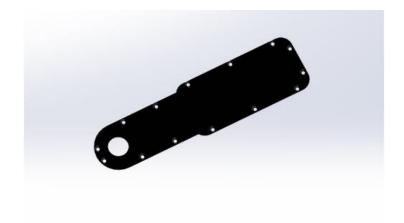






J5 side spacers





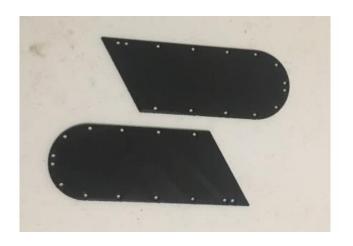
J5 side cover cap



J3 side cover spacers

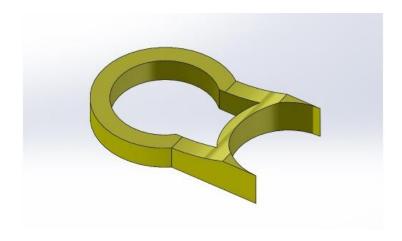


J6 gripper mount



J3 side cover caps





J2 arm auxilliary support

# Stepper Motors

 Geared and linear stepper motors as well as stepper drivers are available from Stepper Online <a href="http://www.omc-stepperonline.com/">http://www.omc-stepperonline.com/</a>





Add to Cart

Price Break:

Quantity

5-9

Unit Price
US\$ 28.47



### Gear Ratio 47:1 Planetary G 23HS30-2804S-PG47

Products item: #0282

Price: US\$ 62.08

15 IN STOCK

Add to Cart 1 Add to Cart

Price Break:

Quantity Unit Pri

J1 motor J2 motor



# Gear Ratio 19:1 Planetary Gearbox High Tor 17HS19-1684S-PG19

Products item: #042

Price: US\$ 29.65

44 IN STOCK

Add to Cart: 1 Add to Cart

Price Break:

Quantity	Unit Price	Save
5-9	US\$ 28.47	4 %
10-49	US\$ 27.28	8 %
50-99	US\$ 26.10	12 %



# Gear Ratio 5:1 Planetary Gearbox With Nem 11HS20-0674S-PG5

Products item: #033

Price: US\$ 34.68

5 IN STOCK

Add to Cart 1 Add to Cart

Price Break:

Quantity	Unit Price	Save
5-9	US\$ 33.29	4 %
10-49	US\$ 31.91	8 %
50-99	US\$ 30.52	12 %

J3 motor J4 motor



### Threaded Rod Nema 17 External Lin 200mm T8 x 8

Products item: #0226

Price: US\$ 39.41

### 32 IN STOCK

Add to Cart Add to Cart: 1

Price Break:



### Gear Ratio 19:1 Planetary 14HS13-0804S-PG19

Products item: #0137

Price: US\$ 32.34

### O IN STOCK

Add to Cart Add to Cart: 1 Price Break:

Quantity Unit P

17LS19-1684E-200G



Price: US\$ 3.45

184 IN STOCK

Add to Cart 1

Price Break:

Quantity	Unit Price	Save
5-9	US\$ 3.14	9 %
10-49	US\$ 2.82	18 %
50-99	US\$ 2.51	27 %
100+	US\$ 2.20	36 %

f 🕒 📥 🕏 🗊 🚨 🚳







Bipolar Stepper Motor Driver Max 4A Current 40VDC ST-6600

Products item: #0246

Price: US\$ 18.98

98 IN STOCK

Add to Cart: 1 Add to Cart

Price Break:

Init Price Sav
JS\$ 18.11 5 %
JS\$ 17.25 9 %

J4 motor mount bracket

Qty(6) stepper motor drivers



# Bearings







Qty. (2) for J1 bearings - Amazon

Qty. (2) for J2 bearings - Amazon



Uxcell 30204 Single Row 47mm Outside Diameter 14mm Thick Ta Roller Bearing

Be the first to review this item

Price: \$8.30 & FREE Shipping

Note: Not eligible for Amazon Prime. Available with fi shipping from other sellers on Amazon.

Only 3 left in stock.

Get it as soon as Feb. 27 - March 2 when you choo Expedited Shipping at checkout.



Qty. (1) for J3 bearing - Amazon

Qty. (1) 35mm thrust bearing and washer set for J3 - Amazon



### Thrust Needle-Roller Bearing

for 1" Shaft Diameter, 1-9/16" OD



Each
ADD TO ORDER

You ordered 4 each on 01/28/17.

In stock

\$3.17 Each 5909K36

### 0.032" Thick Washer for 1" Shaft Diameter Thrust N



Qty.(3) 1" thrust bearings (2 for J4 and 1 for J6) – McMaster Carr

### Qty.(4) (3 for J4 and 1 for J6) – McMaster Carr



Qty.(2) (1 for J4 and 1 for J6) – McMaster Carr



by Koyo

Koyo B-1616 Needle Roller Bearing, Full Compleme Cup, Open, Inch, 1" ID, 1-1/4" OD, 1" Width, 4300rp Rotational Speed, 16700lbf Static Load Capacity, 76 Dynamic Load Capacity

Note: Available at a lower price from other sellers, potentially without free Prime shi

In Stock.

Want it Tuesday, Feb. 28? Order within 4 hrs 19 mins and choose Two-Day Ship Details

Ships from and sold by Amazon.com.

New (5) from \$1.71 + \$6.15 shipping

Qty.(2) for J4 bearings - Amazon









10 Pcs 688Z Metal Sealed Deep Groove Radial B

Want it Thursday, March 9? Order within 13 hrs 23 mins and choose One-Da

Qty. (1) for J5 belt idler - Amazon







Qty.(1) set of 10 shafts (you only need 2) - Amazon

\* 4 customer reviews

New (2) from \$7.79 & FREE shipping.

Specifications for this item

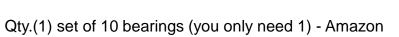
uxcell

Details

x 16 x 5mm

Price: \$8.91 Prime

Only 15 left in stock.



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

Qty.(1) set of 8 bearings (you only need 2) - Amazon

Specifications for this item

Part Number

CNC000001-8





# 30203 Taper Roller Wheel Bearing: 17x40x12 VXB Brand

Be the first to review this item

Price: \$6.55

Note: Not eligible for Amazon Prime.

In Stock.

Get it as soon as March 27 - 30 when you choose Exp

checkout.

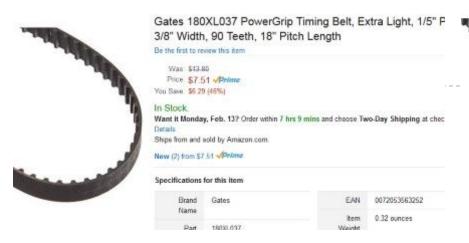
Ships from and sold by VXB Bearing.

. ... . ...

Qty.(1) for J6 bearing - Amazon



# Belts - Sprockets



Qty. (1) J1 belt - Amazon



Qty (1) J3 belt – or use chain option instead (see instructions) - Amazon



2' length – J3 chain option (see instructions) – McMaster Carr

Qty.(1) link for J3 – McMaster Carr





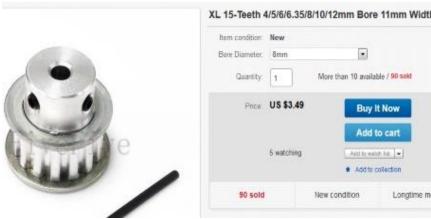
Gates 150XL037 PowerGrip Timing Belt, Ex Pitch Length Sold by: Amazon.com LLC Return window closed on Mar 18, 2017 \$6.79

Buy it Again

Qty.(1) J4 belt – Amazon



Qty.(1) driven pulley for J1 – Amazon



Qty.(1) J5 belt – Amazon

Qty.(4) 15 tooth 8mm bore sprocket (1 for J1 - 2 for J3 if using belt option and 1 for J6) - Ebay

# Machinable-Bore Sprocket

for ISO #04B Roller Chain, 6mm Pitch, 13 Teeth



Each

ch In stock \$12.45 Each 2302K72

ADD TO ORDER

2 each added to your order. Ships in the morning (from our Chicago warehouse)



2PCS 10 Tooth 6mm Bore XL Type Aluminum Timii

**\$3.46**Buy It Now

From China

Qty.(2) for J3 chain option – McMaster Carr

Qty.(1) for J4 - Ebay



# Hardware

## Steel Compression Spring

Zinc-Plated Music Wire, 2.00" Long, 845" OD, 080" Wire





ADD TO ORDER

In stock \$7.80 per p 9657K401



# Forney 72649 Wire Spring Compression, 9 by-3-Inch-by-.054-Inch, 2-Pack

Be the first to review this item

Price: \$10.00 (\$5.00 / Pack) Prime

Only 2 left in stock (more on the way).

Want it Tuesday, March 7? Order within 32 mins and choose Two-Details

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

- Used in light industry
- · Zinc plated steel wire compression spring
- Baked for a rust resistant finish and heat treated for performance;

Qty.(1) – McMaster Carr

Qty.(1) - McMaster Carr

### Metric Key Stock

Undersized, Steel, 2mm x 2mm, 12" Length





You ordered 1 each on 01/20/17.

Material	Steel
Size	2 × 2 mm
Length	12"

### Metric Key Stock

Oversized, Zinc-Plated Steel, 4mm x 4mm, 12" Long





You ordered 1 each on 02/09/17.

Qty.(1) – McMaster Carr

Qty.(1) – McMaster Carr





High-Strength 2024 Aluminum Tube
0.035" Wall Thickness, 1" 0D

Length, ft.

ADD TO ORDER
In stock
\$10.53 Each
1968T17

Qty.(1) McMaster Carr

Qty.(1) McMaster Carr



Qty. (4) spacers purchased at hardware store these are 3/8" x 3/16" x 1" cut down to 15mm long

# Metric Heavy Duty Ball Joint Linkage M6 x 1 RH Thread Male Stud with Right-Hand Thread Female Sha





In stock \$10.79 Each 6275K53

Qty.(1) McMaster Carr



#### uxcell

### uxcell M4x55mm Fully Thread Hex Socket Hea Cap Screw Bolt Black 10pcs

Be the first to review this item

Price: \$11.15 \( \textit{Prime} \)

#### In stock on April 24, 2017.

Order it now.

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

- Drive Type: Hex Socket Cap Head; Head Style: Socket Cap Head; Materi
- Package Content: 10pcs x Hex Socket Cap Screw; Product Name: Hex S Thread Size: M4 x 55mm/0.16" x 2.2"(D\*L)
- · Weight: 49g; Main Color: Black; Thread Pitch: 0.7mm
- Total Length: 59mm/2.3"; Thread Style: Fully Thread
- Grade: 14.9; Hex Width: 3.5mm/0.14"
- > See more product details

## Alloy Steel Shoulder Screw

8 mm Diameter x 14 mm Long Shoulder, M6 x 1 mm Thread Size





ADD TO ORDER

In stock 1-4 Each \$2.94 5 or more \$2.50 92981A151

Qty.(1) set of 10 (you only need 4) - Amazon

Qty.(2) - McMaster Carr

# Square Head Extended Point Set Screw

Alloy Steel, M8 x 1.25 Thread, 25mm Long





ADD TO ORDER

In stock \$5.52 per pack 92635A314

### Alloy Steel Shoulder Screw

8 mm Diameter x 80 mm Long Shoulder, M6 x 1 mm Thread Size



Each

ADD TO ORDER

In stock 1-4 Each \$3.93 5 or more \$3.33 92981A230

You ordered 4 each on 12/13/16.

Qty.(1) – McMaster Carr

Qty.(1) – McMaster Carr



### Zinc-Plated Steel Tee Nut Inserts for Wood

M8 x 1.25 mm Thread Size, 11 mm Long





In stock \$9.44 per pack of 50 98965A410

Qty.(1) M8 - T nut - Hardware store is more cost effective for a single piece than buying multiple from McMaster Carr



# **SCREWS**:

(hardware store or order from McMaster Carr)

QTY	ITEM
7	M3 x 10 flat head screws
4	M3 x 10 set screws
12	M3 x 14 socket head cap screws
14	M3 x 14 socket head cap screws
44	M3 x 25 flat head screws
5	M3 x 3 set screws
28	M3 x 35 flat head screws
9	M3 x 6 set screws
I	M3 x 6 socket head cap screw
6	M3 x 8 socket head cap screws
8	M4 nuts
16	M4 washers
4	M4 x 10 button head screws
4	M4 x 10 cap screws
16	M4 x 10 flat heads
24	M4 x 10 set screws
23	M4 x 10 socket head cap screws
2	M4 x 14 flat head screws
12	M4 x 20 socket head cap screws
4	M4 x 35 socket head cap screws
2	M4 x 6 set screws
31	M6 x 14 socket head cap screws
15	M6 x 18 flat head screws

# **Electrical Components**



Qty.(1) - Amazon

### uxcell Switch Power Supply Driver for LED Strip 110/220V 5V 2A 10W by uxcell ★★★☆☆ ▼ 66 customer reviews | 12 answered questions Price: \$6 99 Prime i Get \$50.00 off instantly: Pay \$0.00 upon approval for the Amazon.com Rewards

Want it Sunday, Feb. 26? Order within 37 mins and choose Two-Day Shipp

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

Size: DC 5V 2A 10W DC 5V 2A 10W DC 5V 3A 15W DC 5V 8A 4 DC 5V 5A 25W DC 5V 10A 50W DC 5V 12A 60W DC 5V 20A 100W DC 5V

### Hammond 1591DSBK ABS Project Box Manufacturing \* 30 customer reviews | 5 answered question Price: \$6.25 + \$5.95 shipping Note: Not eligible for Amazon Prime. In Stock Get it as soon as Feb. 16 - 22 when you choose Standard at a Ships from and sold by Parts Express. New (2) from \$6.25 + \$5.95 shipping Specifications for this item Brand Name Hammond

Hammond

Qty.(1) – Amazon

### Pi DSP AVR PIC ARM ★★★★ \* 147 customer reviews | 42 answered questions Price: \$8 98 Prime

Only 9 left in stock.

In Stock.

Want it Monday, Feb. 27? Order within 17 hrs 37 mins and choose Two-Day Sh

JBtek 8 Channel DC 5V Relay Module for Arduino I

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

- . 5V 8-Channel Relay interface board, and each one needs 15-20mA Driver Curre
- Equiped with high-current relay, AC250V 10A; DC30V 10A
- Standard interface that can be controlled directly by microcontroller (Arduino, 8 DSP, ARM, ARM, MSP430, TTL logic)
- · Indication LED's for Relay output status



Qty.(3) - Amazon

91919 91919 91919

19.68" Length, Black/Red(PH-CB24P BF ★★★★★ \* 8 customer reviews | 4 answered questions List Price: \$16.99 Price: \$14.99 \Prime You Save \$2.00 (12%) ¿ Your cost could be \$9.99 Qualified customers get \$5 in Gift Card fu Amazon Gift Card Balance, Learn more Only 20 left in stock (more on the way). Want it Tuesday, Feb. 14? Order within 4 hrs 34 mins and choo: checkout. Details Ships from and sold by Amazon.com. Gift-wrap available. Color Black/Red

Phanteks 24 Pin M/B Premium Sleeved E

Qty.(1) - Amazon

#### Switching Power Supply 350W 24V 14.6A for CNC Router S-350-24

Products item: #0177

Price: US\$ 26.35

326 IN STOCK

Add to Cart: 1

Add to Cart

#### Price Break:

Quantity	Unit Price	Save
5-9	US\$ 25.52	3 %
10-49	US\$ 24.70	6 %
50-99	US\$ 23.88	9 %

### Arduino Mega Case Enclosure New Black Computer B with Switch

by SB Components

\* 8 customer reviews

Price: \$6.99 Free shipping for Prime members when buying this Add-on Item. Detail

i Your cost could be \$1.99: Reload \$100, get \$5 free. Learn more

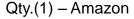
In Stock

Want it Monday, Feb. 27? Add it to a qualifying order within 17 hrs 39 mins and choos Two-Day Shipping at checkout. Details

Sold by SB Components and Fulfilled by Amazon. Gift-wrap available.

- . This is a no-nonsense protective case designed specifically for the Arduino Mega 256
- . The case is a two-piece injection-molded ABS enclosure that snaps together around Arduino. Holds the Arduino firmly in place

Qty.(1) - Stepper Online





leik Mega 2560 R3 ATmega2560-16AU + ATMEGA16 USB Cable for Robot Arduino UNO MEGA2560 R3 Duemilanove 2013

by IEIK

★★★★ \* 89 customer reviews | 7 answered questions

Price: \$11.89 /Prime

In Stock.

Want it Sunday, Feb. 26? Order within 1 min and choose Two-Day Shipping at ch

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

- . Our development boards and modules are compatible with the Arduino
- 1 x IEIK Mega 2560 R3 Bule
- 1 x USB Cable

by BUD Industries

BUD Industries NBX-32926-PL ABS Plastic Internal Panel, 14-1/4" Length x 10-27/64" Width x 9/64" Thick, for NBF Series Boxes

★★★★★ 3 customer reviews

Price: \$20.10 Prime

In Stock

Want it Sunday, Feb. 26? Order within 39 mins and choose Two-Day Shipping at checkout. Details Ships from and sold by Amazon.com.

New (3) from \$20.10 Prime

Specifications for this item

Part NBX-32926-PL Number

Material Plastic Type

Qty.(1) - Amazon

Qty.(1) – Amazon





by BUD Industries BUD Industries NBF-32026 Plastic ABS NEMA Economy Box with Solid Door, 15-47/64" Length x 11-51/64" Width x 6-9/32"

Height, Light Gray Finish



15 Pcs 35mm Width Slotted Design Aluminum DIN 9.8"



a12022900ux0297

Part Number

Qty.(1) – Amazon

Qty.(1) – Amazon







Qty.(1) – Amazon



### Red 16pc 22 AWG Wire wit .187 Quick Disconnect

\$7.25

Brand Focus Attack

SKU RED-187MWIREQCD16

Weight 3.25 Ounces

Availability Ships within 1-2 business days

Please note that FA Plexworks orders ship within 7 business da

Shipping Calculated at checkout



### 16pc 22 AWG Wire with .187 **Ouick Disconnect**

\*\*\*\*\* (6)

\$7.25

Brand Focus Attack

SKU 187MWIREQCD16

Weight 3.25 Ounces

Availability Ships within 1-2 business days

Please note that FA Plexworks cu orders ship within 7 business days linfo



Qty.(1) - Amazon

### uxcell AC 600V 10A Red Mushroom Emergency Stop Button Switch 22mm NO NC

★★★★☆ ▼ 33 customer reviews | 5 answered questions

Price: \$6.94 Prime

In Stock.

Want it Tuesday, May 16? Order within 11 hrs 22 mins and choose Two-Day Shippi

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

- . Item Name: Emergency Stop Push Switch; Type: Self Locking Rotary; Ith: 10A
- Ui: 600V;Voltage Category: AC 125V, 5A; AC 300V, 3A;Button Diameter: 4cm/1.!
- Contact Type: 1 NO (Normally Open) + 1 NC (Normally Closed); Mount Hole Diam / 0.87"(7/8");Fit Panel Thickness(Adjustable): Max 0.6cm / 0.24"
- Size: 3.7 x 3 x 7cm/ 1.4" x 1.2" x 2.8"(L\*W\*H); Material: Plastic and Metal; Main Co Fuchsia, Blue, Gray
- Net Weight: 45g;Package Content: 1 x Emergency Stop Switch

> See more product details



Qty.(1) - Amazon

### URBEST Inlet Module Plug 5A Fuse Switch UR an Certification Male Power Socket 10A 250V 3 Pin IE

by URBEST®

★★★★☆ ▼ 91 customer reviews | 15 answered questions

Price: \$5.98 FREE Shipping for Prime members once available Details >

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

- Total Size: 5.8 x 4.8 x 3.4cm / 2.3" x 1.9" x 1.3"(LxWxH); Plug Type: 3 Pin IE
- . Product Name: Power Socket w Switch Fuse; Material (External): Plastic, Me Silver Tone, Silver Tone
- Weight: 24g;Package Content: 1 x Power Socket
- Hole Center Distance: 3.9cm / 1.5":Bottom Size: 4.7 x 2.7cm / 1.9" x 1.1"(L) and CE certification
- Voltage/ Current: 10A, 250V AC; Hole in Top Face Diameter: 0.42cm / 0.16";

New (1) from \$5.98 Prime





Qty.(1) – Amazon



Qty.(1) – Amazon

### In Stock.

connections S02

Price: \$7.99 \( \textit{Prime} \)

★★★★★ ▼ 10 customer reviews

Smraza

Want it Thursday, March 9? Order within 2 hrs 26 mins and choos checkout Details

Smraza 120pcs Multicolored Jumper Wire

Female, 40pin Male to Male, 40pin Female

Breadboard Jumper Wires Ribbon Cables

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

. Multicolored 3 pieces Breadboard Jumper Wires as a set, High-gr



Qty.(1) - Amazon

### OdiySurveil

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

JawayTool 127 Pieces Assortment Heat Shrink Tube V Wrap Kit Electrical Connection Cable Sleeve Tubing S

With Durable Storage Case - Assorted Diameters- 2:1

Want it Tuesday, Feb. 147 Order within 4 hrs 30 mins and choose Two-Day Shippin

Heat Shonk + Helping Hand

\*\*\* \* 205 customer reviews | 3 answered questions

Sold by M.Y House and Fulfilled by Amazon. Gift wrap available.

\* 15 customer reviews | 4 answered questions

Price: \$8.29 \( \textit{Prime} \)

Shrink Ratio

Price: \$12.99 Sale: \$6.99 /Prime

You Save: \$6.00 (46%)

Size Name: Heat Shrink

Heat Shrink

#### In Stock.

Want it Friday, April 21? Order within 3 hrs 24 mins and choose Two-L 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;



## 25 x Black Nylon Plastic P Clips - Fasteners for Cable, Tubing & Sleeving [ 16mm ]

会会会会会 ▼ 1 customer review

Price: \$8.00 & FREE Shipping

Note: Not eligible for Amazon Prime.

In Stock.

Get it as soon as May 9 - 12 when you choose Expedited Shipping at chec Ships from and sold by Homesmart-uk.

Size: Ø 16mm Qty.(1) - Amazon



Qtv.(2) - Amazon



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

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 Ships from and sold by Standard Supply Co. New (1) from \$7.55 + \$4.49 shipping Specifications for this item

Yueqing Saigo Electronics

Brand Name



#### ASI ASIUK5N Din Rail Mounted Terminal Block, Screw Clamp (Pack of 50)

\*\*\* 4 customer reviews List Price: \$24.42

Price: \$21.01 (\$0.42 / DIN Rail Terminal) Prime You Save: \$3.41 (14%)

In Stock

Want it tomorrow, Feb. 26? Order within 11 hrs 11 mins and choose One-Day Shipping at checkor

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

Used & new (4) from \$15.76 Prime

Specifications for this item

Part ASIUK5N

Current Amp

Qty.(1) - Amazon

Qty.(1) - Amazon



### **Automation Systems Interconnect**

## ASI ASIEB106 Din Rail Terminal Blo Bridge (Pack of 10)



Price: \$21.60 (\$2.16 / Din Rail Terminal) Prime



### In Stock.

Want it Monday, May 29? Order within 2 hrs 10 mins an Shipping at checkout. Details

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

Qty.(1) – Amazon (The ASI terminal blocks list this as the correct jumpers but I had screw type on hand shown in manual)