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## Direct Water Cooled Wirewound Resistor



### 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

### DESIGN SUPPORT TOOLS

[click logo to get started](#)
**3D**  
Models  
Available

### STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	POWER RATING $P_n$ <sup>(1)</sup> W	RESISTANCE RANGE $\Omega$	TOLERANCE $\pm$ %
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

- <sup>(1)</sup> Water inlet temperature 65 °C with 40 % mono ethylene glycol, flow rate 8.33 l/min  
<sup>(2)</sup> 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	$\mu\text{s/cm}$	$< 2$

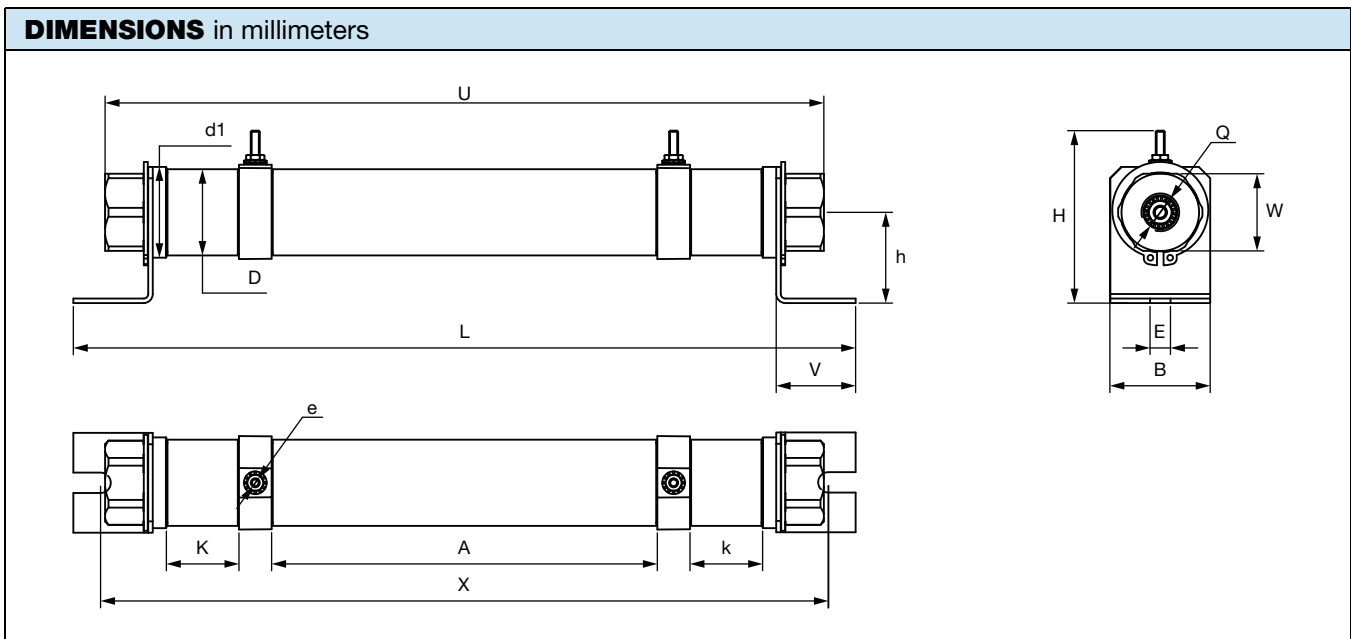
### GENERAL CHARACTERISTICS

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 <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 ( $\theta_{65} \text{ } ^\circ\text{C}$ 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**

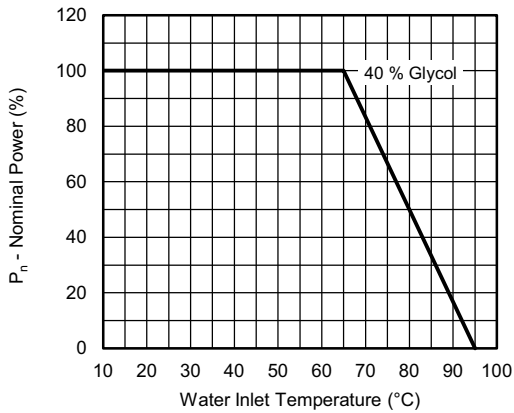


Fig. 1 - Power vs. Water Inlet Temperature  
 $P_n = f(\text{Water Inlet Temperature})$ , Flow Rate = 8.33 l/min

**FLOW RATE**

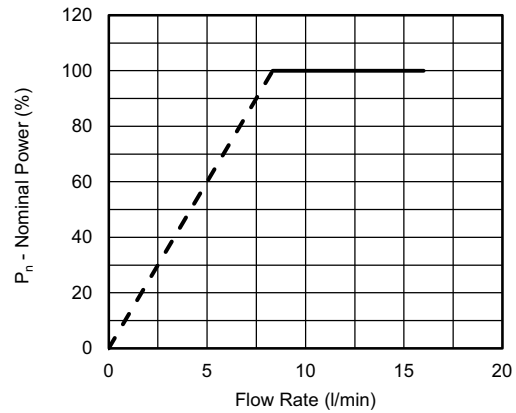


Fig. 2 - Power vs. Flow Rate  
 $P_n = f(\text{Flow Rate})$ , Water Inlet Temperature = 65 °C

**INDUCTANCE**

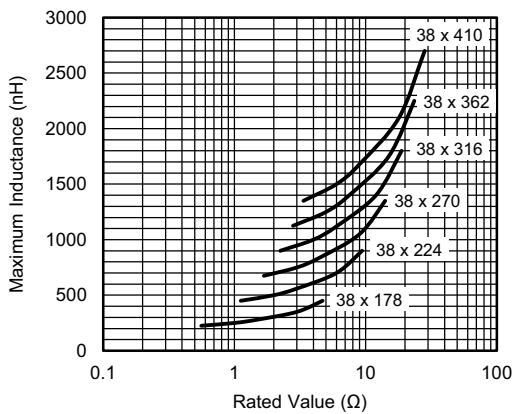


Fig. 3 - Inductance vs. Ohmic Value  
 Maximum Inductance (may Vary for Particular Rated Values)

**PRESSURE DROP**

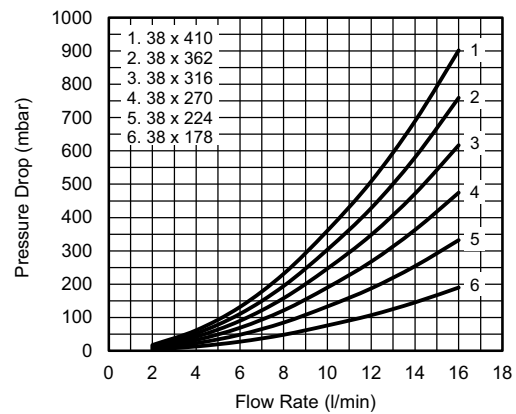
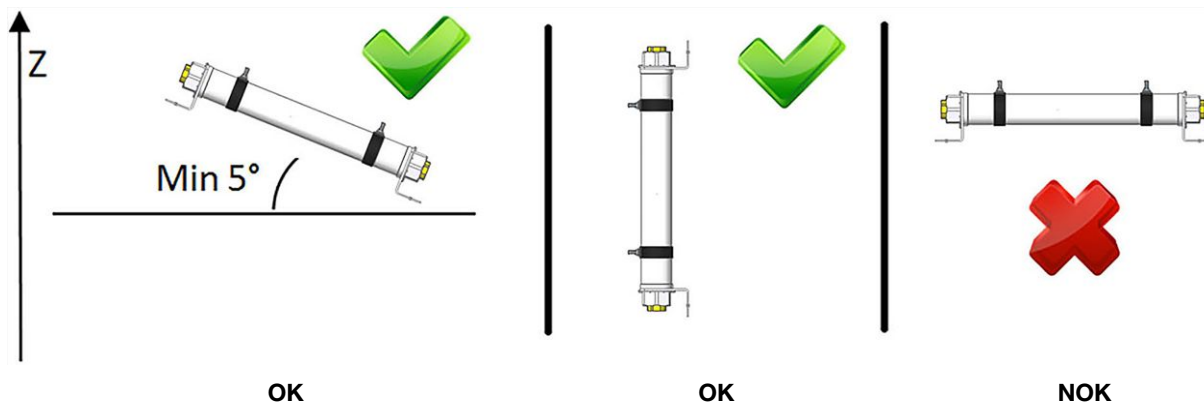


Fig. 4 - Pressure Drop vs. Flow Rate  
 40 % of Mono Ethylene Glycol at 20 °C

**MOUNTING RECOMMENDATION**





<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>									



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