

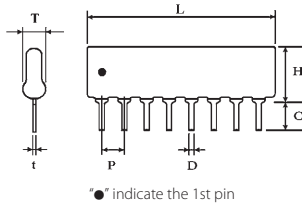
Feature

- Miniature, high density packaging
- High reliability $R_{0.02}$ paste

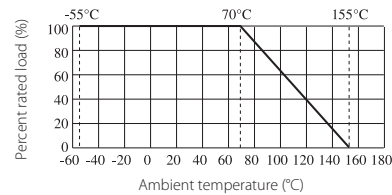
Application

- Control circuit V.C.R.
- Air-conditioner
- Computer, color TV

Dimension (mm)

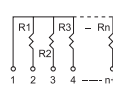
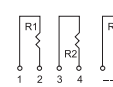
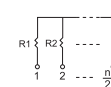
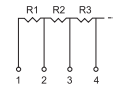
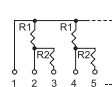

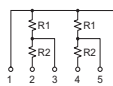
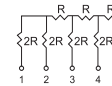
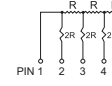
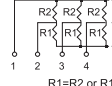


Derating Curve



Type	Dimension of L(Max.)											H max	C ^{+0.5 -0.3}	T max	t±0.05	P±0.2	D±0.1
	4pin	5pin	6pin	7pin	8pin	9pin	10 pin	11 pin	12 pin	13 pin	14 pin						
RNL	10.2	12.7	15.3	17.8	20.4	22.9	25.4	28.0	30.5	33.1	35.6	5.08	3.3	2.5	0.25	2.54	0.5
RPL	10.2	12.7	15.3	17.8	20.4	22.9	25.4	28.0	30.5	33.1	35.6	5.08	3.3	2.5	0.25	2.54	0.5
RNM	10.2	12.7	15.3	17.8	20.4	22.9	25.4	28.0	30.5	33.1	35.6	6.35	3.3	2.5	0.25	2.54	0.5
RPH	10.2	12.7	15.3	17.8	20.4	22.9	25.4	28.0	30.5	33.1	35.6	8.89	3.3	2.5	0.25	2.54	0.5

Circuit Structure

A	B	C	D	E
RNL/RPL/RNM/RPH  <p>$R1=R2=...Rn$</p>	RNL/RPL/RNM/RPH  <p>$R1=R2=...Rn$</p>	RNL  <p>$R1=R2=Rn$</p>	RNL  <p>$R1=R2=...Rn$ $R1 \neq R2 \neq ... Rn$</p>	RNL  <p>$R1=R2$ or $R1 \neq R2$</p>
G	H	L	P	R
RNL  <p>$R1=R2=...Rn$</p>	RNL 	RNL 	RNL 	RNL/RPL/RNM/RPH  <p>$R1=R2$ or $R1 \neq R2$</p>

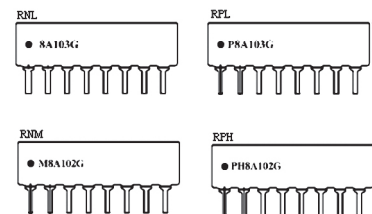
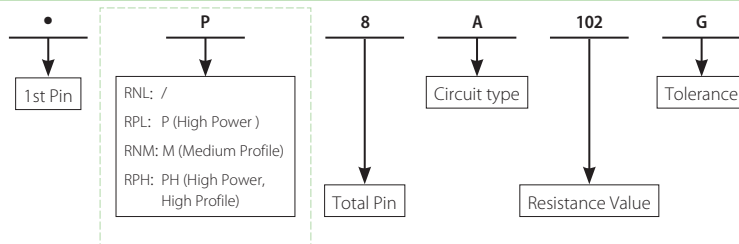
* Special circuit is available case by case.

Package Power Ratings

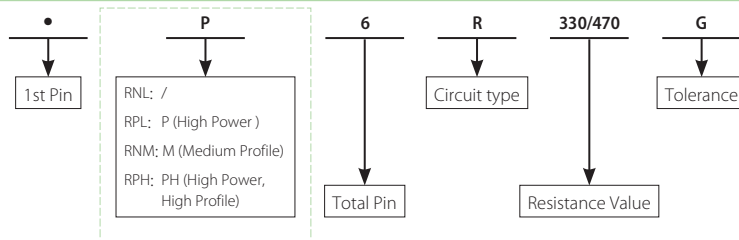
Type	4PIN	5PIN	6PIN	7PIN	8PIN	9PIN	10PIN	11PIN	12PIN	13PIN	14PIN
RPL	0.5W	0.63W	0.75W	0.88W	1.0W	1.13W	1.25W	1.38W	1.5W	1.63W	1.75W
RNM	0.6W	0.75W	0.9W	1.05W	1.20W	1.35W	1.50W	1.65W	1.80W	1.95W	2.10W
RPH	0.8W	1.0W	1.2W	1.4W	1.6W	1.8W	2.0W	2.2W	2.4W	2.6W	2.8W

Type	Power Rating 70°C	Max. Working Voltage	Max. Overload Voltage	Dielectric Withstanding Voltage	Resistance Range	Tolerance	Operating Temperature
RNL	B type: 0.2W Others: 0.125W	100V	150V	200V	R Type: 100Ω~10K Others: 10Ω~1MΩ	±2% ±5%	-55°C~+155°C
RPL	A:0.2W	100V	150V	200V	10Ω~1MΩ	±2% ±5%	-55°C~+155°C
	B:0.3W R:0.2W				10Ω~1MΩ 100Ω~10KΩ		
RNM	A:0.25W	100V	150V	200V	10Ω~1MΩ	±2% ±5%	-55°C~+155°C
	B:0.4W R:0.25W				10Ω~1MΩ 100Ω~10KΩ		
RPH	A:0.3W	100V	150V	200V	10Ω~1MΩ	±2% ±5%	-55°C~+155°C
	B:0.5W R:0.3W				10Ω~1MΩ 100Ω~10KΩ		

Marking (Single Value)



Marking(Dual Value):



Dual Value (R1/R2)(Ohm)

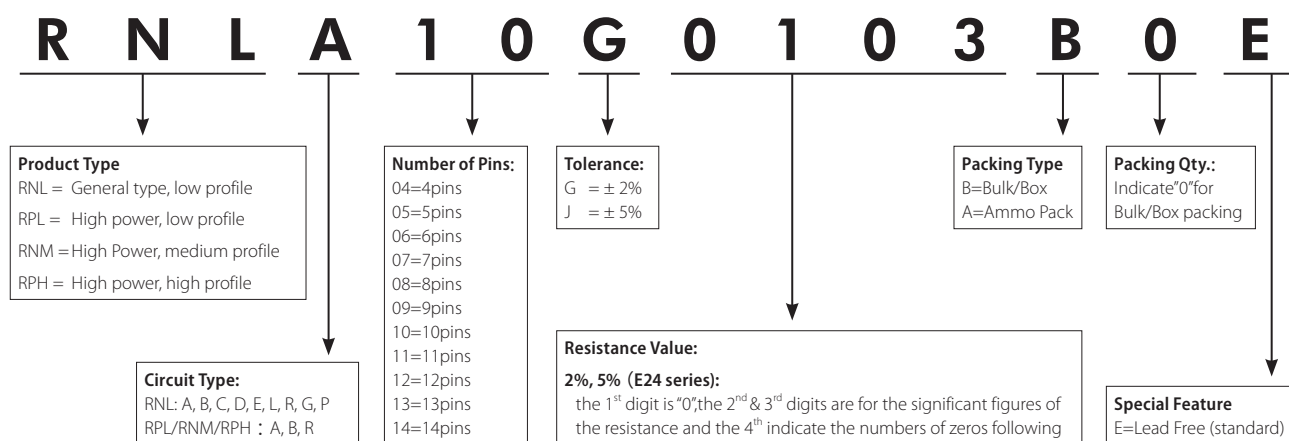
160 / 240	330 / 390
180 / 390	330 / 470
220 / 270	1.5K / 3.5K
220 / 330	3.0K / 6.2K

* Special value is available case by case.

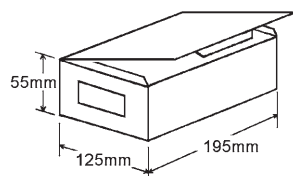
Performance Specification

Test Item	Evaluation Criteria			
Temperature	RNL	RPL	RNM	RPH
	50Ω~1MΩ: ±200PPM/°C <50Ω&>1MΩ: ±250PPM/°C	50Ω~1MΩ: ±100PPM/°C <50Ω&>1MΩ: ±250PPM/°C		
Short-time overload	ΔR/R≤±(0.5%+0.1Ω)		ΔR/R≤±(0.25%+0.1Ω)	
Insulation resistance	≥10,000MΩ			
Dielectric withstanding voltage	No Evidence of flashover,arcing or insulation breakdown			
Terminal strength	ΔR/R≤±(0.5%+0.1Ω)		ΔR/R≤±(0.25%+0.1Ω)	
Soldering heat	ΔR/R≤±(0.5%+0.1Ω)			
Solderability	Coverage must be over 95%.			
Thermal shock	ΔR/R≤±(0.5%+0.1Ω)		ΔR/R≤±(0.25%+0.1Ω)	
Rapid change of temperature	ΔR/R≤±(0.5%+0.1Ω)			
Load life in humidity	ΔR/R≤±(3%+0.1Ω)		ΔR/R≤±(0.5%+0.1Ω)	
Load life	ΔR/R≤±(3%+0.1Ω)		ΔR/R≤±(1%+0.1Ω)	

Ordering Procedure (Example: RNL A type 10 PIN 2% 10KΩ B/B)



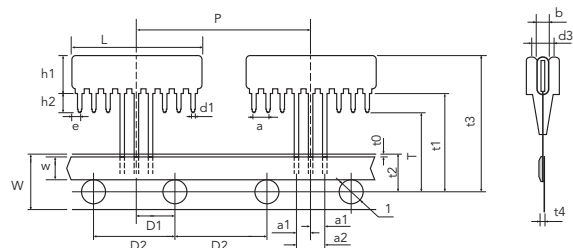
Standard Packing of Resistor Network



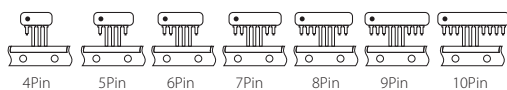
Type	Pins	Weight of 1,000pcs (g)	Qty.per Bag	Qty.per Box	Qty.per Carton
RNL RPL	4	210	200	1,000	30,000
RNM		240	100		
RPH		330			
RNL RPL	5	250	200	1,000	30,000
RNM		300	100		
RPH		410			
RNL RPL	6	320	200	1,000	30,000
RNM		360	100		
RPH		490			
RNL RPL	7	360	200	1,000	30,000
RNM		420	100		
RPH		570			
RNL RPL	8	430	200	1,000	30,000
RNM		480	100		
RPH		660	50		

Type	Pins	Weight of 1,000pcs (g)	Qty.per Bag	Qty.per Box	Qty.per Carton
RNL RPL	9	450	200	1,000	30,000
RNM		540	50	500	15,000
RPH		760			
RNL RPL	10	530	200	1,000	30,000
RNM		610	50	500	15,000
RPH		870			
RNL RPL	11	600	100	500	15,000
RNM		670	50		
RPH		950			
RNL RPL	12	650	100	500	15,000
RNM		730	50		
RPH		1030			
RNL RPL	13	710	100	500	15,000
RNM		790	50		
RPH		1130			
RNL RPL	14	770	100	500	15,000
RNM		850	50		
RPH		1210			

Ammo Pack of Resistor Network

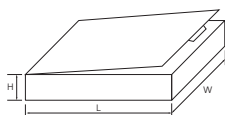


* ... n=Pin Count



Dimension (mm)		Dimension (mm)	
H1	Max 5.08	t0	2.0Max
L	Max 2.54*n	t1	18.99±0.5
a	2.54±0.25	t2	9.0±0.5
d1	0.5±0.1	t3	24.46Max
P	25.4±1.0	t4	1.5max
W	18±0.5	I	φ4.0±0.3
w	5.0min	h2	3.0±0.5
P1	6.35±0.7	a1	2.54±0.25
P2	12.7±0.3	a2	5.08±0.3
B	Max 2.49	d3	2.0Max
T	16±0.5	/	/

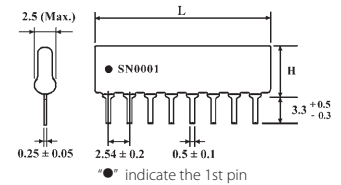
Packing quantity

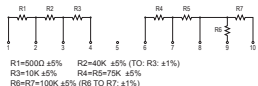
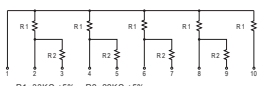
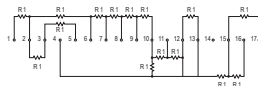
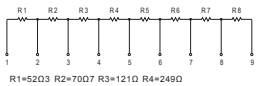


The inner box sizes:
 4~9pin: 320(L) × 207(W) × 40(H)mm
 10pin: 315(L) × 295(W) × 40(H)mm

Pins	Qty.per Box	Qty.per Carton
4~10	1,000	12,000

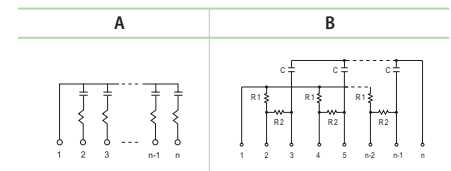
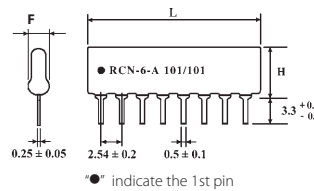
Special Network-SIP Series



Type	SN0001	SN0002	SN0003	SN0004
Circuit Structure	 <p>R1=500Ω ±5% R2=40K ±5% (TO: R3: ±1%) R3=10K ±5% R4=100K ±5% R5=10K ±5% R6=100K ±5% (R6 TO R7: ±1%)</p>	 <p>R1=33KΩ ±5% R2=22KΩ ±5%</p>	 <p>R3=9K1 R1=120K R14=24K R4=30K R1=11K R5=14K R15=1K5 R5=R6=7K5 R10=R11=R12=20K R13=2K R7=52K5 R13=11K</p>	 <p>R1=520Ω R2=700Ω R3=121Ω R4=249Ω R5=1K33 R6=619K R7=174Ω R8=75Ω</p>
Dimension of L(max)	10PINS:25.4mm	10PINS:25.4mm	10PINS:43.2mm	9PINS:22.9mm
H(max)	5.08mm	5.08mm	6.35mm	5.08mm
Power Rating at 70°C	0.2W	0.2W	0.125W	0.125W
Max Working Voltage	100V	100V	100V	100V
Max Overload Voltage	150V	150V	200V	150V
Operating Temperature	-55~+155 °C	-55~+155°C	-55~+155 °C	-55~+155 °C

* Special circuit is available case by case.

Resistor/Capacitor Network - SIP Series



Electrical Characteristics- Capacitor

Capacitance Dielectric	Capacitance Range	Capacitance Tolerance	Capacitance Voltage
NPO	39pF~270pF	±10%	50V
X7R	>270pF~0.1μF	±20%	

* Special circuit is available case by case.

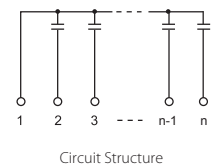
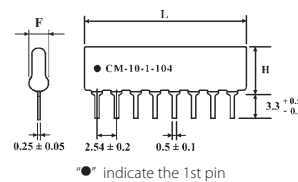
Dimension (mm)

Type	H (mm)	F (mm)
RCH	7.62 Max.	3.81 Max.
RCN	8.89 Max.	3.81 Max.

Dimension (mm)

L	
4 PIN: 10.2mm	10 PIN: 25.4mm
5 PIN: 12.7mm	11 PIN: 28.0mm
6 PIN: 15.3mm	12 PIN: 30.5mm
7 PIN: 17.8mm	13 PIN: 33.1mm
8 PIN: 20.4mm	14 PIN: 35.6mm
9 PIN: 22.9mm	

Capacitor Network-SIP Series



Electrical Characteristics- Capacitor

Capacitance Dielectric	Capacitance Range	Capacitance Tolerance	Capacitance Voltage
NPO	39pF~270pF	±10%	50V
X7R	>270pF~0.1μF	±20%	

* Special circuit is available case by case.

Dimension (mm):

Type	H (mm)	F (mm)
CNM	6.35 Max.	3.81 Max.
CNH	7.62 Max.	3.81 Max.

Dimension (mm):

L	
4 PIN: 10.2mm	10 PIN: 25.4mm
5 PIN: 12.7mm	11 PIN: 28.0mm
6 PIN: 15.3mm	12 PIN: 30.5mm
7 PIN: 17.8mm	13 PIN: 33.1mm
8 PIN: 20.4mm	14 PIN: 35.6mm
9 PIN: 22.9mm	

1	2	3	4	5	6	7	8	9	10	11	12	13	14
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The standard Part No. includes 14 digits with the following explanation:

1. 1st~4th digits:
 - a) This is to indicate the SMD Resistor size. Example: 1206, TC05 or HV03;
 - b) For Resistor Network & Coated type, the 1st~3rd digits are to indicate the product type and the 4th digit is the special feature. Example: RNLA = Resistor Network Circuit A type; CFRF = Carbon Film Fixed Resistors Non-Flame type; MORI = Metal Oxide Film Fixed Resistor Non-Inductive type.
 - c) For Cement Fixed Resistors, these 4 digits are to indicate the product type but if the product type has only 3 digits, the 4th digit will be "0". Example: PRW0=PRW type; PRWC=PRWC type.
2. 5th~6th digits:
 - a) This is to indicate the wattage or power rating. To distinguish the sizes and the numbers, the following codes are used, and please refer to the following chart for details: W = Normal Size; S = Small Size; U = Ultra Small Size; "1"~"G" to denotes "1"~"16" as Hexadecimal:

1/16W ~ 1/2W (<1W)

Wattage	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	1/11	1/12	1/13	1/14	1/15	1/16
Normal Size	W2	W3	W4	W5	W6	W7	W8	W9	WA	WB	WC	WD	WE	WF	WG
Small Size	S2	S3	S4	S5	S6	S7	S8	S9	SA	SB	SC	SD	SE	SF	SG
Ultra Small Size	U2	U3	U4	U5	U6	U7	U8	U9	UA	UB	UC	UD	UE	UF	UG

1W ~ 16W (≥1W)

Wattage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Normal Size	1W	2W	3W	4W	5W	6W	7W	8W	9W	AW	BW	CW	DW	EW	FW	GW
Small Size	1S	2S	3S	4S	5S	6S	7S	8S	9S	AS	BS	CS	DS	ES	FS	GS
Ultra Small Size	1U	2U	3U	4U	5U	6U	7U	8U	9U	AU	BU	CU	DU	EU	FU	GU

- b) For power rating less than 1W, the 5th digit will be the letters W, S or U to represent the size required & the 6th digit will be a number or a letter code. Example: WA = 1/10W; U2 = 1/2W-SS
- c) For power rating of 1W to 16W, the 5th digit will be a number or a letter code and the 6th digit will be the letters of W, S or U. Example: AW = 10W; 3S = 3W-S.
- d) For power rating between 20W to 99W, the 5th & 6th digits will show the whole numbers of the power rating itself. Example: 20 = 20W; 75 = 75W.
- e) For power rating of 100W & over, the 5th & 6th digits will be indicated with "00" and the actual wattage being indicated at the last 3 digits (12th~14th) of the Part No.
- f) For special power ratings, the following codes are to be used:

1). WH = 1/32W (10P8 Chip Network)	2). 07 = 3/4WS (Chip 2010 size)
3). 04 = 0.4W-SS (0.4 watt Ultra Small size)	4). 06 = 0.6W-S (0.6 watt Small size)
5). 2A = 2.5W 6). 6A = 6.5W 7). WK = 2/3W	8). 1A = 1.5W 9). 1.25W = 1Q
- g) For Resistor Network, since the power rating is fixed as 1/8W for A circuit & 1/5W for B circuit, the 5th & 6th digit is to be used to denote the number of pins required. Example: 09 = 9pins; 12 = 12pins.
- h) For Jumper Wires the 5th & 6th digits will be indicated with "00".
- i) For Thin Film Chip Resistors, these 2 digits will be used to indicated the requested Temperature coefficient:

1). 05 = 5PPM	2). 10 = 10PPM	3). 15 = 15PPM	4). 25 = 25PPM	5). 50 = 50PPM
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3. The 7th digit is to denote the Resistance Tolerance. The following letter code is to be used for indicating the standard Resistance Tolerance. As for Metal Film Fixed Resistor products, it is also to denote the standard PPM as follows:

B = ±0.1% (15PPM)	G = ±2% (100PPM)	W = ±0.05%
C = ±0.25% (25PPM)	J = ±5% (200PPM)	L = ±0.01%
D = ±0.5% (50PPM)	K = ±10%	
F = ±1% (50PPM)		

Remark: if it is not one of the above standard "tolerance-TCR", the requirement should be clearly stated when placing order.
 Example: ±1% (25PPM), the 7th digit still shows "F" but separately note the requirement of "25PPM"

4. The 8th to 11th digits is to denote the Resistance Value:

- For the standard resistance values of E-24 series in 5% & 10% tolerance, the 8th digit is "0", the 9th & 10th digits are to denote the significant figures of the resistance and the 11th digit is the number of zeros following
- For the standard resistance values of E-96 series in $\leq 2\%$ tolerance, the 8th digit to the 10th digits are to denote the significant figures of the resistance and the 11th digit is the number of zeros following.
- For the code to the significant figures to E-24 & E-96 series, please refer to page 170 & 171 of the standards Resistance Value list.
- The following numbers and the letter codes is to be used to indicate the number of zeros in the 11th digit:

0 = 10^0	1 = 10^1	2 = 10^2	3 = 10^3	4 = 10^4	5 = 10^5	6 = 10^6
J = 10^{-1}	K = 10^{-2}	L = 10^{-3}	M = 10^{-4}	N = 10^{-5}	P = 10^{-6}	

- For Cement Resistors the 8th digit will be coded with "W" or "P" to denote Wire-wound type or Power Film type respectively of the Cement Fixed Resistor product. The 9th to 11th please refer to point 4.a

Example:

E-24 series

0120 = 12 ohm
0123 = 12K ohm
012J = 1.2 ohm

E-96 series

1210 = 121 ohm
1302 = 13K ohm
196J = 19.6 ohm

Cement Resistors

W120 = 12 ohm Wire-wound type
W12J = 1.2 ohm Wire-wound type
P273 = 27 kohm Power Film type

5. The 12th, 13th & 14th digits:

- The 12th digit is to denote the Packaging type with the following codes:
A = Tape / Box (Ammono Pack) C = Bulk in Cassette (for Chip product)
B = Bulk / Box T = Tape / Reel P = Tape / Box of PT-26 product
- The 13th digit is normally to indicate the Packing Quantity of Tape/Box or Tape/Reel packaging types. Except for Chip products Bulk packing, this digit should be filled "0" or other products with "Bulk/Box packaging requirement. The following letter codes is to be used for some packaging quantities.

A = 500pcs	B = 2,500pcs	C = 10,000pcs	N = 12,500pcs	E = 15,000pcs
D = 20,000pcs	G = 25,000pcs	L = 45,000pcs	H = 50,000pcs	J = 60,000pcs

Example:

CHIP product

TD = T/R-20,000
TE = T/R-15,000
T4 = T/R-4,000

Other products

A5 = T/B-5,000
TB = T/R-2,500
B0 = B/B

- For the Forming type products, the 13th & 14th digits are used to denote the forming types of the product with the following letter codes:

MF = M type with Flattened lead wire	F0 = F type
MK = M type with Kinked lead wire	F1 = F1 type
ML = M type with normal lead wire	F2 = F2 type
MC = M type with kinked lead wire	F3 = F3 type

- For power rating over 100watt, the 12th to the 14th digits are to denote the actual wattage of the products:

Example: 100 = 100watt 150 = 150watt 225 = 225watt

- For some products, the 14th digit alone can use to denote special features or additional information with the following codes:

P = Panasert type	1 = Avisert 1 type	2 = Avisert 2 type
3 = Avisert 3 type	A = CO 1/4W - A type	B = CO 1/4W - B type

E = used to denote the "Environment Protection, lead Free type" of SMD category resistors (now, this became the Standard type of SMD)

- For some products, the 14th digit alone can use to denote special features or additional information with the following codes:

B=1/32W	C=1/16W	F=1/10W	G=1/8W	H=1/6W	J=1/4W	K=1/3W	M=1/2W
N=3/4W	P=1W	S=Special					