NORATEL Isolating transformer ES710/...-T

Single-phase energy-efficient isolating transformers with extremely low inrush current for the design of medical IT systems

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Device features

- Inrush current $I_E = 1 \times \hat{I}_n$
- Built-in temperature sensor acc. to DIN 44081 (120 °C)
- Screen winding with led out insulated connection
- Protection class, IP00 (open design)
- Protection class I
- Reinforced insulation
- Classification of insulation: ta40/F
- Connections: cable ends
- Noise level < 35 dB (A) (no-load and nominal load)
- Vector group: IiO

Approvals

CE UKCA

Application and description

The patented design achieves an extremely low inrush current. This facilitates the design of the entire supply system (generator, battery-based additional power supply, back-up fuses).

The transformers of the ES710 series have reinforced insulation and comply with the requirements of DIN EN 61558-1 (VDE 0570-1) and DIN EN 61558-2-15 (VDE 0570-2-15). In addition, the transformers comply with the requirements of DIN VDE 0100-710 (VDE 0100-710) for IT systems in medical locations.

The windings are galvanically isolated. In order to minimise electrical interferences, an electrostatic screen is installed between the windings with an insulated connection led out to the equipotential bonding.

The transformers are available for horizontal and vertical installation. The associated mounting material ensures insulated installation as required by the standard (see DIN VDE 0100-710 (VDE 0100-710), para. 710.512.1.101).

The transformers are designed for use in dry locations. To ensure proper cooling, free air circulation must be ensured. If the ambient temperature rises above 40 °C, the power consumption must be adapted to the thermal conditions.
A PTC thermistor is provided for temperature monitoring in accordance with the applicable standards.

Any other use than that described in this manual is regarded as improper.

Enclosure

The transformers are to be installed in suitable distribution cabinets or separate transformer enclosures according to the mounting diagram.

Nominal power

According to IEC 60364-7-710, the nominal power of the transformer shall not be less than 0.5 kVA and shall be limited to 10 kVA.

According to DIN VDE 0100-710 (VDE 0100-710), the nominal power of the transformer shall not be less than 3.15 kVA and shall not exceed 8 kVA.

Overload protection

When isolating transformers are used to form a medical IT system in accordance with IEC 60364-7-710 (DIN VDE 0100-710), **overload protection is not permitted**. In this case, short-circuit protection is required. That means, emphasis is focused on the availability of the power supply; it is therefore essential to avoid disconnection on the occurrence of transient overload.
The protection of isolating transformers against overload and overtemperature shall be realised by using monitoring devices in accordance with para. 710.411.6.3.101.
The appropriate back-up fuses for short-circuit protection shall be selected from the table "Technical data".

Standards

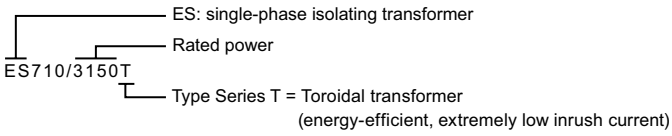
ES710 isolating transformers comply with the device standards and the regulations for installation:

- EN IEC 61558-1 (VDE 570-1)
- EN 61558-2-15 (VDE 570-2-15)
- IEC 60364-7-710 (DIN VDE 0100-710)

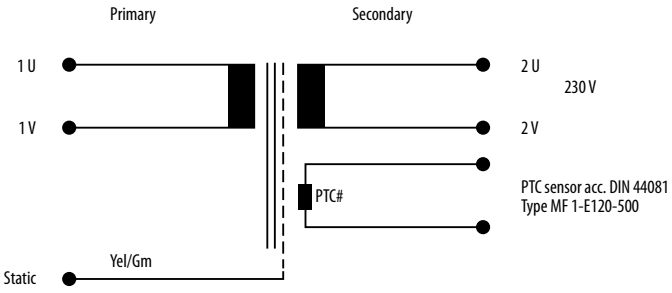
HAZARD warning:
When performing installation work in the environment of the transformer, it has to be ensured that the insulation coordination of the transformer is not influenced in a negative way.

For example, no ferromagnetic and conductive metal swarf may fall down close to the transformer. These can interfere with the function and the dielectric properties. The environment of the transformer must be kept clean and free from such particles during the entire operating time, and controls must be carried out at regular intervals.

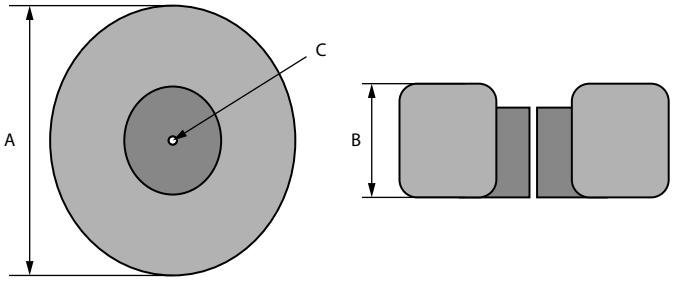
Nameplate



Wiring diagram



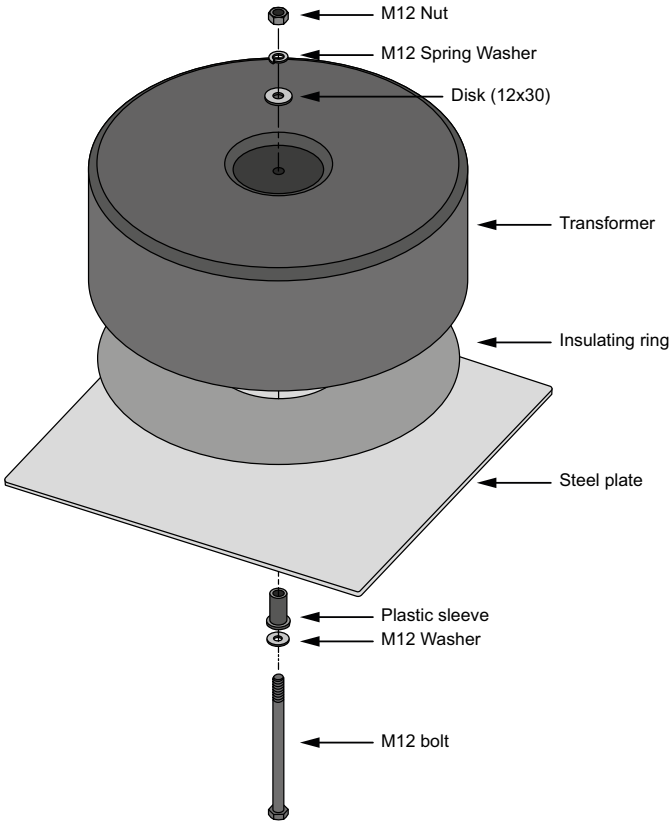
Dimension diagram



Ordering information

Dimensions (mm)			Cu weight (kg)	Weight (kg)	Type	Art. No.
A	B	C				
245	95	12	4.74	20	ES710/1600-T	B92090220
300	120	12	11.22	38	ES710/3150-T	B92090221
320	120	12	11.88	44	ES710/4000-T	B92090222
340	130	12	13.63	55	ES710/5000-T	B92090223
370	140	12	16.92	64	ES710/6300-T	B92090224
380	160	12	24.11	76	ES710/8000-T	B92090225
440	180	12	32.11	98	ES710/10000-T	B92090226

Mounting



For easier mounting of the transformer on a mounting plate, the bolt should be fixed in place

Accessories (already included in the scope of delivery of the transformer)

Description	Type	Art. No.
Mounting set for	ES710/1600-T	BF92090230
	ES710/3150-T	BF92090231
	ES710/4000-T	BF92090232
	ES710/5000-T	BF92090233
	ES710/6300-T	BF92090234
	ES710/8000-T	BF92090235
	ES710/10000-T	BF92090236

Included in the mounting set: M12 nut, M12 spring washer, disk (12x30), insulating ring, plastic sleeve, M12 washer, M12 bolt.

Technical data

Type	ES710/1600-T	ES710/3150-T	ES710/4000-T	ES710/5000-T	ES710/6300-T	ES710/8000-T	ES710/10000-T
Power/voltages/currents							
Rated power	1600 VA	3150 VA	4000 VA	5000 VA	6300 VA	8000 VA	10000 VA
Rated frequency	47…63 Hz						
Rated input voltage	AC 230 V						
Rated input current	7.3 A	14.2 A	17.9 A	22.3 A	28.1 A	35.6 A	44.3 A
Rated output voltage	AC 230 V						
Rated output current	7.0 A	13.7 A	17.4 A	21.7 A	27.4 A	34.8 A	43.5 A
Inrush current I_E	1 x I_n						
Leakage current	≤ 0.5 mA						
No-load input current I_0	≤ 3 %						
No-load output voltage U_0	≤ 235 V	≤ 233 V	≤ 233 V	≤ 232 V	≤ 233 V	≤ 232 V	≤ 232 V
Short-circuit voltage U_k	≤ 4.51 %	≤ 3.54 %	≤ 3.20 %	≤ 2.62 %	≤ 2.65 %	≤ 2.84 %	≤ 2.59 %
Environmental conditions							
Ambient temperature	≤ 40 °C						
Noise level (under no-load conditions and nominal load)	≤ 45 dB(A)						
Altitude	2000 m						
Other							
Insulation classification	t_a40/F						
Degree of protection	IP00						
Protection class	I						
Recommended fuse when used in accordance with DIN VDE 0100-710	13 A gL/gG	20 A gL/gG	25 A gL/gG	32 A gL/gG	40 A gL/gG	50 A gL/gG	63 A gL/gG
Rprimary ±5 %	0.48	0.18	0.12	0.09	0.07	0.05	0.03
Rsecondary ±5 %	0.56	0.22	0.15	0.10	0.08	0.06	0.04
Efficiency	0.953	0.963	0.967	0.971	0.972	0.972	0.975
Loss at 20…22 °C ambient temperature							
No-load power loss	7 W	12 W	14 W	20 W	23 W	26 W	30 W
Short-circuit power loss	71 W	110 W	123 W	128 W	160 W	200 W	225 W
Full load power loss	78 W	121 W	137 W	148 W	183 W	226 W	255 W
Cooling	AN						
Operating mode (Duty cycle)	100 %						
Cable cross-sections power section (length 600 mm)	AWG14/2.5 mm²	AWG14/2.5 mm²	AWG14/2.5 mm²	AWG10/6 mm²	AWG10/6 mm²	AWG8/10 mm²	AWG8/10 mm²
Cable cross-sections PTC sensor (length 400 mm)	AWG26/0.14 mm²						
Cable cross-sections shield (length 600 mm)	AWG12/4 mm²						

The values specified in the "Technical data" refer to a maximum ambient temperature of 40 °C, max. 2000 m above sea level, and a nominal frequency of 50 Hz.

BENDER
The Power in Electrical Safety©

Bender GmbH & Co. KG
Londorfer Straße 65 • 35305 Grünberg • Germany
Tel.: +49 6401 807-0 • info@bender.de • www.bender.de

BENDER Group