

Direct Water Cooled Wirewound Resistor


DESIGN SUPPORT TOOLS
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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

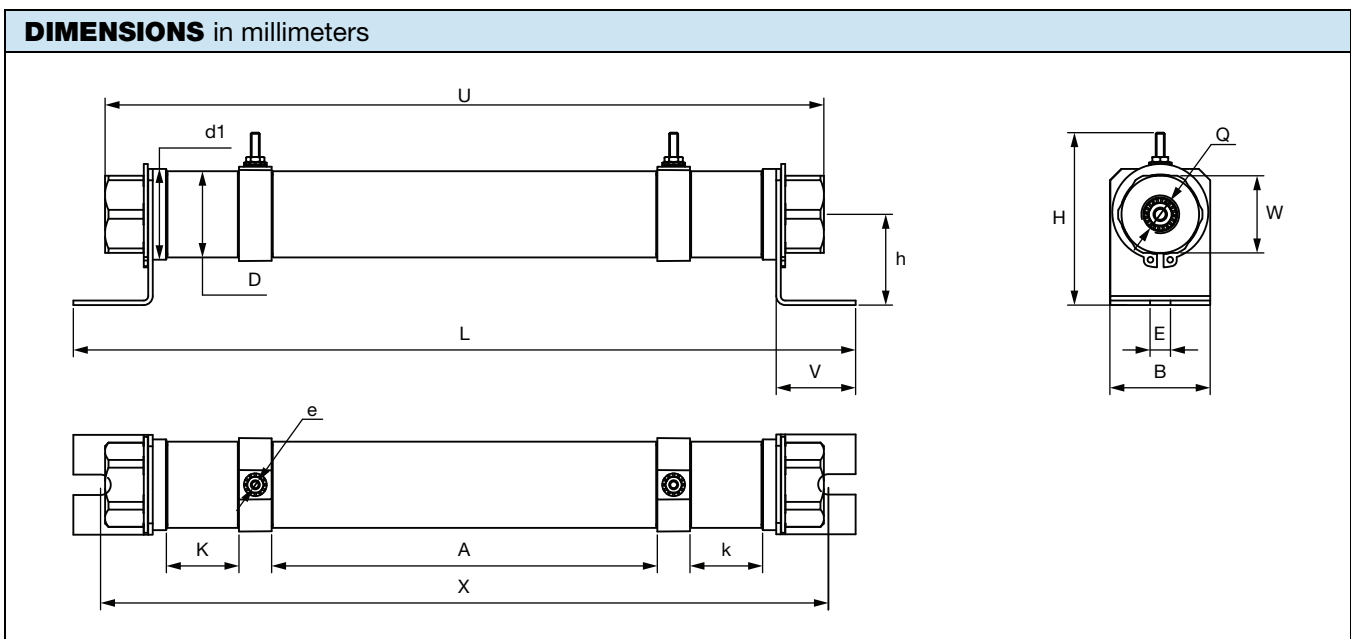
GENERAL CHARACTERISTICS

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	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

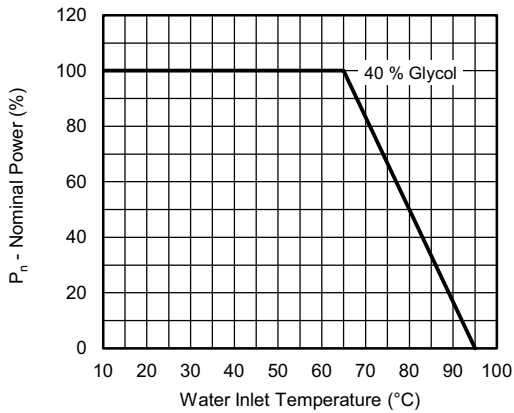


Fig. 1 - Power vs. Water Inlet Temperature
 $P_n = f(\text{Water Inlet Temperature})$, Flow Rate = 8.33 l/min

FLOW RATE

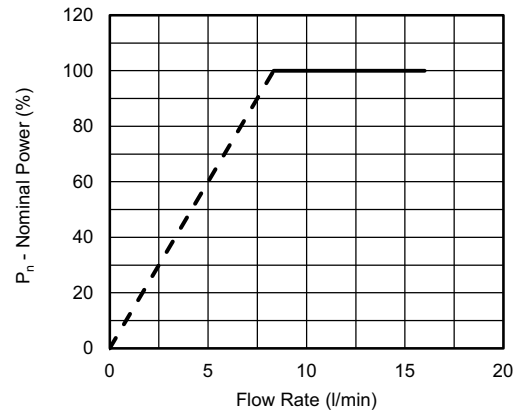


Fig. 2 - Power vs. Flow Rate
 $P_n = f(\text{Flow Rate})$, Water Inlet Temperature = 65 °C

INDUCTANCE

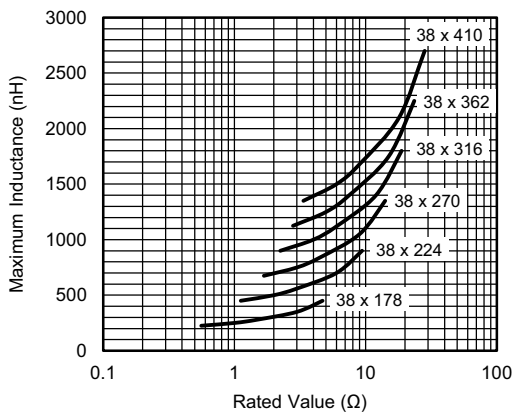


Fig. 3 - Inductance vs. Ohmic Value
 Maximum Inductance (may Vary for Particular Rated Values)

PRESSURE DROP

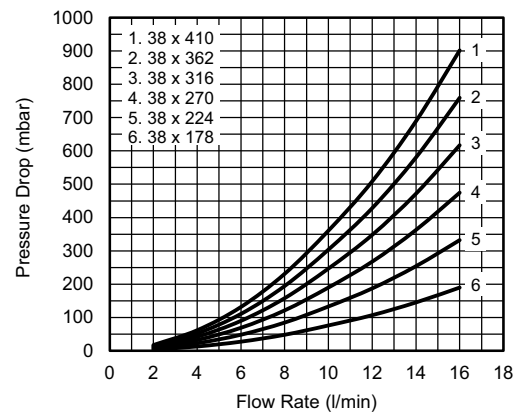
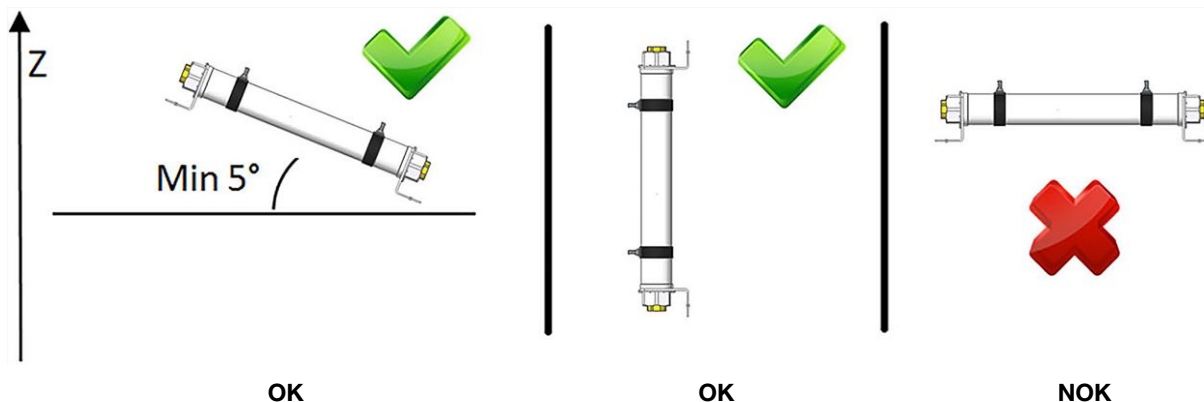


Fig. 4 - Pressure Drop vs. Flow Rate
 40 % of Mono Ethylene Glycol at 20 °C

MOUNTING RECOMMENDATION





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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