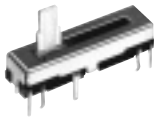
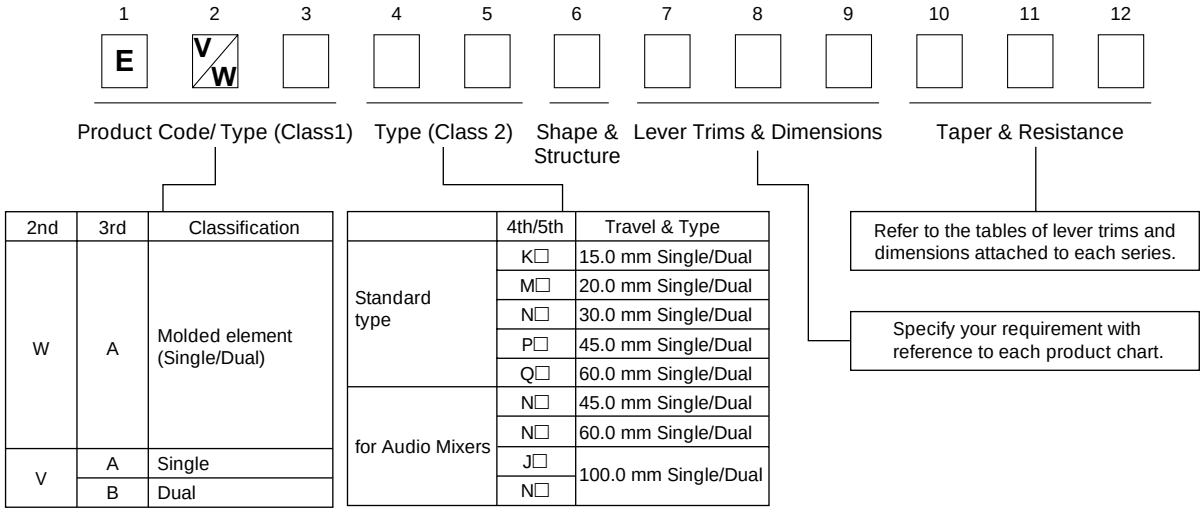
■ Quick Selection Guide

Type	Appearance	Part Numbers	Total Resistance	Taper	Travel	Page
Standard Type		EWAK EWAM EWAN EWAP EWAQ	5 kΩ, 10 kΩ, 20 kΩ, 50 kΩ, 100 kΩ, 200 kΩ · B Taper : ⊕500 kΩ · BH Taper : 10 kΩ, 50 kΩ, 100 kΩ	A, B, C, D, G, BH	15.0 mm, 20.0 mm, 30.0 mm, 45.0 mm, 60.0 mm	053
Standard Faders for Audio Mixers		EWAP1 EWAP3 EWAQ1 EWAQ3	10 kΩ, 20 kΩ, 50 kΩ	A, B, D, Y	60.0 mm, 45.0 mm	059
Thin type Faders for Audio Mixers		EVAJQ EVBJQ EVANA EVBNA EVANB EVBNB	10 kΩ, 20 kΩ	A, B, D, Y	100.0 mm, 60.0 mm 45.0 mm	061
Mono Faders for Audio Mixers		EVANF	5 kΩ, 10 kΩ, 20 kΩ	A, B, D, Y	100.0 mm	063
Monorail Faders for Audio Mixers		EVANH EVBNH EVANJ EVBNJ EVANK EVBNK	10 kΩ, 20 kΩ	A, B, D, Y	100.0 mm, 60.0 mm 45.0 mm	065

■ Explanation of Part Numbers



2nd	3rd	Classification
W	A	Molded element (Single/Dual)
V	A	Single
	B	Dual

	4th/5th	Travel & Type
Standard type	K□	15.0 mm Single/Dual
	M□	20.0 mm Single/Dual
	N□	30.0 mm Single/Dual
	P□	45.0 mm Single/Dual
	Q□	60.0 mm Single/Dual
for Audio Mixers	N□	45.0 mm Single/Dual
	N□	60.0 mm Single/Dual
	J□	100.0 mm Single/Dual
	N□	

■ Checklist Before Inquiry

When you specify Potentiomters, please take advantages of our standard products for better price and delivery. Please provide the following items before ordering.

Checklist

		Item			Information (Requirements)		
Common	C-1	Inquiry purpose			New use, Modification, Others ( )		
	C-2	Modification	Current supplier				
			Current part No.				
			Purpose				
	C-3	Application	Equipment				
			Environment		Indoor/Outdoor use, Stationary/Portable set, High humidity, SO_2, NaCl		
			Temperature		(°C) to (°C)		
			Operation		General use, Low torque		
	C-4	Adjustment	Method		Manual, Automatic		
			Direction		Top, Bottom, Vertical, Horizontal		
			Driver shape		Knob (Shape;)		
	C-5	Mounting	Method		Manual, Automatic		
			Mounter		Panasert (Model:), Other mounter (Maker/Model: /), Parts feeder		
	C-6	Soldering	Method		Manual soldering, Flow soldering, Reflow soldering		
			Conditions		Temp. (°C), Time (s), Dipping times( )		
			Washing		Machine, Soaking, Applied solvent ( )		
Electrical	E-1	Electrical application	Circuit		Volume, Tone, Balance, Circuit regulation, Others ( )		
			Stereo tone use		General tone, High-cut tone, Bass, Treble		
	E-2	Conditions	Current		ac, dc		
			Rating		Max. operating power (W), Operating voltage (V)		
			Applied current		Small current use, Applying current (mA)		
	E-3	Resistance	Total value/Torelance		(Ω) / ±20 %, ±30 %, Others (± %)		
	E-4	Taper			A, B, C, D, G, BH, 15A, 1B, 15C, 10A, 4B, H, Others ( )		
	E-5	Tracking error	Range		(dB) to (dB)		
			Specifications		±(dB)		
	E-6	Tap	Necessity/Position		Necessary, Unnecessary / 40 %, 50 %, 60 %, Others ( )		
	E-7	Other requirements					
Shapes/Dimensions	M-1	Shape	Size		100.0 mm, 60.0 mm, 45.0 mm, 30.0 mm, 20.0 mm, 15.0 mm		
			Structure	Units	Single, 1-shaft 2 gang, Others ( )		
				Shape*	Horizontal type (Shaft is parallel to PWB), Vertical type (Shaft is vertical to PWB)		
	M-2	Shaft/Lever	Shape		Standard slide	Insulated lever	Type C, Type X, Type U
					Potentiometer	Metal lever	Type C, Type S, Type D
					Open frame type (MK-II)		Type C, Type T, Type W
	M-3	Mounting	Type		Soldering, Screw mounting, Others ( )		
	M-4	Terminals	Type		Solder lug, PWB		
			(PWB terminals)		Length from mounting surface: (mm), Layout pattern: ( )		
	Additional functions						
	M-5	Detent(s)	Detents		1 point, 11 points, 41 points, Others (points)		
			Position		Midpoint, Others (at)		
Other	L-1	Special requirements for endurance					
	L-2	Other questionnaires					

Notes:
1. When you specify custom types (custom-made), new tooling and jigs, and/or equipment may be required. It will be necessary to confirm your estimates of quantity and development schedule as accurately as possible.
2. Please inform us if you designate your own part number.

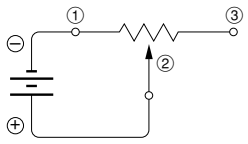
* Previous notations for potentiometer shape “Stand-up type” (Shaft is parallel to PWB.) and “Lay-down type” (Shaft is vertical to PWB.) – have been changed in this edition to “Horizontal type” or “Side-adjust type” (Shaft or knob is parallel to PWB.) and “Vertical type” or “Top-adjust type” (Shaft or knob is vertical to PWB.).

■ ⚠ Application Notes

When using our Slide Potentiometers, please observe the following items to prevent dangerous accidents and deterioration of performance.

1. Prohibited items and notes in design stage

1. Use within the rating
   The Power Rating or Maximum Voltage varies with the size and type of a product. Also, the Power Rating must be reduced according to a Power Derating Curve. When a potentiometer is used with a current of less than a few micro-amperes, the influence of contact resistance increases because of the circuit diagram. Check the potentiometer under actual operating conditions.
2. Migration
   Some potentiometers cannot be used with dc voltage. If a potentiometer is to be used with dc voltage, specify this when ordering, or check the availability referring to the "Product Specifications for Information."
3. Anodization
   When a potentiometer is used with dc voltage under conditions of high humidity, the terminal at the side of the wiper (terminal 2) must be a positive electrode, as shown in the figure at right.



4. Recommended Circuit Configuration
   It is recommended that you use the variable resistor for voltage adjustments. If it is used for current adjustments, then it may be influenced by the contact resistance between the resistor body and the slide, depending on the target circuit conditions. Conducting a test under actual operating conditions is highly recommended.
5. Soldering conditions
   When performing solder dipping, check the soldering conditions according to the "Product Specifications for Information", because the conditions vary with the product.
   Do not wash a potentiometer after solder dipping because flux may invade the potentiometer, resulting in contact failure. Avoid use of jumper cables near the potentiometers because flux may attach to them.
6. Operating temperature conditions
   Tactile feeling in operation is given serious consideration, and rotation torque increases under low temperatures (below–10 °C) depending on the product. If a potentiometer is expected to be used under low temperatures, specify this in advance.

2. Prohibited items and notes on handling

1. Terminal clinch
   Bending and unbending of terminals after mounting to a PWB must be one cycle or less. More than one bending/unbending cycle may result in damage.
2. Stress on the terminals
   Do not apply excessive stress to terminals during handling. Set soldering conditions with consideration given to stress on the terminals.
3. Storage conditions
   Do not store the potentiometers under high temperatures and/or high humidity, or in a location where corrosive gas may be generated. Store the potentiometers at room temperature and room humidity in a packed condition. Use them within a maximum of 6 months. Check the date of manufacture on the package box and apply the "first-in-first-out" rule. If unpacked switches must be stored as inventory, store them in a polyethylene bag to keep out air.

3. Prohibited items on fire and smoking

1. Absolutely avoid use of a potentiometer beyond its rated range because doing so may cause a fire. If misuse or abnormal use may result under conditions in which the potentiometer is used out of its rated range, take proper measures such as current interruption using a protective circuit.
2. The grade of nonflammability for resin used in potentiometers is "94HB," which is based on UL94 Standards (flammability test for plastic materials). Prohibit use in a location where a spreading fire may be generated or prepare against a spreading fire.

4. For use in equipment for which safety is requested

Although care is taken to ensure potentiometer quality, inferior characteristics, short circuits, and open circuits are some problems that might be generated. To design a set which places maximum emphasis on safety, review the affect of any single fault of a potentiometer in advance and perform virtually fail-safe design to ensure maximum safety by:

1. preparing a protective circuit or a protective device to improve system safety, and
2. preparing a redundant circuit to improve system safety so that the single fault of a potentiometer does not cause a dangerous situation.

For notes on use, the following sources were referred:

Technical report EIAJ RCR-2191A "Guideline of Notabilia for potentiometers for Use in Electronic Equipment" issued by the Japan Electronics and Information Technology Industries Association (Issued by March 2002)

Refer to this Technical Report for additional details.

5. For actual use, be sure to refer to "Product Specifications for Information."

■ Common Specifications

● Electrical Specifications

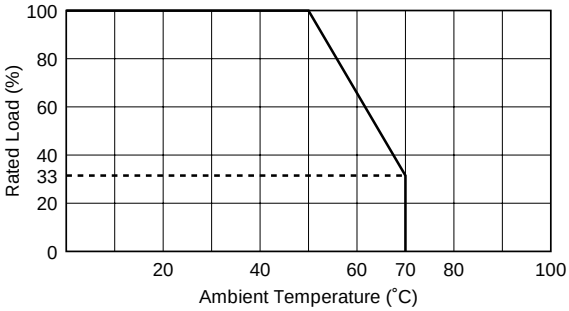
1. Voltage Rating

$E=\sqrt{P \cdot R}$

E=Voltage Rating (V)
P=Power Rating (W)
R=Total Resistance (Ω)

Voltage rating is defined by above formula.
When voltage rating exceeds max. operating voltage, the max. operating voltage shall become the rated voltage.

Power Derating Curve

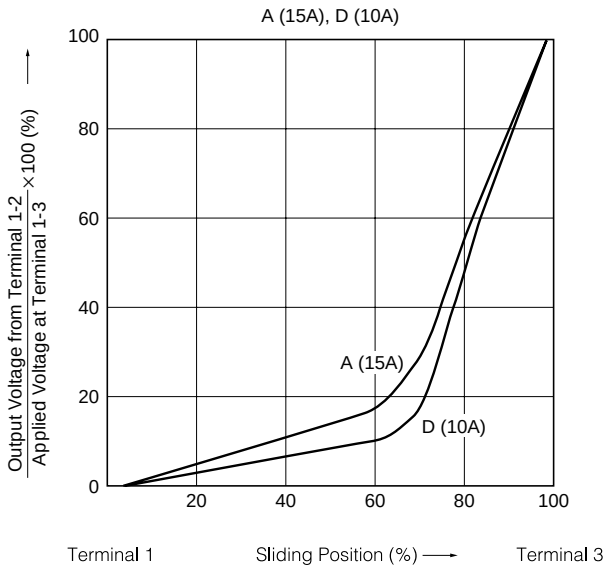


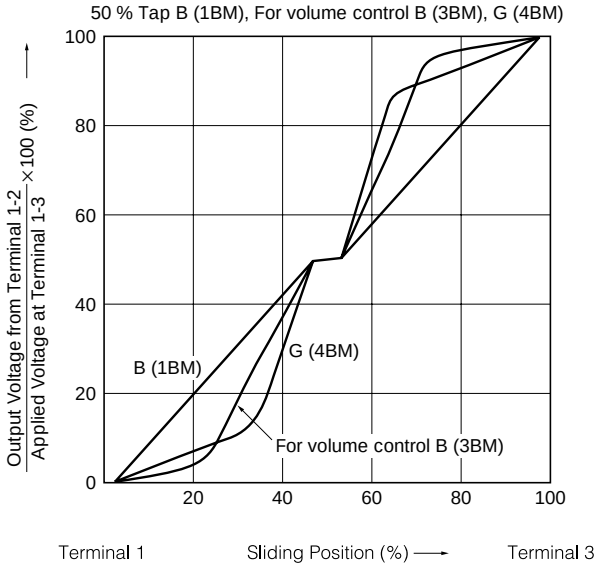
2. Taper (Resistance Curve)

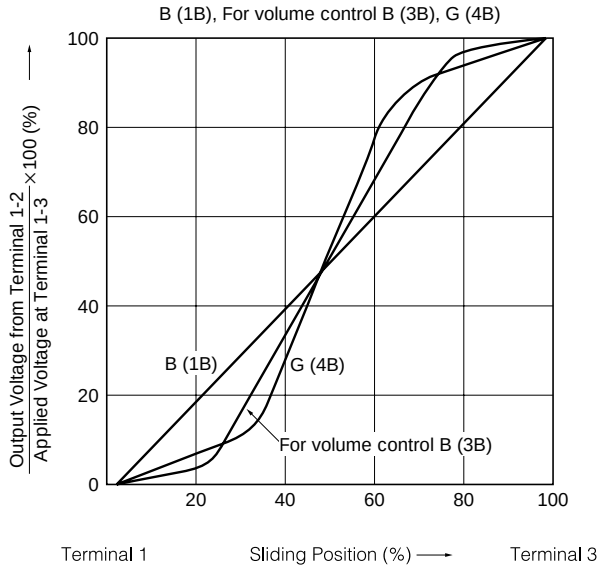
Calculation Formula / Measuring point / Taper		V (terminal 1-2)/V (terminal 1-3)×100 (%)		V (terminal 2-3)/V (terminal 1-3)×100 (%)	
		Sliding Ratio (%)			
EIAJ	Panasonic	30 (20)	50	30 * (20)	50 *
15A	A		10 to 25		
1B	B		40 to 60		
15C	C				10 to 25
10A	D		6 to 15		
4B	G	5 to 15 (1 to 8)	40 to 60	5 to 15 (1 to 8)	
H	BH	Linear (Special)			

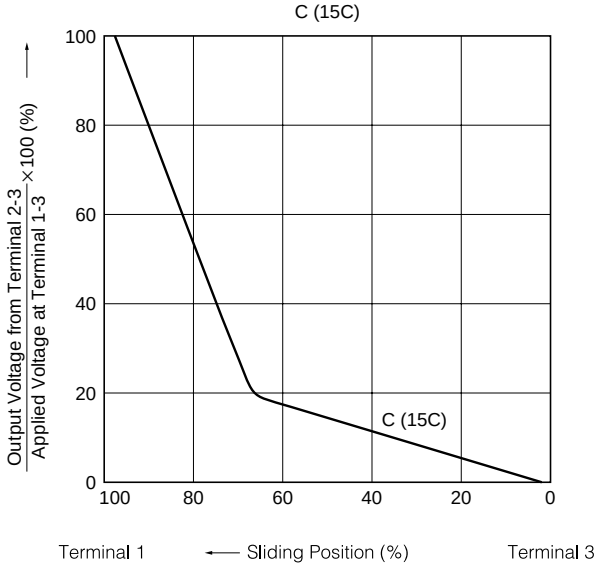
Notes:
1. ✻Measured from terminal 3 end.
2. ( ) is applied to EWAK (15.0 mm series) and EWAM (20.0 mm series).

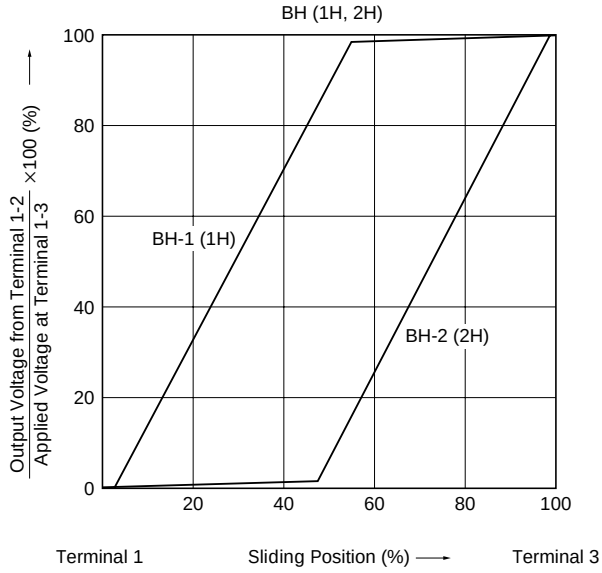
2-1. Taper











3. Insulation resistance

The insulation resistance measured with a 250 V insulation resistance tester across the terminal and the lever, across the terminal and the metallic cover, and for the dual type, across the terminals of both the resistors is 100 MΩ or more.

4. Withstand voltage

When 300 V is applied across the terminal and the lever, across the terminal and the metallic cover, and for the dual type, across each terminal of both the resistors for one minute, damages, arcs or dielectric breakdown will not be caused.

5. Slide noise

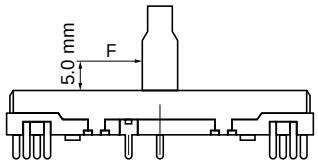
While applying 20 V (if the rated voltage is less than 20 V, the rated voltage) across terminals 1 and 3, slide the lever at a speed of 20 mm/s. The voltage of noise generated is less than 47 mV.

● Mechanical Specifications

1. Stopper Strength

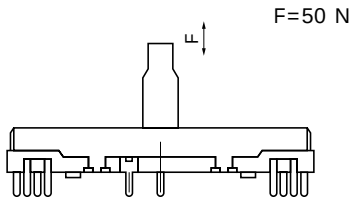
The following static load shall be applied to the lever at a point of 5.0 mm from the mounting surface for 10 seconds at the both ends of lever sliding travel.

Lever material	Load	
	Standard type, Standard faders type	Others faders type
Insulated lever	20 N	–
Metal lever	50 N	50 N



2. Thrust Strength of Lever

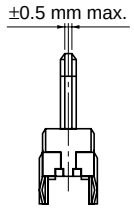
When the following thrust static load is applied to the lever in the longitudinal axis for 10 seconds, no damage shall occur.



3. Lever Discentering

Discentering of lever from the center of cover width shall be 0.5 mm max.

Lever Discentering	Standard type, Standard faders type	Others faders type
	±0.5 mm	±0.7 mm



■ Minimum Quantity/Packing Unit

Please place an order by an integer multiple of the Quantity/Carton.

Product Item (Series, Type)	Part No.	Packaging	Quantity/Carton	Minimum Quantity/ Packing Unit	Notes
Standard Type Slide Potentiometers	EWAK	Tray Pack	1000 pcs.	100 pcs.	
	EWAM		1000 pcs.	100 pcs.	Lever length < 20.0 mm
			500 pcs.	50 pcs.	Lever length > 21.0 mm
	EWAN		1000 pcs.	100 pcs.	
	EWAP		500 pcs.	50 pcs.	
	EWAQ		500 pcs.	50 pcs.	Lever length < 20.0 mm
			250 pcs.	25 pcs.	Lever length > 21.0 mm
Standard Faders for Audio Mixers Slide Potentiometers	EWAP1	Tray Pack	500 pcs.	50 pcs.	
	EWAP3				
	EWAQ1		500 pcs.	50 pcs.	Lever length < 20.0 mm
	EWAQ3		250 pcs.	25 pcs.	Lever length > 21.0 mm
Thin type Faders for Audio Mixers Slide Potentiometers	EVAJQ	Tray Pack	200 pcs.	40 pcs.	
	EVBJQ				
	EVANA		200 pcs.	50 pcs.	
	EVBNA				
	EVANB				
	EVBNB				
Mono Faders for Audio Mixers Slide Potentiometers	EVANF	Tray Pack	500 pcs.	100 pcs.	
Monorail Faders for Audio Mixers Slide Potentiometers	EVANH	Tray Pack	300 pcs.	60 pcs.	
	EVBNH				
	EVANJ				
	EVBNJ				
	EVANK				
	EVBNK				