



Please read this first!

This unpacking list provides information on parts from two different kits.

You will only have all parts on this list **if** you ordered both 104-300 "Electronics Essentials", and 102-300 "Sensors, Motors, and More Version 3."

The count for each part in "Electronics Essentials" is provided in the column marked with this symbol:



The count for each part in "Sensors, Motors, and More V3" is provided in the column marked with this symbol:



Please email sales@FVResearch.com right away if any items are missing or damaged.

10 Tray Boxes VS 4 Tray Organizers

- Prior to August 2025, the recommended storage for both "Electronics Essentials" and Sensors, Motors, and More" was **three** 10 tray parts boxes from Harbor Freight (PN40528). These boxes have been discontinued.
- As of August 2025, the recommend storage for both kits is **two** 4 drawer organizers from Harbor Freight. (PN 68238). Updated ready-to-cut labels are available for these organizers.
- Part locations for both types of storage are available in this reference list.



10 Tray Parts Boxes Used until August 2025



4 drawer organizers
Used beginning August 2025

How to read this parts list (Figure 1)

- A: Shows the quantity of this part from the Electronics Essentials kit.
- B: Shows the quantity of this part from the Sensors, Motors, and More V3 kit.
- C: Provides the standard schematic symbol(s) for this part.
- D: Provides a sample picture of the part.
- E: Provides the part description and other useful information.
- F: Provides the location in one of three 10 Tray Parts Boxes.
- G: Provides the location in one of two 4 Tray Organizers. This cell is color coded to indicate whether the part comes from "Electronics Essentials", "Sensors, Motors, and More", or both.

Parts from Electronics Essentials are coded like this.

Parts from Sensors, Motors, and More are coded like this.

Parts included in both kits are coded like this.

		B	C	D		F	G
QT		QTY	Symbol	lmage	Description	10 Tray Box Location	4 Tray Organizer Location
1(0	0	- W -OR	aria	10Ω ¼W 5% Carbon Film Resistor Brown, Black, Black, Gold	Box 1 Tray 7	Case 1 Tray 1

Figure 1



Unpacking Instructions

- 1) Install the ready-to-cut labels that came with your parts boxes by following the instructions provided with the labels. If you did not purchase the organizers through FutureVision Research, you can download and print your own labels or purchase a set of labels by visiting this page: fvresearch.com/product/label-packs/
- The ready-to-cut label cards provide a description and location of items in each tray. In order to
 make it easier to know the source for each part, the labels also provide the same color codes as
 this list.
- 3) Install the label cards and dividers in each tray before unpacking any parts
- 4) When unpacking your parts, only open one bag at a time.
- 5) Our suppliers often use abbreviations for the part descriptions seen on each bag's label. The guide on the next page provides explanations for the most commonly used abbreviations.



Figure 2 - Harbor Freight 4 tray organizer



Reference Guide for Part Description Abbreviations:

Our suppliers often use abbreviations for the part descriptions seen on each bag's label.

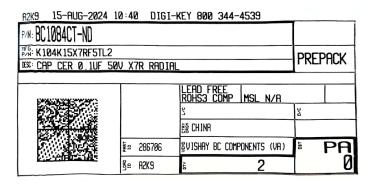
This reference guide provides explanations for the most commonly used abbreviations.

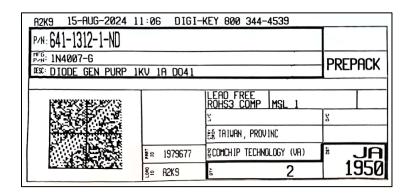
Keep in mind that the manufacturer part number may be part of the description (shown as MFG P/N on the label). Also, resistor values are usually part of the part number.

Two label examples are also provided below.

If you have any questions feel free to email sales@FVResearch.com.

MFG PN (Manufacturer Part Num- ber	Supplier Description	What it means
K104K15X7RF5TL2	CAP CER 0.1UF 50v XYR RADIAL	0.1μF Ceramic Capacitor
ECA-1HM102B	CAP ALUM 1UF 20% 50V RADIAL	1μF Electrolytic Capacitor (ALUM = electrolytic)
CF14JT360R	RES 360 OHM 5% ¼ W AX-IAL	360Ω Resistor 5% ¼ watt
1N4007-G	DIODE GEN PURP 1KV 1A D041	1N4007 General Purpose Diode 1A
MCP3008-I/P	IC ADC 10BIT SAR 16DIP	MCP3008 10 bit Analog to Digital (A/D) IC
PN2222ATF	TRANS NPN 40V 1A	2222 NPN Transistor







Component Categories

Here are the main component categories and their page numbers.

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Notes:

- These parts are a choking hazard. Keep them away from small children and pets.
- Some parts look identical (except for the color code or part number). Be sure to put each part back in its place.
- The code shown in certain part images should also be printed on the actual part.
- Many parts come on strips of tape. Gently peel off any tape and wipe off adhesive before using each part.
- You may need to slightly bend leads of resistors and diodes to put them away. When you do so, bend leads in the middle (not against the body of the component). This helps prevent the leads from breaking.
- The **location** columns show where to place each part. Refer to the previous pages for information on when column you should use.
- Some parts, such as breadboards and speakers are too large for the trays and should be placed in the top compartment of each organizer as indicated in this list.

Resistors

All fixed value resistors have a tolerance of ±5% (gold stripe)

QTY	QTY	Symbol	Image	Description	10 Tray Box Location	4 Tray Organizer Location
10	0		Maria	10Ω ¼W 5% Carbon Film Resistor Brown, Black, Black, Gold	Box 1 Tray 7	Case 1 Tray 1
10	0	- / WW- OR 	Maria	51Ω ¼W 5% Carbon Film Resistor Green, Brown, Black, Gold	Box 1 Tray 7	Case 1 Tray 1
10	0	- / WW OR 	Carrie	100Ω ¼W 5% Carbon Film Resistor Brown, Black, Brown, Gold	Box 1 Tray 7	Case 1 Tray 1
10	10			150Ω ¼W 5% Carbon Film Resistor Brown, Green, Brown, Gold	Box 1 Tray 7 Box 3 Tray 7	Case 1 Tray 1
10	0		ariz	270Ω ¼W 5% Carbon Film Resistor Red, Violet, Brown, Gold	Box 1 Tray 7	Case 1 Tray 1



Resistors (Continued)

All fixed value resistors have a tolerance of ±5% (gold stripe)

	All fixed value resistors have a tolerance of ±5% (gold stripe)							
QTY	QTY	Symbol	Image	Description	10 Tray Box Location	4 Tray Organizer Location		
10	0	OR —	Maria	330Ω ¼W 5% Carbon Film Resistor Orange, Orange, Brown, Gold	Box 1 Tray 8	Case 1 Tray 1		
10	10		aria	360Ω ¼W 5% Carbon Film Resistor Orange, Blue, Brown, Gold	Box 1 Tray 8 Box 3 Tray 7	Case 1 Tray 1		
10	0	0R	Maria	470Ω ¼W 5% Carbon Film Resistor Yellow, Violet, Brown, Gold	Box 1 Tray 8	Case 1 Tray 1		
10	10	0R	ariz	1KΩ ¼W 5% Carbon Film Resistor Brown, Black, Red, Gold	Box 1 Tray 8 Box 3 Tray 7	Case 1 Tray 1		
10	10	0R	and	2.2KΩ ¼W 5% Carbon Film Resistor Red, Red, Red, Gold	Box 1 Tray 8 Box 3 Tray 7	Case 1 Tray 1		
10	0		Maria	4.7KΩ ¼W 5% Carbon Film Resistor Yellow, Violet, Red, Gold	Box 1 Tray 9	Case 1 Tray 1		
10	0	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Maria	5.1KΩ ¼W 5% Carbon Film Resistor Green, Brown, Red, Gold	Box 1 Tray 9	Case 1 Tray 1		
10	0		Maria	5.6KΩ ¼W 5% Carbon Film Resistor Green, Blue, Red, Gold	Box 1 Tray 9	Case 1 Tray 1		



Resistors (Continued)

All fixed value resistors have a tolerance of ±5% (gold stripe)

	All lixed value resistors have a tolerance of ±5% (gold stripe)						
QTY	QTY	Symbol	Image	Description	10 Tray Box Location	4 Tray Organizer Location	
10	10	-\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	and	10KΩ ¼W 5% Carbon Film Resistor Brown, Black, Orange, Gold	Box 1 Tray 9 Box 3 Tray 7	Case 1 Tray 1	
10	0	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Carried States	100KΩ ¼W 5% Carbon Film Resistor Brown, Black, Yellow, Gold	Box 1 Tray 9	Case 1 Tray 1	
10	0		Mais	220KΩ ¼W 5% Carbon Film Resistor Red, Red, Yellow, Gold	Box 1 Tray 10	Case 1 Tray 1	
10	0	0R	Tale	470KΩ ¼W 5% Carbon Film Resistor Yellow, Violet, Yellow, Gold	Box 1 Tray 10	Case 1 Tray 1	
10	0	0R	The state of the s	1MΩ ¼W 5% Carbon Film Resistor Brown, Black, Green, Gold	Box 1 Tray 10	Case 1 Tray 1	
10	0	OR	The same of the sa	10MΩ ¼W 5% Carbon Film Resistor Brown, Black, Blue, Gold	Box 1 Tray 10	Case 1 Tray 1	
1	1	-₩- OR - <u>-</u> -		CdS Photocell Dark Resistance. ≈ .5MΩ Light Resistance = Between 16 – 33 KΩ)	Box 1 Tray 10 Box 3 Tray 8	Case 1 Tray 2	
1	0	-₩- OR 	102	1kΩ (code 102) Trimmer Potentiometer (Style may vary)	Box 2 Tray 6	Case 1 Tray 2	



Resistors (Continued)

				,		
QTY	QTY	Symbol	Image	Description	10 Tray Box Location	4 Tray Organizer Location
1	0	→ OR —	502	5KΩ (code 502) Trimmer Potentiometer (Style may vary)	Box 2 Tray 6	Case 1 Tray 2
1	0	→	103	10KΩ (code 103) Trimmer Potentiometer (Style may vary)	Box 2 Tray 6	Case 1 Tray 2
1	0		104	100kΩ (code 104) Trimmer Potentiometer (Style may vary)	Box 2 Tray 6	Case 1 Tray 2
1	0	→₩- OR -	OR 504	500KΩ (code 504) Trimmer Potentiometer (Style may vary)	Box 2 Tray 6	Case 1 Tray 2
1	0	–₩ ^τ OR –□, ^τ		Thermistor - Negative Temperature Coefficient (NTC) 10K Ω	Box 1 Tray 10	Case 1 Tray 2



Capacitors

	Package color may vary Note: The voltage rating on the electrolytic capacitors will vary but should always be 25V or higher.								
QTY	QTY	Symbol	Image	Description	10 Tray Box Location	4 Tray Organizer Location			
2	0	- -	103	0.01 μF (10000 pF) 50V Ceramic Capacitor	Box 2 Tray 7	Case 1 Tray 3			
2	0	—	683	0.068 μF (68000 pF) 50V Ceramic Capacitor	Box 2 Tray 7	Case 1 Tray 3			
2	2	⊣⊢	104	0.1μF (100000 pF) 50V Ceramic Capacitor	Box 2 Tray 7 Box 3 Tray 8	Case 1 Tray 3			
2	0	+	154	0.15 μF (150000) 50V Ceramic Capacitor	Box 2 Tray 7	Case 1 Tray 3			
2	0	+	224	0.22 μF (220000 pF) 50V Ceramic Capacitor	Box 2 Tray 8	Case 1 Tray 3			
2	2	- -	334	0.33 μF (330000 pF) 50V Ceramic Capacitor	Box 2 Tray 7 Box 3 Tray 8	Case 1 Tray 3			
2	0	- (- OR] -		0.1 μF 50V Electrolytic Capacitor	Box 2 Tray 8	Case 1 Tray 4			
2	0	- (- OR ,1 ⊩ -		0.47 μF 50V Electrolytic Capacitor	Box 2 Tray 8	Case 1 Tray 4			



Capacitors (Continued)

Package color may vary

Note: The voltage rating on the electrolytic capacitors will vary but should always be 25V or higher.

	Note: I	ne voltage rati	ng on the elect	trolytic capacitors will vary but should always be 25V o	or higher.	1
QTY	QTY	Symbol	Image	Description	10 Tray Box Location	4 Tray Organizer Location
2	2	- (- OR] -		1 μF 50V Electrolytic Capacitor	Box 2 Tray 8 Box 3 Tray 8	Case 1 Tray 4
2	0	- (- OR] -		10 μF 35V Electrolytic Capacitor	Box 2 Tray 1	Case 1 Tray 4
2	0	- OR - - - - -		22 μF 35V Electrolytic Capacitor	Box 2 Tray 1	Case 1 Tray 4
2	0	⊣(- OR]⊩		47 μF 35V Electrolytic Capacitor	Box 2 Tray 1	Case 1 Tray 4
2	0	- OR - - - - -		100 μF 35V Electrolytic Capacitor	Box 2 Tray 1	Case 1 Tray 4
2	0	⊣(- OR]⊩		220 μF 35V Electrolytic Capacitor	Box 2 Tray 1	Case 1 Tray 4
2	0	- (- OR] -		470μF 35V Electrolytic Capacitor	Box 2 Tray 1	Case 1 Tray 4
2	2	- (- OR] -		1000 μF 25V Electrolytic Capacitor	Box 2 Tray 1 Box 3 Tray 8	Case 1 Tray 4



Light Emitting Diodes (LED)

				,		,
QTY	QTY	Symbol	Image	Description	10 Tray Box Location	4 Tray Organizer Location
10	10	*_		5mm Clear Red LED Forward Voltage (Vf) = 2V Forward Current (If) = 20mA	Box 1 Tray 6 Box 3 Tray 8	Case 2 Tray 1
5	2	*\		5mm Green LED Forward Voltage (Vf) = 2.1V Forward Current = 20mA	Box 1 Tray 6 Box 3 Tray 8	Case 2 Tray 1
5	0	*\		5mm Yellow LED Forward Voltage (Vf) = 2.1V Forward Current (If) = 20mA	Box 1 Tray 6	Case 2 Tray 1
5	0	*\		5mm Clear Blue LED Forward Voltage (Vf) = 3.2V Forward Current (If) = 20mA	Box 1 Tray 6	Case 2 Tray 1
5	5			5mm Bi-color Red/Green Two Lead LED Forward Voltage (Vf) = 2.1V Green 1.95V Red Forward Current (If) = 20mA	Box 1 Tray 6 Box 3 Tray 8	Case 2 Tray 1
0	5	WSEELS USE DO NOT BE DO NO		Addressable RGB 5mm LED WS2812 compatible 4.5V – 6V Use at least 1000µF capacitor across power leads.	Box3 Tray 8	Case 2 Tray 1

Transistors, Diodes, and Integrated Circuits

			T		T	1
QTY	QTY	Symbol	Image	Description	10 Tray Box Location	4 Tray Organizer Location
2	2	\	1N4007	1N4007 1A Rectifier Diode Forward Voltage (Vf)=1.1V@1A (0.7V@.02A) DC Reverse Voltage (Vr) = 1000V	Box 2 Tray 9 Box 3 Tray 10	Case 2 Tray 1
2	2	В	PN2222	PN2222 Bi-Polar Junction Transistor (BJT) NPN 40volts 1A (Can also be used in projects calling for a 2N3904 transistor)	Box 2 Tray 9 Box 3 Tray 10	Case 2 Tray 1
2	0	в	2N3904	2N3904 Bi-Polar Junction Transistor (BJT) NPN 40V .2A	Box 2 Tray 9	Case 2 Tray 1
2	0	В	2N3906	2N3906 Bi-Polar Junction Transistor PNP 40V .2A	Box 2 Tray 9	Case 2 Tray 1
2	0	D S G	J113	J113 Junction-gate-Field Effect Transistor (J-FET) N-Channel (replacement for MPF102)	Box 2 Tray 9	Case 2 Tray 1
1	0			NPN Phototransistor Wavelength sensitivity: 450 to 1080nm (Visible light is considered 400 to 700nm) Note: Be careful this looks just like an LED	Box 2 Tray 9	Case 2 Tray 2
1	1	- VI VO GND	7805	7805 5V Linear Voltage Regulator Supply Voltage = 5V – 35V Current Limit = 1.5A	Box 2 Tray 10 Box 3 Tray 10	Case 2 Tray 1
2	0	741		741 Operational Amplifier (Op-Amp) Integrated Circuit (IC) Supply Voltage = 7V – 36V	Box 2 Tray 10	Case 2 Tray 1



Transistors, Diodes, and Integrated Circuits (Continued)

QTY	QTY	Symbol	Image	Description	10 Tray Box Location	4 Tray Organizer Location
2	0	386		386 Operational Amplifier (Op-Amp) Integrated Circuit (IC) Supply Voltage = 4V – 12V	Box 2 Tray 10	Case 2 Tray 1
2	0	555		555 Timer Integrated Circuit (IC) Supply Voltage = 4.5V – 16V	Box 2 Tray 10	Case 2 Tray 1
0	1	△ 388 VCC 38 ∠ 34 04 15 △ 17 07 15 △ 40 000 000 13 △ 600 000 15 △ 500 000 15 △ 77 07 15 △ 17 15 △ 18 1	MMM L293	L293D Bipolar Motor Driver IC Quadruple half-H motor driver Integrated Circuit Supply Voltage = 4.5V - 36V	Box 3 Tray 10	Case 2 Tray 1
0	1	1 CHO VDD 155 2 CH1 VREF 154 3 CH2 VREF 154 5 CH2 ODUT 112 1 CH5 DDT 112	MCP3008	10MCP3008IP A/D Converter 10-bit Integrated Circuit (IC) Supply Voltage = 2.7V – 5.5V	Box 3 Tray 10	Case 2 Tray 1
0	1	11 000 VCC 110 110 110 110 110 110 110 110 110 1	SN74H595N	SN74HC595N IC 8-BIT Shift Register Integrated Circuit (IC) Supply Voltage =2V – 6V	Box 3 Tray 10	Case 2 Tray 1



Switches, Relays, and Encoders								
QTY	QTY	Symbol	Image	Description	10 Tray Box Location	4 Tray Organizer Location		
1	0	- -		Black Slide Switch 1P2T (SPDT) 200mA (DC) 30V	Box 1 Tray 1	Case 2 Tray 4		
4	4	OR		Tact Switch 12*12mm Through Hole SPST-NO	Box 1 Tray 1 Box 3 Tray 1	Case 2 Tray 4		
1	1			8.4 – 12 VDC Relay – SPDT (1 Form C) (PN RT214012)	Box 1 Tray 1 Box 3 Tray 1	Case 2 Tray 4		
0	1	CLK DT SW SW GND		KY-040 Rotary Encoder with Push Button – 360° (Attach washer nut and knob before putting away)	Box 3 Tray 10	Case 2 Tray 4		
Magnets								
0	1	No Symbol	A Read of the latest of the la	3D printed magnet wand containing a brushed nickel neodymium-iron-boron (NdFeB) magnet (For use with Hall effect sensor) (Color may vary)	Box 3 Tray 2	Case 2 Tray 2		
Lamps								
1	0		The state of the s	Neon lamp 65VAC 90VDC	Box 2 Tray 10	Case 2 Tray 1		



Tray 10

Tray 2

Sensors </> 10 Tray 4 Tray Organizer Box **QTY QTY Symbol Description** Location Location **Image** VDD Latching Magnetic Switch Box 3 Case 2 0 1 Tray 9 Tray 2 112NUS1881EUA Hall Effect Digital Switch US1881 TMP36 Analog Temperature Sensor Case 2 Box 3 тмрз6 Temperature Range = -40C - 125C Vout 0 1 Tray 9 Tray 2 Supply Voltage = 2.7V - 5.5V**TMP36** GND VCC SDA SCL ADXL345 3axis Accelerometer Breakout Case 2 Box 3 1 0 Supply Voltage = 3V - 5V Tray 2 Tray 6 HC-SR501 PIR Motion Sensor Case 2 Box 3 0 1 Tray 2 Tray 6 Supply Voltage = 5V VCC TRIG HC-SR04 Ultrasonic Distance Sensor Box 3 Case 2 0 1 ECHO GND Tray 2 Supply Voltage = 5V Tray 6 **Displays** 0.96" 128x64 OLED Display Module I2C SSD1306 SDA SCL Case 2 Box 3 1 0 VCC GND

availability

Display will be white or blue depending on



Speakers and Microphones

QTY	QTY	Symbol	Image	Description	10 Tray Box Location	4 Tray Organizer Location	
1	0	(+)		Electret Condenser Microphone Supply Voltage = 3V ~ 10V	Box 1 Tray 1	Case 2 Tray 2	
1	0			9VDC Mechanical Buzzer with Wire Lead	Box 1 Tray 5	Case 2 Tray 2	
1	0	+ -		Round 8 Ohm Speaker 2 Watt 1" Diameter	Box 1 Tray 5	Top of Case 2	
0	1	+ -	12308MR-R ⊕(8-ohm Breadboard Speaker 100MW 75DB Note: Remove the "Remove After Washing" sticker.	Box 3 Tray 6	Case 2 Tray 2	
1	0	+ -		Stereo Earbuds	Box 1 Tray 1	Case 2 Tray 3	
1	0	+ -		Stereo Jack Connector 3.5mm	Box 1 Tray 1	Case 2 Tray 2	



Motors

QTY	QTY	Symbol	Image	Description	10 Tray Box Location	4 Tray Organizer Location	
1	0	+(2)-		Hobby Motor (6600 RPM @ 12V)	Box 2 Tray 3	Case 2 Tray 3	
0	1	+(3)+		Gearmotor 200 RPM Supply Voltage 3 - 6V DC	Box 3 Tray 3	Case 2 Tray 3	
0	1	COC. a James. CO		Geared Stepper Motor 5V (28BYJ-48 Unipolar Stepper Motor)	Box 3 Tray 3	Case 2 Tray 3	
0	1	SIG W. D.	7 7 9	Servomotor 5V – Positional Rotation (SG90 Servomotor and horns 3V to 6V)	Box 3 Tray 6	Case 2 Tray 3	



Prototyping Supplies

and a supplied							
QTY	QTY	Symbol	Image	Description	10 Tray Box Location	4 Tray Organizer Location	
1	1	No Symbol		400 Point Solderless Plug-in Breadboard	Box 2 Tray 5 Box 3 Tray 5	Case 1 Top Compartment	
1	1	No Symbol		830 Point Solderless Plug-in Breadboard	Box 2 Tray 5 Box 3 Tray 5	Case 1 Top Compartment	
1	1	No Symbol		Dupont Jumper Wires Male to Male 6" Quantity = 20PCS	Box 2 Tray 4 Box 3 Tray 4	Case 2 Tray 4	
0	1	No Symbol		Dupont Jumper Wires Male to Female 6" Quantity = 20PCS	Box 3 Tray 4	Case 2 Tray 3	
1	0	No Symbol		Alligator Clip test leads (Pack of 10)	Not stored in parts boxes	Case 1 Top Compartment	
1	0	No Symbol		Jumper Kit Various colors 22AWG 70PCS	Box 2 Tray 4	Case 1 Top Compartment	



Power Supplies and Battery Connectors </> 10 Tray 4 Tray Box Organizer **QTY QTY Symbol** Location Location **Image Description** Box 1 Case 2 9V Alkaline Battery (Brand may vary) Tray 3 Top Com-2 1 No Symbol Store 9V batteries separately if the contacts partment Box 3 are not protected by a battery clip. or Tray 4 Tray 2 Box 1 9V Battery Connector with plug for breadboard jumpers Case 2 Tray 3 2 2 No Symbol Always store them attached to a 9V battery or AA Top Com-Box 3 partment battery pack. Tray 5 Box 1 Case 2 Two pack AA alkaline batteries (Brand may vary) Tray 3 Top Com-2 4 Store in the assigned tray when install installed in partment Box 3 a battery holder. Tray 2 or Tray 3 Two AA battery holders with plug for 9V Bat-Case 2 tery Connector (Only store with AA batteries Box 1 No Symbol 0 1 Top Cominstalled if a battery clip is attached to protect Tray 4 partment the contacts) Four AA Cell Battery Holder with 9V clip. Case 2 Box 3 1 No Symbol 0 Top Com-Tray 4 (Only store with AA batteries installed if a batpartment tery clip is attached to protect the contacts) Solar Cell Case 2 Box 1 0 OR 1 Panasonic Part numbers and their open circuit voltage: Tray 1 Tray 4 Part #1417 = 2.4V, Part #1454 = 2.4V Part #1819 = 4.9V Safety Safety Glasses Use With or Without prescrip-Top of 1 1 No Symbol N/A tion Eyewear Case 1