

## Standard for Resistance Value, Resistance Tolerance and Color Code

### ■ Basis Standard

IEC Publication 60062: Marking codes for resistors and capacitors.

IEC Publication 60063: Preferred number series for resistors and capacitors.

JIS C 5062: Marking codes for resistors and capacitors.

JIS C 5063: Preferred number series for resistors and capacitors.

### ■ Resistance Values

The resistance values are notched by "Ratio" below in each series.

Series	Resistance Tolerance (Standard)	Ratio	Remarks
E6	±20 %	$\sqrt[6]{10} \approx 1.46$	Please refer to standard resistance values shown on page 79 of this catalog.
E12	±10 %	$\sqrt[12]{10} \approx 1.21$	
E24	± 5 %	$\sqrt[24]{10} \approx 1.10$	
E48	± 2 %	$\sqrt[48]{10} \approx 1.05$	
E96	± 1 %	$\sqrt[96]{10} \approx 1.02$	

### ■ How to express the resistance value with a Panasonic part number.

The resistance value expressed in ohms is identified by a three digit number or a four digit number.

The last digit specifies the number of zeroes to follow.

The letter "R" shall be used as the decimal point for less than 10 ohm.

#### The examples of a three digit number

Resistance Code	Value in ohms
R56	0.56
5R6	5.6
100	10
271	270
102	1 k
273	27 k
104	100 k
275	2.7 M
106	10 M
107	100 M

#### The examples of a four digit number

Resistance Code	Value in ohms
R562	0.562
5R62	5.62
56R2	56.2
1000	100
2711	2.71 k
1002	10 k
2713	271 k
1004	1 M
2715	27.1 M
1006	100 M

### ■ How to express the resistance tolerance with a Panasonic part number

The resistance tolerance is identified by a single letter in accordance with the following table and the code is placed just before the resistance code in the following examples.

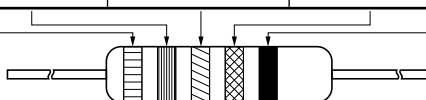
Tolerance Code	Tolerance (%)	Examples
W	±0.05	W1001 : 1000 Ω±0.05 %
B	±0.1	B1001 : 1000 Ω±0.1 %
C	±0.25	C1001 : 1000 Ω±0.25 %
D	±0.5	D1001 : 1000 Ω±0.5 %
F	±1	F1001 : 1000 Ω±1 %
G	±2	G1001 : 1000 Ω±2 %
J	±5	J101 : 100 Ω±5 %
K	±10	K101 : 100 Ω±10 %
M	±20	M101 : 100 Ω±20 %

### ■ Color code indication for the resistance value and the tolerance

Fixed resistors whose resistance value and tolerance are indicated by color code follow the standard below.

Color code

Color	First digit	Second digit	Third digit	Multiplier	Resistance tolerance	
					%	Code
Black	0	0	0	1		
Brown	1	1	1	10	±1	F
Red	2	2	2	10 <sup>2</sup>	±2	G
Orange	3	3	3	10 <sup>3</sup>	±0.05	W
Yellow	4	4	4	10 <sup>4</sup>		
Green	5	5	5	10 <sup>5</sup>	±0.5	D
Blue	6	6	6	10 <sup>6</sup>	±0.25	C
Violet	7	7	7	10 <sup>7</sup>	±0.1	B
Gray	8	8	8			
White	9	9	9			
Gold				10 <sup>-1</sup>	±5	J
Silver				10 <sup>-2</sup>	±10	K
None					±20	M



#### Indication example

##### Color code of 5 color bands

When the standard resistance value follows E48 series or 96 series, color code of the resistors are indicated by five color bands. Example below is 154 kΩ.

##### Example 1

1st Color	2nd Color	3rd Color	4th Color	5th Color
Brown (1)	Green (5)	Yellow (4)	Orange (1000)	Brown (±1 %)

##### Color code of 4 color bands

When the standard resistance value follows E6 series, 12 series or 24 series, color code of the resistors are indicated by four color bands. Example below is 15 kΩ.

##### Example 2

1st Color	2nd Color	3rd Color	4th Color
Brown (1)	Green (5)	Orange (1000)	Gold (±5 %)

## ■ Standard Resistance Values

E6	E12	E24	E48	E96		
10	10	10	100	100		
				102		
			105	105		
				107		
			11	110	110	
					113	
				115	115	
					118	
			12	12	121	121
						124
	127	127				
		130				
	13	133			133	
				137		
		140		140		
	15	15		154	154	
					158	
				16	162	162
			165			
			169		169	
18		18	178	178		
				182		
		187	187			
			191			
		196	196			
20	20	205	200			
			205			
	210	210				

E6	E12	E24	E48	E96		
22	22	22	215	215		
				221		
			226	226		
				232		
			24	237	237	
					243	
				249	249	
					255	
			27	27	261	261
						267
	274	274				
		280				
	30	287			287	
				294		
		301		301		
	33	33		332	332	
					340	
				36	348	348
			357			
			365		365	
39		39	383	383		
				392		
		402	402			
			412			
		422	422			
43	43	442	432			
			442			
	453	453				

E6	E12	E24	E48	E96		
47	47	47	464	464		
				475		
			487	487		
				499		
			51	511	511	
					523	
				536	536	
					549	
			56	56	562	562
						576
	590	590				
		604				
	62	619			619	
				634		
		649		649		
	68	68		681	681	
					698	
				75	715	715
			732			
			750		750	
82		82	787	787		
				806		
		825	825			
			845			
		866	866			
91	91	909	909			
			931			
	953	953				
976	976					