

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.

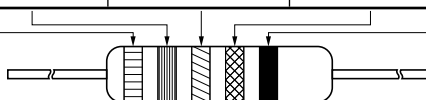
Tolerance Code	Tolerance (%)	Examples
W	±0.05	W1001 : 1000 Ω±0.05 %
B	±0.1	B1001 : 1000 Ω±0.1 %
C	±0.25	C1001 : 1000 Ω±0.25 %
D	±0.5	D1001 : 1000 Ω±0.5 %
F	±1	F1001 : 1000 Ω±1 %
G	±2	G1001 : 1000 Ω±2 %
J	±5	J101 : 100 Ω±5 %
K	±10	K101 : 100 Ω±10 %
M	±20	M101 : 100 Ω±20 %

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	121	121
						124
	127	127				
	13	130	130			
			133	133		
		137				
	140	14	140	140		
				143		
			147	147		
	15	15	15	150	150	
					154	154
158						
16				162	162	
					165	
169		169				
174						
178		18	178	178		
				182		
			187	187		
191	196	196				
		199				
20	200	200				
		205	205			
	210					

E6	E12	E24	E48	E96		
22	22	22	215	215		
				221		
			226	226		
				232		
			237	24	237	237
						243
				249	249	
			255	27	261	261
						267
	274	274				
	280	27	274	274		
				280		
		287	287			
	294	30	301	301		
				309		
			316	316		
	324	33	332	332		
				340		
348			348			
357	36	365	365			
			374			
	383	383				
392	39	39	392			
			399			
	402	402				
412	43	422	422			
			432			
442	442					
453						

E6	E12	E24	E48	E96		
47	47	47	464	464		
				475		
			487	487		
				499		
			511	51	511	511
						523
				536	536	
			549	56	562	562
						576
	590	590				
	604	62	619	619		
				634		
		649	649			
	665	68	681	681		
				698		
			715	715		
	732	75	750	750		
				768		
787		787				
806	82	825	825			
			845			
	866	866				
887	91	909	909			
			931			
953	953					
976						