

## List of Components

## Bearings

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
2 Bolt Self-Aligning Flange		Bearing Bag	8	The Torrington Company
Radial Ball Bearing w/Spherical OD	1/2" i.d., self locking collar	Bearing Bag	4	The Torrington Company
Single Row Radial Flanged Ball Bearing	1/4" i.d.	Bearing Bag	4	The Torrington Company
Single Row Radial Flanged Ball Bearing	3/8" i.d.	Bearing Bag	4	The Torrington Company

## Control System

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
15 Pin Cable	DB15 Male to Female, 6'	Loose	1	Brevan Electronics
15 Pin Connector	DB15, solder cup, female	Electronics Bag	2	Brevan Electronics
15 Pin Connector	DB15, solder cup, male	Electronics Bag	2	Brevan Electronics
2 Conductor Jacketed Wire	15', #16 AWG	Loose	1	General Cable
2 Conductor Jacketed Wire	#24 AWG	Loose	20'	General Cable
2 Pin Power Connector	Black, European style header	Electronics Bag	2	Augat RDI
2 Pin Power Connector	Green, European style header	Electronics Bag	1	Augat RDI
3 Conductor Shielded Wire	#24 AWG	Loose	20'	General Cable
6 Pin Connector	European style header	Electronics Bag	1	Augat RDI
9 Pin Cable	DB9 Male to Female, 6'	Loose	1	Brevan Electronics
9 Pin Ribbon Cable	12", DB9 Male to Female	Electronics Bag	1	Brevan Electronics
9 Pin Tether Adapter	DB9 F-F, pins: 5->5, 2->3,3->2	Electronics Bag	1	Brevan Electronics
Battery Box	Battery Charger Case	Loose	2	Assembled by Nova Biomedical
Battery Charger		Loose	2	Milwaukee Electric Tool Corp.
Black Project Box		Loose	1	Serco
Circuit Breaker	12 volt, 20 Amp, auto-resetting	Electronics Bag	2	Snap-Action, Inc.
Delco Motor Wiring Harness	5', #16 AWG	Loose	4	Assembled by Nova Biomedical
Diode	1 Amp max	Electronics Bag	2	Brevan Electronics
Flightstick Joystick	7 ft cable with Male DB15	Loose	2	CH Products
Heat Shrink Tubing	3/4"Ø x 1', Black, 2:1 Shrink	Electronics Bag	1	Raychem Corporation
Heat Shrink Tubing	3/8"Ø x 2', Black, 2:1 Shrink	Electronics Bag	1	Raychem Corporation
Jack Screw with Lock Washer	3 screws per bag	Electronics Bag	12	Honeywell - Microswitch Division
Limit Switch	Faint printing on side	Electronics Bag	4	Honeywell - Microswitch Division
Limit Switch	White printing on side	Electronics Bag	4	Honeywell - Microswitch Division
Muffin Fan	12 vdc, 0.90 A	Loose	1	Digital Equipment Corporation
Plastic Hood for 15 Pin Connector	fits DB15	Electronics Bag	3	Brevan Electronics

## List of Components

Power Connector for Valves		Pneumatics Bag	3	Numatics
Power Supply	9 Volts DC, 1.2 Amps max	Loose	1	Golden Pacific Electronics, Inc.
Receiver Box		Loose	1	Assembled by Nova Biomedical
Rechargeable Battery	12 Vdc	Loose	4	Milwaukee Electric Tool Corp.
Reed Switch	Normally open	Electronics Bag	4	CP Clare
Relay Box		Loose	1	Assembled by Nova Biomedical
RNET 9600slm + Antenna		Loose	2	Motorola
Rocker Switch		Electronics Bag	4	Honeywell - Microswitch Division
Rocker Switch Cover	Blue	Electronics Bag	1	Honeywell - Microswitch Division
Rocker Switch Cover	Green	Electronics Bag	1	Honeywell - Microswitch Division
Rocker Switch Cover	Red	Electronics Bag	1	Honeywell - Microswitch Division
Rocker Switch Cover	White	Electronics Bag	1	Honeywell - Microswitch Division
Servo	Hitec/JR-style connector, 42	Electronics Bag	2	Hitec RCD, Inc.
Servo Arms & Mounting Hardware	Fits HS300 Servo	Electronics Bag	2	Hitec RCD, Inc.
Servo Extension Cable	Hitec/JR-style, 36" long	Electronics Bag	2	Hitec RCD, Inc.
Servo Y Cable	Hitec/JR-style, 24" long	Electronics Bag	2	Hitec RCD, Inc.
Spade Connector	female, 22-18 AWG	Electronics Bag	20	Thomas & Betts Corp.
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Speed Controller	7.2 - 12 vdc, Reversing	Loose	2	Tekin Electronics, Inc.
Terminal Strip	6 channel, tubular screw	Electronics Bag	2	Thomas & Betts Corp.
Transmitter Box		Loose	1	Assembled by Nova Biomedical
Wire	#12 AWG, Black	Loose	12'	General Cable
Wire	#12 AWG, Red	Loose	12'	General Cable
Wire Nut	for 12 AWG wire	Electronics Bag	10	Home Depot
Wiring Harness for Air Pumps	fits Textron pumps, 6" leads	Pneumatics Bag	2	McCord Winn Textron

## Documentation

<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Location</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
Kent™ Connect Flyer		Loose	1	Value Plastics, Inc.
Numacalc	manual and software for IBM	Loose	1	Numatics
Numatics Training Manual		Loose	1	Numatics
Small Parts Catalog		Loose	2	Small Parts, Inc.
Spec Sheets for Constant Force Spring		Loose	1	Associated Spring Raymond
Spring Hinge Instructions	comes with Spring Hinge	Hardware Bag	1	Stanley Hardware

## List of Components

## Fasteners

<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Location</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
5 Minute Epoxy Gel	resealable 1 oz. dual syringe	Small Parts Bag	1	McMaster-Carr Supply Company
Cable Tie	11.10" x 0.140"	Small Parts Bag	20	Thomas & Betts Corp.
Cable Tie	7.00" x 0.091"	Small Parts Bag	20	Thomas & Betts Corp.
Cable Tie Mounting Base	self-adhesive, holes for #8	Small Parts Bag	25	Thomas & Betts Corp.
Chuck Screw	left handed thread, Torx P20	Drill Bag	2	Milwaukee Electric Tool Corp.
Helical Plastic Wire Wrap	1/4" Ø x 24"	Small Parts Bag	1	McMaster-Carr Supply Company
Hook & Loop Fastener	1" x 2", stick-on	Small Parts Bag	1	McMaster-Carr Supply Company
Mushroom-Head Fastener	1" x 2", stick on	Small Parts Bag	1	McMaster-Carr Supply Company
Rubber Band, Large	3-1/2" x 1/4" wide	Small Parts Bag	5	Alliance Rubber Company
Rubber Band, Small	3-1/2" x 1/8" wide	Small Parts Bag	5	Alliance Rubber Company
Velcro Back Pack Strap		Velcro Bag	1	Velcro USA, Inc.
Velcro Heavy Duty Hold It		Velcro Bag	1	Velcro USA, Inc.
Velcro Pen /Pencil Holders		Velcro Bag	1	Velcro USA, Inc.
Velcro Plant Ties		Velcro Bag	1	Velcro USA, Inc.
Velcro Self Gripping Discs		Velcro Bag	1	Velcro USA, Inc.
Velcro Self Gripping Discs		Velcro Bag	1	Velcro USA, Inc.
Velcro Sticky back Hook & Loop Tape		Velcro Bag	1	Velcro USA, Inc.
Velcro Trunk Strap		Velcro Bag	1	Velcro USA, Inc.

## Field Components

<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Location</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
Inflation Needle for 4-Square Ball	fits bicycle tire pump	Loose	1	Sport Fun, Inc.
U-Bolt Wire Rope Clip	for 3/16" Ø rope, galvanized	Hardware Bag	1	McMaster-Carr Supply Company

## Motors &amp; Pumps

<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Location</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
Delco Seat Motor	12 vdc motor w/ socket for	Loose	4	Delco Electronics Corporation
Drill Gear Shift Link		Drill Bag	2	Milwaukee Electric Tool Corp.
Drill Gearbox	1000/300 RPM transmission	Drill Bag	2	Milwaukee Electric Tool Corp.
Drill Housing, Left Half	Holds motor and gearbox	Loose	2	Milwaukee Electric Tool Corp.
Drill Housing, Right Half	Holds motor and gearbox	Loose	2	Milwaukee Electric Tool Corp.
Drill Motor	12 V DC	Drill Bag	2	Milwaukee Electric Tool Corp.
Drill Shell Screws	5/8" x 4-20 sheet metal screw	Drill Bag	16	U.S. FIRST
Drill Shifter Button		Drill Bag	2	Milwaukee Electric Tool Corp.

## List of Components

Drill Shifter Spring	large	Drill Bag	4	Milwaukee Electric Tool Corp.
Drill Shifter Spring	small	Drill Bag	2	Milwaukee Electric Tool Corp.
High Output Lumbar Pump MWT Motor	12 vdc, 22 psi max, 3/16" o.d.	Pneumatics Bag	1	McCord Winn Textron
Low Output Lumbar Pump Johnson	12 vdc, 4 psi max, 3/16" o.d.	Pneumatics Bag	1	McCord Winn Textron

## Other

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
Carpet Sample	12" x 12"	Loose	1	
Co-Polymer Gutter Guard	6" x 24"	Loose	1	Home Depot
Fiberglass Matting	4' x 4' x up to 1/8"	Additional	1	TEAM
Kent™ Connect Key Ring Kit		Pneumatics Bag	1	Value Plastics, Inc.

## Pneumatics

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
Adapter Fitting	1/4" NPTF male to 1/8" NPTF	Pneumatics Bag	1	Sprague Fluid Connectors
Air Cylinder	1-1/16" bore, 4" stroke	Loose	1	Numatics
Air Cylinder	7/16" bore, 12" stroke	Loose	1	Numatics
Barbed Fitting	1/8" i.d. to 1/8" NPTF	Pneumatics Bag	4	Numatics
Barbed Fitting	1/8" i.d. to 10-32 UNF	Pneumatics Bag	12	Numatics
Barbed T-Connector	1/8" Ø barbs	Pneumatics Bag	2	Value Plastics, Inc.
Check Valve	1/8" Ø barbs	Pneumatics Bag	2	Air Logic
Detachable Barbed Reducing Connector	3/16"Ø to 1/8"Ø	Pneumatics Bag	2	Value Plastics, Inc.
Double Solenoid Valve	12 VDC, 10-32 UNF-3B	Pneumatics Bag	1	Numatics
Numatrol Tubing	1/4" o.d., 1/8" i.d., 15'	Pneumatics Bag	1	Numatics
PIAB Suction Cup	53 mm Ø, 1/8" NPSF	Pneumatics Bag	1	PIAB, U.S.A.
Plug for Air Accumulator	1/4" NPTF	Pneumatics Bag	1	Sprague Fluid Connectors
Plug for Valves	10-32 UNF	Pneumatics Bag	5	Numatics
Polyurethane Tubing	3/16" i.d., 5/16"o.d. x 4'	Pneumatics Bag	1	Value Plastics, Inc.
Pressure Switch	1/8" Ø barb	Pneumatics Bag	2	Numatics
Single Solenoid Valve	12 VDC, 10-32 UNF-3B	Pneumatics Bag	1	Numatics
Syringe	140 cc, Luer Lock Tip	Pneumatics Bag	1	Lowell Medical Instrument
Volume Chamber	approximately 1 liter volume	Loose	1	American Cylinder Company, Inc.

## Rods &amp; Shafts

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
Aluminum Rod	1/2" Ø x 12"	Tube	1	McMaster-Carr Supply Company
Aluminum Rod	1/2" Ø x 24"	Tube	1	McMaster-Carr Supply Company



## List of Components

Brazing Rod	1/16" Ø x 18"	Tube	6	McMaster-Carr Supply Company
Brazing Rod	1/8" Ø x 18"	Tube	2	McMaster-Carr Supply Company
Delrin (Acetal) Rod	1/4" Ø x 24"	Tube	1	McMaster-Carr Supply Company
Drill Rod	1/2" Ø x 18"	Tube	2	New Hampshire Industrial
Drill Rod	1/4" Ø x 18"	Tube	2	McMaster-Carr Supply Company
Drill Rod	3/8" Ø x 18"	Tube	2	McMaster-Carr Supply Company
Drill Rod	5/16" Ø x 18"	Tube	2	McMaster-Carr Supply Company
Flexible Motor Shaft	13.5" long, Fits Delco Seat	Loose	4	Delco Electronics Corporation
LDPE Rod	1" Ø x 24"	Tube	1	McMaster-Carr Supply Company
Threaded Rod with 8 Hex Nuts	1/4" Ø x 24", 20 pitch coarse	Tube	1	McMaster-Carr Supply Company
Wooden Dowel	1/4" Ø x 12"	Tube	1	McMaster-Carr Supply Company
Wooden Dowel	1/4" Ø x 24"	Tube	1	McMaster-Carr Supply Company

## Sheets &amp; Boards

<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Location</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
Aluminum Plate	1/4" x 3" x 12"	Loose	1	McMaster-Carr Supply Company
Aluminum Sheet	1/16" x 12" x 18"	Loose	1	McMaster-Carr Supply Company
Chipboard - Sample	1/2" x 6" x 12"	Loose	1	Home Depot
HDPE Block	1" x 2" x 6"	Loose	1	McMaster-Carr Supply Company
Masonite Board	12" x 18"	Loose	1	Home Depot
Particle Board - Sample	5/8" x 6" x 12"	Loose	1	Home Depot
Pine Board - Sample	1" x 1-1/2" x 9"	Loose	1	Home Depot
Pine Board - Sample	1" x 2-1/2" x 9"	Loose	1	Home Depot
Pine Board - Sample	1" x 3-1/2" x 9"	Loose	1	Home Depot
Plywood	1/4" x 6" x 12"	Loose	1	Home Depot
Plywood - Sample	1/2" x 6" x 12"	Loose	1	Home Depot
Polycarbonate Sheet	1/16" x 12" x 12"	Loose	1	Plastic Supply Inc.
Rohacell® P170 Structural Foam	1" x 24" x 49"	Loose	1	Richmond Aircraft Products
Rubber Sheet, Black	3/32" x 6" x 18"	Loose	1	McMaster-Carr Supply Company
Rubber Sheet, Red	1/16" x 6" x 18"	Loose	1	McMaster-Carr Supply Company

## Small Parts

<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Location</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
Assorted Brass Screws	comes with Spring Hinge	Hardware Bag	1	Stanley Hardware
Cabinet Catch Magnet w/ Plastic Case		Hardware Bag	1	Stanley Hardware
Double Magnet Cabinet Catch		Hardware Bag	1	Stanley Hardware

## List of Components

Flexible Shaft Coupling	Black	Small Parts Bag	4	U.S. FIRST
Folding Table Brace w/ screws	9-1/2"	Hardware Bag	4	Stanley Hardware
Hinged Hasp	3" Strap	Hardware Bag	1	Stanley Hardware
Pivot for Steel Track		Hardware Bag	2	Stanley Hardware
Rectangular Magnet		Small Parts Bag	4	Radio Shack
Roller Guide for Steel Track	7/8" Ø x 1/4" wheel	Hardware Bag	4	Stanley Hardware
Side Release Buckle	Fits 3/4" Strap	Small Parts Bag	1	McMaster-Carr Supply Company
Steel Hinge w/ screws	3-1/2" x 3-1/2"	Hardware Bag	2	Stanley Hardware
Steel Track w/Endstop	2'	Loose	2	Stanley Hardware
Trantorque Coupling	3/8" i.d., 3/4" o.d.	Small Parts Bag	2	Small Parts, Inc.
Utility Draw Pull Latch	1-3/4" high x 3-9/32" wide,	Hardware Bag	1	McMaster-Carr Supply Company
Wheelchair Wheel	6" Ø, 5/16" i.d. bearings, 1-1/2"	Loose	2	Skyway Recreation Products
Wheelchair Wheel	8" Ø, 5/16" i.d. bearings, 1-1/2"	Loose	2	Skyway Recreation Products

## Springs

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
Compression Spring	0.600" o.d. x 3" long x 0.059"	Small Parts Bag	1	Associated Spring Raymond
Constant Force Spring, Large	1.02" i.d.	Small Parts Bag	2	Associated Spring Raymond
Constant Force Spring, Medium	0.85" i.d.	Small Parts Bag	1	Associated Spring Raymond
Constant Force Spring, Small	0.51" i.d.	Small Parts Bag	2	Associated Spring Raymond
Latex Tubing	1/4" i.d., 3/8" o.d., 5'	Loose	1	Totalmed
Small Tension Spring	0.650" o.d. x 2.875-3.000"	Small Parts Bag	1	Associated Spring Raymond
Snugger (Spring for Steel Track)		Hardware Bag	4	Stanley Hardware
Spring Loaded Hinge	4" x 4", 30 in/lb max	Hardware Bag	1	Stanley Hardware

## Sprockets &amp; Pulleys

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
Pulley with Fixed Eye	1" Ø, for 5/16" Rope	Hardware Bag	3	Stanley Hardware

## Tools

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
5/32" Allen Wrench	comes with Spring Hinge	Hardware Bag	1	Stanley Hardware
Torx L-Key	Torx T20 Heads, 3-3/4" Length	Hardware Bag	1	McMaster-Carr Supply Company