Coupling Networks – CN xx

According to IEC / EN 61000-4-16

Coupling networks for powerline conductors

For each wire the coupling network for powerline conductors is made of a serious connection of a resistor and a capacitor. Coupling networks of each wire are connected to establish the coupling network of the corresponding M-type.

Value of the capacitor is C = 1,0 µF.

Value of the resistor is R = 100 x n Ω, where n is the number of the wires (n ≥ 2).

Values of capacitor and resistor shall match with a limiting deviation of 1 %.

For direct current tests the 1,0 µF capacitors shall be short circuited.

For safety reasons coupling networks M2 and M3 are separated units for DC tests and AC tests. Short circuiting the capacitor by mistake while an alternating current is applied inevitably destroys the coupling network.

Each connection which is not under test must be grounded (SW2). For this reason an isolated BNC jumper plug is included.

Coupling networks for communication lines

For balanced communication lines and similar lines a "T" network is used.

The "T" network is made of capacitors (C = 4,7 µF), resistors (R = 200 Ω) and inductances (L = 2 x 38 mH / bifilar winding).

All components shall match with a limiting deviation to ensure that there is no significant reduction of the differential to common mode conversion loss of the EUT .

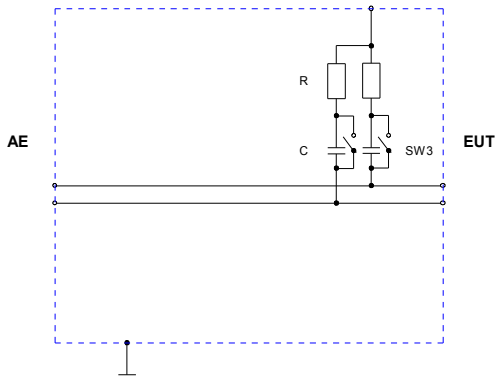
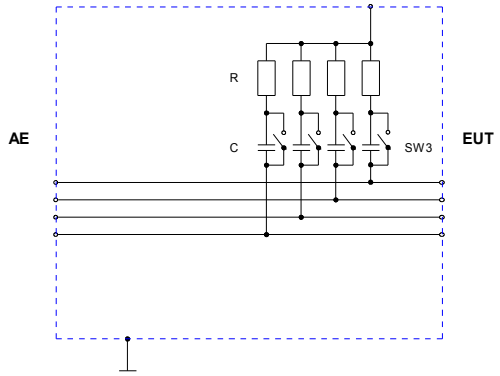
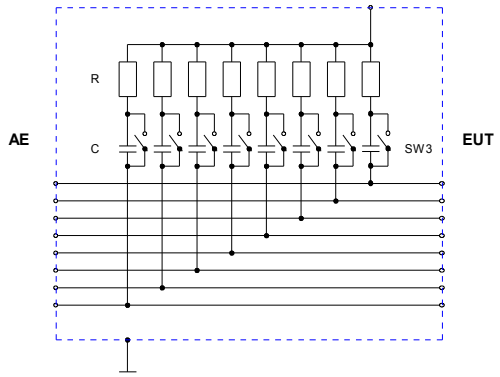
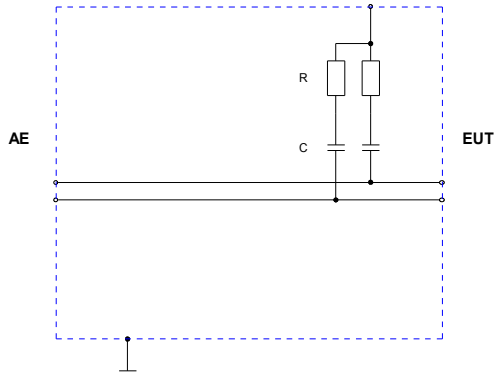
For direct current tests the 1,0 µF capacitors shall be short circuited.

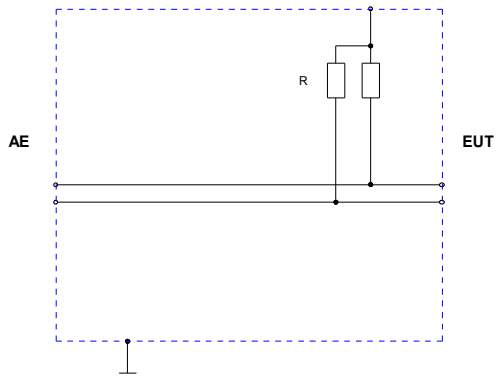
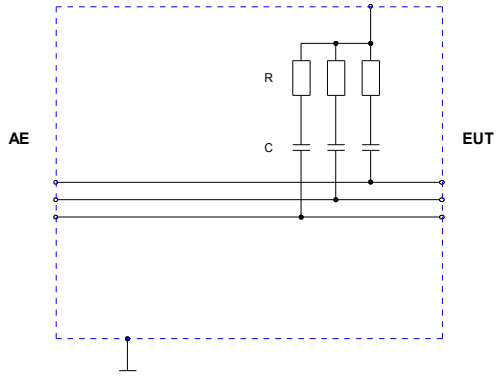
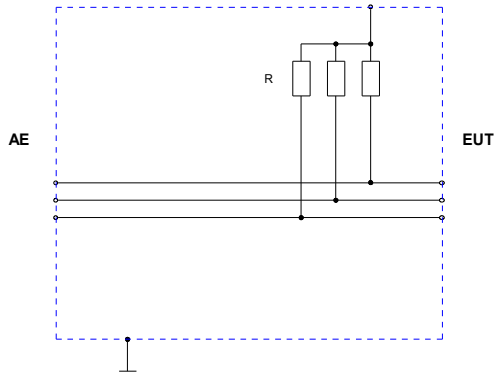
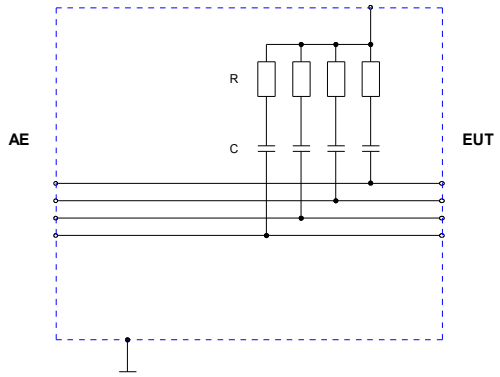
Each connection which is not under test must be grounded (SW2). For this reason an isolated BNC jumper plug is included.

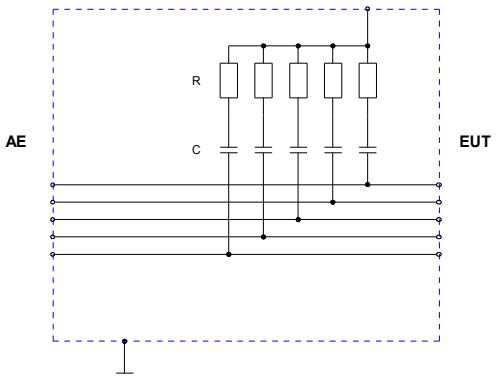
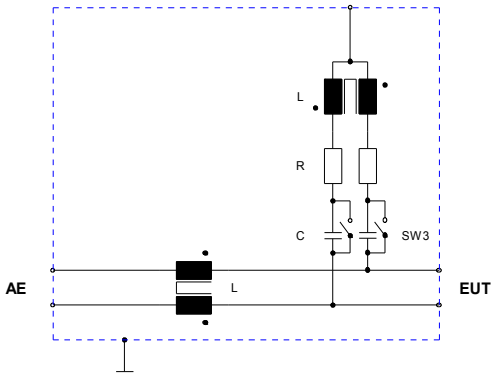
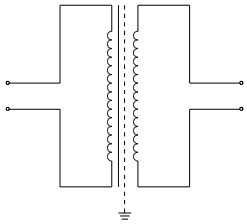
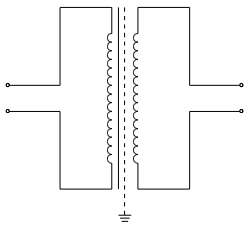
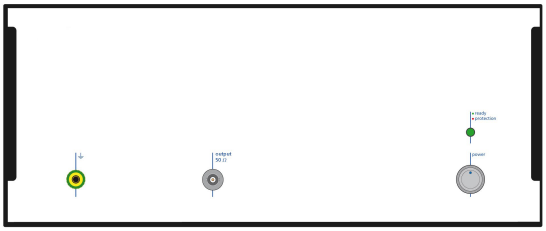
Important safety instructions for immunity tests according to EN 61000-4-16

Please, notice the following safety instructions for immunity tests on AC and DC supply lines (AC > 30 V / DC > 60 V):

- The coupling network must be in tight connection to the ground reference plane!
- An additional cable connection between coupling network baseplate (threaded bolts) and ground reference plane is recommended!
- Always ground the coupling network before connecting any power line to the AE-port!
- Never open the ground connection between coupling network and ground reference plane before removing the supply lines from the AE-port!

Type	Simplified diagram	Description
AF2		Coupling network acc. EN 61000-4-16 for unscreened, unbalanced lines Frequency range: DC / 15 Hz to 150 KHz Test level: 50 V cont. EUT / AE - port: 50 V / 0,5 A Connector EUT / AE: clamp terminal For DC tests the capacitors are short circuited by a rocker switch.
AF4		Coupling network acc. EN 61000-4-16 for unscreened, unbalanced lines Frequency range: DC / 15 Hz to 150 KHz Test level: 50 V cont. EUT / AE - port: 50 V / 0,5 A Connector EUT / AE: clamp terminal For DC tests the capacitors are short circuited by a rotary switch.
AF8		Coupling network acc. EN 61000-4-16 for unscreened, unbalanced lines Frequency range: DC / 15 Hz to 150 KHz Test level: 50 V cont. EUT / AE - port: 50 V / 0,5 A Connector EUT / AE: clamp terminal For DC tests the capacitors are short circuited by a rotary switch.
M2/AC		Coupling network acc. EN 61000-4-16 for unscreened powerline conductors Frequency range: 15 Hz to 150 KHz Test level: 50 V cont.; 300 V (1sec) power frequency EUT / AE - Connector: 250 VAC / 32 A (50 VDC / 32 A) Connector EUT / AE: 4mm safety banana jack For AC tests only

Type	Simplified diagram	Description
M2/DC		Coupling network acc. EN 61000-4-16 for unscreened powerline conductors Frequency range: DC Test level: 50 V cont. EUT / AE - port: 50 V / 32 A Connector EUT / AE: 4mm safety banana jack For DC tests only!
M3/AC		Coupling network acc. EN 61000-4-16 for unscreened powerline conductors Frequency range: 15 Hz to 150 KHz Test level: 50 V cont.; 300 V (1sec) power frequency EUT / AE - Connector: 250 VAC / 32 A (50 VDC / 32 A) Connector EUT / AE: 4mm safety banana jack For AC tests only
M3/DC		Coupling network acc. EN 61000-4-16 for unscreened powerline conductors Frequency range: DC Test level: 50 V cont. EUT / AE - port: 50 V / 32 A Connector EUT / AE: 4mm safety banana jack For DC tests only!
M4/AC		Coupling network acc. EN 61000-4-16 for unscreened powerline conductors Frequency range: 15 Hz to 150 KHz Test level: 50 V cont.; 300 V (1sec) power frequency EUT / AE - Connector: 250 VAC / 32 A Connector EUT / AE: 4mm safety banana jack For AC tests only

Type	Simplified diagram	Description
M5/AC		Coupling network acc. EN 61000-4-16 for unscreened powerline conductors Frequency range: 15 Hz to 150 KHz Test level: 50 V cont.; 300 V (1sec) power frequency EUT / AE - Connector: 250 VAC / 32 A Connector EUT / AE: 4mm safety banana jack For AC tests only
T2		Coupling network acc. EN 61000-4-16 for unscreened, balanced lines Frequency range: DC / 15 Hz to 150 KHz Test level: 50 V cont. EUT / AE - port: 50 V / 0,5 A Connector EUT / AE: clamp terminal For DC tests the capacitors are short circuited by a rocker switch. Differential to common mode conversion loss (15 Hz to 150 kHz): 60 dB Insulation: > 1 kV (50/60 Hz)
IT-6		Isolating transformer 1380 VA Prim: 230 V Sec: 230 V / 6 A Differential to common mode conversion loss (15 Hz to 150 kHz): 60 dB Insulation: > 1 kV (50/60 Hz)
IT-16		Isolating transformer 3680 VA Prim: 230 V Sec: 230 V / 16 A Differential to common mode conversion loss (15 Hz to 150 kHz): 60 dB Insulation: > 1 kV (50/60 Hz)
PGA 1330		PGA 1330 Immunity generator for short term tests up to 300 V; acc. EN 61000-4-16; USB port; Application software WIN NT/2000/XP/Vista

	Coupling network
CN AF2	Coupling Network acc. to EN61000-4-16; for unscreened nonbalanced lines; DC / 15 Hz to 150 kHz; connector: clamp terminal
CN AF4	Coupling Network acc. to EN61000-4-16; for unscreened nonbalanced lines; DC / 15 Hz to 150 kHz; connector: clamp terminal
CN AF8	Coupling Network acc. to EN61000-4-16; for unscreened nonbalanced lines; DC / 15 Hz to 150 kHz; connector: clamp terminal
CN M2 AC	Coupling Network acc. to EN61000-4-16; for unscreened supply lines; 32A; 15 Hz to 150 kHz; connector: 4 mm Safety Banana Jacks
CN M2 DC	Coupling Network acc. to EN61000-4-16; for unscreened DC supply lines; 50V / 32A; connector: 4 mm Safety Banana Jacks
CN M3 AC	Coupling Network acc. to EN61000-4-16; for unscreened supply lines; 32A; 15 Hz to 150 kHz; connector: 4 mm Safety Banana Jacks
CN M3 DC	Coupling Network acc. to EN61000-4-16; for unscreened DC supply lines; 50V / 32A; connector: 4 mm Safety Banana Jacks
CN M4 AC	Coupling Network acc. to EN61000-4-16; for unscreened supply lines; 32A; 15 Hz to 150 kHz; connector: 4 mm Safety Banana Jacks
CN M5 AC	Coupling Network acc. to EN61000-4-16; for unscreened supply lines; 32A; 15 Hz to 150 kHz, 4mm Safety Banana Jacks
CN T2	Coupling Network acc. to EN61000-4-16; for unscreened balanced lines; DC / 15 Hz to 150 kHz; connector: clamp terminal
	Isolation transformer
CN IT 6A	Isolating transformer 1380 VA; Prim: 230 V; Sec: 230 V / 6 A; Differential to common mode conversion loss (15 Hz to 150 kHz): 60 dB; Insulation: > 1 kV (50/60 Hz); steel plate housing
CN IT 16A	Isolating transformer 3680 VA; Prim: 230 V; Sec: 230 V / 16 A; Differential to common mode conversion loss (15 Hz to 150 kHz): 60 dB; Insulation: > 1 kV (50/60 Hz); steel plate housing
	Amplifier with integrated generator
PGA 1240	Precision power generator ± 50V / ± 5A; including software