

Components for Power Conversion **ETD/EER-Series**



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All dimensions in mm/inch

The permissible deviations according to
DIN 16901 apply as tolerances

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NORWE ONE GmbH

Paulstraße 5, Pernze
51702 Bergneustadt
Deutschland

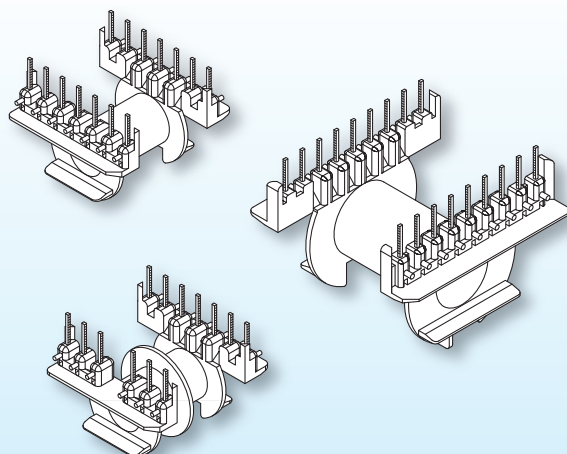
Telefon	+49 (0) 27 63-807-0
WhatsApp	+49 2763 807-0
E-mail	verkauf@norwe.de
Internet	www.norwe.de www.norwe.eu

NORWE Inc.

North Canton, OH 44720-0511
United States of America

Telefon	+1-330 497-8113
E-mail	usa@norwe.com
Internet	www.norwe.com

Description of the different designs ETD / EER-Series



ETD II Coilformers

The ETD-Series II is a completely new design from NORWE. The coilformers feature a reduced weight and also a minimized overall height.

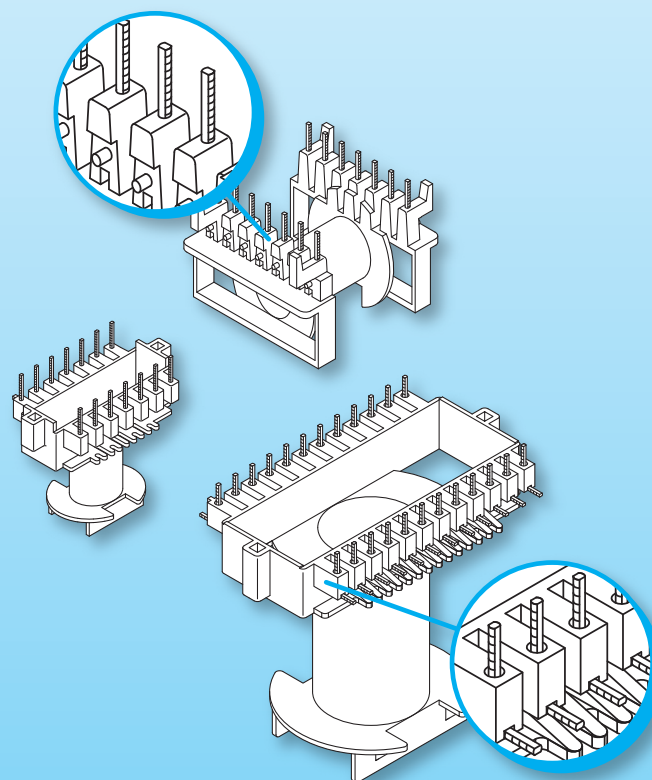
Special winding noses and a new wire routing provide tension-relief when binding on the wire. Due to their optimized design, the coilformers are very attractive with regard to technical and also economical aspects.

ETD Standard with Solder-Pins

A well-established design and – resulting there of – optimum features in the further processing characterize this solid series. All coilformers are suitable for automatic winding on computer controlled machines. They feature stand-offs on the PCB-side, thus reducing solder problems.

ETD Standard Side-Wrapping Pins

Due to integrate of side-wrapping pins the total height is reduced by 3 mm. The pins have a separate wrap area where wrapping and soldering is possible without any problem. The pin-side for contacting to the PCB, however, remains unaffected and free of tin.



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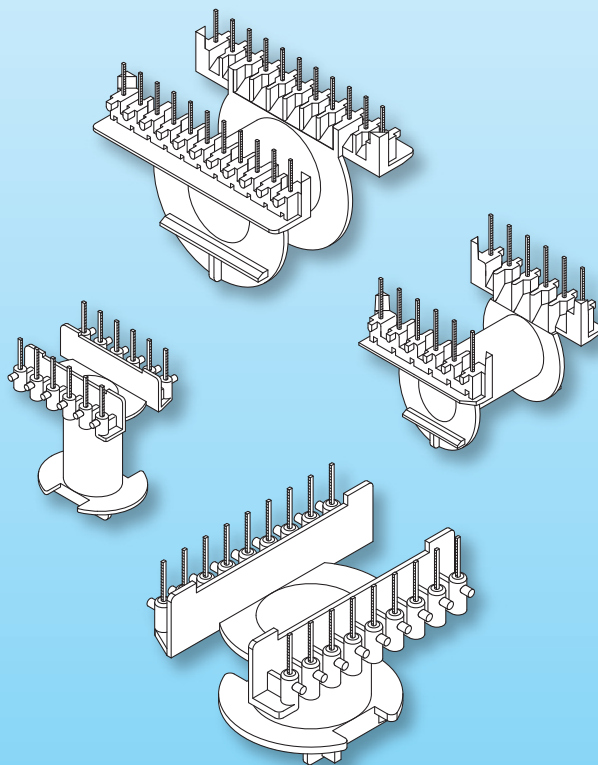
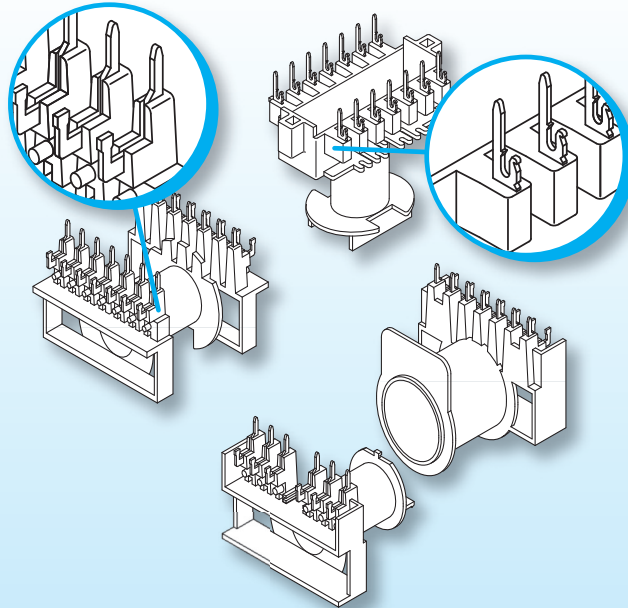
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United States of America

Telefon +1-330 497-8113
E-mail usa@norwe.com
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Description of the different designs ETD / EER-Series

ETD Standard with Solder-Tags

From the technical point of view this series is very solid and well-established and convinces by optimum characteristics in the further processing. The coilformers are suitable for automatic winding on computer controlled machines. Side-wrapping and soldering, including thick wires and litz wires, does not distort tag positions in the grid and leaves the underside free from tin.



EER Coilformers

The coilformer series is a completely new design from NORWE and features a reduced weight and also a minimized overall height. The EER-coilformers for power conversion are very well suitable for compact windings with low leakage inductance.

The design allows automatic winding also on NC winding machines. The round inner core is suitable for the use of thick wires or strips. The coilformers have stand offs to avoid cold-solder joints to the pcb.

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www.norwe.eu

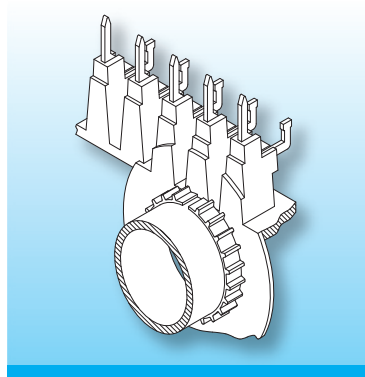
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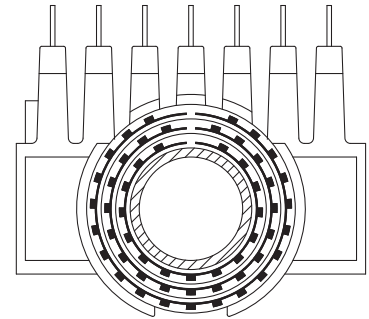
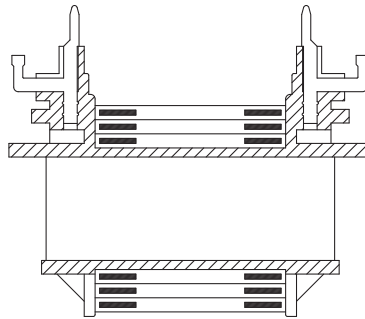
ETD Safety Class with Spacers DR

Clearance and creepage dimensions for safety-insulated components may vary from country to country. Accordingly, test voltages of 2500/4000/7500 V between primary and secondary and to the core require creepages and clearances from 4 to 12 mm (0.157 to 0.472 inch).

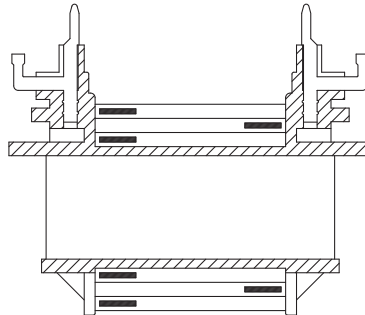


Spacers DR are advantageous for these applications. Examples are shown in the drawings below. Insulating tape between separate windings (across the total width including spacers) is required to achieve creepage and clearance dimensions.

With spacers DR on both sides of the winding creepage and clearance distances of 8 or 12 mm (0.315 or 0.472 inch) can be achieved.



With spacers DR only on one or the other side of the winding creepage and clearance distances of 4 or 6 mm (0.157 or 0.236 inch) can be achieved.



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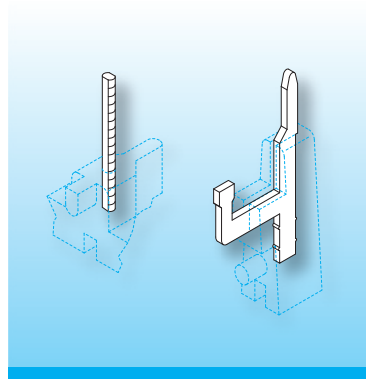
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Internet www.norwe.com

Survey of Solder-pins

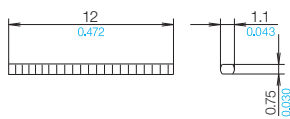
The survey below contains the standard solder-pins matched to the coilformers of the ETD/EER-Series and informs you about the exact dimensions of the solder-pins. The material used is tin bronze, tinned. Further shapes and types are included in our catalogue "Stamped and Pressed Components for Electronic Applications". In addition we also supply individual solder-pins and solder-tags to customers specification – please contact us.



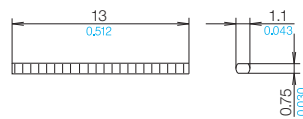
Survey of Solder-tags

The solder-tags below are the standard types matched to the coilformers of the ETD/EER-Series. The survey contains the exact dimensions of the solder-tags. The material used is brass, tinned.

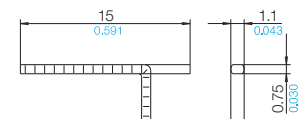
Special materials/designs on request, dimensions in mm/inch.



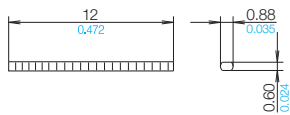
Solder-pin: z112/ua
73322-212



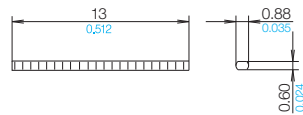
Solder-pin: z113/ua
73323-212



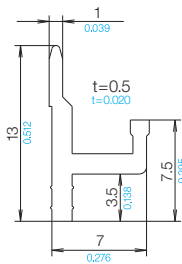
Solder-pin: h115/ua
73523-212



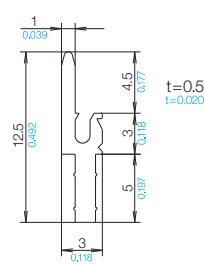
Solder-pin: z812/ua
73298-212



Solder-pin: z813/ua
73299-212



Solder-tag: s18/wd
75511-261



Solder-tag: s20/wd
75513-261



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 94	RTI Elec acc. UL
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
096	TE 250 F6	PA46 Polyamide 46	TE250F6 Stanyl DSM	E 47960	V-0 (0.35) V-0 (0.75)	+ 65° C +140° 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
417	x2g5/m25	PA66 Polyamide 66	A3X2G5 Ultramid BASF AG	E 41871	V-0 (0.81)	+120° 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 website www.norwe.de or can obtain them from us. You can call up all relevant yellow cards – also called UL cards – for different material qualities just by clicking on the respective UL-file-number.

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

RTI (Elec.) 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 ETD/EER Components

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 ETD/EER-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.



NORWE ONE GmbH

Paulstraße 5, Pernze
51702 Bergneustadt
Deutschland

Telefon	+49 (0) 27 63-807-0
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E-mail	verkauf@norwe.de
Internet	www.norwe.de www.norwe.eu

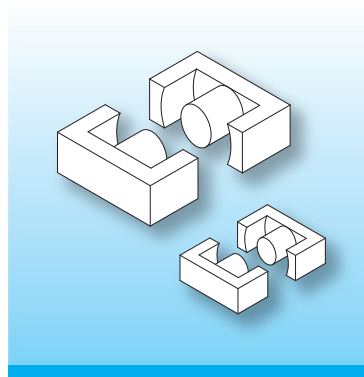
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North Canton, OH 44720-0511
United States of America

Telefon	+1-330 497-8113
E-mail	usa@norwe.com
Internet	www.norwe.com

ETD Ferrite Cores

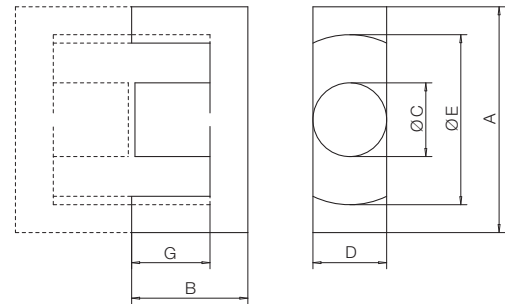
The tables below show the dimensions of the ferrite cores for the coilformers shown in this catalogue. The data can be used as an orientation in the design of application specific converters.



Specific details on the ferrite cores and materials should be available from the catalogues of the ferrite manufacturers.

l_e - effective length
 A_e - effective area
 A_{min} - core cross section
 V_e - effective volume

Magnetic Characteristics per set	l_e mm / inch	A_e mm ² / inch ²	A_{min} mm ² / inch ²	V_e mm ³ / inch ³
ETD 19/13/ 7	59.0 2.323	44.0 0.068	40.0 0.062	2600 0.159
ETD 24/14/ 8	67.0 2.638	60.0 0.093	54.0 0.084	4020 0.245
ETD 29/16/10	72.0 2.835	76.0 0.118	71.0 0.110	5470 0.334
ETD 34/17/11	78.6 3.094	97.1 0.151	87.0 0.135	7640 0.466
ETD 39/20/13	92.2 3.630	125.0 0.194	123.0 0.191	11500 0.702
ETD 44/22/15	103.0 4.055	173.0 0.268	167.0 0.259	17800 1.086
ETD 49/25/16	114.0 4.488	211.0 0.327	204.0 0.316	24000 1.465
ETD 54/27/19	127.0 5.000	280.0 0.434	280.0 0.434	35700 2.179
ETD 59/31/22	139.0 5.472	368.0 0.570	368.0 0.570	51500 3.143



Type	A	B	C	D	E	G
ETD 19/13/ 7	19,60±0,5 0.772±0.020	13.80-0.3 0.543-0.012	7.60-0.4 0.299-0.016	7.60-0.4 0.299-0.016	14.40+1.0 0.567+0.039	9.20+0.4 0.362+0.016
ETD 24/14/ 8	24.40±0.6 0.961±0.024	14.60-0.3 0.575-0.012	8.70-0.4 0.343-0.016	8.70-0.4 0.343-0.016	18.00+1.2 0.709+0.047	9.90+0.4 0.390+0.016
ETD 29/16/10	29.80±0.8 1.173±0.031	16.00-0.4 0.630-0.016	9.80-0.6 0.386-0.024	9.80-0.6 0.386-0.024	22.00+1.4 0.866+0.055	10.70+0.6 0.421+0.024
ETD 34/17/11	34.00±0.8 1.339±0.031	17.50-0.4 0.689-0.016	11.10-0.6 0.437-0.024	11.10-0.6 0.437-0.024	25.60+1.4 1.008+0.055	11.80+0.6 0.465+0.024
ETD 39/20/13	38.90±0.9 1.531±0.035	20.00-0.4 0.787-0.016	12.80-0.6 0.504-0.024	12.80-0.6 0.504-0.024	29.30+1.6 1.154+0.063	14.20+0.6 0.559+0.024
ETD 44/22/15	43.80±1.0 1.724±0.039	22.50-0.4 0.886-0.016	15.20-0.8 0.598-0.031	15.20-0.8 0.598-0.031	32.50+1.6 1.280+0.063	16.10+0.7 0.634+0.028
ETD 49/25/16	48.50±1.1 1.909±0.043	24.90-0.4 0.980-0.016	16.70-0.8 0.657-0.031	16.70-0.8 0.657-0.031	36.10+1.8 1.421+0.071	17.70+0.8 0.697+0.031
ETD 54/27/19	54.50±1.3 2.146±0.051	27.80-0.4 1.094-0.016	19.30-0.8 0.760-0.031	19.30-0.8 0.760-0.031	40.10+2.2 1.579+0.087	19.80+0.8 0.780+0.031
ETD 59/31/22	59.80±1.4 2.354±0.055	31.20-0.4 1.228-0.016	22.10-0.9 0.870-0.035	22.10-0.9 0.870-0.035	43.60+2.2 1.717+0.087	22.90+0.9 0.902+0.035

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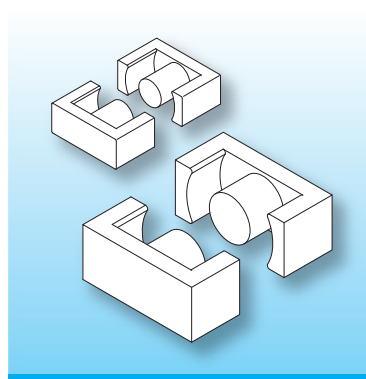
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ETD/EER Coilformers

EER Ferrite Cores

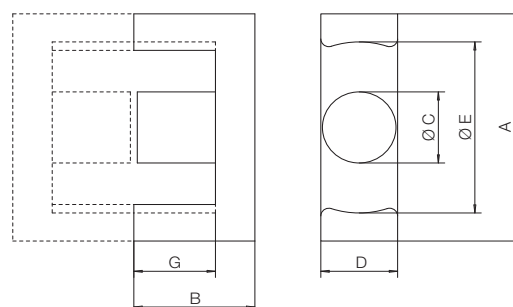
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EER 28/14/11	64.0 2.520	81.4 0.126	77.0 0.119	5260 0.321
EER 28/17/11	75.5 2.972	81.4 0.126	77.0 0.119	6140 0.375
EER 35/21/11	90.8 3.575	107.0 0.166	100.0 0.155	9710 0.593
EER 40/22/13	98.0 3.858	149.0 0.231	139.0 0.215	14600 0.891
EER 42/22/15	99.0 3.898	170.0 0.264	170.0 0.264	16800 1.025
EER 46/17/18	79.0 3.110	233.0 0.361	226.0 0.350	18400 1.123
EER 48/18/18	100.0 3.937	255.0 0.395	248.0 0.384	20300 1.239
EER 48/21/21	87.0 3.425	231.0 0.358	221.0 0.343	25500 1.556
EER 49/27/17	118.0 4.646	243.0 0.377	225.0 0.349	28700 1.751
EER 54/18/18	91.8 3.614	250.0 0.388	240.0 0.372	23000 1.404



Type	A	B	C	D	E	G
EER 28/14/11	28.55 ±0.55 1.124 ±0.022	14.0 ±0.20 0.551 ±0.008	9.9 ±0.25 0.390 ±0.010	11.40 ±0.35 0.449 ±0.014	21.75 ±0.50 0.856 ±0.020	9.75 ±0.40 0.384 ±0.016
EER 28/17/11	28.55 ±0.55 1.124 ±0.022	16.9 ±0.25 0.665 ±0.010	9.9 ±0.25 0.390 ±0.010	11.40 ±0.35 0.449 ±0.014	21.75 ±0.50 0.856 ±0.020	12.65 ±0.40 0.498 ±0.016
EER 35/21/11	35.00 ±0.65 1.378 ±0.026	20.7 ±0.20 0.815 ±0.008	11.3 ±0.25 0.445 ±0.010	11.40 ±0.35 0.449 ±0.014	26.15 ±0.55 1.030 ±0.022	14.75 ±0.35 0.581 ±0.014
EER 40/22/13	40.00 ±0.70 1.575 ±0.028	22.4 ±0.20 0.882 ±0.400	13.3 ±0.25 0.524 ±0.010	13.40 ±0.35 0.528 ±0.014	29.60 ±0.60 1.165 ±0.024	15.45 ±0.35 0.608 ±0.014
EER 42/22/15	42.00 +1 -0.7 1.654 +0.039 -0.028	21.8 -0.40 0.858 -0.016	15.0 -0.60 0.591 -0.024	15.00 -0.60 0.591 -0.024	30.40 +1.20 1.197 +0.047	15.60 +0.70 0.614 +0.028
EER 46/17/18	46.00 -2.00 1.811 -0.079	17.5 -0.40 0.689 -0.016	18.0 -0.80 0.709 -0.031	18.00 -0.80 0.709 -0.031	33.00 +1.60 1.299 +0.063	10.50 +0.50 0.413 +0.020
EER 48/18/18	48.00 ±1.00 1.890 ±0.039	18.0 ±0.20 0.709 ±0.008	17.6 ±0.40 0.693 ±0.016	17.60 ±0.40 0.693 ±0.016	36.80 ±0.80 1.449 ±0.031	11.45 ±0.25 0.451 ±0.010
EER 48/21/21	48.00 ±1.00 1.890 ±0.039	21.2 -0.40 0.835 -0.016	18.0 ±0.30 0.709 ±0.012	21.00 +0.3 -0.5 0.827 +0.012 -0.020	38.00 +0.50 -0.80 1.496 +0.020 -0.039	14.70 +0.70 0.579 +0.028
EER 49/27/17	49.00 ±1.00 1.929 ±0.039	27.0 ±0.30 1.063 ±0.012	17.2 ±0.40 0.677 ±0.016	17.20 ±0.40 0.677 ±0.016	37.30 ±0.90 1.469 ±0.035	18.50 ±0.40 0.728 ±0.016
EER 54/18/18	53.40 ±1.00 2.102 ±0.039	18.3 ±0.20 0.720 ±0.008	17.9 ±0.40 0.705 ±0.016	17.95 ±0.35 0.707 ±0.014	40.65 ±0.85 1.600 ±0.033	11.10 ±0.30 0.437 ±0.012

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All dimensions in mm/inch

The permissible deviations according to DIN 16901 apply as tolerances

Warranties:
refer to Terms and Conditions of Sale



Valid version of
data sheet online

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NORWE ONE GmbH

Paulstraße 5, Pernze
51702 Bergneustadt
Deutschland

Telefon +49 (0) 27 63-807-0
 WhatsApp +49 2763 807-0
 E-mail verkauf@norwe.de
 Internet www.norwe.de
 www.norwe.eu

NORWE Inc.

North Canton, OH 44720-0511
United States of America

Telefon +1-330 497-8113
 E-mail usa@norwe.com
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