Further type series as examples of customized solutions

1. Resistor wired on terminals,
also in a compact multiple design form for high short time energy absorption

Type series FBEMS..

- construction form very compact
- for horizontal mounting
- connection at terminals
- with ground connection
- degree of protection IP 20 (resistors IP 54)

Type series FBEM..

- construction form very compact
- for vertical mounting
- connection at terminals
- with ground connection
- degree of protection IP 20 (resistors IP 54)

2. Version in multiple configuration for continuous dissipation up to 4000 W

Type series FDAZ(Q)..

- connection at terminals in terminal box
- with cover
- with ground connection
- degree of protection IP54

Type series FFAE..

- flat type construction
- mounting on switch cabinet
- with grounded and screened wiring
- degree of protection IP21 (resistors IP54)

3. Special design for mounting under and beside Servo- and frequency converters

Type series GUXD..

- connection by wires
- for mounting under and beside converters
- scalable design
- degree of protection IP 40

Type series GXWD..

- connection by wires
- for mounting under and beside converters
- optionally with ground and screen connection
- degree of protection IP 54

Type series GXHM../ GXUM..,

100 – 750 W, up to IP 40 in aluminium enclosure, connection at terminals


GXHMQ216x80

Short-circuit proof wirewound flat resistor in blue anodized aluminium enclosure. Prepared to connect screened wiring on porcelain terminal. Version with strain relief and ground connection.

GXHM.. for integration into switch cabinet
Resistor with degree of protection IP 40, terminals protected against access according to BGV A2

GXUM.. for mounting outside the switch cabinet
Version like GXHM but terminals in terminal box, degree of protection IP 20

③ optionally, type designation would be GXHM(Q)U or GXUM(Q)U..,
e.g. GXUMQU 420x80-33 (version with terminals G10/G5)

Technologies

- very flat, compact construction form
- short-circuit proof
- self-extinguishing
- connection option for screened wiring
- GXUM.. with covered terminal box
- higher continuous dissipation by direct mounting on heat sink or cooling surface
- easy mounting by T-slot

By direct mounting on an appropriate cooling surface or onto a heat sink the continuous dissipation can be increased resp. the surface temperature can be lowered. Typical factors for an increase are 1,5 up to 5, depending on type, ventilation and size of the cooling surface or heat sink.
We provide various mounting brackets as accessories for different mounting types; see page T310E for further information.

Option: temperature switch (..Q)

Both type series can be fitted with a 180°C temperature switch for monitoring which is connected to 2 terminals.

Type designation would be: GXHMQ ... or GXUMQ..

Application

e.g. as braking resistors for servo- or frequency converters. Due to optional screened wiring and to space saving construction form protection against access to hazardous parts is ensured also at cramped mounting places.

Special design

- Resistor with degree of protection IP 54 (GW...)

Electrical and mechanical data

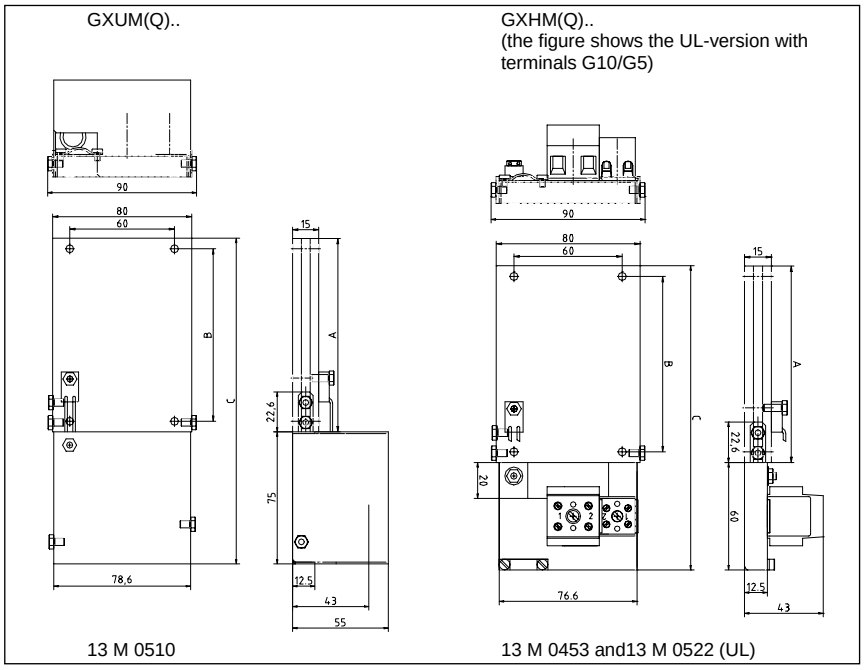
type series GXHM … GXUM …	continuous dissipation in W at 40°C, 100% DCF and surface excess temperature of		production range Ω–value		dimensions in mm			weight in g
	200 K typical power	250 K	from	up to	A	B	C_{max}	
GX. M 110 x 80	100	150	2,7	3,3k	110	98	185	300
GX. M. 160 x 80	150	225	4,7	5,6k	160	148	255	420
GX. M. 216 x 80	200	300	6,8	8,2k	216	204	291	550
GX. M. 320 x 80	300	450	10,0	12 k	320	2x154	395	850
GX. M. 420 x 80	400	600	12,0	18 k	420	2x204	495	1100
GX. M. 520 x 80	500	750	18,0	22 k	520	4x127	595	1350

NOTE: excess temperature values of 200 K should not be exceeded in order not to disturb the degree of protection!

The given power rating values are valid for 100%CD (continuous dissipation). For short time operation you will find the values in the following table as a function of the duty cycle factor (DCF). Just multiply by the corresponding overload factor (OLF). See page T304E for further information.

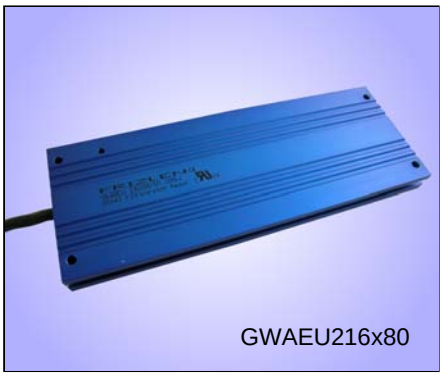
DCF	60%	40%	25%	15%	6%	3%	1%
OLF	1,5	2,2	3,0	4,2	8,2	13	22

These overload factors are valid for a total cycle time of maximum 120 s



Type series GWAE..

100 – 500 W, IP 54, in aluminium enclosure, connection by screened wiring



Short-circuit proof wirewound flat resistor with degree of protection IP 54 in blue anodized aluminium enclosure. Version with screened wiring 3x1,5mm² (AWG 16/19), 600 V, 200°C, 0,75 m long.

③ optionally, type designation would be GWAEU ...,

Technologies

- very flat, compact construction form
- short-circuit proof
- self-extinguishing
- degree of protection IP 54
- incl. screened wiring
- higher continuous dissipation by direct mounting on heat sink or cooling surface
- easy mounting by T-slot

By direct mounting on an appropriate cooling surface or onto a heat sink the continuous dissipation can be increased resp. the surface temperature can be lowered. Typical factors for an increase are 1,5 up to 5, depending on type, ventilation and size of the cooling surface or heat sink.
We provide various mounting brackets as accessories for different mounting types; see page T310E for further information.

Application

e.g. as braking resistors for servo- or frequency converters. Due to screened wiring and to the high degree of protection the resistors can also be mounted outside the switch cabinets.

Special design

- longer wiring

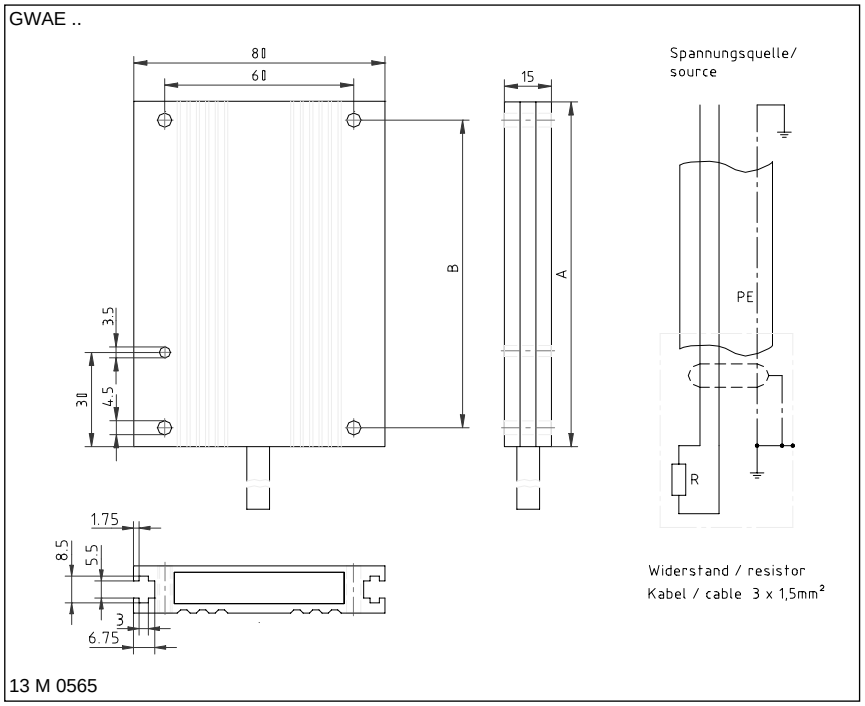
Electrical and mechanical data

Type series	continuous dissipation in W at 40°C, 100%DCF and surface excess temperature of 200 K	production range Ω–value		dimensions in mm		weight in g
		from	up to	A	B	
GWAE. 110 x 80	100	2,7	3,3k	110	98	380
GWAE. 160 x 80	150	4,7	5,6k	160	148	500
GWAE. 216 x 80	200	6,8	8,2k	216	204	630
GWAE. 320 x 80	300	10,0	12 k	320	2x154	930
GWAE. 420 x 80	400	12,0	18 k	420	2x204	1180
GWAE. 520 x 80	500	18,0	22 k	520	4x127	1430

The given power rating values are valid for 100%CD (continuous dissipation). For short time operation you will find the values in the following table as a function of the duty cycle factor (DCF). Just multiply by the corresponding overload factor (OLF). See pages T304E and T307E for further information.

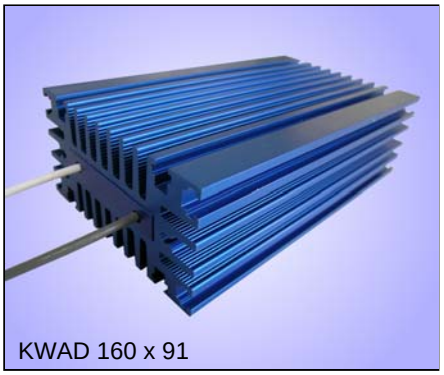
DCF	60%	40%	25%	15%	6%	3%	1%
OLF	1,5	2,2	3,0	4,2	8,2	13	22

These overload factors are valid for a total cycle time of maximum 120 s.



Type series KWAD.. / KYAD..

150 – 1050 W, IP 54 or IP 67, in aluminium enclosure


KWAD 160 x 91

Short-circuit proof wirewound flat resistor in blue anodized aluminium enclosure. Version with 2 FEP-wires, 600 V, AWG 14/19 (1,9 mm²), 0,5 m long.

Version with degree of protection IP 54– Type series KWAD.. (standard version)
Version with degree of protection IP 67– Type series KYAD..
③ optionally, type designation would be K.ADU or K.ADQU..,
e.g. KWADQU 420x91-33 (UL in preparation)

Technologies

- extremely compact construction form
- short-circuit proof
- self-extinguishing
- degree of protection up to IP 67
- suited for rough environment
- easy mounting by T-slot

We provide various mounting brackets as accessories for different mounting types; see page T310E for further information.

Option: Temperature switch (..Q)

(only for type KW..Q.. – not for KY..)

This type series can be fitted with a 180°C temperature switch for monitoring which has 2 connection wires.

Type designation would be: KWADQ ...

Application

e.g. as brake resistor for frequency converters (FC). They are perfectly suited for rough environments because of their high degree of protection. With adequate mechanical protection of the wires, the resistors can be mounted outside the switch cabinets directly at the FC or motor.

Special design

- e.g. with terminals, terminal box or screened wiring or in multiple combination for higher dissipation values.

Electrical and mechanical data

Type series KWAD – IP 54 KYAD – IP 67	continuous dissipation in W at 40°C, 100%DCF and surface excess temperature of 200 K Typical power	 250 K	production range Ω–value from	 up to	dimensions in mm A	weight in kg
K. AD. 110 x 91	150	225	2,7	3,3k	110	0,7
K. AD. 160 x 91	225	340	4,7	5,6k	160	1,0
K. AD. 216 x 91	300	450	6,8	8,2k	216	1,4
K. AD. 320 x 91	450	675	10,0	12 k	320	2,0
K. AD. 420 x 91	600	900	12,0	18 k	420	2,6
K. AD. 520 x 91	750	1125	18,0	22 k	520	3,2
K. AD. 620 x 91	900	1350	22,0	27 k	620	3,8
K. AD. 720 x 91	1050	1575	33,0	33 k	720	4,4

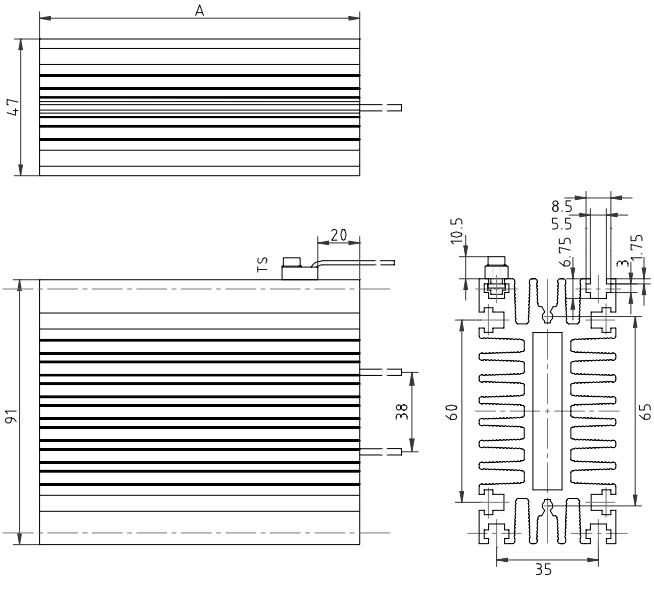
NOTE: excess temperature values of 200 K should not be exceeded in order not to disturb the degree of protection!

The given power rating values are valid for 100%CD (continuous dissipation). For short time operation you will find the values in the following table as a function of the duty cycle factor (DCF). Just multiply by the corresponding overload factor (OLF). See page T304E for further information.

DCF	60%	40%	25%	15%	6%	3%	1%
OLF	1,5	2,2	3,0	3,6	6,3	9,3	15

These overload factors are valid for a total cycle time of maximum 120 s.

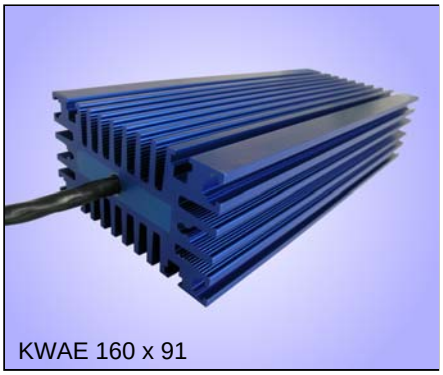
KWAD / KYAD.. (the figure shows the version with temperature switch (TS))



13 M 0558

Type series KWAE..

150 – 1050 W, IP 54, in aluminium enclosure, connection by screened wiring


KWAE 160 x 91

Short-circuit proof wirewound flat resistor with degree of protection 54 in blue anodized aluminium enclosure. Version with screened wiring 3x1,5mm² (AWG 16/19), 600 V, 200°C, 0,75 m long.

③ optionally, type designation would be KWAEU ..., (UL in preparation)

Technologies

- extremely compact construction form
- short-circuit proof
- self-extinguishing
- degree of protection IP 54
- incl. screened wiring
- easy mounting by T-slot

We provide various mounting brackets as accessories for different mounting types; see page T310E for further information.

Application

e.g. as brake resistor for servo- or frequency converters. Due to the screened wiring and to the high degree of protection the resistors also can be mounted outside of switch cabinets.

Special design

- longer wiring

Electrical and mechanical data

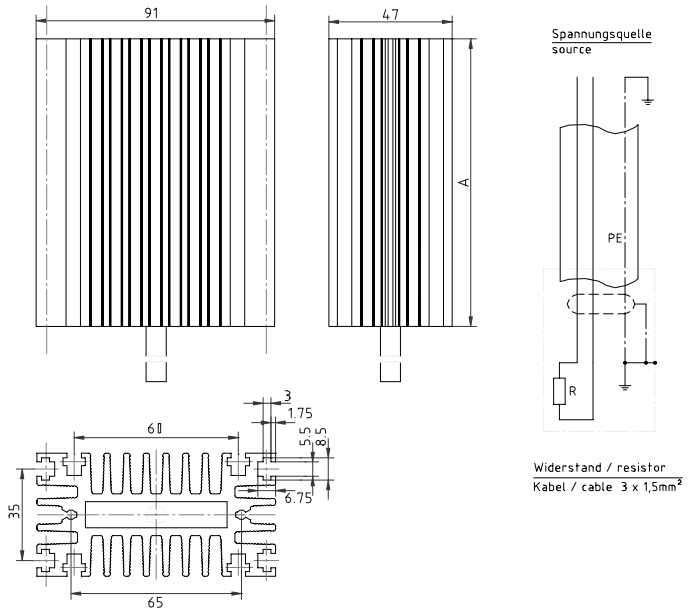
Type series	continuous dissipation in W at 40°C, 100%DCF and surface excess temperature of 200 K	production range Ω–value from	up to	dimensions in mm A	weight in kg
KWAE. 110 x 91	150	2,7	3,3k	110	0,8
KWAE. 160 x 91	225	4,7	5,6k	160	1,1
KWAE. 216 x 91	300	6,8	8,2k	216	1,5
KWAE. 320 x 91	450	10,0	12 k	320	2,1
KWAE. 420 x 91	600	12,0	18 k	420	2,7
KWAE. 520 x 91	750	18,0	22 k	520	3,3
KWAE. 620 x 91	900	22,0	27 k	620	3,9
KWAE. 720 x 91	1050	33,0	33 k	720	4,5

The given power rating values are valid for 100%CD (continuous dissipation). For short time operation you will find the values in the following table as a function of the duty cycle factor (DCF). Just multiply by the corresponding overload factor (OLF). See page T304E for further information.

DCF	60%	40%	25%	15%	6%	3%	1%
OLF	1,5	2,2	3,0	3,6	6,3	9,3	15

These overload factors are valid for a total cycle time of maximum 120 s.

KWAE..



13 M 0564

Type series FDWZ.. / FYWZ..

225 – 2520 W, IP 54 or IP 67, in aluminium enclosure, with terminals and terminal box


FDWZ 5170302

Short-circuit proof wirewound flat resistor in single, double or triple configuration. Degree of protection IP 54 or IP 67 in blue anodized aluminium enclosure. Version with terminals and strain relief provision in terminal box.

③ optionally, type designation would be F.WZU… or F.WZQU..., (UL in preparation)

Technologies

- compact construction form
- short-circuit proof
- self-extinguishing
- degree of protection IP 54 or IP 67
- incl. terminals in terminal box

All connections run on G10 terminals in the mounted terminal box. A M25 cable gland can be used for cable inlet and strain relief.

Option: Temperature switch (..Q)

(only for type series FDWZ.. – not for FYWZ..)

This type series can be fitted with a 180°C temperature switch for monitoring which is wired on two terminals in the terminal box.

Type designation would be: FDWZQ...

Application

e.g. as brake resistor for servo- or frequency converters. Due to the terminals in the terminal box various connection conditions and a high degree of protection can be realized at the same time. Thus the resistors also can be mounted outside of switch cabinets at various environment conditions.

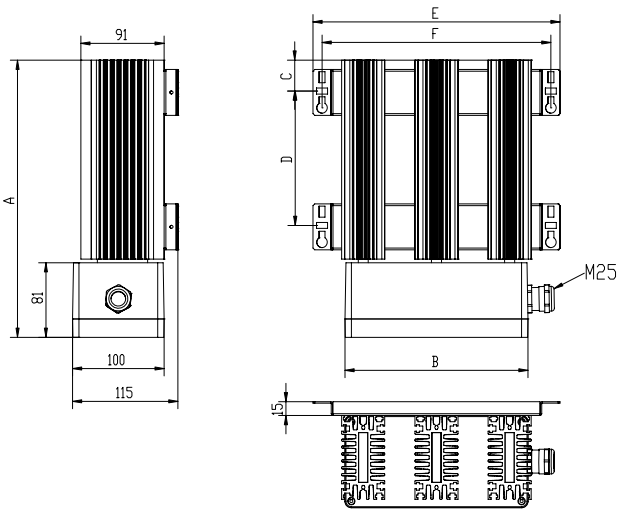
Special design

- optionally with wiring, screened or unscreened

Electrical and mechanical data

Type	continuous dissipation in W at 40°C, 100%DCF and surface excess temperature of 200 K	production range Ω–value		dimensions in mm						weigh t in kg
		from	tp to	A	B	C	D	E	F	
F.WZ.51201..	225	4,7	5,6k	245	100	34	90	110	90	1,9
F.WZ.51301..	300	6,8	8,2k	301	100	34	146	110	90	2,3
F.WZ.51401..	450	10,0	12 k	405	100	34	250	110	90	2,9
F.WZ.51501..	600	12,0	18 k	505	100	74	270	110	90	3,5
F.WZ.51601..	750	18,0	22 k	605	100	74	370	110	90	4,1
F.WZ.51701..	900	22,0	27 k	705	100	74	470	110	90	4,8
F.WZ.51801..	1050	33,0	33 k	805	100	74	570	110	90	5,4
F.WZ.51202..	360	4,7	5,6k	245	160	34	90	190	170	3,3
F.WZ.51302..	480	6,8	8,2k	301	160	34	146	190	170	4,0
F.WZ.51402..	720	10,0	12 k	405	160	34	250	190	170	5,2
F.WZ.51502..	960	12,0	18 k	505	160	74	270	190	170	6,5
F.WZ.51602..	1200	18,0	22 k	605	160	74	370	190	170	7,7
F.WZ.51702..	1440	22,0	27 k	705	160	74	470	190	170	9,0
F.WZ.51802..	1680	33,0	33 k	805	160	74	570	190	170	10,2
F.WZ.51203..	540	4,7	5,6k	245	200	34	90	270	250	4,7
F.WZ.51303..	720	6,8	8,2k	301	200	34	146	270	250	5,7
F.WZ.51403..	1080	10,0	12 k	405	200	34	250	270	250	7,7
F.WZ.51503..	1440	12,0	18 k	505	200	74	270	270	250	9,6
F.WZ.51603..	1800	18,0	22 k	605	200	74	370	270	250	11,4
F.WZ.51703..	2160	22,0	27 k	705	200	74	470	270	250	13,3
F.WZ.51803..	2520	33,0	33 k	805	200	74	570	270	250	15,2

F.WZ...



13 M 0569

Type series WPAZQ..

10 – 40 kW, IP 54, water cooled, with terminals and terminal box

IP 54 **E**

Wire wound flat type resistors in protection degree IP 54 in aluminium enclosure, combined with water cooler with integrated Cu-tubes. Electric wiring on terminals in attached terminal box. Cooling connection on two pipe connections 1 ¼ inch (DIN ISO 228).

Technologies

- very compact design
- high degree of protection IP 54
- very low excess of surface temperature (<40K)
- designed for water cooling by industrial water and almost any standard cooling liquid (dirt particles ≤ 1mm)
- max. working pressure 4 bar (test pressure 10 bar)
- max. drop of pressure 0,5 bar
- with temperature switch

Construction

Power resistor:
Electrical connection at terminals 16-95mm² (depending on design) in terminal box incl. cable gland up to M50.

Cooling:
The integrated Cu-tubes are for industrial water and almost any standard cooling liquids or oils – not for aggressive liquids, sea water or demineralized water.
Water connection at 1 ¼ inch thread for max. 3600 litre/hour. Maximum "In-Water" +30°C, maximum "Out-Water" +45°C.

Application

An important application is the use as internal load resistor or as brake resistor. The big advantage is the very good transport of temperature by the integrated cooling water connection.

Special design

- Mounting and connection material out of stainless steel
- with additional PT100 element
- integrated into switch cabinet

Electrical and mechanical data

type series	continuous dissipation in kW for cold "In-Water" of 20°C at 100%ED and a max. surface excess temperature of 30 K	necessary flow of cooling liquid in litre / h at a "Out-Water" temperature rise of 12K	production range Ω–value		dimensions in mm		approx. weight in kg
			from	up to	A	B	
WPAZQ90404	10	900	4,5	2,7 k	220	200	25
WPAZQ90604	15	1350	3,0	3,3 k	280	260	33
WPAZQ90804	20	1800	2,3	3,9 k	340	320	40
WPAZQ91004	25	2250	1,8	4,7 k	400	380	48
WPAZQ91204	30	2700	1,5	5,6 k	460	440	55
WPAZQ91404	35	3150	1,3	6,8 k	520	500	63
WPAZQ91604	40	3600	1,2	8,2 k	580	560	70

The given power rating values are valid for 100%CD (continuous dissipation). For short time operation you will find the values in the following table as a function of the duty cycle factor (DCF). Just multiply by the corresponding overload factor (OLF).

DCF	60%	40%	25%	15%	6%
OLF	1,2	1,6	2,2	3,1	5,5

These overload factors are valid for a total cycle time of maximum 120 s