

# WFH Series

## Aluminum Housed Wirewound Power



Ohmite's new flat core winding technology allows for wirewound heatsinkable resistors affording a very low profile, and superior thermal transfer characteristics when compared to conventional aluminum housed wirewound resistors.

Close mounting of heat sensitive components is possible due to only a slight rise of the temperature on the aluminum profile.

No heat sink compound is required because of large mounting surface.

### FEATURES

- Solder lug, wire, and "Fast-on" amp terminations
- Multiple resistors in one profile possible
- Custom wire lengths available

### SERIES SPECIFICATIONS

| Type   | Power Rating*<br>(watts) | Resistance Range<br>( $\Omega$ ) |
|--------|--------------------------|----------------------------------|
| WFH90  | 90                       | 0.22 $\Omega$ – 6.8K             |
| WFH160 | 160                      | 0.47 $\Omega$ -18K               |
| WFH230 | 230                      | 0.82 $\Omega$ -27K               |
| WFH330 | 330                      | 1 $\Omega$ - 39K                 |

\*at 40°C base plate temperature

### CHARACTERISTICS

|                                           |                                                                                                                                                                                                                                                                                        |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Power rating</b>                       | 90W-330W                                                                                                                                                                                                                                                                               |
| <b>Resistance tolerance</b>               | $\pm 5\%$ , $\pm 10\%$                                                                                                                                                                                                                                                                 |
| <b>Temperature Coefficients</b>           | Normal: 50ppm - 150ppm<br>Low ohmic values: 400ppm                                                                                                                                                                                                                                     |
| <b>Dielectric strength</b>                | 2500 VAC peak                                                                                                                                                                                                                                                                          |
| <b>Working voltage</b>                    | 1200 VAC                                                                                                                                                                                                                                                                               |
| <b>Test voltage</b>                       | 6000 VAC                                                                                                                                                                                                                                                                               |
| <b>Lead wire</b>                          | (wire terminal version only): XLPE, 600V, 125C, 18 AWG stranded                                                                                                                                                                                                                        |
| <b>Insulation</b>                         | Silicone Rubber & Mica. The Silicone is UL-recognised (UL 94 HB) to a working temperature of 220°C. Temperatures of up to 300°C can be endured for shorter periods. This may however cause an expansion of the silicone rubber with a possibility of reducing the dielectric strength. |
| <b>Min. Storage &amp; Operating Temp.</b> | -40°C                                                                                                                                                                                                                                                                                  |

### Power Dissipation



This graph shows the maximum wattage rating for each possible resistor of standard size corresponding to the heat sink temperature. It is assumed that all resistors are equally loaded.

### Thermal Resistances

Thermal Resistance ( $^{\circ}\text{C}/\text{W}$ ) between different measuring points

|                  | WFH90 | WFH160 | WFH230 | WFH330 |
|------------------|-------|--------|--------|--------|
| $R_{\text{TH1}}$ | 2     | 1      | 0.75   | 0.5    |
| $R_{\text{TH2}}$ | 6.8   | 3.9    | 2.75   | 2      |
| $R_{\text{TH3}}$ | 0.1   | 0.05   | 0.03   | 0.02   |
| $R_{\text{TH4}}$ | 0.3   | 0.17   | 0.1    | 0.085  |



### THIS PRODUCT IS DESIGNED FOR USE WITH PROPER HEATSINKING.

Maximum base plate temperature of the resistor must be monitored and kept within specified limits to establish the power rating. Best technique is to attach a thermocouple to the side of the base plate of the resistor. Temperature of plastic housing or heat sink cannot be used to establish rating of the resistor.

(continued)

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### DESIGN INFORMATION

The following equations are applied in the dimensioning of the resistors at stationary load. If more information is required please consult Ohmite. It is assumed that the air around the resistors is stationary (worst case). See [ohmite.com](http://ohmite.com) for more examples.

#### 1. WFH is mounted on a heat sink:

A. The thermal resistance  $R_{TH}$  of the heat sink is known,

$$T = W_{MAX} \times (R_{TH4} + R_{TH})$$

Check that:

$$T_{MAX} = W_{MAX} \times (R_{TH} + R_{TH3} + R_{TH1}) + T_{AMB} < 220^{\circ}C$$

B. The Temperature of the Heat Sink is known,

$$T = W_{MAX} \times R_{TH4} + T_H$$

Check that:

$$T_{MAX} = W_{MAX} \times (R_{TH1} + R_{TH3}) + T_H < 220^{\circ}C$$

#### 2. WFH is mounted without a heat sink:

Check that:

$$T_{MAX} = W_{MAX} \times (R_{TH1} + R_{TH2}) + T_{AMB} < 220^{\circ}C$$

#### Where:

$W_{MAX}$  = Maximum required load in resistor

$T_{MAX}$  = Maximum hot spot temperature requested in resistor ( $T_{MAX} < 220^{\circ}C$ )

The lower  $T_{MAX}$  the higher reliability and lifetime.

$T_{AMB}$  = Ambient temperature

$R_{TH}$  = Thermal resistance. Refer to table Thermal resistances

$T_H$  = Heat sink temperature (chassis).

$T$  = Temperature on top of the Aluminum profile.

### DIMENSIONS

| (mm) | Type   | Watts | A   | B      | L ±2 |
|------|--------|-------|-----|--------|------|
|      | WFH90  | 90    | 70  | 39.7   | 53   |
|      | WFH160 | 160   | 140 | 80     | 123  |
|      | WFH230 | 230   | 210 | 2x 80  | 193  |
|      | WFH330 | 330   | 280 | 2x 100 | 263  |



### ORDERING INFORMATION

**WFH160LR47KE** - RoHS Compliant

|        |                                  |                                                                                                |                     |                                |
|--------|----------------------------------|------------------------------------------------------------------------------------------------|---------------------|--------------------------------|
| Series | Wattage at 40°C base plate temp. | Terminal Type<br>L = lug terminals<br>A = amp terminals<br>W = 30cm insulated wire cable 18AWG | Ohms<br>R47 = 0.47Ω | Tolerance<br>J = 5%<br>K = 10% |
|--------|----------------------------------|------------------------------------------------------------------------------------------------|---------------------|--------------------------------|

#### Standard part numbers

|             |              |              |              |              |
|-------------|--------------|--------------|--------------|--------------|
| WFH90L4R7KE | WFH160LR47KE | WFH160L1K0JE | WFH230L100JE | WFH330L50RJE |
| WFH90L10RKE | WFH160L1R0KE | WFH160L5K0JE | WFH230L150JE | WFH330L75RJE |
| WFH90L25RJE | WFH160L2R0KE | WFH160L10KJE | WFH230L250JE | WFH330L100JE |
| WFH90L50RJE | WFH160L10RKE | WFH230L1R0KE | WFH230L1K0JE | WFH330L150JE |
| WFH90L100JE | WFH160L27RJE | WFH230L2R0KE | WFH230L1K5JE | WFH330L250JE |
| WFH90L470JE | WFH160L50RJE | WFH230L5R0KE | WFH230L2K5JE | WFH330L1K0JE |
| WFH90L750JE | WFH160L75RJE | WFH230L10RKE | WFH330L1R0KE | WFH330L5K0JE |
| WFH90L1K0JE | WFH160L100JE | WFH230L27RJE | WFH330L2R0KE | WFH330L10KJE |
| WFH90L2K7JE | WFH160L150JE | WFH230L50RJE | WFH330L10RKE |              |
| WFH90L5K0JE | WFH160L250JE | WFH230L75RJE | WFH330L27RJE |              |

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