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 %	⁶ √10≒1.46	
E12	±10 %	¹² √10≒1.21	Diagram of the standard maristance well-
E24	± 5 %	²⁴ √10≒1.10	Please refer to standard resistance values shown on this catalog.
E48	± 2 %	⁴⁸ √10≒1.05	Shown on this catalog.
E96	± 1 %	⁹⁶ √10≒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	Resistance Code	,
R56	0.56	R562	
5R6	5.6	5R62	
100	10	56R2	
271	270	1000	
102	1 k	2711	
273	27 k	1002	
104	100 k	2713	
275	2.7 M	1004	
106	10 M	2715	
107	100 M	1006	

0.562 5.62 56.2 100 2.71 k 10 k 271 k 1 M 27.1 M 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 B C D F G J	±0.05 ±0.1 ±0.25 ±0.5 ±1 ±2 ±5 ±10	W1001: 1000 $\Omega \pm 0.05$ % B1001: 1000 $\Omega \pm 0.1$ % C1001: 1000 $\Omega \pm 0.25$ % D1001: 1000 $\Omega \pm 0.5$ % F1001: 1000 $\Omega \pm 1$ % G1001: 1000 $\Omega \pm 2$ % J101: 100 $\Omega \pm 5$ % K101: 100 $\Omega \pm 10$ %

■ 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 digi	Second digit	Third digit	Multiplier	Resistance tolerance	
Coloi	Tirst digit	Second digit	Trilla digit	iviuitipiiei	%	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	С
Violet	7	7	7	10 ⁷	±0.1	В
Gray	8	8	8			
White	9	9	9			
Gold				10 ⁻¹	±5	J
Silver				10 ⁻²	±10	K
None					±20	М

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 k Ω .

Example 1

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

Example 2

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

■ Standard Resistance Values

				/alues
E6	E12	E24	E48	E96
10	10	10	100	100
				102
			105	105
				107
		11	110	110
				113
			115	115
	12	12		118
	,,	12	121	121
				124
			127	127
		13		130
			133	133
				137
			140	140
				143
			147	147
15	15	15		150
			154	154
		16	100	158
			162	162
				165
			169	169
				174
	18	18	178	178
				182
			187	187
			400	191
		20	196	196
		20	205	200
			205	210

E6 E12 E24 E48 E96 22 22 22 226 226 232 237 237 237 237 24 249 249 249 255 261 261 261 261 267 274 280 287 287 294 30 301 301 301 309 316 316 316 324 324 332 332 332 332 332 332 332 332 332 348 348 348 357 365 365 365 365 374 392 402 402 412 422 422 422 422 432 432 442 442 442 443 442 442 442 442 442 442 442 442 443 442 442 443 443 443 443 443 4453 4453 4453 4453 <t< th=""><th></th><th></th><th></th><th></th><th></th></t<>					
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226 226 237 237 243 249 249 255 261 261 267 274 280 287 294		22	22	215	
232 237 237 237 243 249 249 255 261 261 261 267 274 274 274 280 287 287 294 300 301 301 301 301 309 316 316 324 332 332 332 332 332 332 340 348 348 357 36 365 365 374 383 383 383 383 383 383 392 402 402 412 412 422 422 422 422 432 44					221
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24 249 249 255 261 267 274 274 280 287 294 294 294 280 287 294					232
249 249 249 255 261 261 267 274 274 280 287 294			24	237	237
255 261 261 267 267 274 274 280 280 287 294 294 300 301 301 309 316 316 324 332 332 332 340 348 348 357 36 365 374 383			27		243
261 261 27 27 280 287 287 287 294 30 301 309 316 316 324 33 33 33 33 33 33 340 348 348 348 357 36 365 365 374 383 383 383 39 39 402 402 412 422 432 442 442 442				249	249
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30 301 301 30 301 309 316 316 324 324 340 348 348 348 357 36 365 365 374 383 383 383 39 39 402 402 412 422 432 442 442 442				274	274
30 301 301 309 309 316 316 324 340 348 348 357 365 365 374 383 383 383 383 383 383 382 402 402 402 412 422 422 432 432 442 442					280
30 301 301 309 309 316 316 324 340 340 348 348 357 365 365 374 383 383 383 383 383 383 383 383 383 38				287	287
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316 316 324 33 33 33 33 332 332 340 340 348 348 357 36 365 365 374 383 383 39 39 39 392 402 402 412 422 422 43 432 442 442			30	301	301
33 33 33 33 332 332 340 340 348 348 348 357 365 365 374 383 383 383 392 402 402 412 422 422 432 432 442 442					309
33 33 33 33 340 340 340 348 348 357 365 365 374 383 383 383 392 402 402 412 422 422 432 432 442 442				316	316
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348 348 357 36 365 365 374 383 383 39 39 392 402 402 412 422 422 43 432 442 442				332	332
36 365 365 374 383 383 383 382 402 402 412 422 422 432 442 442					340
36 365 365 374 383 383 383 382 402 402 412 422 422 432 442 442				348	348
374 383 383 383 392 402 402 412 422 422 432 442 442 442			36		357
39 39 39 392 402 402 412 43 432 442 442				365	
39 39 392 402 402 412 422 422 43 432 442 442					374
402 402 412 422 422 43 432 442 442		39	39	383	383
412 422 422 43 432 442 442					
43 422 422 43 432 442 442				402	
43 432 442 442					412
432			43	422	422
					432
453				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
		62	619	619
				634
			649	649
				665
68	68	68	681	681
				698
			715	715
				732
		75	750	750
				768
			787	787
	82	82	_	806
			825	825
				845
			866	866
				887
		91	909	909
				931
			953	953
				976