CDN T SERIES
COUPLING / DECOUPLING NETWORK (CDN) FOR UNSCREENED BALANCED PAIRS

CDN T400A basic network and ADR T444

- ■ Coupling networks designed for IEC / EN 61000-4-6
- ■ T series for unscreened balanced pairs
- ■ 1 mm banana sockets for CDN T2-10 and CDN T4-10
- ■ D Sub 25 adapters to RJ11 and RJ45 sockets for CDN T2xxA, CDN T4xxA and CDN T8 products

IEC / EN 61000-4-6 specifies the design and performance of a range of coupling / decoupling networks (CDNs). Each CDN is specific to the type of cable and the intended signal carried on the cable. Teseq offers an extensive range of CDNs which fully comply with the requirements of the standard and provide a simple and reliable method of injecting RF energy into the equipment under test (EUT).

CDN T210A, T240A, T246A, T410A, T411A, T440A, T442A, T443A, T444A, T445A and T4A
This series is specially designed for testing single pair, with CDN T4xxA single and double pair, applications. Each CDN T2xxA and CDN T4xxA consist of one basic network (CDN T200A and CDN T400A) with D-Sub-25- connectors. The connections to a different pin configurations of the modular connectors (RJ11 / RJ45) in use is performed in adapters. An adapter set (ADR Txxx) consists of two same connecting adapters for the EUT- and AE- port and at least one set is part of each CDN of this series. Additional adapter sets are available. Teseq offers different kinds of CDN, prepared for the most important fixed pin- arrangements of RJ11 / RJ45- connectors and also versions for customer's specific configuration.

CDN T8
The CDN T8 is designed for tests on up to four unscreened balanced pairs. It consists of one basic network (CDN T800) with D-Sub-25- connectors and two adapter sets (ADR Txxx) for RJ11 and RJ45. An adapter set (ADR Txxx) has two similar connecting adapters for the EUT- and AE- port. The ADR T800 gives the connection to RJ45 sockets with pin-arrangements of EIA / TIA T568A respectively T568B. The adapter set ADR T811 offers application for RJ11.

CDN T2-10, T4-10 and T8-10
This series is specially designed for testing at a 10 kHz start frequency as required by standards like Namur NE21 and IEC 60945. Further CDN T2-10 and CDN T4-10 allow testing up to 300 MHz as required by CISPR 15. CDN T8-10 is made for four unscreened balanced pairs, allows testing up to 230 MHz and supports Ethernet with 1000BaseT. EUT and AE port are supplied with RJ45. CDN T2-10 and CDN T4-10 are supplied with 1 mm banana sockets for easy adaptation for different single pair, with CDN T4-10 double pair, applications.

CDN T4-10

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COUPLING / DECOUPLING NETWORK (CDN) FOR UNSCREENED BALANCED PAIRS

Technical specifications T type

Model	CDN T8-10	CDN T4-10	CDN T2-10
Frequency range:	10 kHz to 230 MHz	10 kHz to 300 MHz	10 kHz to 300 MHz
Line parameters: Connector (EUT and AE port): Application: PoE:	4 pairs RJ45 1000BaseT PoE+	2 pairs 1 mm banana 10/100BaseT, ISDN PoE+	1 pair 1 mm banana Telecom, UP0 -
Power ratings (EUT and AE port) AC max. voltage (line to ground): DC max. voltage (line to ground): Current max.: Test voltage:	63 V 100 V 400 mA (line), 800 mA (pair) 200 VDC, 2 s	63 V 100 V 400 mA (line), 800 mA (pair) 200 VDC, 2 s	63 V 100 V 400 mA (line) 200 VDC, 2 s
Common mode impedance (EUT port) 10 kHz to 26 MHz: 26 MHz to 80 MHz: 80 MHz to (230) 300 MHz:	150 Ω ±20 Ω 150 Ω +60 Ω/-45 Ω 150 Ω +60 Ω/-60 Ω	150 Ω ±20 Ω 150 Ω +60 Ω/-45 Ω 150 Ω +60 Ω/-60 Ω	150 Ω ±20 Ω 150 Ω +60 Ω/-45 Ω 150 Ω +60 Ω/-60 Ω
Coupling path (RF port/EUT port) Connector (RF port): RF voltage:	BNC 50 Ω <20 V	BNC 50 Ω <20 V	BNC 50 Ω <20 V
Voltage division factor (RF port to EUT port)	10 kHz to 230 MHz: 10 dB ±1 dB	10 kHz to 300 MHz: 10 dB ±1 dB	10 kHz to 300 MHz: 10 dB ±1 dB
Transmission bandwidth (EUT to AE)*) (wanted signal):	>100 MHz sin.	>100 MHz sin.	>100 MHz sin.
Crosstalk (EUT and AE port) 1 MHz to 100 MHz:	≥61 dB to ≥21 dB	≥61 dB to ≥21 dB	-
Longitudinal conversion loss (LCL), typical values (EUT port) 150 kHz/1.5 MHz: 30 MHz:	>75 dB >60 dB	>75 dB >60 dB	>75 dB >60 dB
Decoupling of CM disturbance (RF port/AE port) 10 kHz: 1.5 MHz/30 MHz: 80 MHz: 230 MHz:	>20 dB >55 dB >45 dB >35 dB	>20 dB >55 dB >45 dB >35 dB	>20 dB >55 dB >45 dB >35 dB

*) 3 dB bandwidth, all balanced parameters in relation to a symmetrical load of 100 Ω

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Technical specifications T type

Model	CDN T8	CDN T410A, T411A, T440A, T442A, T443A, T444A, T445A and T4A	CDN T210A, T240A and T246A
Frequency range:	150 kHz to 80 MHz	150 kHz to 80 MHz	150 kHz to 80 MHz
Line parameters: Connector (EUT and AE port): Application: PoE:	1 up to 4 pair(s) D-Sub adapter to RJ45 / RJ11 as given in the next table PoE+	1 up to 2 pair(s) D-Sub adapter to RJ45 / RJ11 as given in the next table PoE+	1 pair D-Sub adapter to RJ45 / RJ11 as given in the next table -
Power ratings (EUT and AE port) AC max. voltage (line to ground): DC max. voltage (line to ground): Current max.: Test voltage:	63 V 100 V 400 mA (line), 800 mA (pair) 200 VDC, 2 s	63 V 100 V 400 mA (line), 800 mA (pair) 200 VDC, 2 s	63 V 100 V 400 mA (line) 200 VDC, 2 s
Common mode impedance (EUT port) 150 kHz to 26 MHz: 26 MHz to 80 MHz:	150 Ω ±20 Ω 150 Ω +60 Ω / -45 Ω	150 Ω ±20 Ω 150 Ω +60 Ω / -45 Ω	150 Ω ±20 Ω 150 Ω +60 Ω / -45 Ω
Coupling path (RF port / EUT port) Connector (RF port): RF voltage:	BNC 50 Ω <15 V	BNC 50 Ω <15 V	BNC 50 Ω <15 V
Voltage division factor (RF port to EUT port):	9.5 dB ±1 dB	9.5 dB ±1 dB	9.5 dB ±1 dB
Transmission bandwidth (EUT to AE)*):	>100 MHz sin.	>100 MHz sin.	>100 MHz sin.
Crosstalk (EUT and AE port) 1 MHz to 100 MHz:	≥61 dB to ≥21 dB	≥61 dB to ≥21 dB	-
Longitudinal conversion loss (LCL), (EUT port) 150 kHz / 1.5 MHz: 30 MHz:	>75 dB >60 dB	>75 dB >50 dB	>75 dB >50 dB
Decoupling of CM disturbance (RF port / AE port) 150 kHz: 1.5 MHz: 30 MHz: 80 MHz:	>35 dB >55 dB >55 dB >45 dB	>35 dB >55 dB >55 dB >40 dB	>35 dB >55 dB >55 dB >40 dB

*) 3 dB bandwidth, all balanced parameters in relation to a symmetrical load of 100 Ω

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CDN T SERIES
COUPLING / DECOUPLING NETWORK (CDN) FOR UNSCREENED BALANCED PAIRS

Product range

CDN type	Product name	Line type	Application	Adapter name	Connector EUT and AE port
T2	CDN T2-10	1 pair	German Telecom UPN (U_{P0}), Siemens UPN (U_{P0})	-	1 mm banana
T2	CDN T210A	1 pair	pin arrangement customer specific	ADR T210	D-Sub 25 / RJ11
T2	CDN T240A	1 pair	pin arrangement customer specific	ADR T240	D-Sub 25 / RJ45
T2	CDN T246A	1 pair	Siemens UPN (U_{P0})	ADR T246	D-Sub 25 / RJ45
T4	CDN T4-10	2 pairs	German Telecom, US standard, ISDN, ATM, Ethernet 10BaseT and 100BaseT	-	1 mm banana
T4	CDN T410A	up to 2 pairs	pin arrangement customer specific	ADR T410	D-Sub 25 / RJ11
T4	CDN T411A	up to 2 pairs	German Telecom, US standard	ADR T411	D-Sub 25 / RJ11
T4	CDN T440A	up to 2 pairs	pin arrangement customer specific	ADR T440	D-Sub 25 / RJ45
T4	CDN T442A	up to 2 pairs	ISDN basic rate access S0	ADR T442	D-Sub 25 / RJ45
T4	CDN T443A	up to 2 pairs	ISDN primary rate access (2Mbps)	ADR T443	D-Sub 25 / RJ45
T4	CDN T444A	up to 2 pairs	10BaseT, 100BaseT	ADR T444	D-Sub 25 / RJ45
T4	CDN T445A	up to 2 pairs	ATM, FDDI	ADR T445	D-Sub 25 / RJ45
T4	CDN T4A	up to 2 pairs	as given in the table "Application & adaptation"	ADR T411, ADR T442, ADR T443, ADR T444, ADR T445	D-Sub 25 / RJ45, D-Sub 25 / RJ11
T8	CDN T8-10	4 pairs	Ethernet 1000BaseT	-	RJ45
T8	CDN T8	up to 4 pairs	as given in the table "Application & adaptation"	ADR T800 ADR T811	D-Sub 25 / RJ45, D-Sub 25 / RJ11

COUPLING / DECOUPLING NETWORK (CDN) FOR UNSCREENED BALANCED PAIRS

CDN T411A

Application & adaptation

CDN type	Adapter name	Socket	Application	Pair 1		Pair 2		Pair 3		Pair 4	
T2	ADR T210	RJ11		customer specific							
T2	ADR T240	RJ45		customer specific							
T2	ADR T246	RJ45	Siemens UPN (U_{P0})	3,4	5,6						
T4	ADR T410	RJ11		customer specific							
T4	ADR T411	RJ11	German Telecom, US standard	5	2	4	3				
T4	ADR T440	RJ45		customer specific							
T4	ADR T442	RJ45	Token ring, ISDN basic rate access / S0	4	5			3	6		
T4	ADR T443	RJ45	ISDN primary rate access (2Mbps)	4	5	1	2				
T4	ADR T444	RJ45	10BaseT, 100BaseTX			1	2	3	6		
T4	ADR T445	RJ45	ATM, FDDI, TP-PMD			1	2			7	8
T8	ADR T811	RJ11	German Telecom, US standard	3	4	1	6	2	5		
T8	ADR T800	RJ45	100BaseT4, 100Base VG-AnyLan, 1000BaseT, Token ring, ISDN, 10BaseT, 100BaseTX, ATM, FDDI, TP-PMD	4	5	1	2	3	6	7	8

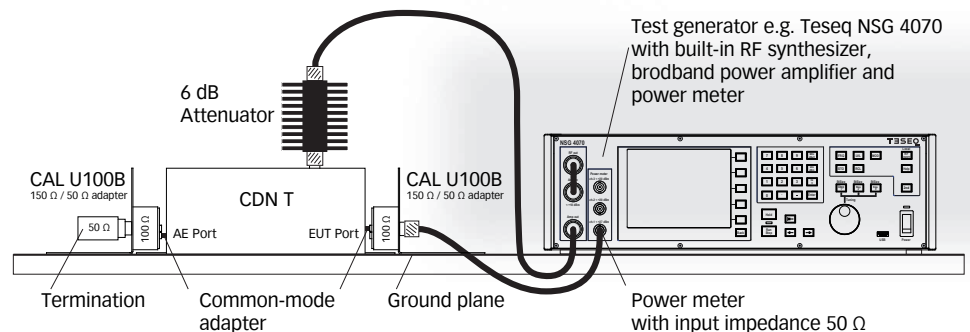### Mechanical specifications

Size (W x H x D):	105 mm x 65 mm x 110 mm
Weight:	approx. 0.5 kg

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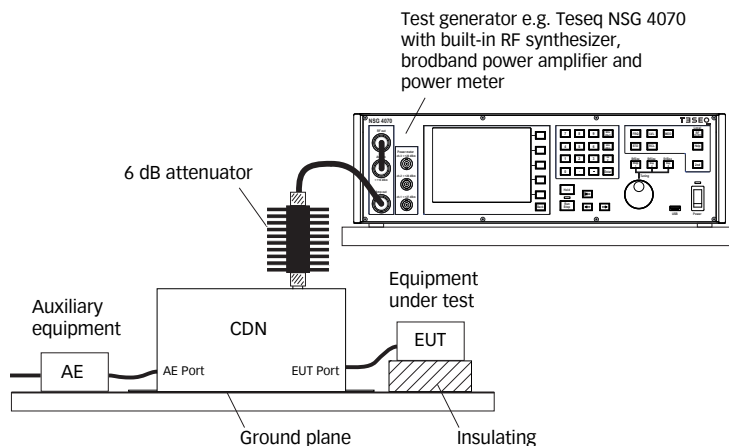
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FOR UNSCREENED BALANCED PAIRS

Example of test set-up calibration

Test generator e.g. Teseq NSG 4070
with built-in RF synthesizer,
brodband power amplifier and
power meter

6 dB
Attenuator

CAL U100B
150 Ω / 50 Ω adapter

CDN T

CAL U100B
150 Ω / 50 Ω adapter

50 Ω

100 Ω

AE Port

EUT Port

100 Ω

Termination

Common-mode
adapter

Ground plane

Power meter
with input impedance 50 Ω

Example of EUT test set-up

Test generator e.g. Teseq NSG 4070
with built-in RF synthesizer,
brodband power amplifier and
power meter

6 dB attenuator

Equipment
under test

Auxiliary
equipment

CDN

EUT

AE

AE Port

EUT Port

Ground plane

Insulating

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CDN T SERIES
COUPLING / DECOUPLING NETWORK (CDN)
FOR UNSCREENED BALANCED PAIRS

CDN T8 with ADR T800 adapter set

CDN T2-10

CDN T8-10

Model No. and options

Part number	Description
243771	CDN T2-10 CDN T2, 10 kHz to 300 MHz, 1 mm banana
247842	CDN T2-10S CDN T2, 10 kHz to 300 MHz, 1 mm banana, incl. calibration adapter in storage case
254622	CDN T210A CDN T200A with adapter set RJ11 customer specific in storage case
254623	CDN T240A CDN T200A with adapter set RJ45 customer specific in storage case
254624	CDN T246A CDN T200A with RJ45 adapter set (ADR T246) in storage case
254625	CDN T246AS CDN T200A with RJ45 adapter set (ADR T246) and calibration adapter in storage case
243769	CDN T4-10 CDN T4, 10 kHz to 300 MHz, 1 mm banana
243770	CDN T4-10S CDN T4, 10 kHz to 300 MHz, 1 mm banana, incl. calibration adapter in storage case
254628	CDN T411A CDN T400A with RJ11 (ADR T411) adapter set in storage case
254629	CDN T440A CDN T400A with adapter set RJ45 customer specific in storage case
254630	CDN T442A CDN T400A with RJ45 (ADR T442) adapter set in storage case
254631	CDN T443A CDN T400A with RJ45 (ADR T443) adapter set in storage case
254632	CDN T444A CDN T400A with RJ45 (ADR T444) adapter set in storage case
254633	CDN T445A CDN T400A with RJ45 (ADR T445) adapter set in storage case
254626	CDN T4A CDN T400A with with 5 different adapter sets (ADR T411, T442, T443, T444 and T445) in storage case
254627	CDN T4AS CDN T400A with 5 different adapter sets (ADR T411, T442, T443, T444 and T445) and calibration adapter in storage case

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CDN T SERIES
COUPLING / DECOUPLING NETWORK (CDN)
FOR UNSCREENED BALANCED PAIRS

CDN T4AS in storage case

Model No. and options (continued)

Part number	Description
243772	CDN T8-10 CDN T8, 10 kHz to 230 MHz, RJ45
247844	CDN T8-10S CDN T8, 10 kHz to 230 MHz, RJ45, calibration adapter in storage case
244156	CDN T8 80 MHz, with RJ 11 (ADR T811) and RJ 45 (ADR T800) adapter sets in storage case, suitable for 1 Gbps and PoE application
244157	CDN T8S 80 MHz, with RJ 11 (ADR T811), RJ 45 (ADR T800) adapter sets and calibration adapter in storage case
97-241924	CDN Txxx-TC Traceable calibration (ISO17025) for IEC 61000-4-6 requirements, order only with device CDN T type
247825	CAL U100B Universal calibration unit (150 Ω / 50 Ω adapter)
239902	IMA U100 Universal impedance measuring adapter (0 Ω)
248717	SAR T2x0 Common mode adapter for 2x 1 mm banana
248718	SAR T4x0 Common mode adapter for 4x 1 mm banana
242430	SAR T801 Common mode adapter for Sub-D 25
242428	SAR T802 Common mode adapter for RJ45 (unscreened)
254661	FIX ISN Magnetic fixture for ISN T2A, ISN T4A, ISN T8, ISN T8-Cat6 or CDN T

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