

UNI-ROYAL
厚聲集團

DATA SHEET

Product Name Wire -Wound Fusible Resistors

Part Name KNPU Series

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1. Scope

- 1.1 This datasheet is the characteristics of wire wound fusible resistors manufactured by UNI-ROYAL
- 1.2 Suitable for all kinds of protection circuit
- 1.3 Non-flammable coating, could withstand high Temperature
- 1.4 Common resistor with additional safety function, no flame or smoke, no explosion or coating crack when fusing
- 1.5 UL items available (file NO: E306074)

2. Part No. System

The standard Part No. includes 14 digits with the following explanation:

- 2.1 Wire wound fusible Resistors type, the 1st to 3rd digits are to indicate the product type and 4th digit is the special feature.

Example: KNPU= Wire wound fusible Resistors type.

- 2.2 5th~6th digits:

This is to indicate the wattage or power rating. To dieting the size and the numbers,

The following codes are used; and please refer to the following chart for detail. This is to indicate the wattage or power rating. To distinguish the size and the number, the following codes are used; and please refer to the following chart for details:

1W~7W (\cong 1W)

Wattage	1	2	3	5	7
Normal Size	1W	2W	3W	5W	7W

- 2.3 The 7th digit is to denote the Resistance Tolerance. The following letter code is to be used for indicating the standard Resistance Tolerance.

F= \pm 1% G= \pm 2% J= \pm 5% K= \pm 10%

- 2.4 The 8th to 11th digits is to denote the Resistance Value.

2.4.1 For the standard resistance values of 5% series, 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.;

- 2.4.2 The following number s and the letter codes are 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}

- 2.4.3 The 12th, 13th & 14th digits.

The 12th digit is to denote the Packaging Type with the following codes:

A=Tape/Box (Ammo pack) B=Bulk/Box T=Tape/Reel P=Tape/Box of PT-26 products

- 2.4.4 The 13th digit is normally to indicate the Packing Quantity of Tape/Box & Tape/Reel packaging types. The following letter code is to be used for some packing quantities:

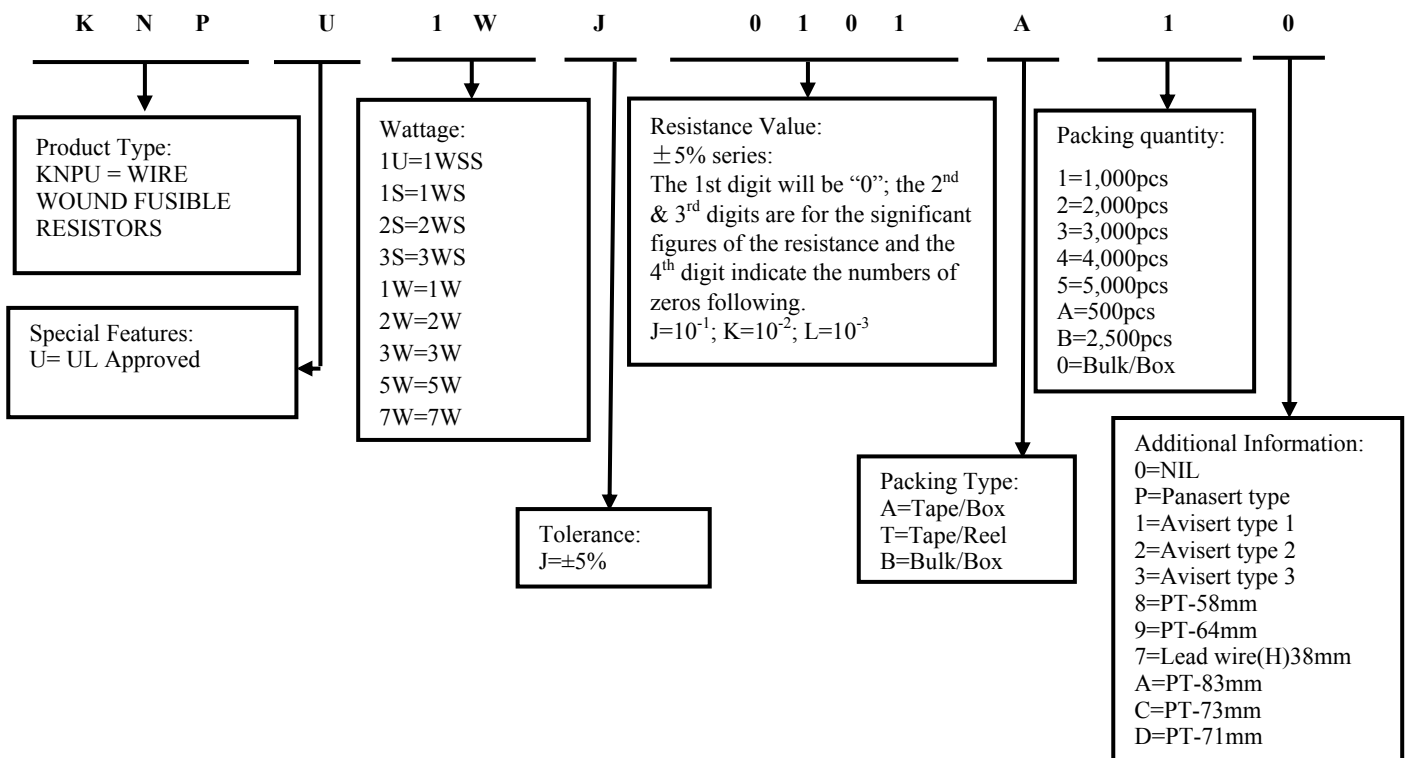
1=1000pcs 2=2000pcs 5=5000pcs

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

P=Panasert type 0=NIL 1=Avisert type 1 2=Avisert type 2 3=Avisert type 3 A=Cutting type CO 1/4W-A type B= Cutting type

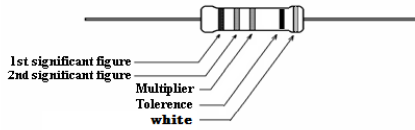
3. Ordering Procedure

(Example: KNPU 1W \pm 5% 100 Ω T/B-1000)



4. Marking

Resistors shall be marked with color coding and welding point exposed. Colors shall be in accordance with JIS C 0802
For KNPU ±5%



Example:

WIRE WOUND FUSIBLE RESISTORS	
WATT : 1W	VAL: 10Ω
Q'TY: 1000	TOL: 5%
LOT:	PPM:

4.1 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

5. Ratings & Dimension

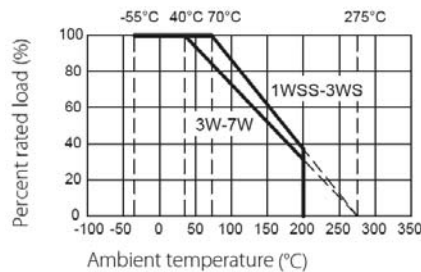


Type	Dimension(mm)					Tolerance	ResistanceRange
	D(MAX)	L(MAX)	H±3	d±0.05	PT		
KNPU 1WSS	3.0	8.5	28	0.54	52	±5%	10Ω
KNPU 1WS	4.3	10.0	28	0.75	52	±5%	0.47Ω~240Ω
KNPU 1W	5.0	12.0	25	0.70	52	±5%	0.47Ω~240Ω
KNPU 2WS	5.0	12.0	25	0.70	52	±5%	0.47Ω~240Ω
KNPU 2W	5.5	16.0	28	0.70	64	±5%	0.47Ω~240Ω
KNPU 3WS	5.5	16.0	28	0.70	64	±5%	0.47Ω~240Ω
KNPU 3W	6.5	17.5	28	0.75	64	±5%	0.47Ω~240Ω
KNPU 5W	8.0	20.0	38	0.75	B/B	±5%	0.47Ω~240Ω
KNPU 7W	8.5	25.0	38	0.75	B/B	±5%	0.47Ω~47Ω

6. Derating Curve

Resistors shall have a power rating based on continuous load operation at an ambient temperature from -55°C to 70°C. For temperature in excess of 70°C, the load shall be derate as shown in figure 1

Figure1



6.1 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 corresponding to the power rating, as determined from the following formula:

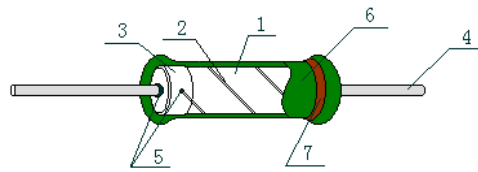
$$RCWV = \sqrt{P \times R}$$

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

P = power rating (WATT.) R = nominal resistance (OHM)

The overload voltage is 2.5 times RCWV or Max. Overload voltage whichever is less.

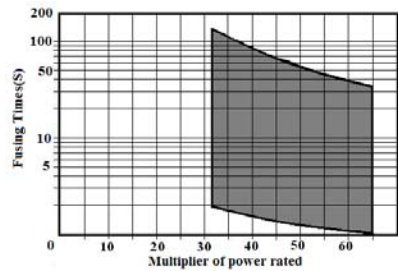
7. Structure



NO.	Name	Raw materials
1	Basic body	Rod Type Ceramics
2	Resistor	Resistance Wire 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 : Deep Green)
7	Color code	Non-Flame Epoxy Resin

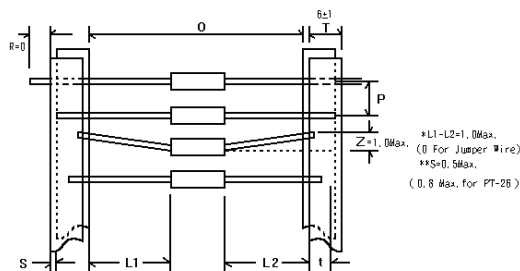
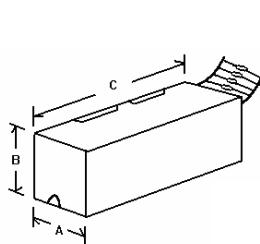
8. Performance Specification

Characteristic	Limits	Test Method (JIS-C-5201& JIS-C-5202&UL1412& IEC60115-1)
Temperature Coefficient	$\geq 20\Omega$: $\pm 300\text{PPM}/^\circ\text{C}$ $< 20\Omega$: $\pm 400\text{PPM}/^\circ\text{C}$	JIS-C-5201 4.8 4.8 Natural resistance changes per temp. Degree centigrade $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM}/^\circ\text{C)}$ R ₁ : Resistance Value at room temperature (t ₁) ; R ₂ : Resistance at test temperature (Upper limit temperature or Lower limit temperature) t ₁ : +25°C or specified room temperature t ₂ : Upper limit temperature or Lower limit temperature test temperature
Short-Time Overload	Resistance change rate is: $\pm(2\%+0.05\Omega)\text{Max.}$ With no evidence of mechanical damage.	JIS-C-5201 4.13 Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down	JIS-C-5201 4.7 Resistors shall be clamped in the trough of a 90°metallic V-block and shall be tested at AC potential respectively specified in the above list for 60-70 seconds.
Terminal strength	No evidence of mechanical damage	JIS-C-5201 4.16 Direct load: Resistance to a 2.5 kg direct load for 10 seconds 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.
Solderability	95% Coverage Min.	JIS-C-5201 4.17 The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes. Temperature of solder: 245°C±3°C Dwell time in solder: 2~3seconds.
Resistance to soldering heat	Resistance change rate is: (1%+0.05 Ω) Max. With no evidence of mechanical damage	JIS-C-5201 4.18 Permanent resistance change when leads immersed to a point 2.0-2.5mm from the body in 260°C±5°C solder for 10±1 seconds.

Load life	Resistance change rate is $\pm(5\%+0.05\Omega)$ Max.. With no evidence of mechanical damage.	JIS-C-5201 4.25.1 Permanent resistance change after 1,000 hours operating at RCWV with duty cycle of 1.5 hours "ON", 0.5 hour "OFF" at $70^{\circ}\text{C}\pm 2^{\circ}\text{C}$ ambient				
Load life in humidity	Resistance change rate is $\pm(5\%+0.05\Omega)$ Max.. With no evidence of mechanical damage.	JIS-C-5202 4.24 Resistance change after 1,000 hours (1.5 hours "ON", 0.5 hour "OFF") at RCWV in a humidity test chamber controlled at $40^{\circ}\text{C}\pm 2^{\circ}\text{C}$ and 90~95%RH relative humidity.				
Fusing test	Resistance should be opened (The Resistance value is over than 50 times from before test value) follow fusing curve condition <table border="1" style="margin-left: 20px;"> <tr> <td>Magnification of power</td> <td>Fusing</td> </tr> <tr> <td>35 times</td> <td>120s (max)</td> </tr> </table>	Magnification of power	Fusing	35 times	120s (max)	UL1412 
Magnification of power	Fusing					
35 times	120s (max)					
Low Temperature Storage	Resistance change rate is $\pm(5\%+0.05\Omega)$ Max.. With no evidence of mechanical damage.	IEC 60068-2-1 (Aa) Lower limit temperature \cdot for 2H.				
High Temperature Exposure	Resistance change rate is $\pm(5\%+0.05\Omega)$ Max.. With no evidence of mechanical damage.	MIL-STD-202 108A Upper limit temperature \cdot for 16H.				
Rapid change of temperature	Resistance change rate is $\pm(5\%+0.05\Omega)$ Max.. With no evidence of mechanical damage.	JIS-C-5201 4.19 30 min at lower limit temperature and 30 min at upper limit temperature \cdot 100 cycles.				

9. Packing

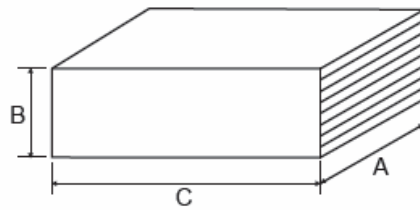
9.1 Tapes in Box Packing



Dimension of T/B (mm)

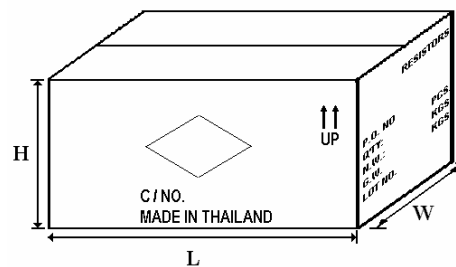
Part No.	O	P	A \pm 5	B \pm 5	C \pm 5	Qty/Box
KNPU 1W	52 \pm 1	5 \pm 0.3	86	80	262	1,000pcs
KNPU 2W	64 \pm 5	10 \pm 0.5	92	108	262	1,000pcs
KNPU 3W	64 \pm 5	10 \pm 0.5	92	80	256	500pcs
KNPU 1WSS	52 \pm 1	5 \pm 0.3	85	70	260	1,000pcs
KNPU 1WS	52 \pm 1	5 \pm 0.3	92	106	262	1,000pcs
KNPU 2WS	52 \pm 1	5 \pm 0.3	86	80	262	1,000pcs
KNPU 3WS	64 \pm 5	10 \pm 0.5	92	108	262	1,000pcs

9.2 Box packing (Plastic Case)



Type	Dimension of Box (mm)			Quantity Per Bag (Pcs.)
	L(C) ± 5	W(A) ± 5	H(B) ± 5	
KNPU5W	36	20	8	100 / 1,000

9.3 Bulk in inner box packing (in plastic case)



Type	Q'ty / Bag (pcs.)	Q'ty / Inner Box (pcs.)	Q'ty / Carton (pcs.)	Carton Box Size L x W x H (±5)
KNPU7W	8	32	1,600	560 x 305 x 310

10. Note

- 10.1. UNIROYAL recommend products store in warehouse with temperature between 15 to 35°C under humidity between 25 to 75%RH. Even under storage conditions recommended above, solder ability of products will be degraded stored over 1 year old.
- 10.2. Cartons must be placed in correct direction which indicated on carton, otherwise the reel or wire will be deformed.
- 10.3. Storage conditions as below are inappropriate:
 - a. Stored in high electrostatic environment
 - b. Stored in direct sunshine, rain, snow or condensation.
 - c. Exposed to sea wind or corrosive gases, such as Cl₂, H₂S, NH₃, SO₂, NO₂, etc.

11. Record

Version	Description	Page	Date	Amended by	Checked by
1	First version	1~6	Mar.20, 2018	Haiyan Chen	Nana Chen
2	1.Modify the Derating Curve 2. Modify characteristic	5~6	Feb.23, 2019	Haiyan Chen	Yuhua Xu
3	Modify characteristic	4~5	Nov.15, 2019	Haiyan Chen	Yuhua Xu
4	Delete a 1WS dimension	3	May.13, 2020	Haiyan Chen	Yuhua Xu
5	Modify the color ring label	3	Aug.18, 2021	Haiyan Chen	John Zhao

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