

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 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.

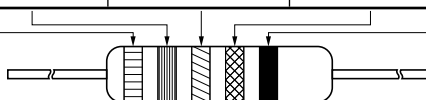
Tolerance Code	Tolerance (%)	Examples
W	±0.05	W1001 : 1000 Ω±0.05 %
B	±0.1	B1001 : 1000 Ω±0.1 %
C	±0.25	C1001 : 1000 Ω±0.25 %
D	±0.5	D1001 : 1000 Ω±0.5 %
F	±1	F1001 : 1000 Ω±1 %
G	±2	G1001 : 1000 Ω±2 %
J	±5	J101 : 100 Ω±5 %
K	±10	K101 : 100 Ω±10 %
M	±20	M101 : 100 Ω±20 %

■ 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 ²	±2	G
Orange	3	3	3	10 ³	±0.05	W
Yellow	4	4	4	10 ⁴		
Green	5	5	5	10 ⁵	±0.5	D
Blue	6	6	6	10 ⁶	±0.25	C
Violet	7	7	7	10 ⁷	±0.1	B
Gray	8	8	8			
White	9	9	9			
Gold				10 ⁻¹	±5	J
Silver				10 ⁻²	±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
	124			
	127			127
	13		130	
			133	133
			137	
	140		140	
	143			
	147		147	
	15	15	15	150
154				154
158				
16			162	162
			165	
			169	169
174				
18		18	178	178
			182	
			187	187
		191		
		196	196	
	200			
20	205	205		
	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
	267			
	274			274
	280			
	30		287	287
			294	
			301	301
	309			
	33		33	316
		324		
332		332		
340				
36		348	348	
		357		
	365	365		
374				
39	39	383	383	
		392		
		402	402	
	412			
	422	422		
	432			
43	442	442		
	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
	576			
	590			590
	604			
	62		619	619
			634	
			649	649
	665			
	68		68	681
		698		
715		715		
732				
75		750	750	
		768		
		787	787	
806				
82		82	825	825
	845			
	866		866	
	887			
	91	909	909	
		931		
953		953		
976				