

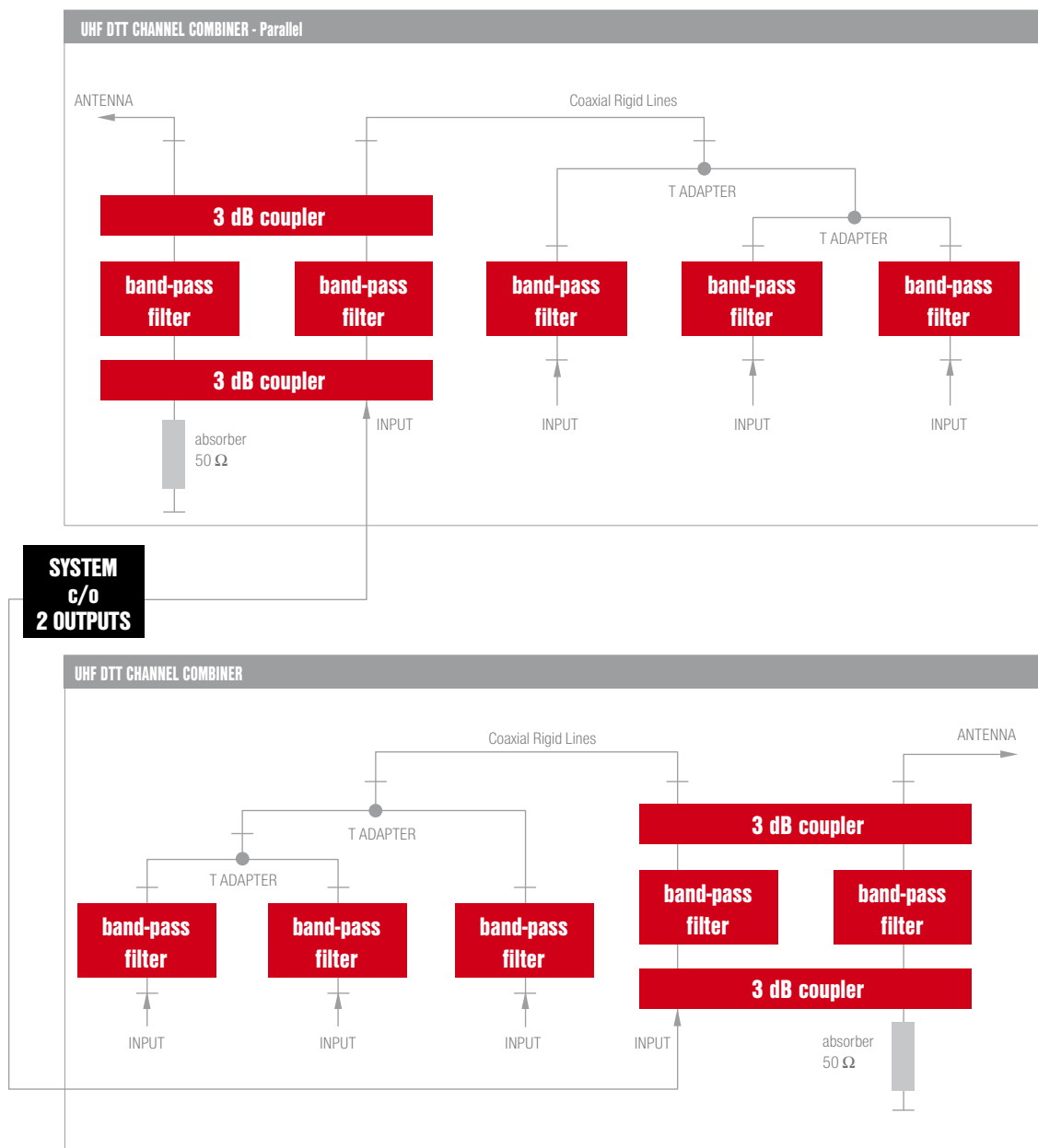
# TV combiners

Combiners are used to combine the signals of several transmitters and translators into one antenna system. In view of the unique configurations required by individual systems, Elti perform a detailed analysis before recommending customised solutions to the customer.

Compact designs and robust construction make them easy to position and install. Light weight units allow for wall-mounting, small size allows for mounting within the transmitter rackmount.

Combiners for analogue networks are available with three and four cavities. Combiners for digital networks are applicable with 3, 4 and 6 cavity filters. For adjacent channel operations are recommended combiners with six cavity filters. All combiners are applicable for simultaneous analogue and digital signals.

## REDUNDANT COMBINER SYSTEM



## DVB combiners

DVB combiners are designed as starpoint or CIF combiners or even as combination of both. Available with 3 and 4 cavity filters with minimum 2 channel spacing and with 6 cavity filters for adjacent channel operation. All combiners are suitable to operate together with analogue channels.

## starpoint combiners

Starpoint combiners (type A) represent a compact and effective solution when there is a large channel spacing between the transmitters and translators. In the starpoint configuration it is possible to combine up to four band-pass filters. The starpoint combiner is pre-tuned to the requested frequency, and is easily retuned on site.

Line lengths in starpoint combiners are dependant on channels. Elti has developed a software for calculating a custom combiner solution. A different solution is calculated for each specified channel configuration and input power in a matter of seconds. For more information see <http://www.elti.com>.

## constant impedance combiners

Constant impedance combiners (type B) consist of pairs of 3 dB couplers and band-pass filters with the dummy load connected in modules for each of the narrow-band inputs to the combiner. They are commonly used when the channels of the transmitters and translators are close, or when connecting a new module to a broadband input in order to open additional channels.

## a combination of starpoint and constant impedance combiners

When more than four transmitters and translators need to be connected in the same antenna system, a combination of starpoint and constant impedance combiners can be installed (type C).

## stretchline combiners

Stretchline combiners (type S) are adjustable across the entire UHF band and feature a wide range of filters with different numbers of cavities, high isolation, low levels of insertion loss and are available in scalable solutions from 5 W to 20 kW per channel.

## TYPE DESCRIPTION

**xy-zppp**

x - number of inputs:

**DPX** - two inputs

**TPX** - three inputs

**QPX** - four inputs

**PPX** - five inputs

y - frequency range:

**2** - FM band (87,5 - 108 MHz)

**3** - VHF band III (174 - 230 MHz)

**4** - UHF band IV and V (470 - 862 MHz)

z - type of combiner:

**A** - star-point type

**B** - CIF type

**C** - combined type (type A + B)

**D** - with the filter on the broad-band input

**S** - stretchline

ppp - maximum power per input:

**050** - up to 50 W

**200** - up to 200 W

**2K5** - up to 2,5 kW

**20K** - up to 20 kW

**2K0D** - up to 2 kW DTT power

# combiners for DVB-T and DVB-H

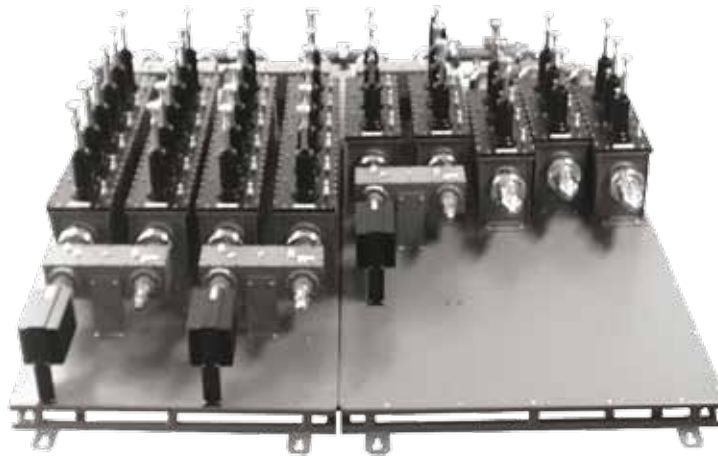
## TYPES

DPX4-B200D-N  
DPX4-B500D-N  
DPX4-B1K0D-N  
DPX4-B1K0D-C  
DPX4-B2K0D-N  
DPX4-B2K0D-C  
DPX4-B5K0D-N  
DPX4-B5K0D-C  
DPX4-B10K0D-N  
DPX4-B10K0D-C

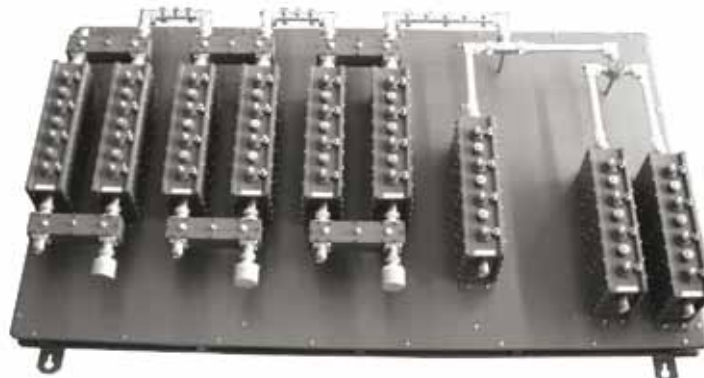
ELTI DVB-T and DVB-H combiners are designed for up to 10 kW rms DVB per channel and total output power up to 50 kW.

High quality filters with six cavities are available, and allow adjacent analogue and DVB-T/H channels on the same antenna, as well they can be tuned for critical requirements.

Combiners are fully compliant with the DVB-T standard EN 300 744 and DVB-H EN 302 304.



SPX4-C220&150D



SPX4-C040D

## specifications

	DPX4-B200D-N		DPX4-B500D-N		DPX4-B1K0D-N DPX4-B1K0D-C	
Type	Double bridge XLine				Double bridge DualCross	
Frequency range	470 - 862 MHz					
Impedance	50 Ω					
Maximum power NB (kW rms)	0,2		0,5		1	
Maximum output power (kW rms)	0,75		2		5	
NB Insertion loss at 858MHz (dB)	non adjacent non critical mask	adjacent non critical mask	non adjacent non critical mask	adjacent non critical mask	non adjacent non critical mask	adjacent critical mask
f0	< 1,05	< 1,15	< 0,80	< 0,90	< 0,55	< 0,60
f0 +/- 3,8 MHz	< 2,20	< 3,90	< 1,70	< 3,25	< 1,47	< 2,20
WB Insertion loss (dB)	< 0,05	< 0,30	< 0,05	< 0,20	< 0,05	< 0,16
Selectivity (dB)						
f0 +/- 4,2 MHz	> 3	> 12	> 3	> 12	> 4	> 12
f0 +/- 6 MHz	> 16				> 20	> 24
f0 +/- 12 MHz	> 36				> 30	> 34
Return loss (dB)	> 26					
Decoupling (dB)	> 30					
NB Group Delay Variation (ns)	< 200	< 350	< 200	< 350	< 250	< 450
Adjacent Channel Configuration	Yes					
Non Critical Mask	Yes					
Critical Mask	No				Yes	
Connectors	DIN 7/16 (N female or EIA 7/8") optional		DIN 7/16 (EIA 7/8" or EIA 1 5/8") optional		EIA 1 5/8" (DIN 7/16 or EIA 7/8") optional	
Temperature stability (kHz/K)	< 6		< 4		< 4	
Temperature range	From - 10°C to + 50°C					
Weight (kg)	8		9		25	
Dimensions (mm)	324 x 176 x 386		420 x 187 x 400		767 x 236 x 580	

	DPX4-B2K0D-N DPX4-B2K0D-C		DPX4-B5K0D-N DPX4-B5K0D-C		DPX4-B10K0D-N DPX4-B10K0D-C	
Type	Double bridge, DualCross		"Double bridge, DualCross or Dir. Filter, DualCross+MultiStep"		Directional filter DualCross+MultiStep	
Frequency range	470 - 862 MHz					
Impedance	50 Ω					
Maximum power NB (kW rms)	2		5		10	
Maximum output power (kW rms)	7,5		20		50	
NB Insertion loss at 858MHz (dB)	non adjacent non critical mask	adjacent critical mask	non adjacent non critical mask	adjacent critical mask	non adjacent non critical mask	adjacent critical mask
f0	< 0,44	< 0,48	< 0,37	< 0,42	< 0,30	< 0,35
f0 +/- 3,8 MHz	< 1,10	< 1,65	< 0,90	< 1,35	< 0,68	< 0,98
WB Insertion loss (dB)	< 0,05	< 0,13	< 0,05	< 0,12	< 0,05	< 0,10
Selectivity (dB)						
f0 +/- 4,2 MHz	> 4	> 12	> 4	> 12	> 4	> 12
f0 +/- 6 MHz	> 20	> 24	> 20	> 24	> 20	> 24
f0 +/- 12 MHz	> 30	> 34	> 30	> 34	> 30	> 34
Return loss (dB)	> 26					
Decoupling (dB)	> 30					
NB Group Delay Variation (ns)	< 250	< 450	< 250	< 450	< 250	< 450
Adjacent Channel Configuration	Yes					
Non Critical Mask	Yes					
Critical Mask	Yes					
Connectors	EIA 1 5/8" (EIA 3 1/8") optional		EIA 3 1/8" (EIA 1 5/8" or EIA 4 1/2") optional		EIA 4 1/2" (EIA 3 1/8" or EIA 6 1/8") optional	
Temperature stability (kHz/K)	< 4		< 2			
Temperature range	From - 10°C to + 50°C					
Weight (kg)	38		80 - double bridge 120 - directional filter		183	
Dimensions (mm)	946 x 302 x 550		946 x 302 x 550 - double bridge 1.040 x 419 x 1.051 - dir. Filter		1.040 x 539 x 1.370 mm	

# TV starpoint combiners

## TYPES

DPX4-A005  
 DPX4-A050  
 TPX4-A050  
 QPX4-A050  
 DPX4-A200  
 TPX4-A200  
 QPX4-A200  
 DPX4-A1K0  
 TPX4-A1K0  
 QPX4-A1K0  
 DPX4-A2K5  
 TPX4-A2K5  
 QPX4-A2K5  
 DPX4-A5K0  
 TPX4-A5K0  
 QPX4-A5K0

The Starpoint combiners consist of a parallel connection of several transmitters and translators to a single antenna via two, three or four band-pass filters and a junction point with defined lengths. The parallel connection is achieved by means of coaxial cables or rigid lines of defined length in order to assure isolation between the transmitters and translators. Starpoint combiners have two (or three/four) narrowband inputs that correspond to the pass-band characteristics of the filters. They operate without forced cooling and represent an optimised cost-efficient solution for the multiple use of single antennas where transmitters and translators operate with a wide frequency spacing.

Elti has developed software tool to easily calculate interconnecting cable lengths in seconds. According to specified channel combination adequate starpoint combiner is calculated.

The starpoint combiners are factory tuned to the desired operating channels. Specify channel configuration when ordering.



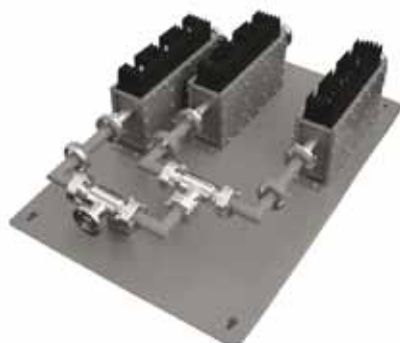
DPX4-A005



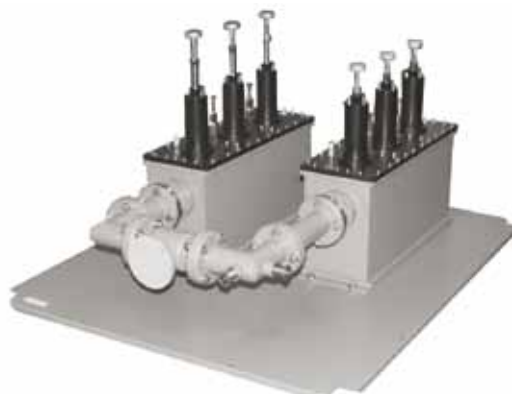
TPX4-A050



DPX4-A200



TPX4-A1K0

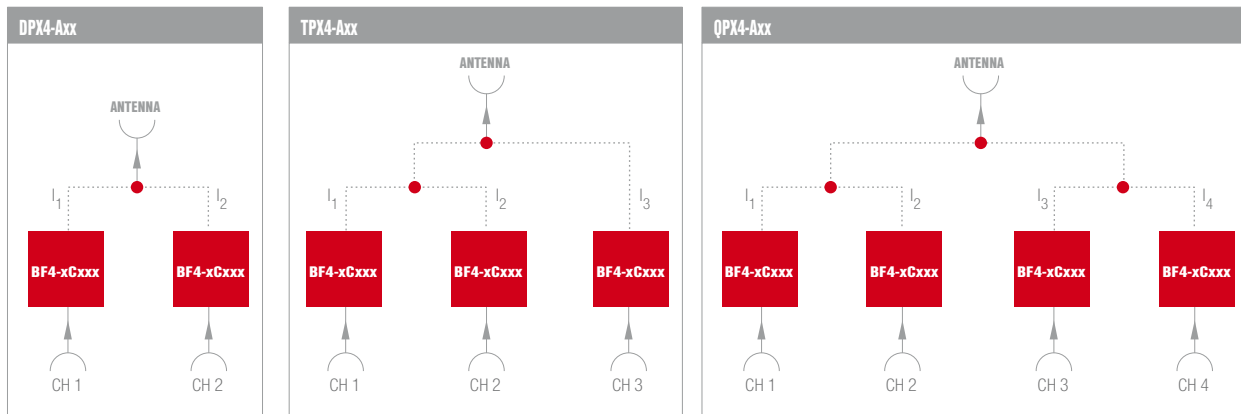


DPX4-A2K5

## specifications

	DPX4-A005	DPX4-A050 TPX4-A050 QPX4-A050	DPX4-A200 TPX4-A200 QPX4-A200	DPX4-A1K0 TPX4-A1K0 QPX4-A1K0	DPX4-A2K5 TPX4-A2K5 QPX4-A2K5	DPX4-A5K0 TPX4-A5K0 QPX4-A5K0
Frequency range	470 - 862 MHz					
Impedance	50 Ω					
Return loss	≥ 26 dB	≥ 28 dB				
Pass-band width	1 TV channel					
Max. power per input	5 W	50 W	200 W	1 kW	2.5 kW	5 kW
Insertion loss	≤ 1,25 dB (typical value 1,1 dB)	≤ 0,8 dB	≤ 0,6 dB	≤ 0,6 dB	≤ 0,4 dB	≤ 0,4 dB
Isolation (between the inputs)	≥ 30 dB					
Min. channel spacing	3 channels (24 MHz)					
Input connectors	BNC or N	Nf	DIN 7/16 EIA 7/8"	DIN 7/16 EIA 7/8"	EIA 1 5/8"	EIA 1 5/8"
Output connectors	N socket	Nf	DIN 7/16 EIA 7/8"	DIN 7/16 EIA 7/8" EIA 1 5/8"	EIA 1 5/8" EIA 3 1/8"	EIA 1 5/8" EIA 3 1/8"
Material	outer and inner conductor silver plated brass					
Mounting	two holes for 2 mounting bolts M5	four holes for M6 mounting bolts	four holes for M8 mounting bolts	four holes for M8 mounting bolts	four holes for M10 mounting bolts	four holes for M10 mounting bolts
Temperature range	from - 10 °C to + 50 °C					
Weight (kg)						
DPX	1,5	4,6	15	19	45	50
TPX		6,2	22	31	63	73
QPS		8,2	29	37	94	109
Cooling	fan-less convectional cooling					air-forced cooling

Dimensions are subject to change according to channel combination.



# TV constant impedance combiners

## TYPES

DPX4-B100  
 TPX4-B100  
 QPX4-B100  
 DPX4-B400  
 TPX4-B400  
 QPX4-B400  
 DPX4-B2K0  
 TPX4-B2K0  
 QPX4-B2K0  
 DPX4-B5K0  
 TPX4-B5K0  
 QPX4-B5K0  
 DPX4-B10K  
 TPX4-B10K  
 QPX4-B10K

Constant impedance combiners consist of the following units: two 3 dB couplers, two identically tuned band-pass filters and a dummy load. These combiners isolate the transmitters and translators from one another, and any amplitude or phase-quadroture imbalance shows up as power in the reject load. One of the two inputs has narrow-band characteristics corresponding to the filter's band-pass curve; the other has broadband characteristics conducting all frequencies outwith the filter's pass-band to a common output. The impedance of both inputs is frequency independent and corresponds to the characteristic impedance of filters and couplers.

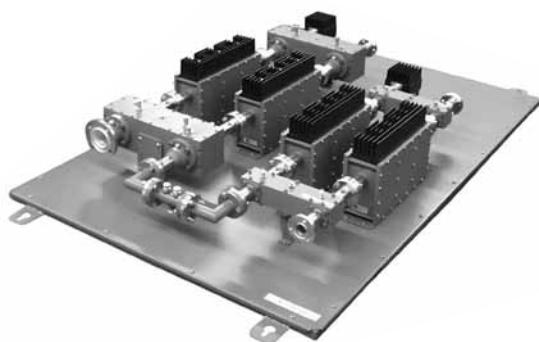
Constant impedance combiners are factory tuned to the desired operating channels. The broad-band input accepts any frequency within the specified frequency range.



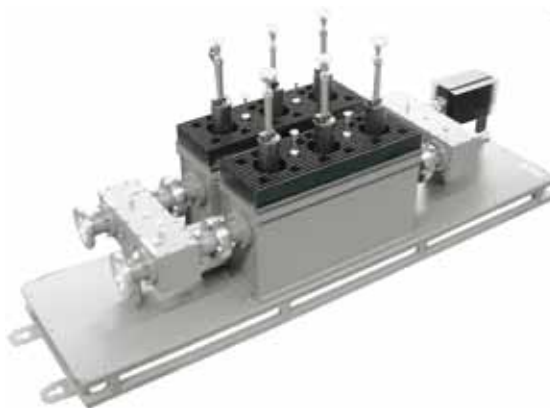
DPX4-B100



DPX4-B400



TPX4-B2K0

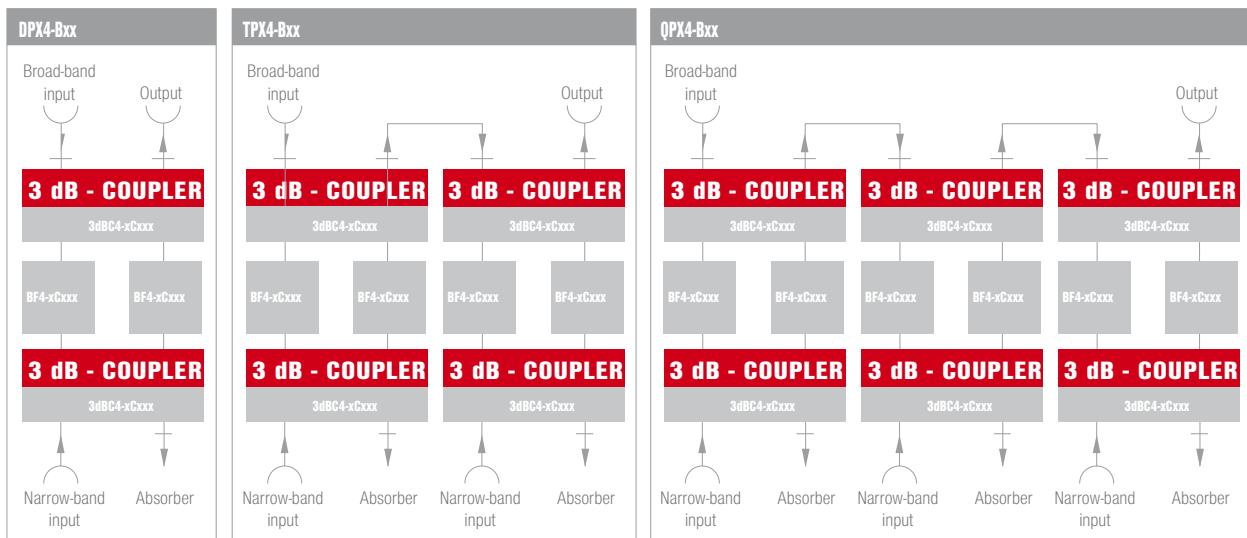


DPX4-B5K0

## specifications

	<b>DPX4-B100</b> <b>TPX4-B100</b> <b>QPX4-B100</b>	<b>DPX4-B400</b> <b>TPX4-B400</b> <b>QPX4-B400</b>	<b>DPX4-B2K0</b> <b>TPX4-B2K0</b> <b>QPX4-B2K0</b>	<b>DPX4-B5K0</b> <b>TPX4-B5K0</b> <b>QPX4-B5K0</b>	<b>DPX4-B10K</b> <b>TPX4-B10K</b> <b>QPX4-B10K</b>
Frequency range	470 - 862 MHz				
Impedance	50 Ω				
Pass-band width	TV channel				
Return loss (narrow-band)	> 28 dB	> 28 dB	> 28 dB	> 28 dB	> 28 dB
Return loss (broad-band)	21 dB min. > 28 dB opt.	23 dB min. > 28 dB opt.	23 dB min. > 28 dB opt.	23 dB min. > 28 dB opt.	23 dB min. > 28 dB opt.
Max. power per input (narrow-band)	100 W	400 W	2 kW	5 kW	10 kW
Input power (broad-band) <sup>1</sup>	100 W	400 W	2 kW	5 kW	10 kW
Insertion loss (narrow-band)	≤ 0,8 dB	≤ 0,6 dB	≤ 0,6 dB	≤ 0,4 dB	≤ 0,4 dB
Insertion loss (broad-band)	≤ 0,3 dB	≤ 0,2 dB	≤ 0,2 dB	≤ 0,15 dB	≤ 0,15 dB
Isolation (between the inputs)	> 28 dB	> 30 dB	> 30 dB	> 30 dB	> 30 dB
Min. channel spacing	2 channels (16 MHz)				
Input connectors	Nf	DIN 7/16 EIA 7/8"	EIA 7/8"	EIA 1 5/8"	EIA 3 1/8"
Output connectors	Nf	DIN 7/16 EIA 7/8"	EIA 7/8" EIA 1 5/8"	EIA 1 5/8" EIA 3 1/8"	EIA 3 1/8" EIA 4 1/2"
Material	outer and inner conductor silver plates brass				
Mounting	four holes for M6 mounting bolts	four holes for M8 mounting bolts	four holes for M8 mounting bolts	four holes for M10 mounting bolts	four holes for M10 mounting bolts
Temperature range	from - 10 °C to + 50 °C				
Cooling	fan-less convectional cooling				air-forced cooling

<sup>1</sup> if necessary higher input power on broad-band input is available on request



# TV stretchline combiners

## TYPES

DPX4-S050  
DPX4-S5K0  
DPX4-S10K  
DPX4-S20K



DPX4-S10K

Where the frequency separation between signals is not too narrow, stretchline combiners offer a cost-effective and reliable solution. They consist of a pair of 3 dB couplers interconnected by two transmission coaxial cables whose electrical lengths differ by half a wavelength at the difference frequency of the combined signals. Isolation between the two transmitters and translators inputs or cross insertion loss is determined by the isolation of the primary 3 dB coupler. Transmission loss or insertion loss depends on both the channel spacing and the middle frequency. This type of combiner is not tuneable, but can be modified by replacement of the phasing line.

## specifications

	DPX4-S050	DPX4-S5K0	DPX4-S10K	DPX4-S20K
Frequency range	470 - 862 MHz			
Impedance	50 $\Omega$			
Return loss (on the channel)	$\geq 26$ dB	$\geq 30$ dB		
Coupling attenuation	$\geq 30$ dB			
Channel spacing	Channel combination dependent			
Bandwidth	1 TV channel (per input)			
Max. input power	50 W	5 kW	10 kW	20 kW
Insertion loss	$\leq 0,6$ dB	$\leq 0,3$ dB	$\leq 0,3$ dB	$\leq 0,3$ dB
Input and output connectors*	N female	EIA 1 5/8"	in. EIA 3 1/8" out. EIA 4 1/2"	EIA 4 1/2"
Material	aluminium, fluoroglas copper clad laminates	outer conductor aluminium, inner conductor silver plated brass		
Mounting	four holes for M6 mounting bolts	four holes for M10 mounting bolts	mounted on frame	mounted on frame
Temperature range	from - 10 °C to + 50 °C			
Weight (kg)	2,5	20	130	200
External dimensions (mm)	300 x 230 x 30	560 x 260 x a**	600 x 600 x a**	600 x 600 x a**

\* for special requests indicate tpe of the input/output connector

\*\* a=depends on channel

REMARK: Before order confirmation please state the channels

