

## 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](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

**APPLICATIONS**

- Filter resistor
- Snubber resistor
- Discharge resistor

**STANDARD ELECTRICAL SPECIFICATIONS**

GLOBAL MODEL	POWER RATING P <sub>n</sub> <sup>(1)</sup> W	RESISTANCE RANGE Ω	TOLERANCE ± %
DCRF 38 x 178	1500	0.56 to 4.7	5, 10 <sup>(2)</sup>
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 ≥ 1 Ω, 10 for value < 1 Ω

**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	μs/cm	< 2

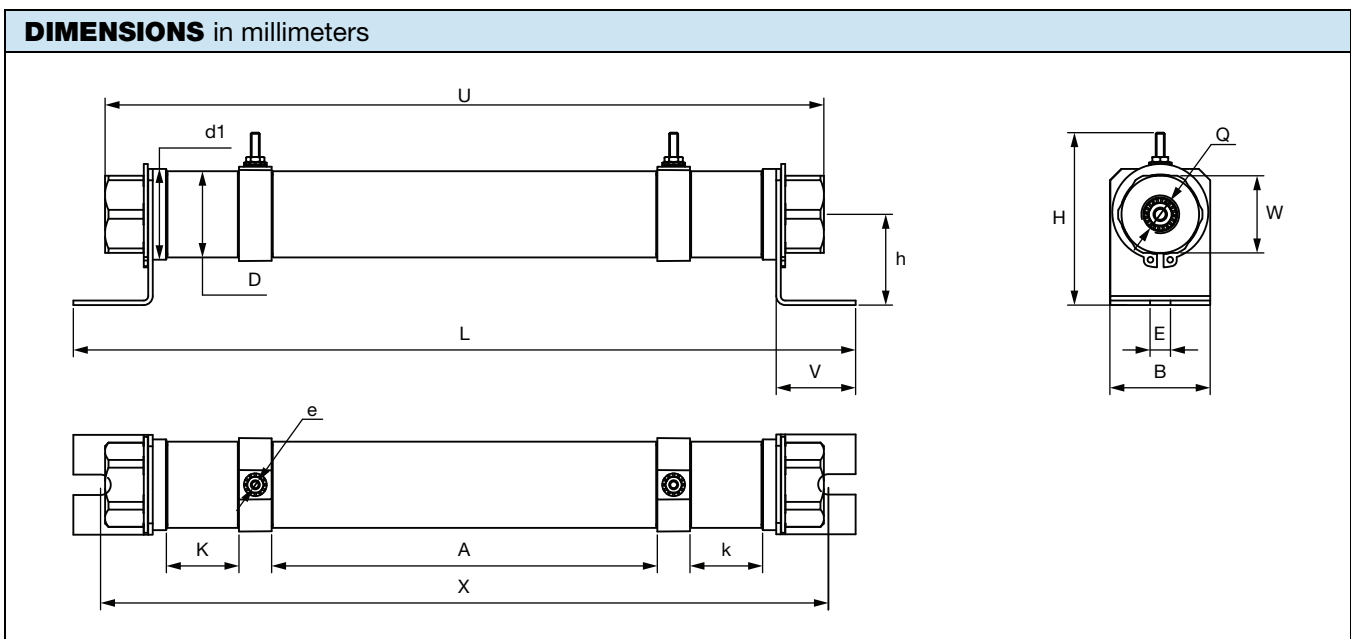
**GENERAL CHARACTERISTICS**

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 <sup>(1)</sup> ; 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

<b>GENERAL CHARACTERISTICS</b>	
Clearance distance	On request
Dielectric strength $V_{RMS}$ (50 Hz / 1 min)	8000 V <sup>(2)</sup>
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 ( $\theta_{65} \text{ °C}$ 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	Ø 6.6 mini	Ø 6.6 mini	Ø 6.6 mini	Ø 6.6 mini	Ø 6.6 mini	Ø 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	Ø M4	Ø M4	Ø M4	Ø M4	Ø M4	Ø 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
Ø	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 ± 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 ± 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**

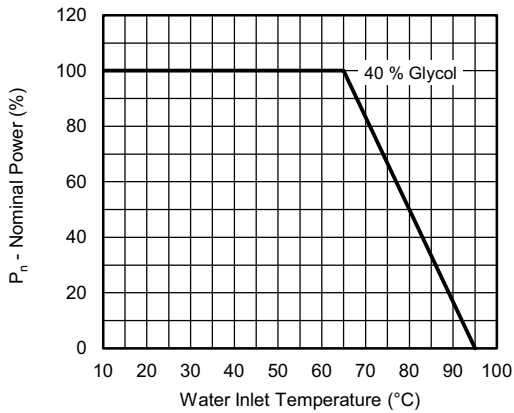


Fig. 1 - Power vs. Water Inlet Temperature  
 $P_n = f(\text{Water Inlet Temperature})$ , Flow Rate = 8.33 l/min

**FLOW RATE**

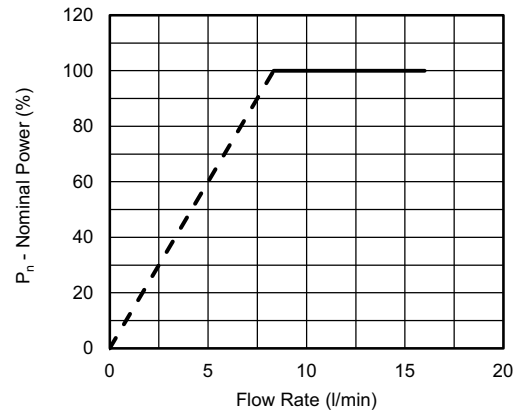


Fig. 2 - Power vs. Flow Rate  
 $P_n = f(\text{Flow Rate})$ , Water Inlet Temperature = 65 °C

**INDUCTANCE**

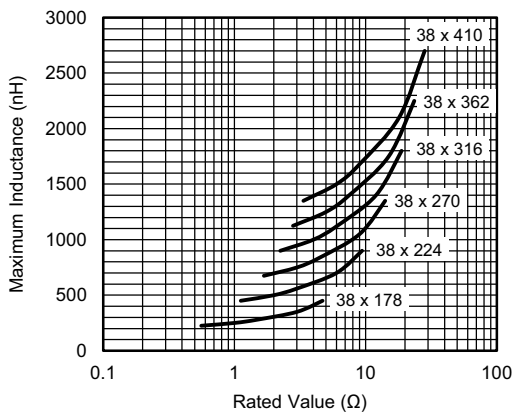


Fig. 3 - Inductance vs. Ohmic Value  
 Maximum Inductance (may Vary for Particular Rated Values)

**PRESSURE DROP**

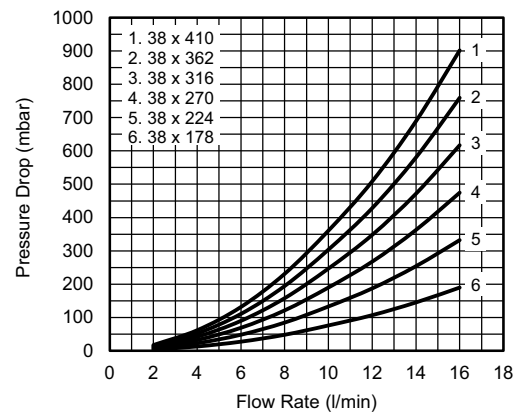
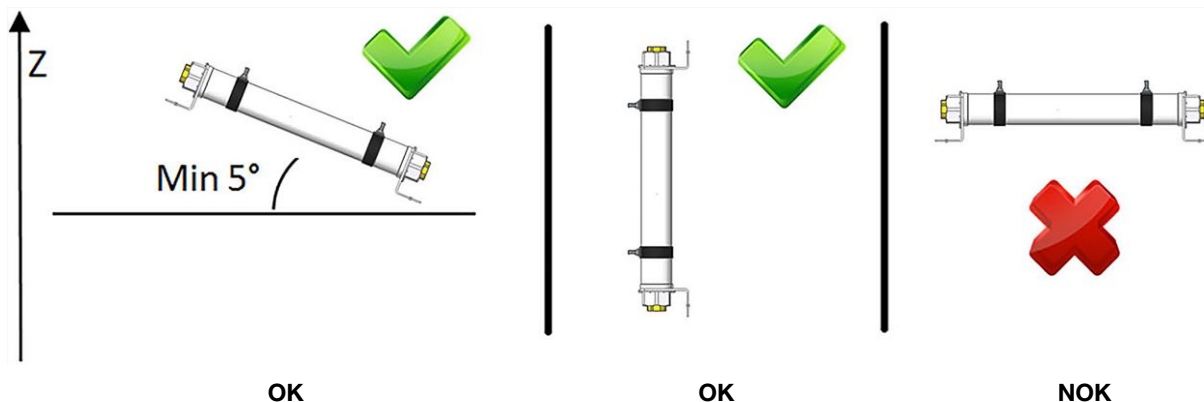


Fig. 4 - Pressure Drop vs. Flow Rate  
 40 % of Mono Ethylene Glycol at 20 °C

**MOUNTING RECOMMENDATION**





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

<b>GLOBAL PART NUMBER INFORMATION</b>																	
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									
<b>DCRF</b>	<b>38178</b> <b>38224</b> <b>38270</b> <b>38316</b> <b>38362</b> <b>38410</b>	The first three digits are significant figures and the last specifies the number of zeros to follow, R designates decimal point. <b>4R7 = 4.7 Ω</b> <b>0R56 = 0.56 Ω</b>		<b>J = 5 %</b> <b>K = 10 %</b>		<b>B = box</b> <b>Box quantity depends of model and size</b>		<b>3 specific digits (if applicable)</b>									



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.