

ES710-GL Series

Isolating transformer for single phase medical IT systems

with -30%* heat dissipation loss and inrush current $I_E < 8 \times I_n$

Energy efficient Green Line (GL) Series



Isolating transformer

ES710-GL

Single-phase isolating transformers
for the design of medical IT systems



Device features

- Built-in temperature sensors acc. to DIN 44081 (120 °C)
- Screen winding with brought-out insulated connection terminal
- Insulated mounting angles
- Degree of protection, IP00 (open design)
- Degree of protection, IP23 (with enclosure)
- Protection class I
- Protection class II (option: encapsulated version)
- Reinforced insulation
- Classification of insulation: t_a40/B
- Connections: screw terminals
- Noise level < 35 dB (A) (no-load and nominal load)
- Vector group: liO
- Inrush current $I_E < 8 \times I_n$

Approvals



VDE test mark for ES...S-GL types, SN-GL types are not VDE certified,



Application and description

The transformers of the ES710 series have reinforced insulation and comply with the requirements of IEC 61558-1/DIN EN 61558-1 (VDE 0570-1) and IEC 61558-2-15/DIN EN 61558-2-15 (VDE 0570-2-15).

In addition, the transformers comply with the requirements of IEC 60364-7-710/DIN VDE 0100-710 (VDE 0100-710) for IT systems in medical locations. The windings are galvanically isolated. In order to minimize electrical interferences, an electrostatic screen is installed between the primary and secondary winding the lead out of which is connected to an insulated terminal for connection to the equipotential bonding.

The fixing angles are isolated from the transformer core in order to guarantee an isolated installation to comply with the requirements of DIN VDE 0100-710 (VDE 0100-710), para. 710.512.1.6.2).

The transformers are available for horizontal and vertical installation. Protection against corrosion is guaranteed by a complete resin impregnation.

The transformers are designed for use in dry locations. Transformers of the SK2 series are completely encapsulated and fulfil the requirements of protection class II.

Frequency/ratings

The transformers are designed for rated frequencies of 50...60 Hz. The values specified in the chapter "Technical data" refer to a maximum ambient temperature of 40 °C and a rated frequency of 50 Hz.

Temperature rise

Free air circulation must be ensured. An ambient temperature exceeding 40 °C will reduce the rated power. For temperature monitoring, a PTC thermistor is placed on each transformer leg and the leads are connected to the terminals.

Enclosure

Appropriate steel sheet enclosures, degree of protection IP 23, are available for all standard types of isolating transformers.

Rated power

According to DIN VDE 0100-710 (VDE 0100-710), the rated 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 para. 710.512.1.6.2 of DIN VDE 0100-710 (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 can be realized by using monitoring devices in accordance with para. 710.531.3.1. The appropriate fuses for short-circuit protection can be selected from the table "Technical data".

Standards

ES710 isolating transformers comply with the device standards and the regulations for installation: DIN EN 61558-1 (VDE 570-1), IEC 61558-1, DIN VDE 0100-710 (VDE 0100-710), DIN EN 61558-2-15 (VDE 0570-2-15), IEC 61558-2-15, IEC 60364-7-710.

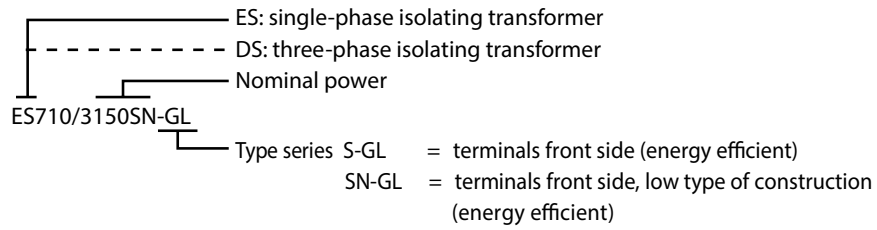


Hazard warning:

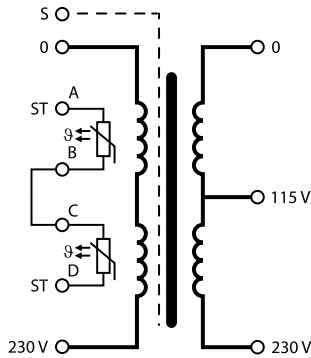
When performing installation work in the environment of the transformer, it has to be ensured that the insulation coordination of the transformer is not influenced in a negative way.

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

Nameplate

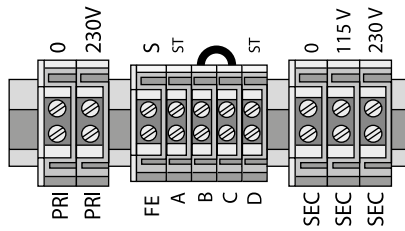


Wiring diagram



Terminal diagram

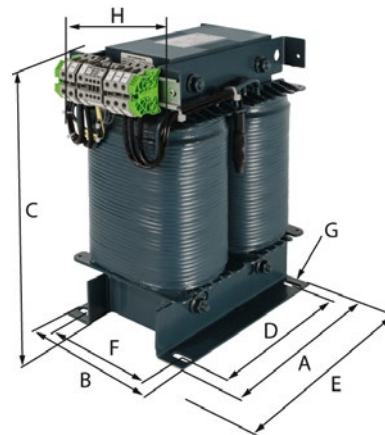
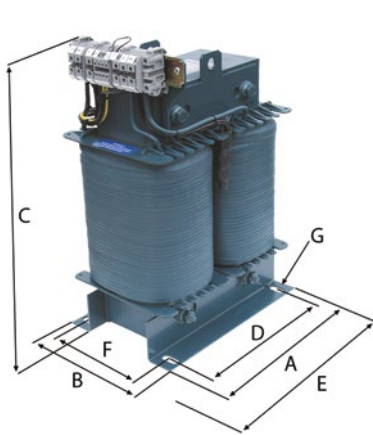
S-GL series, SN-GL series



Dimension diagram/type of construction

S-GL series
 Dimension E is the depth incl. terminal

SN-GL series



Ordering information

	Dimensions (mm)								Cu weight (kg)	Weight (kg)	Core U/I	Type	Art. No.
	A	B	C	D	E	F	G	H					
S-GL series	280	180	370	240	290	145	11 x 28		15	49	180/93	ES710/3150S-GL	B 9209 0061
	280	150	420	240	290	115	11 x 28		24	59	210/63	ES710/4000S-GL	B 9209 0062
	280	160	420	240	290	125	11 x 28		25	61	210/73	ES710/5000S-GL	B 9209 0063
	280	175	420	240	290	140	11 x 28		26	65	210/88	ES710/6300S-GL	B 9209 0064
	280	190	420	240	290	155	11 x 28		27	74	210/103	ES710/8000S-GL	B 9209 0065
	280	207	420	240	290	172	11 x 28		33	85	210/120	ES710/10000S-GL	B 9209 0066
SN-GL series	240	180	310	200	280	145	11 x 28	< 200	15	49	180/93	ES710/3150SN-GL	B 9209 0121
	280	150	360	240	320	115	11 x 28	< 170	24	59	210/63	ES710/4000SN-GL	B 9209 0122
	280	160	360	240	320	125	11 x 28	< 180	25	61	210/73	ES710/5000SN-GL	B 9209 0123
	280	175	360	240	320	140	11 x 28	< 195	26	65	210/88	ES710/6300SN-GL	B 9209 0124
	280	190	360	240	320	155	11 x 28	< 210	27	74	210/103	ES710/8000SN-GL	B 9209 0125
	280	205	373	240	330	175	11 x 28	< 205	33	85	210/120	ES710/10000SN-GL	B 9209 0126

Technical data E29>! E@Z9>eMqVd

Type	ES710/3150	ES710/4000	ES710/5000	ES710/6300	ES710/8000	ES710/10000
Power/voltages/currents						
Rated power	3150 VA	4000 VA	5000 VA	6300 VA	8000 VA	10000 VA
Rated frequency	50...60 Hz	50...60 Hz	50...60 Hz	50...60 Hz	50...60 Hz	50...60 Hz
Rated input voltage	AC 230 V	AC 230 V	AC 230 V	AC 230 V	AC 230 V	AC 230 V
Rated input current	14.2 A	18 A	22.5 A	28.5 A	36 A	45.3 A
Rated output voltage	AC 230/115 V	AC 230/115 V	AC 230/115 V	AC 230/115 V	AC 230/115 V	AC 230/115 V
Rated output current	13.7 A	17.4 A	21.7 A	27.4 A	34.7 A	43.5 A
Inrush current I_c GL version	$< 8 \times \hat{I}_n$	$< 8 \times \hat{I}_n$	$< 8 \times \hat{I}_n$	$< 8 \times \hat{I}_n$	$< 8 \times \hat{I}_n$	$< 8 \times \hat{I}_n$
Leakage current	≤ 0.5 mA	≤ 0.5 mA	≤ 0.5 mA	≤ 0.5 mA	≤ 0.5 mA	≤ 0.5 mA
No-load input current I_0 GL version	≤ 2 %	≤ 2 %	≤ 2 %	≤ 2 %	≤ 2 %	≤ 2 %
No-load output voltage u_0	≤ 236 V	≤ 233 V	≤ 234 V	≤ 235 V	≤ 233 V	≤ 233 V
Short-circuit voltage u_k	≤ 3 %	≤ 3 %	≤ 3 %	≤ 3 %	≤ 3 %	≤ 3 %
Environmental conditions						
Ambient temperature	≤ 40 °C	≤ 40 °C	≤ 40 °C	≤ 40 °C	≤ 40 °C	≤ 40 °C
No-load temperature rise	≤ 22 °C	≤ 22 °C	≤ 26 °C	≤ 31 °C	≤ 33 °C	≤ 36 °C
Full-load temperature rise	≤ 55 °C	≤ 53 °C	≤ 62 °C	≤ 67 °C	≤ 76 °C	≤ 65 °C
Noise level (under no-load conditions and nominal load)	≤ 35 dB(A)	≤ 35 dB(A)	≤ 35 dB(A)	≤ 35 dB(A)	≤ 35 dB(A)	≤ 35 dB(A)
Other						
Insulation classification	t_a40/B	t_a40/B	t_a40/B	t_a40/B	t_a40/B	t_a40/B
Degree of protection	IP00	IP00	IP00	IP00	IP00	IP00
Protection class	I/II*	I/II*	I/II*	I/II*	I/II*	I/II*
Core U/I GL version	180/93	210/63	210/73	210/88	210/103	210/120
Recommended use when used in accordance with DIN VDE 0100-710	25 A gL/gG	35 A gL/gG	50 A gL/gG	50 A gL/gG	63 A gL/gG	80 A gL/gG
Recommended use when used in accordance with DIN VDE 0100-710 GL version	25 A gL/gG	25 A gL/gG	35 A gL/gG	50 A gL/gG	50 A gL/gG	63 A gL/gG
Induction	0.86 T	0.94 T	1 T	1.05 T	1 T	1.1 T
$R_{primary}$	0.255 Ω	0.135 Ω	0.100 Ω	0.080 Ω	0.064 Ω	0.050 Ω
$R_{secondary}$	0.230 Ω	0.110 Ω	0.095 Ω	0.070 Ω	0.056 Ω	0.036 Ω
Efficiency	95 %	96 %	96 %	96 %	96 %	96 %
Documentation number: D00109						
Loss at 20...22 °C ambient temperature						
Fe loss (iron loss) GL version	< 18 W	< 19 W	< 25 W	< 33 W	< 37 W	< 42 W
Cu loss (copper loss) GL version	< 95 W	< 80 W	< 100 W	< 125 W	< 160 W	< 210 W
Heat dissipation loss at 40 °C ambient temperature and 100 % continuous load						
Heat dissipation loss GL version	< 135 W	< 115 W	< 145 W	< 185 W	< 230 W	< 295 W
* Option: completely encapsulated version						



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