## PRECISION ELECTRONIC COMPONENTS MFG. CO.

## WIREWOUND RESISTORS/DATA SHEET

## **PIASERIES**

COMMITTED TO QUALITY

PROFESSIONAL AND MILITARY APPLICATIONS. SILICONE COATED. AXIAL.

- \* Easy to Mount on PCBs
- \* HIGH STABILITY, PRECISION AND SMALL SIZE
- \* Industrial, Professional and Premium Grades
- \* Tolerances of 0.1%
- \* Non-Inductive Types
- \* Low Values down to 0R01

- \* Reference Standards
  - MIL-R-26E
  - MIL-R-39007
  - JSS 50402 [RFHT-1]
  - IEC QC

Covering a broad range of requirements in the electronics industry, the PIA Series has been split up into three groups - Industrial, Professional and Premium. A fourth group for Precision Resistors is separately detailed in PEC's PSP Series.

The industrial group is characterized by small size. It is non-insulated and it's main advantage is the relatively low price. This group covers all requirements of industrial electronic equipment, power supplies and instrumentation.

The Professional group generally corresponds to MIL grade and JSS

requirements. They are approved to JSS 50402. Screw mounting terminals can be supplied in 3, 6, 9 and 12 watts [Table 2, Fig.3A].

The Premium type has sizes and performance as per MIL-R-26 E characteristic U. Tolerance of 0.1% available in this category in combination with power rating upto 10W, make the series of unique value for the circuit designer. Non-inductive resistors are also available in this series with extremely fast rise time. Maximum values in non-inductive types are half the maximum values specified. The non-inductive types carry the suffix N, ex. P-3N.

## SPECIFICATIONS JSS 50402, MIL-R-26E

	<i>'</i>				
	Industrial	Professional	Premium		
PEC Types	P1, P2, P3, P4, P5, P7 & P10	P1B, P2A, P3C, P4B, P5B, P6, P6A, P9, P10A, P12 & P14	P1A, P1B, P3A, P5A & P10A		
Tolerance	±1%, 2%, 5%, & 10%	±1%, 2%, 5%, & 10%	±0.10%, 0.25%, 0.50% & 1.00%		
TEMP. COEFF. OF RESISTANCE [TCR]	±200ppm/°C (max.)	±200ppm/°C(max.)	±30ppm°C(max.) [ except for very low values ]		
Max. Voltage	$Generally \ corresponding \ to \ the \ limits \ of \ specification.$				
Stability	±3%	±3%	±0.5%		
Power Rating	RATED @ 40°C  AMBIENT AND.  DERATED LINEARLY  TO ZERO AT 275°C  [ Fig. 2A ]	FOR JSS, RATED @ 70°C AMBIENT AND DERATED LINEARLY TO ZERO AT 350°C [FIG. 2B].	RATED @ 25°C  AMBIENT AND  DERATED LINEARLY  TO ZERO AT 275°C  [ FIG.2C - CHARACTERISTIC U ]		
		FOR MIL RATED @ 25°C AMBIENT AND DERATED LINEARLY			

TO ZERO AT 350°C

[Fig.2C - Characteristic V]

0894/RA01/DS/1-3

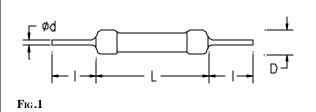
1-3-1031, Lower Tank Bund Road, Kavadiguda, Hyderabad 500380, Andhra Pradesh, INDIA Telephones: 613432, 613476, 612090 Fax: (91-(0)40) 613619, 230281

Felex: (81-(0)425) 6291 PECO IN TELEGRAM: POTMETER

DO NOT SCALE DRAWINGS.

ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.

SPECIFICATIONS SUBJECT TO CHANGE.



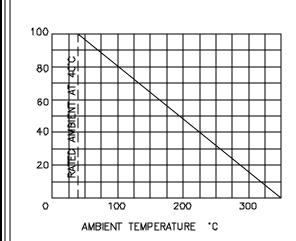


Fig.2A

Table 2: Option 1 - S crew Mounting Termination [Fig.3A]

PEC		Dimensions in MM (IN.)					
$T_{YPE}$	L	D	1	SCREW THREAD			
	±2.00	$\pm 0.50$	$\pm 0.50$				
	$(\pm 0.079)$	$(\pm 0.020)$	$(\pm 0.020)$				
P3S	31.0	8.0	5.0	$M3 \times 0.50$			
	(1.22)	(0.31)	(0.20)				
D 40			- 0	3.54 0.50			
P6S	35.0	9.0	5.0	M4 x 0.70 and			
	(1.38)	(0.35)	(0.20)	$M3 \times 0.50$			
DOG	40.0	0.0	5.0	M4 0.70			
P9S	49.0	9.0	5.0	M4 x 0.70 and			
	(1.93)	(0.35)	(0.20)	$M3 \times 0.50$			
D12C	(1.0	0.0	<i>5</i> 0	M4 0.70			
P12S	64.0	9.0	5.0	M4 x 0.70 and			
	(2.52)	(0.35)	(0.20)	$M3 \times 0.50$			

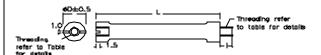
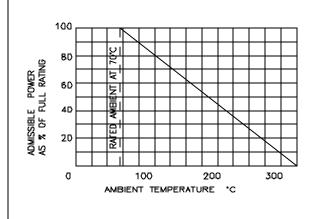


Fig.3A

PIA SERIES



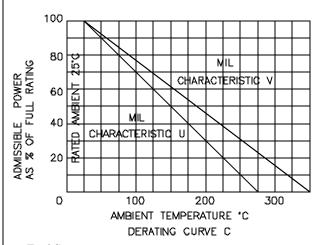


Fig.2C

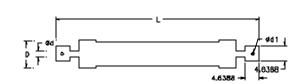


Fig.3B

Table 3: Option 2 - Knife Edge Termination

PEC	Dimensions in mm (in.)					
Түре	L	D	d	$d_1$		
	$\pm 2.00$	$\pm 0.50$	±0.20	±0.20		
	$(\pm 0.079)$	$(\pm 0.020)$	$(\pm 0.008)$	$(\pm 0.008)$		
P6F	40.0 (1.57)	7.6 (0.30)	2.2 (0.09)	1.2 (0.05)		
P9F	54.0 (2.13)	7.6 (0.30)	2.2 (0.09)	1.2 (0.05)		
P12F	69.0 (2.72)	7.6 (0.30)	2.2 (0.09)	1.2 (0.05)		

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P1A   2.00W   50V   11.0   3.5   0.8   0.8   0.8   0.8   1.00W   50V   7.0   3.0   0.05   0.10   0.02   0	RIES	PIAS									
Type         Voltage         L 2.00 (±0.079) (±0.020) (±0.024)         ARAGE (±0.074) (Min² Max) (Min² Max)         MILR-26E Type Nos.²² Nos.         Type Nos.²² Nos.           P1         1.00W         50V         12.0 (±0.020) (±0.024) (±0.024) (±0.024) (±0.033) (±0.	ADE	188	MII -R-30007	ANCE		nge - Stani					
P1A   2.00W   50V   11.0   3.5   0.8   0	ADE	Түре	MIL-R-26E	ī.	RANGE OHMS	$\pm 0.10$	D ±0.50	L ±2.00		KATING	
P1B   1.00W   50V   7.0   3.0   0.5   0.5   0.81   2.62   RW81   P2B   P3B	USTRIAL			3K3	0R1				50V	1.00W	P1
Page	EMIUM		RW80	6K8	0R1				50V	2.00W	P1A
P2A\$   2.50W   100V   13.0   5.6   0.8	EMIUM/ DFESSIONA		RW81	2K2	0R1				50V	1.00W	P1B
P36	USTRIAL			4K7	0R1				100V	2.00W	P2
P3A   3.00W   150V   12.0   5.0   0.8   0.03)   0.03   0.00   0.03   0.04   0.03   0.03   0.04   0.03   0.03   0.04   0.03   0.03   0.04   0.03   0.04   0.03   0.04   0.03   0.04   0.03   0.04   0.03   0.04   0	OFESSIONA			10K	0R1				100V	2.50W	P2A <sup>5</sup>
P3C** 3.00W 150V 14.5¹ 5.6¹ 0.8 0R01 10K PRWR89  P4 4.00W 150V 17.0 (0.28) (0.03) 0R1 6K8 INE  P4B** 4.00W 150V 16¹ 5.6¹ 0.8 0R01 15K PRO  P5 5.00W 250V 22.0 7.0 0.8 0R1 33K RWR74  P5B** 5.00W 250V 23.0 8.0 1.0 0R1 39K RWR74  P5B** 5.00W 250V 23.0 8.0 1.0 0R1 39K RW74  P65.6.8 6.00W 250V 23.0¹ (0.24) (0.03) 0R1 33K RW67 RFHT-1 PRO  P65.6.8 6.00W 250V 23.0¹ (0.31) (0.31) (0.03) 0R1 33K RW67 RFHT-1 PRO  P67 7.00W 500V 35.0 7.0 0.8 0R1 33K RW67 RFHT-1 PRO  P69.6.8 7.00W 250V 23.0¹ (0.31) (0.31) (0.03) 0R1 33K RW67 RFHT-1 PRO  P69.6.8 7.00W 250V 23.0¹ 8.0¹ 0.8 0R1 33K RW67 RFHT-1 PRO  P69.6.8 6.00W 250V 23.0¹ 8.0¹ 0.8 0R1 33K RW67 RFHT-1 PRO  P69.6.8 7.00W 250V 26.0¹ 8.8¹ 0.8 0R01 33K RW67 RFHT-1 PRO  P69.6.8 7.00W 500V 35.0 7.0 0.8 0R01 33K RW55 RFHT-1 PRO  P69.6.8 9.00W 500V 35.0 7.0 0.8 0R1 68K RW55 RFHT-1 PRO  P69.6.8 9.00W 500V 35.0 7.0 0.8 0R1 68K RW55 RFHT-1 PRO  P69.6.8 9.00W 500V 35.0 7.0 0.8 0R1 68K RW55 RFHT-1 PRO  P69.6.8 9.00W 500V 35.0 7.0 0.8 0R1 68K RW55 RFHT-1 PRO  P69.6.8 9.00W 500V 35.0 7.0 0.8 0R1 68K RW55 RFHT-1 PRO  P69.6.8 9.00W 500V 35.0 7.0 0.8 0R1 68K RW55 RFHT-1 PRO  P69.6.8 9.00W 500V 35.0 7.0 0.8 0R1 68K RW55 RFHT-1 PRO  P69.6.8 9.00W 500V 35.0 7.0 0.8 0R1 68K RW55 RFHT-1 PRO  P69.6.8 9.00W 500V 35.0 7.0 0.8 0R1 68K RW55 RFHT-1 PRO  P69.6.8 9.00W 750V 45.0 8.0 1.0 0R1 100K RW68, RW78 PRO  P60.000 RWRR89  P60.0000 RWR89  P60.0000 RW89  P60.	USTRIAL			4K7	0R1				150V	3.00W	P3 <sup>6</sup>
P3C**         3.00W         150V         14.5¹ (0.51)         5.6¹ (0.22)         0.003)         0R01 10K         Proceedings           P4         4.00W         150V         17.0 (0.28)         0.03)         0R1 6K8         INE           P4B**         4.00W         150V         16¹ (0.59)         0.22)         0.03)         0R01 15K         Proceedings           P5         5.00W         250V         22.0 (0.22)         0.03)         0R1 33K         RWR74 RW74         Proceedings           P5A         5.00W         250V         23.0 (0.91)         8.0 (0.03)         0R01 20K         RWR74 RW74         Proceedings           P5B**         5.00W         200V         18.5¹ (0.0¹ (0.24)         0.03)         0R01 20K         RW67         RFHT-1 Proceedings           P65.6.8         6.00W         250V         23.0¹ (0.24)         0.03)         0R01 33K         RW67         RFHT-1 Proceedings           P64.**         7.00W         250V         26.0¹ (0.31)         0.03         0R01 33K         RW67         RFHT-1 Proceedings           P7         7.00W         500V         35.0 (0.03)         7.0 (0.03)         0R1 68K         RW55         RFHT-1 Proceedings         RW67         RFHT-1 Proceedings         0R1 68K	EMIUM		RW79 (3W)	4K7	0R1				150V	3.00W	P3A
P4B**       4.00W       150V       16¹ (0.59) (0.22) (0.03)       0R01 15K       PRO (0.59)         P5       5.00W       250V       22.0 (0.22) (0.03)       0R1 33K       INE         P5A       5.00W       250V       23.0 (0.87) (0.28) (0.03)       1.0 (0.04)       0R1 39K RWR74 RW74       PRI RW74         P5B**       5.00W       250V       23.0 (0.91) (0.31) (0.04) (0.04)       0R1 39K RW74       PRO RW74       PRO RW74         P5B**       5.00W       200V       18.5¹ (0.0¹ (0.24) (0.03)       0R01 20K       PRO RW74       PRO RW74         P65.6.8       6.00W       250V       23.0¹ (0.24) (0.03)       0R1 33K RW67       RFHT-1 PRO RFHT-1 (6W)         P6A**       7.00W       250V       26.0¹ (0.31) (0.03) (0.03)       0R01 33K       PRO RFHT-1 (6W)         P7       7.00W       500V       35.0 (0.94) (0.33) (0.03)       0R01 68K       RW55 RFHT-1 PRO (9W)         P95.6.8       9.00W       500V       39.0¹ (0.31) (0.03) (0.03)       0R1 68K RW55 RFHT-1 PRO (9W)         P10       10.00W       750V       50.0 (0.28) (0.03) (0.03)       0R1 100K RW68, RW78       PRO (0.28) (0.03)	OFESSIONA		KWK09	10K	0R01				150V	3.00W	P3C**
P5	USTRIAL			6K8	0R1				150V	4.00W	P4
P5A   5.00W   250V   23.0   8.0   1.0   0.04   0.04   0.05   0.04   0.05     P5B**   5.00W   200V   18.5	OFESSIONA			15K	0R01				150V	4.00W	P4B**
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	USTRIAL			33K	0R1				250V	5.00W	P5
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	EMIUM/ OFESSIONA			39K	0R1				250V	5.00W	P5A
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	OFESSIONA			20K	0R01				200V	5.00W	P5B**
P7   7.00W   500V   35.0   7.0   0.8   0.03)   OR1   68K   INE	OFESSIONA		RW67	33K	0R1				250V	6.00W	P6 <sup>5,6,8</sup>
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	OFESSIONA			33K	0R01				250V	7.00W	P6A**
(1.53) (0.31) (0.03) (9W)  P10 10.00W 750V 50.0 7.0 0.8 0R1 100K INE (1.97) (0.28) (0.03)  P10A 10.00W 750V 45.0 8.0 1.0 0R1 100K RW68, RW78 PRI	USTRIAL			68K	0R1				500V	7.00W	P7
(1.97) (0.28) (0.03) P10A 10.00W 750V 45.0 8.0 1.0 0R1 100K RW68, RW78 PRI	OFESSIONA		RW55	68K	0R1				500V	9.00W	P9 <sup>5,6,8</sup>
	USTRIAL			100K	0R1				750V	10.00W	P10
	EMIUM/ OFESSIONA			100K	0R1				750V	10.00W	P10A
P12 <sup>5,6,8</sup> 12.00W 750V 54.0 <sup>1</sup> 8.0 <sup>1</sup> 0.8 0R1 100K RFHT-1 PRO (2.13) (0.31) (0.03) (12W)	OFESSIONA			100K	0R1				750V	12.00W	P12 <sup>5,6,8</sup>
P14 14.00W 750V 50.0 9.0 1.0 0R1 180K RW56 PRO (1.97) (0.35) (0.04)	OFESSIONA		RW56	180K	0R1				750V	14.00W	

- 1. Maximum dimension.
- Minimum dimension.
   Except for dimensions.

4. 0.8mm dia. and copperweld leads are available as options for P5A,P10A and P14.

- 5. In P2A, P6, P9 and P12, JSS 50402 has a minimum limit of 0R1. However, values down to 0R01 can be supplied. The range indicated is the approved range.
- 6. P3, P6, P9 and P12 types can be supplied with screw mounting terminals. These are designated with the suffix "S" as for ex. in P3S. Dimensions are as per Table 2 and Fig 3A.
- 7. For very low values, large dia. leads may be used.
- 8. Low values in this series are available with knife edge terminals in P6, P9 and P12. These are designated with the the suffix "F" as for ex.in P6F. Dimensions are as per Table 3 and Fig 3B.
- 9. NI resistor 'D' are likely to be more by upto +1.5mm, depending on the value.
- 10. All MIL equivalents will have tolerance on  $L' \pm 1.6$ mm &  $D' \pm 0.8$ mm.
- 11. Premium grades will generally be in Black colour & will have a suffix "P" for identification.
- 12. The MIL standard reference is intended to serve as a guide. This does not imply qualification approval. Exact interchangeability is not implied, as some minor difference may exist.

0894/RA01/DS/3-3

\*\* Power rated @  $25^{\circ}C$