

THE 2000 FIRST ROBOTICS COMPETITION MANUAL

APPENDIX B: KIT OF PARTS

2000 FIRST Robotics Competition Kit Parts

Bearings

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
Pillow Block	1/2"	Gray Container - Bearing Bag	2	The Torrington Company
Radial Ball Bearing With Spherical O.D.	1/2" I.D., Self Locking Collar	Gray Container - Bearing Bag	4	The Torrington Company
Roller Clutch	3/8" I.D.	Gray Container - Bearing Bag	2	The Torrington Company
Single Row Radial Flanged Ball Bearing	1/4" I.D.	Gray Container - Bearing Bag	4	The Torrington Company
Single Row Radial Flanged Ball Bearing	3/8" I.D.	Gray Container - Bearing Bag	4	The Torrington Company
Two Bolt Self Aligning Flange	Fits 1/2" Bearing	Gray Container - Bearing Bag	8	The Torrington Company

Control System

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
1 Conductor Wire	10', #6 AWG, Black	Gray Container - Loose	1	BICC General
1 Conductor Wire	10', #6 AWG, Red	Gray Container - Loose	1	Pioneer Packard
1 Conductor Wire	35', #10 AWG, Black	Gray Container - Loose	1	BICC General
1 Conductor Wire	35', #10 AWG, Red	Gray Container - Loose	1	BICC General
15 Pin Molded Cable	DB15 pin M-F, 6 feet	Green Container - Loose	2	Innovation First
15 Pin Solder Cup Connector	DB15 Male	Green Container - Electronics Bag	2	AMP Foundation
2 Conductor Jacketed Wire	30', #24 AWG	Gray Container - Loose	1	BICC General
2 Conductor Jacketed Wire	35', #16 AWG	Gray Container - Loose	1	BICC General
25 Pin Solder Cup Connector	DB25 Male	Green Container - Electronics Bag	2	AMP Foundation
3 Conductor Shielded Wire	30', #24 AWG	Gray Container - Loose	1	BICC General
9 Pin Cable	DB9 Male to Female, 6', Shielded	Green Container - Loose	4	Innovation First
Anderson Power Products Catalog	Catalog	Green Container - Loose	1	Anderson Power Products
Battery	12 volt	Green Container - Loose	2	Exide
Battery Charger	Sealed Lead Acid Battery, 4 amp	Green Container - Loose	1	Xenotronix
Battery Fuse	60 A, Maxi-Fuse	Green Container - Electronics Bag	1	Bussmann

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Battery Fuse Holder	Maxi-Fuse, 6 AWG leads	Green Container - Electronics Bag	1	Bussmann
Circuit Breaker For Motors	30 amp, 12 volt, Auto-Resetting	Green Container - Electronics Bag	12	Snap-Action, Inc.
Connector for Seat Motor	2 pin, 16 AWG x 12" cable	Green Container - Loose	2	Delphi Packard Electric Systems
Connector for Window Motor	2 pin, 16 AWG x 12" cable	Green Container - Loose	2	Delphi Packard Electric Systems
Connector for Yaw Rate Sensor	3 pin, 24 AWG x 12" cable	Green Container - Loose	1	Delphi Packard Electric Systems
Diode	Max: 1 Amp, 50V (peak rev.)	Green Container - Electronics Bag	2	Brevar
Flightstick Joystick	7" Cable with Male DB15	Green Container - Loose	2	CH Products
Fuse Panel	ATC, 6 fuseable, 12 unfused	Green Container - Electronics Bag	2	Bussmann
Heat Shrink Tubing	1/2"Ø x 6", Black, 2:1 Shrink Ratio	Green Container - Electronics Bag	1	Brevar
Heat Shrink Tubing	1/4"Ø x 6", Black, 2:1 Shrink Ratio	Green Container - Electronics Bag	1	Brevar
Heat Shrink Tubing	1/8"Ø x 6", Black, 2:1 Shrink Ratio	Green Container - Electronics Bag	1	Brevar
Heat Shrink Tubing	3/16"Ø x 6", Black, 2:1 Shrink Ratio	Green Container - Electronics Bag	1	Brevar
Heat Shrink Tubing	3/4"Ø x 6", Black, 2:1 Shrink Ratio	Green Container - Electronics Bag	1	Brevar
Heat Shrink Tubing	3/8"Ø x 6", Black, 2:1 Shrink Ratio	Green Container - Electronics Bag	1	Brevar
Knob for Potentiometer	1" Hexagon, Fits 1/4" Shaft	Green Container - Electronics Bag	2	Radio Shack
LED, Panel Mount	Amber, 12V	Green Container - Electronics Bag	4	Chicago Miniature Lamp, Inc.
LED, Panel Mount	Green, 12V	Green Container - Electronics Bag	4	Chicago Miniature Lamp, Inc.
LED, Panel Mount	Red, 12V	Green Container - Electronics Bag	4	Chicago Miniature Lamp, Inc.
Limit Switch		Green Container - Electronics Bag	10	Honeywell - Microswitch Division
Momentary Rocker Switch		Green Container - Electronics Bag	4	Honeywell - Microswitch Division
Muffin Fan	12 Vdc	Gray Container - Loose	1	EBM Industries
Muffin Fan (Tiny)	12 Vdc	Green Container - Electronics Bag	3	EBM Industries
Operator Interface		Green Container - Loose	1	Innovation First

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Plastic Shield for 25 Pin Connector	fits DB25 Connector	Green Container - Electronics Bag	2	AMP Foundation
Potentiometer	100K Ω , Linear	Green Container - Electronics Bag	6	Bourns, Inc.
Power Supply for Operator Interface	9 Vdc	Green Container - Loose	1	Innovation First
Project Box	Black	Gray Container - Loose	1	Serpac
PWM/Relay Cable	Hitec/JR-style, 36" Long	Green Container - Electronics Bag	8	Innovation First
PWM/Relay Y Cable	Hitec/JR-style, 24" Long	Green Container - Electronics Bag	2	Innovation First
Quick-Disconnect Power Connector	#6 AWG Red/Black Wire	Green Container - Loose	2	Anderson Power Products
Radio Modem for Operator Interface	RS-422, 9 pin F, metal antenna	Green Container - Loose	1	Innovation First
Radio Modem for Robot Controller	RS-422, 9 pin F, rubber antenna	Green Container - Loose	1	Innovation First
Reed Switch	Normally Open, Magnet Activated	Green Container - Electronics Bag	4	CP Clare
Relay Module (Spike)	12V, 20A Max	Green Container - Loose	4	Innovation First
Ring Connector	# 10-12 Awg, #6 lug	Kick Off Check Out -	20	Thomas & Betts Corp.
Ring Connector	# 14-16 Awg, #6 lug	Kick Off Check Out -	10	Thomas & Betts Corp.
Ring Connector	# 22-26 Awg, #6 lug	Kick Off Check Out -	8	Thomas & Betts Corp.
Ring Connector	# 6 Awg	Kick Off Check Out -	10	Thomas & Betts Corp.
Robot Controller		Green Container - Loose	1	Innovation First
Rocker Switch Cover	Any Color	Green Container - Electronics Bag	3	Honeywell - Microswitch Division
Servo	42 oz. in. Peak, 0.19 s/60°	Green Container - Electronics Bag	2	Hitec RCD, Inc.
Spade Connector	Female, 12-10 AWG, Yellow	Green Container - Electronics Bag	10	Thomas & Betts Corp.
Spade Connector	Female, 16-14 AWG, Blue	Green Container - Electronics Bag	10	Thomas & Betts Corp.
Spade Connector	Female, 22-18 AWG, Red	Green Container - Electronics Bag	10	Thomas & Betts Corp.
Spade Connector	Male, 12-10 AWG, Yellow	Green Container - Electronics Bag	10	Thomas & Betts Corp.
Spade Connector	Male, 16-14 AWG, Blue	Green Container - Electronics Bag	10	Thomas & Betts Corp.

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Spade Connector	Male, 22-18 AWG, Red	Green Container - Electronics Bag	10	Thomas & Betts Corp.
Speed Controller (Victor 883)		Green Container - Loose	4	Innovation First
Tri-lens Revolving Light	Light w/ red and blue domes	Green Container - Loose	1	North American Signal
Wire Nut	Wire Nut for Wire Sizes #18-10 AWG	Green Container - Electronics Bag	10	Thomas & Betts Corp.
Yaw Rate Sensor		Gray Container - Loose	1	BEI Systron Donner

Documentation

<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Location</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
BASIC Stamp Programming Disk	CD-ROM	Packaged with Innovation First	1	Parallax, Inc.
BASIC Stamp Programming Manual		Green Container - Loose	1	Parallax, Inc.
Kee Klamp Pipe Fitting Catalog		Gray Container - Loose	1	Kee Industrial Products
Pneumatic Training Manual CD		Vendor will drop ship to teams	1	SMC Pneumatics, Inc.
Small Parts Catalog		Green Container - Loose	6	Small Parts, Inc.
The 2000 FIRST Robotics Competition Manual		Kick Off	1	FIRST

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	Gray Container - Loose	1	Kaman Industrial Technologies
Cable Tie	7" x 0.09"	Green Container - Electronics Bag	12	Thomas & Betts Corp.
Cable Tie Mounting Base	Self-Adhesive, #8 Holes	Green Container - Electronics Bag	10	Thomas & Betts Corp.
Drill Housing Screws	#4 x 3/4, Pan Head - Phillips	Green Container - Drill Bag	10	Fastenal Company
Drill Motor Mounting Flange Fastening Screws	M4 x 6mm, Button Head 19	Green Container - Drill Bag	4	Fastenal Company
Helical Plastic Wire Wrap	1/2" Ø x 24"	Gray Container - Hardware Bag	1	Tyton Hellermann
Helical Plastic Wire Wrap	1/4" Ø x 24"	Gray Container - Hardware Bag	1	Tyton Hellermann
Polyethylene grommet	1/16" x 24"	Gray Container - Hardware Bag	1	Tyton Hellermann
Polyethylene grommet	3/8" x 24"	Gray Container - Hardware Bag	1	Tyton Hellermann
Velcro 1" Hook & Loop Tape	36" Length, Adhesive Backing	Gray Container - Velcro Bag	1	Velcro USA, Inc.

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Velcro 1" One Wrap Tape	24" Lengths, Black	Gray Container - Velcro Bag	1	Velcro USA, Inc.
Velcro 18" One Wrap grip tie	1"x18" grip tie, lemon	Gray Container - Velcro Bag	2	Velcro USA, Inc.
Velcro 5/8" One Wrap Tape	24" Lengths, Black	Gray Container - Velcro Bag	1	Velcro USA, Inc.
Velcro 8" One Wrap grip tie	1"x8" grip tie, Cranberry	Gray Container - Velcro Bag	10	Velcro USA, Inc.
Velcro grip tie	6"x 1"	Gray Container - Velcro Bag	2	Tyton Hellermann
Velcro Sticky Back Coins	5/8" Ø x 36" (48 sets)	Gray Container - Velcro Bag	1	Velcro USA, Inc.

Field Components

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
Ball	13" Ø yellow ball, w/ plastic plug	Green Container - Loose	1	Sport Fun

Misc Hardware

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
Caster, W/ Bolt Hole Mount	165 Pounds, swivel	Gray Container - Loose	2	WT Hight company
Channel For Tape Drive	28" Long	Gray Container - Loose	4	Delphi Interior and Lighting Systems
Double Magnet Cabinet Catch		Gray Container - Hardware Bag	1	Stanley Hardware
Drill Housing Cover	W/ Shift Lever	Green Container - Drill Bag	2	S-B Power Tool
Flange Nut for Seat Positioning Unit	M6 x 1.0 Pitch	Gray Container - Seat Positioning	8	Lear Corporation
Flat Washers	1/4" I.D., 7/8" O.D.	Gray Container - Hardware Bag	4	Fastenal Company
Flexible Shaft Coupling	Black	Gray Container - Seat Positioning	2	DEKA
Folding Table Brace	9-1/2" Brass plated	Gray Container - Hardware Bag	1	Stanley Hardware
Gate Latch	Steel/Zinc Plated	Gray Container - Hardware Bag	1	Stanley Hardware
Hex Head Bolt for Seat Positioning Unit	M6 x 1.0 Pitch x 30mm	Gray Container - Seat Positioning	4	Lear Corporation
Hex Nuts	1/4" I.D., 20 Pitch Coarse Thread	Gray Container - Hardware Bag	8	Fastenal Company
Horiz. Act. (L) for Seat Positioning Unit, Left Hand	Natural Color	Gray Container - Seat Positioning	1	Lear Corporation
Horiz. Act. (R) for Seat Positioning Unit, Right Hand	Black and Natural Color	Gray Container - Seat Positioning	1	Lear Corporation
Lower Channel for Seat Positioning Unit	2.25" x 17" Channel	Gray Container - Loose	1	Lear Corporation

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Magnet	1/4-20 Plastic Thread	Gray Container - Hardware Bag	2	Honeywell - Microswitch Division
Pivot	5/16" Ø	Gray Container - Hardware Bag	2	Stanley Hardware
Roller Guide	7/8" Ø x 1/4" Wheel	Gray Container - Hardware Bag	2	Stanley Hardware
Screen Door Holder	Zinc-Plated	Gray Container - Hardware Bag	1	Stanley Hardware
Upper Channel for Seat Positioning Unit	1.3125" x 9.875" Channel with Gear	Gray Container - Seat Positioning	2	Lear Corporation
Wheelchair Wheel	6" Ø, 5/16" I.D. Bearings, 1-1/2" Wide	Gray Container - Loose	2	Skyway Recreation Products
Wheelchair Wheel	8" Ø, 5/16" I.D. Bearings, 1-1/2" Wide	Gray Container - Loose	2	Skyway Recreation Products
Window Lift Bracket, Left Hand	Color Natural	Gray Container - Window Lift	1	Delphi Interior and Lighting Systems
Window Lift Bracket, Right Hand	Color Natural	Gray Container - Window Lift	1	Delphi Interior and Lighting Systems
Window Lift Gear	Use with Window Tape, Window Lift Mechanism	Gray Container - Window Lift	2	Delphi Interior and Lighting Systems
Window Lift Guide Drive	Use with Guide, Channel, Window Tape	Gray Container - Window Lift	8	Delphi Interior and Lighting Systems
Window Lift Guide, Left Hand	Attach to Triangular Mount, Window Lift	Gray Container - Window Lift	1	Delphi Interior and Lighting Systems
Window Lift Guide, Right Hand	Attach to Triangular Mount, Window Lift	Gray Container - Window Lift	1	Delphi Interior and Lighting Systems
Window Lift Mechanism Tape	16' Length	Gray Container - Window Lift	1	Dymetrol Company, Inc.
Window Lift Triangular Mount	White, Window Lift Mechanism	Gray Container - Window Lift	2	St. Clair Plastics Company

Motors & Pumps

<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Location</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
Drill Drive Assembly	225 in. lbs Maximum Torque	Green Container - Drill Bag	2	S-B Power Tool Company
Drill Housing	T-Handle Style Grip, Left/Right	Green Container - Loose	2	S-B Power Tool
Drill Motor	12 Vdc	Green Container - Drill Bag	2	S-B Power Tool
Fisher-Price 10 Web Jeep Driver	Black	Gray Container - Loose	2	Fisher-Price, Inc.
Fisher-Price Axle	7/16" Ø x 26"	Gray Container - Loose	1	Fisher-Price, Inc.
Fisher-Price Motor/Gearbox	two 12 Vdc motors, switches	Gray Container - Loose	1	Fisher-Price, Inc.
Globe Motor with Drive Assembly	12Vdc	Gray Container - Loose	2	Globe Motors

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Seat Motor	12 Vdc	Gray Container - Loose	2	Delphi Automotive
Van Door Motor - Tiagene	12 Vdc, 75 RPM	Gray Container - Loose	2	Delphi Interior and Lighting Systems
Window Motor, Left Hand	12 Vdc, 12 Tooth Pinion, 16 pitch stub	Gray Container - Window Lift	1	ITT Automotive
Window Motor, Right Hand	12 Vdc, 12 Tooth Pinion, 16 pitch stub	Gray Container - Window Lift	1	ITT Automotive

Other

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
Carpet Sample	12" x 12", 20 oz., Closed Loop	Gray Container - Loose	1	FIRST
Co-Polymer Gutter Guard	6" x 24"	Gray Container - Loose	1	Home Depot
Folding Table Leg Brace, Left Hand	Heavy Duty Leg Brace	Gray Container - Loose	1	Stanley Hardware
Folding Table Leg Brace, Right Hand	Heavy Duty Leg Brace	Gray Container - Loose	1	Stanley Hardware
Pneumatics Bag		Vendor will drop ship to teams	1	SMC

Rods & Shafts

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
Aluminum Rod	1/2" Ø x 24"	Gray Container - Tube	2	Cohen Steel Supply Inc.
Delrin (Acetal) Rod	1/4" Ø x 20"	Gray Container - Tube	1	Plastic Supply
Drill Rod	1/2" Ø x 18"	Gray Container - Tube	2	Cohen Steel Supply Inc.
Drill Rod	1/4" Ø x 18"	Gray Container - Tube	2	Cohen Steel Supply Inc.
Drill Rod	3/8" Ø x 18"	Gray Container - Tube	2	Cohen Steel Supply Inc.
Drill Rod	5/16" Ø x 18"	Gray Container - Tube	2	Cohen Steel Supply Inc.
Flexible Motor Shaft	13.5" Long, Fits Seat Motor	Gray Container - Seat Positioning	2	Grand Rapids Controls
LDPE Rod	1" Ø x 24"	Gray Container - Loose	1	Plastic Supply Inc.
Lead Screw	12" Long	Gray Container - Loose	1	Kerk Motion Products, Inc.
Threaded Rod	1/4" Ø x 18", 20 Pitch Coarse Thread	Gray Container - Tube	1	McMaster-Carr Supply Company

Sheets & Boards

Part Name/Description	Dimensions	Location	Qty /Kit	Product Supplier
Aluminum Plate	1/4" x 3" x 12"	Gray Container - Loose	1	Cohen Steel Supply Inc.

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HDPE Block	1" x 2" x 6"	Gray Container - Loose	1	Plastic Supply
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Springs

<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Location</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
Compression Spring	0.600" O.D. x 3.5 " Long x 0.059" Wire Diameter	Gray Container - Hardware Bag	2	Associated Spring Raymond
Constant Force Spring, Extra Small	0.34" I.D.	Gray Container - Hardware Bag	2	Associated Spring Raymond
Constant Force Spring, Large	1.02" I.D.	Gray Container - Hardware Bag	2	Associated Spring Raymond
Constant Force Spring, Medium	0.59" I.D.	Gray Container - Hardware Bag	2	Associated Spring Raymond
Constant Force Spring, Small	0.51" I.D.	Gray Container - Hardware Bag	2	Associated Spring Raymond
Extension Spring	0.650" O.D. x 2.000" Long	Gray Container - Hardware Bag	2	Associated Spring Raymond
Latex Tubing	1/4" I.D., 3/8" O.D., 5'	Gray Container - Loose	1	Gulf South Medical Supply
Snugger	Spring With Plastic Guide	Gray Container - Hardware Bag	2	Stanley Hardware
Spring Loaded Hinge/brass	4" x 4", 30 in/lb Maximum	Gray Container - Hardware Bag	1	Stanley Hardware
Spring Loaded Hinge/gray	4" x 4", 30 in/lb Maximum	Gray Container - Hardware Bag	1	Stanley Hardware
Torsion Spring, Left Hand	270 Degrees, 0.664" Dia , 0.054" Wire Diameter	Gray Container - Hardware Bag	2	Associated Spring Raymond
Torsion Spring, Right Hand	270 Degrees, 0.664" Dia , 0.054" Wire Diameter	Gray Container - Hardware Bag	2	Associated Spring Raymond

Sprockets & Pulleys

<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Location</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
Pulley With Fixed Eye	1" Ø, For 5/16" Rope	Gray Container - Hardware Bag	3	Stanley Hardware