Pentagon power resistors

Vitreous Enamelled and Open Types

HVR PENTAGON

UNIT 2,
KINGS ROAD INDUSTRIAL ESTATE,
TYSLEY,
BIRMINGHAM.
B11 2AX

Tel. +44 (0) 121 773 2413
http://www.hvrpentagon.com

Vitreous enamelled resistors

Pentagon Electrical Products Limited was established in 1973 by engineers who already had many years experience in the manufacture of Power Resistors. That wealth of knowledge has been maintained and expanded to the present day to be recognised as one of the U.K.'s foremost manufacturers of Power Resistors.

The following pages describe our extensive range of resistors, but Pentagon are also well known in the panel building industry for their range of heaters for preventing condensation in switch and control gear cubicles. Please ask for our separate leaflet.

Wire-Wound Vitreous Enamelled Resistors (Prefix PE)

Pentagon vitreous-enamelled resistors are available in a range from 20 watts to 500 watts.

The nickel-chrome winding is completely protected by several coats of vitreous enamel, which have been fired to produce a high reliability resistor, capable of withstanding adverse conditions.

Resistors are supplied with tinned terminal tags suitable for screws, solder or on some sizes for 'Faston' terminals.

Terminal bands are spot-welded in position on the heat resistant ceramic former, and the winding in turn spot welded to the terminal before the enamelling process. The terminal bands are therefore an integral part of the resistor, protected by the vitreous coating.

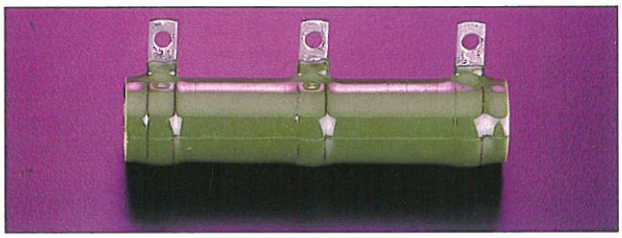
TYPE PE

Unmounted resistor with standard tinned tags

TYPE PE (TAPPED)

Tapped Resistors

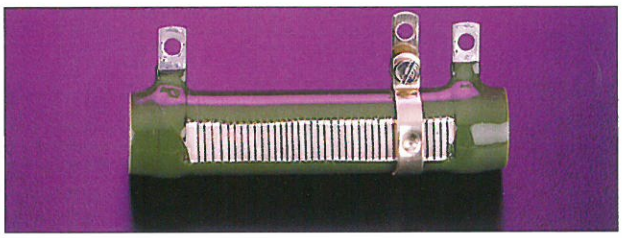
Extra fixed tappings, with terminal bands protected by the vitreous coating, are available in the majority of sizes. The maximum number of tappings depends upon the size of the resistor and the ohmic value.
We will be pealed to advise in specific cases.



TYPE PE (ADJ)

Adjustable Resistors

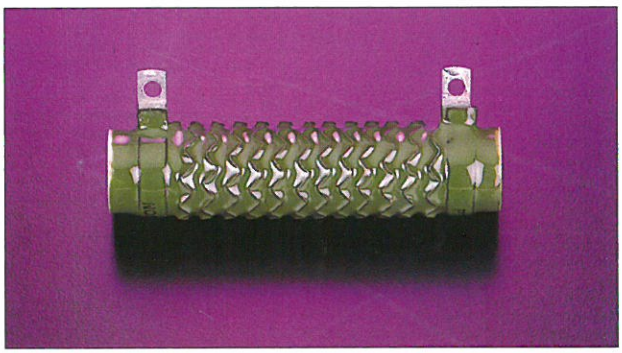
Most wire-wound vitreous enamelled resistors are available with an adjustable tapping clip, which can be moved along the former, making contact with an exposed track on the side of the resistor.



TYPE PT

Corrugated Tape Wound Resistors (Prefix PT)

For low ohmic values, resistors are edge-wound with corrugated tape, as shown in the illustration. On this type of resistor, the power rating can be approximately 25% greater than that of the equivalent wire-wound resistor, due to the increased heat dissipation provided by the corrugated tape. Tape-wound resistors can also be provided with adjustable tapping clip (Suffix ADJ).



TYPE PE---WF

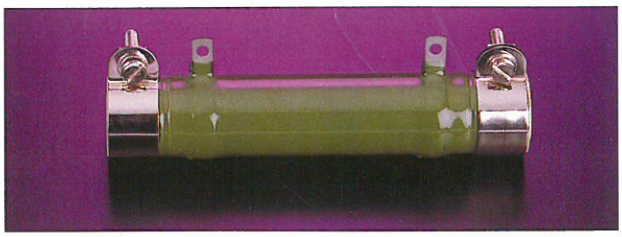
Ferrule Ended Resistors Live Ferrule Ends (Suffix WF)

Flexible wire leads, connected to ferrule ends, make this style of resistor suitable for mounting directly into special mounting clips.

TYPE PE---F

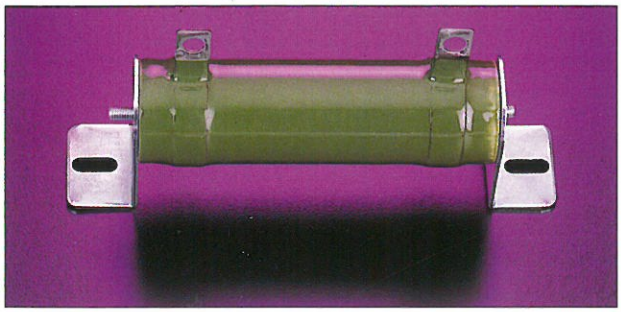
Dead Ferrule Ends (Suffix F)

This style of resistor is fitted with standard tinned tags and with ferrules, which makes it suitable for fitting into special mounting clips (see opposite).



HVR PENTAGON

Vitreous enamelled resistors

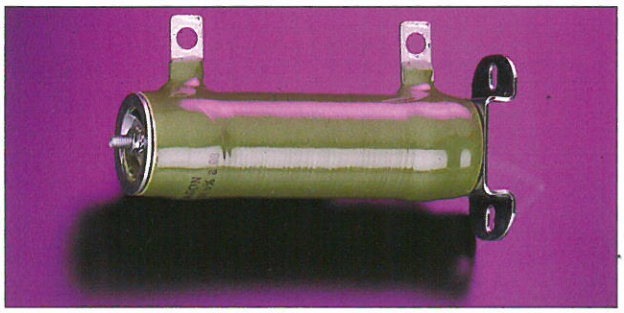


TYPE H

Horizontal Mounting

Horizontal mounting brackets are fixed firmly in position by tie-rods and fixing nuts, avoiding the possibility of the resistor rotating about its axis.

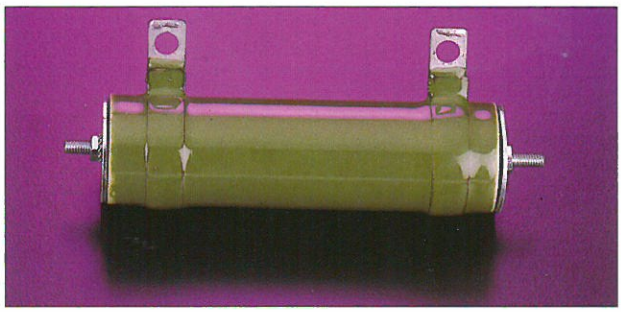
Where space is at a premium, reverse horizontal feet can be supplied (see photograph on page 6).



TYPE V

Vertical Mounting

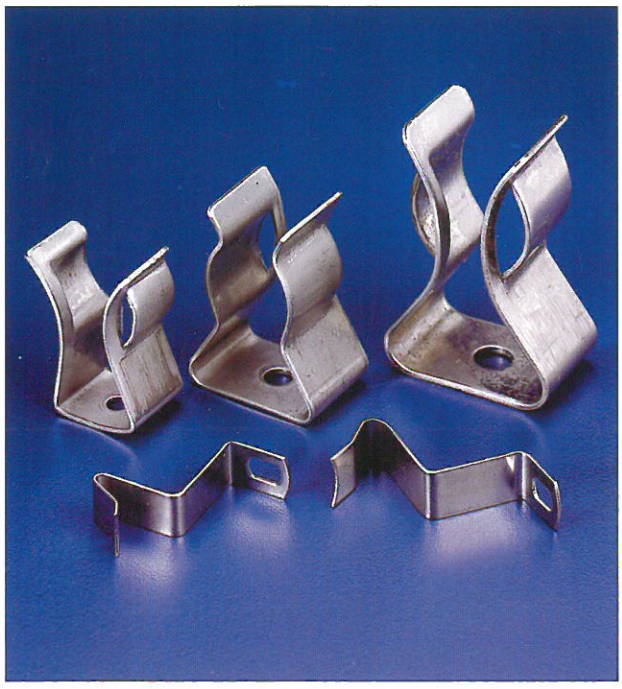
Similar to horizontal mounting but having a fixing bracket at one end which is suitable for mounting on to a panel.



TYPE TB

Through-bolt mounting

This arrangement is suitable for mounting resistors direct on to a panel of 6mm or less in thickness and consists of cupped washers in each end of the resistor with a tie-rod protruding.



Mounting Clips for Ferrule Ended Resistors

These clips are manufactured from Stainless Steel and comply with N.A.T.O. specifications. They are suitable for live or dead ferrule ended resistors.

N.A.T.O. Part No's.
5905-99-011-9870 for PE20WF, PF30WF, PE40WF.
5905-99-011-9868 for PE60LWF and PE90LWF.
5905-99-011-9869 for PE45WF, PE60SWF, PE90SWF, PE130WF, PE180WF, PE220WF.

Push-In Mounting Brackets

Nickel-plated phosphor bronze brackets, which are a spring fit in the ends of the resistor tubular formers provide an inexpensive method of mounting.

They are available for PE 30, PE 40, PE 60L and PE 90L, but should not be used where rotation of the resistor in the clip is undesirable.

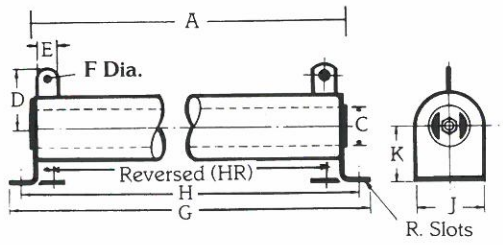
Mounting styles

Pentagon vitreous enamelled resistors can be supplied un-mounted or with a variety of mounting styles illustrated.

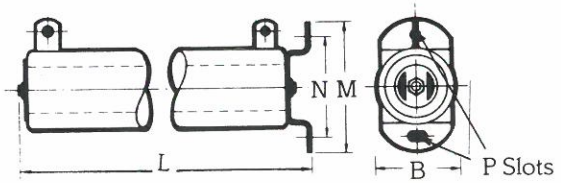
HVR PENTAGON

Vitreous & open wound resistors

Suffix H and HR Mounting



Suffix V Mounting



Dimensions (mm) - vitreous enamelled resistors

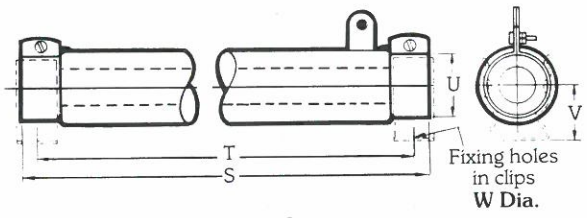
TYPE	WATTS 280°C	WATTS 380°C*	A	B	C	D	E	F	G	H	HR	J	K	L	M	N	P	R
PB & PE30 PT30	30 35	35 44	51	19	9.5	25	6.3	4	72	62	42	16	20	64	38	25	4x6	4x6
PB & PE40 PT40	40 50	65 80	102	19	9.5	25	6.3	4	123	113	93	16	20	114	38	25	4x6	4x6
PB & PE45 PT45	45 55	65 80	51	32	19	37	6.3	4	91	75	30	28	27	64	54	41	5x8	5x13
PB & PE60L PT60L	60 75	75 90	89	22	12.6	30	6.3	4	117	103	77	20	27	102	45	32	4x6	5x8
PB & PE60S PT60S	60 75	75 90	70	32	19	37	6.3	4	110	94	48	28	27	83	54	41	5x8	5x13
PB & PE90L PT90L	90 110	125 185	165	22	12.6	30	6.3	4	193	179	153	20	27	178	45	32	4x6	5x8
PB & PE90S PT90S	90 110	125 185	102	32	19	37	9.5	6	142	126	80	28	27	114	54	41	5x8	5x13
PB & PE130 PT130	130 160	175 215	152	32	19	37	9.5	6	192	176	130	28	27	165	54	41	5x8	5x13
PB & PE150 PT150	150 185	195 245	178	32	19	37	9.5	6	218	202	156	28	27	191	54	41	5x8	5x13
PB & PE180 PT180	180 220	230 285	216	32	19	37	9.5	6	256	240	194	28	27	229	54	41	5x8	5x13
PB & PE220 PT220	220 275	285 400	267	32	19	37	9.5	6	307	291	245	28	27	279	54	41	5x8	5x13
PB & PE320 PT320	320 400	420 560	267	45	28	43	9.5	6	318	291	248	44	51	-	-	-	-	7x14
PB & PE380 PT380	380 476	500 625	305	45	28	43	9.5	6	356	327	286	44	51	-	-	-	-	7x14

PT Resistors. Dimension 'B' may vary up to 10mm greater depending on the resistance value specified

Dimensions (mm) - continued

TYPE	WATTS 280°C	WATTS 380°C	S	T	U	V	W
PB & PE20F & WF PT20F & WF	20 23	30 35	59	48	14	19	4
PB & PE30F & WF PT30F & WF	30 35	35 44	76	65	14	19	4
PB & PE40F & WF PT40F & WF	40 50	65 80	127	116	14	19	4
PB & PE45F & WF PT45F & WF	45 55	65 80	83	70	27	32	6
PB & PE60LF & WF PT60LF & WF	60 75	75 90	121	108	21	22	5
PB & PE60SF & WF PT60SF & WF	60 75	75 90	102	90	27	32	6
PB & PE90LF & WF PT90LF & WF	90 110	150 185	197	184	21	22	5
PB & PE90F & WF PT90F & WF	90 110	125 185	133	121	27	32	6
PB & PE130F & WF PT130F & WF	130 160	175 215	184	171	27	32	6
PB & PE180F & WF PT180F & WF	180 220	230 285	248	235	27	32	6
PB & PE220F & WF PT220F & WF	220 275	285 400	298	286	27	32	6

Suffix F and WF Mounting



Electrical Data Power Rating - Continuous Duty

The two power ratings given to each type of resistor in the table are based on temperature rises of 280°C and 380°C respectively and relate to single resistors mounted in free air.

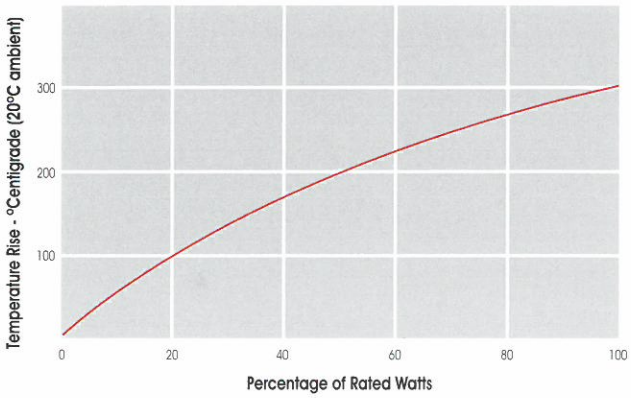
*380°C applies only to vitreous resistors.

Where it is desirable to limit the surface temperature of the resistor refer to the graph on page 5..

HVR PENTAGON

Vitreous enamelled resistors

Vitreous Enamelled and Open Resistors

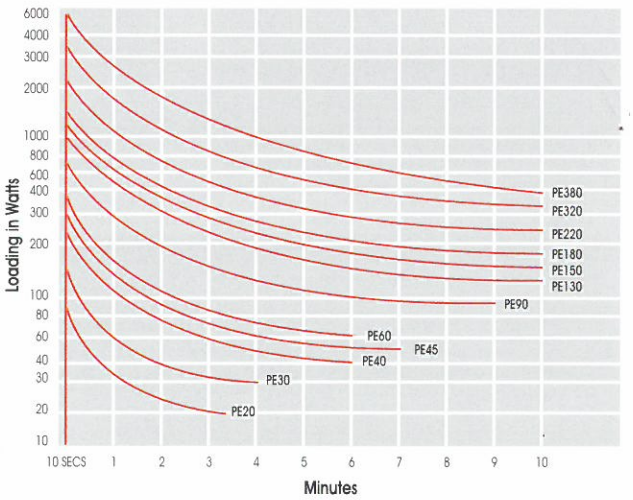


Ratings

De-Rating Continuous Rating

Where it is desirable to limit the surface temperature of the resistor, refer to this graph.

Power Rating - Short Time

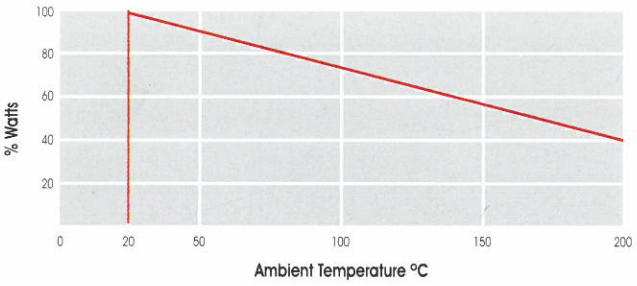


Short Time

In cases where resistors are only required to be operated intermittently, a higher short-time rating may be considered.

The graph shows loading against on time assuming a cooling time of at least 20 minutes between duty cycles.

Operation in High Ambient Temperatures



Operation in High Ambient Temperatures

When the ambient temperature is above 20°C resistors should be de-rated as shown on the graph below.

Ohmic Values

The range of ohmic values available is shown below. You may select any ohmic value between the Max and Min values.

Low Inductance Windings

Ayrton Perry windings are available for resistors which are required to be substantially non-inductive.

Thermal cut-outs

Cut-outs can be fitted to certain resistors which will operate a contact to disconnect the resistor to prevent overload damage.

Ordering Procedure

Unless otherwise specified, resistors will be supplied with tinned tags suitable for screws or solder terminations.

Fixed Resistors

Please specify: Type Number, Mounting Style, Ohmic Value, Tolerance, e.g:
PE 130H 400R ± 5%

Adjustable Resistors

For adjustable resistors, please add the letters ADJ e.g:
PE 180H 350R ± 10% ADJ

If tags are to be suitable for Faston terminals, please specify:- e.g:
PE40 200R±5% FASTON TAGS

When ordering ferrule ended resistors, please state whether live or dead ferrule and whether mounting clips are required. e.g:
PE180F-450R±5%
Dead Ferrules
or
PE90LWF-27-R±5%
Live Ferrules

When ordering corrugated tape-wound resistors, please use the prefix PT, e.g:
PT130H2R5±10%

Standard Ohmic Values & Tolerances - other Values & tolerances are available on request

WATTS TYPE	RANGE	30	40	45	60	90	130	150	180	220	320	380	TOLERANCE
							OHMIC VALUE						
PE FIXED WIRE	MIN	2R2	4R7	4R7	4R7	10R	10R	12R	22R	22R	33R	47R	OVER 10R +/-5%
	MAX	5K0	10K	10K	15K	30K	60K	70K	100K	120K	120K	125K	10R OR LESS +/-10%
PT FIXED TAPE	MIN	0R02	0R15	0R2	0R2	0R3	0R7	0R8	1R0	1R0	1R5	1R5	+/-10%
	MAX	2R0	4R5	4R5	4R5	9R0	9R0	10R	20R	20R	30R	30R	
NI NON INDUCTIVE	MIN	1R0	2R0	2R0	3R0	3R0	5R0	6R0	7R0	10R	25R	30R	+/-10%
	MAX	500R	500R	500R	500R	1K0	1K5	1K5	1K5	1K5	2K0	2K5	
ADJ ADJUSTABLE	MIN	2R2	2R2	4R7	4R7	8R2	15R	16R	20R	27R	36R	43R	+/-10%
	MAX	1K3	3K9	2K2	3K9	6K2	11K	13K	16K	22K	22K	22K	

HVR PENTAGON

Open wire-wound resistors

Open Wire-Wound Resistors (Prefix PB)
Pentagon Open Wire-Wound resistors are close wound with oxidised resistance wire and each resistor is fitted with an adjustable tapping clip as standard.

The nickel silver end bands and tapping clips are suitable for soldered connections, screw terminals or on some size 'Faston' connectors. Extra tappings can be provided on request.

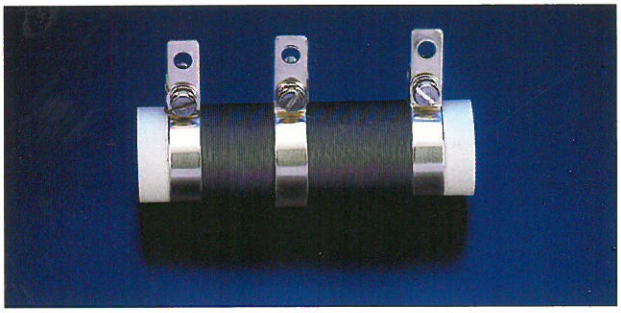
Mounting Styles
Pentagon Open wound resistors are available un-mounted or in a variety of mounting styles similar to those available for vitreous resistors.

Dimensions
Dimensions of Pentagon open wire-resistors are similar to dimensions shown in vitreous enamelled section on page 4.

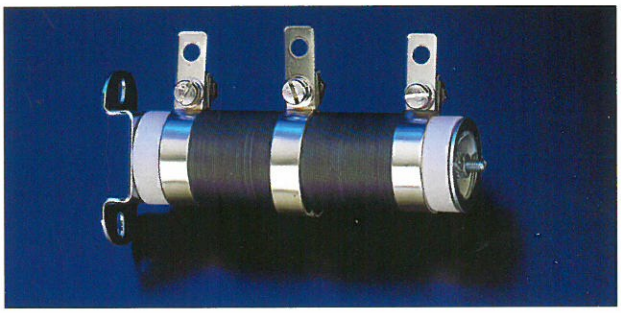
Power Ratings - Continuous Duty
Pentagon open wire wound resistors are designed to operate at a maximum temperature rise of 280°C. If a lower surface temperature is required, please refer to the graph on page 5.

Resistance Tolerance
The standard tolerance on resistance for open wound resistors is ± 10% when fitted with one tapping clip.

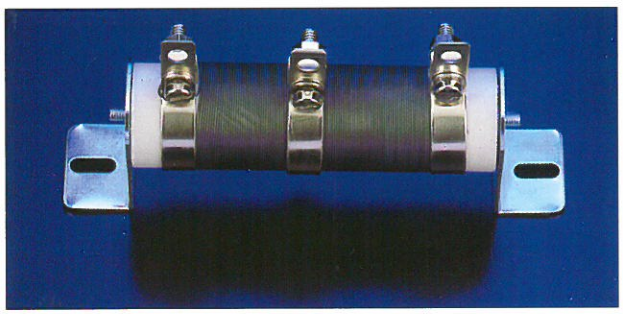
TYPE PB
Unmounted open-wound resistor



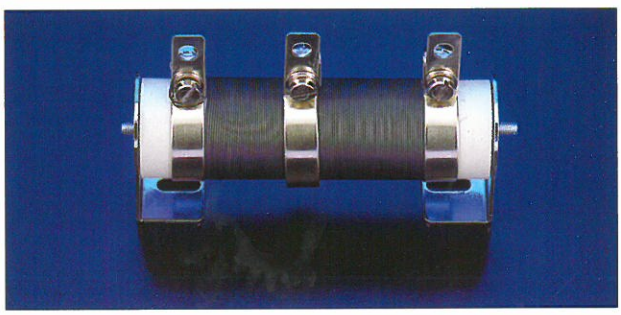
TYPE V
Vertically mounted on open-wound resistor



TYPE H
Horizontal mounting on open-wound resistor



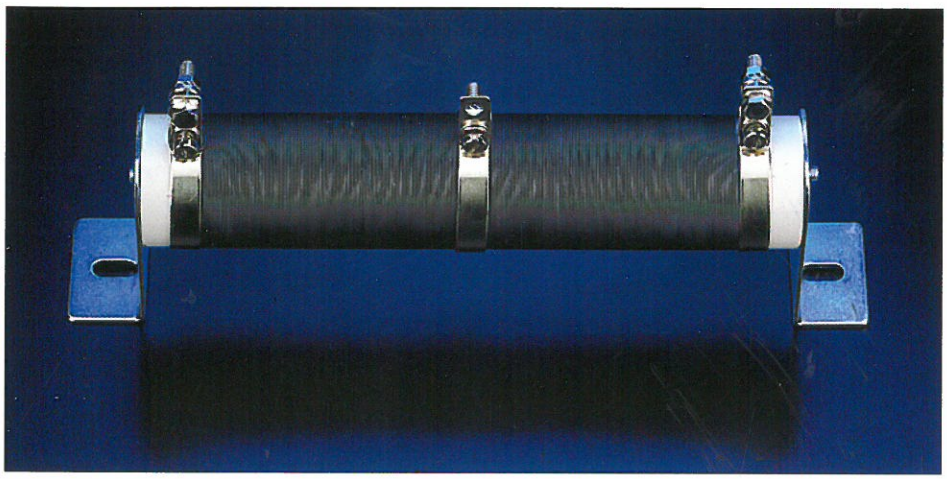
TYPE HR (REVERSE)
Horizontal mounting on open-wound resistor



Power Ratings & Ohmic Values

	PB30	PB40	PB45	PB60L	PB60S	PB90L	PB90S	PB130	PB150	PB180	PB220	PB320	PB380
RATING WATTS	30	40	45	60	60	90	90	130	150	180	220	320	380
OHMIC VALUES MIN	0R2	0R5	0R3	0R5	0R4	0R5	0R4	0R4	0R5	0R7	0R7	1R0	1R2
WITH ONE TAPPING MAX	510R	1KR	720R	1K3	1K3	2K1	2K1	3K2	4K0	5K2	6K8	9K8	11K5

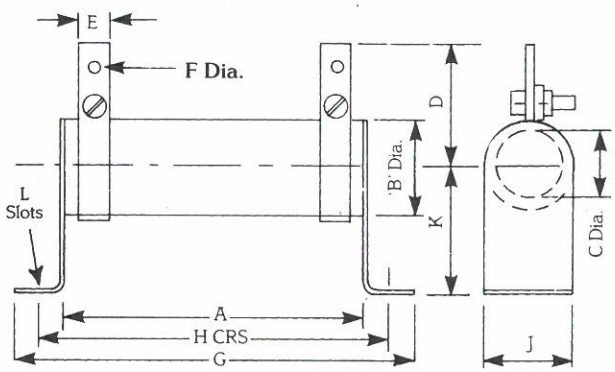
Heavy duty power resistors



Dimensions (mm) - PHD heavy duty resistors

TYPE	WATTS	A	B	C	D	E	F	G	H	J	K	L
PHD200	200	152	44	29	43	9.5	5	190	173	44	51	7 X 14
PHD300	300	203	44	29	43	9.5	5	241	223	44	51	7 X 14
PHD400	400	254	44	29	43	9.5	5	292	274	44	51	7 X 14
PHD450	450	305	44	29	43	9.5	5	343	325	44	51	7 X 14
PHD600	600	305	54	38	50	9.5	5	356	333	54	76	7 X 17
PHD750	750	356	54	38	50	9.5	5	406	384	54	76	7 X 17

Dimensions



Ohmic Values & Ratings - continuous, short time & intermittent

TYPE	CONT	SHORT TIME (SECONDS) 5	10	20	INTERMITTENT (MINUTES) 1/2	1	2	3	4	5	OHMIC VALUES MIN	MAX
	WATTS	WATTS	WATTS	WATTS	WATTS	WATTS	WATTS	WATTS	WATTS	WATTS	OHMS	OHMS
PHD200	200	4000	3000	1800	1100	660	500	400	300	250	0.45	872
PHD300	300	6000	4500	2700	1650	990	750	600	450	375	0.67	1294
PHD400	400	8000	6000	3600	2200	1320	1000	800	600	500	0.90	1700
PHD450	450	9000	6700	4000	2500	1500	1130	900	690	570	1.06	2100
PHD600	600	12300	9200	5500	3200	1930	1460	1170	880	740	1.35	2600
PHD750	750	14700	11000	6600	4000	2420	1830	1460	1100	920	1.60	3100
		OPERATION ONCE PER HOUR			OPERATING TIME IN ANY 15 MINUTE PERIOD						WITH TAPPING BAND	

THE POWER IN WATTS TO GIVE A TEMPERATURE RISE OF 300° C IN TIME STATED

PHD heavy duty resistors
Mainly used for dynamic braking or where a pulse-rated resistor is required.

Power ratings
Standard continuous ratings are from 200 watts to 750 watts.

For pulse ratings refer to the table below.

Thermal cut-outs
Cut-outs can be fitted to certain resistors which will operate a contact to disconnect the resistor to prevent overload damage.

Resistance
The minimum and maximum values shown below are those available within a range of standard resistance alloys.

You may select any ohmic value between Min and Max values.

Enclosed resistors
See page 8.

HVR PENTAGON

Heavy duty power resistor enclosures

Pentagon high quality heavy duty power resistor enclosures (IP20) are manufactured from zinc plated steel and have a powder coated finish.

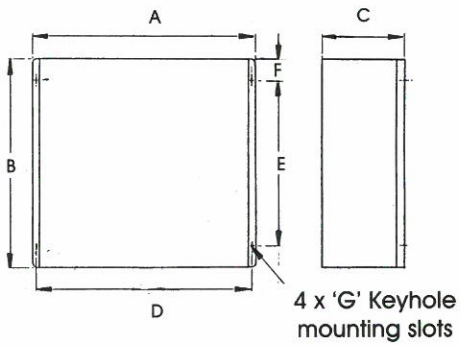
Dimensions and power ratings for assembled resistors are shown below.

Typical uses include dynamic braking, motor starting and load banks.

TYPE	A	B	C	D	E	F	G
BX40	182	300	133	168	208	38	4
BX75	182	430	153	168	335	38	4
BX275	510	315	187	495	225	40	5
BX375	510	500	187	495	410	40	5

Dimensions

Enclosures Type BX40, BX75, BX275 & BX375



Ohmic Values & Ratings - continuous, short time & intermittent

TYPE	CONT	SHORT TIME (SECONDS) 5	10	20	INTERMITTENT (MINUTES) 1/2	1	2	3	4	5
	WATTS	WATTS	WATTS	WATTS	WATTS	WATTS	WATTS	WATTS	WATTS	WATTS
BX40/200	200	4000	3000	1800	1100	660	500	400	300	250
BX40/300	300	6000	4500	2700	1650	990	750	600	450	375
BX40/400	400	8000	6000	3600	2200	1320	1000	800	600	500
BX75/450	450	9000	6700	4000	2500	1500	1130	900	690	570
BX75/600	600	12300	9200	5500	3200	1930	1460	1170	880	740
BX75/750	750	14700	11000	6600	4000	2420	1830	1460	1100	920
BX275/1500	1500	29400	22000	13200	8000	4840	3660	2920	2200	1840
BX375/3000	3000	58800	44000	26400	16000	9680	7320	5840	4400	3680
		OPERATION ONCE PER HOUR			OPERATING TIME IN ANY 15 MINUTE PERIOD					

THE POWER IN WATTS TO GIVE A TEMPERATURE RISE OF 300°C IN TIME STATED

HVR PENTAGON

UNIT 2,
KINGS ROAD INDUSTRIAL ESTATE,
TYSLEY,
BIRMINGHAM.
B11 2AX

Tel. +44 (0) 121 773 2413
http://www.hvrpentagon.com