

Robot Phantom Bill of Materials

Creation Date: April 3 2020

Portion of Project	Part Number	Part Name	Manufacturer	Manufacturer Part Number	Supplier	Supplier Part Number	Quantity	Unit of Measurement	Procurement Type (OTS, MTO*)	Cost (CAD)	Associated Drawing	Datasheet	BOM Notes
Lungs (L)	L-CFS	Chlorox-35	Ottobock Germany	8SP21-2	Ottobock Germany	8SP21-2	1BD	/ (big container)	OTS	\$ 302.40			Purchased through of Desmond Cook, BCT (Desmond_Cook@bcit.ca)
	L-Lum(R/L)	Lungs	In house- Barber Prosthetics	-	-	-	1	-	MTO	\$ -	L-LumRt SL DASM		Drawing is for lungs mold, 3D Printed PLA
	L-TFIM(F/R/L)	Lung-Trachea Fitting	In house	-	-	-	2	-	MTO	\$ -	L-LT SL DASM		3D Printed PLA - One right (R), one left (L), each with a male (M) and female (F) part
	L-TFOR(L/L)	Lung-Trachea Fitting O-ring	In house	-	-	-	2	-	MTO	\$ -	L-LTFO SL DOPRT		Not yet spec'ed
Linear Actuator (LA)	LA-ERD15	Tolomatic ERD15 Linear Actuator	Tolomatic	ERD15 BNM05 SM90.000 LMI ST1 FFG AR1	PQ Systems Ltd	ERD15 BNM05 SM90.000 LMI ST1 FFG AR1	1	each	OTS	\$ 1,257.00	LA-ERD15 SL DASM	ERD Brochure	Contact Robert de Rot at PQ Systems for inquiries (robert@pqsystemsLtd.com)
	LA-ACS	Tolomatic ACS Stepper Drive	Tolomatic	ACST1048UD	PQ Systems Ltd	ACST1048UD	1	each	OTS	\$ 69.00	-	ACS Driver Manual	
		Tolomatic AMS NEMA23, 2-Stack Stepper Motor	Tolomatic	AMS1C2A1	PQ Systems Ltd	AMS1C2A1	1	each	OTS	\$ 350.00	LA-ERD15 SL DASM		
	LA-SM23	With 2000-count Encoder											
	LA-AC3	Tolomatic 3m Stepper Motor Cable											
	LA-EC3	Tolomatic 3m Encoder Cable											
	LA-IC3	Tolomatic 3m IO Cable											
	LA-PS48	AC-DC Converter, 48 V 120 W	Mean Well USA Inc.	EDR-120-48	Digkey Canada	1866-1442-ND	1	each	OTS	\$ 32.34	-		Came with actuator and stepper motor
	LA-WPC	Cord 18 AWG	Qualtek	311007-01	Digkey Canada	Q106-ND	1	each	OTS	\$ 4.03	-		Came with actuator and stepper motor
	LA-PSC	Cord 18 AWG		311007-01	Digkey Canada	Q106-ND	1	each	OTS	\$ 4.03	-		Came with actuator and stepper motor
	LA-USB	USB Type A Male to Type B Male 30cm Cable		-	Project Lab	-	1	each	OTS	\$ -	-	EDR-120-48 Datasheet	
		Oil Resistant Buna-N O-Ring, 1/4 Fractional Width	McMaster Carr	9452K416	McMaster Carr	9452K416	1	pack of 5	OTS	\$ 7.87	-		Wall to Power Supply Cable (WPC)
	AM-PB429	Dash Number 429	McMaster Carr	9452K521	McMaster Carr	9452K521	1	pack of 5	OTS	\$ 6.48	-		Power Supply to Stepper-Driver Cable (PSC)
Actuation Mechanism (AM)	AM-CR364	Oil Resistant Buna-N O-Ring, 3/16 Fractional Width	McMaster Carr	9452K411	McMaster Carr	9452K411	1	pack of 5	OTS	\$ 5.96	-		To be tested for potential friction / water proofing improvements
	AM-PB353	Dash Number 353	McMaster Carr	90025K579	McMaster Carr	90025K579	1	pack of 5	OTS	\$ 12.65	-		To be tested for potential friction / water proofing improvements
	AM-PB429x	Oil Resistant Buna-N O-Ring, 1/4 Fractional Width	McMaster Carr	90025K579	McMaster Carr	90025K579	1	pack of 5	OTS	\$ 12.65	-		To be tested for potential friction / water proofing improvements
	AM-P20	Dash Number 429, X-profile	UBC Physics and Astronomy Machine Shop	-	-	-	1	-	MTO	\$ 442.77	AM-P20 SL DOPRT		Cheaper labour cost as associated with UBC Physics and Astronomy Department
	AM-LPC	Piston	In house	-	-	-	1	each	MTO	\$ -	AM-LPC SL DOPRT		Not made yet - to be 3D printed or machined
	AM-Cyl	Lung to piston motion coupling cable mount	UBC Physics and Astronomy Machine Shop	-	-	-	1	each	MTO	\$ 442.77	AM-Cyl SL DOPRT		Cheaper labour cost as associated with UBC Physics and Astronomy Department
	AM-Cyl	Cylinder	UBC Physics and Astronomy Machine Shop	-	-	-	1	each	MTO	\$ 442.77	AM-Cyl SL DOPRT		Cheaper labour cost as associated with UBC Physics and Astronomy Department
Mounting (M)	M-1024-916	18-8 Stainless Steel Socket Head Screw 10-24 x 9/16" Fully Threaded	McMaster Carr	92196A243	McMaster Carr	92196A243	1	pack of 50	OTS	\$ 5.82	-		
		18-8 Stainless Steel Socket Head Screw	McMaster Carr	92196A243	Project Lab	-	12	each	OTS	\$ -	-		
	M-1420-916	1/4"-20 x 9/16" Fully Threaded	McMaster Carr	92196A243	Dan Kadmas	-	24	each	OTS	\$ -	-		
	M-1420-214	18-8 Stainless Steel Socket Head Screw 1/4"-20 x 2 1/4" Partially Threaded	McMaster Carr	92196A243	Dan Kadmas	-	24	each	OTS	\$ -	-		
	M-1420-112	18-8 Stainless Steel Socket Head Screw 1/4"-20 x 1-1/2" Fully Threaded	McMaster Carr	92196A546	McMaster Carr	92196A546	1	pack of 25	OTS	\$ 9.22	-		
	M-BP	Base Plate	In house	-	-	-	1	each	MTO	\$ -	M-BP SL DOPRT		Manufactured in PHAS Student Machine Shop
	M-MP	Mounting Plate	In house	-	-	-	1	each	MTO	\$ -	M-MP SL DOPRT		Manufactured in PHAS Student Machine Shop
Control (C)	C-RPi4	Canakit Raspberry Pi 4 Starter Kit (4GB RAM)	Canakit	PI4-4GB-STR32F-C4-BLK	Amazon Canada	B07WRMR2CX	1	each	OTS	\$ 134.99	-	Raspberry Pi Documentation	
	C-DAC	DAC	Adafruit Industries LLC	MCP4725	Digkey Canada	1528-1010-ND	1	each	OTS	\$ 7.55	-	MCP4725 Manual	
Testing		Grade B7 Medium-Strength Steel Threaded Rod 7/16"-20 Thread Size, 2" Long	McMaster Carr	98750A473	McMaster Carr	98750A473	1	each	OTS	\$ 1.90	-		Used for testing demo actuator
		Grade B7 Medium-Strength Steel Threaded Rod M12 x 1.75 mm Thread Size, 50 mm Long	McMaster Carr	93675A365	McMaster Carr	93675A365	1	each	OTS	\$ 4.33	-		Used for testing demo actuator

Total Cost \$ 3,724.11

*OTS: Off the Shelf
MTO: Made to Order