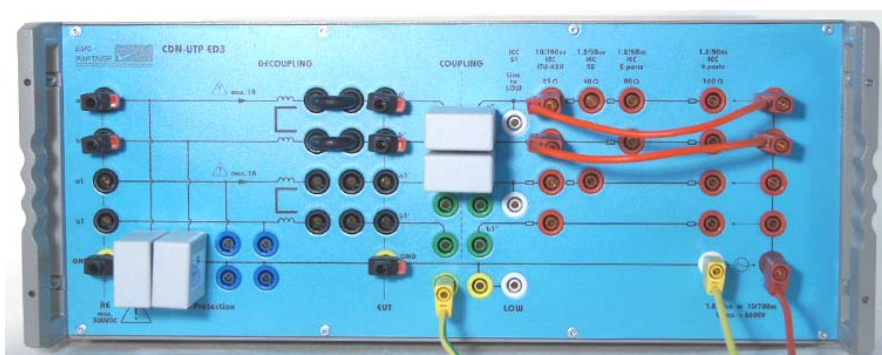


Technical Specification

E-CDN-UTP Ed3.doc
Revised: 29. August 2013

1 CDN Network Type CDN-UTP ED3

(Unshielded Twisted Pairs)



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1.1 Introduction

The CDN-UTP ED3 is a sophisticated coupling and de-coupling network for superimposing surge impulses on balanced communication lines in accordance with IEC61000-4-5 ED3 Figure: 9, unshielded unsymmetrical interconnection lines; Figure 10 unshielded symmetrical interconnection lines, ITU-K20, K21 and FCC part 68. Figure A.4

It is designed for 1.2/50us and 10/700us pulses up to 6.6kV

2 General

2.1 Application range

The CDN-UTP ED3 is specially designed to fulfil the requirements of modern high speed communication lines. For the following communication ports the CDN-UTP ED3 is recommended and tested :

Application	Typical data	Remarks
CDN-UTP8 ED3		
Gigabit Ethernet	10Mbits/s, 100Mbits/s, 1Gbit/s 8 wires, 4 pairs	IEEE 802. RJ45 connectors coupling and decoupling with GDT Needed PN 105839 ADAPTER BOX RJ45
Ethernet : 10Base-T	100ohm, 4wire 10Mbit/s and 100Mbit/s	IEEE 802.3 RJ45 connectors coupling and decoupling with GDT Needed PN 105839 ADAPTER BOX RJ45
USB	90ohm, 2-wire + 2-wire supply 5V, 200mA 1.5Mbit/s, 12Mbit/s, 480Mbit/s	USB = Universal Serial Bus RJ45 connectors coupling and decoupling with GDT Needed PN 105839 ADAPTER BOX RJ45
CDN-UTP ED3 and	CDN-UTP8 ED3	
Analogue subscriber lines (a/b-line)	600ohm, 2-wire 24V..60V, 20..100mA, 100Hz..3.4kHz (50Hz..16kHz)	Including modems up to 56kBit/s
ISDN	100ohm, 4-wire 0.75V (supply 40V) 25kHz..80kHz(120kHz) 192Kbit/s	Integrated Services Digital Network (ISDN) S0-Bus (CCITT 1.430)
ADSL resp. xDSL	100ohm, 4-wire, 1 V 25kHz..1104kHz up to 8MBit/s	ADSL = Asymmetric Digital Subscriber Line. Different protocols for 2- and 4-wire at different data-rates
Interbus	4-wire + 1wire ground 5V, 800mA up to 500kBit/s	RS-485
Profibus	2-wire up to 500kBit/s	RS-485 EN50170
ASI	2-wire 2V, 100mA	ASI = Actor Sensor Interface
Can-Bus	2-wire	RS-485
RS-432	2-wire	20k, 115kbits/s

2.2 Standards,

FCC part 68 - Connection of terminal equipment to the telephone network - subpart D Conditions for registration (Edition 10-1-00)

IEC61000-4-5: 2013, Electromagnetic compatibility (EMC) - Part 4 Testing and measurement techniques – Section 2: SURGE immunity tests

ITU-T K.20 Resistibility of telecommunication switching equipment to overvoltages and overcurrents

ITU-T K.21 Resistibility of subscriber's terminals to overvoltages and overcurrents

ITU-T K.22 Overvoltage resistibility of equipment connected to an ISDN T/S bus

ITU-T K.44 Resistibility tests for telecommunication equipment exposed to overvoltages and overcurrents - Basic Recommendation

3 Function of the Network

The third edition of IEC61000-4-5 cancels and replaces the second edition published in 2005, and constitutes a technical revision.

This edition includes the following significant technical additions with respect to the previous edition:

- a) New Annex E on mathematical modelling of surge waveforms;
- b) New Annex F on measurement uncertainty;
- c) New Annex G on method of calibration of impulse measuring systems;
- d) New Annex H on coupling/Decoupling surges to lines rated above 200 A.

Moreover while surge test for ports connected to outside telecommunication lines was addressed in sub-clause 6.2 of Edition 2, in this Edition 3 the normative Annex A is fully dedicated to this topic. In particular it gives the specifications of the 10/700 μ s combined wave generator.

3.1 De-coupling part

Current compensated inductor :		
Common mode inductance	20mH	
Stray inductance	12 μ H	
DC-Resistance	3.5ohm	each line
Maximum unbalance	< 0.003ohm	line to line
Line capacitance	2nF	line to line
Stray capacitance	150pF	line to ground
Signal line characteristics		
Number of lines	up to 8 (one up to 4 pairs balanced)	
Maximum signal current per line	1A ac or dc	Sum of all lines max. 2A
Signal voltage range	0V .. 300Vdc	No switching contacts inside CDN-UTP ED3
Signal transmission		
Maximum pulse voltage	6400V	1.2/50 μ s or 10/700 μ s
Saturation	No relevant saturation up to 6kV 10/700 μ s	V x T > 1Vs
Frequency response		
Insertion loss	< 1dB	at 1MHz
Near end crosstalk (NEXT)	> 40dB	at 1MHz
Transmission line impedance	100ohm	
Bandwidth (50 ohm source/load)	>5MHz	- 3dB
Bandwidth (100 ohm source/load)	>10MHz	- 3dB
Bandwidth (600 ohm source/load)	>300kHz	- 3dB
Protection of auxiliary equipment :		
Selectable		
1) 90V gas arrester (GTD) PN 104409 ADAPTER BOX 90VG	V signal < 90V V residual peak < 300V V clamping = 0V Insertion capacitance < 2pF	V signal = maximum usable wanted signal voltage
2) adapter for other clamp elements PN 104412 EMPTY BOX	Empty boxes For customer design	included

3.2 Coupling part

Coupling resistors : Selectable		
Unsymmetric lines		
2 x 40 Ohm	IEC 1,2/50µs up to 4 wires	Up to 6.6kV
Symmetric lines (pairs)		
2 x 80 ohm	IEC 1.2/50us on 2-wires	up to 6.6kV
4 x 160 ohm	IEC 1.2/50us on 4-wires	up to 6.6kV
IEC/ITU 10/700 µs		
4 x 25 ohm	ITU-K20	up to 6.6kV
Coupling elements : Selectable		
1) direct		
2) 90V gas arrestor (GTD) PN 104409 ADAPTER BOX 90VG	V signal maximum < 90V V surge minimum > 1000V Insertion capacitance < 2pF	
3) 05µF capacitor PN 106526 ADAPTER BOX C05	V signal maximum < 300V V surge minimum > 250V	
4 adapter for other clamp elements PN 104412 EMPTY BOX	Empty boxes For customer design	included

Coupling elements : IEC/EN61000-4-5 ED3 recommends a gas discharge tube (GTD) of 90V for unsymmetric and symmetric operated lines. The 0.5µF is specified in some product standard.

3.3 Mechanical dimensions, climatic conditions

CDN type	Dimensions [mm]	Weight [kg]	Versions
	width x depth x height		
CDN-UTP ED3	450 x 600 x 190	39	19" Rack 4 UH

Environment conditions		
Temperature range	°C	0 to 35 °C
Humidity	rh %	25 to 80%
Pressure	kPa	86 to 106

4 Accessories and use with EMC PARTNER generators

4.1 Accessories to CDN-UTP ED3

Accessories to CDN-UTP ED3 (Article No. 106426)

Qty	PN	Description	Weight (kg)	Length (cm)	Width (cm)	Height (cm)
9	100284	MC bridge black	0	3.8	2.8	0.8
10	100296	MC clip connector insulated, black	0	0	0	0
1	103016	Plastic bag 100x125mm	0	0	0	0
1	103016	Plastic bag 100x125mm	0	0	0	0
1	103026	Plastic pack small	0.01	25	15	0
1	103026	Plastic pack small	0.01	25	15	0
1	103026	Plastic pack small	0.01	25	15	0
1	103026	Plastic pack small	0.01	25	15	0
1	103068	MC safety cable with protected banana plug, yellow	0	50	0	0
1	103069	MC safety cable with protected banana plug, red	0	50	0	0
1	103088	White EMC PARTNER Case	1.7	44	38	13
1	103089	MC safety cable with protected banana plug, yellow/green	0	50	0	0
4	103097	MC safety cable with protected banana plug, red	0	15	0	0
1	103098	MC safety cable with protected banana plug, white	0	15	0	0
8	104409	Box 90V GDT to CDN-UTP or CDN-UTP8.	0	0	0	0
4	104412	Empty box to CDN-UTP or CDN-UTP8.	0	0	0	0
1	106526	Box 90V 0.5µF to CDN-UTP ED3 or CDN-UTP8 ED3.	0	0	0	0

4.2 CDN-UTP ED3 network can be used with following EMC-PARTNER generators

MIG0603IN2	1.2/50µs and 10/700µs up to 6kV	
MIG0603IN3	1.2/50µs and 10/700µs up to 6kV	
TRA3000	1.2/50µs up to 4kV	
IMU3000 Versions with S6-T6 circuits	1.2/50µs and 10/700µs up to 6kV	

4.3 Other EMC-PARTNER coupling, de-coupling networks

CDN-UTP8 Ed3	1.2/50us and 10/700us up to 6kV for 4 pairs (8 lines)
CDN-KIT1000 Ed3	1.2/50 μ s surge coupling-decoupling network for unbalanced data lines in accordance with IEC 61000-4-5.

