

Direct Water Cooled Wirewound Resistor


DESIGN SUPPORT TOOLS
[click logo to get started](#)
3D
Models
Available

FEATURES

- Direct cooling without heatsink
- Excellent power / volume ratio
- Multi resistive element option
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

APPLICATIONS

- Filter resistor
- Snubber resistor
- Discharge resistor

STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | POWER RATING P_n ⁽¹⁾ W | RESISTANCE RANGE Ω | TOLERANCE \pm % |
|---------------|--|------------------------------|----------------------|
| DCRF 38 x 178 | 1500 | 0.56 to 4.7 | 5, 10 ⁽²⁾ |
| DCRF 38 x 224 | 3000 | 1 to 9.1 | 5 |
| DCRF 38 x 270 | 4500 | 1.5 to 15 | 5 |
| DCRF 38 x 316 | 6000 | 2 to 20 | 5 |
| DCRF 38 x 362 | 7500 | 2.4 to 24 | 5 |
| DCRF 38 x 410 | 9000 | 3 to 27 | 5 |

Notes

- ⁽¹⁾ Water inlet temperature 65 °C with 40 % mono ethylene glycol, flow rate 8.33 l/min
⁽²⁾ 5 for value $\geq 1 \Omega$, 10 for value $< 1 \Omega$

TECHNICAL SPECIFICATIONS

| PARAMETER | UNIT | RESISTOR CHARACTERISTICS |
|-----------------------------|------------------|--------------------------|
| Temperature coefficient | ppm/°C | 100 ppm/°C (typical) |
| Maximum working voltage | V | Up to 3600 V |
| Operating temperature range | °C | -55 to +120 |
| Water conductivity | $\mu\text{s/cm}$ | < 2 |

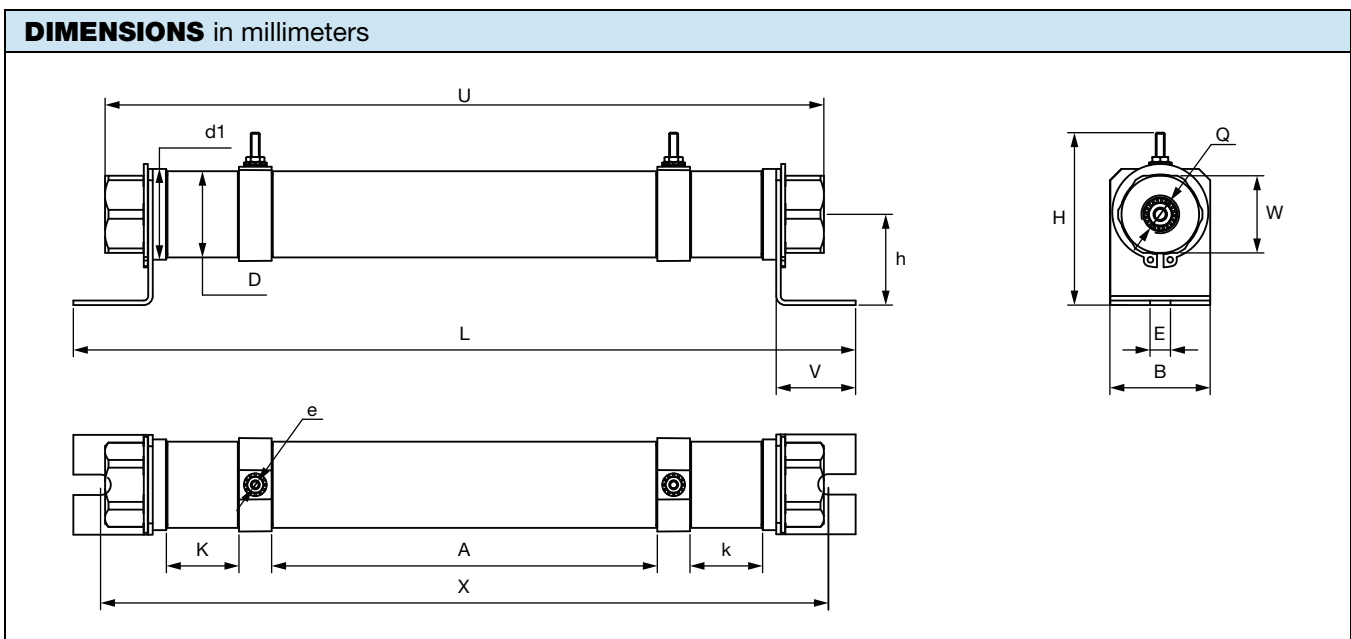
GENERAL CHARACTERISTICS

| | |
|--------------------|---|
| Core | Ceramic, stainless steel |
| Winding | NiCr alloy (direct in water) |
| Hydraulic plugs | Stainless steel |
| Coating | None: ceramic nude |
| Ohmic values | E24 (for other values consult us) |
| Inductance | Refer to Inductance curves (see Fig. 3) |
| Cooling | Deionized water ⁽¹⁾ ; coolant mixtures up to 60 % mono ethylene glycol |
| Operating pressure | 1 bar to 6 bars |
| Test pressure | 15 bars |
| Flow | 8.33 l/min to 16 l/min (see Fig. 2) |
| CTI index | > 600 |
| Creeping distance | On request |

| GENERAL CHARACTERISTICS | |
|--|--|
| Clearance distance | On request |
| Dielectric strength V_{RMS} (50 Hz / 1 min) | 8000 V ⁽²⁾ |
| Partial discharge | For free partial discharge version please consult us |
| Electrical connections | M4 rod (tightening 2 Nm max.) |
| Mounting | Minimum 5° angle from horizontal (see "Mounting Recommendation") |
| Overload | $2 \times P_n$ 60 s ($\theta_{65} \text{ } ^\circ\text{C}$ at 8.33 l/min) |
| Endurance | 1200 h; P_n 30 s / 30 s; variation < 5 % (MCB laboratory condition) |
| Pressure drop | Refer to "Pressure Drop" curves (see Fig. 4) |

Notes

- (1) Water conductivity must be permanently controlled to remain under 2 $\mu\text{S/cm}$.
 The cooling mixture must remain homogeneous without any liquid or solid foreign element.
 Use appropriate filter with regenerating mixed bed resin device
- (2) Resistor filled with deionized water (conductivity < 2 $\mu\text{S/cm}$)



| TYPE | 38 x 178 | 38 x 224 | 38 x 270 | 38 x 316 | 38 x 362 | 38 x 410 |
|--------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Water pipe fitting internal diameter | \varnothing 6.6 mini | \varnothing 6.6 mini | \varnothing 6.6 mini | \varnothing 6.6 mini | \varnothing 6.6 mini | \varnothing 6.6 mini |
| A | 32 | 78 | 124 | 170 | 216 | 264 |
| B +0.5 / -0 | 44 | 44 | 44 | 44 | 44 | 44 |
| D max. | 43 | 43 | 43 | 43 | 43 | 43 |
| e | \varnothing M4 | \varnothing M4 | \varnothing M4 | \varnothing M4 | \varnothing M4 | \varnothing M4 |
| E | 9 | 9 | 9 | 9 | 9 | 9 |
| H max. | 80 | 80 | 80 | 80 | 80 | 80 |
| k | 32 | 32 | 32 | 32 | 32 | 32 |
| K | 32 | 32 | 32 | 32 | 32 | 32 |
| L max. | 213 | 259 | 305 | 351 | 397 | 445 |
| \varnothing | 38 | 38 | 38 | 38 | 38 | 38 |
| Q | G 3/8" | G 3/8" | G 3/8" | G 3/8" | G 3/8" | G 3/8" |
| $U \pm 6$ | 178.8 | 224.8 | 270.8 | 316.8 | 362.8 | 410.8 |
| V | 35 | 35 | 35 | 35 | 35 | 35 |
| W | 34 | 34 | 34 | 34 | 34 | 34 |
| $X \pm 6$ | 182.8 | 228.8 | 274.8 | 320.8 | 366.8 | 414.8 |
| Weight kg | 0.77 | 0.89 | 1.01 | 1.13 | 1.26 | 1.38 |

POWER DISSIPATION

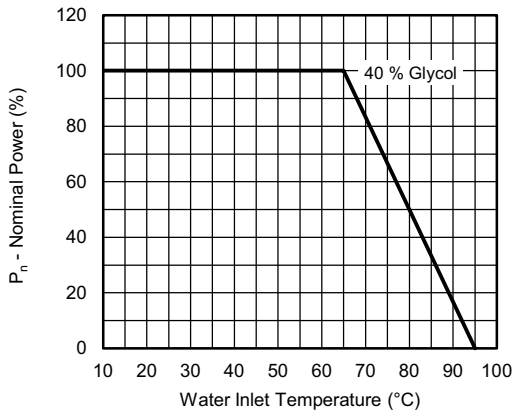


Fig. 1 - Power vs. Water Inlet Temperature
 $P_n = f(\text{Water Inlet Temperature})$, Flow Rate = 8.33 l/min

FLOW RATE

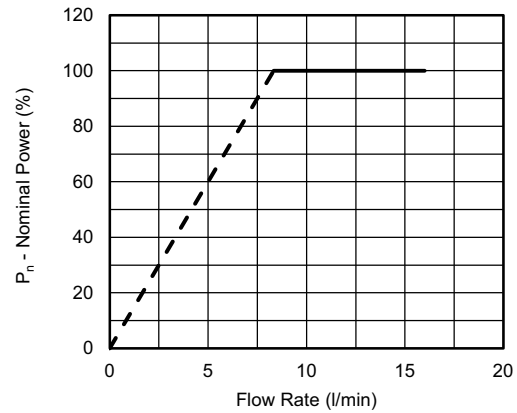


Fig. 2 - Power vs. Flow Rate
 $P_n = f(\text{Flow Rate})$, Water Inlet Temperature = 65 °C

INDUCTANCE

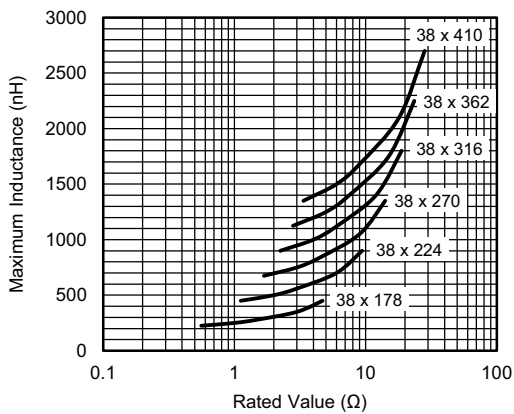


Fig. 3 - Inductance vs. Ohmic Value
 Maximum Inductance (may Vary for Particular Rated Values)

PRESSURE DROP

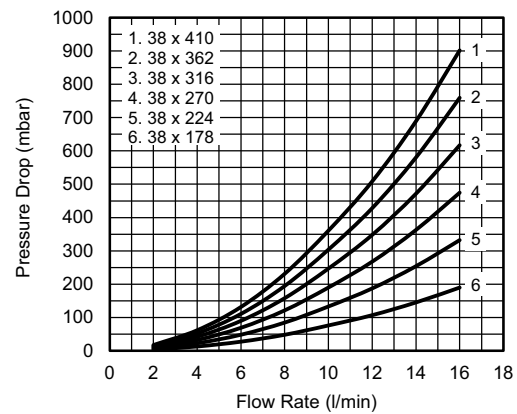
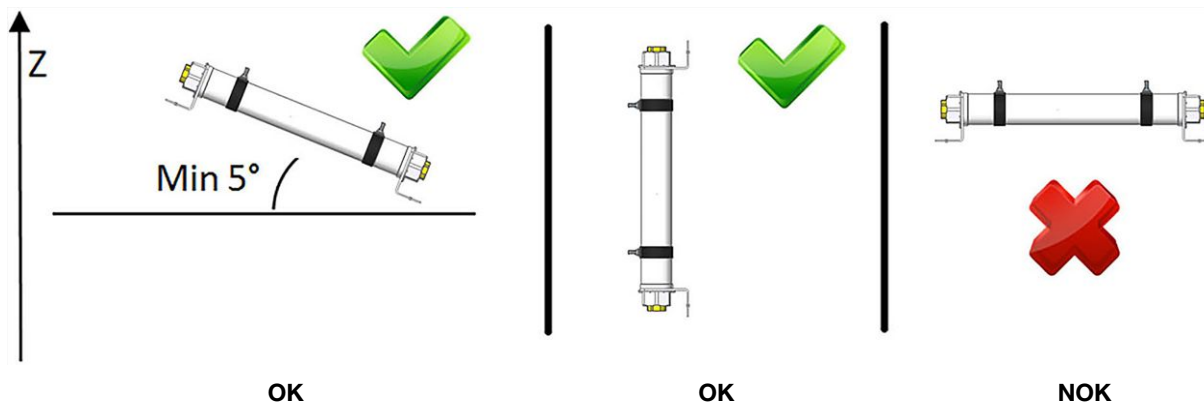


Fig. 4 - Pressure Drop vs. Flow Rate
 40 % of Mono Ethylene Glycol at 20 °C

MOUNTING RECOMMENDATION





| ORDERING INFORMATION | | | | | |
|----------------------|-----------------|------------------|-----------------|--|-------------|
| DCRF | 38 x 178 | U56 | ± 10 % | XXX | BO12 |
| MODEL | STYLE | RESISTANCE VALUE | TOLERANCE | CUSTOM DESIGN | PACKAGING |
| | | | ± 5 % ± 10 % | Optional On request: special value, multiple resistor, etc. | |

| GLOBAL PART NUMBER INFORMATION | | | | | | | | | | | | | | | | | |
|--------------------------------|--|---|---|---|-----------------------------------|---|---|---|--|---|---|---|---|---|---|---|---|
| D | C | R | F | 3 | 8 | 1 | 7 | 8 | 0 | R | 5 | 6 | K | B | 8 | 7 | 9 |
| 1 | | | | 2 | | | | | 3 | | | | 4 | 5 | 6 | | |
| 1 | 2 | 3 | | | 4 | 5 | | 6 | | | | | | | | | |
| PRODUCT TYPE | TYPE | RESISTANCE VALUE | | | TOLERANCE | | PACKAGING | | INDUSTRIALIZATION NUMBER | | | | | | | | |
| DCRF | 38178 38224 38270 38316 38362 38410 | The first three digits are significant figures and the last specifies the number of zeros to follow, R designates decimal point. 4R7 = 4.7 Ω 0R56 = 0.56 Ω | | | J = 5 % K = 10 % | | B = box Box quantity depends of model and size | | 3 specific digits (if applicable) | | | | | | | | |



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