

Components for Power Conversion **EE/M-Series**



This catalogue contains information on our product range of the EE/M-Series

The EE/M components were designed for applications in small transformers, but are also used in switched mode power conversion.

We supply coilformers made in high quality thermoplastics, matching your production requirements. Accessories, such as potting boxes, snap-on caps, latching-clips and spring-clips, are also included in this catalogue.

All dimensions in mm/inch. The permissible deviations according to DIN 16901 apply as tolerances.

Wherever high-temperature soldering processes are used in connection with EE/M-series coilformers, we recommend irradiation cross-linked plastics. This ensures that the mechanical properties – in particular those of gfr-polyamides – are maintained and breakages are reduced. For this reason NORWE offers all plastic components of the EE/M-series in irradiated cross-linked materials.

In the short term, the cross-linked materials can be exposed to very high temperatures. Apart from improved aspects in production there may be interesting cost advantages, and a discussion with us could be useful.

Should you need further assistance, be it technical or to assist when placing your order, we look forward to hearing from you.

Fully tagged or pinned coilformers are – in small quantities – usually available from stock. We can also quote for coilformers with pins or tags fitted to your requirements. All lead-times are relatively short.

Our extensive range of modular tooling allows almost unlimited constructional changes to meet customers specification, often by simple changes of tool inserts.

In addition the modular tooling system allows extremely short tooling times and can be very cost effective.

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All dimensions in mm/inch

The permissible deviations according to DIN 16901 apply as tolerances

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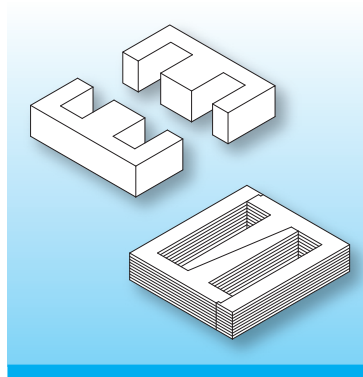
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Ferrite Cores EF/E

The tables below show the dimensions of the ferrite cores for the coilformers shown in this catalogue. The data can be used as an orientation in the design of application specific converters. Specific details on the ferrite cores and materials should be available from the catalogues of the ferrite manufacturers.

**Laminations EE/M**

Dimensions of laminations, suitable for coilformers listed in this catalogue, can be found below. The data can be used when designing specific converters. Specific details on the laminations should be obtained from the lamination manufacturers.

Dimensions in mm/inch.

Type I	A	B	C	D	E	G
EF 8	8.0 ±0.15 0.315 ±0.006	4.05 -0.10 0.159 -0.004	2.40 -0.10 0.094 -0.004	2.4 -0.10 0.094 -0.004	5.6 +0.2 0.220 +0.008	2.8 +0.10 0.110 +0.004
EF 10	10.0 ±0.20 0.394 ±0.008	5.00 -0.12 0.197 -0.005	3.00 -0.12 0.118 -0.005	3.0 -0.12 0.118 -0.005	7.0 +0.3 0.276 +0.012	3.5 +0.12 0.138 +0.005
EF 12,6	12.6 ±0.40 0.496 ±0.016	6.50 -0.20 0.256 -0.008	3.70 -0.30 0.146 -0.012	3.7 -0.30 0.146 -0.012	8.9 +0.6 0.350 +0.024	4.5 +0.30 0.177 +0.012
EF 16	16.1 ±0.60 0.634 ±0.024	8.20 -0.30 0.323 -0.012	4.70 -0.30 0.185 -0.012	4.7 -0.40 0.185 -0.016	11.3 +0.6 0.445 +0.024	5.7 +0.40 0.224 +0.016
EF 20	20.1 ±0.70 0.791 ±0.028	10.20 -0.40 0.402 -0.016	5.90 -0.40 0.232 -0.016	5.9 -0.50 0.232 -0.020	14.1 +0.6 0.555 +0.024	7.0 +0.40 0.276 +0.016
EF 25	25.0 ±0.70 0.984 ±0.028	12.80 -0.50 0.504 -0.020	7.50 -0.50 0.295 -0.020	7.5 -0.60 0.295 -0.024	17.5 +0.8 0.689 +0.031	8.7 +0.50 0.343 +0.020
EF 25-11	25.0 ±0.70 0.984 ±0.028	12.80 -0.50 0.504 -0.020	7.50 -0.50 0.295 -0.020	11.0 -0.60 0.433 -0.024	17.5 +0.8 0.689 +0.031	8.7 +0.50 0.343 +0.020
EF 32	32.1 ±0.80 1.264 ±0.031	16.40 -0.60 0.646 -0.024	9.50 -0.60 0.374 -0.024	9.5 -0.70 0.374 -0.028	22.7 +1.0 0.894 +0.039	11.2 +0.60 0.441 +0.024

Type I	A	B	C	D	E	G
E 20	20.0 ±0.6 0.787 ±0.024	10.2 -0.4 0.402 -0.016	5.20 -0.4 0.205 -0.016	5.3 -0.4 0.209 -0.016	12.8 +0.7 0.504 +0.028	6.3 +0.5 0.248 +0.020
E 30	30.0 ±0.7 1.181 ±0.028	15.2 -0.4 0.598 -0.016	7.20 -0.5 0.283 -0.020	7.3 -0.5 0.287 -0.020	19.5 +0.8 0.768 +0.031	7.9 +0.6 0.311 +0.024
E 30-11	30.0 ±0.7 1.181 ±0.028	15.2 -0.4 0.598 -0.016	7.20 -0.5 0.283 -0.020	11.0 -0.6 0.433 -0.024	19.5 +0.8 0.768 +0.031	7.9 +0.6 0.311 +0.024
E 36	36.0 ±0.8 1.417 ±0.031	18.0 -0.4 0.709 -0.016	9.70 +0.5 0.382 +0.020	11.5 -0.5 0.453 -0.020	24.5 +1.2 0.965 +0.047	12.0 +0.6 0.472 +0.024
E 42	42.0 ±0.8 1.654 ±0.031	21.2 -0.4 0.835 -0.016	12.20 -0.5 0.480 -0.020	15.2 -0.5 0.598 -0.020	29.5 +1.2 1.161 +0.047	14.8 +0.7 0.583 +0.028
E 42-20	42.0 ±0.8 1.654 ±0.031	21.2 -0.4 0.835 -0.016	12.20 -0.5 0.480 -0.020	20.0 -0.8 0.787 -0.031	29.5 +1.2 1.161 +0.047	14.8 +0.7 0.583 +0.028
E 55	55.0 ±1.0 2.165 ±0.039	27.8 -0.6 1.094 -0.024	17.20 -0.5 0.677 -0.020	21.0 -0.6 0.827 -0.024	37.5 +1.2 1.476 +0.047	18.5 +0.8 0.728 +0.031
E 55-25	55.0 ±1.0 2.165 ±0.039	27.8 -0.6 1.094 -0.024	17.20 -0.5 0.677 -0.020	25.0 -0.8 0.984 -0.031	37.5 +1.5 1.476 +0.059	18.5 +0.8 0.728 +0.031
E 65	65.0 ±1.2 2.559 ±0.047	32.8 -0.6 1.291 -0.024	20.00 -0.7 0.787 -0.028	27.4 -0.8 1.079 -0.031	44.2 +1.5 1.740 +0.059	22.2 +0.8 0.874 +0.031
E 70	70.0 ±1.4 2.756 ±0.055	33.2 -0.6 1.307 -0.024	22.00 -0.8 0.866 -0.031	32.0 -0.8 1.260 -0.031	48.0 +1.6 1.890 +0.063	21.9 +0.8 0.862 +0.031
E 80-20	80.0 ±1.6 3.150 ±0.060	38.5 -0.8 1.516 -0.031	20.20 -0.8 0.795 -0.031	20.2 -0.8 0.795 -0.031	58.9 +2.6 2.319 +0.102	27.9 +0.8 1.098 +0.031

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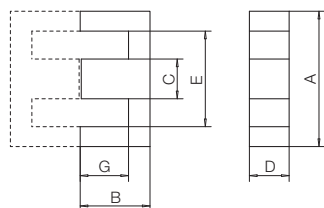
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EE/M Coilformers

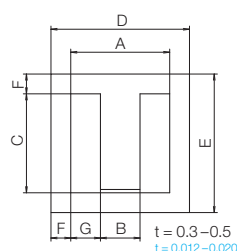
Type II, III, IV	A	B	C	D	E	F	G	H
EE 8	5.6 0.220	2.4 0.094	5.6 0.220	8.0 0.315	8.0 0.315	1.20 0.047	1.6 0.063	2.5 0.098
EE 10	7.0 0.276	3.0 0.118	7.0 0.276	10.0 0.394	10.0 0.394	1.50 0.059	2.0 0.079	3.0 0.118
EE 12,6	8.8 0.346	3.8 0.150	8.8 0.346	12.6 0.496	12.6 0.496	1.90 0.075	2.5 0.098	4.0 0.157
EE 16	11.2 0.441	4.8 0.189	11.2 0.441	16.0 0.630	16.0 0.630	2.40 0.094	3.2 0.126	5.0 0.197

Type II, III, IV	A	B	C	D	E	F	G
M 20	13.0 0.512	5.0 0.197	13.0 0.512	20.0 0.787	20.0 0.787	3.50 0.138	4.0 0.157
M 22	13.0 0.512	5.0 0.197	15.0 0.591	20.0 0.787	22.0 0.866	3.50 0.138	4.0 0.157
M 30	20.0 0.787	7.0 0.276	20.0 0.787	30.0 1.181	30.0 1.181	5.00 0.197	6.5 0.256
M42	30.0 1.181	12.0 0.472	30.0 1.181	42.0 1.654	42.0 1.654	6.00 0.236	9.0 0.354
M 55	38.0 1.496	12.0 0.472	38.0 1.496	55.0 2.165	55.0 2.165	8.50 0.335	10.5 0.413
M 65	45.0 1.772	20.0 0.787	45.0 1.772	65.0 2.559	65.0 2.559	10.00 0.394	12.5 0.492
M 74	51.0 2.008	23.0 0.906	51.0 2.008	74.0 2.913	74.0 2.913	11.50 0.453	14.0 0.551

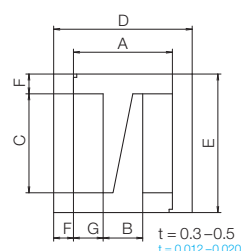
Type I



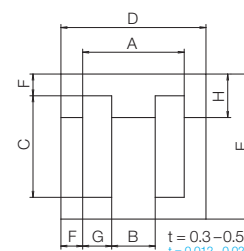
Type II



Type III



Type IV



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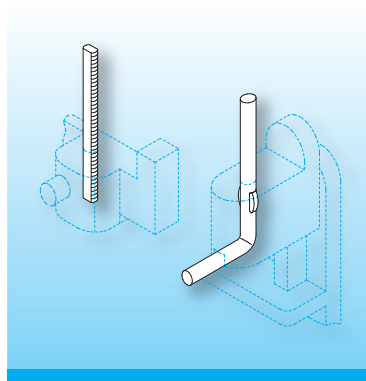
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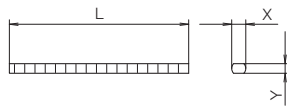
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Survey of Solder-pins

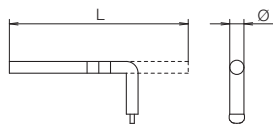
The tables below contain the standard solder-pins matched to the coilformers of the EE/M-series and inform you about the exact dimensions of the solder-pins. The material used is tin bronze, tinned.



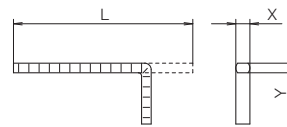
Further shapes and types are included in our catalogue "Stamped and Pressed Components for Electronic Applications". In addition we also supply individual solder-pins to customers specification – please contact us. Special materials/designs on request, dimensions in mm/*inch*.



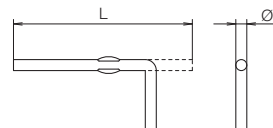
Solder-pin	Order-Code	L	X	Y
z406/ua	73203-212	6 0.236	0.44 0.017	0.3 0.012
z606/ua	73262-212	6 0.236	0.66 0.026	0.45 0.018
z607/ua	73263-212	7 0.276	0.66 0.026	0.45 0.018
z608/ua	73264-212	8 0.315	0.66 0.026	0.45 0.018
z609/ua	73265-212	9 0.354	0.66 0.026	0.45 0.018
z807/ua	73293-212	7 0.276	0.88 0.035	0.6 0.024
z808/ua	73294-212	8 0.315	0.88 0.035	0.6 0.024
z809/ua	73295-212	9 0.354	0.88 0.035	0.6 0.024
z810/ua	73296-212	10 0.394	0.88 0.035	0.6 0.024
z811/ua	73297-212	11 0.433	0.88 0.035	0.6 0.024
z812/ua	73298-212	12 0.472	0.88 0.035	0.6 0.024
z110/ua	73320-212	10 0.394	1.1 0.043	0.75 0.030
z111/ua	73321-212	11 0.433	1.1 0.043	0.75 0.030
z113/ua	73323-212	13 0.512	1.1 0.043	0.75 0.030



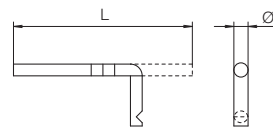
Solder-pin	Order-Code	L	Ø
f810/ua	77910-212	10 0.394	0.8 0.031



Solder-pin	Order-Code	L	X	Y
h608/ua	73464-212	8 0.315	0.66 0.026	0.45 0.018
h610/ua	73466-212	10 0.394	0.66 0.026	0.45 0.018
h811/ua	73497-212	11 0.433	0.88 0.035	0.6 0.024
h813/ua	73499-212	13 0.512	0.88 0.035	0.6 0.024
h814/ua	73500-212	14 0.551	0.88 0.035	0.6 0.024
h115/ua	73523-212	15 0.591	1.1 0.043	0.75 0.030
h116/ua	73524-212	16 0.630	1.1 0.043	0.75 0.030



Solder-pin	Order-Code	L	Ø
u812/ua	70677-212	12 0.472	0.8 0.031
u813/ua	70674-212	13 0.512	0.8 0.031



Solder-pin	Order-Code	L	Ø
x811/ua	77951-212	11 0.433	0.8 0.031

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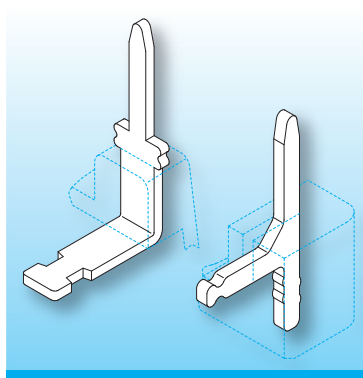
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EE/M Coilformers

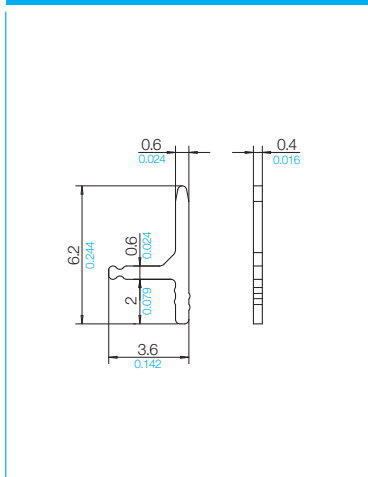
Survey of Solder-tags

The solder-tags below are the standard types matched to the coilformers of the EE/M-series. The tables contain the exact dimensions of the solder-tags. The material used is brass, tinned.

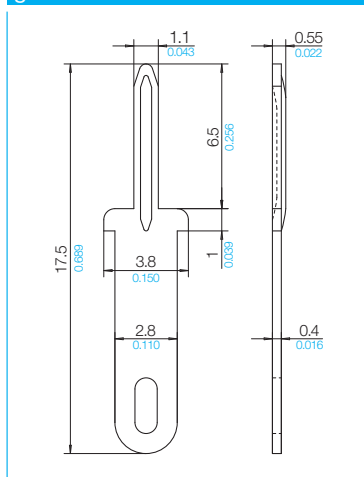


Further shapes and types are included in our catalogue "Stamped and Pressed Components for Electronic Applications". In addition we also supply individual solder-tags to customers specification – please contact us. Special materials/designs on request, dimensions in mm/*inch*.

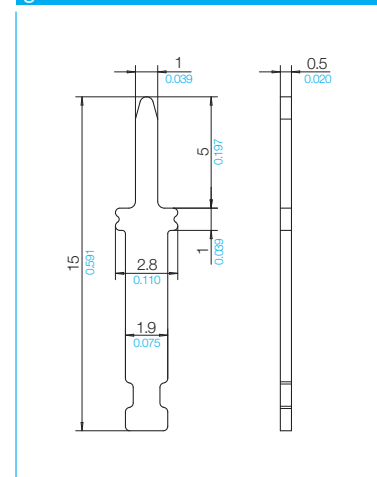
s24/wd 75518-261



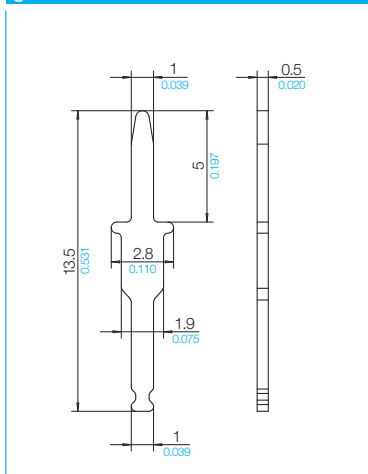
g3e/wc 73012-259



g2c/wc 71070-259



g2x/wc 71210-259



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Thermoplastic Materials

The following survey contains supplementary information on the different thermoplastic-qualities. The material quality orientates to the conventional use of the components. For technical reasons alternative materials cannot be used for all articles. Consult our qualified specialists regarding your individual material requests – we will be pleased to check whether your material requirements can be realized. Further information on the materials can also be obtained from our homepage (e.g. to call up the UL cards).

NORWE Mat.-Code	NORWE Mat.-Description	Chemical Symbol	Tradename Manufacturer	UL-File-No.	Flammability Rating acc. UL	RTI Elec acc. UL
010	eg7	PA66 Polyamide 66	A3EG7 Ultramid BASF AG	E 41871	HB (0.75)	+120°C
024	p6g	PA66 Polyamide 66	PA66 30% GF black Compound	–	–	(+125°C)
039	A3X2G5 sv.	PA66 Polyamide 66	A3X2G5 cross-linked Ultramid BASF AG	–	–	(+120°C)
047	pcg	PBT Polybutylene Terephthalate	B4225 Pocan Lanxess AG	E 245249	V-0 (1.50)	+130°C
087	rtg nat.	PET Polyethylene Terephthalate	FR 530 L Rynite DuPont	E 41938	V-0 (0.35)	+155°C
106	A RV250 nat.	PA66 Polyamid 66	Radiflam A RV250 AF RADICINOVACIPS SPA	E116324	V-0 (0.75)	+100°C
181	A3X2G10	PA66 Polyamide 66	A3X2G10 Ultramid BASF AG	E 41871	V-0 (1.50)	+115°C
186	SKYT.5220FR	PET Polyethylen-terephthalat	5220FR natur Skytra SK Chemicals Co. Ltd.	E 215991	V-0 (0.70)	+155°C

Explanations on the above survey of materials:

NORWE Mat.-Code designates the number NORWE fixed for the material

NORWE Mat.-Description names the NORWE-abbreviation for the material

Chemical Symbol classifies the chemical product group of the material

Tradename designates the product name or trade name fixed by the manufacturer

Manufacturer name of manufacturer

UL-File-No. material quality tested and certified with respect to safety and flammability. The manufacturers of certified and approved products receive a so-called recognition card (yellow card) in which the product qualities are listed in detail. You find all relevant yellow cards – also called UL cards – for different material qualities on our homepage or you can obtain them from us.

Flammability Rating acc. UL . . . determines the flammability of thermoplastic materials based on burning tests in accordance with UL 94 considering the wall thickness of the material.

RTI Elec acc. UL Relative Temperature Index according to UL 746 B. The specified temperatures are valid for long-range electrical load (Elec).

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Irradiation Cross-Linking of EE/M Coilformers and EE/M Accessories

NORWE cannot only look back on more than 40 years of experience in the development and production of coilformers but has in the meantime also gained almost 10 years of experience in irradiation cross-linking.

All components of the EE/M-series can on request be supplied in cross-linked material. A cross-linking enhancing material is added to the thermoplast granulates. After moulding the components are irradiated with Beta- or Gamma rays – depending on the penetration required.

The material loses its thermoplast characteristics (but it is not a thermoset) and withstands very high temperature peaks for short periods without any problems.

- Depending on the degree of cross-linking the coilformers and accessories withstand solder temperatures of 450–480°C for about 1–3 seconds. Irradiated cross-linked components easily tolerate the higher solder temperatures required due to the contact elements being changed to be leadfree.
- Unlike high temperature polymers – also cost-effective granulates are suitable for irradiation cross-linking. The characteristic features of the coilformers and accessories do not change due to the cross-linking.
- In contrast to high temperature polymers lower temperatures of material and mould during the production process are required and thus the tool elements are less stressed resulting in longevity. The lower temperature profiles during the moulding process provide a lower wear and tear of the tool elements as well as a perceptible saving of energy costs.

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Current certifications

- EN ISO 9001:2008
- UL 746 D
- EN ISO 14001:2005
- AEOC

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Services

- qualified advice
- cost neutral sample request
- individual quotation request
- mobile access via QR-Code

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