

Fixed & Variable Wire Wound Resistors



IRH COMPONENTS

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Miniature, Coated Wire Wound Resistors XW Series



ACTUAL SIZE

● **2 Watt rating**

SPECIFICATIONS

Power rating

at 25°C ambient : 2 W

at 70°C ambient : 1.7 W

Resistance Ranges

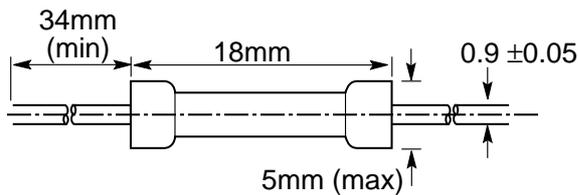
±10% tolerance : R1 - 4K7

±5% tolerance : R47 - 3K9

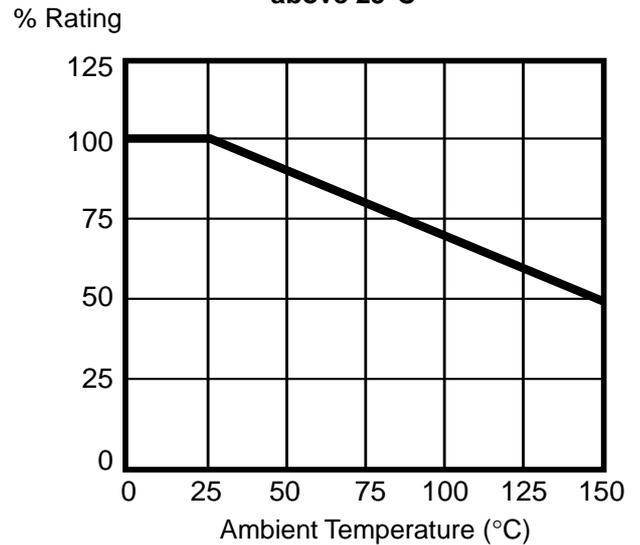
Temperature Derating : See graph

Temperature Rise : See graph

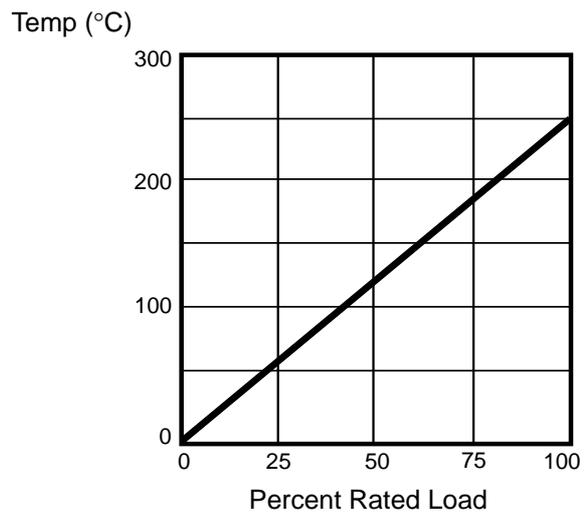
DIMENSIONS



Derating curve for Ambient Temperatures above 25°C

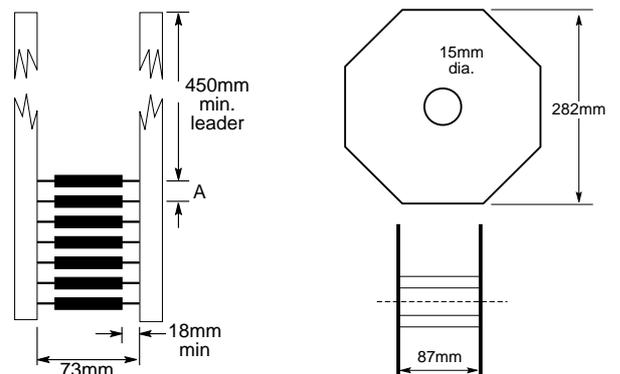


Average Temperature Rise Curve for resistor suspended in free air at 25°C ambient



TAPE & REEL SPECIFICATIONS

Type	Component Spacing A	Quantity per reel	Minimum order quantity
XW2	10mm	1,250	2,500



Wire Wound Resistors

ASW Series

- **Economical**
- **Reliable**
- **Insulated coating**
- **Weldable axial leads¹**
- **Available in tape or reel**
- **Non Inductive available**
- **Low Temperature Coefficient**
- **Precision winding**
- **High temperature coating**



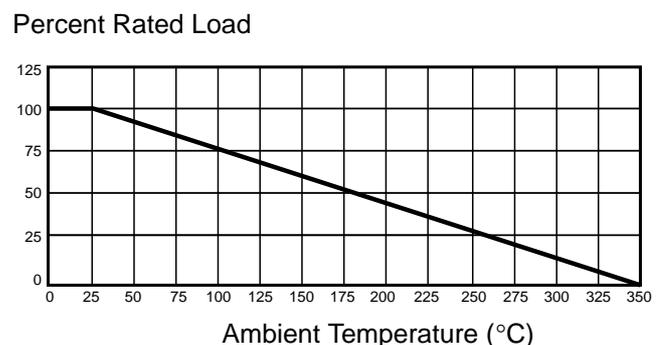
SPECIFICATIONS

Type Number	ASW-1	ASW-2	ASW 5	ASW-7	ASW-10
Power Rating at 25°C ambient and surface temperature 350°C at rated load (W) :	1.5	3	6.5	8	11
Resistance Ranges* : Min at ±5% tol. (Ω) :	0R1	0R1	0R1	0R1	0R1
Min at ±2% tol., ±1% tol. (Ω) :	0R5	0R5	0R5	0R5	0R5
Max at ±5%, ±2%, or ±1 % tol. (kΩ) :	500R	1K8	5K	9K	13K
Body Length "L" (mm) :	12.45	14.30	25.40	39.62	49.02
Diameter "D" (mm) :	4.06	6.35	7.62	7.62	9.65
Alternative to Vitreous Styles :	—	3J	4J	4K	4L
Alternative to Tubular Styles :	—	—	AA	—	AB
MIL-R-26E Equivalent Styles :	—	RW69	RW67	—	RW68

* : Special Low Tolerance (±0.1%) available. Consult factory for further information
 1 : excluding ASW-10 Series

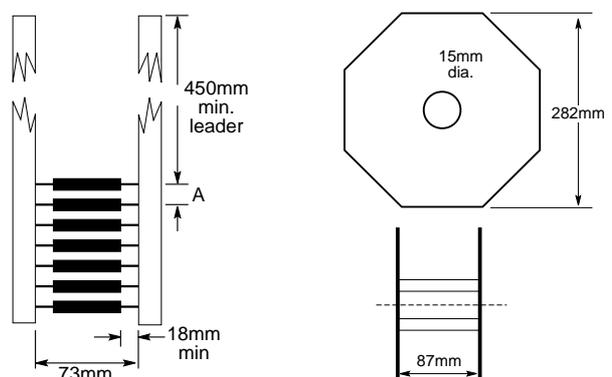
Ambient Temperature Range : -55 to + 275°C
 Note : De-rated linearly to zero at 350°C
 i.e. % Rating = 100 - [100 (Ambient °C—25)/325]
 Temperature Coefficient ≤100 ppm/°C
 Voltage Coefficient Negligible
 Maximum Voltage across resistor : \sqrt{WR}
 Insulation Resistance : >100MΩ
 Insulation withstand voltage : 1000 Vrms
 Electrical Noise : Negligible
 Stability at full rated load for 1000 hours : ≤ 3%

DERATING CURVE TEMPERATURE—POWER



TAPE & REEL SPECIFICATIONS ASW1/2/5

Type	Component Spacing A	Quantity per reel	Minimum order quantity
ASW1	5mm	2,000	2,000
ASW2	10mm	1,000	2,000
ASW5	10mm	750	2,250



Flameproof Power Resistors PW Series

CONFIGURATIONS



fig 1



fig 2



fig 3



fig 4



fig 5

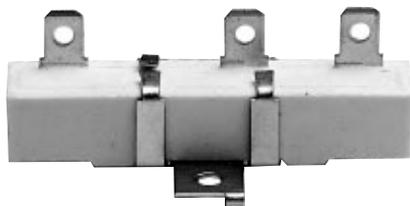


fig 6



fig 7



fig 8

PW Series wire wound resistors are available in four power ratings of 5, 10, 20 and 50 Watts. They are designated Types PW5, PW10, PW20 and PW50. Combining a unique design with a high degree of automatic assembly, they offer practical possibilities for cost saving.

APPLICATIONS:

PW Series wire wound resistors are particularly recommended for the following situations :

(a) A low cost, easily installed power resistor is required. e.g. dish washers, electric stoves, range hoods etc.

(b) Circuits requiring an actual wattage dissipation equal to, or less than, the wattage rating of the PW resistor selected.

(c) Operation must be reliable at high ambient temperatures.

(d) Radio, TV or industrial circuits requiring the PW wattage dissipation and where a **fireproof** resistor is essential.

(e) Medium power bridge circuits with balanced pairs.

(f) Medium power attenuator networks.

DESIGN AND CONSTRUCTION:

The resistance wire is uniformly and tightly wound on a glass fibre core. Types PW5 and 10 have alloy plated copper leads securely fastened to the winding by special terminations, while the PW20 and PW50 have 6.3 QC terminals.

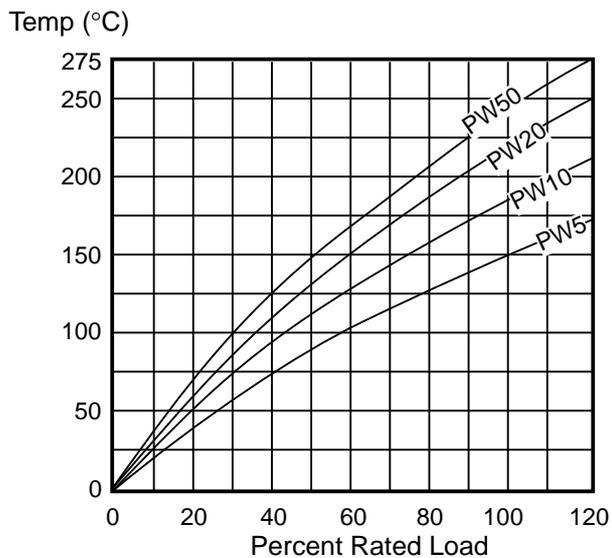
The resistance winding is housed in a rectangular ceramic case which is filled with an inert and *non-flammable* compound, unaffected by solvents. Having high thermal conductivity, this filling compound maintains a lower surface temperature.

TYPE				RATING W @ 40° C	RESISTANCE RANGE (Ω)		DIMENSIONS L X W (mm)
STD.	FIG.	SPECIAL	FIG.		±10% TOL. E12	±5% TOL. E24	
PW5	1 ²	PW5-V	2	5	0R1 - 0R27	0R33 - 4K7	22.4 x 9.6
PW10	1 ²	PW 10-V	2	10	1R—18K	1R—18K	48 x 9.6
PW20	3	PW20-T*	4	20	0R47 - 27K	—	63.5 x 12.7
		PW20-H	5				
		PW20-V	7				
		PW20-TH*	6				
		PW20-TV*	8				
PW50	3	PW50-T*	4	50	2R2 - 47K	—	90 x 19
		PW50-H	5				
		PW50-V	7				
		PW50-TH*	6				
		PW50-TV*	8				

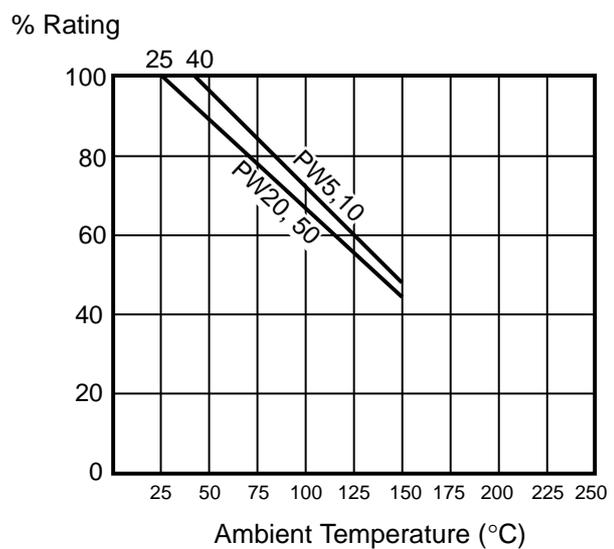
* NOTE : 1. The use of a tap results in a small reduction in power rating
 2. Types PW5 and PW10 have lead wires 30mm (minimum) x ø 0.9mm (±0.01)

TEMPERATURE AND DERATING CHARTS

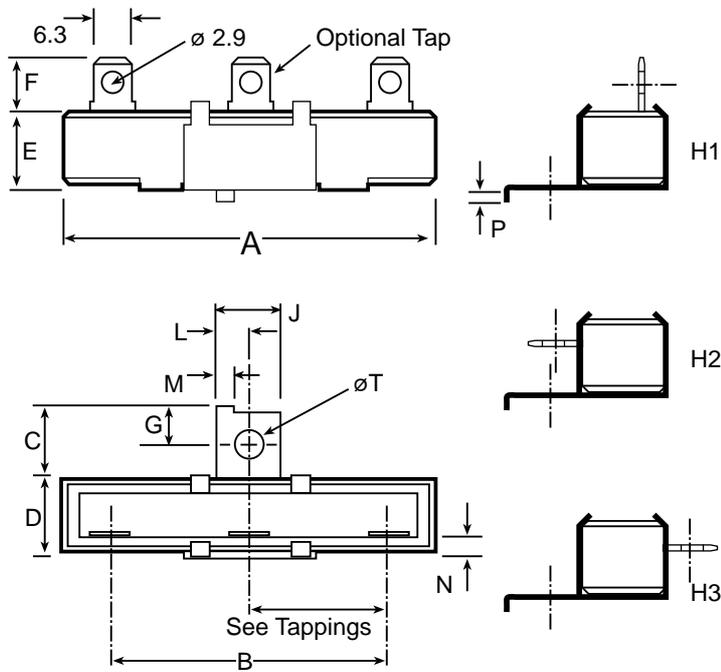
Average Temperature Rise v. Load Curve at 25°C ambient



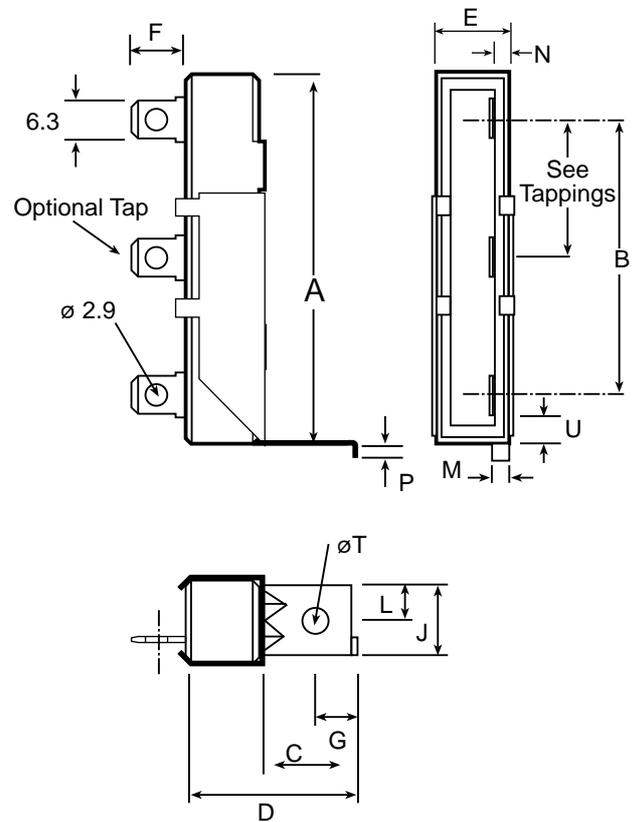
Derating curve for Ambient Temperatures above 25°C



TECHNICAL DATA
DIMENSIONS
PW20H, PW50H



PW20V, PW50V



Dimension	PW20		PW50	
	H	V	H	V
A	63.5	63.5	90	93.8
B	46.6	46.6	73	73
C	12.9	16.0	19.5	19.0
D	12.7	28.7	19.0	38.0
E	13.5	14.5	20.0	20.5
F	10.0	10.0	10.0	9.5
G	6.5	7.0	8.6	9.0
J	11.2	12.0	18.2	18.5
L	5.6	6.0	9.0	9.25
M	3.0	3.1	3.2	3.3
N	3.6	3.7	7.0	5.0
P	1.8	2.2	2.5	2.3
∅T	4.1	3.8	4.2	3.8
U	—	3.0	—	7.2

Tappings

Type		Mounting Styles
PW20	Between 21 and 79% of resistance	H1, H2, V
PW50	Between 11 and 89% of resistance	H1, H2, V

Flameproof 5 Watt Metal Glaze Resistors PGR-T Series



The PGR-T Series resistors extend the resistance range of the PW series with another inorganically filled ceramic boat type resistor. The PGR-T is entirely **flameproof** for use wherever MIL style power resistors are not mandatory and an industrial grade resistor is desired. The main flameproof characteristics are:

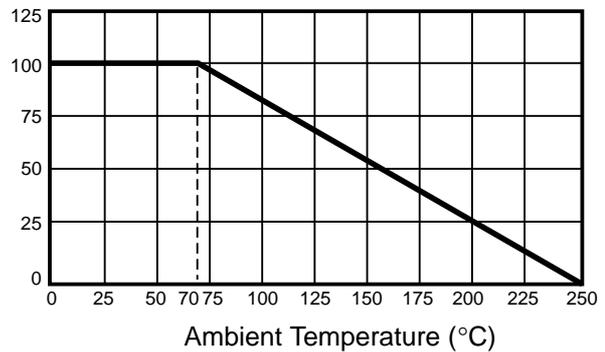
- (1) Opens cleanly under overloads.
- (2) The construction is completely **inorganic** and will not support combustion.

SPECIFICATIONS

Resistance range : 1 kΩ—100 kΩ (E24 Series)
 Resistance tolerance : ± 5%
 Power rating at 70°C : 5 W de-rated to zero at 250°C
 Maximum continuous working voltage : 600 V (dc/ac rms)
 Isolation voltage : 1000 V (dc/ac pk)
 Solderability : 2 sec. max.(IEC globule test)

DERATING CURVE TEMPERATURE—POWER

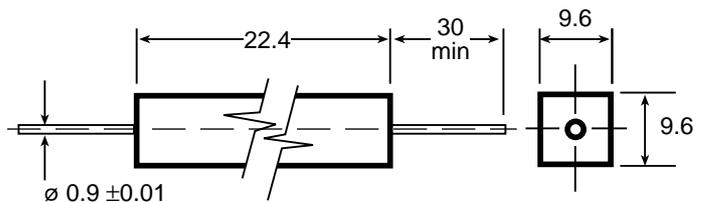
Percent Rated Load



PERFORMANCE CHARACTERISTICS

Test	Spec Limits (% change)
Temperature coefficient (per °C) :	0.02
Endurance :	5.0
Overload (25W for 5 sec.) :	0.5
Effect of soldering heat :	0.5
Robustness of terminations :	0.5
Rapid change of temperature :	0.5
Vibration :	0.5

DIMENSIONS (mm)



Tubular Power Wire Wound Resistors

... with the exclusive **PYROSIL D-Coat** or **SILICONE C-Coat** for the ultimate in protection against high humidity.



A complete range of Power Wire Wound Resistors from 3 watts to 350 watts is available with the exclusive PYROSIL D Coating. Proven after extensive field testing to provide long, trouble-free performance under most operating conditions, PYROSIL coating offers the following features:

- Low temperature cured — no limitations on wire specification.
- Repels moisture — minimises the effect of high humidity conditions.
- Resists chipping — for mechanical robustness.
- Unaffected by most common solvents — for resistance to environmental attack.
- Withstands temperatures over 1000°C—resistor can absorb a short time overload of 5 times rated load.

COATINGS

PYROSIL D-COAT is a unique combination of silicone resins and refractory oxidation barriers designed particularly for high temperature operation. It is capable of withstanding temperatures corresponding to five times rated load.

TROPICAL C-COAT is a specially developed silicone coat for the worst conditions encountered, such as on ship-board, in tropical countries and humid climates. Power rating in watts shown in the table should not be exceeded for full protection against moisture over the lifetime of the resistor.

TOLERANCES

Standard tolerance $\pm 5\%$ 50 ohms and above, 10% below. Tolerances as low as 1.0% can be supplied. Further details on application.

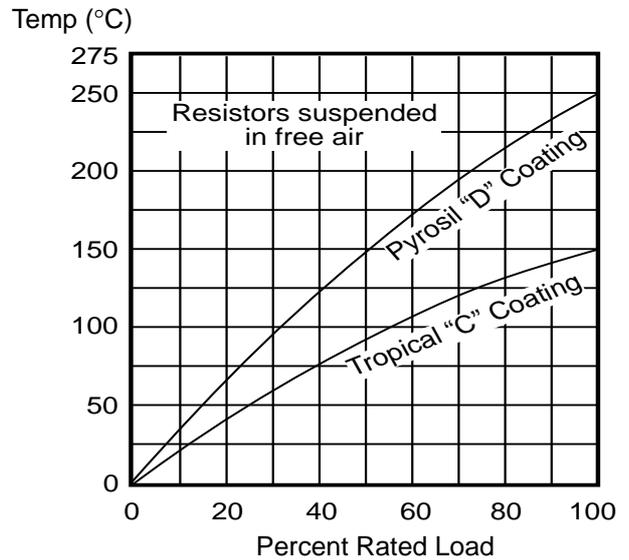
ADJUSTABLE RESISTORS

Adjustable resistors are available within the maximum resistance range for each type, as shown in the table.

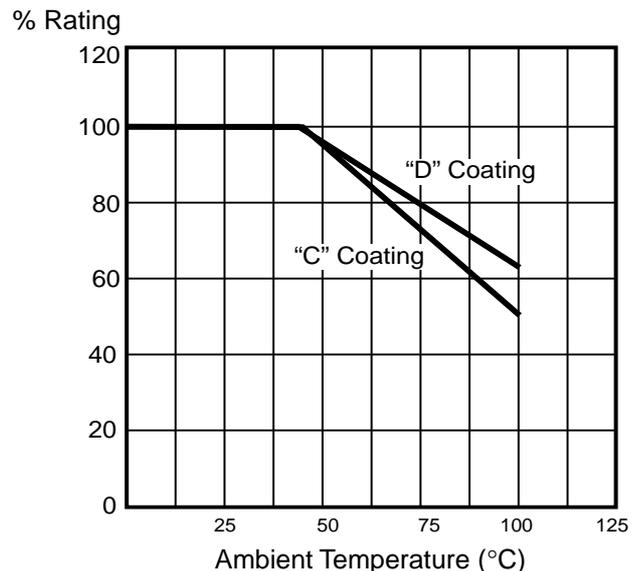
TAPPED RESISTORS

Tapped resistors may be supplied within the limitations of the resistor size used. The use of a tap results in a small reduction in power rating and resistance available, since winding space is lost.

Average Temperature Rise Curve for resistor suspended in free air



Derating curve for Ambient Temperatures above 40°C



TYPE NUMBERS, DIMENSIONS AND RESISTANCE RANGES

TYPE	RATING (W)		Ceramic Length	Ceramic Outside Diameter	Approx O.D. when coated (inc Band)	Mounting Feet Hole Centres	Standard Range(Ω)			
	Pyrosil D-Coat	Tropical C-Coat					Min.	Max.	Adjustable	
								Min.	Max.	
AA	5	3	22	8	10	N/A	0R1	5K0	N/A	N/A
AB	10	5	44	8	10	N/A	0R1	12K0	0R75	2K0
DG	20	10	51	14	17	71	0R1	25K0	1	5K0
DH	25	12	64	14	17	81	0R1	30K0	1	6K0
DJ	30	15	76	14	17	97	0R1	40K0	1R5	7K5
EN	40	20	89	19	23	114	0R27	60K0	3	12K5
EP	50	25	114	19	23	140	0R27	88K0	3	20K0
ES	75	36	165	19	23	191	0R27	130K0	5	25K0
HX	51	25	81	29	33	106	0R5	80K0	4	16K0
HY	65	32	114	29	33	139	0R5	120K0	4	22K5
HA	100	50	165	29	33	191	0R5	200K0	5	37K0
HE	150	75	216	29	33	241	0R5	270K0	5	51K0
HO	200	100	267	29	33	292	0R5	340K0	5	62K0
XA	350	175	340	54	59	312	1R0	400K0	N/A	N/A

All dimensions in mm

POWER RATINGS

The power ratings for Pyrosil "D" and Tropical "C" coatings are based on the ability of the resistor to give long service at full rated load, at the nominated ambients. At higher ambients, the resistor should be derated in accordance with the de-rating curve.

Full rated load for a Pyrosil "D" coated resistor is based on a temperature rise of 250°C from an ambient of 40°C. Full rated load for Tropical "C" coated resistor is based on a temperature rise of 150°C, from an ambient of 40°C.

HIGH VOLTAGE OPERATION

Wire wound resistors may be supplied on special request for operation at 2 kV or higher, by special positioning of end terminals (where some reduction in wattage may be tolerated) or the addition of mica or ceramic insulators. Consult your local sales office for further details.

RESISTANCE RANGE

Although maximum and minimum resistance values have been tabulated against each type, these are intended to indicate standard ranges only. Higher and lower values may be available on request.

TERMINAL SPECIFICATIONS

No	Description	Applicable Types
1.	Radial 38.1 mm (1 1/2") Wire Leads	A
3.	Mounting Lugs (supplied as Standard) Type A B C D 14.29 5.56 3.81 E 15.08 7.94 4.83 H 15.88 9.53 4.83	D, E & H
4.	As Above but complete with Nut & Bolt through terminal	D, E & H
5.	Ferrule D : 14.29mm L : 14.29mm Add 33.34mm to ceramic length	D
6.	Quick Connect Terminal 6.3mm (0.25") Quick Connect Terminal	D, E & H

No	Description	Applicable Types
7.	Ferrule D: 20.64mm L: 12.7mm Add 30.16mm to ceramic length	E & H
8.	Ferrule D: 28.58mm L: 12.7mm Add 30.16mm to ceramic length	H
9.	Medium Edison Base D: 25.4mm approx. L: 23.81mm	E
10.	Flexible Leads Length: 38.1 to 152.4mm (specify)	A, D, E & H
11.	Ferrule D: 26.99mm L: 15.88mm Add 36.51mm to ceramic length	H

Flat Wire Wound Resistors

FRW Series



The FRW Series is designed for vertical or horizontal mounting, either singly or in stacks. Non-magnetic mounting brackets extending through the resistor allow easy and economical mounting. They also aid in heat distribution along its entire length and serve as conductors to transfer internal heat to the chassis.

Other features of the FRW Series are lightweight construction, combined with exceptional mechanical strength, and the ability to withstand severe vibration.

Designed to fulfill requirements of high wattage dissipation in limited-space applications, the FRW Flat Wire Wound Resistor has a higher power-to-space ratio than standard tubular wire winds. For different operating conditions, these compact resistors are available in two coatings, "D Coat" or "C Coat".

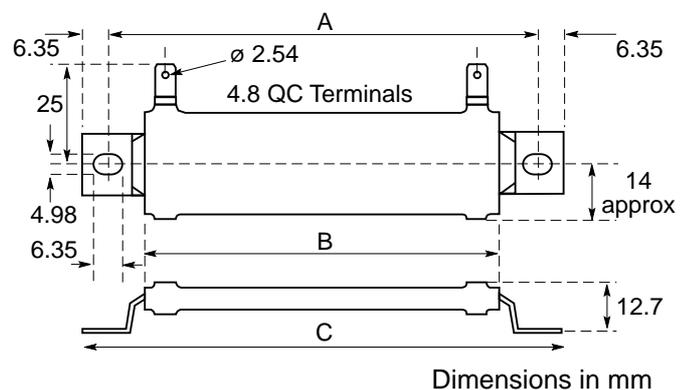
COATINGS

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TROPICAL C-COAT is a specially developed silicone coat for the worst conditions encountered, such as on ship-board, in tropical countries and humid climates. Power rating in watts shown in the table should not be exceeded.

TOLERANCES

Standard tolerance is 5% (50 Ω and above), 10% below. Tolerances as low as 1.0% can be supplied. Further details on application.



ADJUSTABLE RESISTORS

Adjustable resistors are available within the maximum resistance range for each type, as shown in the chart.

TAPPED RESISTORS

Tapped resistors may be supplied within the limitations of the resistor size used. The use of a tap results in a small reduction in power rating and ohmage available, since winding space is lost (see overleaf).

Power Rating		Dimension (mm)			Resistance (Ω)				
"D" Coat	"C" Coat	A	B	C	Min.	Max. Fixed	Series	Max. Adjustable	Series
20W	10W	50.8	31.8	63.5	0.25	10,000	FRW-20	N/A	—
30W	15W	69.9	50.8	82.6	0.25	25,000	FRW-21	6,000	FRWA-21
50W	25W	108	88.9	121	1.0	50,000	FRW-22	13,000	FRWA-22
65W	32W	140	121	152	1.0	80,000	FRW-23	19,000	FRWA-23
75W	36W	171	152	184	1.5	100,000	FRW-24	25,000	FRWA-24

STACKING

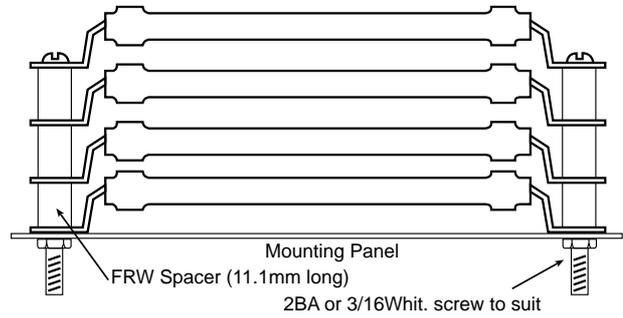
FRW Series Resistors are designed for assembly in stacks or gangs, as illustrated. When stacked, each resistor, under load, affects the temperature of its adjoining resistors. To limit the temperature rise of the hottest unit to 250°C, for "D" coat or 150°C, for "C" coat, it is necessary, depending upon the number of resistors in the stack, to reduce the power applied to each resistor by the percentage given in Table 1.

For more efficient ventilation, FRW Resistors should be mounted in a vertical, rather than a horizontal plane. A lower percentage of de-rating is necessary for vertical stacks, as shown in Table 1.

Two spacer sleeves are required for each resistor (more than one) in a stack assembly, as illustrated in the outline drawing. The required number of spacers should be noted when ordering. Specify as "FRW Spacers."

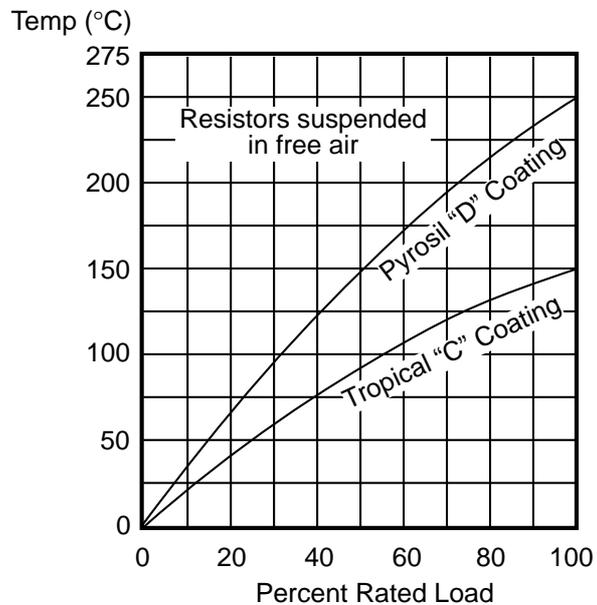
Table 1

Kind of "Stack" Mounting Employed	% Reduction in Rating for no. of units stacked		
	2	3	4
Resistors Stack-Mounted on a Horizontal Panel Reduce Rating by:	25%	45%	60%
Resistors Stack-Mounted on a Vertical Panel Reduce Rating by:	18%	30%	35%



No of resistors	Approx Stack Height
1	12.7
2	25.4
3	36.5
4	47.6
5	58.7

fig.1 Average Temperature Rise v. Load Curve



TAPPED RESISTORS

Tapped resistors may be supplied, within the limitations of the resistor size used as listed below. The use of taps results in a reduction in total resistance available, due to loss of winding space. When specifying Tapped Resistors, provide wattage per section.

- FRW-20 Single section only.
- FRW-21 Two sections maximum.
- FRW-22 Three sections maximum.
- FRW-23 Four sections maximum.
- FRW-24 Five sections maximum.

POWER RATINGS

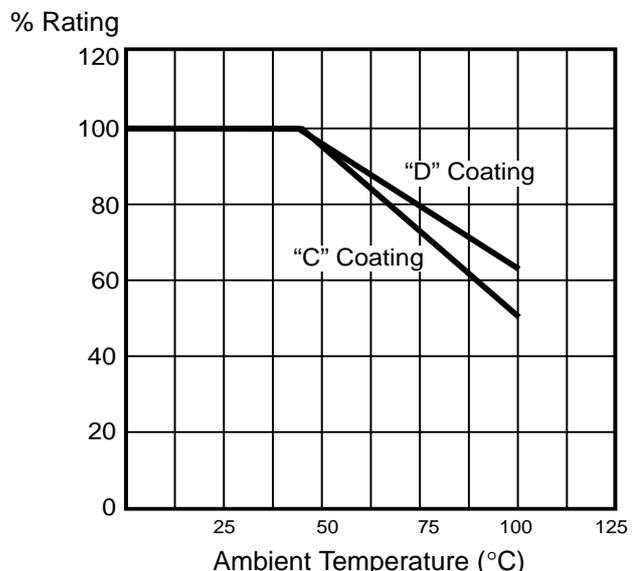
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Full rated load for a Pyrosil "D" coated resistor is based on a temperature rise of 250°C from an ambient of 40°C. Full rated load for Tropical "C" coated resistor is based on a temperature rise of 150°C, from an ambient of 40°C.

DERATING

If operating FRW Resistors in an ambient higher than 40°C., it is recommended that they be derated according to the Derating Curve for High Ambient Temperatures.

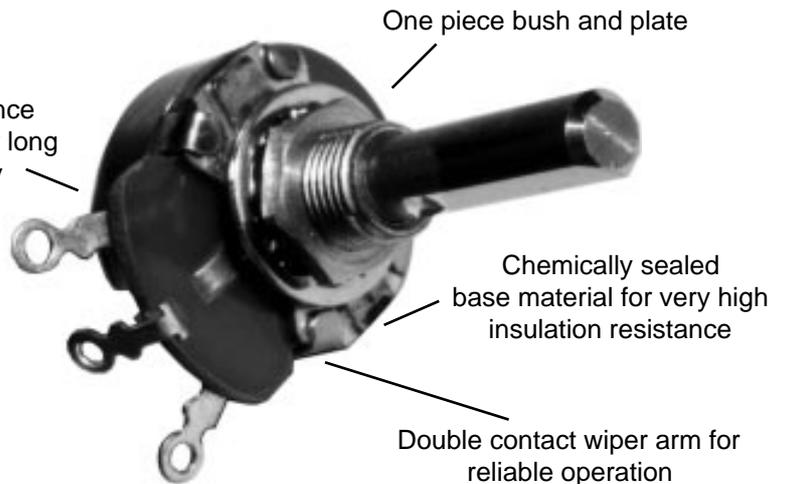
fig.2 Derating curve for Ambient Temperatures above 40°C



3 Watt Wire Wound Potentiometer AW Series

- 24mm diameter
- Compact size
- Full 3-watt rating
- Economical
- Wide resistance range fully enclosed construction
- Single or 2-gang
- Bush mounting

High grade resistance element materials for long life and reliability



ELECTRICAL SPECIFICATIONS

Resistance Range : 1 Ω to 50,000 Ω (linear taper).

Resistance Tolerance : Total resistance ± 10% standard. Special ± 5%,

Tapers Available : Linear.

Wattage and Temperature Rating :
3 watts at 25°C derated to no load at 105°C with control mounted on steel panel 100 x 100 x 1mm (4x4x0.05") based on linear taper, single section.

VOLTAGE RATING:

Bushing to Terminals : 1,000 Vac for one minute, high pot. test.

Across End-Terminals : 500 Vdc (load not to exceed wattage rating).

DIMENSIONS

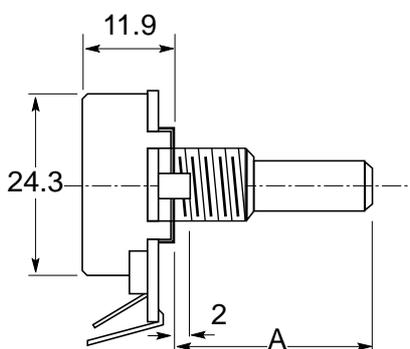
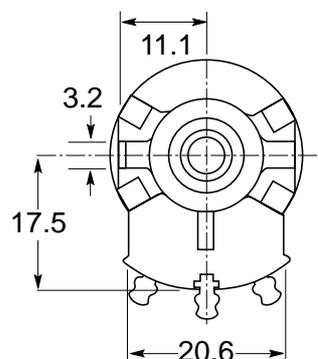


fig.1



MECHANICAL SPECIFICATIONS

Angle of Rotation : 300° ± 5° (total)
280° approx (effective)

Shaft Dimensions :

Diameter : 6.3/6.32 mm Aluminium (6 mm to special quotation).
Length : Standard Dimension "A"
57 mm for shaft with flat.
For screwdriver slotted shaft : 15.9 mm.

Options : Unless otherwise specified, controls are supplied with flat or slot located at random. Special location subject to quotation.

Mounting Bushing : 9.5 mm—32 N.E.F.
— 2 thread x 9.5 mm ± 0.4 mm long. Material die cast aluminium

Mounting Hardware : Unless specified, controls are supplied complete with pressed pal nut (brass nut and washer to special quotation).

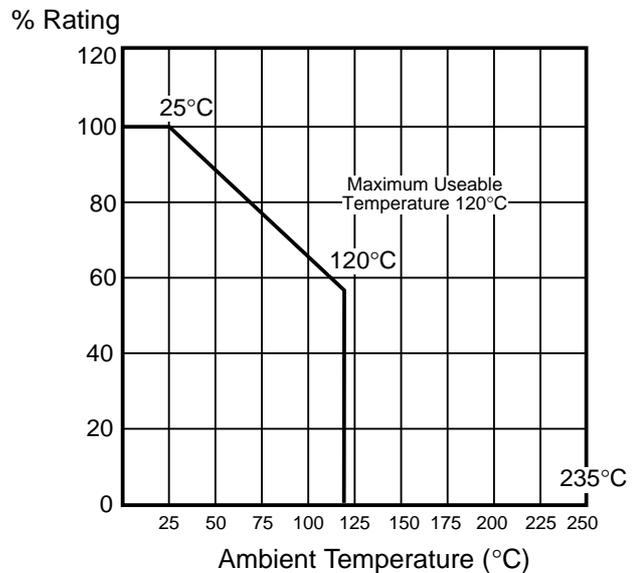
Locating Lugs : Left side as shown (fig.1). Standard on 2-gang, by request on single gang.

25 - 100 Watt Power Wire Wound Rheostat APR Series

- **Robust, compact, ceramic construction.**
- **Toroidally wound element.**
- **Exclusive 'Pyrosil' coating for greater heat dissipation.**
- **Copper/graphite brush assembly ensures smooth operation and positive contact with minimal long term wear of the resistance element.**
- **Two styles of terminals, solder and 6.3mm quick connect.**
- **Custom designs including 'OFF' position available¹.**



fig. 1 Derating curve for Ambient Temperatures above 25°C



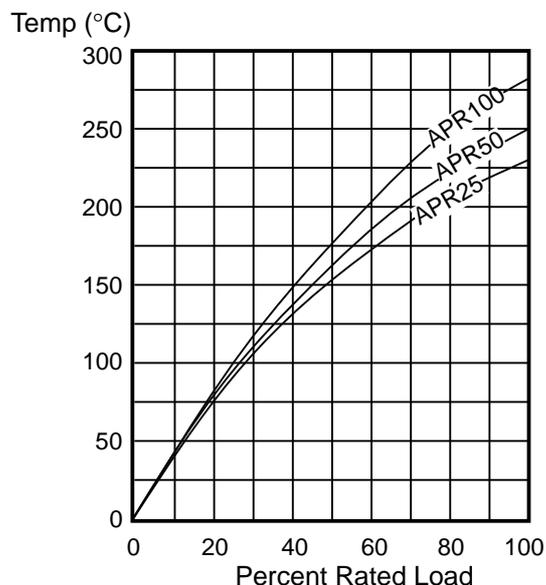
SPECIFICATIONS

Type	APR25	APR50	APR100
Rating (W)* :	25	50	100
Resistance Range :	R5 - 5K	R5 - 10K	R5 - 10K
Dimensions :	fig. 3	fig. 4	fig. 5.
Torque (g-cm) :	250 - 1,000	300 - 1,000	500 - 1,500

* at 25°C and full rotation

- Resistance tolerance : ±10% (Symbol K)
- Insulation resistance : 100 MΩ/dc 500V
- Dielectric Strength : 1000 Vac/1 minute min.
- Derating : Refer fig.1.
- Temp. Rise : Refer fig.2.
- Rotation life : 10,000 turns min.
- Mechanical rotation angle : 290° + 5°
- Termination options : Solder Tag (std)
Quick Connect (6.3mm)¹.

fig. 2 Average Temperature Rise v. Load Curve



¹ Consult nearest sales office for more information

TECHNICAL DATA
DIMENSIONS

fig.3 APR25

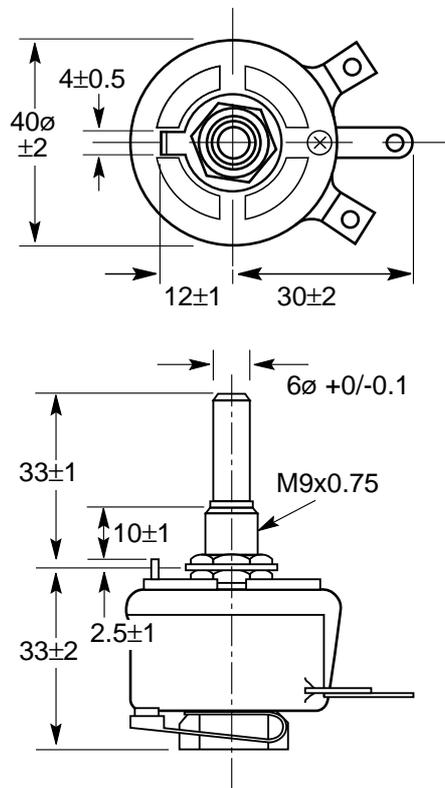


fig.4 APR50

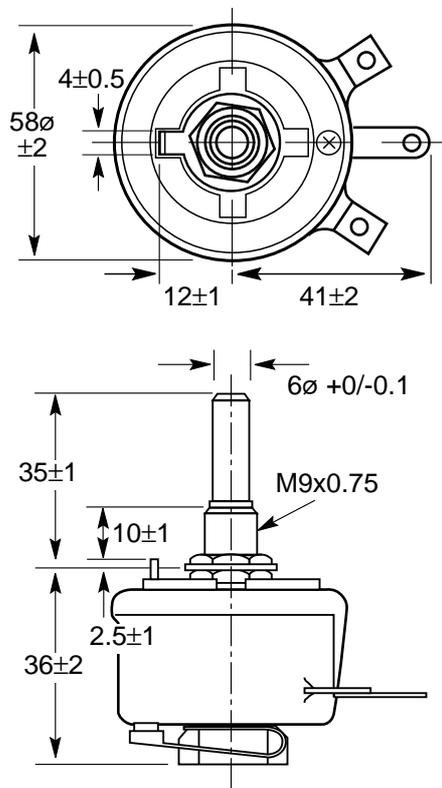
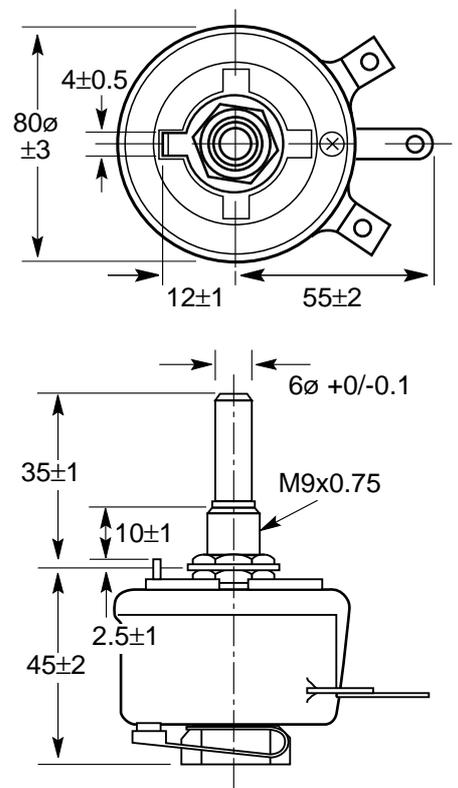


fig.5 APR100



Laboratory Power Slider Resistor XAS Series



These resistances are very suitable for laboratory, experimental and educational applications. Contact wear and resistance are reduced to the absolute minimum. All

types are fitted with multiple fingered, phosphor bronze contacts that bear on both sides of the wound tube.

<i>Type</i>	<i>Continuous Rating</i>	<i>Former Size</i>	<i>Available in all standard Resistance values between</i>	<i>Overall Length</i>	<i>Overall Height</i>
XAS	200 W	325 x 54 mm	2 Ω & 10,000 Ω	350 mm	121 mm

IRH COMPONENTS

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