

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 ER110 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.

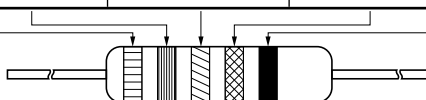
Tolerance Code	Tolerance (%)	Examples
W	±0.05	W1001 : 1000 Ω±0.05 %
B	±0.1	B1001 : 1000 Ω±0.1 %
C	±0.25	C1001 : 1000 Ω±0.25 %
D	±0.5	D1001 : 1000 Ω±0.5 %
F	±1	F1001 : 1000 Ω±1 %
G	±2	G1001 : 1000 Ω±2 %
J	±5	J101 : 100 Ω±5 %
K	±10	K101 : 100 Ω±10 %
M	±20	M101 : 100 Ω±20 %

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 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	121
						124
	127	127				
		130				
	13	133			133	
				137		
		140		140		
				143		
		147		147		
	15	15		150	150	
			154			
			158	158		
162						
16			162	162		
		165				
		169	169			
			174			
		178	178			
18		18	182	182		
	187					
	191		191			
			196			
	196		196			
	20	200	200			
			205			
		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	261
						267
	274	274				
		280				
	287	287				
		294				
	30	301		301		
				309		
		316		316		
				324		
		33	33	332	332	
	340					
348	348					
	357					
365	365					
	374					
36	383		383			
			392			
	402		402			
			412			
	422	422				
43	422	422				
		432				
	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	562
						576
	590	590				
		604				
	619	619				
		634				
	62	649		649		
				665		
		681		681		
				698		
		68	68	715	715	
	732					
750	750					
	768					
787	787					
	806					
82	825		825			
			845			
	866		866			
			887			
	909	909				
91	909	909				
		931				
	953	953				
		976				