ROYALOHM

SPECIFICATION FOR APPROVAL

TRELIK COMERCIAL IMPORTADORA LTD.

Description : Wire-Wound Fixed Resistors

Royalohm Part no.: KNP05SJxxxxAA9 (KNP 5W-S +/- 5% PT-64mm.)

Approved by

Parts corresponding to RoHS Compliant: 2005-Apr.-1

Royal Electronic Factory (Thailand) Co., Ltd.
20/1-2 Moo 2 Klong-Na, Muang
Chachoengsao 24000, Thailand
Tel: +66-38-822404-8
Fax: +66 38-981190 / 823765
E-mail Address: Export sales: Export@royalohm.com
Local sales: Local@royalohm.com
http://www.royalohm.com
P.O. Box 251 Klongchan, Bangkok 10240, Thailand

Approved	Checked	Prepared
Mr. Jack Lin	Ms. S. Sakultala	Ms. T. Suparuch

Issue Date: 2008/03/14

CHANGE NOTIFICATION HISTORY			
Version	**Date of Version**	**History**	**Remark**
1	2004/11/3	Resistance range: 0.1Ω----200Ω	
2	2005/3/17	Change from JIS C 5202 to JIS C 5201-1	
3	2005/7/7	Lead wire diameter: 0.75 ± 0.05 (Unit: mm)	

Customer: TRELIK COMERCIAL IMPORTADORA LTD.	Part No.: KNP05SJxxxxAA9

1. Scope:

This specification for approval relates to Wire-Wound Fixed Resistors manufactured by ROYALOHM 's specifications.

2. Type designation:

The type designation shall be in the following form :

(Ex.)	KNP	5 W-S	J	8.2Ω
	Type	Power Rating	Resistance Tolerance	Nominal Resistance

3. Ratings:

Ratings shall be shown in the table 1.

Table 1

Type	KNP
Rated Power	5 W at 70℃
Max. Working Voltage	500 V
Max. Overload Voltage	1000 V
Dielectric Withstanding Voltage	500 V
Rated Ambient Temp.	70 ℃
Operating Temp. Range	-55℃ --- +155℃
Resistance Tolerance	± 5 %
Resistance Range	0.1Ω----200Ω

3.1 Power rating:

Resistors shall have a power rating based on continuous full load operation at an ambient temperature of 70 ℃. For temperature in excess of 70 ℃ , the load shall be derated as shown in the figure 1.

3.2 Voltage rating:

Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial-line frequency and waveform curresponding to the power rating , as determined from the following formula :

$$RCWV = \sqrt{P \times R}$$

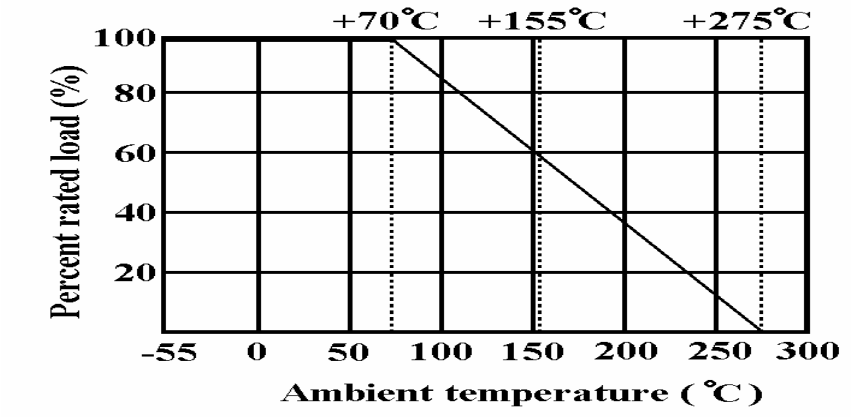
Were : RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volt)

P = Power Rating (watt)

R = Nominal Resistance (ohm)

In no case shall the rated DC or RMS AC continuous working voltage be greater than the applicable maximum value

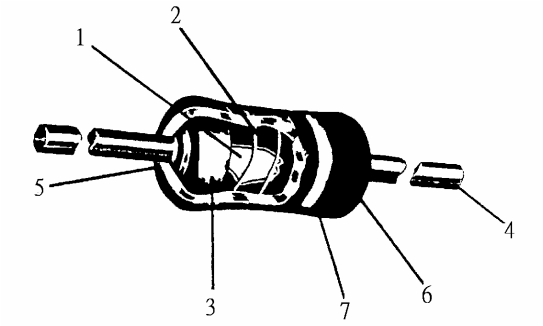
Figure 1.



3.3 Nominal resistance :

Effective figures of nominal resistance shall be in accordance with E-24 series, and resistance tolerance shall be shown by table 1.

4. Construction :

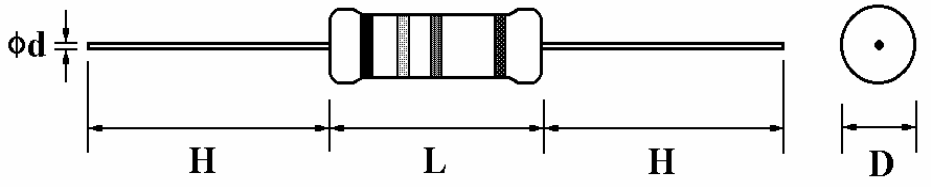


No.	Name	Material
1	Basic Body	Rod Type Ceramics
2	Resistance wire	Ni-Cr Alloy, Cu-Ni Alloy
3	End Cap	Steel (Tin plated iron surface)
4	Lead Wire	Annealed copper wire coated with tin
5	Joint	By Welding
6	Coating	Insulated & Non-Flame paint (Color : Light Green)
7	Color Code	Non-Flame Epoxy Resin

Wire-Wound Fixed Resistors		
5. Characteristics :		
Characteristics	Limits	Test Methods (JIS C 5201-1)
DC. Resistance	Must be within the specified tolerance	5.1 The limit of error of measuring apparatus shall not exceed allowable range or 5% of resistance tolerance
Temperature coefficient	± 300 PPM/℃ Max. ＜20Ω ± 400PPM/℃	5.2 Natural resistance change per temp. degree centigrade. $\frac{R_2-R_1}{R_1(t_2-t_1)} \times 10^6$ (PPM/℃) R_1: Resistance value at room temperature (t1) R_2: Resistance value at room temp. plus 100 ℃ (t_2)
Short time overload	Resistance change rate is ± (2% + 0.05Ω) Max. with no evidence of mechanical damage	5.5 Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds
Terminal strength	No evidence of mechanical damage	6.1 **Direct load** : Resistance to a 2.5 kgs direct load for 10 secs. in the direction of the longitudinal axis of the terminal leads **Twist test :** Terminal leads shall be bent through 90 ° at a point of about 6mm from the body of the resistor and shall be rotated through 360° about the original axis of the bent terminal in alternating direction for a total of 3 rotations
Resistance to soldering heat	Resistance change rate is ± (1% + 0.05Ω) Max. with no evidence of mechanical damage.	6.4 Permanent resistance change when leads immersed to 3.2 to 4.8 mm from the body in 350℃ ± 10 ℃ solder for 3 ± 0.5 seconds.
Solderability	95 % coverage Min.	6.5 The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes. Test temp. of solder : 245℃ ± 3℃ Dwell time in solder : 2 ~ 3 seconds

<table>
<tr><th colspan="5">Wire-Wound Fixed Resistors</th></tr>
<tr><td colspan="5"></td></tr>
<tr><th>Characteristics</th><th>Limits</th><th colspan="3">Test Methods
(JIS C 5201-1)</th></tr>
<tr><td rowspan="2">Temperature cycling</td><td rowspan="2">Resistance change rate is ± (2% + 0.05Ω) Max. with no evidence of mechanical damage</td><td colspan="3">7.4 Resistance change after continuous 5 cycles for duty shown below:</td></tr>
<tr><td colspan="3"><table>
<tr><th>Step</th><th>Temperature</th><th>Time</th></tr>
<tr><td>1</td><td>-55℃ ± 3℃</td><td>30 mins</td></tr>
<tr><td>2</td><td>Room temp.</td><td>10～15 mins</td></tr>
<tr><td>3</td><td>+155℃ ± 2℃</td><td>30 mins</td></tr>
<tr><td>4</td><td>Room temp.</td><td>10～15 mins</td></tr>
</table></td></tr>
<tr><td>Load life in humidity</td><td>Resistance change rate is ±(5% + 0.05Ω) Max. with no evidence of mechanical damage</td><td colspan="3">7.9 Resistance change after 1,000 hours (1.5 hours "on", 0.5 hour "off") at RCWV in a humidity test chamber controlled at 40 ℃ ± 2 ℃ and 90 to 95 % relative humidity</td></tr>
<tr><td>Load life</td><td>Resistance change rate is ±(5% + 0.05Ω) Max. with no evidence of mechanical damage</td><td colspan="3">7.10 Permanent resistance change after 1,000 hours operating at RCWV with duty cycle of (1.5 hours "on", 0.5 hour "off") at 70℃ ± 2℃ ambient</td></tr>
<tr><td></td><td></td><td colspan="3"></td></tr>
</table>

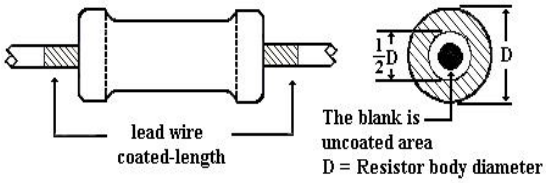
6. Dimension : Unit : mm



Type	Power Rating	D ± 1	L ± 1	d ± 0.05	H ± 3
KNP	5 W-S	6.5 mm	17.5 mm	0.75 mm	28 mm

Painting method:

Welding point, terminal and lead wire, is permissible to be exposed without the outer coated cover. The extent should be within 1/2 of the are angle.

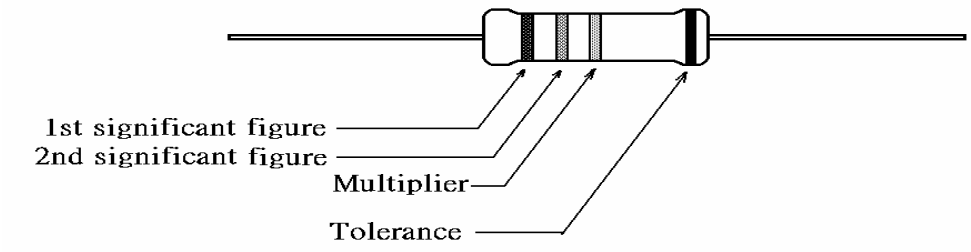


7. Marking :

7.1 Resistor :

Resistors shall be marked with color coding

colors shall be in accordance with JIS C 0802



7.2 Label :

Label shall be marked with following items:

(1) Type and style
(2) Nominal resistance
(3) Resistance tolerance
(4) Quantity
(5) Lot number
(6) PPM

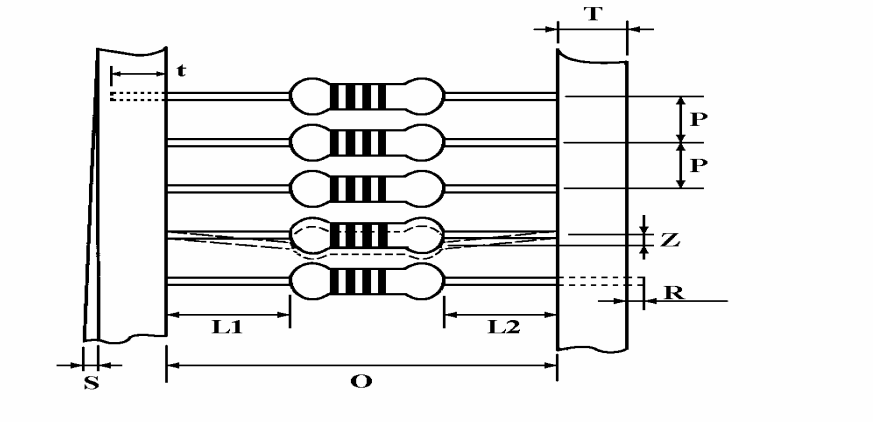
Example :

Wire-Wound Fixed Resistors

Watt :	5W-S	Val :	8E2
Q'TY :	500	Tol :	5%
Lot :	709012	PPM :	
	ROYALOHM		Pb Free

8. Packing specification :

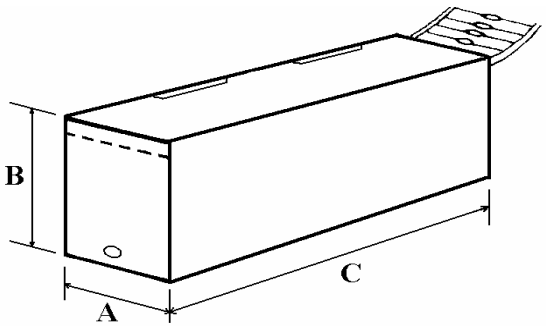
8.1 Taping dimension :



Dimensions (mm)

Type	Style	O	P	L_1-L_2	T	Z	R	t	S
KNP-500s	PT-64	64 ± 1	10 ± 0.5	1 Max.	6 ± 1	1 Max.	0	5 ± 1	0.5 Max.

8.2 Tape in box packing :



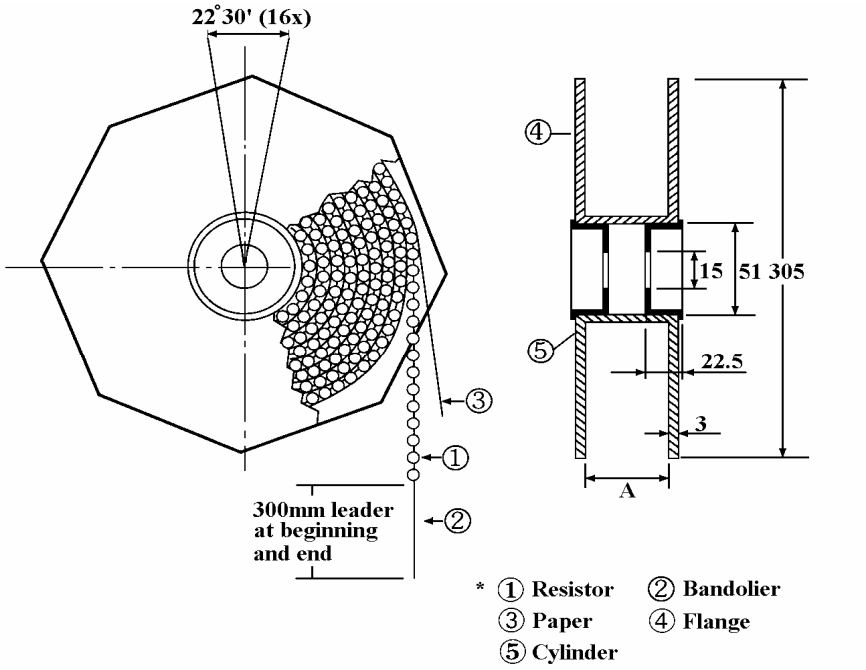
Bandoliers may also be contained in a cardboard box ("Ammopack")

Dimension (mm)

Type	Style	L (C) ± 5	W (A) ± 5	H (B) ± 5	Quantity Per Box (pcs.)
KNP-500s	PT- 64	256	92	80	500

"Ammopack" is an abbreviation of "ammunition pack"

8.3 Tape on reel packing :

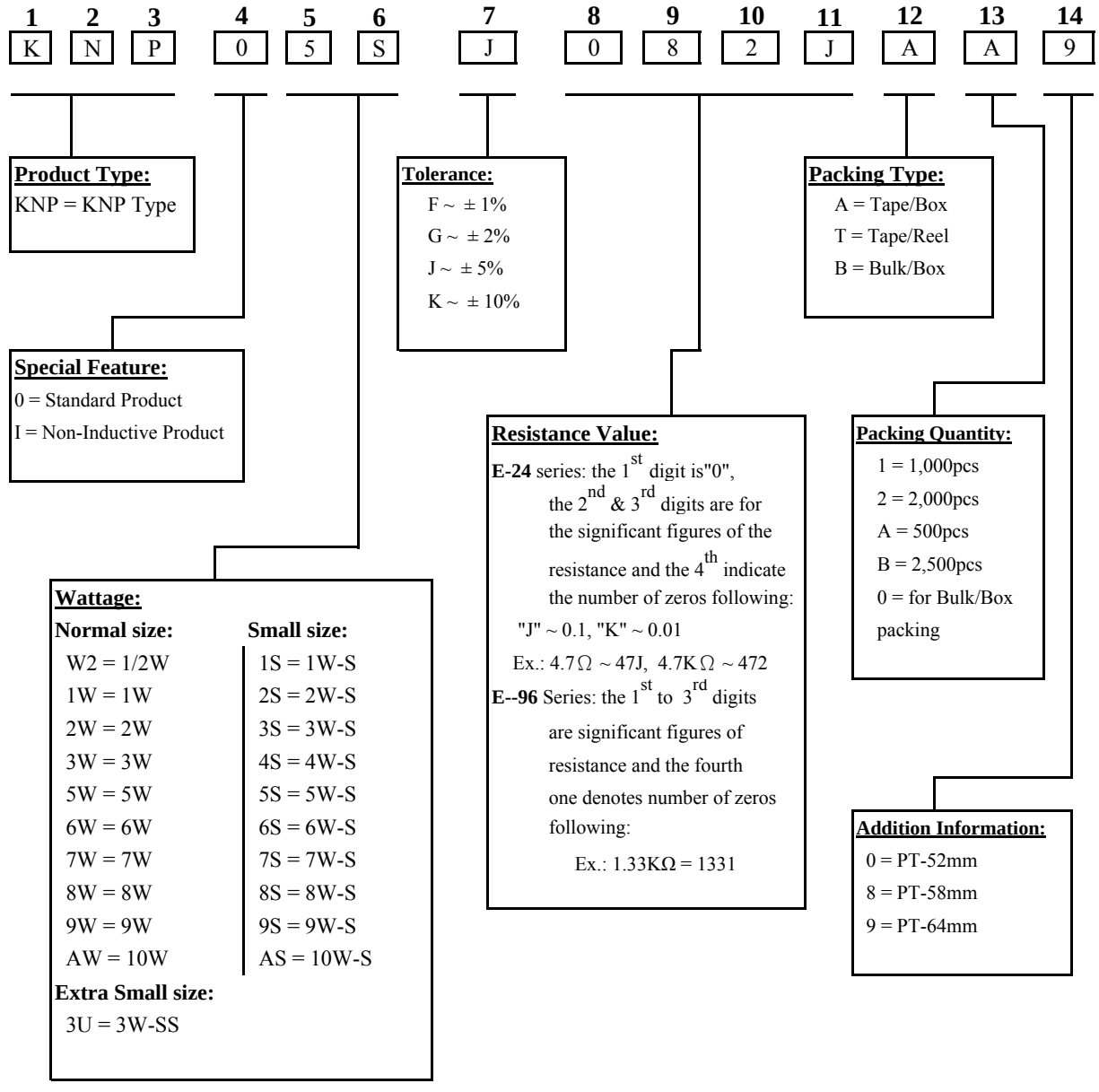


Dimension (mm) :

Type	Style	Across Flange (A)	Quantity Per Reel
KNP-500s	PT- 64	81 ± 5	500 pcs.

Part Number System

Explanation of Part Number System
(Wire-Wound Fixed Resistors)



Sample: KNP 5W-S +/- 5% 8.2Ω T/B 500 PT-64mm → KNP05SJ082JAA9