



## CDN T SERIES

# COUPLING / DECOUPLING NETWORK (CDN) FOR UNSCREENED BALANCED PAIRS



**CDN T402-10**

- Coupling networks designed for IEC / EN 61000-4-6
- T series for unscreened balanced pairs
- 1 mm banana sockets for CDN T2A-10 and CDN T4A-10
- 4 mm banana sockets for CDN T202-10 and CDN T402-10
- D Sub 25 adapters to RJ45 sockets for CDN T246A, CDN T4xxA and CDN T8 products
- RJ45 sockets for CDN T8A-10 and CDN T8-230

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 T246A, 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 T246A and CDN T4xxA consist of one basic network (CDN T200A and CDN T400A) with D-Sub-25-connectors. The connections to a different pin configuration of the modular RJ45 connectors 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 RJ45 connectors.

### 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 an adapter set (ADR T800) for the connection to RJ45 sockets with pin-arrangements of EIA/TIA T568A respectively T568B.

### CDN T8-230

The CDN T8-230 is made for four unscreened balanced pairs, allows testing from 150 kHz to 230 MHz and supports Ethernet with 1000BaseT. EUT and AE port are supplied with RJ45.

### CDN T2A-10, T202-10, T4A-10, T402-10 and T8A-10

This series is specially designed for testing at a 10 kHz start frequency as required by standards like Namur NE21 and IEC 60945. CDN T2A-10 and CDN T4A-10 are supplied with 1 mm banana sockets for easy adaptation for different single pair, with CDN T4-10 double pair, applications. The optional available adapter AD RJ11 and AD RJ45 provide the connection between the CDN T2A-10 or CDN T4A-10 with RJ11 or RJ45 plugs of the test cable. CDN T202-10 and CDN T402-10 are supplied with 4 mm banana sockets. CDN T8A-10 is made for four unscreened balanced pairs and supports Ethernet with 1000BaseT. EUT and AE port are supplied with RJ45.

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CDN T4A-10



CDN T202-10



CDN T8-230



CDN T8

### Model range and applications

#### EUT connector type

1 mm banana



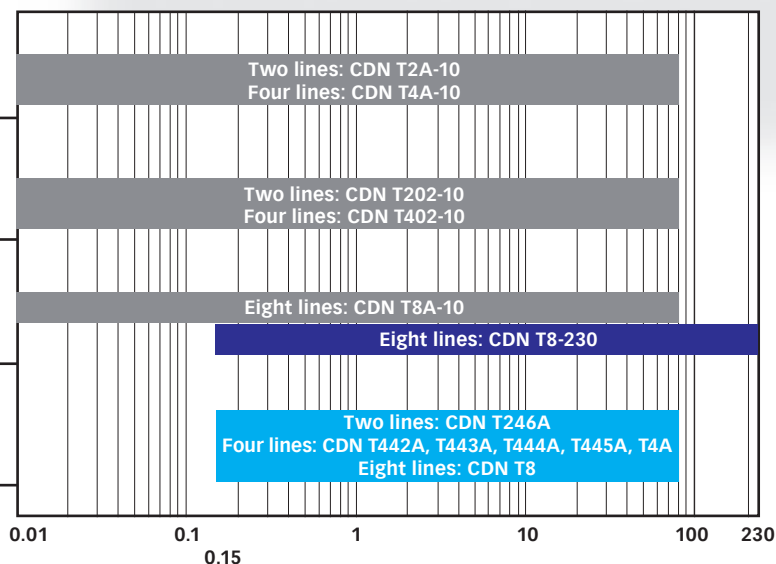
4 mm banana



RJ45



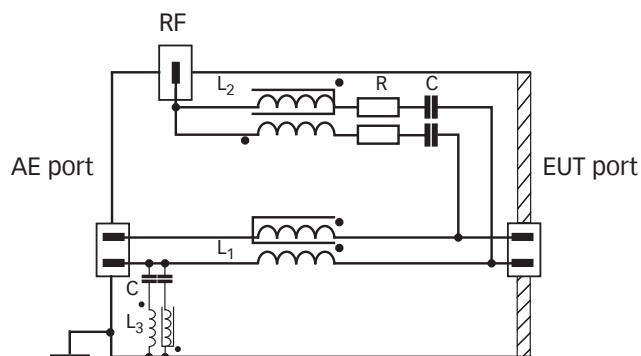
D-Sub/RJ45



#### Frequency in MHz

- Namur, IEC / EN 61326-3-2 and IEC / EN 61000-4-6: 10 kHz to 80 MHz
- IEC / EN 61000-4-6: 150 kHz to 80 MHz
- IEC / EN 61000-4-6: 150 kHz to 230 MHz

### Example of coupling and decoupling circuit of CDN T2



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# CDN T SERIES

## COUPLING / DECOUPLING NETWORK (CDN) FOR UNSCREENED BALANCED PAIRS

### Technical specifications T type

Model	CDN T8A-10	CDN T4A-10	CDN T2A-10
Frequency range:	10 kHz to 80 MHz	10 kHz to 80 MHz	10 kHz to 80 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, UPO -
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 600 mA (line), 1.2 A (pair) 200 VDC, 2 s	63 V 100 V 600 mA (line), 1.2 A (pair) 200 VDC, 2 s	63 V 100 V 600 mA (line) 200 VDC, 2 s
Common mode impedance (EUT port) 10 kHz to 24 MHz: 24 MHz to 80 MHz:	150 $\Omega$ $\pm$ 20 $\Omega$ 150 $\Omega$ +60 $\Omega$ / -45 $\Omega$	150 $\Omega$ $\pm$ 20 $\Omega$ 150 $\Omega$ +60 $\Omega$ / -45 $\Omega$	150 $\Omega$ $\pm$ 20 $\Omega$ 150 $\Omega$ +60 $\Omega$ / -45 $\Omega$
Coupling path (RF port/EUT port) Connector (RF port): Max. nominal test level according IEC 61000-4-6 (with AM, 80% during testing):	BNC 50 $\Omega$ 33 V in 300 $\Omega$ loop	BNC 50 $\Omega$ 33 V in 300 $\Omega$ loop	BNC 50 $\Omega$ 33 V in 300 $\Omega$ loop
Voltage division factor (RF port to EUT port) 10 kHz to 80 MHz:	10.5 dB $\pm$ 1.5 dB	10.5 dB $\pm$ 1.5 dB	10.5 dB $\pm$ 1.5 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:	$\geq$ 61 dB to $\geq$ 21 dB	$\geq$ 61 dB to $\geq$ 21 dB	-
Longitudinal conversion loss (LCL), typical values (EUT port) 150 kHz / 1.5 MHz: 30 MHz:	>75 dB >55 dB	>75 dB >55 dB	>75 dB >55 dB
Decoupling of CM disturbance (RF port / AE port) 10 kHz: 1.5 MHz / 30 MHz: 80 MHz:	>20 dB >55 dB >45 dB	>20 dB >55 dB >45 dB	>20 dB >55 dB >45 dB

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

## **CDN T SERIES**

# **COUPLING / DECOUPLING NETWORK (CDN) FOR UNSCREENED BALANCED PAIRS**

### Technical specifications T type

Model	CDN T402-10	CDN T202-10
Frequency range:	10 kHz to 80 MHz	10 kHz to 80 MHz
Line parameters: Connector (EUT and AE port): Application: PoE:	2 pairs 4 mm banana 10/100BaseT, ISDN PoE+	1 pair 4 mm banana Telecom, UPO -
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 2 A (line), 4 A (pair) 200 VDC, 2 s	63 V 100 V 2 A (line) 200 VDC, 2 s
Common mode impedance (EUT port) 10 kHz to 24 MHz: 24 MHz to 80 MHz:	150 $\Omega$ $\pm$ 20 $\Omega$ 150 $\Omega$ +60 $\Omega$ / -45 $\Omega$	150 $\Omega$ $\pm$ 20 $\Omega$ 150 $\Omega$ +60 $\Omega$ / -45 $\Omega$
Coupling path (RF port/EUT port) Connector (RF port): Max. nominal test level according IEC 61000-4-6 (with AM, 80% during testing):	BNC 50 $\Omega$ 33 V in 300 $\Omega$ loop	BNC 50 $\Omega$ 33 V in 300 $\Omega$ loop
Voltage division factor (RF port to EUT port) 10 kHz to 80 MHz:	10 dB $\pm$ 1.5 dB	10 dB $\pm$ 1.5 dB
Transmission bandwidth (EUT to AE)* (wanted signal):	>100 MHz sin.	>100 MHz sin.
Crosstalk (EUT and AE port) 1 MHz to 100 MHz:	$\geq$ 61 dB to $\geq$ 21 dB	-
Longitudinal conversion loss (LCL), typical values (EUT port) 150 kHz to 30 MHz:	>40 dB	>40 dB
Decoupling of CM disturbance (RF port/AE port) 10 kHz: 1.5 MHz/30 MHz: 80 MHz:	>20 dB >55 dB >45 dB	>20 dB >55 dB >45 dB

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

## **CDN T SERIES**

# **COUPLING / DECOUPLING NETWORK (CDN) FOR UNSCREENED BALANCED PAIRS**

### Technical specifications T type

Model	CDN T8	CDN T442A, T443A, T444A, T445A and T4A	CDN 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 as given in the next table PoE+	1 up to 2 pair(s) D-Sub adapter to RJ45 as given in the next table PoE+	1 pair D-Sub adapter to RJ45 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 600 mA (line), 1.2 A (pair) 200 VDC, 2 s	63 V 100 V 600 mA (line), 1.2 A (pair) 200 VDC, 2 s	63 V 100 V 600 mA (line) 200 VDC, 2 s
Common mode impedance (EUT port) 150 kHz to 24 MHz: 24 MHz to 80 MHz:	150 $\Omega$ $\pm$ 20 $\Omega$ 150 $\Omega$ +60 $\Omega$ / -45 $\Omega$	150 $\Omega$ $\pm$ 20 $\Omega$ 150 $\Omega$ +60 $\Omega$ / -45 $\Omega$	150 $\Omega$ $\pm$ 20 $\Omega$ 150 $\Omega$ +60 $\Omega$ / -45 $\Omega$
Coupling path (RF port/EUT port) Connector (RF port): Max. nominal test level according IEC 61000-4-6 (with AM, 80% during testing):	BNC 50 $\Omega$ 22 V in 300 $\Omega$ loop	BNC 50 $\Omega$ 22 V in 300 $\Omega$ loop	BNC 50 $\Omega$ 22 V in 300 $\Omega$ loop
Voltage division factor (RF port to EUT port):	9.5 dB $\pm$ 1 dB	9.5 dB $\pm$ 1 dB	9.5 dB $\pm$ 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:	$\geq$ 61 dB to $\geq$ 21 dB	$\geq$ 61 dB to $\geq$ 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  $\Omega$

# CDN T SERIES

## COUPLING / DECOUPLING NETWORK (CDN) FOR UNSCREENED BALANCED PAIRS

### Technical specifications T type

Model	CDN T8-230
Frequency range:	150 kHz to 230 MHz
Line parameters: Connector (EUT and AE port): Application: PoE:	4 pairs RJ45 Ethernet 1000BaseT PoE+
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 600 mA (line), 1.2 A (pair) 200 VDC, 2 s
Common mode impedance (EUT port) 150 kHz to 24 MHz: 24 MHz to 80 MHz: 80 MHz to 230 MHz:	150 $\Omega$ $\pm$ 20 $\Omega$ 150 $\Omega$ +60 $\Omega$ / -45 $\Omega$ 150 $\Omega$ $\pm$ 60 $\Omega$
Coupling path (RF port/EUT port) Connector (RF port): Max. nominal test level according IEC 61000-4-6 (with AM, 80% during testing):	BNC 50 $\Omega$ 33 V in 300 $\Omega$ loop
Voltage division factor (RF port to EUT port):	10.5 dB $\pm$ 1.5 dB
Transmission bandwidth (EUT to AE)*):	>80 MHz sin.
Crosstalk (EUT and AE port) 1 MHz to 100 MHz:	$\geq$ 61 dB to $\geq$ 21 dB
Longitudinal conversion loss (LCL), (EUT port) 150 kHz / 1.5 MHz: 30 MHz:	>75 dB >60 dB
Decoupling of CM disturbance (RF port / AE port) 150 kHz: 1.5 MHz: 30 MHz: 80 MHz:	>55 dB >55 dB >45 dB >35 dB

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

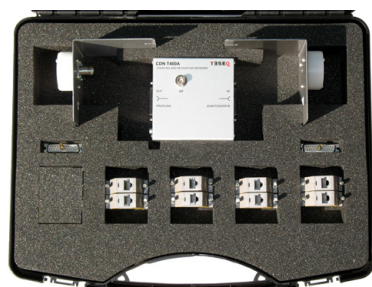
## **CDN T SERIES**

### **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 ( $U_{PO}$ ), Siemens UPN ( $U_{PO}$ )	-	1 mm banana
T2	CDN T202-10	1 pair	German Telecom UPN ( $U_{PO}$ ), Siemens UPN ( $U_{PO}$ ), bus systems	-	4 mm banana
T2	CDN T246A	1 pair	Siemens UPN ( $U_{PO}$ )	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 T402-10	2 pairs	German Telecom, US standard, ISDN, ATM, Ethernet 10BaseT and 100BaseT, bus systems	-	4 mm banana
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 T442, ADR T443, ADR T444, ADR T445	D-Sub 25/RJ45
T8	CDN T8-10	4 pairs	Ethernet 1000BaseT	-	RJ45
T8	CDN T8-230	4 pairs	Ethernet 1000BaseT	-	RJ45
T8	CDN T8	up to 4 pairs	as given in the table "Application & adaptation"	ADR T800	D-Sub 25/RJ45

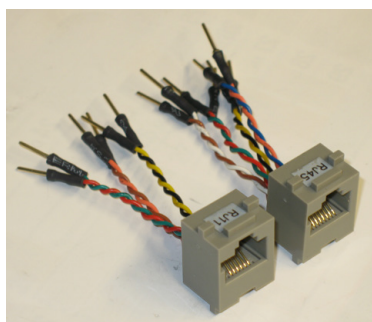
# **CDN T SERIES** **COUPLING / DECOUPLING NETWORK (CDN)** **FOR UNSCREENED BALANCED PAIRS**



CDN T4AS in storage case



CDN T4A with connected adapter set



Option: Adapter AD RJ45 or AD RJ11

## **Application & adaptation**

CDN type	Adapter name	Socket	Application	Pair 1		Pair 2		Pair 3		Pair 4	
T2	ADR T246	RJ45	Siemens UPN ( $U_{p0}$ )	3,4	5,6						
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 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 CDN T2-10, T246A, T4A-10, T442A, T443A, T444A, T445A, T4A, T8A-10, T8, T8-230**

Size (W x H x D):	105 mm x 65 mm x 110 mm (without adapter)
Weight:	approx. 0.5 kg

## **Mechanical specifications CDN T202-10**

Size (W x H x D):	100 mm x 100 mm x 240 mm
Weight:	approx. 1.5 kg

## **Mechanical specifications CDN T402-10**

Size (W x H x D):	100 mm x 100 mm x 288 mm
Weight:	approx. 1.5 kg

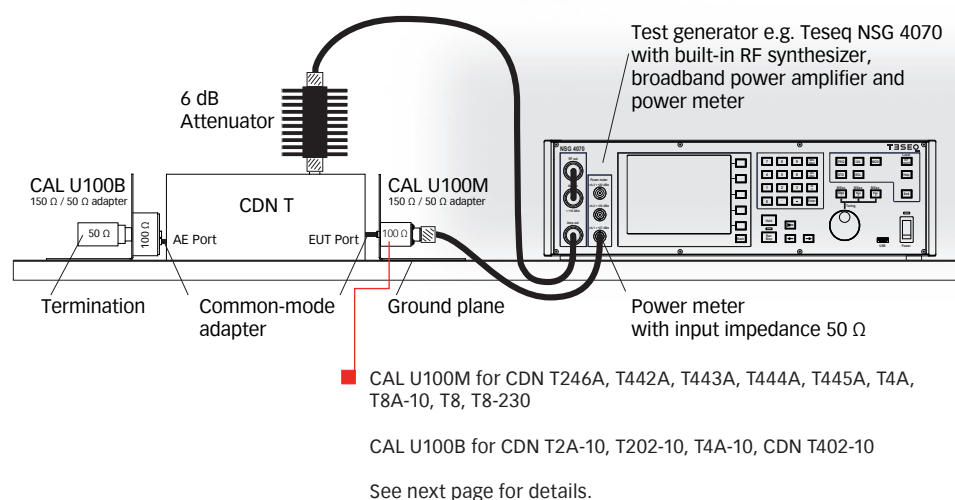


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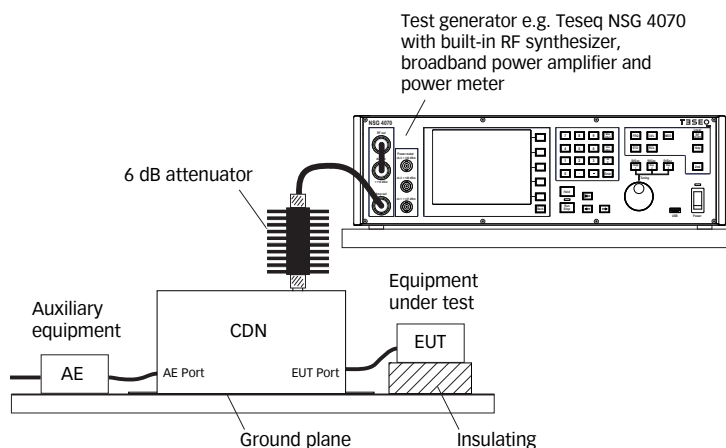


# **CDN T SERIES** **COUPLING / DECOUPLING NETWORK (CDN)** **FOR UNSCREENED BALANCED PAIRS**

Example of test set-up calibration



Example of EUT test set-up



# CDN T SERIES

## COUPLING / DECOUPLING NETWORK (CDN) FOR UNSCREENED BALANCED PAIRS

Product	Drawing	Adapters for test level setting (parts of the set option)
CDN T2A-10		
CDN T202-10		
CDN T246A		
CDN T4A-10		
CDN T402-10		
CDN T442A		
CDN T443A		
CDN T444A		
CDN T445A		
CDN T4A		
CDN T8A-10		
CDN T8		
CDN T8-230		

## **CDN T SERIES**

# **COUPLING / DECOUPLING NETWORK (CDN) FOR UNSCREENED BALANCED PAIRS**

### **Model No. and options**

Product	Description	Order code
CDN T246A	Coupling Decoupling Network for IEC 61000-4-6, type T200A with RJ45 adapter set (ADR T246) in storage case	254624
CDN T246AS	Coupling Decoupling Network for IEC 61000-4-6, type T200A with RJ45 adapter set (ADR T246) and calibration adapter in storage case, includes CAL U100B, CAL U100M, 2x SAR T801, SAR M116, A 50-N	254625
CDN T2A-10	Coupling Decoupling Network for IEC 61000-4-6, type T2, 10 kHz to 80 MHz, 1 mm banana	257864
CDN T2A-10S	Coupling Decoupling Network for IEC 61000-4-6, type T2, 10 kHz to 80 MHz, 1 mm banana, incl. calibration adapter in storage case, includes 2x CAL U100B, 2x SAR T2X0, SAR M116, A 50-N	257865
CDN T202-10	Coupling Decoupling Network for IEC 61000-4-6, type T2, 10 kHz to 80 MHz, 4 mm banana	257915
CDN T4A	Coupling Decoupling Network for IEC 61000-4-6, type T400A with with 4 different adapter sets (T442, T443, T444 and T445) in storage case	254626
CDN T4AS	Coupling Decoupling Network for IEC 61000-4-6, type T400A with 4 different adapter sets (T442, T443, T444 and T445) and calibration adapter (CAL U100, TRA U150 and 2x SAR T801) in storage case, includes CAL U100B, CAL U100M, 2x SAR T801, SAR M116, A 50-N	254627
CDN T442A	Coupling Decoupling Network for IEC 61000-4-6, type T400A with RJ45 (ADR T442) adapter set in storage case	254630
CDN T443A	Coupling Decoupling Network for IEC 61000-4-6, type T400A with RJ45 (ADR T443) adapter set in storage case	254631
CDN T444A	Coupling Decoupling Network for IEC 61000-4-6, type T400A with RJ45 (ADR T444) adapter set in storage case	254632
CDN T4A-10	Coupling Decoupling Network for IEC 61000-4-6, type T4, 10 kHz to 80 MHz, 1 mm banana	257866
CDN T4A-10S	Coupling Decoupling Network for IEC 61000-4-6, type T4, 10 kHz to 80 MHz, 1 mm banana, incl. calibration adapter in storage case, includes 2x CAL U100B, 2x SAR T4X0, SAR M116, A 50-N	257867
CDN T402-10	Coupling Decoupling Network for IEC 61000-4-6, type T4, 10 kHz to 80 MHz, 4 mm banana	257916
CDN T8	Coupling Decoupling Network for IEC 61000-4-6, type T800, 150 kHz to 80 MHz, with RJ 45 adapter set in storage case, suitable for 1 Gbps and PoE application	244156
CDN T8S	Coupling Decoupling Network for IEC 61000-4-6, type T800, 150 kHz to 80 MHz, with RJ 45 adapter sets and calibration adapter in storage case, suitable for 1 Gbps and PoE application includes CAL U100B, CAL U100M, 2x SAR T801, SAR M116, A 50-N	244157
CDN T8-230	Coupling Decoupling Network for IEC 61000-4-6, type T8, 150 kHz to 230 MHz, with RJ 45, suitable for 1 Gbps and PoE application	257917
CDN T8-230S	Coupling Decoupling Network for IEC 61000-4-6, type T8, 150 kHz to 230 MHz, with RJ 45, incl. calibration adapter in storage case, suitable for 1 Gbps and PoE application includes CAL U100B, CAL U100M, 2x SAR T802, SAR M116, A 50-N	257918
CDN T8A-10	Coupling Decoupling Network for IEC 61000-4-6, type T8, 10 kHz to 80 MHz, RJ45	257868
CDN T8A-10S	Coupling Decoupling Network for IEC 61000-4-6, type T8, 10 kHz to 80 MHz, RJ45, incl. calibration adapter in storage case, includes CAL U100B, CAL U100M, 2x SAR T802, SAR M116, A 50-N	257869
CDN Txxx-TC	Traceable calibration (ISO17025) for IEC 61000-4-6 requirements, order only with device CDN T type	97-241924

## **CDN T SERIES**

# **COUPLING / DECOUPLING NETWORK (CDN) FOR UNSCREENED BALANCED PAIRS**

### Model No. and options (continued)

Product	Description	Order code
CDN-DAkKS	DAkKS accredited calibration (ISO17025) for impedance and VDF in the frequency range of the CDN, order only with the device	98-231024
CAL U100B	Universal calibration unit (150 $\Omega$ / 50 $\Omega$ adapter)	247825
CAL U100M	Universal calibration unit (150 $\Omega$ / 50 $\Omega$ adapter) for CDN M with 100 A and others	257138
CAL U100X-TC	Traceable calibration (ISO17025), order only with CAL U100M or CAL U100B device	97-247825
CAL U100X-DAkKS	DAkKS accredited calibration (ISO17025), order only with CAL U100M or CAL U100B device	98-247825
IMA U100	Universal impedance measuring adapter (0 $\Omega$ )	239902
IMA U100M	Universal impedance measuring adapter (0 $\Omega$ ) for CDN M with 100 A and others	257137
ADR T2X0	Arranging adapter set for CDN T200A with 1 mm banana to RJ11 and RJ45	242030
ADR T4X0	Arranging adapter set for CDN T400A with 1 mm banana to RJ11 and RJ45	242045
AD RJ11	Adapter 1 mm banana to RJ11 (two pieces)	257981
AD RJ45	Adapter 1 mm banana to RJ45 (two pieces)	248694
ADR T442	Arranging adapter set for CDN T400A with RJ45.2, ISDN basic rate access, (S0)	242022
ADR T443	Arranging adapter set for CDN T400A with RJ45.3, ISDN primary rate access (2Mbps)	242023
ADR T444	Arranging adapter set for CDN T400A with RJ45.4, 10BaseT, 100BaseT	242024
ADR T445	Arranging adapter set for CDN T400A with RJ45.5, ATM, FDDI	242025
ADR T800	Arranging adapter set for CDN T800A with RJ45	242049
SAR M116	Adapter 4 mm banana	239915
SAR MA21	Common mode adapter for CDN A2, M2, T202, 4 mm banana	247827
SAR MA41	Common mode adapter for CDN A4, M4, T402, 4 mm banana	247831
SAR T2X0	Common mode adapter for 2x 1 mm banana	248717
SAR T4X0	Common mode adapter for 4x 1 mm banana	248718
SAR T801	Common mode adapter for Sub-D 25	242430
SAR T802	Common mode adapter for RJ45 (unscreened)	242428
A 50-BNC	Termination 50 Ohms, BNC type, male	257520
A 50-N	Termination 50 Ohms, N type, male, 1 Watt, 2.5 GHz	257521

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82-255600 E15 April 2022

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