

ED Series

PREMIUM HV ENGINEERING



3RLab

resistors@3rlab.com www.3RLab.com
2008©3RLab,Inc.

Composite Disk, Washer for High Voltage Super Energy pure Non-Inductive

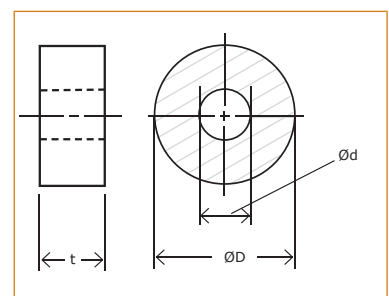
ED series ; Impulsings extreme energy injection ,high frequency, repetitive pulsings . EDAO ; Forced Air Coolant , as well as direct Oil coolant type . EDW; indirect water coolant type, and customize direct water coolant type available. The basic materials are carbon and metal balances and ceramics fired at high temperature in hydrogen environment Kiln for a long time, since those are in robust structure, as good as able to supply stable working condition in oil immersed , enforced air coolant ,harmonized with water coolant block. High Voltage Engineers can use ED series as high voltage, large current, high energy injection resistors bank , with ED resistors in serial and parallel connection in easy.



(Fig.1) DIMENSIONS [mm]

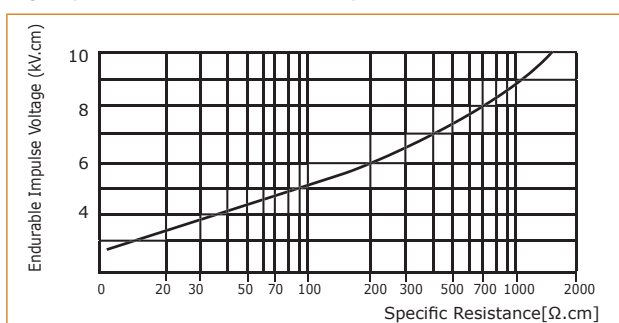
Item Nr.	ØD	Ød	T	Ohmic Value [Ω] per elements	Peak injection energy per elements
ED5312	53+/-1	15+/-0.7	12+/-0.5	0.2~50	6.93kJ
ED5325	53+/-1	15+/-0.7	25+/-0.5	0.2~75	14.2kJ
ED8017	80+/-1.5	21+/-1	17+/-1	0.2~50	25.07kJ
ED8025	80+/-1.5	21+/-1	25+/-0.5	0.2~70	33.1kJ
ED15025	150+/-2	30+/-2.0	25+/-1.5	0.2~20	120.0kJ

(Fig.2)

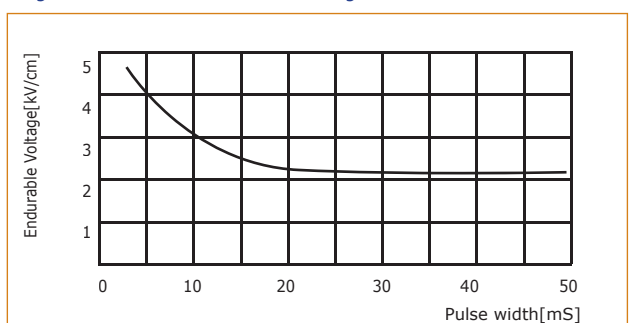


* Custom MegaJouls System: ED8017, ED15025 in Oil,Water block, Forced Air-Fins

(Fig.3) Specific R-Value vs. endurable Impulse



(Fig.4) Pulse Width vs. Endurable Voltage



EDAO, Forced-Air or direct Oil coolant

EDAO-series are Forced-Air Coolant , or Direct Oil Coolant types both available. The heat transferring through resistives to Aluminum Fins & Enforced Air or Oil . As well as on resistives surface there is heat exchange which rate 0.5Watt/1cm². Those types are one of very comfortable method for an environment without pure water , plumbing , supply. And outdoor conditions , EDAO will be good solutions for them .



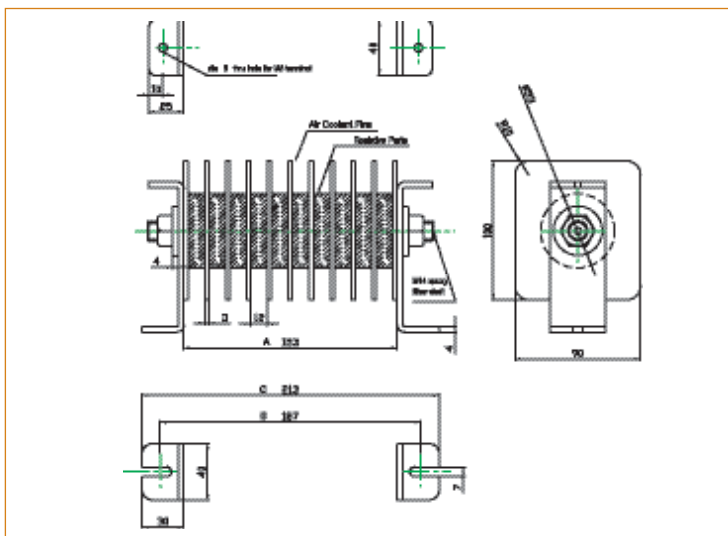
Applications

- MPC , MPS
- Large Energy ,heat exchange by enforced Air coolant or direct Oil coolant without pure waters
- Surge absorber of high frequency thyristors
- Big load resistors in high voltage systems
- Dumping / Damping resistors especially for Nuclear Fusion
- With Large Capacitors

Characteristics

- Individual Resistive Elements: ED5312 dimension in OD53 x ID15 x 12t [mm]
- Specific gravity of Bulk Resistive Elements : 2.0 ~ 2.8
- Specific Heat : 630~1,250J [kg-K]
- Thermal Conductivity : 1.2W / (m-K)
- Temperature Coefficient of Resistance : +/-0.1%/°C typ.
- Thermal Coefficient of expansion : 4~7 x 10⁻⁶
- Max. working temperature: 250°C in resistive elements (but epoxy fiber shaft max.150°C)
- Max. withstand voltage :7kV per element at 1.2/50[μS] (must be limited by Fig.3 of curve, in humidity ≤58%)
- Max. of allowable current : 350A , 900A

(Fig.11) DIMENSIONS & SPECIFICATION [mm]



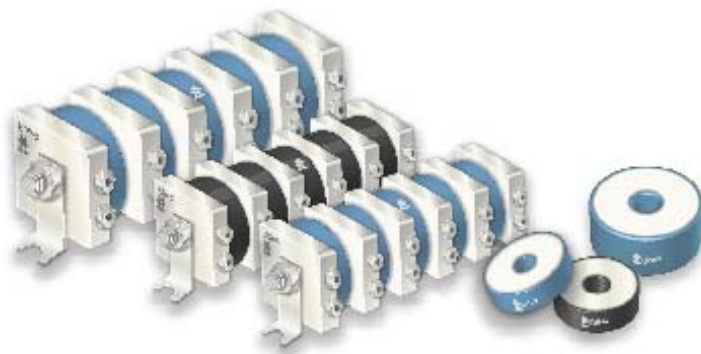
(Fig.10)

Item Nr.	Rated Power[W]	Resistives of elements q'ty	Std. R- Range[Ω]		Allowable Injection Energy[J]	Dimension [mm]		
			Min.	Max.		A	B	C
EDAO-5	175	ED5312; 5pcs	2.5	150	34.65k	78	112	138
EDAO-10	350	ED5312; 10pcs	5.0	300	69.30k	153	187	213
EDAO-10B	1,000	ED8017; 10pcs	5.0	300	250.7k	see Fig.12		
EDAO-20B	2,000	ED8017; 20pcs	2.5	150	501.4k	see Fig.13		

Notes: ** AL. Fins must be cooled less than 45°C
 *** Various type of large tank are ready made & Custom deisgn available,. please call factory

EDW, indirect Water Coolant type

EDW-series, indirect water-cooled high energy non-inductive resistors are capable of dissipating more power in a smaller package than previously system. Water coolant block made from aluminum in strong welding not allows water leakage. As well as ,tubular of direct coolant type available on request cusptom. EDW-series, available connected in series or parallel will comply with the requirements on the voltage, current loads, and various environments, harmonized with power semi-conductors.



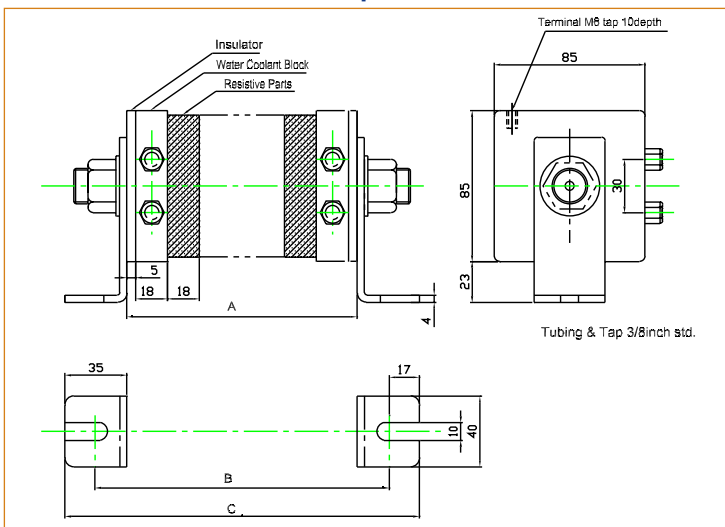
Applications

- MPC, MPS
- Surge absorber of high frequency thyristors
- Big load resistors in high voltage systems
- Dumping / Damping resistors especially for Nuclear Fusion
- Large capacitors

Characteristics

- Individual Resistive Elements: EDW8017 dimension in OD80 x ID21 x 17t [mm]
- Specific gravity of Bulk Resistive Elements : 2.0 ~ 2.8
- Specific Heat : 630~1,250J [kg-K]
- Thermal Conductivity : 1.2W / (m-K)
- Temperature Coefficient of Resistance : +/-0.1%/°C typ.
- Thermal Coefficient of expansion : 4~7 x 10⁻⁶
- Max. working temperature: 250°C in resistive elements (but epoxy fiber shaft max.150°C)
- Max. of allowable injection energy : 12kJ per individual resistive elements
- Max. withstand voltage : 10kV per element at 1.2/50[μS] (must be limited by Fig.3 of curve, in humidity ≤58%)
- Max. of allowable current : 900 A

(Fig.6) Dimension & Specifications [mm]

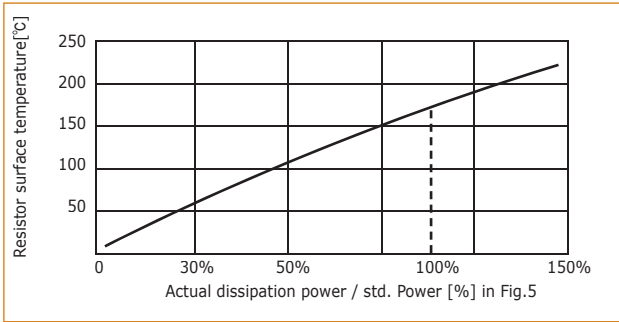


(Fig.5)

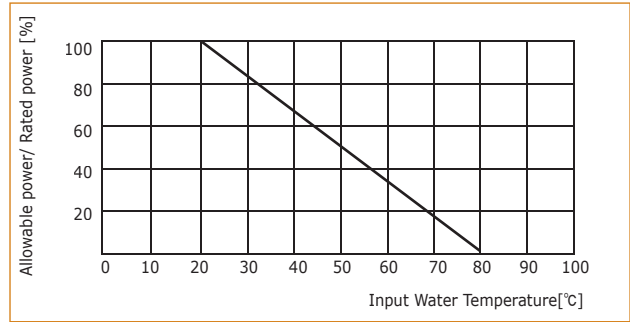
Item Nr.	Rated Power[W]	Resistives of elements q'ty	Std. R- Range[Ω]		Allowable Injection Energy[J]	Dimension [mm]		
			Min.	Max.		A	B	C
EDW-1	390	1	0.5	30	12k	67	97	137
EDW-2	780	2	1.0	60	24k	100	130	170
EDW-3	1170	3	1.5	90	36k	136	166	206
EDW-4	1560	4	2.0	120	48k	172	202	242
EDW-5	1950	5	2.5	150	60k	208	238	278

Notes: Shall be controlled pure water flow into 5Liter/min, pressure of 0.59Mpa. max.
Water tubing and taping is 3/8inch std.
Pure water of shall R-value higher than 1MΩ

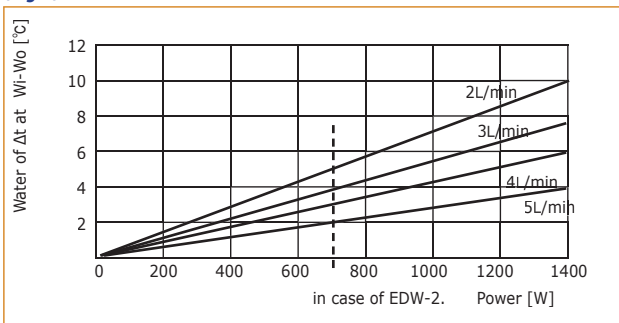
(Fig.7) Power vs. Surface Temperature



(Fig.8) Derating Curve ; input water



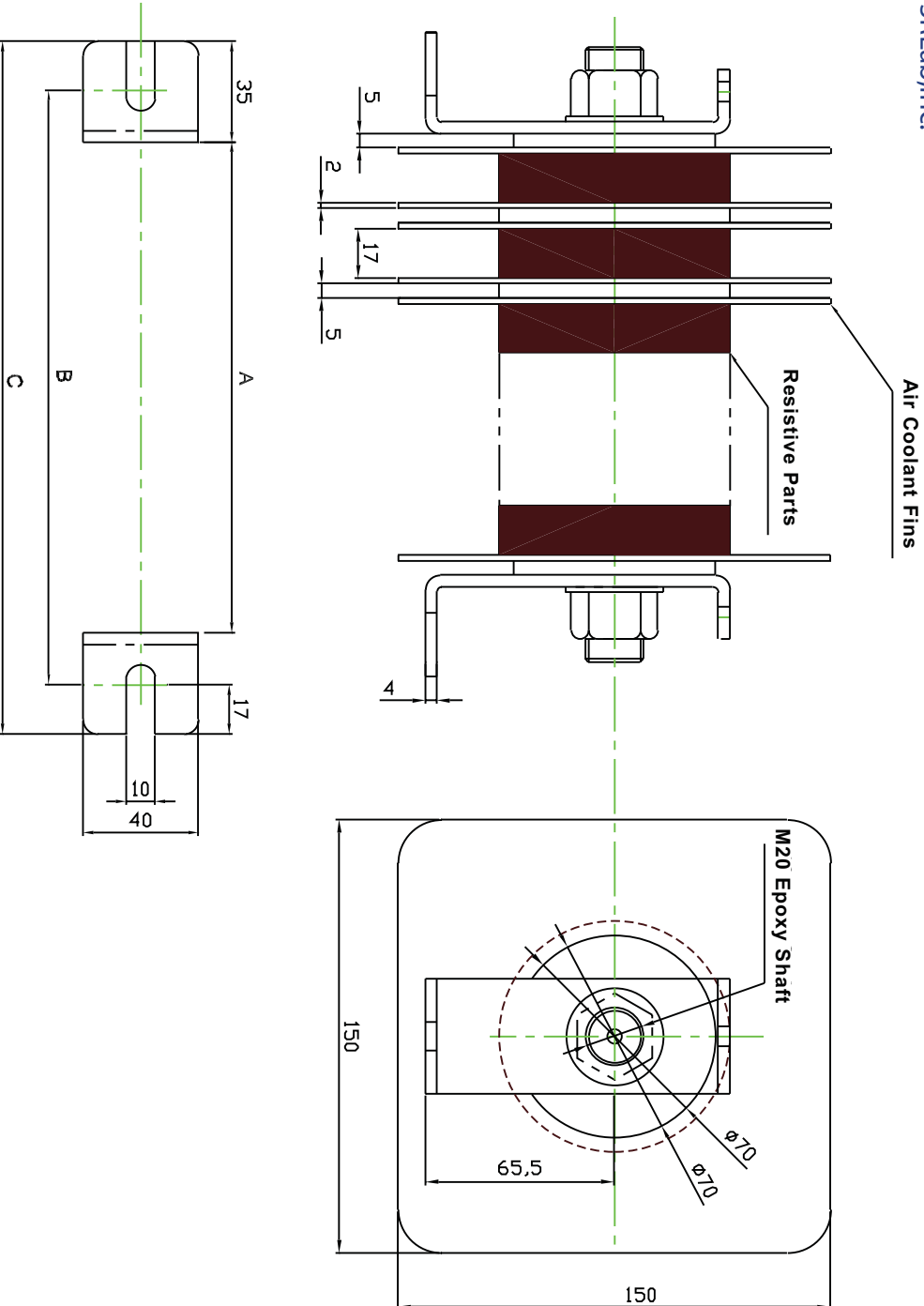
(Fig.9) Power vs. water of Δt at Wi-Wo



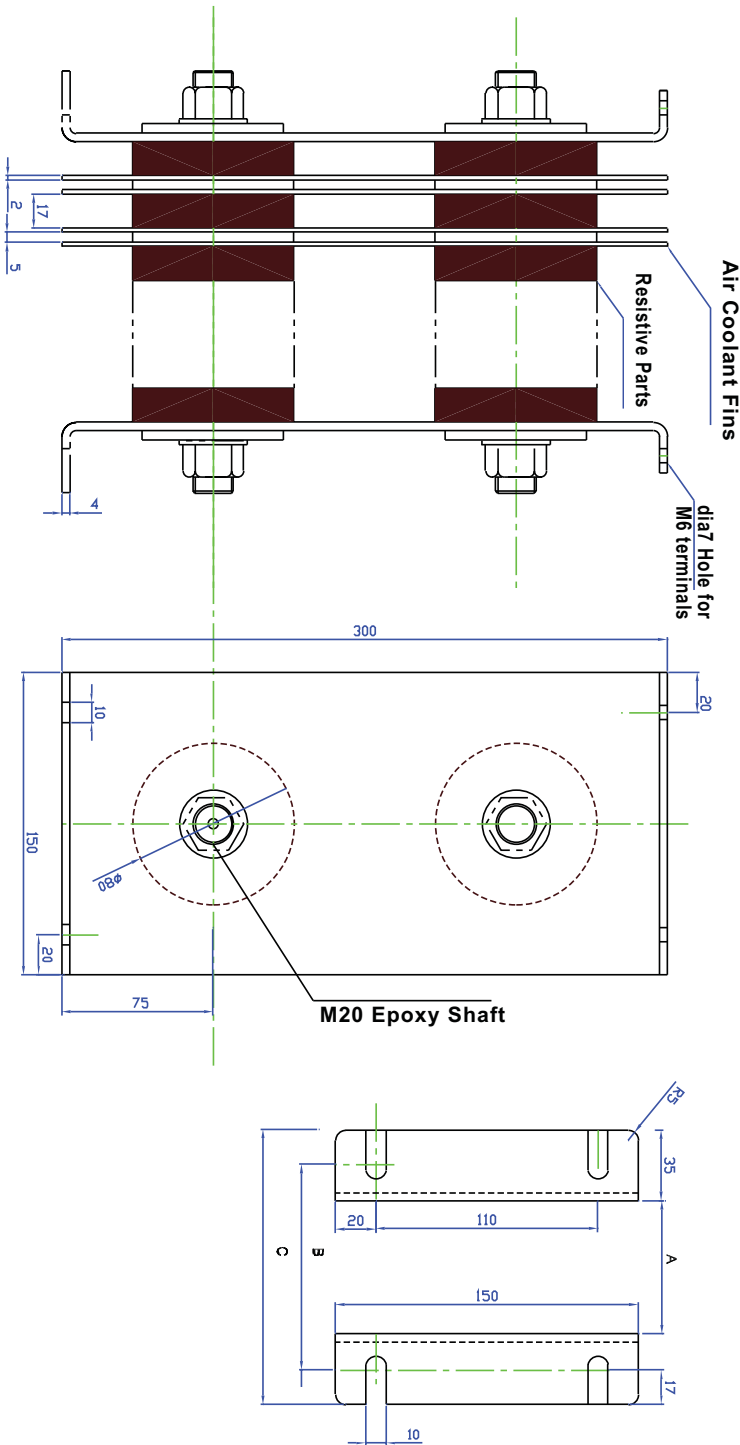
(Fig.12)

Products Nr. : EDAO-10B-ED8017-10S
 Spec. : Max.1kW-avg. in 45 °C Aluminum Fints temp. , 250.7KJ
 DWG. Issued date : June .10. 2008
 Validity : talk with 3RLab factory, the size & spec. might be cahnge w/out pre-notice

3RLab,Inc.



(Fig. 13)



Products Nr. : EDAO-20B-ED8017-10S2P
 Spec. : 2KW-avg. in 45°C AL Fins temp. , Energy ; 501.4kJ
 DWG. Issued date : June.10.2008
 Validity : talk with 3RLab factory, the size & spec. might be cahnge w/out pre-notice
 3RLab,Inc.