



Compressor set

Equipment Under Test (EUT)

Type 028

Type 047

Type 052

Type 085

Electromagnetic compatibility – Guidance and manufacturer's declaration DIN EN 60601-1-2:2007 (IEC 60601-1-2:2007)

1 ELECTROMAGNETIC COMPATIBILITY

Medical electrical devices are subject to special precautionary measures in particular regarding EMC with the installation and operation.

Portable and mobile HF-communication devices e.g. mobile phone can affect medical electrical devices.

Use of accessories and lines other than those indicated can lead to increased transmission or reduced noise immunity of the equipment. The equipment has to be operated exclusively with original accessories.

The device should not be used beside or on top of other equipment. If such use is unavoidable, the device should be observed to verify normal operation in the configuration in which it will be used.

The EUT is intended for use in the electromagnetic environment specified below. The customer or the user of the EUT must ensure that it is used in such environment.

There is no essential performance.


2 ELECTROMAGNETIC EMISSIONS

Emission test	Compliance	Electromagnetic environment – Guidance
RF emissions CISPR 11	Group 1	EUT uses RF energy only for its internal function. Therefore, RF-emission is very low and not likely to cause any interference with nearby electronic equipment.
	Class B	The EUT is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Not applicable	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Passed	

Table 1 of DIN EN 60601-1-2:2007 (IEC 60601-1-2:2007)

3 ELECTROMAGNETIC IMMUNITY

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient / burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input / output lines	±2 kV for power supply lines ±1 kV for input / output lines	Mains power quality should be similar to that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV common mode ±2 kV differential mode	±1 kV common mode ±2 kV differential mode	Mains power quality should be similar to that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% U_T ¹⁾ (>95% dip of U_T) for 1/2 cycle 40% U_T (60% dip of U_T) for 5 cycles 70% U_T (30% dip of U_T) for 25 cycles <5% U_T (>95% dip of U_T) for 5 s	<5% U_T ¹⁾ (>95% dip of U_T) for 1/2 cycle 40% U_T (60% dip of U_T) for 5 cycles 70% U_T (30% dip of U_T) for 25 cycles <5% U_T (>95% dip of U_T) for 5 s	Mains power quality should be similar to that of a typical commercial or hospital environment. When the user of the Medical Electrical Equipment continued function also calls in the event of disruption of supply, it is recommended the EUT from an uninterruptible power supply or a battery.
Power frequency (50 Hz/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Conducted RF IEC 61000-4-6	3 V_{eff} 150 kHz to 80 MHz	3 V_{eff} 150 kHz to 80 MHz	Portable and mobile RF communication equipment should be used no closer to any part of the EUT, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – Guidance
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	3 V/m	<p>Recommended separation distance: $d = 3,5/3 * \text{SQRT}(P)$ $d = 3,5/3 * \text{SQRT}(P)$ 80 MHz to 800 MHz $d = 7/3 * \text{SQRT}(P)$ 800 MHz to 2,5 GHz where "P" is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey²⁾, should be less than the compliance level in each frequency range³⁾. Interference may occur in the vicinity of equipment marked with the following symbol:</p> 

Tables 2 and 4 of DIN EN 60601-1-2:2007 (IEC 60601-1-2:2007)

1) U_T is the AC mains voltage prior to application of the test level.

2) Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy.

To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the EUT is used exceeds the applicable RF compliance level above, the EUT should be observed to verify normal operation.

If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the EUT.

3) Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Note 1:

At 80 Hz and 800 MHz, the higher frequency range applies.

Note 2:

These guidances may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

4 RECOMMENDED SEPARATION DISTANCES

For portable and mobile RF communication equipment and the EUT.

The EUT is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the EUT can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communication equipment (transmitters) and the EUT as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter [W]	Separation distance according to frequency of transmitter in [m]		
	150 kHz to 80 MHz $d = (3.5/3) \times \text{SQRT}(P)$	80 MHz to 800 MHz $d = (3.5/3) \times \text{SQRT}(P)$	800 MHz to 2.5 GHz $d = (7/3) \times \text{SQRT}(P)$
0.01	0.2 m	0.2 m	0.3 m
0.1	0.4 m	0.4 m	0.8 m
1	1.2 m	1.2 m	2.3 m
10	3.8 m	3.8 m	7.3 m
100	12 m	12 m	23 m

Table 6 of DIN EN 60601-1-2:2007 (IEC 60601-1-2:2007)

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres [m] can be determined using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts [W] according to the transmitter manufacturer.

Note 1:

At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2:

These guidances may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.



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