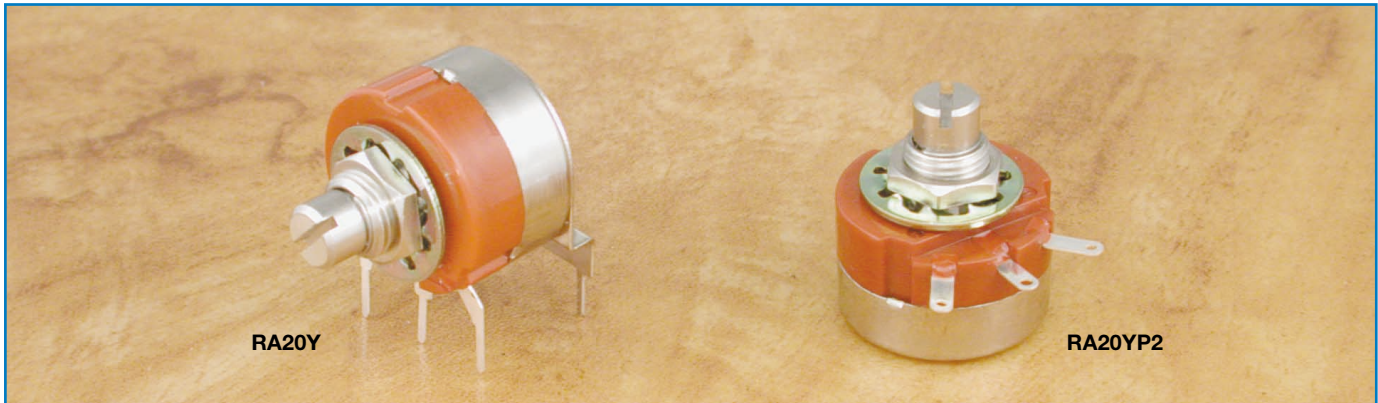


## 20mm Diameter, Single-Turn, Wirewound Industrial Panel Controls



### Features

- 20mm diameter, single-turn industrial panel controls
- Wirewound element
- Linear or audio tapers
- Single or tandem units, single shaft
- Metal shaft and bushing
- Panel and PCB mounting styles
- Shaft lock available
- 6mm diameter shafts in slot, flat or round end styles
- Standard 10mm or 15mm shaft length
- Lug or right angle mount pin terminals
- Low operating temperature option of  $-10^{\circ}\text{C}$  or  $-30^{\circ}\text{C}$ , up to  $+100^{\circ}\text{C}$

### Specifications

#### Electrical

**Standard Resistance Range** . . . . . B =  $10\Omega$  to  $20\text{k}\Omega$   
 A, C =  $100\Omega$  to  $3\text{k}\Omega$

**Resistance Tolerance** . . . . .  $\pm 10\%$  standard  
 ( $\pm 5\%$ ,  $\pm 2\%$  or  $\pm 1\%$  special order)

**End Resistance** . . . . .  $R < 500\Omega = 1\Omega$  max.  
 $R \geq 500\Omega = 0.2\%$  max.

**Resistance Taper** . . . . . B = linear; A = CW audio (logarithm);  
 C = CCW audio (logarithm)

**Power Rating** . . . . . B = 1 watt; A, C = 0.5 watt, at  $+40^{\circ}\text{C}$

**Insulation Resistance** . . . . .  $100\text{M}\Omega$  minimum at 500VDC

**Dielectric Strength** . . . . . 500VAC, 1 minute

#### Theoretical Resolution

Resistance ( $\Omega$ )	Resolution (%)	Resistance ( $\Omega$ )	Resolution (%)
10	0.62	1,000	0.44
20	1.12	2,000	0.35
50	0.78	5,000	0.25
100	0.62	10,000	0.18
200	0.46	20,000	0.14
500	0.38	-	-

#### Mechanical

**Mechanical Travel** . . . . .  $290^{\circ} \pm 5^{\circ}$

#### Shaft Torque

Single Unit . . . . . 30.6 to 204 gf·cm (0.424 to 2.828 oz·in)

Tandem Unit . . . . . 71.2 to 510 gf·cm (0.987 to 7.07 oz·in)

**Stop Strength** . . . . . 6.12 kgf·cm (84.84 oz·in) max.

**Mounting Nut Torque** . . . . . 15 kgf·cm (207.94 oz·in) max.

**Solderability** . . . . .  $235^{\circ}\text{C}$ , 3 seconds

**Marking** . . . . . Model type, taper, resistance code,  
 shaft type, terminal identification, date code

#### Environmental

**Temperature Range** . . . . . Y =  $-10^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$   
 or X =  $-30^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$

**Temperature Characteristics** . . . . .  $+85^{\circ}\text{C}$ , 5 hours  
 without load  
 $\Delta T/R \leq \pm 5\%$

**Low Temperature Exposure** . . . . .  $-10^{\circ}\text{C}$  (Y),  $-30^{\circ}\text{C}$  (X)  
 1 hour without load  
 $\Delta T/R \leq \pm 3\%$

**Load Life** . . . . .  $+40^{\circ}\text{C}$ , 1,000 hours with rated load  
 $\Delta T/R \leq \pm 3\%$

**Moisture and Load Life** . . . . .  $+40^{\circ}\text{C}$ , 90-95% RH,  
 500 hours with 1/10 rated load  
 $\Delta T/R \leq \pm 5\%$

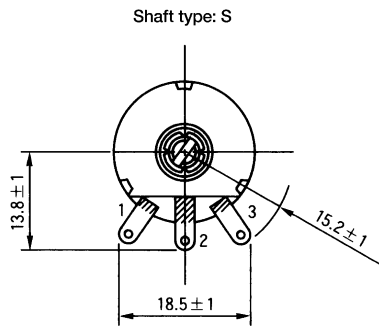
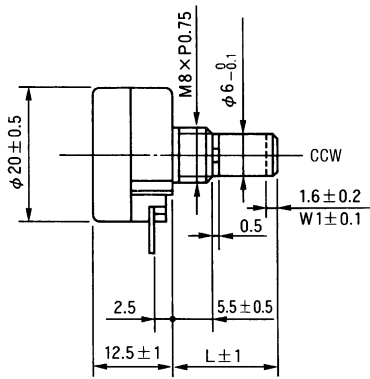
**Vibration** . . . . . 10-55Hz, 1.5mm amplitude,  
 2 directions, 2 hours each  
 $\Delta T/R \leq \pm 1\%$

**Soldering Heat Resistance** . . . . .  $350^{\circ}\text{C}$ , 3.5 seconds;  
 $260^{\circ}\text{C}$ , 5 seconds (PCB units)  
 $\Delta T/R \leq \pm 2\%$

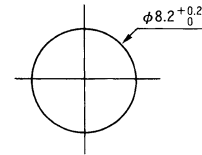
**Rotational Life** . . . . . 15,000 cycles (500 cycles for shaft lock  
 models only) with 1/2 rated load  
 $\Delta T/R \leq \pm 3\%$

R = Total Resistance Value;  $\Delta T/R$  = Total Resistance Change

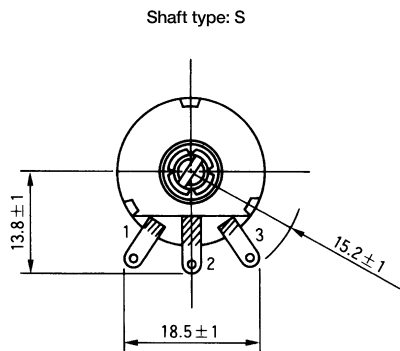
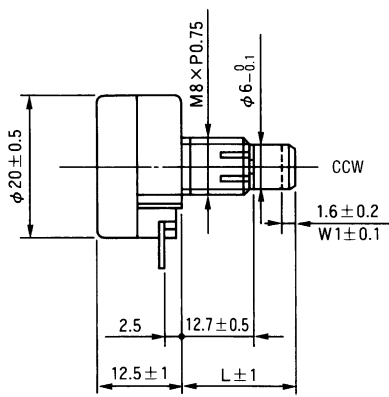
**RA20Y & RA20X**  
**Panel Mount, Single Unit, Single Shaft**  
**Right Angle Ear-Lug Terminals**



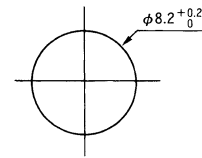
**Recommended Panel Mounting Hole**



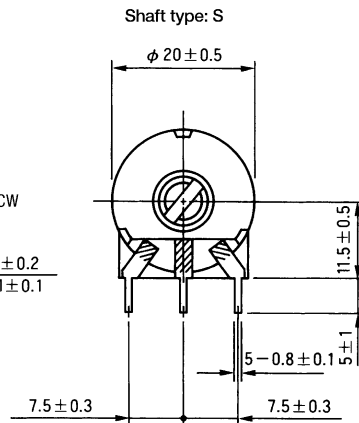
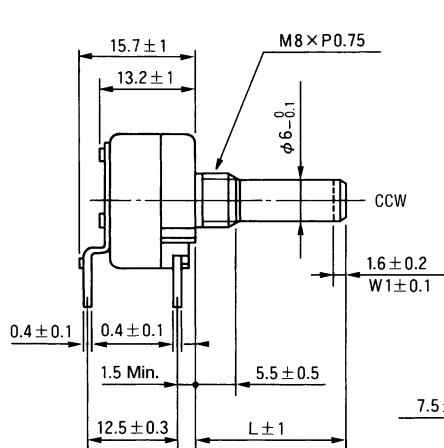
**RA20YL & RA20XL**  
**Panel Mount, Single Unit, Single Shaft with Shaft Lock**  
**Right Angle Ear-Lug Terminals**



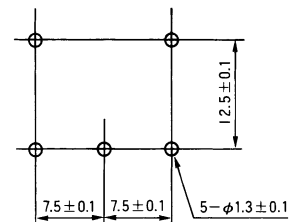
**Recommended Panel Mounting Hole**



**RA20YP2**  
**PCB Mount, Single Unit, Single Shaft**  
**Right Angle Mount Pin Terminals, 3-Pin Inline Pattern, 2-Pin Standoff Rear Support Bracket**

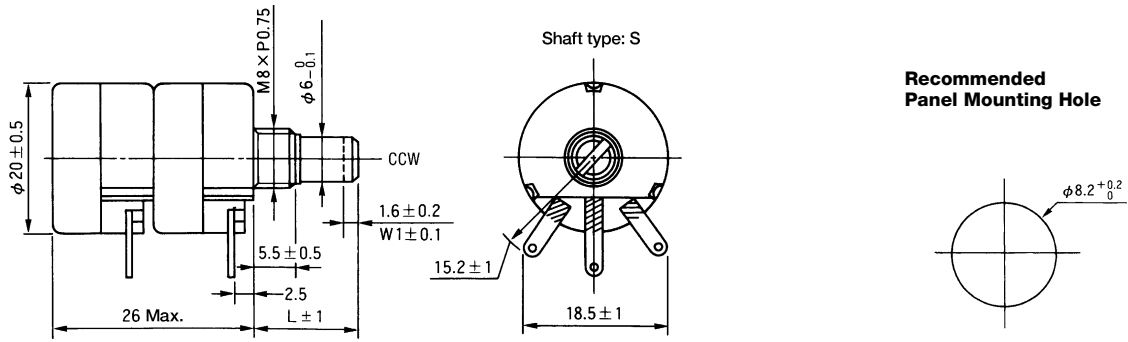


**Recommended PCB Mounting Holes**



**RA20YG**

**Panel Mount, Ganged Tandem Unit, Single Shaft  
Right Angle Ear-Lug Terminals on Each Unit**



RA 20 Y L 10 S B 203 K

NOTE: FMS = From Mounting Surface

- ➔ **Resistance Tolerance: K** = ±10% (standard).  
**J** = ±5% (special order).  
**G** = ±2% (special order).  
**F** = ±1% (special order).
- ➔ **Resistance Code:** Expressed in ohms. A three digit code where the first two digits are significant figures, and the third digit indicates the number of zeros that follow these figures (i.e., 200 = 20Ω; 201 = 200Ω; 202 = 2,000Ω; 203 = 20,000Ω). See table for standard resistance values.
- ➔ **For Single Unit:**  
Specify taper and resistance code as shown.
- ➔ **For Ganged Tandem Unit:**  
Specify a taper code and resistance code for each unit starting with the front unit followed by the rear unit. If both units have the same taper and resistance codes, add "X2" suffix per example below.  
Examples: **B203A503** or if both units are the same: **B203X2**
- ➔ **Resistance Taper: B** = Linear.  
**A** = CW Audio (logarithm).  
**C** = CCW Audio (logarithm).
- ➔ **Shaft End Style: S** = Slotted.  
**F** = Flatted.  
**R** = Round.
- ➔ **Standard Shaft Length: 10** = 10mm FMS.  
**15** = 15mm FMS.  
 Up to 30mm shaft length available (special order).
- ➔ **Style: Blank** = Panel Mount, Single Unit, Single Shaft, Right Angle Ear-Lug Terminals.  
**L** = Panel Mount, Single Unit, Single Shaft with Shaft Lock, Right Angle Ear-Lug Terminals.  
**P2** = PCB Mount, Single Unit, Single Shaft, Right Angle Mount Pin Terminals, 3-Pin Inline Pattern, 2-Pin Rear Support Bracket.  
**G** = Panel Mount, Ganged Tandem Unit, Single Shaft, Right Angle Ear-Lug Terminals on Each Unit.
- ➔ **Operating Temperature Range: Y** = -10°C to +100°C.  
**X** = -30°C to +100°C.
- ➔ **Size: 20** = 20mm Diameter.
- ➔ **TOCOS Series Name: RA** = Wirewound Element.

Standard Resistance Values and Part Numbering Codes

Standard Nominal Total Resistance Values and Part Numbering Codes

Resistance (Ω)	Code	Resistance (Ω)	Code	Resistance (Ω)	Code	Resistance (Ω)	Code
10	100	100	101	1,000	102	10,000	103
20	200	200	201	2,000	202	20,000	203
50	500	500	501	5,000	502		

Refer to Shaft End Styles Specifications and Hardware Specifications for details and availability.  
 For additional information, refer to Guidelines and Precautions for Using Panel Controls.